Federal Energy Regulatory Commission

Office of Energy Projects

March 2017

Columbia Gas Transmission, LLC | **Docket No. CP16-38-000**

WB XPress Project

Environmental Assessment

Cooperating Agencies

US Army Corps of Engineers

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 2
Columbia Gas Transmission, LLC
Docket No. CP16-38-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this environmental assessment (EA) for the WB XPress Project (Project) proposed by Columbia Gas Transmission, LLC (Columbia) in the above-referenced docket. Columbia requests authorization to construct and operate natural gas facilities in West Virginia and Virginia to provide additional natural gas volumes on its existing pipeline system.

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

The U.S. Forest Service (USFS), U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service, West Virginia Department of Environmental Protection, and West Virginia Division of Natural Resources 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 USFS and Corps will adopt the EA to fulfill their agency's NEPA obligations. The USFS will use the EA, as well as other supporting documentation, to consider the issuance of right-of-way authorization for the portion of the project on National Forest System lands. The Corps will use the EA and supporting documentation to consider the issuance of Clean Water Act Section 404 and Rivers and Harbors Act Section 10 permits.

The Project involves (i) installation, construction, and operation of about 29.3 miles of various diameter pipeline; (ii) modifications to seven existing compressor stations; (iii) construction and operation of two new compressor stations; (iv) uprates and restoration of the maximum allowable operating pressure on various segments of the existing WB and VB natural gas transmission pipeline systems; and (v) installation of various appurtenant and auxiliary facilities, all located in either Braxton, Clay, Grant, Hardy, Kanawha, Pendleton, Randolph, and Upshur Counties, West Virginia, or Clark, Fairfax, Fauquier, Loudoun, Shenandoah, or Warren Counties, Virginia.

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; interested individuals and groups; and newspapers and libraries in the project area. Everyone on our environmental mailing list will receive a CD version of the EA. In addition, the EA is available for public viewing on the FERC's website (www.ferc.gov) using the eLibrary link. A limited number of copies of the EA are available for distribution and public inspection at:

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

Any person wishing to comment on the EA may do so. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they will be. To ensure that the Commission has the opportunity to consider your comments prior to making its decision on this Project, it is important that we receive your comments in Washington, DC on or before **April 24, 2017.**

For your convenience, there are three methods you can use to file your comments with the Commission. In all instances please reference the Project docket number (CP16-38-000) 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).[1] Only intervenors have the right to seek rehearing of the Commission's decision. The Commission grants affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.**

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC,** or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket numbers excluding the last three digits in the Docket Number field (i.e., CP16-38). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

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

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

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ABBREVIATIONS AND TECHNICAL ACRONYMS

ABPP	American Battlefield Protection Program
ACP	Atlantic Coast Pipeline
AERMOD	Atmospheric Dispersion Modeling System
ATWS	additional temporary workspace
AMMs	Avoidance and Minimization Measures
AOC	Administrative Order of Consent
APE	area of potential effects
AQCR	Air Quality Control Regions
BA	Biological Assessment
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Certificate	Certificate of Public Convenience and Necessity
CH_4	methane
CMS	Cheat Mountain Salamander
Corps	U.S. Army Corps of Engineers
Columbia	Columbia Gas Transmission, LLC
COMP	Construction, Operation, and Management Plan for NFS lands
Commission	Federal Energy Regulatory Commission
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CSR	Code of State Rules
CZMA	Coastal Zone Management Act of 1972
dB	decibels
dBA	decibels on the A-weighted scale
DOT	U.S. Department of Transportation
EA	Environmental Assessment
ECS	Environmental Construction Standards
EFH	Essential Fish Habitat
EIs	Environmental Inspectors
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
E&SC Plan	Erosion and Sediment Control Plan
EWNAP	Elklick Woodlands Natural Area Preserve
FCC	Federal Consistency Certificate
FCPA	Fairfax County Park Authority
FERC	Federal Energy Regulatory Commission
FSM	Forest Service Manual
FWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GWJNF	George Washington and Jefferson National Forests
GWP	global warming potential

HAPs	hazardous air pollutant
HCAs	high consequence areas
HDD	Horizontal Directional Drill
hp	horsepower
HUC	Hydrologic Unit Code
IBA	Important Bird Area
IPaC	Information, Planning, and Conservation System
KOP	Key Observation Points
kV	kilovolt
L_{dn}	24-hour A-weighted day-night averaged sound level
L_{eq}	equivalent sound level
LRMP	Land and Resource Management Plan
M&R	metering and regulating
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
MCI	Madison Cave isopod
MIS	Management Indicator Species
MNF	Monongahela National Forest
MP	milepost
MSHCP	Multi-Species Habitat Conservation Plan
MXP	Mountaineer XPress Project
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NFMA	National Forest Management Act of 1976
NFS	National Forest System
NGA	Natural Gas Act
NHP	Natural Heritage Program
NHPA	National Historic Preservation Act
NNIS	non-native invasive species
NOI	Notice of Intent to Prepare an Environmental Assessment for the Planned WB XPress Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings
NLEB	Northern long-eared bat
NO_2	nitrogen dioxide
N_2O	nitrous oxide
NO_x	oxides of nitrogen
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NSA	noise sensitive areas
NSPS	New Source Performance Standards
OEP	Office of Energy Projects
ORV	Outstanding Remarkable Value
O_3	ozone
Pb	lead
PCB	polychlorinated biphenyls

PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	Upland Erosion Control, Revegetation, and Maintenance Plan
PM_{10}	particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than 2.5 microns
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
Project	WB XPress Project
PSD	Prevention of Significant Deterioration
PSI	pounds per square inch
RAC/FR	Response Action Completion/Final Report
RFSS	Regional Forester's Sensitive Species
Rx	Management Prescription
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SPCC Plan	Spill Prevention, Containment, and Control Plan
SSURGO	Soil Survey Geographic
SUP	Special Use Permit
TPY	tons per year
USFS	U.S. Forest Service
USDA	United States Department of Agriculture
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
VDH-ODW	Virginia Department of Health – Office of Drinking Water
VDMME	Virginia Department of Mines, Minerals, and Energy
WHPA	Wellhead Protection Areas
WMA	Wildlife Management Area
WRS	Wildlife Resources Section
WSL	Work Scope List of Facilities
VOC	volatile organic compound
WVDCH	West Virginia Division of Culture and History
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Department of Health and Human Resource
WVDNR	West Virginia Department of Natural Resources
WVNFS	West Virginia Northern Flying Squirrel

A. PROPOSED ACTION

1.0 INTRODUCTION

On December 30, 2015, Columbia Gas Transmission, LLC (Columbia) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) in Docket No. CP16-38-000 for a Certificate of Public Convenience and Necessity (Certificate) under Section 7(c) of the Natural Gas Act (NGA) for construction, modification, operation, and maintenance of various facilities along its existing natural gas transmission pipeline system in West Virginia and Virginia. Columbia's WB XPress Project (Project) would consist of construction and operation of about 29.3 miles of various diameter pipeline, modifications to seven existing compressor stations, construction of two new compressor stations, and uprating the maximum allowable operation pressure (MAOP) on various segments of the existing Line WB and Line VB natural gas transmission pipeline systems (discussed in section A.4.2).

We[2] 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 (Title 40 of the Code of Federal Regulations [CFR], Parts 1500-1508 [40 CFR 1500-1508]), and the Commission's implementing regulations at Title 18 CFR Part 380 (18 CFR 380). The assessment of environmental impacts is an important and integral part of FERC's decision on whether to issue Columbia a Certificate to construct, modify, and operate the proposed facilities. Our principal purposes in preparing this EA are to:

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

FERC is the lead federal agency for the preparation of this EA. The following agencies participated as cooperating agencies in the preparation of this EA:

- U.S. Forest Service (USFS);
- U.S. Army Corps of Engineers (Corps);
- U.S. Fish and Wildlife Service (FWS);
- West Virginia Department of Environmental Protection (WVDEP); and
- West Virginia Division of Natural Resources (WVDNR).

The purpose and role of FERC and each of the cooperating agencies is described below.

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

Federal Energy Regulatory Commission

FERC is an independent federal agency responsible for evaluating applications for authorization to construct and operate interstate natural gas pipeline facilities. If the Commission determines a project is required by the public convenience and necessity, a Certificate is issued under Section 7(c) of the NGA and Part 157 of the Commission's regulations. As such, FERC is the lead federal agency for the preparation of the EA in compliance with the requirements of NEPA, the CEQ regulations for implementing the procedural provisions of NEPA (40 CFR 1500-1508), and FERC's regulations implementing NEPA (18 CFR 380).

This EA presents our review of potential environmental impacts and reasonable recommendations to avoid or mitigate impacts. This EA will be used as an element in the Commission's review of the Project to determine whether a Certificate would be issued. FERC will also consider non-environmental issues in its review of Columbia's application. A Certificate will be granted if the Commission finds the evidence produced on financing, rates, market demand, gas supply, existing facilities and service, environmental impacts, long-term feasibility, and other issues demonstrates the Project is required by the public convenience and necessity. Environmental impact assessment and mitigation development are important factors in the overall public interest determination.

U.S. Department of Agriculture - Forest Service

The USFS is a civilian federal agency within the United States Department of Agriculture (USDA), and can trace its roots back to 1876 when Congress assigned the Office of Special Agent within the USDA the responsibility of assessing the quality of forests in the country. With the Forest Reserve Act of 1891, Congress established the process for designating western public domain lands that later became National Forests. In 1905, President Theodore Roosevelt established the USFS to provide quality water and timber for the nation's benefit, and transferred the care of the national forests to the new agency. The Weeks Act of 1911 authorized the USFS to purchase privately owned lands in the eastern United States for the protection of water supplies and navigable rivers.

The mission of the USFS is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. It is the responsibility of the USFS to manage the national forests for multiple uses of resources such as water, forage, wildlife, wood, recreation, minerals, and wilderness; and to provide products and benefits to benefit the American people while ensuring the productivity of the land and protecting the quality of the environment. The agency carries out this mission through four main activities: international assistance in forest management, domestic community assistance to help protect and manage non-federal forest lands, forestry research, and the protection and management of National Forest System (NFS) lands. Although the agency manages NFS lands under many laws and regulations, three Acts primarily govern the mission of the USFS: the Multiple Use Sustained Yield Act of 1960, NEPA, and the National Forest Management Act of 1976 (NFMA).

The USFS would consider adopting this EA for agency decisions pursuant to 40 CFR 1506.3(c) if, after an independent review of the document, the USFS concurs the analysis provides sufficient evidence to support agency decisions and is satisfied that agency comments and suggestions have been addressed. The USFS land management planning requirements are established by the NFMA and regulations at 36 CFR 219. These laws and regulations require a

Forest-specific, multi-year Land and Resource Management Plan (LRMP). All projects or activities within a national forest must be consistent with the governing LRMP, pursuant to 36 CFR 219.15, and must undergo a NEPA review.

The Project would cross NFS lands of the Monongahela National Forest (MNF) and the George Washington and Jefferson National Forests (GWJNF). However, no construction activity or installation of permanent, temporary, or aboveground facilities would occur on the GWJNF. Pursuant to the Mineral Leasing Act of 1920 and in accordance with federal regulations in 43 CFR 2880, Columbia must secure a Special Use Permit (SUP) from the USFS to cross NFS lands on the MNF. In January 2015 and June 2016, Columbia applied to the USFS for a SUP to replace and operate its pipeline on the MNF. The USFS is considering issuing a SUP that would provide the terms and conditions for replacement and operation of the Project on NFS lands in response to Columbia's application. Issuance of the SUP must be in accordance with 36 CFR 251 Subpart B, the Mineral Leasing Act of 1920 (as amended), relevant USFS manual and handbook direction, and the MNF LRMP. In making this decision, the USFS will consider several factors including conformance with the 2006 MNF LRMP (updated in 2011) and impacts on resources and programs. Following adoption of the EA, the USFS would issue a Decision Notice that documents the decision whether to issue the SUP to Columbia.

The issuance of a SUP by the USFS would be in addition to any authorization issued by FERC for the Project. The pipeline right-of-way, if approved, would be authorized by issuance of a temporary SUP from the USFS for the pipeline clearing and construction phase, which would terminate upon completion of construction. A long-term SUP for ongoing pipeline operations and maintenance for up to a 50-year term would then be issued. Once the Project is constructed and in operation, the SUP would be modified to reflect the final location of the project, the associated maintenance corridor, and any roads on federal lands or under federal easements that are necessary for project operations.

In accordance with Forest Service Manual 2700, Special Uses Management (FSM 2700), USFS policy in FSM 2703.2(2) directs the agency to consider the public interest and authorize use of NFS lands only if a) the proposal is consistent with the mission of the USFS to manage NFS lands and resources in a manner that will best meet the present and future needs of the American people, taking into account the needs of future generations for renewable and nonrenewable resources; and b) the proposed use cannot reasonably be accommodated on non-NFS lands. FSM 2703.2(3) also states to not authorize the use of NFS lands solely because it affords the applicant lower cost or less restrictive location when compared with non-NFS lands.

The USFS will use this EA to review the project in accordance with applicable regulations, including, but not limited to FSM 1900 – Planning, Chapter 1920 – Land Management Planning; FSM 2700 – Special Uses Management, Chapter 2730 – Special Uses Administration (2726.31b through 2726.31e, 2726.32, 2726.33, 2726.34, etc.); 36 CFR 251.54; 36 CFR 219.15; and 30.185. The USFS will also use this EA in its decision whether to issue a SUP to Columbia.

About 11.4 miles of Line WB Replacement mainline right-of-way would cross the MNF in Randolph and Pendleton Counties, West Virginia. There are no significant aboveground facilities (such as compressor stations, metering and regulating [M&R] stations, valves) proposed within the MNF, although there would minor appurtenances that include test stations and line markers, which would be entirely contained within the operational right-of-way as required by the U.S. Department of Transportation (DOT) – Pipeline and Hazardous Materials Safety Administration (PHMSA) safety regulations. A summary of land requirements on NFS lands is provided in section B.5.1.

U.S. Army Corps of Engineers

The Corps is a federal agency within the U.S. Department of Defense with jurisdictional authority pursuant to Section 404 of the Clean Water Act (Title 33 of the United States Code [U.S.C.], Section 1344 [33 U.S.C. 1344]), which governs the discharge of dredged or fill material into waters of the United States, and Section 10 of the Rivers and Harbors Act (33 U.S.C. 403), which regulates any work or structures that potentially affect the navigable capacity of a waterbody. Because the Corps would need to evaluate and approve aspects of the Project and must comply with the requirements of NEPA before issuing permits under the above statutes, it has elected to participate as a cooperating agency in the preparation of this EA. As FERC is the NEPA's Lead Federal Agency, it is required to complete any required consultations, such as those under Section 7 of the Endangered Species Act of 1973 (ESA) and Section 106 of the National Historic Preservation Act (NHPA) and will be completed through the FERC process. The Corps would adopt the EA per 40 CFR 1506.3 if, after an independent review of the document, it concludes the EA satisfies the Corps' comments and recommendations and any required consultations are complete.

The Project occurs within the Huntington, Pittsburgh, and Norfolk Districts of the Corps. Columbia submitted its pre-construction notifications for Nationwide Permit 12 in March 2016, and application for Section 10 of the Rivers and Harbors Act in July and December 2016. Each District will evaluate the portions of the proposed project that fall within its District boundary. As an element of its review, the Corps must consider whether a proposed project avoids, minimizes, and compensates for impacts on existing aquatic resources, including wetlands, to strive to achieve a goal of no overall net loss of aquatic resource values and functions. Based on its participation as a cooperating agency and its consideration of the EA (including responses to public comments), the Corps would issue a Record of Decision to formally document its decision on the proposed action, including required environmental mitigation commitments.

U.S. Fish and Wildlife Service

The FWS is responsible for the conservation, protection, and enhancement of fish, wildlife, plants, and their habitats. Pursuant to a number of environmental laws (ESA, Marine Mammal Protection Act, Migratory Bird Treaty Act [MBTA], Bald and Golden Eagle Protection Act, Fish and Wildlife Coordination Act, and Coastal Barriers Resources Act), the FWS has a principal trust responsibility. As the lead federal agency for authorizing the Project, FERC is required to consult with the FWS to determine whether federally listed endangered or threatened species or designated critical habitat are found in the vicinity of the Project, and to evaluate the proposed action's potential effects on those species or critical habitat.

For actions involving major construction activities with the potential to affect listed species or designated critical habitat, FERC must report its findings to the FWS in a Biological Assessment (BA) for those species that may be affected. If it is determined the action is likely to adversely affect listed species or designated critical habitat, FERC is required to initiate formal consultation with the appropriate agency. In response, the FWS would issue a Biological Opinion as to whether or not the action would likely jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Columbia, acting as FERC's non-federal representative for the purpose of complying with Section 7(a)(2) of the ESA, has initiated informal consultation with the FWS for multiple species, and formal consultation is in progress for the Cheat Mountain salamander (CMS).

The FWS also collaborates with other federal agencies pursuant to Executive Order 13186 (66 Federal Register 3853) to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds. On March 30, 2011, the FWS and the Commission entered into a MBTA Memorandum of Understanding that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies. This voluntary MBTA Memorandum of Understanding does not waive legal requirements under the MBTA, Bald and Golden Eagle Protection Act, ESA, Federal Power Act, NGA, or any other statutes and does not authorize the take of migratory birds.

West Virginia Department of Environmental Protection

The WVDEP is a state agency responsible for implementing and enforcing West Virginia's environmental regulations with respect to managing the state's air, land, and water resources. The Division of Water and Waste Management's mission is to preserve, protect, and enhance the state's watersheds for the benefit and safety of all its citizens through implementation of programs controlling hazardous waste, solid waste and surface and groundwater pollution, from any source. The Division of Water and Waste Management may grant, grant with conditions, waive, or deny a Water Quality Certification under Section 401 of the Clean Water Act and operates in accordance with 47CSR5A. Section 401 Water Quality Certification is required for each permit or license issued by a federal agency to ensure projects will not violate the state's water quality standards or stream designated uses.

In addition to serving as a regulatory role for the proposed project, the WVDEP has requested to be a cooperating agency in order to lend their experiences and insight with environmental impacts relative to this type of activity and provide recommendations on assessment, minimization, and mitigation of potential environmental impacts.

West Virginia Division of Natural Resources

The statutory mission of the WVDNR is to provide and administer a long-range comprehensive program for the exploration, conservation, development, protection, enjoyment, and use of the natural resources of the State of West Virginia. The Division is composed of Wildlife Resources, Parks and Forests, Law Enforcement Sections and the Office of Lands and Streams.

Under State Code §20-2-1, "It is declared to be the public policy of the State of West Virginia that the wildlife resources of this state shall be protected for the use and enjoyment of all the citizens of the state. All species of wildlife shall be maintained for values which may be either intrinsic or ecological or of benefit to man. Such benefits shall include (1) hunting, fishing and other diversified recreational uses; (2) economic contributions in the best interests of the people of this state and (3) scientific and educational uses."

The Wildlife Resources Section (WRS) is responsible for management of the state's wildlife resources. The primary objective of the WRS is to maintain and perpetuate fish and wildlife at levels compatible with the available habitat while providing maximum opportunities for recreation, research, and education. The WRS is comprised of Game Management, Fisheries, Wildlife Diversity, Technical Support and Environmental Coordination Units.

The WRS Environmental Coordination Unit reviews numerous projects that potentially impact wildlife, fisheries, and its respective habitat. Primary concerns are road construction, stream alteration, hydropower projects, power line rights-of-way, gas line construction, oil/gas well sites, surface mines, and other construction projects. In numerous cases, recommendations have been made to alter projects, thus reducing detrimental impacts on wildlife and fisheries. The Technical Support unit provides Geographic Information System and computer support to all biologists in the agency.

Currently, the Game Management Unit conducts management activities on 105 Wildlife Management Areas (WMA) and eight State Forests totaling 1,415,839 acres. Black bear, white-tailed deer, and wild turkey are some of the most important hunted game species. Impacts to property managed by the WRS may be subject to review by the FWS for concurrence under the authority established in 50 CFR 80.

Fisheries management programs are designed to provide a variety of fishing opportunities and experiences for the enjoyment of anglers. These programs consist of efforts focused on warmwater species (e.g., walleye and channel catfish), and coldwater species (e.g., trout), that are stocked in rivers, lakes, reservoirs, and streams throughout the state. Research, stocking, public access development, regulations, and outreach combined with habitat protection, improvement, and restoration form the foundation of management of the state's fishery resources.

The Wildlife Diversity and Natural Heritage Program (NHP) is responsible for those species listed by the federal government as threatened or endangered, and nongame wildlife, nongame fish, mussels, birds, and their habitats. It also administers outreach programs and provides vital assessment information.

The State Parks and Forests Section promotes conservation by preserving and protecting natural areas of unique or exceptional scenic, scientific, cultural, archaeological, or historical significance and to provide outdoor recreational opportunities for the citizens of this state and its visitors. The system is composed of 35 parks, 7 forests, 5 WMA, the Greenbrier River Trail, and North Bend Rail Trail.

The Office of Lands and Streams preserves, protects, and enhances the state's title to its recreation lands. Currently, the WVDNR holds title to the beds of the state's rivers, creeks, and streams totaling some 34,000 miles or some 5,000 named waterways in the state. The Office of Lands and Streams grants right-of-entry letters to governmental agencies, companies, and individuals to conduct construction activities in the state's rivers, creeks, and streams as well as right-of-way licenses for pipelines, underground or underwater cables, and overhead power and telephone lines crossing the state's waterways.

The Law Enforcement Section is responsible for the prompt, orderly, and effective enforcement of all laws of Chapter 20, Code of West Virginia, and rules promulgated under that authority. Of primary importance is the protection of West Virginia's wildlife to the degree that they are not endangered by unlawful activities.

The WVDNR mission is to provide and administer a long-range comprehensive program for the exploration, conservation, development, protection, enjoyment, and use of the natural resources of the State of West Virginia. Its responsibilities include the supervision and administration of the Division's land acquisition and real estate title documents program and the administration of the state's rivers and streams, including stream activity permits. The WVDNR is also responsible for the management of the state's wildlife resources, state parks, state forests, five WMAs, the Greenbrier River Trail, and the North Bend Rail Trail. The WVDNR also administers the state's Wildlife Diversity and NHPs, which are responsible for threatened or endangered species, as well as nongame wildlife and their habitats. Columbia initiated consultation with the WVDNR regarding endangered and threatened species in May 2015, and plans to submit their application for a stream activity permit application with the WVDNR in February 2017.

2.0 PURPOSE AND NEED

Columbia's stated purpose is to expand the capacity of its existing natural gas pipeline system by 1.3 million dekatherms per day and to provide bi-directional transportation service in order to meet growing market demands. The Project would enable Columbia to increase transportation to a major local distribution company and increase deliveries to third-party interstate pipelines. In support of the Project, Columbia has executed binding Precedent Agreements with terms ranging from 15 to 20 years from the Project in-service date. The Project would also support the need for additional natural gas capacity and infrastructure to transport shale reserves in West Virginia to markets throughout the region, meeting market demand.

Under Section 7 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.

3.0 PUBLIC REVIEW AND COMMENT

Columbia submitted a request to use the pre-filing environmental review process (Pre-filing Process) on April 1, 2015. The Commission granted Columbia's request to use the Pre-filing Process on April 16, 2015 in Docket No. PF15-21-000. The Pre-filing Process was established to encourage early involvement by citizens, governmental entities, non-governmental organizations, and other interested parties in the development of proposed natural gas transmission projects. During the Pre-filing Process we worked with Columbia and interested stakeholders, including federal and state agencies, to identify and resolve Project-related issues.

We participated in four public open houses sponsored by Columbia in Elkview, Elkins, and Cabins, West Virginia and Centreville, Virginia on June 16, 17, 18, and 24, 2015, respectively, to inform stakeholders about the Project and to provide an opportunity for stakeholders to ask questions and express their comments and concerns. Columbia mailed an open house notification letter to Project stakeholders and published an announcement in local newspapers. About 50 people attended the open house presentations in West Virginia, and 14 people attended the open house presentation in Virginia. We also participated in two field visits of the Project area with Columbia staff on June 17 and 24, 2015.

On July 22, 2015, the Commission issued a *Notice of Intent to Prepare an Environmental Assessment for the Planned WB XPress Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings* (NOI). The NOI was published in the Federal Register and was mailed to 2,257 interested parties, including federal, state, and local officials; agency representatives; public interest groups; local libraries and newspapers; Native American groups; and potentially affected landowners affected by the Project facilities. The NOI requested comments from the public on specific concerns about the Project that should be considered during preparation of the EA.

We conducted one scoping meeting on August 12, 2015, in Centreville, Virginia to receive verbal scoping comments on the Project. Three people spoke in the scoping meeting. FERC staff also participated in two interagency meetings: one in Elkins, West Virginia on June 17, 2015, and one in Manassas, Virginia on June 24, 2015. Attendees at these meetings included staff from the USFS, Corps, FWS, and various state agencies.

FERC received 55 letters commenting on the Project. Two of these were submitted prior to the issuance of the NOI. The remainder was submitted after the issuance of the NOI. Of these, 13 were submitted during the scoping period, the rest were submitted after the close of the scoping period. The transcripts of the public scoping meeting and written scoping comments are part of the public record for the Project and are available for viewing on the FERC Internet website (http://www.ferc.gov).[3] Table A.3-1 summarizes the issues raised during scoping and the section of the EA where the comment is addressed. The comments generally are concerned with the need for the Project; impacts on soils, karst geology, groundwater, waterbodies, wetlands, sensitive and listed species, forests, sensitive NFS lands, air quality, safety, and climate change; alternatives, and cumulative and indirect impacts; and the need for a programmatic environmental impact statement (EIS).

TABLE A.3-1

Issues Identified During the Public Scoping Process for the WB XPress Project

Comment / Concern	**Section**
Purpose and need of the Project	Section A.2
Scope of the Project	Section A.4
Protection of environmental resources	Section B
Landowner compensation	Section B.5.2
Pipeline construction depths	Section A.7
Impacts on water resources	Section B.2
Impacts on existing land use	Section B.5
Proximity to residences	Section B.5.1
Property taxes	Section B.6.6
Utilization of alternative pipeline routes	Section C
Safety	Section 9.0

3 Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., PF15-21); be sure to select an appropriate date range. The pre-fling process concluded on December 30, 2015, following Columbia's filing of its formal application. The proceedings for the Project are currently being conducted under Docket No. CP16-38-000.

The Virginia and West Virginia Chapters of the Sierra Club (the Sierra Club) requests production of 21 various studies including the following:

- surveys for all proposed contractor yards concerning water wells, waterbodies, and wetlands;
- site-specific plans for the permanent access road crossings of wetlands and waterbodies, including site-specific justification for the use of permanent fill;
- geotechnical feasibility, slope stability analysis and risk studies for possible routes, including all water crossing locations and steep terrain;
- identification of all water wells and springs within 500 feet of the proposed pipeline and contractor yards;
- waterbody-specific description of impacts caused by workspaces and proposed impact avoidance, minimization, and mitigation measures;
- description of proposed access roads leading to compressor stations, including maps of impacts on vegetation, and of any proposed mitigation; forest mitigation plan;
- site-specific blasting plans that include protocols for in-water blasting and the protection of aquatic resources and habitats;
- information regarding water withdrawals for hydrostatic testing, including timing restrictions; mitigation plans for rare, endangered and threatened species;
- bald and golden eagle mitigation plans; impact avoidance or effective impact minimization or mitigation measures for bat species;
- survey results for federal- and state-listed species and mitigation measures;
- classification of unsurveyed residential structures;
- impact avoidance or effective impact minimization or mitigation measures for specialty crops;
- construction emissions plan, including mitigation measures;
- pipeline safety and reliability systems installation;
- site-specific construction plans and engineering calculations for erosion and sediment control measures required for construction;
- site-specific stormwater management plans and engineering calculations;
- noise mitigation measures; and
- information regarding the pipeline interconnection/distribution plans.

Each of these resources and impacts was considered in this EA, and is addressed in its respective segment of section B of this EA. An acceptable number of plans, studies, and surveys have been performed on this Project, and mitigation and other measures to further reduce impact are discussed throughout this EA.

The combined comments from the Southern Environmental Law Center, Application Mountain Advocates, Appalachian Voices, Chesapeake Climate Action Network, the Sierra Club, and Amanda Tandy state that FERC should prepare a Programmatic or Regional EIS to address the multiple projects in the area. The CEQ regulations do not require broad or "programmatic" NEPA reviews. The CEQ has stated, however, that such a review may be appropriate where an agency: (1) is adopting official policy; (2) is adopting a formal plan; (3) is adopting an agency program; or (4) is proceeding with multiple projects that are temporally and spatially connected. The Supreme Court has held that a NEPA review covering an entire region (that is, a programmatic review) is required only "if there has been a report or recommendation on a proposal for major federal action" with respect to the region, and a Court of Appeals has concluded there is no requirement for a programmatic EIS where the agency cannot identify the projects that may be sited within a region because individual permit applications will be filed at a later time.

No Commission plan, policy, or program exists for the development of natural gas infrastructure. Rather, the Commission acts on individual applications filed by entities proposing to construct interstate natural gas pipelines. Under NGA section 7, the Commission is obligated to authorize a project if it finds the construction and operation of the proposed facilities "is or will be required by the present or future public convenience and necessity." What is required by NEPA, and what the Commission provides, is a thorough examination of the potential impacts of specific projects. In the circumstances of the Commission's actions, a broad, regional analysis would "be little more than a study . . . concerning estimates of potential development and attendant environmental consequences," which would not present "a credible forward look and would therefore not be a useful tool for basic program planning."

The CEQ states a programmatic EIS can "add value and efficiency to the decision-making process when they inform the scope of decisions," "facilitate decisions on agency actions that precede site- or project-specific decisions and actions," or "provide information and analyses that can be incorporated by reference in future NEPA reviews." We do not believe these benefits can be realized by a programmatic review of natural gas infrastructure projects because the projects subject to our jurisdiction do not share sufficient elements in common to narrow future alternatives or expedite the current detailed assessment of each particular project. Therefore, we find a programmatic EIS is neither required nor useful under the circumstances here.

We also received comments from the non-governmental organizations 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. The 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."[4] 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.

[4] 40 C.F.R. §1508.8(b) (2015).

We find no causal link between the proposed Project and natural gas production. The Project principally involves facility replacements, modifications, and safety upgrades. 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 . . ."[5] Consistent with CEQ guidance, in order to determine the scope of a cumulative impacts analysis for each project, Commission staff establishes a "geographic scope" 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.10 of this EA, we did not identify any natural gas production projects within the geographic scope for any resource analyzed.

4.0 PROPOSED FACILITIES

An overview map of the Project locations and facilities is provided on figure A.4-1. Detailed maps showing the proposed pipeline routes, access roads, aboveground facilities, and staging/contractor yards are provided in appendix A.

4.1 Pipeline Facilities

Columbia would construct 26.2 miles of replacement pipeline and 3.1 miles of new pipeline composed of varying diameters. The majority of the replacement pipeline would be located parallel to existing Columbia-owned pipelines and within or adjacent to existing Columbia rights-of-way. About 11.4 miles of the proposed replacement pipeline would traverse the MNF. The remaining 14.8 miles would cross privately owned lands, of which 3.1 miles would be new pipeline located within or adjacent to other utility corridors.

The U.S. Environmental Protection Agency (EPA) Region 3 stated that baseline conditions of the pipeline proposed for replacement should be described. Line WB is currently out of service between the Glady and Smokehole gate settings. According to Columbia, this section of the line was originally installed around 1949 or 1950 and consisted of bare steel 26-inch-diameter pipe, mostly 0.281-inch wall thickness, Grade X-52, and manufactured by A.O. Smith using the flashweld longitudinal seam welding process. Due to the deteriorating condition of this bare steel line, hydrostatic testing was conducted in the late 1970s in an effort to identify and replace the weak sections of pipe and restore serviceability. Through hydrostatic testing the pipeline was subsequently determined to be unsuited for continued use for high-pressure gas transportation and was abandoned in-place, except for a few short sections that were used to supply farm taps at 50 pounds per square inch (psi) MAOP. Thereafter, segments of this pipe were damaged during a 1985 flood event, which culminated in the final abandonment of the remaining 50 psi sections. One short section of the original pipeline, near the Smokehole gate setting, is currently being used as an anode for cathodic protection.

Sections of the previously abandoned Line WB Replacement, Line WB Replacements #1 through #5, and Line WB-5 Replacement would be removed or capped in-place. Pipe to be

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[5] 40 C.F.R. §1508.7 (2015).

removed would be cut into about 40-foot lengths and hauled away. Pipe remaining would have a steel plate welded on the end.

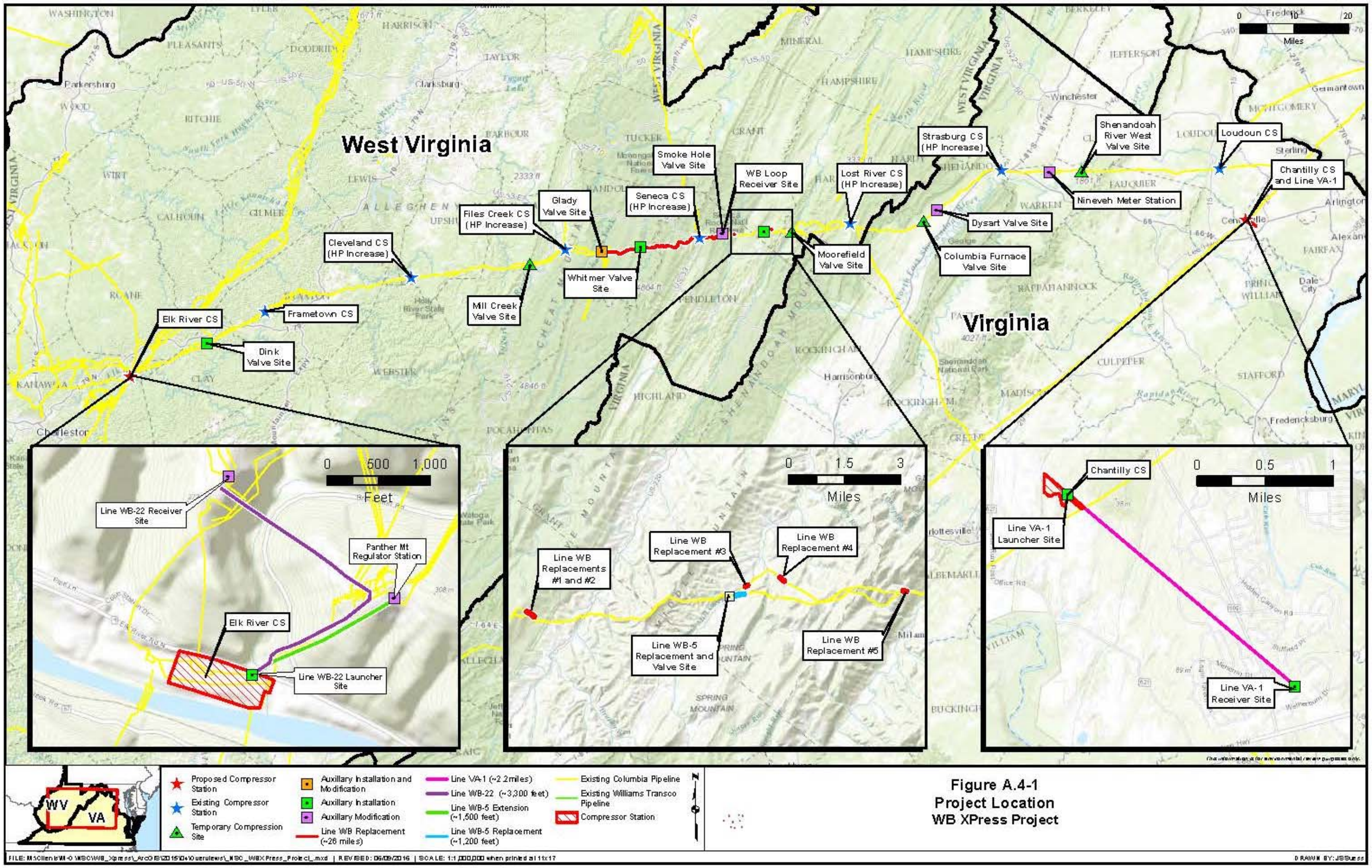

Figure A.4-1
Project Location
WB XPress Project

Table A.4.1-1 summarizes the proposed Project pipeline facilities including the lengths of the new and replacement pipelines that would be collocated with existing utility rights-of-way and pipeline segments that would be restored or uprated to higher MAOPs.

TABLE A.4.1-1

Pipeline Facilities Associated with the WB XPress Project

Facility Name	County, State	Begin Milepost	End Milepost	Total Length (miles)	Existing Rights-of-Way Paralleled (miles)	Diameter (inches)
New Pipeline Facilities						
Line WB-5 Extension	Kanawha, WV	0.0	0.3	0.3	0.3	36
Line WB-22	Kanawha, WV	0.0[a]	0.6[a]	0.6	0.6	36
Line VA-1	Fairfax, VA	0.0	2.2	2.2	2.2	12
			Subtotal (miles)	**3.1**	3.1	
Replacement Pipeline Facilities						
Line WB-5 Replacement	Grant, WV	4.5	4.7	0.2	0.2	36
Line WB Replacement	Randolph and Pendleton, WV	0.0	25.4	25.5[b c]	24.1	26
Line WB Replacements #1	Pendleton, WV	134.6	134.6[g]	0.1	0.1	26
Line WB Replacements #2	Pendleton, WV	134.7	134.8	0.1	0.1	26
Line WB Replacements #3	Grant, WV	141.3	141.3[g]	0.1	0.1	26
Line WB Replacements #4	Grant, WV	142.4	142.6	0.1	0.1	26
Line WB Replacements #5	Hardy, WV	146.4	146.4[g]	0.1	0.1	26
			Subtotal (miles)	**26.2**	**24.8**	
			PROJECT TOTAL (miles)	**29.3**	**27.9**	
MAOP Restoration						
Line WB-5	Upshur, Randolph, Pendleton, Grant, and Hardy Counties, WV	64.6[a]	9.1[a]	72.4[d]	72.4	N/A
		22.1[a]	25.5[a]			N/A
Line VB-5	Shenandoah, Warren, Clark, Fauquier, and Loudoun Counties, VA	25.5[a]	70.6[a]	70.4[e]	70.4	N/A
			MAOP TOTAL (miles)	**142.8**	**142.8**	**N/A**
Uprate Segments						
Line WB-6	Randolph County, WV	0.0	2.4	2.4[f]	2.4	N/A
Line WB-5	Pendleton, Grant, and Hardy Counties, VA	9.1[a]	22.1[a]	22.1	22.1	N/A
			UPRATE TOTAL (miles)	**24.5**	**24.5**	**N/A**

[a] Pipeline was built in several sections, therefore, there are multiple milepost Zeros along the Line WB-5 and mileposts not in sequential order.

[b] Due to the adoption of route variations subsequent to the establishment of mileposts, the length of the pipeline does not equal the difference between the beginning and ending mileposts.

[c] 11.4 miles of the Line WB Replacement crosses the MNF. The Line WB Replacement does not cross and would not impact the GWJNF.

[d] Line WB-5 MAOP Restoration segments cross 16.3 miles of NFS land. The WB-5 MAOP Restoration segments cross 0.3-mile of the GWJNF, however, no land disturbance would occur within the GWJNF.

[e] Line VB-5 MAOP Restoration segments cross 1.5 miles of the GWJNF, however, no land disturbance would occur within the GWJNF. Line VB-5 MAOP Restoration segments do not cross and would not impact NFS land.

[f] Line WB-6 MAOP Uprate segments cross 0.2 mile of NFS land. Line WB-6 MAOP Uprate segments do not cross and would not impact the GWJNF.

[g] Begin and end mileposts appear to be the same due to rounding, and segments are correctly identified as about 0.1-mile in length.

Table A.4.1-2 provides additional detail regarding the locations where the proposed pipelines would be collocated with existing rights-of-way, and identifies the owner and name of the adjacent pipeline or electric transmission line, the overlap of the proposed right-of-way with the existing right-of-way, and the orientation of the proposed pipeline to the existing facility(ies). Where a proposed parallel pipeline would cross the MNF, Columbia would use a width of construction right-of-way, opposite the side that faces the existing pipelines, that would be newly affected land. This newly affected width would consist of temporary and new permanent right-of-way as described in Land Requirements, Section B.5.0. Table A.4.1-3 provides details on pipeline segments that would be removed or capped.

TABLE A.4.1-2

Facilities Collocated with the WB XPress Project

Pipeline	County	MP Start	MP End	Lift and Lay	Collocated[a]	Length Adjacent to or Within Existing ROW (miles)	Proposed Construction ROW (feet) [b]	Overlap of Proposed Area with Existing ROW (feet)	Orientation of Project Facility in Relation to Existing Adjacent Facility
Panther Mountain Area									
Line WB-22	Kanawha	0.0	0.3	No	Yes	0.3	75	25	South of Natural Gas Pipeline, Electric Transmission Line
Line WB-22	Kanawha	0.3	0.6	Yes	Yes	0.3	75	50	Northwest of Line WB-5 and another pipeline
Line WB-5 Extension	Kanawha	0.0	0.3	No	Yes	0.3	75	25	South of Natural Gas Pipeline & Line WB-22
Line WB Replacement									
Line WB	Randolph	0.0	0.02	No	Yes	0.02	75	25	South of Existing Pipeline
Line WB	Randolph	0.02	0.2	Yes	Yes	0.18	75	50	N/A
Line WB	Randolph	0.2	0.3	Yes	Yes	0.1	75	50	Crosses Line WB-5 & Line WB-Loop
Line WB [d]	Randolph	0.3	5.6	Yes	Yes	5.3	75	75	South of Line WB-5 & Line WB-Loop
Line WB	Randolph	5.6	6.7	Yes	Yes	1.1	75	50	South of Line WB-5 & Line WB-Loop
Line WB	Randolph	6.7	7.1	Yes	Yes	0.4	75	50	South of Line WB-Loop
Line WB	Randolph	7.1	7.4	Yes	Yes	0.3	75	75	Between Line WB-5 & Line WB-Loop
Line WB	Randolph	7.4	7.9	Yes	Yes	0.5	75	50	North of Line WB-5 & Line WB-Loop
Line WB	Randolph	7.9	8.8	No	Yes	0.9	75	25	South of Line WB-5 & Line WB-Loop
Line WB	Randolph	8.8	9.0	No	No	0.0	75	0	None
Line WB	Randolph	9.0	9.8	Yes	Yes	0.8	75	50	North of Line WB-5
Line WB [d]	Randolph, Pendleton	9.8	10.5	Yes	Yes	0.7	75	75	North of Line WB-5
Line WB	Pendleton	10.5	11.0	Yes	Yes	0.5	75	50	North of Line WB-5
Line WB [d]	Pendleton	11.0	11.3	Yes	Yes	0.3	75	75	Between Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	11.3	11.7	Yes	Yes	0.4	75	75	South of Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	11.7	12.0	No	Yes	0.3	75	50	South of Line WB-5 & Line WB-Loop
Line WB	Pendleton	12.0	12.2	Yes	Yes	0.2	75	50	South of Line WB-5 & Line WB-Loop
Line WB	Pendleton	12.2	12.4	No	Yes	0.2	75	25	South of Line WB-5 & Line WB-Loop
Line WB	Pendleton	12.4	13.5	No	No	0.0	75	0	None
Line WB [e]	Pendleton	13.5	14.7	No	Yes	1.2	75	25	South of Line WB-5 & Line WB-Loop

TABLE A.4.1-2 (Continued)

Pipeline	County	MP Start	MP End	Lift and Lay	Collocated[a]	Length Adjacent to or Within Existing ROW (miles)	Proposed Construction ROW Width (feet) [b]	Overlap of Proposed Area with Existing ROW (feet)	Orientation of Project Facility in Relation to Existing Adjacent Facility
Line WB Replacement (Continued)									
Line WB	Pendleton	14.7	15.7	No	Yes	1.0	75	75	South of Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	15.7	15.8	No	Yes	0.1	75	75	South of Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	15.8	16.3	No	Yes	0.5	75	50	South of Line WB-5 & Line WB-Loop
Line WB	Pendleton	16.3	18.4	No	Yes	2.1	75	25	South of Line WB-5 & Line WB-Loop
Line WB	Pendleton	18.4	18.8	No	Yes	0.4	75	25	North of Line WB-5 & Line WB-Loop
Line WB	Pendleton	18.8	19.8	No	Yes	1.0	75	25	South of Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	19.8	19.9	No	Yes	0.1	75	50	South of Line WB-5 & Line WB-Loop
Line WB	Pendleton	19.9	20.0	No	Yes	0.1	75	25	South of Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	20.0	20.1	No	Yes	0.1	75	50	South of Line WB-5 & Line WB-Loop
Line WB[d]	Pendleton	20.1	20.4	Yes	Yes	0.3	75	50	N/A [c]
Line WB	Pendleton	20.4	20.6	Yes	Yes	0.2	75	50	N/A [c]
Line WB	Pendleton	20.6	22.0	Yes	Yes	1.4	75	50	South of Line WB-5
Line WB[d]	Pendleton	22.0	23.4	Yes	Yes	1.4	75	65	South of Line WB-5
Line WB[d]	Pendleton	23.4	25.2	Yes	Yes	1.7	75	75	North of Line WB-5 & Line WB-Loop
Line WB	Pendleton	25.2	25.4	Yes	Yes	0.2	75	50	North of Line WB-5 & Line WB-Loop
Line WB Replacements #1 - #5									
Line WB #1	Pendleton	134.6	134.6	Yes	Yes	0.1	75	50	N/A [c]
Line WB #2	Pendleton	134.7	134.8	Yes	Yes	0.1	75	50	N/A [c]
Line WB #3	Grant	141.3	141.3	Yes	Yes	0.1	75	50	N/A [c]
Line WB #4	Grant	142.4	142.6	Yes	Yes	0.1	75	50	N/A [c]
Line WB #5	Grant	146.4	146.6	Yes	Yes	0.1	75	50	North of Line WB-5 & Line WB-Loop
Line WB-5 Replacement									
Line WB-5 Replacement	Grant	4.5	4.7	Yes	Yes	0.2	75	50	South of Line WB-Loop
Line VA-1 Installation									
Line VA-1	Fairfax	0.0	2.2	No	Yes	2.2	40[f]	40	Southwest of Dominion Virginia Power electric transmission lines and non-CPG natural gas pipelines

[a] "Yes" indicates the proposed pipeline would be located within or adjacent to an existing ROW.

TABLE A.4.1-2 (Continued)	
[b]	Columbia would use a typical 75-foot-wide construction ROW in uplands, across wetlands, and across waterbodies; and a 40-foot-wide construction ROW to install Line VA-1. This table does not include ATWS areas, including long strips of ATWS parallel to the construction ROW.
[c]	N/A indicates areas where the existing pipeline is the only pipeline within the existing ROW corridor. This existing pipeline would be removed and replaced by the new pipeline so that when construction is completed there would still only be one pipeline (and no adjacent pipeline) in the area.
[d]	This segment of the Project crosses NFS land. Columbia's existing ROW within the MNF is 100 feet wide in some areas and 150 feet wide in other areas. None of new or replacement pipeline would impact the GWJNF.
[e]	At MP 13.5, the Project crosses <0.1 mile of NFS land.
[f]	As reported in Columbia's Supplement No. 4 to the application in August 2016, the width of the construction ROW for the Line VA-1 pipeline has not changed, but the permanent ROW, previously reported before August to be 30 feet wide, would now be 20 feet wide; and the width of the temporary ROW, previously reported before August to be 10 feet wide, would now be 20 feet wide.

TABLE A.4.1-3

Pipeline Segments Associated with Lift and Lay Replacements for the WB XPress Project [a]

Pipeline	Milepost Range	Diameter (inches)	Length (miles)	Lift and Lay (Yes or No)	Plan of Action	Ownership
Line WB-22						
TM-7 Loop	0.3 - 0.6	20	0.3	Yes	Replace with 36” Pipe	Columbia Gas Transmission, LLC
Line WB Replacement						
WB	0.0 – 0.3	26	0.3	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB[b]	0.3 – 5.6	26	5.3	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB	5.6 - 7.9	26	2.3	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB	7.9 - 9.0	26	1.1	No	Capped[c]	Revert to land owner or maintain ownership
WB	9.0 – 9.8	26	0.8	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB[b]	9.8 – 10.5	26	0.7	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB	10.5 - 11.0	26	0.5	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB[b]	11.0 – 11.7	26	0.7	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB[b]	11.7 – 12.0	26	0.3	No	Capped[c]	Revert to land owner or maintain ownership
WB	12.0 - 12.2	26	0.2	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB	12.2 – 13.5	26	1.3	No	Capped[c]	Revert to land owner or maintain ownership
WB[b]	13.5 – 13.5	26	<0.1	No	Capped[c]	Revert to land owner or maintain ownership
WB	13.5 – 15.7	26	1.2	No	Capped[c]	Revert to land owner or maintain ownership
WB[b]	15.7 – 16.3	26	0.6	No	Capped[c]	Revert to land owner or maintain ownership
WB	16.3 – 19.7	26	3.4	No	Capped[c]	Revert to land owner or maintain ownership
WB[b]	19.7 – 19.8	26	0.1	No	Capped[c]	Revert to land owner or maintain ownership
WB	19.8 - 20.0	26	0.2	No	Capped[c]	Revert to land owner or maintain ownership
WB[b]	20.0 - 20.1	26	0.1	No	Capped[c]	Revert to land owner or maintain ownership
WB[b]	20.1 – 20.4	26	0.3	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB	20.4 – 22.0	26	1.6	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB[b]	22.0 - 25.2	26	3.2	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC
WB	25.2 - 25.4	26	0.2	Yes	Replace with 26” Pipe	Columbia Gas Transmission, LLC

TABLE A.4.1-3 (Continued)						
Pipeline	**Milepost Range**	**Diameter (inches)**	**Length (miles)**	**Lift and Lay (Yes or No)**	**Plan of Action**	**Ownership**
Line WB Replacements #1 - #5						
WB	134.6 - 134.7	26	0.1	Yes	Replace with 26" Pipe	Columbia Gas Transmission, LLC
WB	134.7 - 134.8	26	0.1	Yes	Replace with 26" Pipe	Columbia Gas Transmission, LLC
WB	141.3 - 141.3	26	0.1	Yes	Replace with 26" Pipe	Columbia Gas Transmission, LLC
WB	142.4 - 142.6	26	0.1	Yes	Replace with 26" Pipe	Columbia Gas Transmission, LLC
WB	146.4 - 146.5	26	0.1	Yes	Replace with 26" Pipe	Columbia Gas Transmission, LLC
Line WB-5 Replacement						
WB-5	4.5 - 4.7	36	0.2	Yes	Replace with 36" Pipe	Columbia Gas Transmission, LLC

[a] All removals and replacements have previous abandonment authority; no new abandonments would occur for the Project.
[b] This segment of the Project crosses NFS land. No lift and lay impact would occur on the GWJNF.
[c] These segments of the existing pipeline would be abandoned in place and a steel plate would be welded onto the ends of the abandoned segments. The easements associated with these segments would either be retained by Columbia or relinquished to the landowner.

4.2 Maximum Allowable Operating Pressure Uprate and Restoration

Columbia would restore and uprate the MAOP on various segments of the existing Line WB and Line VB natural gas transmission pipeline systems (figure A.4.2-1). Specifically, Columbia would incrementally increase the pressure on about 72.4 miles of Line WB-5 in West Virginia and 70.4 miles of Line VB-5 in Virginia to restore these segments to their originally certificated MAOP of 1,000 psi gauge. Columbia would uprate the MAOP on about 2.4 miles of Line WB-6 and 22.1 miles of Line WB-5 by incrementally increasing the pressure in these segments (both in West Virginia) from 800 to 1,000 psi gauge.

The MAOP uprate involves testing on five different segments. Along Lines WB-5 and VB-5 these segments include the Cleveland Compressor Station to Files Creek Compressor Station, Files Creek Compressor Station to Seneca Compressor Station, Seneca Compressor Station to Lost River Compressor Station, Lost River Compressor Station to Strasburg Compressor Station, and Strasburg Compressor Station to Loudoun Compressor Station. The MAOP uprate testing proposed along Line WB-6 (Glady Gate Tie-In at the Glady Valve Site to Glady Compressor Station) would be performed as part of the Files Creek Compressor Station to Seneca Compressor Station segment. Figure A.4.2-1 indicates these locations.

In order to test the pipelines, reserve pre-staged 300-hp portable compression units would be temporarily used within existing facilities, including at the Cleveland Compressor Station, Mill Creek Valve Site, Whitmer Valve Site, Moorefield Valve Site, Columbia Furnace Valve Site, Shenandoah River West Valve Site, and Loudoun Compressor Station. Prior to each test, the segments would temporarily be operationally isolated from the rest of the pipeline. The portable compressor units would then be used to incrementally increase the pressure with each segment by 50 psi every hour until a pressure of 1,000 psi is achieved.

Gas service would be maintained during the MAOP uprate and restoration testing. This may include temporarily diverting gas flows into the adjacent Line WB and Line WB-Loop or making deliveries from other parts of Columbia's system.

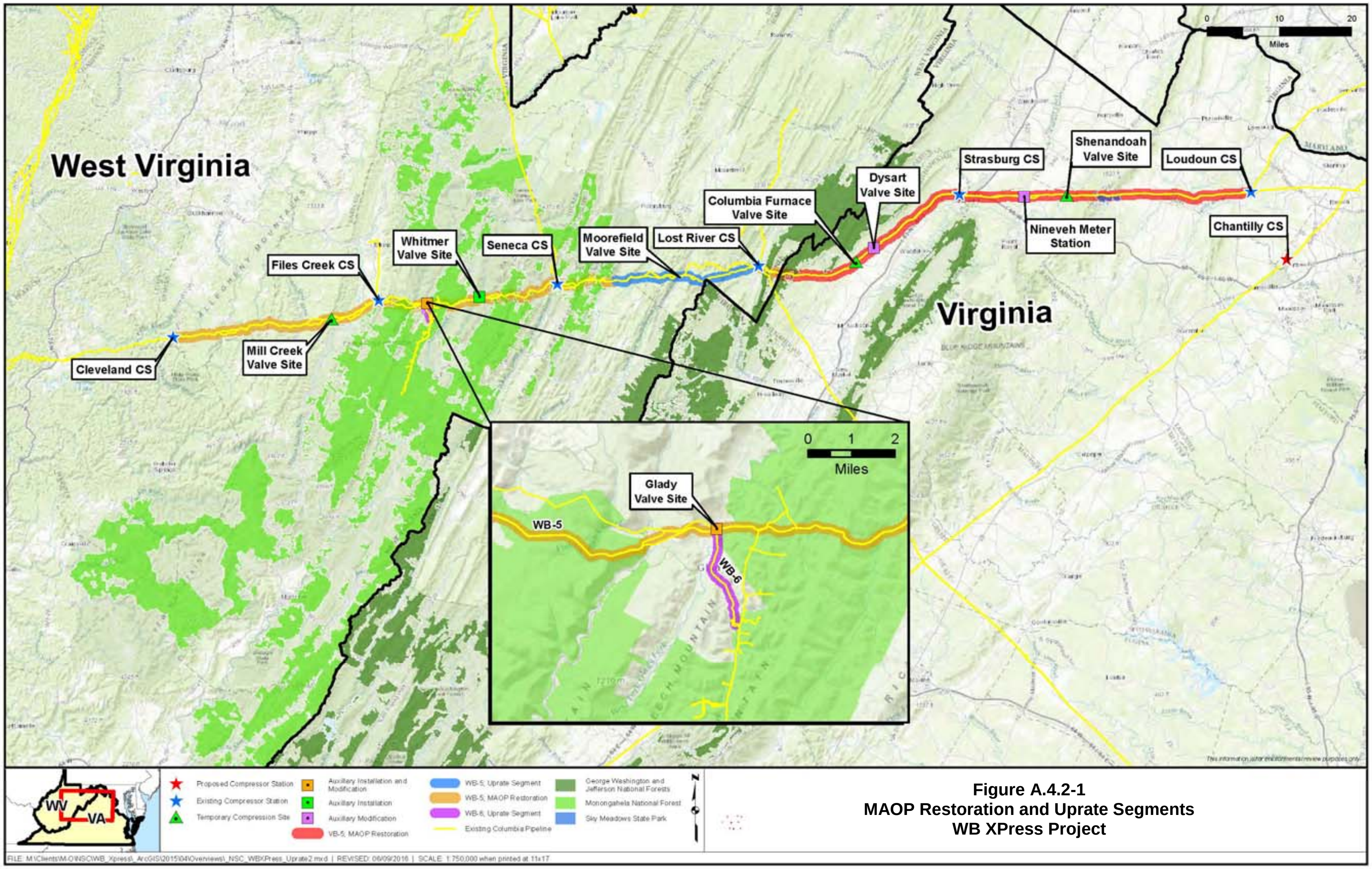

Figure A.4.2-1
MAOP Restoration and Uprate Segments
WB XPress Project

Leak control inspections would occur prior to the incremental increases in each MAOP restoration or uprate section. This would consist of holding the pipeline pressure at 800 psi, and performing a leak inspection helicopter flyover. The helicopter would have leak detection equipment, and would perform the inspection along each of the test sections to establish a baseline. Additional leak inspection flyovers would be conducted along each of the test sections after each incremental increase of 50 psi. The final leak inspection of each segment would be conducted when 1,000 psi is attained. The duration of each flyover would vary depending on the length of line being tested, but the flyover for any given segment should not take longer than 105 minutes. No ground survey would be necessary to conduct the leak control surveys.

Columbia intends to notify the USFS by email 30 days prior to the MAOP uprate and restoration leak inspection flyovers on NFS lands. At this time, Columbia would identify a narrow range of dates for the inspection flyovers and follow-up with a second notification, which would be provided to the USFS a couple of days before the inspection flyovers are scheduled to occur.

No changes to the Project workspace are anticipated as a result of these MAOP uprate and restoration activities. The MAOP activities would take about five weeks to complete. No venting of gas is currently planned for MAOP activities.

4.3 Aboveground Facilities

Columbia would construct one new natural gas-fired compressor station, Elk River Compressor Station, and one new electric motor driven compressor station, Chantilly Compressor Station in West Virginia and Virginia, respectively. Columbia would modify and upgrade the horsepower (hp) at five existing compressor stations, Cleveland, Files Creek, Seneca, Lost River, and Strasburg Compressor Stations, and modify pipeline appurtenances at two existing compressor stations, Frametown and Loudoun Compressor Stations.

In addition, Columbia would construct one new valve site, two new launcher facilities, two new receiver facilities, and modify five existing valve sites, one existing meter station, one existing regulator station, and one existing receiver site. Columbia's proposed new and modified aboveground facilities are summarized in table A.4.3-1.

TABLE A.4.3-1

Aboveground Facilities Associated with the WB XPress Project [a]

Facility Name	County, State	Milepost	Scope of Work
New Aboveground Facilities			
Elk River Compressor Station[b]	Kanawha, WV	0.3	New compressor station involving installation of natural gas-fired compressor units, and associated appurtenances in order to provide 31,800 hp of compression.
Line WB-22 Receiver Station[b]	Kanawha, WV	0.6	Installation of a new receiver facility along Line WB-22.
Line WB-5 Valve Site[b]	Grant, WV	4.3	Installation of a new mainline valve along the Line WB-5 Replacement segment.
Chantilly Compressor Station[c]	Fairfax, VA	0.0	Installation of one measurement station, two new electric motor driven compressor units, 4,000 hp each, 1,800 feet of new dual 20-inch-diameter suction and discharge pipelines, and associated appurtenances.
Line VA-1 Receiver Site[c]	Fairfax, VA	2.2	Installation of a new receiver facility at the terminus of the proposed Line VA-1.
Modifications to Existing Aboveground Facilities			
Proposed Line WB-22			
Panther Mountain Regulator Station	Kanawha, WV	0.3	Installation of crossover piping between Line WB-22 and SM-86 Loop and the removal of the existing launcher.
Existing Line WB-5			
Dink Valve Site	Clay, WV	2.8	Installation of a new mainline valve and modification to the existing piping and receiver.
Frametown Compressor Station[d]	Braxton, WV	32.0	Modifications to launcher/receivers and associated appurtenances and installation of filtration equipment.
Cleveland Compressor Station[d]	Upshur, WV	64.6	Installation of two new 15,900 hp Solar Mars 100 turbine compressor units, and associated appurtenances to increase the station hp by 31,800 hp. In addition, the two existing Solar Taurus 70 turbine compressor units would be restaged.
Files Creek Compressor Station[d]	Randolph, WV	5.2	Installation of two new 10,915 hp Solar Taurus 70 natural gas-fired turbine compressor units, the uprate of the two existing Solar Taurus 70 natural gas-fired turbine compressor units from 9,311hp to 10,915 hp, and associated appurtenances to increase the station hp by 25,038 hp.
Lost River Compressor Station[d]	Hardy, WV	22.0	Installation of two new 15,900hp Solar Mars 100 natural gas-fired turbine compressor units, the uprate of two existing Solar Taurus 70 natural gas-fired turbine compressor units from 8,690hp to 10,915 hp, and associated appurtenances, would increase the station hp by 36,250. In addition, the two existing Solar Taurus 70 turbine compressor units would be restaged.
Proposed Line WB Replacement			
Glady Valve Site	Randolph, WV	0.0	Installation of one bi-directional launcher facility and modifications to associated appurtenances.
Whitmer Valve Site	Randolph, WV	7.9	Installation of a new mainline valve and associated crossover piping.
Seneca Compressor Station	Pendleton, WV	20.5	Installation of one new 10,915 hp Solar Taurus 70 natural gas-fired turbine compressor unit, the uprate of an existing Solar Mars 100 natural gas-fired turbine compressor unit from 13,750 hp to 15,900 in order to increase the station hp by 13,065 hp. In addition, two existing Solar Taurus 60 turbine compressor units would be restaged.
WB Loop Receiver	Pendleton, WV	25.1	Installation of crossover piping.
Smokehole Valve Site	Pendleton, WV	25.3	Removal of an existing launcher installation of a new mainline valve and modifications to associated appurtenances.

TABLE A.4.3-1 (Continued)

Facility Name	County, State	Milepost	Scope of Work
Existing Line VB-5			
Dysart Valve Site	Shenandoah, VA	14.6	Installation of two new over pressure protection regulation runs and associated appurtenances.
Strasburg Compressor Station	Shenandoah, VA	29.1	Installation of two new 10,915hp Solar Taurus 70 natural gas-fired turbine compressor units, one new 15,900 hp Mars 100 natural gas-fired turbine compressor unit, and the uprate of an existing Titan 130 natural gas-fired turbine compressor unit from 17,800 hp to 20,500 hp. The total certificated hp of the station would be 40,430 hp which would put 17,800 hp of the total available unit hp of 58,230 hp on emergency stand-by. In addition, the existing Titan 130 turbine compressor unit would be restaged and the two existing EGT Tornado units, 8,900 hp each, would be retired and removed.
Nineveh Meter Station	Warren, VA	38.3	Installation of valves and appurtenances.
Loudoun Compressor Station	Loudoun, VA	70.6	Installation of a new regulator and meter run, and a modification to the existing regulator run.

[a] None of the proposed aboveground facilities would impact NFS land.
[b] Milepost associated with Columbia's existing Line WB-5.
[c] Milepost associated with Columbia's proposed Line VA-1.
[d] Pipeline was built in several sections, therefore multiple milepost Zeros along the Line WB-5 and mileposts not in sequential order.

4.4 Access Roads, Staging Areas, and Contractor Yards

Columbia would generally use existing public roads and existing rights-of-way to obtain access to the Project facilities during construction. Columbia would use 46 private access roads during construction, 14 of which would be retained for permanent access to the aboveground facilities and operation and maintenance activities along the pipeline. Access roads may require upgrades including widening, grading, and/or graveling activities. After construction, temporary access roads would be returned to pre-existing conditions or in accordance with landowner agreements. A list of access roads, including locations, existing land uses, acreage affected, and approximate lengths, is provided in appendix B.

Although Columbia's proposed stream buffer mitigation measure calls for a minimum distance from streams or wetlands of 25 feet for new access roads, MNF Forest Plan Standards and Guidelines call for riparian buffer widths of 100 feet for perennial streams and intermittent streams with a drainage area of >50 acres, 50 feet for intermittent stream with drainage area <50 feet, and 25 feet for ephemeral streams. However, within NFS lands, Columbia would use existing roads. Some minor modifications of these roads may be required, but no new roads would be constructed on the MNF.

Columbia has identified 5 contractor yards and 20 staging areas for potential use for the Project. These areas would be used during construction for storage of materials and equipment and would be restored to pre-construction conditions upon Project completion, unless otherwise agreed upon with the landowner. Table A.4.4-1 lists the size and locations of the contactor yards and the nearest street and Project facility.

TABLE A.4.4-1

Contractor Yards for the Project [a]

Facility	County	State	Latitude/ Longitude	Existing Land Uses	Area Affected by Construction (acres)	Nearest Project Facility [b]
White Contractor Yard	Kanawha	WV	38.44, -81.47	Industrial	5.2	Elk River CS
HWY 48 Contractor Yard	Randolph	WV	38.98, -79.84	Open Land	17.7	Files Creek CS
CPG Elkins Contractor Yard	Randolph	WV	38.89, -79.84	Industrial	6.9	Files Creek CS
UPS Contractor Yard	Randolph	WV	38.86, -79.84	Open Land	11.3	Files Creek CS
				Wetland	0.3	
Seneca Contractor Yard	Pendleton	WV	38.82, -79.37	Open Land	8.1	Seneca CS
				TOTAL	**49.5**	

[a] None of the proposed contractor yards would impact NFS land.
[b] CS= Compressor Station

5.0 LAND REQUIREMENTS

Construction of the Project would disturb about 602.7 acres of land, including 368.9 acres for pipeline facilities (including 170.8 acres for permanent pipeline workspace, 81.0 acres for temporary pipeline workspace, 58.5 acres for additional temporary workspace (ATWS), and 58.6 acres for staging areas), 41.9 acres for access roads, 49.5 acres for contractor yards, and 142.0 acres for aboveground facilities (see appendix C for details on residential construction plans).

Following construction, about 282.5 acres would be retained for operation of the Project, including 170.8 acres for the permanent pipeline right-of-way, 10.3 acres for permanent access roads, and 100.0 acres for aboveground facilities. Additional detail regarding the land requirements associated with each Project facility is included in section B.5, and the details regarding ATWS in the Project area is included as appendix D.

Although Columbia has identified areas where ATWS would be required, additional or alternative areas could be identified in the future due to changes in site-specific construction requirements. As indicated in Columbia's Environmental Construction Standards (ECS)[6], it would request ATWS, not identified in appendix D, on an as-needed basis from FERC during construction. This ATWS could be used for unanticipated topsoil conservation, side hill construction, equipment staging, pipe and material storage, borrow and disposal areas, temporary and permanent access, and related construction activities. Columbia would be required to file information on each of those areas for review and approval prior to use.

As discussed in section A.7.2, Columbia would require ATWS at the Line VA-1 Horizontal Directional Drill (HDD) entry and exit locations, but would not need temporary right-of-way between MP 0.0 and 2.2. In this area, it would reduce the permanent right-of-way by 10 feet (to 20 feet) and increase the width of the temporary right-of-way by the same amount (to 20 feet). It would acquire a 20-foot-wide permanent easement above the pipeline for maintenance. The disturbance of land during construction in this area would be limited to use of a 12-foot-wide travel lane on the proposed permanent right-of-way between Pleasant Valley Road (MP 1.8) and the HDD exit location (MP 1.5). All of the workspace for Line VA-1 would

[6] The Environmental Construction Standards can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20151230-5391in the "Numbers: Accession Number" field.

be located within a Dominion easement. Using HDD, Columbia would eliminate impacts to three intermittent streams, one perennial stream, and one wetland, and also reduce impacts to nearby landowners. Given that the use of HDD reduces resource impacts, we agree with its use.

The width of the construction right-of-way would differ according to the type of terrain, environmental features, and existing structures encountered along the proposed route. For the majority of the new and replacement pipelines (i.e., all of the pipeline construction in West Virginia), Columbia would use a typical 75-foot-wide construction right-of-way in uplands, consisting of 50 feet of permanent right-of-way and 25 feet of temporary right-of-way. Line VA-1 is smaller in diameter than the other pipelines and would not require as large a ditch or spoil storage area. For Line VA-1, Columbia would use a 40-foot-wide typical construction right-of-way, consisting of 20 feet of permanent right-of-way and 20 feet of temporary right-of-way. Other right-of-way configurations would be used where needed based on site-specific conditions and construction requirements, such as in areas with steep slopes or to accommodate topsoil segregation protocols. Columbia's proposed typical right-of-way configurations for various site-specific conditions are included within each of its ECS's, one for Virginia and one for West Virginia (see WB Xpress Typicals).

Columbia has surveyed a 300-foot-wide corridor within NFS land along areas where there could be potential ground disturbance, depending on the final project design. No survey occurred on GWJNF lands. The survey corridor on the MNF encompasses any alternative right-of-way configuration that may be necessary for steep slope construction or topsoil stripping.

The total number of acres of impact on NFS land managed by the MNF is 143.2 acres. No land disturbance would occur on the GWJNF.

Columbia has provided site-specific plans for all water body crossings on NFS lands including schematics and profiles for each stream crossings. These are found in Attachment F of the Construction, Operations, and Maintenance Plan (COMP).

6.0 CONSTRUCTION SCHEDULE

Subject to the receipt of necessary permits and regulatory approvals, Columbia anticipates construction of the Project would start in July 2017. The westernmost Project components, including the Frametown Compressor Station would be placed into service by September 2017 followed by Dysart Valve Site facilities (April 2018), Nineveh Meter Station (May 2018), Line WB-5 Extension, Line WB-22 pipelines, Line WB-22 Receiver, Line VA-1, and Panther Mountain Regulator Station (June 2018) and Elk River and Strasburg Compressor Station facilities (October 2018). The remainder of the proposed facilities would be placed into service by December 2018.

Columbia would perform the work utilizing two prime contractors, one for aboveground facilities and one for pipeline facilities. Construction would be performed in a phased sequence as shown in table A.6-1 with some facility construction activity occurring concurrently. At any given time, the temporary workforce for construction of the Project would range from 300 to 600 individuals.

Columbia would hire 12 permanent employees to assist with the operation of the Project.

TABLE A.6-1

Construction Schedule for the WB XPress Project[a]

Project Facilities	Estimated Construction Start Date	Anticipated In-Service Date
New Pipeline Facilities		
Line WB-5 Extension	September 2017	June 2018
Line WB-22	September 2017	June 2018
Line VA-1	January 2018	June 2018
Replacement Pipeline Facilities		
Line WB-5 Replacement	September 2017	November 2017
Line WB Replacement	October 2017	December 2018
Line WB Replacement #1	October 2017	December 2018
Line WB Replacement #2	October 2017	December 2018
Line WB Replacement #3	October 2017	December 2018
Line WB Replacement #4	October 2017	December 2018
Line WB Replacement #5	October 2017	December 2018
New Aboveground Facilities		
Elk River Compressor Station	July 2017	October 2018
Line WB-22 Receiver Site	July 2017	June 2018
Line WB-5 Valve Site	September 2017	September 2018
Chantilly Compressor Station	January 2018	October 2018
Line VA-1 Receiver Site	January 2018	October 2018
Existing Aboveground Facilities		
Panther Mountain Regulator Station	July 2017	June 2018
Dink Valve Site	July 2017	September 2017
Frametown Compressor Station	July 2017	September 2017
Cleveland Compressor Station	July 2017	April 2018
Mill Creek Valve Site	July 2017	August 2017
Files Creek Compressor Station	July 2017	April 2018
Glady Valve Site	August 2017	March 2018
Whitmer Valve Site	November 2017	September 2018
Seneca Compressor Station	July 2017	April 2018
WB Loop Receiver	November 2017	October 2018
Smokehole Valve Site	November 2017	October 2018
Moorefield Valve Site	July 2017	October 2018
Lost River Compressor Station	July 2017	August 2018
Columbia Furnace Valve Site	July 2017	June 2018
Dysart Valve Site	March 2018	April 2018
Strasburg Compressor Station	December 2017	October 2018
Nineveh Meter Station	April 2018	May 2018
Shenandoah River West Valve Site	July 2017	July 2018
Loudoun Compressor Station	March 2018	May 2018

[a] Vegetation clearing at all facilities would occur per federal, state, and local timing requirements which may occur before estimated construction start dates.

7.0 CONSTRUCTION, OPERATIONS, AND MAINTENANCE PROCEDURES

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

Columbia would use its state-approved Virginia and West Virginia ECSs for constructing and operating its Project in Virginia and West Virginia. Columbia's ECSs adopt and incorporate the requirements of the Commission's May 2013 *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) (FERC, 2013a) and *Wetland and Waterbody and Construction Mitigation Procedures* (Procedures) (FERC, 2013b). Columbia's ECSs also incorporate a Spill Prevention, Containment, and Control Plan (SPCC Plan).

The SPCC Plan measures that would be used for the Project are described in Columbia's ECS manual. The ECS manual is included as attachment A to the Construction, Operation, and Management Plan for NFS lands (COMP)[7] and as part of the Construction SUP application to the MNF. The COMP would be revised to include a provision that crews and contractors shall be trained and know how to deploy, use, and retrieve any spill equipment. Environmental requirements, including those pertaining to the SPCC Plan, would be included in the contractor bid documents. Training regarding the deployment, use, and retrieval of spill equipment would also be included as part of the environmental training Columbia would provide to its Environmental Inspectors (EIs), the Environmental Foreman, and other contractor supervisors. All construction personnel would also receive safety and environmental awareness training before performing work on the proposed Project, which would include a summary of the SPCC Plan requirements.

In accordance with each of these two state-specific ECSs, Columbia is currently developing four Erosion and Sediment Control Plans (E&SC Plans) for Virginia and two E&SC Plans for West Virginia to accommodate construction and mitigation standards at a more site-specific level. These E&SC Plans would focus on erosion and sediment control only, but would be in full conformity with the Virginia and West Virginia ECSs. The four Virginia E&SC Plans would be specific to the Chantilly Compressor Station, the Loudoun County Compressor Station, the Strasburg Compressor Station, and the Line VA-1 Lateral Pipeline. The Virginia E&SC Plans would be submitted for review and approval in the near future to Fairfax County, Virginia; Loudoun County, Virginia; Shenandoah County, Virginia; and the Virginia Department of Environmental Quality (VDEQ), respectively. The VDEQ issued a Federal Consistency Certificate (FCC) for the Project including non-point source pollution control (dated October 7, 2016) which indicates the Project is consistent with the Virginia Coastal Zone Management Act of 1972, provided all applicable permits and approvals are obtained as described herein. The two West Virginia E&SC Plans would be specific to construction periods in 2017 and 2018 in the State of West Virginia. In February 2017, Columbia submitted final West Virginia E&SC Plans for review and approval to the WVDEP.

Columbia's SUP application was submitted to the MNF in 2016. As part of the SUP application, Columbia has developed a forest-specific COMP for construction on NFS lands.

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[7] The COMP was filed on November 11, 2016 and USFS approval is still pending. It can be can be viewed on the FERC elibrary at elibrary.ferc.gov. Under "Advanced Search," enter 20161202-5113 in the "Numbers: Accession Number" field.

This Plan addresses resource protection measures, special construction and stabilization techniques, and any other measures necessary to maintain Forest Plan consistency and includes a site-specific E&SC Plan as attachment B. In several aspects of construction phases and methodologies, the COMP's provisions for construction, restoration and mitigation have the same or greater level of detail compared to the above-mentioned Virginia and West Virginia ECSs. This includes variant provisions for right-of-way clearing, grading, topsoil handling, trenching, right-of-way stabilization, pipe laying, steep slope construction, backfilling, restoration and revegetation. Most of the MNF's applicable restrictions and requirements would be included in this COMP, such as road use, survey markers, mowing, long-term access, and emergency repairs.

We have reviewed the Virginia and West Virginia ECSs and have determined that Columbia's ECSs, and Columbia's conforming E&SC Plans, would adhere to requirements described in FERC staff's Plan and Procedures. Columbia would provide the E&SC Plans to FERC prior to construction.

7.1 General Pipeline Construction Procedures

Construction of the proposed pipelines would follow industry-standard practices and procedures, which involve a series of discrete activities conducted in a linear sequence. Figure A.7.1-1 shows the typical steps of cross-country pipeline construction.

Prior to construction, the survey contractor would stake the pipeline centerline and the limits of the construction work areas. The pipeline centerline would be marked at 200-foot intervals, at known crossings of foreign lines by the proposed pipeline, and at points of intersection. Wetland and waterbody boundaries, cultural resource areas, and sensitive species habitat would also be marked at this time. A clearing crew would then clear the construction work areas of trees, stumps, logs, brush, and rocks. On NFS lands, this would only occur once all merchantable volume has been properly accounted, appraised, and paid for. Crops and other non-woody vegetation may be mowed while other vegetation may be left in place to limit soil erosion. A fence crew would work alongside the clearing crew to remove and brace fencing. Temporary gates would be installed where necessary to control livestock or limit public access.

Columbia has stated it would only remove timber where necessary for construction. Non-merchantable timber and cleared vegetation would be chipped or hauled offsite to a commercial disposal facility. If burning is required, Columbia would obtain the required burn permits, adhere to all local and state regulations, and conduct necessary burning in a manner to minimize fire hazard and damage to other vegetation.

Forest clearing in NFS lands would follow a different procedure, beginning with merchantable and non-merchantable timber designation, marking, cruising, sale at fair market value, and removal in accordance with all USFS policies and procedures (outlined in the COMP). Timber removal cannot begin until the MNF develops a timber cruise plan identifying the appropriate cruise methods and data collection. Columbia would provide timber cruise information and allow enough time for the MNF to perform a check cruise and appraise the value of the timber. If the check cruise does not meet USFS specifications the cruise would need to be corrected. No timber could be removed until it has been properly cruised, designated, included in a USFS timber contract, and paid for by the Contractor/Purchaser.

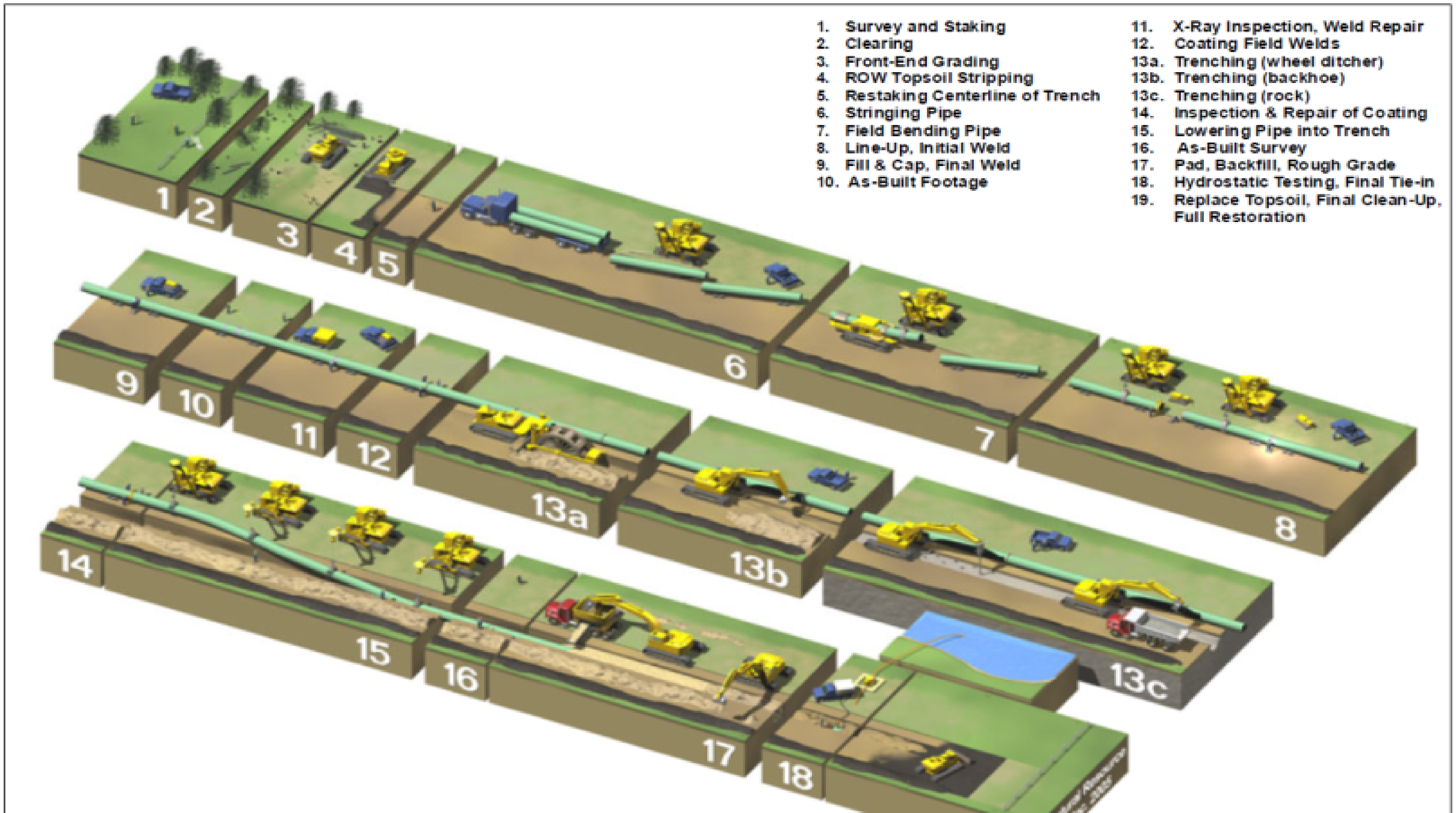

Figure A.7.1-1
Construction Sequence
WB XPress Project

Timber harvesting on steep slopes (40 percent or greater) would need to be done in a manner that ensures slope stability from the time the timber is harvested until pipeline construction begins. Options include helicopter logging, use of overland equipment that does not require skid road development, and other non-ground disturbing methods as approved by USFS personnel. Sediment and erosion control features are to be employed on these slopes as outlined in the COMP. Short-term erosion control measures are to be used as directed in the COMP prior to the start of disturbance for the construction of the pipeline replacement. All timber harvest roads are to be fully reclaimed and restored according to MNF Forest Plan standards.

Columbia would not place logs, or pile brush, rocks, or stumps in windrows within riparian buffers on NFS lands as defined in the MNF Forest Plan Standards and Guidelines.

The MNF expressed its desire for the treatment of non-merchantable wood and vegetation from cleared NFS land. The MNF stated that such vegetation be left on-site as large woody vegetation and chipped material instead of being hauled away according to Columbia's ECSs. Large woody vegetation and chips should be distributed in certain areas for enhancement of soil organic matter and for wildlife habitat, particularly the CMS. Additionally, the MNF requested that equipment used to chip wood and vegetation be cleaned in order to ensure it is free of non-native, invasive species seed. Columbia would adopt these practices and has included them in its forest-specific COMP for MNF lands.

Following clearing, the work areas would be graded where necessary to provide a level work surface. In areas disturbed by grading, temporary erosion and sediment control devices would be installed in accordance with Columbia's ECSs, to minimize erosion and sedimentation. These erosion and sediment control devices would be inspected and maintained throughout the construction and restoration phases of the Project. To prevent mixing of the soil horizons, Columbia would segregate a maximum of 12 inches of topsoil in residential areas, non-saturated wetlands, croplands, improved pastures, and where requested by the landowner or land manager. Topsoil would be stockpiled separately from subsoil, typically on the spoil side of the construction right-of-way. Topsoil segregation is discussed in more detail in Section B.1.2 Soils under Soil Mixing. On NFS lands only the trench area would have topsoil segregation, with a minimum of six inches of topsoil removed and stored separately.

Trenching would be conducted with backhoes or rippers. Columbia would meet or exceed DOT Federal Safety Standards in 49 CFR Part 192 for pipeline design, construction, operation, and maintenance. The trench would be deep enough to provide for about three feet of cover over the pipeline in areas that do not contain shallow bedrock. In areas containing shallow bedrock, the pipeline would be placed in a trench providing a minimum of 18 inches of cover over the pipeline in class I areas and 24 inches of cover in class II and III areas. At least 24 inches of separation would be maintained where the Project pipeline crosses foreign pipelines.

Pipeline sections would be transported by rail or truck and placed either in staging areas for later use or strung on the right-of-way. On the right-of-way, the pipe would be bent by track-mounted hydraulic pipe-bending machines, where necessary, to allow for a uniform fit with the contours at the bottom of the trench. After the pipe sections are bent, they would be welded together into long sections and placed on temporary supports. All bending, welding, and coating in the field would comply with 49 CFR 192 and with the latest edition of American Petroleum Institute Standard 1104 Welding of Pipelines and Related Facilities. Completed welds would be visually and radiographically inspected, and all pipe welds would be coated in accordance with required specifications to prevent corrosion. Except for a small area at the end of the pipe joint, coating is applied at the pipe mill before shipment to the site. Coating would be inspected for defects, and repaired, if necessary, before lowering the pipe into the trench. Columbia would use set-on concrete weights, concrete coating, pipe sacks, and/or soil anchors to provide negative buoyancy where necessary.

After lowering the pipe into the trench, the trench would be backfilled with previously excavated materials using a bulldozer or other suitable equipment. Occasionally, other sources of backfill would be used to fill in the trench. If off-site fill is proposed for use on NFS lands, Columbia would obtain site-specific approval from the USFS for both the source and the fill site. Further, Columbia would obtain site-specific approval before sourcing fill material from NFS lands or using fill material from off-site on NFS lands. In areas where topsoil has been segregated, the subsoil would be placed in the trench first and the topsoil would then be placed over the subsoil. Columbia would restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practical. The COMP contains provisions for restoration of the right-of-way on NFS lands, the disposition of non-merchantable trees, logs, stumps, and brush lumber left on-site and in adjacent woodlands where practicable to enhance wildlife, or otherwise disposal in accordance with the MNF's requirements

After backfilling, the entire pipeline would be hydrostatically tested in accordance with 49 CFR 192 and applicable permit conditions to ensure the system is free from leaks and provides the required margin of safety at operating pressures. This testing involves filling the pipeline with water and then pressurizing the water for eight hours. Any considerable loss of pressure indicates a leak may have occurred and would require further inspection. If a leak is discovered, the pipeline would be repaired and the segment retested. Test water would be withdrawn from Columbia-approved municipal supplies or other agency-approved sources. The sources and discharge locations for hydrostatic testing of the proposed pipelines are discussed in section B.2.2.

Final cleanup would begin after backfilling and as soon as weather and site conditions permit. Construction debris and organic refuse not suitable for distribution over the right-of-way would be collected and taken to a disposal facility, and erosion control measures would be put in place. Contours along the right-of-way would be restored to pre-existing conditions as closely as possible using acceptable soil from construction or agency-approved borrow pits. Segregated topsoil would be returned to the stripped area and permanent erosion controls would be installed. Revegetation measures would be implemented in accordance with Columbia's ECSs, the COMP on NFS lands, or based on specific landowner requests.

In accordance with 49 CFR 192, pipeline markers would be put in place along the right-of-way. Each marker would identify Columbia as the operator and provide telephone numbers for emergencies and inquires. Columbia would conduct periodic inspections of the right-of-way and would implement further restoration measures if necessary.

7.2 Special Pipeline Construction Procedures

Columbia would use special construction techniques when constructing across waterbodies, wetlands, roads, agricultural areas, residential areas, areas of shallow bedrock, and in areas with steep side slopes as described below. Impacts to water resources as a result of these procedures, and minimization measures Columbia would employ, are discussed in section B.2 of this EA.

Waterbody Crossings

Columbia proposes to construct all waterbody crossings using dry crossing methods, including the flume method or the dam and pump method, both of which are described below. Columbia would construct across waterbodies in accordance with its ECSs and applicable federal and state permits. A stream crossing presentation which shows Columbia's procedures for construction across streams was included in its response to Data Request 22 as Attachment 1.[8] A list of waterbodies crossed or affected by the Project, including the proposed crossing method for each, is provided in appendix E.

Columbia's ECSs and site-specific crossing plans are developed in accordance with the WVDEP's Erosion and Sediment Control Best Management Practice Manual (E&S Manual) and the WVDEP's current General Water Pollution Control Permit for Stormwater Associated with Oil and Gas Related Construction Activities, which is the governing document for land disturbance practices in West Virginia. Columbia receives annual approval from the WVDEP to confirm that its ECS standards are consistent with state regulations and permit requirements. In addition to state standards, the ECS manual is also developed in accordance with FERC standards for land disturbance.

<u>Temporary Spoil Piles Near Streams</u>

Temporary spoil piles would periodically be stored within the stream buffers during stream crossings only. Protective measures that would be taken to prevent the piles from being impacted by high flows include the following:

- Each stream crossing with perceptible flow at the time of crossing would be treated as a separate construction entity such that the trenching, pipe installation, backfilling, and temporary stabilization or final restoration are completed in the minimum number of calendar days possible. (Specialized stream crossing crews would be assigned to those streams separate from upland crews.)
- For smaller streams, Columbia anticipates that these crossings would be completed within 24 to 48 hours barring unforeseen circumstances such as excessive rock or other field constraints. For larger streams, construction may take up to five days (or more) depending on rock encountered and field constraints.
- Columbia would monitor National Oceanic and Atmospheric Administration weather forecasts in the area (and upstream drainage areas) as appropriate to minimize the potential for high flows or flash floods to impact the crossing activities, including the spoil piles.
- Spoil piles would be located at a minimum of 10 feet back from streams and protected with silt fencing until the stream crossing is complete.

Columbia would locate all ATWS on NFS lands outside of the stream channel buffers prescribed in the MNF's Land and Resources Management Plan.

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[8] The stream crossing presentation can be can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161006-5125 in the "Numbers: Accession Number" field.

Dam and Pump Crossing Method

The dam and pump crossing method would involve the use of pumps and hoses to maintain stream flow and installation of temporary dams, typically made of sandbags or plastic sheeting, upstream and downstream of the proposed waterbody crossing location. The pumps would transport the stream flow around the construction area to the downstream side of the work area. Columbia would install intake screens at the pump intakes to prevent entrainment of aquatic life, and energy dissipating devices at the discharge points to minimize erosion and streambed scour. Following the completion of trenching, pipe installation, and backfill of the trench, Columbia would restore the waterbody banks to pre-construction conditions and remove the temporary dams and pumps to restore flow through the work area.

Flume Crossing Method

The flume crossing method would involve the installation of one or more temporary flume pipes over and across the area to be excavated to allow the excavation of the pipe trench without disruption of the water flow in the stream. Stream flow would be diverted through the flumes by constructing two temporary dams, using sand bags and/or plastic dams. Following completion of trenching, pipe installation, and backfill of the trench, Columbia would restore the waterbody banks to pre-construction conditions and remove the temporary dams and flume pipes.

We have reviewed the waterbody crossings plan and find it to be acceptable.

Wetland Crossings

Columbia would conduct wetland crossings using standard construction techniques specified in its ECSs and applicable federal and state permits. A list of wetlands crossed or affected by the Project is provided in appendix F.

The specific crossing procedures used to install the pipeline across wetlands would depend on the level of soil stability and saturation encountered during construction. Construction across unsaturated soils that can support the weight of equipment would be conducted in a manner similar to the upland construction procedures. Topsoil would be segregated in unsaturated wetlands over the trench only. Trench plugs would be installed as necessary to maintain wetland hydrology. In areas where soil conditions may not support the weight of equipment, stable temporary work surfaces in the wetlands may be constructed, including travel pads or gravel on geotextile fabric. Following installation of the pipeline, Columbia would backfill the trench and restore pre-construction contours and drainage patterns. Columbia would construct trench breakers at the wetland boundaries to maintain the wetland hydrology. Additionally, Columbia would remove from the wetlands any materials that are used to stabilize the wetland soils during construction. Inspections of wetland restoration would be conducted during construction by Columbia's EIs and post-construction monitoring of wetland restoration would be performed by Columbia pursuant to Corps and FERC requirements. Any restoration issues that are noted, including any problems with the restoration of wetland hydrology, would be evaluated and corrected as necessary.

Grading and stump removal would only be conducted over the trench, unless safety conditions require additional stump removal. In addition to restoring hydrologic conditions and soil profiles following construction, Columbia would preserve the existing seed bank, and follow its ECSs for restoration of wetlands. Columbia expects that most wetland impacts would be short-term and localized. There would be no permanent filling of wetlands.

We have reviewed the wetland crossings plan and find it to be acceptable.

Road Crossings

Columbia would use the conventional open-cut method or the bore method for crossing public and private roads. Road crossings would be conducted in accordance with applicable federal, state, and local road crossing permits. Table B.6.4-1 (in section B.6.4) lists the public roads Columbia would need to cross.

The open-cut method would typically be used to cross driveways, local roads, private roads, and small state roads with low traffic volumes. Appropriate traffic control measures would be implemented during construction, as necessary, to detour traffic around open trenches. Columbia may construct temporary bypass roadways to detour traffic around the open trench during construction across small roads and driveways. Crossings of multiple-lane roads may require the closure of one lane at a time and diversion of traffic to the other lane(s).

Columbia would use conventional bore construction to cross major federal and state roadways. This method would require the excavation of bore pits on both sides of the crossing. The bore pits would be excavated to a depth several feet below the depth of the trench and graded so that the bore would follow the grade of the pipe. An auger fitted with a cutting head and placed inside a casing pipe, would be used to bore under the roadway. After the bore is complete, the pipeline would be pushed through the casing pipe and pulled into place. The casing pipe would either be removed or left in place. The bore crossing method typically allows the roadway to remain in service while the installation process takes place, thereby resulting in little or no disruption to traffic.

Columbia would work with residents along private roads to minimize access disruption. During non-working hours, open trenches would be fenced or covered with steel plates, and steel plates would be kept on-site at each crossing to provide for access by emergency vehicles if necessary. After crossing construction is complete, Columbia would promptly restore road surfaces in accordance with permit requirements. Public roads would be inspected, swept, shoveled and/or scraped as necessary to keep the road surface safe and remove any debris originating from the Project. Columbia would repair any damages to roadway surfaces, shoulders, and bar ditches.

Residential Areas

Columbia would implement the construction and restoration measures described in its ECSs and Fugitive Dust Control Plan,[9] and detailed on the site-specific residential construction plans it developed for residences within 50 feet of the construction work areas (provided in appendix C). Construction and restoration measures for homes within 50 feet of construction workspace areas are discussed in detail in section 5.5.1.

In residential areas or other locations where space is limited or insufficient to assemble the pipe in place, Columbia may use special construction techniques such as drag section or stovepipe methods. The drag section method involves trenching, installation, and backfilling of a prefabricated section of pipe (typically comprising several joints of pipe) in sequence over a short period of time. This method reduces the amount of time work would occur in a given location because the pipe is preassembled at a nearby staging area. Stovepipe construction involves excavating a short section of the trench, installing a single joint of pipe, and then

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[9] The Fugitive Dust Control Plan is available on the FERC's eLibrary website at http://ferc.gov/docs-filing/elibrary.asp in the "Search" tab, using Docket No. CP16-38, under the date December 30, 2015, file titled "16_PUB_CPG_XPress_Vol I-B_Appendix 7A-12B", page 215.

backfilling the trench over that pipe prior to excavating the trench for the next joint of pipe. Use of this method would involve a smaller construction crew and less equipment on site for extended periods of time. Columbia would complete final grading in residential areas within 10 days of backfilling, weather and soil conditions permitting.

We have reviewed the site-specific residential construction plans and find them to be acceptable. We encourage affected landowners to review the site-specific residential construction plans in appendix C and provide us with any comments during the EA comment period.

Agricultural Areas

Construction in agricultural lands would be conducted in accordance with Columbia's ECSs. In active croplands, pastures, or hayfields, a maximum of 12 inches of topsoil layer would be segregated from the subsoil and stored in protected spoil piles, separately from stored subsoil spoil piles, to prevent contamination by subsoil during construction. Following pipeline installation, the subsoil would be returned to the trench and then the topsoil replaced. Topsoil segregation is discussed in more detail in Section B.1.2 Soils under Soil Mixing. Columbia would consult with landowners or land managers to determine the location of drainage tiles. If any irrigation systems are damaged, Columbia would repair or replace them after communicating with the respective landowner. Temporary disturbances to irrigation would be coordinated with the landowner. Following construction, agricultural lands would be allowed to return to preconstruction use.

Steep Terrain

Portions of the pipeline in West Virginia would cross areas of steep slopes, side slopes of varying steepness, or rugged terrain. In steep and/or rugged terrain, pipeline joints would be stored at the top or bottom of each slope. For safety of construction crews, equipment would be tethered with winch lines at the top of the slope. A side boom tractor would transport each joint to the work area, one at a time, and the joint would be lowered into the trench, welded and coated.

Where the pipe is installed laterally along the slope (side slopes), cut and fill grading may be used. This method would involve excavating soil from the high side of the right-of-way and storing along the low sides of the right-of-way to create safer more efficient level working surface for crews and for equipment working and passing lanes. Extra workspaces may be needed on the uphill side of the construction right-of-way to store larger spoil piles created by leveling the working side of the right-of-way. Columbia plans to place its temporary spoil piles excavated from the trench on the downslope side of the construction right-of-way.

<u>NFS Lands</u>

Columbia identified side slopes greater than 15 percent, in a perpendicular direction from the proposed pipeline (Data Request 6 Attachment 1[10]). The highlighted orange centerline in the mapping indicates the locations of these areas. The associated table indicates the milepost ranges and crossing lengths in feet of each of the highlighted side slopes along the Line WB Replacement within the MNF. At the request of MNF staff, Columbia recently modified its workspace to minimize potential impacts to West Virginia northern flying squirrel (WVNFS)

[10] The steep slope information can be can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161006-5125 in the "Numbers: Accession Number" field.

habitat within the MNF. Specifically, Columbia reduced and/or relocated as much of the workspace as possible onto the existing right-of-way. In doing so, much more of the proposed workspace is now within Columbia's existing right-of-way over Columbia's existing active pipelines. Columbia would not be able to perform typical side slope construction where the proposed pipeline is downslope of the existing pipeline(s) (which includes most of the side sloping areas identified in Data Request 6 Attachment 1). This is because the cutting required in these areas to level the work surface would endanger or potentially damage the existing pipeline(s).

This reduction and modification of workspace and corresponding change of construction technique, while beneficial to the species, poses significant risks including: safety of workers, the integrity of the existing pipelines, and stable work surfaces for operating equipment. Columbia has assessed this additional risk and would implement protective measures, as necessary, to mitigate these risks including minimizing the operation of equipment over the active pipelines and using the trench spoil as temporary padding over the existing pipelines to temporarily increase the cover over the existing pipelines when necessary to operate heavy equipment over the lines.

Columbia identified Steep Slope Work Procedures (Attachment K in the COMP) and showed examples of successful work done in Kanawha and Clay Counties, West Virginia. Super Silt Fence, excavation and backfill procedures, safety netting and barriers, and limiting the height of spoil piles are all discussed in relation to temporary excavated spoil piles. Should any rock or soil spillage be observed, Columbia and the Contractor would identify and implement the necessary provisions to alleviate any further downslope movement (attachment K, notes 6.3, 6.4). Permanent trench breakers and slope breakers installed at tighter intervals on steeper slopes, and vegetation restoration techniques are shown on final slopes.

Columbia's Steep Slope Work Procedures (attachment K in the COMP) contain photographs documenting the successful construction practices used to manage excavated spoil piles in the workspace on steep slopes and side slopes along projects in central Appalachia. Attachment K also describes how Columbia plans to construct in areas of steep slope. In addition, Columbia has performed a geotechnical hazard analysis in order to identify potential slope instability, with a goal of further refining construction practices and E&SC design in those areas. Columbia plans to use the trench spoil as temporary padding over the existing pipelines to facilitate heavy equipment over the lines, further reducing the potential of downslope soil movement. Attachment K also contains photographs documenting the effectiveness of permanent trench breakers, slope breakers, and other construction practices contained in Columbia's ECS and project-specific E&SC plans.

Additional discussion concerning specialized techniques for controlling erosion and maintaining slope stability during construction and operations is included in Sections B.1.1 Geology and B.1.2 Soils.

Horizontal Direction Drilling

The HDD method is a trenchless construction method that involves drilling a borehole below the depth of a conventional lay, enlarging the borehole to the appropriate size, and then pulling a prefabricated section of pipe through the borehole. The HDD method generally reduces the workspace required along the length of the HDD (between the HDD entry and exit) when compared to traditional pipeline construction, but requires additional workspace at both the

HDD entry and exit locations. A drill rig would be positioned at the drill entry location to drill the pilot hole. This rig and other equipment would subsequently be used to enlarge the diameter of the drilled hole to a size adequate for installing the pipeline. During drilling, the pipe section to be installed in the HDD hole would be fabricated within the proposed workspace north of the HDD exit hole. When this pipe section is assembled and the hole is complete, the pipe section would be pulled into the hole from the HDD entry location. Drilling fluid, consisting of water, bentonite clay and other nontoxic materials, is critical to the HDD operation and would be used to aid in the drilling and to carry drill cuttings back to the HDD entry and exit points, where they can be removed.

Columbia proposes to use an HDD to install a 3,508-foot segment of Line VA-1 pipeline between mileposts (MP) 1.5 and 2.2 to minimize impacts on residences adjacent to the south side of the proposed right-of-way and existing Dominion electric transmission corridor. Although not proposed specifically for wetland or waterbody reasons, the proposed HDD would also avoid or minimize wetland and waterbody impacts (see section B.2). Columbia has developed a HDD Contingency Plan[11] to mitigate adverse effects associated with any potential inadvertent return. Geotechnical investigations would be completed prior to initiation to confirm the feasibility of the HDD method. We have reviewed the HDD Contingency Plan and find it to be acceptable.

Areas of shallow bedrock

Blasting may be required in areas of shallow bedrock during pipeline installation, and also at the Strasburg Compressor Station, should other excavation methods (i.e., trackhoe, ripping, hammering) be ineffective. Blasting operations would adhere to all federal, state, and local regulations. Columbia has developed a Project-specific blasting plan[12] for West Virginia. In addition to identifying general requirements and mitigation measures for blasting operations to address issues of safety, notification, communication with landowners and agencies, and reporting, the plan also requires the construction contractor to develop site-specific blasting plans for Columbia's approval prior to any blasting activity. No blasting would occur in Virginia. We have reviewed the blasting plan and find it to be acceptable.

7.3 Aboveground Facility Construction Procedures

The proposed aboveground facilities would be constructed or modified in a manner that would meet applicable DOT requirements and Columbia's specifications, including the ECSs. Construction would begin with clearing and grading of the sites to establish suitable grades for the facilities. Subsequent activities would include preparing foundations, installing underground piping, erecting and installing buildings, installing aboveground piping and equipment, testing the piping, testing the control equipment, cleaning up the work area, and graveling access roads and parking areas. Each station site would be fenced for security and safety and control devices would be installed and tested prior to operation. Following construction, disturbed areas that are not paved or covered with gravel would be finish-graded and seeded.

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[11] Columbia's Horizontal Directional Drill Contingency Plan was filed with Columbia's August 31, 2016 Supplement as appendix I and can be found on FERC's eLibrary.

[12] Columbia's blasting plan can be can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170127-5025 in the "Numbers: Accession Number" field. It can also be found in attachment G of the COMP.

7.4 Environmental Compliance Inspection and Monitoring

Columbia would employ five EIs to monitor environmental compliance throughout construction. The EIs would be responsible for verifying that the measures contained in Columbia's ECSs, and any other environmental permit conditions or agreements are followed during construction and restoration activities. As stated in Section II.A.1 of the Commission's Plan, the EI would have stop work authority. Columbia would also require the contractor to have at least one Environmental Foreman available at all times during the Project's duration. The Environmental Foreman would oversee installation and maintenance of environmental controls and construction activities in environmentally sensitive areas.

Columbia would provide environmental training to the Environmental Foreman and other contractor supervisors. The training program would cover requirements for environmental compliance with federal, state, and county permits, and with Columbia's ECSs. Environmental requirements would also be included in the contractor bid documents. All construction personnel would be trained in safety and environmental awareness before performing work on the proposed Project, and the contractor would be required to comply with the Minimum Federal Safety Standards adopted by the DOT under the Natural Gas Pipeline Safety Act of 1968, as well as additional Columbia standards.

FERC would inspect the Project site during construction and restoration. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency per section V.A.6 of our Plan), revegetation is successful, and proper drainage has been restored.

The USFS would employ its own EIs to ensure that the protection measures contained in the COMP and other applicable plans for NFS lands are implemented and are effective. Forest Service inspectors would also have stop-work authority on NFS lands. Data obtained from Columbia's Order 1 Soil Survey[13] would be used to extrapolate the depth of topsoil within each mapped soil unit that is crossed by the pipeline. Columbia would furnish this information to its EIs, construction inspection staff, and the construction contractor to help determine the topsoil and subsoil boundary during construction. Columbia would employ an EI with a soil science background. If a person with these academic qualifications cannot be found, Columbia would assign the responsibility of differentiating topsoil and subsoil to an EI who would receive specialized training from a soil scientist, and work closely with the contractor and other inspection staff during construction to determine the topsoil and subsoil boundary.

7.5 Operation and Maintenance

Columbia would operate and maintain the proposed pipeline and aboveground facilities in accordance with applicable federal and state requirements, including the minimum federal safety standards identified in 49 CFR 192, and with Columbia's operating policies and procedures. Columbia's operating personnel receive periodic training in safe operation of equipment and facilities, hazardous material handling procedures, fire-fighting, public liaison programs, and general operating procedures. Columbia is a member of the West Virginia and Virginia "One Call" Systems, through which contractors provide notification of proposed excavation. If Project facilities are located in an area of proposed contractor activity, they would

[13] The Order 1 Soil Survey can be found within the COMP, which is at accession number 20161202-5113 on FERC's e-library.

be marked in the field and a representative of Columbia would be present during excavation to ensure that the facility is not compromised.

The Project facilities would be subject to periodic visual inspections by aerial and vehicle patrols, including leak surveys, as well as scheduled preventative maintenance. Unusual situations or conditions would be reported and investigated immediately. The proposed pipelines would be connected to Columbia's existing cathodic protection system to prevent corrosion. Columbia inspects the functional capability of its cathodic protection systems frequently to verify proper operating conditions for corrosion prevention. Additional information about Columbia's operation and safety standards is provided in section B.9.

Post-construction monitoring would be conducted to identify erosion or washout areas, damaged or non-functional permanent erosion control devices, and to evaluate restoration of affected wetlands. Issues identified during post-construction monitoring would be addressed in accordance with applicable federal and state regulations and Columbia's ECSs.

As stated above, FERC would conduct independent compliance inspections to verify compliance with the Commission's Order and evaluate the progress of restoration. The USFS would conduct its own long-term monitoring to ensure that proper resource protections are maintained on NFS land.

Maintenance of the permanent pipeline right-of-way would be performed in accordance with Columbia's ECSs. Maintenance would include periodic mowing, as necessary, to allow for visual inspections. Actively cultivated areas would be allowed to revert to pre-construction use for the full width of the right-of-way. In other upland areas, the permanent pipeline right-of-way would be maintained in a primarily herbaceous state. In wetlands a 10-foot corridor centered over the pipeline would be maintained; trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating would be selectively cut and removed.

Operation and maintenance activities at the new and existing aboveground facilities would include calibration, inspection, and other scheduled or routine maintenance. Operational testing would also be performed on safety equipment to ensure proper functioning.

Columbia would develop a site-specific emergency evacuation plan in coordination with local emergency management officials in the event that individual(s) get injured on NFS lands, during construction activities.

8.0 NON-JURISDICTIONAL FACILITIES

Under Section 7 of the NGA, the Commission is required to consider, as part of its decision to approve facilities under Commission jurisdiction, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities, such as a power plant at the end of a jurisdictional pipeline, or they may be minor, non-integral components of the facilities under the Commission's jurisdiction. The non-jurisdictional facilities associated with the Project would include one new substation and associated electric transmission lines necessary to provide power to a compressor station, an electric distribution line, and other minor non-jurisdictional facilities, such as taps and basic utilities (water, sewer, communication, etc.) for the proposed new or modified compressor stations.

The Mathias Substation would be a 34.5 kV to 12 kV electric transmission substation located adjacent to the existing Lost River Compressor Station in Hardy County, West Virginia. An upgraded 34.5 kV sub-transmission line would serve upgraded and more reliable utility power to the Lost River Compressor Station and enhanced utility power east and west of the Lost River Compressor Station. The 14.5 mile sub-transmission power line would initiate from the existing Baker Substation, run along Highway 259, and terminate at the pad-mounted transformers located at the proposed Mathias Substation. Potomac Edison is currently setting 300 new 50-foot wooden utility poles that will carry the new line in existing right-of-way or new right-of-way near Route 259 (First Energy, 2016). The project would also include 12 kV secondary lines off the transformers. The Mathias Substation would consist of three pad-mounted transformers, one to serve the Lost River Compressor Station and two to serve areas east and west of the station, pole-mounted fuses, reclosers, switches, and regulators. FirstEnergy would provide the electric service update and obtain all permits necessary to construct the new electric transmission line. All substation workspace is incorporated within the proposed limits of disturbance for the Lost River Compressor Station. Figure A.8-1 indicates the location of the Mathias Substation.

Northern Virginia Electric Cooperative's (NOVEC) Pleasant Valley Substation is a 230 kilovolt (kV) to 12.47 kV electric transmission substation located across Dominion Virginia Power's existing transmission powerline corridor from the proposed Chantilly Compressor Station in Fairfax County, Virginia. NOVEC would upgrade their substation, run new a new approximately 630-foot underground distribution line and install a pad-mounted meter and disconnect switch to provide the 12.47 kV electric service required at the Chantilly Compressor Station. The upgrade to existing equipment within the substation includes, but is not limited to transformers, breakers, switches, and the main bus. No permits are required to perform the substation upgrades, to construct the new distribution line, nor to install the meter and disconnect switch. The substation upgrade workspace is within the existing NOVEC substation. The powerline would connect NOVEC's substation to the Chantilly Compressor Station by crossing perpendicularly to Dominion's transmission powerline corridor. The meter and disconnect switch work will be performed within the proposed limits of disturbance for the Chantilly Compressor Station. See figure A.8-2 for a location map of the existing substation, the new distribution line, and the proposed meter and disconnect switch in Chantilly Compressor Station.

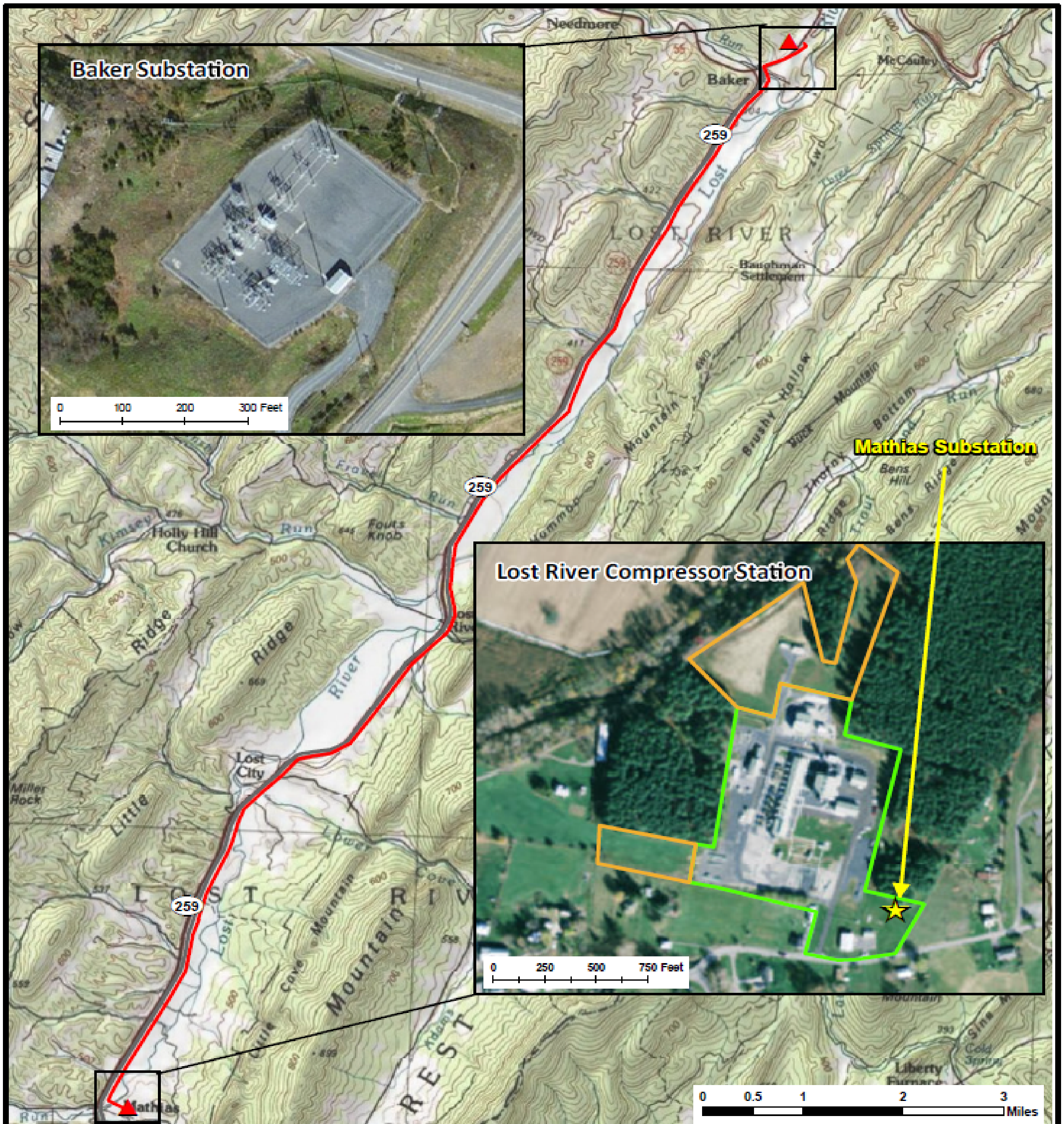
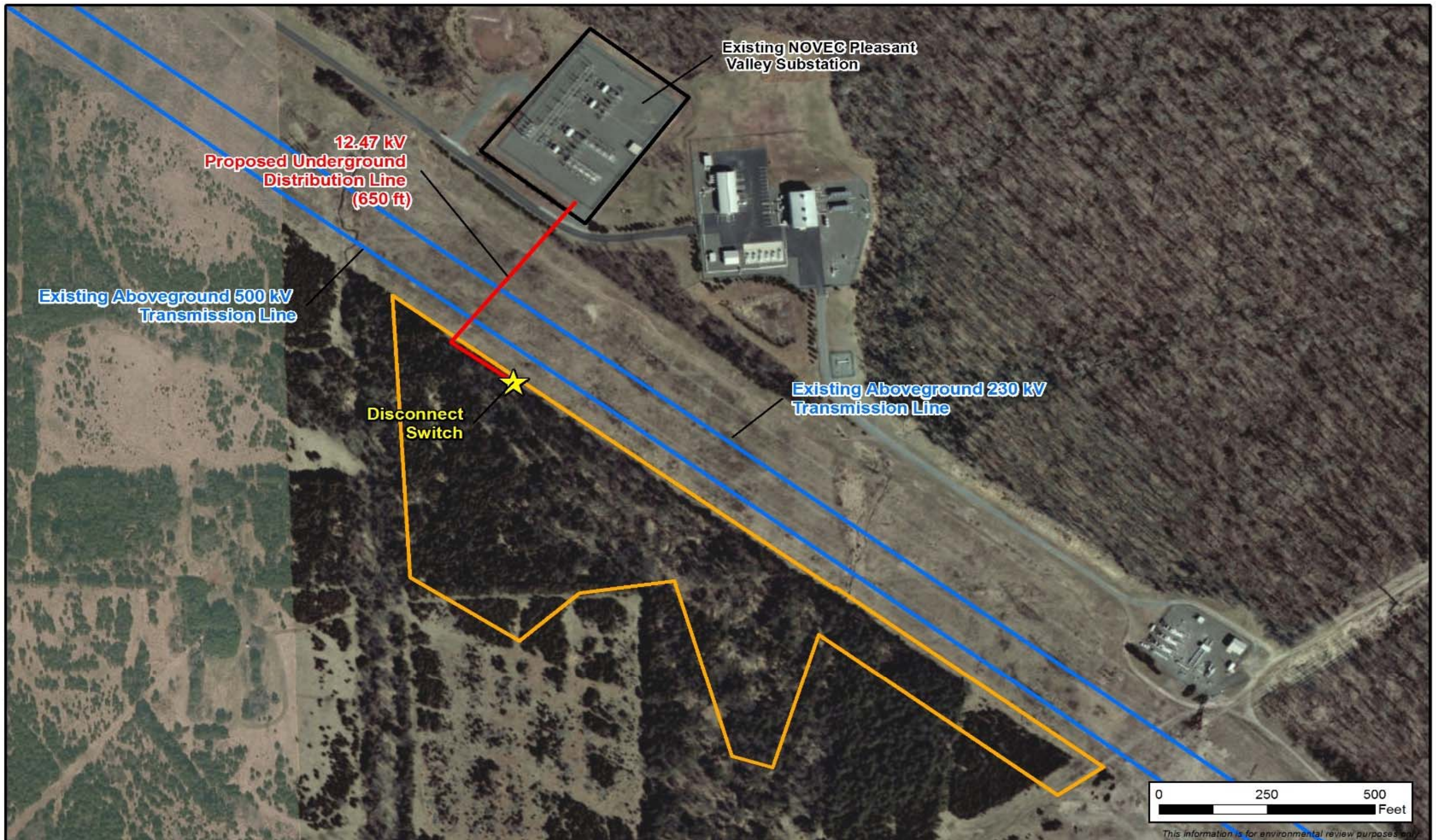


FIGURE A.8-1
Non - jurisdictional - Mathias Substation
WB XPress Project



Proposed Underground Distribution Line

Existing Transmission Line

Existing Substation

Chantilly Compressor Station Limit of Disturbance

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Figure A.8-2
Non-Jurisdictional
Chantilly Electric Distribution Line
WB XPress Project
Fairfax County, Virginia

February 2017

Additionally, consumer farm taps along Line WB-5 and Line VB-5 will require regulation upgrades to operate at the MAOP of 1000 psig. These upgrades will be performed by Columbia or Columbia-approved contractors and will involve accessing the taps with rubber-tired trucks and equipment. All work will be performed within the existing rights-of-way and involve replacing existing aboveground facilities (meter stations) and associated belowground piping, which will be able to operate at the new MAOP of 1000 psig. About 40 taps will require excavation to evaluate/change existing materials. Four of these excavations will expose pipelines with diameters up to eight inches and will require a disturbance footprint of 50 feet by 100 feet. The remaining excavations will require an eight-foot by eight-foot disturbance due to smaller diameter pipes that will be exposed. See figure A.8-3 for the farm taps location map.

In general these non-jurisdictional facilities would result in minimal impacts (see table A.8-1). The majority of impacts would be temporary and confined to areas that would be affected by construction of the proposed facilities or that have been previously disturbed by existing pipeline, roadway, or electric transmission line facilities. Because these non-jurisdictional facilities do not fall under our purview, they are not covered in the same detail as Columbia's proposed Commission-jurisdictional facilities. However, we have provided a discussion of the impacts of the facilities in section B.10 under cumulative impacts.

The three consumer farm taps located on NFS land would not be upgraded as part of the Project.

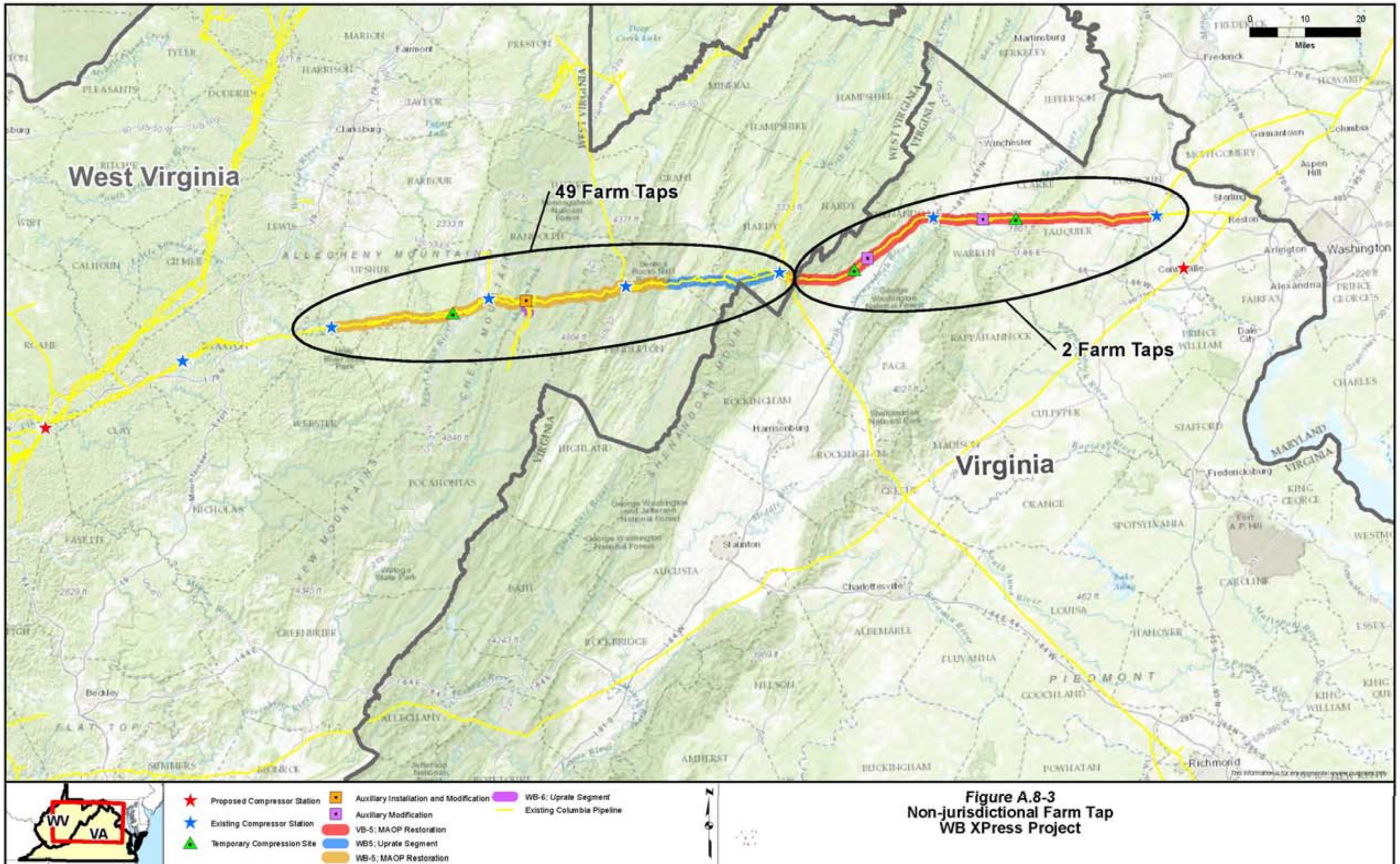

Figure A.8-3
Non-jurisdictional Farm Tap
WB XPress Project

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Table A.8-1

Non-jurisdictional Facilities Associated with the WB XPress Project

	Mathias Substation	**Chantilly Electric Distribution Line**	**Farm Taps**
Company/owner	FirstEnergy	Northern Virginia Electric Cooperative (NOVEC)	TransCanada/Columbia Gas Transmission, LLC
Type of facility	New substation and powerline upgrade	Underground distribution line and meter/disconnect switch	Meter Station
Dimensions (pipe diameter, length, horsepower, etc. as appropriate for pipeline and land area for other facilities)	Easement acreage: Approx. 0.34 acre	Multiple units within the existing substation will require improvements including: • Transformer • Lowside Bank Breaker • Lowside switches between transformers and main bus • Main Bus Additionally, a new underground 12.47 kV distribution line and new meter/disconnect switch will need to be installed.	• Pipe Diameters of 1", 2", 4", 6" and 8" • Pipe lengths of no longer than 240' • all farm taps located within company existing ROW
	Voltage: 34.5 kV / 12kV	Voltage: 12.47 kV	
	Size: 12.5 MVA Total	Meter/Disconnect switch size: 600 Amps	
	Length of powerline upgrade: 14.5 miles	Powerline length: Approx. 650 feet	
Federal permits required and their status	None required	None required	• FERC – Blanket Automatic Authority • U.S. Army Corps of Engineers – Non reporting Nationwide Permit 3 or 12 (if stream or wetland crossings are required)
Status of local and state permits required	None required	None required	None required

9.0 PERMITS AND APPROVALS

Columbia would obtain all necessary permits and approvals relating to the construction and operation of the Project. Table A.9-1 lists the applicable permits, approvals, and regulatory clearances Columbia would obtain, as well as the anticipated submittal and receipt dates.

TABLE A.9-1 Anticipated Environmental Permits, Approvals, and Consultations for the WB XPress Project			
Agency	Permit/Approval/Consultation	Filing Date (Anticipated)	Receipt Date (Anticipated)
Federal			
Federal Energy Regulatory Commission	Certificate of Public Convenience and Necessity under Section 7(c) of the Natural Gas Act	December 2015	Pending
U.S. Army Corps of Engineers – Huntington District	Department of the Army Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act	March 2016 and July 2016	(April 2017)
U.S. Army Corps of Engineers – Pittsburgh District	Department of the Army Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act	March 2016, July 2016, and December 2016	(April 2017)
U.S. Army Corps of Engineers –Norfolk District	Department of the Army Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (Joint Permit Application)	March 2016 and December 2016	(April 2017)
U.S. Fish and Wildlife Service – West Virginia Ecological Field Services Office	Consultation under Section 7 of the Endangered Species Act	July 2015, December 2015, August 2016, November 2016, January 2017, and February 2017 [a]	(March 2017)
U.S. Fish and Wildlife Service –Virginia Ecological Field Services Office	Consultation under Section 7 of the Endangered Species Act	July 2015, December 2015, August 2016, and January 2017 [a]	November 2015, December 2015, and February 2017
National Oceanic and Atmospheric Administration – Great Atlantic Regional Office	Consultation under Section 7 of the Endangered Species Act	April 2015 [a]	May 2016
U.S. Department of Agriculture – Forest Service	Survey Special Use Permit	January 2015 and June 2016	August 2015 and July 2016
U.S. Department of Agriculture – Forest Service	Construction and Long-term Occupancy Special Use Permits	August 2016, November 2016, December 2016	(May 2017)
U.S. Department of Agriculture- Farm Service Agency and Natural Resource Conservation Service	Conservation Reserve Program and Wetland Reserve Program Consultation	July and November 2015	July 2015 and April 2016
State: West Virginia			
West Virginia Department of Environmental Protection- Division of Air Quality	Air Permit - Construction Permits and Permit Modification	January 2016	April 2016, May, 2016, and January 2017
West Virginia Department of Environmental Protection – Division of Water and Waste Management	Water Quality Certificate under Section 401 of the Clean Water Act	N/A	N/A
West Virginia Department of Environmental Protection – Division of Water and Waste Management	West Virginia Water Pollution Control Permit – Stormwater Associated with Oil and Gas Related Construction Activities – WV0116815	August 2016 and (March 2017)	(April 2017) and (August 2017)
West Virginia Department of Environmental Protection – Division of Water and Waste Management	National Pollutant Discharge Elimination System – Water Pollution Control Permit for Hydrostatic Testing Water – WV0113069	(April 2017 and August 2017)	(June 2017 and October 2017)
West Virginia Division of Culture and History	Consultation under Section 106 of the National Historic Preservation Act	December 2015 and November 2016	(March 2017)

TABLE A.9-1 (Continued)
Anticipated Environmental Permits, Approvals, and Consultations for the WB XPress Project

Agency	Permit/Approval/Consultation	Filing Date (Anticipated)	Receipt Date (Anticipated)
West Virginia Division of Natural Resources – Natural Heritage Program	Natural Heritage/Protected Species Consultation	May 2015	June 2015
West Virginia Division of Natural Resources – Office of Land and Streams	Stream Activity Permit)	(April 2017)	(May 2017)
State: Virginia			
Virginia Department of Environmental Quality – Air Division	Air Permit – State Major Permit	January 2016	January 2017
Virginia Department of Environmental Quality – Water Division	Virginia Water Protection Permit (Joint Permit Application)	March 2016 and December 2016	(April 2017)
Virginia Department of Environmental Quality – Water Division	Water Quality Certificate under Section 401 of the Clean Water Act (Joint Permit Application)	March 2016 and December 2016	(April 2017)
Virginia Department of Environmental Quality – Coastal Zone Management Program	Consistency Determination under the Virginia Coastal Zone Management Program	July 2016 and December 2016	October 2016 and January 2017
Virginia Marine Resources Commission	River and Stream Crossing Permit (Joint Permit Application)	March 2016	NA (Exempt) per March 2016 correspondence
Virginia Department of Environmental Quality – Water Division	General Permit for Discharges of Stormwater from Construction Activities (9VAC25-880)	N/A (Exempt)	N/A (Exempt)
Virginia Department of Environmental Quality – Water Division	General Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests (VAG83)	N/A (Exempt)	N/A (Exempt)
Virginia Department of Conservation and Recreation	Natural Heritage/Protected Species Consultation	May/July/November 2015 and May/August 2016	June/August/ December 2015 and June/September 2016
Virginia Department of Game and Inland Fisheries	Natural Heritage/Protected Species Consultation	July 2015 and August 2016	December 2015 and February 2017
Virginia Department of Historical Resources	Consultation under Section 106 of the National Historic Preservation Act	December 2015 and December 2016	March 2016 and December 2016
Local			
Kanawha County, West Virginia	Floodplain Ordinance Permit	February 2017	(April 2017)
Randolph County, West Virginia	Floodplain Ordinance Permit	December 2016	(March 2017)
Hardy County, West Virginia	Floodplain Ordinance Permit	(April 2017)	(May 2017)
Fairfax County, Virginia	Rough Grading Plan	(March 2017)	(May 2017)
Loudoun County, Virginia	Site Plan of Development	(March 2017)	(June 2017)
Shenandoah County, Virginia	Site Plan	December 2016	(March 2017)

[a] To comply with the provisions of the Endangered Species Act, Columbia has evaluated and certified that the Project activities are consistent with the U.S. Fish and Wildlife Service approved NiSource/Columbia Multi-Species Habitat Conservation Plan (MSHCP) and the resulting programmatic Section 7 consultation for most areas, and FERC is conducting formal consultation for areas not covered by the MSHCP.

B. ENVIRONMENTAL ANALYSIS

Construction and operation of the Project would have temporary, short-term, long-term, and permanent impacts. As discussed throughout this EA, temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting between 2 and 5 years. Long-term impacts are defined as lasting 5 years or more. Permanent impacts are defined as lasting throughout the life of the Project.

1.0 GEOLOGY AND SOILS

1.1 Geology

Physiography and Geologic Setting

The Project would be located within the Appalachian Plateaus, Ridge and Valley, and the Piedmont Provinces. Much of the Appalachian Plateau is composed of cyclic sequences of Permian and Pennsylvanian sedimentary strata, including sandstone, siltstone, shale, limestone, and coal, of which the upper strata are more resistant to weathering, resulting in decreased erosional processes. The Valley and Ridge Province is famous for its folded mountains. The entire Paleozoic era, from early Cambrian to Permian, can be found in the 40,000-foot-thick sedimentary strata. These sediments were derived from an ancient mountain mass to the east (now buried under the Coastal Plain and the Atlantic Ocean), with sandstone and shale formations in the east gradually shifting to shale and limestone in the west. Most of the rocks in the Piedmont are gneiss and schist, with some marble and quartzite, derived from the metamorphism of older sedimentary and igneous rocks. In addition, downfaulted, Triassic-aged, unmetamorphosed rocks form basins of sandstone, conglomerate, and silt, and include diabase sills. Physiographic provinces and bedrock geology are depicted in figures B.1.1-1 and B.1.1-2, respectively. Elevations in the Project area range from about 250 to about 4,200 feet above mean sea level. Topography in the Project area ranges from nearly level to very steep, with slopes ranging from 0 to 81 percent based on civil field survey data points.

Mineral Resources

Based on a review of United States Geological Survey (USGS) topographic maps, recent aerial photography, and available USGS and state databases, there is 1 active mining operation and 16 oil and gas wells located within 0.25-mile of the proposed Project (USGS, 2015a; USGS, 2015b; Virginia Department of Mines, Minerals, and Energy [VDMME], 2015a; VDMME, 2015b; WVDEP, 2015b). The Carmeuse Lime & Stone quarry is located about 600 feet northeast of the Strasburg Compressor Station. Mineral resources in the Project vicinity are described in table B.1.1-1.

Blasting

Based on an analysis of the United States Department of Agriculture (USDA), Natural Resources Conservation Service's (NRCS) Soil Survey Geographic (SSURGO) Database, about 58 percent (348 acres) of the Project pipeline routes would cross areas with bedrock at depths of less than 60 inches (Soil Survey Staff, 2015a). About 205 acres of this bedrock is estimated to be lithic (i.e., hard), while the remaining 143 acres of this bedrock is considered paralithic (soft).

Based on the recently completed Order 1 Soil Survey of the MNF lands; out of 313 soil pit observations in natural soils the depth to a restrictive layer (undifferentiated between lithic and paralithic bedrock contact and fragipan contact) occurred at <12 inches in 1 percent of the pits, between 12 to 24 inches in 20 percent of the pits, between 24 to 36 inches in 55 percent of the pits, between 36 to 48 inches in 19 percent of the pits, between 48 to 60 inches in 35 percent of the pits, and greater than 60 inches in 3 percent of the pits. These values are not indicative of the existing pipeline trench where most construction would take place. About 1.3 miles of the route on MNF land would consist of new pipeline that would not be constructed using the lift and lay method and would likely encounter bedrock within 50 inches of the surface. The 1.3 miles is not contiguous, rather it consists of four segments. Route variations 9 and 10 are discussed in section B.4.2 and were adopted to address MNF concerns. Route variation 9 was adopted to avoid the roadless area and safety and engineering challenges associated with the existing Line WB-5 and the WB Loop alignments, which cross over a narrow ridgeline. Route variation 10 was adopted to avoid the roadless area associated with the Seneca Creek Roadless Inventory area. Table 5.10-1 in the COMP gives the milepost range of these segments.

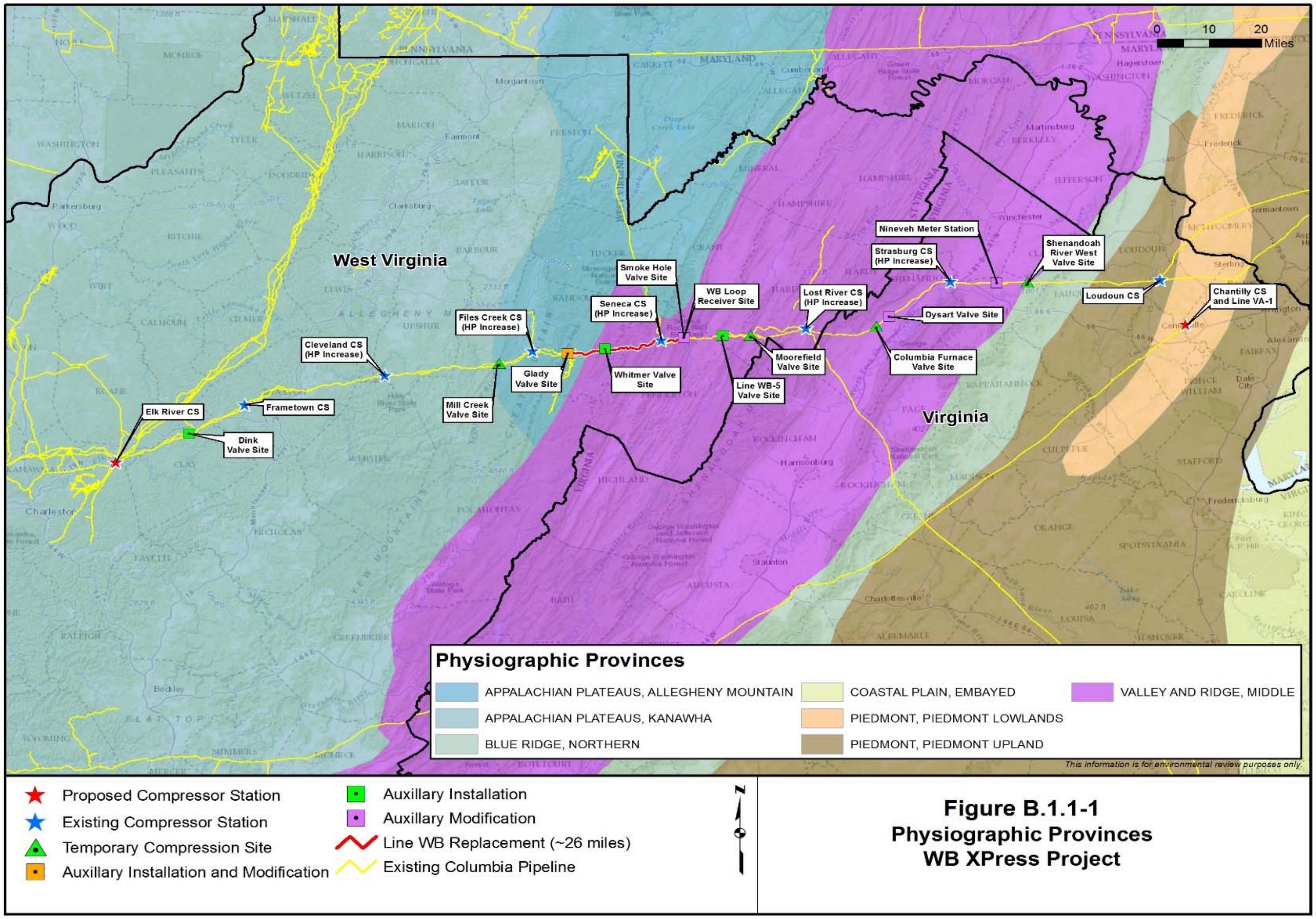

Figure B.1.1-1
Physiographic Provinces
WB XPress Project

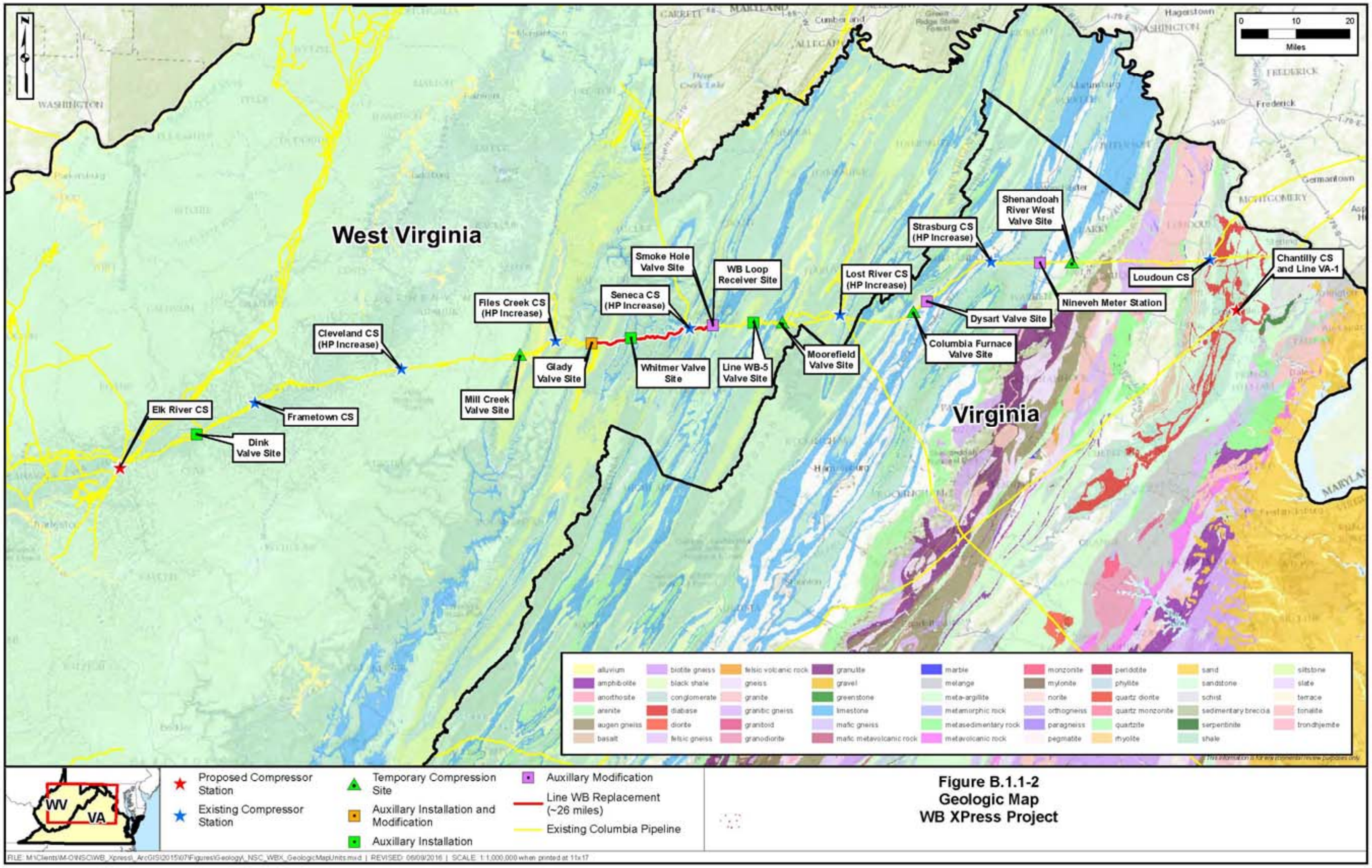

Figure B.1.1-2
Geologic Map
WB XPress Project

TABLE B.1.1-1

Mineral Resources within 0.25-mile of the WB XPress Project

Facility/County, State	Operator Name	Status	Permit ID	Distance and Direction from Project
Line WB Replacement				
Randolph, WV	Columbia Gas Transmission, LLC	Active	8300097	10 feet W of SA-3 (MP 19.1)
Elk River Compressor Station				
Kanawha, WV	Reserve Oil & Gas, Inc.	Active	3905784	327 feet N
Line WB-22 Receiver Site				
Kanawha, WV	Reserve Oil & Gas, Inc.	Active	3905785	153 feet NE
Dink Valve Site				
Clay, WV	Cabot Oil & Gas Corporation	Never Issued	7901478	931 feet SW
Frametown Compressor Station				
Braxton, WV	Trans-Capital Investment Group In	Active	701518	444 feet W
Strasburg Compressor Station				
Shenandoah, VA	Carmeuse Lime & Stone (Chemstone)	Active	05635AA	600 feet NE
Access Roads				
Pendleton, WV	T & F Exploration, LP	Plugged	7100003	36 feet NE of PAR-27A
Pendleton, WV	T&F Exploration, LP	Active	7100019	54 feet SW of PAR-27A
Kanawha, WV	Columbia Natural Resources, LLC	Plugged	3903030	147 feet N of PAR-60
Randolph, WV	Columbia Gas Transmission, LLC	Active	8300087	180 feet W of TAR-3A
Kanawha, WV	Operator Unknown	Abandoned	3901175	187 feet SE of PAR-64
Kanawha, WV	Reserve Oil & Gas, Inc.	Active	3905783	911 feet SW of PAR-60
Upshur, WV	EQT Production Company	Active	9703658	1,316 NE of PAR-101

Source: WVDEP, 2015b; VDMME, 2015b

Columbia used the Order 1 Soil Survey results to revise its depth to bedrock estimates of the amount of proposed pipeline right-of-way route overlaying shallow-to-bedrock areas. Columbia estimates that 97 percent of the pipeline route within the MNF contains bedrock within 50 inches of the soil surface. The above-mentioned SSURGO-based estimate of the paralithic (soft) contribution of bedrock was revised upward from 41 percent to 55 percent from the Order 1 Soil Survey data source.

Geologic Hazards

Geologic hazards are natural, physical conditions that can result in damage to land and structures or injury to people. Such hazards typically include seismicity (e.g., earthquakes, surface faults, and soil liquefaction), landslides, flooding, and karst terrain. The Appalachian Highlands are historically known to be a high-risk area for landslides and flash flooding following anthropogenic disturbance (Hong, Y. et al., 2007). Conditions necessary for the development of other geologic hazards, including regional subsidence, avalanches, and volcanism, are not present in the Project area. In general, the potential for geologic hazards to significantly affect construction or operation of the Project facilities is moderate. Specifically, there are portions of the Project area within the MNF that were deemed highly susceptible to landslide hazards. Columbia has performed a Landslide Hazard Assessment is which the pipeline route within the MNF was mapped and given a rating from low to high. The report from this assessment is included in attachment L of the COMP.

Earthquakes and Surface Faults

Historically, seismicity in West Virginia and Virginia has been low. The closest significant earthquake to the Project area occurred in 2011 near Mineral, Virginia, about 67 miles southwest of the Chantilly Compressor Station. This event had a magnitude of 5.8 and a Modified Mercalli Intensity of VIII. The 2011 earthquake occurred as reverse faulting on a north or northeast plane in the Central Virginia Seismic Zone, which has been producing small and moderate earthquakes since at least the 18^{th} century. The largest earthquake from this zone, prior to the 2011, was a magnitude 4.8 event occurring in 1875. A magnitude 4.5 event also occurred in 2003, producing minor damage (USGS, 2012).

Based on USGS seismic hazard mapping, the Project site is in an area where peak horizontal ground accelerations, with 10 percent probability of exceedance in 50 years, are 2 percent of gravity or less. At a 10 percent probability, the frequency of exceedance (return time) for a given horizontal ground acceleration is once every 475 years. Peak horizontal ground accelerations in the Project area, with a 2 percent probability of exceedance in 50 years (2,500 year return time), are 6 percent of gravity or less (USGS, 2014). For reference, peak horizontal ground accelerations less than four percent of gravity would result in light to no perceived shaking and no potential damage and peak horizontal ground accelerations between four and nine percent would result in moderate perceived shaking and very light damage (USGS, 2006a). Peak horizontal ground accelerations in the Project area are depicted in figure B.1.1-3.

The USGS maintains a database containing information on surface and subsurface faults and folds in the United States that are believed to be sources of earthquakes of greater than 6.0 magnitude during the past 1.6 million years (Quaternary Period). The proposed Project facilities would not cross any surface or subsurface Quaternary-aged faults identified in the database; however, the Project would be located about 75 miles north of the Central Virginia Seismic Zone (USGS, 2006b). Geologic evidence for Quaternary faulting in this zone includes small Holocene sand dikes (indicative of soil liquefaction events during prolonged shaking), but do not identify specific faults responsible for the event (Crone and Wheeler, 2000).

Soil Liquefaction

Soil liquefaction is a phenomenon often associated with seismic activity or other dynamic loading events in which saturated, non-cohesive soils temporarily lose their strength and liquefy (i.e., behave like viscous liquid) when subjected to forces such as intense and prolonged ground shaking. Areas susceptible to liquefaction may include soils that are generally sandy or silty, or are subject to saturation, such as those generally located along rivers, streams, lakes and shorelines or in other areas with shallow groundwater. Soil conditions necessary for liquefaction to occur would likely be present in the Project area. However, given the low potential for a seismic event that would cause strong and prolonged ground shaking, the potential for soil liquefaction to occur is low. The related phenomenon of landsliding, which also is partially triggered by soil pore-based forces leading to liquefaction, is discussed below.

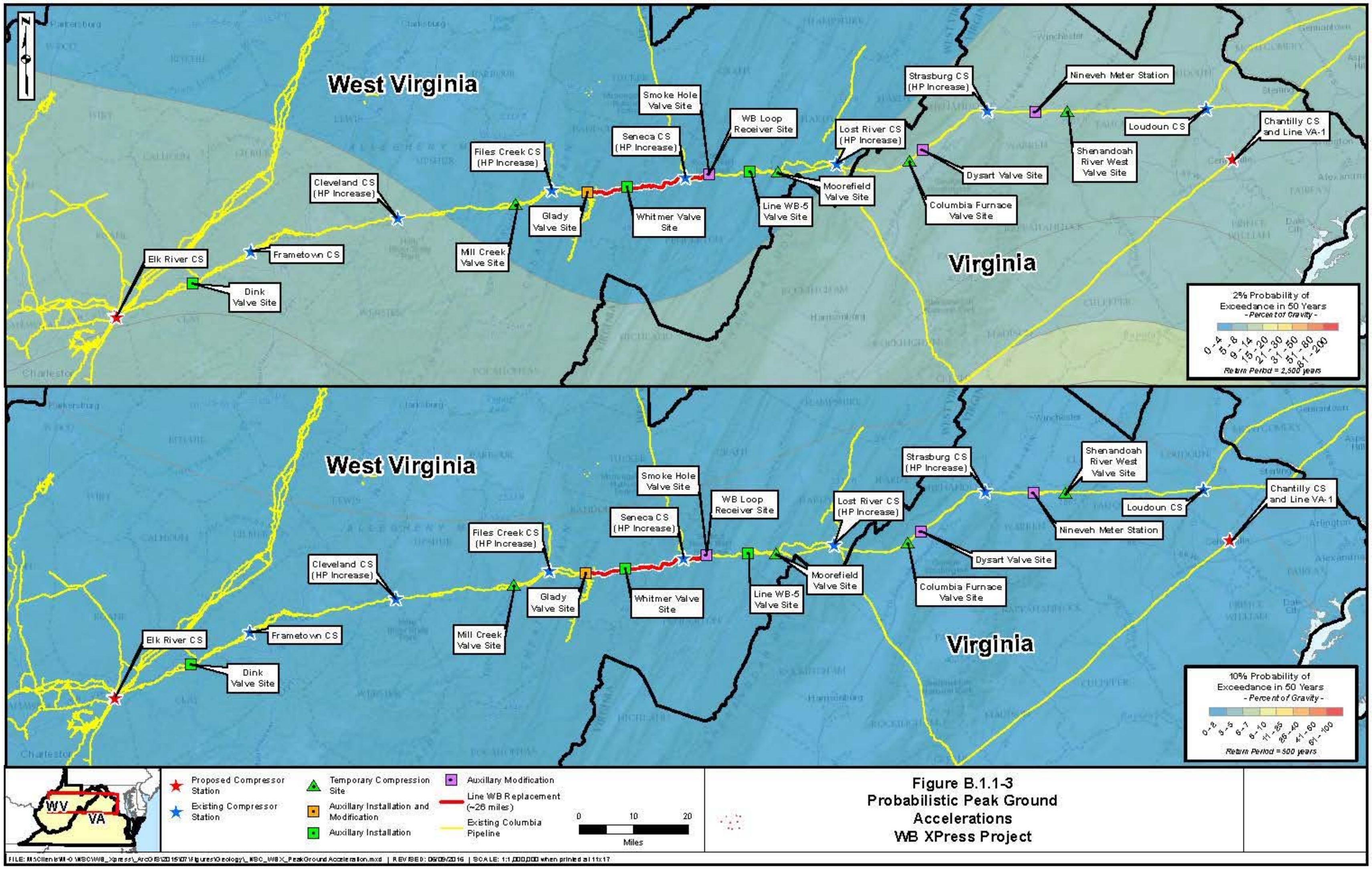

Figure B.1.1-3
Probabilistic Peak Ground Accelerations
WB XPress Project

Landslides

Landslides involve the downslope movement of earth materials under a force of gravity due to natural or manmade causes. Specific forces involved leading to landslides include inter-spaces amongst adjoining soil particles losing their tensile strength under conditions of saturation, earthquake or man-induced movement, or loss of toe-of-slope bolstering at the base of a slope, such that sideways-leading forces of gravity take over and move freed slabs of earthen material. The most common reference used to assess landslide hazards is the *Landslide Overview Map of the Conterminous United States,* authored by Radbruch-Hall et al., in 1982. The map was developed by interpreting geologic formations as having a high, medium, or low susceptibility to slope failure, and whether or not those formations have had a high, medium, or low incidence rate of observed landslides. Landslide hazard areas are depicted in figure B.1.1-4.

About 6.8 miles of proposed pipeline, 3 of the new aboveground facilities (Elk River Compressor Station, Line WB-22 Receiver Site, Line WB-5 Valve Site) and 10 of the existing aboveground facilities (Panther Mountain Regulator Station, Dink Valve Site, Frametown Compressor Station, Cleveland Compressor Station, Alexander Valve Site, Glady Valve Site, Smokehole Valve Site, Moorefield Valve Site, Lost River Compressor Station, and Columbia Furnace Valve Site) are within areas of high susceptibility to and/or incidence of landslides (Radbruch-Hall et al., 1982). The MNF states that multiple landslides in areas of steep-saturated conditions were observed within the MNF as recently as June 2016, and that another benefit of examining the Order 1 Soil Survey is that it may be possible to identify areas prone to landsliding and soil liquefaction.

An analysis of the SSURGO data showed the majority (70 percent) of the soils in the Project area have average slopes of nine percent or more and would, therefore, have a moderate to high susceptibility to landslides (Soil Survey Staff, 2015a and 2015b). About 11 percent (3.2 miles) of the Project's pipelines would cross slopes greater than 40 percent or more. Columbia's desktop and field surveys in Randolph, Pendleton, and Hardy Counties in West Virginia also identified a 2.5-mile-long area of unstable slopes between MPs 14.3 and 16.9 along the Line WB Replacement. The new aboveground facilities are proposed in areas adjacent to other existing facilities. The areas in which the existing facilities are located have had no known slope failures or landslides in recent geologic time.

Columbia performed a cross-sectional topographical survey of a 300-foot-wide linear corridor using a global positioning system and conventional survey equipment over a grid covering the natural ground every 100 feet or at specific land features (e.g. top/toe of slope, edge of water, ditch lines, etc.). The slope was then calculated by using the surveyed points to create an AutoCAD-based surface profile along the entire pipeline corridor. Additionally, Columbia performed a geohazard study to identify slopes that may be of concern. This study, which was included as appendix 6D of Columbia's Environmental Report, identified 2.5 miles of potentially unstable slopes (mostly less than 40 percent slopes) between MPs 14.3 and 16.9 (MPs 14.3 to 15.7 located outside the MNF) along the crest of the Spruce Mountain section of the Alleghany Front geologic feature. About 0.55-mile of these potentially unstable areas (between MP 15.7 and MP 16.25) was located within NFS lands.

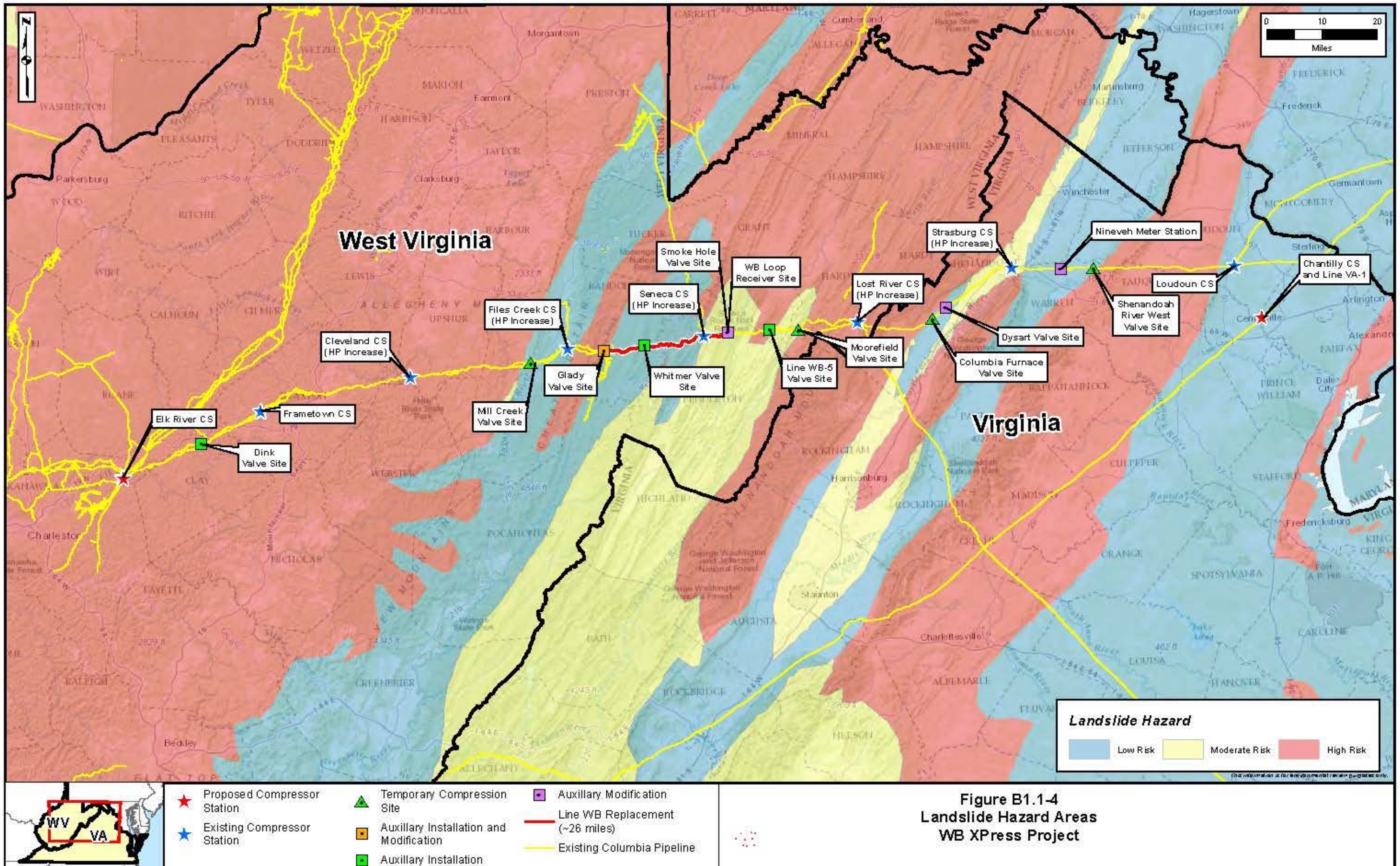

Figure B1.1-4
Landslide Hazard Areas
WB XPress Project

NFS Lands

In response to the MNF's concerns on the potential for slope instability and landslide susceptibility, Columbia and its geotechnical engineering consultant, Terracon, implemented a phased geotechnical program for identifying and assessing landslide hazards and to analyze potential slope instability along the proposed construction right-of-way within NFS lands. The results are included as Attachment L-Landslide Assessment Report in the COMP. Phase I of this geotechnical strategy used desktop geographic information system methods, in concert with the Order 1 Soil Survey, to identify areas along the pipeline corridor that are susceptible to landslide hazards. This initial phase focused on identifying available geologic data for the area and compiling this data along with nationally standardized statewide datasets for bedrock geology, elevation/terrain, and flood zones. Other geologic data identified from this research include, but are not limited to: surficial geology, overburden thickness, landslide inventory and/or mapping, and mineable resources. The public data sources reviewed for this study are tabulated in the Landslide Assessment Report, including the Order 1 Soil Survey, which was listed as third-party, project-specific data. Upon data compilation and database development, Terracon used ESRI's ArcGIS Modelbuilder to execute a custom-developed geoprocessing model to convert, re-classify, and analyze spatial data. The objective of the geoprocessing model was to generate a raster data set that classifies the land surface according to a qualitative geohazard susceptibility matrix. The final geohazard model output was a standardized raster dataset, with each cell value representing the cumulative geohazard susceptibility score. This raster model was used to classify areas as having a low, moderate, high, or very high susceptibility to landslide hazards. This effort resulted in the project-specific maps contained within the Landslide Assessment Report.

Phase II of the geotechnical strategy was completed to identify existing landslide hazards along the proposed pipeline alignment visually, by aerial and ground patrol methods. Results from the visual assessments were compared to the model results to help evaluate the model, as appropriate, as well as determine appropriate scopes for design. An aerial survey of the proposed pipeline alignment was performed to observe the visible ground surface for indicators of existing landslide hazard features. Areas of interest were identified during the aerial survey in the vicinity of the proposed construction right-of-way.

Field verification surveys of the Areas of Interest were then performed on foot. The purpose of the field survey was to inspect the proposed construction right-of-way and workspace areas for signs of instability, past ground movement, and to make general geotechnical observations about potential landslide-affected areas, including: notation of landslide features, aspects of surface topography, drainage, existing structures, vegetation, and surface soils.

In general, widespread evidence of slow, natural soil creep-type movement was observed in the form of undulating, "hummocky" ground surface, bent/leaning trees, exposed tree roots, etc. This is consistent with observations reported by ERM during the Order 1 Soil Survey. The creep-type movement can be mitigated during construction by typical methods described in Columbia's ECSs (see appendix A of the COMP). In addition to the creep-type slope movement, one past landslide was observed during field surveys near MP 0.4. The landslide appeared to be inactive and the majority of the scarp was located outside the proposed workspaces for the Project. No indications of active deep-seated slope failures were identified during field surveys. Columbia is aware that large storm events in the central Appalachians often result in large-scale incidence of landslide activity. Such an event did occur in June 2016 and similar storms are predicted to increase in the future. This project did take into account the information collected from that event and elevated the risk based on geology and soil type.

Mining

Underground mining for coal has occurred in the states crossed by the Project since the 1800s. In the United States, the traditional method used is room-and-pillar mining. This consists of excavating an area ("room") while leaving pillars of coal in place to support the mine roof. The other basic method of underground coal mining is longwall mining. Longwall mining involves the complete removal of coal contained in a large rectangular block or "panel". Following removal of the coal, the mined-out area is allowed to collapse. Longwall mining coal production has grown rapidly over the past 50 years and is now one of the principal underground mining methods in the United States (Energy Information Administration, 1995).

One impact of underground mining, especially longwall mining, is subsidence at the surface when the mine collapses. The potential damage of subsidence on structures (e.g., building, roads, or utility lines) at or near the surface depends on the structures orientation and position within the subsided area (Energy Information Administration, 1995).

The WVDEP, Division of Water and Waste Management, advised Columbia to avoid routing pipelines through abandoned mine lands, paying attention to handling capped toxic overburden replacement areas if trenching is envisioned through abandoned mines. However, based on a review of the USGS Mineral Resources Data System, it was determined that no known subsurface mines exist within 0.25-mile of the Project facilities. Therefore, subsidence from coal production is not expected to impact the Project. Additionally, no plans have been identified for future coal mining near the proposed facilities.

Flooding

The greatest potential for flash flooding to occur in the Project area would be along waterbodies such as ephemeral, intermittent, or perennial streams during or after a large storm event with significant precipitation over a short period of time. According to the Federal Emergency Management Agency flood insurance rate maps and the National Flood Hazard Layer data, four (one new, three existing) aboveground facilities including the Elk River Compressor Station, Files Creek Compressor Station, Whitmer Valve Site, and Lost River Compressor Station would be located within the 100-year floodplain, which includes areas that will be inundated by flood events having a 1.0 percent chance of being equaled or exceeded in any given year (FEMA, 2014). A portion of the Elk River Compressor Station workspace would lie in the regulatory floodway; however, no structures would be constructed in the floodway. No facilities would be located within the 500-year floodplain, which includes areas that will be inundated by flood events having a 0.2 percent chance of being equaled or exceeded in any given year (FEMA, 2014).

Karst Terrain

Karst terrain is a type of landscape, generally underlain by soluble carbonate bedrocks such as limestone, dolomite, gypsum or marble, whose topographic features are chiefly formed by the dissolving of bedrock by surface water or groundwater. These features are characterized by sinkholes, closed depressions, sinking streams, and near-surface subterranean drainages and caves/caverns. Based on publicly available data from the USGS, WVDEP, and the Virginia Department of Conservation and Recreation (VDCR), segments of the proposed Project in West Virginia and Virginia cross areas with the potential to contain karst features.

Karst hazards could include ground subsidence, unstable pipeline bedding, sinkhole collapse, water interaction, transmission of fluids through cracks and fractures, and cross-connectivity issues affecting water quality and water quantity/stream bank stability. Loose rock or overburden soil could obscure possible solution openings in the bedrock surface prior to construction and only become evident during trenching activities. These overburden materials could be subject to differential subsidence at locations where voids have formed in the underlying bedrock resulting in closed-contour depression sinkholes and/or surficial collapse of the soil column at ground surface (collapse sinkholes). This process could be significant in areas where the water table has been lowered either naturally or through man-induced activities such as groundwater pumping.

Sinkholes, which are a major feature of karst terrain, fall into two broad categories: vault collapse sinkholes and cover-collapse sinkholes. Vault-collapse sinkholes are characterized by the sudden catastrophic failure of a subterranean cavern vault (i.e., a roof), causing the rapid displacement of surface materials into the resulting void. Vault-collapse sinkholes are present, but rare, in the areas crossed by the proposed Project.

The more common sinkhole type, a cover-collapse sinkhole, forms from the transport of soil materials from the surface into the bedrock through pre-existing voids or conduits. The resulting voids from this process are filled with the surrounding soil materials (a process called piping), and over time, form a noticeable depression on the land surface. This natural process can be exacerbated by disturbances such as: 1) an increase or redirection of overland or subsurface hydrology (i.e., surficial grading), which may accelerate the transportation of soil materials; 2) removal of vegetative cover and topsoil (e.g., stripping or grubbing), which can reduce the cohesive strength of soils; and 3) sudden changes in the elevation of the water table (e.g., due to drought, over-pumping of wells, or quarry dewatering), which removes the natural buoyancy of the water supporting a soil plug in a bedrock channel.

Columbia conducted desktop and field survey investigations to identify sinkholes and other karst features during fall 2015 along the proposed Line WB Replacement in Randolph, Pendleton, and Hardy Counties in West Virginia. The desktop review examined existing literature and remote sensing data to create an inventory of known karst features located within a 300-foot study area centered on the centerline, and known or suspect karst features in an area extending 0.5-mile on either side of the proposed right-of-way.

The desktop review identified geologic units known for unstable slope and landslide behavior (e.g., Mauch Chunk and Pottsville Formations) and potential karst geologic features at major stream crossings. The focus at major stream crossings was to identify the strata under streams and rivers which could be inferred to intersect karst-prone rock.

The field survey investigation focused on identifying and delineating surface karst features (e.g., sinkholes, karst-related subsidence, cave entrances, closed depressions, and sinking and losing streams) with an emphasis on features inferred to have direct communication with uncovered karst features (e.g., “open-throat” sinkholes, karst windows, cave entrances, abandoned wells, and sinking streams). The study located, and delineated wherever possible, suspect or mapped karst features outside the 300-foot study area, but were within the 0.5-mile karst review area that touched or received drainage from the 300-foot study area.

The results of the investigation, detailed in the Karst Terrain and Preliminary Geohazard Investigation Report (attachment M to the COMP),[14] listed 24 karst caves within 1-mile of the project and delineated karst features in four areas within the 300-foot study corridor: Bennett Creek, Gandy Creek, Spruce Mountain Upland, and Onego. No caves were identified within the 300-foot study area.

Paleontology

Based on the scope of the Project, Columbia does not anticipate any paleontological resources within the Project vicinity. Columbia would notify the appropriate agencies if significant fossil materials are encountered during construction. Until a determination is made by the appropriate agencies, work would be stopped in the immediate area of the paleontological find. Columbia filed its Plan for Unanticipated Discovery of Paleontological Resources During Construction.[15]

General Impacts and Mitigation

The overall effect of the Project on topography and geology would be minor. The primary impacts would be limited to construction activities and would include temporary disturbance of slopes within the right-of-way resulting from grading and trenching. Columbia would minimize impacts by returning contours to pre-construction conditions to the maximum extent practicable. At the aboveground facilities, grading and filling may be required to create a safe and stable land surface to support the facility.

Based on the low probability of localized earth movements in the vicinity of the Project, no problems attributable to earthquake activity are anticipated. Maintained pipelines constructed using modern arc-welding techniques have performed well in seismically active areas of the United States, such as California (O’Rourke and Palmer, 1996). Only large, abrupt ground displacements have caused serious impacts on pipeline facilities. Due to the limited potential for large, seismically induced ground movements in the Project area (USGS, 2014), there is little risk of earthquake-related impacts on the pipeline and other Project facilities.

The EPA inquired about the risk of citing new aboveground facilities in areas susceptible to landslides. Siting the new aboveground facilities outside of areas with high susceptibility to landslides is impractical due to the valve siting requirements set forth by the DOT PHMSA. The Project facilities would be designed and built in accordance with DOT standards (Title 49 CFR Part 192), which would provide adequate protection from washouts, floods, unstable soils, karst landscape, landslides, or other hazards that may cause the pipe to move or sustain abnormal loads. The potential for slope failure and erosion during construction would be minimized by implementing the measures in Columbia’s ECS. These measures would include the use of erosion control devices (e.g., silt fences, slope and trench breakers) and other best management practices to stabilize soils. Based on the implementation of these measures and adherance with the DOT standards, the risk of impacts due to geologic hazards on the Project facilities ranges from low to high. As discussed above, the risk of landslides is high in certain environments of the Appalachian Highlands.

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[14] The Karst Terrain and Preliminary Geohazard Investigation Report was filed as appendix 6D with Columbia’s application on December 31, 2015 and can be obtained at elibrary.ferc.gov.

[15] The Plan for Unanticipated Discovery of Paleontological Resources During Construction was filed on October 14, 2016 and can be viewed on the FERC website at http://www.ferc.gov. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20161014-5171 in the “Numbers: Accession Number” field.

Columbia would attempt to use hydraulic hammering to dislodge paralithic bedrock, and may resort to rock sawing, ripping, or even blasting using its blasting plan, in areas with lithic bedrock (Columbia would also abide by the MNF standards for blasting, see attachment G of the COMP). Columbia filed a Blasting Plan for use in the State of West Virginia and we find it acceptable. Blast rock or otherwise excavated rock may be used to backfill the trench to the top of the existing bedrock profile. Columbia's blasting plan contains measures to protect utilities, wells, persons, and property during blasting operations. It is not anticipated that blasting would be required in the State of Virginia, but if it is needed, **we recommend:**

- **<u>Prior to construction,</u> Columbia should file with the Secretary, for review and written approval by the Director of the OEP, a site-specific blasting plan for use in the State of Virginia that includes the procedures for monitoring and mitigation of the potential effects of bedrock blasting on surface structures, water wells, and other buried utilities and how those impacts would be addressed.**

The majority of the Project facilities would be constructed directly adjacent to the existing pipeline, electric transmission line, or other utility right-of-way, which already preclude mining operations. For example, the Carmeuse Lime & Stone quarry and the Strasburg Compressor Station are separated by the I-81 highway. Therefore, construction and operation of the Project would not result in a significant, additional restriction to current or future mining operations in the area. None of the oil and gas wells identified would be within Project workspaces. If an unanticipated oil or gas well is discovered proximate to the Project workspace, Columbia would stop construction in the area and immediately notify the VDMME or WVDEP and FERC. If necessary, Columbia would request approval to reroute the pipeline around the area.

Columbia would primarily use steep slope construction and mitigation measures from the Slip Prevention Control Procedures contained within the WVDEP's E&SC Plan. As required by the FERC Procedures and relevant state and Corps permits, if construction activities affect the potential for landslide material that may result in impacts on Waters of the United States, Columbia would immediately notify the appropriate Corps district office and state regulatory office.

Columbia would minimize risks in potential landslide areas through its employment of specialized procedures in steep slopes during construction and operation. Landslide risk would be further minimized by implementing a Slip Prevention Control Procedures, (see Data Request 7 Attachment 1[16]), as well as various surface and subsurface measures described in Columbia's site specific ECS and E&SC Plan, including waterbars, trench breakers, and appropriate placement of spoil piles to prevent downslope movement. Pipe installation and construction activities across steep slopes would require that equipment may be tethered via winch lines to other equipment at the top of slopes to ensure the safety of work crews. Pipe joints would be stockpiled at the top or bottom of each slope. A side-boom tractor tethered to a winch line would carry one joint at a time up or down the slope and place the joint along the trench. The joint would then be lowered into the trench by a tractor. Welders would connect the joint to the

[16] These were filed on October 6, 2016 and can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161006-5125 in the "Numbers: Accession Number" field.

previous joint within the trench to assemble the pipeline. Pipeline may be buried to a deeper depth below the grade of potential landslide movement.

In order to control water flow and reduce saturation of landslide-prone slopes during construction and operation, Columbia would use appropriate erosion control measures to reduce erosion on steep terrain. This may include frequent spacing of permanent erosion controls, use of subsurface gravel or cobble drains, and installed culverts and drainage ditches to divert water away from the facilities or rights-of-way. Reinforced silt fences, staked straw bales, and erosion control matting may be used during construction and restoration activities. Permanent trench breakers consisting of sandbags, or cement-filled sacks would be installed as the trench is backfilled. Permanent slope breakers would be constructed in coordination with the placement of the trench breakers in accordance with Columbia's state ECS and project-specific E&SC Plans.

If necessary, springs or seeps found entering or emanating from the construction right-of-way would be temporarily diverted off the construction workspace to stable areas or carried downslope through drain pipes and/or gravel French drains that may be required as part of restoration. Grading of the right-of-way to pre-construction contours would result in a more stable right-of-way surface and assist in successful revegetation. In general terms, a bleeder drain is installed to divert seeps and springs away from the pipeline to avoid pipeline slips. Columbia has also provided documentation, including narrative description and photographs in Data Request 7 Attachment 1, to demonstrate the successful use of bleeder drains on a similar pipeline project in West Virginia. The prevention of slips of the pipeline is the primary goal when encountering seeps and springs. Coordination between Columbia, the MNF, and WVDEP is ongoing regarding the planned implementation of these measures.

Mitigation measures to prevent flooding may include building up the site elevation, installing equipment and structures on elevated piers, and factoring in design measures to prevent erosion and facilitate proper site drainage. Construction of Project facilities on Federal Emergency Management Agency flood zones would be designed and constructed in accordance to DOT standards and all applicable stormwater regulations and permits.

Columbia provided an acceptable Karst Terrain and Preliminary Geohazard Investigation (appendix M of the COMP) which contains measures that would be implemented to monitor and minimize risks associated with karst features and mitigate potential construction impacts. These monitoring and construction procedures include, but are not limited to the following: 1) monitoring of karst features that are known prior to construction, are discovered during construction, or disturbed during construction; 2) protecting features in all work areas by marking buffer areas; 3) conducting earthwork in a manner that minimizes alteration of existing grade and hydrology of existing surficial karst features; 4) attending to uncovered features with specific stabilization procedures; 5) controlling runoff and trenchwater disposal water to avoid erosion of features; and 6) other measures related to blasting and access roads. In addition, Columbia committed to having a geotechnical professional evaluate uncovered features during construction to determine the need for additional mitigation measures or stabilization.

<u>NFS Lands</u>

The majority of pipeline construction through the MNF would consist of lift and lay in which the established trench is uncovered, removed of its existing pipeline, and new pipeline installed and backfilled. About 1.3 miles of the route would consist of new trench, and this entire length would likely encounter bedrock within 50 inches of the soil surface; specifically between MPs 11.7 to 12.0, 15.7 to 16.3, and within 0.1-mile segments at MPs 13.5, 193.7 and 20.0.

A landslide effects analysis was conducted using computer-aided simulations to identify areas of proposed pipeline construction expected to be under greater risk of landslides. The analysis concluded that: in general, widespread evidence of slow, natural soil creep-type movement was observed in the form of undulating, "hummocky" ground surface, bent/leaning trees, exposed tree roots, etc. This is consistent with observations reported Project surveyers during the Order 1 Soil Survey. The creep-type movement can be mitigated during construction by typical methods described in Columbia's ECSs. In addition to the creep-type slope movement, one past landslide was observed during field surveys near MP 0.4. The landslide appeared to be inactive and the majority of the scarp was located outside the proposed workspaces for the Project. No indications of active deep-seated slope failures were identified during field surveys. Many landslides occurred on NFS lands during a June 2016 storm and this knowledge has been incorporated into the risk assessment and the designs for the pipeline in areas of similar geology and soils.

Columbia would ensure safety measures in areas of potential landslides through its employment of specialized procedures in steep slopes during construction and operation. Columbia would mitigate landslides by implementing its Slip Prevention Control Procedures, (see Data Request 7 Attachment 1), as well as various surface and subsurface measures described in its ECS and E&SC Plan, including waterbars, trench breakers, bleeder drains, and appropriate placement and protection to spoil piles to prevent downslope movement. Based on the results of Phase I and II of the geotechnical strategy, no further site characterization, subsurface exploration, or geotechnical engineering analysis is proposed (i.e., Phase III geotechnical work). However, based on the close proximity of the inactive landslide identified near MP 0.4, Columbia would have a geotechnical engineer on-site to monitor the area, including at the start of construction and during post-construction site restoration. The geotechnical engineer would be able to evaluate the slope stability in the area, assess activity and determine if mitigation or remediation measures are warranted.

If necessary, springs or seeps found entering or emanating from the construction right-of-way would be temporarily diverted off the construction workspace to stable areas or carried downslope through drain pipes and/or gravel French drains that may be required as part of restoration. Grading of the right-of-way to pre-construction contours would result in a more stable right-of-way surface and assist in successful revegetation. No springs are identified within Project workspace on NFS land. Two seeps at MPs 3.9 and 4.3 are within the proposed construction workspace. Columbia proposes to implement its Slip Prevention Control Procedures (Data Request 7 Attachment 1) to permanently re-direct potential seeps or springs off the right-of-way. Columbia met with MNF staff and a WVDEP representative on September 28, 2016 to discuss the implementation of these procedures which have been approved by the WVDEP for use throughout the state. In general terms, a bleeder drain is installed to divert seeps and springs away from the pipeline to avoid pipeline slips. Columbia has also provided documentation, including narrative description and photographs in Data Request 7 Attachment 1, to demonstrate the successful use of bleeder drains on a similar pipeline project in West Virginia. The prevention of slips of the pipeline is the primary goal when encountering seeps and springs.

Coordination between Columbia, the MNF, and WVDEP is ongoing on the planned implementation of these measures.

The MNF indicates drainage along Columbia's existing pipeline right-of-way across MNF lands, and within proposed rights-of-way, could be hydrologically disconnected from the surrounding landscape. This disconnection may pose problems for proper drainage of the proposed pipeline installation, potentially resulting in saturation-induced slippages (landslides). Columbia would address and account for the existing drainage patterns during the restoration of the proposed construction workspace. Columbia's use of trench and slope breakers to facilitate water running across the right-of-way would prevent water from piping down the trench line. On NFS lands the spacing of erosion controls would be adjusted accordingly in order for Columbia to meet MNF LRMP SW07 for steep slope construction procedures. This adjustment would be based upon the site-specific design criteria outlined in the final COMP.

No karst features were identified or located in parcels under MNF land. One area of concern was identified in the Karst Mitigation Plan, on the south side of the right-of-way near MP 14.1 of the Line WB Replacement that includes a spring and a karst feature (closed depression, or sinkhole). Columbia has eliminated the extra workspace closest to the feature on the south side of the right-of-way and replaced it with an equivalently sized workspace on the north side of the right-of-way. This change would increase the distance of the workspace from the feature out to a more acceptable distance of 77 feet.

1.2 Soils

Existing Soil Resources

General soil information for the Project area was obtained from the NRCS SSURGO database (Soil Survey Staff, 2015a). The SSURGO database is a digital version of the original county soil surveys developed by the NRCS for use with geographic information systems. Extensive work has been done by the NRCS in the last several years to join and correlate soil map units across historic political boundaries into physiological areas. This work is currently on-going and updates to the SSURGO database are periodically released throughout any given year. The SSURGO database provides the most detailed level of soils information immediately available for natural resource planning and management to the public. Additional information about soils was obtained from Official Soil Series Descriptions (Soil Survey Staff, 2015b).

<u>NFS Lands</u>

The MNF LRMP provides direction through SW02 to collect, interpret, and display information on Forest Soils to: 1) Determine the kinds and intensities of soil resource inventories needed, 2) Identify relationships between soil types and the growth of trees or other vegetation, 3) Predict effects to soil and water resources caused by various management options applied to specific tracts of land, 4) Provide information to aid in multiple-use management that does not impair the productivity of the land, and 5) Identify limitations on management practices and mitigation measures by soil mapping unit for activities that have potential to impact soil and water resources. Therefore, based on LRMP Guideline SW10, the MNF selected an Order 1 Soil Survey methodology which is based on a more precise degree of study, and therefore more detailed level of information, than that provided by the SSURGO survey (Order 2). Columbia agreed to augment the soils information from the SSURGO-published source by conducting an Order 1 Soil Survey of the soils that would be affected by the Project within NFS lands largely following methods outlined in Stolt (2007) and SSSNNE (2011). In particular, the design and naming of map units were based on Stolt (2007). This field survey included soil characteristics such as depth to bedrock, texture, moisture, rock content, slope and acidity, and is complete and accepted by the USFS and was filed with the FERC on December 21, 2016 (Docket # CP16-38-000; Submittal # 20161221-5102). The results of the survey are summarized in a report that Columbia provided to the USFS and filed on October 21, 2016 on the FERC docket (Docket # CP16-38-000; Accession #: 20161021-5163). Overall, both types of soil surveys are used to inform the planning, design, and construction for this project

As stated in the MNF LRMP, an ideal condition for soil and water resources is soil protective cover, soil organic matter, and coarse woody material are at levels that maintain the natural infiltration capacity, moisture regime, and productivity of the soil. Soils also have adequate physical, biological, and chemical properties to support desired vegetation growth. Exposed mineral soil and soil compaction from human activity may be present but are dispersed and do not impair the productivity and fertility of the soil. This condition serves as a guide for the protection, restoration, and management of the soil resources in the MNF associated with this project.

For MNF lands, soils within the existing right-of-way consist of a mix of disturbed backfill materials within the pipeline trench associated with the retired Line WB and partially modified native soils between the existing pipeline trenches, where the right-of-way contains multiple pipelines. Subsurface soil materials within the existing Line WB trench vary widely based on the parent materials of the original natural soils and range from silty- to loamy-textured materials in the fine-earth fraction, with coarse fragment contents ranging from about 15 percent to as much as 80 percent. Coarse fragment size ranges from gravels and channers to large flagstones, cobbles, and boulders, depending on bedrock geology. Subsurface soil materials within the existing Line WB pipeline trench were weakly to strongly compacted and presented a high to very high degree of hand excavation difficulty. The soil map unit that covers the existing right-of-way also includes a 5-foot- to 20-foot-wide area of large cobbles, flags, and boulders deposited along the margins of the right-of-way over the course of multiple construction episodes. The rock materials were likely separated from soil materials as part of grading and backfilling operations during past pipeline construction and were side cast or windrowed at the edge of the right-of-way. Surface rock content on the existing right-of-way is generally low as a result of this previous grading activity during construction.

Native soils, outside the existing right-of-way, generally consist of spodosols, spodic intergrades, inceptisols, entisols, and ultisols. Most of the native soils formed in residuum or thin colluvium over residuum on upland slopes. Slopes ranged from 3 percent to greater than 60 percent and included summit, shoulder, backslope, and footslope positions. Tree-throw pit and mound microtopography ranged from little or none to prevalent on the upland slopes. In areas where the microtopography was prevalent, a few of the pedons were excavated in pits and a few in mounds. The native soils range from shallow to deep, with most soils falling in the moderately deep class (20 to 40 inches to paralithic or lithic contact). Drainage classes range from somewhat-poorly drained to excessively drained with most soils occurring in the well-drained class. Surface rock content ranges from about 15 percent to as much as 80 percent or more (including rock outcrop) and rocks range from large gravels to boulders depending on landscape position and local bedrock geology. Coarse fragment content of the natural subsoils varies widely, ranging from 15 percent or less to as much as 80 percent or more and varies from gravels and channers to flags, cobbles, and boulders, depending on the parent materials. Most soils occur in the loamy-skeletal to fine loamy family. The content and distribution of surface and subsurface rock in the natural soils has implications for soil segregation and management during construction.

General Impacts and Mitigation

Construction activities such as clearing, grading, trench excavation, backfilling, and the movement of construction equipment along the right-of-way may affect soil resources. Clearing removes protective vegetative cover and exposes the soil to the effects of wind and rain, which increases the potential for soil erosion and sedimentation of sensitive areas. Grading, spoil storage, and equipment traffic would compact soil, reducing porosity and increasing runoff potential and sedimentation into streams. Construction activities would also affect soil fertility and revegetation potential, and facilitate the dispersal and establishment of weeds. Inadequate restoration of subsoil and topsoils during trench backfilling, grading and restoration could result in poor revegetation, decreased soil stabilization, increased erosion and sedimentation, and settling over the buried pipeline. In addition, contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. Mitigations and design features would be applied to soil disturbing activities to reduce these affects. The COMP outlines in detail how these mitigations and design features are to be applied to implementation of the project both in a general manner and in a site-specific detailed manner (see Attachment B: MNF Erosion and Sediment Control Plans; Attachment D: Restoration Plan; Attachment I: Slip Prevention Control Procedures; Attachment K: Steep Slope Work Procedures).

Using the SSURGO database, the soils in the Project area were evaluated to identify prime farmland and major soil characteristics that could affect construction or increase the potential for adverse construction-related soil impacts. The soil characteristics evaluated include erosion potential, the potential for compaction, and revegetation concerns. Table B.1.2-1 summarizes the amount of prime farmland and the significant soil characteristics in the Project area.

TABLE B.1.2-1

Acres of Soil Characteristics Affected by the WB XPress Project Facilities [a, b]

Pipeline Facility	Total acreage	Prime Farmland [c]	Compaction Prone [d]	Highly Erodible		Re-vegetation Concerns [g]	Rocky [h]	Shallow to Bedrock [i]
				Water [e]	Wind [f]			
New Pipeline Facilities								
Line WB-5 Extension	2.5	1.9	0.0	1.9	0.0	1.9	1.5	1.9
Line WB-22	5.7	3.5	0.0	5.0	0.0	5.0	4.1	5.0
Line VA-1 with HDD	9.3	4.8	6.0	2.1	0.0	2.1	1.6	4.8
Line WB-5 Extension Access Roads	0.5	0.2	0.0	0.5	0.0	0.5	0.4	0.5
Line WB-22 Access Roads	0.4	0.2	0.0	0.4	0.0	0.4	0.4	0.4
Line VA-1 Access Roads	3.9	1.8	2.4	0.6	0.0	0.6	1.5	2.8
Subtotal	**22.3**	**12.4**	**8.4**	**10.5**	**0.0**	**10.5**	**9.5**	**15.4**
New Aboveground Facilities								
Elk River Compressor Station	7.3	6.4	0.0	1.0	0.0	1.0	1.0	1.0
Line WB-22 Receiver Site	1.3	1.2	0.0	1.3	0.0	1.3	0.7	1.3
Line WB-5 Valve Site	0.3	0.3	0.0	<0.1	0.0	<0.1	0.3	0.0
Chantilly Compressor Station	13.2	2.7	1.6	9.6	0.0	9.6	11.6	13.2
Line VA-1 Receiver Site	0.1	<0.1	<0.1	<0.1	0.0	<0.1	0.0	<0.1
Subtotal	**22.2**	**10.6**	**1.6**	**11.9**	**0.0**	**11.9**	**13.6**	**15.5**
Replacement Pipeline Facilities								
Line WB Replacement	349.3	143.1	0.7	291.4	0.0	331.5	321.4	225.2
Line WB-5 Replacement	2.2	1.2	0.0	2.2	0.0	2.2	2.2	1.1
Line WB (1-5)	5.8	1.3	0.3	5.2	0.0	5.2	5.5	3.3
Line WB Access Roads	32.9	8.6	0.0	30.1	0.0	30.5	32.1	19.8
Line WB-5 Access Roads	0.6	0.6	0.2	0.2	0.0	0.2	0.3	0.1
Subtotal	**390.8**	**154.8**	**1.2**	**329.1**	**0.0**	**369.6**	**361.5**	**249.5**
Line WB Replacement Subtotals by County [j]								
Randolph County	162.4	66.6	0.7	118.2	0.0	158.3	134.8	104.3
Pendleton County	187.2	76.8	0.0	173.2	0.0	173.2	186.6	120.9
Replacement Pipeline Facilities Subtotals by County [j]								
Randolph County	171.4	68.9	0.7	126.7	0.0	167.2	143.2	111.1
Pendleton County	209.1	83.3	0.0	192.9	0.0	192.9	208.3	131.0
Grant County	5.2	2.3	0.5	4.2	0.0	4.2	4.6	2.9
Hardy County	1.7	0.1	0.0	1.7	0.0	1.7	1.7	1.2
Modifications to Existing Aboveground Facilities								
Panther Mountain Regulator Station	1.3	1.3	0.0	1.3	0.0	1.3	0.8	1.3
Dink Valve Site	0.5	0.6	0.0	0.0	0.0	0.0	0.5	0.0
Frametown Compressor Station	9.5	9.4	0.0	3.2	0.0	3.2	3.3	0.8
Cleveland Compressor Station	15.7	6.9	0.0	15.7	0.0	15.7	15.7	15.7
Mill Creek Valve Site	0.5	0.0	0.1	0.4	0.0	0.4	0.5	<0.1

TABLE B.1.2-1 (Continued)

Pipeline Facility	Total acreage	Prime Farmland [c]	Compaction Prone [d]	Highly Erodible Water [e]	Highly Erodible Wind [f]	Re-vegetation Concerns [g]	Rocky [h]	Shallow to Bedrock[i]
Modifications to Existing Aboveground Facilities (Continued)								
Files Creek Compressor Station	14.5	0.2	0.0	5.8	0.0	5.8	5.8	5.6
Glady Valve Site	2.8	0.0	0.2	2.3	0.0	2.3	2.5	0.6
Whitmer Valve Site	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0
Seneca Compressor Station	17.5	8.5	0.0	9.5	0.0	9.5	9.5	0.9
WB Loop Receiver	0.4	0.4	0.0	0.4	0.0	0.4	0.4	0.1
Smokehole Valve Site	0.8	0.8	0.0	0.8	0.0	0.8	0.8	0.2
Moorefield Valve Site	1.0	0.7	0.0	1.0	0.0	1.0	1.0	0.2
Lost River Compressor Station	19.7	8.9	0.0	10.7	0.0	0.1	9.0	0.1
Columbia Furnace Valve Site	0.8	0.8	0.0	0.4	0.0	0.4	0.8	0.0
Dysart Valve Site	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0
Strasburg Compressor Station	17.7	8.3	0.0	4.2	0.0	9.5	0.0	17.7
Nineveh Meter Station	1.9	0.0	0.0	1.9	0.0	1.9	<0.1	1.9
Shenandoah River West Valve Site	0.3	0.3	0.0	0.3	0.0	0.3	0.3	<0.1
Loudoun Compressor Station	14.3	14.3	1.1	7.0	0.0	7.0	13.2	14.3
Valve Site Access Roads	4.4	3.8	<0.1	3.6	0.0	3.6	4.4	0.3
Subtotal	**124.9**	**66.2**	**1.4**	**69.5**	**0.0**	**64.5**	**69.8**	**59.7**
Contractor Yards								
West Virginia Sites	49.5	33.9	9.3	13.4	0.0	13.4	38.4	9.3
Virginia Sites	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**49.5**	**33.9**	**9.3**	**13.4**	**0.0**	**13.4**	**38.4**	**9.3**
West Virginia Contractor Yards Subtotals by County								
Kanawha County	5.2	5.2	0.0	0.0	0.0	0.0	0.0	0.0
Randolph County	36.2	19.9	9.3	13.0	0.0	13.0	30.3	8.8
Pendleton County	8.1	4.6	0.0	0.5	0.0	0.5	8.1	0.5
TOTAL[a]	**609.7**	**277.9**	**21.9**	**434.4**	**0.0**	**469.9**	**492.8**	**349.4**

Sources: Soil Survey Staff, 2015a and 2015b

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

b Values within rows do not add up to the totals listed for each facility due to the fact that soils may occur in more than one characteristic class or may not occur in any class listed in the table.

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

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

e Soils in land capability subclasses IVE through VIIIE and soils with an average slope greater than 8 percent.

f Soils with a WEG classification of 1 or 2.

g Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained, and soils with an average slope greater than eight percent.

h Soils with one or more horizons that have a cobbley, stony, bouldery, channery, flaggy, very gravelly, or extremely gravelly modifier to the textural class and/or contain greater than 5.0 percent by weight rocks larger than 3.0 inches.

i Soils identified as containing bedrock within 60.0 inches of the soil surface. About 202.3 acres are lithic (hard) and could require blasting; the remaining 147.1 acres are paralithic (soft) and likely rippable with standard construction equipment.

j Soil acreage values do not include access road acreage.

Erosion

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors such as soil texture, structure, slope, vegetative cover, rainfall intensity, and wind intensity can influence the degree of erosion. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind-induced erosion often occurs on dry soil where vegetative cover is sparse and strong winds are prevalent.

To minimize or avoid potential impacts due to soil erosion and sedimentation, Columbia would use the erosion and sedimentation controls outlined in the West Virginia ECS, attachment A and in the MNF E&SC Plans, attachment B. Columbia's E&SC Plans adopts and incorporates the requirements identified in the FERC's *Upland Erosion Control, Revegetation and Maintenance Plan* and *Wetland and Waterbody Construction and Mitigation Procedures*. Temporary erosion controls, including slope breakers and sediment barriers (e.g., straw bales and silt fences), would be installed following initial ground disturbance to control runoff and prevent sediment transport off the construction right-of-way. Temporary slope breakers would be installed during grading in accordance with Columbia's E&SC Plans to reduce runoff velocity and divert water off the construction work areas into stable, well-vegetated areas. Temporary interceptor diversions/slope breakers (also referred to as waterbars on the E&SC Plans) would be installed during grading and maintained during the construction phase until permanent interceptor diversions/slope breakers are installed. These devices would be installed per the minimum spacing requirements according to the West Virginia ECS, E&SC Plans and FERC's Procedures. Adjusted installation and spacing requirements for these devices would be required on MNF lands as stated in the site-specific design criteria outlined in the final COMP (see NFS Lands). Temporary erosion controls would be maintained until the Project area is successfully revegetated according to West Virginia Stormwater permit guidance and after a two year (three years in MNF) monitoring period. Permanent erosion controls would be installed, as necessary, and in accordance with final restoration and revegetation requirements outlined in Attachment D Restoration Plan of the final COMP to ensure the successful restoration of the Project area.

During construction, all temporary erosion and sedimentation control devices, such as straw bale, filter socks, or silt fence sediment control devices, temporary slope breakers, trench plugs at stream and road crossings, trench dewatering and dissipation devices, and temporary bridge silt netting, would be inspected near the end of each workday or after each storm (rain) event of ½-inch or greater, to ensure proper functioning. Any devices damaged would be repaired promptly. If devices are wearing out or becoming less effective, maintenance of the devices would be conducted to ensure they are functioning properly and can work effectively throughout the life of the soil disturbing activities on the project.

During the restoration phase which typically includes final grading of pipeline right-of-way, cleaning up of construction debris and excess vegetation and rock material, and seedbed preparation and seeding, Columbia would continue to inspect on a daily basis its erosion and control devices and repair them when necessary. Columbia would be required to commence cleanup operations immediately following backfill operations such that it complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). Temporary erosion controls would remain in place especially on steep slopes through project restoration, and even partly into the operational phase of the Project where appropriate, in order to ensure the maximum degree of protection from erosion and excessive water flows.

Columbia would install permanent erosion control slope breakers (interceptor diversions) in all pipeline rights-of-way except in cultivated areas and lawns, unless requested by the landowner. During the first two growing seasons (three in MNF) following restoration, Columbia would continue to monitor temporary erosion and sediment control devices until such time as the right-of-way has been stabilized by successful revegetation in accordance with FERC, the MNF, and WVDEP requirements, at which time they would be removed. FERC staff would conduct regular monthly inspections during construction, restoration and continue with periodic inspections for one to two years following restoration of Columbia's proposed Project area to ensure it successfully implements its state ECSs and E&SC Plans.

NFS Lands

Data from the Order 1 Soil Survey indicates that within the MNF about 135.9 acres are highly susceptible to water erosion. Most of these acres are on the WB right-of-way and temporary workspaces. The MNF LRMP, SW04 standard, dictates that erosion prevention and control measures shall be used in program and project plans for activities that may reduce soil productivity or cause erosion. In addition to this standard, the Plan also provides direction on how to reduce or mitigate erosion from proposed activities in SW14, SW16, and SW19. This project includes human disturbance that would temporarily accelerate erosion; however, by applying the standards and guidelines from the MNF LRMP, those effects would be reduced.

Soils would be exposed from initial grading until the completion of final restoration grading, including construction activities such as trenching/spoil storage, pipeline layout, fabrication, lowering and backfilling. Typically, the trench would not remain open for more than 30 days in any area unless authorized by the EI for weather-related delays. Columbia would work with the MNF regarding the amount of time soils would be exposed and would comply with applicable Standards and Guidelines of the MNF LRMP. LRMP Standards SW03 and SW11 state that rehabilitation to disturbed soils shall take place as soon as possible following project completion, but generally within two weeks. In addition to the amount of time of exposure, SW16 provides direction on limiting the amount or size of an area that is to be exposed at any one time. Ongoing coordination with the USFS, EI, and Columbia on this issue would occur on an as needed basis.

Erosion and sediment control devices would be installed prior to or immediately following initial ground disturbance, which typically follows the tree and woody vegetation clearing phase. Columbia would install as needed, and maintain all installed erosion controls throughout each construction phase. In addition, right-of-way areas surrounding the trench would be susceptible to rutting and subsequent erosion. LRMP Standard SW07 provides specific direction for working in soil conditions that could led to slope instability. Specifically, use of wheeled and/or tracked motorized equipment may be limited on soil types that include the following soil/site area conditions: 1) Steep Slopes (40 to 50 percent) – operation on these slopes shall be analyzed on a case-by-case basis to determine the best method of operation while maintaining soil stability and productivity; 2) Very Steep Slopes (more than 50 percent) – use is prohibited without recommendations from interdisciplinary team review and line officer approval; 3) Susceptible to Landslides – use on slopes greater than 15 percent with soils susceptible to downslope movement when loaded, excavated, or wet is allowed only with mitigation measures during periods of freeze-thaw and for one to multiple days following significant rainfall events, if the risk of landslides during these periods cannot be mitigated, then use is prohibited; and 4) Soils Commonly Wet At Or Near The Surface During A Considerable

Part Of The Year, Or Soils Highly Susceptible To Compaction - equipment use shall normally be prohibited or mitigated when soils are saturated or when freeze-thaw cycles occur.

Thirty-six percent of the soil pits examined in the MNF were on slopes between 40 and 55 percent (slope class F). On very steep slopes (>50 percent) wheeled or tracked vehicles are prohibited without an interdisciplinary team review. Twelve percent of the soil pits examined in the MNF occurred on slopes >55 percent (slope class G).

Where site-specific conditions exist making earthen slope breakers impractical (saturated soils, residential areas, pastures, agricultural fields, or other areas where the landowner requests an alternative measure), Columbia would use alternative diversion structures using devices such as silt fences and compost filter socks, or other agency-approved advanced controls. In response to the MNF's concerns over the effectiveness of Columbia's proposed spoil pile protection measures, and of general measures in its E&SC Plans in steep Appalachian settings, Columbia provided case-specific descriptions of construction methods in various slope settings within its Steep Slope Work Procedures.[17] In the MNF, Columbia would use compost filter socks instead of silt fences and super silt fences for erosion control at any locations of concentrated overland flow, including from constructed drainage features and natural drainage features (this pertains to both summer and winter operating conditions). Silt fences may be used as perimeter erosion control where concentrated flow does not exit. Polymer additives, such as polyacrylamides or polysaccharides, may be added to the compost filter socks, as long as the additive used is approved by the USFS. Polymer additives are particularly encouraged in areas where larger volumes of concentrated flow, such as some drainage outlets, are expected, or where drainage outlets are near waterbodies. Polymer additives increase sediment retention, particularly of small-size particles that are otherwise difficult to trap and retain.

The MNF expects Columbia to monitor the pipeline for the lifetime of the ROW for slope stability, signs of erosion and other circumstances that would lead to Clean Water Act violations and soil/slope instability, and would require Columbia to remediate any adverse impacts.

Soil Mixing

During construction, topsoil and subsoil would be disturbed during grading and trenching activities and the movement of heavy equipment. The potential mixing of topsoil with the subsoil from these activities could result in a loss of soil fertility. To prevent mixing of the soil horizons topsoil segregation would be performed in residential areas, non-saturated wetlands, croplands, improved pastures, on all MNF lands, and in areas requested by the landowner. In deep soils (more than 12 inches of topsoil) Columbia would segregate at least 12 inches of topsoil. In soils with less than 12 inches of topsoil, Columbia would make every effort to segregate the entire topsoil layer (attachment A in COMP). Implementation of proper topsoil segregation would help to ensure post-construction revegetation success, thereby minimizing loss of soil productivity and the potential for long-term erosion problems.

The topsoil would be stockpiled separately from all subsoil and replaced last during backfilling and final grading. Where topsoil is stripped from the entire construction right-of-way, an additional 25-foot-wide temporary work area may be used for topsoil storage with landowner's permission and appropriate environmental approvals.

[17] These were filed on October 6, 2016 and can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161006-5125 in the "Numbers: Accession Number" field.

NFS Lands

Data obtained from Columbia's Order 1 Soil Survey was used to extrapolate the depth of topsoil within each mapped soil unit that is crossed by the pipeline within the MNF. Columbia would furnish this information to its EIs, construction inspection staff, and the construction contractor to help determine the topsoil and subsoil boundary during construction. Columbia would employ an EI with a soil science background. If a person with these academic qualifications cannot be found, Columbia would assign the responsibility of differentiating topsoil and subsoil to an EI who meets MNF criteria, would receive specialized training from a soil scientist, and would work closely with the contractor and other inspection staff during construction to determine the topsoil and subsoil boundary.

Columbia would strip six inches of soil from the trench line only. More than six inches may be stripped if it is observed by EIs. The stripped topsoil would be stored separately on the right-of-way from the trench spoil and would be restored to its original position on the top of the soil profile after the pipeline is installed and the trench is backfilled. Columbia would use a visual indicator (straw, chalk, paint, etc.) between segregated topsoil and the underlying ground surface where the segregated topsoil is stockpiled. This would allow the equipment operator to recognize when they have reached the bottom of the stockpile. Columbia is not proposing to segregate topsoil in any workspace areas outside the trench. Instead, Columbia would provide a topsoil alternative on all areas of disturbance on the MNF. The topsoil enhancement currently under consideration is called ProGanics™ Biotic Soil Media™ (BSM™). ProGanics™ is not a direct replacement for topsoil, but provides an abundant source of organic matter and soil building organisms to initiate growth establishment. This material would blend with and enhance the topsoil that remains in place in the workspaces. Columbia intends to apply this product to the right-of-way and additional workspace areas on NFS land disturbed by construction, except along access roads. The application of the topsoil enhancement product across the entire workspace is anticipated to accelerate the restoration process and maintain and restore soil conditions.

The reasons Columbia is not intending to segregate topsoil as directed by MNF LRMP SW15, in areas outside the trench are varied. A portion of the construction workspace outside the pipeline trench is forested. Columbia does not consider topsoil segregation effective in forested areas where it would need to pull stumps to grade the surface of the right-of-way to create a level surface on the right-of-way to safely operate equipment. The pulling of stumps would mix topsoil and subsoil horizons and increase soil erosion potential. In addition, stockpiling topsoil requires additional workspace. Columbia has already committed to leaving brush and timber on the right-of-way and narrowed the width of the construction right-of-way to reduce tree clearing to avoid and minimize impacts. Because of these measures, there is not enough workspace to segregate all topsoil on the construction right-of-way. In areas on steep slopes, topsoil segregation outside the immediate trench area is not feasible where machinery would be winched up or down the slopes. Winching of equipment must be minimized to the fewest number of passes as possible for worker safety and to mitigate the potential for compaction. Columbia would mitigate any topsoil losses or loss of soil productivity on MNF lands in order to comply with LRMP SW15.

Topsoil and subsoil would be stockpiled separately from each other in protected spoil piles, typically on the spoil side of the construction right-of-way. On steep slopes, Columbia would use temporary erosion control areas as necessary to prevent excavated spoil piles from being eroded or mixed with each other. The topsoil and subsoil would be replaced in the proper order during backfilling and final grading. Topsoil and spoil material would be replaced only when moisture levels in those reserved materials are at appropriate levels. Appropriate levels would be determined using TDR measurements taken at five or more locations in each pile between one and two feet below the pile surface. All moisture values from a pile must be less than 25 percent volumetric water content for replacement into the trench (spoil material) or onto the surface of the trench (topsoil). Twenty-five percent volumetric water content is about field capacity (field capacity is the approximate soil moisture resulting from two to three days of drainage following saturation). The third-party environmental inspector (USFS approved) wouldbe responsible for these measurements.

Soil Carbon Stocks on NFS Lands

Soil carbon stocks in the southern Appalachian Mountains vary along an elevation gradient (Garten, et al., 1999). Along the elevation gradient, as much as 53 percent of soil organic carbon SOC is contained in forest floor O horizons and other labile soil organic matter in various stages of decomposition. Most of the carbon in the mineral soil was identified as protected due to association with a heavy soil fraction (>1.4 g/mL) or a silt-clay fraction. Substantial losses of soil organic matter due to disturbance or as the result of a warmer climate, could have long-term impacts on hydrology, soil quality, and plant nutrition in forest ecosystems. A relatively large portion of the carbon lost due to land use change in the southern Appalachian Mountains may be recaptured relatively quickly where forest growth is rapid (Bolstad and Vose, 2005).

The USDA adopted a NFS land management planning rule in 2012, commonly referred to as “the 2012 planning rule.” This rule will guide the development, amendment, and revision of land management plans for all units of the NFS (USFS, 2012). Based on the 2012 Planning Rule, USFS project planning will include the identification and evaluation of information relevant to understanding ecological conditions and trends and to forming a baseline assessment of carbon stocks. Plans will include components to maintain or restore ecological integrity, so that ecosystems can resist change, are resilient under changing conditions, and are able to recover from disturbance. From this planning rule, the MNF USFS is working towards establishing ways to incorporate carbon mitigation from large-scale soil disturbing projects. Based on the 2012 planning rule, the MNF USFS required Columbia to include soil carbon within soil testing parameters obtained from the Order 1 Soil Survey.

Existing soil carbon stocks in the Project area would be disturbed primarily by trench excavation. To estimate the soil carbon content of the pipeline trench of the WB XPress Project (Project) in the Monongahela National Forest (MNF), Columbia Pipeline Group (Columbia) used the following data and approach:

- Order 1 Soil Survey carbon analyses;
- Regional soil bulk density and carbon content data for soils in Major Land Resource Area (MLRA) 127 obtained from the Natural Resources Conservation Service (NRCS) and best professional judgement;
- Soil volume based on the cross-sectional area and depth of the pipeline trench (5.5 feet or 1.676 meters) and the Order 1 Soil Survey map unit lengths, adjusted for coarse fragment content, and where appropriate, the volume of the existing

pipeline. The existing right-of-way (ROW) consists of grasses and forbes intermittently disturbed by vegetation maintenance (i.e., mowing). This calculation does not account for carbon contained in the existing above ground vegetation.

Pipeline trench excavation and the temporary storage of topsoil and subsoil material during construction would alter the normal temperature, moisture content, and air exchange relationships for these soils as they are handled. This may lead to more rapid decomposition and loss of soil carbon. In particular, the active carbon pool (3 to 8 percent of C in the total soil C pool) is especially sensitive to disturbance since its Mean Residence Time (MRT) is on the order of tens to hundreds of days (Paul and van Veen, 1978; Trumbore et al., 1996). The MRT of the active carbon pool would essentially be exceeded when topsoil and subsoil are stockpiled for 100 days or more during construction with a potential loss of the entire active carbon pool from the stockpiled soils.

Columbia has estimated the total soil carbon content of MNF trench soils is approximately 631.80 Mg. Loss of the entire active carbon pool (8 percent of total carbon in the trench soils) would result in a loss of approximately 50.54 Mg of carbon.

As part of the restoration and revegetation of the ROW following construction, Columbia has proposed the use of an organic soil amendment, ProGanics™ Biotic Soil Media™ (ProGanics), and the application of an erosion control material, Flexterra® High Performance-Flexible Growth Medium™ (Flexterra). The combined addition of both ProGanics and Flexterra would add approximately 1,426,886.36 grams (1.43 Mg) of carbon per acre to the soils impacted by the construction area.

Using a quantitative analysis, the addition of ProGanics and Flexterra to the construction ROW during restoration and revegetation would return approximately 183.83 Mg of carbon to the soils on the MNF. Since the estimated carbon loss from stockpiled trench soils is approximately 50.54 Mg carbon, Columbia’s restoration measures would result in a net gain of approximately 133.29 Mg of carbon. However, these calculations do not account for the qualitative analysis of the type or form of carbon that is being extracted, lost, and replaced. In addition, this analysis did not incorporate the calculation of aboveground carbon loss from construction disturbance of existing shrub and grass species along the current ROW and in the new disturbance portions of the proposed route. With the application of soil amendments and topsoil replacement during restoration, successful revegetation of the ROW would help to mitigate soil carbon loss through yearly turnover of new vegetation; however, these amendments would not account for or readily replace the form of carbon that is lost in the ROW immediately upon excavation. Additional mitigation may be required to meet the objective of the USFS 2012 Planning Rule.

Compaction Potential

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, and cause rutting. Compaction could also negatively affect restoration of microbial populations important for maintaining soil fertility during pipeline operations. The degree of compaction depends on the moisture content and soils texture. Fine-textured soils that are moist during construction are the most susceptible to compaction. The soils that are compaction prone are characterized by somewhat poor to very poor drainage classes (seasonal high water table within 36 inches of the surface) and surface textures of sandy clay loam and finer.

Columbia would construct its pipeline when soils are firm enough to avoid rutting and thereby minimize associated processes of compaction and mixing of subsoils with topsoil. During construction in soft or saturated soils, Columbia would use measures outlined in its E&SC Plan, including the use of low-ground-weight equipment and/or temporary installation of timber equipment mats. Columbia's E&SC Plan includes a provision that the EI assigned to the Project is responsible for advising the Chief Construction Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction.

The topsoil and subsoil would be tested for compaction in all areas disturbed by construction. An EI would supervise testing and determination of need for soil mitigation. This would be performed prior to final restoration in case mitigation is required. Severely compacted agricultural areas would be mitigated through the use of deep tillage operations during restoration activities using a paraplow or similar implement. In areas where topsoil segregation occurs, plowing with a paraplow or other deep tillage implement to alleviate subsoil compaction would be conducted before replacement of the topsoil. Soil compaction mitigation would also be performed in severely compacted residential areas.

NFS Lands

The Order 1 Soil Survey indicated about 17.1 acres of long-term line WB right-of-way, temporary workspace, ATWS, and access roads are compaction prone. Therefore, mitigations would need to be applied to these soil types to reduce effects and maintain soil productivity and soil quality. According to LRMP Standard SW07, mechanized equipment shall not be permitted on wet soils. LRMP Standard SW06 states that severe rutting resulting from management activities shall be confined to less than five percent of an activity area. These 17.1 acres are the highest at risk for adverse effects resulting in compaction.

In the MNF, the EI would determine if soil compaction has occurred by quantitative penetrometer measurement. Columbia would use a handheld Electronic Cone Penetrometer for Measuring Soil Strength (USFS 2005). The testing protocols are American Society of Agricultural and Biological Engineers S313.3 Soil Cone Penetrometer (2004) and EP542 Procedure for Using and Reporting Data Obtained with the Soil Cone Penetrometer (1999). When compacted soils are identified, Columbia would employ appropriate methods of decompacting soils such as mechanical decompactors, or rippers. During the Order 1 Soil Survey, a majority of the existing right-of-way was identified to have undergone compaction during previous pipeline construction events. Columbia would conduct pre-construction compaction testing to establish baseline data, and where safe and feasible, employ decompaction methods to restore to baseline conditions in the construction work area. Columbia would share the results of pre-construction and post-restoration compaction testing of soils with the MNF on a weekly basis as part of the reporting requirements.

Site-specific conditions during construction that are recognized by Columbia's EIs as exhibiting high levels of soil moisture or excessive amounts of standing water would require the EI to ensure that appropriate measures such as low-ground-weight equipment, timber matting, prefabricated equipment mats or terra mats are used to stabilize saturated or ponded areas for crews to be able to avoid soil rutting or mixing of subsoil and topsoil. Regarding the use of wetland construction right-of-way for access by equipment, Columbia may allow all of its equipment onto wetlands whose soils are firm enough to avoid rutting, or onto saturated wetlands that have been stabilized by matting, etc. If the saturated wetland cannot be stabilized, Columbia would limit its construction equipment not necessary for installation across the wetland to remain in upland areas. If upland access is not available, then only one pass through the saturated wetland by each piece of affected construction equipment is permitted.

Major post-construction settlement of the trench is not anticipated. Columbia Operations personnel monitor the pipeline right-of-way for erosion and other major soil conditions including landslides, slumping, and subsidence. A review of Columbia's records does not indicate instances relative to widespread trench settling along its pipelines within the MNF. In addition, Columbia recently conducted a comprehensive Order 1 Soil Survey encompassing a 300-foot-wide corridor along the proposed pipeline route within the MNF. This corridor encompassed Columbia's existing WB-5 and WB Loop pipelines and the proposed Line WB Replacement pipeline. According to the lead soil scientist responsible for the survey, who walked the route to be surveyed, no widespread trench subsidence was observed. Should substantial settlement occur, Columbia would regrade affected areas, using imported topsoils if necessary. Columbia would import soil on MNF lands to address settlement and reestablish grades in coordination with the MNF to confirm imported topsoil is acceptable and consistent with the MNF LRMP.

Prime Farmland

The USDA defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops" (Soil Survey Division Staff, 1993). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops. Areas that are not currently used for agriculture can be designated as prime farmland if they are available for these uses in the future. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may also be considered prime farmland if the limiting factor is mitigated (e.g., soils having artificial drainage or soils in unique farmland, farmland of statewide importance, and farmland of local importance).

About 48 percent of the soils in the Project area are considered prime farmland (290 acres), which includes prime farmland soils (60 acres), farmland of statewide importance (139 acres), or farmland of local importance (93 acres). Of these soils, about 2.0 acres of prime farmland at the Chantilly Compressor Station and 0.1-acre of prime farmland at the Line VA-1 Receiver Site would be permanently converted to industrial use for the operation of the Project. Currently, none of these 2.1 acres of prime farmland soils to be converted are under crop cultivation. The remaining prime farmland soils would be restored and allowed to return to their pre-construction land use. None of the soils in the Project area would be considered prime farmland with mitigation (e.g., drainage) or are considered unique farmland (e.g., cranberry bogs).

NFS Lands

The MNF noted the majority of any prime farmland soils crossed on MNF lands have been previously disturbed and stated that restoration of these soils would need to conform with standards from the NRCS as well as with the MNF's Forest Plan. Soils from the series Calvin and Ernst totaling about 42.8 acres qualifying as prime farmland soils of statewide importance do occur in the MNF crossing corridor including WB right-of-way, temporary workspaces and access roads. Permits are not required from the NRCS to disturb prime farmland of this designation. FERC staff acknowledges these previously disturbed soils may no longer be characterized as prime farmland upon closer surveying, however, only the NRCS has the authority to make this determination. Nonetheless, all the soil conservation and mitigation measures contained within Columbia's E&SC Plan would be implemented for any and all soils on MNF land.

Shallow Bedrock and Rocky Soils

Soils with significant quantities of rock were identified by querying the SSURGO database for component soil series that have one or more soil horizons that: 1) have a cobbley, stony, bouldery, channery, flaggy, very gravelly, or extremely gravelly modifier to the textural class; and/or 2) contain greater than five percent (by weight) of rocks larger than three inches. About 80 percent (492.6 acres) of Project facilities would cross areas with rocky soil profiles. The potential to introduce rock into surface soils in those areas could be significant; however, the soils in those areas may already contain surface horizons with significant quantities of rocks. Construction through soils with shallow bedrock and rocky soils could result in the incorporation of rock fragments into surface soils. Introducing rocks to the surface soil horizon could reduce soil moisture-holding capacity, resulting in a reduction of soil productivity.

In areas where topsoil has been segregated, the subsoil would be placed in the trench first and then the topsoil would be placed over the subsoil. During backfilling, special care would be taken to minimize erosion, restore the natural contour of the ground, and restore surface drainage patterns as close to pre-construction conditions as practical. To minimize the possibility of subsurface water flow on slopes along the pipeline, sand bags or foam-type trench breakers would be placed across the trench prior to backfilling. In other areas such as terrace, levee, and stream crossings (including banks), the trench backfill would be solidly compacted. Any excess excavated materials or materials unsuitable for backfill would be spread evenly over the right-of-way or disposed of in a commercial facility or state-approved landfill.

Columbia proposes to windrow excess rock off the edge of the construction work area with landowner's approval or haul it offsite and dispose of in an approved landfill or state-approved facility. We consider excess rock to be construction debris and find Columbia's proposal to windrow such debris conflicts with the requirements in our *Upland Erosion Control, Revegetation, and Maintenance Plan,* specifically section III.E regarding disposal planning, section V.A.3 regarding cleanup operations, and section V.A.6 regarding beneficial reuse. Furthermore, Columbia has stated it would remove excess rocks greater than four inches in size from surface soils disturbed by construction such that the size, density, and distribution of rock on the construction right-of-way would be similar to adjacent non-right-of-way areas. While the *Upland Erosion Control, Revegetation, and Maintenance Plan* at section V.A.4 does state that the size, density and distribution of rock shall be similar to adjacent areas not disturbed by construction, it has no "four inch" qualifier for the size of rock that should be removed. We find Columbia's proposal to only remove rock if it's greater than four inches is inconsistent with the restoration requirements of the *Upland Erosion Control, Revegetation, and Maintenance Plan*. Therefore, **we recommend:**

- **<u>Prior to construction</u>, Columbia should file with the Secretary of the Commission (Secretary), for review and written approval by the Director of OEP, a revised ECS that is consistent with the *Upland Erosion Control, Revegetation, and Maintenance Plan* at sections III.E., V.A.3, V.A.4., and V.A.6.**

If shallow bedrock is encountered during construction, the technique used for removal would depend on the strength and hardness of the rock. Attempts would be made to use mechanical rippers or other mechanical means, such as conventional excavation with a track-mounted excavator (trackhoe) or trencher, or hammering with a trackhoe-attached device followed by excavation to remove bedrock encountered in the trench. If required, blasting would be conducted according to guidelines designed to control energy propagation and protect persons and property in the area. These activities would adhere to the specifications of Columbia's project-specific blasting plan, and federal, state, and local regulations applying to blasting and blast vibration limits with regard to structures and underground utilities. Care would be taken when blasting in the vicinity of water wells or sensitive species, and blasting within the vicinity of other pipelines would be coordinated with the pipeline operator.

<u>NFS Lands</u>

Soils within the existing right-of-way consist of a mix of disturbed backfill materials within the pipeline trench associated with the retired Line WB and partially modified native soils between the existing pipeline trenches, where the right-of-way contains multiple pipelines. Subsurface soil materials within the existing Line WB trench vary widely based on the parent materials of the original natural soils and range from silty- to loamy-textured materials in the fine-earth fraction, with coarse fragment contents ranging from about 15 percent to as much as 80 percent. Coarse fragment size ranges from gravels and channers- to large flagstones, cobbles, and boulders, depending on bedrock geology. Subsurface soil materials within the existing Line WB pipeline trench were weakly to strongly compacted and presented a high to very high degree of hand excavation difficulty. The soil map unit that covers the existing right-of-way also includes a 5-foot- to 20-foot-wide area of large cobbles, flags, and boulders deposited along the margins of the right-of-way over the course of multiple construction episodes. The rock materials were likely separated from soil materials as part of grading and backfilling operations during past pipeline construction and were side cast or windrowed at the edge of the right-of-way. Surface rock content on the existing right-of-way is generally low as a result of this previous grading activity during construction.

Excess rock and excavated rock, including blast rock, may be used to backfill the trench, but only up to a level that is even with the top of the existing bedrock profile. Columbia proposes to spread or windrow any excess excavated materials or materials that are unsuitable for backfill off the edge of the construction work area, but this is inconsistent with our Plan. In addition, Columbia proposes to remove excess rocks greater than four inches in size from surface soils disturbed by construction such that the size, density, and distribution of rock on the construction right-of-way would be similar to adjacent non-right-of-way areas, but this is also inconsistent with the restoration requirements of our Plan. To address these inconstencies, we have recommended above that Columbia provide a revised ECS that agrees with the disposal planning, cleanup operation, and beneficial reuse sections of our Plan. Larger rocks may be used to develop mitigative rocky habitat adjacent to the right-of-way for Regional Forester's Sensitive Species (RFSS) species (refer to the BE for more detail).

The Order 1 Soil Survey conducted within the MNF portion of the Project revealed that in native soils about 404 acres of the 417-acre study area (97 percent) have bedrock within 50 inches of the soil surface. In the soil profiles with bedrock within 50 inches of the soil surface, about 55 percent had paralithic (Cr) horizons. Paralithic horizons indicate materials that are partially weathered bedrock or weakly consolidated bedrock, such as sandstone, siltstone, or shale that can be excavated with some difficulty using a spade. Paralithic bedrock can generally be fractured and excavated using standard construction equipment. Lithic contact, indicated by an R horizon, represents consolidated bedrock that cannot be excavated using a spade. Lithic bedrock may require special construction techniques, or blasting. In the soil pit locations where there was a Cr horizon over an R horizon, the average thickness of the Cr horizon was nine inches. The results of the Order 1 Soil Survey indicated that within the MNF portion of the pipeline route, paralithic bedrock is nearly twice as prevalent as the SSURGO data indicated.

The majority of the project consists of lift and lay construction. Based on the fracturing and removal of rock associated with the previous pipeline installation and the amount of cover over the existing pipe, it may be possible to install the new replacement pipeline and meet depth of cover requirements without blasting. About 1.3 miles of the route on the MNF would consist of new pipeline that would not be constructed using the lift and lay method and wouldlikely encounter bedrock within 50 inches of the soil surface. These areas include the route segments identified in table 5.10-1 of the COMP (appendix B of the SUP).

The pipe would be placed in the trench so as to conform to the alignment of the trench and also not to damage the coating. After lowering the pipe in the trench, the trench would be backfilled using a bulldozer, backhoe, auger-type backfilling machine or other suitable equipment. If the excavated material is rocky, or the bottom of the trench is rocky, the pipeline may be lowered onto sandbags, other padding, or wrapped with a rock shield prior to lowering.

Backfill usually consists of the material originally excavated from the trench. In some cases, additional backfill from other sources may be required because of: 1) the amount of rock excavated and disposed, and 2) the lack of suitable padding material placed on top of the lowered pipeline serving as protection from rocky backfill material. Alternative sources of padding for pipeline in rocky soil may be sand, gravel, or screened soil, which consists of existing excavated subsoil (excluding topsoil), which is sifted through a shaker bucket on an excavator on the construction site. Padding material should be free of hazardous chemicals and non-native invasive species seeds, and must comply with the LRMP's (SW15 and SW18) requirements for soil type. Columbia has committed to ensuring that any sources of padding from an off-site facility would be subject to its Health, Safety, and Environmental protocols and would come from a state-permitted local facility. All imported soil materials would be selected to conform to MNF LRMP Standards and Guidelines.

Restoration and Revegetation

Initial revegetation following construction depends on soil factors such as proper soil handling and restoration, soil texture, moisture content, compaction and loss of soil fertility. In turn, successful revegetation is important for maintaining soil moisture content, soil productivity, and protecting soil from potential damage during pipeline operations such as erosion, compaction, and loss of soil fertility. The revegetation potential of soils crossed by the Project was evaluated based on the soil surface texture, drainage class, and slope class. Soils that have a coarse texture and/or are located on moderately well to excessively drained slopes may prove to be difficult to revegetate because these droughty soils tend to lose their moisture content quickly following precipitation. Coarse-textured soils also have a lower overall water holding capacity. Soils located on steep slopes (greater than eight percent) tend to absorb less precipitation. These factors hinder seed germination and establishment of new vegetation. About 76 percent (469.9 acres) of the soils that would be affected by the Project are considered to have revegetation concerns, mainly due to the presence of steep slopes in the Project area

In general, Columbia's ECS for West Virginia Projects – 2016 document contains the procedures that would be used for construction, and restoration is specifically discussed in sections III.I.3, IV.A.8, and IV.B.8 of the document associated with uplands, waterbody crossings, and wetland crossings, respectively. Following installation of the pipeline, Columbia would backfill the trench and restore pre-construction contours and drainage patterns. Columbia would construct trench breakers at the wetland boundaries to maintain the wetland hydrology. Additionally, Columbia would remove from the wetlands any non-biodegradable mats or other materials that are used to stabilize the wetland soils during construction. Inspections of wetland restoration would be conducted during construction by Columbia's EI and post-construction monitoring of wetland restoration would be performed by Columbia pursuant to Corps and FERC requirements. Any restoration issues that are noted, including any problems with the restoration of wetland hydrology, would be evaluated and corrected.

Columbia would use the following approach to reestablishing vegetation coverage and/or habitat type within the right-of-way following construction activities. The first step in the restoration process is to establish soil conditions that would promote the reestablishment of vegetation. This would be followed by the application of a variety of seed mixes to disturbed areas in order to reestablish vegetation similar to that present prior to construction activities (currently a mix of native and non-native grass and forb species), and to promote the regrowth of native plant species. Mulching and stabilizing the planted seed in place would be the final step in the restoration process. These three restoration steps are described in greater detail below.

As described in the E&SC (Columbia, 2016a), the seed application process involves the following steps:

- compaction relief (where possible);
- tracking or scarifying the post-construction soil;
- application of seed mixes; and
- mulching.

The tracking or scarifying of the soil involves making depressions and firming loose soil after construction by leaving excavator or other vehicle track marks on the soil surface, or purposely creating these depressions with smaller machinery. The depressions make local pockets in which seed and water can collect, thus moistening the soil and aiding seed germination. Tracking also helps firm, but not compact, the seedbed, which provides improved seed-to-soil contact, and improved retention of soil moisture compared to loose soil. The tracking of an area can be used to incorporate soil amendments in some instances. The West Virginia ECS indicates that fertilizer and lime would be disked into the soil (except rocky soils) to a depth of three to four inches to prepare a seedbed. In rocky soils, fertilizer and lime may be incorporated into the soil with tracked equipment. Hydro-seeding is the preferred method of seed application due to the use of Flexterra™ to stabilize the area disturbed by construction activities along the entire length of the right-of-way.

Following completion of post-construction restoration activities, a monitoring program would be implemented to confirm the reestablishment of vegetation and stabilization of soil within the right-of-way. The regrowth of potential invasive species would also be evaluated. Columbia would conduct post-construction monitoring for two years (three years in MNF). These inspections will also document shorter-term vegetation coverage after completion of construction because a minimum 70 percent vegetative coverage must be achieved prior to removal of erosion control measures (e.g., silt fence). The West Virginia ECS also indicate that areas where the seed has failed to germinate adequately (uniform perennial vegetative cover of 70 percent) within 30 days after seeding and mulching must be re-seeded immediately, or as soon as weather conditions allow.

NFS Lands

Factors affecting re-establishment and sustainment of vegetation of disturbed soils include compaction and soil fertility. The MNF commented that soil acidity/alkalinity and health of microbial communities also contribute to the success of short- and long-term revegetation by directly affecting soil fertility and advised against using non-native (imported subsoil and topsoil) trench fill materials if not of a similar mineral content, as this would introduce a contrasting acidity or alkalinity to the adjacent untrenched soils. Columbia's primary construction procedure for ensuring that soil putback restores soils to pre-construction conditions is its proposed soil segregation measures. Given Columbia's soil segregation procedure which preserves much of the disturbed soil vertical profile, and its storage and backfill of subsoil and/or topsoil to the side of the trench, alteration of soil acidity/alkalinity would be minimized. Careful backfilling and soil segregation of original soils, efforts to reduce or mitigate for compaction, and presence of initial revegetation should allow disturbed microbial populations to recolonize the soil profile in the root zone over the long-term.

The Order 1 Soil Survey indicated that existing soil fertility is at an acceptable level overall, with the exception of calcium and phosphorous at some locations. While this may hold true for a forest ecosystem of mixed coniferous and deciduous trees, woody shrubs and native forbs, the measured soil fertility is not at an optimal level for establishing mixed grasses, legumes, and other herbaceous species in a disturbed landscape. As shown in the Order 1 Soil Survey (Columbia, 2016b), pH levels measured in the soil of the right-of-way were acidic, and in many cases the soil was classified as very strongly acidic to extremely acidic. The highly acidic soils in some areas may reduce the availability of nutrients for plant growth. However, lower calcium levels can be addressed by the addition of dolomitic limestone (calcium/magnesium carbonate) at the general rate of 4,000 pounds per acre, which would increase calcium levels in the soil and also help raise pH levels and increase the availability of existing nutrients in soil to plants. Specific application rates need to be keyed into specific soil map units and based on the exchangeable acidity, cation exchange capacity (CEC), and base saturation data contained in appendix 8 of the Order 1 Soil Survey, and the needs of the specific species contained in the MNF approved seed mixes. The use of soil amendments such as powdered dolomitic limestone are planned to improve seed germination and seedling growth in a one-time application with the understanding that acidic conditions would likely return after a period of time. The period of time would vary depending on local environmental conditions and climate. After the acidic conditions return the more acid tolerant species would become dominant. No dolomitic limestone is proposed to be added to areas deemed sensitive for the Cheat Mountain Salamander (CMS).

Research indicates that in grasslands, the use of native seed species is more effective than fertilizer in combating the growth of invasive species (Seabloom et al., 2015). However, Columbia may utilize some fertilizer as part of seed application operations. The amendment application process and seed application would be conducted in conjunction with the use of ProGanics™ and Flexterra™. ProGanics™ is a soil enhancer and Flexterra™ is a spray-on erosion control cover, which includes a project-specific seed mix, mulch, and a bonded fiber matrix applied via hydroseeding equipment. ProGanics™ provides an abundant source of organic matter and soil building components to initiate growth and vegetation establishment (COMP attachment D). This material would blend with and enhance the topsoil that remains in place in the workspaces disturbed by construction including trench areas where topsoil segregation is proposed.

Vegetation reestablishment for the Line WB Replacement would primarily involve reseeding of areas within the work areas disturbed by construction activities, and re-seeding associated areas with conservation and or mitigation measures (such as pollinator seed mixes) related to disturbance of certain habitats used by sensitive species. During restoration, seed may be applied at an adjusted application rate to increase the probability of establishment and rapid stabilization along with the application of ProGanics™ and Flexterra™ soil amendments. However, increasing seeding rates does not always result in more successful germination or establishment. Often it is the combination of site-specific environmental factors that influence germination and establishment.

Native seed mixes that are representative of various habitat types that are encountered on the right-of-way are provided in Attachment D Restoration Plan of the COMP, and represent those specific mixes identified by Ernst Conservation Seeds for use in West Virginia. While the seed lists provided in attachment D are proposed for reseeding disturbed areas within the right-of-way, modified seed lists were considered in consultation with MNF staff. The agreed to seed lists are contained in the final COMP. The map-series provided in attachment F indicates the proposed seed mixes that would be used at various habitat-type locations associated with the right-of-way, and the table provided in attachment G indicates the seed mixes to be used at given milepost locations.

As described above, one step in the seed application process is the tracking or scarification of the post-construction soil. The process results in localized “pockets” that trap seeds, nutrients and water on slopes. However, the process also involves running machinery over the post-construction soil which could result in unintended soil compaction. Tracking is usually accomplished at the end of the final grading process, which consists of leaving the existing track marks in place, as there is no surface smoothing process as there is on other construction sites. In areas with relatively smooth post-construction surfaces, the lightest piece of machinery, generally a small bulldozer, low-impact, wide-track machine, or even a Bobcat-type of skid steer is used to make track marks in the surface with as few passes as possible. The EI on-site would monitor soil compaction during this step of the restoration process. If compaction is detected the process would be halted.

Planting of trees and shrubs as part of conservation and/or mitigation measures related to sensitive species is also planned. A habitat-type approach would be used to identify appropriate seed mixes for application in different areas of the right-of-way. This approach integrates existing vegetation resource information/data with the selection of native seed mixes, which include many of the same and/or similar plant species adapted to a particular habitat type and/or specific environmental/physical conditions found in specific areas along the Project.

The Flexterra™ method involves using a spray-on erosion control cover, which includes a project-specific seed mix amendments such as limestone and fertilizer, applied via hydroseeding equipment. This approach avoids the need to conduct a separate mulching step with straw, as indicated in the West Virginia ESC, and the need to separately anchor the mulch to minimize loss due to wind and water. If mulching separate from the Flexterra™ application method is necessary for this project, on NFS lands, Columbia would only use straw (and not hay) for mulch during construction and restoration because straw is less likely than hay to contain invasive species. In addition, mulch tackifiers may be used as an alternative in accordance with the manufacturer's recommendations; however, liquid mulch binders are not to be used within 100 feet of wetlands or waterbodies.

Soil Contamination

A review of the EPA's Facility Registry Service and state/commonwealth Leaking Underground Storage Tank databases identified 34 contaminated sites within 1-mile of the Project facilities (EPA, 2015a; WVDEP, 2015a; VDEQ, 2015). Six of these sites are at Columbia's existing compressor stations (Lost River, Files Creek, Seneca, Cleveland, Loudoun, and Cobb Compressor Stations) which are currently regulated under the Resource Conservation and Recovery Act as large and/or small quantity waste producers. Of the remaining sites, 10 are less than 1,000 feet from the proposed Project facilities or workspaces. The facilities and workspaces closest to these sites are PAR-77, PAR-64, the Strasburg Compressor Station, and the White and UPS contractor yards, which are each within 1,000 feet of one site; and the CPG Elkins contractor yard, which is within 1,000 feet of five sites. The contaminated sites are listed in table B.1.2-2. Based on the scope of work at the proposed Project facility sites and the distance of most of the proposed work from the potentially contaminated sites, the potential to encounter contaminated soils during construction and/or operation of the Project is low.

TABLE B.1.2-2

Hazardous and Contaminated Sites Identified for the WB XPress Project

County/City and State/Commonwealth	Project Facility	Site Name/Ownership	Distance and Direction from Project	Facility Type
Project facilities identified under RCRA database				
Hardy, WV	Lost River Compressor Station	Columbia Gas Transmission	0 feet	RCRA, Large Quantity
Randolph, WV	Files Creek Compressor Station	Columbia Gas Transmission	0 feet	RCRA, Small Quantity
Pendleton, WV	Seneca Compressor Station	Columbia Gas Transmission	0 feet	RCRA, Large Quantity
Upshur, WV	Cleveland Compressor Station	Columbia Gas Transmission	0 feet	RCRA, Conditionally-Exempt Small Quantity
Loudoun, VA	Loudoun Compressor Station	Columbia Gas Transmission	0 feet	RCRA, Conditionally-Exempt Small Quantity, Small and Large Quantity
RCRA, CERLIS, TRI Sites Identified within One-Mile of the Aboveground Facilities and Access Roads				
Clendenin, WV	Elk River Compressor Station	Columbia Gas Transmission – Cobb Compressor Station	0 feet.	RCRA, Conditionally-Exempt Small Quantity
Fairfax, VA	TAR-77	Dominion Cove Point	9 feet NE	RCRA, Small Quantity
Shenandoah, VA	Strasburg Compressor Station	Columbia Gas Transmission	116 feet W	RCRA, Small Quantity
Kanawha, WV	PAR-64	Dave's Body Shop	378 feet N	RCRA, Small Quantity
Kanawha, WV	White Contractor Yard	WV Dept. of Environmental Protection	563 feet SW	RCRA, Unknown
Randolph, WV	UPS Contractor Yard	United Parcel Service	670 feet NE	RCRA, Small Quantity
Randolph, WV	CPG Elkins Contractor Yard	Par Mar Store #34	725 feet SE	RCRA, Small Quantity
Randolph, WV	CPG Elkins Contractor Yard	KMART #3877	811 feet E	RCRA, Small Quantity
Randolph, WV	CPG Elkins Contractor Yard	Wal-Mart Supercenter	829 feet E	RCRA, Small Quantity
Randolph, WV	CPG Elkins Contractor Yard	Rich Oil #3956	861 feet E	RCRA Small Quantity
Randolph, WV	CPG Elkins Contractor Yard	Rite Aid #914	882 feet .E	RCRA, Small Quantity
Fairfax, VA	PAR-79	Centreville Brite Cleaners	1,175 feet NE	RCRA, Small Quantity
Fairfax, VA	PAR-79	Newgate Custom Cleaners	1,175 feet E	RCRA, Small Quantity
Kanawha, WV	White Contractor Yard	Prima Marketing LLC	1,269 feet W	RCRA, Small Quantity
Kanawha, WV	White Contractor Yard	Scott Carpenter Excavating CO.	1,595 feet SE	RCRA, Unknown
Warren/ Front Royal, VA	Nineveh Compressor Station	Baugh Northeast CO-OP Inc.	1,987 feet SE	TRI Reporter
Loudoun, VA	Loudoun Compressor Station	Dominion Leesburg Station	2,436 feet N	RCRA, Small Quantity
Loudoun, VA	Loudoun Compressor Station	Dominion Transmission	2,690 feet N	RCRA, Small Quantity
Kanawha, WV	White Contractor Yard	Rite Aid #452	3,180 feet W	RCRA, Small Quantity
Warren, VA	Nineveh Compressor Station	Family Dollar Distribution	3,405 feet N	RCRA, Small Quantity

TABLE B.1.2-2 (Continued)				
County/City and State/Commonwealth	**Project Facility**	**Site Name/Ownership**	**Distance and Direction from Project**	**Facility Type**
RCRA, CERCLIS, TRI Sites Identified within One-Mile of the Aboveground Facilities and Access Roads (Continued)				
Warren/ Front Royal, VA	Nineveh Compressor Station	Toray Plastics (America) Inc.	4,107 feet S	TRI Reporter
Randolph, WV	UPS Contractor Yard	Guttman Oil CO.	4,216 feet W	TRI Reporter, RCRA Small Quantity
Fairfax, VA	PAR-79	London Towne Elementary	4,570 feet E	RCRA, Small Quantity
Kanawha, WV	White Contractor Yard	H.E.S. INC	4,908 feet W	RCRA, Small Quantity
Warren, VA	Ninevah Compressor Station	Virginia Inland Port	5,046 feet S	RCRA, Small Quantity
Fairfax, VA	PAR-79	Bell Atlantic	5,055 feet SE	RCRA, Small Quantity
Fairfax, VA	PAR-79	Luck Stone	5,144 feet SE	RCRA, Small Quantity
Leaking Underground Petroleum Storage Tank Sites within 1 mile of the Centerline and Aboveground Facilities				
Saint Luke, VA	Dysart Valve	Walker Cash Grocery	4,960 feet W	LUST

[a] Site not listed on EPA National Priorities List based on site inspections; no contaminants listed on the site
TRI = Toxic Release Inventory
RCRA = Resource Conservation and Recovery Act
CERCLIS = Comprehensive Environmental Response, Compensation and Liability Information System

Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. Measures outlined in Columbia's ECS would be implemented to reduce potential impacts on soils from spills of the hazardous materials used during construction. These measures include regularly inspecting equipment to ensure it is in good working order, properly training employees regarding the storage and handling of fuels and other hazardous materials, and promptly containing, cleaning up, and reporting, as necessary, any spills to the appropriate agencies.

Implementation of the measures outlined in Columbia's ECS minimize soil impacts and ensure effective revegetation of disturbed areas with regard to areas where spills occurred. If unexpected contaminated soil is encountered, Columbia would contact the WVDEP, VDEQ, and other local agencies, as appropriate, to develop and implement mitigation measures and procedures to address the contamination. If a spill occurs within the MNF, the USFS representative would be notified immediately and appraised of the situation. Photographs would be taken of the spill area before, during, and after cleanup, weather conditions noted, and personnel involved noted. Contaminated materials would be collected, removed from the work site promptly, and disposed of or recycled in a proper manner. Given the impact minimization and mitigation measures described above for spills and potential contamination, we conclude that soils would not be significantly affected by construction and operation of the Project.

By adopting and incorporating the measures contained in FERC's Plans and Procedures in Columbia's ECSs, Columbia would adequately minimize and mitigate impacts on soil resources. The USFS has requested additional data to aid in their review of the Construction SUP application and Columbia is providing this information to them. We conclude that the measures described above will minimize impacts on soil related to the proposed project would be minimal.

2.0 WATER RESOURCES

2.1 Groundwater Resources

The Project would cross the following four principal aquifer systems: the Pennsylvanian aquifer system, Mississippian aquifer system, Valley and Ridge aquifer system, and Early Mesozoic Basin aquifer system (USGS, 1997). The Mississippian aquifer system consists primarily of carbonate rocks. Within the project area, the Mississippian aquifer system is limited in geographic extent and only yields groundwater in localized areas (USGS, 1997). As of 2005, well yields from the Mississippian aquifer system averaged 0.9 million gallons per day in West Virginia, and 0.1 million gallons per day in Virginia (Maupin and Barber, 2005). The Valley and Ridge aquifer system mostly consists of folded sandstone, shale, and limestone (USGS, 1997). As of 2005, well yields from the Valley and Ridge aquifer system averaged 34.2 million gallons per day in Virginia (Maupin and Barber, 2005). Both the Pennsylvanian and Mesozoic aquifer systems consist primarily of layers of consolidated sedimentary rock, with sandstone deposits as the primary water producing units (USGS, 1997). As of 2005, average well yields within the Pennsylvanian aquifer system were 18.3 million gallons per day in West Virginia. Average well yields as of 2005 were 2.1 million gallons per day in the Virginia portion of the Early Mesozoic aquifer system (Maupin and Barber, 2005). According to USGS well data, average depths to groundwater in West Virginia are between 20 and 30 feet. Principal aquifers in the Project area are depicted in figure B.2.1-1.

Sole Source Aquifers, Wellhead Protection Areas, and Public Watershed Areas

The EPA defines a sole or principal source aquifer (SSA) area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. EPA guidelines also stipulate these areas can have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water (EPA, 2015b). The Project would not be located within a designated SSA. The nearest SSA (Prospect Hill SSA) is located 8.5 miles northeast of the proposed Nineveh Meter Station (EPA, 2007).

Columbia consulted with the West Virginia Department of Health and Human Resources (WVDHHR) and the VDEQ to identify Wellhead Protection Areas (WHPA) crossed by the proposed Project. The WVDHHR indicated that 22 WHPAs are within 3 miles of the proposed Project. Six of these WHPAs are within 150 feet of proposed Project facilities in Pendleton County, West Virginia (see table B.2.1-1). Each of the six WHPAs serve up to 25 individuals. There are no WHPAs crossed or within 150 feet of the Project in Virginia. Wellhead and Surface Water Protection Plans in West Virginia and Virginia are implemented at the local level on a voluntary basis.

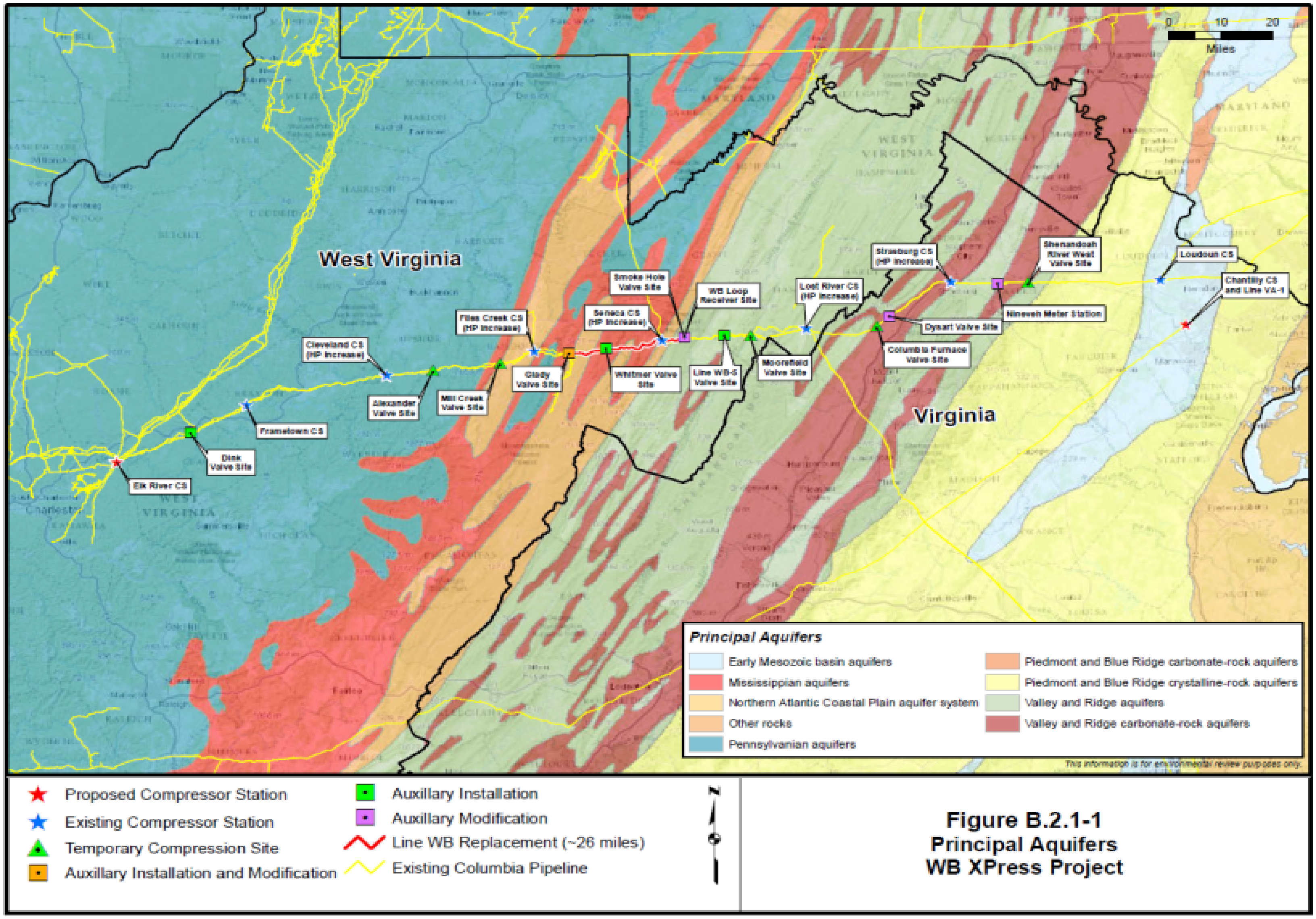

Figure B.2.1-1
Principal Aquifers
WB XPress Project

TABLE B.2.1-1

Wellhead Protection Areas within 150 feet of the WB XPress Project

Milepost/Facility	Public Water System ID Number
Line WB Replacement	
20.2 – 20.9	WV9936035
	WV9936074
	WV9936068
Seneca Compressor Station	
N/A	WV9936022
	WV9936035
	WV9936068
	WV9936074
Access Roads	
TAR 45 and 47	WV9936022
	WV9936035
	WV9936068
	WV9936074
Contractor Yards	
Seneca Contractor Yard	WV9936061
	WV9936070
Staging Areas	
Staging Area 12 and 12.1	WV9936035
	WV9936074
	WV9936068

Public and Private Water Supply Wells and Springs

Public and private water supply wells and springs within the vicinity of the Project area were identified based on field surveys. Table B.2.1-2 summarizes the water supply wells and springs identified within 150 feet of Project area. Seeps were identified during Columbia's wetlands delineations and are described in its delineation reports, which were included as appendix 2C of its Environmental Report.

TABLE B.2.1-2

Water Supply Wells and Springs within 150 Feet of the WB XPress Project Area [a]

Milepost	County, State	Type
Line WB Replacement		
0.3	Randolph, WV	Private Well
6.0	Randolph, WV	Private Well
6.3	Randolph, WV	Private Well
6.4	Randolph, WV	Private Well
6.6	Randolph, WV	Private Well
7.0	Randolph, WV	Private Well
7.2	Randolph, WV	Private Well
7.8	Randolph, WV	Private Well
8.0	Randolph, WV	Private Well
13.8	Randolph, WV	Spring
17.9	Pendleton, WV	Private Well
18.0	Pendleton, WV	Private Well
19.4	Pendleton, WV	Private Well
19.5	Pendleton, WV	Private Well
21.5	Pendleton, WV	Private Well
21.6	Pendleton, WV	Private Well

[a] Based on field surveys.

Impacts and Mitigation

Pipeline construction activities are not likely to result in significant impacts on groundwater resources because the majority of construction would involve shallow (generally no deeper than 10 feet deep), temporary, and localized excavation. However, trench excavation could intersect the water table in low-lying areas where groundwater is near the surface (e.g., wetlands). Groundwater resources could also be temporarily affected due to changes in overland water flow and recharge caused by clearing and grading of the Project right-of-way. In addition, near-surface soil compaction caused by heavy construction vehicles could reduce the soil's ability to absorb water in these isolated areas. During construction, local water table elevations could be affected by trenching and backfilling, which could temporarily impact wells near the construction area.

Columbia would protect groundwater supplies including wells and springs by implementing the measures in its SPCC Plan and blasting plan. As part of these measures, Columbia would prohibit refueling activities and storage of hazardous liquids within at least a 200-foot radius of all private wells and at least a 400-foot radius of all municipal or community water supply wells. Where blasting is necessary, Columbia would require the Contractor to provide seismographic equipment to measure the peak particle velocity of all blasts in vertical, horizontal, and longitudinal directions. The measurement of the peak particle velocity would occur at water wells and potable springs within 150 feet of blasting to confirm that blasting is conducted in a manner that protects groundwater supplies.

The direct and indirect impacts described above would be temporary and would not significantly affect groundwater resources including seeps. Impacts on groundwater supplies, including water wells and nearby WHPAs, would be avoided or minimized by the use of construction techniques contained in Columbia's ECSs and blasting plan. Measures in its ECSs include:

- installing temporary and permanent trench plugs;
- discharging all trench water into well-vegetated upland areas to allow the water to infiltrate back into the ground, thereby minimizing any long-term impacts on the water table;
- restoring the ground surface as closely as practicable to original contours and revegetating the right-of-way to ensure restoration of pre-construction overland flow and recharge patterns; and
- conducting compaction testing in residential and agricultural areas and mitigate severely compacted soils through the use of deep tillage operations to increase the water infiltration and groundwater recharge (see section B.1.2).

The EPA Region 3 and the Sierra Club submitted comments regarding concern about the impact on WHPAs, drinking water, and wells. Columbia has neither completed identification of all private water wells and potable springs in proximity to project work areas, nor has it identified any specific protection measures that would be implemented for wells located within the construction work areas. Therefore, **we recommend:**

- **<u>Prior to construction</u>, Columbia should:**

a. file with the Secretary the location by milepost of all water wells and potable springs within 150 feet of construction workspaces and identify the distance of each well from the construction workspace;

b. file with the Secretary, for review and written approval of the Director of OEP, specific protection and mitigation measures for any water wells or potable springs located within the construction workspace; and

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

- **<u>Within 30 days of placing the facilities in service</u>, Columbia should also file a report with the Secretary discussing whether any complaints were received concerning well yield or water quality and how each was resolved.**

Columbia has stated that if construction adversely affects a well, Columbia would pay to have the well repaired and the water quality and yield restored. If water quality or yield is affected such that the well is unusable or unable to meet the affected landowner's needs, Columbia would provide an alternate source of potable water until the necessary well repairs can be made or a new well is drilled.

The EPA Region 3 is also concerned about WHPAs being impacted by methane gas leaks. The risk of a leak contaminating water supply wells with methane is very low. The proposed transmission facilities are shallowly buried or in some cases, aboveground. If there were a methane leak, the gas would naturally migrate up to the soil surface and dissipate into the air, not migrate down into the underlying aquifers. Columbia also continuously monitors the operation of its pipelines and periodically conducts routine inspections of its pipelines to check pipeline integrity and detect gas leaks. In the event that a gas leak is detected, Columbia would notify landowners that are in close proximity to the site of the leak.

The EPA Region 3 is also concerned about the impact of aboveground storage tanks. Columbia has not identified aboveground storage tanks within the proposed work areas where ground disturbance would occur, except at existing valve and compressor station sites. These tanks are highly visible. Furthermore, to ensure potential tanks would not be impacted by construction activities, Columbia would conduct contractor training sessions before construction and would mark the location of the tanks with high visibility flagging. Most of Columbia's aboveground storage tanks are designed with double-walled tanks to provide secondary containment, and most tanks have existing protection with permanent pipe bollards. During construction, at each location, Columbia would assess the risk of damaging tanks and install additional preventative measures where necessary. This could include the installation of jersey barriers, additional bollards, and/or safety fences. Columbia would implement the measures contained in its SPCC Plan in the event of any leak associated with these tanks. Each site would have on-site copies of the SPCC Plan, safety data sheets, and contact information identifying who should be contacted in the event of a spill and the numbers for emergency responders.

As described in section B.1.1, some of the Project facilities would cross areas of known karst terrain. Impacts on groundwater quality could occur where sinkholes or karst features are present at or near ground surface. Karst systems have a very low self-purification or filtering capability which makes karst groundwater highly susceptible to impact from erosion of surface materials and/or spills. Erosion of excavated materials at ground surface into karst openings could impact local groundwater supplies such as springs and wells which would be manifested as increased turbidity and bacterial load. Inadvertent spills from equipment refueling and/or leaks could impact groundwater quality through rapid transport of contaminants discharging at springs and surface waterbodies. The Sierra Club expressed concern that the use of blasting could encourage contamination of groundwater supplies by introducing new bedrock conduits for passage of contaminated water and sedimentation, and could alter groundwater well capacity.

Impacts of such contamination are typically minor because of the low frequency and volumes of spills and leaks. Columbia would implement measures outlined in its ECSs, Karst Mitigation Plan, and specifically the SPCC measures, to avoid and minimize impacts on groundwater in areas of karst terrain and reduce potential for and impacts of spills of the hazardous materials used during construction. Measures in the SPCC Plan would include:

- installing erosion and sediment control devices along the edge of the construction rights-of-way and other work areas upslope of known sinkholes or other karst features;
- regularly inspecting equipment to ensure it is in good working order;
- properly training employees regarding the handling of fuels and other hazardous materials;
- promptly reporting any spills to the appropriate agencies; and
- locating fuel, and other hazardous liquid, storage areas at least 200 feet from private water wells, 300 feet from karst features, and 400 feet from municipal or community water wells.

In addition, the Karst Mitigation Plan outlines construction procedures and mitigation measures for pre-construction and construction monitoring of karst features, protection of karst openings from construction runoff and sedimentation, repair of newly discovered karst features, and blasting precautions and procedures near karst areas (previously summarized in Section 1.1 Geology). Columbia's Karst Mitigation Plan incorporates provisions from the WVDEP (2005) Sinkhole Mitigation Guidance Document.

Release of hydrostatic test water may occur near known karst features. Columbia's Karst Mitigation Plan contains several measures Columbia would follow to minimize the risk of hydrostatic test water release making its way into karst drainage areas, including ensuring that:

- Hydrostatic test water would not be obtained from karst features (only free-flowing streams). Water from these sources would be withdrawn at a rate that does not reduce downstream flows by more than 25 percent; and
- Hydrostatic testing water from a new pipe would not be discharged directly into flagged or marked buffer areas of sinkholes, fissures, or other karst features or channels or surface features that flow towards those features. Hydrostatic testing water would be discharged in the following manner (in order of priority and preference):

1. Discharge hydrostatic test water downgradient of flagged or marked buffer areas of sinkholes, fissures, or other karst features unless on-the-ground circumstances (e.g., manmade structures, terrain, other sensitive resources) prevent such discharge;
2. If those circumstances occur, discharge water into uplands greater than 300 feet from flagged or marked buffer areas of sinkholes, fissures, or other karst features unless on-the-ground circumstances (e.g., manmade structures, terrain, or other sensitive resources) prevent such discharge;
3. If not practicable, discharge water as far from flagged or marked sinkholes, fissures, or other karst features as practical and use additional sediment and water flow control devices to minimize effects.

As discussed in section B.1.2, several sites of existing contamination were identified within one mile of the Project facilities. However, due to the distance of these sites from the Project facilities, the potential to encounter contaminated groundwater during construction and/or operation of the Project is low. If unexpected contaminated groundwater is encountered, Columbia would implement mitigation measures developed in coordination with the WVDEP and the VDEQ to address the contamination. Contaminated materials would be collected, removed from the work site promptly, and disposed of or recycled in a proper manner.

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

2.2 Surface Water Resources

Existing Surface Water Resources

A total of 94 waterbodies were identified within the Project area, including 27 perennial waterbodies, 36 intermittent waterbodies, 28 ephemeral waterbodies and 3 open water ponds. Of the 94 waterbodies, 55 streams and 3 open water ponds would be crossed by or located within the workspace for pipeline facilities; 30 streams would be crossed by access roads; 7 streams would be located in the aboveground facilities workspace; and 1 stream would be located within the contractor yards. In some instances, a single stream is crossed more than once, resulting in more crossings than streams. Although five waterbodies (four intermittent streams and one perennial stream) would not be impacted by ground disturbance, the HDD would cross underneath them so they are included in the tally of waterbodies crossed totalling 99 (see appendix E). Most of the waterbodies are located in West Virginia. These include 26 perennial streams (both SPEG001P and SPEG025P are crossed twice, for a total of 28 perennial stream crossings, 26 intermittent streams (SPEM004I is crossed twice for a total of 27 intermittent stream crossings), 26 ephemeral streams (SPEM009E is crossed twice for a total of 27 ephemeral stream crossings, and 2 open water ponds. The remaining 14 waterbodies are located in Virginia and include 1 perennial stream, 10 intermittent streams (SFAG001I is crossed twice for a total of 11 intermittent stream crossings, 2 ephemeral streams, and 1 open water pond. The MP location, feature ID, waterbody name, FERC classification, fisheries classification, flow regime, approximate crossing width, and proposed method of crossing for all 99 waterbodies that would be crossed or otherwise affected by the Project are provided in appendix E.

Wild and Scenic River Segments

The Project would involve pipeline and/or access road crossings of the following Nationwide Rivers Inventory (NRI) waterbodies within MNF-managed land: Laurel Fork and Seneca Creek. Laurel Fork would be crossed within MNF-managed land by the Line WB Replacement pipeline and Seneca Creek would be crossed within MNF-managed land by two access roads: PAR-27A and TAR-29. Potential impacts associated with these crossings are described in Columbia's *Assessment of National Park Service Designated Nationwide Rivers Inventory Proposed Waterbody Crossings* (NRI assessment) submitted to the National Park Service and the MNF on August 17, 2016, and FERC on August 19, 2016. Specifically, the crossing and potential impacts of the pipeline on Laurel Fork are discussed in section 4.1 of the NRI assessment. The crossings and potential impacts of the access roads on Seneca Creek are discussed in section 4.5 of the NRI assessment. The NRI assessment is included as Attachment N of the COMP. The National Park Service stated in an email dated February 7, 2017 that it has no additional comments on NRI crossings and would let MNF take the lead on this coordination.[18]

Table A.9-1 lists the permits that Columbia would need to obtain to cross surface waters. These would include Section 404 permits from each Corps of Engineers' District (see table B.2.2-1, Section 401 water quality certification from VDEQ, and a stream activity permit from the WVDNR. The VDEQ issued a FCC (dated October 7, 2016) for the Project including Subaqueous Lands Management which indicates the Project is consistent with the CZMA provided all applicable permits and approvals are obtained. The WVDEP stated in a letter dated December 5, 2016[19] the project as proposed does not require an individual 401 water quality certification, but if permanent impacts associated with the project were increased, an individual 401 water quality certification may be required.

Overall, there are 164 aquatic resources (71 wetlands and 94 waterbodies) crossed by the project. The following table provides a breakdown of these resources per Corps District.

TABLE B.2.2-1

Number and Type of Aquatic Resources per U.S. Army Corps of Engineers' District in the WB XPress Project

Corps District		Open Water/Pond	Waterbodies			Wetlands		
			Perennial	Intermittent	Ephemeral	PFO	PSS	PEM
Huntington		-	3	2	-	-	-	-
Norfolk		1	1	10	2	5	1	13
Pittsburgh		2	23	24	26	5	-	47
	Total	**3**	**27**	**36**	**28**	**10**	**1**	**60**

Surface Water Protection Areas

Columbia consulted with WVDHHR and the Virginia Department of Health – Office of Drinking Water (VDH-ODW) to identify public surface water intake and protection areas in the

[18] Letter can be found can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170307-5144 in the "Numbers: Accession Number" field.

[19] Letter can be found can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161206-5221 in the "Numbers: Accession Number" field.

vicinity of the Project. Information provided by the WVDHHR indicated the Project facilities in West Virginia would not intersect any surface water intakes; however, the Project would cross eight surface water protection areas (WVDHHR, 2003). The protection areas crossed by the Project are summarized in table B.2.2-2.

TABLE B.2.2-2

Surface Water Protection Areas Crossed by the WB XPress Project Facilities in West Virginia

Project/Facility	County	System Name	Protection Area	Milepost	Distance from Project (feet)
Pipeline Facilities					
Line WB-5 Replacement	Grant	Moorefield Municipal Water-WV3301601	ZPC	0.0	Crossed
Line WB Replacement	Randolph	Town of Harman- WV3304204	ZPC	6.8	Crossed
Line WB Replacement	Pendleton	Town of Petersburg- WV3301204	ZPC	17.1	Crossed
Aboveground Facilities					
Seneca Compressor Station	Pendleton	Town of Petersburg- WV3301204	ZPC	N/A	Crossed
Files Creek Compressor Station	Randolph	Town Of Beverly- WV3304202	ZCC, ZPC	N/A	Crossed
Files Creek Compressor Station	Randolph	City of Elkins - WV3304203	ZPC	N/A	Crossed
Frametown Compressor Station	Braxton	Sugar Creek PSD – WV3300404	ZCC	N/A	4,471
Frametown Compressor Station	Braxton	Sugar Creek PSD – WV3300404	ZPC	N/A	6,396
Files Creek Compressor Station	Randolph	City of Elkins - WV3304203	ZCC	N/A	8,883
Dink Compressor Station	Clay	Clay Water Dept. – WV3300801	ZCC	N/A	10,763
Contractor Yards					
CPG Elkins Contractor Yard	Randolph	City of Elkins – WV3304203	ZCC	N/A	Crossed
Hwy 48 Contractor Yard	Randolph	Town of Belington – WV3300101	ZPC	N/A	Crossed
White Contractor Yard	Kanawha	WVAWC-Kanawha Valley District-WV3302016	ZCC	N/A	10,311
Hwy 48 Contractor Yard	Barbour	Town of Belington – WV3300101	ZCC	N/A	13,293
Hwy 48 Contractor Yard	Barbour	City of Philippi – WV3300101	ZPC	N/A	14,080
Hwy 48 Contractor Yard	Barbour	Town of Belington – WV3300101	ZCC, ZPC	N/A	14,081
Access Roads					
TAR-56, PAR-103, PAR-104	Hardy	Moorefield Municipal Water-WV3301601	ZPC	N/A	Crossed
TAR-10	Randolph	Town of Harman – WV3304204	ZCC, ZPC	N/A	Crossed
TAR-48.2	Pendleton	Town of Petersburg – WV3301204	ZPC	N/A	Crossed
PAR-102	Randolph	Town of Beverly – WV3304202	ZPC	N/A	Crossed
PAR-100	Clay	Clay Water Dept. – WV3300801	ZPC	N/A	Crossed
PAR-101	Upshur	Buckhannon Water Board – WV3304902	ZPC	N/A	3,051
PAR-101	Upshur	Grand Badger Community Water System – WV3304910	ZCC	N/A	11,396
TAR-51	Grant	Town of Petersburg – WV3301204	ZCC	N/A	12,445

Source: WVDHHR, 2003
ZCC (Zone of Critical Concern): The ZCC is based on a five-hour time-of-travel of water in the streams to the water intake.
ZPC (Zone of Peripheral Concern): The ZPC is based on an additional five-hour time-of-travel of water in the streams beyond the perimeter of the ZCC, which creates a protection zone of 10 hours above the water intake.

Columbia's review of the data provided by the VDH-ODW identified one public surface water intake within three miles of the Project facilities. This intake is located within two miles of the Strasburg Compressor Station in the Town of Strasburg and withdraws water from the North Fork of the Shenandoah River (VDH-ODW, 2015). Based on the information provided by the VDH-ODW, no surface water protection area is associated with this intake.

Sensitive Surface Waters

Waterbodies can be considered sensitive for several reasons, including the presence of critical aquatic habitat, special status species, or high-quality recreational, scenic, or historic value. West Virginia and Virginia maintain a list of Tier 3 streams, which are defined as outstanding national resource waters that receive special status to protect water quality. The NRI is a list of more than 3,400 free-flowing river segments in the United States that are believed to possess “outstandingly remarkable” natural or cultural values. National Wild and Scenic Rivers are select “unspoiled rivers” chosen for federal protection to balance river developments nationwide.

In West Virginia, the Project would include six pipeline crossings and four access road crossings of Tier 3 streams and four pipeline crossings and four access road crossings of NRI Rivers (see table B.2.2-3). The Tier 3 and NRI designations are not mutually exclusive and five of the crossings would be in areas that include both designations. The Project would not cross any Tier 3 streams or NRI Rivers in Virginia. No federal wild and scenic rivers or state-designated scenic rivers would be crossed or affected by the Project in West Virginia or Virginia (National Wild and Scenic Rivers System, 2015).

Dry Fork, Gandy Creek, South Branch Potomac River, and South Mill Creek are all classified as Tier 3 streams in some areas of West Virginia, but are not classified as Tier 3 streams where they are crossed by the proposed pipeline or MAOP uprate and restoration segments. Dry Fork, South Branch Potomac River, and South Mill Creek are considered trout streams. Gandy Creek is not classified as a trout stream where it is crossed by the Project. The trout status of each stream and river is included on the updated table. Gandy Creek was not included on the updated table because it is not a West Virginia Tier 3 stream, NRI river, or trout stream where it is crossed by the Project. Given no ground disturbance associated with the MAOP work would occur, and thus there would be no impacts on the South Branch Potomac River or South Mill Creek, these waterbodies were not included in the table.

TABLE B.2.2-3

Sensitive Waterbodies Crossed by the WB XPress Project

Facility	Milepost	Waterbody Name	Proposed Crossing Method	Sensitive Feature of Waterbody
Line WB Replacement	0.1	Glady Fork	Dam and Pump or Flume	NRI River, Trout stream
Line WB Replacement	2.0	Daniels Creek	Dam and Pump or Flume	WV - Tier 3
Line WB Replacement	4.3	Laurel Fork	Dam and Pump or Flume	WV - Tier 3 NRI River, Trout stream
Line WB Replacement	4.6	Mud Run	Dam and Pump or Flume	WV - Tier 3
Line WB Replacement	5.3	Bennett Run	Dam and Pump or Flume	WV - Tier 3
Line WB Replacement	7.4	Dry Fork	Dam and Pump or Flume	Trout stream
Line WB Replacement	11.2	Upper Gulf Run	Dam and Pump or Flume	WV - Tier 3, Trout stream
PAR-27A	12.9 [a]	Seneca Creek [b]	Temporary Bridge Crossing	WV - Tier 3,-NRI River, Trout stream
PAR-27A	12.9 [a]	Seneca Creek [b]	Temporary Bridge Crossing	WV - Tier 3, NRI River, Trout stream
Line WB Replacement	12.9	Seneca Creek [c]	Dam and Pump or Flume	WV - Tier 3, NRI River, Trout stream
PAR-27A	12.9 [a]	Whites Run	Temporary Bridge Crossing	WV - Tier 3, Trout stream
TAR-29	13.8 [a]	Seneca Creek [d]	N/A – existing bridge crossing	WV - Tier 3, NRI River, Trout stream
Line WB Replacement	20.7	North Fork South Branch Potomac River	Dam and Pump according to Site-Specific Plan	NRI River, Trout stream
TAR-45	21.0 [a]	North Fork South Branch Potomac River	Temporary Bridge Crossing	NRI River, Trout stream

[a] Milepost indicates the location where the access road crosses the pipeline route and does not necessarily indicate where the access road crosses the creek or river.

[b] PAR-27A crosses Seneca Creek in two separate locations.

[c] At this pipeline crossing, Seneca Creek is a braided channel with a distinct instream landmass in between the channels. The two channels would be crossed individually and the total crossing would be 40 feet.

[d] TAR-29 is an existing, public county road (Straders Run Rd CR-7/1) that crosses Seneca Creek via an existing bridge.

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

The list of 303(d) impaired waters for West Virginia and Virginia was reviewed to identify crossings of waterbodies that may contain contaminated sediments. No impaired waterbodies would be impacted by the Project facilities in West Virginia or Virginia (WVDEP, 2014; VDEQ, 2012).

The EPA Region III and the Sierra Club were concerned about the impacts of waterbody crossings as proposed on sensitive or high-quality waterbodies. The feasibility and impacts of using trenchless crossing methods were evaluated for all sensitive or high-quality waterbodies as in comparison to constructing through trenching or conventional methods or HDD. Technical infeasibility or constraints include the existence of steep slopes, need for additional steel bends in the pipeline in steep terrain, lack of available space for safety and operation of equipment, lack of access to remote locations, need for additional off-right-of-way workspace, and presence of sensitive areas within the workspace. Based on our review, we find that dam and pump, flume, or dry-ditch methods are preferable in warm and coldwater fisheries, for waterbodies that would be impacted by the Project.

Impacts and Mitigation

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

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

The greatest potential impacts of pipeline construction would result from an increase in sediment loading to surface waters and an increase in internal sediment loading due to channel/floodplain instability as a result of a change in erosion/deposition patterns. The level of impact of the Project on surface waters would depend on the duration of construction activities; precipitation events; sediment loads; the characteristics at each crossing location including the bed material, stream area (depth and width of the stream) and flow velocity, which affects the mixing of the sediment plume in the water column; and the local turbulence at and downstream of the crossing location.

With the exception of ephemeral waterbodies with no perceivable flow, the pipeline would be installed using a dry crossing method (e.g., flume or dam and pump). If no flow is present at the time of the crossing, standard upland construction techniques would be used. Temporary construction-related impacts associated with the dry crossing method would be limited primarily to short periods of increased turbidity before installation of the pipeline, during the installation of the upstream and downstream dams, and following installation of the pipeline when the dams are pulled and flow across the restored work area is re-established.

Columbia removed the Jaywood Contractor Yard and Alexander Valve Site from the Project, thereby eliminating the need to cross two surface water protection areas associated with these sites. At the request of the EPA Region III, Columbia explored the potential of avoiding all source water protection areas, and it was determined that significant rerouting of pipeline would be necessary to avoid the remaining surface water protection areas described in table B.2.2-1. As this would require substantial greenfield pipeline construction and likely new compressor station facilities, greater environmental impacts are likely expected with this alternative. The implementation of Columbia's SPCC and site-specific E&SC Plans, during construction and operation would adequately minimize the impacts on surface water protection areas.

Columbia also would use HDD along Line VA-1, thereby avoiding impacts to wetlands and waterbodies between MPs 1.5 and 2.2. Specifically, the HDD would avoid impacts on three intermittent streams (SFA-0051, SFA-004, and SFA-003), one perennial stream

(SFA-002P), and one wetland (WFA003E) between the HDD entry and exit location. The HDD would also avoid trenching through wetland WFA002F near MP 2.1, although Columbia would still need to cross this wetland with equipment to access the HDD exit location via Pleasant Valley Road. The realignment of PAR-78 to the Chantilly Compressor Station described in Columbia's August 31, 2016 supplement20 also avoids permanent fill in wetlands WFA004E, WFAZ003E and WFAZ002E and reduces impacts on stream SFAGO191.

About 1,171,000 gallons of water would be used from a municipal source for the drilling fluid.

The primary environmental issue associated with the HDD is the potential for an inadvertent return of drilling fluid to the surface where it could potentially enter a waterbody or wetland. This risk is low given that the proposed HDD would be located primarily in upland areas and would only pass under or near a small number of streams and wetlands. Columbia would reduce the risk and consequences of an inadvertent return by implementing best management drilling practices, which are identified in Columbia's HDD Contingency Plan and would include:

- visually inspecting the ground surface between the HDD entry and exit locations to look for signs of an inadvertent return;
- monitoring of annular fluid pressures and circulation;
- implementing measures to contain the release, should one occur;
- if an inadvertent release cannot be contained or controlled, immediately suspending drilling operations until appropriate measures of containment are in place; and
- notifying FERC and other appropriate agencies if a release occurs.

Of the 11 waterbodies crossed by the permanent access roads, 2 would be crossed with proposed new permanent bridges (PAR-78, Line VA-1). The other nine crossings would use temporary bridge crossings. Impacts on the remaining waterbodies, including those at the aboveground facilities, contractor yards, and along the temporary access roads, would mainly include the placement and removal of timber mats or rip-rap and would not result in new permanent impacts.

The period of in-stream construction would be limited and Columbia would adhere to the stream crossing windows stipulated by the Virginia Department of Game and Inland Fisheries (VDGIF) and WVDNR. In West Virginia, this includes no in-stream work from April 1 to June 30 in B1 (warm water) streams and no in-stream work from September 15 to February 28 in B2 (designated Trout Waters) streams. In Virginia, the VDGIF has issued species-specific timing restrictions that would be incorporated, as applicable. If construction becomes necessary within the restricted timing windows in either state, Columbia would obtain any waivers that are required from the applicable state agency.

Columbia has prepared a COMP as part of the application for a SUP for construction with NFS lands. The COMP includes the following text with regard to construction timing

[20] This supplement and can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20160831-5392 in the "Numbers: Accession Number" field.

within perennial trout streams on NFS lands: "For protection of cold water fisheries, apply the following to the channel buffers of perennial trout streams (stocked and native) during the period of October 1 to June 1: (1) Potential sediment-producing ground disturbance exceeding two consecutive days shall only be initiated after consultation with a Forest fisheries biologist. (2) Potential sediment-producing ground disturbance allowed during this period shall employ additional erosion control measures, seeding or mulching, applied concurrently with the activity."

No water would be withdrawn from any location on NFS lands, as Columbia would withdraw and discharge water for hydrostatic testing outside the MNF. Withdrawal and discharge locations include Glady Fork, Dry Fork Creek and the North Fork South Branch Potomac River (see next section for further detail on hydrostatic testing).

Columbia's West Virginia ECS states that water pumped from a trench or bore pit through sediment filter device would occur "at least 10 feet from stream or wetland," which is consistent with the FERC's Procedures. The MNF Forest Plan Standard SW37 requires the minimum riparian buffer widths of 100 feet for perennial streams and intermittent streams with a drainage area of >50 acres, 50 feet for intermittent stream with drainage area <50 acres, and 25 feet for ephemeral streams. Columbia would discharge water from all trench or bore pits on the MNF in accordance with the 100-foot, 50-foot, and 25-foot riparian buffer distances identified in this standard. On NFS land, Columbia would be required to locate ATWS outside of the stream channel buffers as defined in the LRMP.

Columbia would minimize impacts on waterbodies and associated resources by implementing measures outlined in its ECSs. These measures would include:

- completing in-stream work between June 1 and November 30 in warmwater fishery streams;
- comply with WVDNR timing restrictions for in-stream work in trout (coldwater) streams by not conducting in-stream work between September 15 and March 31 unless a site-specific waiver is obtained from the WVDNR, and would conduct in-stream work in trout streams after June 1 to the maximum extent possible, but reserves the right to further consult with MNF fisheries biologists to waive this limitation, if needed, on a case-by-case basis;
- maintaining reduced workspace areas near waterbodies;
- locating ATWS that are in undisturbed lands at least 50 feet back from waterbody boundaries (this distance may increase to 100 feet on NFS lands, which would be determined in consultation with the USFS and contained as a minimization measure in the SUP application for construction submitted to the MNF);
- requiring temporary erosion and sediment control measures to be installed across the construction right-of-way as necessary to prevent the flow of spoil or heavily silt-laden water into any waterbody;
- maintaining adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses;
- designing and maintaining equipment bridges to prevent soil from entering the waterbody;

- restricting spoil placement near surface waters to the construction right-of-way at least 10 feet from the water's edge or in other approved additional extra workspaces away from the water's edge;
- On NFS lands, restricting spoil placement near surface waters to areas that lie outside stream channel buffers, as defined in the MNF Forest Plan; and
- mitigating the degree of sedimentation and turbidity by limiting the duration of in-stream construction activities (typically 24 to 48 hours).

Following installation of the pipeline Columbia would promptly restore streambeds and banks as near as practicable to their pre-construction conditions and contours. Banks would be stabilized with vegetation and erosion control fabric such as jute netting or bonded fiber blankets. (Any non-biodegradable erosion control fabric that may be used would be removed from the right-of-way when it is no longer needed to stabilize the soils and prevent erosion or stabilize sediments.) Use of riprap would be limited to areas where flow conditions preclude effective vegetative stabilization techniques and any application of riprap would be in performed in accordance with applicable permits.

Columbia's ECSs also includes a SPCC Plan, which would be implemented during construction activities to mitigate potential adverse impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids. Specific measures in the SPCC include requirements to:

- store bulk quantities of diesel fuel and gasoline in a designated fuel depot;
- install adequate spill containment measures, such as containment dikes, combined with impervious lining before fuel storage tanks are filled;
- keep sorbent booms and clean-up kits at all storage locations;
- locate fuel storage areas at least 100 feet from streams, ponds, or wetlands, and at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Columbia property;
- not locate fuel storage areas within any designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority);
- service, lubricate, and refuel equipment in accordance with these same requirements whenever possible, and if not possible conduct these activities in accordance with a supplemental SPCC plan prepared by the EI, based on field conditions;
- place impervious or sorbent materials under the work area before conducting vehicle maintenance;
- collect waste materials created during maintenance (e.g., used oil) for proper disposal;
- inspect the work site and the vehicle after the maintenance work is complete to ensure that all hazardous materials are properly contained and collected for proper disposal; and

- equip each construction crew with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.

In addition to the measures outlined in the ECSs, Columbia would adhere to all requirements contained within applicable federal, state, and local permits for construction activities associated with waterbodies including its Section 404, Section 401, and state stream crossing permits and its hydrostatic test water and stormwater discharge permits.

Following construction, the stream bed and banks would be restored to pre-construction contours and seeded. Columbia would attempt to restore the waterbodies and a 50-foot buffer within 24 to 48 hours of backfilling. In the absence of site-specific seeding recommendations, the specifications listed in Columbia's ECSs would be used. Columbia would return all waterbody banks to pre-construction contours or to a stable angle of repose as approved by the EI. If required, mechanical stabilization of the waterbody banks (e.g., rip-rap, gabions, jute netting) would be used, in accordance with all applicable permits.

Long-term impacts associated with pipeline operations and maintenance would be relatively minor and limited to periodic clearing of the vegetation within the permanent right-of-way at waterbody crossings. To allow for riparian areas to revegetate, clearing within 25 feet of waterbodies would be limited to a 10-foot-wide corridor over the pipeline being maintained in a herbaceous state and trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating being be selectively cut and removed.

Columbia's proposed construction techniques and mitigation measures, and its adherence to applicable state and local permits, would minimize the impact of construction and operation of the Project on surface water resources and surface water protection areas.

Water Use for Hydrostatic Testing

Under DOT regulations (49 CFR Part 192), Columbia is required to verify the integrity of the piping associated with the Project facilities before placing them into service by conducting hydrostatic testing. This testing would involve filling the pipeline with water, pressurizing it, and then checking for pressure losses due to pipeline leakage and is generally carried out after backfilling, and after completion of other construction activities. Table B.2.2-4 summarizes the quantity and sources of water that would be required for the hydrostatic testing of the Project facilities. Columbia would attempt to reuse hydrostatic test water at multiple facilities to minimize the volume of water used and the number of discharges.

TABLE B.2.2-4

Hydrostatic Test Water Used at the WB XPress Project Sites

Facility Name	Milepost	Water Source	Estimated Water Requirements (Gallons)	Locations of Water Discharge (Milepost)	Rate of Discharge (gal/min)
New Pipeline Facilities					
Line WB-5 Extension	0.0 - 0.3	Municipal	76,648	0.3	200
Line WB-22	0.0 - 0.6	Municipal	163,586	0.6	200
Line VA-1	0.0 - 2.2	Municipal	72,400	0.0	200
HDD segment on Line VA-1	1.5-2.2[a]	Municipal	21,500	2.2	200
Replacement Pipeline Facilities					
Line WB-5 Replacement	4.5 - 4.7	Municipal	60,274	4.7	200
Line WB Replacement	0.0 - 16.9	Glady Fork Municipal	1,095,100 17,300	0.1, 7.9, 16.9	200
	16.9 - 25.4	North Fork South Branch Potomac River	661,000	20.7	200
Line WB Replacement #1	134.6 - 134.6	Municipal	6,936	134.7	200
Line WB Replacement #2	134.7 - 134.8	Municipal	18,206	134.8	200
Line WB Replacement #3	141.3 - 141.3	Municipal	11,244	141.3	200
Line WB Replacement #4	142.4 - 142.6	Municipal	19,283	142.4	200
Line WB Replacement #5	146.4 - 146.5	Municipal	11,585	146.5	200
New Aboveground Facilities					
Elk River Compressor Station (WB Launcher)	0.3[b]	Municipal	200,000	Hauled Off	500
Elk River Compressor Station (WB-22 Launcher)	0.3[b]	Municipal	5,912	Hauled Off	500
Elk River Compressor Station (WB-5 Receiver)	0.3[b]	Municipal	5,912	Hauled Off	500
Line WB-22 Receiver Site	0.6[b]	Municipal	5,912	Hauled Off	500
Line WB-5 Valve Site	4.5[b]	Municipal	3,695	Hauled Off	500
Chantilly Compressor Station	0.0[c]	Municipal	30,000	0.0 [c]	500
Line VA-1 Receiver Site	2.0[c]	Municipal	5,912	2.0 [c]	500
Existing Aboveground Facilities					
Proposed Line WB-22					
Panther Mountain Regulator Station	0.3	Municipal	5,000	0.3	500
Existing Line WB-5					
Dink Valve Site	2.8[c, d]	Municipal	7,390	Hauled Off	500
Frametown Compressor Station	32.0[c, d]	Municipal	20,000	32.0[d]	500
Cleveland Compressor Station	64.6[c, d]	Municipal	200,000	64.6[d]	500
Files Creek Compressor Station	5.2[c, d]	Municipal	250,000	5.2[d]	500
Lost River Compressor Station	22.0[c, d]	Municipal	200,000	22.0[d]	500
Proposed Line WB Replacement					
Glady Valve Site	0.0	Municipal	3,825	Hauled Off	500
Seneca Compressor Station	20.5	Municipal	300,000	20.5	500

TABLE B.2.2-4 (Continued)

Facility Name	Milepost	Water Source	Estimated Water Requirements (Gallons)	Locations of Water Discharge (Milepost)	Rate of Discharge (gal/min)
Existing Line VB-5 Line					
Dysart Valve Site	14.6	Municipal	15,000	14.6	500
Strasburg Compressor Station	29.1	Municipal	200,000	29.1	500
Nineveh Meter Station	38.3	Municipal	5,000	38.3	500
Loudoun Compressor Station	70.6	Municipal	75,000	70.6	500

[a] Milepost associated with proposed HDD segment; volume indicates water needed for hydrostatically testing the HDD pipeline segment before it is installed
[b] Milepost associated with Columbia's existing Line WB-5
[c] Milepost associated with Columbia's proposed Line VA-1
[d] Pipeline was built in several sections, therefore there are multiple zero stations along the WB-5 Line and mileposts are not sequential.

Hydrostatic test water manifolds would be located outside wetlands and riparian areas to the maximum extent possible. For the facilities that would not be tested with municipal water, Columbia would implement measures outlined in its ECSs to minimize impacts on waterbodies during withdrawals including:

- screening the intake hose to minimize the potential entrainment of fish, and
- maintaining adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

Following the completion of hydrostatic testing of the pipeline facilities, test water would either be discharged into adjacent well-vegetated upland areas at a controlled rate, or transported and disposed of at an approved off-site treatment facility. Where on-site discharges are conducted, energy dissipation devices and/or sediment barriers would be used as necessary to prevent erosion and scour, minimize the suspension of sediments, and increase filtration of the water. The water would then be allowed to infiltrate the soil and recharge the local groundwater system. Columbia may also transport and dispose the hydrostatic test water at an approved off-site water treatment facility. Columbia would comply with all the conditions included in the hydrostatic test water discharge permits that would be obtained from each state.

The facilities to be tested would consist of new pipe free of chemicals or lubricants and none of the hydrostatic test water would be treated with harmful chemicals. Test water may be dechlorinated by dissipation or treatment with sodium bisulfite prior to discharge. Based on the implementation of the measures outlined in the ECSs and the adherence to applicable permit requirements, no significant impacts on water quality or waters used for drinking supplies are anticipated as the result of the withdrawal and discharge from hydrostatic testing.

No hydrostatic test water is currently proposed to be withdrawn or discharged on the MNF. Details on the distance from discharge locations near MNF-land are described following:

- **Withdrawal and Discharge at or in an upland area near Glady Fork:** The withdrawal location at Glady Fork and MP 0.1 of the Line WB Replacement is about 0.1-mile from MNF land to the east while the discharge location in the upland area near Glady Fork is about 0.1-mile downgradient of MNF land also to the east.

- **Discharge at or in an upland area near the North Fork South Branch of the Potomac:** The discharge location in the upland area near the North Fork South Branch of the Potomac and MP 20.7 of the Line WB Replacement is about 0.3-mile downgradient of MNF land to the west and 0.7-mile from MNF land to the east.
- **Discharge near Glady Fork in an upland area near MP16.9:** The discharge location in the upland area near MP 16.9 of the Line WB Replacement is about 0.6-mile downgradient of NFS land to the west.
- **Discharge in upland area near MP4.7 for WB-5 Replacement:** The discharge location in the upland area near South Mill Creek and MP 4.7 of Line WB-5 Replacement is about 4.7 miles to the east of NFS land.

Columbia proposes to hydrostatically test the Line WB Replacement pipeline in six sections. At the first four test sections between MPs 0.0 and 16.9, Columbia would use mostly water from Glady Fork and a small amount of water from a municipal source. The first test section would use 1,095,100 gallons of water from Glady Fork. Following completion of the hydrostatic test of the first section, 658,800 gallons of the test water would be discharged to an upland area near Glady Fork and MP 0.1. The remaining 436,200 gallons of water from Glady Fork would be reused for the second test section. Due to differences in volume between the second and third test sections, about 36,200 gallons of the water from the second test would be discharged to an upland area near Dry Fork and MP 7.9. The remaining 400,000 gallons would be used to hydrotest sections 3 and 4. Because of differences in volume between the third and fourth test sections, 17,300 gallons of municipal water would be added to complete the filling of the fourth section. Following completion of the fourth test section, the water (the 400,000 gallons from Glady Fork and the 17,300 gallons from a municipal source) would be discharged into an upland area near MP 16.9 (figure B.2.2-1).

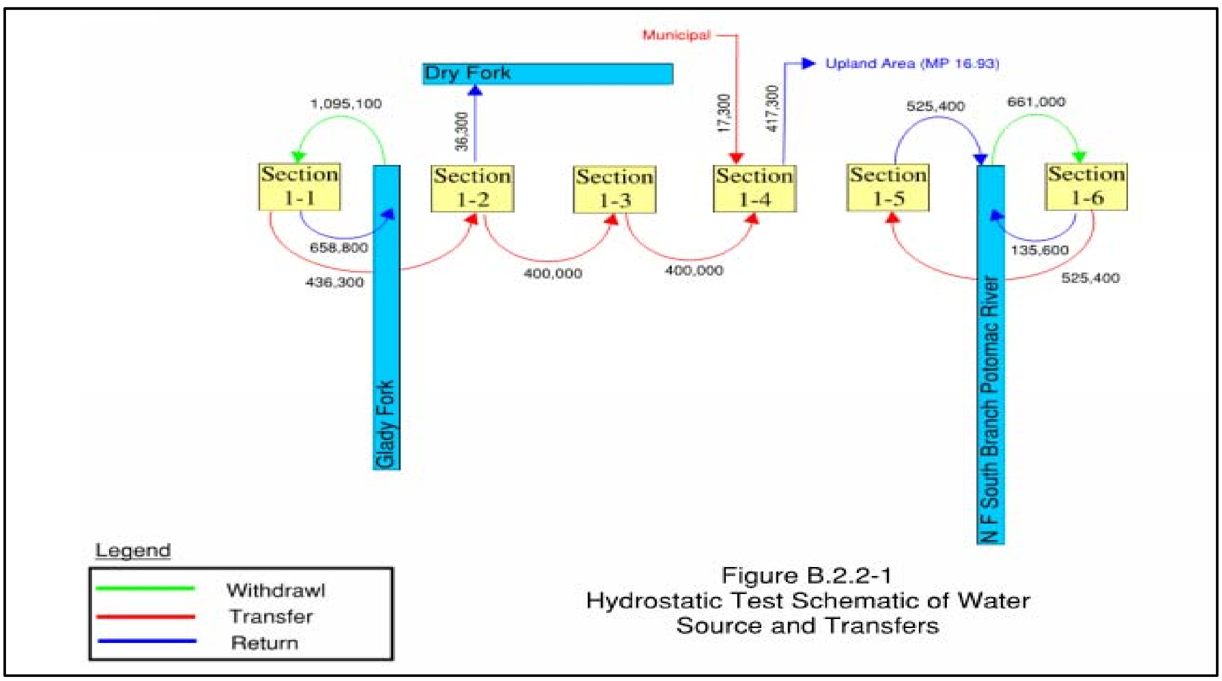

Figure B.2.2-1
Hydrostatic Test Schematic of Water Source and Transfers

Columbia would hydrostatically test the last two sections of the Line WB Replacement between MPs 16.9 and 25.4 using water from the North Fork South Branch Potomac River at MP 20.7. Columbia would withdraw 661,000 gallons of water from the North Fork South Branch Potomac River. Following the completion of the testing of these two sections, the water that was taken from the North Fork South Branch Potomac River would be discharged back to an upland area near the river.

Columbia would need an additional 21,500 gallons to hydrostatically test the HDD segment along VA-1. This water would be obtained from a municipal source and would be discharged to an upland area near MP 2.2 after testing is completed.

The VDEQ issued a FCC (dated October 7, 2016) for the Project including point source pollution control which indicates the Project is consistent with the CZMA for any water withdrawal or discharge in Virginia waterways provided all applicable permits and approvals are obtained.

Columbia's proposed construction techniques and mitigation measures, and its adherence to applicable state and local permits, would minimize the impact of construction and operation of the Project on water resources as a result of hydrostatic testing.

2.3 Wetland Resources

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation adapted for life in saturated soil conditions. Wetlands can be a good source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, recreational opportunities, flood control, and naturally improving water quality.

Existing Wetland Resources

The wetlands in the Project area were field delineated in accordance with the *Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (Corps, 2012). Pedestrian surveys were conducted during April and December 2014 and May, June, July, and August 2015. Wetland types were assigned based on the National Wetlands Inventory classifications as described in Cowardin et al. (1979).

A total of 71 wetland areas were identified in the Project area, or above the HDD area, comprising one or more of the following three cover types: palustrine forested, palustrine scrub-shrub, and/or palustrine emergent. Forested wetlands are characterized by woody vegetation that is 6 meters (about 20 feet) tall or taller and normally include an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer. Scrub-shrub wetlands are generally dominated by woody vegetation less than 6 meters (about 20 feet) tall. Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes not including mosses and lichens.

Of the 71 wetlands identified, 53 would be crossed or impacted by the pipeline facilities, 7 would be located in the aboveground facilities workspace, 1 would be located within a contractor yard, and 10 would be crossed by access roads. The milepost location, feature ID, wetland type, approximate crossing length, and acres impacted by construction and operation for the wetlands in the Project area are provided in appendix F. Wetland crossings would be constructed using Columbia's standard construction techniques specified in the ECSs, FERC Procedures, and applicable federal and state permits.

Columbia has indicated its interest in purchasing commercially available mitigation credits from an agency-approved mitigation bank to compensate for permanent conversion of forested to scrub-shrub or emergent wetlands along the project right-of-way. In-kind mitigation bank credits would be purchased from mitigation banks servicing the areas (hydrologic unit code [HUC]-8 watershed, or approved service area) where the conversion or loss occurs.

Impacts and Mitigation

The effects of construction in wetlands would be greatest during and immediately following construction. Wetland construction procedures are discussed in more detail in section A.7.2. The primary impact of construction would be the removal or alteration of wetland vegetation within the proposed work area. In emergent wetlands, the impact of construction would be relatively short-term since herbaceous vegetation would regenerate quickly. The impact on scrub-shrub wetland vegetation would be greater due to the longer time required for woody vegetation to regenerate. In forested wetlands, the impact from construction would be long term as it may take many years to regenerate within the temporary workspace. Vegetation maintenance on the permanent right-of-way may also permanently convert some scrub-shrub wetlands to emergent wetlands and some forested wetlands to scrub-shrub or emergent.

Other wetland impacts due to construction may include temporary changes to wetland hydrology and water quality. Construction could increase the potential for erosion and sedimentation impacts and result in the mixing of the topsoil with the subsoil (however, see minimization measures, described in section 2.3 that Columbia would implement to reduce potential topsoil and subsoil mixing on NFS lands). This in turn could alter biological activities and chemical conditions within the wetland soils and could affect the reestablishment and natural recruitment of native wetland vegetation. The temporary stockpiling of soil and movement of equipment in wetlands could also compact and furrow wetland soils, which could alter the natural hydrologic patterns, inhibit seed germination, or increase seedling mortality.

Trenching could penetrate or remove impervious soil layers under the wetland and, consequently, drain perched water tables. This in turn could result in drier soil conditions that could impact the reestablishment of wetland vegetation. Construction clearing activities and disturbance of wetland vegetation could also temporarily affect the wetland's capacity to buffer flood flows and/or control erosion. Construction activities also have the potential to temporarily diminish the recreational and aesthetic value of wetlands.

Table B.2.3-1 summarizes the construction and operation impacts on wetlands in the Project area. As shown in table B.2.3-1, construction of the Project facilities would impact a total of 8.3 acres of wetlands, including 0.4-acre of forested wetlands, less than 0.1-acre of scrub-shrub wetlands, and 7.8 acres of emergent wetlands. Wetlands impacted by the Project within NFS land are identified in table B.2.3-1 and appendix F. No wetlands would be impacted on the GWJNF. The number and type of wetland per Corps District is presented in table B.2.2-1.

TABLE B.2.3-1

Summary of Wetlands Affected by Construction and Operation of the WB XPress Project

Facility / County	Emergent		Scrub-Shrub		Forested	
	Construction (acres)	Operation (acres)	Construction (acres)	Operation (acres)	Construction (acres)	Operation (acres)
New Pipeline Facilities [a]						
Line VA-1	0.8	0.0 [a]	<0.1	<0.1	<0.1	<0.1
Replacement Pipeline Facilities [a]						
Line WB Replacement [b]	5.6	0.0 [a]	0.0	0.0	0.3	<0.1
Line WB Replacement #3	0.1	0.0 [a]	0.0	0.0	0.0	0.0
Existing Aboveground Facilities						
Glady Valve Site	0.9	0.0	0.0	0.0	0.0	0.0
Loudoun Compressor Station	<0.1	0.0	0.0	0.0	0.0	0.0
New Aboveground Facilities						
Chantilly Compressor Station	<0.1	0.0	0.0	0.0	<0.1	<0.1
Contractor Yards						
UPS Contractor Yard	0.3	0.0	0.0	0.0	0.0	0.0
Access Roads						
PAR-27A [b]	0.1	0.0	0.0	0.0	0.0	0.0
TAR-47	<0.1	0.0	0.0	0.0	0.0	0.0
TAR-52	<0.1	0.0	0.0	0.0	0.0	0.0
TAR-56	<0.1	0.0	0.0	0.0	0.0	0.0
TAR-77	<0.1	0.0	0.0	0.0	0.0	0.0
PAR-78	0.0	0.0	0.0	0.0	0.0	0.0
PAR-79	<0.1	<0.1	0.0	0.0	0.0	0.0
Project TOTAL	**7.8**	**<0.1** [d]	**<0.1**	**<0.1**	**0.4**	**0.2**

[a] Operation impacts associated with the pipeline facilities are based on a 10-foot-wide corridor being maintained in a herbaceous state and selective tree cutting within 10 feet of either side of the herbaceous corridor (30-foot-wide corridor). Therefore, there would be no operational impacts on emergent wetlands; impacts on scrub-shrub wetlands would be limited to the 10-foot-wide corridor; and forested wetland impacts are based on the 30-foot-wide corridor.

[b] Within NFS land, 1.8 acres of emergent wetland and <0.1 acre of forested wetland would be temporarily impacted by the Project. Long term impacts on wetlands within NFS land due to operation of Project would total <0.1 acre of forested wetland impact along Line WB Replacement and <0.1 acre of emergent wetland along PAR-27A. No wetlands would be crossed or impacted by the Project within the GWJNF.

[c] Totals may differ slightly due to rounding.

[d] Emergent wetlands within the pipeline facilities, PAR-27A, Chantilly Compressor Station, and Glady Valve Site would not be permanently impacted. Therefore only <0.1 acre of emergent wetlands would be permanently impacted by the Project due to the PAR-79 crossing. Operational impacts to forested and scrub-shrub wetlands are limited to 0.2 acre due to the conversion to PEM as a result of Columbia's ROW maintenance practices. Therefore, total wetland operational impacts are 0.2 acre.

During the operation of the Project, a 10-foot-wide corridor centered on the pipeline would be maintained in an herbaceous state and trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating would be selectively cut and removed. These vegetation maintenance practices on the pipeline right-of-way would convert about 0.2-acre of previously forested wetland areas to emergent and scrub-shrub wetland areas and less than 0.1-acre of scrub-shrub wetland areas to emergent wetland areas. The conversion from one vegetation cover type to another could result in changes in wetland functions and values. In general, however, it is expected the affected wetlands would continue to provide important ecological functions such as sediment/toxicant retention, nutrient removal/ transformation, flood attenuation, groundwater recharge/discharge, and wildlife habitat.

In areas crossed by the pipeline, Columbia would minimize the potential for wetland impacts by implementing the measures contained in its ECSs. These measures would include:

- limiting the width of the construction right-of-way in wetlands to 75 feet;
- locating ATWS that are in undisturbed lands at least 50 feet back from wetland boundaries;
- segregating up to 12 inches of topsoil from the trench line in unsaturated wetlands[21];
- temporarily installing mats or timber riprap where necessary to create a stable surface for equipment, or using other methods such as low-ground-weight equipment to minimize soils mixing and compaction;
- installing trench plugs at the edges of wetlands to prevent subsurface drainage along the pipeline; and
- installing erosion controls as needed to control sedimentation until disturbed soils are adequately stabilized and adjacent upland areas are restored.

The WVDEP questioned whether or not Columbia planned to analyze soil density wetland areas prior to and following construction of the pipeline to assess the impact of construction equipment on the ability of wetland soil hydrologic conditions to be restored. We have determined that the above-mentioned measures would adequately protect wetland subsoil and topsoils from becoming compacted by construction.

The Sierra Club states that impacts to wetlands are not properly evaluated or mitigated unless a site-specific analysis for each proposed temporary workspace is completed. As stated above, the wetlands in the Project area were field delineated in accordance with the Wetland Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (Corps, 2012), which is the standard method of delineation. The Commission's Procedures require site-specific justifications for extra work areas that would be closer than 50 feet from a waterbody or wetland. The Corps would determine the mitigation required for any permanent impacts to jurisdictional wetlands. Columbia would mitigate construction-related impacts on wetlands by implementing its ECSs (which incorporates the Commission's Plan and Procedures) and SPCC Plan, and complying with any federal, state, and local permits issued. Therefore, we find that wetlands were properly evaluated and would be properly mitigated.

If after three years, revegetation is not successful, Columbia would develop and implement, in consultation with a professional wetland ecologist, a remedial revegetation plan to actively revegetate the affected wetlands with native wetland herbaceous and (as appropriate) woody plant species. Columbia would then continue the monitoring and revegetation efforts and must file a report with the Commission annually documenting progress until wetland revegetation is successful.

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[21] In its comments on the Project prior to Columbia filing its application, the WVDEP commented that topsoil in wetlands should be stripped up to a depth of 18 inches. Columbia would comply with the topsoil segregation requirements in its permits but is proposing as described in it ECSs to strip up to 12 inches of topsoil from the trench line in wetlands, which would be consistent with FERC's Procedures. On NFS lands, where topsoil depth exceeds 6 inches, the depth of stripping would be defined on-site by a soil scientist (see COMP for details).

Columbia would generally implement the measures in its ECSs to minimize impacts on wetlands. However, Columbia has identified a few locations where alternative measures are proposed. These locations are listed in table B.2.3-2, which also includes Columbia's site-specific justifications. In addition to the locations identified below, Columbia's site-specific plan for crossing Seneca Creek at approximate MP 18.7 would require ATWS within 50 feet of a waterbody and wetlands. We reviewed these alternate measures, and find them acceptable.

TABLE B.2.3-2

Proposed Alternative Measures to the FERC Procedures

Facility/ Milepost	Wetland/ Waterbody ID	Procedures Section Reference	Deviation Description	Justification for Deviation
Line WB Replacement				
7.9	sram006i	V.B.2.a	ATWS within 50 feet of waterbody	ATWS is required within 50 feet of this intermittent stream for installation of mainline valve at the Whitmer valve site.
Line VA-1				
2.1	wfat002f	VI.B.1.a	ATWS within 50 feet of wetland boundary	Columbia adopted the HDD method to reduce environmental impacts. ATWS within 50 feet of this forested wetland is required at the HDD entry point workspace to conduct the HDD.
2.1	sfat002p	V.B.2.a	ATWS within 50 feet of waterbody	Columbia adopted the HDD method to reduce environmental impacts. ATWS within 50 feet of this perennial waterbody is required at the HDD entry point workspace to conduct the HDD.
2.1	sfat001i	V.B.2.a	ATWS within 50 feet of waterbody	Columbia adopted the HDD method to reduce environmental impacts. ATWS within 50 feet of this intermittent waterbody is required at the HDD entry point workspace to conduct the HDD.
Aboveground Facilities				
Glady Valve Site	wrag002e wrag003e wrag001e	VI.A.6	Portion of aboveground facility within wetland	The existing valve site is immediately surrounded by wetlands on multiple sides. Due to locations of existing infrastructure and the proposed modifications at this facility, temporary wetland impacts cannot be avoided. The building design has been revised to avoid permanent wetland impact and only emergent wetlands would be affected.
Loudoun Compressor Station	wlomn001 wlomn002 slmon001i	V.B.2.a, VI.B.1.a	Portion of staging area associated with Loudoun Compressor Station expansion would be within these wetlands	Two small emergent wetlands and an intermittent stream would be temporarily impacted by a staging area that is needed for the Loudon Compressor Station expansion. The wetlands and intermittent stream are located within the facility footprint of Columbia's existing aboveground facility and cannot be easily avoided without severely limiting the usefulness of the proposed staging area. The emergent wetlands would be restored and any stream flow that is present would be maintained during construction.
Chantilly Compressor Station	wfag001f wfag001e sfag001i	V.B.2.a, VI.B.1.a	The footprint of the proposed compressor station includes a small intermittent stream and wetland fringe along the stream	Columbia assessed alternatives to minimize impacts on waterbodies and wetlands associated with its Chantilly Compressor Station. The proposed compressor station design, which would have the least impact, includes two short pipeline segments that cross an intermittent waterbody and a narrow forested wetland. Construction of these short pipe segments would disturb the stream and about 0.06 acre of wetland vegetation but would not result in any permanent wetland filling or stream impacts.
Access Roads				
PAR-27A	wpeg010e* wpeg011e* wpeg012e* wpeg013e*	VI.B.1.d	Access road would cross four wetlands. Modifications would be necessary to use this road.	Limited choices are available for accessing this remote portion of the Project. PAR-27A is an existing access road. Use of this existing access road versus creating a new access road would reduce impacts. The proposed access road crosses four emergent wetlands. Some minor road modifications may be necessary, which could impact these wetlands. Any effects on these wetlands would be temporary and any disturbed wetland areas would be restored.

For the reasons provided in table B.2.3-2, we conclude that the alternative measures at these locations are reasonable and adequately justified.

Inadvertent spills of fluids, such as fuels, lubricants, and solvents, could contaminate wetland soils and vegetation during construction. Columbia would implement measures outlined in its SPCC Plan to minimize contamination from these spills. Hazardous materials, chemicals, lubricating oils, and fuels used during construction would be stored in upland areas at least 100 feet from wetland boundaries. Concrete coating activities would be performed at least 100 feet from wetland boundaries. Additionally, no equipment would be parked, serviced, and/or refueled within 100 feet of wetland boundaries unless no other practical alternative exists, and only then if it is approved by the EIs and additional precautions such as secondary containment structures are used and spill kits are available nearby. Columbia would also implement measures outlined in its SPCC Plan to avoid impacts from hazardous materials on wetlands.

Following construction, Columbia would monitor the revegetation of the affected wetlands annually for three years and would file a report with the Commission identifying the status of the wetland revegation efforts. Revegetation would be considered successful when:

- the affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation);
- vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
- if natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and
- invasive species and invasive weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

As discussed above, construction of the Project would affect about 8.3 acres of wetlands and about 0.2-acre of wetlands would be permanently affected by operation of the Project facilities. The permanent impacts would include the conversion of 0.2-acre of forested wetlands and less than 0.1-acre of scrub-shrub wetlands to another wetland type and the filling of 0.2-acre of emergent wetlands. Columbia would develop a compensatory mitigation plan, as part of the Corps and state permitting processes, to compensate for these impacts. The Huntington District has indicated that no compensatory mitigation is required in the Huntington District, but the Pittsburgh or Norfolk Districts could require mitigation. The WVDEP commented during pre-filing that the conversion of wetlands from one cover type to another in West Virginia would require a compensatory mitigation ratio to 2:1. Ratios for unavoidable impacts on Waters of the United States and Waters of the State would be determined by the Corps and applied as necessary to calculate the amount of compensatory mitigation credits needed to compensate for both forested and shrub wetlands conversion and permanent loss of wetlands. In the event that mitigation bank credits are unavailable to Columbia for purchase, or to make up the balance of credits needed, Columbia would satisfy the remaining compensatory mitigation requirements through an In-lieu Fee Program. The VDEQ issued a FCC (dated October 7, 2016) for the Project including wetlands which indicates the project is consistent with the Coastal Zone Management Act (CZMA) provided all applicable permits and approvals are obtained.

In summary, the Project would result in temporary and permanent impacts on wetlands. The implementation of the mitigation measures outlined in the ECSs would minimize temporary impacts and help ensure the successful restoration of wetlands. Permanent wetland impacts would be offset by the implementation of the compensatory mitigation. With Columbia's implementation of these measures, the Project would not have a significant impact on wetland resources.

3.0 VEGETATION, FISHERIES, AND WILDLIFE

3.1 Vegetation

The vegetation habitats within the Project area include agricultural, open land and rights-of-way, forested, and wetland types. The acreage of land cover types crossed by the Project during construction and operation is provided in table B.3.1-1. The Project crosses the Northern Piedmont, Ridge and Valley, Central Appalachians, and Western Allegheny Plateau ecoregions. The majority of the affected area (about 509.2 acres or 83 percent) would occur within the Ridge and Valley ecoregion and consists of alternating forest ridges and agricultural valleys bordered by Blue Ridge Mountains and Allegheny Plateau. The most common vegetation habitats that would be affected by the Project are open lands and rights-of-way vegetated by grasses, shrubs, and other herbaceous species such as plantain and clover. The next most common vegetation habitat that would be affected is forestland, predominantly Oak-Hickory-Pine Forest, dominated by hickory, longleaf pine, loblolly pine, white oak, and post oak, or Appalachian Oak Forest. These forests include canopies of trees with understories of smaller trees, shrubs, and herbaceous species. Common species within these forests include conifers such as hemlock, red pine, red spruce, and Virginia pine and deciduous species such as black cherry, hickories, yellow popular, chestnut oak, sugar maple, and beech. The next most common vegetation habitat after open lands (including rights-of-way) and forest lands is agricultural land consisting of croplands and hayfields. Most of the remaining vegetation that would be affected by the Project consists of wetlands, mostly emergent wetlands. Common wetland species in the Project area include pin oak, black willow, wool-grass, bulrush, hop sedge, and broadleaf arrowhead. Additional information regarding the wetland types that would be affected by the Project are included in section B.2.3 and appendix E.

General Impacts and Mitigation

Construction and operation of the Project facilities would result in temporary and permanent impacts on vegetation. Table B.3.1-1 lists the acres of impacts on the major vegetation habitat types that would be affected by construction and operation of the Project. Table B.3.1-1A lists the acres of impacts on the major vegetation habitat types that would be affected by construction and operation of the Project within the MNF. Additional detail regarding the impacts of each of the Project facilities is included on table B.5.1-1.

TABLE B.3.1-1

Major Vegetative Cover Types Affected by the WB XPress Project

Vegetation Cover Type	Within Construction Footprint (acres)	Within Operational Footprint (acres)
Agriculture (Includes NFS and Non-NFS Lands)	82.4	14.1
Open Land including ROW (Includes NFS and Non-NFS Lands)	259.5	137.0
Forest (Includes NFS and Non-NFS Lands)	91.1	41.9
Wetland (Includes NFS and Non-NFS Lands)	8.3	4.4[a]
Project TOTAL	**442.3**[b, c]	**197.3**[c]

[a] This value represents the total area of wetlands within the Project's operational footprint, which includes permanent workspace along pipeline facilities, permanent access roads, and aboveground facilities. Emergent wetlands within the pipeline facilities, PAR-27A, Chantilly Compressor Station, and Glady Valve Site would not be permanently impacted. Therefore only <0.1-acre of emergent wetlands would be permanently impacted by the Project due to the PAR-79 crossing. Operational impacts to forested and scrub-shrub wetlands are limited to 0.2-acre due to the conversion to PEM as a result of Columbia's ROW maintenance practices. Therefore, total wetland operational impacts are 0.2-acre.

[b] This value represents the total area where vegetation would be disturbed in both temporary and permanent workspaces combined.

[c] Some areas to be disturbed are not vegetated; therefore, the total acreage of vegetative cover type affected does not equal the total acreage of land disturbed.

TABLE B.3.1-1A

Major Vegetative Cover Types Affected within the MNF by the WB XPress Project [ab]

Vegetation Cover Type	Within Construction Footprint (acres)	Operational Footprint Within Existing Easement (acres)[c]	Operational Footprint Outside Existing Easement (acres)[d]
Agriculture within NFS land	0.1	0.0	0.0
Open Land including open ROW within NFS land	111.8	57.7	2.3
Upland Forest within NFS land	11.7	6.6	0.3
Wetland within NFS land [e]	3.0	1.8	0.1
MNF Project TOTAL	**126.6**	**66.1**	**2.7**

[a] No land disturbance would occur on the GWJNF.

[b] Numbers do not include lands classified on table B.5.1-2 as open water or industrial land.

[c] This column indicates the acreage of each land use that is located within the current operational footprint of Columbia's existing facilities within the MNF. Columbia has the right to maintain land uses within its existing operational footprint pursuant to its existing SUP9. The WB Xpress Project would not increase the impact on these land uses.

[d] This column indicates the acreage of each land use that is outside of the current operational footprint of Columbia's existing facilities within the MNF. These land uses would be impacted by the operation of the new replacement pipeline.

[e] The acreage of wetlands within the operational footprint does not necessarily reflect the permanent impact on wetlands. For example emergent wetlands within the operational footprint would not be converted from one wetland cover type to another and thus would not be permanently impacted by the Project. Appendix F provides additional detail regarding permanent wetland impacts anticipated to result from the Project.

Construction activities would include the cutting, clearing, and/or removal of existing vegetation to provide a safe working area for personnel and equipment. These activities would result in the alteration and loss of vegetation and could result in increased soil erosion, changes to surface water flow and infiltration, and increased potential for the introduction and establishment of invasive weeds. The degree of impact would depend on the type and amount of vegetation affected, the rate at which the vegetation would regenerate after construction, and the frequency and type of vegetation maintenance conducted during operation. The condition of soils replaced during restoration has an important effect on revegetation. The clearing, trenching, and grading of soils with poor revegetation potential could result in a lack of adequate vegetation following construction and restoration of the right-of-way, which could lead to increased erosion, a reduction in wildlife habitat, and adverse visual impacts.

The impact on forested wetlands would be long term as it may take several years to regenerate within the temporary workspace. The impact would be greatest in forested lands because trees growing within new permanent rights-of-way would be prevented from reestablishing by Columbia's future right-of-way maintenance activities, and trees allowed to regenerate or planted in temporary workspace would take decades to grow to maturity. The removal of forest vegetation would also result in other impacts including the long-term or permanent loss of tree canopy, a reduction in the vertical and horizontal complexity of the habitat, reduction of humidity along the forest edges, and increased penetration of light at the ground surface. The latter two effects could raise temperatures and reduce soil moisture along the forest edge, favoring the growth of open land vegetation over forest vegetation. Columbia's clearing of forest land would increase forest fragmentation, but since most of the pipeline would be collocated with existing rights-of-way, little new greenfield corridors would be created and the primary effect would be the widening of existing corridors (for additional discussion of forest fragmentation see section B.3.3).

The impact of the Project associated with the removal of shrub cover would be similar to impacts on forest lands, but the magnitude and duration of the impact would be less.

Impacts on agricultural lands, including cultivated crops and uncultivated pasture land, and open lands, including existing rights-of-way and other previously cleared lands, would be temporary and minor. Potential impacts would include a temporary loss of cover during the construction period.

Impacts on vegetation would be minimized by Columbia's collocation of the proposed facilities with existing rights-of-way and aboveground facilities. Where Columbia's existing and proposed pipelines would be collocated, which would be the case in all but a few areas, forest clearing would be reduced by Columbia's use of the existing right-of-way for construction. This collocation would also reduce the need for new permanent right-of-way, and only an additional 15 to 25 feet of new permanent right-of-way would be acquired and maintained in most areas. Throughout construction of the proposed Project, Columbia would also abide by the ECSs to minimize impacts on vegetation resources. Disturbed sites would be stabilized and re-vegetated as soon as practicable and non-agricultural areas would be seeded in accordance with Columbia's ECSs, landowner, or land managing agency recommendations, after which trees and shrubs on the temporary right-of-way and ATWS would be allowed to re-vegetate naturally.

On NFS lands, Columbia would use certified weed-free mulch, straw, coconut fiber, wood fiber, or other low-risk USFS-approved material during restoration as described in the MNF LRMP. Restoration seed mixtures would be certified weed-free, or Columbia would provide the seed vendor's test results for invasive weed content to demonstrate that the seed is substantially free from invasive weed seeds as described in the MNF LRMP. Columbia has developed a Restoration Plan and submitted it to the MNF with the COMP, for reestablishing native herbaceous and/or woody species. This plan incorporates pre- and post-construction invasive species control and monitoring, and monitoring vegetation on MNF lands. These measures are included in the MNF-specific COMP that would be used on NFS lands.

Vegetation impacts associated with the construction and operation of the aboveground facilities would be minor compared with the pipelines. The majority of work associated with these facilities would be within previously disturbed areas within or adjacent to existing facilities. Impacts on vegetation would not be significant. The greatest aboveground facility impacts would occur at the Seneca, Strasburg, Chantilly, and Loudoun Compressor Stations where tree clearing would be required. Construction at these four sites would result in the clearing of 24.1 acres of forestland, of which 18.2 acres would be converted to industrial land for facility operation.

Sensitive Vegetation Communities

Columbia identified sensitive and protected vegetation communities within the Project area through review of official agency data and direct consultations with local, state, and federal agencies. These communities include a federally managed national forest, rare plant communities, and a natural area preserve. A summary of the locations of these vegetation communities is provided in table B.3.1-2.

TABLE B.3.1-2

Sensitive and Protected Vegetation Communities Crossed by the WB XPress Project Centerline

Vegetation Community	Approximate Location (MP)	Approximate Crossing Length or acres of Construction Impact
Monongahela National Forest [a]	Line WB Replacement 0.3-5.6, 9.8-10.5, 11.0-12.0, 13.5, 15.7-16.3, 19.7-19.8, 20.0-20.4, 22.0-25.2	60,192 feet (143.2acres)[d]
Halifax Point District Park [b~~c~~]	Chantilly Compressor Station, PAR-78, and Line VA-1 MP 0.0-0.2	13.6 acres
Elklick Woodlands Natural Area Preserve [c~~d~~]	Line VA-1 0.7-0.9	1,067 feet
Elklick Diabase Flatwoods Conservation Site [c~~d~~]	Chantilly Compressor Station, Line VA-1 0.0-1.1	18.9 acres (including 5,928.6 feet of Line VA-1)
Vascular Plant Element Historic Occurrence [c~~d~~]	Line VA-1 1.5, 1.8, PAR-77, PAR-79	1,394 feet

Note: Red spruce cover was deleted from the table. The primary concern about red spruce is associated with West Virginia northern flying squirrel suitable habitat. Additional detail regarding West Virginia northern flying squirrel suitable habitat is addressed in Columbia's Biological Evaluation.

[a] MNF, 2009a. Reference is to NFS lands within the MNF proclamation boundary.

[b] Sinclair, 2015

[c] VDCR, 2015b

[d] The following segments and crossing lengths are not included in this total: WB-5 MAOP Restoration segment crosses 16.3 miles of NFS land and 0.3-mile of the GWJNF. The WB-6 MAOP Uprate segment crosses 0.2-mile of NFS land and 1.5 miles of the GWJNF.

Columbia has adjusted the workspace through WVNFS suitable habitat to maximize use of the existing cleared right-of-way and reduce tree clearing in WVNFS habitat. This proposed adjustment in workspace also limits and confines most of the tree clearing in WVNFS suitable habitat to within the limits of the existing SUP easement right-of-way. Avoidance, minimization, and conservation measures to minimize impacts to federally listed species as well as MNF, Regional Foresters Sensitive Species (RFSS) are identified and discussed in the Draft Biological Evaluation initially posted to the FERC Docket on August 19, 2016. Mitigation to offset loss on RFSS habitat continues to be coordinated with MNF staff following completion of the avoidance and minimization efforts.

Federal Lands

<u>National Forest System Lands</u>

The National Forest System (NFS) lands on which Project related activities would occur include lands of the MNF and lands of the GWJNF. Following briefly are the activities that would occur within each National Forest.

Monongahela National Forest

- Within NFS land, Columbia proposes to construct and operate about 11.4 miles of new 26-inch-diameter replacement pipeline (this pipeline is part of Line WB Replacement).
- In association with the replacement work, Columbia would remove about 10.3 miles of existing Line WB on NFS land.
- Columbia proposes to use four USFS System Roads: FS-187, FS-382, FS382A, and FS-1580. Refer to appendix B (Access Roads for the WB XPress Project) table that includes details on the access roads used on NFS land.
- Columbia would also use four private roads crossing NFS lands to access Project work areas.
- Columbia proposes to use two staging areas on NFS lands during construction to store materials and equipment.
- About 16.5 miles of the existing Line WB-5 and Line WB-6 would be tested to restore or upgrade the existing MAOP of the pipeline within the GWJNF. No ground survey would be necessary within MNF owned land to conduct the leak control surveys. Additional detail regarding the MAOP upgrade and restoration activity was filed as part of Columbia's Supplement No. 2, which was filed with FERC on March 21, 2016. As described in that supplement, the testing would involve incrementally increasing the pressure within the pipelines from 800 to 1,000 psi. Before 9 beginning the incremental pressure increases associated with each MAOP uprate and restoration test section, the pipeline pressure would be held at 800 psi and a leak inspection flyover with leak detection equipment would be performed using a helicopter along each of the test sections to establish a baseline. Additional leak inspection flyovers would be conducted along each of the test sections after each incremental increase. A final leak inspection flyover would be conducted when 1,000 psi is attained.

George Washington Jefferson National Forest

- No pipeline or aboveground facilities would be constructed, replaced, or removed within the GWJNF.
- No USFS System Roads, private roads, or staging areas would be used within the GWJNF.
- About 1.8 miles of the existing Line WB-5 and VB-5 would be tested to restore or upgrade the existing MAOP of the pipeline within the GWJNF. No ground survey would be necessary within the GWJNF to conduct the leak control surveys. Additional detail regarding the MAOP upgrade and restoration activity was filed as part of Columbia's Supplement No. 2, is summarized above in the description of MAOP activities within the MNF.

<u>Monongahela National Forest</u>

The proposed Project would cross about 11.4 miles of NFS lands within the MNF proclamation boundary. In accordance with the Forest's LRMP (USFS, 2011), the MNF is divided into Management Prescription (Rx) with specific management goals and objectives. The Project would cross three different Rxs within the MNF: Rx 3.0 Vegetation Diversity, Rx 6.1 Wildlife Habitat Emphasis, and Rx 8.1 Special Areas Spruce Knob-Seneca Rocks National Recreation Area (USFS, 2011). Table B.3.1-3 includes a brief description of each Rx and the length of pipeline within each Rx.

TABLE B.3.1-3

Management Prescriptions Crossed by the WB XPress Project [a]

Management Prescription Unit	Description [b]	Approximate Length Crossed (miles)[c]	Acres of Rx within Approximate Temporary Footprint of the Project[c d]	Acres of Rx within the Approximate Permanent Footprint of the Project[c e]
3.0 – Vegetation Diversity	Enhance diversity of forest vegetative cover (species, type, age); Sustain timber production	6.0	71.9	36.1
6.1 – Wildlife Habitat Emphasis	Use vegetation management to enhance the variety of wildlife habitat	0.9	11.6	5.8
8.1 – Special Area: Spruce Knob-Seneca Rocks National Recreation Area	Preservation of unique ecosystems for scientific or recreational purposes; Provide recreation opportunities	4.5	59.7	29.6

[a] USFS, 2011
[b] MNF, 2009b
[c] The following segments and crossing lengths are not included in this total:WB-5 MAOP Restoration segment crosses 16.3 miles of NFS land and 0.3-mile of the GWJNF. The WB-6 MAOP Uprate segment crosses 0.2-mile of NFS land and 1.5 miles of the GWJNF.
[d] Calculation includes all workspace outside of the assumed 50-foot-wide permanent ROW for the replacement pipeline.
[e] Calculation based on an assumed 50-foot-wide permanent ROW for the replacement pipeline. Most of the acreage associated with this 50-foot-wide permanent ROW overlaps and is within Columbia existing easement. See the new table, B.5.1-2 for more detail regarding the amount of new "permanent" (i.e., long term) ROW that would be required on the MNF for the WB Xpress Project.

Rx 3.0 (Vegetation Diversity) encompasses elevations ranging from less than 2,000 feet to over 4,000 feet and comprises 21.2 percent of the MNF. Major forest communities within Rx 3.0 include conifer, northern hardwoods, mixed cove hardwoods, mixed oak, pine-oak, and wildlife openings. These communities are primarily mid-late successional and mid successional age classes and support a wide range of vegetation types, wildlife, and fish species. There are also many non-native invasive species (NNIS) represented in this management unit. A primary management goal within this Rx is to enhance diversity of forest vegetation cover (USFS, 2011). Details of how Columbia would mitigate the spread of non-native invasive species and control existing populations within the Project right-of-way are described in the Invasive Species Plan, submitted to the MNF and FERC in November 2016.

Rx 6.1 Wildlife Habitat Emphasis encompasses elevations ranging from 1,500 to 4,500 feet and comprises 30.3 percent of the MNF. Major forest communities within Rx 6.1 include conifer, northern hardwoods, mixed cove hardwoods, mixed oak, pine oak, and open areas. These communities, like those in Rx 3.0, are primarily mid-late successional and mid-successional age classes. Oak communities comprise the majority of forest cover with an even distribution of white oak, red oak, mixed oak, and black cherry groups. Primary management goals within this Rx are to maintain water sources and mast-producing trees, and enhance communities and diversity of wildlife habitat (USFS, 2011).

Rx 8.1 Spruce Knob-Seneca Rocks National Recreation Area encompasses elevations ranging from 1,000 to 4,861 feet. Major forest communities include conifer, northern hardwoods, mixed cove hardwoods, mixed oak, pine-oak, and openings. These communities are primarily mid-late successional and mid-successional age classes. Primary management goals include providing recreational opportunities and the conservation of scenic, scientific, and historic values (USFS, 2011).

Columbia noted an addition of access road TAR-34 in their June 14, 2016 supplement. The addition of TAR-34 to the project footprint triggered the need for a survey to document the presence or absence of federally listed threatened and endangered plants, as well as RFSS plants due to a portion of the road that extends within the MNF.

Based on the results contained in the report entitled "Addendum to Botanical Survey Report" submitted in August 2016, a survey was conducted on TAR-34. No species or habitat were identified for five targeted TES and 61 RFSS on TAR-34. If any of the project area changes and any future surveys are needed, Columbia would not begin construction until the staff and MNF receive survey results for RFSS with proposed minimization measures that are acceptable to MNF staff.

The types of tree stands crossed within NFS lands are described in table B.3.1-4. Red spruce (*Picea rubens*) communities are ecologically complex and considered a valuable vegetative resource that has greatly decreased in size during recent centuries (Restore Red Spruce, 2015). The Project does not cross any red spruce botanical areas or Rx that have been identified and designated by the MNF as areas for the restoration and management of red spruce communities. However, according to the WVDNR red spruce modelling, the pipeline would cross about 269 feet of low- and medium-density red spruce stands abutting Columbia's existing right-of-way. Some ATWS would also be located in these stands (see table B.3.1-5). In total the Project would impact about 2.3 acres of low- to medium-density red spruce tree habitat. While this would not contribute to a significant loss of high-quality stands, it would diminish the existing stands of a valuable species.

Columbia is coordinating with the MNF regarding measures to avoid or minimize impacts on managed forest land including the three Rx and would mitigate for the impact on red spruce stands that cannot be avoided by restoring an equivalent amount of red spruce forest elsewhere in the Project vicinity.

TABLE B.3.1-4

Modelled Forested Habitats Crossed by the WB XPress Project within the National Forest System-Owned Lands [a]

Type of Workspace	Coniferous Forest		Deciduous Forest		Shrubs		Total Forest/Shrub Cover	
	Acres	Percent [b]	Acres	Percent [b]	Acres	Percent [b]	Acres	Percent [b]
Right-of-way	0.17	0.1	6.28	4.4	0.40	0.3	6.85	4.8
Temporary Workspace	0.12	<0.1	2.58	1.8	0.27	0.2	2.97	2.0
Additional Temporary Workspace	0.05	<0.1	1.25	0.9	0.34	0.2	1.64	1.1
Staging Area	0.0	0.0	0.05	<0.1	0.14	0.1	0.19	0.2
Access Road	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.34**	**0.2**	**10.16**	**7.1**	**1.15**	**0.8**	**11.65**	**8.1**

[a] MNF, 2004.
[b] Percentage is amount of forest cover in relation to total Project workspace.

TABLE B.3.1-5

Modelled Red Spruce Forest Crossed by the WB XPress Project Within U.S. Forest Service-Owned Lands [a]

Red Spruce Density Cover [b]	Approximate Feet Crossed by Centerline	Approximate acres Crossed by Construction Work Area
Low Cover	88	0.71
Medium Cover	94	0.16
TOTAL	182	0.87

[a] As modeled by Byers et al., 2013

[b] Low cover based on <10 percent modeled red spruce cover. Medium cover based on 10-50 percent modeled red spruce cover. Other vegetation based on absence of red spruce.

State/Commonwealth Natural Heritage Communities

West Virginia

The WVDNR NHP conducted a review of the state Natural Heritage Inventory to determine possible impacts on rare, significant, or unique ecological resources (WVDNR, 2015). Three rare plant species, butternut (*Juglans cinerea*), white alumroot (*Heuchera alba*), and southern woodrush (*Luzula bulbosa*) were identified as potentially occurring in the Project area. Table B.3.1-6 lists the locations where these resources were documented by the WVDNR. Columbia evaluated these resources during pedestrian surveys conducted in August and September 2015. Butternut was last observed along access road PAR-27A in 2009 and individual butternut trees were located by survey crews along the access road PAR-27A survey corridor. White alumroot was found in low density both within the construction right-of-way and the adjacent off-right-of-way area between MPs 22.3 and 23.1 of the pipeline route. Southern woodrush was last observed in 1996 and was not observed during surveys in the Project area. These species are discussed further in Section B.4.2 in Threatened, Endangered, and Special Status Species.

An extension of access road TAR-47 and an addition of TAR-35 were submitted by Columbia on June 14, 2016[22]. The extension of TAR-47 required a survey that was completed in early June 2016 for federally listed threatened and endangered plants, no additional plants were identified during this survey. The addition of TAR-35 required no additional biological surveys as the 2015 surveys covered this area.

TABLE B.3.1-6

West Virginia Natural Heritage Resources Potentially Found in Construction Work Area of the WB XPress Project [a]

Resource Common Name	Nearest Pipeline Milepost	Workspace Type [b]	Approximate Acres Crossed
Butternut	12.4	PAR-27A	0.5
White alumroot	23.2	TWS	<0.1
White alumroot	23.5	ROW	0.0 [c]
Southern woodrush	23.5	ATWS	<0.1[d]

[a] WVDNR, 2015

[b] PAR= permanent access road; name succeeded by "A" indicates a USFS road; ROW=permanent ROW workspace, TWS=temporary right-of-way workspace, ATWS=additional temporary workspace

[c] Documented by WVDNR about 20 feet from permanent ROW.

[d] Population size not specified by WVDNR, assumes 10 ft^2 population radius.

[22] This can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20160614-5129 in the "Numbers: Accession Number" field.

Virginia

Columbia contacted the VDCR Division of Natural Heritage and requested that it conduct a review of the Biotics Data System for occurrences of rare and protected plant and animal habitat, unique natural communities, and significant geologic formations in or near the Project area. This search identified several sensitive features or habitats including the Little River Stream Conservation Unit, Bull Run Diabase Flatwoods Conservation Site, Elklick Diabase Flatwoods Conservation Site, and the Elklick Woodlands Natural Area Preserve (EWNAP). Descriptions and the approximate locations of each area are detailed in table B.3.1-7. The majority of pipeline facilities, both new and replacement, would be installed within or adjacent to existing rights-of-way to minimize new permanent impacts on vegetation.

TABLE B.3.1-7

Virginia Natural Heritage Biotics Data System Resources Found within 2 miles of the WB XPress Project

Natural Resource/Rare Plant Occurrence	**Description**	**Approximate Location**
Sensitive Resources	Karst-forming carbonate rock; potential Madison Cave Isopod (*Antrolana lira*) habitat; rare vascular plant occurrences	Within 2 miles of proposed Project
Little River Stream Conservation Unit	High biodiversity ranking; habitat for state-listed freshwater mussel, Green floater (*Lasmigona subviridis)*; contains Aquatic Natural Community including in-stream vegetation habitat [a]	Downstream of Loudoun Compressor Station, Loudoun Co., VA
Bull Run Diabase Flatwoods Conservation Site	High biodiversity ranking; communities of hickory and oak species	About 900 feet southwest of proposed Line VA-1 in Fairfax Co., VA
Elklick Diabase Flatwoods Conservation Site	High biodiversity ranking; communities of hickory and oak varieties; associated with purple milkweed (*Asclepias purpurascens*) and Torrey's mountain-mint (*Pycnanthemum torreyi*)	About 19.1 acres (including 5,928.6 feet of Line VA-1) are within the Chantilly Compressor Station and Line VA-1 MPs 0.0-1.1 in Fairfax Co., VA
Elklick Woodlands Natural Area Preserve	Shared sensitive resources with Elklick Diabase Flatwoods Conservation Site; Northern Hardpan Basic Oak-Hickory Forest [a]	Crossed for about1,067 feet by the proposed Line VA-1 from MP 0.7-0.9 in Fairfax Co., VA.
"Halifax Point District Park	Shared sensitive resources with Elklick Diabase Flatwoods Conservation Site; Northern Hardpan Basic Oak-Hickory Forest [a]	13.8 acres of the Chantilly Compressor Station, PAR-78, and 275 feet of Line VA-1 would be within the Halifax Point District Park.

[a] VDCR, 2015b

The proposed route for Line VA-1 does not cross the Bull Run Diabase Flatwoods Conservation Site, and thus would not impact this area. The proposed Line VA-1 route would cross both the Elklick Diabase Flatwoods Conservation Site and the EWNAP. Additionally, the Chantilly Compressor Station would be located in the Halifax Point District Park within the Elklick Diabase Flatwoods Conservation Site. The VDCR identified seven global and state rare plant species as potentially present in these areas. Columbia conducted field surveys of the proposed Chantilly Compressor Station and Line VA-1 in August and October 2015. None of global and state rare plant species identified by the VDCR were observed within the proposed Project workspaces. The proposed pipeline would be located within existing right-of-way in these areas and no additional permanent right-of-way would be required. Thus the Project would have no permanent impacts on the EWNAP. However, there would be some temporary impacts during construction, including the loss of vegetative cover and soil exposure. These effects would be short term and would be mitigated by the implementation of Columbia's ECSs. Columbia is currently negotiating with Fairfax County Park Authority (FCPA) for a land swap to mitigate impacts on Halifax Point District Park to construct the Chantilly Compressor Station.

Invasive Species and Invasive Weeds

As defined in Executive Order 13112, invasive species are species that are non-native (or alien) to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., microbes). Non-native invasive plants often flourish in disturbed areas, tend to outcompete other plant species, and provide inferior food and shelter resources for animals, thereby causing significant ecological harm and biodiversity loss. Under Executive Order 13112, federal agencies are directed to not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States. The MNF has compiled a list of 30 high-priority NNIS and 63 problematic NNIS. MNF staff recommended documenting any high-priority NNIS observed during field surveys. MNF staff also noted didymo (*Didymosphenia geminata*) as a species that could spread easily during Project construction activities and warrants a control plan (Bailey, 2015). The states of West Virginia and Virginia also maintain lists of invasive weeds (see table B.3.1-8), some of which are non-native invasives, and some are listed for other reasons. The Virginia Department of Agriculture and Consumer Services also recommended surveying for purple loosestrife and European wand loosestrife at all Project sites, giant salvinia (*Salvinia molesta*) in Shenandoah County, and wavyleaf basketgrass (*Oplismenus hirtellus* ssp. *undulatifolius*) in Loudoun County (Nichols, 2015).

TABLE B.3.1-8

State-listed Invasive Weeds in Virginia and West Virginia [a, ba, b]

Common Name	Scientific Name	State Where Listed
Autumn olive	*Elaeagnus umbellate*	West Virginia
Curled thistle	*Carduus crispus*	West Virginia
European wand loosestrife	*Lythrum virgatum*	Virginia
Japanese knotweed	*Polygonum cuspidatum*	West Virginia
Japanese stiltgrass	*Microstegium vimineum*	West Virginia
Johnsongrass	*Sorghum halepense*	West Virginia
Kudzu	*Pueraria montana, Pueraria thunbergiana*	West Virginia
Marijuana	*Cannabis sativa*	West Virginia
Mile-a-minute	*Polygonum perfoliatum*	West Virginia
Morrow’s honeysuckle	*Lonicera morrowii*	West Virginia
Multiflora rose	*Rosa multiflora*	West Virginia
Musk thistle	*Carduus nutans*	West Virginia
Opium poppy	*Papaver somniferum*	West Virginia
Plumeless thistle	*Carduus acanthoides*	West Virginia
Poison hemlock	*Conium maculatum*	West Virginia
Purple loosestrife	*Lythrum salicaria*	Virginia, West Virginia
Tartarian honeysuckle	*Lonicera tartarica*	West Virginia
Tree of heaven	*Ailanthus altissima*	West Virginia

[a] USDA, 2015.
[b] Arnold, 2015.

Columbia documented invasive plant species and invasive weeds while conducting biological surveys. Table B.3.1-9 lists communities of invasive species and invasive weeds that were observed on both private and public lands during the field surveys. Certain invasive plants are of special concern on NFS lands and are specified in the table.

TABLE B.3.1-9

Invasive Plant Species and Invasive Weeds Observed During Field Surveys for the WB XPress Project [a]

Location	Milepost	County, State	Species
New Pipeline Facilities			
Line WB-5 Extension	0.2	Kanawha, WV	Multiflora rose
Line WB-22 Replacement	0.5	Kanawha, WV	Multiflora rose
Line VA-1	0.0	Fairfax, VA	Autumn olive Basketgrass Garlic mustard Horsenettle Japanese honeysuckle Japanese stiltgrass Multiflora rose Privet Poison ivy Thistle Tree of heaven
Replacement Pipeline Facilities			
Line WB Replacement	0.1	Randolph, WV	Multiflora rose Garlic mustard Reed canary grass
	0.3	Randolph, WV	Multiflora rose[d]
	2.0	Randolph, WV	Japanese siltgrass[b]
	3.8	Randolph, WV	Horsenettle[c]
	4.3	Randolph, WV	Reed canary grass[d] Multiflora rose[d]
	4.7	Randolph, WV	Multiflora rose[d]
	5.6	Randolph, WV	Multiflora rose[d]
	6.8	Randolph, WV	Japanese rose Multiflora rose
	7.2	Randolph, WV	Reed canary grass
	7.5	Randolph, WV	Reed canary grass
	7.9	Randolph, WV	Reed canary grass
	8.1	Randolph, WV	Reed canary grass
	9.2	Randolph, WV	Multiflora rose Garlic mustard
	9.6	Randolph, WV	Multiflora rose
	10.3	Randolph, WV	Multiflora rose[d]
	11.2	Pendleton, WV	Multiflora rose[d]
	15.3	Pendleton, WV	Reed canary grass
	16.6	Pendleton, WV	Multiflora rose
	18.7	Pendleton, WV	Multiflora rose Garlic mustard Autumn olive Japanese knotweed Japanese siltgrass
	18.9	Pendleton, WV	Multiflora rose
	19.4	Pendleton, WV	Thistle

TABLE B.3.1-9 (cont'd)

Invasive Plant Species and Invasive Weeds Observed During Field Surveys for the WB XPress Project [a]

Location	Milepost	County, State	Species
Line WB Replacement	19.0	Pendleton, WV	Multiflora rose Japanese siltgrass Garlic mustard
	19.5	Pendleton, WV	Garlic mustard
	19.6	Pendleton, WV	Multiflora rose Japanese siltgrass Garlic mustard
	20.7	Pendleton, WV	Japanese knotweed
	25.3	Pendleton, WV	Japanese siltgrass
Access Roads			
PAR-27A	n/a	Pendleton, WV	Multiflora rose[d] Japanese siltgrass[b]
TAR-52	n/a	Pendleton, WV	Multiflora rose
TAR-56	n/a	Grant, WV	Reed canary grass
New Aboveground Facilities			
Elk River Compressor Station	n/a	Kanawha, WV	Japanese knotweed Multiflora rose
Chantilly Compressor Station	n/a	Fairfax, VA	Autumn olive Basketgrass Garlic mustard Horsenettle Japanese honeysuckle Japanese stilt grass Multiflora rose Privet Poison ivy Thistle Tree of heaven
Existing Aboveground Facilities			
Panther Mountain	n/a	Kanawha, WV	Multiflora rose Japanese knotweed
Frametown Compressor Station	n/a	Braxton, WV	Multiflora rose
Cleveland Compressor Station	n/a	Upshur, WV	Multiflora rose Japanese knotweed Japanese siltgrass
Files Creek Compressor Station	n/a	Randolph, WV	Multiflora rose
Staging Area 6.1	7.2	Randolph, WV	Reed canary grass
Staging Area 6.1	7.2	Randolph, WV	Reed canary grass
Staging Area 8	12.4	Pendleton, WV	Multiflora rose[d]
Seneca Compressor Station	n/a	Pendleton, WV	Multiflora rose Japanese knotweed

a Field surveys were conducted during December, 2014; and June, July, and August 2015.
b At this location, plant species is located on NFS land and considered a high priority non-native invasive species (NNIS).
c At this location, plant species is located on NFS land but is not considered a high priority or problematic NNIS.
d At this location, plant species is located on NFS land and considered a problematic NNIS.

The MNF LRMP dictates that the MNF manage NNIS using prevention, education, eradication, and containment. Columbia has adequately addressed invasive weeds using best management practices identified or based on Project-specific requirements and in accordance with its ECSs to minimize invasive species spread in the Project area. While maintaining its current pipeline right-of-way on the MNF, Columbia has complied with MNF recommendations and has employed mechanical control techniques and avoid chemical methods where feasible. If required, Columbia would not use herbicides or pesticides within 100 feet of a wetland and any use of herbicides and pesticides would be in accordance with manufacturers' recommendations and applicable regulations.

Columbia would address invasive weeds on NFS lands in accordance with its ECSs and MNF Standards and Guidelines. Columbia would require the contractor's equipment to be clean and free of invasive species prior to arriving to the MNF job site and before leaving the job site. Wash stations would be established where necessary to prevent the transfer of invasive species from infested areas to non-infested areas. A Restoration Plan, which has been submitted to the MNF as part of the COMP, includes specific measures to address invasive species and invasive weeds. If Japanese knotweed is found within any construction areas in the Elk River watershed, Columbia would take measures to treat and control it. Columbia would also abide by the Multi-Species Habitat Conservation Plan (MSHCP), described in greater detail in section B.4.1, and implement the specific control plan for Didymo (*Didymosphenia geminata*) activities within MNF. The Didymo Control Plan clearly identifies methods to prevent the spread of this species in construction work areas.

3.2 Fisheries

As discussed in section B.2.2, the proposed Project would cross or otherwise impact 99 waterbodies. This would include 28 perennial streams, 39 intermittent streams, 29 ephemeral streams, and 3 open water ponds. A total of 84 of these waterbodies are located in West Virginia (27 perennial streams, 28 intermittent streams, 27 ephemeral streams, and 2 open water ponds). The remaining 15 waterbodies are located in Virginia (1 perennial stream, 11 intermittent streams, 2 ephemeral streams, and 1 open water pond). Representative fish species typical of these waters are summarized in table B.3.2-1.

TABLE B.3.2-1

Representative Fish Species in Waterbodies Crossed by or Located near the WB XPress Project

West Virginia (Cold water habitats)		
Rainbow trout	Brook trout[a]	Brown trout
Mottled sculpin	Sauger[b]	Fantail darter
West Virginia (Warm water habitats)		
Channel catfish	Largemouth bass	Muskellunge
Flathead catfish	Walleye	Striped bass
White bass	Rock bass	Small-mouthed bass
Virginia (Cold water habitats)		
Rainbow trout	Brook trout	Brown trout
Virginia (Warm water habitats)		
Largemouth bass	Small-mouthed bass	Bluegill
Redear sunfish	Walleye	Muskellunge
Northern pike	Channel catfish	Striped bass
American shad		

Sources: VDGIF, 2015a and WVDNR, 2003.

[a] An effects analysis of wild brook trout including species description, potential project impacts, avoidance, and conservation measures can be found in section B.4.4.

[b] Columbia acknowledges that sauger may not effectively represent the fish species found in coldwater aquatic habitats on the MNF. However, sauger is a coldwater fish species that may be found in the Elk River. A portion of the Project is located immediately adjacent to the Elk River and the list provided in Table B.3.2-1 is intended to represent all portions of the Project, not just those that are located within the MNF.

The West Virginia Code of State Rules (CSR) 47-2-4 (West Virginia CSR, 2014) outlines an anti-degradation policy that establishes three classes for waters of the state. These classes have been assigned to waters in an effort to maintain quality and/or existing uses. With regard to fisheries classifications, streams and rivers are assigned to Water Use Category B: Propagation and Maintenance of Fish and Other Aquatic Life. Within this category, West Virginia further classifies fisheries as either warm water fishery streams (B1) or trout waters (B2) (West Virginia CSR, 2014). High Quality Waters and Outstanding Resource Waters are also part of West Virginia's Anti-degradation Policy. Thus a single stream may have more than one classification.

The High Quality Waters designation is the only classification in West Virginia for the protection of stocked trout waters that do not support trout year round. The High Quality Streams designation is also used to define streams or stream segments as those that provide significant or irreplaceable fish, wildlife, and recreational resources. An Outstanding Resource Water is a classification of waters whose unique character, ecological or recreational value or pristine nature constitutes a valuable national or state resource (West Virginia CSR, 2014). The fisheries classifications associated with the waterbodies that would be crossed by the Project are identified in appendix E.

The Commonwealth of Virginia has established four designated uses for all inland waterbodies, including wetlands. Two of these four uses pertain to fisheries classifications: Aquatic Life and Fish Consumption (Virginia Administrative Code, 2015a). The VDEQ has not established separate use categories differentiating cold and warm water fisheries within the Aquatic Life or Fish Consumption classifications. However, the VDGIF has established a classification system for trout waters based on aesthetics, productivity, resident fish population, and stream structure (Virginia Administrative Code, 2015b). Classes i through iv rate wild trout habitat whereas classes v through viii rate coldwater habitat not suitable for wild trout but adequate for year-round hold-over of stocked trout. None of the waterbodies that would be impacted in Virginia are designated as wild trout or stocked trout streams. Therefore, the 14 streams and 1 open water pond crossings in Virginia are considered warm water fisheries.

Fisheries of Special Concern and Essential Fish Habitat

There are no commercial fisheries in any of the waterbodies that would be crossed. One federally protected fish species, the diamond darter (*Crystallaria cincotta*), listed by the FWS as endangered, is known or believed to occur within waterbodies located near the Project. This species is discussed further in section B.4.1 in Threatened, Endangered, and Special Status Species. None of the waterbodies that would be crossed by or located near the Project contain or have the potential to contain species managed by the National Oceanic and Atmospheric Administration National Marine Fisheries Service, nor do they include Essential Fish Habitat (EFH) as defined by the Magnuson-Stevens Fishery Conservation and Management Act. Therefore, the Project would have no adverse effect on EFH and further consultation with the National Oceanic and Atmospheric Administration National Marine Fisheries Service for EFH is not required.[23]

[23] Columbia requested concurrence with this conclusion from the National Oceanic and Atmospheric Administration National Marine Fisheries Service but has not yet received a reply to this request.

Impacts and Mitigation

In-stream construction and removal of vegetation may cause a temporary increase in turbidity levels, which can increase the sedimentation rate downstream of the work area. Temporary habitat alteration, alteration of streambed morphology, and substrate disturbance could also occur. Additionally, loss of stream bank and aquatic vegetation could affect aquatic species by reducing shade and cover and increasing the temperature of the water. Potential fishery impacts from other construction activities could include introduction of water pollutants resulting from a spill of hazardous material, entrainment of fish larvae during pumping operations or the appropriation of hydrostatic test water, and the effects of blasting should in-stream blasting be required. The majority of fish would likely be displaced to similar adjacent habitats up or downstream for the duration of construction. However, the stress, injury, or death of individual fish may occur.

<u>Impacts on NFS Lands</u>

In the MNF, aquatic RFSS include eastern hellbender, pearl dace, Cheat minnow, rapids clubtail, and green-faced clubtail. No known eastern hellbender populations are located within the study area. However, potential impacts to the eastern hellbender include direct effects due to construction activity, which could cause temporary displacement of individuals, and indirect effects from sedimentation caused by project activities, which could increase stream turbidity, thus suffocating hellbender eggs, filling in hiding places for young and impacting their food sources. No known populations of the pearl dace are located in the project area. However, potential impacts on pearl dace include direct impacts from construction, which could cause individual displacement or mortality from heavy machinery and entrapment in intake hoses. Indirect impacts could be caused from sedimentation that could increase turbidity and acidity thus degrading the habitat. No known populations of the Cheat minnow are located in the project area. However, potential impacts on the Cheat minnow include direct impacts from construction activity, which could cause individual displacement or mortality from heavy machinery and entrapment in intake hoses. Indirect impacts could be caused from sedimentation that could create turbid stream conditions and result in suffocation of minnow eggs and gills, and changes to water chemistry that could result in morality and population declines. One population of rapids clubtail is located in the Project area near South Branch Potomac River. Potential impacts on the rapids clubtail include direct impacts from construction activity, which could cause individual displacement or mortality from heavy machinery. Indirect impacts could be caused from sedimentation that may result in mortality of larva, which could reduce local clubtail numbers. One population of green-faced clubtail is located in the Project area near South Branch Potomac River. Potential impacts on the green-faced clubtail include direct impacts from construction activity, which could cause individual displacement or mortality from heavy machinery. Indirect impacts could be caused from sedimentation that may result in mortality of larva. A more detailed description of the effects on these RFSS species and the conservation measures Columbia would use to minimize impact to them can be found in the BE.

Wild brook trout are considered an aquatic management indicator species (MIS). There are known locations of naturally producing wild brook trout within the Project area. The Project could impact local populations of wild brook trout. Tree removal near waterbodies could result in temporary and permanent canopy loss within the construction work area. Loss of trees could result in water temperature increases within the waterbody. A more detailed description of the effects on these wild brook trout and the conservation measures Columbia would use to minimize impact to them are found in section B.4.4.

Off-channel earth disturbance and vegetation removal could potentially cause temporary or long-term impacts to fisheries from increased turbidity and embeddedness of substrate, which may be caused by off-channel erosion and sheet flow. Columbia would implement project-wide E&SC measures to minimize both the risk for and the amount of sediment entering stream channels from erosion and sheet flow. The E&SC measures include the installation of trench breakers, slope breakers, compost filter sock, silt fence, and the utilization of stream buffers, where herbaceous vegetation would be left intact except for the pipeline excavation. See the COMP Attachment B, Monongahela National Forest Erosion and Sedimentation Control Plan for full details of the erosion and sedimentation control measures to be implemented for the project.

Potential impacts to fisheries could include habitat fragmentation due to temporary and permanent access roads. Columbia would use temporary bridge crossings, culverts or timber mats for temporary access roads during construction. Columbia proposes one permanent access road within the MNF, existing USFS road FS-1580. Temporary bridge crossing and culverts would be installed at the stream crossings of FS-1580 during construction of the Project, but would be removed and the stream crossing would revert to the existing low-water crossings. These low-water crossings would allow fish passage, and minimize the extent of habitat fragmentation. Should permanent structures in stream channels on NFS lands be required, Columbia would install them in a manner that satisfies stream simulation design standards to maintain passage for aquatic organisms per Forest Plan guideline WF21.

Tree clearing for new rights-of-way associated with reroutes could increase stream temperature in streams designated as coldwater fisheries. Only one reroute requiring new right-of-way would cross a trout water, in or near the MNF. At about MP 12.95, a reroute crosses Seneca Creek; this crossing is outside the MNF. The impact of this new section of right-of-way would be minimal to overall stream water temperature in Seneca Creek, as the new right-of-way would only require a 75-foot swath of tree clearing in the riparian zone.

Water withdrawal and discharge for hydrostatic testing could potentially impact fisheries. Impacts could result from fish entrapment in intake hoses, or alteration of habitat from water drawdown. Discharge form hydrostatic testing would be in an upland location and should not directly impact fisheries. No hydrostatic testing withdraws or discharge locations are located within the MNF. Hydrostatic testing is further discussed in section B.2.2.

Fisheries may be impacted by fuel or chemical spills during construction, this could impair water quality or lead to fish mortality depending on the degree of the spill and distance from a stream channel. Procedures to reduce the chance of a spill occurring and precautionary containment measures of major spills are described in the Spill Prevention, Containment and Control Plan located in Attachment A of the COMP.

Future or long-term impacts to fisheries could be caused from water quality degradation due to potential leaks in the pipeline, potential erosion, washout areas, or non-functional permanent erosion control devices. Columbia would conduct post-construction monitoring as well as periodic visual inspections and leak surveys to identify and address any potential issues. More discussion of operation and maintenance of the pipeline is discussed in section A.7.5 and reliability and safety of the pipeline is discussed in section B.9.

Mitigation, NFS and Non-NFS lands

To address concerns about potential impacts of in-stream work on critical life stages of coldwater species, various practices would be used. Columbia would cross flowing waterbodies using dry-ditch methods, which would isolate construction areas from the stream flow. In addition, both the period and duration of in-stream construction would be limited. Columbia would adhere to the stream crossing windows in the ECSs unless stipulated otherwise in its stream crossing permits.

In West Virginia, in-stream work would be completed between June 1 and November 30 in warmwater fishery streams.

Columbia would comply with WVDNR timing restrictions for in-stream work in trout (coldwater) streams by not conducting in-stream work between September 15 and March 31 unless a site-specific waiver is obtained from the WVDNR. Columbia would conduct in-stream work in trout streams after June 1 to the maximum extent possible, but reserves the right to further consult with MNF fisheries biologists to waive this limitation, if needed, on a case-by-case basis. MNF Forestwide Standards and Guidelines require protection of the channel buffer to perennial trout streams during the October 1 through June 1 construction timeframe. These requirements include consultation with the forest fisheries biologist for activities lasting two or more consecutive days, and that additional erosion control measures, seeding or mulching be applied concurrently with the sediment producing ground disturbance activity. See Attachment B, Monongahela National Forest Erosion and Sedimentation Control Plan in the COMP for locations where the requirement applies.

In Virginia, the VDGIF has issued species-specific timing restrictions that would be incorporated into Columbia's plans.

If construction becomes necessary within the restricted timing window, a waiver would be obtained from the applicable West Virginia or Virginia state agency. Water flow would be maintained at all times and Columbia would implement mitigation measures outlined in its ECSs to minimize impacts on waterbodies and associated resources with them during construction. These mitigation measures include but are not limited to maintaining reduced workspace areas near waterbodies, implementing buffers to prevent run-off from entering waterbodies, and installing erosion and sediment control devices. Once construction is complete, streambeds and banks would be restored to their pre-construction conditions and contours to the maximum extent practicable, which would aid in preventing erosion and minimize long-term impacts on fisheries. Implementation of these measures along with Columbia's ECSs, would be expected to minimize impacts to coldwater fisheries.

Columbia would obtain water for hydrostatic testing from Dry Fork Creek and the North Fork South Branch Potomac River. Columbia would minimize the potential for impacts associated with the use of this water, including the entrapment and entrainment of fish larvae by installing screens on its intake hoses, controlling the rate of withdrawals and discharges, and implementing the measures outlined in the ECSs for hydrostatic testing, including complying with all applicable federal and state permits.

Columbia would implement an SPCC Plan to minimize the risk and consequences of a hazardous material spill. Specific measures in the SPCC Plan would include checking equipment for leaks before initiation of construction near waterbodies, designating hazardous material storage areas away from wetlands and waterbodies, and restricting refueling of equipment within 100 feet of wetland and waterbody boundaries.

Although individual fish could be impacted by the Project, impacts on fisheries would likely be short term and limited primarily to the construction period. Upstream and downstream areas adjacent to the Project waterbody crossing sites would provide similar and ample habitats for any fishery resources that would be temporarily displaced during construction. The Project would not permanently alter the character of the majority of available aquatic habitats. Based on the proposed construction methods, implementation of the proposed avoidance and minimization measures (AMMs) and Project plans discussed above, the locality of most proposed in-channel activities to existing stream channel modifications, and the limited duration of construction and potential fishery impacts, we conclude that impacts on fisheries would be temporary and minimized.

3.3 Wildlife

Existing Wildlife Resources

Existing wildlife resources include mammals, birds, reptiles, amphibians, and invertebrates that live in and use the habitat types that would be crossed by the Project including pipeline rights-of-way, aboveground facilities, TWS, ATWS, staging areas, and access roads. Table B.3.3-1 lists the typical wildlife species found within each of these habitat types.

TABLE B.3.3-1

Typical Wildlife Species in Habitat Type Crossed by the WB XPress Project [a b]

Habitat	Species
Forest	Mammals: deer mouse, northern short-tailed shrew, eastern chipmunk, red squirrel, coyote, southern flying squirrel, silver-haired bat, bobcat, woodland vole, eastern gray squirrel, gray fox, WVNFS Birds: sharp-shinned hawk, wood duck, ruffed grouse, cedar waxwing, red-shouldered hawk, broad-winged hawk, wild turkey, cerulean warbler Reptiles/Amphibians: spotted salamander, black ratsnake, timber rattlesnake Invertebrates: flamed disc, gray-foot lancetooth
Edge	Mammals: eastern red bat, hoary bat, groundhog, fox squirrel Birds: red-tailed hawk, northern cardinal
Rock Features	Mammals: Allegheny woodrat, eastern small-footed myotis, southern rock vole Birds: common raven Reptiles/Amphibians: northern copperhead, green salamander, timber rattlesnake
Cave	Mammals: big brown bat, eastern small-footed myotis, tri-colored bat Invertebrates: MCI
Wetland	Mammals: bobcat, mink, muskrat, masked shrew Birds: northern saw-whet owl, red-winged blackbird, common yellowthroat, swamp sparrow Invertebrates: suboval ambersnail, dragonfly
Stream and Open Water	Mammals: beaver, river otter Reptiles/Amphibians: common snapping turtle, northern dusky salamander, red-spotted newt, eastern hellbender, tadpoles, snapping turtle, box turtle, green frog Invertebrates: rock crayfish, Allegheny crayfish, big water crayfish, Appalachian brook crayfish, bigtooth whitelip; boatman strider, caddisfly Fish: brook trout, rainbow trout, brown trout, smallmouth bass, channel catfish, walleye
Brush and Open Field	Mammals: groundhog, meadow vole, red fox Birds: grasshopper sparrow, Canada goose, American goldfinch, killdeer, bobolink, gray catbird, American woodcock Reptiles/Amphibians: eastern American toad, black racer, smooth greensnake
Generalist	Mammals: Virginia opossum, striped skunk, long-tailed weasel, little brown bat, whitetail deer, deer mouse, raccoon, eastern cottontail, American black bear Birds: turkey vulture, American crow, mourning dove Reptiles/Amphibians: eastern milksnake Invertebrates: whitelip snail

[a] Byers et al., 2010; Johnson, 2015; and field surveys conducted in June through October, 2015.
[b] USFS, 2011.

Protected and Sensitive Areas

West Virginia

The majority of the proposed Line WB Replacement (25.3 of the total 25.5 miles) would be within the MNF proclamation boundary, including 11.4 miles of NFS land. In addition, there are access roads, staging areas, and various workspaces within the proclamation boundary and NFS lands. The MNF encompasses a wide range of elevations experiencing variations in temperature and annual rainfall, and is one of the "most ecologically diverse forests in the NFS" (USFS, 2011). The MNF has expansive tracts of un-fragmented forest and variations in habitat type including wetlands, karst, and rock features. The Forest is also home to endemic wildlife species such as CMS and WVNFS. See discussions of these species in section B.4.1 and B.4.2, respectively.

Red spruce and red spruce-northern hardwood forest communities are found within high-elevation areas of the Appalachian Mountain range and MNF. Many species, including the CMS and the WVNFS, depend on the red spruce forests for breeding habitat and food resources. For more information, refer to section B.4.1 regarding CMS and section B.4.2 regarding WVNFS.

Rock features (including rock outcrops, talus slopes, rocky ledges, rock clusters, etc.), which are considered sensitive habitats by the MNF, exist within the vicinity of the Project on NFS lands. In May 2016, a habitat survey for rock features was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Project centerline and within a 50-foot corridor centered on Project access road centerlines. These features were evaluated for potential to support rock-dependent RFSS animal species. Presence/absence surveys were conducted on areas identified as potential habitat for these RFSS species. For more information regarding specific species methods, results, and pertinent AMMs, refer to section B.4.2.

Virginia

The Little River Stream Conservation Unit is located about two miles downstream of the Loudoun Compressor Station site in Loudoun County, Virginia. It is home to the state-listed freshwater mussel, green floater. This site is also known as containing an Aquatic Natural Community (VDCR, 2015a). The compressor station would not directly impact the Little River or any of its tributaries. Additional discussion of the green floater is included in section B.4.2.

Impacts and Mitigation

Construction and operation of the Project could result in short- and long-term impacts on wildlife including the displacement, stress, and injury of some mobile wildlife species such as bird or bats. Construction activities could also result in direct mortality of some small, less mobile mammals, reptiles, and amphibians that are unable to leave work areas. Mobile species would likely be displaced into adjacent areas during construction. Other impacts would include the temporary loss of habitat and increased noise. Temporary vegetation removal during construction could directly or indirectly impact pollinator species in the Project area. The clearing of forest vegetation would increase forest fragmentation and result in long-term impacts on wildlife habitat. Areas within the permanent right-of-way and aboveground facility sites would be permanently converted from forest to open habitats for the operational life of the Project, and cleared wooded areas within temporary work areas would take many years to revert to pre-construction conditions. Columbia has designed the Project to parallel and make use of existing rights-of-way and minimize the amount of workspace needed for safe pipeline construction, particularly in forested areas. Although the Project could contribute to forest fragmentation, it generally would not create additional edge habitat since most of the work would occur within or adjacent to existing cleared corridors. Additionally, much of the woodland in the Project area already has previously been fragmented by agricultural land, managed timber operations, and other developments including other maintained utility corridors.

Although individuals of some wildlife species would be affected by the Project, most of the impacts on wildlife would be short term and limited predominantly to the construction period. The Project would not permanently alter the character of the majority of available habitats. Areas adjacent to the Project site provide similar and ample habitats for any wildlife that would be temporarily or permanently displaced during construction or operation of the Project facilities.

Following installation of the facilities, work areas would be restored and non-agricultural areas would be seeded and then allowed to revegetate naturally. Columbia would reseed after construction using seed mixes currently approved in the ECSs and may use alternate seed mixes beneficial to wildlife and pollinators, as feasible, in coordination with recommendations from WVDNR and MNF. Impacts on wildlife during operations would be minor. Work at aboveground facilities would occur primarily within fenced facility sites and right-of-way maintenance would be limited. Vegetation maintenance across the full width of the right-of-way would be limited to a maximum frequency of once every three years. All mowing would be conducted between August 1 and April 15 outside of the primary bird breeding season, or as stipulated in the MNF permit. Columbia would control the spread of invasive species within the Project area, and would employ mechanical weed removal techniques and avoid chemical methods as feasible.

Columbia would coordinate with MNF staff to minimize impacts on any rock features identified on NFS land during surveys. It would mitigate for losses of red spruce forest on NFS lands by planting an equivalent area of red spruce in the Project vicinity. This would be accomplished through relocation of saplings under five feet in height and planting of seedlings at a ratio of 1.5:1 to trees cleared. For more specific information about red spruce mitigation, refer to section B.4.1 regarding CMS, section B.4.2 regarding the WVNFS, and the BE (appendix G).

Based on the implementation of the proposed mitigation measures and the fact that the majority of the disturbed areas would be restored and allowed to revert back to previous conditions following construction, impacts on wildlife and protected and sensitive habitat areas as a result of construction and operation of the Project would be minimized.

Migratory Birds

Migratory birds are protected under the MBTA, 16 U.S.C. 703-711 (FWS, 2015e). Executive Order 13186 (66 Federal Register 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the FWS. Executive Order 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and that particular focus should be given to addressing population-level impacts.

On March 30, 2011, the FWS and the Commission entered into a Memorandum of Understanding (FERC, 2011) that focuses on avoiding or minimizing adverse effects on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies. This voluntary Memorandum of Understanding does not waive legal requirements under the MBTA, Bald and Golden Eagle Protection Act, ESA of 1973, NGA, Federal Power Act, or any other statutes and does not authorize the take of migratory birds.

Birds of Conservation Concern (BCC) are a subset of protected birds under the MBTA and include all species, subspecies, and populations of migratory nongame birds that are likely to become candidates for listing under the ESA without additional conservation actions (FWS, 2008a). The BCC identifies species at distinct levels including a national level, North American Bird Conservation Initiative Bird Conservation Regions (BCRs) level, and at a FWS service regions level. The entire Project lies within FWS Region 5, which encompasses six BCRs. The Project is located in two of these BCRs: the Appalachian Mountains Region (BCR 28) and the Piedmont Region (BCR 29). A list of migratory BCC species that may be affected by the proposed Project as identified by the FWS is provided in table B.3.3-2.

TABLE B.3.3-2

Birds of Conservation Concern that may be Affected by the WB XPress Project

Species	Season of Occurrence in Project Area	State	Preferred Habitat in Project Area
American bittern (*Botaurus lentiginosus*)	Wintering	VA	Fresh and brackish marsh with tall vegetation
Bald eagle (*Haliaeetus leucocephalus*) [a]	Year-round	VA, WV	Near lakes, reservoirs, rivers, marshes, and coasts
Black-billed cuckoo (*Coccyzus erythropthalmus*)	Breeding	VA, WV	Forest dwelling
Black-capped chickadee (*Poecile atricapillus*)	Year-round	WV	Trees or woody shrubs
Blue-winged warbler (*Vermivora pinus*)	Breeding	VA, WV	Early to mid-succession habitats and forest/field edges
Canada warbler (*Wilsonia canadensis*)	Breeding	WV	Forest dwelling
Cerulean warbler (*Dendroica cerulea*)	Breeding	WV	Tall deciduous trees and open understory
Fox sparrow (*Passerella liaca*)	Wintering	VA, WV	Coniferous forest and dense mountain scrub
Golden-winged warbler (*Vermivora chrysoptera*)	Breeding	VA, WV	Tangled, shrubby habitats
Kentucky warbler (*Oporornis formosus*)	Breeding	VA, WV	Ground nesting. Found in the lower levels of the forest
Least bittern (*Ixobrychus exilis*)	Breeding	VA, WV	Fresh and brackish marsh with tall vegetation
Loggerhead shrike (*Lanius ludovicianus*)	Year-Round	VA, WV	Open country with scattered shrubs and trees
Louisiana waterthrush (*Parkesia motacilla*)	Breeding	VA, WV	Gravel-bottomed streams flowing through hilly, deciduous forest
Northern saw-whet owl (*Aegolius acadicus*)	Year-round	WV	Forest dwelling
Pied-billed grebe (*Podilymbus podiceps*)	Breeding	VA, WV	Small, quiet ponds and marshes with some thick vegetation
Prairie warbler (*Dendroica discolor*)	Breeding	VA, WV	Scrubby fields and forests
Prothonotary warbler (*Protonotaria citrea*)	Breeding	VA	Breeds in wooded swamps and other bottomland forests.
Red crossbill (*Loxia curvirostra*)	Year-round	WV	Mature coniferous forests
Red-headed woodpecker (*Melanerpes erythrocephalus*)	Year-round	VA, WV	Open forests with clear understories
Rusty blackbird (*Euphagus carolinus*)	Wintering	VA, WV	Flooded woods, swamps, marshes and the edges of ponds
Short-billed dowitcher (*Limnodromus griseus*)	Wintering	VA	Near coastal mud flats and brackish lagoons
Short-eared owl (*Asio flammeus*)	Wintering	VA, WV	Prairie, meadows, marshes, savanna, and open woodland
Swainson's warbler (*Limnothlypis swainsonii*)	Breeding	WV	Rhododendron-mountain laurel
Wood thrush (*Hylocichla mustelina*)	Breeding	VA, WV	Deciduous and mixed forests
Worm eating warbler (*Helmitheros vermivorum*)	Breeding	VA, WV	Steep slopes with dense understory
Yellow-bellied sapsucker (*Sphyrapicus varius*)	Breeding	VA, WV	Hardwood and conifer forests up to about 6,500 feet elevation

Source: Cornell Lab of Ornithology, 2015
[a] ESA de-listed species

Important Bird Areas (IBA) are sites identified by the National Audubon Society that provide essential habitat for one or more species of birds and can support breeding, wintering, or migrating birds. These areas can be publicly or privately owned and may or may not be protected (BirdLife International, 2015; National Audubon Society, 2015). No IBAs would be crossed by the Project. However, two IBAs are in the vicinity of the Project including the Wallback WMA which is 0.25-mile from the Dink Valve Site in West Virginia, and the Culpepper Basin IBA, which is 0.75-mile from the proposed Chantilly Compressor Station and Line VA-1 pipeline in Virginia.

The Wallback WMA is known as one of the important breeding areas for Cerulean warblers in West Virginia. Several rare or uncommon bird species in Virginia are known within the Culpepper Basin IBA including rare grass and shrubland species, and species such as loggerhead shrikes and upland sandpipers.

As described previously, the most significant change to any habitat type would be the long-term impact of removing forestland and the permanent conversion of forested areas to herbaceous cover within the permanent right-of-way. Scrub-shrub cover, herbaceous cover, and open water habitat types would also be temporarily impacted by construction activities. Migratory birds may use all of these habitat types in the Project area for foraging and nesting habitat.

Loss of nesting and foraging habitat and forest fragmentation resulting from construction and operation of the Project could increase the amount of stress, injury, and mortality experienced by migratory birds, displace migratory birds and result in birds avoiding the Project area lands. Displacement and avoidance could impact bird migration, nesting, foraging, and mating behaviors.

The majority of the Project would be collocated along existing utility right-of-way, located on open land, or abutting fragmented hardwood or managed forests. This collocation and construction in previously disturbed areas would minimize the effects of forest fragmentation caused by construction of the pipeline.

On the MNF and GWJNF, mowing for maintenance of the pipeline right-of-way would be restricted to minimize impacts to breeding birds according to guidelines provided in the LRMP or as coordinated with MNF staff. Columbia does not currently apply herbicides on NFS land, and mowing and herbicide restrictions specific to the Project on NFS lands has been identified in the COMP.

Impacts on BCC and IBA areas are expected to be minimal. The Project would not cross either the Wallback WMA or Culpepper Basin IBA, and, based on their distance from the Dink Valve Site and Chantilly Compressor Station, respectively, and the small area that would be impacted is not expected to affect birds using these areas. Columbia would also implement the MSHCP AMMs for other species, such as timing restrictions on clearing for the Indiana bat and northern long-eared bat (NLEB), which would minimize impacts on migratory birds. Columbia received concurrence from the FWS Virginia Ecological Field Services Office on November 3, 2015 that these measures are sufficient to avoid and minimize impacts on migratory birds and in a letter dated November 4, 2015 requested similar concurrence on these measures from FWS West Virginia Field Services Office. Given the FWS West Virginia Ecological Services Office has not yet commented on migratory bird minimization measures, **we recommend**:

- **<u>Prior to construction</u>, Columbia should continue to consult with the FWS, West Virginia Ecological Services Office regarding project-related impacts on migratory birds and file with the Secretary any correspondences or comments received and any additional conservation measures it will implement.**

Based on Columbia's use of existing rights-of-way, proposed construction procedures, the limited amount of habitat affected, the presence of similar habitat types within the vicinity of the Project area, Columbia's implementation of AMMs, and compliance with our recommendation above, impacts on migratory birds as a result of construction and operation of the Project would be sufficiently minimized.

Bald and Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA; 16 USC 668-668c) enacted in 1940, which prohibits anyone, without a permit issued by the Secretary of the Interior, from take of bald or golden eagles, including their parts, nests, or eggs. The Act defines take as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb is defined as agitating or bothering a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available:

- injury to an eagle;
- a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or
- nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior.

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits (FWS, 2012c).

Bald eagles are considered a RFSS for the MNF, and in Virginia are also protected under Virginia's ESA, the ESA Cooperative Agreement, and the State Protection of Wildlife Species. The state of Virginia prohibits the taking, selling, or transportation of bald eagles (VDGIF, 2012). The FWS has given the VDGIF jurisdiction over bald eagle protection according to the ESA Cooperative Agreement. Columbia would follow the Project review process and guidelines outlined in the "Management of Bald Eagle Nests, Concentration Areas, and Communal Roosts in Virginia: A Guide for Landowners," issued by the VDGIF in 2012 (VDGIF, 2012), which is consistent with the Virginia FWS "Endangered Species: Project Reviews in Virginia Step 6a – Eagle Nests." West Virginia does not currently have state legislation regarding bald eagles but the federal laws would apply there.

No occurrences of known bald eagle nests were identified by VDCR within two miles of any of the Project areas located in Virginia. Columbia's review of the Center for Conservation Biology Virginia Eagle Nest Locator also indicated there are no nests or communal roosts in the vicinity of the Project sites (Center for Conservation Biology, 2015). Additionally, no bald eagles or bald eagle nests were identified in or near the Project area during its various biological surveys, which were conducted in 2015 and 2016.

In West Virginia, Columbia reviewed the Project locations using the WVDNR database. This search did not identify any known bald eagle nests within the vicinity of Project area. However, bald eagles may use the area. Non-nesting golden eagles have also been observed in West Virginia during the spring and fall, and also occasionally in the summer months. No bald eagles or golden eagles or bald or golden eagle nests were identified in or near the Project area during its various biological surveys in 2015 and 2016.

In accordance with the Bald Eagle Survey Plan provided to the USFS on January 25, 2017, a bald eagle nest survey was performed via helicopter on February 20, 2017 of NFS and non-NFS lands. Weather conditions were optimal for survey. No bald eagle nests were observed within one-half mile of any perennial streams crossed by the proposed pipeline route or within one-half mile of the Line WB pipeline right-of-way. Several adult and juvenile bald eagles were observed flying, and one adult bald eagle was observed perching. The biologists then surveyed within one-half mile of the perched eagle and did not find any signs of nests.[24]

NFS Lands

An abandoned bald eagle nest is located about 1.17 miles from the eastern end of Line WB Replacement and 0.95-mile from Line WB Replacement #1. Prior to the February 2017 nest survey, MNF expressed concern that the same pair of eagles may have re-built a new nest closer to the Project on NFS lands. As stated above, no nests were observed during the survey.

The abandoned nest site would not be disturbed by the construction of the Project. The location of the abandoned nest is 0.15-mile from the portion of existing Line WB that would undergo restoration of the MAOP. No ground activities or land disturbance are anticipated to occur as a result of the MAOP restoration, but helicopter flyovers would be necessary to complete the restoration work. Columbia states that helicopter surveys would occur in late summer or the fall, which would further minimize disturbance in the vicinity of the abandoned nest. Columbia would comply with National Guidelines and RFSS guidelines in the MNF Plan standards.

The golden eagle is not known to nest in the area, it is not an RFSS, and individuals were not documented by WVDNR natural heritage data; however, the species is known to commonly migrate through and spend the winter in West Virginia. Therefore, the MNF requested that protocol for encounters with the species during winter and migration season clearing activities be addressed. These protocols are incorporated into the COMP.

Summary

The bald eagle nest survey results covers Project construction activities proposed for 2017. If construction is delayed to 2018, Columbia would perform an additional survey prior to construction and before leaf-out in early 2018. Should any nests be identified within one mile of the Project area, Columbia would reassess the potential for Project activities to affect the bald eagle. Based on the surveys conducted, as well as avoidance and minimization measures described in the BE (appendix G) and COMP, we have determined that construction and operation of the Project would be in compliance with National Guidelines and would not impact the bald eagle.

4.0 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Special status species are those species for which state and/or federal agencies afford an additional level of protection by law, regulation, or policy. Included are those federally listed species that are protected under the ESA and those that are designated as state sensitive. Federal agencies (i.e., the Commission) are required under Section 7 of the ESA, as amended, to ensure that any actions authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed threatened or endangered species, or result in the

[24] This information can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170308-5056 in the "Numbers: Accession Number" field. Columbia will file the filal report once it is complete.

destruction or adverse modification of the designated critical habitat of a federally listed species. FERC is required to consult with the FWS to determine if any federally listed endangered or threatened species or any of their designated critical habitat are located in the vicinity of the project, and to determine the proposed action's potential effects on those species or critical habitats.

4.1 Federally Listed Species

Federally listed threatened and endangered species that potentially occur in the vicinity of the Project area are presented in table B.4.1-1.

TABLE B.4.1-1

Federally Listed Threatened and Endangered Species that Potentially Occur in the Vicinity of the WB XPress Project

Species	Status	State	MSHCP Covered (C) or Non-Covered Lands (NC)	Facilities Where Species May Occur
Indiana bat (*Myotis sodalis*)	Endangered	VA, WV	C, NC	All, except Chantilly CS and Line VA-1
Virginia big-eared bat (*Corynorhinus townsendii*)	Endangered	VA, WV	C, NC	Nineveh CS, Strasburg CS, Dysart VS, Panther Mountain, Line WV from Glady to Smokehole, Elk River CS, Files Creek CS, Seneca CS Lost River, CS
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	VA, WV	C, NC	All
Cheat Mountain salamander (*Plethodon nettingi*)	Threatened	WV	C, NC	Line WB from Glady to Smokehole
Diamond darter (*Crystallaria cincotta*)	Endangered	WV	C	Elk River CS
Clubshell (*Pleurobema clava*)	Endangered	WV	C	Elk River CS
Northern riffleshell (*Epioblasma torulosa rangiana*)	Endangered	WV	C	Elk River CS
Pink mucket (*Lampsilis abrupta*)	Endangered	WV	C	Elk River CS
Snuffbox mussel (*Epioblasma triquetra)*	Endangered	WV	C	Elk River CS
Rayed bean (*Villosa fabalis*)	Endangered	WV	C	Elk River CS
Spectaclecase (*Cumberlandia* monodonta)	Endangered	WV	C	Elk River CS
Madison cave isopod (*Antrolana lira*)	Threatened	VA	C	Nineveh CS, Strasburg CS, Shenandoah River West VS, Dysart VS
Small whorled pogonia (*Isotria medeoloides*)	Threatened	VA, WV	C, NC	Chantilly CS, Mill Creek VS, Line VA-1, Line WB from Glady to Smokehole
Running buffalo clover (*Trifolium stoloniferum*)	Endangered	WV	C, NC	Files Creek CS, Seneca CS, Mill Creek VS, Line WB from Glady to Smokehole
Shale barren rock cress (*Arabis serotina*)	Endangered	VA, WV	C, NC	Nineveh CS, Strasburg CS, Dysart VS, Line WB from Glady to Smokehole, Lost River CS
Virginia spiraea (*Spiraea virginiana*)	Threatened	WV	C	Cleveland CS
Northeastern bulrush (*Scirpus ancistrochaetus*)	Endangered	VA, WV	C	Lost River CS, Dysart CS
Smooth coneflower (*Echinacea laevigata*)	Endangered	VA	NC	Nineveh CS, Strasburg CS, Dysart VS
Sensitive joint vetch (*Aeschynomene virginica*)	Threatened	VA	NC	Chantilly CS, Line VA-1
Swamp pink (*Helonias bullata*)	Threatened	VA	NC	Chantilly CS, Line VA-1

TABLE B.4.1-1

Federally Listed Threatened and Endangered Species that Potentially Occur in the Vicinity of the WB XPress Project

Species	Status	State	MSHCP Covered (C) or Non-Covered Lands (NC)	Facilities Where Species May Occur

Source: Nisource/Columbia, 2013 and FWS, 2015c

Columbia has developed an MSHCP in coordination with the FWS, which identifies common pipeline activities that may take place within potential federally listed species habitat. The MSHCP outlines detailed monitoring, reporting, and management protocols for multiple ESA listed species known to occur in the Project area including the Indiana bat, NLEB, Virginia big-eared bat, CMS, diamond darter, clubshell, northern riffleshell, pink mucket, snuffbox mussel, rayed bean, spectaclecase, northeastern bulrush, running buffalo clover, shale barren rock cress, small whorled pogonia, and Virginia spiraea. The MSHCP applies to this project because the Incidental Take Permit issued to NiSource by FWS on September 13, 2013, amended on May 4, 2015, was transferred from NiSource to Columbia on June 1, 2016 for "…Columbia's onshore pipeline system in the States of Delaware, Indiana, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, New Jersey, New York, Ohio Pennsylvania, Tennessee, Virginia, and West Virginia." According to the TransCanada website, TransCanada acquired Columbia Pipeline Group on July 1, 2016. Columbia is now a subsidiary of TransCanada, and still holds the Incidental Take Permit and MSHCP with financial assurances provided by TransCanada PipeLine USA Ltd. We have reviewed the MSHCP, Biological Opinion, and associated concurrence letters issued by an inter-agency effort on September 13, 2013. Through the MSHCP, Columbia and the FWS have developed standard mitigation measures that would reduce impacts on listed species to less than significant levels. Columbia provided the Interagency ESA Consultation Checklist for the MSHCP for FERC review and approval. This checklist is included in appendix H of this EA.

Some of the Project activities would occur on lands that are covered under the MSHCP. These MSHCP-covered lands include Columbia's existing facilities and, with some exceptions, the lands within a one-mile corridor encompassing Columbia's existing facilities. Columbia would implement the AMMs in these MSHCP-covered lands as required by the MSHCP. There are areas of the Project that fall outside the MSHCP-covered lands in Clay, Pendleton, Randolph, and Upshur Counties in West Virginia and Fairfax County in Virginia. In these areas, consultation is ongoing with the FWS. On February 17, 2017, FERC staff initiated formal consultation for the Cheat Mountain Salamander (CMS) by submitting the biological assessment to the FWS, West Virginia Field Office. A Biological Opinion is in preparation by the FWS. The remaining species identified and our determinations of effect are further discussed below.

Mammals

The Indiana bat (*Myotis sodalis*) is listed as federally endangered and has been protected under this listing since 1967 (FWS, 2015d). Populations are in decline because of disturbance of cave and abandoned mine hibernacula, summer roosting and foraging habitat loss, and a fungal infection known as White-Nose Syndrome. Indiana bats are found within all of the counties that would be affected by the Project except Loudoun and Fairfax Counties in Virginia.

The Virginia big-eared bat (*Corynorhinus townsendii*) has been protected as a federally endangered species since 1979 and is in decline primarily due to winter hibernacula habitat loss and summer habitat loss or degradation through pesticide use and exposure to contaminants (FWS, 1979). Virginia big-eared bats have been documented to occur within Shenandoah and Warren Counties in Virginia and Grant, Hardy, Kanawha, Randolph, and Pendleton Counties in West Virginia (Nisource/Columbia, 2013). Within Pendleton County, there are four caves that have been designated as critical habitat as documented in the MSHCP. These caves range from three to seven miles from the Project (FWS, 2015h).

The NLEB (*Myotis septentrionalis*) was listed as federally threatened in April 2015. The NLEB was primarily listed because of declining populations as a result of White-Nose Syndrome. Other factors that may be contributing to population loss include habitat loss or degradation, pesticides and environmental contaminants, and wind-farm operation. The distribution of the NLEB is widespread and it is found throughout the states of Virginia and West Virginia (FWS, 2015a).

These three federally listed bat species are addressed in the MSHCP, which covers most of the Project area. MSHCP-covered lands are any areas within a one-mile corridor centered on Columbia's existing facilities, with the exception of two areas. The first exception is within Randolph County, West Virginia, where the covered lands are limited to Columbia's existing right-of-way. The second area is Kanawha County, West Virginia, where the MSHCP covers the entire county. Access roads within covered lands located in Grant, Hardy, Pendleton, and Randolph Counties, West Virginia, are within the bounds of the MSHCP and all required AMMs would be implemented in these areas. However, areas of the Project that fall outside the MSHCP-covered areas include portions of Clay, Pendleton, Randolph, and Upshur Counties in West Virginia.

Within the majority of lands covered by the MSHCP, the Project is within known Indiana bat Priority 1 through 4 spring staging and fall swarming habitat and Virginia big-eared bat summer foraging and fall swarming habitat. Because of documented collocation of hibernacula with Indiana bat, Columbia has assumed NLEB are also present in these areas. In these areas Columbia would implement applicable AMMs from the MSHCP.

Within lands covered by the MSHCP, AAMs to protect bats would include:

- implementing size and quantity limitations on brush burning within 0.25-mile of known winter hibernacula;
- prohibiting vegetation or spoil disposal within 100 feet of known or presumed occupied winter hibernacula;
- prohibiting the clearing of suitable spring staging and fall swarming habitat within a 10-mile radius of known Priority 1 and 2 presumed occupied hibernacula from April 1 to May 31 and August 15 to November 14;
- implementing minimization criteria on blasting and drilling within 0.5-mile of known or presumed occupied winter hibernacula;
- prohibiting equipment service and maintenance within 300 feet of streambeds, sinkholes, and drainage areas to these features;
- educating contractors regarding the biology of the species and avoidance of the species; creating and maintaining open, herbaceous habitat within the pipeline right-of-way;

- restricting the use of herbicides within 10 miles of known or presumed occupied habitat winter hibernacula to those approved for use in karst and water areas;
- protecting potential recharge areas of cave streams and other karst features that are connected to potentially occupied hibernacula by employing Columbia's ECS;
- prohibiting the clearing of known maternity colony summer habitat or trees greater than nine inches diameter at breast height within any existing right-of-way and/or appurtenant facilities from April 1 to October 15 to avoid direct effects to female and juvenile Indiana bats;
- prohibiting the clearing of suitable summer habitat from June 1 to August 1 to protect juvenile Indiana bats or side-trimming of suitable summer habitat from April 15 to September 1 to avoid direct effects to female and juvenile Indiana bats; and
- drilling within 0.5-mile of potentially occupied habitat only in a manner that would not compromise the structural integrity of the cave.

Additional measures to be implemented on MSHCP covered lands include those in known or presumed occupied caves/winter habitat, spring staging/fall swarming habitat, and summer habitat. Columbia may also conduct summer surveys to determine presence or probable absence of the three listed bats species in areas of the Project that are covered by the MSHCP but outside of Priority 1 and 2 or Priority 3 and 4 spring staging and fall swarming habitat for Indiana bat, or summer foraging and fall swarming habitat Virginia big-eared bat. If Columbia elects not to conduct presence or probable absence surveys in these areas, it would assume the bats are present and implement the applicable AMMs required in the MSHCP.

Portions of the Project are not covered by the MSHCP. These include a small portion of the Line WB Replacement (about 2.1 miles) where the MSHCP only covers the existing right-of-way, and portions of the Project in Virginia including MPs 0.7 to 2.2 along Line VA-1 and the Line VA-1 Receiver Site. A Myotid Bat Conservation Plan (MBCP) was prepared, in accordance with the *Guidance on Developing and Implementing a Myotid Bat Conservation Plan* (FWS 2015b), to provide avoidance, minimization, and conservation measures in Project areas of West Virginia not covered by the MSHCP.[25] The MBCP discusses background, habitat evaluation, and avoidance, minimization, and conservation measures in detail. On lands not covered by the MSHCP, Columbia assumed presence of listed bats and would implement the AMMs and conservation measures in the MBCP.

As part of the MBCP process, Columbia performed surveys in the Priority 1 and 2 and Priority 3 and 4 areas for potential roost trees and maternity habitat for Indiana bat and NLEB to determine suitable avoidance, minimization, and conservation measures. A total of 65 potential roost trees were documented, of which 29 were considered potential primary maternity roost trees, and 36 were considered potential secondary potential roost trees. Of the potential roost trees identified, one primary potential roost tree was identified in workspace areas where tree clearing cannot be avoided for the Line WB Replacement. None were identified at Files Creek

[25] The Myotid Bat Conservation Plan was filed on January 27, 2017 and can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170127-5025 in the "Numbers: Accession Number" field.

Compressor Station, Highway 48 Contractor Yard, Columbia Elkins Contractor Yard, United Parcel Service Contractor Yard, and Seneca Contractor Yard.

Cave/mine portal surveys for lands not covered by the MSHCP were completed once the Karst Terrain and Preliminary Geohazard Investigation determined the areas of potential karst caves. Within karst habitats, survey areas encompassed a 300-foot wide corridor centered on the pipeline centerline. No caves or karst features were located in or within one mile of MSHCP non-covered lands during this survey.

A draft MBCP was provided to the West Virginia FWS Field Office on December 4 and then December 15, 2015, which was posted to the docket on December 30, 2015 with Columbia's application. An updated draft was submitted on March 7, 2016. Columbia requested comments from the FWS with those submittals and during phone calls on January 21, May 10, and May 31, 2016. The FWS indicated that formal comments would not be provided on the MBCP; however, during a phone conversation on June 27, 2016, the FWS requested that Columbia provide a revised MBCP to include the results of the roost tree surveys and proposed conservation measures to offset the roost trees to be cleared in areas that are not covered by Columbia's MSHCP. Based on these and subsequent comments, revised drafts of the MBCP were submitted in August 2016 and November 2016. Further comments from FWS were filed on December 21, 2016 and a final MBCP was submitted in January 2017.

As stated in the MBCP, Columbia would implement the following conservation measures to avoid and minimize potential impacts on Indiana bat and NLEB in Project areas not covered by the MSHCP:

- Training: Operators, employees, and contractors would be educated on the biology of the Indiana bat and NLEB, activities that may affect bat behavior, and ways to avoid and minimize these effects.
- Collocate Project Features with Previously Disturbed or Cleared Areas: The Project is collocated with an existing utility corridor.
- Avoid Cutting Potential Roost Trees/Minimize Limits of Disturbance: As the Project was originally designed, it would have required impacts to 6 PMRT and 10 PRT. Columbia reduced and reconfigured Project workspace to require the removal of only 1 PMRT and avoid the remaining PMRTs and PRTs.
- Pollution Control Plan in Place: Equipment servicing and maintenance areas would be sited at least 300 feet away from streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features. Columbia's ECS would be implemented throughout the Project.
- Strong Erosion and Sedimentation Best Management Practices: Adherence to sediment and erosion control measures would be strictly enforced within known or presumed occupied spring staging and fall swarming habitat to ensure restoration of topographic contours after any ground disturbance and successful restoration of native vegetation (where possible) as specified in Columbia's ECS upon completion of work. Columbia would obtain all necessary federal, state, and local permits, which also require implementation of best management practices.

- Seasonal Tree Clearing Restrictions: No clearing of trees greater than three inches in diameter at breast height would be allowed in suitable Indiana bat or NLEB habitat between April 1 and November 14. This includes side-trimming and tree removal (i.e., felling).
- Pollution Control Plan in Place: Use of tanks would be required to store waste fluids between April 1 and November 14 to ensure no loss of bats by entrapment in waste pits in known maternity colony summer habitat within the covered lands of the MSHCP.
- Avoid High Quality Foraging Areas: Construction activities would be avoided after sunset in known or suitable summer habitat to avoid harassment of foraging Indiana bat and NLEB.
- Avoid Use of Invasive, Exotic Plant Species When Stabilizing Soils: The right-of-way would be seeded with a native species mix on NFS lands. On privately owned lands, Columbia would use seed mixes approved by the WVDEP and listed in the ECS unless otherwise requested by landowners. Measures would be implemented to control the spread of invasive plants and invasive weeds as described in Columbia's ECS and the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures*.
- Erect artificial roosting structures: One artificial roosting structure would be erected to replace one PMRT that would be lost during construction of the Project (a 1:1 ratio). The location of this structure would be coordinated with landowners and placed outside the right-of-way so that continued maintenance of the pipeline right-of-way does not interfere with the effective use by Myotid bats. The purpose of this conservation measure is to avoid net loss of PMRTs. The roosting structure would be monitored twice yearly for a period of two years following the year of installation to determine occupancy.

In addition to coordination with FWS, the project must be in compliance with the MNF Forest Plan Standards and Guidelines for the Indiana and Virginia big-eared bats, as well as for those bat species that are included in the Forest's RFSS list. Compliance requires mitigation for any potential roost trees that are lost. Such mitigation would involve creation of additional snags to serve as replacement roost trees for any snags or shagbark hickory impacted as part of pipeline clearing and construction activities.

Based on the implementation of the MSHCP and all of its applicable AMMs for these species, we conclude that the portion of the Project covered by the MSHCP complies with the MSHCP for the Virginia big-eared bat, Indiana bat, and NLEB. We also conclude that with the implementation of all AMMs and conservation measures in the MBCP, Project activities in portions of the Project not covered by the MSHCP *may affect but are not likely to adversely affect* Virginia big-eared bat, Indiana bat, and NLEB. The FWS Virginia Field Office concurred on November 3, 2015 with this determination. We request that the FWS West Virginia Field Office concur with this determination.

Amphibians

As discussed in detail in the biological assessment, the CMS was listed as federally threatened in 1989 as a result of population declines as a result of the degradation of high-elevation red spruce and spruce/northern hardwood forests and increased competition by the Allegheny Mountain dusky and redback salamanders for food, cover, and moist habitat. The CMS spend the majority of their lives in sub-surface soils. Potential impacts to CMS include the removal of trees and surface disturbance within and adjacent to occupied habitat, altering micro–climate and habitat, blasting activities within and/or adjacent to occupied habitat, trenching activities, and general disturbance in the area during construction.

CMS have been documented within Randolph and Pendleton Counties in West Virginia. In accordance with the MSHCP, Columbia conducted surveys in the late summer/early fall 2015 to determine if suitable habitat for the CMS is present in the Project area. In June 2016, additional habitat suitability studies and presence/absence surveys were conducted in areas previously identified by Dr. Thomas Pauley as suitable habitat for CMS within the Project study area. This survey was conducted based on recommendations by MNF staff during the April 22, 2016 site visit to further refine the boundaries of the suitable habitat. Surveys were completed north of the existing right-of-way, in an area located within 300 feet of NFS lands. Habitat in this area includes forest composed of deciduous trees with isolated or small stands of red spruce, and leafy liverwort (*Bazzania trilobata)* is virtually absent. While CMS is most often associate with red spruce forest, and leafy liverwort is generally considered a characteristic species in CMS habitats, these are not required habitat components. While not typical CMS habitat, the forest along the right-of-way includes rock outcrops, suitable elevation for CMS, and is about one-mile from another CMS population on Spruce Mountain. Upon completion of 2016 surveys, Columbia revised the delineations of suitable CMS habitat within NFS lands and nearby lands per the MNF LRMP. Two locations of occupied habitat for CMS were identified along a roughly one-mile section of the Line WB Replacement. Collectively, these areas total about 29.7 acres.

In December 2016, FWS requested more information regarding the suitability of a small patch of bedrock and forested habitat extending into the southern side of the existing right-of-way on non-NFS lands. Based on follow-up information from Dr. Thomas Pauley, the FWS December 21, 2016 letter states that the CMS habitat in question is considered suitable, and since it is contiguous with habitat containing known CMS occurrences, it must also be considered occupied habitat. Due to unavoidable impacts to occupied CMS habitat within the existing right-of-way, the FWS determined that adverse effects to CMS are likely to occur as a result of activities such as tree/vegetation removal and trenching, even with implementation of AMMs associated with the MSHCP. Therefore, the FWS recommended that FERC submit an initiation package in order to initiate formal consultation under Section 7 of the ESA. A BA was developed to evaluate effects to CMS within occupied habitat on lands not covered by the MSHCP.

In order to avoid and minimize effects to CMS and its habitat, Columbia performed the following measures during the Project planning process:

- Columbia designed the Project to be collocated with two other Columbia-operated pipelines within an existing corridor.

- Columbia assessed alternate construction methods to avoid all direct impacts on CMS and its habitat, such as installing Line WB between or to the north of the two active natural gas pipelines for a limited distance. After carefully considering various safety, pipeline integrity, and natural resource factors, Columbia ultimately concluded that the alternate construction methods were not feasible. The methods described in this document constitute the preferred route and construction methods.
- Columbia reduced the construction workspace and operational footprint of the Project to be contained within the existing right-of-way corridor to avoid and minimize direct impacts on CMS and its habitat. This involved designing the Line WB centerline within 12.5 feet of an existing active pipeline. As a result, direct impacts on CMS habitat were reduced by 0.09 acre.

In addition to AMMs for CMS prescribed by Columbia's MSHCP, Columbia would also perform the following measures within the vicinity of CMS occupied habitat.

- Prior to initiating pre-clearing activities and construction, Columbia would provide environmental training about the CMS for company and contractor personnel.
- A qualified biologist would search for CMS individuals immediately prior to construction within the Project workspace where it overlaps with CMS occupied habitat. If a CMS individual is found, the observation would be documented and a qualified biologist would relocate the individual to an area of suitable habitat outside of Project workspace before work begins.
- A qualified biologist would be on-site during construction that overlaps occupied CMS habitat to monitor for CMS individuals within Project workspaces.
- Columbia would isolate the Project workspace from occupied CMS habitat outside of the Project workspace through the installation of CMS barriers (e.g., silt fencing). A qualified biologist would be present to assist in the placement of the barriers. Soil on either side of the fencing would be level with the surrounding grade and pressed against the inside and outside of the silt fence. CMS barriers would be inspected daily and breaches would be repaired immediately. If a breach occurs, work would not begin until repairs are complete and one survey for CMS individuals is conducted within the Project workspace by a qualified biologist. When construction activities are complete and the site is stabilized, silt fencing would be removed from the area and furrows or holes would be leveled to grade.
- During construction, Columbia would place temporary spoil piles (soil excavated from the pipeline trench and vegetative debris removed for construction purposes) on the northern side of the workspace within the existing right-of-way, adjacent to occupied CMS habitat. The purpose is to create a physical barrier to wind and noise for CMS present in the habitat north of the workspace. Silt fencing would serve to prevent spoil from entering occupied CMS habitat outside of the Project workspace. If spoil is needed as padding in the Project workspace, the silt fencing would remain in place during construction to serve the same purpose.

- Where occupied CMS habitat intersects or is tangent to the Project workspace, blasting would be designed to minimize ground vibrations. Specific AMMs for blasting are provided in the blasting plan.
- Biological monitoring of CMS would be conducted during blasting operations where the Line WB centerline crosses occupied CMS habitat. If a CMS individual is observed within the proposed blasting footprint during construction, a Columbia representative would be notified immediately and blasting activities in the area would cease until the qualified biologist completes a search for CMS individuals in the immediate blasting area. The observation would be documented and a qualified biologist would relocate the individual to an area of suitable habitat outside of Project workspace before work begins.
- Where occupied CMS habitat intersects the Line WB pipeline centerline or is tangent to a bend in the alignment, blast design and timing delays would be designed such that ground vibration at the adjacent habitat area is minimized. Specifically, seismic ground vibrations from blasting activities would not exceed 1.25 in/sec PPV in any measured direction at the nearest active pipeline (Line WB-Loop) per Columbia standards. Specific AMMs for blasting are provided in the blasting plan.
- Following construction, Columbia would plant red spruce seedlings along the edges of the right-of-way to create a wind barrier that would improve the ability of the soils within occupied CMS habitat to maintain moisture. The plantings would begin up to two years after construction is complete to accommodate for seedling availability, acceptable planting conditions, or other environmental conditions. Columbia would monitor relocated saplings and planted seedlings for three years post-planting to evaluate mitigation success. Site-specific plans and mapping for these measures are provided in the COMP and Restoration Plan.

NFS lands

Based on MNF Forest Plan Standard TE59, ground and vegetation-disturbing activities must be avoided within occupied CMS habitat and a 300-foot buffer zone around occupied CMS habitat, unless analyses can show that the activities would not have an adverse effect on populations or habitat. While only a small portion of the delineated CMS habitat is located on NFS lands, the 300’ buffer associated with that habitat does extend into the MNF. Construction activities would not occur directly within occupied CMS habitat located on NFS lands. Within 300 feet of occupied CMS habitat, construction would be confined to the south side of the right-of-way, where the buffer is currently disrupted by the existing cleared right-of-way.

As such, mitigation measures on NFS lands are focused on the northern side of the existing right-of-way. In addition to the AMMs described above, Columbia would perform the following measures on NFS lands within 300 feet of occupied CMS habitat (refer to the Biological Evaluation, COMP, and Restoration plan for more details):

- Following construction, Columbia would plant woody shrubs with shallow roots (e.g., rhododendron and mountain laurel) in areas used for temporary workspace within the 300-foot buffer of occupied CMS habitat on NFS lands southeast of the existing right-of-way.
- Columbia would transplant spruce saplings from other areas (locations selected per the MNF's guidance) into open areas on the northwest side of the right-of-way, up to at a distance of 25 feet from the existing pipeline. These saplings would provide a wind break and potential future seed source for the area. Spruce seedlings would also be planted. The specific locations and plans for these plantings is provided in the COMP and Restoration Plan.
- In coordination with MNF staff, Columbia would enhance and restore a nearby off-site property that will eventually become part of the NFS.
- Columbia would conduct post-construction surveys on NFS land along occupied CMS habitat annually for three years following construction to document where CMS are active and to determine if CMS are expanding their use of habitat into adjacent areas previously not mapped as suitable habitat. Surveys would be developed in conjunction with the MNF and would be conducted by a qualified biologist.
- Columbia would prohibit lime use during restoration efforts within CMS habitat or the 300-foot buffer of occupied CMS habitat.
- Columbia would leave the exclusion silt fencing in place within the 300-foot buffer zone of occupied CMS habitat during restoration activities that involve Proganics™ or Flexterra™, to prevent accidental overspray into suitable habitat.

For lands not covered by the MSHCP, we found that the Project *may affect* and is *likely to adversely affect* CMS and requested concurrence on this determination from the FWS, West Virginia Field Office on February 17, 2017. Anticipated level of take is based on occupied habitat affected by the Project, including 0.08-acre of directly impacted habitat and 1.15 acres of indirectly impacted habitat.

For lands covered by the MSHCP, the Project is in compliance with the MSHCP.

<u>Fish</u>

The diamond darter (*Crystallaria cincotta*) has been protected as a federally endangered species since 2013 (FWS, 2010a). Populations have been in decline because of water quality degradation, habitat loss, a small population size that makes the species vulnerable to the effects of the spread of invasive species, loss of genetic fitness, and catastrophic events such as toxic spills. The only diamond darter population known to exist is found along a specific reach in the Elk River of West Virginia. Based on review of the MSHCP, construction of the Elk River Compressor Station and associated pipeline connecting to the Elk River Compressor Station were identified as activities that have the potential to impact the diamond darter due to their proximity to the Elk River. Columbia has assumed all areas of the Elk River in the vicinity of the Project are potentially occupied by the diamond darter. No in-stream work is proposed within the Elk River; however, the Project would involve multiple crossings of Broad Run, which is a tributary to the Elk River. The nearest crossing would be within one-mile of the river. Columbia would use dry-ditch construction methods for both of these crossings. Columbia would also implement measures contained in its ECSs and any applicable MSHCP AMMs.

Specific AMMs to protect the diamond darter would include implementation of an Environmental Management and Construction Plan (to be submitted to FERC upon receipt of, and as a compilation of, all permits and authorizations), and using enhanced and redundant measures to avoid and minimize the impact of spills from contaminant events within the Elk River watershed. Columbia's implementation of these measures would control erosion and sedimentation and minimize the potential for water quality impacts on the Elk River. Based on these measures and the fact that the Project would not directly impact the Elk River, we conclude that the Project is in compliance with the MSHCP for the diamond darter. Columbia requested concurrence of this determination from the FWSWest Virginia Field Office in a letter dated December 4, 2015. The FWS stated in a letter dated March 7, 2016 that it anticipates the implementation of measures in the MSHCP would minimize impacts to the diamond darter, and therefore, would be in compliance with the MSHCP for this species. We find that the Project would be in compliance with the MSHCP using applicable AMMs and the above-mentioned minimization measures.

Mussels

As discussed above, the Project crosses Broad Run (within the Huntington Corps District) within one-mile of the Elk River, which is known habitat for six federally protected mussel species. The clubshell (*Pleurobema clava*) has been protected under ESA as federally endangered since 1993 because of pollution from agricultural run-off and industrial wastes, and impoundments for navigation (FWS, 1997a). The northern riffleshell (*Epioblasma torulosa rangiana*) was also listed as federally endangered in 1993 because of habitat loss (erosion and silt accumulation), logging, and pollution (FWS, 1997b). The pink mucket (*Lampsilis abrupta*) became federally endangered in 1976 because of habitat loss (erosion and silt accumulation) and pollution (FWS, 1997c). The snuffbox (*Epioblasma triquetra)* and rayed bean (*Villosa fabalis*) became federally endangered in 2012 because of habitat loss, sedimentation, and pollution (FWS, 2012a; FWS, 2012d). The spectaclecase (*Cumberlandia* monodonta) was also listed as federally endangered in 2012 because of factors such as habitat loss, scouring river bottoms, water temperature changes, sedimentation, dredging, and pollution (FWS, 2012b).

Columbia has assumed all six mussel species are present in the Elk River. Columbia would cross Broad Run using dry-ditch methods and would implement the measures in its ECSs and the applicable MSHCP AMMs[26]. Some of the specific AMMs that would protect water quality and mussels include, but would not be limited to:

- implementation of an Environmental Management and Construction Plan;
- installation and maintenance of pipeline to minimum depth as described in Columbia's ECSs;
- removal of equipment bridges as soon as practicable after site restoration is completed;
- visual inspection of all stream crossings in occupied habitat annually for early indications of erosion or bank destabilization;

[26] The clubshell and northern riffleshell have been addressed as part of the MSHCP and applicable AMMs for these species are included in the MSHCP.

- siting of staging areas for equipment, fuel, materials, and personnel at least 300 feet from the waterway;
- ensuring any imported fill material is free from contaminants;
- restricting any fertilizer or herbicide use within 100 feet of known or presumed occupied mussel habitat or when weather or other conditions would compromise impact prevention; and
- implementation of equipment cleaning policies.

Columbia's implementation of these measures would minimize erosion and sedimentation and the potential for water quality impacts in the Elk River.

Based on these measures and the fact that the Project would not directly impact the Elk River, we conclude the Project is in compliance with the MSHCP for the clubshell, northern riffleshell, pink mucket, pearlymussel, rayed bean, snuffbox, and spectaclecase. Potential take of clubshell and northern riffleshell, however unlikely, is addressed in the MSHCP. We find the minimization measures proposed for the federally listed species comply with the MSHCP. Columbia requested concurrence with this determination from the FWS West Virginia Field Office in a letter dated December 4, 2015.

Given consultation under section 7 of the ESA is not yet complete, **we recommend**:

- **Columbia should <u>not begin construction activities until</u>**:
  - **a. OEP staff receives comments from the FWS regarding the Myotid Bat Conservation Plan and CMS;**
  - **b. OEP staff completes formal consultation with the FWS; and**
  - **c. Columbia has received written notification from the Director of OEP that construction or use of mitigation may begin.**

<u>Isopods</u>

The Madison Cave isopod (MCI) (*Antrolana lira*) was listed as federally threatened in 1982 because of agricultural, industrial, and urban development threatening groundwater quality and habitat. The MCI is found in karst aquifer habitats beneath the Great Valley of Virginia and West Virginia where it swims freely through calcite-saturated waters of deep karst aquifers. There are documented population centers in the Waynesboro-Grottoes area (Augusta County, Virginia), the Harrisonburg area (Rockingham County, Virginia), and the valley of the main stem of the Shenandoah River (Warren and Clarke Counties, Virginia, and Jefferson County, West Virginia) (FWS, 2010b). The only project areas where MCI could occur are in Virginia, as no project activities are proposed in Jefferson County, West Virginia. The Nineveh Compressor Station, Strasburg Compressor Station, Shenandoah River West Valve Site, and Dysart Valve Site locations were identified as potential habitat for the MCI. Columbia did not conduct surveys for MCI but has assumed that it would be present in any subsurface karst habitats underlying the two compressor stations and two valve sites. Both compressor stations and the two valve sites are located within lands covered by the MSHCP and Columbia would implement applicable AMMs to identify and protect MCI habitat. These would include conducting karst surveys within one-year of the Project's construction activities. The Project is consistent with the MSHCP for this species and, the FWS Virginia field office concurred on November 3, 2015 that the Project is not likely to adversely affect the MCI.

Plants

Eight federally listed plants species have the potential to occur in the Project area (table B.4.1-2). Small-whorled pogonia (*Isotria medeoloides*) was initially listed as a federally endangered species in 1982, but was reclassified as threatened in 1994. Urban expansion and recreational activities (i.e., trampling) pose the greatest threat to this species. Small-whorled pogonia is a member of the orchid family and grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. Sometimes it grows in stands of softwoods such as hemlock. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams (FWS, 2008b). Based on a review of the MSHCP, the Project occurs within the range of the small-whorled pogonia in Randolph and Pendleton Counties in West Virginia. Columbia conducted surveys for small-whorled pogonia in areas of suitable habitat in August 2015 using FWS and WVDNR approved botanists. No small-whorled pogonia individuals were observed during these surveys. The Project would be in compliance with the MSHCP for this species, and the FWS West Virginia Field Office concurred with this determination in a letter dated March 7, 2016.

TABLE B.4.1-2

Federally Listed Plant Survey Timing Windows for the WB XPress Project

Species	Status	State	Survey Timing Window[a]
Small whorled pogonia (*Isotria medeoloides*)	Threatened	VA, WV	Mid-August to mid to Late September
Running buffalo clover (*Trifolium stoloniferum*)	Endangered	WV	June 1 to August 15
Shale barren rock cress (*Arabis serotina*)	Endangered	VA, WV	June to October
Virginia spiraea (*Spiraea virginiana*)	Threatened	WV	May to early July
Northeastern bulrush (*Scirpus ancistrochaetus*)	Endangered	VA, WV	July to September
Smooth coneflower (*Echinacea laevigata*)	Endangered	VA	Late May to October
Sensitive joint vetch (*Aeschynomene virginica*)	Threatened	VA	Mid-July to October
Swamp pink (*Helonias bullata*)	Threatened	VA	April to May

Source: FWS Recovery Plans for each species

[a] The VDCR recommended different survey windows than the FWS Recovery Plans for several of these species; however surveys were not conducted in Virginia because there was no suitable habitat for federally listed plants in Virginia in the Project area. The FWS Virginia field office concurred with this conclusion. Columbia's habitat surveys in West Virginia were conducted in August. No federally listed species were observed during these surveys. Based on its habitat surveys, Columbia is awaiting FWS concurrence that the Project would not result in adverse effects on federally listed plants in West Virginia.

Running buffalo clover (*Trifolium stoloniferum*) was listed as federally endangered in 1987 due to habitat loss, land management practices that minimize disturbance and allow for natural succession and canopy closure, and competition from non-native invasive plants. The loss of Eastern bison, which maintained open trails and wallows and dispersed seeds, may have also contributed to its decline. Running buffalo clover is found in partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails. It requires periodic disturbance and a somewhat open habitat to successfully flourish, but cannot tolerate full sun, full shade, or severe disturbance (FWS, 2003). Based on review of the MSHCP, the Project is within range of running buffalo clover at Project locations in Randolph and Pendleton Counties in West Virginia. Columbia conducted surveys for the running buffalo clover in August 2015. These surveys were conducted by FWS- and WVDNR-approved botanists at locations identified as having suitable habitat. No running buffalo clover individuals were observed during these surveys. Per the MSHCP best management practices, Columbia concluded the Project is not likely to adversely affect running buffalo clover and that no further consultation with the FWS is necessary. The Project would be in compliance with the MSHCP for this species, and the FWS West Virginia Field Office concurred with this determination in a letter dated March 7, 2016.

Shale barren rock cress (*Arabis serotina*) was listed as federally endangered in 1989 due to habitat loss from construction, herbivory, localized environmental catastrophes, reproductive failure, death of pollinators, and over-collection by botanists (USFS, 2015). This species occurs in mid-Appalachian shale barrens. These hot, dry habitats are found in patches on steep southern exposures at elevations of 1,099 to 2,494 feet. Shale barrens are characterized by relatively sparse vegetative cover including pine, oak, red cedar, and other xeric, heat-tolerant species (FWS, 2015g). Based on review of the MSHCP, the Project is within range of shale barren rock cress at Project locations in Randolph, Pendleton, and Hardy Counties in West Virginia, and Shenandoah and Warren Counties in Virginia. However, Columbia's subsequent review of the state Information, Planning, and Conservation System (IPaC) system indicates suitable habitat exists only in Randolph, Pendleton, and Hardy Counties, West Virginia. Although the Project would not occur in Hampshire County, West Virginia, an occurrence of shale barren rock cress has been documented there. Columbia conducted plant surveys in 2015. No shale barren rock cress or habitat for the species was observed during the surveys. Per the MSHCP best management practices, if suitable habitat is absent, adverse effects would be avoided and the Project could be excluded from any future consultation. The Project would be in compliance with the MSHCP for this species, and the FWS West Virginia Field Office concurred with this determination in a letter dated March 7, 2016.

Virginia spiraea (*Spiraea virginiana*) was listed as federally threatened in 1990 due to loss of riverine habitat, small population size, and difficulties with reproduction and dispersal. Virginia spiraea grows in disturbed sites along rivers and streams (FWS, 2011). Based on review of the MSHCP, the Project is within range of Virginia spiraea at the Cleveland Compressor Station in Upshur County, West Virginia. However, Columbia's subsequent review of the state IPaC system indicates there is no suitable habitat for Virginia spiraea in the Project area. Per the MSHCP best management practices, if suitable habitat is absent, adverse effects would be avoided and the Project could be excluded from any future consultation. The Project would be in compliance with the MSHCP for this species, and the FWS West Virginia Field Office concurred with this determination in a letter dated March 7, 2016.

Northeastern bulrush (*Scirpus ancistrochaetus*) was listed as federally endangered in 1992 due to habitat loss. The decline of this species is attributed to multiple threats: degradation of habitat from road construction and upland runoff, destruction by off-road vehicles, and conversion of land for other uses. Like other sedges, northeastern bulrush grows in wet areas such as small wetlands, sinkhole ponds, or wet depressions with seasonally fluctuating water levels. It may be found at the water's edge, in deep water or in just a few inches of water, and during dry spells there may be no water visible where the plant is growing (Pennsylvania NHP, 2007). Based on review of the MSHCP, the Project is within range of northeastern bulrush at the Lost River Compressor Station in Hardy County, West Virginia and the Dysart Valve Site in Shenandoah County, Virginia. However, Columbia's subsequent review of the state IPaC system indicates there is no suitable habitat for northeastern bulrush in the Project area. This was confirmed by Columbia's plant surveys, which were conducted for the northeastern bulrush in August 2015 by FWS- and WVDNR-approved botanists at the locations identified by the MSHCP as being within range of the species in West Virginia. No northeastern bulrush individuals were observed during these surveys. Per the MSHCP best management practices, if suitable habitat is absent, adverse effects would be avoided and the Project could be excluded from any future consultation. Columbia received concurrence from the FWS Virginia field office on November 3, 2015 that the Project is not likely to adversely affect northeastern bulrush. The Project would be in compliance with the MSHCP for this species, and the FWS West Virginia Field Office concurred with this determination in a letter dated March 7, 2016.

Smooth coneflower (*Echinacea laevigata*) was listed as federally endangered in 1991 due to fire suppression, loss of habitat, and collection for horticultural and medicinal purposes. Smooth coneflower is typically found in open areas in forested lands, along roadsides, or in maintained right-of-way or other sites that have abundant sunlight and open herbaceous layers (FWS, 2012e). Based on review of the MSHCP, the Project is within range of smooth coneflower at Dysart Valve Site and Strasburg Compressor Station in Shenandoah County, Virginia, and Nineveh Compressor Station in Warren County, Virginia. However, Columbia's subsequent review of the state IPaC system indicates there is no suitable habitat for smooth coneflower in the Project area. Per the MSHCP best management practices, if suitable habitat is absent, adverse effects would be avoided and the Project could be excluded from any future consultation. Columbia received concurrence with this determination from the FWS Virginia field office on November 3, 2015.

Sensitive joint vetch (*Aeschynomene virginica*) was listed as federally threatened in 1992 due to habitat destruction. Sensitive joint-vetch typically grows in the intertidal zone of coastal marshes where plants are flooded twice daily. The species seems to prefer the marsh edge at an elevation near the upper limit of tidal fluctuation. It is usually found in areas where plant diversity is high (50 species per acre) and annual species predominate (FWS, 2010c). Based on review of the MSHCP, the Project is within range of sensitive joint vetch at the Chantilly Compressor Station and Line VA-1 located in Fairfax County, Virginia. However, Columbia's subsequent review of the state IPaC system indicates there is no suitable habitat for sensitive joint vetch in the Project area. Per the MSHCP best management practices, if suitable habitat is absent, adverse effects would be avoided and the Project could be excluded from any future consultation. The FWS Virginia field office concurred with this determination on November 3, 2015.

Swamp pink (*Helonias bullata*) was listed as federally threatened in 1988 due to population decline and threats to habitat (FWS, 1991). Swamp pink is found in perennially saturated, spring-fed, nutrient poor, shrub swamps and forested wetlands. Typically, swamp pink grows with such species as sphagnum moss, red maple, spicebush, greenbrier, black gum, and various wetland ferns and sedges. It requires stable water levels and can tolerate only brief or infrequent flooding (VDCR NHP, 2015). Based on review of the MSHCP, the Project is within range of swamp pink at the Chantilly Compressor Station and Line VA-1 located in Fairfax County, Virginia. However, Columbia's subsequent review of the state IPaC system indicates there is no suitable habitat for swamp pink in the Project area. Per the MSHCP best management practices, if suitable habitat is absent, adverse effects would be avoided and the Project could be excluded from any future consultation. The FWS Virginia field office concurred with this determination on November 3, 2015.

4.2 Summary of State-Listed and Forest Service Sensitive Species - Fauna

West Virginia

West Virginia does not have a state-listed species program, but instead relies on the FWS list of federally listed threatened and endangered species. However, the WVDNR NHP does assign state rankings to rare species based on occurrences and distributions (WVDNR, 2003). In addition, West Virginia also protects all native freshwater mussels. Columbia requested and received information from the WVDNR NHP regarding the locations of state-ranked rare species and federally listed threatened and endangered species within 10 miles of the Project.

Based on review of the West Virginia Mussel Survey Protocols, six waterbodies located in the Project area possess conditions suitable for non-federally listed native freshwater mussels. A mussel survey report was provided to the WVDNR, MNF, and FWS on August 15, 2016 indicating that no mussels were found during surveys at Gandy Creek, Glady Creek, and North Fork South Branch Potomac River and that no relocations are planned. The WVDNR provided concurrence via email on August 25, 2016 that no further mussel issues need to be addressed for in-stream activities at these locations if in-stream activities are initiated by July 2021.

<u>NFS Lands</u>

The USFS maintains RFSS lists that may require additional protection by the USFS. In addition, the USFS has identified MIS for each National Forest that are actively monitored to assess impacts of forest management activities on native biota within National Forest lands.

Columbia's consultation with MNF staff identified the following RFSS vertebrates that had a high potential to be present within the Project area:

- West Virginia northern flying squirrel (Glaucomys sabrinus fuscus);
- Tri-colored bat (*Perimyotis subflavus*);
- Little brown myotis (*Myotis lucifugus*); and
- Rock feature species
  - Southern rock vole (*Microtus chrotorrhinus carolinensis*);
  - Allegheny woodrat (*Neotoma magister*);
  - Eastern spotted skunk (*Spilogale putorius*);
  - Eastern small-footed myotis (*Myotis leibii*);
  - Timber rattlesnake (*Crotalus horridus*); and
  - Green salamander (*Aneides aeneus*).
- Northern goshawk (*Accipiter gentilis*);
- Eastern hellbender (*Cryptobranchus alleganiensis*);
- Pearl dace (*Margariscus margarita*); and
- Cheat minnow (*Pararhinichthys bowersi*).

Additional species identified by the WVDNR database within a mile of the Project include the boreal fan moth (identified immediately adjacent to access road TAR-48), rapids clubtail and green-faced clubtail (both 0.85-mile south of Line WB), Columbine duskywing (0.91-mile south of Line WB), and a bald eagle (0.95-mile northwest of Line WB Replacement #1). Surveys for aquatic insects such as the green-faced clubtail and rapids clubtail were not conducted but assumed present in potentially suitable wetland and waterbody habitats; AMMs for wetlands and waterbodies were adopted as the most effective approach to address potential concerns related to proposed activities for these species. Surveys for the boreal fan moth would not be conducted as presence of this species is assumed within suitable habitat in the Project area. Further discussion regarding impacts on these species is provided in the USFS BE, which examines potential impacts and mitigation proposed to minimize impacts on RFSS, MIS, and BCC under the Management of the MNF (appendix G).

Columbia conducted biological surveys for RFSS species from August 2015 through August 2016. Surveys documented habitat and occurrences of species within a 300-foot-wide survey corridor along the rights-of-way and within a 50-foot-wide survey corridor along existing access roads.

West Virginia Northern Flying Squirrel

The WVNFS is known to occur in the vicinity of the Project; however, Columbia did not conduct surveys for the species. Instead, Columbia mapped appropriate habitat using information collected during multiple field surveys. Suitable habitat for the WVNFS was evaluated by ground-truthing forested habitat within the 300-foot-wide study corridor on NFS lands using MNF-provided modeling of potential suitable habitat. Columbia adjusted Project workspace to avoid and minimize impacts to the WVNFS suitable habitat to the maximum extent practicable. The Project has reduced tree clearing impacts in the WVNFS potentially suitable habitat from 31.9 acres (the August 2016 Project workspace boundaries) to the clearing of 517 trees within suitable habitat on NFS lands. Columbia would implement measures to minimize impacts on WVNFS as recommended in MNF's Land Resource Management Plan. This would include establishing nest boxes, which provide supplemental nesting sites in habitats with sub-optimal natural nest areas for winter (e.g., cavity trees), and prohibiting the aerial application of herbicides in suitable WVNFS habitat. In addition, because the Project would temporarily and permanently impact areas containing red spruce habitat, Columbia would mitigate for these losses by restoring an equivalent amount of red spruce elsewhere in the vicinity of the Project. Mitigation includes relocation of all saplings under 5 feet in height and planting of seedlings at a ratio of 1.5:1 to trees cleared. Columbia would monitor plantings and relocations for three years post-planting and coordinate results with the MNF to evaluate mitigation success. Additional details regarding WVNFS mitigation are provided in the BE and COMP.

The Project may impact individual WVNFS but is not likely to cause a trend towards federal listing or loss of viability.

Forest Roosting Bat Species

Tri-colored bat and little brown myotis are cave-hibernating RFSS bats that typically roost in trees during warmer months of the year, but are also known to roost in caves and human-made structures. Once common across the eastern United States, these species have been heavily impacted in recent years by the fungal disease White-Nose Syndrome, which affects these bats during hibernation. Columbia did not conduct presence/absence surveys for these species; however, based on documentations of these and multiple other bat species on the MNF, as well as the presence of known bat staging/swarming habitat within 5 miles and known bat hibernacula within 10 miles, presence of these species is assumed on all portions of the Project on NFS lands. These species can be impacted mainly by clearing of suitable roosting and foraging habitat during construction.

AMMs to be implemented by Columbia (including those associated with the MSHCP on covered lands and the MBCP on non-covered lands) for federal species such as Indiana bat, NLEB, and Virginia big-eared bat would also avoid and minimize impacts to these RFFS forest roosting bat species. Therefore, the Project may impact individuals but is not likely to cause a trend towards federal listing or loss of viability.

Rock Feature Species

In May 2016, Columbia conducted a habitat survey for rock features (including rock outcrops, talus slopes, rocky ledges, rock clusters, etc.) on NFS lands within the 300-foot-wide survey corridor centered on the Project centerline and within a 50 foot corridor centered on Project access road centerlines. Nine rock features were identified and assessed by a qualified mammologist and a qualified herpetologist for RFSS animal species suitability. Of those nine features, five had very low potential to support RFSS small mammals, three had low potential to support the eastern small-footed myotis, two had low potential to support green salamanders, and three had low potential to support timber rattlesnakes.

Surveys were conducted in July and August 2016 to determine presence or absence of rock-dependent RFSS small mammals such as the Allegheny woodrat, eastern spotted skunk, and southern rock vole using live traps and cameras. No RFSS small mammal species were encountered.

Three rock features identified as potentially suitable roost and maternity habitat for eastern small-footed myotis were surveyed in July 2016 using a combination of either emergence counts, mist netting, and/or acoustic monitoring. No bats were detected at two of the features; however, one unidentified bat emerged from a talus slope on the edge of the existing right-of-way. In the absence of any further information to the contrary, it is assumed that bat was an eastern small-footed myotis, even though only one eastern red bat (*Lasiurus borealis*) was captured in mist nets. Since only one bat emerged each night of the survey (during the peak maternity season), the habitat likely does not support a maternity colony. The associated rock feature with the emerged bat is not located within the Project limits of disturbance; therefore, no direct impacts are anticipated to any individuals that may be present. If construction occurs in summer, proximal noise or motion may indirectly influence temporary behavioral changes such as delayed emergence, alternative roost site selection, or modified foraging strategy.

The two rock features identified as potential suitable habitat for use by green salamander were surveyed in May 2016 by Dr. Thomas Pauley, who is a leading expert on the species. No green salamanders were documented during the surveys.

The three rock features identified as potentially suitable habitat for the timber rattlesnake were surveyed by a team led by Dr. Thomas Pauley. Multiple timber rattlesnakes were documented at a talus slope in May and June 2016; therefore, the site was determined to be occupied and suitable for gestation and denning. This talus slope is the same feature presumed to be occupied by the eastern small-footed myotis, which is about 25 feet outside the Project limits of disturbance. In order to minimize potential impacts to timber rattlesnakes, Columbia would implement specific AMMs related to habitat isolation. Also, no blasting activities would be authorized within 100 feet of suitable rattlesnake habitat. In conjunction with the MNF, qualified biologists would perform workspace inspections during construction activities to ensure the effectiveness of AMMs in preventing and abating impacts to the species. In addition, qualified biologists would monitor rattlesnakes before, during, and after construction (using methods such as pit tags, external transmitters, etc.) in order and to evaluate continued viability of the local population. Additional details regarding AMMs and monitoring for timber rattlesnakes can be found in the BE (appendix G) and COMP.

Based on the survey results and AMMs that would be implemented for all rock feature RFSS above, the Project may impact individuals but is not likely to cause a trend towards federal listing or loss of viability.

Additional details regarding surveys and AMMs related to each rock feature species are provided in the BE (appendix G).

Northern Goshawk

Northern goshawks are forest interior raptors that generally use dense forests with large trees and high canopy closure, but open understory for nesting. Nests in the MNF have generally occurred in hardwood and spruce-hardwood forest, but have also been found in mixed deciduous stands. Columbia did not conduct presence/absence surveys for these species; however, surveyors searched for stick nests as part of the habitat and wetland/waterbody surveys conducted for the Project in August through October 2015. In addition, biological survey teams conducting other species studies throughout 2016 opportunistically observed the Project study area for large stick nests that could be used by raptors and none were identified within a 300-foot-wide survey corridor centered on the Project centerline. Survey crews also documented any birds either observed or heard during their walkthroughs and no goshawks were noted. Although this species is most likely absent from the Project area, presence would be assumed within suitable habitat on NFS Lands. Columbia would perform conservation measures to avoid and minimize impacts to these species (see section 6.2.7.1 of the BE). If a goshawk or nest is observed in the right-of-way prior to or during construction, activities would be halted until the MNF is consulted to determine appropriate measures. Also, AMMs to be implemented by Columbia for species such as bald eagles and golden eagles would also avoid and minimize impacts to this species. Therefore, the Project may impact individuals but is not likely to cause a trend towards federal listing or loss of viability.

Aquatic Species

A visual stream quality evaluation and habitat assessment were performed at each of the streams crossed by the Project within the MNF to determine habitat suitability for the eastern hellbender, pearl dace, and Cheat minnow. Based on the visual evaluation of stream quality, 5 of the 23 streams crossed by Project possess characteristics of streams that may be used by the eastern hellbender, 14 streams possess characteristics that may be used by pearl dace, and 9 streams possess characteristics that may be used by the Cheat minnow. There are no known locations of eastern hellbender, pearl dace, or Cheat minnow within the Project area. However, suitable habitat may exist within streams crossed by the Project. Suitable habitat for eastern hellbenders may occur in larger streams such as Gandy Creek, and Laurel Fork; suitable habitat for pearl dace may occur within Gandy Creek and some tributaries, and suitable habitat for the Cheat minnow may occur within the Cheat River system, a watershed that includes headwaters and tributaries such as Glady Fork, Daniels Creek, Laurel Fork, Mud Run, and Bennett Run that eventually discharge into the Cheat River.

Species surveys were not conducted to verify presence/probable absence of aquatic RFSS; therefore, suitable habitat was considered occupied. Because in-stream construction may have direct and indirect effects on individuals, Columbia would implement measures to minimize impacts to eastern hellbenders, pearl dace, and cheat minnows. During construction, Columbia would cross waterbodies using dry crossing techniques and implement the E&CS Plans which includes measures to minimize erosion and sedimentation, constrain the duration of construction in streams, and restore stream and riparian habitat following installation of the pipeline and other disturbance within these areas. Additional measures would be used to address concerns and minimize potential indirect effects to aquatic resources from activities proposed in locations upslope from streams and riparian areas. These combined efforts would minimize potential impacts on waterbodies and aquatic biota including RFSS. Columbia would continue to coordinate with MNF staff regarding these and other measures to avoid and minimize impacts on aquatic RFSSs. Therefore, the Project may impact aquatic RFSS individuals but is not likely to cause a trend towards federal listing or loss of viability of the species.

Virginia

The Virginia ESA Act (29.1-563 - 29.1-570) designates VDGIF as the state agency with jurisdiction over state-listed endangered or threatened fish and wildlife. The act authorizes the Board of the VDGIF to adopt the federal list of endangered and threatened species and to identify and protect state-listed wildlife. This act prohibits by regulation the taking, transportation, processing, sale, or offer for sale of those species.

Under the Endangered Plant and Insect Species Act (Virginia Regulations 325-01 et seq.), the taking or possession of endangered or threatened plant and insect species is prohibited. The VDCR represents the Virginia Department of Agriculture and Consumer Services, which is responsible for providing comments regarding potential effects on state-listed plant and insect species.

The VDCR NHP provided comments for potential occurrences of natural heritage resources within or near the Project. Specifically, VDCR identified one Stream Conservation Unit and two conservation sites within two miles of the Project that support natural heritage resources. One state-listed species, the green floater (*Lasmigona subviridis*), was recognized as associated with the SCU. The VDGIF also provided comments on the Project and identified the potential for wood turtle (*Glyptemys insculpta*), brook floater (*Alismodonta varicosa*), and green floater near the proposed Virginia facilities.

Wood Turtle

The VDGIF identified the state-listed threatened wood turtle as occurring in or near Cedar Creek and Meadow Brook, which are in proximity to the Strasburg Compressor Station and Dysart Valve Site in Shenandoah County, and in or near Cub Run, which is in proximity to Line VA-1 in Fairfax County, Virginia (VDGIF, 2015b).

The wood turtle is typically found in fields, floodplains, farmland, and wet meadows near a body of water (VDGIF, 2015b). This species has become threatened because of loss of wetlands, urbanization, and fragmentation of wooded habitats. No in-stream work would occur in Cedar Creek, Meadow Brook, or Cub Run. The proposed work at the Strasburg Compressor Station or the Dysart Valve Site in Shenandoah County, Virginia would be in proximity to Cedar Creek and Meadow Brook. Time-of-year restrictions for wood turtle are applicable within 900 feet of streams listed as potential habitat, and there are no streams within this distance of the Dysart Valve Site or the Strasburg Compressor Station. The work on Line VA-1 would be about 0.2-mile at a minimum from Cub Run, although the pipeline would cross a perennial unnamed tributary of Cub Run using the dam and pump or flume dry-ditch construction method. Columbia's avoidance of direct impacts on and the distance or work activities from Cedar Creek, Meadow Brook, and Cub Run would minimize the potential for impacts on the wood turtle. To further minimize any potential inadvertent impacts on streams, Columbia would implement its ECSs and would implement the measures provided in the conservation guidance listings concerning time-of-year restrictions, which is in accordance with the Virginia Erosion and Sediment Control Law and Regulations. As such, potential impacts on the wood turtle and associated habitat would be minimized. VADEQ stated in its October 7, 2016 FCC that VDCR recommends coordination between Columbia and VDGIF to ensure compliance with the Virginia ESA. Consultation is ongoing between Columbia and the VDGIF regarding this species, and Columbia would implement the measures provided in the conservation guidance listings concerning time of year restrictions.

Brook Floater

The VDGIF identified known occurrence of the state-listed threatened brook floater associated with the North Fork Shenandoah River near the Strasburg Compressor Station in Shenandoah County (FWS, 2015f and VDGIF, 2015c[27]).

The brook floater is a mussel found in constantly flowing water, from small tributaries to large rivers. Their populations have decreased substantially because of stream fragmentation, pollution, degradation of riparian vegetation, silt, and introduction of the invasive Asian clam (FWS, 2015f). No in-stream work would occur in North Fork Shenandoah River or associated tributaries and the river is over 1.5 miles from the Strasburg Compressor Station. The distance of the proposed work from the river and Columbia's implementation of the conservation measures in its ECSs would minimize the potential for any impacts on the brook floater. Coordination is ongoing between Columbia and VDGIF regarding any additional conservation measures that may be recommended.

Green Floater

The VDCR and VDGIF identified the state-listed threatened green floater as occurring in the Little River SCU, near the Loudoun Compressor Station. The VDGIF also identified the green floater in Goose Creek (VDGIF, 2015c).

The green floater is found in slow-moving streams and small rivers with pools and eddies, with fine gravel and sand bottoms. This species does not tolerate flooding or drought condition and only survives in good water quality conditions. The Little River Stream Conservation Unit and Goose Creek would not be directly impacted by construction and both waterbodies are over one-mile from the Loudoun Compressor Station site. The distance of the proposed work from these waterbodies and Columbia's implementation of its ECSs would minimize the potential for any impacts on the green floater. Coordination is ongoing between Columbia and VDGIF regarding any additional conservation measures that may be recommended.

4.3 State-Listed and Forest Service Sensitive Species - Flora

As stated in section B.4.2, West Virginia does not have a state-listed species program, but instead relies on the FWS list of federally listed threatened and endangered species. However, the WVDNR NHP does assign state rankings to rare species based on occurrences and distributions (WVDNR, 2003). Columbia requested and received information from the WVDNR

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[27] This can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20150820-5134 in the "Numbers: Accession Number" field

NHP regarding the locations of state-ranked rare species and federally listed threatened and endangered species within 10 miles of the Project.

The botanical surveys completed in August and September 2015 included all federally listed threatened and endangered species for flora and did not identify any threatened or endangered species. Several areas of potential habitat were identified for all of the species but it was reported to be limited. Field surveys for TES species were completed in all project areas identified as high likelihood of potential habitat. Specific limiting conditions and individual plant survey descriptions are referenced in section 6.3.1 of the BE (appendix G).

MNF also provided a list of species to be surveyed in the MNF known as the RFSS. This list includes plants for which population viability is a concern. Plant species on the RFSS list that are predicted as likely to occur in the Project area are included in the Botanical Survey for threatened and endangered species and RFSS plant species as noted in section 6.3.1 of the BE. The list includes 44 herbaceous species and 8 trees and shrubs. Additionally, six ferns, two vines, and one moss species is on the RFSS list.

Columbia's ongoing consultation with MNF staff also specifically identified the following botanical RFSS that may potentially be within the Project area:

- White alumroot (*Heuchera alba*); and
- Silvery nailwort (*Paronychia argyrocoma*).

Botanical surveys for USFS Sensitive Species confirmed and identified the following four species of RFSS plants within the study corridor during the 2015 surveys. Positively identified species are:

- White alumroot (*Heuchera alba*);
- Silvery nailwort (*Paronychia argyrocoma*);
- Allegheny Onion (*Allium allegheniense*); and
- Butternut (*Juglans cinera*).

Further discussion regarding impacts on these species is provided in the USFS BE, which examines potential impacts and mitigation proposed to minimize impacts on RFSS, Rare, Threatened, and Endangered Species, and BCC (see appendix G).

A determination for RFSS plants impacts included avoiding impacts as well as minimization of impacts.

The Project may impact a limited amount of suitable habitat for these RFSS plants and may affect individual RFSS plants. Based on the results of the 2015 and 2016 surveys, no FWS-listed plant populations were identified, while four RFSS plants populations were identified during the 2015 field surveys. One population of Allegheny onion, one population of white alumroot, and one population of silvery nailwort was identified within the proposed Project area along Line WB in Pendleton County, West Virginia. Four individuals of butternut were identified within the proposed Project area along Line WB in Pendleton County, West Virginia and PAR-27A in Randolph County, West Virginia.

Though Columbia has modified the Project workspace to minimize impacts of all RFSS plant populations identified within the Project workspace, about 0.55-acre of direct impact due to surface grading and vegetation removal are expected to Allegheny onion, white alumroot and silvery nailwort populations. All four individuals of butternut are located outside the Project workspace or along existing access roads and no impacts are anticipated for this species.

Allegheny onion has an estimated total population area of 4.83 acres of which 0.29 acres (six percent) would be directly impacted. Because there are 18 previously known occurrences of this species elsewhere in the MNF and the populations located within the project area is extensive, long-term viability of this species appears to be established. The project is unable to avoid these limited areas because of needed workspaces and need to create level working conditions on steep slopes. The plant populations extend outside of the Project areas, therefore construction is not expected to diminish the continued existence of these plant populations. Some minimization measures are achieved by limiting temporary workspaces to a 10-foot swath on the south side of the long-term right-of-way. In addition, Columbia would identify Allegheny onion individuals within the previously identified population areas prior to construction, and relocate individual plants to the extent feasible. During relocation activities, Columbia would also collect seeds, if present, from the relocated individuals and distribute it in nearby areas determined to be favorable habitat.

White alumroot has an estimated total population area of 3.36 acres, of which 0.12-acre (four percent) would be directly impacted. There are 25 known occurrences of this species elsewhere in the MNF. The project is unable to avoid these limited areas because of needed workspaces and steep slopes. The plant populations extend outside of the Project areas, therefore construction is not expected to diminish the continued existence of these plant populations. Some minimization measures are achieved by limiting temporary workspaces to a 10-foot swath on the south side of the long-term right-of-way. In addition, Columbia would identify white alumroot individuals within the previously identified population areas prior to construction, and relocate individual plants to the extent feasible. During relocation activities, Columbia would also collect seeds, if present, from the relocated individuals and distribute it in nearby areas determined to be favorable habitat. Populations are stable, and because they extend outside of the Project area, the overall viability is not expected to diminish the continued existence of this species. Additionally, the botanical studies reported that a sizable portion of the population grew within the existing disturbed ground of the existing pipeline corridor, thus indicating that further disturbances aren’t likely to lessen its ability to establish in similar conditions.

Silvery nailwort has an estimated total population area of 0.24 acres of which 0.22 acres (92 percent) is directly impacted. There are 30 known occurrences of this species elsewhere in the MNF. Although a high percentage of the populations are being impacted, some of the individual species are located outside of the long-term right-of-way. Avoidance is unavoidable based on the needed workspaces and long-term right-of-way. Columbia would identify Silvery nailwort individuals within the previously identified population areas prior to construction, and relocate individual plants to the extent feasible. During relocation activities, Columbia would also collect seeds, if present, from the relocated individuals and distribute it in nearby areas determined to be favorable habitat. Populations are stable and because they extend outside of the Project area the overall viability is not expected to diminish the continued existence of this species. Additionally, the botanical studies noted that some of the population was located within dry sandy soils in areas of man-made and maintained habitats within the existing right-of-way, thus indicating that continued disturbances aren’t likely to lessen its ability to establish in similar conditions.

Based on Allegheny onion, white alumroot and silvery nailwort populations extending well beyond the Project workspace (about 7.58 acres), extensive suitable habitat found along the Project area and additional populations (about 73) of each are found throughout the MNF, it is expected that Project construction activities would not have a direct effect on the existence of these RFSS individuals within the MNF.

Indirect impacts for the four RFSS plant populations adjacent to the Project workspace have the potential to occur due to increased element exposure or possible introduction of NNIS as a result of Project construction activities. This is based on the fact each identified RFSS species habitat preference consists of exposed sites.

For the three of the four RFSS plants found within the workspace, the proposed project may impact individuals but is not likely to cause a trend towards federal listing or loss of viability. For the fourth, the proposed project has been determined to have no impact. For all RFSS plants determined to have potential habitat within the workspace but for which individuals were not found, the proposed project may impact individuals but is not likely to cause a trend towards federal listing or loss of viability. Columbia's coordination with the MNF regarding avoidance measures for these species is ongoing and may include transplanting and minor route variations.

4.4 Management Indicator Species

Management Indicator Species are "plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (USFS, 2015c).

Each national forest is required by the National Forest Management Act to identify MIS in their LRMP that represent fish and wildlife habitats to be maintained and improved. The role of MIS and the criteria to select MIS are described in 36 Code of Federal Regulations 219.19 (a) (1) and USFS Manual 2600 (1982 Rule).

MIS provide a means of monitoring and evaluating the effects of actions on biotic resources, including specific species, communities, habitats, and interrelationships among organisms. MIS represent overall objectives for wildlife, fish, and plants, may include species, groups of species with similar habitat relationships, or habitats that are of high concern (USFS, 2015c). These species are selected because their population changes are believed to indicate the effects of management activities.

There are four MIS listed for MNF:

- Wild brook trout (*Salvelinus fontinalis*),
- Wild turkey (*Meleagris gallapavo*),
- Cerulean warbler (*Dendroica cerulean*), and
- West Virginia northern flying squirrel, discussed in section B.4.2.

<u>Wild Brook Trout (*Salvelinus Fontinalus*)</u>

Brook trout are the only trout native to West Virginia streams. Brook trout are characterized by a dark green dorsum covered with lighter worm-shaped markings, bluish sides and a pink to scarlet belly. The sides are profusely sprinkled with yellow spots, interspersed with red ones. The lower fins are orange-red with a distinctive white stripe on the front edge (WVDNR, 2003). Adult brook trout typically range from 6 to 13 inches in total length with exceptional individuals in large stream habitats approaching 16 inches. Brook trout tend to grow larger in larger bodies of water (National Park Service, 2015).

Wild brook trout populations are typically associated with moderate gradient, rocky mountain stream habitats that have permanent cool or coldwater spring sources. Brook trout populations are generally most successful in perennial streams with water temperatures less than 20 degrees Celsius (°C). Hatchlings suffer high mortality rates in waters with sustained temperatures of 20°C and above; however, adults can tolerate temperatures up to about 25°C. Closed canopy forest cover is a key common denominator for the persistent long-term success of most brook trout populations within stream habitats (National Park Service, 2015).

Brook trout spawn primarily during October. Their nests, called redds, are built near the lower end of the pools where the gravel is swept clean of silt and fresh oxygenated water is abundant. Since these streams are generally low and clear during the fall, spawning activity can be readily observed in many of the small, cold headwater streams of the Elk, Greenbrier, and Williams rivers, as well as Seneca and Gandy creeks (WVDNR, 2003).

Brook trout serve as indicators of the health of the watersheds they inhabit. Strong wild brook trout populations demonstrate that a stream or river ecosystem is healthy and that water quality is excellent. A decline in brook trout populations can serve as an early warning that the health of an entire system is at risk (Whitewater to Bluewater Partnership, 2015).

The reason for selection of the brook trout as a MIS was that it is a high interest game fish whose population changes reflect an integration of impacts to water quality and stream conditions across aquatic ecosystems influenced by management on NFS lands (USFS, 2011). The Forest has a management objective to maintain at least 560 miles of coldwater stream habitat capable of supporting wild, naturally producing brook trout. MNF is also developing an aquatic monitoring strategy that would include brook trout.

A visual stream quality evaluation and habitat assessment were performed at each of the streams crossed by the Project within MNF. Based on a visual evaluation of stream quality, all of the intermittent and perennial streams crossed by Project within MNF lands possess characteristics of streams that may be used by wild brook trout. A Water Quality Report for Stream Crossings within the MNF is provided in the BE (appendix G).

There are known locations of naturally producing wild brook trout within the Project area (WVCSR, 2014); therefore, the Project could impact local populations of the species.

Direct Effects on Individuals: Tree removal near waterbodies could result in temporary and permanent canopy loss within the construction work area. Loss of trees could result in water temperature increases within the waterbody. In-stream construction impacts to individual brook trout may include temporary displacement, injury, death, or entrapment in intake hoses. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. The surrounding soils are highly erodible and somewhat to extremely acidic. Removal of vegetation and in-stream work at crossings could cause an increase in turbidity, sedimentation, and other changes in water quality that could result in degradation of nesting habitat, suffocation of individuals, or unsuitable water chemistry. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: The surrounding soils are highly erodible and somewhat to extremely acidic. Erosion and sedimentation from failed erosion and sedimentation control measures from upland earth disturbance of the Project or failed stream bank restoration could result in impacts on the brook trout. Erosion and sedimentation could result in an increase in turbidity, substrate embeddedness, and other changes in water quality in streams, which could have an impact on local populations of brook trout downstream or downslope of any earth disturbance and could result in degradation of nesting habitat, suffocation of individuals, or unsuitable water chemistry.

Cumulative Effects Analysis: A list of existing and proposed projects evaluated for potential cumulative impacts in conjunction with the WB Xpress Project is provided in table B.10-2. There are several pipeline and construction projects within the same sub-watershed as the WB Xpress project. Time and space crowding due to multiple sequential projects in the Project area could increase the possibility of accumulation of direct and indirect effects on the river and streams such as increases in sedimentation, turbidity, and acidity. It is assumed that the other projects would implement similar erosion and sediment control measures, which would minimize any cumulative effects on local populations of brook trout.

Conservation Measures: To avoid and minimize potential impacts to the wild brook trout, Columbia would implement the following measures:

- Minimize impacts to wetland and riparian habitat by using existing right-of-way to the greatest extent possible.
- Reseed wetlands and riparian areas with a native species mix as identified in Columbia's Restoration Plan.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan attached as part of the Construction, Operation, and Maintenance Plan.
- Construct stream crossings according to site-specific waterbody crossing plans for waterbody crossings that occur on MNF land and would construct stream crossings outside the MNF following state approved crossing methods.
- Conduct pre-construction water quality testing for turbidity and pH, as well as rapid visual habitat assessment for upstream and downstream of perennial waterbody crossings to determine a baseline with which to compare water quality post-construction. Following construction, water quality would be re-evaluated within one year following construction to determine if conditions post construction have returned to normal.
- Comply with WVDNR timing restrictions for in-stream work in trout (coldwater) streams and would not conduct in-stream work between September 15 and March 31 unless a site-specific waiver is obtained from WVDNR. With the exception of installation or removal of equipment bridges that do not have in-stream supports, Columbia would conduct in-stream work in trout streams after June 1 to the maximum extent possible, but Columbia reserves the right to further consult with MNF fisheries biologists to waive this limitation, if needed, on a case-by-case basis.

- Maintain reduced workspace areas near waterbodies.
- Locate ATWS at least 50 feet back from ephemeral and small intermittent (drainage <50 acres) waterbody boundaries and at least 100 feet back from perennial and large intermittent (drainage >50 acres) waterbody boundaries.
- Place spoil piles at least 10 feet from the stream banks and immediately protected with erosion and sediment controls to reduce the potential for sedimentation into the waterbody.
- Require temporary erosion and sediment control measures to be installed across the construction right-of-way as necessary to prevent the flow of spoil or heavily silt-laden water into any waterbody.
- Maintain adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses.
- Design and maintain equipment bridges to prevent soil from entering the waterbody. Equipment bridges would be removed once access to the area is no longer required.
- With the exception of ephemeral waterbodies with no perceivable flow, install the pipeline using a dry crossing method (e.g., flume or dam and pump). Each stream crossing with perceptible flow at the time of crossing would be treated as a separate construction entity such that trenching, pipe installation, backfilling, and temporary stabilization or final restoration are completed in a minimum number of calendar days possible.
- For smaller streams equal to or less than five feet wide, attempt to complete trenching and backfilling within 24 to 48 hours barring unforeseen circumstances such as extensive removal of rock to achieve the required pipe depth or other field constraints. For larger streams (streams greater than five feet in width), attempt to complete trenching and backfilling within five days, unless site-specific field constraints such as rock make this infeasible.
- Limit temporary construction-related impacts associated with the dry crossing method to short periods of increased turbidity before installation of the pipeline, during the installation of the upstream and downstream dams, and following installation of the pipeline when the dams are pulled and flow across the restored work area is re-established. Conduct streambed and bank stabilization before returning flow to the waterbody channel.
- Use screens on water pump intake hoses at dam and pump waterbody crossings to minimize the potential for fish entrainment.
- Implement a SPCC Plan during construction activities to mitigate potential adverse impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids. Specific measures in the SPCC include requirements to:
    - store bulk quantities of diesel fuel and gasoline in a designated fuel depot;
    - install adequate spill containment measures, such as containment dikes, combined with impervious lining before fuel storage tanks are filled;

- keep sorbent booms and clean-up kits at all storage locations;
- locate fuel storage areas at least 100 feet from streams, ponds, or wetlands, and at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Columbia property;
- not locate fuel storage areas within designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority);
- service, lubricate, and refuel equipment in accordance with requirements laid out in the SPCC plan (COMP Attachment A) whenever possible, and if not possible conduct these activities in accordance with a supplemental SPCC plan prepared by Columbia's EIs, prepare based on field conditions;
- place impervious or sorbent materials under the work area before conducting vehicle maintenance;
- collect waste materials created during maintenance (e.g., used oil) for proper disposal;
- inspect the work site and the vehicle after the maintenance work is complete to ensure that all hazardous materials are properly contained and collected for proper disposal; and
- equip each construction crew with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.

- Following construction, restore and seed the bed and banks. Specific measures include backfilling the trench with native material. If present, include native cobbles in the upper one foot of trench backfill in waterbodies that contain coldwater fisheries. Where required by the MNF, streambed restoration would also include the replacement of stones on the surface of the bed similar to what was there prior to construction to create turbulence and riffles that would enhance the habitat value, as applicable. Columbia would return waterbody banks to pre-construction contours or to a stable angle of repose as approved by the EI.
- Install biodegradable erosion control fabric or a functional equivalent on waterbody banks at the time of final bank re-contouring. Synthetic monofilament would not be used on waterbody banks as an erosion prevention measure. Columbia does not anticipate using rip-rap for bank stabilization. If any rip-rap is deemed necessary at the time of construction, Columbia would comply with appropriate permit terms and conditions regarding its application.

<u>Wild Turkey (Meleagris Gallapavo)</u>

Wild turkey are very large, plump birds with long legs, wide, rounded tails, and a small head on a long, slim neck. They are dark overall with a bronze-green iridescence to most of their plumage. Their wings are dark, boldly barred with white. Their rump and tail feathers are broadly tipped with rusty or white coloring. The bare skin of the head and neck varies from red to blue to gray (Cornell Lab of Ornithology, 2015).

This species has an extremely large range, the population trend appears to be increasing, and the population size is extremely large. It does not meet thresholds to be considered vulnerable on the IUCN Red List of Threatened Species (BirdLife International, 2015).

Wild turkey live in mature forests, particularly nut trees such as oak, hickory, or beech, interspersed with edges and fields. They may also be seen along roads and in wooded backyards. After being hunted out of large parts of their range, turkeys were reintroduced and are numerous once again (Cornell Lab of Ornithology, 2015).

The reason for selection of the wild turkey as a MIS was that it is a high interest game species that is strongly associated with oak mast. It also requires herbaceous openings for brood range and is expected to reflect the effectiveness of the cooperative Forest-WVDNR wildlife opening management effort. The Forest has a management objective to maintain at least 150,000 acres of 50 to 150 year old oak and pine-oak forest to meet habitat needs for wild turkey. MNF is using ongoing harvest data collected by WVDNR to provide a Forest-wide population index (USFS, 2011).

Suitable habitat may exist within forested habitats, open land, and existing rights-of-way with the Project area. Individuals were observed within the MNF along the survey route during biological surveys conducted in June through October 2015.

<u>Direct Effects on Individuals:</u> Construction noise and activity could temporarily impact wild turkey behavior within the immediate vicinity, causing stress or temporary displacement. Since it is a ground nesting species, it is possible that ground disturbance during construction could impact a hidden nest.

<u>Indirect Effects on Individuals:</u> Permanent maintenance of the right-of-way could benefit this species. Columbia would reseed areas after construction and mow the right-of-way once every three years. Mowing and vegetation removal would be conducted from August 15 through April 15. Mechanical methods would be used, as much as possible, to limit herbicide applications. Long term maintenance of the right of way could provide nesting and foraging habitat for this species.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the wild turkey, Columbia would implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Conduct pre-construction walkthroughs of ground disturbance areas to verify that no nests would be disturbed by clearing activities.
- Maintain and mow permanent right-of-way every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing would not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.
- Reseed the right-of-way with a native species mix that would encourage the use wild turkey, which is known to forage and nest in meadow/open field habitats such as those that would be created within the right-of-way.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan included as attachment E of the COMP.
- Per the requirements of the MSHCP restrictions for bats, no tree clearing would occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15, no tree clearing would occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way would be cleared.

Cerulean Warbler (*Dendroica cerulean*)

The cerulean warbler is the smallest warbler in the genus *Dendroica*, measuring 4.5 inches in length. It has a short tail and relatively long wings for a warbler of its size. In breeding plumage, the male cerulean warbler has bright blue upper parts streaked with black, a white underside, and a thin black "necklace" around its neck. The female is much duller than the male with a dull blue to greenish head and back and a dull white to dull yellow underside. The female also lacks the distinctive black "necklace" of the male (WVDNR, 2003).

The cerulean warbler is a neotropical migrant warbler that breeds in eastern North America and winters in South America (Wood et al, 2013). In West Virginia this species occurs mainly west of the Allegheny Mountains with the highest numbers inhabiting the southwestern portions of the state. It occurs less frequently in the Eastern Panhandle and it is uncommon within the Allegheny Mountains (WVDNR, 2003).

Cerulean warblers require heavily forested landscapes for nesting, and within Appalachian forests, primarily occur on ridge tops and steep, upper slopes. They are generally associated with oak-dominated stands that contain gaps in the forest canopy, that have large diameter trees (>16 inches diameter breast height) and that have well-developed understory and upper-canopy layers. They primarily use the mid and upper-canopy where they glean insects from the surface of leaves and conceal their open cup nests (Wood et al, 2013).

Because they are severely declining across much of their range, habitat management is a high priority. Management for this species can also improve conditions for a number of other wildlife species that depend on the same structure (Wood et al, 2013). The reason for selection of the cerulean warbler as a MIS was that it is a high interest non-game species that is associated with large trees, gaps, and complex canopy layering characteristic of old-growth forests. It is also a forest interior species that is sensitive to fragmentation (USFS, 2011). The Forest has a management objective to maintain at least 50,000 acres of mid-late and late successional (>80 years old) mixed mesophytic and cove forest to meet habitat needs for cerulean warbler. MNF, in cooperation with WVDNR, is part of an ongoing songbird point count monitoring program that is expected to provide Forest-wide data on this species (USFS, 2011).

No cerulean warblers were identified during biological surveys conducted in June through October 2015.

Direct Impacts on Individuals: During construction, associated noise and activity could disturb cerulean warblers within the vicinity of the Project area. These direct impacts would be temporary and only occur during the construction phase.

Indirect Impacts on Individuals: The Project would permanently convert forested habitat to open habitat. This new open habitat could provide suitable open areas for foraging.

Conservation Measures: To avoid and minimize potential impacts to the cerulean warbler, Columbia would implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible. Minimization of forest clearing is detailed in the conservation measures for CMS and WVNFS of the BE (appendix G) section 6.1.2.2 and section 6.2.1, respectively.
- If tree clearing would occur in cerulean warbler nesting season, conduct a pre-construction walkthrough to verify that no nests would be disturbed by clearing activities. If a cerulean warbler nest is identified within the Project area, the nesting tree would not be removed until chicks have fledged the nest, in accordance with the MBTA.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan included as attachment E of the COMP.
- Per the requirements of the MSHCP restrictions for bats, no tree clearing would occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing would occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way would be cleared.

West Virginia Northern Flying Squirrel

Because the WVNFS is also a RFSS, background information on the WVNFS as well as information regarding the presence of suitable habitat and AMMs are discussed in section 6.2.1 of the BE (appendix G).

The reason for selection of the WVNFS as a MIS was that it is a high-interest protected species which is associated with spruce-northern hardwood forests with certain late successional characteristics, such as snags and coarse woody debris, canopy gaps, moist microclimate, and the presence of truffles (hypogeous-ectomycorrhizal fungi). It is also a forest interior species that is sensitive to fragmentation (USFS, 2011). The Forest has a management objective to maintain at least 20,000 acres of mid-late and late successional (>80 years old) spruce forest, with a long-term objective of increasing this to at least 40,000 acres to provide optimum habitat for WVNFS. MNF is engaged in a long-term, Forest-wide monitoring program in cooperation with WVDNR and FWS for this species.

5.0 LAND USE AND VISUAL RESOURCES

5.1 Land Use

Construction of the Project would disturb about 602.7 acres of land, including 368.9 acres for the pipeline right-of-way, 41.9 acres for access roads, 49.5 acres for staging/contractor yards, and 142.0 acres for aboveground facilities. Following construction, about 282.5 acres would be retained for operation of the Project, including 170.8 acres for the permanent pipeline right-of-way, 10.3 acres for permanent access roads, and 100.0 acres for aboveground facilities. Table B.5.1-1 summarizes the acres of each land use type that would be affected by construction and operation of the Project facilities. Within the MNF construction of the Project would disturb about 143.2 acres of land, including 128.8 acres for pipeline right-of-way, and 14.4 acres for access roads. Following construction about 71.5 acres would be retained for operation of the Project, including 68.9 acres for permanent right-of-way and 2.6 acres of permanent access roads. Table B.5.1-2 summarizes the acres of each land use type that would be affected by construction and operation of the Project facilities within the MNF.

TABLE B.5.1-1

Summary of Existing Land Uses Affected by Construction and Operation for the WB XPress Project (acres) [a, b ,c, d]

Project/Facility Type/Facility	Agriculture		Residential		Open Land		Open Water		Upland/Forest		Wetland		Industrial		Total	
	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.
New Pipeline Facilities																
Line WB-5 Extension	0.0	0.0	0.0	0.0	1.0	1.0	<0.1	<0.1	1.4	0.4	0.0	0.0	<0.1	<0.1	2.5	1.5
Line WB-22	0.0	0.0	0.0	0.0	4.1	3.5	0.1	<0.1	1.6	<0.1	0.0	0.0	<0.1	0.0	5.7	3.6
Line VA-1 with HDD	0.0	0.0	0.0	0.0	8.3	3.4	0.1	<0.1	<0.1	0.0	0.8	0.3	0.0	0.0	9.3	3.8
Replacement Pipeline Facilities																
Line WB-5 Replacement	0.6	0.3	0.0	0.0	1.6	1.2	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.5
Line WB Replacement	79.4	12.6	0.0	0.0	192.3	117.4	1.2	0.7	61.5	22.0	6.0	3.7	3.1	<0.1	343.4	156.4
Line WB Replacements #1	0.0	0.0	0.0	0.0	1.0	0.8	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.1	0.9
#2	0.0	0.0	0.0	0.0	1.4	1.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.5	1.0
#3	0.5	0.3	0.0	0.0	0.3	0.3	0.0	0.0	<0.1	0.0	0.1	<0.1	0.0	0.0	0.9	0.6
#4	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.6	0.2	0.0	0.0	0.0	0.0	1.4	1.0
#5	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.9	0.6
Pipeline Facility TOTAL	**80.5**	**13.1**	**0.0**	**0.0**	**211.2**	**130.0**	**1.3**	**0.8**	**65.9**	**22.8**	**6.9**	**4.0**	**3.2**	**<0.1**	**368.9**	**170.8**
Temporary Access Roads	0.4	0.0	0.0	0.0	0.1	0.0	0.1	0.0	<0.1	0.0	<0.1	0.0	31.0	0.0	31.6	0.0
Permanent Access Roads	0.0	0.0	0.0	0.0	1.0	1.0	<0.1	<0.1	0.2	0.2	0.1	0.1	9.0	9.0	10.3	10.3
Subtotal	**0.4**	**0.0**	**0.0**	**0.0**	**1.1**	**1.0**	**0.1**	**<0.1**	**0.2**	**0.2**	**0.1**	**0.1**	**40.0**	**9.0**	**41.9**	**10.3**
New Aboveground Facilities																
Elk River Compressor Station	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	6.5	6.5	7.3	7.3
Line WB-22 Receiver Site	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.3	1.3
Line WB-5 Valve Site	0.1	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
Chantilly Compressor Station	0.0	0.0	0.0	0.0	1.0	1.0	<0.1	<0.1	12.1	12.1	0.1	0.1	0.0	0.0	13.2	13.2
Line VA-1 Receiver Site	0.0	0.0	0.0	0.0	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1
Subtotal	**0.1**	**0.0**	**0.0**	**0.0**	**2.5**	**2.3**	**<0.1**	**<0.1**	**12.1**	**12.1**	**0.1**	**0.1**	**7.5**	**7.5**	**22.2**	**21.9**
Existing Aboveground Facilities																
Panther Mountain Regulator Station	0.0	0.0	0.0	0.0	<0.1	<0.1	0.0	0.0	<0.1	<0.1	0.0	0.0	1.3	1.3	1.3	1.3
Dink Valve Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.6	0.4
Frametown Compressor Station	0.0	0.0	0.0	0.0	0.8	0.8	0.1	0.1	0.0	0.0	0.0	0.0	8.6	6.4	9.5	7.3
Cleveland Compressor Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	13.1	15.7	13.1
Mill Creek Valve Site	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1
Files Creek Compressor Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	<0.1	0.0	0.0	13.9	8.0	14.5	8.1
Glady Valve Site	0.2	<0.1	0.0	0.0	0.7	0.3	<0.1	<0.1	0.4	0.4	0.9	0.2	0.7	0.7	2.9	1.6
Whitmer Valve Site	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Seneca Compressor Station	0.0	0.0	0.0	0.0	0.6	0.6	0.1	<0.1	2.9	0.3	0.0	0.0	13.2	9.1	16.8	10.1
WB Loop Receiver	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.3	0.3	0.4	0.3
Smokehole Valve Site	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.2	<0.1	0.0	0.0	<0.1	0.0	0.8	0.1

TABLE B.5.1-1 (Continued)																
	Agriculture		Residential		Open Land		Open Water		Upland/Forest		Wetland		Industrial		Total	
Project/Facility Type/Facility	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.
Existing Aboveground Facilities (Continued)																
Moorefield Valve Site	0.3	<0.1	0.0	0.0	0.7	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	<0.1
Lost River Compressor Station	0.0	0.0	0.0	0.0	1.3	<0.1	0.0	0.0	<0.1	<0.1	0.0	0.0	18.3	13.1	19.7	13.1
Columbia Furnace Valve Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.7	0.1
Dysart Valve Site	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
Strasburg Compressor Station	0.0	0.0	0.0	0.0	1.6	<0.1	0.0	0.0	3.4	1.9	0.0	0.0	12.7	7.8	17.7	9.7
Nineveh Meter Station	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.3	1.9	1.8
Shenandoah River West Valve Site	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	0.0	0.0	0.2	<0.1	0.3	0.1
Loudoun Compressor Station	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	5.0	3.9	<0.1	0.0	9.2	5.8	14.3	9.7
Subtotal	**1.5**	**1.0**	**0.0**	**0.0**	**7.5**	**2.6**	**0.1**	**0.1**	**12.7**	**6.5**	**0.9**	**0.2**	**97.0**	**67.6**	**119.8**	**78.1**
Contractor Yards																
White Contractor Yard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	5.2	0.0
HWY 48 Contractor Yard	0.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0
CPG Elkins Contractor Yard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	6.9	0.0
UPS Contractor Yard	0.0	0.0	0.0	0.0	11.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	11.5	0.0
Seneca Contractor Yard	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	0.0
Subtotal	**0.0**	**0.0**	**0.0**	**0.0**	**37.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**0.0**	**12.2**	**0.0**	**49.5**	**0.0**
Project TOTAL	**82.4**	**14.1**	**0.0**	**0.0**	**259.5**	**137.0**	**1.6**	**0.9**	**91.1**	**41.9**	**8.3**	**4.4**	**159.8**	**84.2**	**602.7**	**282.5**

[a] Estimate based on the typical ROW configurations for each pipeline as described in section A.5.

[b] 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.

[c] Agricultural land includes actively cultivated cropland, hay meadows, and pasture land. Residential land includes mowed and landscaped areas near residential housing. Open land includes non-forested, non-agricultural, non-residential, and non-industrial lands. Open water includes lakes, rivers, streams, ponds, and stormwater retention areas. Upland forest include evergreen, deciduous, and mixed evergreen/deciduous forests and woodlands. Wetlands include emergent, scrub-shrub and forested wetlands. Rights-of-way include existing utility corridors; Industrial lands include lands associated with existing natural gas facilities.

[d] The construction and operational impacts associated with the Line WB Replacement were adjusted to incorporate reductions in ATWS at Whitmer Valve Site (MP 7.9) and Seneca Creek waterbody crossing (MP 18.7) described in the March 29, 2016 Data Request. Acreage changes also incorporate a conversion of TWS to permanent workspace associated with the workspace shift between MP 14.8 and MP 15.8 due to CMS habitat.

TABLE B.5.1-2

Summary of Existing Land Uses Affected within the MNF by Construction and Operation for the WB XPress Project (acres) [a, b ,c, d]

Project/Facility Type/ Facility	Agriculture			Residential			Open Land			Open Water			Upland Forest			Wetland [e]			Industrial			**TOTAL**		
	Construction[e]	Operation[f] Within Existing Easement	Operation [f] Outside Existing Easement	Construction[e]	Operation[f] Within Existing Easement	Operation [f] Outside Existing Easement	Construction[e]	Operation[f] Within Existing Easement	Operation [f] Outside Existing Easement	Construction[e]	Operation[f] Within Existing Easement	Operation [f] Outside Existing Easement	Construction[e]	Operation[f] Within Existing Easement	Operation [f] Outside Existing Easement	Construction[e]	Operation [f] Within Existing Easement	Operation. [f] Outside Existing Easement	Construction[e]	Operation [f] Within Existing Easement	Operation [f] Outside Existing Easement	**Construction[e]**	**Operation [f] Within Existing Easement**	**Operation [f] Outside Existing Easement**
Line WB Replacement (NFS Land)	0.1	0.0	0.0	0.0	0.0	0.0	111.8	57.7	2.3	0.2	0.1	0.0	11.7	6.6	0.3[g]	2.9	1.8	0.0	2.1	<0.1	0.0	**128.8**	**66.3**	**2.6**
Subtotal	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**111.8**	**57.7**	**2.3**	**0.2**	**0.1**	**0.0**	**11.7**	**6.6**	**0.3[g]**	**2.9**	**1.8**	**0.0**	**2.1**	**<0.1**	**0.0**	**128.8**	**66.3**	**2.6**
Temporary Access Roads (NFS Land)	<0.1	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	11.8	0.0	0.0	**11.8**	**0.0**	**0.0**
Permanent Access Roads (NFS Land)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	<0.1	0.0	0.0	0.0	0.1	0.0	0.1	2.4	0.0	2.4	**2.6**	**0.0**	**2.6**
Subtotal	**<0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**<0.1**	**0.0**	**0.0**	**<0.1**	**0.0**	**<0.1**	**<0.1**	**0.0**	**0.0**	**0.1**	**0.0**	**0.1**	**14.2**	**0.0**	**2.4**	**14.4**	**0.0**	**2.6**
Project Total on MNF Land	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**111.8**	**57.7**	**2.3**	**0.3**	**0.1**	**<0.1**	**11.7**	**6.6**	**0.3**	**3.0**	**1.8**	**0.1**	**16.3**	**<0.1**	**2.4**	**143.2**	**66.3**	**5.2**

a Estimate based on the ROW configuration proposed for MNF lands.

b 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.

c Agricultural land includes actively cultivated cropland, hay meadows, and pasture land. Residential land includes mowed and landscaped areas near residential housing. Open land includes rights-of-way, and open non-forested, non-agricultural, non-residential, and non-industrial lands. Open water includes lakes, rivers, streams, ponds, and stormwater retention areas, Upland forest include evergreen, deciduous, and mixed evergreen/deciduous forests and woodlands. Wetlands include emergent, scrub-shrub and forested wetlands.

d The construction and operational impacts associated with the Line WB Replacement were adjusted to incorporate all recently proposed workspace modifications in coordination with MNF staff including changes to avoid or minimize impacts on West Virginia northern flying squirrel habitat.

e Construction impacts column includes both temporary and permanent workspace.

f The operational column is based on a 50-foot-wide long term easement centered on the replacement pipeline. The acreage associated with this 50-foot-wide long term easement has been divided on the table between areas that are within Columbia's existing long term easement, which Columbia has the right to maintain pursuant to its existing SUP9, and areas outside of Columbia existing long term easement. There would be no increase in long term impacts on the land uses that are within Columbia's existing long term easement. Land uses outside of Columbia's existing long term easement, however, would be impacted by the operation of the new replacement pipeline.

g Does not include about 2.2 acres of open land associated with the abandoned ROW for the existing Line WB. This open land would likely revert to forest land were it not for construction and operation of the new replacement pipeline.

Agricultural Lands

Agricultural land in the Project area consists of actively cultivated row crops and uncultivated hay meadows. Construction of the Project would affect about 82.4 acres of agricultural land and about 5.5 acres within the MNF. The Project does not cross land containing any specialty crops such as orchards, vineyards, nurseries, and/or Christmas tree farms. Construction activities within agricultural land could temporarily reduce agricultural production. Columbia would implement measures outlined in its ECSs when constructing through agricultural lands to preserve soil productivity. Typical mitigation measures include topsoil segregation, stone removal, repair and/or replacement of irrigation and drainage structures damaged by construction, restoration of pre-existing contours, and compensation for damage or loss of production. Columbia would consult with landowners prior to construction to locate and flag existing drainage tiles and irrigation systems. Columbia would compensate landowners for damages associated to crops, pasture and timber caused by construction.

All drain tiles and irrigation systems disturbed during construction would be restored to pre-construction conditions. Agricultural land disturbed by construction, including nearly all of the 13.1 acres of agricultural land that would be within the permanent right-of-way retained for operation, would be returned to its previous use once construction is completed. Columbia would be required to monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful. During operation of the pipeline, productivity of agricultural right-of-way should be resume within about two years following restoration. If the landowner observes damage to his farming operation after the Project is complete and the land is rehabilitated, Columbia would work with the landowner to rectify the damage. About 1.0-acre of the affected agricultural land at the proposed Dysart Valve site and along the proposed permanent access roads would be permanently converted to industrial use.

Upland Forest

Upland forest in the Project area includes evergreen dominated, deciduous dominated, and mixed evergreen/deciduous forests and woodlands. About 91.1 acres of upland forest would be affected during construction of the Project, with about 11.7 acres affected within the MNF. Construction activities in these forested areas would require removal of all trees and shrubs within the construction right-of-way and other work areas. Impacts would range from long term within temporary work areas to permanent within areas where forested land would be converted to other land use types.

Following construction, trees and shrubs in the ATWSs would be allowed to revegetate. About 22.8 acres would be permanently converted due to maintenance of the permanent pipeline right-of-way. An additional 18.8 acres of upland forest would be converted to industrial use for operation of the aboveground facilities and permanent access roads. About 6.9 acres of upland forest would be permanently converted to right-of-way within the MNF, there is no conversion to industrial use within the MNF.

Clearing of forest during construction and right-of-way maintenance during operations would impact recreational or special interest areas. Disturbance of forests could alter visual aesthetics by removing existing vegetation and disturbing soils. Construction could pose a nuisance to recreational users given the expected generation of dust, noise, and increased vehicular traffic. Construction could interfere with or diminish the quality of the recreational experience through its disturbance of environments important to wildlife movements, hunting, hiking or aquatic activities. Additional discussion of impacts to public land, recreation, and special interest areas are included in section 5.3.

Open Land

Open land in the Project area consists of non-forested, non-residential, and non-industrial cleared land. Construction of the Project would affect about 259.5 acres of open land with about 111.8 acres acres affected within the MNF. Maintenance of the permanent pipeline right-of-way would not result in a change in land use in open land because the right-of-way would be maintained in an herbaceous state. However, the operation of aboveground facilities and permanent access roads would require the conversion of 7 acres of open land to industrial uses, there is no conversion to industrial use within the MNF. The remaining areas would be restored and revegetated using seed mixes identified in the ECSs, or recommendations and consultations with the landowner or land managing agency.

Existing Rights-of-Way

The Project would impact about 229.2 acres of existing rights-of-way and 57.2 acres of new rights-of-way during construction. The use of existing rights-of-way would significantly mitigate impacts on adjacent landowners and land uses. About 286.4 acres of rights-of-way would be used for operation of the Project.

Access Roads

Columbia would generally use existing public roads or the existing rights-of-way for construction access to Project facilities. Where public access is unavailable, Columbia has identified the private access roads necessary for construction. Columbia proposes the use of 15 permanent access roads and 31 temporary access roads necessary for construction and/or operational activities. Columbia identified about 28.6 miles of access roads, of which 12.6 miles are located on federal lands. Appendix B contains a detailed breakdown of the locations, dimensions and expected improvements for Columbia's proposed access roads.

Temporary access roads are those which Columbia would need for construction and not operations. Columbia would use about 17.8 miles of temporary access roads for a total of 41.9 acres of temporary impacts. Permanent access roads are those which Columbia would need to construct, or upgrade if existing, and maintain for their use during operations and well as construction. Columbia would use about 10.3 miles of permanent access roads totaling about 1.3 acres of permanent conversion to industrial use. Columbia would use about 13.4 miles (15.4 acres) of access roads in the MNF and maintain 1.8 miles (2.6 acres) as permanent access roads within the MNF.

Access roads proposed by Columbia that are existing are in various states of surfacing, whether as two-track roads, gravel roads, or paved. Improvements or modifications to access roads would include filling, widening up to 24 feet in total width, blading, grading, graveling, and installing culverts or matting for crossing of drainage ways. Columbia would leave temporary access roads in their pre-construction conditions or in conformity with landowner agreements.

Industrial

The Project would impact about 159.8 acres of industrial land during construction and 84.2 acres of land during Project operations. The majority of the workspaces associated with the proposed aboveground facilities would use existing industrial land for construction. Following construction, all existing natural gas facilities would continue to be used for operational purposes. Industrial land at the two off-site contractor yards would be restored to pre-construction condition and use. Within the MNF, the Project would impact about 16.3 acres of industrial land during construction and 2.4 acres of land during Project operations.

Open Water

Open water includes major rivers, ponds, and lakes. Construction activities would impact about 1.6 acres of open water, of which 1.3-acre would be located within the permanent right-of-way and 0.3-acre would be within the aboveground facility sites and permanent access roads. Within the MNF, the Project would impact about 0.3-acre of open water during construction and 0.1-acre of open water during Project operations. Waterbodies would not be affected by operation of the facilities. Waterbodies in the Project area are discussed in more detail in section B.2.2.

Wetlands

About 8.3 acres of wetlands would be affected during Project construction, of which 4.4 acres would be within the permanent operational footprint of the Project facilities. The majority of wetlands within the permanent pipeline right-of-way would revert to pre-construction type; <0.2-acre of forested wetland would be permanently converted to scrub-shrub or emergent wetlands. The operation of the aboveground facilities and permanent access roads would result in the loss of about 0.1-acre of emergent wetlands. Within the MNF, the Project would impact about 3.0 acres of wetland during construction and 1.9 acres of wetland during Project operations. Impacts on wetlands in the Project area are discussed in more detail in section B.2.3.

5.2 Easement Requirements, Eminent Domain, and Compensation

Pipeline operators must obtain easements from existing landowners to construct and operate proposed facilities, or acquire the land on which the facilities would be located. Easements can be temporary, granting the operator the use of the land during Project construction (e.g., ATWS, temporary access roads, contractor ware yards), or permanent, granting the operator the right to operate and maintain the facilities once constructed.

Columbia's existing permanent easements gives it the right to maintain the existing rights-of-way as necessary for pipeline operation. Where the proposed pipeline construction activities occur within Columbia's existing rights-of-way, it would not need to acquire new easements or property to operate the proposed facilities. However, Columbia would need to acquire new easements or acquire the necessary land to construct and operate the pipeline where any of the proposed activities deviate from the existing right-of-way. These easements would convey both temporary (for construction) and permanent rights-of-way to Columbia.

In addition to the right to use specific property for construction, operation, maintenance, pipeline repair and replacement, and related activities as referenced above, an easement agreement between a company and a landowner typically specifies compensation for losses resulting from construction. This includes losses of non-renewable and other resources, damages to property during construction, and restrictions on existing uses that would not be permitted on the permanent right-of-way after construction. Compensation would be based on a market study conducted by a licensed real estate appraiser.

If an easement cannot be negotiated with a landowner and the Project is approved by the Commission, Columbia may use the right of eminent domain to acquire the property necessary to construct the Project. This right would extend to all Project-related workspace covered by the Commission's approval on non-federal lands, including the temporary and permanent rights-of-way, aboveground facility sites, pipe and contractor yards, access roads, and ATWS. Columbia would still be required to compensate the landowner for the right-of-way and damages incurred during construction, including agricultural losses. However, the level of compensation would be determined by a court according to state or federal law.

5.3 Public Land, Recreation, and Special Interest Areas

Monongahela National Forest

The proposed Line WB Replacement would cross 11.4 miles of the MNF in Randolph and Pendleton Counties, West Virginia which is managed by the Greenbrier and Cheat-Potomac Ranger Districts at various locations between mileposts 0.3 and 25.2 (see figure B.5.3-1). The majority of the pipeline within NFS lands would be installed using lift and lay replacement, or collocated with Columbia's existing pipeline corridors. The Project facilities would not impact any congressionally designated Wilderness Areas. No new access roads would be created on federal lands. See appendix B for the existing access roads Columbia proposes to use (totaling 13.4 miles), as well as those with expected improvements for construction use.

National forests are managed under individual LRMPs as required by the Forest and Rangeland Renewable Resources Planning Act of 1974, amended by the NFMA and incorporated into the agency planning regulations (36 CFR 219, [2012 version]). LRMPs are unique to a national forest and provide strategic, integrated resource direction for guiding project and activity decision-making on that national forest. Consistent with the Multiple-Use Sustained-Yield Act of 1960 (MUSYA), the USFS manages NFS lands to sustain the multiple use of its renewable resources in perpetuity while maintaining the long-term health and productivity of the lands. LRMPs guide management of NFS lands so that they are ecologically sustainable and contribute to social and economic sustainability; consist of ecosystems and watersheds with ecological integrity and diverse plant and animal communities; and have the capacity to provide people and communities with ecosystem services and multiple uses that provide a range of social, economic, and ecological benefits for the present and into the future. LRMPs do not authorize projects or activities or commit the USFS to take action. LRMPs may constrain the agency from authorizing or carrying out projects and activities, or the manner in which they may occur. All projects and activities occurring on NFS lands must be consistent with the respective LRMP for those lands (§ 219.15). LRMPs are strategic documents that describe the desired conditions, land use allocations, suitable management practices, objectives, standards, and monitoring and evaluation requirements for a forest over the next 10 to 15 years. Land use allocations are management prescription (Rx) areas within a National Forest having common biological, physical, watershed, and social conditions. The LRMP for the MNF was approved in 2006 and updated in 2011. The LRMP provide the following types of management direction that can apply forestwide or by Rx area (USFS, 2011):

- Desired Conditions – Describe how National Forest resources should look and function to provide diverse and sustainable habitats, settings, goods, and services.

- Goals – Statements that help describe desired conditions, or how to achieve those conditions. Goals are designed to maintain conditions if they are currently within their desired range, or move conditions toward their desired range if they are currently outside that range. Goals are normally expressed in general terms that are timeless, and there are no specific dates by which they must be achieved. Goal statements form the basis from which objectives are developed.
- Objectives – Concise time-specific statements of actions or results designed to help achieve goals. Objectives form the basis for project-level actions or proposals to help achieve National Forest goals. The timeframe for accomplishing objectives, unless otherwise state, is generally considered to be the planning period (e.g., 10 to 15 years).
- Standards – Binding limitations placed on management actions. Standards are typically action restrictions designed to prevent degradation of resource conditions, or exceeding a threshold of unacceptable effects, so that conditions can be maintained or restored over time. However, exceptions are made in some cases to allow temporary or short-term effects in order to achieve long-term goals. A project or action that varies from a relevant standard may not be authorized unless the LRMP is amended to modify, remove, or waive its application. Forestwide Standards apply to the entire National Forest unless superseded by specific Rx area direction.
- Guidelines – A preferred or advisable course of action generally expected to be carried out. They can also describe limitations or management actions, but they are generally not as restrictive as standards. Guidelines often indicate measures that should be taken to help maintain or restore resource conditions, or prevent resource degradation. Deviation from compliance does not require a LRMP amendment (as with a Standard), but rationale for deviation is required in the project record or NEPA documentation for a signed decision.

The LRMP for the MNF was approved in 2006 and updated in 2011. The pipeline would pass through portions of three Rx areas on the MNF (see table B.5.3-1). In addition, access roads proposed for use would be located within three Rx areas on the MNF (appendix B).

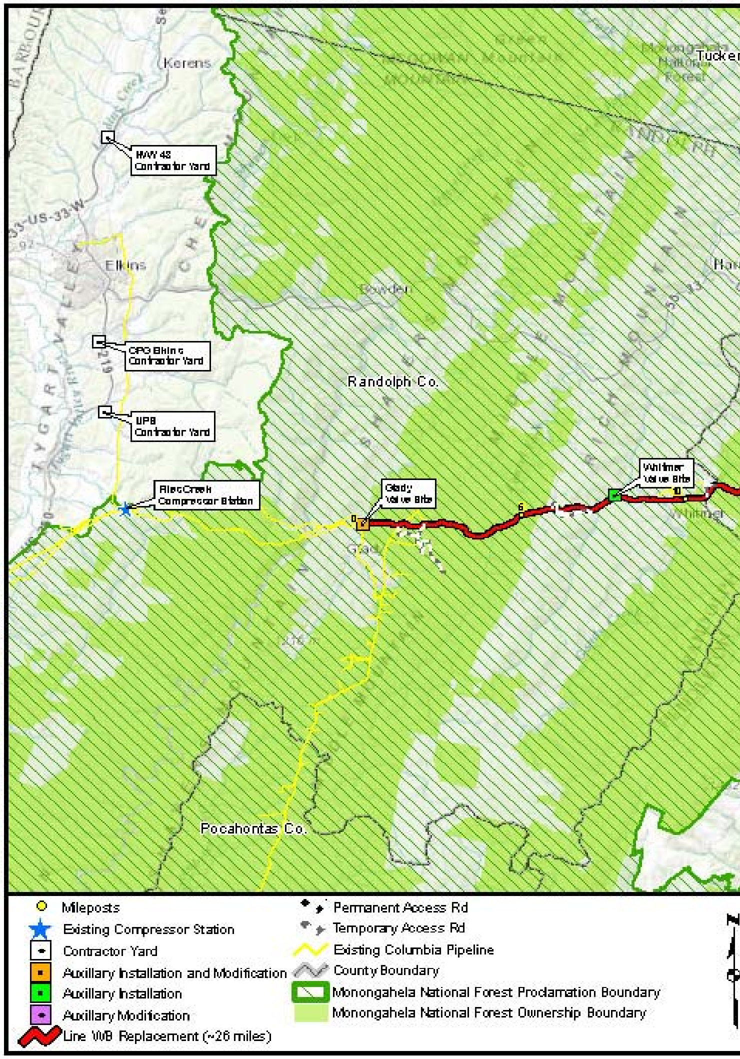

Figure B.5.3-1
Monongahela National Forest
Proclamation and Ownership Boundaries
WB XPress Project

TABLE B.5.3-1

Monongahela National Forest Management Areas Crossed by the WB XPress Project [a]

Begin milepost	End milepost	Miles Crossed	Acres Impacted Construction	Acres Impacted Operation	Management Prescription Area Name
0.3	5.6	5.3	60.7	32.3	3.0 - Vegetation Diversity
9.8	10.5	0.7	5.5	3.8	3.0 - Vegetation Diversity
11.0	12.0	1.0	11.1	5.8	8.1 - Spruce Knob-Seneca Rocks National Recreation Area
13.5	13.5	<0.1	0.2	0.1	8.1 - Spruce Knob-Seneca Rocks National Recreation Area
15.7	16.3	0.6	7.6	3.6	6.1 - Wildlife Habitat Emphasis
19.7	19.8	0.1	1.1	0.6	6.1 - Wildlife Habitat Emphasis
20.0	20.2	0.2	2.6	1.6	6.1- Wildlife Habitat Emphasis
20.2	20.4	0.2	1.8	1.2	8.1 - Spruce Knob-Seneca Rocks National Recreation Area
22.0	25.2	3.2	38.2	19.9	8.1 - Spruce Knob-Seneca Rocks National Recreation Area
	TOTAL	**11.4**	**128.8**	**68.9**	

[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. Acreages do not include access roads.

Rx 3.0 – Vegetation Diversity covers a diversity of landforms and ecosystems across the forest. These areas are managed to provide age class diversity and sustainable timber production; a variety of forest scenery; habitat for a variety of wildlife species; and a primarily motorized recreation environment. Pipeline (utility corridor) and road construction are not prohibited in the Rx area.

Rx 6.1 – Wildlife Habitat Emphasis are areas where vegetation management is used to enhance a variety of wildlife habitat. These areas are managed to provide a sustainable production of mast and other plant species that benefit wildlife, restore pine-oak and oak-hickory communities, restrict motorized access and provide a network of security areas reduce disturbance to wildlife, provide a primarily non-motorized recreational setting, and provide a mix of forest products. Road construction and utility corridors are allowed in the Rx with parameters.

Rx 8.1 – Spruce Knob-Seneca Rocks National Recreation Area emphasizes management of the Congressionally designated National Recreation Area (NRA) to provide public outdoor recreation benefits; conservation of scenic, scientific, historic and other values contributing to public enjoyment; a variety of recreation opportunities; restoration of ecological communities and natural habitat structures; and wildlife habitat for a variety of species. The desire is to avoid new utility corridors within this Rx.

Most management activities within the affected Rxs such as prescribed fire, vegetation management, and wildlife management activities undertaken on NFS lands would not be affected by operation of the proposed Line WB Replacement. The principal concerns for these activities with respect to pipeline safety have to do with 1) excavation or removal of cover on the right-of-way, and 2) any excessive loadings over the line. While the amount of cover over the pipeline would be sufficient to protect the line from fire, any grading or excavation on the right-of-way that might be associated with these activities would not be allowed, other than planned activities coordinated with the pipeline operator. Similarly, any planned construction of roads or skid trails on the pipeline right-of-way would need to be carefully coordinated with pipeline operations staff to ensure compatibility with pipeline integrity standards. Such activities may, for example, require the addition of extra cover over the pipeline at selected crossing locations. Fire or vegetation management activities not directly affecting the pipeline right-of-way would not be restricted, unless the activity were to indirectly cause or contribute to undermining or erosion of the right-of-way.

Columbia's primary set of construction and restoration provisions are contained within its ECSs and proposed COMP submitted to the MNF for review. Included in the COMP are various topical plans designed to reduce impacts to the present mixture of land uses occurring on the MNF and maintain those land use designations through project construction and operations.

George Washington/Jefferson National Forest

Columbia's proposed MAOP pressure restoration and uprate would occur on about 1.7 miles of Line WB and Line VB pipelines within the GWJNF, which involves no construction activity or installation of permanent or temporary pipeline or aboveground facilities. No new access roads would be required. Compression testing of these lines would occur on NFS lands, and would consist of temporarily installing compression testing equipment with slight surface disturbance. The MAOP uprate would occur and restoration testing equipment would be used at three existing valve sites, the Alexander Valve Site in Upshur County, the Mill Creek Valve Site in Randolph County, and the Moorefield Valve Site in Hardy County, West Virginia. In addition, Columbia would conduct aerial surveys of the right-of-way affected by the MAOP uprate and restoration using helicopter fly-overs following a 30-day notice to the GWJNF.

No changes are proposed or required for the existing SUP on the GWJNF. No changes to workspaces and no construction or replacement of the existing pipeline on GWJNF is proposed.

Trails

The Project would cross four recreational trails within the MNF in West Virginia and one unnamed trail in Virginia. Table B.5.3-2 lists the names and locations of the trails.

TABLE B.5.3-2

Trails Crossed by the WB XPress Project

Project Facilities	Trail	Ownership	Begin Milepost	End Milepost	Miles Crossed or Collocated	Trail Type
Glady Valve Site/ WB-6 (MAOP)	Allegheny Trail	U.S. Forest Service	N/A	N/A	N/A	Dirt/ Gravel
Line WB Replacement/ Line WB-5 (MAOP)	Laurel Fork North Trail	U.S. Forest Service	4.3	4.6	0.3	Dirt
Line WB Replacement/ Line WB-5 (MAOP)	Allegheny Mountain Trail	U.S. Forest Service	11.9	11.9	<0.1	Dirt
Line WB Replacement/ Line WB-5 (MAOP)	North Fork Mountain Trail	U.S. Forest Service	23.4	23.7	0.3	Dirt
Line WB Replacement/ Line WB-5 (MAOP)	North Fork Mountain Trail	U.S. Forest Service	24.1	24.1	<0.1	Dirt
Line WB-5 (MAOP)	Forest Trail (1009)	U.S. Forest Service	N/A	N/A	N/A	Dirt/Rock
Line WB-5 (MAOP)	Forest Trail (1017)	U.S. Forest Service	N/A	N/A	N/A	Dirt
Line WB-5 (MAOP)	South Branch Trail Loop Trail	U.S. Forest Service	N/A	N/A	N/A	Dirt
Line WB-5 (MAOP)	South Branch Trail	U.S. Forest Service	N/A	N/A	N/A	Dirt
PAR-27A	Allegheny Trail	U.S. Forest Service	N/A	N/A	<0.1	Dirt/ Gravel
TAR-48.1 [b]	North Fork Mountain Trail	U.S. Forest Service	23.7	24.8	1.1	Dirt
Line VA-1	Unnamed Trail	Virginia Run Community Association	1.8	2.2	0.4[c]	Asphalt
Line VB-5 (MAOP)	Appalachian National Scenic Trail	Sky Meadows State Park	N/A	N/A	<0.1	Dirt
Line VB-5 (MAOP)	Forest Trail (568A)	U.S. Forest Service	N/A	N/A	<0.1	Dirt
Line VB-5 (MAOP)	Forest Trail (1009)	U.S. Forest Service	N/A	N/A	<0.1	Dirt/Rock
				TOTAL	**2.1**	

a “N/A” not crossed by the Project
b Temporary access road follows North Fork Mountain Trail for about 1.1 miles
c Unnamed Trail crossed by the underground Horizontal Direction Drill, but no ground surface is anticipated.

Trail users may experience visual impacts, noise, and disrupted access but these effects would be temporary and minimized by Columbia’s collocation with existing rights-of-way and its restoration of the trail crossings after the pipeline is installed. The trail along the proposed Line VA-1 would be temporarily removed during construction and replaced following completion. Columbia would make efforts to alert recreational trail users prior to construction about the anticipated time and duration of disruptions. Columbia would work with the land managing agency or trail steward to determine the most efficient method for notification. Such notifications could include mailings, an informational notice posted on the managing agency’s website, advertisements in local media, and/or notices posted in public areas.

The COMP contains a MNF Trail Crossing Plan which identifies impacts to individual trails and their proposed mitigation measures. These include noticing potential trail users of impending pipeline construction crossings of trails, status of construction, temporary rerouting of trails around pipeline construction zones, and use of safety fences where appropriate. Following construction, unobstructed access along trails would be restored. No long-term impacts are expected on the three primary trails crossed within the MNF, namely the Laurel Fork North, Allegheny/Allegheny Mountain Trail, and North Fork Mountain Trails.

Morris Creek Wildlife Management Area

The Morris Creek WMA lies within Kanawha County, West Virginia and is managed by the WVDNR. The Line WB Replacement portion of the Project would be located within 0.25-mile but would not cross the management area; therefore, no impacts are anticipated.

Wallback Wildlife Management Area

The Wallback WMA, as stated in section B.3.3, lies 0.25-mile from the Dink Valve Site in West Virginia. This WMA is known as one of the important breeding areas for Cerulean warblers in West Virginia. However, the Project does not cross the Wallback WMA, therefore, no impacts are anticipated.

Fairfax County Park Authority Lands

The FCPA is a department within the Fairfax County Government, that is responsible for developing and maintaining various parks, historical sites, WMAs, and recreational areas owned and managed by Fairfax County. The Project facilities would cross or be located within 0.25-mile of five (EWNAP, Elklick Diabase Flatwoods Conservation Site, Halifax Point District Park, Pleasant Hill Park, and Hickory Forest Park) properties managed by the FCPA. Two of the properties, Pleasant Hill Park and the future site of the Hickory Forest Park, are within 0.25-mile and would not be impacted by the proposed Project facilities.

About 0.2-mile of Line VA-1 (MPs 0.7 to 0.9) would cross the EWNAP. The EWNAP is known for supporting a rare forest type known as the northern hardpan basic oak-hickory forest. The FCPA has a specific management plan for the EWNAP (Lardner/Klein Landscape Architects, P.C. 2009). This plan details areas of concern and addresses the management of utility corridors. Since Columbia's pipeline and construction workspace would be located within an existing powerline right-of-way in this area, it is not anticipated that it would conflict with the FCPA management plan. Columbia would coordinate with the FCPA and VDCR to avoid or minimize impacts associated with the construction and operation of the Project.

The Chantilly Compressor Station is anticipated to be within the development area for the Halifax Point District Park, which is a future park that will be owned and managed by the FCPA. Columbia is currently negotiating with the FCPA for a land swap to mitigate impacts on Halifax Point District Park and would coordinate with the FCPA and VDCR to avoid or minimize impacts on the development plans in the vicinity of proposed compressor station site. About 12.7 acres of the Chantilly Compressor Station would be located on land that is currently managed by FCPA as Halifax Point District Park. This area is primarily wooded but is located adjacent to the existing powerline right-of-way. As part of a land swap agreement, Columbia would purchase this land from the FCPA.

Conservation Easements

The proposed Project facilities would be located within 0.25-mile of four conservation easements including a Potomac Conservancy easement, Northern Virginia Conservation Trust easement, and two Farm and Ranch Lands Protection Program easements. However, the proposed Project facilities would not impact these or any other conservations easements.

Nationwide Rivers Inventory

The Project would include a total of four pipeline and four access road crossings of waterbodies listed on the NRI. All of these crossings would be associated with the Line WB Replacement. The first NRI pipeline crossing would be Glady Fork at MP 0.1; the second would be Laurel Fork at MP 4.3; the third would be Seneca Creek at MP 12.9[28]; and the fourth would be the North Fork South Branch Potomac River at MP 20.7. Seneca Creek and the North Fork South Branch Potomac River would also be crossed within the NRI designated areas by access roads. Seneca Creek would be crossed by PAR-27A in two separate locations and by TAR-29. The North Fork South Branch Potomac River would be crossed by TAR-45.

Waterbodies listed on the NRI must be free flowing and possess one or more Outstanding Remarkable Value (ORV). The ORVs in the area of Glady Fork crossing are Recreation. The ORV in the area of the Laurel Fork crossing is Recreation. The ORVs in the area of the Seneca Creek crossings are Recreation and Fish. The ORV in the area of the North Fork South Branch Potomac River is Scenery. The Recreation designation indicates among other things that recreational opportunities are or have the potential to be popular enough to attract visitors from throughout or beyond the region of comparison, or are unique or rare within the region. River-related recreational opportunities could include, but are not limited to sightseeing, wildlife observation, camping, photography, hiking, fishing, and boating. The Fish designation indicates either fish populations or habitat, or a combination of both. Waterbodies identified because of fish populations are considered nationally or regionally important producers of resident and/or anadromous fish species and may have a high diversity of fish or be of particular significance due to the presence of wild stocks, and/or federal or state-listed species. Waterbodies identified because of fish habitat provide exceptionally high-quality habitat for fish species indigenous to the region and may have a high diversity of habitats or provide habitat to wild stocks, and/or federal or state-listed species. The Other Value designation refers to characteristics for which no specific national standards or guidelines have been developed. For a given waterbody these may include, but are not limited to, hydrology, paleontology, and botanical resources. The Scenery designation indicates the landscape elements of landform, vegetation, water color, and related factors that result in notable or exemplary visual features and/or attractions.

Columbia would remove the old pipeline and install the new pipeline across three of the four NRI waterbodies, Glady Fork, Laurel Fork, and North Fork South Branch Potomac River, using a dry crossing method (either the dam and pump or flume method). These crossings would be collocated with Columbia's existing right-of-way so the crossings would occur adjacent to open areas. This is particularly true of the North Fork South Branch Potomac River pipeline crossing, where the east bank of the river borders a large agricultural field and the west bank of the river is adjacent to West Virginia State Route 28/55 and is 200 feet from the existing Seneca Compressor Station site.

Columbia would cap the previously abandoned section of Line WB in the vicinity of the proposed crossing of Seneca Creek at MP 12.9. Near MP 12.2, the abandoned Line WB veers off the proposed alignment and runs northeast paralleling the NRI-designated section of Seneca Creek for about 3.7 miles. The abandoned pipeline crosses this NRI section of Seneca Creek about seven times. Downstream of the NRI-designated reach, the abandoned section of Line WB

[28] The Line WB Replacement pipeline would cross Seneca Creek a second time at MP 18.7. This second crossing is downstream of the first and is outside of the areas designated and listed on the NRI.

continues paralleling Seneca Creek for an additional 1.4 miles and crosses it five more times. The proposed pipeline crossing of Seneca Creek in a new location south of the abandoned pipeline would result in fewer impacts on both the NRI-designated reach and downstream segments of the creek than replacing the abandoned line. Moreover, due to engineering constraints and safety concerns, collocating Line WB with Lines WB-5 and WB Loop within Columbia's existing right-of-way between MPs 12.4 and 13.4 would not be practicable.

The MNF requested that Columbia reconsider its plans for capping and leaving pipeline along Seneca Creek in the interests of the potential long-term benefits of removal of site-specific sections of pipeline. It cites that pipeline abandoned within the alluvial deposits of streams and active floodplains can become exposed when alluvial deposits are eroded as a function of natural stream processes. The result is unsafe and unsightly conditions for recreational users and potential liability to land managers.

The scope of the Project does not include removal of the abandoned section of Line WB as outlined in CP86-367-000. In addition, this matter was already resolved between Columbia, the MNF and the Commission when FERC issued an Order in Docket No. CP86-367-000 granting approval to abandon in place 20.9 miles and remove 0.9-mile of Line WB. The 21.8 miles of Line WB was subsequently removed from the current MNF SUP9 for operation and maintenance of various pipelines within the MNF. Although a detailed analysis was not performed, the potential impacts that might be expected from removal of the abandoned pipe could include multiple crossings of Seneca Creek. The old Line WB, which runs along 5.4 miles of Seneca Creek, is located parallel to the stream and, based on desktop review, crosses the stream about 18 times, in addition to multiple tributaries to Seneca Creek along this section. Current industry, safety, and environmental practices would not allow the routing of a new pipeline in the manner that the original Line WB was installed in this area, in part due to the environmental cumulative impacts that would be associated with the construction of a pipeline parallel to a stream, which also requires many crossings of the same stream. If the pipe were removed, the process would be similar to the installation of a new pipeline. Specifically, Columbia would clear and grade a right-of-way to access the pipe, and then use heavy equipment to excavate, remove and transport the pipeline to an off-site disposal area. No civil or environmental (e.g., biological, soils, visual, or cultural) surveys along this segment of the abandoned pipeline have been evaluated, nor does Columbia have permission from MNF to conduct such surveys on NFS lands at this location. Based on aerial imagery, the original corridor associated with the abandoned pipeline corridor has been allowed to revert to a forested condition due to having been untouched for nearly 30 years. Tree removal within this forested corridor would result in additional impacts on forested lands, most of which would be in close proximity to and along the riparian areas of Seneca Creek. A minimum 50-foot-wide construction right-of-way along its entire length would be needed to remove the existing pipeline, resulting in disturbance of 32.7 acres of land. This abandoned Line WB route also crosses two mapped NWI emergent wetlands. Potentially more wetlands (and likely forested wetlands) would be identified if field surveys were to be conducted based on current conditions.

In summary, removing the previously abandoned pipeline would result in greater environmental impacts than leaving it in place, as previously approved by FERC.

Columbia would use existing dirt and/or gravel roads for access across the NRI rivers. Columbia's use of access road PAR-27A and TAR-45 would require the installation of two temporary bridges across Seneca Creek and one temporary bridge across the North Fork South

Branch Potomac River. These temporary bridge crossings would be used in lieu of the existing low water crossings and an existing, privately owned bridge crossing of the North Fork South Branch Potomac River during construction. Following construction these temporary bridges would be removed. The access road TAR-29 crossing of Seneca Creek would be via an existing bridge on a public county road (Straders Run Road CR-7/1).

Section VI.B.1.d of the FERC's Procedures states that the only access roads, other than the construction right-of-way, that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland. Columbia requests a modification to the FERC's Procedures to temporarily modify the existing access road by installing temporary bridges across Seneca Creek and other streams and temporary mats in the four emergent wetlands.

Modifications to access road PAR-27A on NFS land associated with Seneca Creek are addressed in Columbia's Assessment of National Park Service (NPS) Designated Nationwide Rivers Inventory Proposed Waterbody Crossings on August 17, 2016.[29] As described in the report, PAR-27A is an existing dirt- and grass-covered road that crosses Seneca Creek twice. Both crossings are within the MNF. In addition to the Seneca Creek crossing, PAR-27A also crosses Whites Run and six unnamed tributaries within the MNF. Columbia would install temporary bridges at each of the Seneca Creek crossings, in lieu of the existing low-water crossings. Temporary bridges would also be installed within the MNF at Whites Run and the other unnamed tributaries along PAR-27A. Temporary bridges are described in Columbia's ECS Plan in attachment C. Following construction, these temporary bridges would be removed. Any soils that may be disturbed by the use of these roads would be restored following construction. As indicated in appendix F, PAR-27A also crosses four narrow emergent wetlands. Depending on the conditions during construction, Columbia anticipates that mats would be temporarily installed within these wetlands to provide a stable surface for equipment to cross these areas and to minimize wetland soil impacts.

The EPA Region III Office is concerned that impacts to the crossings listed on the NRI could threaten the NRI status of these resources, and proposed mitigation strategies may be insufficient to maintain the pristine nature of these stream sections. In its Assessment of NPS Designated Nationwide Rivers Inventory Proposed Waterbody Crossings, the impact of the Project on the four waterbodies listed on the NPS NRI were evaluated. Literature explored concluded that dry crossing methods, including dam and pump or flume crossing methods, are preferred in sensitive aquatic habitats because these methods have little to no effect on mean downstream total suspended solids concentration, and that turbidity measurements are not significantly affected during construction using these methods. Furthermore, the majority of impacts associated with the pipeline crossings and the access roads would be temporary.

[29] This report can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20160817-5375 in the "Numbers: Accession Number" field.

The primary long-term impact from crossing the NRI rivers would be the tree clearing needed for pipeline construction. At three of the four pipeline crossings, the vegetation clearing would overlap with, and be adjacent to, Columbia's existing right-of-way. For environmental and engineering reasons, Columbia's Seneca Creek pipeline crossing is proposed on a new greenfield corridor. However, neither this new corridor, nor Columbia's temporary or permanent widening of its existing right-of-way, nor its use of existing access roads to cross Seneca Creek or the North Fork South Branch Potomac River, would have a permanent or long-term adverse effect on the off-road vehicles (ORVs) of any of the four NRI waterbodies. Thus the Project is not expected to have an adverse effect the eligibility of any of these NRI waters for potential future listing as a Wild and Scenic River.

Columbia's use of dry crossing methods to install the pipeline and existing roads for access, its adherence to federal and state permit requirements, and its implementation of its ECSs, which include specifications for temporary bridges, the use of erosion controls, prompt restoration of streambeds and banks, and revegetation of disturbed soils would minimize impacts on water quality, fish and fish habitat. Columbia's collocation of all but one of the proposed crossings with existing cleared corridors and restoration of disturbed areas following installation of the new pipeline would minimize recreational, scenic, and visual impacts. As such, the proposed pipeline and access road crossings would not adversely impact any of the ORVs associated the NRI designated segments of Glady Fork, Laurel Fork, Seneca Creek, or the North Fork South Branch Potomac River.

5.4 Coastal Zone Management Areas

The VDEQ is the lead agency among eight coastal planning district commissions that serve as a link between local governments and the VCZM Program. The Chantilly Compressor Station and the Line VA-1 would be located in Fairfax County, Virginia, which lies within the Northern Virginia Coastal Planning District of the VCZM Program. Columbia filed a Joint Federal/State Permit Application (JPA) for activities within the CZMA area in March 2016 and a supplement in December 2016. The JPA included a certification stating the proposed Project would be conducted in a manner consistent with the VCZM Program. The VDEQ's FCC for the Project included coastal lands management, which indicates the Project is consistent with the CZMA, provided all applicable permits and approvals are obtained.

5.5 Residential Land and Planned Developments

5.5.1 Existing Residences

The majority of the Project would be located in sparsely populated, rural areas with single family homes. The Project facilities in Fairfax County, Virginia would be in the vicinity of more densely populated suburban residential areas along an existing right-of-way. Routing alternatives and HDD for Line VA-1 were designed to mitigate impacts on residences in the area by locating the majority of the Project in existing rights-of-way. The Project would not use residential land during construction activities.

Construction activities near and within residential properties would result in short-term impacts on residents living in the areas immediately surrounding the workspaces. Impacts could include removal of fences and ornamental shrubs or trees; disturbance of roads, driveways, and sidewalks; altered traffic patterns; and temporary noise and visual impacts. Columbia would repair any damages to residential property resulting from construction activities or provide appropriate compensation to the landowner. Columbia may use imported topsoil in residential areas as a replacement alternative to topsoil conservation.

The Project would include workspace within 50 feet of 9 residences. All but one of these residences would be along Line VA-1. The location of these residences and the distance of each residence from the construction work area is listed on table B.5.5-1.

TABLE B.5.5-1

Location of Residences within 50 feet of the Construction Work Area for the WB XPress Project

Project Facility/ Structure ID	County	State	Milepost	Distance from the Construction Work Area (feet)
Line WB Replacement				
STR-006	Randolph	West Virginia	7.1	33.4
Line VA-1				
STR-018	Fairfax	Virginia	1.6	28.8
STR-019	Fairfax	Virginia	1.7	32.8
STR-020	Fairfax	Virginia	1.7	31.0
STR-021	Fairfax	Virginia	1.7	43.0
STR-022	Fairfax	Virginia	1.7	44.0
STR-025	Fairfax	Virginia	1.8	28.6
STR-026	Fairfax	Virginia	1.8	17.0
STR-027	Fairfax	Virginia	1.8	30.0

The EPA expressed concern over the length of time residents would be offered advance notice of Columbia's proposed Project construction. Columbia has consulted with landowners during initial notification, survey, and easement negotiation phases of the Project concerning the general parameters of what construction would entail. Columbia would continue to consult with landowners during the construction phase to ensure safety and minimize disruptions to residential access.

Columbia has prepared site-specific residential plans for each of the 9 residences that are identified in table B.5.5-1. These plans, which are included in appendix C, show how the Project would affect the property and identify construction requirements to minimize impacts. We encourage affected landowners to review these plans and provide us with any comments during the EA comment period. In addition to construction procedures and mitigation measures discussed in section 7.2, Columbia would use the following mitigation measures for these 9 residences to minimize impacts on these residences include:

- Notifying landowners no later than two weeks prior to the start of construction on their property.
- Safety fencing would be installed along the construction work area in residential areas to discourage non-workers from entering the area. At a minimum, fencing would be installed adjacent to residences for a distance of 100 feet on either side of the residence on the residence side of the construction work area.
- Trench would be secured with safety fencing each day as construction activities conclude within residential areas.
- Maintaining access to residences and the traffic flow and emergency vehicle access on residential roadways.

- Flaggers would be stationed on either side of road crossings to direct traffic during construction across roadways.
- Roadways would be maintained safe and accessible, which includes the removal of soil and/or gravel spilled or tracked onto roadways daily or more frequently as necessary.
- Mature trees and landscaping would 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.
- Attempts would be made to prevent the disruption of utilities. In the event utilities are disturbed, efforts would be made to repair them immediately.
- Following the Fugitive Dust Control Plan (for example spraying construction work areas with water, limiting construction equipment speed, immediately cleaning dirt and other materials tracked onto public roads, etc.).
- Unless specified by the landowner, or replacement topsoil is imported, topsoil would be segregated from either the full work area or from the trench and subsoil storage in order to prevent the mixing of topsoil and subsoil.
- After backfilling the trench, all lawn and landscaping would be restored to final restoration conditions, or temporarily restored pending weather and soil conditions or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance within these time frames then temporary erosion controls (sediment barriers and mulch) would be maintained and monitored until conditions allow restoration.

Following construction in all residential areas, including those without homes within 50 feet of the construction workspace, most developed land uses would be able to continue in accordance with individual easement agreements for approved and/or restricted use of permanent rights-of-way. However, buildings, structures, wells, reservoirs, pools, obstructions, or removal/addition of cover would not be permitted on the permanent pipeline rights-of-way. Construction of features such as roads or driveways, utility lines, and properly gated fences are generally permissible uses within the permanent easements.

Columbia would work with landowners to negotiate agreements for replacing items that are removed along the construction right-of-way. The items must be maintained in accordance with Columbia's right-of-way Encroachment Policy and must not jeopardize the future integrity of the right-of-way or impede access by pipeline personnel for operation and maintenance activities. If any damages to residential property result from construction, Columbia would repair the damaged property or provide appropriate compensation to the landowner.

No permanent conversion of residential land would result from operation of the Project facilities; thus, no long-term impacts are anticipated. No new aboveground facilities would be installed near the 9 homes identified above in table B.5.5-1, and Columbia's pipeline would be buried and adjacent to existing pipelines or electric transmission lines.

We received a comment from Johnsons' outlining property disturbance from Columbia's past operational activities and concerns about present construction work being proposed at the Frametown Compressor Station modifications, including maintenance of access during construction, damage to their property, and dust control. Columbia provided commitments including conducting work during normal business hours, use of its Fugitive Dust Control Plan (see reference in section 7.2), and the site-specific residential construction plan showing plans to widen the Frametown Compressor Station's access road directly across the highway from this residential property, thereby reducing equipment incursions onto their property.

We received comments from the Mullennexes concerning impacts on farming operations, safety, and route selection. Columbia has since filed information indicating it has changed the routing across the Mullennexes' land to avoid bottomland farmland portions. Columbia stressed it would compensate the Mullennexes for any crop damages that result from construction and would speed the restoration of the bottomland hayfields referenced in the Mullennexes' letters. In order to alleviate subsoil compaction during restoration, Columbia would plow the subsoil, in areas where topsoil has been segregated, before replacing the segregated topsoil. Alternatively, Columbia would make arrangements with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure.

Safety for landowners along the proposed pipeline is discussed in section 9 of this EA. Concerns about well water and groundwater impacts from pipeline construction in close proximity to karst features would be reduced through Columbia's implementation of erosion control, sedimentation, and spill prevention controls contained in its ECS. Additional discussion on construction through karst areas is included in section B.1.1 of the EA.

Landowner Caldwell, who's property is adjacent to the proposed Lost River Compressor Station expansion site, is concerned over further loss of property value on account of expected operational impacts to visual aesthetics, noise, and air quality. Columbia would use 19.7 acres of land for the expansion, of which 18.3 acres is existing industrial property, 0.13-acre is existing pipeline right-of-way, and 0.1-acre is forest. Noise impacts for this station is described in more detail in section 8.2, however the noise analysis estimates that no perceptible increase in noise would occur from operation of the expanded compressor facilities, and that total noise levels from operation of the expanded station would still be at or below acceptable levels.

Columbia's commitment to construct its proposed facilities and restore its right-of-way in accordance with its ECSs and Fugitive Dust Control Plan while using the above-listed residential construction measures, impacts on residential and other land uses during construction and operation of the Project would be short term and minor.

5.5.2 Planned Developments

The proposed Chantilly Compressor Station and Line VA-1 would be located within the vicinity of two subdivisions that are both currently under construction. The Hunter's Pond Subdivision is located on a 192-acre parcel adjacent to the Project facilities and is proposed to have 29 lots ranging from 5 to 8 acres. The Foxmont Subdivision includes eight 5- to 7-acre lots on a 41-acre parcel located about 0.3-mile southeast of the proposed Chantilly Compressor Station and adjacent to Line VA-1. Local zoning allows for the construction of utility structures, including compressor stations, and Columbia's Project would not directly impact either planned subdivision or interfere with their development. If one or the other subdivision is occupied when the Chantilly Compressor Station and Line VA-1 are under construction, residents in these subdivisions may experience impacts similar to those described above for existing residences. The majority of these impacts would be temporary and generally confined to the construction period, and Columbia would mitigate the effects on any occupied residences within the planned developments that are very close to the workspace with measures similar to those described above for existing residences. The Chantilly Compressor Station would be a new aboveground facility that would have a long-term visual impact. However, both subdivisions are located adjacent to existing pipeline, electric transmission, and electrical and natural gas infrastructure. Therefore, impacts from the additional utility infrastructure are anticipated to be minimal.

The Chantilly Compressor Station would also be a new source of noise near the subdivisions. As described in more detail in section B.8.2, Columbia conducted noise surveys to determine ambient noise levels and noise analyses to estimate the increases in noise that would result from the proposed compressor stations. Ambient noise surveys were conducted at three noise sensitive areas (NSA) near the Chantilly Compressor Station site. One of these surveys was conducted about 1,050 feet southeast of the site within the area of the Hunter's Pond and Foxmont Subdivisions. Columbia's analysis of this location indicates that the combined noise of the background and the noise from the compressor station would be less than 55 decibels on the A-weighted scale (dBA). Moreover, the estimated increase in noise resulting from the compressor station would be about 0.2 decibels (dB) at this location (see section B.8.2 for more discussion of dBA and dB as measures of noise), which would be undetectable to the human ear. To ensure that the actual noise would be similar to what Columbia has predicted, we are recommending in section B.8.2 that Columbia file a noise survey with the Secretary no later than 60 days after placing the facility into service.

5.6 Hazardous Waste Sites, Polychlorinated Biphenyls, and Asbestos

Hazardous Waste Sites and Landfills

As discussed in section B.1.2 (under Soil Contamination) and listed in table B.1.2-2, Columbia's review of federal and state databases identified 34 contaminated sites within one-mile of the Project facilities. For the reasons discussed in section B.1.2, we conclude that the potential to encounter contaminated soils during construction and/or operation of the Project is low.

Polychlorinated Biphenyls

Pipeline

The Project involves physical removal of the pipeline for which prior abandonment authority was obtained (Columbia received abandonment authority for about 26 miles of Line WB pursuant to authorization in Docket No. CP86-367-000). Any liquids and/or sludge that may be discovered during removal of the pipeline would be contained and analytically tested. Columbia does not anticipate any liquids and/or sludge would be contaminated with Polychlorinated Biphenyls (PCB). If testing results determine the presence of PCB, Columbia would dispose of the contaminated material in accordance with the Administrative Order of Consent (AOC).

Aboveground Facilities

In accordance with the Toxic Substance Control Act, Columbia performed clean-up and disposal activities of PCB contamination at multiple facilities in compliance with the EPA-approved Response Action Work Plan.

In 1995, Columbia entered into an AOC with the EPA. In accordance with the EPA-approved Characterization Work Plan for Work Scope List of Facilities. Columbia conducted a comprehensive characterization of soil, concrete, and groundwater at major facilities included on the AOC Work Scope List. The results of the characterizations and response action activities were documented in a Characterization Report or Response Action Completion/Final Report (RAC/FR) for each site.

Columbia has coordinated with the EPA to address PCB contamination at the following aboveground facilities associated with the Project: Files Creek Compressor Station, Seneca Compressor Station, Lost River Compressor Station, Frametown Compressor Station, and Cleveland Compressor Station in West Virginia, and the Strasburg Compressor Station and Loudoun Compressor Station in Virginia. No known PCB contamination has been identified at any of the other aboveground facilities associated with the Project.

Columbia completed a RAC/FR at the Strasburg Compressor Station in 2002 and RAC/FRs at the other six compressor stations between 2013 and 2015. The RAC/FR concluded that no further response action work is required at the Seneca, Lost River, Frametown, and Strasburg and Loudoun compressor stations. Columbia has requested these facilities be removed from the Work Scope List of the AOC and is currently awaiting a response from the EPA. The RAC/FRs at the Files Creek and Cleveland compressor stations concluded that further response action work is required at these facilities to address potential PCB contamination. When Columbia completes this additional work, it will submit addendums to the RAC/FRs to the EPA for review and approval. Upon approval, these compressor stations would be removed from the Work Scope List facilities as allowed by the AOC.

5.7 Visual Resources

Visual impacts from the Project would involve the clearing of trees and shrubs along the new and existing rights-of-way, new aboveground facilities, and along access roads. Columbia would primarily use existing roads for access and would construct the majority of the pipeline within or adjacent to existing rights-of-way, which would minimize visual impacts. Additionally, the new aboveground facilities would mostly be constructed within or adjacent to existing aboveground utility infrastructure, thus reducing the visual impact of new aboveground facilities.

The majority of the visual impacts would be short term and confined to the period of active construction. The greatest potential for long-term visual impacts would result from the Chantilly Compressor Station. This compressor station would be located adjacent to existing natural gas infrastructure and two electric transmission line facilities which run along the northeastern edge of the proposed site. An existing electric substation and meter station are located across the electric transmission line right-of-way from the proposed compressor station site. There are currently no residences adjacent to or with direct views of the proposed site, although there is a planned subdivision close to the site (see a discussion of this subdivision including potential visual impacts under the Planned Developments heading above).

Virginia State Code (1950 as amended) Section 15.2-2232 states that facilities of this nature must be consistent with the location, character, and extent of the area surrounding them. This facility meets the prescribed characteristics due to the existing industrial facilities in the vicinity of the proposed Chantilly Compressor Station. Additionally, wooded areas surrounding the other three sides of the site would minimize visual impacts on residences, from roadways, and from other points of view in the surrounding areas. Given that the character of the area already includes existing utility facilities, the Chantilly Compressor Station would not have a significant visual impact on the surrounding residences or roadways.

The Elk River Compressor Station would be located adjacent to existing natural gas compressor station and facilities. The area immediately surrounding the proposed site is industrial, and is zoned for utility usage. In the general vicinity of the proposed compressor station site, there are residences to the east and to the west. Residences in both of these directions would be shielded from newly constructed facilities by existing forested parcels. There is also an electric substation that is on a higher elevation than the existing natural gas facilities across the river from the proposed site. Given that the character of the area already includes these utility facilities, the Elk River Compressor Station would not have a significant visual impact on the surrounding residences or roadways.

The Line VA-1 Receiver at MP 2.2 on Line VA-1 would be located close to several residences but would not have a major visual impact. The receiver would be located adjacent to the existing high-voltage right-of-way. The receiver facility would be separated from the closest residence by an existing wooded area and would only be nine feet, two inches above the ground at its highest point. Columbia would install a green slatted fence around the receiver site to minimize its visual impact. Given HDD would be used between MP 1.5 and MP 2.2, existing trees would be preserved which provide visual screening to residences bordering the existing electric utility easement. No houses are present within 50 feet of the proposed entry and exit points of the HDD.

The Project would potentially result in visual impacts on the recreational users of trails within the MNF. To address this impact, Columbia prepared a Seen Area analysis that shows areas in and near MNF that could have views of the Project. The Seen Area Analysis included all land up to five miles from the Project centerline and aboveground facilities that lies within and up to five miles beyond the National Forest proclamation boundary. This analysis was contained within Columbia's Visual Impact Assessment Report[30] and was based on generating a visual simulation of sight impacts in viewing the proposed pipeline path from various Key Observation Points (KOPs).

The report's Seen Area analysis used a methodology based on 11 KOPs determined in consultation with the MNF. This analysis resulted in two maps, one with the Seen Area layered on top of the USFS Scenic Class layer for MNF, and another showing the Seen Area with MNF roads, trails, designated recreation areas, and other locations that could be a KOP. The latter map consisted of 11 high-resolution photo simulations that accurately represents the "human field of view" that would be seen if standing at the actual KOP. Each photo simulation allowed the analyzer to evaluate the pipeline's vegetation clearing's impacts on four different scales of viewings of forest lands expected during operation of the pipeline. The scales were immediate foreground (0 to 300 feet), foreground (300 feet to 0.5-mile), middleground (0.5-mile to 4 miles), and background (4 miles to the horizon). Impacts were measured in terms of Scenic Classes which ranged from 1 (most valuable scenery) to 7 (least valuable scenery).

The results of the analysis concluded that the view shed at all of the 11 KOPs begin as Scenic Classes 1 or 2 (pre-construction), and that all KOPs are afforded little or no reduction in Scenic Class during the operation of the installed pipeline. Most KOPs are located at locations where a trail or recreational river intersects the pipeline corridor, which itself is primarily along existing cleared rights-of-way. The study concluded that impacts of pipeline operations from the Project in the MNF would be none to minor. One unnamed recreational trail would be crossed

[30] The Visual Impact Assessment Report can be found at accession number 20160819-5281(31635518 on FERC's e-library (elibrary.ferc.gov)

by Line VA-1. This trail would be removed during construction and replaced following completion. Prior to the start of construction, Columbia would work with the land managing agency or trail steward to alert recreational users of trails of the anticipated time and duration of disruptions associated with construction.

The proposed route for Line VA-1 would cross Virginia State Route 609, which was designated a Virginia Byway in 2004, at about MP 1.8. A Virginia Byway is defined as a road, having relatively high aesthetic or cultural value, leading to or within areas of historical, natural, or recreational significance. In the vicinity of the crossing, there is dense suburban development located on both sides of the byway. Columbia would work with the VDCR to avoid or minimize potential impacts on the designated Virginia Byway. Due to the existing development and utility infrastructure around the byway, we conclude that the Project would not impact the byway.

Line VA-1 would also be close to the Virginia Run neighborhood. In this area Columbia's pipeline and construction right-of-way would within an existing powerline right-of-way. Representatives of the Virginia Run Homeowner's Association have expressed concern about the Project's removal of trees on the west of the existing utility right-of-way. These trees provide a visual buffer that screens residents' view of the existing powerlines. Columbia met with members of the homeowner's association and evaluated the need for tree clearing in this area. Columbia determined it could minimize the number of trees that would need to be removed to about six trees, which would leave some of the existing trees that provide visually screening. This would minimize the visual impact of the Project on the Virginia Run neighborhood.

A commenter expressed concern over property values related to visual impacts expected at the Lost River Compressor Station expansion. Property values are discussed below in section 6.5. Regarding visual impacts, eight residences located within 50 to 450 feet south, southwest and southeast of the Lost River Compressor Station currently have direct views to the station. The proposed expansion facilities to be added to the station would be located immediately adjacent to several existing buildings and all within the station's existing property limits. A temporary workspace on the southwest side of the station would also be used for construction staging and would not present a long-term visual impact. However, the expanded facilities would include installation of a new building to house the proposed Units 14 and 15 as well as the addition of four separators south of the new building. While the use of the existing Lost River Compressor Station site for construction and operation of the proposed expansion would not be inconsistent with other land uses in the immediate area, it would pose new permanent visual impacts on the view shed of the above-mentioned residences. Therefore, **we recommend that**:

- **Prior to construction, Columbia should file with the Secretary, for review and written approval by the Director of OEP, a visual screening plan for the proposed Lost River Compressor Station expansion.**

6.0 SOCIOECONOMICS

The potential socioeconomic effects of construction and operation of the Project include changes in population levels or local demographics, increased opportunities for employment, increased demand for housing and public services, transportation impacts, and an increase in government revenue associated with sales, payroll, and property taxes with the Project area. The Project area encompasses eight counties in West Virginia and six counties in Virginia.

6.1 Population and Employment

Table B.6.1-1 provides a summary of selected demographic and socioeconomic conditions by state and county for the Project area. Population estimates in the Project area range from 9,386 in Clay County to 1,081,726 in Fairfax County. Population density ranges from 11.1 persons per square mile in Pendleton County to 605.8 persons per square mile in Fairfax County (U.S. Census Bureau, 2015a). The civilian labor force within the counties crossed by the Project includes more than 1,031,175 individuals whose major employment sectors are local government, healthcare, and other services-related industries. Unemployment rates in the counties crossed by the Project range from 3.6 percent in Fairfax County to 12.0 percent in Clay County.

TABLE B.6.1-1

Existing Economic Conditions for the WB XPress Project

State/ County	Population [a]	Population Density (persons per square mile) [a]	Median Household Income (US Dollars) [a]	Rental Vacancy Rate (percent) [b]	Civilian Labor Force [b]	Unemployment Rate (percent) [c]	Major Industry
West Virginia	1,852,994	77.4	$41,043	-	773,200	7.2	-
Kanawha	193, 063	214.1	$46,085	6.5	85,107	6.5	State government, local government services, healthcare
Clay	9,386	27.5	$31,613	5.3	3,350	12.0	Local government
Braxton	14,519	28.4	$31,848	11.2	5,347	9.6	Local government, services
Upshur	24,254	68.4	$39,381	6.7	9,441	8.8	Local government
Randolph	29,405	28.3	$37,276	10.4	11,624	8.0	Local government, healthcare
Pendleton	7,695	11.1	$34,175	3.5	3,462	4.4	Local government, healthcare
Grant	11,937	25.0	$41,368	8.5	5,625	7.5	Local government, healthcare
Hardy	14,025	24.1	$32,723	24.0	5,320	7.7	Local government, agricultural related industries
Virginia	8,001,024	202.6	$63,907	-	4,235,200	4.9	-
Shenandoah	41,993	82.5	$63,907	4.8	21,245	4.5	Local government, agricultural related industries
Warren	37,575	176.0	$61,610	4.9	20,040	4.8	Local government, healthcare
Clarke	14,034	79.7	$77,597	8.4	7,620	4.0	Local government, services
Fauquier	65,203	100.7	$88,409	6.8	35,867	4.0	Local government, healthcare, services
Loudoun	312,311	605.8	$122,238	3.6	191,469	3.7	Local government, aviation services, healthcare, information technology, hi-tech industries
Fairfax	1,081,726	2,766.80	$110,292	4.0	625,658	3.6	Federal government, local government, healthcare, government contracting, hi-tech industries

Sources:
[a] U.S. Census Bureau, 2015a
[b] U.S. Census Bureau, 2015b
[c] U.S. Bureau of Labor Statistics, 2015

Construction of the Project is expected to begin in July 2017 and last for about 22 months. The peak construction workforce would be about 175 workers for the pipeline portions of the Project and 425 for the aboveground facilities. Columbia would attempts to hire local and regional workers to the extent practicable, provided these workers possess the necessary skills and experience. All construction activities would be performed by companies specializing in the construction of natural gas facilities. These companies would likely use their own non-local crews for the majority of the construction positions. Workers would be distributed along the length of the Project route, thereby minimizing the potential impact on population levels and demographics in any individual county. The influx of non-local workers would result in a temporary, negligible population increase within the affected counties.

Construction of the Project would result in the hiring of local workers to supplement non-local construction crews. Additional jobs would also be created because of secondary activities associated with construction of the Project. These jobs would represent a temporary, minor increase in employment within the area.

During operation, the Project would create 12 new full-time positions. This would represent a negligible, permanent increase in population and employment.

6.2 Housing

Rental vacancy rates within the counties crossed by the Project range from 3.5 percent in Pendleton County to 24.0 percent in Hardy County. Within these counties, there are more than 192,997 rental units, 41 recreational vehicles parks, and 380 hotels/motels (U.S. Census Bureau, 2015b; HikerCentral.com, 2015; ePodunk, 2015).

Construction of the Project would likely have a short-term positive impact on the rental industry in the area through increased demand and higher rates of occupancy. The construction work force would consist of non-local workers, most of which are not expected to be accompanied by families. The temporary housing available within the Project area would be capable of meeting the temporary and moderate increased demand for housing resulting from construction of the Project.

The 12 new full-time operational staff for the proposed Elk River and Chantilly Compressor Stations would have a negligible long-term effect on housing demand.

6.3 Public Services

Project construction could temporarily increase demand for medical, police, and fire protection services in the event of a fire or other emergency. Columbia would work with local law enforcement and emergency response agencies to identify resources and responsibilities and to coordinate effective emergency procedures for the Project during construction and operation (see section B.9.1). Table B.6.3-1 summarizes the number of existing public services available in each county crossed by the Project.

Impacts on public services would be short term in duration and dispersed based on the concentrated duration of construction and linear nature of the Project. Because workers would not reside in any one municipality, the influx of workers should not burden the public services in the counties affected by the Project. Impacts on public services from the 12 additional staff required to operate the Elk River and Chantilly Compressor Stations would be negligible.

TABLE B.6.3-1

Existing Public Services for the WB XPress Project

County	Public Schools [a]	Number of Hospitals [b]	Police Services [c]	Fire Services [d]
West Virginia				
Kanawha	68	25	1 county, 16 municipal	5 municipal departments, 25 volunteer stations
Clay	6	0	1 county	3 volunteer stations
Braxton	8	2	1 county, 2 municipal	7 volunteer stations
Upshur	10	1	1 county, 1 municipal	2 municipal departments, 5 volunteer stations
Randolph	21	7	1 county, 1 municipal	1 municipal department, 9 volunteer stations
Pendleton	5	0	1 county	5 volunteer stations
Grant	5	1	1 county, 1 municipal	3 volunteer stations
Hardy	6	0	1 county, 2 municipal	3 volunteer stations
Virginia				
Shenandoah	11	2	1 county, 4 municipal	11 volunteer stations
Warren	10	2	1 county, 1 municipal	9 volunteer stations
Clarke	4	0	1 county, 1 municipal	3 volunteer stations
Fauquier	20	3	1 county, 1 municipal	1 municipal department, 11 volunteer stations
Loudoun	90	4	1 county, 3 municipal	1 county department, 16 volunteer stations
Fairfax	99	14	2 county, 4 municipal	1 county department, 1 municipal department, 12 volunteer stations

[a] Kanawha County Schools, 2015; Clay County Schools, 2015; Braxton County Schools, 2015; Upshur County Schools, 2015; Randolph Public Schools, 2015; Pendleton County Schools, 2015; Grant County Schools, 2015; Hardy County Schools, 2015; Shenandoah County Public Schools, 2015; Warren County Public Schools, 2015; Clarke County Public Schools, 2015; Fauquier County Public Schools, 2015; Loudoun County Public Schools, 2015; Fairfax County Public Schools, 2015.

[b] West Virginia Hospitals Association, 2015; Virginia Hospital and Healthcare Association, 2015.

[c] USACops, 2015a, USACops, 2015b.

[d] Virginia Firefighters, 2015; West Virginia Firefighters, 2015.

6.4 Transportation

The Project would involve 24 public road crossings. The name, location, and proposed crossing method of each of these crossings are listed in table B.6.4-1.

As described in section A.7.2, Columbia would use the bore method to cross 11 major federal and state roads. The bore method would allow installation of the pipeline under the road without impacting the road surface. The remaining 13 roads would be crossed using the open cut method. Construction at public road crossings would typically be scheduled to avoid peak hours to minimize the interruption of traffic. Prior to construction, Columbia would obtain all applicable federal, state, and local road crossing permits.

TABLE B.6.4-1

Public Roadways Crossed by the WB XPress Project

MP	Roadway Name	Roadway Type (Paved, Unpaved)	Jurisdiction (Federal, State, County)	Proposed Crossing Method [a]
Line WB-5 Extension				
0.2	Broad Run Road / County Route 13/20	Gravel	Kanawha County	Open Cut
0.3	Elk River Road / WV State Route 4	Paved	State	Bore
Line WB-22				
0.0	Elk River Road / WV State Route 4	Paved	State	Bore
0.1	Broad Run Road / County Route 13/20	Gravel	Kanawha County	Open Cut
0.5	Broad Run Road / County Route 13/20	Gravel	Kanawha County	Open Cut
Line WB Replacement				
3.2	Middle Mountain Road / County Route 10	Gravel	Randolph County	Open Cut
7.1	Dry Fork Road / County Route 40	Paved	Randolph County	Bore
7.9	Dry Fork Road / County Route 40	Paved	Randolph County	Bore
7.9	Dry Fork Road / County Route 40	Paved	Randolph County	Bore
9.0	Whitmer Road / County Route 29	Paved	Randolph County	Bore
9.8	Old USFS 127 / Whites Run Road / County Route 29/4	Paved	Randolph County	Open Cut
14.0	Straders Run	Dirt	Private	Open Cut
18.0	Brushy Run Road / County Route 5/3	Paved	Pendleton County	Bore
18.4	Lower Timber Ridge Road / County Route 6	Paved	Pendleton County	Bore
18.6	Allegheny Drive / US Hwy 33	Paved	Federal	Bore
19.1	Smith Mountain Road / County Route 5/2	Gravel	Pendleton County	Open Cut
19.6	Smith Mountain Road / County Route 5/2	Gravel	Pendleton County	Open Cut
20.7	Mountaineer Drive / WV State Route 28/55	Paved	State	Bore
23.7	Pub Road 79	Gravel	Federal	Open Cut
24.2	Pub Road 79	Gravel	Federal	Open Cut
24.6	Pub Road 79	Gravel	Federal	Open Cut
24.8	Pub Road 79	Gravel	Federal	Open Cut
24.9	Pub Road 79	Gravel	Federal	Open Cut
1.8	Pleasant Valley Road / VA State Route 609	Paved	Fairfax County / State	Bore

[a] Proposed road crossing methods would be in accordance with DOT regulations and would be finalized per permit conditions.

Construction of the Project could result in minor, short-term negative impacts on the transportation network in the Project area. The movement of equipment, materials, and personnel to construction work areas would result in modest, incremental, short-term impacts on the transportation network. Construction hours would typically be scheduled to take advantage of daylight hours; therefore, most workers would commute to and from the construction right-of-way during off-peak hours. Appropriate traffic control measures, such as flagmen and signs, would be used to ensure the safety of local traffic. Prior to construction, Columbia would work with local transportation officials to obtain any necessary for construction entrances and maintenance of traffic. To ensure safe conditions at all times, Columbia would direct all construction contractors to follow local weight restrictions and limitations and to remove soil that is left on the road surface by the crossing of construction equipment. When necessary for equipment to cross roads, mats or other appropriate measures (such as sweeping) would be used to reduce deposition of soil on roads. Considering the potential for access roads within the MNF to be in use by significant amount of traffic unrelated to construction of the proposed project, the

MNF requested a traffic safety plan be developed. Columbia would develop, and submit for approval to the appropriate agency (for example USFS, West Virginia Division of Highways, and/or Virginia DOT, depending on the road ownership), any required traffic safety plan for public roads that might be temporarily impacted by the construction efforts.

Traffic and transportation impacts associated with the 12 additional operational staff for the Elk River and Chantilly Compressor Stations would be negligible.

6.5 Property Values

The majority of the Project would consist of modifications and/or upgrades to existing facilities. Many of the existing facilities within the Project workspace have been in operation for up to 60 years. The new Project facilities would either be located within or immediately next to existing rights-of-way. Therefore, construction and operation of the Project facilities are not anticipated to significantly impact properties values.

The impact a natural gas project could have on real estate values depends upon various factors including the size of the parcel, the parcel's current value and land use, and the value of other nearby properties. Since each potential purchaser has differing criteria and means, it would be difficult to ascertain if the presence of the Project would make an intended future use infeasible. Subjective valuation is generally not considered in appraisals. Additionally, industry studies from the Interstate Natural Gas Association and International Right of Way Association indicate that proximity to natural gas pipelines would have no discernible impact on or systemic relationship with real estate values (INGAA, 2001; International Right of Way Online, 2011).

6.6 Economy and Tax Revenues

Construction of the Project would result in a temporary beneficial impact on the local economy due to increased payroll and material purchases. A portion of the Project construction payroll would be spent locally for the purchase of housing, food, and entertainment during construction. In addition, some of the materials for construction of the Project (e.g., fuel, fencing material, timber mats, concrete, sand and gravel, portable generators, and hand tools), would be purchased from vendors within the Project counties. Columbia estimates the total cost of the Project would be about $780 million; this figure includes ancillary costs such as right-of-way, project development, installation and maintenance and commissioning costs.

The total estimated capital investment and appraised value of Project components planned in Virginia is projected to be $426,303,553 and the total estimated capital investment and appraised value of Project components proposed in West Virginia is anticipated to be $1,341,904,189 for a total projected capital investment and appraised Project component value of just over $1.7 billion between the two states. This investment would equate to a projected $1,344,171 in property taxes paid to Virginia counties between 2016 and 2019. Local property taxes expected to be collected during the same period in West Virginia would be $11,315,024. In addition to these property tax revenues, Columbia expects to spend about $52 million in Virginia and about $158 million in West Virginia locally on materials.

Economic impacts from Project materials and construction would benefit the local economy on a short-term basis. In addition to the positive short-term economic impact, there would be long-term benefits by way of property tax collection that would benefit localities in Virginia and West Virginia.

6.7 Environmental Justice

The Executive Order 12898 on Environmental Justice recognizes the importance of using the NEPA process to identify and address, as appropriate, any disproportionately high and adverse health or environmental effects of federal programs, policies, or activities on minority populations and low-income groups. The provisions of Executive Order 12898 apply equally to Native American programs. Consistent with Executive Order 12898, the CEQ has called on federal agencies to actively scrutinize the following issues with respect to environmental justice:

Consistent with Executive Order 12898, the CEQ advocates that federal agencies actively scrutinize the following issues:

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

Table B.6.7-1 summarizes the minority and low income populations throughout the Project corridor and compares them to state and federal averages.

The EPA provides guidance on determining whether there is a minority or low-income community to be addressed in a NEPA analysis. According to this guidance, minority population issues must be addressed when they encompass over 50 percent of an affected area or when the minority population percentage of the affected area is substantially greater than the minority percentage in the larger area of the general population. Low-income populations are those that fall within the annual statistical poverty thresholds from the U.S. Department of Commerce, Bureau of the Census Population Reports, Series P-60 on Income and Poverty. The U.S. Census Bureau defines a poverty area as a census tract or other area where at least 20 percent of the residents are below the poverty level (U.S. Census Bureau, 2015c).

TABLE B.6.7-1

Demographics and Low Income Populations in the WB XPress Project Area

Country/State/County	Percent of Persons Below Poverty Level	Percent White Non-Hispanic	Percent Black	Percent Hispanic	Percent Asian	Percent Native American
UNITED STATES	15.4	62.6	13.2	17.1	5.3	1.8
West Virginia	17.9	92.7	3.6	1.4	0.8	1.5
Kanawha	14.1	88.9	7.6	0.8	1.1	2.3
Braxton	22.0	97.5	0.6	0.6	0.2	1.1
Clay	24.8	98.4	0.2	0.5	0.1	0.8
Grant	14.6	96.8	0.9	1.3	0.2	0.8
Upshur	18.4	97.3	1.0	1.1	0.4	0.2
Randolph	15.9	96.9	1.5	0.8	0.4	0.4
Pendleton	18.8	95.9	2.4	1.3	0.2	0.2
Hardy	15.7	92.1	2.8	3.4	0.9	0.8
Virginia	11.3	63.6	19.7	8.6	6.1	2.0
Shenandoah	11.7	89.3	2.2	6.5	0.7	1.3
Warren	9.3	87.8	5.1	4.0	1.1	2.0
Clarke	6.7	87.5	5.2	3.9	1.1	2.3
Loudoun	3.6	60.1	7.7	13.1	16.5	2.6
Fauquier	5.6	81.3	8.2	6.9	1.5	2.4
Fairfax	5.9	52.7	9.9	16.2	18.8	2.4

Sources: U.S. Census Bureau, 2015b

As shown in table B.6.7-1, Clay and Braxton Counties are the only counties crossed with poverty levels greater than 20 percent. There are no counties with a minority population over 50 percent. The county with the largest minority population is Fairfax County, Virginia at 47.3 percent.

Six census tracts and six census blocks were identified that would be affected by the proposed pipelines and new aboveground facilities. The EPA's Environmental Justice Screen, which is an electronic tool, was also used to determine if there are any communities within these census tracts and blocks that meet the EPA's criteria as environmental justice communities. The most racially diverse census tract and block group are located in Fairfax County where the county minority population was 47.3 percent. All of the other census tracts or block groups have minority populations less than 50 percent. As such, none of the six census tracts and six census blocks meet the definition of an environmental justice community based on minority populations.

Review of income data indicates the percentage of persons living below the poverty level in the affected census tracts and blocks is less than the statewide average where the new aboveground facilities would be located. Thus, the new aboveground facilities would not have a disproportionate impact on lower-income communities. The WB Replacement facilities would be located in census tracts and block groups where there is a higher percentage of persons living below the poverty line than the state average. However, given that nearly all of the replacement pipeline facilities would be located either within or adjacent to existing pipeline rights-of-way, there would be minimal impact on these communities and this impact would not disproportionately affect these lower income communities.

In summary, the Project facilities were not sited based on the socioeconomic conditions of local populations, but rather selected based on existing utility infrastructure. Overall, there is no evidence that the construction of the Project would disproportionately impact the health, social, or economic conditions of minority or low-income communities.

7.0 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires FERC to take into account the effect of its undertakings (including the issuance of certificates) on any properties listed on, or eligible for listing on, the National Register of Historic Places (NRHP) and to provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. Columbia, as a non-federal party, is assisting FERC 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).

Consultations

On July 22, 2015, we sent our NOI for the Project to the ACHP, the NPS, the West Virginia Department of Culture and History (WVDCH), the Virginia Department of Historic Resources, and federally recognized Indian tribes (Tribes) that may have an interest in the Project area. The NOI included a summary of the proposed Project, our process, and our intent to initiate consultation with the State Historic Preservation Office (SHPO)[31] and other government agencies, as well as interested Tribes to solicit their views of the Project's potential effects on historic properties.

[31] The SHPO is represented by the Virginia Department of Historic Resources in Virginia and West Virginia Division of Culture and History in West Virginia.

In addition to FERC's notification process, Columbia, or their consultant R. Christopher Goodwin and Associates, Inc., separately contacted the SHPOs and Tribes that might attach cultural or religious significance to cultural resources in the Project area.

State Historic Preservation Officers

Virginia

Table B.7-1 summarizes communication with the Virginia SHPO. In a letter dated March 31, 2015, Columbia introduced the proposed Project to the Virginia SHPO. In a May 8, 2015 response letter, the Virginia SHPO recommended that Columbia consult with the NPS regarding potential impacts on Civil War battlefields situated within the vicinity of the proposed Project area. On May 7, 2015 Columbia provided the Virginia SHPO with a Project Review Application Form and a Scope of Work Description that characterized the scope and methodology for the Phase I archaeological and the aboveground historic resource identification surveys. In a letter dated June 2, 2015, the Virginia SHPO concurred with the proposed scope of work; however, they recommended the visual effect of tree clearing be considered when defining the architectural study area. Additionally, the Virginia SHPO recommended that any previously recorded archeological sites known to be present within existing fenced facilities and pipeline easements be considered as part of the cultural resources survey, regardless of presumed prior disturbance. The Virginia SHPO reiterated that Columbia consult with the NPS regarding potential impacts on Civil War battlefields positioned in the vicinity of the Project area. The work plan included an area of potential effect (APE), which was defined as the area proposed for cultural resources survey and a 0.5-mile viewshed from the proposed compressor station for architectural reconnaissance.

TABLE B.7-1

Columbia and Virginia Department of Historic Resources Correspondence for the WB XPress Project

Date	Summary
3/31/2015	Letter from Columbia to the Virginia SHPO introducing the Project.
5/7/2015	Columbia submitted Project Review Application Form and Scope of Work Description to the Virginia SHPO.
5/8/2015	The Virginia SHPO responded to the Project introductory letter.
6/2/2015	Virginia SHPO commented on the proposed Scope of Work Description.
12/18/2015	Columbia submitted draft Phase I archaeological and architectural identification survey reports to the Virginia SHPO.
12/18/2015	Columbia submitted the Unanticipated Discoveries Plan to the Virginia SHPO
1/20/2016	Letter from Virginia SHPO to Columbia requesting additional information needed in order to complete their review of the Phase I architectural identification survey report.
1/22/2016	Columbia submitted to the Virginia SHPO information requested on 1/20/2016.
1/28/2016	Letter from the Virginia SHPO commenting on the Unanticipated Discoveries Plan.
1/28/2016	Letter from Virginia SHPO to Columbia requesting additional information needed in order to complete their review of the Phase I archaeological identification survey report.
3/15/2016	Letter from the Virginia SHPO concurring that no further archaeological investigations are necessary for the project.
3/22/2016	Letter from the Virginia SHPO concurring that no architectural properties listed in or eligible for the NRHP would be affected by the project.
11/16/2016	Letter from Columbia to the Virginia SHPO requesting review of workspace modifications along Line VA-1
11/16/2016	Letter from Columbia to the Virginia SHPO providing information on changes to the Chantilly Compressor Station and Dysart Valve Site.
12/5/2016	Columbia submitted the Phase I Archaeological Survey – Supplemental Draft Report to the Virginia SHPO.
12/29/2016	Letter from the Virginia SHPO concurring that no further architectural investigations are necessary for updates to the Chantilly Compressor Station and modifications to the Dysart Valve Site.
12/29/2016	Letter from the Virginia SHPO concurring that no additional cultural resources survey is necessary for workspace modifications along Line VA-1 (MPs 1.47-1.82 and MPs 1.9-2.1).
12/30/2016	Letter from the Virginia SHPO concurring that no further archaeological investigations are necessary for the 1.2 acre workspace at the Dysart Valve Site or for access road PAR 78 in Fairfax County.

On December 18, 2015, Columbia sent copies of the Phase I archeological and architectural identification survey reports to the Virginia SHPO for review and comment. On January 20, 2016, the Virginia SHPO requested additional information needed to complete its review of the report, which Columbia provided on January 22, 2016. In letters dated January 28, 2016, the Virginia SHPO commented on the Unanticipated Discovery Plan (UDP) and requested the document entitled *Phase I Archaeological Investigations of Sully Woodlands Parks – Sappington Parcels* to complete their review of the archaeological survey report. In a letter dated March 15, 2016, the Virginia SHPO concurred with recommendations in the report and that no additional archaeological fieldwork would be required. In a response dated March 22, 2016 the Virginia SHPO concurred that no architectural properties listed in or eligible for the NRHP would be affected by the Project. On November 16, 2016, Columbia requested the Virginia SHPO's review of proposed workspace modifications along Line VA-1. In a letter also dated November 16, 2016, Columbia provided the Virginia SHPO with information on changes to the Chantilly Compressor Station and the Dysart Valve Site in regards to the architectural reconnaissance survey. This letter also provided the results of a revised architectural viewshed model for these facilities. In a December 29, 2016 response, the Virginia SHPO concurred that no further architectural investigations would be required for the updated Chantilly Compressor Station or for modifications to the Dysart Valve Site. On December 5, 2016, Columbia submitted the *Phase I Archaeological Survey – Supplemental Draft Report* to the Virginia SHPO for review. In a letter dated December 29, 2016, the Virginia SHPO concurred that no further cultural resources survey would be required for workspace modifications along Line VA-1 between MPs 1.47 to 1.82 and MPs 1.9 to 2.1. In a December 30, 2016 letter the Virginia SHPO concurred that no further archaeological investigations would be required for the 1.2-acre workspace at the Dysart Valve Site or for access road PAR 78 in Fairfax County.

West Virginia

Table B.7-2 summarizes communications with the West Virginia SHPO. Columbia introduced the Project to the West Virginia SHPO in a letter dated March 31, 2015. On April 24, 2015, Columbia provided the West Virginia SHPO with a research design for the Phase I cultural resources inventory and aboveground historic resources survey. In a May 28, 2015 response letter, the West Virginia SHPO stated they disagreed with the survey methodology of moderate probability landforms and requested areas be tested at 15-meter intervals. The West Virginia SHPO concurred with the remaining survey plan. The work plan accepted by the West Virginia SHPO included an APE, which was defined as the area proposed for cultural resources survey. A specific fixed distance for the architectural reconnaissance APE was not defined due to the steep topography surrounding the Project sites. The APE for architectural resources includes the direct APE and the indirect APE (the visual APE) and was reviewed on a case-by-case basis based on the type and extent of project construction, topography, and surrounding vegetation.

TABLE B.7-2

Columbia and West Virginia Division of Culture and History Correspondence for the WB XPress Project

Date	Summary
3/31/2015	Letter from Columbia to the West Virginia SHPO introducing the Project.
4/24/2015	Columbia submitted a research design/work plan for the Project to the West Virginia SHPO.
5/28/2015	Letter from the West Virginia SHPO to Columbia providing comments on the proposed research design/work plan.
9/8/2015	Columbia submitted a Phase II site evaluation work plan to the West Virginia SHPO.
9/16/2015 and 10/7/2015	The West Virginia SHPO accepted the Phase II site evaluation work plan.
12/21/2015	Columbia submitted Draft Phase I Identification Reports to the West Virginia SHPO.
12/21/2015	Columbia submitted the Unanticipated Discoveries Plan to the West Virginia SHPO.
1/26/2016	Columbia submitted Draft Site 46PD402 Phase II site evaluation report to the West Virginia SHPO.
2/4/2016	The West Virginia SHPO concurred with the recommendations in the archaeological identification survey report and requested more information regarding architectural resources and avoidance plans.
2/10/2016	The West Virginia SHPO concurred that the 46PD402 is eligible for the NRHP.
2/18/2016	Columbia provided GIS data regarding 46PD402.
2/25/2016	The West Virginia SHPO accepted the GIS data and noted that no additional consultation for archaeological resources would be necessary.
2/4/2016	Letter from West Virginia Division of Culture and History (WVDCH) to Columbia providing comments on the Draft Phase I reports and the Unanticipated Discoveries Plan.
2/10/2016	Letter from WVDCH to Columbia providing comments on the Draft Site 46PD402 Phase II report.
2/18/2016	Columbia submitted shapefiles to the WVDCH as requested in their 2/10/2016 correspondence to Columbia.
2/25/2016	Letter from WVDCH to Columbia providing final comments on the Draft Site 46PD402 Phase II report.
11/23/2016	Columbia submitted Revised Draft Report for Architectural Investigations to the West Virginia SHPO
11/23/2016	Columbia submitted Draft Report on Supplemental Phase I Archaeological Survey to the West Virginia SHPO
12/13/2016	Letter from the West Virginia SHPO concurring that no further archaeological investigations are necessary for the Supplemental Phase I Archaeological project area
12/20/2016	Email correspondence between Columbia and West Virginia SHPO regarding Revised Architectural Investigations report and submittal of requested copies for Phase I Archaeological Survey report and Revised Architectural Investigations report.
12/21/2016	Letter from West Virginia SHPO providing comments on the Revised Architectural Investigations report.

Columbia submitted a work plan for Phase II archaeological evaluation of site 46PD402 to the West Virginia SHPO for review and comment on September 9, 2015. In an email dated September 16, 2015 and a letter dated October 7, 2015, the West Virginia SHPO concurred with the Phase II work plan.

On December 21, 2015, Columbia sent copies of the Phase I archaeological and architectural identification survey reports to the West Virginia SHPO for review and comment. Columbia sent the draft Site 46PD402 Phase II evaluation report to the West Virginia SHPO on January 26, 2016. The West Virginia SHPO concurred with the recommendations in the Phase I archaeological identification survey. However, the West Virginia SHPO requested the state's Historic Property Inventory forms be completed and updated for architectural resources and include the following information in a revised report: additional information regarding temporary facilities and demonstrate that certain cultural resources would be avoided. The West Virginia SHPO responded in a letter dated February 10, 2016, and concurred that site 40PD402 is eligible for listing on the NRHP. However the Project would have no adverse effects to historic properties if the intact archaeological resources were avoided by project activities. In a letter dated February 18, 2016, Columbia provided geographic information system data regarding site 46PD402 to the West Virginia SHPO, and on December 25, 2016, the West Virginia SHPO responded that no further consultation would be necessary for archaeological resources. On November 23, 2016, Columbia submitted the *Revised Draft Report for Architectural Investigations* to the West Virginia SHPO for review; hard copies and electronic files of the report were provided. Also on November 23, 2016, Columbia submitted the *Draft Report on Supplemental Phase I Archaeological Survey* to the West Virginia SHPO for review; this submittal included both hard copies and electronic files. In a December 13, 2016 review letter, the West Virginia SHPO concurred that that no further archaeological investigations would be required for the Supplemental Phase I project area. Email correspondence between Columbia and the West Virginia SHPO, dating from December 14 to 20, 2016, discussed the inclusion of specific properties (WBX-3, WBX-8, WBX-10, and WBX-11) in the revised architectural investigations report and the submittal of requested copies (hard copies and electronic files) of the revised architectural investigations report and the Phase I archaeological survey report. In a December 21, 2016 review letter the West Virginia SHPO provided comments on the revised architectural investigations report. The West Virginia SHPO concluded that the Lost River Compressor Station would have an adverse effect on the Arthur Smith and the Dr. B.G. Moyers Farmsteads and requested that Columbia reconsider the report's recommendation of no adverse effect for these properties. Columbia has not filed any plans to avoid or minimize the adverse effects to the Arthur Smith and the Dr. B.G. Moyers Farmsteads.

Tribal Consultation

Table B.7-3 summarizes communications with Tribes. On December 9, 2015, we sent letters to nine Indian tribes that historically may have occupied or used the project area, requesting their comments about the Project and assistance in the identification of traditional cultural properties that may be affected. The tribes contacted include: the Delaware Tribe of Indians, the Eastern Shawnee Tribe of Oklahoma, the United Keetoowah Band of Cherokee Indians in Oklahoma, the Shawnee Tribe, the Delaware Nation, the Absentee-Shawnee Tribe of Oklahoma, Eastern Band of the Cherokee Indians, the Catawba Indian Nation, and the Cherokee Nation.

TABLE B.7-3

Communication with Federally Recognized Tribes for the WB XPress Project

Tribe	Date	Summary
Absentee-Shawnee Tribe of Oklahoma	7/6/2015 12/9/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites. Letter from FERC to tribe.
Catawba Indian Nation	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
	9/9/2015 12/9/2015	Letter from the Catawba Indian Nation to Columbia. Letter from FERC to tribe.
Cayuga Nation of New York	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Cherokee Nation	7/6/2015 12/9/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites. Letter from the FERC to tribe.
Delaware Nation	7/6/2015 12/9/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites. Letter from FERC to tribe.
Delaware Tribe of Indians	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
	8/21/2015 12/9/2015	Letter from the Delaware Tribe of Indians to Columbia. Letter from FERC to tribe.
	12/21/2015	Copy of West Virginia archaeological survey report was submitted to the Delaware Tribe of Indians.
	1/26/2016	Copy of draft Site 46PD402 Phase II report was submitted to the Delaware Tribe of Indians by Columbia.
	2/11/2016	Letter from the Delaware Tribe of Indians agreeing with the recommendations in 46PD402 and avoidance of the site.
	11/23/2016	Copy of the Draft Report on Supplemental Phase I archaeological survey submitted to the Delaware Tribe of Indians by Columbia.
Eastern Band of the Cherokee Indians	7/6/2015 12/9/2015 11/7/2016	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites. Letter from FERC to tribe. Letter from Eastern Band of Cherokee Indians to FERC.
Eastern Shawnee Tribe of Oklahoma	7/6/2015 12/9/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites. Letter to from FERC to tribe.
Oneida Tribe of Indians of Wisconsin	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Oneida Indian Nation of New York	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Onondaga Nation of New York	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Pamunkey Indian Tribe	7/14/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Seneca-Cayuga Tribe of Oklahoma	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Seneca Nation of Indians	7/6/2015 7/16/2015 1/12/2016	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites. Email from the Seneca Nation of Indians to Columbia. Copies of Phase I Virginia and West Virginia archaeological survey reports submitted to the Seneca Nation of Indians by Columbia.
	1/26/2016	Copy of draft Site 46PD402 Phase II report sent to the Seneca Nation of Indians by Columbia.

TABLE B.7-3 (Continued)

Tribe	Date	Summary
Seneca Nation of Indians	11/23/2016	Copy of the Draft Report on Supplemental Phase I archaeological survey submitted to the Seneca Nation of Indians by Columbia.
Shawnee Tribe	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
	7/24/2015	Letter from Shawnee Tribe to Columbia.
	12/9/2015	Letter from FERC to Tribe.
St. Regis Band of Mohawk Indians of New York	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Tonawanda Band of Seneca Indians of New York	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
Tuscarora Nation	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
United Keetoowah Band of Cherokee Indians in Oklahoma	7/6/2015	Letter from Columbia to the tribe introducing the Project and requesting information on cultural resource sites.
	12/9/2015	Letter from FERC to tribe.

In addition to the FERC's consultation letters, Columbia sent Project introduction letters in July 2015 to 19 tribes. The 19 tribes contacted included all 9 of the tribes contacted by FERC as well as: the Cayuga Nation of New York, the Oneida Tribe of Indians of Wisconsin, the Oneida Indian Nation of New York, the Onondaga Nation of New York, the Pamunkey Indian Tribe, the Seneca – Cayuga Tribe of Oklahoma, the Seneca Nation of Indians, the St. Regis Band of the Mohawk Indians of New York, the Tonawanda Band of Seneca Indians of New York, and the Tuscarora Nation. The letters contained a description of the Project, location maps, and requested comments concerning the proposed Project, and the identification of tribal religious or cultural sites.

In response to Columbia's letters, the Shawnee Tribe and the Catawba Indian Nation indicated they had no immediate concerns with the proposed Project. Both tribes requested they be notified if archaeological materials were uncovered during construction activities. The Seneca Nation of Indians responded in an email to Columbia stating they had no concerns regarding portions of the Project positioned within previously disturbed areas; however, the tribe requested copies of cultural resources survey reports for proposed project components located in areas that had not been previously disturbed. Columbia provided copies of the West Virginia and Virginia Phase I archaeological reports to the tribe on January 12, 2016, and a copy of the Draft Site 46PD402 Phase II report on January 26, 2016. In a letter to Columbia dated August 21, 2015, the Delaware Tribe of Indians stated they had concerns regarding portions of the proposed Project in West Virginia and requested a copy of West Virginia cultural resources survey report prepared for the Project. Columbia provided a copy of the West Virginia Phase I archaeological survey report to the Delaware Tribe of Indians on December 21, 2015, and a copy of the Draft Site 46PD402 Phase II report on January 26, 2016. In a letter dated, February 11, 2016, the Delaware Tribe of Indians agreed with the recommendations that site 46PD402 is eligible for listing in the NRHP and should be avoided. Furthermore, they requested to be notified if an unanticipated discovery was encountered. On November 23, 2016, Columbia provided the Delaware Tribe of Indians with a copy of the *Draft Report on Supplemental Phase I Archaeological Investigations*, as requested in their August 21, 2015 letter. Also, on November 23, 2013, Columbia sent a copy of the *Draft Report on Supplemental Phase I Archaeological Investigations* to the Seneca Nation of Indians, as requested in their July 16, 2015 letter. In a letter dated January 7, 2017, the Eastern Band of Cherokee Indians stated that a cultural resources survey should occur at the 3.1 miles of new pipeline and requested to be notified about unanticipated discoveries during construction.

Other Parties

Monongahela National Forest

Columbia sent an introductory letter to the MNF on March 31, 2015. The MNF issued the Permit for Archeological Investigations on August 6, 2015.

On November 18, 2015, Columbia sent a brief report to the MNF which summarized the results of cultural resources survey completed within the MNF in accordance with conditions stated in the Permit for Archeological Investigations. On December 21, 2015, Columbia submitted a copy of the West Virginia Phase I cultural resources survey report (which included the results of survey within the MNF) to the MNF for review and comment. Columbia has not filed MNF's comments on the report.

On November 23, 2016, Columbia submitted the *Revised Draft Report on Architectural Reconnaissance Survey* to the MNF for review. Also on November 23, 2016, Columbia submitted the *Draft Report on Supplemental Phase I Archaeological Survey* to the MNF for review. In a November 29, 2016 letter, the MNF concurred with the results both of these draft reports and determined that no further archaeological or architectural investigations would be required for the Project within the MNF. We concur.

National Park Service - American Battlefield Protection Program

Portions of the Project cross or are in proximity to Civil War battlefields. Columbia sent a Project introduction letter to the National Park Service – American Battlefield Protection Program (ABPP) on July 17, 2015. The ABPP responded to the August 18, 2015 letter regarding a potential reroute through the Manassas Battlefield, stating they had concerns about potential impacts on the soundscape and increased stormwater runoff from the proposed Project. Columbia sent a letter addressing these issues on November 2, 2015. Columbia also sent a letter to the ABPP with additional project information on November 11, 2015. Columbia has not filed any additional response from the ABBP.

Fairfax County Park Authority

Portions of the Project are located on land owned by the FCPA. Table B.7-4 summarizes communication with the FCPA. Columbia sent an introductory letter to the FCPA's Cultural Resource and Protection Branch on March 31, 2015. On December 18, 2015, Columbia sent copies of the Virginia Phase I cultural resources survey and architectural investigations reports to the FCPA. Columbia received comments from the FCPA on January 16, 2016 regarding the draft archaeological survey report. The FCPA noted that it only reviewed the portions of the report pertaining to Fairfax County, and that no additional survey would be required. The FCPA stated they would issue a concurrence letter for the archaeological survey upon receipt of the final version of the archaeological survey report. The FCPA provided a copy of the Phase I Archaeological Investigations of Sully Woodlands Parks – Sappington Parcels to the Virginia SHPO in a letter dated February 3, 2016. In a November 16, 2016 letter, Columbia provided the FCPA with information on revisions to the proposed Chantilly Compressor Station which occurred subsequent to submission of the December 2015 architectural reconnaissance survey. Results of a revised architectural viewshed model for updates were discussed. No additional comments from FCPA have been filed by Columbia.

Sierra Club – Virginia Chapter

On February 10, 2016, Appalachian Mountain Advocates on behalf of Sierra Club's Virginia Chapter filed comments, which included a one-page request that FERC perform a cultural attachment review as part of the NEPA process for all proposed pipelines in Virginia. The filing defines cultural attachment as "the cumulative effect over time of a collection of traditions, attitudes, practices, and stories that ties a person to the land, to physical place, and to kinship patterns." The cultural attachment request provides no specific information about the WB XPress Project. Accordingly, this material was considered, but not used in our analysis of the Project.

TABLE B.7-4

Columbia and Monongahela National Forest Communication Relating to Cultural Resources for the WB XPress Project

Date	Summary
3/31/2015	Letter from Columbia to the MNF introducing the Project.
5/20/2015	Columbia submitted Application for Permit for Archaeological Investigations to the MNF.
5/21/2015	Columbia submitted shape files of proposed Project areas to the MNF.
6/19/2015	The MNF provided digital data on previously identified cultural resources and previous cultural resources investigations to Columbia.
7/27/2015	The MNF issued the Permit for Archaeological Investigations for review and signature by Columbia.
7/31/2015	Columbia returned the signed Permit for Archaeological Investigations to the MNF.
8/6/2015	The MNF issued the fully executed Permit for Archaeological Investigations under the Organic Act of 1897.
8/6/2015	The MNF provided Columbia with digital site forms.
8/12/2015	The MNF provided Columbia with digital reports.
11/18/2015	Columbia provided the MNF with a Preliminary Draft Report.
12/21/2015	Columbia provided the MNF with the Draft Reports for West Virginia Survey.
12/21/2015	Columbia provided the MNF with the Unanticipated Discoveries Plan for West Virginia.
2/16/2016	The MNF provided Columbia with comments on the Unanticipated Discoveries Plan for West Virginia.
3/9/2016	Columbia provided the MNF with a revised version of the Unanticipated Discoveries Plan for West Virginia which incorporated their comments.
8/15/2016	The MNF provided Columbia with comments on the West Virginia Draft Cultural Survey Reports and approval of the West Virginia Unanticipated Discoveries Plan.
11/23/2016	Columbia submitted the Revised Draft Report on Architectural Reconnaissance Survey to MNF.
11/23/2016	Columbia submitted the Draft Report on Supplemental Phase I Archaeological Survey to MNF.
11/29/2016	Letter from MNF to Columbia regarding the Draft Report on architectural reconnaissance survey and the Draft Report on Supplemental Phase I archaeological survey and concurring that no further architectural or archaeological investigations are necessary for the project.

Cultural Resource Investigations

Virginia

Columbia conducted Phase I cultural resources survey within the considered APE for the Project, including the pipeline route, extra workspaces, access roads, existing facilities, and the proposed Chantilly Compressor Station site. About 2.2 miles of the proposed pipeline corridor, 1.9 miles of proposed access roads, 41.3 acres of existing facilities, and 13.0 acres for the proposed compressor station were surveyed. A total of 69.6 acres were surveyed. Phase I cultural surveys are 100 percent complete.

The archaeological survey revisited three previously recorded archaeological sites (44FX3679, 44FX3680, and 44FX3681). These sites consist of material from unknown pre-contact and historic 20th century use. All three sites were recommended as not eligible for listing in the NRHP and no additional testing was recommended.

The architectural reconnaissance survey did not identify any structural resources 50 years or older within or adjacent to the pipeline corridor; however, portions of three Civil War battlefields (the First and Second Battles of Manassas) and the Manassas National Battlefield Park are located within the vicinity of the Project. Columbia recommended the Project modifications planned in the vicinity of the battlefields would occur in areas that no longer appear to possess sufficient integrity of setting, workmanship, feeling, or association to illustrate the area's relationship to the First or Second Battles of Manassas. Therefore, construction of the Project would result in no effect to these properties. Columbia responded to the initial concerns of the ABPP but has not filed any additional comments from the ABPP.

The existing Loudoun Compressor Station adjoins the Watson Historic District, which has previously been determined to be eligible for listing on the NRHP. This district has links with an antebellum free African-American community prior to the Civil War. Columbia recommended the proposed new construction at the facility would not result in visual effects on surrounding structural resources 50 years of age or older.

The existing Ninevah Meter Station is located 0.2-mile south of the Thomas McKay House, which was built in the early 19th century; a historic property determined eligible for listing on the NRHP. Columbia's archaeological consultant recommended the proposed activities at the station would have no potential to affect the qualities of significance for the Thomas McKay House due to the distance of the proposed activities from the house and the existing development in the vicinity.

The existing Strasburg Compressor Station adjoins the Cedar Creek Battlefield, which NRHP eligibility has not been evaluated. This Civil War battle was fought in Warren and Shenandoah Counties in 1864. This area of the battlefield has undergone substantial development; therefore, Columbia recommended that construction of new compressor station buildings would not affect the historical resource.

The proposed Dysart Valve construction location is visible from an early 20th century farm complex. Columbia recommended the farm complex does not retain sufficient integrity and is recommended as ineligible for listing in the NRHP.

The Virginia SHPO agreed the project did not require additional fieldwork and would have no effect on historic properties. We agree.

West Virginia

Columbia conducted Phase I cultural resources survey within the considered APE, including the pipeline route, extra workspaces, access roads, and associated aboveground facilities. About 26.7 miles of the proposed pipeline corridor, 22.0 miles of proposed access roads, 84.9 acres of existing facilities, and 53.3 acres of contractor storage yards were surveyed. A total of 544.7 acres were surveyed across each of these components. A subsequent supplemental Phase I archaeological survey studied an additional approximate 1.9 miles of proposed access road, 0.5 acres of workspace along the pipeline corridor, and 0.7-acre comprised of the White Contractor Yard. The Phase I cultural surveys are 99.6 percent complete.

In addition, about 0.2-acre of extra workspace positioned along the Line WB Replacement has not been surveyed due to project changes made after the completion of initial survey. Columbia has stated these areas would be surveyed for cultural resources once access has been granted.

Columbia's archaeological survey in West Virginia resulted in the identification of eight archeological sites (46HY649, 46HY650, 46HY651, 46HY652, 46HY653, 46PD401, 46PD402, and 46RD730) and five cemeteries (46PD399, 46PD400, 46RD278, 46RD731, and 46RD732). Five of the identified archaeological sites (46HY650, 46HY651, 46HY652, 46PD401, and 46RD730) have date ranges from the unknown pre-contact and historic periods. These sites are recommended as not eligible for listing in the NRHP, while the three remaining archaeological sites (46HY649, 46HY653, and 46PD402) were not initially assessed for NRHP eligibility. The Project was reconfigured to avoid sites 46HY649 and 46HY653, which both date to the unknown pre-contact period. However, avoidance of site 46PD402, a pre-contact lithic reduction site, was not possible, and a Phase II site evaluation was conducted. Upon completion of the Phase II evaluation, Columbia recommended that a portion of the site outside the APE was eligible for listing in the NRHP but that no intact contributing elements of the resource were in the APE. Hence, Columbia recommended there would be no adverse effects to site 46PD402. The West Virginia SHPO agreed that avoidance of the intact resources would have no adverse effects on historic properties. We agree.

One of the five identified historic cemeteries dates to the 19th century, while the remaining four date to the late 19th and 20th centuries. None of the five identified cemeteries were assessed for their NRHP eligibility because Columbia reconfigured the Project to avoid impacts on all cemeteries.

Architectural reconnaissance surveys in West Virginia were conducted along the pipeline corridors, access roads, contractor storage yards, and for new construction and/or modifications at six compressor stations (Elk River, Frametown, Cleveland, Files Creek, Seneca, and Lost River), the Panther Mountain Regulator Station, the Broad Run Interconnect Station, and five valve sites (Dink, Glady, Whitmer, Smokehole, and WB-5). Twenty-seven architectural resources 50 years of age or older were identified. The John Mathias House (NRHP 78002796) is listed in the NRHP. The Arthur Snider Farmstead (HY-0052-0007) and the Dr. B.F. Moyers Farmstead (HY-0052-0008) were previously evaluated as potentially eligible for the NRHP. The Martin Mullennex Farmstead (RD-0892) is also recommended as potentially eligible for the NRHP. The remaining resources have been recommended not eligible for the NRHP. Columbia recommended the proposed Project would result in no adverse effect on historic properties. The West Virginia SHPO found that the project would have adverse effects on the Arthur Snider Farmstead (HY-0052-0007) and the Dr. B.F. Moyers Farmstead (HY-0052-0008). No additional responses have been filed.

Unanticipated Discoveries Plan

Columbia submitted UDPs to the Virginia and West Virginia SHPOs on December 18, 2015 and December 21, 2015, respectively. The West Virginia plan also addresses unanticipated discoveries on MNF property. Columbia submitted a copy of the plan to the MNF on December 21, 2015. The plans outline the procedures that would be followed in the event that unanticipated cultural resources or human remains are encountered during construction of the Project. On January 28, 2016, Columbia received comments regarding the Virginia plan from the Virginia SHPO. A revised UDP was submitted to the MNF for review and in an email dated March 2, 2016, the MNF accepted the UDP. The Virginia SHPO found the plan to be acceptable. Columbia has not filed comments from West Virginia SHPO. We find the plans acceptable.

Compliance with the NHPA

Compliance with Section 106 of the NHPA has not been completed for the Project. To ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **Columbia should not begin construction of facilities and/or use of (all) staging, storage, or temporary work areas and new or to-be-improved access roads in Virginia and West Virginia, until:**

  a) Columbia files with the Secretary:

    i. reports, studies, or plans of additional cultural resources surveys in West Virginia;

    ii. site-specific avoidance and/or treatment plan(s), as required;

    iii. comments on reports and plans from the West Virginia SHPO; and

    iv. the records of continued consultation with the National Park Service – ABPP.

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

  c) the FERC staff reviews and the Director of the OEP approves the cultural resources reports and plans, and notifies Columbia in writing that avoidance and/ or treatment measures, as required, may be implemented and/or construction may proceed.

  All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE."

8.0 AIR QUALITY AND NOISE

8.1 Air Quality

Construction and operation of the Project could have an effect on local and regional air quality. The EPA has developed National Ambient Air Quality Standards (NAAQS) for criteria air pollutants to protect human health (primary standards) and public welfare (secondary standards).

Existing Air Quality

The climate of the Project area in West Virginia and Virginia is described as humid continental, characterized by frequent changes in the weather with large ranges in temperature.

Ambient air quality is protected by federal and state regulations. The EPA established NAAQS to protect human health and welfare.[32] Primary standards protect human health, including the health of sensitive subpopulations, such as children, the elderly, and those with chronic respiratory problems. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. NAAQS have been developed for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). However, O_3 is not a pollutant emitted into the air. It is formed from a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Consequently, emissions of NO_x and VOCs are regulated by the EPA as "precursors" to the formation of O_3. West Virginia and Virginia have directly adopted the federal NAAQS.

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

In addition, Virginia is included in the Ozone Transport Region. The Ozone Transport Zone, established under the Clean Air Act amendments, includes 11 northeastern states in which O_3 transports from one or more states and contributes to a violation of the O_3 NAAQS in one or more other states. Emissions in this region are subject to more stringent permitting requirements and various regulatory thresholds are lower for the pollutants that form O_3, even if they meet the O_3 NAAQS.

The EPA and state and local agencies have established a network of ambient air quality monitoring stations to measure and track the background concentrations of criteria pollutants across the U.S. This data is then used by regulatory agencies to compare the air quality of an area to the NAAQS. Table B.8.1-1 identifies the applicable counties in which Project activities would occur and their attainment status.

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32 The current NAAQS are listed on the EPA's website at http://www.epa.gov/air/criteria.html.

TABLE B.8.1-1

Air Quality Attainment Status for Affected Counties for the WB Xpress Project

County	Facility	Attainment	Nonattainment	Maintenance
Kanawha, WV	Elk River Compressor Station	2008 O_3; NO_2; CO; PM_{10}; SO_2; Pb	None	1997: O_3 2006: $PM_{2.5}$ 1997: $PM_{2.5}$
	Line WB-22 Receiver Site			
	Panther Mountain Regulator Station			
	Line WB-5 Extension (MP: 0.0-0.3)			
	Line WB-22 (MP: 0.0-0.6)			
Clay, WV	Dink Valve Site	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
Braxton, WV	Frametown Compressor Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
Upshur, WV	Cleveland Compressor Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
Randolph, WV	Files Creek Compressor Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
	Glady Valve Site			
	Whitmer Valve Site			
	Mill Creek Valve Site			
	Line WB Replacement (MP: 0.0-11.0)			
Pendleton, WV	Seneca Compressor Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
	Smokehole Valve Site			
	WB Loop Receiver			
	Line WB Replacement (MP: 11.0-25.4)			
	Line WB Replacement (MP: 134.6-134.6)			
	Line WB Replacement (MP: 134.7-134.8)			
Grant, WV	Line WB-5 Valve Site	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
	Line WB-5 Replacement (MP: 4.5-4.7)			
	Line WB Replacement (MP: 141.3-141.3)			
	Line WB Replacement (MP: 142.4-142.6)			
Hardy, WV	Lost River Compressor Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
	Moorefield Valve Site			
	Line WB Replacement (MP: 146.4-146.4)			
Shenandoah, VA	Strasburg Compressor Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
	Dysart Valve Site			
	Columbia Furnace Valve Site			
Warren, VA	Nineveh Meter Station	O_3; NO_2; CO; PM_{10}; $PM_{2.5}$; SO_2; Pb	None	None
	Shenandoah River West Valve Site			
Loudoun, VA	Loudoun Compressor Station	NO_2; CO; PM_{10}; 2006 $PM_{2.5}$; SO_2; Pb	1997: O_3 – Moderate 2008: O_3 – Marginal	1997: $PM_{2.5}$
Fairfax, VA	Chantilly Compressor Station	NO_2; CO; PM_{10}; 2006 $PM_{2.5}$; SO_2; Pb	1997: O_3 – Moderate 2008: O_3 – Marginal	1997: $PM_{2.5}$
	Line VA-1 Receiver Site			
	Line VA-1 (MP: 0.0-2.2)			

The EPA now defines air pollution to include the mix of six long-lived and directly emitted greenhouse gases (GHGs), finding that the presence of the following GHGs in the atmosphere may endanger public health and welfare through climate change: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. As with any fossil-fuel fired project or activity, the Project would contribute GHG emissions. The principle GHGs that would be emitted by the Project are CO_2, CH_4, and N_2O. No fluorinated gases would be emitted by the Project. GHG emissions are quantified and regulated in units of CO_2 equivalents (CO_2e). The CO_2e takes into account the global warming potential (GWP) of each GHG. The GWP is a ratio relative to CO_2 of a particular GHG's ability to absorb solar radiation, as well as its residence time within the atmosphere. Thus, CO_2 has a GWP of 1, CH_4 has a GWP of 25, and N_2O has a GWP of 298.[33] In compliance with EPA's definition of air pollution to include GHGs, we have provided estimates of GHG emissions for construction and operation, as discussed throughout this section. Impacts from GHG emissions (i.e., climate change) are discussed in more detail in section C.10.0 under cumulative impacts.

Permitting/Regulatory Requirements

The CAA, as amended in 1977 and 1990, is the basic federal statute governing air pollution. The provisions of the Clean Air Act that are potentially relevant to the Project are discussed further below.

New Source Review and Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review air permit programs are designed to protect air quality when air pollutant emissions are increased either through the construction of new major stationary sources or major modifications to existing stationary sources. The WVDEP and VDEQ administer the PSD and Nonattainment New Source Review permitting programs in West Virginia and Virginia, respectively.

The following Project facilities have current emissions above PSD major source thresholds, and their proposed changes qualify as PSD minor modifications. In January 2016, Columbia applied for a construction permit and Title V permit modification with the WVDEP for each of these compressor stations.

- Cleveland Compressor Station located in Upshur County, West Virginia;
- Files Creek Compressor Station located in Randolph County, West Virginia;
- Seneca Compressor Station located in Pendleton County, West Virginia; and
- Lost River Compressor Station located in Hardy County, West Virginia.

The Frametown Compressor Station located in Braxton County, West Virginia, is a current PSD major source facility, and the proposed changes do not require any permit modification.

The following Project facilities have current or proposed emissions below PSD major source thresholds, and their proposed changes do not qualify them as PSD sources:

- Elk River Compressor Station to be located in Kanawha County, West Virginia;
- Strasburg Compressor Station located in Shenandoah County, Virginia;
- Loudoun Compressor Station located in Fairfax County, Virginia;
- Chantilly Compressor Station to be located in Fairfax County, Virginia; and
- Individual meter or regulator stations, valve sites, and pig launcher/receiver sites.

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

Title V Permitting

Title V of the Clean Air Act is an operating air permit program run by each state for each facility that is considered a "major source." The Title V major source thresholds in both West Virginia and Virginia are 100 tons per year (TPY) for each criteria pollutant, 10 TPY for individual hazardous air pollutants (HAPs), and 25 TPY for total HAPs.

The Elk River Compressor Station would be a Title V major source, and once operational, Columbia would need to apply for a Title V operating permit through the WVDEP. In January 2016, Columbia submitted a construction permit application to the WVDEP. The Strasburg Compressor Station currently operates under a minor source permit, and for the proposed modifications, Columbia submitted a state major permit application in January 2016 with the VDEQ. As described above, Columbia applied for modifications to their existing permits for Cleveland, Files Creek, Seneca, and Lost River Compressor Stations.

The Loudoun Compressor Station is a current Title V major source facility, and the proposed changes would not require any permit modification.

The proposed electric-driven Chantilly Compressor Station, as well as the valve sites, launcher/receiver sites, a regulator station, and a meter station all have current or proposed emissions below Title V thresholds, and their proposed changes would qualify them as minor sources.

New Source Performance Standards

The EPA promulgates New Source Performance Standards (NSPS) to establish emission limits and fuel monitoring, notification, reporting, and recordkeeping requirements for stationary source types or categories. The NSPS are divided into subparts based on source types and sizes. The potentially applicable subparts are addressed below.

Subpart JJJJ applies to stationary spark ignition internal combustion engines. The emergency generators at Elk River Compressor Station would be subject to Subpart JJJJ. The emission standards are expressed in terms of brake-specific emission rates based upon the horsepower rating of the unit, as well as, concentrations. There are applicable emission standards listed in the subpart for NO_x, CO, and VOCs. Subpart JJJJ also requires performance testing, work practice, monitoring, recordkeeping, and reporting for the engines. These requirements would be included in the WVDEP issued air permit. Columbia would ensure compliance with these requirements by complying with their issued air permit.

Subpart KKKK applies to stationary combustion turbines that commenced construction, modification, or reconstruction after February 18, 2005. The new turbines at Elk River, Cleveland, Files Creek, Seneca, Lost River, and Strasburg Compressor Stations would be subject to Subpart KKKK. Each of the proposed turbines meet the definition of a new turbine firing natural gas with a heat input rating between 50 and 850 million British thermal units per hour. The units would be subject to specific NO_X emission limitations for each turbine. Solar Turbines guarantees that each of the proposed turbines would meet the applicable NO_x limit. Initial and annual performance testing is required to demonstrate compliance with the NO_x limit, and all performance tests must meet all of the requirements outlined in 40 CFR 60.4400 in order to be valid. Subpart KKKK also limits the sulfur content of the fuel burned in each turbine.

The recent additions of subparts OOOO and OOOOa add requirements to reduce emissions of GHG and VOCs in the oil and natural gas production chain. Primarily focused on reducing GHG and VOC emissions from oil and gas production wells; gathering and boosting compressor stations; and gas processing plants; Subpart OOOO would affect natural gas transmission compressor stations, including certain storage tanks in service at transmission compressor stations. The rules set out specific measures to reduce GHG and VOC emissions from operations and to fix leaks.

National Emission Standards for Hazardous Air Pollutants

The 1990 Clean Air Act Amendments established a list of 189 HAPs, resulting in the promulgation of National Emission Standards for HAPs. The National Emission Standards for HAPs regulate HAP emissions from specific source types located at major or area sources of HAPs by setting emission limits, monitoring, testing, recordkeeping, and notification requirements.

The National Emission Standards for HAPs, codified in 40 CFR 61 and 63, regulate HAPs from stationary sources through Maximum Available Control Technology standards. Facilities are defined as major sources of HAPs if the facility-wide potential emissions are greater than 10 TPY for a single HAP or greater than 25 TPY for total HAPs. If neither of these thresholds is exceeded, then the facilities are considered area sources of HAPs.

Subpart YYYY applies to stationary combustion turbines at major sources of HAPs. Cleveland, Files Creek, and Lost River Compressor Stations are major sources of HAPs; therefore, Subpart YYYY would apply to the new turbines at each facility. Since all of the turbines are gas-fired units, the only requirement for compliance with the regulation is to provide initial start-up notifications to the WVDEP.

Subpart ZZZZ applies to stationary reciprocating internal combustion engines. Any new stationary reciprocating internal combustion engine located at an area source must meet the requirements of NSPS Subpart JJJJ to demonstrate compliance with the National Emission Standards for HAPs Subpart ZZZZ. Elk River Compressor Station would be an area source of HAPs and subject to NSPS Subpart JJJJ; therefore, no additional requirements of Subpart ZZZZ apply to the reciprocating internal combustion engine at this compressor station.

Federal Class I Areas

Class I federal areas are designated specifically as pristine natural areas or areas of natural significance (e.g., wilderness areas, national parks, national forests). Under the PSD program of the CAA, these areas are protected by the EPA to ensure that deterioration of existing air quality-related values, such as visibility, is minimized in these areas. Class I areas have the most restrictive PSD increments. For a new major source or major modification located within 62 miles (100 kilometers) of a Class I area, the facility is required to notify the appropriate federal officials and assess the impacts of that project on the nearby Class I area. If a major source is located within 6.2 miles (10 kilometers) of a Class I area, the facility is also required to assess ambient air pollutant impacts of any project emission increase on the nearby Class I area. The closest Class I areas to each of the compressor stations are shown in table B.8.1-2.

TABLE B.8.1-2

Closest Class I Areas to the Compressor Stations for the WB XPress Project

Distance and Direction from Class I Area (miles)				
Compressor Station	**Dolly Sods Wilderness Area, West Virginia**	**Otter Creek Wilderness Area, West Virginia**	**James River Face Wilderness, Virginia**	**Shenandoah National Park, Virginia**
Elk River	109 East Northeast	93 East Northeast	118 Southeast	137 East Southeast
Cleveland	54 East Northeast	38 East Northeast	92 Southeast	91 East Southeast
Files Creek	25 Northeast	11 Northeast	85 South Southeast	68 Southeast
Seneca	8 North	16 Northwest	85 South	48 Southeast
Lost River	26 West Northwest	40 West Northwest	92 Southwest	28 East Southeast
Strasburg	53 West	67 West	113 Southwest	10 Southwest
Chantilly	99 West Northwest	113 West Northwest	134 Southwest	34 West

The proposed Elk River Compressor Station would be 93 miles from the nearest federal Class I area and would be a minor source with regard to PSD thresholds. The existing Strasburg and Chantilly Compressor Stations are located within 62 miles of a Class I area, but they would also be minor sources of PSD. The Cleveland, Files Creek, Seneca, and Lost River Compressor Stations are all located within 62 miles of a Class I area and are all major sources with regard to PSD thresholds. However, the modifications that would occur at each of these facilities are not considered a major modification with regard to PSD and are not located within 6.2 miles of a Class I area. As such, no correspondence with a Federal Land Manager with regard to air quality impacts nor an assessment of ambient air pollution impacts on the Class I areas is required.

As described further below, air modeling was performed for the proposed equipment associated with the Project at the Elk River, Cleveland, Files Creek, Seneca, Lost River, and Strasburg Compressor Stations. Modeling was not completed for the Chantilly Compressor Station as it would be a minor source of emissions. The modeling results show that all of the proposed equipment at the compressor stations are in compliance with the NAAQS. Because the facilities are in compliance with the NAAQS, the emissions would not adversely impact nearby locations including the Class I areas surrounding the facilities. Therefore, we conclude that operation of each of these compressor stations would have negligible impacts on Class I area air quality.

<u>General Conformity</u>

The lead federal agency must conduct a conformity analysis if a federal action would result in the generation of emissions that would exceed the conformity threshold levels of the pollutant(s) for which an air basin is designated nonattainment or maintenance. Conforming activities or actions should not, through additional air pollutant emissions:

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

General conformity assessments must be completed when the total direct and indirect emissions of a project would equal or exceed specified pollutant thresholds on a calendar year basis for each nonattainment or maintenance area. The operational emissions that would be permitted by state agencies, for this Project by the WVDEP and VDEQ, are not subject to the general conformity applicability analysis. Estimated emissions for the Project subject to review under the general conformity thresholds (construction emissions and operational emissions not subject to major or minor New Source Review permitting), along with a comparison to the applicable general conformity threshold are presented below in table B.8.1-3.

TABLE B.8.1-3

General Conformity Applicability Analysis for the WB XPress Project

County / Requirement	Pollutant (TPY)			
	NO_X	VOC	$PM_{2.5}$	SO_2
Kanawha County, West Virginia, 2017				
Construction Emissions	38.0	4.3	4.2	1.2
Total Emissions	38.0	4.3	4.2	1.2
General Conformity *De Minimis* Threshold	100	100	100	100
Kanawha County, West Virginia, 2018				
Construction Emissions	1.2	0.3	0.2	0.0
Operational Emissions – one full calendar year [a]	0.0	1.4	0.0	0.0
Total Emissions	1.2	1.7	0.2	0.0
General Conformity *De Minimis* Threshold	100	100	100	100
Loudoun County, Virginia				
Construction Emissions – occurs in 2018	3.2	16.2	0.6	0.1
Operational Emissions – one full calendar year [a]	0.0	1.4	0.0	0.0
Total Emissions	3.2	17.6	0.6	0.1
General Conformity *De Minimis* Threshold	100	50	100	100
Fairfax County, Virginia				
Construction Emissions – occurs in 2018	27.2	3.2	3.4	0.9
Operational Emissions – one full calendar year [a]	0.5	0.6	0.0	0.0
Total Emissions	27.7	3.8	3.4	0.9
General Conformity *De Minimis* Threshold	100	50	100	100

[a] Includes operational emissions not otherwise covered by state-issued permits.

Kanawha County, West Virginia, and Loudoun and Fairfax Counties, Virginia, are located in nonattainment/maintenance areas. As shown in table B.8.1-3, during both construction and operation, non-permitted emission estimates would not exceed general conformity applicability thresholds in these counties. Based upon this evaluation, a general conformity assessment is not required.

Greenhouse Gas Mandatory Reporting Rule

GHGs, the most common of which are CO_2, CH_4, N_2O, O_3, water vapor, hydrofluorocarbons, and perfluorocarbons, are naturally-occurring pollutants in the atmosphere as well as products of human activities, including burning fossil fuels. Fossil fuel combustion emits CO_2, CH_4, and N_2O. GHG emissions are generally calculated in terms of CO_2e where the warming potential of each gas is expressed as a multiple of the warming potential of CO_2e.

On October 30, 2009, the EPA published the final Mandatory Reporting of GHG rule, establishing the Greenhouse Gas Reporting Program (GHGRP) codified in 40 CFR 98. Since 2011, the GHGRP has required large direct emitters of GHGs, and certain suppliers (e.g., of fossil fuels, petroleum products, industrial gases and CO_2) to report GHG information annually. Subpart W of 40 CFR 98 applies to petroleum and natural gas systems, including: both onshore and offshore petroleum and natural gas production; onshore natural gas processing; onshore natural gas transmission compression; underground natural gas storage; liquefied natural gas storage, and import and export equipment; natural gas distribution; onshore petroleum and natural gas gathering and boosting; and onshore natural gas transmission pipeline that emit greater than or equal to 25,000 metric tons[34] of GHG, as CO_2e, per year.

The EPA's Mandatory Reporting of GHG Rule requires reporting from applicable sources of GHG emissions if they emit greater than or equal to 25,000 metric tons of GHG (as CO_{2e}) in 1-year. The Mandatory Reporting Rule does not require emission control devices and is strictly a reporting requirement for stationary sources based on actual emissions. Although the rule does not apply to construction emissions, we have provided GHG construction emission estimates, as CO_{2e}, for accounting and disclosure purposes below in table B.8.1-4. Operational GHG emission estimates for the Project are also presented as CO_{2e}.

Based on the emission estimates presented, actual GHG emissions from operation of the Elk River, Cleveland, Files Creek, Seneca, Lost River, and Strasburg Compressor Stations, each of which would be considered separate stationary sources, have the potential to exceed the 25,000 metric TPY reporting threshold for the Mandatory Reporting Rule. Recent additions to the Mandatory Reporting Rule effective for calendar year 2016 require reporting of GHG emissions generated during operation of natural gas pipeline transmission system, which would include blowdown emissions, equipment leaks, and vent emissions at compressor stations, as well as blowdown emissions between compressor stations (40 CFR 98 Subpart W). The applicability of 40 CFR 98 Subpart W would apply to the entire commonly owned Columbia system. If the actual emissions from any of each compressor stations or from the operation of the Columbia natural gas pipeline system are equal to or greater than 25,000 metric TPY, Columbia would be required to comply with all applicable requirements of the rule.

State Air Quality Regulations

West Virginia regulation 45 CSR 2 applies to the combustion of fuel in indirect heat exchangers. The turbines at Elk River, Cleveland, Files Creek, Seneca, and Lost River Compressor Stations are applicable to 45 CSR 2. The requirements include emission limitation from smoke and particulate matter. By combusting only natural gas in the turbines, all of the turbines would be in compliance with this regulation.

Virginia regulation 9 VAC 5-50-90 applies to new and modified stationary sources. The new equipment at Strasburg Compressor Station would be required to take reasonable precautions to prevent particulate matter from becoming airborne during construction, modification, or operation.

Virginia regulation 9 VAC 5-80-1105 applies to new and modified stationary sources. The new turbines at Strasburg Compressor Station would require a Best Available Control Technology analysis for NO_x, CO, and VOC as the emissions are above the threshold values allowed in the regulation. The Best Available Control Technology analysis would be included in the VDEQ air permit application.

The Chantilly Compressor Station, valve sites, launcher/receiver sites, a regulator station, and a meter station all have current or proposed emissions below Title V thresholds, and their proposed changes would not qualify them as Title V sources. As these facilities fall below state minor source permitting thresholds, they do not require notifications to the WVDEP or VDEQ for the proposed changes.

[34] A metric ton is 2,205 pounds, or about 1.1 tons.

Construction Emissions

Construction of the Project would result in short-term, localized increases in emissions of some pollutants from the use of fossil fuel-fired equipment and the generation of fugitive dust due to earthmoving activities. There may also be some temporary indirect emissions attributable to construction workers commuting to and from work sites during construction and from on-road and off-road construction vehicle traffic. Large earthmoving equipment and other mobile equipment are sources of combustion-related emissions, including criteria pollutants (i.e., NO_x, CO, VOC, SO_2, and PM_{10}). Estimated construction emissions are presented in table B.8.1-4. These emissions present the combined emissions of construction equipment combustion, on-road vehicle travel, off-road vehicle travel, and earthmoving fugitives.

Columbia proposes to use temporary compression equipment intermittently as needed for pressure increase during the MAOP uprate activities at the Mill Creek, Whitmer, Moorefield, Columbia Furnace, and Shenandoah River West Valve Sites and the Cleveland and Loudoun Compressor Stations. The operation of temporary compression units would be limited to normal business hours (7 AM to 7 PM) over the course of four to seven days. The emissions from the equipment and associated venting of natural gas are included in the estimates in table B.8.1-4. [35]

TABLE B.8.1-4

Construction-Related Emissions for the WB XPress Project

	Pollutant (TPY)							
Construction Activity	NO_x	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CO_2e	HAP
2017 Emissions								
Diesel Non-road Equipment	69.6	55.9	6.9	8.8	8.8	2.5	11,640	0.9
Diesel and Gas On-road Equipment	10.2	39.4	2.0	0.4	0.4	0.1	5,168	0.6
Construction Activity Fugitive Dust	-	-	-	42.3	6.1	-	-	-
Roadway Fugitive Dust	-	-	-	22.0	2.2	-	-	-
TOTAL	**79.8**	**95.3**	**8.9**	**73.5**	**17.5**	**2.6**	**16,808**	**1.5**
2018 Emissions								
Diesel Non-road Equipment	75.9	53.7	6.3	8.7	8.7	3.0	13,822	0.8
Diesel and Gas On-road Equipment	12.5	40.1	2.2	0.5	0.5	0.1	5,980	0.6
Construction Activity Fugitive Dust	-	-	-	48.6	7.1	-	-	-
Roadway Fugitive Dust	-	-	-	42.4	4.2	-	-	-
Temporary Compressor Engines	0.1	0.0	0.0	0.0	0.0	0.0	3	0.0
Venting Operations	-	-	70.6	-	-	-	45,259	-
TOTAL	**88.5**	**93.8**	**79.1**	**100.2**	**20.5**	**3.1**	**65,064**	**1.4**

[35] Detailed construction emission calculations were filed on October 6, 2016, and can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161006-5125 in the "Numbers: Accession Number" field for the filing. The construction calculations are listed under "Data request 5 Attachment 1."

Columbia would be required to reduce fugitive emissions of particulate matter (dust) during construction, and follow its Fugitive Dust Control Plan.[36] These procedures may include:

- spraying disturbed areas of dirt/gravel roads with water;
- covering areas susceptible to fugitive dust with mulch or tackifier;
- proper construction sequencing and limiting disturb areas;
- installing fencing in areas susceptible to dust to reduce wind speeds;
- loading haul trucks below the freeboard and covering loads with granular materials;
- 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.

Emissions from construction equipment exhaust would be temporary in nature. Once construction activities in the Project area are completed, fugitive dust and construction vehicle/equipment emissions associated with the pipeline and auxiliary facilities would return to preconstruction levels. Therefore, we conclude that emissions associated with the construction phase of the Project would not result in a significant impact on local air quality.

Operational Emissions

Operation of the Project would result in emissions associated with the new and modified aboveground facilities including compressor stations, valve sites, launcher/receiver sites, a regulator station, and a meter station. Emissions would also be generated from pipeline leaks and blowdown activities.

Compressor Stations

The planned new, modified, and removed equipment with potential to generate emissions for each of the compressor stations are identified in table B.8.1-5. The restaging and uprating modifications at the existing compressor stations would not affect the previously calculated emissions from these units. The existing and new potential annual emissions are presented in table B.8.1-6 for the proposed new compressor stations and in table B.8.1-7 for the proposed modified compressor stations.

[36] Columbia's updated Fugitive Dust Control Plan was filed as part of the Construction, Operation, and Maintenance Plan, Appendix P, on December 2, 2016. It can be viewed on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20161202-5113 in the "Numbers: Accession Number" field.

TABLE B.8.1-5

Emission-Generating New and Modified Equipment for the WB XPress Project Compressor Stations

Compressor Station	Equipment Status	Equipment
New Compressor Stations		
Elk River Compressor Station	New	Two Solar Mars 100 turbines, each rated at 15,900 hp, equipped with advanced dry low NO_X combustion controls; one emergency generator; two line heaters; 49 catalytic space heaters; and two bi-directional launcher/receiver facilities.
Chantilly Compressor Station	New	Two Solar compressors driven by Siemens electric motors, each rated at 4,000 hp, equipped with advanced dry low NO_x combustion controls; 40 catalytic space heaters; one measurement station; and one bi-directional launcher/receiver facility.
Existing Compressor Stations		
Cleveland Compressor Station	New	Two Solar Mars 100 turbines, each rated at 15,900 hp, equipped with advanced dry low NO_x combustion controls; one line heater; and 20 catalytic space heaters.
	Modification	Restage two Solar Taurus 70 turbines.
Files Creek Compressor Station	New	Two Solar Taurus 70 turbines, each rated at 10,915 hp, equipped with advanced dry low NO_x combustion controls; one line heater; and 22 catalytic space heaters.
	Retire/Remove	Two emergency generators.
	Modification	Uprate two Solar Taurus 70 turbines.
Seneca Compressor Station	New	One Solar Taurus 70 turbine, rated at 10,915 hp, equipped with advanced dry low NO_x combustion controls; one line heater; and 23 catalytic space heaters.
	Modification	Uprate one Solar Mars 100 turbine and restage two Solar Taurus 60 turbines.
Lost River Compressor Station	New	Two Solar Mars 100 turbines, each rated at 15,900 hp, equipped with advanced dry low NO_x combustion controls; one line heater; and 48 catalytic space heaters.
	Retire/Remove	One Clark HRA-8T compressor engine[a] and one fuel gas heater.
	Modification	Restage and uprate two Solar Taurus 70 turbines.
Strasburg Compressor Station	New	Two Solar Taurus 70 turbines, each rated at 10,915 hp, equipped with advanced dry low NO_x combustion controls; one Solar Mars 100 turbine, rated at 15,900 hp, equipped with advanced dry low NO_x combustion controls; one emergency generator; two line heaters; and 35 catalytic space heaters.
	Retire/Remove	Two European Gas Tornado turbines [b], two emergency generators, one heating system boiler, and one air compressor engine.
	Modification	Restage and uprate one Solar Titan 130 turbine.

[a] The compressor engine was previously abandoned by replacement in Docket No. CP12-511-000.
[b] These turbines were previously abandoned by replacement in Docket No. CP14-124-000.

TABLE B.8.1-6

Potential Operating Emissions from New Compressor Stations for the WB XPress Project

	Pollutant (TPY)							
Compressor Station	NO_x	CO	VOC	$PM_{10}/PM_{2.5}$	SO_2	CO_2e	Formaldehyde	Total HAPs
Elk River Compressor Station								
Proposed Potential Emissions	**66.1**	**162.8**	**30.1**	**7.8**	**0.9**	**152,294**	**0.8**	**1.3**
Chantilly Compressor Station								
Proposed Potential Emissions	**0.5**	**0.4**	**0.6**	**0.0**	**0.0**	**805**	**0.0**	**0.0**

TABLE B.8.1-7

Potential Operating Emissions from Modified Compressor Stations for the WB XPress Project

Compressor Station	Pollutant (TPY)							
	NO_x	CO	VOC	$PM_{10}/PM_{2.5}$	SO_2	CO_2e	Formaldehyde	Total HAPs
Cleveland Compressor Station								
Existing Potential Emissions	928.7	98.0	56.8	19.2	0.7	132,879	16.9	24.3
Proposed Potential Emissions	63.8	97.1	21.2	7.4	0.8	139,653	0.8	1.2
TOTAL Potential Emissions	**992.5**	**195.1**	**78.0**	**26.6**	**1.5**	**272,532**	**17.7**	**25.5**
Files Creek Compressor Station								
Existing Potential Emissions	939.7	211.4	67.1	28.2	0.8	143,181	16.9	24.4
Changes to Existing Emissions	-3.6	-6.0	-<0.1	-<0.1	0.0	-190	-<0.1	-0.1
Proposed Potential Emissions	43.4	96.1	31.4	5.0	0.5	105,986	0.5	0.8
TOTAL Potential Emissions	**979.5**	**301.5**	**98.5**	**33.2**	**1.3**	**248,977**	**17.4**	**25.1**
Seneca Compressor Station								
Existing Potential Emissions	290.9	279.3	46.7	18.5	1.3	213,982	1.3	2.0
Proposed Potential Emissions	23.4	92.3	16.9	2.6	0.3	54,515	0.3	0.4
TOTAL Potential Emissions	**314.3**	**371.6**	**63.6**	**21.1**	**1.6**	**268,497**	**1.6**	**2.4**
Lost River Compressor Station								
Existing Potential Emissions	838.8	464.1	112.6	20.4	1.1	186,509	31.9	47.1
Changes to Existing Emissions	-103.5	-28.4	-5.7	-2.3	-<0.1	-5,921	-2.6	-3.8
Proposed Potential Emissions	65.6	97.2	17.7	7.5	0.8	139,909	0.8	1.2
TOTAL Potential Emissions	**800.9**	**532.9**	**124.6**	**25.6**	**1.9**	**320,497**	**30.1**	**44.5**
Strasburg Compressor Station								
Existing Potential Emissions [a]	93.6	94.9	11.9	12.4	0.5	82,251	0.6	0.9
Changes to Existing Emissions [b]	-53.6	-8.0	-6.9	-7.7	-<0.1	1,632	-0.1	-0.2
Proposed Potential Emissions [c]	77.3	161.0	58.2	9.2	1.0	194,232	1.0	1.5
TOTAL Potential Emissions	**117.2**	**247.9**	**63.2**	**13.9**	**1.5**	**278,115**	**1.5**	**2.2**

[a] Includes worst-case emissions from one of the two facility operating sections: operating two European Gas Tornado turbines simultaneously or operating one Solar Titan 130 turbine.

[b] NO_x and VOC emissions shown are based on the worst-case scenario emissions from the two European Gas Tornado turbines. Modified station emissions include the removal of the two European Gas Tornado turbines plus the uprated emissions of the one Solar Titan 130 turbine and the other proposed station changes. CO, $PM_{10}/PM_{2.5}$, SO_2, CO_{2e}, formaldehyde and HAP estimates were based on the operation of the Solar Titan 130 turbine. For these pollutants, the modified station emissions include the modification of the one Solar Titan 130 turbine and the other proposed station changes.

[c] This does not include the emissions from the uprated Solar Titan 130 turbine as they are included in the changes to existing potential emissions.

Columbia performed a refined air dispersion modeling analysis using the latest version of the EPA’s Atmospheric Dispersion Modeling System (AERMOD). The modeling was conducted for the proposed new equipment at the proposed new Elk River Compressor Station and the modeled impacts were added to background ambient air quality data for the region to evaluate compliance with NAAQS. Table B.8.1-7 provides the total predicted maximum ground-level concentrations outside of the Elk River Compressor station’s estimated fence line for the modeled pollutants.

TABLE B.8.1-7

AERMOD Results and NAAQS Compliance Summary for Proposed New Compressor Station

		Concentration ($\mu g/m^3$)			
Pollutant	Averaging Period	Modeled [a]	Background	Total	NAAQS
Elk River Compressor Station					
NO_2	1-hour [b]	37.2	57.5	94.7	188
CO	1-hour	149	2,862	3,011	40,000
	8-hour	83.7	1,374	1,457.7	10,000
PM_{10}	24-hour	2.5	30.0	32.5	150
$PM_{2.5}$	24-hour	1.4	18.3	19.7	35
	Annual	0.2	9.1	9.3	12
SO_2	1-hour [c]	2.7	111	113.7	196

[a] Modeled facility highest value outside the estimated fence line.
[b] Annual NO_2 was not modeled, however the 1-hour concentration is below the annual NO_2 of 100 $\mu g/m^3$
[c] 3-hour SO_2 was not modeled, however the 1-hour concentration is below the 3-hour SO_2 of 1,300 $\mu g/m^3$

Columbia filed modeling analysis for both the existing and proposed modified Cleveland, Files Creek, Seneca, Lost River, and Strasburg Compressor Stations on August 22, 2016.[37] Appendix K summarizes the locations for background ambient air quality data and meteorological data for the existing stations. The potential to emit from both the existing and proposed modified compressor stations were modeled. The following modeling parameters were used for these stations:

- Terrain elevations for each receptor;
- Direction specific building downwash for each stack;
- Default model options with the exception of Seneca Compressor Station, described below and in Appendix K;
- Rural dispersion coefficients;
- Conservative ambient conditions of 0° Fahrenheit for short-term averaging periods and 32° Fahrenheit for annual averaging periods;
- Receptor grids of 50-meter (m) spacing out to 0.5 kilometers (km), 100-m to 1.5 km, 250-m to 3.0 km, 500-m to 5.0 km, and 1,000-m to 10.0 km;
- Inclusion of all sources permitted for continuous operation (i.e. the natural-gas fired turbines);
- Exclusion of emergency generators permitted for use less than 100-hours per year for the 1-hour NO2, annual NO2, and PM2.5 models.

At the Seneca Compressor Station, Columbia used the non-default Ozone Limiting Method (OLM) option in AERMOD along with the low wind speed condition (LOWWIND3) to determine 1-hour NO_2 air quality impacts. One of the input requirements for the OLM option is the in-stack NO_2/NO_x ratio for each source. Although Columbia did not have stack test data for the sources at the Seneca CS, it used in-stack NO_2/NO_x ratios from similar units.

[37] Columbia's air modeling protocols were filed on August 22, 2016, under accession number 20160822-5260. As these were classified by Columbia as Critical Energy Infrastructure Information, they can only be accessed through special request to FERC or from Columbia itself.

Table B.1-8 presents a summary of the modeling results and provides the current the air quality impact from the existing station, the proposed modified station, the ambient background data, and the combination of the modeled facility after the Project with the background data. This combined estimated concentration is compared with the NAAQS for each criteria air pollutant and averaging period. The maximum air quality impacts were found to be less than a mile from the stations with the exception of Cleveland Compressor Station where the maximum modeled 1-hour SO_2 and NO_2 concentrations were located 5 km or 3.1 miles to the south of the station.

TABLE B.8.1-8

AERMOD Results and NAAQS Compliance Summary for Proposed Modified Compressor Station

Concentration (µg/m^3)						
Pollutant	Averaging Period	Modeled Existing Facility	Modeled Facility After Project [a]	Background	Total	NAAQS
Cleveland Compressor Station						
NO_2	1-hour [b]	9.7	21.5	77.7	99.2	188
	Annual [c]	0.3	0.5	16.6	17.1	100
CO	1-hour [d]	168.0	168.2	460.0	628.2	40,000
	8-hour [d]	78.8	78.8	345.0	423.8	10,000
PM_{10}	24-hour [e]	1.5	1.5	34.0	35.5	150
$PM_{2.5}$	24-hour [f]	1.3	1.3	19.0	20.3	35
	Annual [g]	0.1	0.1	8.8	8.9	12
SO_2	1-hour [h]	24.0	33.8	39.3	73.1	196.5
	3-hour [d]	18.8	22.8	47.2	70.0	1,300
Files Creek Compressor Station						
NO_2	1-hour [b]	51.3	89.7	77.7	167.4	188
	Annual [c]	0.5	0.8	16.6	17.4	100
CO	1-hour [d]	1051.6	1,051.6	460.0	1,511.6	40,000
	8-hour [d]	741.0	741.0	345.0	1,086.0	10,000
PM_{10}	24-hour [e]	2.8	3.7	39.0	42.7	150
$PM_{2.5}$	24-hour [f]	1.8	2.4	19.0	21.4	35
	Annual [g]	0.4	0.5	8.8	9.3	12
SO_2	1-hour [h]	75.0	131.9	39.3	171.2	196.5
	3-hour [d]	51.1	92.6	47.2	139.8	1,300
Seneca Compressor Station						
NO_2	1-hour [i]	130.9	164.6	NA	164.6	188
	Annual [c]	9.9	9.9	16.6	26.5	100
CO	1-hour [d]	1402.7	1,402.7	460.0	1,862.7	40,000
	8-hour [d]	289.4	289.4	345.0	634.4	10,000
PM_{10}	24-hour [e]	3.2	3.4	23.0	26.4	150
$PM_{2.5}$	24-hour [f]	1.9	2.0	22.0	24.0	35
	Annual [g]	0.5	0.6	8.5	9.1	12
SO_2	1-hour [h]	123.6	144.7	12.3	157.0	196.5
	3-hour [d]	87.7	113.6	18.3	131.9	1,300
Lost River Compressor Station						
NO_2	1-hour [b]	20.2	38.2	77.7	115.9	188
	Annual [c]	0.9	1.0	16.6	17.6	100
CO	1-hour [d]	63.1	80.8	460.0	540.8	40,000
	8-hour [d]	31.4	31.4	345.0	376.4	10,000
PM_{10}	24-hour [e]	0.4	0.6	23.0	23.6	150
$PM_{2.5}$	24-hour [f]	0.3	0.4	21.0	21.4	35
	Annual [g]	0.07	0.1	7.6	7.7	12
SO_2	1-hour [h]	29.1	63.0	53.3	116.3	196.5
	3-hour [d]	15.4	26.8	74.9	101.7	1,300

TABLE B.8.1-8 (Continued)						
Concentration (μg/m^3)						
Pollutant	Averaging Period	Modeled Existing Facility	Modeled Facility After Project [a]	Background	Total	NAAQS
Strasburg Compressor Station						
NO_2	1-hour [b]	5.3	12.6	54.0	66.6	188
	Annual [c]	0.2	0.6	9.0	9.6	100
CO	1-hour [d]	1000.3	1,000.3	460.0	1,460.3	40,000
	8-hour [d]	453.1	453.1	345.0	798.1	10,000
PM_{10}	24-hour [e]	1.3	1.7	23.0	24.7	150
$PM_{2.5}$	24-hour [f]	0.9	1.0	23.7	24.7	35
	Annual [g]	0.1	0.2	8.9	9.1	12
SO_2	1-hour [h]	15.1	18.8	12.3	31.1	196.5
	3-hour [d]	14	18.6	18.3	36.9	1,300

Note: NA = not applicable as seasonal hour-of-day NO_2 background concentrations were summed with the modeled 1-hour NO_2 concentrations within AERMOD.

[a] Modeled facility highest value outside the estimated fence line.

[b] Modeled facility maximum five-year average of the 98th percentile or highest-eighth-highest daily maximum 1-hour average value. EPA default Ambient Ratio Method of 0.8 applied.

[c] Modeled facility maximum annual value. EPA default ambient ratio method of 0.75 applied.

[d] Modeled facility highest-second-highest value.

[e] Modeled facility highest-sixth-highest value.

[f] Modeled facility five-year average of the 98th percentile or highest-eighth-highest 24-hour average value.

[g] Modeled facility maximum five-year average of the annual value.

[h] Modeled facility five-year average of the 99th percentile or highest-fourth -highest daily maximum 1-hour average value.

[i] Modeled facility maximum five-year average of the 98th percentile or highest-eighth-highest daily maximum 1-hour average value. Seasonal hour-of-day NO_2 background concentrations were summed with the modeled 1-hour NO2 concentrations within AERMOD based on the Ozone Limiting Method

The Chantilly Compressor Station was not modeled as the station is a minor source of emissions. The Frametown and Loudoun Compressor Stations were not modeled as the station modifications would be minor with regard to emissions.

As shown in tables B.8.1-7 and B.8.1-8, the modeled concentrations from the new and modified stations, when combined with existing ambient concentrations, is not expected to result in an exceedance of any of the NAAQS and therefore would not result in significant air quality impacts.

Blowdowns and Fugitive Emissions

Most compressor station blowdowns are associated with engine/turbine unit startup/shutdowns and maintenance activities. Each station also performs an annual full station blowdown for testing purposes. Unplanned blowdowns may occur at the compressor stations in response to various unforeseen circumstances such as an electrostatic discharge event or during other abnormal or emergency operating conditions. Since these events infrequently occur, emissions from emergency situations have not been accounted for in the table. Table B.8.1-9 identifies the amount of GHG emissions and the volume of gas that is released for each turbine unit and one full station blowdown event in an average year. The blowdown emissions from the turbine units are included with the total facility emissions identified in table B.8.1-9, however, the total station blowdown values were not included in the compressor station total emissions.

TABLE B.8.1-9

Potential Project Emissions for Compressor Station Blowdowns for the WB XPress Project

Emission Unit	Annual Average Number of Shutdowns[a]	Amount of Gas per Blowdown (scf)	CO_2 (TPY)	CH_4 (TPY)	CO_2e (TPY)
Elk River Compressor Station					
Proposed – Solar Mars 100 (T01)	200	67,126	7.7	265.0	6,632
Proposed – Solar Mars 100 (T02)	200	67,126	7.7	265.0	6,632
Full Station Blowdown	1	1,050,227	0.6	20.7	519
TOTAL Potential Emissions	**-**	**-**	**16.0**	**550.7**	**13,783**
Cleveland Compressor Station					
Existing – Solar Taurus 70 (E12)	100	84,856	4.9	167.5	4,192
Existing – Solar Taurus 70 (E13)	100	84,856	4.9	167.5	4,192
Proposed – Solar Mars 100 (E14)	100	67,126	3.9	132.5	3,316
Proposed – Solar Mars 100 (E15)	100	67,126	3.9	132.5	3,316
Full Station Blowdown	1	1,152,197	0.7	22.7	569
TOTAL Potential Emissions	**-**	**-**	**18.3**	**622.7**	**15,585**
Files Creek Compressor Station					
Existing – Solar Taurus 70 (T01)	156	84,856	7.6	261.3	6,539
Existing – Solar Taurus 70 (T02)	156	84,856	7.6	261.3	6.539
Proposed – Solar Taurus 70 (T03)	190	84,856	9.3	318.2	7,964
Proposed – Solar Taurus 70 (T04)	190	84,856	9.3	318.2	7,964
Full Station Blowdown	1	949,079	0.5	18.7	469
TOTAL Potential Emissions	**-**	**-**	**34.3**	**1,177.7**	**29,475**
Seneca Compressor Station					
Existing – Solar Saturn 10 (E07)	150	4,967	0.4	14.7	368
Existing – Solar Mars 100 (E08)	150	67,126	5.8	198.7	4,974
Proposed – Solar Taurus 70 (E09)	200	84,856	9.7	334.9	8,383
Full Station Blowdown	1	1,619,065	0.9	32.0	800
TOTAL Potential Emissions	**-**	**-**	**16.8**	**580.3**	**14,525**
Lost River Compressor Station					
Existing – Solar Taurus 70 (T01)	156	84,856	7.6	261.3	6,539
Existing – Solar Taurus 70 (T02)	156	84,856	7.6	261.3	6.539
Proposed – Solar Mars 100 (T03)	87	67,126	3.4	115.3	2,885
Proposed – Solar Mars 100 (T04)	87	67,126	3.4	115.3	2,885
Full Station Blowdown	1	1,659,158	1.0	32.7	820
TOTAL Potential Emissions	**-**	**-**	**23.0**	**785.9**	**19,668**
Strasburg Compressor Station					
Existing – Solar Titan 130 (E03)	156	67,126	6.0	206.7	5,173
Proposed – Solar Taurus 70 (E04)	200	84,856	9.7	334.9	8,383
Proposed – Solar Taurus 70 (E05)	200	84,856	9.7	334.9	8,383
Proposed – Solar Mars 100 (E06)	200	67,126	7.7	265.0	6,632
Full Station Blowdown	1	593,808	0.3	11.7	293
TOTAL Potential Emissions	**-**	**-**	**33.4**	**1,153.2**	**28,864**
Chantilly Compressor Station					
Proposed – Solar Compressor	60	9,314	0.3	11.0	276
Proposed – Solar Compressor	60	9,314	0.3	11.0	276
Full Station Blowdown	1	118,552	0.1	2.3	59
TOTAL Potential Emissions	**-**	**-**	**0.7**	**24.3**	**611**

Note: scf = standard cubic feet

[a] Conservative estimate for turbines based on one blowdown per shutdown. It is not expected that a blowdown would occur after each shutdown. Total station blowdowns expected once per year for yearly required testing.

The valve sites, launcher/receiver sites, a regulator station, and a meter station would also result in fugitive emissions from equipment leaks and emissions from pigging operations at the launcher/receiver sites. For all 16 minor facilities, the total CH_4 and CO_2e annual potential emissions is 2.6 and 64.0 TPY, respectively. Infrequent pipeline blowdowns along the system would also result in minor emissions of natural gas across the ten affected counties in West Virginia and Virginia.

The operation of the Project would result in increased emissions in the region, the majority of which would occur in the vicinity of compressor stations. Columbia would be required to comply with various state and federal regulations, which include construction and operating permits for applicability facilities. Where practicable, Columbia has proposed air emission mitigation to minimize emissions generated from new sources. The air quality modeling analysis completed for the compressor stations demonstrates that the new emissions associated with the Project would not result in an exceedance of ambient air quality standards. The analyses demonstrate that Columbia's Project would not have significant adverse impacts on air quality in the Project area.

8.2 Noise

Construction and operation of the Project may affect overall noise levels in the Project area. The magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetative cover.

Noise is measured in dB, which measures the energy of the noise. Because the human ear is not uniformly sensitive to all noise frequencies, dB on the A-weighted frequency scale were devised to correspond with humans' sensitivity. Two measures that associate the time-varying quality of noise to its effect on people are the equivalent sound level (L_{eq}) and the 24-hour A-weighted day-night averaged sound level (L_{dn}). The L_{dn} is the L_{eq} plus 10 dB to account for people's greater sensitivity to nighttime sound (between the hours of 10:00 PM and 7:00 am). The A-weighted scale is used to assess noise impacts because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA; 6 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise.

Regulatory Requirements

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974), which provided information for state and local regulators to use when developing their own ambient noise standards. The EPA has determined that an L_{dn} of 55 dBA protects the public from indoor and outdoor activity noise interference. The L_{dn} would be equal to the L_{eq} level plus 6.4 dB, if sound energy does not vary with time.

FERC has adopted the EPA's determination and requires that the noise from new compressor stations or modifications at existing compressor stations not exceed an L_{dn} of 55 dBA at existing NSAs such as residences, hospitals, and schools. The noise due to the full load operation of a facility, including the additional units, should not exceed any previously existing noise levels above an L_{dn} of 55 dBA at nearby NSAs. In addition to noise requirements, FERC requires that operation of the compressor station not result in any perceptible increase in vibration.

West Virginia and Virginia do not regulate noise at the state level. Fairfax County in Virginia has a noise requirement; however, it excludes activities that are controlled by federal or state law. As such, the requirement does not apply to the proposed Project. Loudoun County in Virginia has a noise requirement applicable to the Loudoun Compressor Station. By complying with the federal standards, Columbia would comply with the local noise requirement for this station.

Construction Noise Impacts and Mitigation

Construction noise is highly variable. Construction equipment operates intermittently, and the type of equipment in use at a given location at any point in time changes with the phase of construction. At aboveground facility locations, construction activities could last from several weeks to several months. Generally, nighttime noise is not expected to increase during construction because most construction activities would be limited to daytime hours.

An exception to daytime construction would be the proposed HDD, a 3,508-foot segment of Line VA-1 pipeline between MP 1.5 and 2.2, which may involve nighttime construction and could continue in one area for weeks to months depending on the length of the drill and the hardness of the substrate being drilled. Columbia provided an acoustical analysis for the proposed HDD.[38] The analyses identified impacts on the nearest NSAs (residences) of the entry and exit points (100-foot and 170-foot, respectively). The calculated peak L_{dn} due to the HDD (with specified noise control measures) would be 69.5 dBA for the NSAs near the entry point and 53.3 dBA for those NSAs near the exit point. Therefore to minimize impacts on surrounding residents, we recommend:

- **<u>Prior construction of the Line VA-1 HDD</u>, Columbia should file with the Secretary, for the review and written approval by the Director of OEP, a noise mitigation plan to reduce the projected noise levels at the NSAs. During drilling operations, Columbia should implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than an L_{dn} of 55 dBA at the NSAs.**

Columbia proposed controlled blasting to occur with pipeline construction activities in West Virginia, pending field conditions. If required, it would be conducted in accordance with the noise mitigation measures outlined in the Project-specific blasting plan and include specifics such as notifying the local fire marshal prior to blasting activities and using stemming material in each shot hole to direct the blast into the consolidated rock. The amount of explosives per borehole would be limited by the proximity of existing structures and utilities. The sound resulting from blasting would be brief, infrequent and subject to notification as described in the Project-specific blasting plan.

Because of the temporary nature of construction activities, and our noise condition, no significant noise impacts are anticipated from construction of the Project.

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[38] The HDD noise analysis can be viewed at the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20160831-5392 in the "Numbers: Accession Number" field for each filing.

Operational Noise Impacts and Mitigation

Noise from operation of the Project would be produced primarily through operation of the compressor stations and, to a lesser degree, station control valves. When operating, these sources would generate noise on a continuous basis (i.e., up to 24 hours per day). Notable sources of noise that are associated with compressor stations are typically generated by:

- the turbine/compressor casing or motor/compressor that radiates through the compressor building;
- outdoor aboveground gas piping and associated components;
- gas aftercooler;
- lube oil cooler;
- unit blowdowns;
- variable frequency drive (primarily the noise of the outdoor variable frequency drive cooler);
- air intake and exhaust system of the turbine; and
- motor ventilation system.

Columbia provided ambient noise surveys and acoustical analyses for the proposed aboveground facilities. The acoustical analyses identified impacts on NSAs within 1 mile of the compressor stations and 0.5 mile of the regulator stations. The distances and directions to the nearest NSAs from the station buildings are presented in the tables below alongside a summary of the noise analyses. The locations of all NSAs within one-mile of the compressor and regulator stations are shown in appendix I.

Two new Solar Mars 100 turbines were reviewed for the operational noise impacts near the Elk River Compressor Station. Because the proposed compressor station would be adjacent to Columbia's existing Cobb Compressor Station, existing sound levels for the Cobb Compressor Station were included in the noise impacts analysis. Table B.8.2-1 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-1

Noise Quality Analysis for the Elk River Compressor Station

NSA	Distance to Proposed Units 1-2 (feet)	Direction to Proposed Units 1-2	Measured Ambient L_{dn} (dBA)	Estimated L_{dn} of Existing Cobb CS (dBA)	Estimated L_{dn} for Proposed Elk River CS (dBA)	Estimated Total L_{dn} (Cobb CS + Elk River CS) (dBA)	Potential Increase Above Existing Cobb CS (dB)
Elk River Compressor Station							
NSA #1 (House)	700	Northwest	62.5	50.4	47.8	52.3	1.9
NSA #2 (Houses)	650	East Southeast	52.3	52.3	47.6	53.6	1.3
NSA #3 (Houses)	875	Northwest	56.4	48.1	45.6	50.0	1.9
NSA #4 (Houses)	2,050	West Northwest	48.9	37.9	37.0	40.5	2.6
NSA #5 (Houses)	1,975	North Northeast	Not Measured	40.6	37.3	42.2	1.6

Note: CS = compressor station

Additional station control valves were reviewed for the operational noise impacts near the Panther Mountain Regulator Station. Because the existing regulator station is about 1,700 feet northeast of Columbia’s existing Cobb Compressor Station and proposed Elk River Compressor Station, estimated sound levels for Cobb and Elk River Compressor Stations were included in the noise impacts analysis. Table B.8.2-2 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-2

Noise Quality Analysis for the Panther Mountain Regulator Station

NSA	Distance to Proposed Control Valves (feet)	Direction to Proposed Control Valves	Estimated L_{dn} of Cobb CS + Elk River CS (dBA)	Estimated L_{dn} for Proposed Control Valves (dBA)	Estimated Total L_{dn} (Cobb CS + Elk River CS + Proposed Control Valves) (dBA)	Potential Noise Increase (dB)
Panther Mountain Regulator Station						
NSA #1 (House)	2,150	West Southwest	52.3	31.9	52.4	0.1
NSA #2 (Houses)	1,200	Southwest	53.6	38.6	53.7	0.1
NSA #5 (Houses)	950	Northwest	42.2	41.1	44.7	2.5

Note: CS = compressor station

Two new Solar Mars 100 turbines were reviewed for the operational noise impacts near Cleveland Compressor Station. Table B.8.2-3 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-3

Noise Quality Analysis for the Cleveland Compressor Station

NSA	Distance to Proposed Units 14-15 (feet)	Direction to Proposed Units 14-15	Estimated L_{dn} of Existing Units 12-13 (dBA)	Estimated L_{dn} of Uprated Units 12-13 (dBA)	Estimated L_{dn} for Proposed Units 14-15 (dBA)	Estimated Total L_{dn} for Modified Station (dBA)	Potential Noise Increase (dB)
Cleveland Compressor Station							
NSA #1 (Houses)	2,000	Southwest	42.3	43.2	41.7	45.5	3.2
NSA #2 (Houses)	1,675	West Southwest	43.3	44.2	43.6	46.9	3.6
NSA #3 (House)	1,450	South	46.3	47.2	45.1	49.3	3.0
NSA #4 (Houses)	1,200	Northeast	43.0	43.9	47.0	48.7	5.7

Two new Solar Taurus 70 turbines and the uprate of two existing Solar Taurus 70 turbines were reviewed for the operational noise impacts near Files Creek Compressor Station. Table B.8.2-4 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-4

Noise Quality Analysis for the Files Creek Compressor Station

NSA	Distance to Proposed Units 13-14 (feet)	Direction to Proposed Units 13-14	Estimated L_{dn} of Existing Units 11-12 (dBA)	Estimated L_{dn} of Uprated Units 11-12 (dBA)	Estimated L_{dn} for Proposed Units 13-14 (dBA)	Estimated Total L_{dn} for Modified Station (dBA)	Potential Noise Increase (dB)
Files Creek Compressor Station							
NSA #1 (Houses)	475	Northwest	50.7	52.4	50.4	54.5	3.8
NSA #2 (Houses)	825	South	48.3	50.0	45.7	51.4	3.1
NSA #3 (Houses)	1,325	East Northeast	46.8	48.5	40.7	49.2	2.4

One new Solar Taurus 70 turbine and the uprate of one existing Solar Mars 100 turbine were reviewed for the operational noise impacts near Seneca Compressor Station. Table B.8.2-5 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-5

Noise Quality Analysis for the Seneca Compressor Station

NSA	Distance to Proposed Unit 9 (feet)	Direction to Proposed Unit 9	Estimated L_{dn} of Existing Station (Units 5-8) (dBA)	Estimated L_{dn} of Station After Uprate of Unit 8 (dBA)	Estimated L_{dn} for Proposed Unit 9 (dBA)	Estimated Total L_{dn} for Modified Station (dBA)	Potential Noise Increase (dB)
Seneca Compressor Station							
NSA #1 (Houses)	1,850	North Northeast	48.1	48.4	29.6	48.5	0.4
NSA #2 (Cabins)	325	Southeast	54.1	54.4	45.4	54.9	0.8
NSA #3 (House)	700	South Southeast	48.9	49.2	38.4	49.5	0.6

Two new Solar Mars 100 turbines and the uprate of two existing Solar Taurus 70 turbines were reviewed for the operational noise impacts near Lost River Compressor Station. Table B.8.2-6 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-6

Noise Quality Analysis for the Lost River Compressor Station

NSA	Distance to Proposed Units 14-15 (feet)	Direction to Proposed Units 14-15	L_{dn} at Existing Station (Units 11-13) (dBA)	Estimated L_{dn} of Uprated Units 12-13 + Unit 11 (dBA)	Estimated L_{dn} for Proposed Units 14-15 (dBA)	Estimated Total L_{dn} for Modified Station (dBA)	Potential Noise Increase or Decrease (dB)
Lost River Compressor Station							
NSA #1 (Houses)	475	South to Southeast	54.2	49.2	51.0	53.2	-1.0
NSA #2 (Houses)	700	East Southeast	52.0	47.0	47.3	50.1	-1.9
NSA #3 (House)	725	Southwest	49.3	44.3	46.9	48.8	-0.5
NSA #4 (Houses)	900	Southwest	45.3	40.3	44.2	45.7	0.4
NSA #5 (House)	875	West	47.8	42.8	45.0	47.1	-0.7

Additional station control valves were reviewed for the operational noise impacts near Dysart Valve Site. Table B.8.2-7 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-7

Noise Quality Analysis for the Dysart Valve Site

NSA	Distance to Proposed Valve Site (feet)	Direction to Proposed Valve Site	Measured Ambient L_d (dBA)	Estimated Ambient L_n (dBA)	Calculated Ambient L_{dn} (dBA)	Estimated L_{dn} at Full Load Site Operation (dBA)	Estimated Total L_{dn} (Site + Ambient) (dBA)	Potential Noise Increase (dB)
Dysart Valve Site								
NSA #1 (House)	300	Southwest	41.9	38.9	45.9	39.7	46.8	0.9
NSA #2 (House)	425	Southeast	41.9	38.9	45.9	36.3	46.3	0.4
NSA #3 (House)	1,025	Northeast	41.9	38.9	45.9	27.1	45.9	0.0

Note: L_d = day sound level
L_n = night sound level

Two new Solar Taurus 70 turbines, one new Solar Mars 100 turbine, and the uprate of one existing Solar Titan 130 turbine were reviewed for the operational noise impacts near Strasburg Compressor Station. Table B.8.2-8 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-8

Noise Quality Analysis for the Strasburg Compressor Station

NSA	Distance to Proposed Units 4-6 (feet)	Direction to Proposed Units 4-6	L_{dn} at Existing Station (Unit 3) (dBA)	Estimated L_{dn} of Uprated Unit 3 (dBA)	Estimated L_{dn} for Proposed Units 4-6 (dBA)	Estimated Total L_{dn} for Modified Station (dBA)	Potential Noise Increase (dB)
Strasburg Compressor Station							
NSA #1 (Houses)	1,400	Southwest	47.5	48.1	44.8	49.3	1.8
NSA #2 (Houses)	1,800	Southeast	44.1	44.7	42.1	46.2	2.1
NSA #3 (Houses)	2,250	East	39.8	40.4	39.6	42.7	2.9
NSA #4 (House)	3,150	North	34.2	34.8	36.1	38.3	4.1

Additional station control valves and replacement of an existing control valve were reviewed for the operational noise impacts near Nineveh Meter Station. Table B.8.2-9 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-9

Noise Quality Analysis for the Nineveh Meter Station

NSA	Distance to Proposed Control Valves (feet)	Direction to Proposed Control Valves	Measured Ambient L_d (dBA)	Measured Ambient L_n (dBA)	Calculated Ambient L_{dn} (dBA)	Estimated L_{dn} for Proposed Control Valves (dBA)	Estimated Total L_{dn} (Control Valves + Ambient) (dBA)	Potential Noise Increase (dB)
Nineveh Meter Station								
NSA #1 (Houses)	400	Northeast	56.2	57.4	63.6	44.6	63.7	0.1
NSA #2 (House)	525	Southwest	60.4	54.5	62.4	41.9	62.4	0.0

Note: L_d = day sound level
L_n = night sound level

Three new over pressure protection control valve runs, replacement of existing control valves, and a new metering station were reviewed for the operational noise impacts near Loudoun Compressor Station. Table B.8.2-10 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-10

Noise Quality Analysis for the Loudoun Compressor Station

NSA	Distance to Proposed M&R Station (feet)	Direction to Proposed M&R Station	L_{dn} at Existing Station (Units 1-9) (dBA)	Estimated L_{eq} for Proposed M&R Station (dBA)	Estimated L_{dn} for Proposed M&R Station (dBA)	Estimated Total L_{dn} for Modified Station (dBA)	Potential Noise Increase (dB)
Loudoun Compressor Station							
NSA #1 (Houses)	1,200	Southwest to Northwest	48.6	34.7	41.1	49.3	0.7
NSA #2 (Houses)	2,050	Southwest to Southeast	46.9	28.2	34.6	47.2	0.3
NSA #3 (Houses)	1,500	Northeast	43.3	32.0	38.4	44.5	1.2
NSA #4 (House)	950	South Southeast	52.6	37.3	43.7	53.1	0.5
NSA #5 (House)	1,500	South Southeast	48.6	32.0	38.4	49.0	0.4

Two new Solar compressors driven by Siemens electric motors were reviewed for the operational noise impacts near Chantilly Compressor Station. Table B.8.2-11 provides the existing and estimated sound levels at nearby NSAs.

TABLE B.8.2-11

Noise Quality Analysis for the Chantilly Compressor Station

NSA	Distance to Proposed Units 1-2 (feet)	Direction to Proposed Units 1-2	Measured Ambient L_d (dBA)	Measured Ambient L_n (dBA)	Calculated Ambient L_{dn} (dBA)	Estimated L_{dn} for Station at Full Capacity (dBA)	Estimated Total L_{dn} (Station + Ambient) (dBA)	Potential Increase Above Ambient (dB)
Chantilly Compressor Station								
NSA #1 (House)	700	West	46.0	44.9	51.4	42.6	52.0	0.6
NSA #2 (Park)	400	Southwest	50.0	47.5	54.4	48.0	55.3	0.9
NSA #3 (Houses)	1,050	Southeast	46.0	44.9	51.4	38.6	51.7	0.3

Note: L_d = day sound level
L_n = night sound level

The analysis indicates the noise resulting from the new compressor stations and new valve and meter station sites would be less than an L_{dn} of 55 dBA at NSAs, and the increase in total noise at NSAs after the compressor stations are operational would be less than 3 dB and thus undetectable to the human ear. At the Chantilly Compressor Station and Nineveh Meter Station, the estimated total noise (calculated ambient plus the proposed equipment) would exceed an L_{dn} of 55 dBA at one or more NSAs near these facilities, but the noise from the proposed equipment would be less than an L_{dn} of 55 dBA at the closest NSAs. Also, most of the total noise in these areas is attributable to existing ambient conditions, and the additional noise from the new equipment at each location would be less than 1 dB and thus undetectable.

None of the proposed compressor station modifications would result in noise in excess of an L_{dn} of 55 dBA at any NSA. Additionally, the total noise of the modifications combined with the existing facilities at these stations would be less than an L_{dn} of 55 dBA at any NSA. However, the increase in noise at the Cleveland, Files Creek and Strasburg Compressor Stations would be more than 3 dB at one or more NSA; therefore, the increase would be detectable at some of the NSAs nearest these stations.

Mitigation measures that Columbia would employ potentially include: compressor buildings with acoustical insulation; turbine unit exhaust and air inlet systems; low noise lube oil coolers; low noise gas aftercoolers; locating high pressure gas piping below grade; acoustical pipe lagging for aboveground piping; low noise control valves and pressure regulators; and regulator buildings with acoustical installation. Columbia commits to installation of all recommended noise control measures.

In addition to noise requirements, the Commission, under 18 CFR 380.12(k)(v)(B), requires that operation of compressor stations not result in any perceptible increase in vibration. If the new facility equipment results in perceptible vibration, the Commission would require Columbia to investigate the cause and could require mitigation to reduce the vibration.

To verify compliance with the FERC's noise standard, **we recommend that:**

- **Columbia should file a noise survey with the Secretary no later than 60 days after placing each of the compressor stations into service. If a full load condition noise survey is not possible, Columbia should provide an interim survey at the maximum possible power load and provide the full power load survey within six months. If the noise attributable to the operation of all of the equipment at any facility at interim or full power load conditions exceeds 55 dBA L_{dn} at any nearby NSA, Columbia should file a report on what changes are needed and should install additional noise controls to meet the recommended noise level within one-year of the in-service date. Columbia should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

9.0 RELIABILITY AND SAFETY

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

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, posing a slight inhalation hazard. If CH_4 is inhaled in high concentrations, oxygen deficiency can occur resulting in serious injury or death.

Methane has an auto-ignition temperature of 1,000 °F and is flammable at concentrations between 5 and 15 percent CH_4 by volume. Unconfined mixtures of CH_4 in air are not generally explosive. Methane is buoyant at atmospheric temperatures and disperses rapidly in air.

9.1 Safety Standards

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

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

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 specifically addresses natural gas pipeline safety issues. Under a Memorandum of Understanding on Natural Gas Transportation Facilities dated January 15, 1993, between the DOT and FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection.

Alternatively, an applicant must certify it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with Section 3(e) of the Natural Gas Pipeline Safety Act. FERC accepts this certification and does not impose additional safety standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the memorandum to promptly alert the DOT. The memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

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

The pipeline and aboveground facilities associated with the Project would be designed, constructed, operated, and maintained in accordance with or to exceed the DOT Minimum Federal Safety Standards in 49 CFR Part 192. These regulations, which are intended to protect the public and to prevent natural gas facility accidents and failures, include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion.

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

In accordance with federal standards, class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalized block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thicknesses and pipeline design pressures, hydrostatic test pressures, MAOP, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas.

All but 1.2 miles of proposed pipeline facilities would be located in Class 1 areas. The only exception would be 1.2 miles (MPs 1.0 to 2.2) of Line VA-1 in Virginia, which would be in a Class 3 area.

If the Project is approved, the DOT regulations require the pipeline be designed, at a minimum, to the appropriate Class location standard and that the spacing between mainline valves meets DOT requirements.

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

High Consequence Areas

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

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

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

- current Class 3 and 4 locations;
- any area in Class 1 or 2 locations where the potential impact radius[39] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[40]; or
- any area in Class 1 or 2 locations where the potential impact circle includes an identified site.
- An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

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

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

- In the second method, an HCA includes any area within a potential impact circle that contains:
  1. 20 or more buildings intended for human occupancy; or
  2. an identified site.

TABLE B.9.1-1

Potential Impact Radius Table for the Project

Pipe Outside Diameter (inch)	**Pressure (psig)**	**PIR Calc (feet)** $OD * \sqrt{Press}$ ***0.69**
24	800	468
24	850	483
24	900	497
24	950	510
24	1000	524
36	800	703
36	850	724
36	900	745
36	950	766
36	1000	786

The HCAs have been determined based on the relationship of the pipeline centerline to other nearby structures and identified sites. Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its Integrity Management Plan to those segments of the pipeline within HCAs. The DOT regulations specify the requirements for the Integrity Management Plan in 49 CFR Part 192.911. The pipeline integrity management rule for HCAs requires inspection of the pipeline every seven years.

Under 49 CFR 192, the DOT prescribes the minimum standards for operating and maintaining pipeline facilities including the requirement to establish a written plan governing these activities. Under 192.615, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- initiating the emergency shutdown of system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

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

Columbia's Proposed Safety Measures

As indicated above, Columbia would design, construct, operate, and maintain the Project facilities in accordance with or to exceed the DOT Minimum Federal Safety Standards in 49 CFR Part 192. About 1.2 miles (MPs 1.0 to 2.2) of the proposed Line VA-1 in Virginia would be classified as a HCA and Columbia would implement the required elements of its Integrity Management Plan in this area. Columbia would provide the appropriate training to local emergency service personnel before the pipeline is placed in service as required by the DOT.

The proposed Project would allow for passage of modern in-line inspection tools, sometimes referred to as "smart pigs." These tools travel through the pipe measuring and recording irregularities that may indicate potential corrosion, cracks, laminations, deformations, and/or other defects along the pipeline. The capabilities of these advanced in-line inspection tools would provide information useful in helping plan preventative maintenance and would reduce the likelihood of unplanned outages due to construction activities. The design of the proposed Project would help to improve the safety and reliability of the pipeline and would be in compliance with the DOT minimum safety standards specified in 49 CFR Part 192.

Cathodic protection systems would be installed at various points along the pipelines to help prevent corrosion by applying a low voltage current to offset natural soil and groundwater corrosion potential. The functional capability of cathodic protection systems is inspected frequently to ensure proper operating conditions for corrosion prevention.

Data acquisition systems would be present at all metering stations. If system pressures fall outside a predetermined range, an alarm is activated and notice is transmitted to Columbia's Charleston Gas Control Center.

Columbia would install a combination of remote and local mainline shutoff valves along the pipeline facilities. These valves would allow Columbia to isolate pipeline segments for maintenance, operations, or construction work, and limit the volume of natural gas inadvertently released if a pipeline leak or rupture were to occur.

As required by the DOT, routine emergency drills (referred to as table top drills) would be conducted on an annual basis involving both Columbia personnel and local first responders.

9.2 Pipeline Accident Data

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

- cause a death or personal injury requiring hospitalization; or
- involve property damage of more than $50,000 in 1984 dollars.[41]

During the 20-year period from 1995 through 2014, a total of 1,265 significant incidents were reported on the more than 300,000 total miles of natural gas transmission pipelines nationwide (PHMSA, 2015b).

[41] $50,000 in 1982-1984 dollars is about $119,000 as of August 2015 (Bureau of Labor Statistics, 2015).

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table B.9.2-1 provides a distribution of the causal factors as well as the number of each incident by cause.

The dominant causes of pipeline incidents are corrosion and pipeline material, weld, or equipment failure comprising 49.4 percent of all significant incidents (PHMSA, 2015b). The pipelines included in the data set in table B.9.2-1 vary widely in terms of age, pipe diameter, and level of corrosion control. Each of these variables influences the incident frequency that may be expected for a specific segment of pipeline. The frequency of significant incidents, for example, is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents because corrosion is a time-dependent process.

TABLE B.9.2-1

Natural Gas Transmission Pipeline Significant Incidents by Cause (1995-2014)

Cause	**Number of Incidents**	**Percentage**
Corrosion	290	22.9
Excavation [a]	207	16.4
Pipeline material, weld, or equipment failure	335	26.5
Natural force damage	147	11.6
Outside forces [b]	79	6.2
Incorrect operation	40	3.2
All other causes [c]	167	13.2
TOTAL	**1265**	–

Source: PHMSA, 2015b
[a] Includes third-party damage.
[b] Fire, explosion, vehicle damage, previous damage, intentional damage.
[c] Miscellaneous causes or unknown causes.

The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.[42]

Excavations, natural forces, and outside forces are the cause in 34.2 percent of significant pipeline incidents (PHMSA, 2015b). Table B.9.2-2 presents information on outside forces incidents by cause. These mostly result from the encroachment of mechanical equipment involved in excavations such as bulldozers and backhoes; heavy rain and flooding; vehicle encroachment (not related to excavation); earth movements due to soil settlement or geologic hazards; and other weather events including high winds, lightning, and thermal strain.

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

TABLE B.9.2-2

Outside Forces Incidents by Cause (1995-2014) [a]

Cause	Number of Incidents	Percent of all Incidents [b]
Third-party excavation damage	172	13.6
Operator excavation damage	24	1.9
Unspecified equipment damage/previous damage (excavation)	11	0.9
Heavy rain/floods	72	5.7
Earth movement	34	2.7
Lightning/temperature/high winds	26	2.0
Unspecified/other natural force	15	1.2
Vehicle (not engaged with excavation)	47	3.7
Fire/explosion	8	0.6
Fishing or maritime activity	7	0.6
Previous mechanical damage	6	0.5
Maritime equipment or vessel adrift	2	0.2
Intentional damage	1	0.1
Electrical arcing from other equipment/facility	1	0.1
Unspecified/other outside force	7	0.6
TOTAL	**433**	**--**

Source: PHMSA, 2015b

[a] Excavation, outside forces, and natural force damage from table B.9.2-1.

[b] Due to rounding, column does not total 34.2 percent.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipeline systems contain a disproportionate number of smaller-diameter pipelines, which have a greater rate of outside forces incidents. Small-diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

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

Columbia is a member of both the West Virginia and Virginia “One Call” Systems (accessed by calling 8-1-1) and similar pre-construction notification organizations in the other states in which it maintains operations. Through “One Call” and related systems, contractors provide notification prior to any ground-disturbing activity to a central agency, which in turn notifies Columbia and other operators of underground utilities of the location of the proposed activity. If Columbia has facilities within the area, Columbia would mark them in the field and have a representative on-site during excavation to ensure the facility is not compromised.

9.3 Impact on Public Safety

Table B.9.3-1 presents the annual injuries and fatalities that occurred on natural gas transmission lines between 2010 and 2014. The data have been separated into natural gas industry employees and non-employees to better identify a fatality rate experienced by the general public. Fatalities among the public averaged one per year over the 10-year period from 2005 to 2014 (PHMSA, 2015c). Total fatalities (employees and general public combined) averaged two per year over the 20-year period from 1995-2014 (PHMSA, 2015b).

TABLE B.9.3-1

Injuries and Fatalities – Natural Gas Transmission Pipelines

	Injuries		Fatalities	
Year	**Employees**	**Public**	**Employees**	**Public**
2010 [a]	10	51	2	8
2011	1	0	0	0
2012	3	4	0	0
2013	0	2	0	0
2014	1	0	1	0

Source: PHMSA, 2015a.

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

The majority of fatalities from pipelines involve local distribution pipelines. These are natural gas pipelines that are not regulated by FERC and that distribute natural gas to homes and businesses after transportation through interstate natural gas transmission pipelines. In general, these distribution lines are smaller-diameter pipes, often made of plastic or cast iron rather than welded steel, and tend to be older pipelines that are more susceptible to damage. In addition, distribution systems do not have large rights-of-way and pipeline markers common to FERC-regulated natural gas transmission pipelines.

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in table B.9.3-2 to provide a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between the different accident categories listed in the table should be made cautiously because individual exposures to hazards are not uniform among all categories. The data nonetheless indicate a low risk of death due to incidents involving natural gas transmission pipelines compared to the other categories. For example, the fatality rate for incidents involving natural gas transmission pipelines is 16 to 55 times lower than the rate from natural hazards such as lightning, tornados, floods, and hurricanes.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 1995 to 2014, there were an average of 63 significant incidents, 9 injuries, and 2 fatalities per year (PHMSA, 2015b). The number of significant incidents over the more than 300,000 miles of natural gas transmission lines indicates the risk is low for an incident at any given location. The operation of the Project would represent a slight increase in risk to the nearby public.

TABLE B.9.3-2

Nationwide Accidental Deaths

Type of Accident	Annual Number of Deaths
All accidents	130,557 [a]
Other Hazards	
Motor Vehicle	35,369 [a]
Poisoning	38,851 [a]
Falls	30,208 [a]
Drowning	3,391 [a]
Fire, smoke inhalation, burns	2,760 [a]
Natural Hazards	
Floods	71 [b]
Lightning	32 [b]
Tornados	110 [b]
Hurricanes	105 [b]
Extreme Heat	124 [b]
Rip Currents	51 [b]
Natural Gas Related Incidents	
Natural gas distribution lines	14 [c]
Natural gas transmission pipelines	2 [c]

Sources: National Center for Health Statistics, 2015; National Weather Service, 2015; PHMSA, 2015b

[a] Total number of fatalities in 2013 (National Center for Health Statistics, 2015) [Most recent annual data available]

[b] Average annual fatalities for period of 2005-2014 (National Weather Service, 2015)

[c] Average annual fatalities for period of 1995-2014 (PHMSA, 2015b)

10.0 CUMULATIVE IMPACTS

In accordance with the NEPA, we considered the cumulative impacts of the Project and other projects or actions in the area. Cumulative impacts represent the incremental effects of the proposed action when added to other past, present, or reasonably foreseeable future projects, regardless of what agency or person undertakes such other actions. Although the individual impact of each separate project may be minor, the additive or synergistic effects of multiple projects could be significant. The direct and indirect impacts of the Project are discussed in other sections of this EA.

The purpose of this analysis is to identify and describe cumulative impacts that would potentially result from implementation of the Project. This cumulative impacts analysis uses an approach consistent with the methodology set forth in relevant guidance (CEQ, 1997, 2005; EPA, 1999). Under these guidelines, inclusion of actions within the analysis is based on identifying commonalities of impacts from other actions to potential impacts that would result from the Project as noted below.

- To be included in the analysis, an action must affect a resource category potentially affected by the Project. For the most part, the area of potential cumulative impact (hereafter referred to as the geographic scope) is limited to the geographic location directly affected by the Project and the immediate surrounding area. The effects of more distant actions are, in most cases, not assessed because the impacts of most actions associated with construction are localized and would not contribute significantly to impacts in the Project area. The potential cumulative impact area for certain resources, such as air quality, watersheds, and aquatic resources, encompasses a larger geographic area; therefore, we considered these on a broader, more regional basis.

- The distance into the past and future (i.e., the temporal range) in which other actions could potentially cumulatively affect the project area depends on the duration and permanency of the impacts. Most of the impacts associated with the WB Xpress Project would be short term and limited to the construction phase, which Columbia plans to begin in July 2017 and complete by the end of 2018 assuming it receives the necessary authorizations. The potential for cumulative impacts associated with the Project would be greatest during this period, and largely confined to this period for certain resources. For this reason, we have focused our analysis on other projects planned to occur during the period from one-year prior to one-year after construction of the Project (i.e., from 2016 to 2019). However, while we have focused on this temporal period, this does not mean projects that have, or would occur outside this range were excluded from this analysis.
- Where a potential for cumulative impacts was determined to exist, the impacts were quantified to the extent practicable; however, in some cases the potential impacts can only be described qualitatively. This is particularly the case for projects that: are in the planning stages; are contingent on economic conditions, availability of financing, and/or the issuance of permits; or for which there is a lack of comprehensive information available.

The geographic scopes used in this cumulative impacts analysis for specific resources are listed in table B.10-1.

TABLE B.10-1

Geographic Scope for Cumulative Impact Assessment for the WB XPress Project

Resource	Geographic Scope[a]
Water and Aquatic Resources	HUC-10 Surface water = HUC-10, for direct in-water work include potential overlapping impacts from sedimentation, turbidity, and water quality
Fisheries	HUC-10
Vegetation	HUC-10
Wildlife	HUC-10
Cultural	Overlapping Impacts within the Area of Potential Effects
Socioeconomic	County
Geological	Same construction footprint as the project
Soil	Same construction footprint as the project
Land Use	Same construction footprint as the project Visual = 5-mile radius of compressor stations; 0.5-mile radius of other project areas
Air Construction Operation	¼ mile radius 50 kilometers (31.1 miles) from stationary sources
Noise Construction Operation	Overlapping NSAs up to 0.25-mile from pipeline and aboveground facility, 0.5-mile from HDD Overlapping NSAs up to one-mile from aboveground facilities

Note: Because the WB Xpress Project crosses the MNF, we also considered projects that fall outside the geographic scopes identified above but located within the MNF Proclamation Boundary that could cumulatively impact resources affected by the WB Xpress Project.

[a] Listed geographic scope categories include only the areas also crossed by the proposed Project.

As shown on table B.10-1, the boundaries of the geographic scopess vary depending on the resource being discussed. The criteria for each geographic scope is described below.

- Based on the discussion in section 3.2 and the Project-wide E&SC Plan located in Attachment A and B of the COMP, most of the Project impacts on water, aquatic, and fisheries resources would be temporary and limited to the duration of construction. However, in the event that an E&SC measure fails or a spill occurs, impacts could extend beyond the immediate work areas. Therefore, the geographic scope for these resources would include sub-watersheds, entire tier III streams, and rivers listed under the National River Inventory.
- Impacts on vegetation from the WB XPress Project would be localized. The geographic scope for vegetation resources includes projects within HUC-10 watersheds traversed by the Project and we also considered projects occurring within the MNF Proclamation Boundary.
- The Project may result in impacts on wildlife resources. Due to the differences in the ecology, range, and movements of each species, the geographic scope for wildlife resources includes the HUC-10 watersheds traversed by the Project as this would serve as a geographic proxy for wildlife habitat, projects anywhere within the MNF proclamation boundary, and projects within one-mile of the Culpeper IBA.
- Impacts on cultural resources are highly localized and generally confined to the historic property that is affected. Thus the geographic scope for cultural resource impacts is limited to overlapping effects on historic properties within the APE.
- Impacts on land use would be highly localized and, therefore, we evaluated other projects impacting the same construction footprint as the Project, and considered projects occurring within the MNF proclamation boundary.
- Impacts on visual resources would be greater at aboveground facilities and areas where material changes to forest vegetation occur. Therefore, we used a geographic scope of 0.5 mile for pipeline activities and a 5-mile radius around compressor stations, based on the extent in which project facilities would typically be visible based on landscape and vegetation.
- Impacts on geologic and soil resources are generally localized to the immediate work area. Therefore the geographic scope for geology and soils includes projects within the same construction footprint.
- The Project could result in both short-term impacts on air quality during construction and long-term impacts on air quality during operation (as a result of installation of new turbines at compressor stations). Short-term cumulative impacts on air quality were evaluated by considering other projects within a 0.25-mile radius of the proposed Project. The geographic scope for potential long-term cumulative air impacts (as defined by FERC) encompasses other major sources of emissions within 50 kilometers (31.1 miles) of the proposed Project's stational sources of emmissions. This is the distance used by the EPA for cumulative modeling of large PSD sources during permitting and we consider this

a conservative geographic scope for identifying other projects which could constribute to a cumulative impact on air quality.

- The Project would result in short-term impacts on noise during construction and long-term impacts on noise during operation, primarily of the compressor stations. Since noise attenuates quickly as the distance from the source increases, the geographic scope covered by our assessment of short-term impacts includes other projects within 0.25-mile of Project construction. Our evaluation of long-term cumulative operational noise impacts focuses on other large noise sources within one-mile of the Project compressor stations that could affect the same NSAs as the proposed Project.

Table B.10-2 lists present or reasonably foreseeable future projects or activities that may cumulatively or additively impact resources along with the construction and operation of the Project. A map of the Cumulative Impact Assessment Projects is shown as Figure B.10-1.

A description of the permits or authorizations required for the project and a description of any environmental review required to support those permits or authorizations is shown on table B.10-3 in appendix J.

TABLE B.10-2

Existing/Proposed Projects Evaluated for Potential Cumulative Impacts in Conjunction with the WB XPress Project

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
MONONGAHELA NATIONAL FOREST							
Forest-wide Non-Native Invasive Species Management Program, U.S. Forest Service	Randolph, Pendleton, Tucker, Pocahontas, Grant, Greenbrier, Webster, WV	10 years; 2010-2020	MNF is implementing vegetation management and associated activities across the Forest to help meet Land Resource Management Planning objectives. The purpose is to reduce the risk of non-native invasive species introduction, control non-native invasive species in high-interest ecosystems, and eliminate emerging infestations.	0.7 Northeast	Occurs within: 1-mile radius, Project Counties, Watershed Areas	WA, VG, WL, LUV	Dry Fork, North Fork South Branch Potomac River, Upper South Branch Potomac River, South Mill Creek-Mill Creek
Big Mountain Project, U.S. Forest Service	Pendleton, WV	Unknown; Under Analysis	Improve oak regeneration and stand structural and age diversity, and increase mast of wildlife through a variety of methods, including commercial and noncommercial treatments. The project will also enhance aquatic habitats for a number of species.	12.7 Northwest	Occurs within: 50-km radius, Project County, Watershed Areas	VG, WL	North Fork South Branch Potomac River
Big Rock Project, U.S. Forest Service	Nicholas, Webster, WV	Unknown; Under Analysis	Provide diverse early successional forest through clearcutting with reserves. This would improve forest health and growth, and provide water sources for wildlife with the creation of 20 vernal pools. Traditional thinning and helicopter thinning would be used.	29.9 Northwest	Occurs within: 50-km radius	None	None
Lower Williams Wildlife Enhancement Project, U.S. Forest Service	Webster, WV	Unknown; Under Analysis	Proposed vegetation alternation and wildlife habitat enhancement on an estimate 140 acres. The project would create grassy and early successional habitat, reduce mid-story diversity forest structure and composition, and enhance native grasses.	26.6 North	Occurs within: 50-km radius	None	None
Tea Creek Phase II Project, U.S. Forest Service	Pocahontas, WV	Unknown; Under Analysis	Trail maintenance, improvements, and relocation are proposed in the Tea Creek Trail system. Includes rerouting steep sections of trails and avoiding wet areas.	27.5 Northwest	Occurs within: 50-km radius	None	None

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
MONONGAHELA NATIONAL FOREST (Continued)							
Mower Tract Restoration Project, U.S. Forest Service	Randolph, Pocahontas, WV	Unknown	Prepare sites, plant natives, create wetlands, maintain wildlife openings, reconstruct trails, decommission roads, place large woody material in streams, and restore spruce by thinning.	18.9 North	Occurs within: 50-km radius, Project County	None	None
Tygart Chestnut Ridge Project, U.S. Forest Service	Randolph, WV	Unknown	Enhance wildlife habitat over about 600 acres by enhancing existing and creating new linear wildlife openings, restoring running buffalo clover, creating permanent and vernal wetlands and habitat for bats, and liming.	7.9 Northwest	Occurs within: 50-km radius, Project County, Watershed Areas	VG, WL	Upper Tygart Valley River
NATURAL RESOURCE CONSERVATION AND RESTORATION							
Pike Knob and Panther Knob Preserve Projects, The Nature Conservancy	Grant, Pendleton, WV	Ongoing	Ongoing projects that involve land acquisition, non-native invasive species control, plant community inventories and red pine forest restoration.	12.0 North	Occurs within: 50-km radius, Project Counties, Watershed	VG, WL	Upper South Branch Potomac River
Bear Rocks Preserve Projects, The Nature Conservancy	Tucker, Grant, WV	Ongoing	Restoration of red spruce and land acquisition.	13.3 South	Occurs within: 50-km radius, Project County, Watershed	VG, WL	North Fork South Branch Potomac River
TRAVEL CORRIDORS							
Dulles Corridor Metrorail Project, Metropolitan Washington Airports Authority, Virginia Department of Rail and Transportation	Arlington, Fairfax, Loudoun, VA; Washington D.C.	12 years; 2008-2019	23-mile extension of existing Metrorail system which will be operated by the WMATA from East Falls Church to Washington Dulles International Airport.	7.3 Southwest	Occurs within: 50-km radius, Project Counties	WL, SE	None
West Fork of Greenbrier Rail with Trail Development Project, West Virginia State Rail Authority	Pocahontas, Randolph, WV	On Hold; 2014-2024	Return 27.2 miles of railroad ROW to active railroad status, and construct a parallel 21 mile trail segment.	<0.1 Northeast	Occurs within: ¼ mile radius, Project County, Watershed	VG, WL, SE, LUV, AC, NC, AO, NO	Glady Fork, Middle Tygart Valley River

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
TRAVEL CORRIDORS (Continued)							
Bickle Run Culvert and Bridge Repair Project, West Virginia Division of Highways	Randolph, WV	4 months; 2016	Repair Bickle Run Bridge and associated culvert.	6.6 South	Occurs within: 50-km radius, Project County	None	None
Music Run ROW Project, Private Landowner	Nicholas, WV	Unknown; Under Analysis	Creation of ROW access to a private in-holding surrounded by National Forest.	29.7 Northwest	Occurs within: 50-km radius	None	None
Union Chapel Church Road ROW Project, Private Landowner	Tucker, WV	Unknown; Under Analysis	Maintenance and use of an existing road to access a cemetery.	10.1 South	Occurs within: 50-km radius	None	None
Corridor H Project, West Virginia Division of Highways	Randolph, Tucker, Grant, Hardy, WV	2000-Ongoing	Construction of a controlled access highway along USDOT designated Corridor H. Construction was completed or is expected to begin in the following counties during the specified years: Randolph-2002, 2016, Rucker-2015, 2016, 2031, Grant-2013, Hardy-2013, 2027. Construction in Monongahela National Forest will occur during 2016 and 2031 in Tucker and Randolph Counties and result in 4 miles of 4-lane highway.	2.6 Southwest	Occurs within: 5-mile radius, Project Counties, Watershed	SE, AO	Middle Tygart Valley River
Gloucester Parkway Extension Project, Virginia DOT	Loudoun, WV	2 years; 2014-2016	0.8-mile extension of four-lane divided-highway, connecting Gloucester Parkway to Nokes Blvd.	8.0 Southwest	Occurs within: 50-km radius, Project County	SE, AO	None
I-66 Widening Project, Virginia DOT	Prince William, VA	2 years; 2014-2016	Add lanes to I-66 in each direction	6.1 Southwest	Occurs within: 50-km radius, Watershed	WL	Bull Run
Pacific Boulevard Extension, Virginia DOT	Loudoun, VA	1 year; 2015-2016	Build 0.5 mile extension of Pacific Blvd as a four lane roadway.	8.7 Southwest	Occurs within: 50-km radius, Project County	WL, SE, AO	None
Route 600 North Fork Bridge Project, Virginia DOT	Shenandoah, VA	6 months; 2017	Replaces single-lane water bridge on Route 600 over the North Fork of the Shenandoah River with 0.2-mile bridge	7.3 West	Occurs within: 50-km radius, Project County, Watershed Area	AO	Narrow Passage Creek-North Fork, Shenandoah River

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
TRAVEL CORRIDORS (Continued)							
Route 606/Loudoun County Parkway, Old Ox Road Widening Project, Virginia DOT	Loudoun	2 years; 2015-2018	Widens Route 606/Loudoun County Pkwy/Old Ox Rd from two to four lanes for 5 miles.	4.9 West	Occurs within: 5-mile radius, Project County	WL, LUV, SE, AO	None
Route 624 (Morgan Ford Road) Shenandoah Bridge Project, Virginia DOT	Warren, VA	6 months; 2016	Replaces single-lane low water bridge on Route 624 over the Shenandoah River with 480-ft two lane bridge.	3.2 Northeast	Occurs within: 5-mile radius, Project County, Watershed Area	LUV, AO	Crooked Run-Shenandoah River
Route 663 (Artz Road) North Fork Bridge Project, Virginia DOT	Shenandoah, VA	6 months; 2016	Replaces single-lane low water bridge on Route 624 over the Shenandoah River with 480-ft two lane bridge.	4.2 West	Occurs within: 5-mile radius, Project County, Watershed Areas	LUV, SE, AO	Narrow Passage Creek-North Fork Shenandoah River
US Highway 1 Widening at Fort Belvoir Project, Virginia DOT	Fairfax, VA	2 years; 2014-2016	Widens US Highway 1 from four to six lanes for 3.7miles at Fort Belvoir	17.3 Northwest	Occurs within: 50-km radius, Project County	SE, A	None
ELECTRIC TRANSMISSION							
Mathias Substation, FirstEnergy	Hardy, WV	2017-2018	New non-jurisdictional 34.5 kV to 12 kV substation and 34.5 kV electric transmission line upgrade to provide power to the Lost River Compressor Station	0.0 N/A	Occurs adjacent to: Lost River Compressor Station Occurs within: Project County, Watershed Area	GE, SL, VG, WL, LU, SE, AC, NC, NO	Lost River
Chantilly Electric Distribution Line NOVEC (Northern Virginia Electric Cooperative)	Fairfax, VA	2017-2018	New non-jurisdictional substation to provide power to the Chantilly Compressor Station	0.0 N/A	Occurs adjacent to: Chantilly Compressor Station Occurs within: Project County, Watershed Area	GE, SL, VG, WL, LU, SE, AC, NC, NO	Bull Run
Haymarket 230kV Line & Substation Project, Dominion Virginia Power	Prince William, VA	2 years; 2017-2019	New 230 kV transmission line and substation.	2.9 West	Occurs within: 5-mile radius, Watershed Area	WL, LUV	Bull Run

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
ELECTRIC TRANSMISSION (Continued)							
Loudoun - Pleasant View 500 kV Rebuild Project, Dominion Virginia Power	Loudoun, VA	1 year; 2015-2016	Rebuild of an existing 500 kV line with the addition of a 230 kV underbuild	2.4 West	Occurs within: 5-mile radius, Project County, Watershed Area	WL, LUV, SE	Bull Run, Lower Goose Creek
Brambleton - Mosby 500 kV Project, Dominion Virginia Power	Loudoun, VA	3 years; 2016-2018	Rebuild of an existing line to improve reliability and increase capacity	3.8 Northwest	Occurs within: 5-mile radius, Project County, Watershed Area	WL, SE	Bull Run
Pacific 230 kV Line & Substation Project, Dominion Virginia Power	Loudoun, VA	1 year; 2016-2017	New 230 kV line and substation	6.2 West	Occurs within: 50-km radius, Project County	WL, SE	None
Warrenton - Wheeler - Gainesville 230 kV Reliability Project, Dominion Virginia Power	Fauquier, Prince William, VA	2 years; 2016-2018	New 230 kV line and substation	10.1 Northeast	Occurs within: 50-km radius	None	None
Idylwood Substation Rearrangement Project, Dominion Virginia Power	Fairfax, VA	3 years; 2017-2020	Rebuild an existing substation to improve reliability and increase capacity.	14.6 West	Occurs within: 50-km radius, Project County	SE	None
Poland Road Project, Dominion Virginia Power	Loudoun, VA	3 years; 2016-2018	New 230 kV transmission line and substation.	4.1 Northwest	Occurs within: 5-mile radius, Project County, Watershed Area	WL, SE	Bull Run
Yardley Ridge 230 kV Transmission Line Project, Dominion Virginia Power	Loudoun, VA	3 years; 2016-2018	New 230 kV double circuit transmission line,	4.4 Northwest	Occurs within: 5-mile radius, Project County, Watershed Area	SE	None
Davis Drive Project, Dominion Virginia Power	Loudoun, VA	2 years; 2016-2017	New substation to increase capacity.	9.6 West	Occurs within: 50-km radius, Project County, Watershed Area	SE	None

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
ELECTRIC TRANSMISSION (Continued)							
Charleston Area Improvements Project, Appalachian Power	Kanawha, WV	2 years; 2017-2019	Rebuild an existing transmissions line, construct a new substation, and upgrade two existing substations.	9.8 Northeast	Occurs within: 50-km radius, Project County, Watershed Area	SE	None
NATURAL GAS							
Dalton Expansion Project, Transcontinental Gas Pipe Line Company, LLC	Pittsylvania, Halifax, Mecklenburg, VA; Brunswick, MD; Greensville, Prince William, GA	3 years; 2015-2017	Mainline facility modifications to compressor stations and meter stations in VA and NC; Construction of Compressor Station, Pipeline, and facilities in GA	5.5 Northeast	Occurs within: 50-km radius	AO	None
Atlantic Coast Pipeline Project, Atlantic Coast Pipeline, LLC	Harrison, Lewis, Upshur, Randolph, Pocahontas WV; Highland, Augusta, Nelson, Buckingham, Cumberland, Prince Edward, Nottoway, Dinwiddie, Brunswick, Greensville, Southampton, Suffolk, Chesapeake, VA; Northampton, Halifax, Nash, Wilson, Johnston, Sampson,	3 years; 2017-2019	Construction of 550 miles of new natural gas pipeline and new compression facilities.	5.0 West	Occurs within: 5-mile radius, Project Counties, Watershed Areas	VG, WL, LUV, SE, AO	Buckhannon River, Upper Tygart Valley River

TABLE B.10-2 (Continued)							
Project, Company/Agency	**County, State**	**Construction time; Schedule**	**Project Description**	**Approximate Closest Distance (miles) and Direction**	**Geographic Scope for Cumulative Impact Assessment**	**Resources Cumulatively Affected [a]**	**Same Watershed (HUC-10)**
	Cumberland, Robeson, NC						
NATURAL GAS (Continued)							
Monroe to Cornwell Project, Dominion Transmission, INC.	Kanawha, Doddridge, Wetzel, WV	9 months; 2016	Modifications to existing compressor stations, including adding horsepower, compressor and office buildings, measurement and regulation stations, discharge pipeline, and associated appurtenances	2.3 West	Occurs within: 5-mile radius, Project County, Watershed Area	WL, SE, AO	Lower Elk River
Cove Point Liquefaction Project, Dominion Cove Point LNG, LP	Fairfax, Loudoun, VA; Calvert, MD	2 years; 2016 - 2017	Modifications to existing compressor station and metering facility in VA; Construction of LNG liquefaction train at existing LNG terminal	0.1 Southwest	Occurs within: ¼-mile radius, Project County, Watershed Area, Noise Sensitive Area	WA, FI, VG, WL, LUV, SE, AO, AC, NC, NO	Bull Run
Line WB2VA Integrity Project, Columbia Pipeline Group, LLC	Hardy, WV; Shenandoah, Rockingham, Page, Greene, VA	10 months; 2016-2017	Modifications to existing compressor stations (including the Lost River Compressor Station), valve sites, launcher and receiver sites, drip sites, and a crossover site. Replacement of sections of existing pipeline.	0.0 N/A	Occurs within: Lost River Compressor Station, Project Counties, Watershed Areas	GE, SL, WA, VG, WL, LU, LUV, SE, AO, AC, NC, NO	Lost River, Stony Creek
Mountaineer XPress Project, Columbia Pipeline Group, LLC	Marshall, Wetzel, Tyler, Doddridge, Ritchie, Calhoun, Wirt, Roane, Jackson, Putnam, Mason, Cabell, Kanawha, WV	10 months; 2018	Construction of 164-miles of new 36-inch pipeline and 6.5 miles of new 24-inch pipeline and associated new and modified compression facilities including modifications at the proposed Elk River Compressor Station.	0.0 N/A	Occurs within: Elk River Compressor Station, Project County, Watershed Area, Noise Sensitives Areas	GE, SL, WA, FI, VG, WL, LU, SE, AO, AC, NC, NO	Lower Elk River
Cleveland Compressor Station Project, Columbia Pipeline Group, LLC	Upshur, WV	1 year; 2017-2018	Installation of two 8,030 hp Solar Taurus 70 turbine compressors at the Cleveland Compressor Station and construct a new compressor building, office/warehouse, fuel gas building, and auxiliary building.	0.0 N/A	Occurs within: Cleveland Compressor Station, Project County, Watershed Area, Noise Sensitive Area	GE, SL, WA, VG, LU, SE, AO, AC, NC, NO	Upper Little Kanawha River
NATURAL GAS (Continued)							

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
Utica Access Project, Columbia Pipeline Group, LLC	Kanawha, Clay, Roane, WV	6 months; 2016	Installation of 4.8 miles of new pipeline and associated bi-directional launcher and receiver and regulating facilities, including at the Cobb Compressor Station adjacent to the proposed Elk River Compressor Station.	0.0 N/A	Occurs adjacent to: Elk River Compressor Station Occurs within: Project County, Watershed Area, Noise Sensitive Area	GE, SL, WA, FI, VG, WL, LU, SE, AO, AC, NC, NO	Lower Elk River
Clendenin Reliability Improvement Project, Columbia Pipeline Group, LLC	Kanawha, WV	2 months; 2017	Installation of Lube Oil Storage Tank and completing work on two units at an existing facility adjacent to Line WB-5 Extension and Line WB-22.	0.0 N/A	Occurs within: Panther Mountain Regulator Station, Project County, Watershed Area, Noise Sensitive Areas	GE, SL, WA, VG, WL, LU, SE	Lower Elk River
2015 Controls System Upgrades Projects, Columbia Pipeline Group, LLC	Richland, Crawford, OH; Chester, Westmoreland, PA; Wayne, Upshur, WV; Shenandoah, Dinwiddie, Goochland, VA	3 months; 2015	Modernization of select unit controls with current Columbia standard panels and instrumentation at selected compressor stations (Cleveland, Goochland, Crawford, Downingtown, Weaver, Shenandoah and Ceredo).	0.0 N/A	Occurs within: Cleveland Compressor Station, Project Counties, Watershed Area, Noise Sensitive Area	GE, SL, WA, VG, LU, SE	Upper Little Kanawha River
Files Creek Compressor Station Project, Columbia Pipeline Group, LLC	Randolph, WV	1 year; 2015-2016	Improve system reliability by installing two 8,030 horsepower Solar 70 units at Files Creek Compressor Station, adding four filter separators, and constructing a new auxiliary control building, office building, fuel gas building,	0.0 N/A	Occurs within: Files Creek Compressor Station, Project County, Watershed Area, Noise Sensitive Area	GE, SL, VG, LU, AO, AC, NC, NO	Middle Tygart Valley River
Broad Run Expansion Project, Tennessee Gas Pipeline Company, LLC	Davidson, TN; Madison KY; Kanawha, WV	1 year; 2016-2017	Construction of 2 new CS in Kanawha County, 1 new CS in Madison (KY) and Davidson (TN), and modifications at 2 existing CS in KY.	16.1 East	Occurs within: 50-km radius, Project County	WL, SE, AO, NO	None

TABLE B.10-2 (Continued)

Project, Company/Agency	County, State	Construction time; Schedule	Project Description	Approximate Closest Distance (miles) and Direction	Geographic Scope for Cumulative Impact Assessment	Resources Cumulatively Affected [a]	Same Watershed (HUC-10)
NATURAL GAS (Continued)							
Mountain Valley Pipeline Project, Mountain Valley Pipeline, LLC	Wetzel, Harrison, Doddridge, Lewis, Braxton, Webster, Nicholas, Greenbrier, Summers, Monroe, WV; Giles, Montgomery, Salem, Franklin, Pittsylvania, VA	2 years; 2016-2018	Construction of about 300 miles of a 36 to 42-inch diameter interstate natural gas pipeline with capacity of 2 Bcf/d and four compressor stations.	8.9 West	Occurs within: 50-km radius, Project County, Watershed Areas	WA, VG, WL, SE, AO	Upper Little Kanawha River, Middle Elk River

Table B.10-2 (Continued)

a GE=Geological, SL=Soil, WA= Water and Aquatic, FI=Fisheries, VG=Vegetation, WL=Wildlife, LU= Land use, LUV = Land Use (Visual), SE=Socioeconomic, AC=Air (Construction), NC=Noise (Construction), AO=Air (Operation), NO=Noise (Operation)

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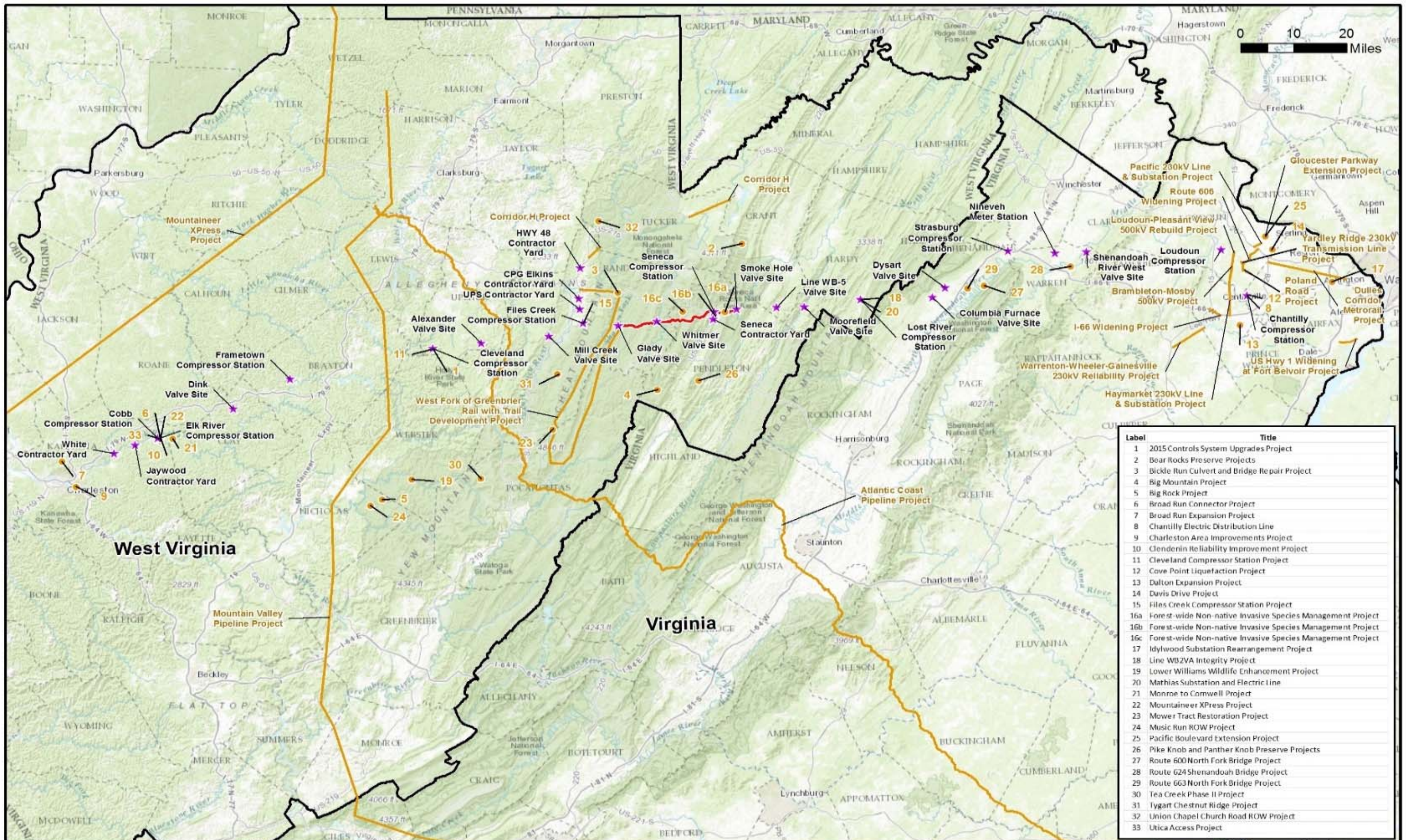


Label	Title
1	2015 Controls System Upgrades Project
2	Bear Rocks Preserve Projects
3	Bickle Run Culvert and Bridge Repair Project
4	Big Mountain Project
5	Big Rock Project
6	Broad Run Connector Project
7	Broad Run Expansion Project
8	Chantilly Electric Distribution Line
9	Charleston Area Improvements Project
10	Clendenin Reliability Improvement Project
11	Cleveland Compressor Station Project
12	Cove Point Liquefaction Project
13	Dalton Expansion Project
14	Davis Drive Project
15	Files Creek Compressor Station Project
16a	Forest-wide Non-native Invasive Species Management Project
16b	Forest-wide Non-native Invasive Species Management Project
16c	Forest-wide Non-native Invasive Species Management Project
17	Idylwood Substation Rearrangement Project
18	Line WB2VA Integrity Project
19	Lower Williams Wildlife Enhancement Project
20	Mathias Substation and Electric Line
21	Monroe to Cornwell Project
22	Mountaineer XPress Project
23	Mower Tract Restoration Project
24	Music Run ROW Project
25	Pacific Boulevard Extension Project
26	Pike Knob and Panther Knob Preserve Projects
27	Route 600 North Fork Bridge Project
28	Route 624 Shenandoah Bridge Project
29	Route 663 North Fork Bridge Project
30	Tea Creek Phase II Project
31	Tygart Chestnut Ridge Project
32	Union Chapel Church Road ROW Project
33	Utica Access Project

Line WB Aboveground Facilities

Line WB Replacement (~26 miles)

Projects with Potential Cumulative Impacts

Projects with Potential Cumulative Impacts

Figure B.10-1
Cumulative Impact Assessment Projects
WB XPress Project

FERC Jurisdictional Natural Gas Pipeline Projects

There are 14 natural gas projects listed in table B.10-2. Four of these projects are of particular significance for the purposes of this analysis. These four projects, which are described below, are similar to or greater in scope than the WB XPress Project, and have the potential to affect similar resources. It is important to note while most of the work associated with these projects would occur at a significant distance from the Project, some work would occur within the Project-defined geographic scope of each resource area. As a result, these projects are included in the discussion of cumulative impacts.

Mountaineer XPress Project

Columbia's Mountaineer Xpress Project (MXP) is under review by FERC. The construction and operation of MXP would involve about 163.9 miles of new 36-inch-diameter natural gas pipeline from Marshall County to Cabell County, West Virginia; about 5.8 miles of new 24-inch-diameter natural gas pipeline in Doddridge County, West Virginia; three new compressor stations in Doddridge, Calhoun, and Jackson Counties, West Virginia; two new regulating stations in Ripley and Cabell Counties, West Virginia; additional compression at existing compressor stations in Marshall and Wayne, and Kanawha Counties, West Virginia; and related facilities in various West Virginia counties. Additionally, Columbia would replace a 0.4-mile-segment of 30-inch-diameter natural gas pipeline on its existing system in Cabell County, West Virginia. Although the proposed MXP pipeline would be located 27 miles from the Project, both MXP and WB XPress would involve work within Kanawha County. For this reason, the MXP is included in the analysis. The WB XPress Project would include modifications to the Elk River Compressor Station located within Kanawha County, West Virginia. The anticipated construction schedules for the MXP and the WB XPress would likely coincide, or occur shortly after each other. Additional discussion of the MXP project is included in the cumulative impact assessment by resource below.

Mountain Valley Pipeline Project

The Mountain Valley Pipeline Project (MVP) project would involve construction of 300 miles of pipeline and 4 compressor stations in West Virginia and Virginia. The MVP proposes to construct pipeline facilities in Braxton County, where Columbia is proposing minor modifications to an existing compressor station associated with WB XPress. The anticipated construction schedule for the MVP project would coincide with the Project's schedule. Additional discussion of the MVP Project is included in the cumulative impact assessment by resource below.

Atlantic Coast Pipeline

The proposed ACP would involve the construction of about 600 miles of variable diameter pipeline that extends through West Virginia, Virginia, and North Carolina. The ACP is currently under review by FERC. The ACP was evaluated for this cumulative impact analysis because portions of the ACP would be installed in Upshur and Randolph Counties. Columbia proposes modifications to existing compressor stations in Upshur County and replace existing Line WB segments in Randolph County. Based on current information, construction of the ACP would likely occur shortly thereafter the construction of the WB XPress Project. The ACP and the WB XPress Project would also be constructed in the same AQCR and both projects would cross within the MNF proclamation boundary. Therefore, ACP was included in this analysis.

Broad Run Expansion Project

Unlike the other projects described above, the Broad Run Expansion Project is a relatively small project involving the construction of three new compressor stations and modification of two existing compressor stations. Although most of the facilities associated with the Broad Run Expansion Project would occur in different states, two of the new compressor stations would be constructed in Kanawha County, West Virginia. Within Kanawha County, Columbia is proposing to construct the Line WB-5 Extension, Line WB-22, the Elk River Compressor Station and the Line WB-22 Receiver Site.

Other Known Projects

The other 10 natural gas projects identified in table B.10-2, are smaller in scale relative to the WB XPress Project (e.g., modifications to existing facilities), or the primary project area is geographically distant. However, these projects could result in impacts on resources within the defined geographic scope and, therefore, the cumulative impacts are evaluated further in this assessment.

In addition to those projects identified in table B.10-2, there is only one other FERC-jurisdictional project planned in the states crossed by the Project. This project, the Appalachian Connector Project, if constructed, would be located in Marshall County, West Virginia and Chatham County, Virginia and thus, within the air geographic scope defined for the WB XPress Project. No other Project geographic scopes would be affected by Appalachian Connector Project. At this time the Appalachian Connector Project has not proceeded past pre-planning development by the project sponsor and does not appear to be a reasonably foreseeable project. Therefore, it is not discussed further.

Geology and Soils

The facilities associated with the WB XPress Project would have a direct impact on near-surface geology and soils due to construction activities such as clearing, grading, trenching, backfilling, and traffic by heavy equipment. As a result of these activities, erosion, compaction, rutting, and reduction of soil quality would be anticipated. Because the Project would occur largely in previously disturbed areas, extensive blasting is unlikely but limited blasting could be required. Portions of the Project would be located in areas where covered karst features potentially exist. However, the Project would disturb only limited areas of surface soil and shallow bedrock, and surveys did not reveal karst features in the Project area. There is potential for landslides because of steep slopes. Clearing and grading activities could expose the soils to erosive elements such as precipitation and wind. About 71 percent of the soils that would be affected by the Project are susceptible to water erosion but none are susceptible to wind erosion. About 47 percent of the soils in the Project area are considered prime farmland (285.8 acres). Should hazardous materials or contaminated soils be encountered during construction, they would be disposed of in accordance with federal and state regulations. Impacts on geological and soil resources would be minimized by implementation of the Columbia's ECS and E&SCP, which includes erosion control and stabilization measures.

The effects on geology and soils would be highly localized and limited primarily to the period of construction and restoration. Ten potential projects within the geographic scope would be located at or adjacent to the same existing facility sites as the WB XPress Project. Overlapping direct impacts on geologic and soil resources would occur within the previously disturbed fence lines of these facilities. Because the soils have been previously disturbed, additional impacts from the WB XPress Project and other projects would not contribute significantly to additional impacts. Implementation of Columbia's and other project E&SCPs would also minimize impacts on geologic and soil resources in these areas.

Other large ground-disturbing projects that are not adjacent to the Project but are within the geographic scope include the Corridor H Project and Atlantic Coast Pipeline (ACP) Project. The Corridor H and ACP Projects would likely result in geology and soil impacts that exceed those of the WB XPress Project. ACP would cross over 84 miles of slopes greater than 20 percent and constructing pipelines in steep terrain or high landslide incidence areas could increase the potential for landslides to occur. Altantic Coast Pipeline has proposed programs and several mitigation measures to minimize the potential for slope instabilities and landslides. It also developed a Geohazard Analysis Program and is also developing a Best in Class Steep Slope Management Program to address issues of landslide potential and susceptibility. These projects would also implement E&SCPs to avoid or minimize impacts. However, some limited cumulative impacts on geologic and soil resources would likely occur in the area as a result of these projects.

Waterbodies and Aquatic Resources

No impact on groundwater is expected as a result of the WB XPress Project. Thus, the Project would not contribute to potential cumulative effects related to other project in the same sub-watersheds. The Project would impact wetlands in 76 locations, including 10 locations in palustrine forested wetlands, 1 location in palustrine scrub-shrub wetlands, and 65 locations in palustrine emergent wetlands. The Project would involve construction impacts of about 8.2 acres of palustrine wetlands and permanently impact about 0.2 acre of palustrine wetlands. Permanent impacts would include conversion of a combined 0.2 acre of forested wetlands and scrub-shrub wetlands to another wetland type, and the filling of less than 0.1 acre of emergent wetland. Temporary impacts could include loss of vegetation during construction and the possible introduction of chemical discharges from fuels and lubricants. Columbia would mitigate construction-related impacts on wetlands by implementing its ECS, SPCC Plan, and E&SCPs, and complying with any federal, state, and local permits issued. It is assumed that the other projects would implement similar measures and abide by federal and state regulations, which would minimize cumulative wetland effects.

Cumulative effects on surface water and aquatic resources affected by the WB XPress Project would be limited to waterbodies that are affected by other projects located within the same watersheds. A total of 94 waterbodies were identified within the Project area, including 3 open water ponds, 27 perennial streams, 36 intermittent streams, and 28 ephemeral streams. Clearing and grading of stream banks, in-stream trenching, trench de-watering, and backfilling could affect waterbodies and aquatic resources such as fisheries through modification of existing aquatic habitat, an increased rate of in-stream sediment loading, increased turbidity levels, reduced dissolved oxygen concentrations, introduction of chemical discharges from fuels and lubricants, and general disturbance of habitat. The level of impact would depend on precipitation events, stream velocity, channel integrity, and proposed construction methods. The Project would use dry ditch, dam-and-pump, or flume crossing methods at each waterbody crossing, resulting in only temporary impacts on surface waters and the ability of fish to fully use habitat. In-stream work would not occur in trout waters during trout stocking periods. Waterbodies would be restored to pre-construction contours and seeded within 48 hours of backfilling.

Impacts would be avoided or minimized by use of the Columbia's ECS, SPCC, E&SCPs, and site-specific crossing plans.

Columbia would hydrostatically test the pipeline in accordance with regulations of General NPDES Permits WV0113069 and VAG83, and the ECS prior to placing the facilities into service. Columbia estimates using 3,773,620 gallons of water during this process, of which 2,017,520 gallons would be sourced from municipal supplies and 1,756,100 gallons would be sourced from Glady Fork and North Fork South Branch Potomac River. Columbia would ensure sufficient water levels prior to withdrawing from these waterbodies and would withdraw water in a manner that would not alter flow rate. Water withdrawal structures would be screened to avoid intake of fish, fish larvae, and other aquatic resources. Following testing of the pipeline, the water would be discharged into dewatering structures in upland areas within construction workspace. Due to hydrostatic testing, the Project would temporarily reduce the amount of water in Glady Fork and North Fork South Branch Potomac River. Other temporary impacts resulting from hydrostatic testing would be minimized due to the Columbia's implementation of its ECS. We are not aware of any other proposed water withdrawals from these waterbodies that would occur within the watershed around the same time as the proposed Project. Thus, we do not anticipate cumulative impacts associated with hydrostatic testing.

The WB XPress Project and two other projects (Utica Access Project and Mountaineer XPress Project [MXP]) are located adjacent to the Elk River and indirect effects on this waterbody and associated aquatic resources are possible. Time and space crowding due to multiple sequential projects in this area could increase the possibility of accumulation of indirect effects on the River. Columbia would implement measures during construction to minimize temporary impacts on the Elk River and associated aquatic resources. Because Columbia is also the Applicant for the other two projects, it is assumed that the other projects would implement similar measures, which would minimize any cumulative effects on this resource.

The ACP and its associate Supply Header Project would cross 1,989 waterbodies, including 851 perennial, 779 intermittent, 248 ephemeral, 64 canals/ditches, and 47 open water ponds/reservoirs (some waterbodies are crossed more than once). The MVP would result in 986 waterbody crossings, of which 377 are perennial waterbodies. The MXP would directly cross 417 minor waterbodies, 86 intermediate waterbodies, and 5 major waterbodies. We note that the 417 minor waterbodies are mostly ephemeral drainages typical of the topography in the MXP area.

The WB XPress Project would impact 17 HUC-10 watersheds where potential geographic scope identified projects would be located:

- Dry Fork;
- Glady Fork;
- North Fork South Branch Potomac River;
- Upper South Branch Potomac River;
- South Mill Creek-Mill Creek;
- Upper Tygart Valley River;
- Bull Run;
- Crooked Run-Shenandoah River;

- Narrow Passage Creek-North Fork Shenandoah River;
- Lost River;
- Buckhannon River;
- Lower Elk River;
- Stony Creek;
- Upper Little Kanawha River;
- Middle Tygart Valley River;
- Middle Elk River; and
- Lower Goose Creek.

Waterbody and wetland crossing methods of other projects are not known at this time; however, it is expected that methods would be in accordance with applicable local, state, and federal permits. Columbia would implement measures during construction to minimize temporary impacts on surface water and aquatic resources, and it is assumed that the other projects that cross waterbodies within these watersheds would require federal and state permits, and thus would implement similar measures, which would minimize any cumulative surface water and aquatic resource effects.

Vegetation, Wildlife, and Protected Species

Construction of the WB XPress Project would temporarily impact about 91.1 acres of forested upland, 259.5 acres of open land, (including right-of-way), and 82.4 acres of agricultural land. The Project would result in the permanent impact of about 41.9 acres of forested upland, 137.0 acres of open land, and 14.1 acres of agricultural land. Along with some of the other projects listed in table B.10-2, right-of-way clearing and grading and other construction activities associated with the Project would result in the removal of vegetation, potential introduction of invasive weeds and invasive species, alteration of wildlife habitat, disturbance and displacement of wildlife, and other potential secondary effects such as increased stress and mortality. These effects would be greatest where the recovery time of the vegetation and habitat takes longer to restore to its pre-construction state. Columbia would restore vegetative cover and monitor restoration according to its ECSs. Columbia proposes to locate the majority of Project pipelines and facilities in areas adjacent to existing rights-of-way, which would minimize the amount of vegetation disturbance and habitat loss, and would increase the distance between already-fragmented forest patches.

Eighteen other projects are located within the HUC-10 geographic scope for vegetation resources. Only one project, the Cove Point Liquefaction Project, would likely involve tree clearing. This would occur in the vicinity of the proposed Chantilly Compressor Station in Fairfax County, Virginia. In this area, the Project would involve clearing of 12.5 acres of trees. This impact from the Project, in addition to any impacts from the other project, would contribute to cumulative impacts on vegetation via permanent loss of mature trees. The presence of local and state protected forest areas within the vegetative geographic scope, would ensure there are still considerable forest resources in the area and would tend to lessen the cumulative impact associated with the tree clearing of nearby projects.

The Corridor H and ACP Projects are partially located in the same counties as the WB XPress Project and would have direct and indirect impacts on vegetation and wildlife. Operation of ACP and related facilities would have long-term to permanent effects on about 4,208 acres of vegetation, including about 3,424 acres of upland forest vegetation (deciduous, coniferous, and mixed). When combined, the long-term effects of tree clearing and habitat changes associated with the WB XPress Project and other projects would persist. This would be more pronounced in regions of West Virginia known for exceptional ecological diversity.

The MNF can be considered a collective vegetation and wildlife resource area, and therefore, we have examined the MNF for other projects that may also impact vegetation and wildlife. Such other construction projects within the MNF include the West Fork of Greenbrier Rail with Trail Development Project (currently on hold), Corridor H Project, and the ACP Project. Collectively, these projects and the WB XPress Project would directly and indirectly impact vegetation and wildlife resources in the MNF. However, impacts from these other projects and the proposed Project would be dispersed throughout the MNF over a wide geographic region. The effects of these projects would include forest clearing, increased habitat fragmentation, disturbance during construction, and could include the potential introduction of invasive plants. Columbia would minimize and mitigate its potential contribution to cumulative impacts by locating pipeline facilities adjacent to existing maintained rights-of-way, cleaning construction equipment prior to entering the MNF, implementing its ECSs, and adhering to mitigation requirements set forth by a SUP and a Construction, Operations, and Maintenance Plan approved by the MNF. It is assumed the other projects would also require SUP and Construction, Operation, and Maintenance Plans. These would need to comply with the MNF LMRPs and thus would need to adhere to similar measures.

Many of the other projects on table B.10-2 would occur at or adjacent to proposed Project sites at existing facilities, and would yield minimal permanent cumulative impacts on vegetation, habitat and associated wildlife. Other projects located within the same counties as the WB XPress Project are located enough miles away so that potential cumulative impacts would be minimized.

A total of 20 federally listed species under the jurisdiction of the FWS are known to potentially occur in the WB XPress Project area. Through consultations with state agencies, three state threatened or endangered animals also potentially occur in the Project area in Virginia. In addition, all native mussel species are protected in West Virginia. Cumulative impacts on each of these species could result if the other projects would affect the same species or their associated habitats. Most the impacts on the federally protected species most likely to be affected by the WB XPress Project are covered under the MSHCP. The Project would not likely adversely affect the other 16 federally listed species. In areas where Project activities are covered, Columbia would adhere to the AMMs described in the MSHCP to mitigate impacts on any federally listed species affected by the Project. In areas where the MSHCP does not apply, Columbia would implement applicable MSHCP AMMs for all applicable listed species and implement the MBCP to avoid or mitigate any impacts on protected bat species and habitat. In addition, all non-federally listed native mussel species located at stream crossings in West Virginia would be relocated by Columbia prior to construction. Similar conservation measures would likely be required by jurisdictional agencies for the other projects on table B.10-2 to minimize potential impacts on federal and state protected species. In contrast while other federally listed species may be within the action area, we determined that construction and operation of ACP would be likely to adversely affect five federally listed species: Indiana bat, Northern long-eared bat, Roanoke logperch, running buffalo clover, and Madison Cave isopod. Similarly, the MVP would be likely to adversely affect 3 species: Indiana bat, northern long-eared bat, and Roanoke logperch. These conservation measures would reduce impacts such that the projects singly and cumulatively would not adversely affect special status species, jeopardize the continued existence of a species, or adversely modify critical habitat.

We have concluded, through discussions with the FWS, that the WB Xpress Project may affect and is likely to adverse affect the CMS. The project would directly impact about 0.08-acre of CMS habitat, with additional indirect impacts. Columbia has proposed avoidance and mitigation measures to minimize the impact of the Project and is currently in consultation with the FWS. The FWS is currently preparing a Biological Opinion concerning the potential effects of the Project on CMS. Recently the FWS completed a similar Biological Opinion for the Timberline Ski area. The two projects would impact different populations of CMS and the BAs for both projects evaluated cumulative impacts. The WB XPress Project combined with the Timberline Project would contribute to cumulative impacts on the species but the effects would not be significant or, in our opinion, jeopardize the existence of the species.

Land Use

The WB XPress Project would temporarily and permanently impact land use and land cover. Construction of the Project would impact a total of 607.7 acres. The primary land use types impacted during construction would be open land (43 percent), and industrial (27 percent). The majority of the land use impacts associated with the Project would be temporary, and most land uses would be allowed to revert to prior conditions following construction. Most of the permanent land use impacts would occur at or adjacent to areas that are currently maintained as rights-of-way or aboveground industrial facilities.

Most of the other projects in table B.10-2 would impact areas already used for right-of-way or industrial purposes. The Corridor H and ACP Projects would affect currently undisturbed areas, resulting in greater permanent land use changes than that of the WB XPress Project. Combined, these projects would cumulatively affect land use in the area of the Project. Construction of the ACP and its related facilities would affect 12,030.7 acres of land, and operating the proposed facilities would affect 5,976.0 acres of land. Of this this total, 100.5 acres would be affected on the MNF during construction and 53.6 acres during operation. Construction of the MXP would impact a total of about 3,590 acres. Construction of the MVP would impact a total of 6,325 acres and 2,103 acres during operation.

Visual impacts from the WB XPress Project would generally be limited to the construction period in the vicinity of the construction work areas due to increased presence of construction equipment and the clearing of vegetative cover. Permanent visual impacts would result from the clearing of trees for a new right-of-way as well as the construction of two new compressor stations. The widening of the existing right-of-way would be incremental and barely noticeable after disturbed areas are revegetated. The areas of new right-of-way are generally in remote areas that are not highly visible from homes or roadways and thus the visual impact in these areas would be minor. The Elk River Compressor Station in Kanawha County, West Virginia would be built adjacent to existing aboveground industrial facilities and would not greatly alter the overall visual landscape in that area. The Chantilly Compressor Station would be constructed in a currently forested area and would alter the visual landscape. However, the visual changes would be shielded from nearby residential buildings by a vegetative buffer. Because most of the other projects, which would occur at the same aboveground facilities, would not be constructed at the same time as the WB XPress Project, cumulative visual impacts would be minimized. Two projects, the Mathias Substation and Chantilly Electric Distribution Line, would occur at the Lost River Compressor Station and Chantilly Compressor Station, respectively at the same time as the WB XPress Project. These facilities associated with these two projects would incrementally contribute to the temporary and permanent visual impacts associated with the Mathias Substation and Chantilly Electric Distribution Line, but the cumulative visual effects would be minor.

Construction of the Project would temporarily impact road traffic in some areas, especially two-lane state and county roads, and could contribute to cumulative traffic impacts in areas where there are high traffic volumes or few alternate routes. Based on the differing schedules of the various projects and dispersed nature of construction activities associated with these projects, cumulative traffic impacts in any one area would likely not be greater than those caused solely by the proposed Project.

The MNF, a large and regionally important recreation area, would be impacted temporarily and permanently by the WB XPress Project. Specifically, it would temporarily widen the existing Columbia right-of-way. About 11.4 miles of the Project would occur on NFS land, of which about 4.3 miles would cross the Spruce Knob-Seneca Rocks National Recreation Areas. The project would also cross 3 trails within the MNF and 4 NRI rivers. Columbia prepared a NRI assessment to evaluate the impact of the project on NRI rivers and performed a visual assessment to determine the potential long term effect of Project–related tree clearing within the MNF and determined that the effect would be relatively minor. While other projects such as the ACP Project would cross the MNF (a crossing length of 5.1 miles in Pochohontas County, WV), we are not aware that any other major projects would cross the same National Recreation Areas or NRI segments or viewsheds as the Project. The Project would also temporarily impact a recreational trail in Fairfax County, Virginia. While this would impact the trail during construction, no other projects would impact this same trail and cumulative impacts would not occur. Overall, although the Project would impact recreation areas, cumulative impacts on these areas are not anticipated.

Socioeconomic Resources

The WB XPress Project would impact job availability, rental and term housing markets, and sales and income tax revenue throughout the Project area. Because the Project is dispersed through 12 counties and 2 states, the impacts would likely be minimal within each county and state. The majority of impacts would be temporary, occurring only during construction. The workforce would primarily be non-local, meaning the Project would not directly alter job markets and unemployment rates within the impacted counties. Permanent impacts could occur in Kanawha County, West Virginia and Fairfax County, Virginia, where new compressor stations would require a total of 12 new long-term employees. Due to current vacancy rates, workers would likely not encounter difficulties finding temporary housing. Due to timing, scope, and location of the other projects (particularly larger projects such as the ACP, MVP and MXP), there could be slight difficulty finding housing or more expensive housing, but this is not expected to be significant and would last only the duration of project construction. Other projects within these counties would likely also impact socioeconomic resources only temporarily during construction. Overall, cumulative impacts on socioeconomic resources would be minimal, but there would be some cumulative economic benefits resulting from direct and indirect spending associated with the planned projects as well as increased local employment, sales and income tax revenues, and ad valorem taxes during operation of the planned projects.

Cultural Resources

The WB XPress Project would not impact historic resources at sites where the direct footprint overlaps that of other projects. For this reason, no direct cumulative impacts on historic properties would occur. Columbia has developed a Project-specific plan to address unanticipated discoveries of cultural resources and human remains in the event they are discovered during construction. Federal and state agencies which oversee historic resources would likely require appropriate avoidance or mitigation measures as applicable for the other major projects listed on table B.10-2. Thus indirect cumulative impacts on historic resources are possible but would likely be minimal.

Air and Noise

The WB XPress Project would create temporary air quality impacts at construction locations due to fugitive dust, elevated levels of ambient air pollutants, and air emissions from mobile sources and construction equipment. The Project would also create temporary noise impacts due to sound emissions from mobile sources and construction equipment. These impacts would be limited to daytime hours during the construction period, and would be minimized by complying with local, state, and federal air and noise standards. Other projects scheduled near the Project would not occur at the same time as Project construction. Thus, temporary cumulative impacts on air and noise quality are not expected. The Project would not impact Class I areas, and impacts of other projects on the same Class I areas are currently undetermined, so we currently do not expect the Project to contribute to air impacts in Class I areas.

The WB XPress Project would result in emissions during operation of the Project that would, along with emission from other facilities within a 50-km radius, contribute to cumulative air quality impacts in the area surrounding the proposed Project facilities. The other projects that would contribute to cumulative air impacts include:

- Dulles Corridor Metrorail Project, Metropolitan Washington Airports Authority, Virginia
- Department of Rail and Transportation;
- West Fork of Greenbrier Rail with Trail Development Project, West Virginia State Rail Authority;
- Corridor H Project, West Virginia Division of Highways;
- Gloucester Parkway Extension Project, Virginia DOT;
- I-66 Widening Project, Virginia DOT;
- Pacific Boulevard Extension, Virginia DOT;
- Route 600 North Fork Bridge Project, Virginia DOT;
- Route 606/Loudoun County Parkway, Old Ox Road Widening Project, Virginia DOT;
- Route 624 (Morgan Ford Road) Shenandoah Bridge Project, Virginia DOT;

- Route 663 (Artz Road) North Fork Bridge Project, Virginia DOT;
- US Highway 1 Widening at Fort Belvoir Project, Virginia DOT;
- Dalton Expansion Project, Transcontinental Gas Pipe Line Company, LLC;
- Atlantic Coast Pipeline Project, Atlantic Coast Pipeline, LLC;
- Monroe to Cornwell Project, Dominion Transmission, INC.;
- Cove Point Liquefaction Project, Dominion Cove Point LNG, LP;
- Line WB2VA Integrity Project, Columbia Pipeline Group, LLC;
- Mountaineer XPress Project, Columbia Pipeline Group, LLC;
- Cleveland Compressor Station Project, Columbia Pipeline Group, LLC;
- Broad Run Connector Project, Columbia Pipeline Group, LLC;
- Utica Access Project, Columbia Pipeline Group, LLC;
- Files Creek Compressor Station Project, Columbia Pipeline Group, LLC;
- Broad Run Expansion Project, Tennessee Gas Pipeline Company, LLC; and
- Mountain Valley Pipeline Project, Mountain Valley Pipeline, LLC;

In all cases, impacts would be minimized by compliance with local, state, and federal air regulations and permit requirements. Many of the natural gas projects in Table B.10-2 would create permanent impacts on air quality. The newly identified Idylwood Substation Rearrangement Project, Poland Road Project, Yardley Ridge 230kV Transmission Line Project, and the Davis Drive Project all lay within 50km of the proposed Loudoun and Chantilly Compressor Stations. The newly identified Charleston Area Improvements Project lies within 50km of the proposed Elk River Compressor Station. The newly identified Mower Tract Restoration Project lies within 50km of the proposed Cleveland and Files Creek Compressor Stations. The newly identified Tygart Chestnut Ridge Project lies within 50km of the proposed Cleveland and Files Creek Compressor Stations.

The WB XPress Project would impact noise levels at nearby NSAs due to the installation of the Elk River and Chantilly Compressor Stations, and the installation of additional turbines at the Cleveland, Files Creek, Seneca, Lost River, and Strasburg Compressor Stations, and new station control valves at the Panther Mountain Regulator Station, Dysart Valve Site, Nineveh Meter Station, and Loudoun Compressor Station. In all cases, impacts would be minimized by Columbia's proposed design and noise mitigation measures and its compliance with local, state, and federal air regulations and permit requirements.

Only the Elk River Compressor Station, Panther Mountain Regulator Station, Cleveland Compressor Station, Files Creek Compressor Station, Lost River Compressor Station, and Chantilly Compressor Station would impact NSAs that would also be impacted by another project. The WB XPress Project would impact five NSAs near Elk River Compressor Station, but the potential noise increase would be less than 3 dB (and thus undetectable to the human ear), and the estimated total noise attributable to operations and combined estimated total noise attributable to operations would be in compliance with FERC requirements. However, the combined estimated total noise estimated by Columbia did not include potential impacts from the

Utica Access Project. The Project Panther Mountain Regulator Station would impact three of the same NSAs as the Elk River Compressor Station. The potential noise increase would be minor and the estimated total and combined total noise attributable to operation would be in compliance with FERC requirements. However, the combined total noise estimated by Columbia did not account for estimates of the Utica Access Project, MXP, and Broad Run Connector Project, which would be located in the vicinity of this site.

The Project would impact four NSAs located near Cleveland Compressor Station. At three NSAs, the potential noise increase would be minor and estimated total noise attributable to operation would be in compliance with FERC requirements. At one NSA, the estimated total noise attributable would be in compliance with FERC requirements, but the potential noise increase would be greater than 3 dB and thus would be a noticeable impact. However, the Cleveland Compressor Station Project (the other project on table B.10-2 that is near the compressor station), which involved significant noise reduction mechanisms, was accounted for in Columbia's calculations of noise impacts associated with the operation of the WB XPress Project. Moreover, the total sound levels at this site after completion of the WB XPress Project would be less than previous levels.

The Project would impact three NSAs located near Files Creek Compressor Station. At one NSA, the potential noise increase would be a minor and estimated total noise attributable to operation would be in compliance with FERC requirements. At two NSAs, the estimated total noise attributable to the WB XPress Project would be in compliance with FERC requirements, but the potential noise increase would be greater than 3 dB and thus would be a noticeable impact. However, the Files Creek Compressor Station Project (the other project on table B.10-2 that is near the compressor station), which involved significant noise reduction mechanisms, was accounted for in Columbia's calculations of noise impacts associated with the operation of the WB XPress Project. Moreover, the total sound levels at this site after completion of the WB XPress Project would be less than previous levels.

The Project would impact five NSAs near the Lost River Compressor Station, but the potential noise increases would be of minor and the estimated total noise attributable to operations would be in compliance with FERC requirements. However, the combined total noise estimated by Columbia did not account for potential impacts from the Line WB2VA Integrity Project, which would occur at the same site. The Project would impact three NSAs near the Chantilly Compressor Station, but the potential noise increases would be minor and the estimated total noise attributable to operations would be in compliance with FERC requirements. However, the combined total noise estimated by Columbia did not account for potential impacts from the Cove Point Liquefaction Project, which would occur near this site.

Climate Change

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

Oil Change International, in conjunction with other environmental organizations, filed a study on natural gas emissions from pipelines and recommended a "climate test" for this Project and all natural gas infrastructure. Neither CEQ nor any other government agency has, to our knowledge, proposed a particular "climate test" to be used in evaluating natural gas infrastructure projects. FERC is responsible for reviewing natural gas transmission infrastructure projects to ensure that they are in the public interest and need. A portion of that responsibility is to complete a NEPA analysis to disclose potential impacts associated with a project, analyze reasonable alternatives that would meet the project need, and propose reasonable mitigation measures to minimize potential impacts. We examine the impacts of the projects before us, including impacts on climate change, using the best available science. The comment and associated report did not provide any new or specific information about the proposed Project and thus did not assist us in the analysis presented in this EA. Section B.8.1 of this EA provides a quantification of GHG emissions from both the construction and operation of the Project. Section B.1.2 discusses the impacts of a warmer climate on soil carbon. The rest of this section discusses potential cumulative impacts of climate change more broadly.

The leading U.S. scientific body on climate change is the U.S. Global Change Research Program (USGCRP)[43]. In May 2014, the USGCRP issued a report, *Climate Change Impacts in the United States*, summarizing the impacts that climate change has already had on the United States and what projected impacts climate change may have in the future (USGCRP, 2014). The report includes a breakdown of overall impacts by resource and impacts described for various regions of the United States. Although climate change is a global concern, for this cumulative analysis, we will focus on the potential cumulative impacts of climate change in the Project area.

The USGCRP's report notes the following observations of environmental impacts with a high or very high level of confidence that may be attributed to climate change in the Northeast region:

- average temperatures have risen about 2°F between 1895 and 2011 and are projected to increase another 1 to 8°F over the next several decades with more frequent days above 90 °F;
- areas that currently experience ozone pollution problems are projected to experience an increase in the number of days that fail to meet the federal air quality standards;
- an increase in health risks and costs for vulnerable populations due to projected additional heat stress and poor air quality;
- precipitation has increased by about 5 inches and winter precipitation is projected to increase 5 to 20 percent by the end of the century;
- extreme/heavy precipitation events have increased more than 70 percent between 1958 and 2010 and are projected to continue to increase;
- sea levels have risen about one foot since 1900 and are projected to continue increasing one to four feet by 2100 stressing infrastructure (e.g., communications, energy, transportation, water and wastewater);
- severe flooding due to sea-level rise and heavy downpours is likely to occur more frequently;

[43] The following departments comprise the USGCRP: EPA, DOE, U.S. Department of Commerce, U.S. Department of Defense, USDA, U.S. Department of the Interior, U.S. Department of State, PHMSA, Department of Health and Human Services, National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, and Agency for International Development.

- crop damage from intense precipitation events, delays in crop plantings and harvest, and heat stress negatively affect crop yields;
- invasive weeds are projected to become more aggressive due to their benefit of higher CO_2 levels;
- a change in range, elevation, and intra-annual life cycle events of vegetation and wildlife species; and
- an increase in carrier habitat and human exposure to vector-borne diseases (e.g., Lyme disease or West Nile).

The rate and magnitude of expected changes will exceed those experienced in the last century. Existing adaptation and planning efforts are inadequate to respond to these projected impacts.

The FERC staff has presented the direct and indirect GHG emissions associated with construction and operation of the Project are discussed in more detail in section B.8. In addition, downstream end-use would result in about 25.2 million metric tons of carbon dioxide per year assuming that the project transports the maximum 1.3 MMdth per day of natural gas and that all of the gas being transported is combusted. However, given the possibility of fuel-switching from coal or other fossil fuel combustion as a result of additional gas supply and the likelihood that pipeline would not operate continuously at maximum capacity, the actual carbon dioxide emissions are expected to be less.

The emissions would increase the atmospheric concentration of GHGs, in combination with past and future emissions from all other sources, and contribute incrementally to climate change that produces the impacts previously described. Because we cannot determine the projects' incremental physical impacts on the environment caused by climate change, we cannot determine whether the projects' contribution to cumulative impacts on climate change would be significant.

Conclusion

Recently completed, ongoing, and planned projects in the geographic scope were identified for inclusion in this cumulative impact analysis (refer to tables B.10-1 and B.10-2). The majority of cumulative impacts would be temporary and minor when considered in combination with past, present, and reasonably foreseeable activities. However, some long-term cumulative impacts would occur on forested habitat and the associated habitat for the CMS, but we conclude the effects would not be significant. Some long-term cumulative benefits to the communities in and around the geographic scope would be realized from increased tax revenues. Short-term cumulative benefits would also be realized through jobs, wages, and purchases of goods and materials.

Due to the implementation of specialized construction techniques, the relatively short construction timeframe in any single location, and carefully developed resource protection and mitigation plans designed to avoid or minimize environmental impacts from the project as a whole, minimal cumulative effects are anticipated when the effects of the geographic scope are added to the past, present, and reasonably foreseeable future projects within the Project's geographic scope.

C. ALTERNATIVES

The Project is intended to serve regional natural gas distribution needs in West Virginia and in Northern Virginia, and is intended to provide additional infrastructure for the purpose of transporting natural gas to meet growing market demands. The Project includes new pipeline segments, pipeline replacement segments, modifications to existing compressor stations, and new compressor stations. Pursuant to the NEPA and Commission policy, we evaluated alternatives to the Project to determine reasonable and environmentally preferable actions to the proposed action. These alternatives included the no-action alternative, energy alternatives, system alternatives, pipeline route alternatives, and aboveground facility site alternatives.

The evaluation criteria used for developing and reviewing alternatives were:

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

Each alternative was considered until it was clear that the alternative was not reasonable or would result in environmental impacts that would be greater than those of the proposed Project and that could not be readily mitigated.

1.0 NO-ACTION ALTERNATIVE

The no-action alternative is the absence of the construction of the Project. By not constructing the Project, the environmental impacts associated with the Project would not occur; however, the objective of increasing infrastructure and providing more capacity for regional distribution, allowing gas reserves to get to market would not be met.

The proposed Project would transport natural gas from the shale reserves in West Virginia to markets throughout the region. The need for additional natural gas capacity and infrastructure to transport shale reserves is substantial enough that if this Project were not constructed, it is likely other gas companies would propose to construct similar, new facilities to meet current demand. Other proposed projects would likely result in impacts similar to or greater than the proposed Project, and might not meet the Project's objectives within the proposed timeframe.

Therefore, since the proposed project's purpose, in part, is to replace existing, older pipeline infrastructure to provide reliable transportation of gas, the no-action alternative is not a viable option. If this Project is not built, it is likely that another project would need to satisfy the stated need to transport shale reserves for regional distribution markets.

The use of alternative energy sources, such as solar, wind, geothermal or biofuels, or the use of energy conservation measures are not reasonable options to meet the objectives of the Project. The natural gas that would be transported by the proposed Project is associated with non-conventional shale gas development in the region and neither alternative energy sources nor energy conservation would provide an outlet for the natural gas supply.

2.0 SYSTEM ALTERNATIVES

System alternatives would make use of other existing, modified, or proposed pipeline systems to meet the objectives of the Project. Implementation of a system alternative would make it unnecessary to construct all or part of the Project, although some modifications or additions to existing or proposed pipeline systems may be required. These modifications or additions could result in environmental impacts that are less than, similar to, or greater than those associated with construction and operation of the Project. The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with construction and operation of the Project could be avoided or reduced by using another pipeline system, while still meeting the objectives of the Project.

The increase of the shale reserve production and substantial demand require new infrastructure to support the increased natural gas availability. The existing transmission pipeline systems in the region that serve the general vicinity of the proposed Project do not directly connect the necessary receipt points to the proposed markets. Any of the existing systems would require additional construction to serve the Project's purpose and need. Columbia currently operates three transmission pipelines in the market area (Lines WB/VB, WB-Loop/VB-Loop, and WB-5/VB-5) and determined that it could transport natural gas supplies using efficiencies afforded by its existing systems, but in order to increase volumes Columbia would need to increase pipeline pressures, add compression, replace pipeline segments and loop pipeline in some areas. Evaluating system alternatives involved various configurations of pipeline and compression facilities. These system alternatives included uprating and looping Line WB-5/VB-5, uprating and looping Line WB/VB, and take up and relay of the out-of-service Line WB.

We considered uprating and looping Line WB-5/VB-5, which would require increasing the pipeline's MOAP from 800 psi to 1000 psi, and constructing 185 miles of new pipeline. While the pipeline is constructed to operate up to 1000 psi, the construction of 185 miles of pipeline would add significant costs and would have significantly more environmental impacts than the proposed Project. The Project currently proposes to replace about 25 miles of existing pipeline, MAOP increases on existing segments of Line WB-5/VB-5, and the construction of 2.1 miles of new 12-inch-diameter pipeline in Virginia. The aforementioned components of the Project use significant sections of existing right-of-way and existing pipeline and avoid construction of new pipeline within new, previously undisturbed right-of-way corridors. If Columbia were to pursue the looping option, the new about 185-mile pipeline would need to be constructed within new right-of-way. This use of new right-of-way, and the proposed length of the pipeline would result in more wetland and waterbody crossings, more forest clearing and land disturbance, and a greater amount of new permanent right-of-way when compared to the proposed Project components which primarily use existing rights-of-way and existing infrastructure. Thus, uprating and looping Line WB-5/VB-5 was not considered a feasible alternative.

Uprating and looping Line VB would require the same increase in MAOP as the loop Line WB-5/VB-5, but would also require moving some gas capacity through Line WB2VA. In addition, construction of additional looping pipeline would be required to fulfill the capacity. The impacts from constructing the loop line would have significantly more environmental impacts than the proposed Project.

Lastly, removal and relay of the existing Line WB loop would require replacing about 25.4 miles of pipeline. This new pipeline would require the addition of 21,000 incremental hp, and increase gas temperature requiring installation of additional gas coolers. However, even with the new pipeline and increase in hp, the system would not have the capacity to accommodate the proposed volumes of gas. Therefore, removal and relay of Line WB loop was not considered feasible.

For all these reasons, none of the system alternatives we evaluated met the project objective to transport 1.3 million dekatherms per day, without substantially more environmental impacts than the proposed Project. The Project already makes substantial use of existing Columbia pipeline infrastructure to minimize impacts on the environmental and to meet the proposed need.

3.0 MAJOR PIPELINE ALTERNATIVES AND ROUTE VARIATIONS

3.1 Identified Prior to Columbia Filing Its Application

Line VA-1 (Virginia)

Major route alternatives are identified to determine if these alternatives could avoid or reduce impacts on environmentally sensitive resources, such as large population centers, scenic areas, wildlife and natural habitat management areas, etc., that would be affected by the proposed pipeline. The origin and delivery points of a major route alternative are generally the same as for the corresponding segment of a proposed pipeline. However, the alternatives could follow routes significantly different from the proposed pipeline. Route alternatives would not modify or make use of an existing pipeline system as would a system alternative. We did not receive comments on the need for major route alternatives; thus our discussion below is based on routing that Columbia considered in selecting its proposed route.

In addition to the proposed route, five major route alternatives were identified prior to Columbia filing its application, for the proposed Line VA-1 (see figure C.3.1-1). Table C.3.1-1 provides comparative information relevant to these routes. None of the routes cross state or federal lands, or railroads. A description of each major route alternative is provided below.

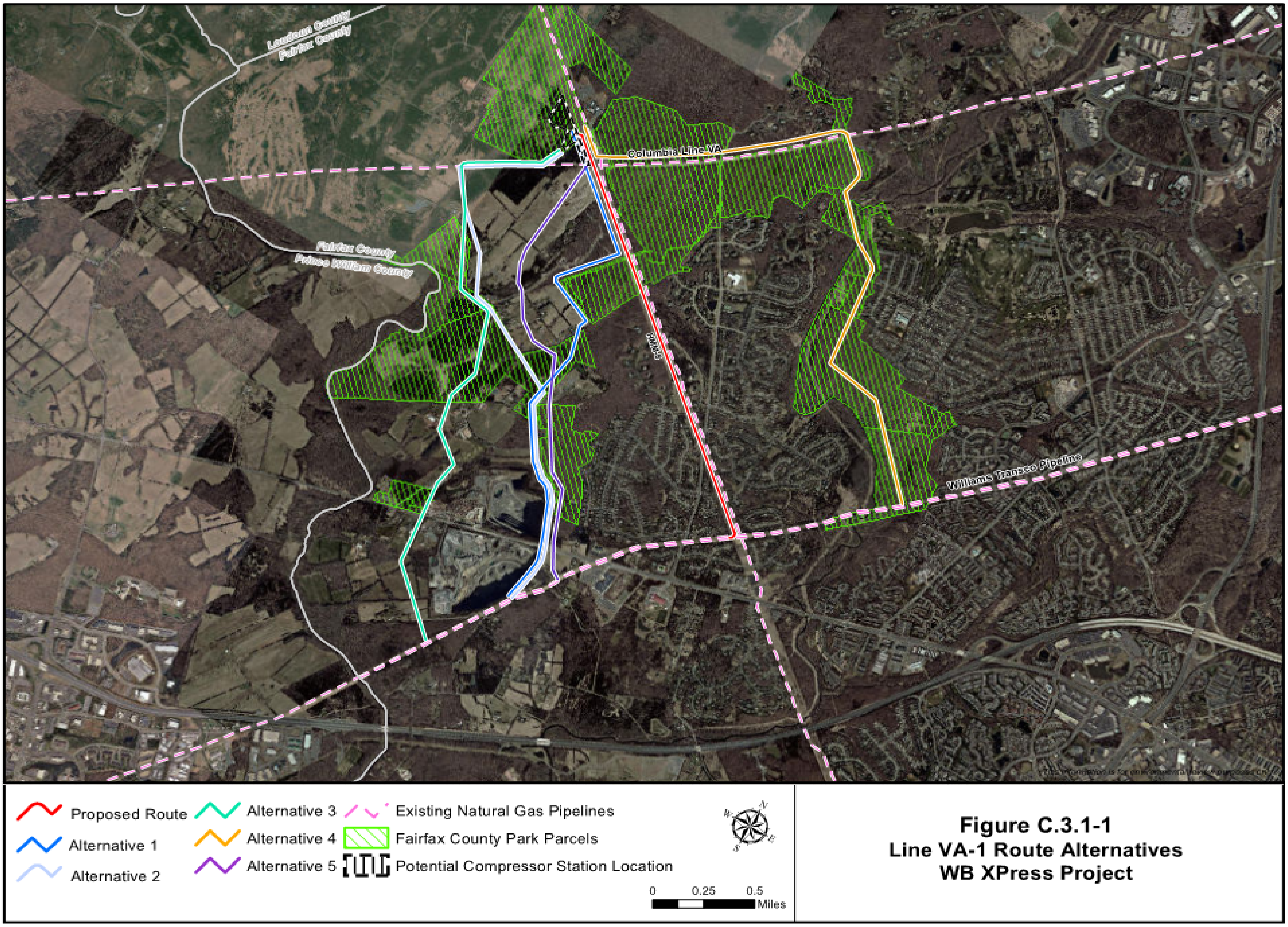


Figure C.3.1-1
Line VA-1 Route Alternatives
WB XPress Project

TABLE C.3.1-1

Alternatives Analysis for Line VA-1 Route Alternatives for the WB XPress Project

Environmental Constraint	Unit	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Land Constraints							
Length	Miles	2.2	2.9	3.0	3.2	3.6	2.6
Length	Feet	11,735	15,501	15,735	16,766	18,867	13,497
Construction ROW	Acres	10.8	14.3	14.5	15.5	17.4	12.5
Permanent ROW	Acres	13.5	17.8	18.1	19.3	21.7	15.5
Parcels	Number	23	18.0	18.0	16.0	15.0	15.0
Federal Lands	Feet	0	0	0	0	0	0
State Lands	Feet	0	0	0	0	0	0
County Lands	Feet	1,200	6,188	4,537	5,504	16,824	4,689
Recreational Areas Crossed							
Trails	Number	2	0	0	0	0	0
Surface Waters Crossed							
Wetlands [a]	Number (Feet)	4 (562)	1 (100)	3 (552)	7 (1,084)	5 (1,148)	2 (60)
Waterbodies [b]							
Ephemeral Stream	Number	0	0	0	0	0	0
Intermittent Steam	Number	3	3	5	5	2	4
Perennial Stream	Number	0	0	2	3	1	0
Lakes & Ponds	Number (Feet)	1 (32)	0	1 (205)	0	1 (34)	0
Protected Areas Crossed							
Fairfax County Park Lands	Feet	1,351	6,188	4,537	5,504	16,824	4,689
Previously Recorded Archeological and Historic Resources [c]	Number	0	1	1	1	0	1
Land Cover [d]							
Forest	Feet	4,333	11,779	10,167	8,575	15,166	4,768
Temporary ROW	Acres	3.7	7.1	5.5	5.9	12.7	3.8
Permanent ROW	Acres	4.9	8.8	6.7	7.4	16.0	4.3
Cultivated Crops	Feet	1,105	3,152	1,821	3,671	1,018	5,169
Hay/Pasture	Feet	0	0	524	1,610	0	574
Developed	Feet	4,650	4,946	6,465	2,338	360	3,367
Wetland	Feet	245	764	2,969	2,898	1,812	4
Shrub/Scrub	Feet	871	3,823	1,532	945	385	2,930
Herbaceous	Feet	532	3,267	2,083	365	638	0

TABLE C.3.1-1 (Continued)
Alternatives Analysis for Line VA-1 Route Alternatives for the WB XPress Project

Environmental Constraint	Unit	Proposed Route	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Transportation Features Crossed							
Primary U.S. or State Highway	Number	0	1	1	1	0	1
Secondary State or County Highway	Number	1	0	0	1	0	0
Railroads	Number	0	0	0	0	0	0
Community Landmarks within 500 feet							
Schools	Number	0	0	0	0	0	0
Churches	Number	0	0	0	0	0	0
Cemeteries	Number	0	0	0	0	0	0
Golf Courses	Number	0	0	0	0	0	0
Residences within 50 feet	Number	10	0	0	0	0	0
Residences within 100 feet	Number	17	0	0	10	0	1
Collocation Opportunities							
Railroads	Feet	0.0	0.0	0.0	0.0	0.0	0.0
Existing Natural Gas Pipelines [e]	Feet	11,853	3,773	2,512	2,326	7,574	1,001
	Miles	2.2	0.7	0.5	0.4	1.4	0.2
Existing Electric Transmission Lines [e]	Feet	11,853	3,773	0	0	7,574	1,001
	Miles	2.2	0.7	0.0	0.0	1.4	0.2
Existing Roads	Feet	0	6,298	9,075	2,556	0	1,508
	Miles	0.0	1.2	1.7	0.5	0.0	0.3
Total Collocation	Feet	23,706	13,844	11,587	4,882	15,148	3,510
	Miles	4.4	2.6	2.2	0.9	2.8	0.7
Percent of TOTAL		100.0	65.0	74.0	29.0	40.0	19.0

[a] Based on the FWS National Wetlands Inventory.
[b] Based on the U.S. Geological Survey's National Hydrography Dataset.
[c] Based on data from a Phase I review by R. Christopher Goodwin & Associates, Inc. of the Virginia Department of Historic Resources database.
[d] Based on the U.S. Geological Survey's National Land Cover Database (2011) and aerial interpretation.
[e] Based on digital layer from REXTAG.

Route Alternative 1, like the proposed route, would originate at the proposed Chantilly Compressor Station, and would extend to the south/southeast before terminating at a Williams' Transco interconnect site. As shown in table C.3.1-1, Route Alternative 1 is 2.9 miles in length, and is the second shortest of the route alternatives. While this alternative is collocated for about 65 percent of the route, it would cross about 11,779 feet of forested land, which is more than the other alternatives, and it would cross the second highest amount of FCPA land. In addition, this alternative would cross three intermittent streams and one wetland, and cross an area containing one previously recorded archeological or historical resource. Route Alternative 1 would cross more sensitive resources than the proposed route and would not result in an environmental advantage over the proposed route.

Route Alternative 2 would also originate at the proposed Chantilly Compressor Station Site and would travel south and then southwest before turning southeast and terminating at a Williams' Transco interconnect site southeast of Lee Highway (Highway 29). As shown in table C.3.1-1, Route Alternative 2 is about 3.0 miles in length and would use the second highest amount of collocation at 74 percent of its length. However, the alternative would cross five intermittent streams, two perennial streams, one pond, and three wetlands. The route would cross mostly forested and developed land, about 10,167 and 6,465 feet respectively, but it would also cross about 1,821 feet of agricultural land. In addition, the route would cross an area containing one previously recorded archeological or historical resource. While this alternative would cross the second least amount of FCPA land of the alternatives, it crosses 3,157 more feet of FCPA than the proposed route. Route Alternative 2 would cross more sensitive resources than the proposed route and would not result in an environmental advantage over the proposed route.

Route Alternative 3 originates at the proposed Chantilly Compressor Station Site. Like Alternative 2, this route travels south then southwest turning southeast finally turning south and terminating at a Williams' Transco interconnect site. As shown in table C.3.1-1, Route Alternative 3 is about 3.2 miles in length, making it the second longest of the alternative routes and is only collocated on about 29 percent of the route, which is the second least amount of collocation of all the route alternatives. This alternative would cross about 5,504 feet of FCPA land, and it would cross five intermittent streams, three perennial streams, and seven wetlands. It would cross a mixture of forested, agricultural, and developed land. Route Alternative 3 would cross more sensitive resources than the proposed route, has very little of the route collocated, and would not result in an environmental advantage over the proposed route.

Route Alternative 4 originates at the proposed Chantilly Compressor Station Site location. Unlike all the other route alternatives, this route heads northeast for about 1.2 miles before turning southeast for about 2.0 miles where it terminates at a Williams' Transco interconnect site, making it the longest route alternative. As shown in table C.3.1-1, Route Alternative 4 would cross two intermittent streams, one perennial stream, and five wetlands. While this route alternative is collocated for about 40 percent of its length, it would cross about 16,824 feet of FCPA land and 15,166 feet of forested land, the most of any alternative route. This route is located within Cub Run Park, which has been developed by the FCPA with walking trails through the wooded landscape for recreational use. Route Alternative 4 would cross more sensitive resources than the proposed route, and would not result in an environmental advantage over the proposed route.

Route Alternative 5 originates at the proposed Chantilly Compressor Station Site and travels south and southeast avoiding a known cultural resource site identified during a literature search of Virginia Department of Historical Resources known cultural resources. The route then continues southeast and south skirting an active rock quarry before terminating at a Williams' Transco interconnect site southeast of Lee Highway (Highway 49). Route Alternative 5 is about 2.6 miles in length making it the shortest of all the other alternatives; however, it would cross four intermittent streams and two wetlands. In addition it would cross about 4,689 feet of FCPA land, and would impact mostly forest, agricultural, and developed lands. The amount of FCPA land crossed by this route alternative is the second smallest of the route alternatives but still more than the proposed route. The Fairfax County tract, which is closest to Lee Highway, is crossed and contains a sensitive old growth hickory forested area. The route would cross an area containing one previously recorded archeological or historical resource. Route Alternative 5 would cross more sensitive resources than the proposed route, and would not result in an environmental advantage over the proposed route.

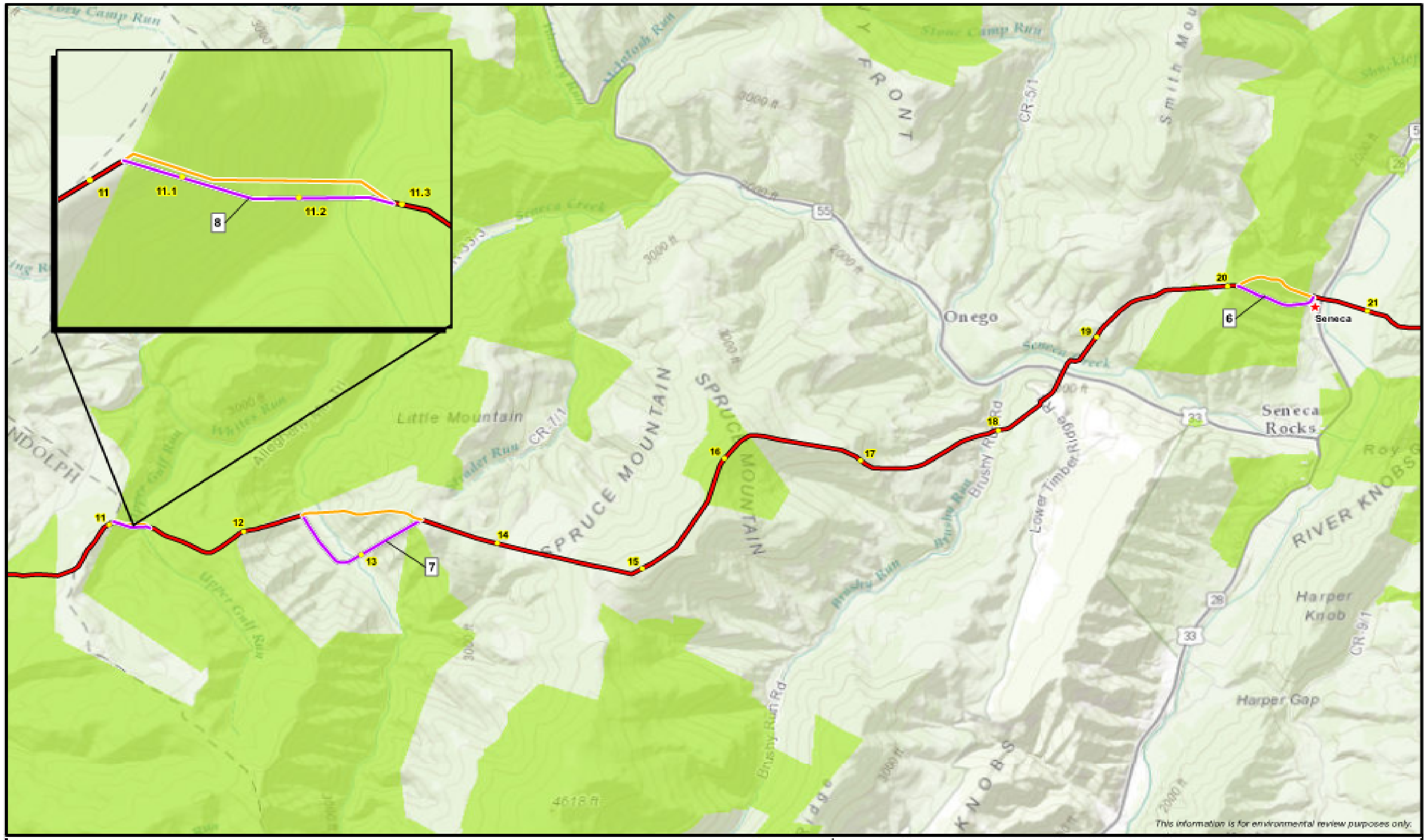
Line WB Replacement (West Virginia)

Columbia proposes to replace segments of the existing Line WB in West Virginia. The majority of the replacement sections would be constructed as lift and lay in the same trench and/or along other existing rights-of-way to minimize impacts on resources. Pipe replacements deviating from the original line or existing right-of-way are considered to be route variations. Route variations differ from system or route alternatives in that they are identified to reduce impacts of a short segment of pipeline on specific resource issues such as residences, businesses, cultural resources, including properties of cultural and religious significance to tribes, and sensitive biological resources. Additionally, route variations may be examined to avoid conflicts with other projects or in response to scoping comments and engineering constraints. Because route variations are considered in response to a specific, localized issue, they may not always clearly display an environmental advantage other than to reduce impacts on the localized issue.

The Project would involve the replacement of five short sections (totaling 0.4-mile) of existing 26-inch-diameter Line WB in Pendleton, Grant and Hardy Counties, West Virginia, and a 0.2-mile section of 36-inch-diameter Line WB-5 in Grant County, West Virginia. These replacements would be constructed as lift and lay. Because lift and lay is considered to have the least environmental impact, alternative routes for this portion of the proposed Project were not evaluated.

The Project would also involve the replacement of about 25.4 miles of retired 26-inch-diameter Line WB in Randolph and Pendleton Counties, West Virginia. This replacement would involve about 16.1 miles of lift and lay replacement within the original trench and adjacent to other Columbia pipelines and rights-of-way. The majority of the remaining mileage of replacement would be collocated within or adjacent to existing Columbia rights-of-way. Since the 16.1 miles of pipe replacement benefits from collocating within and along existing Columbia rights-of-way and minimizes disturbance of new land, an alternative analysis of other possible collocation or greenfield alternatives was not considered to be necessary.

Along the 25.4-mile replacement of Line WB, Columbia identified three locations, totaling about 1.9 miles where minor route deviations from existing rights-of-way were adopted prior to filing its application (see figure C.3.1-2). Two of these variations would avoid areas of steep terrain, where significant earth disturbance would be required and would present potential stabilization challenges. The third route variation was designed to avoid technical and safety challenges related to installing the replacement pipeline in between Columbia's existing WB-Loop and/or Line WB-5 rights-of-way. These routing variations were proposed as technically feasible alternatives that would minimize potential stabilization, safety, and environmental concerns.



- Mileposts
- ★ Compressor Station
- Proposed Route Variation (Adopted)
- Original Alignment
- Centerline
- MNF Ownership

0 0.5 1 Miles

Figure C.3.1-2
Line WB Minor Route Variations Adopted Prior to Filing Application
WB XPress Project

3.2 Identified After Columbia Filed Its Application

Following submittal of its application in December 2015, Columbia adopted and incorporated two new route variations into the proposed Line WB Replacement pipeline route. Both route variations were identified in response to concerns raised by the MNF. These new route variations are referred to as Route Variation 9 and Route Variation 10 and are shown in figure C.3.2-1. A description and comparative analysis of each of these route variations to the corresponding segment of the previously proposed route (the route filed in the December 2015 application) is provided below.

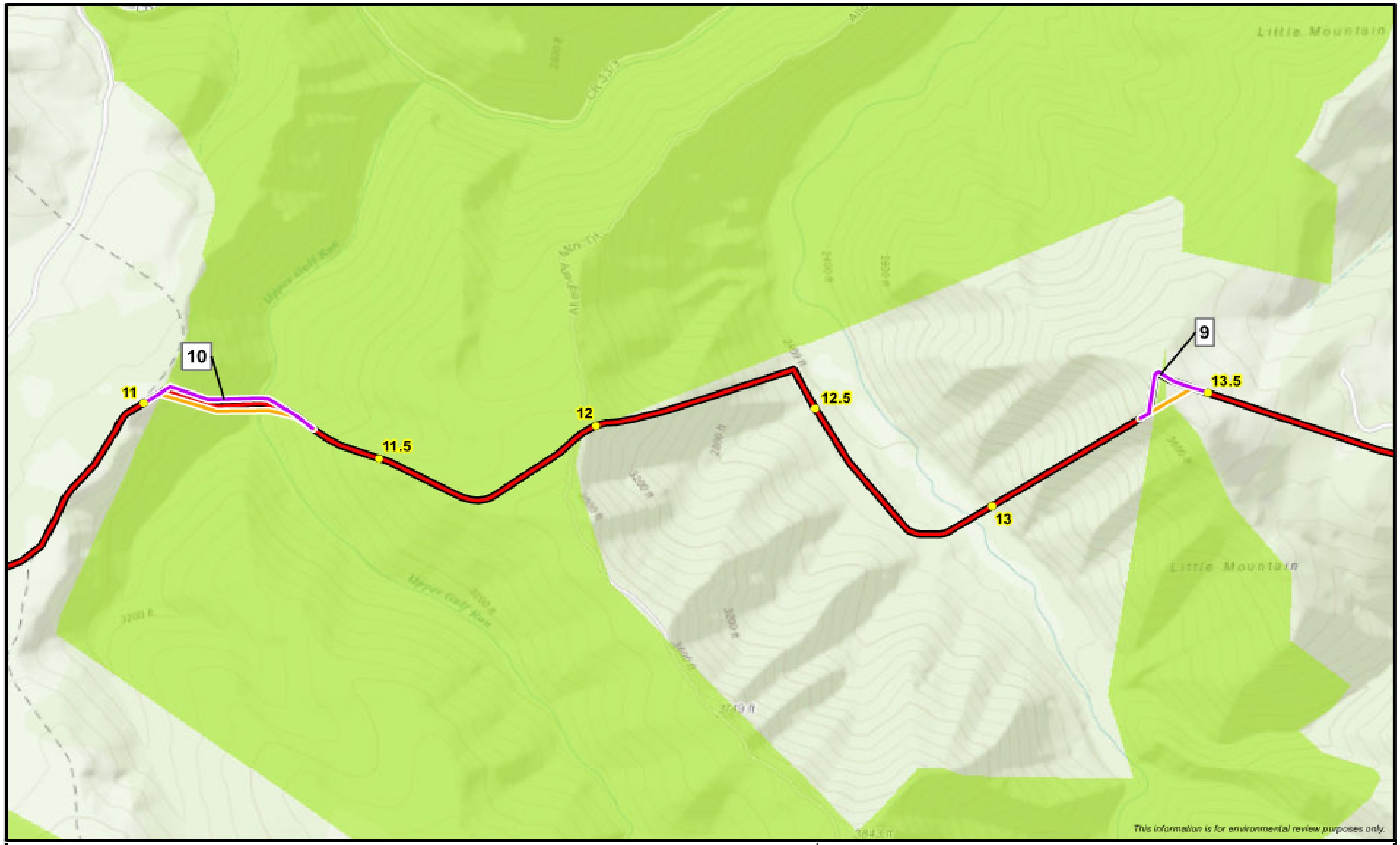
Columbia also provided supplement 4 on August 31, 2016, proposing to use HDD construction techniques for 1.2 miles in a residential area. Within this supplement, Columbia also proposed the modification of PAR-78, an access road to Chantilly Compressor Station. Both modifications would occur in Fairfax County, Virginia. We find both project modifications to be environmentally preferable, and would not result in impacting any additional landowners.

Route Variation 9

The route depicted in Columbia's December 2015 application between MPs 12.4 and 13.5 (identified in the application as Route Variation 7) followed a greenfield corridor about 1.1 miles in length to the south of the existing Line WB-5 and WB Loop. As described in the application, Columbia selected this greenfield alignment as opposed to following its existing pipeline corridor due to safety and engineering challenges associated with the existing Line WB-5 and the WB Loop alignments, which cross over a narrow ridgeline. The MNF expressed concern about the portion of this route that crosses about 220 feet of the Seneca Creek Inventoried Roadless Area within the MNF. Columbia developed Route Variation 9 to address this concern.

Route Variation 9 would deviate from the route presented in the application at approximate MP 13.4. From there it would extend north as a greenfield route for about 445 feet before meeting the existing Line WB-5 and WB Loop. The route variation would cross these pipelines, turn southeast and then parallel the existing pipelines southeast for about 401 feet until it rejoins the previously proposed WB Replacement alignment (i.e., the route presented in the application) at approximate MP 13.5. A comparison of the route variation and corresponding segment of the previous proposed route is presented in table C.3.2-1.

Route Variation 9 would avoid the roadless area. It would be about 344 feet longer than the corresponding segment of the proposed route and require an additional 1.3 acres of workspace. In other respects, it would be similar to the previously proposed route. Specifically, it would avoid the narrow ridgeline that is crossed by the existing pipelines and would not impact any wetlands or waterbodies. For these reasons, we agree that Route Variation 9 is environmentally preferable to the previously proposed route and should be adopted.



Mileposts

Proposed Route Variation Adopted After Filing of the Application

Proposed Route Filed in the Application

Centerline

MNF Ownership

0 1,000 2,000 Feet

N

Figure C.3.2-1
Line WB Minor Route Variations Adopted After Filing Application
WB XPress Project

TABLE C.3.2-1

Analysis of Route Variation 9 for the Line WB Replacement

Environmental Constraint	Unit	Previously Proposed Route	Route Variation 9
Total Length	Feet	542	886
Monongahela National Forest Land	Feet	220	67
Monongahela National Forest Land – Roadless Area	Feet	220	0
Wetlands [a]	Number (Feet)	0(0)	0(0)
Waterbodies [b]			
Intermittent Stream	Number	0	0
Perennial Stream	Number	0	0
Previously Recorded Archeological and Historic Resources [c]	Number	0	0
Land Cover [d]			
Open Land	Acres	0.6	1.0
Upland/Forested	Acres	1.2	1.6
Workspace			
Additional Temp Workspace	Acres	0.5	1.0
Permanent Workspace	Acres	0.9	1.3
Temporary Workspace	Acres	0.4	0.8
Collocation			
Existing ROW	Feet	0	403

Sources:
[a] Based on the U.S. Fish and Wildlife Service's National Wetlands Inventory.
[b] Based on the U.S. Geological Survey's National Hydrography Dataset.
[c] Based on data from a Phase I review by R. Christopher Goodwin & Associates, Inc. of the Virginia Department of Historic Resources database.
[d] Based on the U.S. Geological Survey's National Land Cover Database (2011) and aerial interpretation.

Route Variation 10

The route that was filed in Columbia's December 2015 application was collocated on the south side of the WB Loop right-of-way for about 1,687 feet between MPs 11.0 and 11.3 (identified in the application as Route Variation 8) and crossed about 1,660 feet of the Seneca Creek Roadless Inventory area within the MNF. The MNF expressed concern about crossing this roadless area. Columbia developed Route Variation 10, which is a minor variation to the route presented in the application, to address this concern.

Route Variation 10 would deviate from the proposed route near MP 11.0 and travel to the northeast for about 145 feet, crossing the existing Line WB-5 and WB Loop. From there, the route variation would proceed southeast for about 415 feet, then east for about 630 feet, and finally south for 572 feet where it would rejoin the previously proposed route (the route presented in the application) near MP 11.3. A comparison of the route variation and corresponding segment of the previous proposed route is presented in table C.3.2-2.

TABLE C.3.2-2

Analysis of Route Variation 10 for the Line WB Replacement

Environmental Constraint	Unit	Previously Proposed Route	Route Variation 10
Total Length	Feet	1,687	1,762
Monongahela National Forest Land	Feet	1,660	1,762
Monongahela National Forest Land – Roadless Area	Feet	1,660	0
Wetlands [a]	Number (Feet)	0(0)	0(0)
Waterbodies [b]			
Intermittent Stream	Number	0	0
Perennial Stream	Number	1	1
Previously Recorded Archeological and Historic Resources [c]	Number	0	0
Rock outcrop	Acres	0	0.1
Land Cover [d]			
Open Land	Acres	0.2	0.6
Upland/Forested	Acres	2.0	3.3
Workspace			
Additional Temp Workspace	Acres	1.1	1.2
Permanent Workspace	Acres	2.1	2.2
Temporary Workspace	Acres	0.4	1.1
Collocation			
Existing ROW	Feet	1,687	1,761

Sources:
a Based on the FWS National Wetlands Inventory.
b Based on the U.S. Geological Survey's National Hydrography Dataset.
c Based on data from a Phase I review by R. Christopher Goodwin & Associates, Inc. of the Virginia Department of Historic Resources database.
d Based on the U.S. Geological Survey's National Land Cover Database (2011) and aerial interpretation.

Route Variation 10 would avoid the roadless area. It would be about 75 feet longer than the corresponding segment of the previously proposed route and require an additional 0.9-acre of workspace. This route variation would cross a rock ledge as described in section B.4. Columbia is coordinating with MNF staff regarding measures to avoid and minimize impacts on rock feature species. In other respects, Route Variation 10 would be similar to the previously proposed route. It would not impact any wetlands and would cross the same waterbody as the previously proposed route using a similar dry crossing method. Also, it would be collocated adjacent to the same existing pipeline right-of-way as the previously proposed route. For these reasons, we agree that Route Variation 10 is environmentally preferable route on USFS land, and should be adopted.

Line VA-1 Realignment

Columbia provided a supplement to its application on August 31, 2016 indicating the edge of Dominion's existing right-of-way is 10 feet south of where Columbia previously understood it was located. The pipeline centerline and workspace are, therefore, required to shift 10 feet to the south. With this change, conventional open-cut pipeline construction would require the workspace to be 10 feet closer to the residences on the south side of the power line corroder and would require the removal of 43 screening trees, instead of 6 as indicated in section B.5.7. To avoid tree clearing and minimize the impact of the Project on the residents in the Virginia Run neighborhood, Columbia is proposing to use the HDD method between MPs 1.5 and 2.2.

The HDD would require slightly more pipe than a conventionally laid pipe due to its depth but the length of the corridor would be the same for both methods and both routes would be collocated within the existing Dominion electric line right-of-way. The number of landowners affected by the two methods would also be the same. The HDD method would disturb about the same acreage as the conventional open cut installation method but the workspace would be configured differently, with more space at the drill entry and exit locations and less workspace between the drill entry and exit locations. The primary advantage of the HDD is that it would not require clearing grading, trenching, stringing, pipe laying or backfilling between the HDD entry and exit holes. Columbia would still use the existing right-of-way between MPs 1.5 and 1.8 to access the HDD exit location from Pleasant Valley Road but no tree clearing would be required for this activity.

Thirteen residences would be within 50 feet of the proposed workspace if the conventional open cut method is used. The HDD would eliminate construction activity within 50 feet of five of these homes. The other eight would be within 50 feet of the travel lane Columbia proposes between Pleasant Valley Road and the HDD exit but would only be impacted by passing equipment, not the full range of construction activities. The HDD method would also reduce noise and dust impacts near these residences, and avoid disturbing a portion (about 1,700 feet) of the paved walking trail within the power line corridor, which would have to be temporarily removed if the conventional open cut method were used.

The HDD would avoid impacts on three intermittent streams, one perennial stream, and one wetland (near MP 2.1) that would be disturbed if the conventional open cut installation method were used. The HDD would also avoid trenching through a second wetland near MP 1.5, although Columbia would still need to cross this wetland with equipment to access the HDD exit location. Columbia attempted to configure the ATWS for the HDD to maintain the setbacks specified in the Procedures but was unable to maintain the setbacks on the southern end of the HDD near MP 2.1. In this area the ATWS would be within 20 feet of two waterbodies and 25 feet of a wetland. The HDD entry point workspace boundary near MP 2.1 is constrained on three sides by two streams and the edge of the existing Dominion easement. At these locations Columbia requests a variance from V.B.2.a and VI.B.1.a of the Procedures (which require ATWS to be setback 50 feet from waterbodies and wetlands) to conduct the HDD.

An environmental impact associated with the HDD would be an increase in the duration and amount of noise experienced by NSAs close to the HDD entry and exit locations. There are five residences within 260 feet of the HDD exit location; the closest of which is 170 feet away. There are two residences within 260 feet of the HDD entry location; the closest of these is about 100 feet away. The second residence is about 248 feet away. The next three closest residences are between 290 and 390 feet away. As described in section 9, the residents in these and other nearby homes would be exposed to elevated noise levels for the several weeks the HDD is being conducted. This increase in noise would be audible to the NSAs close to the entry and exit points, but would only be present during construction and there would be no increase in noise at these NSAs during operation of the pipeline.

Given the analysis above, the HDD construction method appears to be environmentally preferable to the conventional open cut construction method between MPs 1.5 and 2.2.

PAR-78 Realignment

Columbia proposes additional modifications to the alignment of the Chantilly Compressor Station access road (PAR-78). In Columbia's June 2016 Supplemental filing, the western section of PAR-78's alignment was modified to satisfy a request from the Virginia DOT to align PAR-78's intersection with Pleasant Valley Road opposite Glory Creek Trail and to widen PAR-78 to meet the minimum roadway standards for Fairfax County, which requires a 24-foot minimum surface roadway width. Columbia now proposes a few additional modifications to PAR-78. Specifically, Columbia has adjusted the western section of PAR-78 to avoid a delineated wetland area, and the eastern section of the road to avoid a waterbody and to align the road with the entrance of the Chantilly Compressor Station.

The proposed alignment for PAR-78 would deviate from the previously proposed alignment about 150 feet west of the intersection of PAR-78 and Pleasant Valley Road. From there, it would curve around and avoid the northern boundary of a wetland that was crossed by the previously proposed alignment. East of this wetland, the road would rejoin and follow the previously proposed alignment east for about 855 feet. At this point the road would deviate to the south of previously proposed alignment to avoid a stream and align PAR-78 with the entrance of the Chantilly Compressor Station. The proposed alignment for PAR-78 does not reduce the number of stream crossings, but avoids new impacts to stream SFAG0191 by realigning the access road to the south. The previous alignment would have encroached upon this stream on the southern edge. The existing alignment encroaches into steam SFAG0191 which may have caused permanent impacts. Figure C.3.2-2 provides the previous and revised alignment and indicates resources at the site.

Because the new road alignment has more curves, it is slightly longer than the existing alignment, however, it reduces the environmental impact of the access road on streams and wetlands, and it aligns the access road with the ingress/egress point of the Chantilly Compressor Station. For these reasons, the new access road alignment is environmentally preferable to the previous alignment.

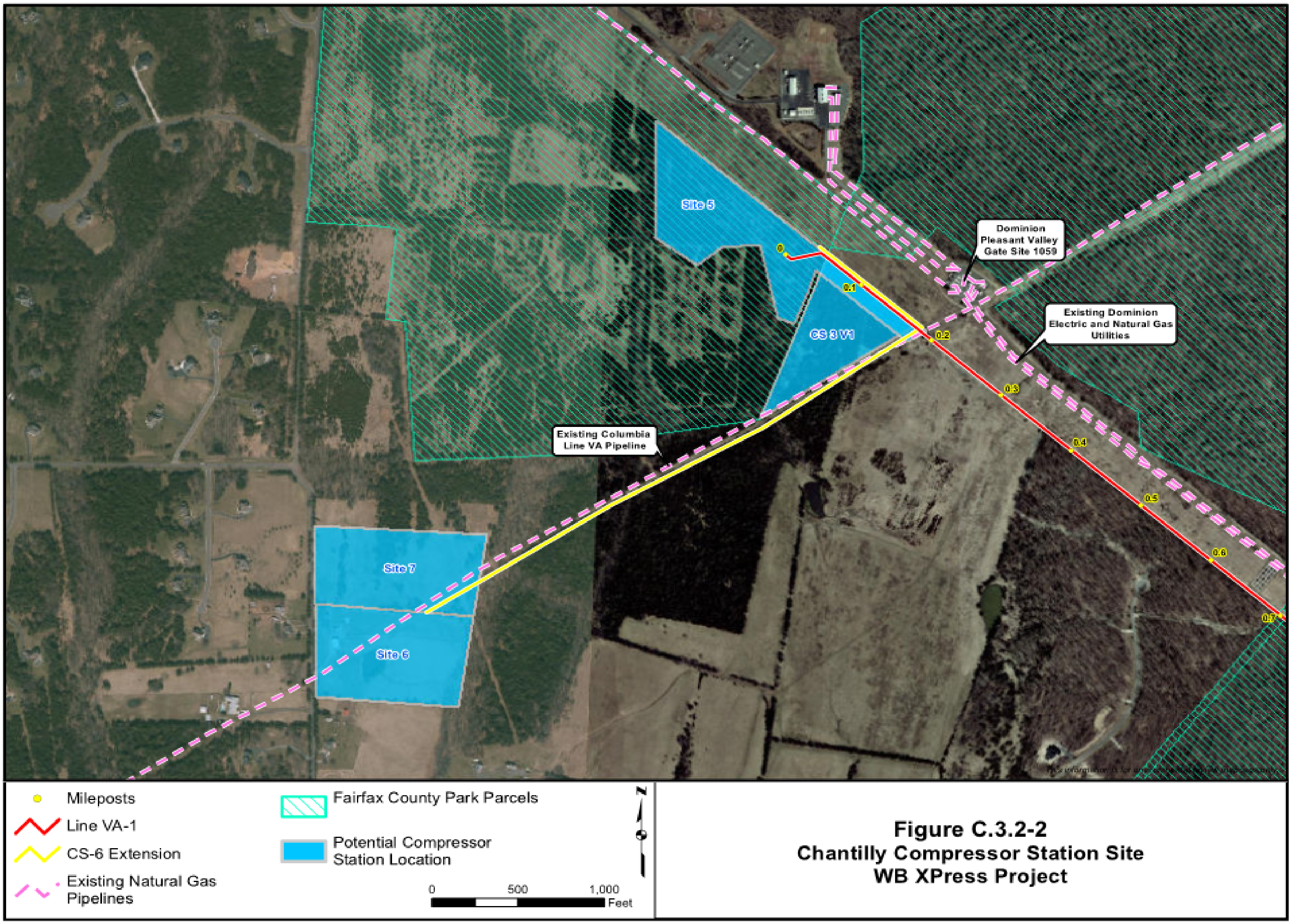


Figure C.3.2-2
Chantilly Compressor Station Site
WB XPress Project

4.0 ABOVEGROUND FACILITIES

While considering above ground facility sites, pursuant to 18 CFR 380.12(I)(2), the applicant is required to provide sufficient comparative data to justify the selection of the proposed site. Columbia is proposing two new compressor stations as part of the Project, and has examined alternative sites for each of the proposed compressor station facilities based on their analysis. Key considerations for alternative compressor station sites include, proximity to existing pipelines, the ability to obtain land that could be acquired from a willing seller at a commercially reasonable price, an already disturbed area (e.g., commercial or by agriculture), an area large enough to construct and operate the proposed compressor station, and a site that has minimal elevation change within the property. We did not receive any comments requesting evaluation of alternative sites for the Elk River Compressor Station; however we did receive comments regarding alternatives sites for the Chantilly Compressor station, which are further discussed below.

4.1 Elk River Compressor Station

The proposed Elk River Compressor Station site would be located on property that is presently owned by Columbia. The site was chosen primarily by its proximity to existing Columbia pipelines and presence of an existing Columbia-owned compressor station. All options described below would also require an approximate 0.3-mile 36-inch-diameter pipeline to connect the Elk River Compressor Station with the Panther Mountain Regulator Station and a 0.6-mile 36-inch-diameter pipeline from the Elk River Compressor Station to the Tennessee Gas Pipeline-owned point of delivery. See figure C.4.1-1 for alternative locations considered for the Elk River Compressor Station.

The proposed Elk River Compressor Station site is located on an approximate 7.3-acre footprint and adjacent to the east side of Columbia's existing Cobb Compressor Station.

The Elk River Alternate Compressor Station Site 1 is about 0.5-mile to the east/northeast of the existing Cobb Compressor Station. This site is located along the ridge top of a mountainous area and would require significant permanent grading. This location as plotted is about 10.8 acres and would require tree clearing as the location is currently forested. This alternative would also require an approximate 0.3-mile pipeline that could be located within an existing utility right-of-way, but would also involve tree clearing and an unidentified amount of earth disturbance to provide construction and operational access. This alternative compressor station site would likely impact more forested lands, require extensive earth work, and may be further constrained by constructing the interconnecting pipeline.

The Elk River Alternate Compressor Station Site 2 is located about 0.4-mile south of the existing Cobb Compressor Station. This approximate nine-acre site is also located on a hill top that is currently forested requiring tree clearing and significant permanent grading. This site would require an approximate 0.8-mile pipeline that would include a crossing of Elk River. This alternative compressor station site would result in greater impacts on forested lands, require extensive earth work, and the interconnecting pipeline would need to cross the Elk River, which the proposed site would not, so it was not preferred.

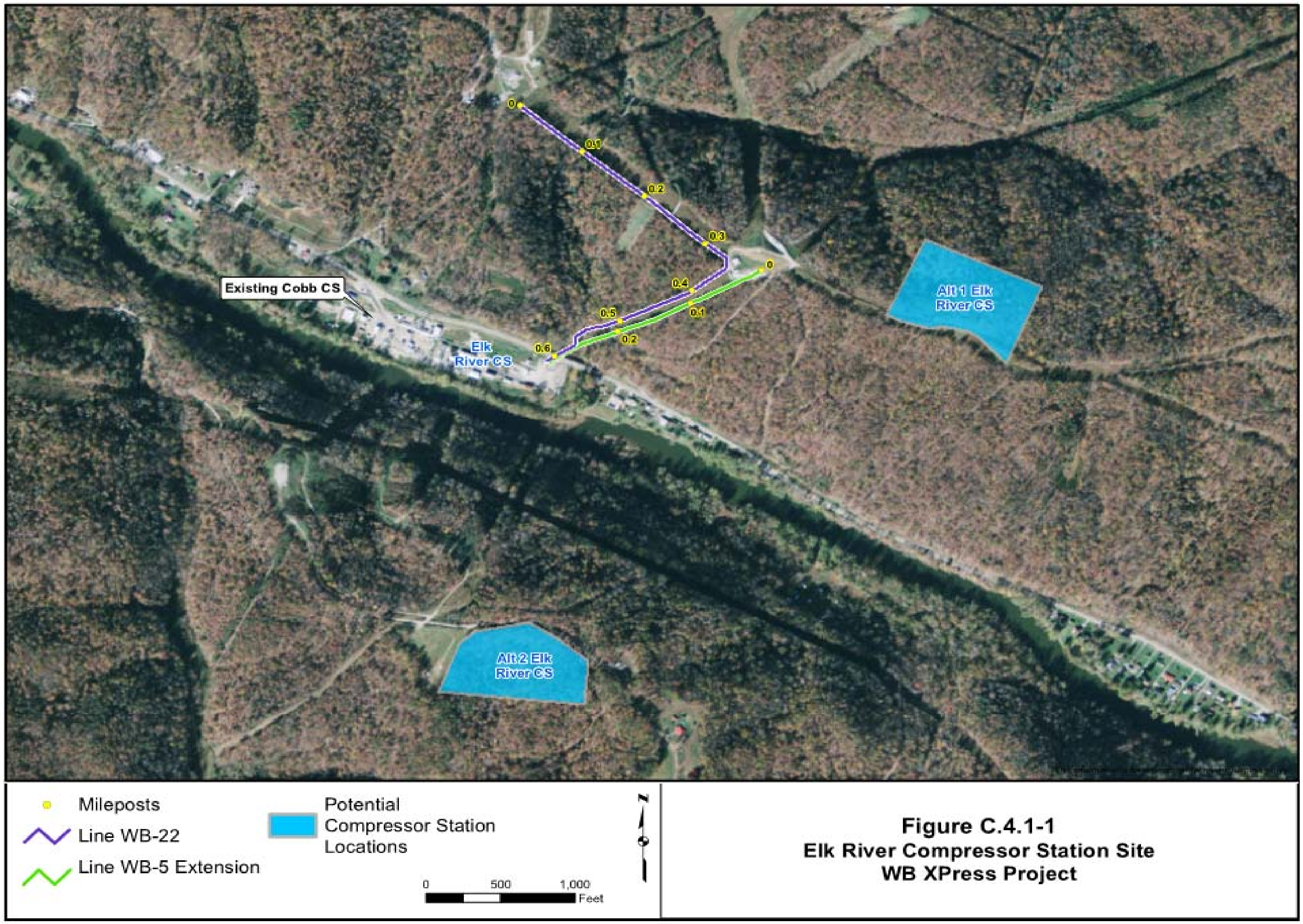


Figure C.4.1-1
Elk River Compressor Station Site
WB XPress Project

4.2 Chantilly Compressor Station

The proposed Chantilly Compressor Station site is necessary to provide connections to the existing Line VA pipeline, and for providing sufficient pipeline pressure to flow gas from the proposed Line VA-1 to Transco's pipeline system. Because of the relatively low horsepower requirements to achieve required pipeline pressure, Columbia has determined that electric motor driven compressor units could be installed. As such, Columbia considered location requirements for the proposed compressor station and the alternatives should be situated near a viable source of electricity, be adjacent to Line VA-1, have a willing property owner, and ideally have an existing tree buffer to provide visual screening to adjacent residences. Three alternatives to the proposed compressor station (see figure C.3.2-2) were considered. A table that quantifies the environmental considerations for the Chantilly Compressor Station site is included as table C.4.2-1.

TABLE C.4.2-1

Alternatives Analysis for Chantilly Compressor Station Site for the WB XPress Project

Environmental Constraints	Unit	Proposed Chantilly Compressor Station: Site[g]	Proposed Chantilly Compressor Station: Revised Site (June 2016)	Site Alternative 1	Site Alternative 2	Site Alternative 3
Land Constraints						
Size	Acres	13.2 [f]	13.2	7.7	11.4	10.9
Parcels	Number	2 [e,g]	2 [e]	1	1	1
Federal Lands	Acres	0.0	0.0	0.0	0.0	0.0
State Lands	Acres	0.0	0.0	0.0	0.0	0.0
County Lands	Acres	12.7 [f]	11.3	0.0	0.0	0.0
Surface Waters Crossed						
Wetlands [a]	Number (Acres)	2 (<0.1) or 1 (<0.1)[h]	1 (<0.1)	2 (0.8)	2 (0.7)	1 (<0.1)
Waterbodies [b]	Number (Feet)	3 (150) or 1 (120)[h]	1(125)	2 (946)	1 (480)	0
Protected Areas Crossed						
Fairfax County Park Lands	Acres	12.7 [f]	11.3	0.0	0.0	0.0
Previously Recorded Archeological and Historic Resources [c]	Number	10.0	10.0	0	0	0
Land Cover [d]						
Forest	Acres	11.7	11.3	5.3	0	1.7
Cultivated Crop	Acres	0.2	0.5	0.9	4.2	3.8
Hay/Pasture	Acres	0.0	0.0	0.0	1.5	3.1
Developed	Acres	0.0	0.0	0.0	4.9	2.0
Wetland	Acres	0.8	1.0	0.9	0.7	<0.1
Shrub/Scrub	Acres	0.4	0.4	0.7	0.0	0.3
Community Landmarks within 500 feet						
Schools	Number	0	0	0	0	0
Churches	Number	0	0	0	0	0
Cemeteries	Number	0	0	0	0	0
Golf Courses	Number	0	0	0	0	0
Residences	Number	0	0	0	7	4

[a] Based on the U.S. Fish and Wildlife Service's National Wetlands Inventory.
[b] Intermittent drainage based on the U.S. Geological Survey's National Hydrography Dataset.
[c] Based on data from a Phase I review by R. Christopher Goodwin & Associates, Inc. of the Virginia Department of Historic Resources database and consultation with the Fairfax County Park Authority.
[d] Based on the U.S. Geological Survey's National Land Cover Database (2011) and aerial interpretation.
[e] At least one Fairfax County Park Parcel crossed.
[f] Land requirements for Chantilly CS were updated in Supplement No. 1 to indicate 12.8 acres, with 12.7 within Fairfax County Parks Authority land; however, Table 10.6.2.1 was not included with Supplement No. 1.
[g] Site 5 impacts include the extension of PAR-77 that would have been necessary for operation but had not yet been included in previous submittals.
[h] The impacts on wetlands and waterbodies depends on the alignment of the new permanent access road (not previously reported). The first number is indicative of the impact if the access road extends mostly along the existing pipeline ROW; the second number is indicative of the impact if the access road runs mostly through the compressor station, as described in the RR10 section of Supplement No. 3.

Chantilly Compressor Station Site Alternative 1 is located on the north side of the existing Columbia Line VA right-of-way and is on the west side of the Dominion right-of-way. The parcel is about 7.7 acres in size, privately owned, and is largely forested, with forest cover comprising 5.3 acres of the 7.7 acres site. Comments filed during the public scoping period revealed this property had plans for future development, and was not available for purchase by Columbia. Because of the need to clear a large portion of vegetation, based on our evaluation of the site, we also eliminated this site from consideration.

The Chantilly Compressor Station Site Alternative 2 is crossed by the existing Columbia Line VA as illustrated in figure C.3.2-2. This alternative site is about 11.4 acres in size and currently has a mix of non-forested land cover. The site is a single parcel that is privately owned. This site also includes an approximate 0.4-acre pond located in the central portion of the site. The presence of the pond, distance to the proposed Line VA-1 and electrical power source, and proximity to residential properties are considered construction constraints for this location. Therefore, we eliminated this site from consideration.

The Chantilly Compressor Station Site Alternative 3 is located immediately north of Chantilly Compressor Station Site Alternative 2 and is also bisected by the existing Columbia Line VA. The site footprint is about 10.9 acres and is a portion of a larger parcel of about 63.5 acres that is privately owned. The site is largely grasslands with a forested area of about 1.7 acres in the north-central portion of the site. The distance to the proposed Line VA-1 and electrical power source, and proximity to residential properties are considered construction constraints for this location. Therefore, we eliminated this site from considertation.

D. USFS CONCLUSIONS AND RECOMMENDATIONS

The WB XPress Project traverses about 11.4 miles of land owned by the NFS and managed by the Monongahela National Forest. The MNF staff has received an application from Columbia for a SUP which includes, among other documents, a COMP for Project activities on the MNF. MNF staff has also received from Columbia numerous land use, soil, habitat and species survey reports pertaining to the resources that would be affected on the MNF. MNF staff has prepared a Biological Evaluation for Regional Forester Sensitive Species; Rare, Threatened and Endangered Species, and BCC under the Management of the U.S. Forest Service, MNF (BE) which is attached to this EA as appendix G. The BE concludes that:

"Columbia's Project workspaces, both temporary and permanent, have been specifically routed to maximize collocation with other existing pipelines and therefore minimize disturbance of NFS lands. Columbia currently has authorization to operate and maintain right-of-way within NFS lands. The Line WB replacement would widen the existing authorized right-of-way through NFS lands. The associated reduction in forest habitat would have both positive and negative effects on RFSS species, depending on the particular habitat preferences of each species. Measures that Columbia has committed to implementing for the Project, as detailed in previous sections of this document, would minimize the potential for adverse effects to RFSS species and is not likely to cause a trend towards federal listing. Additional coordination between Columbia, the MNF and FWS would also address potential effects to federally listed species." Under their own authority, the USFS will require the following:

Prior to commencing any construction activities on the MNF, Columbia must:

1. Complete the COMP and obtain MNF approval for the plan.
2. Continue to consult with the MNF to identify avoidance, minimization, and mitigation measures to be consistent with the LRMP.
3. Obtain a SUP from the MNF.
4. Notify the MNF of the proposed work schedule, construction spreads, and sequencing of activities on NFS lands.

E. CONCLUSIONS AND RECOMMENDATIONS

We conclude that approval of the WB XPress Project would not constitute a major federal action significantly affecting the quality of the human environment. This finding is based on the environmental analysis in this EA, Columbia's application and supplements, implementation of the proposed Project plans, and staff's recommended mitigation measures.

We recommend 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 to Columbia.

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, contractor/pipeyards, additional 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 FERC 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 the mitigation required at each site is clear to on-site 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), with the opportunity for OEP staff to participate in session(s);

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:

   i. the completion of all required surveys and reports;

   ii. the environmental compliance training of onsite personnel;

   iii. the start of construction; and

   iv. the start and completion of restoration.

7. Columbia shall employ at least one EI per construction spread. The EIs shall be:

   a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

   b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

   c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

   d. a full-time position, separate from all other activity inspectors;

   e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

   f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Columbia shall file updated status reports with the Secretary on a **bi-weekly basis until all construction and restoration activities are complete**. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on 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.

9. **Prior to receiving written authorization from the Director of OEP to commence construction 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).

10. 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.

11. **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 Certificate 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.

12. **Prior to construction,** Columbia shall file with the Secretary, for review and written approval by the Director of the OEP, a site-specific blasting plan for use in the State of Virginia that includes the procedures for monitoring and mitigation

of the potential effects of bedrock blasting on surface structures, water wells, and other buried utilities and how those impacts will be addressed.

13. **Prior to construction**, Columbia shall file with the Secretary, for review and written approval by the Director of OEP, a revised ECS that is consistent with the *Upland Erosion Control, Revegetation, and Maintenance Plan* at sections III.E., V.A.3, V.A.4., and V.A.6.

14. **Prior to construction**, Columbia shall:

    a. file with the Secretary the location by milepost of all water wells and potable springs within 150 feet of construction workspaces and identify the distance of each well from the construction workspace;

    b. file with the Secretary, for review and written approval of the Director of OEP, specific protection and mitigation measures for any water wells or potable springs located within the construction workspace; and

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

15. **Within 30 days of placing the facilities in service**, Columbia shall file a report with the Secretary discussing whether any complaints were received concerning well yield or water quality and how each was resolved.

16. **Prior to construction,** Columbia shall continue to consult with the FWS, West Virginia Ecological Services Office regarding project-related impacts on migratory birds and file with the Secretary any correspondences or comments received and any additional conservation measures it will implement.

17. Columbia shall **not begin construction activities until**:

    a. OEP staff receives comments from the West Virginia FWS regarding the MBCP and CMS;

    b. OEP staff completes formal consultation with the FWS; and

    c. Columbia has received written notification from the Director of OEP that construction or use of mitigation may begin.

18. **Prior to construction**, Columbia shall file with the Secretary, for review and written approval by the Director of OEP, a visual screening plan for the proposed Lost River Compressor Station expansion.

19. Columbia shall not begin construction of facilities and/or use of (all) staging, storage, or temporary work areas and new or to-be improved access roads in Virginia and West Virginia, **until**:

    a. Columbia files with the Secretary:

i. reports, studies, or plans of additional cultural resources surveys in West Virginia;

ii. site-specific avoidance and/or treatment plan(s), as required;

iii. comments on reports and plans from the West Virginia SHPO; and

iv. the records of continued consultation and the National Park Service – ABPP.

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

c. FERC staff reviews and the Director of the OEP approves the cultural resources reports and plans, and notifies Columbia in writing that avoidance and/or treatment measures, as required, may be implemented and/or construction may proceed.

All materials filed with the Commission containing **location, character, and ownership information** about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "**CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE.**"

20. **Prior to construction of the Line VA-1 HDD**, Columbia shall file with the Secretary, for the review and written approval by the Director of OEP, a noise mitigation plan to reduce the projected noise levels at the NSAs. During drilling operations, Columbia shall implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than an Ldn of 55 dBA at the NSAs.

21. Columbia shall file a noise survey with the Secretary **no later than 60 days** after placing each of the compressor stations into service. If a full load condition noise survey is not possible, Columbia shall provide an interim survey at the maximum possible power load and provide the full power load survey **within six months**. If the noise attributable to the operation of all the equipment at any facility at interim or full power load conditions exceeds 55 dBA L_{dn} at any nearby NSAs, Columbia shall file a report on what changes are needed and shall install additional noise controls to meet the recommended noise level **within one-year** of the in-service date. Columbia shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

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Appendix A
U.S. Geological Survey Topographic Maps

PAGE	DESCRIPTION
1	- Cover Sheet
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3	USGS Quad Excerpt: - Elk River Compressor Station and Proposed Pipeline
4	USGS Quad Excerpt: - Dink Valve Site
5	USGS Quad Excerpt: - Frametown Compressor Station
6	USGS Quad Excerpt: - Cleveland Compressor Station
7	USGS Quad Excerpt: - Permanent Access Road #101
8	USGS Quad Excerpt: - Mill Creek Valve Site
9	USGS Quad Excerpt: - HWY 48 Contractor Yard
10	USGS Quad Excerpt: - CPG Elkins Contractor Yard
11	USGS Quad Excerpt: - UPS Contractor Yard
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13-19	USGS Quad Excerpt: - WB Proposed Pipeline
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21	USGS Quad Excerpt: - WB Pipeline Integrity Replacements
22	USGS Quad Excerpt: - Petersburg Gate and WB Pipeline Integrity Replacements
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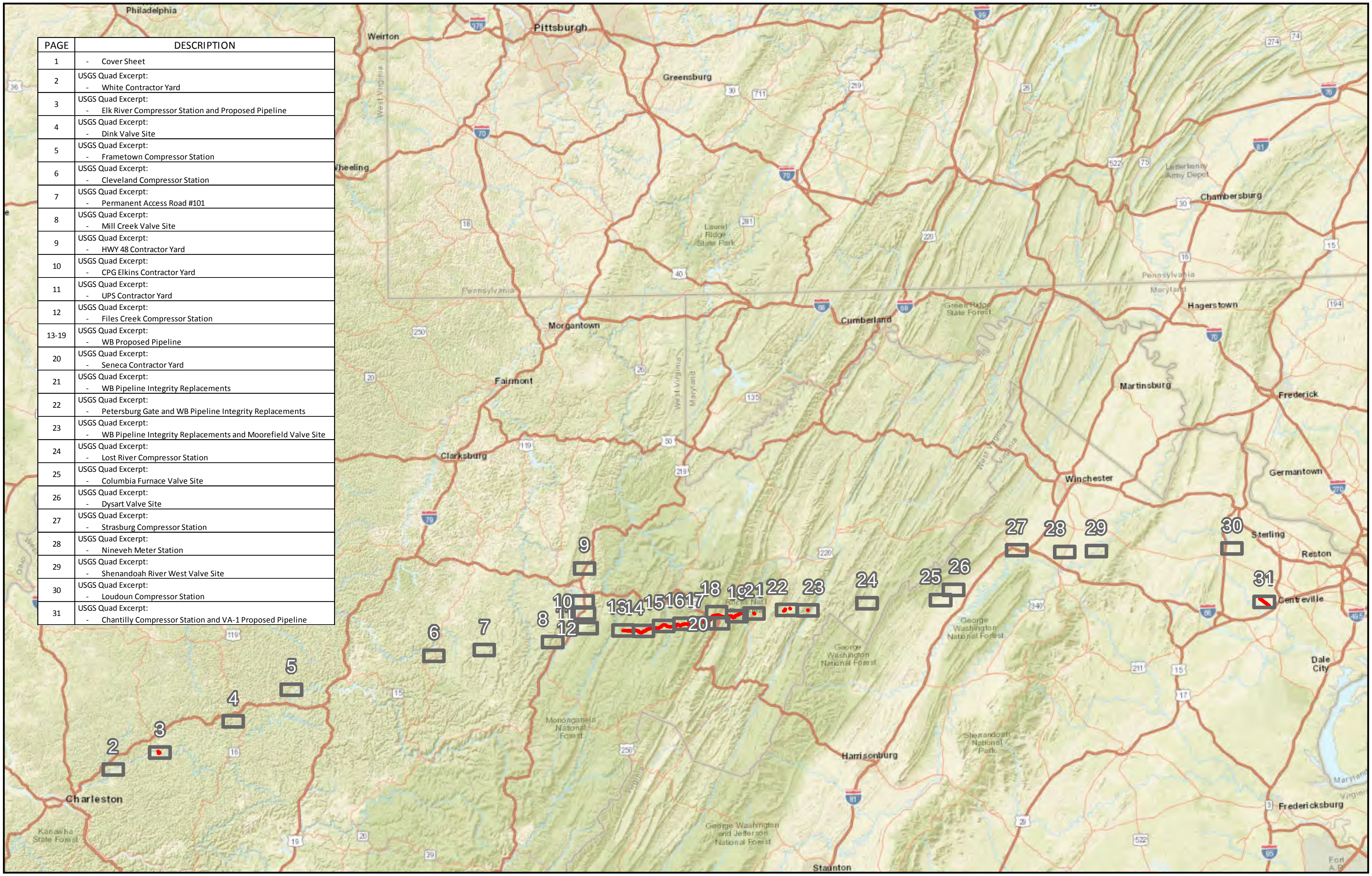
25	USGS Quad Excerpt: - Columbia Furnace Valve Site
26	USGS Quad Excerpt: - Dysart Valve Site
27	USGS Quad Excerpt: - Strasburg Compressor Station
28	USGS Quad Excerpt: - Nineveh Meter Station
29	USGS Quad Excerpt: - Shenandoah River West Valve Site
30	USGS Quad Excerpt: - Loudoun Compressor Station
31	USGS Quad Excerpt: - Chantilly Compressor Station and VA-1 Proposed Pipeline



PROPOSED PIPELINE

PAGE INDEX

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT
COVER SHEET

Miles
0 12.5 25 50

N W E S

ABSOLUTE SCALE: 1:1,584,000

REFERENCE SCALE: 1 IN = 25 miles

PAGE: 1 of 31

DRAWN BY:	DEP
CHECKED BY:	CED
APPROVED BY:	KDM
PROJECT:	21393
DATE:	10/12/2016
REV:	20150213-8511-QMS-006

Columbia Pipeline Group

MOTT MACDONALD

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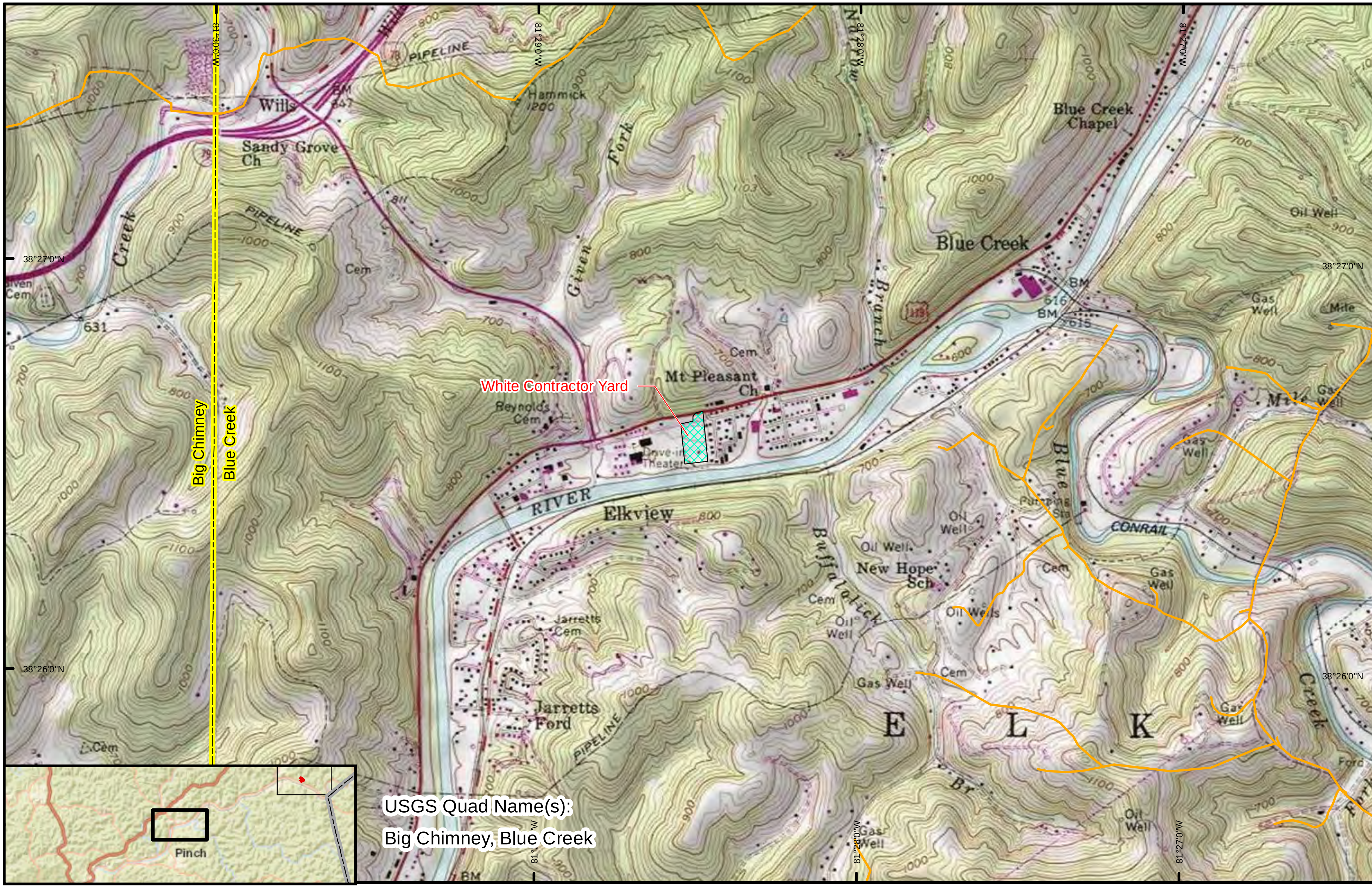

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WHITE
CONTRACTOR YARD

0 1,000 2,000 4,000 Feet

N E S W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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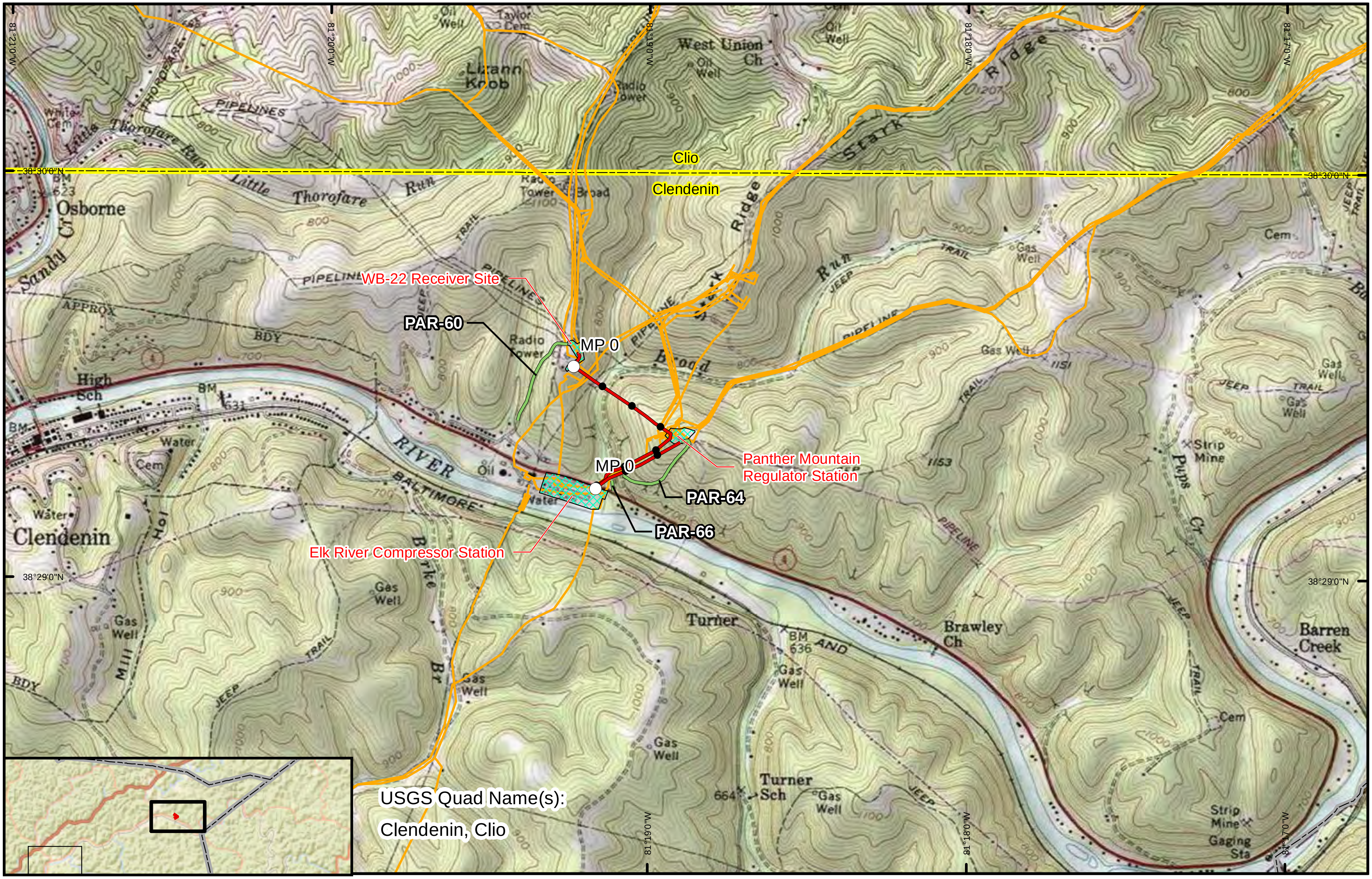

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

ELK RIVER COMPRESSOR STATION AND PROPOSED PIPELINE

0 1,000 2,000 4,000 Feet

N S E W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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PROJECT:	21393
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MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

DINK
VALVE SITE

0 1,000 2,000 4,000 Feet

N S W E

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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Columbia Pipeline Group

MOTT MACDONALD

PROPRIETARY
COLUMBIA PIPELINE GROUP

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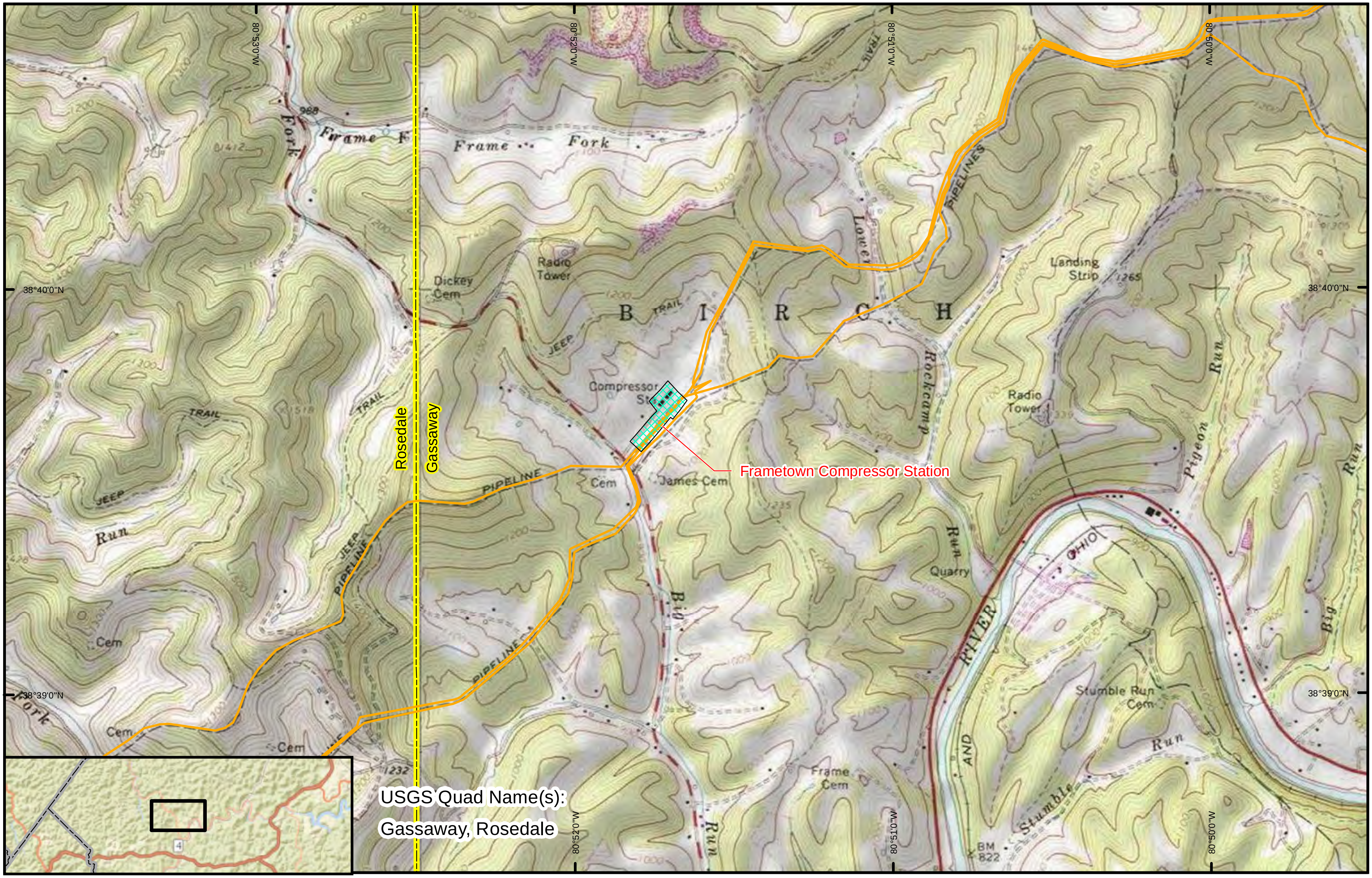

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

FRAMETOWN
COMPRESSOR STATION

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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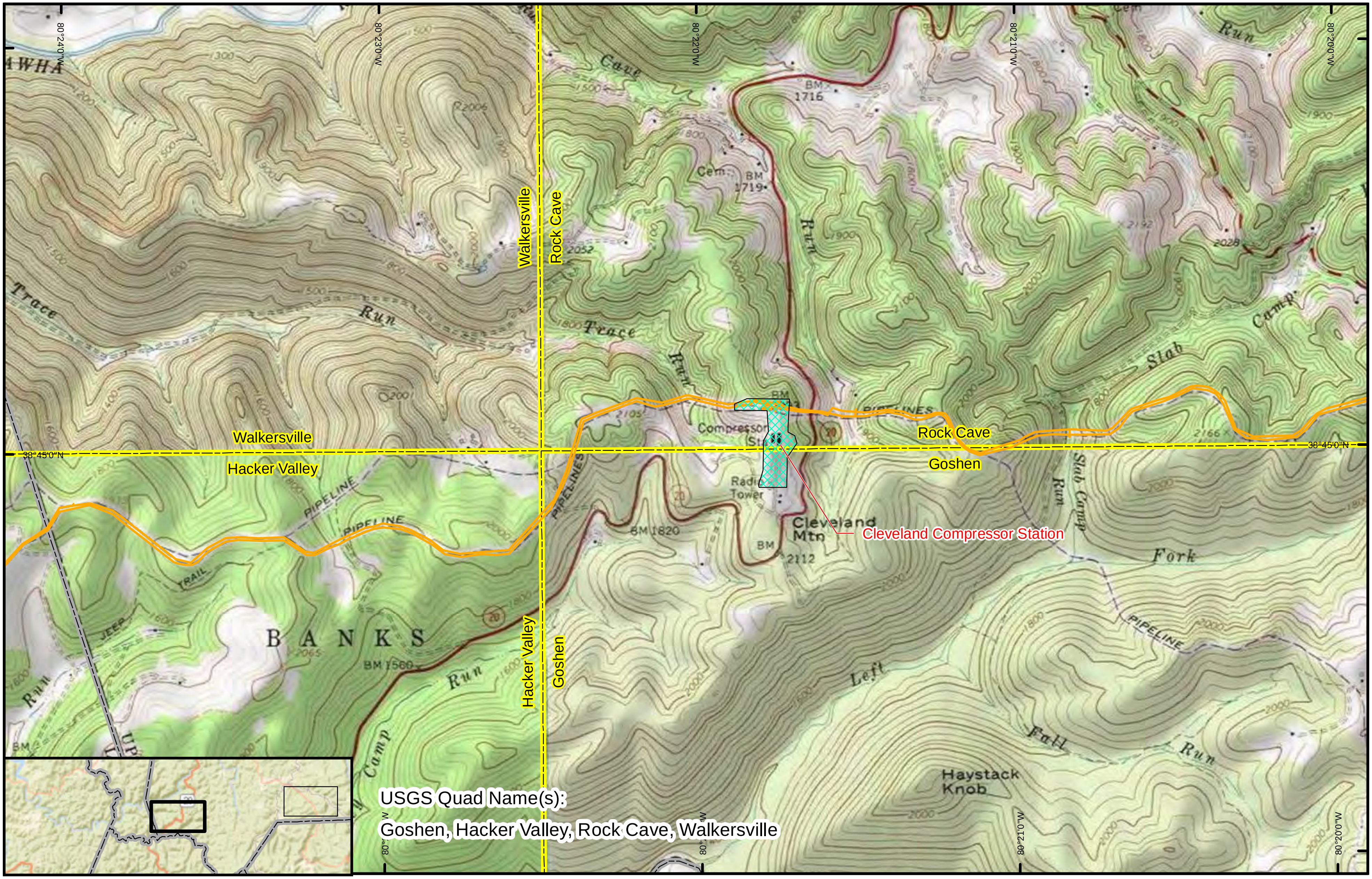

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

CLEVELAND
COMPRESSOR STATION

0 1,000 2,000 4,000 Feet

N W E S

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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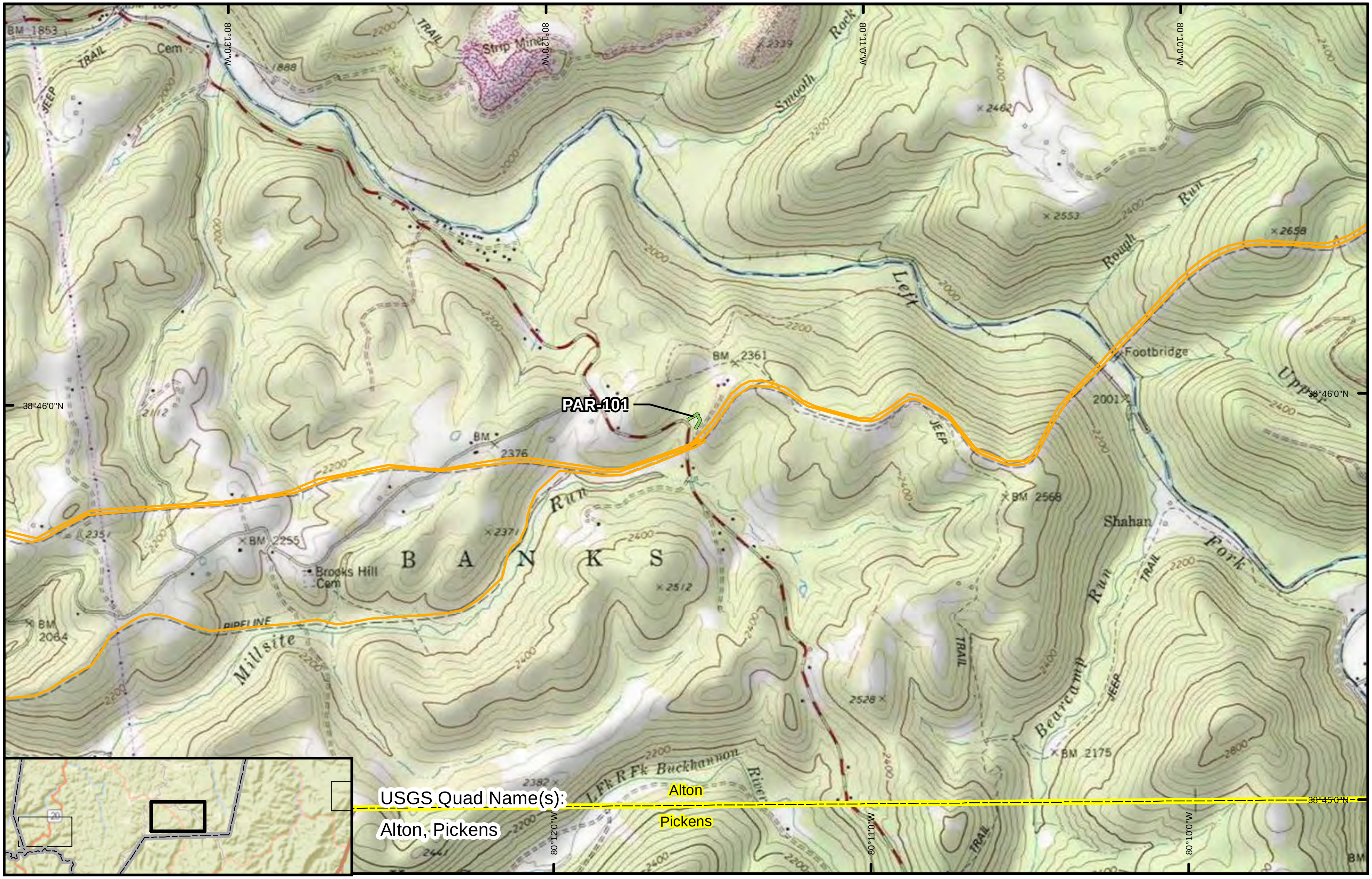

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

PAR-101

0 | 1,000 | 2,000 | 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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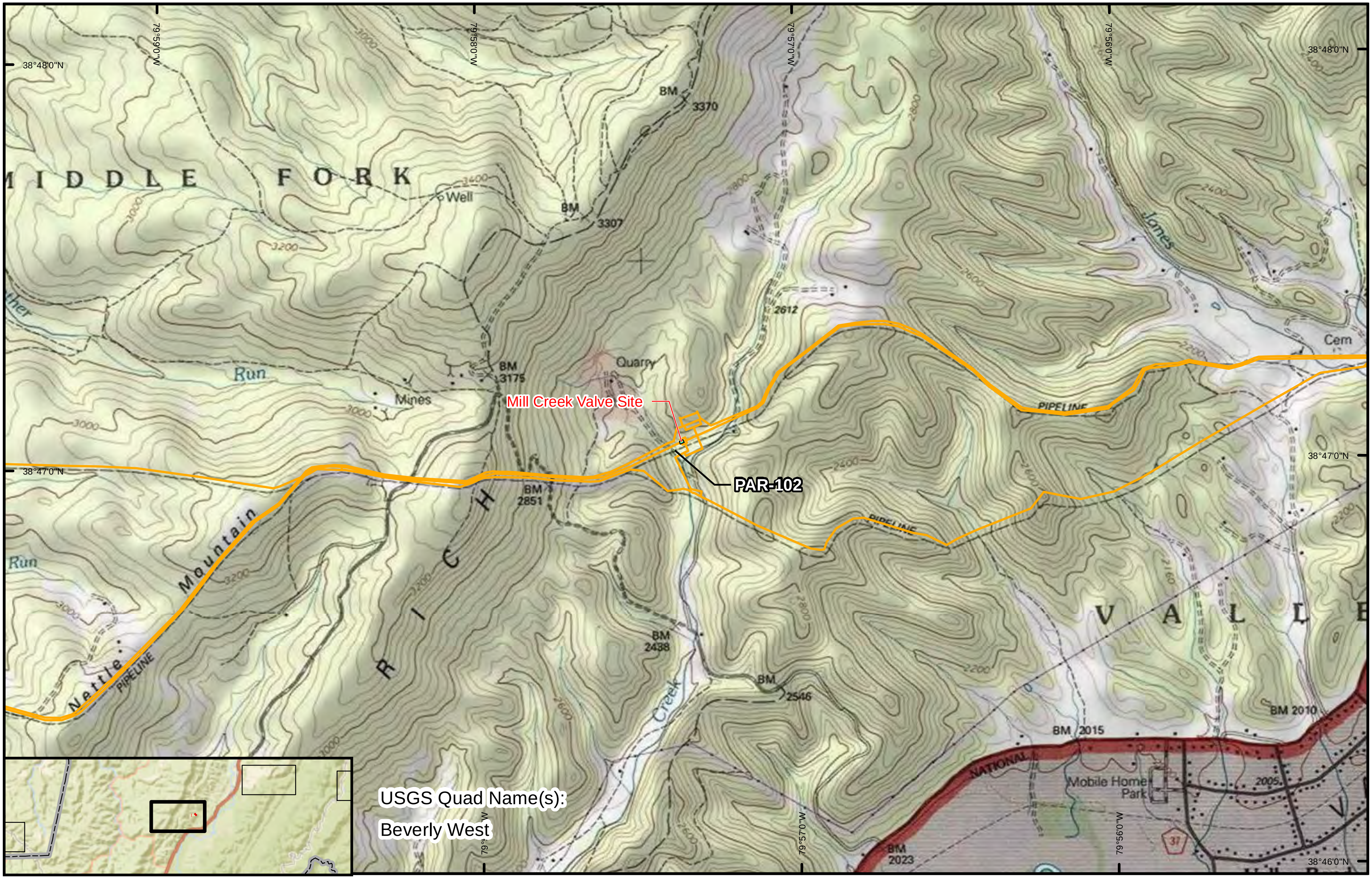

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

MILL CREEK
VALVE SITE

0 1,000 2,000 4,000 Feet

N W E S

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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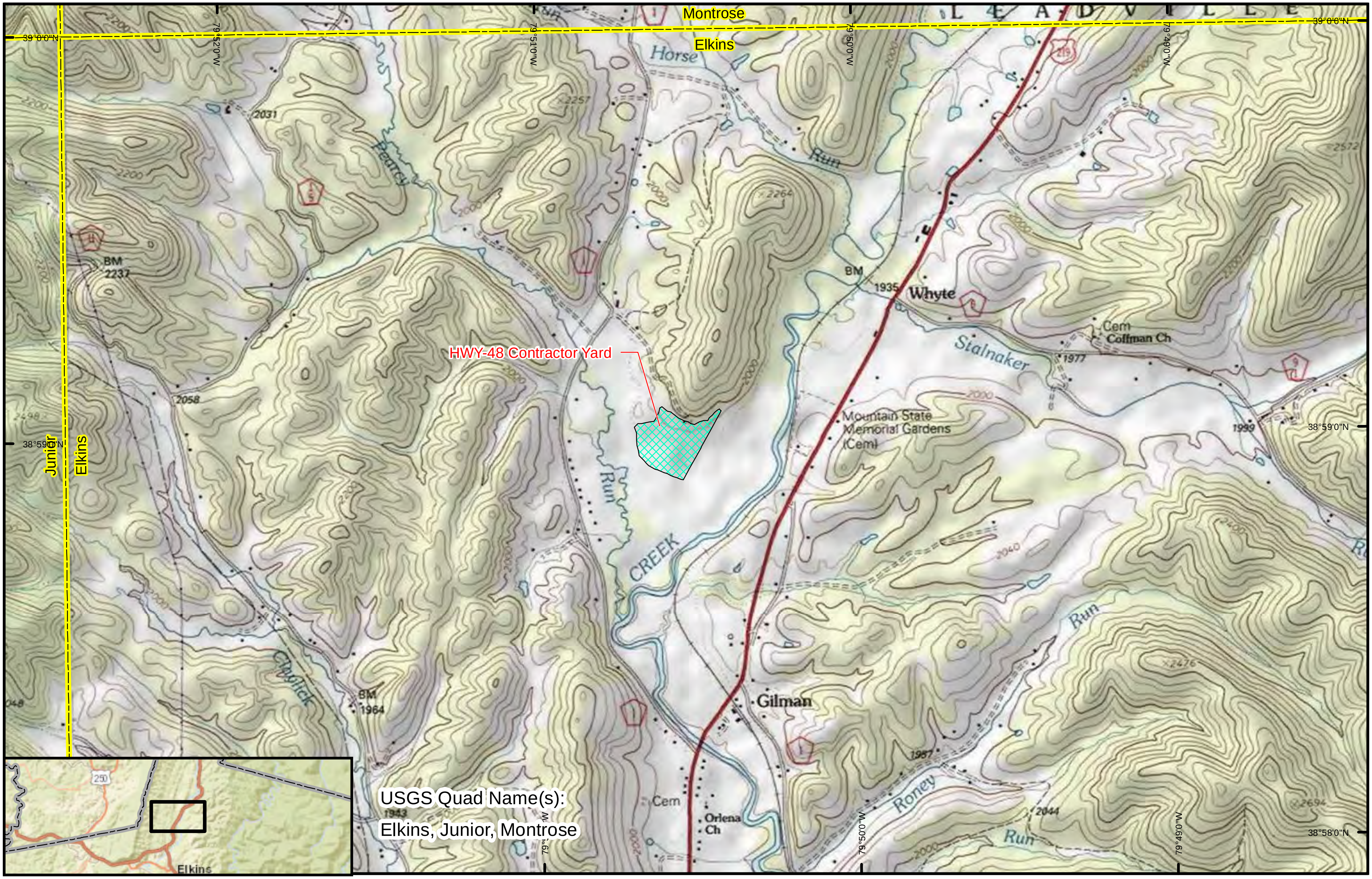

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

HIGHWAY 48
CONTRACTOR YARD

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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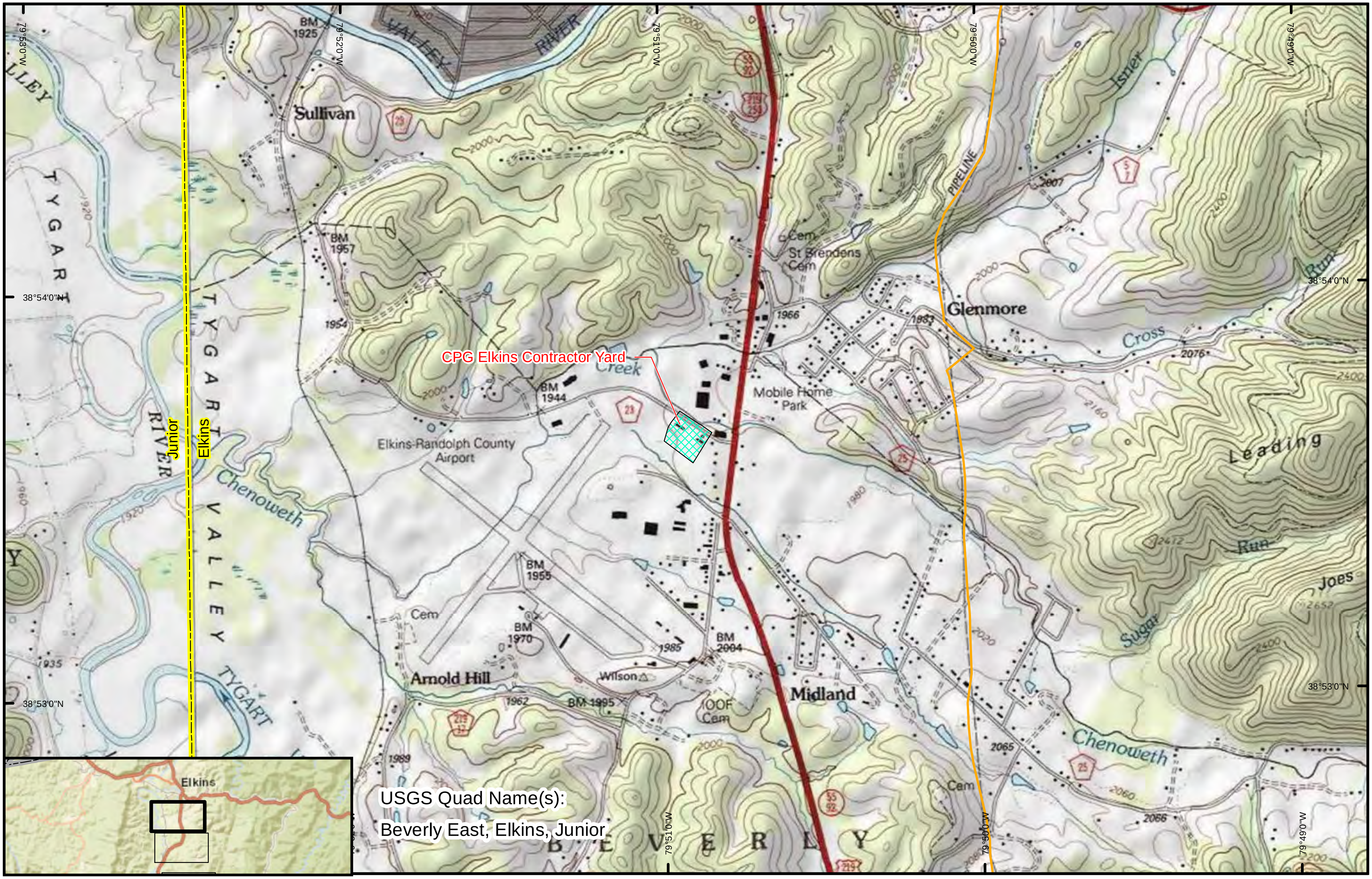

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

CPG ELKINS
CONTRACTOR YARD

0 | 1,000 | 2,000 | 4,000 Feet

N S E W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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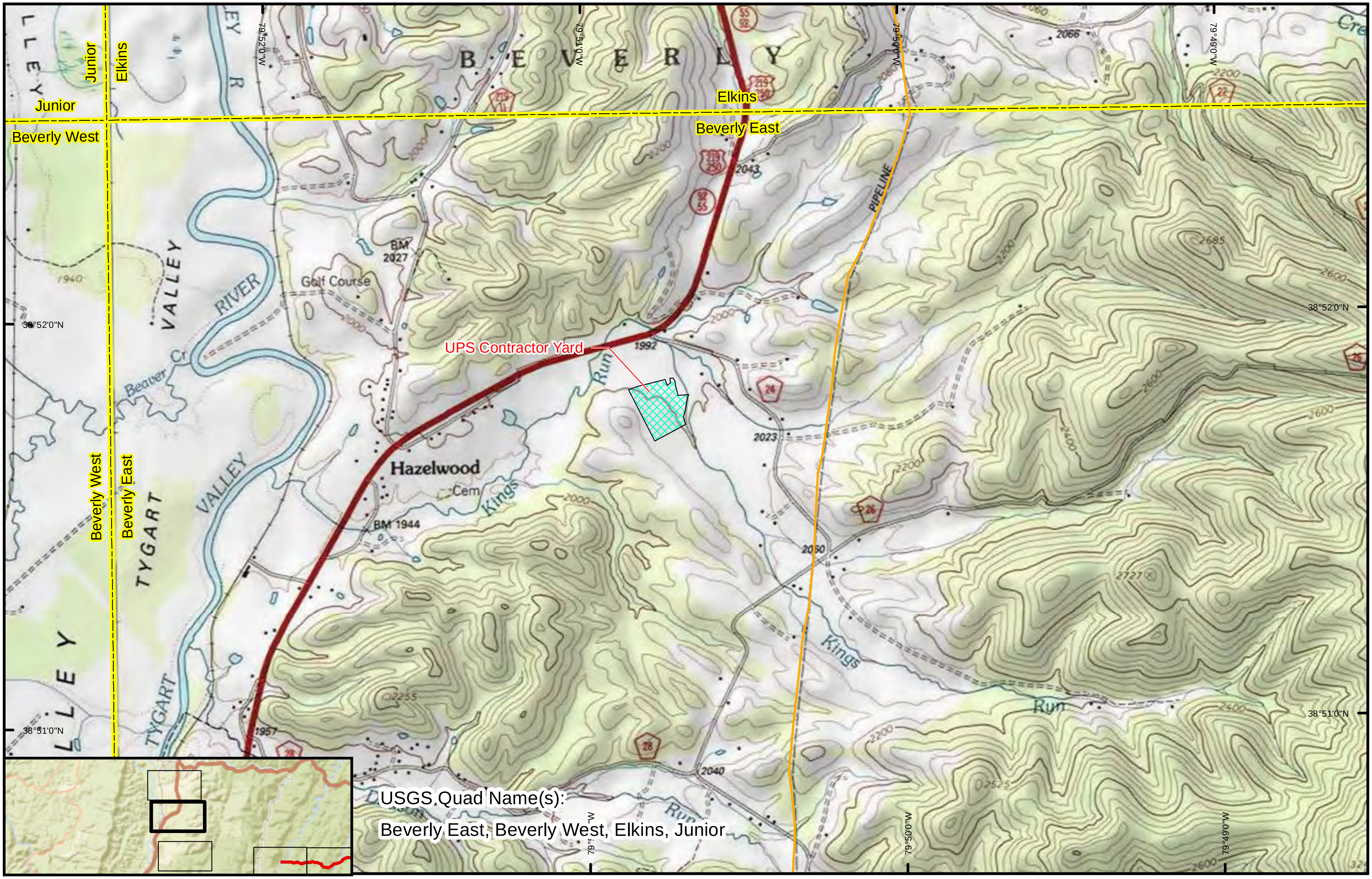

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

UPS
CONTRACTOR YARD

0 1,000 2,000 4,000 Feet

N S E W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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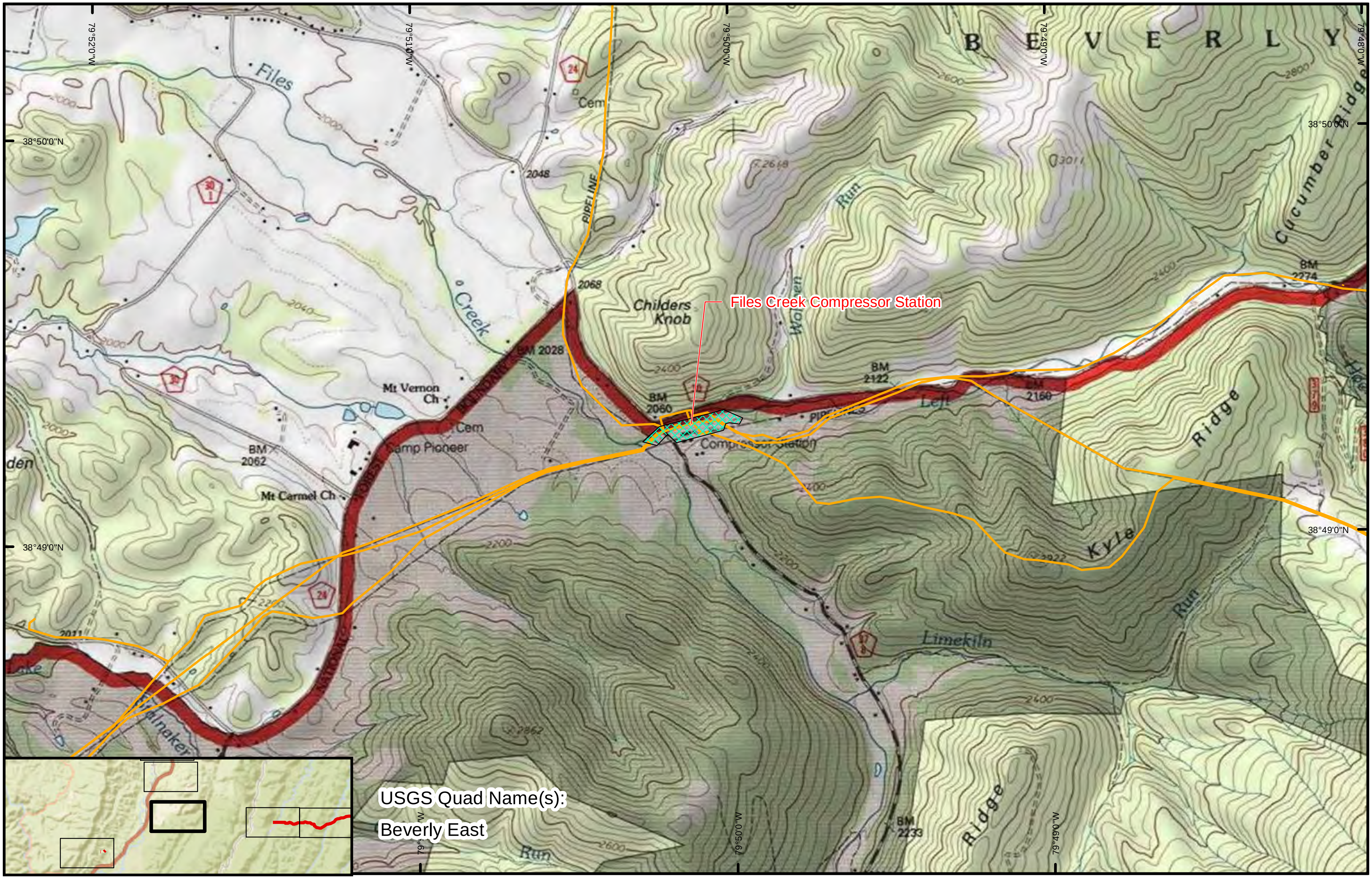

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

FILES CREEK
COMPRESSOR STATION

0 1,000 2,000 4,000 Feet

N S E W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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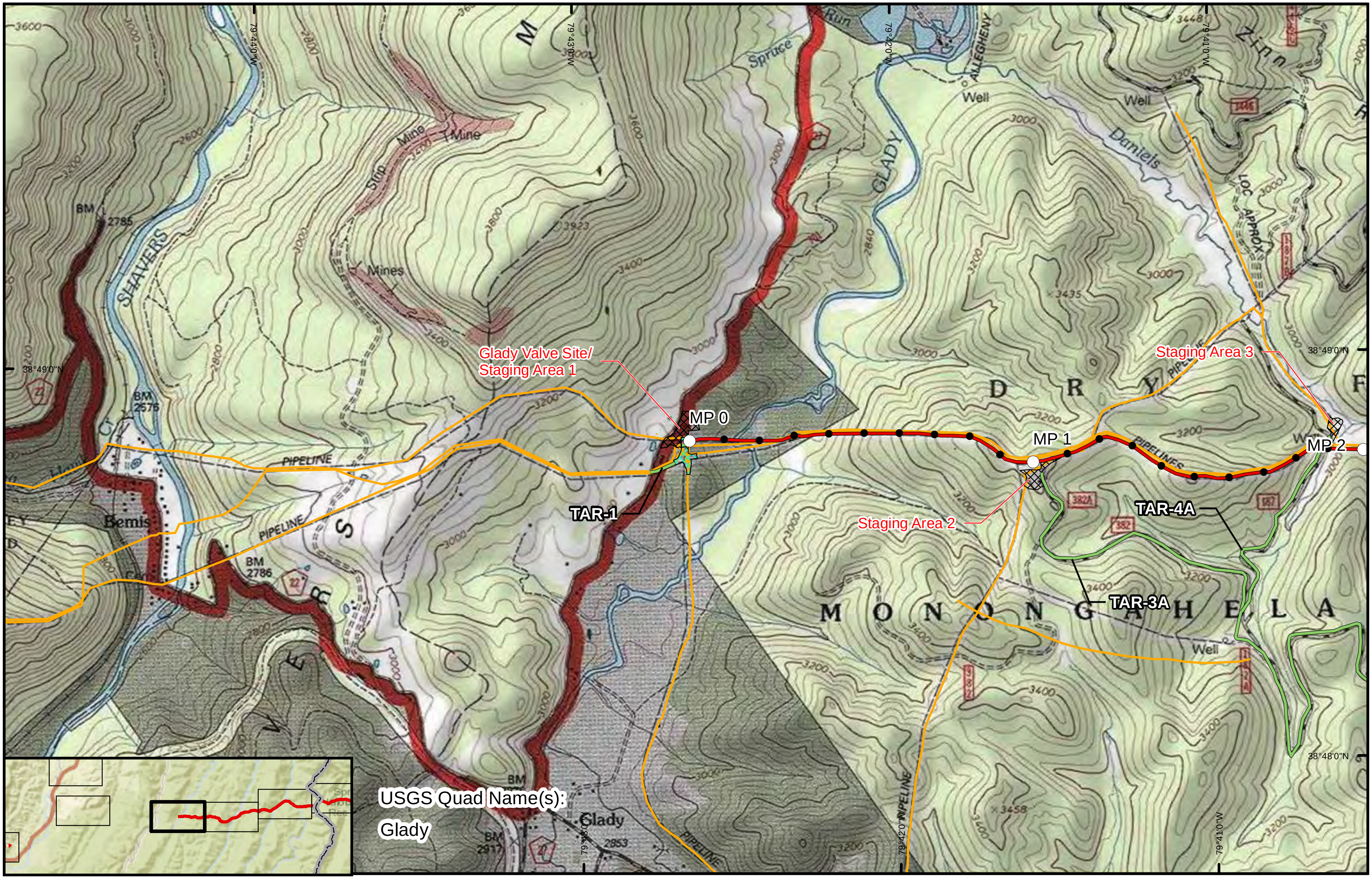

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

Feet
0 1,000 2,000 4,000

ABSOLUTE SCALE: 1:24,000
REFERENCE SCALE: 1 IN = 2,000 FT

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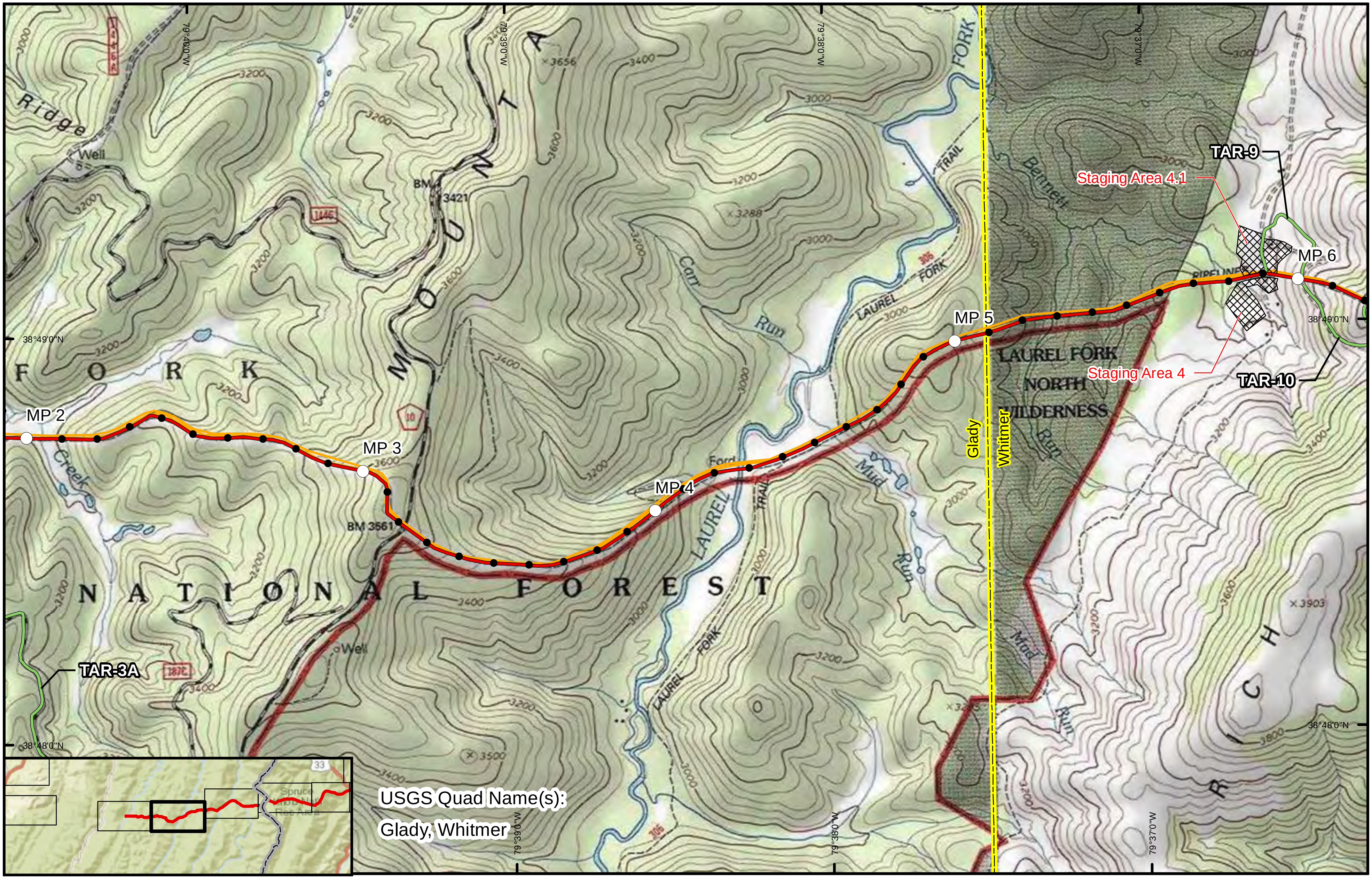

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

Feet
0 1,000 2,000 4,000

ABSOLUTE SCALE: 1:24,000
REFERENCE SCALE: 1 IN = 2,000 FT

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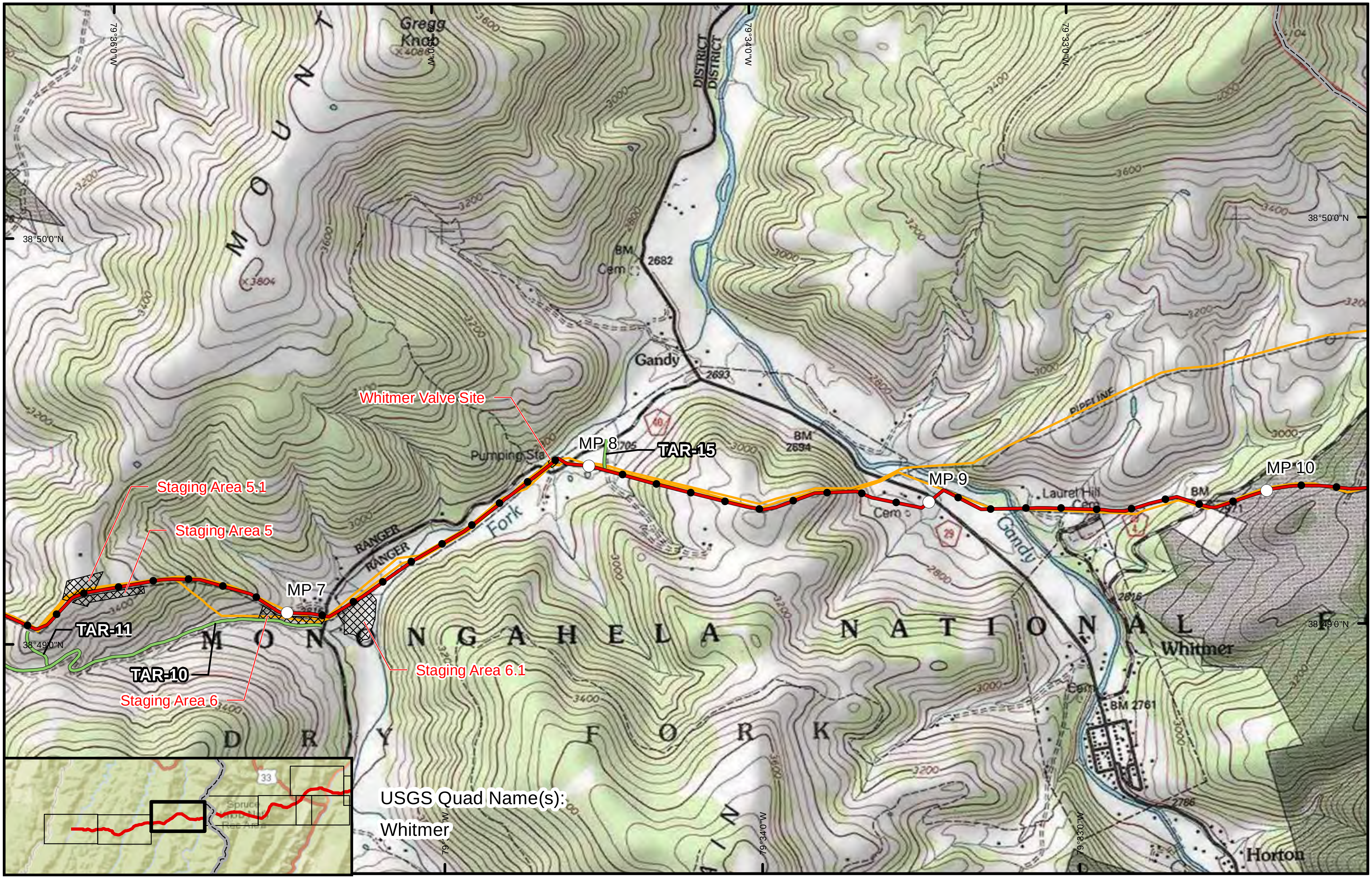

○	MILEPOSTS
	PROPOSED PIPELINE
	PROPOSED ACCESS ROAD
	EXISTING CPG PIPELINE
	LIMIT OF DISTURBANCE
	STAGING AREA
	USGS QUADRANGLE BOUNDARY
	COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

0 — 1,000 — 2,000 — 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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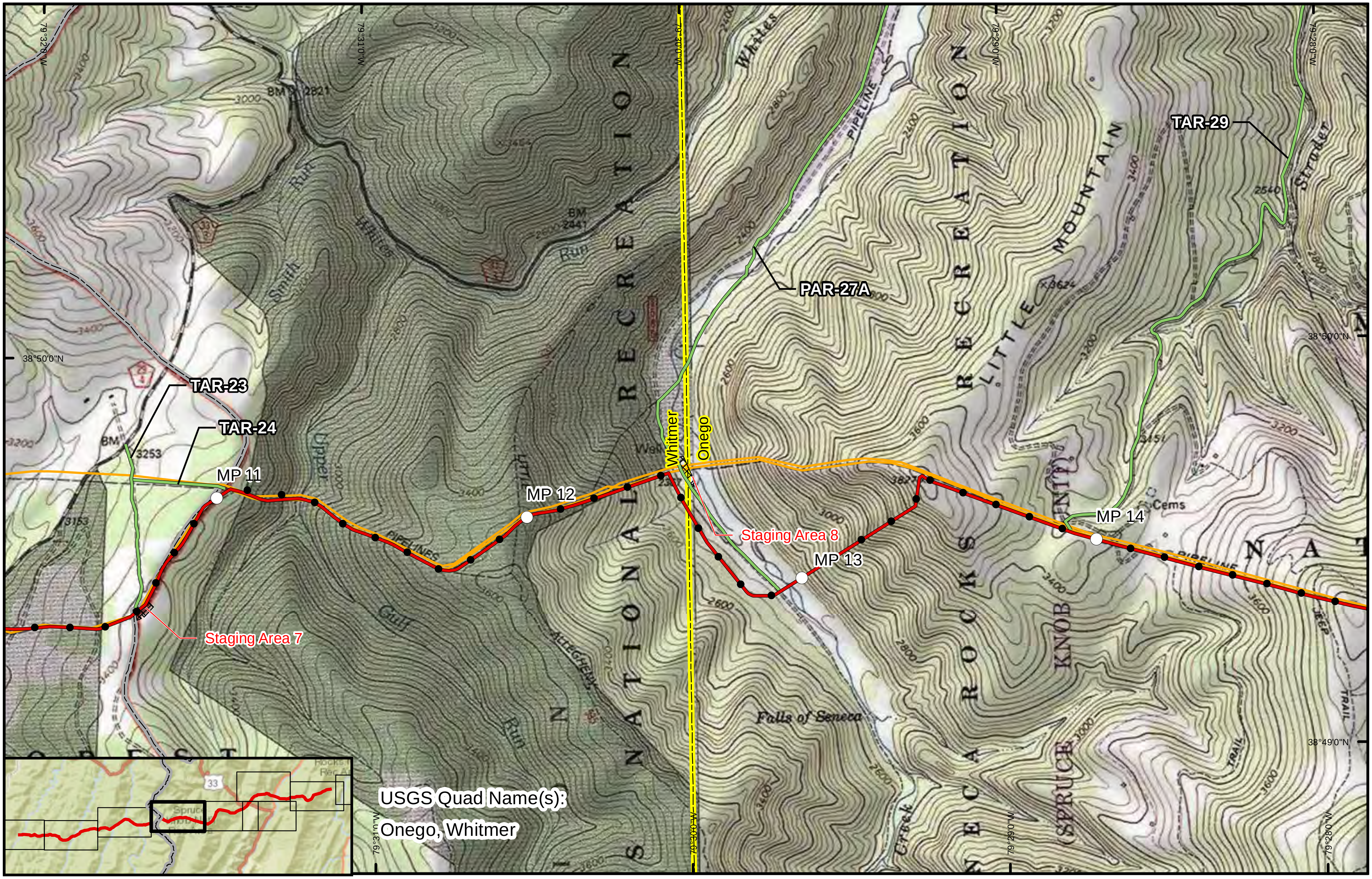

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

Feet: 0 | 1,000 | 2,000 | 4,000

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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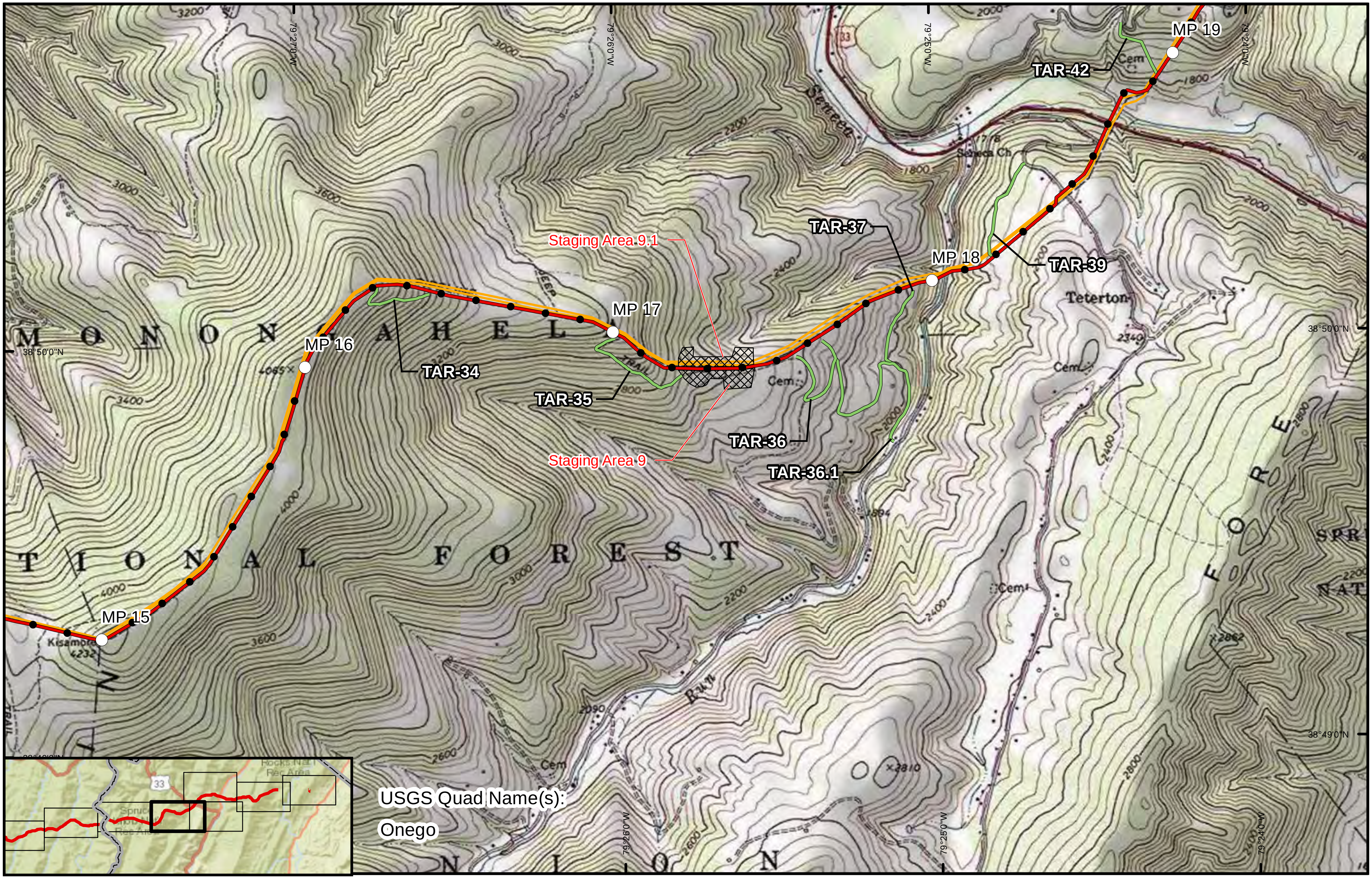

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

0 | 1,000 | 2,000 | 4,000 Feet

N W E S

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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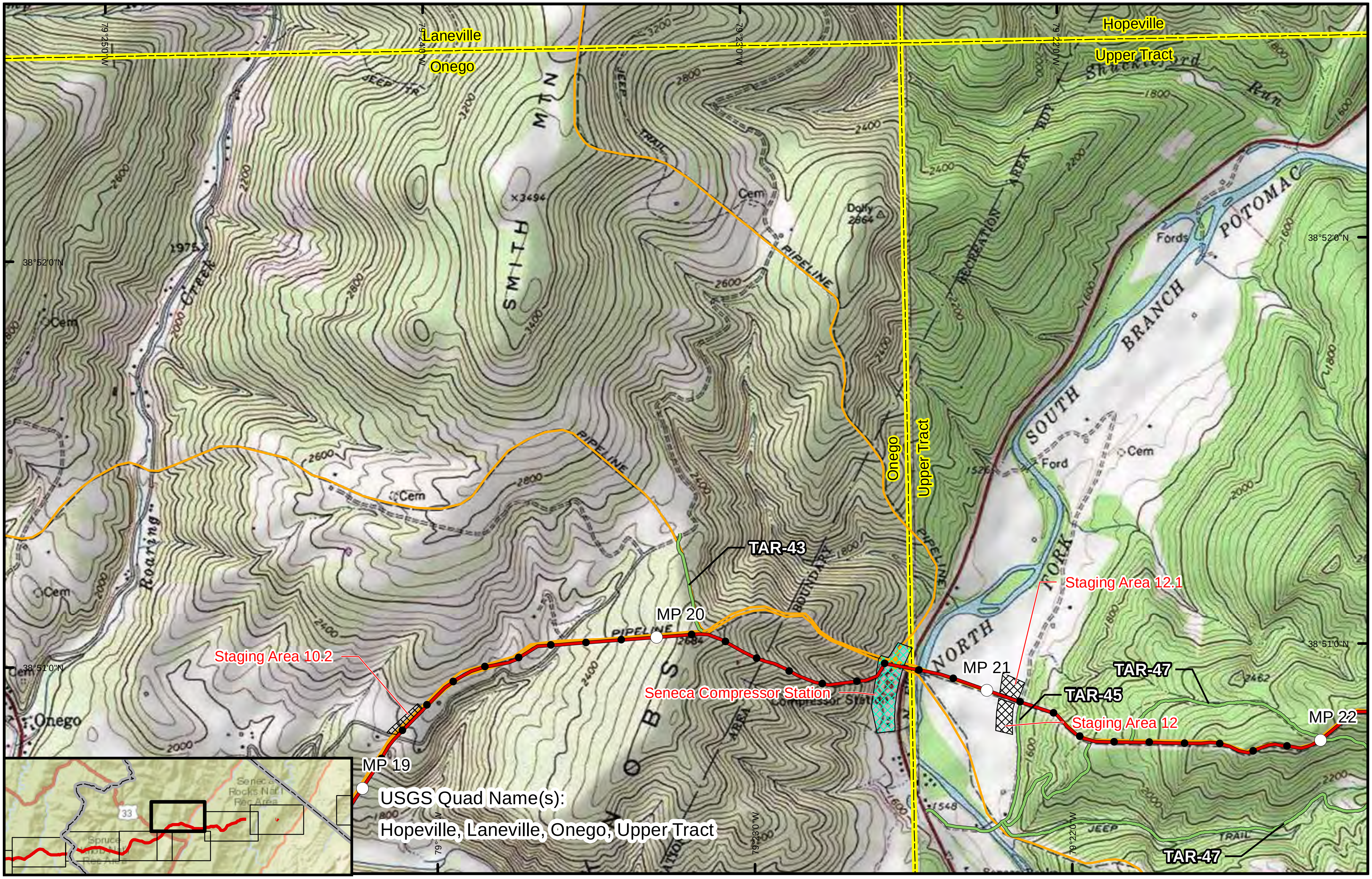

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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COLUMBIA PIPELINE GROUP

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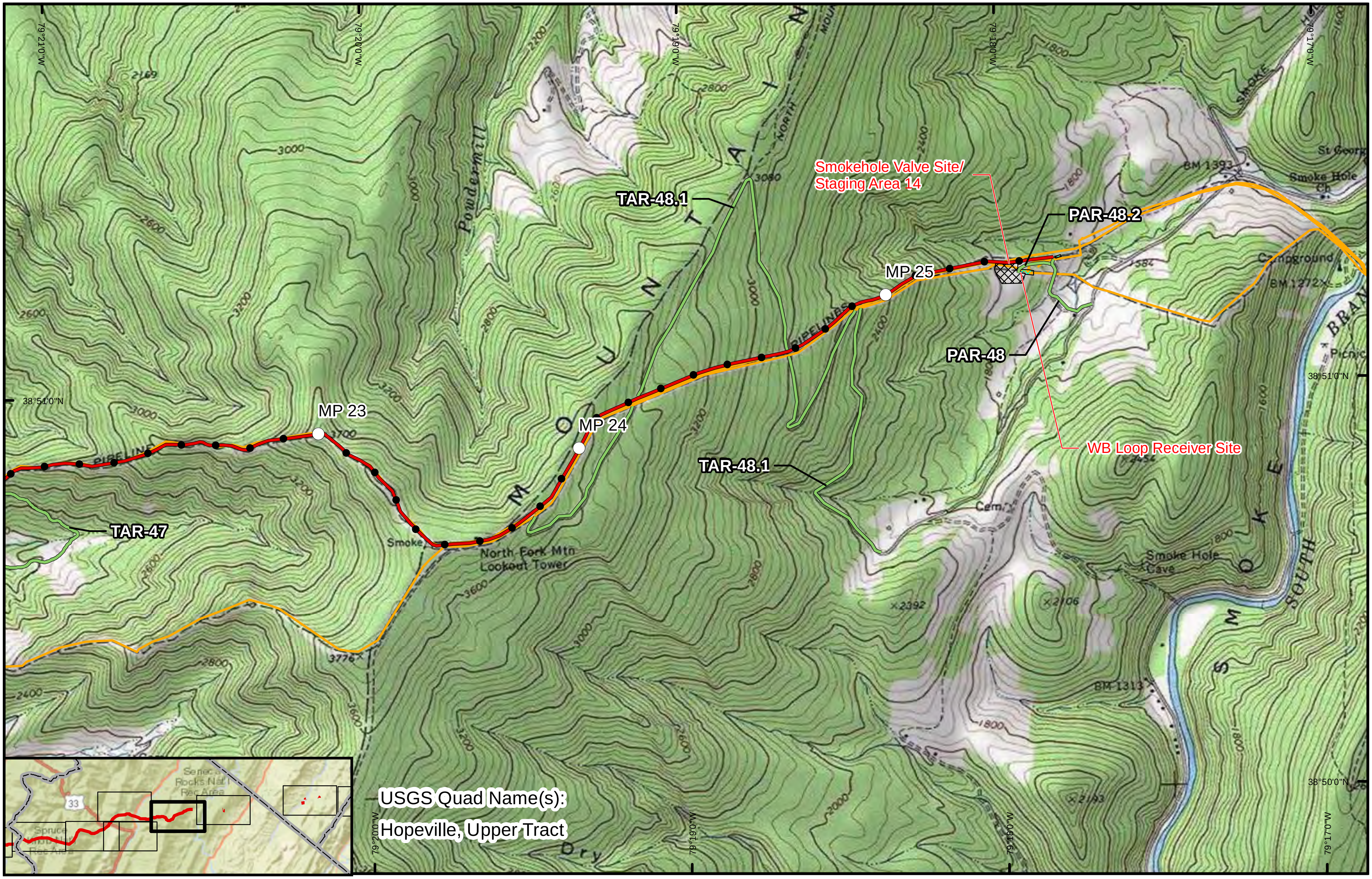

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PROPOSED PIPELINE

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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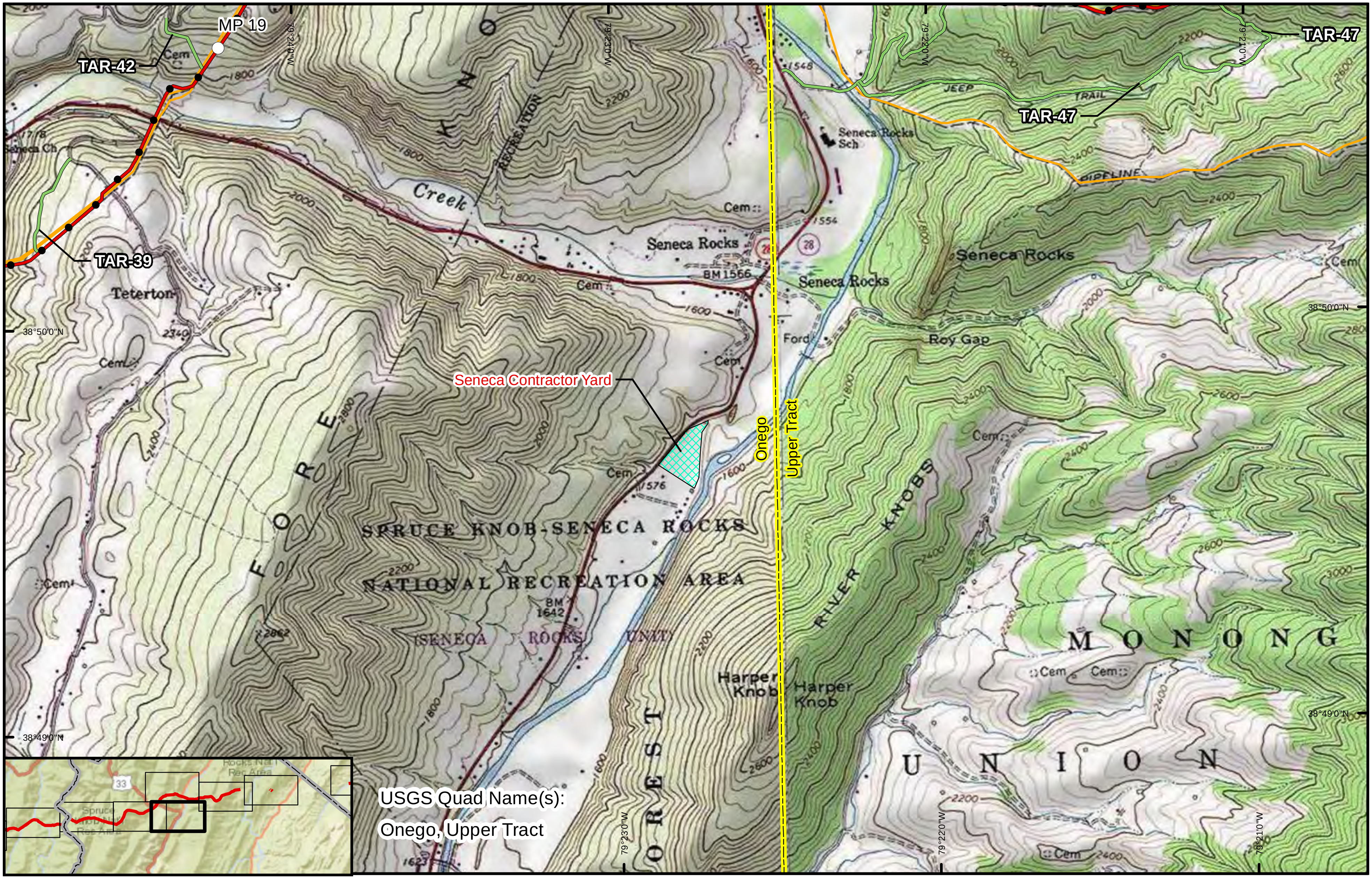

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

SENECA
CONTRACTOR YARD

0 | 1,000 | 2,000 | 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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COLUMBIA PIPELINE GROUP

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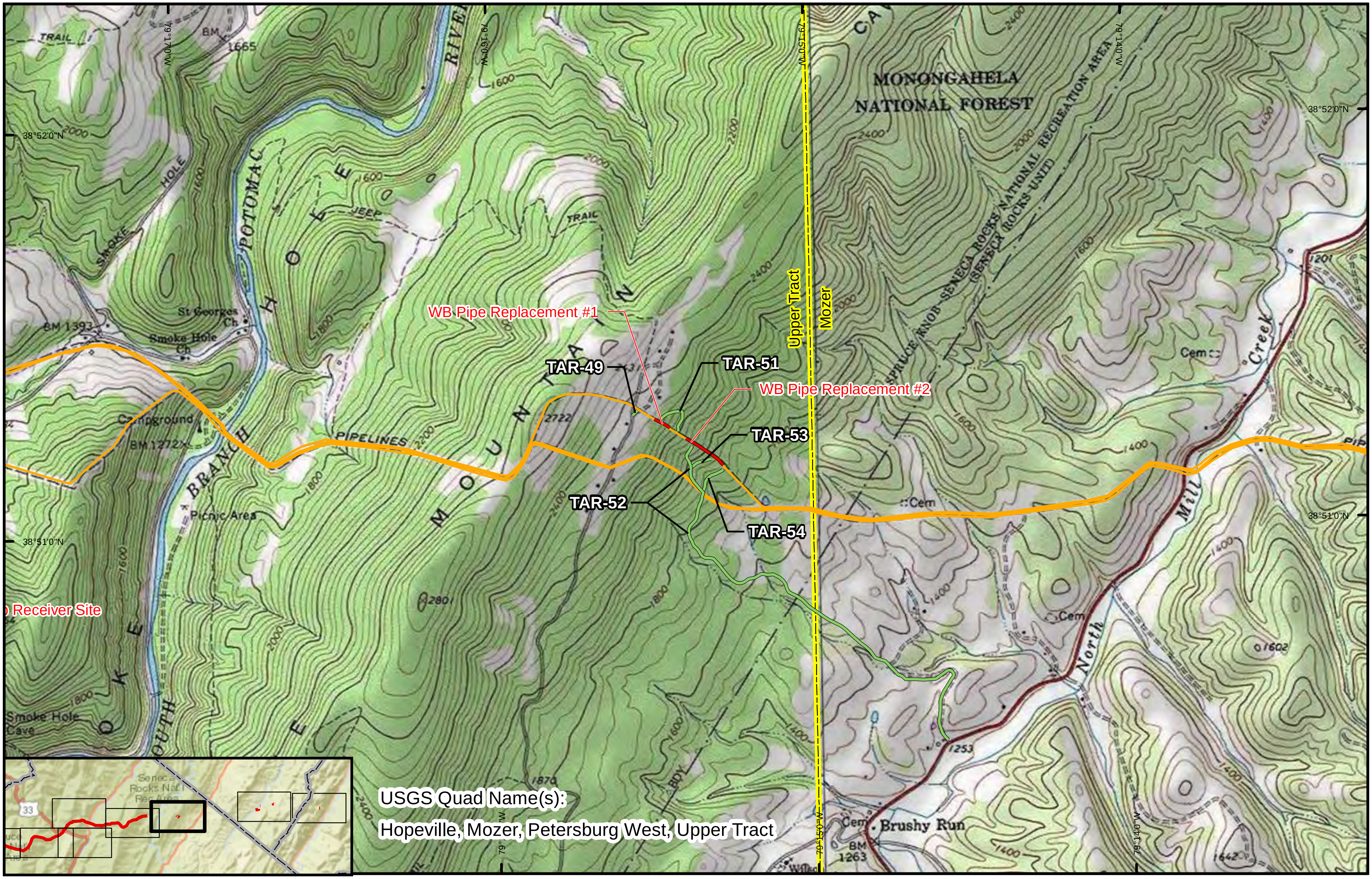

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PIPELINE
INTEGRITY REPLACEMENTS

Feet
0 1,000 2,000 4,000

ABSOLUTE SCALE: 1:24,000
REFERENCE SCALE: 1 IN = 2,000 FT

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Columbia Pipeline Group

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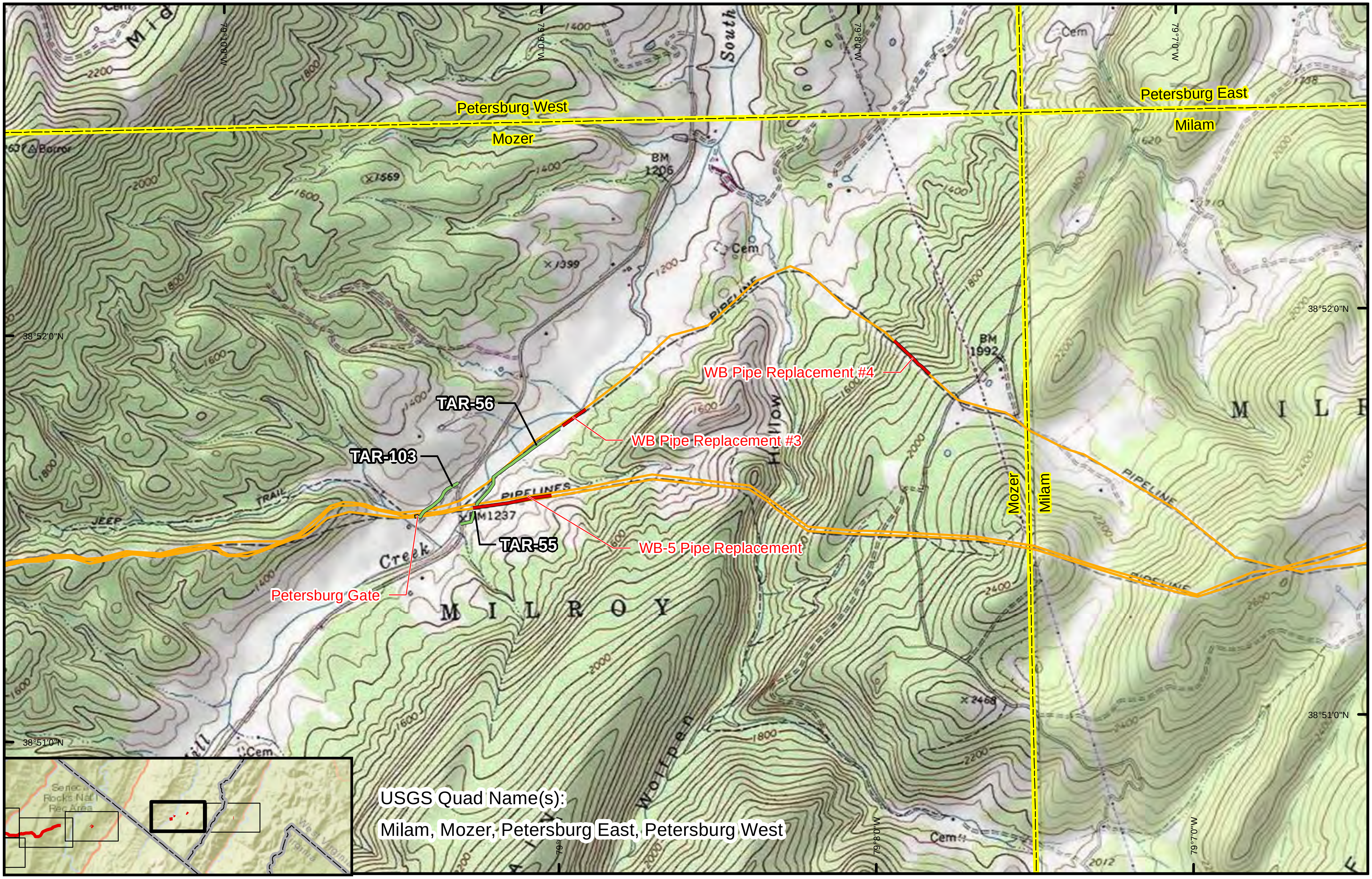

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

PETERSBURG GATE AND
WB PIPELINE AND
LINE WB-5 PIPELINE
REPLACEMENTS

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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COLUMBIA PIPELINE GROUP

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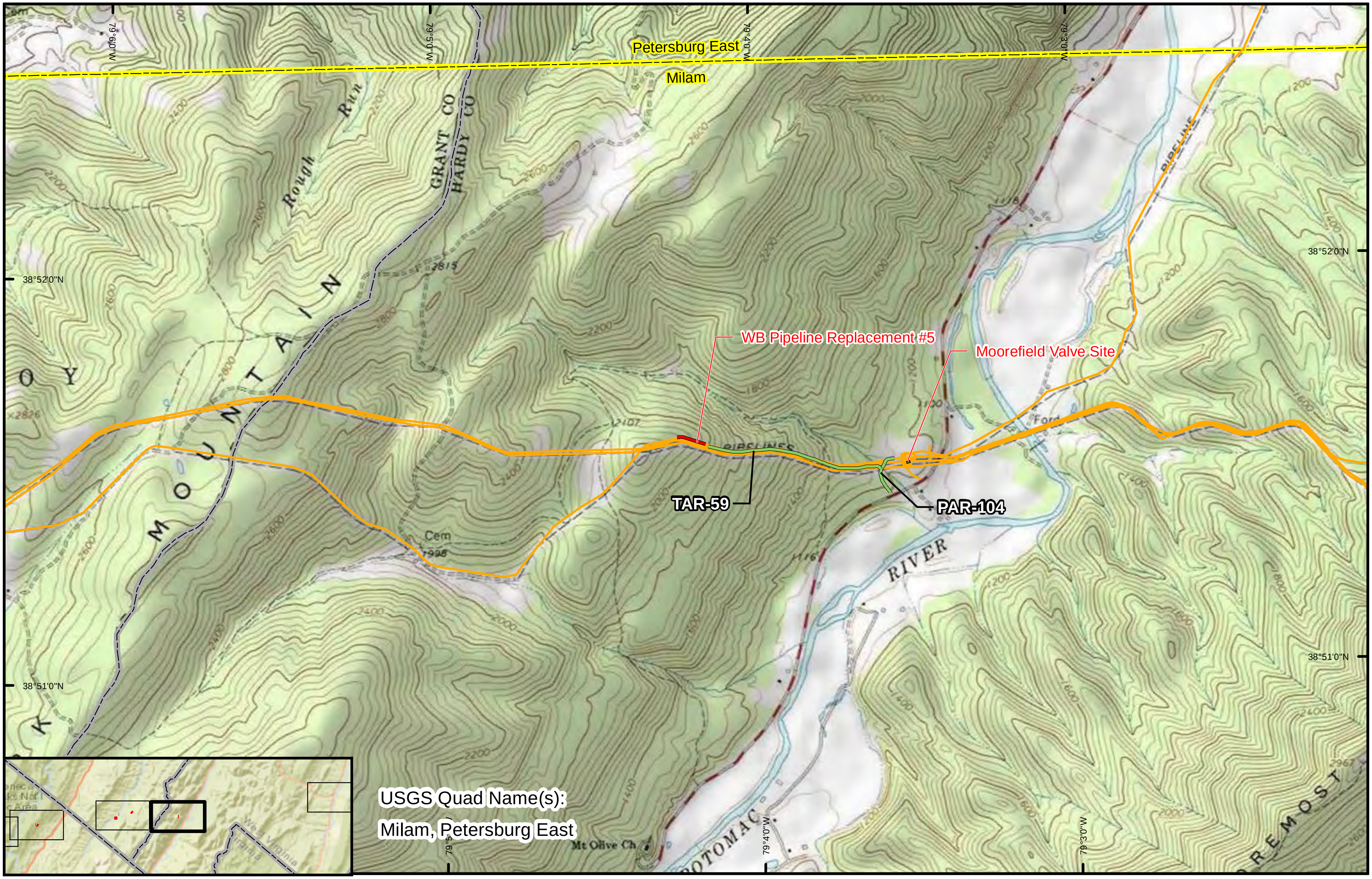

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

WB PIPELINE
INTEGRITY REPLACEMENTS AND
MOOREFIELD VALVE SITE

0 1,000 2,000 4,000 Feet

N S E W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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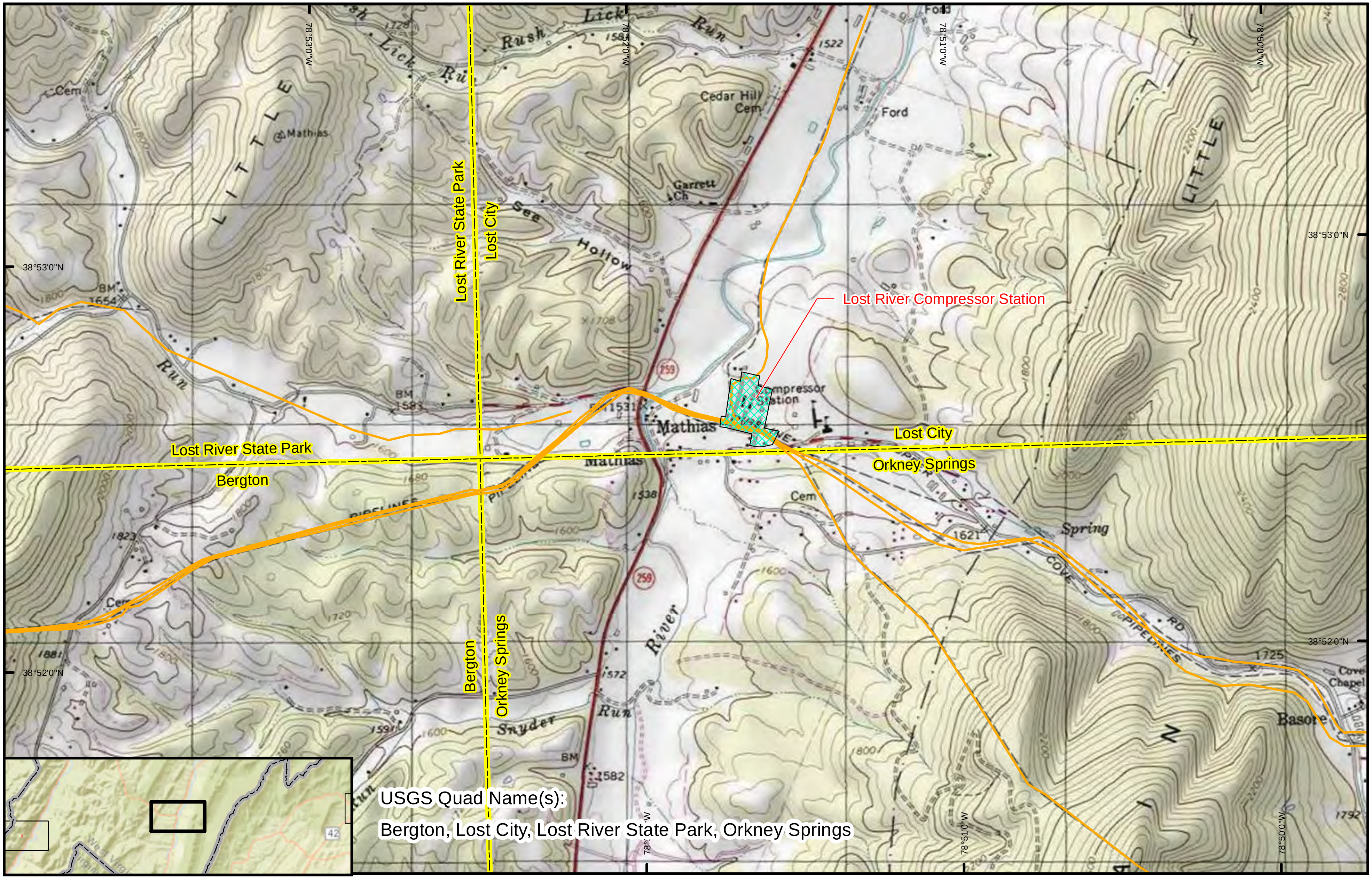

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

LOST RIVER
COMPRESSOR STATION

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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COLUMBIA PIPELINE GROUP

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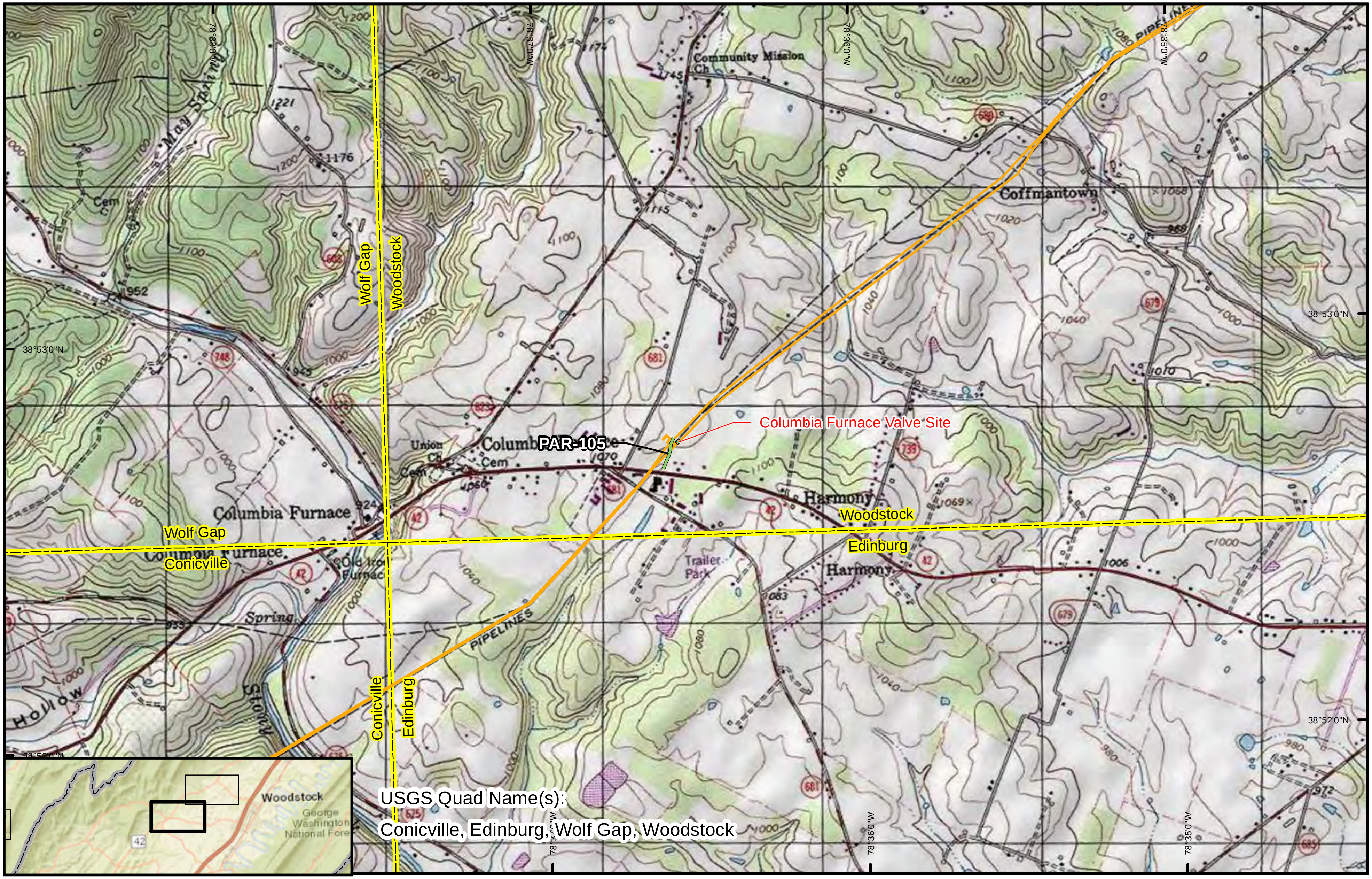

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

COLUMBIA FURNACE
VALVE SITE

0 1,000 2,000 4,000 Feet

N
W E
S

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

DRAWN BY:	DEP
CHECKED BY:	CED
APPROVED BY:	KDM
PROJECT:	21393
DATE:	10/12/2016
REV:	20150213-8511-QMS-006

PAGE: 25 of 31

Columbia Pipeline Group

MOTT MACDONALD

PROPRIETARY
COLUMBIA PIPELINE GROUP

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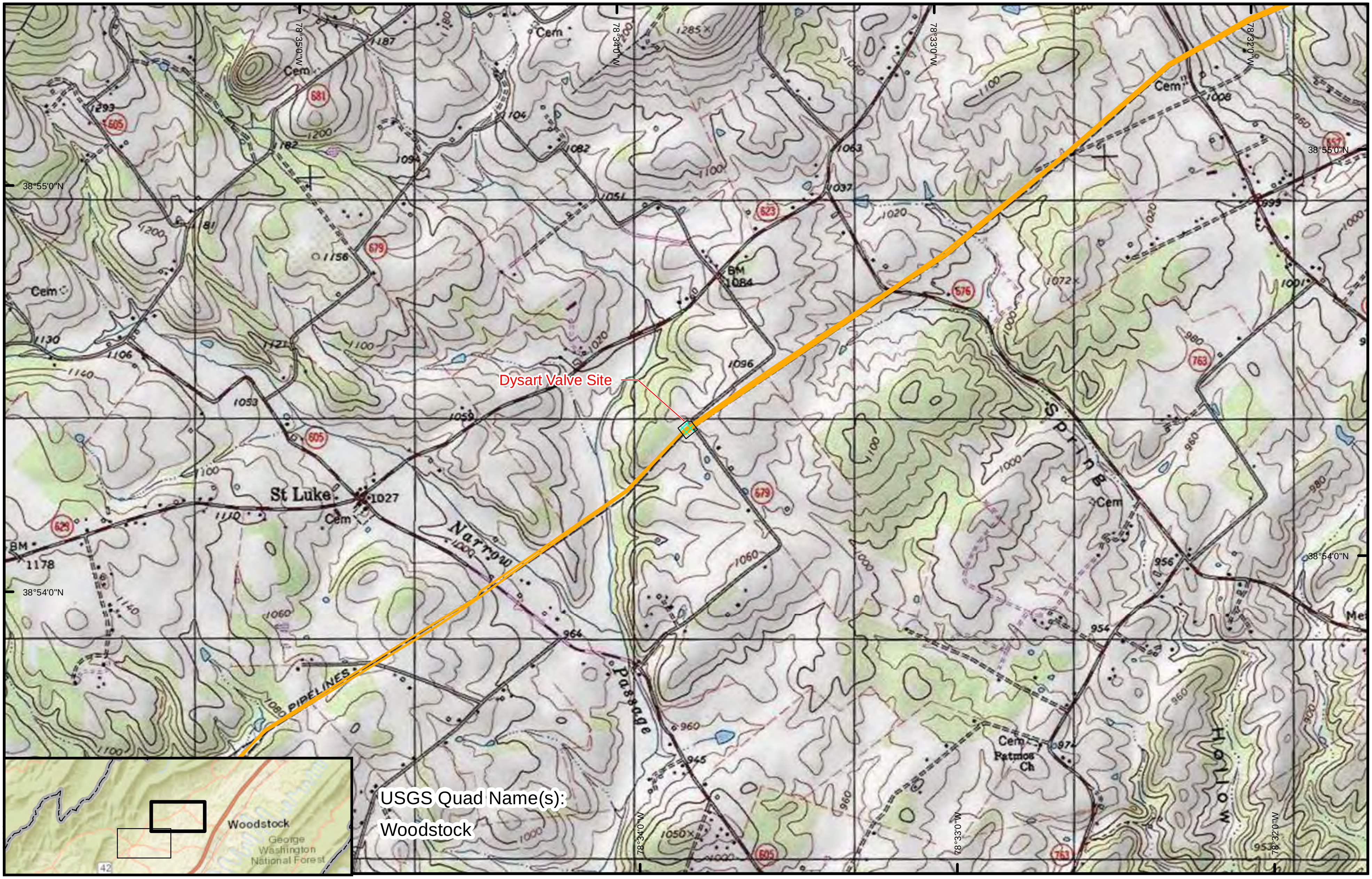

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

DYSART
VALVE SITE

0 | 1,000 | 2,000 | 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

PAGE: 26 of 31

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Columbia Pipeline Group

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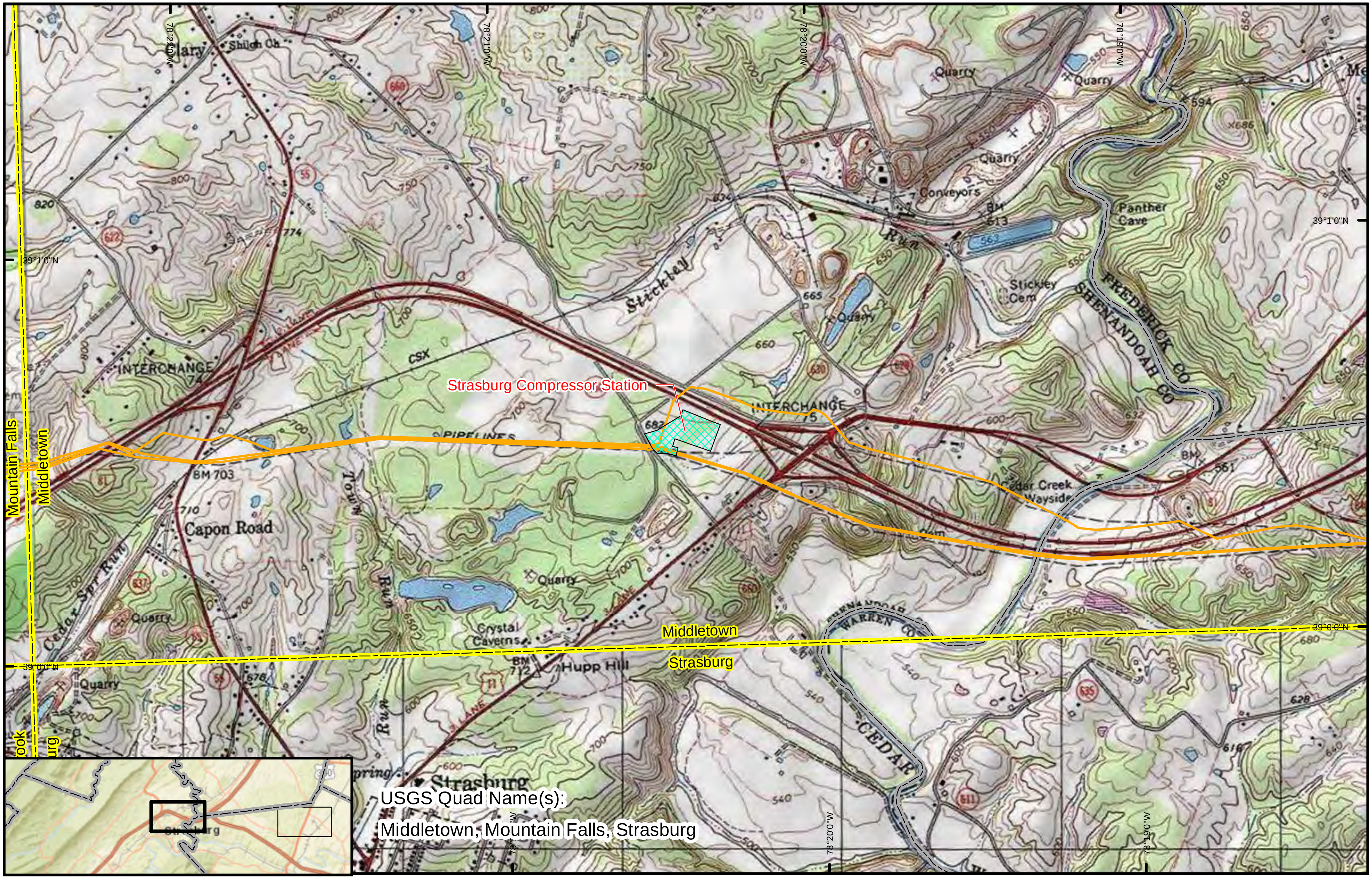

MILEPOSTS	
PROPOSED PIPELINE	
PROPOSED ACCESS ROAD	
EXISTING CPG PIPELINE	
LIMIT OF DISTURBANCE	
STAGING AREA	
USGS QUADRANGLE BOUNDARY	
COUNTY/STATE BOUNDARY	

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

STRASBURG
COMPRESSOR STATION

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

PAGE: 27 of 31

DRAWN BY:	DEP
CHECKED BY:	CED
APPROVED BY:	KDM
PROJECT:	21393
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REV:	20150213-8511-QMS-006

Columbia Pipeline Group

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PROPRIETARY
COLUMBIA PIPELINE GROUP

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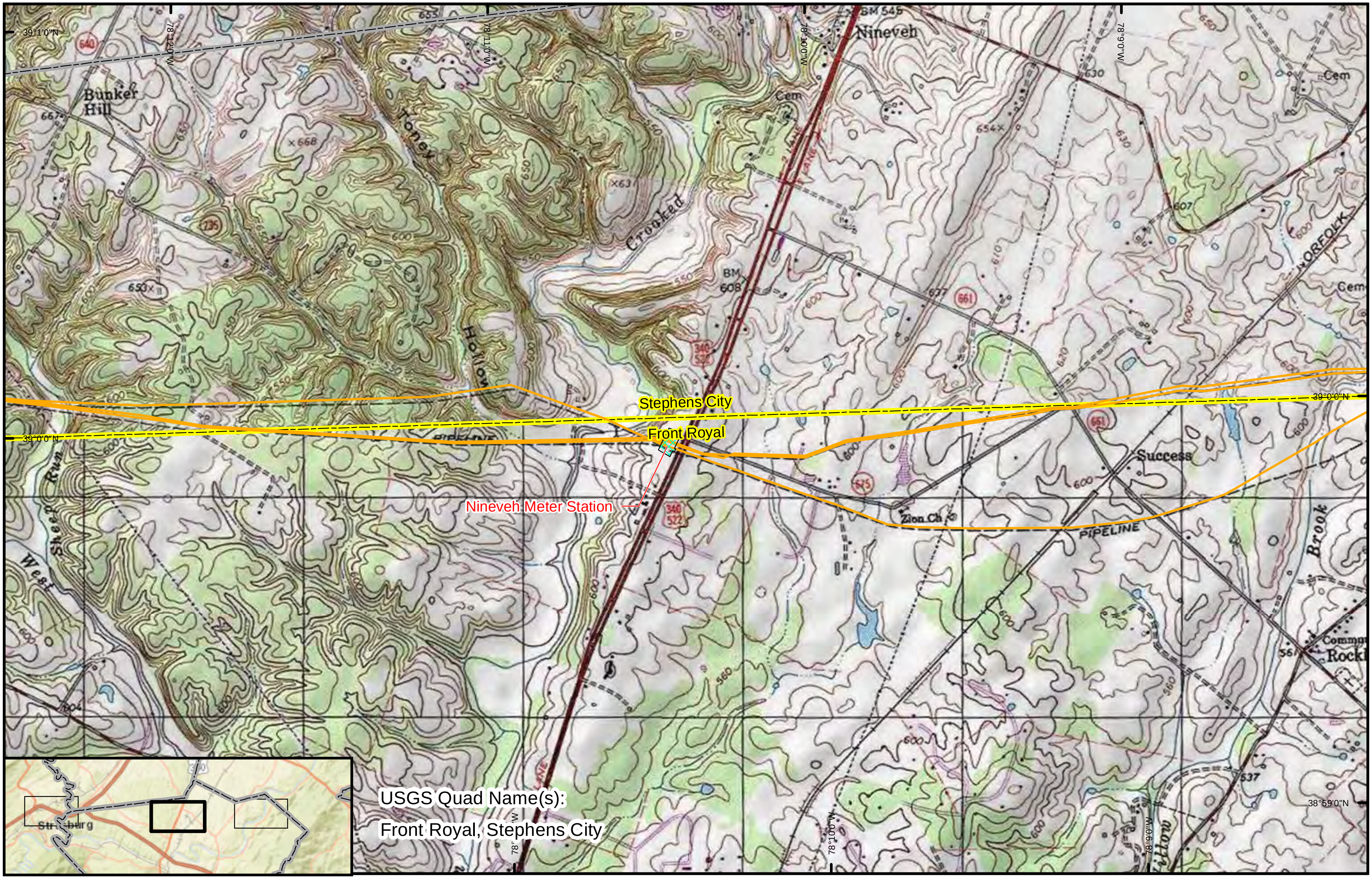

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

NINEVEH METER STATION

0 — 1,000 — 2,000 — 4,000 Feet

N / W / E / S

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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CHECKED BY:	CED
APPROVED BY:	KDM
PROJECT:	21393
DATE:	10/12/2016
PAGE:	28 of 31
REV:	20150213-8511-QMS-006

Columbia Pipeline Group

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PROPRIETARY
COLUMBIA PIPELINE GROUP

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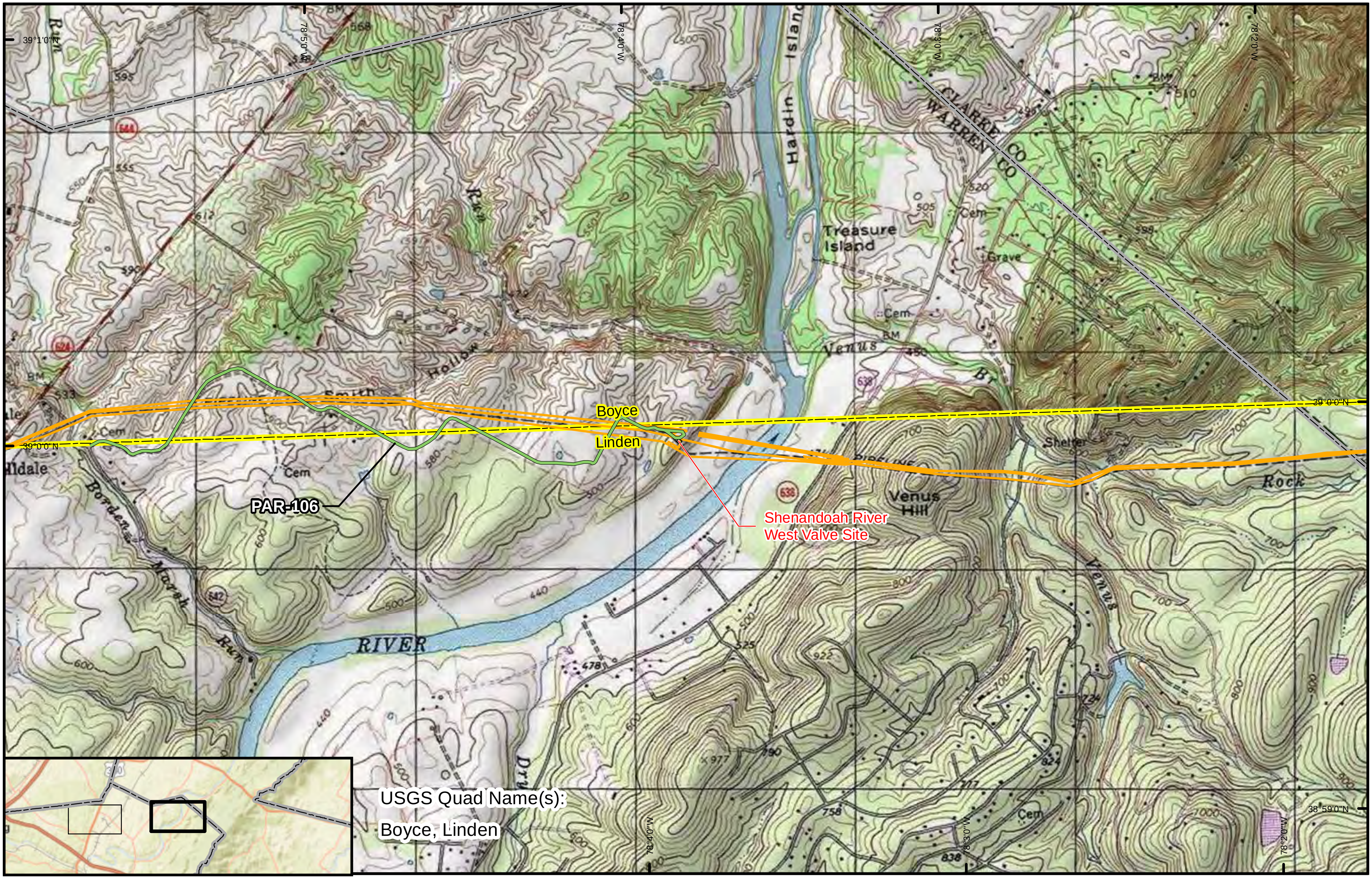

- MILEPOSTS
- PROPOSED PIPELINE
- PROPOSED ACCESS ROAD
- EXISTING CPG PIPELINE
- LIMIT OF DISTURBANCE
- STAGING AREA
- USGS QUADRANGLE BOUNDARY
- COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP WB XPRESS USGS QUAD EXCERPT

SHENANDOAH RIVER WEST VALVE SITE

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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APPROVED BY:	KDM
PROJECT:	21393
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REV:	20150213-8511-QMS-006

PAGE: 29 of 31

Columbia Pipeline Group

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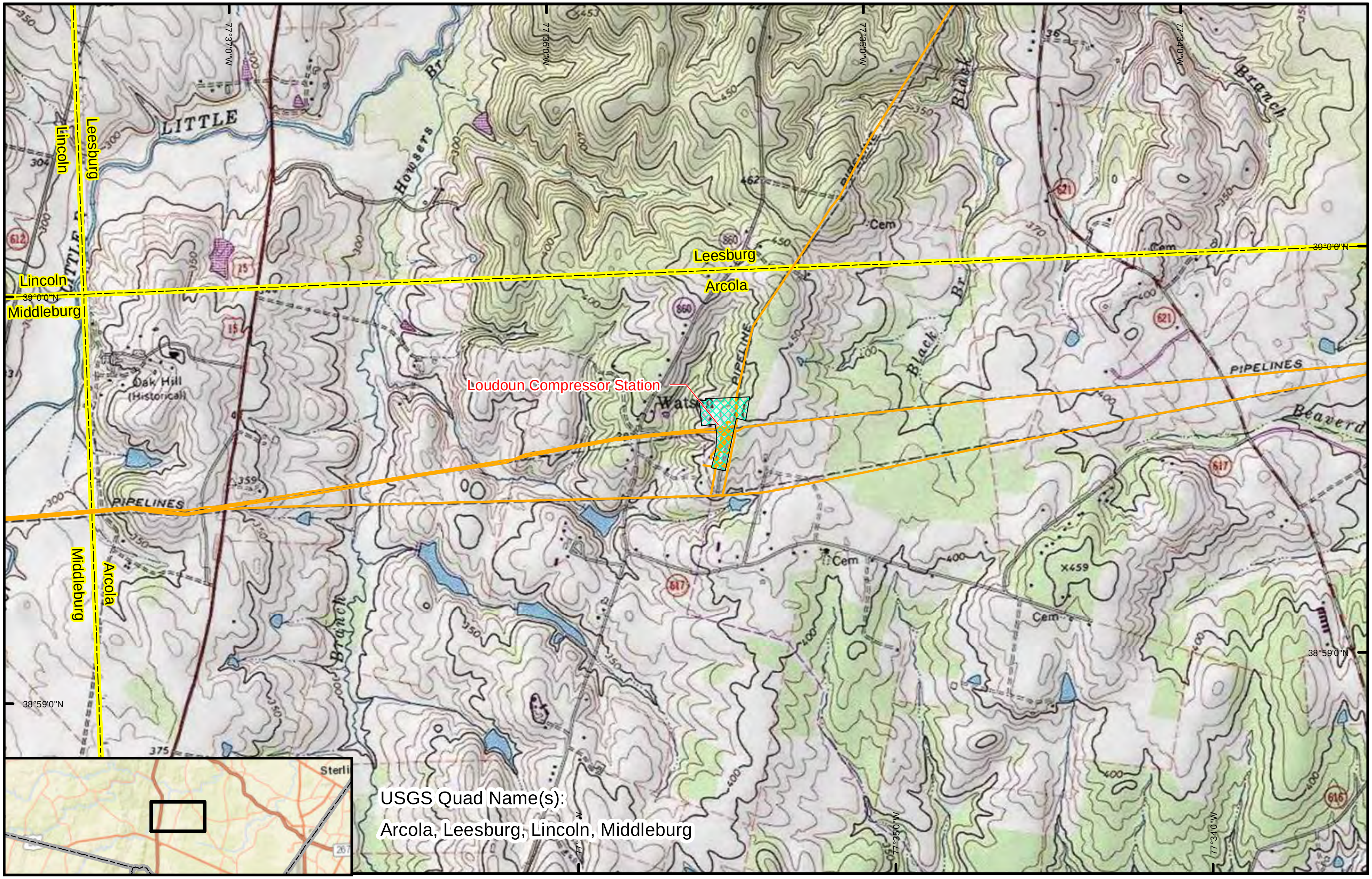

MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

LOUDOUN
COMPRESSOR STATION

0 1,000 2,000 4,000 Feet

N S E W

ABSOLUTE SCALE: 1:24,000

REFERENCE SCALE: 1 IN = 2,000 FT

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		APPROVED BY:	KDM
		PROJECT:	21393
		DATE:	10/12/2016
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Columbia Pipeline Group

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COLUMBIA PIPELINE GROUP

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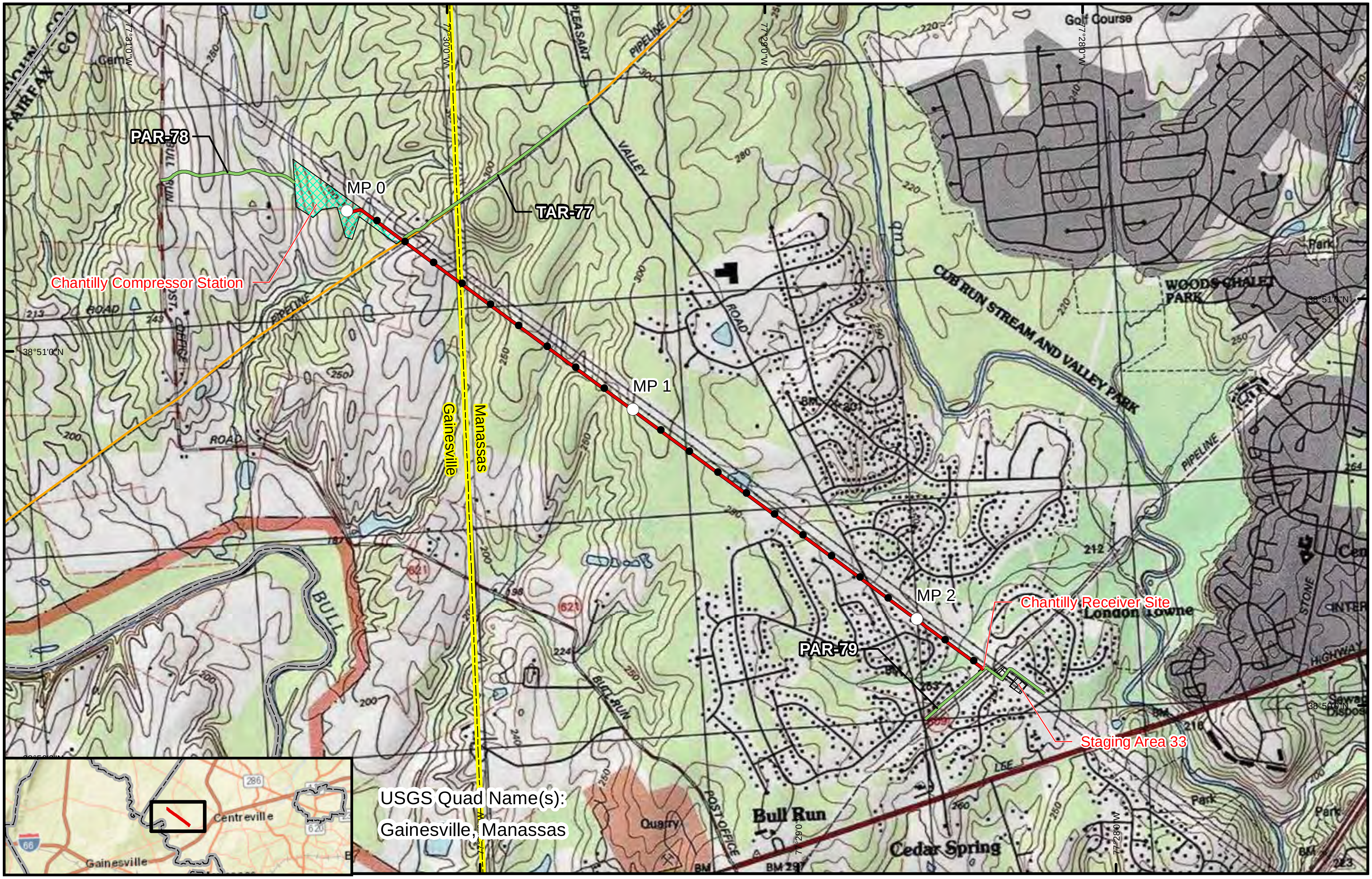

○ MILEPOSTS
PROPOSED PIPELINE
PROPOSED ACCESS ROAD
EXISTING CPG PIPELINE
LIMIT OF DISTURBANCE
STAGING AREA
USGS QUADRANGLE BOUNDARY
COUNTY/STATE BOUNDARY

COLUMBIA PIPELINE GROUP
WB XPRESS
USGS QUAD EXCERPT

CHANTILLY
COMPRESSOR STATION AND
VA-1 PROPOSED PIPELINE

0 1,000 2,000 4,000 Feet

ABSOLUTE SCALE: 1:24,000
REFERENCE SCALE: 1 IN = 2,000 FT

DRAWN BY:	DEP
CHECKED BY:	CED
APPROVED BY:	KDM
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Columbia Pipeline Group

MOTT MACDONALD

Document Path: C:\Users\pis60731\Desktop\Temp\WB_Xpress\WBXpressQuadMap.mxd

Appendix B

Access Roads for the WB XPress Project

APPENDIX B

Access Roads for the WB XPress Project [a]

Facility/Access Road Name [b]	County	State	Milepost	Existing Land Uses	Area Affected by Construction (acres)	Length (miles)	Existing Condition	Upgrade Requirements
New Pipeline Facilities								
Line WB-5 Extension								
PAR-64	Kanawha	WV	0.0	Industrial[c]	0.5	0.3	Gravel	None
TAR-66	Kanawha	WV	0.2	Industrial[c]	<0.1	<0.1	Dirt	Grading and Gravel
Line WB-22								
PAR-60	Kanawha	WV	0.6	Industrial[c]	0.4	0.3	Gravel	None
Line VA-1								
TAR-77	Fairfax	VA	0.0	Industrial[c]	0.9	0.6	Grass	None
				Wetlands	<0.1	0.1		
PAR-78	Fairfax	VA	0.0	Open Land	2.0	0.3	New Access Road	Clearing, Grading, Culverts, and Pavement
				Upland/Forested	0.4	0.1		
				Open Water	<0.1	<0.1		
PAR-79	Fairfax	VA	2.1	Industrial[c]	0.6	0.4	Gravel / Dirt	Grading and Gravel
				Wetlands	<0.1	<0.1		
Replacement Pipeline Facilities								
Line WB-5 Replacement								
TAR-55	Grant	WV	4.5	Industrial[c]	0.1	0.1	Gravel / Grass	None
				Open Water	<0.1	<0.1		
TAR-56	Grant	WV	4.5	Open Land	0.1	0.1	Agricultural Field on Right-of-way; Low Water Crossing	Grading and Gravel, Temporary Bridge Low Water Crossing
				Agricultural Land	0.4	0.3		
				Open Water	<0.1	<0.1		
				Wetlands	<0.1	<0.1		
Line WB Replacement								
TAR-3A[d] FS-187 (Daniels Run), FS-382 (Daniels Ridge), FS-182A (Daniels Ridge – A)	Randolph	WV	1.0	Industrial[c]	4.7	3.2	Gravel / Dirt	None
TAR-4A[d] FS-187 (Daniels Run)	Randolph	WV	1.9	Industrial[c]	0.9	0.6	Gravel / Dirt	None
TAR-9	Randolph	WV	5.9	Industrial[c]	0.5	0.4	Gravel	Grading and Gravel
TAR-10	Randolph	WV	6.0	Industrial[c]	1.5	1.2	Gravel	Grading and Gravel
TAR-11	Randolph	WV	6.2	Industrial[c]	0.2	0.1	Gravel	Grading and Gravel
TAR-15	Randolph	WV	8.0	Industrial[c]	0.1	0.1	Dirt / Grass	None

APPENDIX B (cont'd)

Access Roads for the WB XPress Project [a]

Facility/Access Road Name [b]	County	State	Milepost	Existing Land Uses	Area Affected by Construction (acres)	Length (miles)	Existing Condition	Upgrade Requirements
TAR-23	Randolph	WV	10.6	Industrial[c]	0.7	0.5	Dirt	None
TAR-24	Pendleton	WV	11.0	Industrial[c]	0.4	0.3	Dirt / Grass	None
	Randolph	WV						
PAR-27A[d] FS-1580 (Lower Seneca Creek)	Pendleton	WV	12.9	Industrial[c]	3.1	2.2	Dirt / Grass / Low Water Crossings	Temporary Bridge Low Water Crossings; No Additional Improvements
				Open Water	<0.1	<0.1		
				Wetlands	0.1	0.1		
TAR-29[d] CR-7/1 (Straders Run Road)	Pendleton	WV	13.8	Industrial[c]	4.2	2.9	Gravel / Dirt	Widen Entrance at ROW, Grading and Gravel for last 200', off Public Road (No grading and gravel in MNF)
TAR-34[d] Private Road	Pendleton	WV	16.2	Industrial[c]	0.3	0.2	Dirt / Gravel	Grading and Gravel (0.2 mile of grading and gravel in MNF)
				Open Water	<0.1	<0.1		
TAR-35	Pendleton	WV	17.1	Industrial[c]	0.5	0.4	Dirt / Gravel	Grading and Gravel
TAR-36	Pendleton	WV	17.5	Industrial[c]	0.6	0.4	Dirt	Grading, Widening, and Gravel
TAR-36.1	Pendleton	WV	17.6	Industrial[c]	1.0	0.7	Dirt	Grading, Widening, and Gravel
TAR-37	Pendleton	WV	17.9	Industrial[c]	0.3	0.2	Dirt	None
TAR-39	Pendleton	WV	18.1	Industrial[c]	0.4	0.3	Dirt	Tree Trimming, Grading, & Gravel
TAR-42	Pendleton	WV	18.9	Industrial[c]	0.3	0.2	Dirt / Grass	Clearing, Grading, and Gravel
TAR-43[d] Private Road	Pendleton	WV	20.1	Industrial[c]	0.4	0.3	Dirt / Grass	Widen Entrance, Grading, and Gravel (0.2 miles of grading and gravel in MNF)
TAR-45	Pendleton	WV	21.0	Industrial[c]	0.7	0.6	Gravel / Low Water Crossing	Bridge Low Water Crossing
				Open Water	<0.1	<0.1		

APPENDIX B (cont'd)

Access Roads for the WB XPress Project [a]

Facility/Access Road Name [b]	County	State	Milepost	Existing Land Uses	Area Affected by Construction (acres)	Length (miles)	Existing Condition	Upgrade Requirements
TAR-47[d] Private Road	Pendleton	WV	21.9	Industrial[c]	3.9	2.7	Dirt / Low Water Crossings	Clearing, Widen, Grading, and Gravel, Temporary Bridge Low Water Crossings (0.2 miles of grading and gravel in MNF)
				Wetlands	<0.1	<0.1		
				Open Water	0.1	<0.1		
TAR-48.1[d] Public Road 79 (Old FS-79, old North Mountain)	Pendleton	WV	23.7	Industrial[c]	4.7	3.2	Gravel / Dirt	None
Line WB Replacement #1								
TAR-49	Pendleton	WV	134.6	Industrial[c]	<0.1	<0.1	Dirt	None
TAR-51	Pendleton	WV	134.6	Industrial[c]	0.2	0.1	Dirt	Grading and Gravel
Line WB Replacement #2								
TAR-52	Pendleton	WV	134.7	Industrial[c]	2.1	1.4	Gravel / Dirt	Tree Trimming, Grading, and Gravel
				Open Water	<0.1	0.1		
				Wetlands	<0.1	<0.1		
TAR-53	Pendleton	WV	134.8	Industrial[c]	0.1	0.1	Dirt	Grading and Gravel
TAR-54	Pendleton	WV	134.8	Industrial[c]	0.1	0.1	Dirt	Grading and Gravel
Line WB Replacement #4								
TAR-58	Grant	WV	142.6	Industrial[c]	0.1	0.1	Grass	None
Line WB Replacement #5								
TAR-59	Hardy	WV	146.5	Industrial[c]	0.7	0.5	Dirt / Grass	None
New Aboveground Facilities								
WB-5 Valve Site								
PAR-103	Grant	WV	N/A	Industrial[c]	0.3	0.2	Gravel	Grading and Gravel
Existing Aboveground Facilities								
Dink Valve Site								
PAR-100	Clay	WV	N/A	Industrial[c]	<0.1	<0.1	Gravel	None

APPENDIX B (cont'd)

Access Roads for the WB XPress Project [a]

Facility/Access Road Name [b]	County	State	Milepost	Existing Land Uses	Area Affected by Construction (acres)	Length (miles)	Existing Condition	Upgrade Requirements
Alexander Valve Site								
PAR-101	Upshur	WV	N/A	Industrial[c]	0.2	0.1	Gravel	None
Mill Creek Valve Site								
PAR-102	Randolph	WV	N/A	Industrial[c]	<0.1	<0.1	Gravel	None
Glady Valve Site								
TAR-1	Randolph	WV	0.0	Industrial	0.1	0.1	Grass	Clear, Grade, and Gravel
				Open Water	<0.1	<0.1		
WB Loop Receiver								
PAR-48.2	Pendleton	WV	25.1	Industrial[c]	0.2	0.1	Gravel	None
Smokehole Valve Site								
PAR-48	Pendleton	WV	25.3	Industrial[c]	0.4	0.2	Gravel	None
Moorefield Valve Site								
PAR-104	Hardy	WV	N/A	Industrial[c]	0.2	0.1	Paved Driveway/ Gravel	None
Columbia Furnace Valve Site								
PAR-105	Shenandoah	VA	N/A	Industrial[c]	0.1	0.1	Gravel	None
Shenandoah River West Valve Site								
PAR-106	Warren	VA	N/A	Industrial[c]	2.9	2.1	Gravel/ Grass	None
				TOTAL	**41.9**	**28.6**	**N/A**	**N/A**

[a] Access road improvements necessary for construction are in development.
[b] Roads with an "A" Designation are considered U.S. Forest Service system roads (i.e. TAR-3A, TAR-4A, and PAR-27A)
[c] Land uses associated with these roads were reclassified following Columbia's original submittal of Appendix B. Based on the existing condition of these roads, which are mostly gravel or dirt, the land use was reclassified as industrial land.
[d] Access road crosses MNF-owned land. No access roads would be used within GWJNF-owned land.

Appendix C

Residential Plans

TRACT 91.00.00–FX–VA
VIRGINIA RUN COMMUNITY ASSOCIATION, A VIRGINIA NONSTOCK CORPORATION
FAIRFAX COUNTY, VIRGINIA

DESCRIPTION

THIS DRAWING DOCUMENTS MITIGATION MEASURES THAT WILL BE IMPLEMENTED FOR ALL RESIDENCES WITHIN 50 FEET OF THE PROPOSED CONSTRUCTION WORK AREA. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS

1. CONTRACTOR SHALL ERECT AND MAINTAIN A SAFETY FENCE BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT RESIDENCES EXTENDING 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
2. 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 OVERNIGHT.
3. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
4. OTHER EXISTING PHYSICAL FEATURES THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.
5. ALL OPEN DITCHES SHALL BE BARRICADED/FENCED OFF OR PLATED WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.
6. AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS. IF SEASONAL OR WEATHER CONDITIONS PREVENT COMPLIANCE WITH THESE TIME FRAMES, TEMPORARY EROSION CONTROLS MUST BE MONITORED AND MAINTAINED UNTIL CONDITIONS ALLOW COMPLETION OF RESTORATION.
7. CONTRACTOR SHALL UTILIZE WATER TRUCKS AS NECESSARY TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES/BUSINESSES. REFER TO CPG FUGITIVE DUST PLAN.
8. ACCESS TO RESIDENCES WILL BE MAINTAINED AT ALL TIMES, OR OTHER ACCOMMODATIONS WILL BE MADE WITH EACH RESPECTIVE LANDOWNER.
9. CONTRACTOR SHALL MAINTAIN AGREED UPON ACCESS TO THE IMPACTED AREA DURING CONSTRUCTION.
10. CONTRACTOR SHALL LIMIT WORK IN THIS AREA TO DAYLIGHT HOURS, UNLESS OTHERWISE AGREED UPON WITH LANDOWNER/OCCUPANT.
11. LANDOWNER/OCCUPANT SHALL BE NOTIFIED OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO CONSTRUCTION WORK.

PRELIMINARY NOT FOR CONSTRUCTION

LEGEND

MILEPOST
MILEPOST (¹⁄₁₀ MILE)
ROUTE
EXISTING COLUMBIA PIPELINE
FOREIGN PIPELINE
PERMANENT ROW
COUNTY BORDER
FENCE
TEMPORARY WORKSPACE
ADDITIONAL TEMPORARY WORKSPACE
ACCESS ROAD
LOD BOUNDARY
ST–CO–001.000 PROPERTY TRACT NUMBER
PAR–0001 ACCESS ROAD NUMBER
WETLAND ID
WATERBODY ID
BIOLOGICAL STUDY LIMITS
CONTRACTOR / PIPE YARD
UNDERGROUND CABLE
OVERHEAD POWER LINE
WATERLINE
WETLAND
WATERBODY
MAINLINE VALVE (MLV)
TEST LEAD
TREE

SCALE: 1" = 20'

20' 10' 0' 20' 40'

DWG. NO.	REFERENCE
TD–6917–704	12" VA–1 LIGNMENT SHEET

No.	REVISIONS	APPROVED BY	DATE
1	ISSUE FOR FERC PRE–FILING	KDM	11/06/15
2	ISSUE FOR BID	KDM	07/29/16
3	ISSUE FOR REVIEW	KDM	08/30/16

PROJECT DELIVERY
PROJECT ENGINEERING
P.O. BOX 1273 CHARLESTON, WV 25325-1273
1700 MACCORKLE AVENUE SE, CHARLESTON, WV 25314

Columbia Gas Transmission

WB XPRESS PROJECT

TITLE: RESIDENTIAL DETAIL
FAIRFAX COUNTY, VIRGINIA

DRAWN BY:	DATE:	PROJECT NUMBER	WORK ORDER NUMBER	DRAWING NUMBER	SHEET	ISSUE
JBH	08/30/16	21394	45819	RS–6917–001	1 OF 1	P3

TRACT 91.00.00–FX–VA
VIRGINIA RUN COMMUNITY ASSOCIATION, A VIRGINIA NONSTOCK CORPORATION
FAIRFAX COUNTY, VIRGINIA

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DESCRIPTION

THIS DRAWING DOCUMENTS MITIGATION MEASURES THAT WILL BE IMPLEMENTED FOR ALL RESIDENCES WITHIN 50 FEET OF THE PROPOSED CONSTRUCTION WORK AREA. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS

1. CONTRACTOR SHALL ERECT AND MAINTAIN A SAFETY FENCE BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT RESIDENCES EXTENDING 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
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3. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
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5. ALL OPEN DITCHES SHALL BE BARRICADED/FENCED OFF OR PLATED WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.
6. AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS. IF SEASONAL OR WEATHER CONDITIONS PREVENT COMPLIANCE WITH THESE TIME FRAMES, TEMPORARY EROSION CONTROLS MUST BE MONITORED AND MAINTAINED UNTIL CONDITIONS ALLOW COMPLETION OF RESTORATION.
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11. LANDOWNER/OCCUPANT SHALL BE NOTIFIED OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO CONSTRUCTION WORK.

PRELIMINARY NOT FOR CONSTRUCTION

LEGEND

M 1.00 P — MILEPOST	EXISTING COLUMBIA PIPELINE	TEMPORARY WORKSPACE	ST–CO–001.000 — PROPERTY TRACT NUMBER
MILEPOST (1/10 MILE)	FOREIGN PIPELINE	ADDITIONAL TEMPORARY WORKSPACE	PAR–0001 — ACCESS ROAD NUMBER
ROUTE	PERMANENT ROW	ACCESS ROAD	WPADJC002 — WETLAND ID
	COUNTY BORDER	LOD BOUNDARY	SPADJC002 — WATERBODY ID
	X — FENCE		

BIOLOGICAL STUDY LIMITS	WETLAND	TREE
CONTRACTOR / PIPE YARD	WATERBODY	
U — UNDERGROUND CABLE	MAINLINE VALVE (MLV)	
P — OVERHEAD POWER LINE	TL — TEST LEAD (TYPE)	
W — WATERLINE		

SCALE: 1" = 20'

20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE	No.	REVISIONS	APPROVED BY	DATE	No.	REVISIONS	APPROVED BY	DATE
P1	ISSUED FOR FERC PREFILING	KDM	11/06/15	P3	ISSUE FOR REVIEW	KDM	08/30/16				
P2	ISSUE FOR BID	KDM	07/29/16								

DWG. NO.	REFERENCE
TD–6917–704	12" VA–1 ALIGNMENT SHEET

PROJECT DELIVERY
PROJECT ENGINEERING
P.O. BOX 1273 CHARLESTON, WV 25325-1273
1700 MACCORKLE AVENUE SE, CHARLESTON, WV 25314

Columbia Gas Transmission

WB XPRESS PROJECT

TITLE
RESIDENTIAL DETAIL
FAIRFAX COUNTY, VIRGINIA

DRAWN BY:	JBH	DATE: 08/30/16	DRAWING NUMBER	SHEET	ISSUE
PROJECT NUMBER	21394		RS–6917–002	1 OF 1	P3
WORK ORDER NUMBER	45819				

TRACT 89.00.00–FX–VA
VIRGINIA RUN COMMUNITY ASSOCIATION, A VIRGINIA NONSTOCK CORPORATION
FAIRFAX COUNTY, VIRGINIA

DESCRIPTION

THIS DRAWING DOCUMENTS MITIGATION MEASURES THAT WILL BE IMPLEMENTED FOR ALL RESIDENCES WITHIN 50 FEET OF THE PROPOSED CONSTRUCTION WORK AREA. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS

1. CONTRACTOR SHALL ERECT AND MAINTAIN A SAFETY FENCE BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT RESIDENCES EXTENDING 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
2. 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 OVERNIGHT.
3. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
4. OTHER EXISTING PHYSICAL FEATURES THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.
5. ALL OPEN DITCHES SHALL BE BARRICADED/FENCED OFF OR PLATED WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.
6. AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS. IF SEASONAL OR WEATHER CONDITIONS PREVENT COMPLIANCE WITH THESE TIME FRAMES, TEMPORARY EROSION CONTROLS MUST BE MONITORED AND MAINTAINED UNTIL CONDITIONS ALLOW COMPLETION OF RESTORATION.
7. CONTRACTOR SHALL UTILIZE WATER TRUCKS AS NECESSARY TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES/BUSINESSES. REFER TO CPG FUGITIVE DUST PLAN.
8. ACCESS TO RESIDENCES WILL BE MAINTAINED AT ALL TIMES, OR OTHER ACCOMMODATIONS WILL BE MADE WITH EACH RESPECTIVE LANDOWNER.
9. CONTRACTOR SHALL MAINTAIN AGREED UPON ACCESS TO THE IMPACTED AREA DURING CONSTRUCTION.
10. CONTRACTOR SHALL LIMIT WORK IN THIS AREA TO DAYLIGHT HOURS, UNLESS OTHERWISE AGREED UPON WITH LANDOWNER/OCCUPANT.
11. LANDOWNER/OCCUPANT SHALL BE NOTIFIED OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO CONSTRUCTION WORK.

PRELIMINARY NOT FOR CONSTRUCTION

LEGEND

M 1.00 P MILEPOST	EXISTING COLUMBIA PIPELINE	TEMPORARY WORKSPACE	ST–CO–001.000 PROPERTY TRACT NUMBER	BIOLOGICAL STUDY LIMITS	WETLAND
MILEPOST (1/10 MILE)	FOREIGN PIPELINE	ADDITIONAL TEMPORARY WORKSPACE	PAR–0001 ACCESS ROAD NUMBER	CONTRACTOR / PIPE YARD	WATERBODY
ROUTE	PERMANENT ROW	ACCESS ROAD	WPADJC002 WETLAND ID	U UNDERGROUND CABLE	MAINLINE VALVE (MLV)
	COUNTY BORDER	LOD BOUNDARY	SPADJC002 WATERBODY ID	P OVERHEAD POWER LINE	TL TEST LEAD (TYPE)
	X FENCE			W WATERLINE	TREE

SCALE: 1" = 20'

20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE	No.	REVISIONS	APPROVED BY	DATE	No.	REVISIONS	APPROVED BY	DATE
P1	ISSUED FOR FERC PREFILING	KDM	11/06/15	P3	ISSUE FOR REVIEW	KDM	08/30/16				
P2	ISSUE FOR BID	KDM	07/29/16								

DWG. NO.	REFERENCE
TD–6917–704	12" VA–1 ALIGNMENT SHEET

PROJECT DELIVERY
PROJECT ENGINEERING
P.O. BOX 1273 CHARLESTON, WV 25325-1273
1700 MACCORKLE AVENUE SE, CHARLESTON, WV 25314

Columbia Gas Transmission

WB XPRESS PROJECT

TITLE: RESIDENTIAL DETAIL
FAIRFAX COUNTY, VIRGINIA

DRAWN BY:	JBH	DATE: 8/30/16	DRAWING NUMBER	SHEET	ISSUE
PROJECT NUMBER	21394		RS–6917–003	1 OF 1	P3
WORK ORDER NUMBER	45819				

TRACT 89.00.00-FX-VA
VIRGINIA RUN COMMUNITY ASSOCIATION, A VIRGINIA NONSTOCK CORPORATION
FAIRFAX COUNTY, VIRGINIA

DESCRIPTION

THIS DRAWING DOCUMENTS MITIGATION MEASURES THAT WILL BE IMPLEMENTED FOR ALL RESIDENCES WITHIN 50 FEET OF THE PROPOSED CONSTRUCTION WORK AREA. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS

1. CONTRACTOR SHALL ERECT AND MAINTAIN A SAFETY FENCE BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT RESIDENCES EXTENDING 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
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3. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
4. OTHER EXISTING PHYSICAL FEATURES THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.
5. ALL OPEN DITCHES SHALL BE BARRICADED/FENCED OFF OR PLATED WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.
6. AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS. IF SEASONAL OR WEATHER CONDITIONS PREVENT COMPLIANCE WITH THESE TIME FRAMES, TEMPORARY EROSION CONTROLS MUST BE MONITORED AND MAINTAINED UNTIL CONDITIONS ALLOW COMPLETION OF RESTORATION.
7. CONTRACTOR SHALL UTILIZE WATER TRUCKS AS NECESSARY TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES/BUSINESSES. REFER TO CPG FUGITIVE DUST PLAN.
8. ACCESS TO RESIDENCES WILL BE MAINTAINED AT ALL TIMES, OR OTHER ACCOMMODATIONS WILL BE MADE WITH EACH RESPECTIVE LANDOWNER.
9. CONTRACTOR SHALL MAINTAIN AGREED UPON ACCESS TO THE IMPACTED AREA DURING CONSTRUCTION.
10. CONTRACTOR SHALL LIMIT WORK IN THIS AREA TO DAYLIGHT HOURS, UNLESS OTHERWISE AGREED UPON WITH LANDOWNER/OCCUPANT.
11. LANDOWNER/OCCUPANT SHALL BE NOTIFIED OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO CONSTRUCTION WORK.

PRELIMINARY NOT FOR CONSTRUCTION

LEGEND

- M 1.00 P — MILEPOST
- MILEPOST (1/10 MILE)
- ROUTE
- EXISTING COLUMBIA PIPELINE
- FOREIGN PIPELINE
- PERMANENT ROW
- COUNTY BORDER
- X — FENCE
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE
- ACCESS ROAD
- LOD BOUNDARY
- ST-CO-001.000 — PROPERTY TRACT NUMBER
- PAR-0001 — ACCESS ROAD NUMBER
- WPADJC002 — WETLAND ID
- SPADJC002 — WATERBODY ID
- BIOLOGICAL STUDY LIMITS
- CONTRACTOR / PIPE YARD
- U — UNDERGROUND CABLE
- P — OVERHEAD POWER LINE
- W — WATERLINE
- WETLAND
- WATERBODY
- MAINLINE VALVE (MLV)
- TL — TEST LEAD (TYPE)
- TREE

SCALE: 1" = 20'

20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE	No.	REVISIONS	APPROVED BY	DATE	No.	REVISIONS	APPROVED BY	DATE
P1	ISSUED FOR FERC PREFILING	KDM	11/06/15	P3	ISSUE FOR REVIEW	KDM	08/30/16				
P2	ISSUE FOR BID	KDM	07/29/16								

DWG. NO.	REFERENCE
TD-6917-703	12" VA-1 ALIGNMENT SHEET

PROJECT DELIVERY
PROJECT ENGINEERING
P.O. BOX 1273 CHARLESTON, WV 25325-1273
1700 MACCORKLE AVENUE SE, CHARLESTON, WV 25314

Columbia Gas Transmission

WB XPRESS PROJECT

TITLE: RESIDENTIAL DETAIL
FAIRFAX COUNTY, VIRGINIA

DRAWN BY:	JBH	DATE: 08/30/16	DRAWING NUMBER	SHEET	ISSUE
PROJECT NUMBER	21394		RS-6917-004	1 OF 1	P3
WORK ORDER NUMBER	45819				

Appendix D
Additional Temporary Workspaces for the WB XPress Project

APPENDIX D

Additional Temporary Workspaces for the WB XPress Project[a]

Facility	ATWS ID	Dimensions Length (Feet)	Dimensions Width (Feet)	Milepost	Land Use	Acres	Justification
New Pipeline Facilities							
Line WB-22	ID-126	125	50	0.1	Upland/Forested	0.1	Road & Stream Crossing
	ID-127	125	50	0.1	Upland/Forested	0.1	Constructability & Terrain
	ID-128	125	50	0.4	Upland/Forested	0.1	Power line Crossing
Line WB-5 Extension	ID-129	125	50	0.4	Upland/Forested	0.1	Power line Crossing
	ID-130	225	60	1.5	Open Land	0.3	HDD Bore
	ID-131	150	12	1.5	Open Land	<0.1	HDD Bore
	ID-132	170	70	2.2	Open Land	0.3	HDD Bore
	ID-133	144	12	2.2	Upland/Forested	<0.1	HDD Bore
Replacement Pipeline Facilities							
Line WB Replacement	ID-001	122	52	0.1	Upland/Forested	0.1	Stream & Wetland Crossing
	ID-002	400	25	0.3	Upland/Forested	0.2	Stream & Wetland Crossing
	ID-003	472	30	0.3	Open Land	0.3	Stream & Wetland Crossing
	ID-004	96	64	0.3	Upland/Forested	0.1	Stream & Wetland Crossing
	ID-005	7879	18	0.7	Open Land	3.3	Constructability & Terrain
	ID-006	463	20	2.0	Open Land	0.2	Stream & Wetland Crossing
	ID-007	1985	16	2.2	Open Land	0.7	Stream & Wetland Crossing and Constructability & Terrain
	ID-008	8728	14	3.3	Open Land	2.8	Constructability & Terrain
	ID-009	194	18	4.2	Open Land	0.1	Stream & Wetland Crossing
	ID-010	489	17	4.6	Open Land	0.2	Stream & Wetland Crossing
	ID-011	1793	16	4.9	Open Land	0.7	Constructability & Terrain and Wetland Crossing
	ID-012	734	18	5.2	Upland/Forest	0.3	Stream & Wetland Crossing
	ID-013	538	16	5.4	Upland/Forest	0.2	Stream & Wetland Crossing
	ID-014	158	20	5.5	Open Land	0.1	Stream & Wetland Crossing
	ID-015	266	17	5.6	Open Land	0.1	Stream & Wetland Crossing
	ID-016	538	25	5.7	Upland/Forested	0.1	Constructability & Terrain
Line WB Replacement	ID-017	100	75	5.7	Upland/Forested	0.2	Stream & Wetland Crossing
	ID-018	2186	25	6.1	Open Land	1.3	Constructability & Terrain
	ID-019	50	25	6.6	Open Land	<0.1	Constructability & Terrain
	ID-020	100	50	6.7	Upland/Forested	0.1	Pipeline & Road Crossing
	ID-021	1134	25	6.8	Agricultural	0.2	Constructability & Terrain
					Upland/Forested	0.4	
	ID-022	57	79	7.1	Agricultural	0.1	Road Crossing
	ID-023	314	25	7.2	Agricultural	0.2	Stream & Wetland Crossing
	ID-024	492	25	7.3	Agricultural	0.3	Stream & Wetland Crossing
	ID-025	100	50	7.4	Agricultural	0.1	Stream & Wetland Crossing
	ID-026	178	39	7.4	Agricultural	0.2	Stream & Wetland Crossing
	ID-027	463	25	7.5	Agricultural	0.3	Stream & Wetland Crossing
	ID-028	697	25	7.6	Agricultural	0.4	Constructability & Terrain
	ID-029	157	34	7.7	Agricultural	0.1	Pipeline Crossing
	ID-030	115	19	7.7	Agricultural	0.1	Pipeline Crossing
	ID-031	100	25	7.8	Agricultural	0.1	Road Crossing

APPENDIX D (Cont'd)

Additional Temporary Workspaces for the WB XPress Project[a]

		Dimensions					
Facility	ATWS ID	Length (Feet)	Length (Feet)	Milepost	Land Use	Acres	Justification
	ID-032	185	11	7.9	Open Land	<0.1	MLV Installation & Road Crossing
	ID-033	50	45	7.9	Open Land	0.1	MLV Installation & Road Crossing
	ID-034	112	48	7.9	Open Land	0.1	Pipeline & Road Crossing
	ID-035	270	37	7.9	Agricultural	0.2	Pipeline & Road Crossing
	ID-036	155	25	8.0	Agricultural	0.1	Constructability & Terrain
					Open Land	<0.1	
	ID-037	211	25	8.0	Open Land	0.1	Stream Crossing
	ID-038	1542	25	8.2	Agricultural	0.4	Constructability & Terrain
					Open Land	0.3	
					Upland/Forested	0.2	
	ID-039	509	27	8.5	Agricultural	0.3	Constructability & Terrain
	ID-040	233	48	8.6	Agricultural	0.3	Constructability & Terrain
	ID-041	1932	25	8.8	Agricultural	0.8	Constructability & Terrain
					Upland/Forested	0.5	
	ID-042	110	48	9.0	Agricultural	0.1	Road Crossing
Line WB Replacement	ID-043	300	45	9.0	Agricultural	0.3	Road Crossing
	ID-044	854	25	9.1	Agricultural	0.4	Constructability & Terrain
					Upland/Forested	0.1	
	ID-045	1155	25	9.4	Agricultural	0.7	Constructability & Terrain
	ID-046	99	76	9.5	Agricultural	0.2	Constructability & Terrain
	ID-047	572	25	9.6	Agricultural	0.3	Constructability & Terrain
	ID-048	100	50	9.8	Upland/Forested	0.1	Stream and Wetland Crossing
	ID-049	127	25	9.8	Upland/Forested	0.1	Constructability & Terrain
	ID-050	144	41	9.8	Upland/Forested	0.1	Road Crossing
	ID-051	100	50	10.6	Upland/Forested	0.1	Road Crossing
	ID-052	1946	25	10.8	Upland/Forested	1.1	Constructability & Terrain
	ID-053	169	25	11.0	Upland/Forested	0.1	Constructability & Terrain
	ID-054	73	42	11.0	Right of Way	0.1	Constructability & Terrain
	ID-055	453	8	11.2	Open Land	0.1	Stream Crossing
	ID-056	981	22	11.2	Open Land	0.5	Stream Crossing
	ID-057	259	28	11.3	Upland/Forested	0.2	Stream Crossing
	ID-058	4077	16	11.8	Open Land	1.5	Constructability & Terrain
	ID-059	2275	25	12.2	Upland/Forested	1.3	Constructability & Terrain
	ID-060	287	27	12.4	Upland/Forested	0.2	Major Power Line
	ID-061	2505	25	12.7	Upland/Forested	1.5	Constructability & Terrain
	ID-062	63	50	12.9	Upland/Forested	0.1	Stream and Wetland Crossing
	ID-063	131	50	13.0	Upland/Forested	0.1	Stream and Wetland Crossing
	ID-064	251	25	13.0	Upland/Forested	0.1	Constructability & Terrain
	ID-065	200	50	13.1	Upland/Forested	0.2	Constructability & Terrain
	ID-066	1128	25	13.2	Upland/Forested	0.6	Constructability & Terrain
	ID-067	100	50	13.3	Upland/Forested	0.1	Constructability & Terrain
	ID-068	367	25	13.3	Upland/Forested	0.2	Constructability & Terrain

APPENDIX D (Cont'd)

Additional Temporary Workspaces for the WB XPress Project[a]

		Dimensions					
Facility	ATWS ID	Length (Feet)	Length (Feet)	Milepost	Land Use	Acres	Justification
	ID-069	252	35	13.4	Upland/Forested	0.2	Constructability & Terrain
	ID-070	186	47	13.4	Upland/Forested	0.2	Constructability & Terrain
	ID-071	137	66	13.4	Open Land	0.2	Major Power Line
	ID-072	31	88	13.4	Open Land	0.1	Constructability & Terrain
	ID-073	646	32	13.5	Agricultural	0.5	Constructability & Terrain
	ID-074	590	25	13.7	Upland/Forested	0.3	Constructability & Terrain
	ID-075	100	50	13.8	Upland/Forested	0.1	Wetland & Road Crossing
	ID-076	100	50	13.8	Upland/Forested	0.1	Wetland & Road Crossing
	ID-077	1064	25	13.9	Upland/Forested	0.6	Constructability & Terrain
	ID-078	204	25	14.1	Open Land	0.1	Constructability & Terrain
	ID-079	310	75	14.1	Open Land	0.5	Topsoil Segregation & Pipe Storage
Line WB Replacement	ID-080	3127	25	14.1	Upland/Forested	1.2	Constructability & Terrain
					Agricultural	0.6	
	ID-081	150	50	14.7	Open Land	0.2	Wetland & Waterbody Crossing
	ID-082	3166	29	16.0	Open Land	2.1	Constructability & Terrain
	ID-083	100	50	16.4	Upland/Forested	0.1	Stream & Wetland Crossing
	ID-084	3616	25	16.5	Upland/Forested	1.6	Constructability & Terrain
					Agricultural	0.5	
	ID-085	2896	25	17.6	Agricultural	1.6	Constructability & Terrain
					Upland/Forested	0.1	
	ID-086	125	50	17.9	Upland/Forested	0.1	Road & Stream Crossing
	ID-087	142	43	18.0	Upland/Forested	0.1	Road & Stream Crossing
	ID-088	1562	25	18.2	Open Land	0.8	Constructability & Terrain
					Upland/Forested	0.1	
	ID-089	135	20	18.4	Open Land	0.1	Pipeline & Road Crossing
	ID-090	102	20	18.4	Upland/Forested	<0.1	Pipeline & Road Crossing
	ID-091	150	25	18.5	Upland/Forested	0.1	Road Crossing
	ID-092	155	25	18.6	Upland/Forested	0.1	Road Crossing
	ID-093	111	50	18.6	Upland/Forested	0.1	Road Crossing
	ID-094	167	50	18.7	Upland/Forested	0.2	Stream & Wetland Crossing
	ID-095	404	50	18.7	Open Land	0.5	Stream & Wetland Crossing
	ID-096	269	50	18.8	Open Land	0.3	Stream & Wetland Crossing
	ID-097	121	29	18.8	Open Land	0.1	Constructability & Terrain
	ID-098	100	50	18.8	Upland/Forested	0.1	Steam & Wetland Crossing
	ID-099	100	50	18.9	Upland/Forested	0.1	Steam & Wetland Crossing
	ID-100	533	25	18.9	Upland/Forested	0.3	Constructability & Terrain
	ID-101	197	50	19.1	Agricultural	0.2	Road Crossing
	ID-102	125	50	19.1	Agricultural	0.1	Road Crossing
	ID-103	559	25	19.2	Agricultural	0.3	Constructability & Terrain
	ID-104	869	25	19.3	Agricultural	0.5	Constructability & Terrain
	ID-105	138	44	19.4	Upland/Forested	0.1	Stream & Wetland Crossing
	ID-106	116	56	19.5	Upland/Forested	0.1	Stream & Wetland Crossing
	ID-107	570	25	19.6	Upland/Forested	0.3	Constructability & Terrain
	ID-108	406	23	19.8	Open Land	0.2	Constructability & Terrain

APPENDIX D (Cont'd)

Additional Temporary Workspaces for the WB XPress Project[a]

		Dimensions					
Facility	ATWS ID	Length (Feet)	Length (Feet)	Milepost	Land Use	Acres	Justification
	ID-109	422	21	20.0	Open Land	0.2	Road Crossing
	ID-110	4910	9	20.5	Upland/Forested	1.1	Constructability & Terrain
Line WB Replacement	ID-111	208	93	20.8	Agricultural	0.4	Waterbody & Road Crossing
	ID-112	300	65	20.8	Agricultural	0.4	Waterbody & Road Crossing
	ID-113	940	25	20.9	Agricultural	0.5	Constructability & Terrain
	ID-114	100	50	21.1	Open Land	0.1	Constructability & Terrain
	ID-115	155	25	21.1	Upland/Forested	0.1	Constructability & Terrain
	ID-116	225	41	21.1	Upland/Forested	0.2	Constructability & Terrain
	ID-117	900	5	21.2	Open Land	0.1	Constructability & Terrain
	ID-118	72	63	21.2	Open Land	0.1	Constructability & Terrain
	ID-119	1257	50	21.4	Upland/Forested	1.4	Constructability & Terrain
	ID-120	55	10	21.5	Open Land	<0.1	Constructability & Terrain
	ID-121	485	20	21.6	Open Land	0.2	Constructability & Terrain
	ID-122	271	19	22.0	Open Land	0.1	Road Crossing
	ID-123	9708	41	24.4	Open Land	9.1	Constructability & Terrain
	ID-124	420	24	25.3	Agricultural	0.2	Stream Crossing
	ID-125	198	25	25.4	Upland/Forested	0.1	Constructability & Terrain
					TOTAL	**58.0**	

Note Site-specific modifications to the FERC Plan and Procedures associated with these ATWSs are identified and further detailed in Table B.2.3-2.

[a] Table does not include staging areas.

Appendix E
Waterbodies Crossed or Otherwise Impacted and Crossing Method for the Project

APPENDIX E

Waterbodies Crossed or Otherwise Impacted and Crossing Methods for the Project [a]

Project/Facility	Milepost	Waterbody ID	Waterbody Name	Flow Regime	FERC Classification	Fisheries Classification [k]	OHWM Width at the Centerline Crossing (feet)	Crossing Method
New Pipeline Facilities								
Line WB-5 Extension	0.3	SKAN002P[b]	Broad Run	Perennial	Intermediate	B1, HQW	20.0	Dam and Pump or Flume
Line WB-22	0.6	SKAN002P[b]	Broad Run	Perennial	Intermediate	B1, HQW	20.0	Dam and Pump or Flume
	0.1	SKAN003P	Broad Run	Perennial	Intermediate	B1, HQW	20.0	Dam and Pump or Flume
Line VA-1	0.0	SFAG001I	UNT to Bull Run	Intermittent	Minor	Warm water	5.0	Dam and Pump or Flume
	0.2	SFAG004E	UNT to Bull Run	Ephemeral	Minor	Warm water	1.0	Dam and Pump or Flume
	0.5	SFAG005I	UNT to Bull Run	Intermittent	Minor	Warm water	3.0	Dam and Pump or Flume
	0.7	SFAG012I	UNT to Bull Run	Intermittent	Minor	Warm water	4.0	Dam and Pump or Flume
	0.9	SFAM011E	UNT to Bull Run	Ephemeral	Minor	Warm water	2.0	Dam and Pump or Flume
	1.3	OFAT001	Unnamed Pond	N/A	N/A	Warm water	N/A	Dam and Pump or Flume
	1.9	SFAT005I	UNT to Cub Run	Intermittent	Minor	Warm water	3.0	Dam and Pump or Flume
	1.9	SFAT004I	UNT to Cub Run	Intermittent	Minor	Warm water	2.5	Dam and Pump or Flume
	2.1	SFAT003I	UNT to Cub Run	Intermittent	Minor	Warm water	2.5	Dam and Pump or Flume
	2.1	SFAT002P	UNT to Cub Run	Perennial	Minor	Warm water	3.0	Dam and Pump or Flume
	2.2	SFAT001I	UNT to Cub Run	Intermittent	Minor	Warm water	3.5	Dam and Pump or Flume
						Subtotal	**89.5**	
Replacement Pipeline Facilities								
Line WB-5 Replacement	0.1	SGRM002E	UNT to South Mill Creek	Ephemeral	Minor	none	1.0	Dam and Pump or Flume
Line WB Replacement	0.0	SRAG003I[c]	UNT to Glady Fork	Intermittent	Minor	B2, HQS, HQW	3.0	Dam and Pump or Flume
	0.1	SRAG003I[c]	UNT to Glady Fork	Intermittent	Minor	B2, HQS, HQW	3.0	Dam and Pump or Flume
	0.1	SRAG001P	Glady Fork	Perennial	Intermediate	B2, NRI[l], HQS, HQW	40.0	Dam and Pump or Flume
	0.4	SRAG016I	UNT to Glady Fork	Intermittent	Minor	B2, HQS, HQW	1.0	Dam and Pump or Flume
	1.9	SRAG017I	UNT to Daniels Creek	Intermittent	Minor	B2, ORW, HQS	5.0	Dam and Pump or Flume
	2.0	SRAG018I	Daniels Creek	Intermittent	Minor	B2, ORW, HQS	5.0	Dam and Pump or Flume
	4.2	SRAM024I	UNT to Laurel Fork	Intermittent	Minor	B2, ORW	5.0	Dam and Pump or Flume
	4.3	SRAG019P	Laurel Fork	Perennial	Intermediate	B2, NRI, ORW	50.0	Dam and Pump or Flume
	4.6	SRAM025I	Mud Run	Intermittent	Minor	B1, ORW	2.0	Dam and Pump or Flume
	4.7	SRAG021E	UNT to Mud Run	Ephemeral	Minor	none	1.0	Temporary Bridge Crossing

APPENDIX E

Waterbodies Crossed or Otherwise Impacted and Crossing Methods for the Project [a]

Project/Facility	Milepost	Waterbody ID	Waterbody Name	Flow Regime	FERC Classification	Fisheries Classification [k]	OHWM Width at the Centerline Crossing (feet)	Crossing Method
Line WB Replacement	5.1	SRAM028E	UNT to Bennett Run	Ephemeral	Minor	none	1.0	Temporary Bridge Crossing
	5.3	SRAM026I	Bennett Run	Intermittent	Minor	B1, ORW	2.0	Dam and Pump or Flume
	5.4	SRAM029I	UNT to Bennett Run	Intermittent	Minor	B1, ORW	3.0	Dam and Pump or Flume
	5.5	SRAM031I	UNT to Bennett Run	Intermittent	Minor	B1, ORW	2.0	Dam and Pump or Flume
	5.8	SRAM011I	UNT to Bennett Run	Intermittent	Minor	B1, ORW	2.0	Dam and Pump or Flume
	5.8	SRAM010P	UNT to Bennett Run	Perennial	Minor	B1, ORW	6.0	Dam and Pump or Flume
	7.3	SRAM001I	UNT to Dry Fork	Intermittent	Minor	B2, HQS, HQW	4.0	Dam and Pump or Flume
	7.4	SRAM003P	Dry Fork	Perennial	Intermediate	B2, HQS, HQW	18.0	Dam and Pump or Flume
	7.9	SRAM005I	UNT to Dry Fork	Intermittent	Minor	B2, HQS, HQW	5.0	Dam and Pump or Flume
	7.9	SRAM006I	UNT to Dry Fork	Intermittent	Minor	B2, HQS, HQW	4.0	Dam and Pump or Flume
	8.1	SRAM032I	UNT to Dry Fork	Intermittent	Minor	B2, HQS, HQW	5.0	Dam and Pump or Flume
	9.2	SRAG010P	Gandy Creek	Perennial	Intermediate	B1, HQS, HQW	50.0	Dam and Pump or Flume
	9.6	SRAG011I	UNT to Gandy Creek	Intermittent	Minor	B1, HQS, HQW	5.0	Dam and Pump or Flume
	9.6	SRAG013E	UNT to Gandy Creek	Ephemeral	Minor	none	N/A [j]	N/A
	9.7	SRAM022I	UNT to Gandy Creek	Intermittent	Minor	B1, HQS, HQW	3.0	Dam and Pump or Flume
	10.3	SRAM020E	UNT to Gandy Creek	Ephemeral	Minor	none	N/A [i]	Temporary Bridge Crossing
	10.3	SRAM021E	UNT to Gandy Creek	Ephemeral	Minor	none	N/A [j]	N/A
	11.2	SPEG019P	Upper Gulf Run	Perennial	Intermediate	B2, ORW, HQS	25.0	Dam and Pump or Flume
	12.9	SPEG025P[d]	Seneca Creek	Perennial	Intermediate[d]	B2, NRI, ORW, HQS	40.0[d]	Dam and Pump or Flume
	12.9	SPEG025P[d]	Seneca Creek	Perennial		B2, NRI, ORW, HQS		Dam and Pump or Flume
	14.8	OPEG003	Unnamed Pond	N/A	N/A	none	N/A [j]	N/A
	16.4	SPEM004I	UNT to Brushy Run	Intermittent	Minor	B2, HQS, HQW	N/A [j]	N/A
	17.9	SPEM005P	Brushy Run	Perennial	Intermediate	B2, HQS, HQW	19.0	Dam and Pump or Flume
	18.0	SPEM001E	UNT to Brushy Run	Ephemeral	Minor	none	1.0	Dam and Pump or Flume
	18.7	SPEG001P[e]	Seneca Creek	Perennial	Major [e]	B2, HQS, HQW	146[e]	Site-Specific Plan
	18.7	SPEG001P[e]	Seneca Creek	Perennial		B2, HQS, HQW		Site-Specific Plan
	18.9	SPEG004E	UNT to Seneca Creek	Ephemeral	Minor	none	0.5	Dam and Pump or Flume

APPENDIX E

Waterbodies Crossed or Otherwise Impacted and Crossing Methods for the Project [a]

Project/Facility	Milepost	Waterbody ID	Waterbody Name	Flow Regime	FERC Classification	Fisheries Classification [k]	OHWM Width at the Centerline Crossing (feet)	Crossing Method
Line WB Replacement	19.0	OPEG001	Unnamed Pond	N/A	N/A	none	N/A [j]	N/A
	19.1	SPEG005E	UNT to Seneca Creek	Ephemeral	Minor	none	0.5	Dam and Pump or Flume
	19.5	SPEG006I	UNT to Seneca Creek	Intermittent	Minor	B2, HQS, HQW	4.0	Dam and Pump or Flume
	19.6	SPEG007E	UNT to Seneca Creek	Ephemeral	Minor	none	2.5	Dam and Pump or Flume
	19.6	SPEG008I	UNT to Seneca Creek	Intermittent	Minor	B2, HQS, HQW	1.5	Dam and Pump or Flume
	20.7	SPEM006P	North Fork South Branch Potomac River	Perennial	Intermediate	B2, NRI, HQS, HQW	70.0	Site-Specific Plan
	25.3	SPEG020E_3	UNT to South Branch Potomac River	Ephemeral	Minor	none	2.0	Dam and Pump or Flume
	25.4	SPEG020E_2	UNT to South Branch Potomac River	Ephemeral	Minor	none	N/A [j]	N/A
						Subtotal	**352.0**	
New Aboveground Facilities								
Chantilly Compressor Station	0.0	SFAG001I	UNT to Bull Run	Intermittent	Minor	Warm water	N/A [g]	N/A
Existing Aboveground Facilities								
Frametown Compressor Station	32.0	SBRMN001P	UNT to Big Run	Perennial	Minor	B1, HQW	N/A [g]	N/A
		SBRMN002I	UNT to Big Run	Intermittent	Minor	B1, HQW	N/A [g]	N/A
		SBRMN003I	UNT to Big Run	Intermittent	Minor	B1, HQW	N/A [g]	N/A
Glady Valve Site	0.0	SRAG006E	UNT to Glady Fork	Ephemeral	Minor	none	N/A [g]	N/A
Seneca Compressor Station	20.5	SPEMN003E	UNT to North Fork South Branch Potomac River	Ephemeral	Minor	none	N/A [g]	N/A
Loudoun Compressor Station	70.6	SLOMN001I	UNT to Howsers Branch	Intermittent	Minor	Warm water	N/A [g]	N/A
Contractor Yards								
UPS Contractor Yard	N/A	SRAT004P	Kings Run	Perennial	Intermediate	B1, HQW	N/A [g]	N/A
Permanent Access Roads								
PAR-78 (Line VA-1)	0.0	SFAG019I	UNT to Bull Run	Intermittent	Minor	Warm water	2.5	Proposed New Bridge
	0.0	SFAG018I	UNT to Bull Run	Intermittent	Minor	Warm water	5.0	Proposed New Bridge
PAR-27A (Line WB Replacement)	12.4	SPEG011P	Seneca Creek	Perennial	Intermediate	B2, NRI, ORW, HQS	30.0	Temporary Bridge Crossing
	12.4	SPEG012P	Seneca Creek	Perennial	Intermediate	B2, NRI, ORW, HQS	60.0	Temporary Bridge Crossing
	12.4	SPEG009E[c]	UNT to Seneca Creek	Ephemeral	Minor	none	5.0	Temporary Bridge Crossing
PAR-27A (Line WB Replacement)	12.4	SPEG009E[c]	UNT to Seneca Creek	Ephemeral	Minor	none	5.0	Temporary Bridge Crossing

APPENDIX E

Waterbodies Crossed or Otherwise Impacted and Crossing Methods for the Project [a]

Project/Facility	Milepost	Waterbody ID	Waterbody Name	Flow Regime	FERC Classification	Fisheries Classification [k]	OHWM Width at the Centerline Crossing (feet)	Crossing Method
	12.4	SPEG010E	UNT to Seneca Creek	Ephemeral	Minor	none	2.5	Temporary Bridge Crossing
	12.4	SPEG013E	UNT to Seneca Creek	Ephemeral	Intermediate	none	12.0	Temporary Bridge Crossing
	12.4	SPEG013I	UNT to Seneca Creek	Intermittent	Intermediate	B2, ORW, HQS	12.0	Temporary Bridge Crossing
	12.4	SPEG014E	UNT to Seneca Creek	Ephemeral	Minor	none	4.0	Temporary Bridge Crossing
	13.5	SPEG018P	Whites Run	Perennial	Intermediate	B2, ORW, HQS	30.0	Temporary Bridge Crossing
						Subtotal	**168.0**	
Temporary Access Roads								
TAR-1 (Line WB Replacement)	0.0	SRAG028E	UNT to Glady Fork	Ephemeral	Minor	none	3.0	Temporary Bridge Crossing
TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB	TAR-34 (Line WB
TAR-45 (Line WB Replacement)	21.0	SPET001P	North Fork South Branch Potomac River	Perennial	Major	B2, NRI, HQS, HQW	127.0	Site-Specific Plan
TAR-47 (Line WB Replacement)	21.0	SPEG041P	UNT to North Fork South Branch Potomac River	Perennial	Minor	B2, HQS, HQW	5.0	Temporary Bridge Crossing
	21.0	SPEG039P	UNT to North Fork South Branch Potomac River	Perennial	Minor	B2, HQS, HQW	10.0	Temporary Bridge Crossing
	21.0	SPEG030E	UNT to North Fork South Branch Potomac River	Perennial	Minor	B2, HQS, HQW	2.5	Temporary Bridge Crossing
	21.0	SPEG040E	UNT to North Fork South Branch Potomac River	Ephemeral	Minor	B2, HQS, HQW	2.0	Temporary Bridge Crossing
	21.0	SPEG038P	UNT to North Fork South Branch Potomac River	Perennial	Minor	B2, HQS, HQW	10.0	Temporary Bridge Crossing
	21.0	SPEG067E	SPEG067E	SPEG067E	Minor	B2, HQS, HQW	1.5	Temporary Bridge Crossing
	21.0	SPEG031E	SPEG031E	SPEG031E	Minor	B2, HQS, HQW	1.0	Temporary Bridge Crossing
	21.0	SPEG036P	SPEG036P	SPEG036P	Minor	B2, HQS, HQW	10.0	Temporary Bridge Crossing
	21.0	SPEG034E	UNT to North Fork South Branch Potomac River	Ephemeral	Minor		1.0	Temporary Bridge Crossing
	21.0	SPEG035P	UNT to North Fork South Branch Potomac River	Perennial	Minor		4.0	Temporary Bridge Crossing

APPENDIX E

Waterbodies Crossed or Otherwise Impacted and Crossing Methods for the Project [a]

Project/Facility	Milepost	Waterbody ID	Waterbody Name	Flow Regime	FERC Classification	Fisheries Classification [k]	OHWM Width at the Centerline Crossing (feet)	Crossing Method
	21.0	SPEG033I	UNT to North Fork South Branch Potomac River	Intermittent	Minor		6.0	Temporary Bridge Crossing
	21.0	SPEG032P	UNT to North Fork South Branch Potomac River	Perennial	Minor		7.0	Temporary Bridge Crossing
TAR-52 (Line WB Replacements #2)	0.1	SPEG022I	UNT to North Mill Creek	Intermittent	Minor	B1, HQS	2.5	Temporary Bridge Crossing
	0.1	SPEG023I	UNT to North Mill Creek	Intermittent	Minor	B1, HQS	5.0	Temporary Bridge Crossing
	0.1	SPEG029E	UNT to North Mill Creek	Ephemeral	Minor	none	1.0	Temporary Bridge Crossing
TAR-55 (Line WB-5 Replacement)	0.0	SGRM003E	UNT to South Mill Creek	Ephemeral	Minor	none	1.0	Temporary Bridge Crossing
TAR-56 (Line WB-5 Replacement)	0.2	SGRG001I	UNT to South Mill Creek	Intermittent	Minor	B2, HQS	1.0	Temporary Bridge Crossing
						Subtotal	**188.5**	
						TOTAL [h]	**798.0**	

[a] No features were found at the WB Replacements #1-5, Elk River Compressor Station, Line WB-22 Receiver Site, Line WB-5 Valve Site, Line VA-1 Receiver Site, Panther Mountain Regulator Station, Dink Valve Site, Cleveland Compressor StationFiles Creek Compressor Station, Mill Creek Valve Site, Moorefield Valve Site, Lost River Compressor Station, Whitmer Valve Site, WB Loop Receiver, Smokehole Valve Site, Columbia Furnace Valve Site, Dysart Valve Site, Strasburg Compressor Station, Nineveh Meter Station, Shenandoah River West Valve Site, White Contractor Yard, HWY 48 Contractor Yard, CPG Elkins Contractor Yard and Seneca Contractor Yard during the field survey.
SKAN002P[b] - The stream crosses both Line WB-5 Extension and Line WB-22.
SRAG003I[c], SPEG009E[c] and SPEG001P[c] - The centerline crosses these streams twice.
SPEG025P[d] - Braided channel with a distinct instream landmass in between the channels. The two channels will be crossed individually and the total crossing will be 40 feet.
SPEG001P[e] - Braided channel with a wetland in between the channels. Both the channels will be crossed together with a total crossing of 146 feet which includes the wetland as part of crossing it.
[g] Waterbodies located in the proposed workspaces for the aboveground facilities, however, impacts will be avoided and minimized per Columbia's ECS.
[h] Total excludes new and existing aboveground facilities.
[i] OHWM not visible due to disturbance from cattle.
[j] Waterbodies located in the proposed workspaces but not crossed by the centerline. Impacts will be avoided and minimized per Columbia's ECS.
[k] In Virginia, the general fishery type was considered warm water if not designated a wild trout or stocked trout stream. Fisheries classifications in West Virginia include: warm water fishery streams (B1); trout waters (B2); High Quality Waters (HQW); Outstanding Resource Waters (ORW); and High Quality Streams (HQS).
[l] NRI = Nationwide Rivers Inventory
UNT = unnamed tributary
N/A = not applicable

Appendix F
Wetlands Crossed or Affected by the Project Facilities

APPENDIX F

Wetlands Crossed or Affected by the Project Facilities [a, b, c]

Facility Name	Wetland ID	Cowardin Classification	Milepost	Centerline Distance Crossed (feet)	Construction Impact (acres)[k]	Operation Impact (acres)
New Pipeline Facilities [g]						
Line VA-1	WFAG001E	PEM	0.0	N/A[f]	<0.1	0.0
	WFAG002E	PEM	0.2	78.7	0.1	0.0
	WFAG003E	PEM	0.4	35.0	0.1	0.0
	WFAG003F	PFO	0.4	160.0	<0.1	<0.1
	WFAG004F	PFO	0.5	73.2	<0.1	<0.1
	WFAG004E	PEM	0.5	76.5	<0.1	0.0
	WFAG008F	PFO	0.7	8.9	<0.1	<0.1
	WFAM007E	PEM	1.0	N/A[f]	<0.1	0.0
	WFAM006E	PEM	1.1	42.9	0.1	0.0
	WFAM008E	PEM	1.3	31.8	<0.1	0.0
	WFAT005E	PEM	1.4	111.9	0.1	0.0
	WFAT004S	PSS	1.5	N/A[f]	<0.1	<0.1 [j]
	WFAT002F	PFO	2.1	N/A[f]	0.0[i]	0.0[i]
	WFAT001E	PEM	2.2	N/A [f]	0.3	0.0
			Subtotal	**618.9**	**0.8**	**<0.1**
Replacement Pipeline Facilities [g]						
Line WB Replacement	WRAG001E	PEM	0.0	601.5	0.8	0.0
	WRAG001F	PFO	0.0	0.1	0.1	<0.1
	WRAG011E	PEM	0.3	170.0	0.2	0.0
	WRAG011F	PFO	0.3	N/A [f]	<0.1	<0.1
	WRAG012E	PEM	1.9	99.7	0.1	0.0
	WRAG012F	PFO	1.9	N/A [f]	<0.1	<0.1
	WRAG013E	PEM	2.0	207.5	0.3	0.0
	WRAG014E	PEM	4.2	170.4	0.3	0.0
	WRAM026E	PEM	4.3	678.7	0.5	0.0
	WRAM025E	PEM	4.5	N/A [f]	<0.1	0.0
	WRAG015E	PEM	4.7	26.9	<0.1	0.0
	WRAM028E	PEM	5.1	164.2	0.2	0.0
	WRAM027E	PEM	5.3	167.5	0.3	0.0
	WRAM029E	PEM	5.4	109.8	0.2	0.0
	WRAM030E	PEM	5.5	70.7	0.1	0.0
	WRAM007E	PEM	5.6	N/A [f]	<0.1	0.0
	WRAM008E	PEM	5.7	0.0	<0.1	0.0
	WRAM010E	PEM	5.8	468.4	0.7	0.0
	WRAM001E	PEM	7.2	N/A [f]	0.3	0.0
	WRAM002E	PEM	7.3	5.3	<0.1	0.0
	WRAM003E	PEM	7.6	14.6	<0.1	0.0
	WRAM031E	PEM	8.0	73.5	0.1	0.0
	WRAG008E	PEM	9.2	15.7	<0.1	0.0
	WRAG009E	PEM	9.6	170.0	0.4	0.0
	WRAM021E	PEM	10.3	38.8	0.1	0.0
	WRAG010E	PEM	11.0	33.6	<0.1	0.0
	WPEG021E	PEM	12.9	22.2	<0.1	0.0
	WPEG007E	PEM	13.8	1.8	0.1	0.0
	WPEG007F	PFO	13.8	34.9	<0.1	<0.1
	WPEG009E	PEM	14.8	N/A [f]	<0.1	0.0
	WPEM001E	PEM	16.4	N/A [f]	<0.1	0.0
	WPEG001F	PFO	18.7	54.5	0.1	<0.1

APPENDIX F (cont'd)

Wetlands Crossed or Affected by the Project Facilities [a, b, c]

Facility Name	Wetland ID	Cowardin Classification	Milepost	Centerline Distance Crossed (feet)	Construction Impact (acres)	Operation Impact (acres)
Line WB Replacement	WPEG002E	PEM	18.9	24.4	<0.1	0.0
	WPEG003E	PEM	19.1	10.7	<0.1	0.0
	WPEG004E	PEM	19.5	74.6	0.1	0.0
	WPEG005E	PEM	19.6	14.9	<0.1	0.0
	WPEG016E	PEM	23.3	41.8	<0.1	0.0
	WPEG015E	PEM	23.5	41.7	0.1	0.0
	WPEG017E	PEM	25.3	62.1	0.1	0.0
Line WB Replacement #3	WGRM001E	PEM	0.0	N/A [f]	0.1	0.0
			Subtotal	**3670.5**	**5.8**	**<0.1**
New Aboveground Facilities						
Chantilly Compressor Station	WFAG001F	PFO	0.0	N/A [d]	<0.1	<0.1
	WFAG001E	PEM	0.0	N/A [d]	<0.1	0.0
				Subtotal	**<0.1**	**<0.1**
Existing Aboveground Facilities						
Glady Valve Site	WRAG001E	PEM	0.0	N/A [d]	0.6	0.0
	WRAG002E	PEM	0.0	N/A [d]	0.2	0.0
	WRAG003E	PEM	0.0	N/A [d]	0.1	0.0
Loudoun Compressor Station	WLOMN001	PEM	70.6	N/A [d]	<0.1	0.0
	WLOMN002	PEM	70.6	N/A [d]	<0.1	0.0
				Subtotal	**0.9**	**0.0**
Contractor Yards						
UPS Contractor Yard	WRAT001E	PEM	N/A	N/A [d]	0.3	0.0
				Subtotal	**0.3**	**0.0**
Access Roads						
PAR-27A	WPEG010E	PEM	12.9	40.3	<0.1	0.0
PAR-27A	WPEG011E	PEM	12.9	80.2	<0.1	0.0
PAR-27A	WPEG012E	PEM	12.9	6.7	<0.1	0.0
PAR-27A	WPEG013E	PEM	12.9	11.9	<0.1	0.0
~~PAR-78~~	~~WFAZ002E~~	~~PEM~~	~~0.0~~	~~N/A~~	~~<0.1~~	~~<0.1~~
~~PAR-78~~	~~WFAZ003E~~	~~PEM~~	~~0.0~~	~~N/A~~	~~<0.1~~	~~<0.1~~
~~PAR-78~~	~~WFAZ004E~~	~~PEM~~	~~0.0~~	~~87.2~~	~~0.1~~	~~0.1~~
PAR-79	WFAG012E	PEM	2.2	0.0	<0.1	<0.1
TAR-47	WPEG023E	PEM	21.0	30.4	<0.1	0.0
TAR-52	WPEG018E	PEM	0.1	5.6	<0.1	0.0
TAR-56	WGRG002E	PEM	0.2	10.8	<0.1	0.0
TAR-77	WFAG002E	PEM	0.2	3.6	<0.1	0.0
TAR-77	WFAM009E	PEM	0.2	N/A	<0.1	0.0
			Subtotal	**391.7**	**0.1**	**<0.1**
			TOTAL	**4,478.9 [e]**	**8.0**	**0.2 [h]**

[a] The numbers in this table have been rounded for presentation purposes. As a result, the subtotals and totals may not reflect the exact sum of the addends in all cases.
[b] PEM=Palustrine Emergent Wetland, PFO=Palustrine Forested Wetland, PSS=Palustrine Scrub-Shrub.
[c] No wetland features were found in the following areas: Line WB-5 Extension, Line WB-22, Line WB-5 Replacement, Line WB Replacements #1, #2, #4, #5, Elk River Compressor Station, WB-22 Receiver Site, Line WB-5 Valve Site, Line VA-1 Receiver Site, Panther Mountain Regulator Station, Dink Valve Site, Frametown Compressor Station, Cleveland Compressor Station, Files Creek Compressor Station, Lost River Compressor Station, Whitmer Valve Site, Seneca Compressor Station, WB Loop Receiver, Smokehole Valve Site, Dysart Valve Site, Strasburg Compressor Station, Nineveh Meter Station , Mill Creek Valve Site, Moorefield Valve Site, Columbia Furnace Valve Site, Shenandoah River West Valve Site and White Contractor Yard.
[d] Wetlands are located in the proposed workspaces for the aboveground facilities or contractor yards; however, impacts will be avoided and minimized per Columbia's ECS.
[e] Total excludes new and existing aboveground facilities.
[f] Wetland does not cross the centerline, but it is located within the project facility or staging area.
[g] Includes staging areas.
[h] Operation impacts associated with the pipeline facilities are based on a 10-foot-wide corridor being maintained in a herbaceous state and selective tree cutting within 10 feet of either side of the herbaceous corridor (30-foot-wide corridor). Therefore, there would be no operational impacts on emergent wetlands; impacts on scrub-shrub wetlands would be limited to the 10-foot-wide corridor; and forested wetland impacts are based on the 30-foot-wide corridor.
[i] Wetland crossed by HDD alignment but not impacted.
[j] Wetland crossed by travel lane between Pleasant Valley Road and the HDD exit location. The acreage remained <0.1 acre.
[k] Construction impact includes both temporary and permanent workspace acreages.

APPENDIX G

BIOLOGICAL EVALUATION FOR REGIONAL FORESTER'S SENSITIVE SPECIES, RARE, THREATENED, AND ENDANGERED SPECIES, AND BIRDS OF CONSERVATION CONCERN

Biological Evaluation

Columbia Gas Transmission, LLC
WB Xpress Project

for

Regional Forester's Sensitive Species, Rare, Threatened, and Endangered Species

and

Birds of Conservation Concern

Monongahela National Forest

March 2017

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AMM	Avoidance and Minimization Measures
ATWS	Additional Temporary Work Space
BA	Biological Assessment
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BE	Biological Evaluation
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
CMS	Cheat Mountain Salamander
Columbia	Columbia Gas Transmission, LLC
COMP	Construction, Operation, and Management Plan
DDT	dichlorodiphenyltrichloroethane
EA	Environmental Assessment
ECS	Environmental Construction Standards
EI	Environmental Inspector
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
Forest	Monongahela National Forest
GIS	Geographic Information System
GPS	Global Positioning System
LOO	Likelihood of occurrence
LRMP	Land and Resource Management Plan
MAOP	Maximum Allowable Operation Pressure
MBCP	Myotid Bat Conservation Plan
MBTA	Migratory Bird Treaty Act
MIINLT	May impact individuals or habitat but is not likely to contribute to a trend toward federal listing or loss of viability of the species
MNF	Monongahela National Forest
MP	milepost
MPU	Management Prescription Unit
MSHCP	Multi-Species Habitat Conservation Plan
NABCI	North American Bird Conservation Initiative
NFS	National Forest Service
NHD	Natural Heritage Database
NI	No Impact
NLEB	Northern long-eared bat
NNIS	Non-native invasive species
NPS	National Park Service
NWI	National Wetlands Inventory
PMRT	Potential Maternity Roost Tree
PRT	Potential Roost Tree
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures

Project	WB XPress Project
psi	pounds per square inch
RFSS	Regional Forester Sensitive Species
SPCC	Spill Prevention, Control, and Containment
SUP	Special Use Permit
TES	threatened and endangered species
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VDGIF	Virginia Department of Game and Inland Fisheries
WVDNR	West Virginia Department of Natural Resources
WVNFS	West Virginia Northern Flying Squirrel

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1.0 INTRODUCTION

Columbia Gas Transmission, LLC (Columbia) has operated and maintained natural gas transmission infrastructure within the Monongahela National Forest (MNF or Forest) for many decades. Columbia currently holds several Special Use Permits (SUPs) issued by MNF for the right to maintain and operate their existing pipelines and associated access roads within NFS lands.

On December 30, 2015, Columbia submitted its application to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity under Section 7(c) of the Natural Gas Act, as amended, for construction, modification, operation, and maintenance of various facilities along its Line WB and Line VB natural gas transmission pipeline systems in West Virginia and Virginia, herein referred to as the WB XPress Project (Project). The Project would provide an additional 1.3 million dekatherms per day of capacity for bidirectional firm transportation service to markets in western West Virginia and northern Virginia. A portion of the Project is located on lands owned by the U.S. Department of Agriculture, Forest Service (NFS) in the MNF. Figure 1-1 provides a Project Location Map.

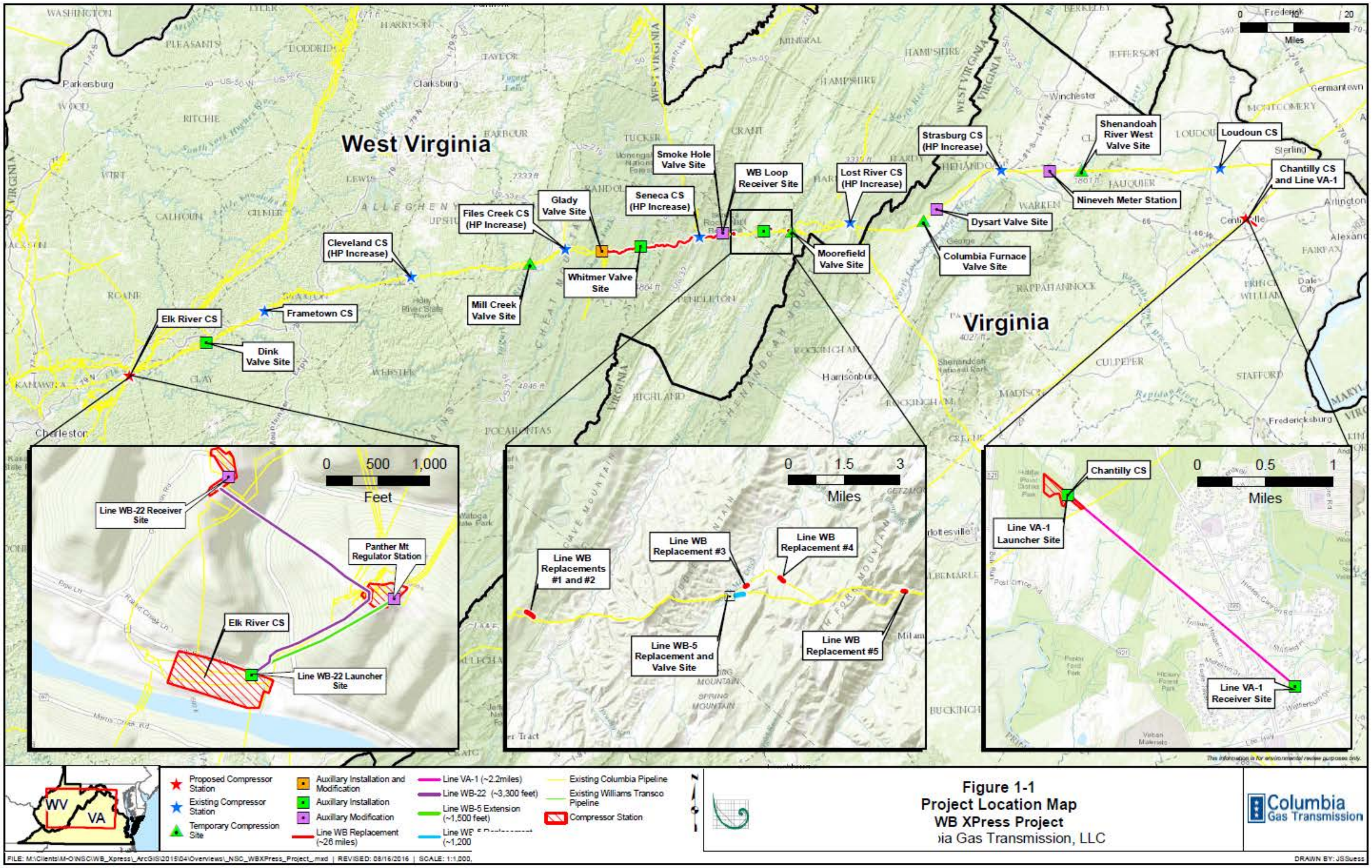
The Project would expand the capacity of Columbia's existing natural gas pipeline system by 1.3 million dekatherms per day to provide bi-directional transportation service in order to meet growing market demands. The Project would enable Columbia to increase transportation to a major local distribution company and increase deliveries to third-party interstate pipelines. In support of the Project, Columbia has executed binding Precedent Agreements with terms ranging from 15 to 20 years from the Project in-service date.

This draft Biological Evaluation (BE) evaluates the potential impacts of the Project on regional forester sensitive species (RFSS), federally listed rare, threatened and endangered species, and birds of conservation concern (BCC) on NFS lands. This draft BE will be finalized by the MNF once final mitigation details for several species are resolved with Columbia.

2.0 PROJECT DESCRIPTION

The Project would involve the construction and operation of approximately 29.3 miles of various diameter pipeline, modifications to seven existing compressor stations, construction of two new compressor stations, and uprating or restoring the Maximum Allowable Operation Pressure (MAOP) on various segments of the existing Line WB and Line VB natural gas transmission pipeline systems.

The MAOP uprate and restoration testing is proposed along Line WB-5 and Line WB-6 in West Virginia to increase the current MAOP of 800 pounds per square inch (psi) to 1,000 psi. MAOP uprates will be performed on sections of the pipeline that are not currently certificated to operate at 1,000 psi. The MAOP restorations will be performed on sections of existing pipeline where Columbia already has a FERC certificate to operate at 1,000 psi; however, Columbia has historically been operating these lines at 800 psi. The testing for the proposed restoration is voluntary as there are no Pipeline Hazardous Materials Safety Administration requirements to perform the MAOP restoration testing before restoring pipelines to their previously established FERC-certificated MAOP. However, Columbia would execute the MAOP restorations in the same manner as an uprate.


West Virginia
Virginia
Elk River CS
Dink Valve Site
Frametown CS
Cleveland CS (HP Increase)
Mill Creek Valve Site
Files Creek CS (HP Increase)
Glady Valve Site
Whitmer Valve Site
Seneca CS (HP Increase)
Smoke Hole Valve Site
WB Loop Receiver Site
Moorefield Valve Site
Lost River CS (HP Increase)
Strasburg CS (HP Increase)
Columbia Furnace Valve Site
Dysart Valve Site
Shenandoah River West Valve Site
Nineveh Meter Station
Loudoun CS
Chantilly CS and Line VA-1
Line WB-22 Receiver Site
Panther Mt Regulator Station
Line WB-22 Launcher Site
Line WB Replacements #1 and #2
Line WB Replacement #3
Line WB Replacement #4
Line WB Replacement #5
Line WB-5 Replacement and Valve Site
Chantilly CS
Line VA-1 Launcher Site
Line VA-1 Receiver Site
Proposed Compressor Station
Existing Compressor Station
Temporary Compression Site
Auxiliary Installation and Modification
Auxiliary Installation
Auxiliary Modification
Line WB Replacement (~26 miles)
Line VA-1 (~2.2miles)
Line WB-22 (~3,300 feet)
Line WB-5 Extension (~1,500 feet)
Existing Columbia Pipeline
Existing Williams Transco Pipeline
Compressor Station
Figure 1-1
Project Location Map
WB XPress Project
Columbia Gas Transmission, LLC

2.1 PROJECT ELEMENTS WITHIN MONONGAHELA NATIONAL FOREST

The MNF, which is an administrative unit of the Eastern Region (Region 9) of the USFS, comprises approximately 921,000 acres of federal land in West Virginia. Within the proclamation boundary of the MNF, Columbia proposes to replace approximately 25.3 miles of 26-inch diameter Line WB natural gas pipeline, herein referred to as the Line WB Replacement, generally within and along an existing utility corridor which also includes Columbia's Line WB-Loop and/or Line WB-5 natural gas pipelines. Of the length within the proclamation boundary, approximately 13.9 miles of the Line WB replacement would be on privately owned lands while approximately 11.4 miles (9 sections) would be on NFS lands along Columbia's existing natural gas pipeline corridors (Figure 2.1-1). The pipeline replacement crosses the Greenbrier and Cheat-Potomac Ranger Districts within the MNF. The Line WB replacement does not cross lands designated by the USFS as Wilderness Areas or potential Wilderness Areas. This BE addresses the portions of the Line WB replacement that fall within the 11.4 miles of non-contiguous NFS lands.

Columbia's existing pipeline system through the MNF consists of the original, retired Line WB pipeline, and the active WB-Loop and WB-5 pipelines. To avoid increasing the number of pipeline corridors through the MNF, the proposed replacement pipeline alignment follows a combination of existing Line WB right-of-way corridor, the Line WB-5 right-of-way corridor, or the WB Loop right-of-way corridor. These corridors are currently or have previously been maintained under SUP9 issued by MNF on April 5, 2012.

Table 2.1-1 summarizes the segments of the Line WB replacement that fall within the boundaries of the NFS lands. Detailed maps showing the proposed pipeline route and access roads associated with Project elements located within the MNF are provided in Appendix A.

The placement of the pipeline adjacent to Lines WB-Loop and WB-5 versus the retired Line WB route between milepost (MP) 11.0 – 11.3, 11.7 – 12.0, 13.5 – 13.5, 15.7 – 16.3, and 19.7 – 19.8 addresses constructability concerns. The proposed reroute avoids installation of several miles of the replacement pipeline parallel to Seneca Creek and multiple crossings of Seneca Creek between MPs 12.1 and 20.1 and minimizes the crossing of steeper terrain and the associated soil erosion and subsequent stabilization concerns between Milepost (MP) 11.0 and 12.0.

Approximately 16.5 miles of the MAOP uprate and restoration test segments will be located within the MNF (Figure 2.1-2). Since this MAOP uprate and restoration test segments will not result in ground disturbance or vegetation clearing, this portion of the Project is not considered to have any effects on sensitive species and, therefore, is not further addressed in this BE.

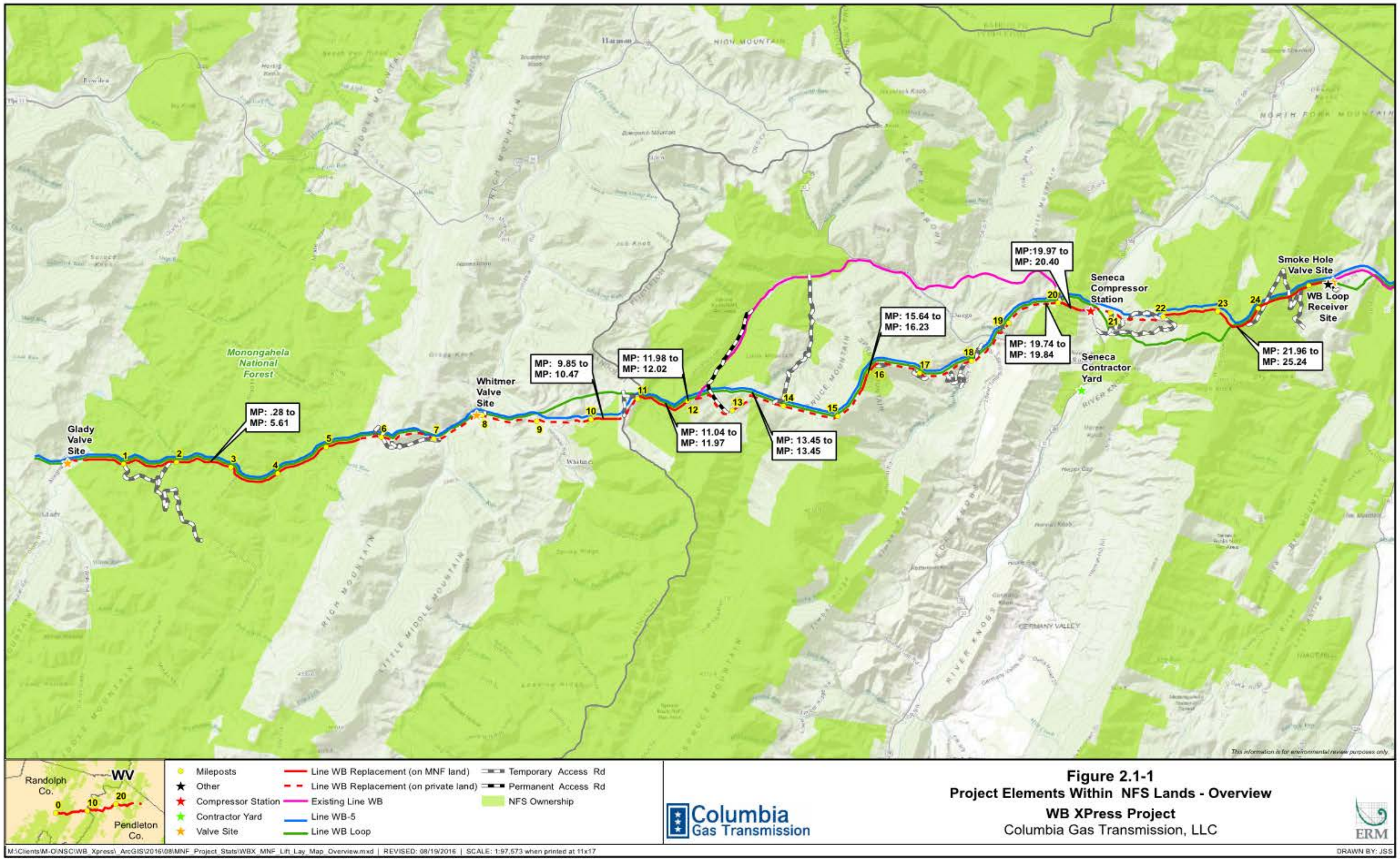


Figure 2.1-1
Project Elements Within NFS Lands - Overview
WB XPress Project
Columbia Gas Transmission, LLC

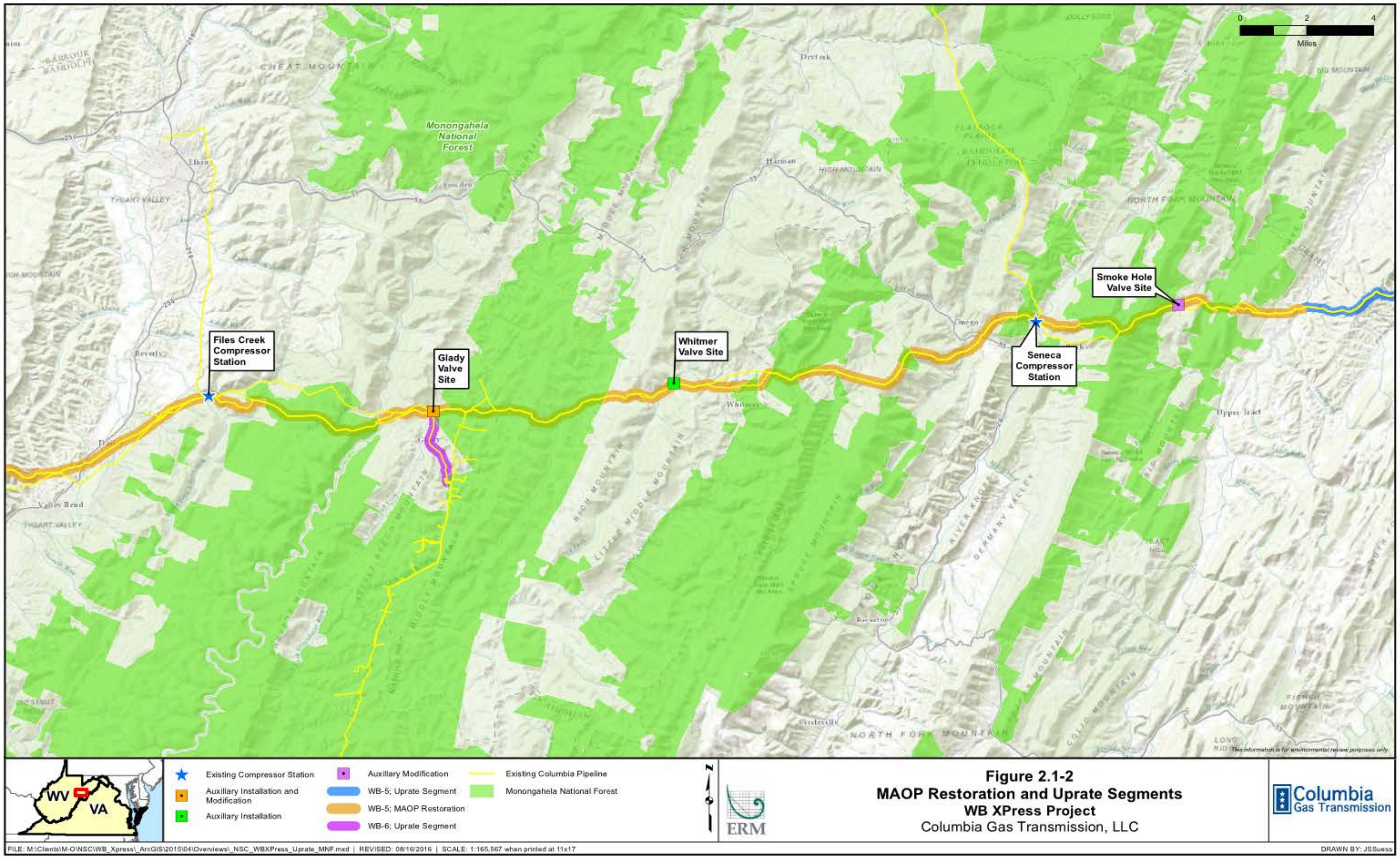


Figure 2.1-2
MAOP Restoration and Uprate Segments
WB XPress Project
Columbia Gas Transmission, LLC

TABLE 2.1-1

WB XPress Project
Line WB Replacement within NFS lands

Right-of-way Configuration	Federal Tract Numbers (as listed in Operational SUP)	Begin Milepost	End Milepost	Miles Crossed
Collocated with Line WB-5 and WB-Loop; Remove existing Line WB; install Line WB Replacement	71 (MP 0.3 – 1.9) 32A (MP 1.9 – 2.5) 48 (MP 2.5 – 5.6)	0.3	5.6	5.3
Collocated with Line WB-5; Remove existing Line WB; install Line WB Replacement	862 (MP 9.8 – 10.5)	9.8	10.5	0.7
Collocated with Line WB-5 and WB-Loop; Remove existing Line WB; install Line WB Replacement	1312 (MP 11.0 – 11.0) 1065 (MP 11.0 – 11.2) 102 (MP 11.2 – 12.0)	11.0	12.0	1.0
Collocated with Line WB-5 and WB-Loop	356 (MP 13.5 – 13.5)	13.5	13.5	<0.1
Collocated with Line WB-5 and WB-Loop	382 (MP 15.7 – 16.3)	15.7	16.3	0.6
Collocated with Line WB-5 and WB-Loop	58 (MP 19.7 – 19.8)	19.7	19.8	0.1
Remove existing Line WB; install Line WB Replacement	58 (MP 20.0 – 20.4)	20.0	20.4	0.4
Collocated with Line WB-5 and WB-Loop; Remove existing Line WB; install Line WB Replacement	724 and 910 (MP 22.0 – 23.0) 300C(B) (MP 23.0 – 23.2) 207 (MP 23.2 – 23.6) 196E (MP 23.6 – 25.2)	22.0	25.2	3.2

2.0 ANTICIPATED TEMPORARY AND PERMANENT PROJECT LAND DISTURBANCE

5.1 Project Area Definitions

The Project area includes areas that would be affected directly or indirectly by the Project on NFS lands. The boundary of the proposed Project impact area (both temporary workspaces and permanent right-of-way) thus sets the limits of direct effects of the Project. Due to Columbia's extensive network of existing right-of-way corridors and access roads within the MNF, the Project's temporary workspaces and permanent right-of-way overlap with existing right-of-way in many locations. Details regarding Columbia's existing pipeline corridors and Project workspaces are provided in the following sections.

2.0 Columbia's Existing Special Use Permits

Columbia has been operating natural gas transmission pipelines through the MNF for many decades. The following special use permits were reviewed to identify areas for which Columbia already has authorization to operate and maintain the various natural gas pipelines that traverse NFS lands:

1. Authorization ID: SUP9, "issued for the purpose of: Operating and maintaining natural gas pipeline (Line WB-5 and WB Loop) rights-of-way and associated aboveground facilities (such as telephone lines and 11 volt cathodic protection lines)" dated April 5, 2012 and valid through December 31, 2041.

2. FS 7700-41 Road Use Permit, issued for "use of the following roads or road segments and related transportation facilities… on the Greenbrier Ranger District of the Monongahela National Forest, for commercial hauling…" dated July 15, 2013 and valid through July 31, 2033.

2.0 Anticipated Land Disturbance

This section describes the general categories of potential impacts of the Project on Threatened and Endangered Species (TES) and RFSS sensitive species and their associated habitats located on NFS lands. Impacts on individual species and their habitats are expected to vary by species, and are discussed in the individual species accounts in section 6.0.

Project construction would result in both temporary and permanent impacts. Temporary impact areas are those areas temporarily disturbed during construction activities that would revert back to pre-construction conditions following construction. Temporary impacts would cause a temporal loss of habitat during the recovery period. Based on the vegetation or habitat type, these temporal impacts may be long- or short-term.

Permanent impact areas are those that would be converted from the forested or shrub scrub condition to an herbaceous condition for the life of the Project, and would be maintained in a generally herbaceous state following construction. Permanent impacts would occur on an existing permanent access road, FS-1580 and permanent access road-27A, that would be used for ongoing maintenance and operation. Permanent impact areas also include forested portions of the new permanent right-of-way where removal of trees and other tall vegetation would be required to maintain the pipeline right-of-way and meet federal safety regulations. These areas would remain vegetated, but would be maintained to limit vegetation to low-growing shrubs, forbs and graminoids. In this case, the area converted from forested to shrub-scrub or emergent habitat to accommodate the pipeline maintenance has been included in the calculation of permanent impacts.

Most impacts would result from construction rather than operation of the Project. Once the Project is built, no further habitat conversion is anticipated. Vegetation maintenance activities within the right-of-way would consist of ground inspections, mowing, along with periodic removal of tree species capable of growing over 15 to 35 feet tall. Because these activities are infrequent and localized in nature, and would occur in an already existing right-of-way, and would not change the character of the habitat, potential impacts from operation of the Project are expected to be minimal to both RFSS and their habitats. On NFS lands, Columbia must adhere to applicable Forest standards during vegetation maintenance activities.

Direct impacts are impacts that have a direct or immediate effect on TES or RFSS species or their habitat. These impacts are primarily associated with clearing of the right-of-way and temporary workspace where habitat would be removed, and includes visual or noise disturbance. Indirect impacts are generally caused by or result from the Project at a later time, and which are reasonably certain to occur.

3.3.1 Construction

Construction impacts can be direct or indirect. Potential direct impacts on TES and RFSS species and their associated habitats during construction include:

- Disturbance;
- introduction of non-native invasive or noxious plants;
- habitat removal or modification; and
- injury or mortality.

The acreage of forested land cover types supporting significant vegetation on NFS lands that will be affected by the Project during construction and operation is provided in Table 3.3-1. These cover types and acreages are based on modelled forest types as prepared by MNF staff and provided to Columbia in the form of shapefiles, which were used to generate the acreage in Table 3.3-1. Impacts on existing habitat types during construction and operation of the Project will be minimized by collocating pipelines and utilizing existing rights-of-way. Construction will necessitate clearing of surface vegetation and grading of ground surface in the designated construction work areas.

TABLE 3.3-1

WB XPress Project
Forested Habitats Affected within Monongahela National Forest[a]

Type of Workspace	Coniferous Forest		Deciduous Forest		Shrubs		Total Forest/Shrub Cover	
	Acres	Percent [b]	Acres	Percent [b]	Acres	Percent [b]	Acre s	Percent [b]
Long-Term Right-of-way	0.17	0.1	6.28	4.4	0.40	0.3	6.85	4.8
Temporary Workspace	0.12	<0.1	2.58	1.8	0.27	0.2	2.97	2.0
Additional Temporary Workspace	0.05	<0.1	1.25	0.9	0.34	0.2	1.64	1.1
Staging Area	0.0	0.0	0.05	<0.1	0.14	0.1	0.19	0.2
Access Road	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.34**	**0.2**	**10.16**	**7.1**	**1.15**	**0.8**	**11.65**	**8.1**

[a] MNF, 2004b.
[b] Percentage is amount of forest cover in relation to total Project workspace.

3.3.2 Operation

Operational impacts are the result of operation and maintenance activities, and may be direct or indirect. Potential impacts from Project operation to TES and RFSS species include disturbance, displacement, habitat modification, increased predation and competition, habitat fragmentation and edge effects, introduction of invasive or noxious plants, and direct mortality of individuals. These impacts would primarily occur as a result of vegetation maintenance. As noted above, a majority of the permanent right-of-way to be maintained will be collocated with existing rights-of-way in which vegetation maintenance is currently permitted until the year 2041.

3.3.3 Cumulative effects

Current conditions have been impacted by innumerable actions over the last century and a half, and trying to isolate individual actions that continue to have residual impacts would be nearly impossible. This section summarizes the reasonably foreseeable future actions, those that are likely to occur or are probable, rather than those that are merely possible, within the MNF.

Other projects planned within the MNF proclamation boundary include the Forest-Wide Non-Native Invasive Species (NNIS) Management Project, Big Mountain Project, Big Rock Project, Lower Williams Wildlife Enhancement Project, Music Run Right-of-Way Project, Tea Creek Phase II Project, Union Chapel Church Road Right-of-Way Project, WV Restoration Venture-Anthony Creek Disperse Areas Project, Bear Rocks Projects, West Fork of Greenbrier Rail with Trail Development Project, Bickle Run Culvert and Bridge Repair Project, Bird Run Bridge Repair Project, Corridor H Project, and Atlantic Coast Pipeline Project.

The Forest-wide NNIS Management, Big Mountain, Big Rock, Lower Williams, and Bear Rocks Preserve Projects will have positive impacts on the vegetative and forest stand diversity within the MNF and will reduce non-native invasive plants. Columbia's Project, West Fork of Greenbrier Rail with Trail Development Project, Corridor H Project, and Atlantic Coast Pipeline Project could negatively impact vegetation resources within the MNF due to forest clearing and possible introduction of invasive or noxious plants. The Atlantic Coast Pipeline Project will occur 16 miles from the proposed Project construction at its nearest point within the MNF. Construction of the Corridor H Project within the MNF will occur during 2016 in Tucker and Randolph counties, and will result in four miles of new four-lane highway. Because these projects are dispersed within the MNF proclamation boundary, the potential for space crowding impacts, or the high geographic density of effects on a system, is unlikely. The proposed Project's impacts are largely minimized by replacing an existing pipeline and utilizing existing rights-of-way for the majority of the construction workspace within the MNF. Additionally, Columbia would implement its Environmental Construction Standards (ECS) (Columbia 2016a) and consult with the West Virginia Department of Natural Resources (WVDNR) and MNF staff to minimize the potential introduction and spread of non-native plants and noxious weeds. Also, Columbia would re-plant temporary and permanent workspaces in coordination with the appropriate federal and state agencies. Furthermore, Columbia would adhere to the mitigation requirements set forth by the construction SUP issued by the MNF. The Project will contribute to impacts on vegetation resources within MNF; however, the overall impacts are not expected to be cumulatively significant.

All projects identified within the MNF would have relatively benign or beneficial effects on both terrestrial and aquatic sensitive species and their habitats. Construction associated with the Project may reduce suitable habitat for sensitive species through removal of habitat. However, this effect, along with the cumulative effects of other nearby projects enacted in the past, present, or reasonably foreseeable future, is not expected to substantially alter species viability because of the relatively large acreage of suitable habitat under federal management in the MNF; and because current analyses does not indicate a significant downward trend in habitat extent or habitat capability to support associated species. Because other reasonably foreseeable projects are not expected to reduce the amount of habitat for sensitive species, no cumulative effects to sensitive species are anticipated.

2.0 Alternatives

During development of the Project scope, Columbia evaluated the No-Action Alternative, Energy Alternatives, System Alternatives, Pipeline Route Alternatives, and Aboveground Facility Site Alternatives for the proposed Project. An analysis of these alternatives is presented in the Environmental Assessment (EA) prepared by FERC for the Project.

Within NFS lands, the Project will involve the replacement of approximately 11.4 miles of retired 26-inch-diameter Line WB in Randolph and Pendleton Counties, West Virginia. This replacement will involve approximately 10.0 miles of ‘lift and lay’ replacement on NFS lands within the original trench and adjacent to other Columbia pipelines and rights-of-way. Since the 10.0 miles of pipe replacement benefits from collocating within and along existing Columbia rights-of-way and minimizes disturbance of new land, an alternative analysis of other possible collocation or greenfield alternatives was not reasonable.

Along the 11.4-miles of replacement of Line WB on NFS lands, Columbia has identified locations totaling approximately 1.3 miles where the proposed pipeline would deviate from the original Line WB right-of-way or be aligned adjacent to the existing Line WB right-of-way and follow the WB-5 and WB Loop rights-of-way instead. The existing Line WB pipeline right-of-way veers off to the north from the existing WB-5 and WB Loop lines at MP 12.2. If the replacement pipeline were to follow this route, it would be parallel to the National Rivers Inventory-designated section of Seneca Creek for several miles and its installation would require multiple crossings of Seneca Creek and its tributaries. Instead, Columbia proposes to install the Line WB replacement pipeline mostly adjacent to and south of the existing WB-5 and WB Loop lines through this area. Reasons for the reroute include choosing an existing path with less steep terrain where significant earth disturbance would be required and would present potential stabilization challenges and avoiding installing the replacement pipeline directly in, adjacent to, and along Seneca Creek for a significant distance. Approximately 0.8-mile would be collocated adjacent to the Columbia WB-Loop and/or Line WB-5 rights-of-way on NFS lands.

2.0 PRE-FIELD SPECIES ANALYSIS AND REVIEW

4.1 Project Study Area

The Project field survey area generally included a 300-foot-wide study area centered on the Line WB replacement centerline within NFS lands. This area included the proposed Project limits of disturbance, defined as the proposed pipeline permanent workspace, temporary workspace, additional temporary workspace, and two staging areas. The study area for temporary and permanent access roads associated with the Project was 50 feet wide for habitat and species studies. Field surveys did not include areas of the Project limited to restoration of the MAOP. No ground activities or land disturbance is anticipated to occur as a result of the MAOP restoration but helicopter flyovers will be necessary to complete the restoration work. Columbia currently anticipates these helicopter surveys will occur in late summer or the fall and therefore should not disturb nesting eagles.

Some species-specific survey areas were used based on the survey requirements unique to the species. Surveys for Cheat Mountain Salamander (CMS) were conducted within a survey corridor that extended 300 feet from the edge of proposed limits of disturbance on both pipeline and access road workspaces. An aerial bald eagle nest survey was conducted on February 20, 2017 in accordance with Columbia's West Virginia Bald Eagle Survey Plan which describes the proposed methodology to determine the activity and use of the project area by bald eagles. Columbia observed no bald eagle nests within one-half-mile of any perennial streams crossed by the proposed pipeline route or within one-half-mile of the Line WB pipeline right-of-way. If construction is delayed to 2018, Columbia would conduct aerial bald eagle nest surveys prior to construction in early 2018.

The western terminus of the Project study area is the western boundary of the MNF, located roughly parallel to Glady Fork, at the easternmost edge of Federal Tract Number 71 along the existing Line WB right-of-way which is visible by aerial. The eastern terminus of the Project study area is located approximately 4.2 miles northeast of Seneca Rocks at the eastern edge of Federal Parcel 196E along the existing Line WB right-of-way which is visible by aerial.

4.2 Effects Analysis Area

For direct, indirect, and cumulative effects, the spatial boundary of the analysis is the Proclamation and Purchase Unit boundary for the Monongahela National Forest. This is the boundary to which the National Forest Management Act's species diversity and viability requirements apply. The temporal boundary for direct and indirect effects on RFSS is 120 years from the beginning of Project implementation. This is the time frame within which effects to forested habitat will persist. This temporal boundary is also used for the cumulative effects analysis because the contribution to cumulative effects ends when the direct and indirect effects no longer exist.

2.0 RFSS

The February 20, 2012 Regional Forester Sensitive Animal and Plant Species for the Eastern Region (USFS 2012) was filtered to identify only species documented or suspected sensitive species within the MNF. The probable presence of RFSS was evaluated in coordination with MNF and WVDNR biologists and botanists and by reviewing publically available and requested data from State Natural Heritage databases, fish distribution spatial data, National Hydrography and National Wetlands Inventory data, topographic maps, United States Fish & Wildlife Service's (USFWS), Planning, and Conservation System Official Species Lists, and aerial photographs.

Habitat information gathered during Project surveys was compared to modeled suitable habitats within MNF to determine potential species occurrence in the Project area. Species with no possibility of occurrence were removed from further consideration. If an RFSS was out of range or suitable habitat did not existing with the survey boundary, the species was excluded from further evaluation. A table showing 137 RFSS with a rationale for inclusion or exclusion from further discussion is provided as Appendix B. Examples of this include:

- species not known to occur within counties crossed by the Project within NFS lands;
- cave-dwelling invertebrates, since no caves or karst features were identified through field surveys within the 300-foot-wide study corridor of the Project on NFS lands; and

- species not known to occur in streams, ponds, or rivers at elevations above 2,000 feet since no area of the Project has streams, ponds, or rivers located at elevations lower than 2,000 feet on NFS lands.

4.3.1 Fauna

This section focuses on the methodology used to evaluate RFSS faunal species. There are a total of 77 faunal species on the MNF RFSS list, with 34 of these having potential to be found within the Project area and impacted by Project activities. Table 4.3-1 lists faunal species with the potential to occur within the Project area based on this review.

TABLE 4.3-1

WB XPress Project
MNF RFSS Faunal Species with Potential to Occur in the Project Area

Species	Global/ State Conser-vation Rank[1]	Pre-field Review			Field Review	Effect Determination for Proposed Project
		Usual Habitat in WV	Within Known Range?	Habitat Present?	Species Present?	
MAMMALS						
West Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*)	G5T2/S2	Spruce, fir, spruce-hardwood, and northern hardwood forests, with well-developed understory (in Randolph and Pendleton Counties).	YES	YES	No species surveys conducted – assumed presence in mapped suitable habitat.	MIINLT
Southern Rock Vole (*Microtus chrotorrhinus carolinensis*)	G4T3/S2	Prefer forest habitats with moss-covered rocks and boulders, thick ground cover, and accessible water (in Randolph and Pendleton Counties).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat.	MIINLT
Eastern Small-footed Myotis *(Myotis leibii)*	G3/S1	It has a limited range, occurring only in eastern deciduous and coniferous forests. This bat tolerates colder temperatures than many bats, entering hibernation later than many (November to December) and leaving it rather early (in March) in Randolph and Pendleton Counties).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat.	MIINLT
Little Brown Myotis *(Myotis lucifugus)*	G3G4	Typically found living around swamp lands (in Randolph and Pendleton Counties).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Allegheny Woodrat *(Neotoma magister)*	G3G4/S3	Rock areas, caves, large boulder, rock slides, mountains, woods and swamps (in Randolph and Pendleton Counties).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat.	MIINLT

TABLE 4.3-1

WB XPress Project
MNF RFSS Faunal Species with Potential to Occur in the Project Area

Species	Global/ State Conser-vation Rank[1]	Pre-field Review: Usual Habitat in WV	Pre-field Review: Within Known Range?	Field Review: Habitat Present?	Field Review: Species Present?	Effect Determination for Proposed Project
Tri-colored Bat *(Perimyotis subflavus)*	G2	Associated with forested landscapes, where they forage near trees (including forest perimeters) and along waterways. In many areas, most foraging occurs in riparian areas. In Nova Scotia, they appeared to use primarily areas with intact, un-fragmented forest cover. In spring and summer in deciduous forest in western North Carolina, non-reproductive individuals selected mature stands or buffer zones near perennial streams, and they tended to roost near openings (perhaps to minimize commuting costs when openings comprise a small proportion of a densely forested landscape) (in Randolph and Pendleton Counties, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Long-tailed Shrew *(Sorex dispar)*	G4/S2S3	Mountainous, forested areas (deciduous or evergreen) with loose talus. Rocky damp areas with deep crevices covered by leaf mold and roots are preferred (in Randolph County, WV).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat.	MIINLT
Southern Water Shrew *(Sorex palustris punctulatus)*	G5T3/S1	Riparian areas within spruce-fir forests and northern hardwoods (in Randolph and Pendleton Counties, WV).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat.	MIINLT
Eastern Spotted Skunk *(Spilogale putorius)*	G5/S2S3	Forested, open, and brushy areas, rocky canyons and outcrops in woodlands and prairies (in Pendleton County, WV).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat.	MIINLT
Southern Bog Lemming *(Synaptomys cooperi)*	G5/S2	Boggy habitat but also common in marshes, meadows, and upland forests with thick humus layer (especially when conditions not hot and dry); areas with intermixture of herbaceous/shrubby vegetation (in Randolph and Pendleton Counties, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
BIRDS						
Northern Goshawk *(Accipiter gentilis)*	G5/S1B,S1N	Mainly in coniferous forests, but they may occur in deciduous hardwood forest (in Randolph and Pendleton Counties, WV).	YES	YES	No nests observed. No recorded bird sightings or vocalizations during site visits.	MIINLT
Long-eared Owl *(Asio otus)*	G5/S1B,S1N	Combination of grassland or other open country for foraging, and dense tall shrubs or trees for nesting and roosting (in Randolph and Pendleton Counties, WV.	YES	YES	No nests observed. No recorded bird sightings or vocalizations during site visits.	MIINLT

TABLE 4.3-1

WB XPress Project
MNF RFSS Faunal Species with Potential to Occur in the Project Area

Species	Global/ State Conser-vation Rank[1]	Pre-field Review			Field Review	Effect Determination for Proposed Project
		Usual Habitat in WV	Within Known Range?	Habitat Present?	Species Present?	
Olive-sided Flycatcher *(Contopus cooperi)*	G4/S1B	Northern and montane coniferous forests (in Randolph and Pendleton Counties, WV).	YES	YES	No recorded bird sightings or vocalizations during site visits.	MIINLT
Bald Eagle *(Haliaeetus leucocephalus)*	G5/S2B, S3N	Feeds and nests on or near large lakes and rivers (in Randolph and Pendleton Counties, WV).	YES	YES	No nests observed during site visits. Several eagle sightings and vocalizations with the closest approximately 3/4 mile from the line. Aerial nest survey completed February 20, 2017.	MIINLT
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	G5/S2B, S3N	Open forests with clear understories (in Randolph and Pendleton Counties, WV). Rarer in higher elevations.	YES	YES	No recorded bird sightings or vocalizations during site visits.	MIINLT
Vesper Sparrow *(Pooecetes gramineus)*	G5/S2N, S3B	Grasslands and fields (in Randolph and Pendleton Counties, WV).	YES	YES	No recorded bird sightings or vocalizations during site visits.	MIINLT
Golden-winged Warbler *(Vermivora chrysoptera)*	G4/S2B	Brushy edge habitats, openings with saplings, forbs and grasses (in Randolph and Pendleton Counties, WV).	YES	YES	No recorded bird sightings or vocalizations during site visits.	MIINLT
REPTILES						
Timber Rattlesnake *(Crotalus horridus)*	G4/S3	Upland hardwood and mixed pine-hardwood forests, in areas where there are sunny, rocky slopes and ledges throughout the Appalachian Mountain Region (in Randolph and Pendleton Counties, WV.	YES	YES	YES	MIINLT
AMPHIBIANS						
Green Salamander *(Aneides aeneus)*	G3G4/S3	The primary habitat of the species includes humid cliff faces with numerous crevices. Suitable habitat contains moist stones and logs in moist forests throughout the Appalachian Mountain Region (in Randolph and Pendleton Counties, WV).	YES	YES	Surveys Conducted May and June 2016. No individuals identified.	MIINLT
Eastern Hellbender *(Cryptobranchus alleganiensis)*	G3G4T3T4/S2	Clear, fast-flowing, rocky or debris bottomed well oxygenated streams and rivers.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
FISH						
Pearl Dace *(Margariscus margarita)*	G4/S3S4	Cool, clear headwater streams in the south, bog drainage streams, ponds and small lakes in the north, and in stained, peaty waters of beaver ponds in Cheat River System in WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT

TABLE 4.3-1

WB XPress Project
MNF RFSS Faunal Species with Potential to Occur in the Project Area

Species	Global/ State Conser-vation Rank[1]	Pre-field Review		Field Review		Effect Determination for Proposed Project
		Usual Habitat in WV	Within Known Range?	Habitat Present?	Species Present?	
Cheat Minnow *(Pararhinichthys bowersi)*	G1G2Q/S1S2	Streams in the Monongahela River Basin (in Randolph County, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
INVERTEBRATES - INSECTS						
Boreal Fan Moth *(Brachionycha borealis)*	G4/S1	Cold mountain oak forests at higher elevations in WV. Larvae of this moth feed on spring foliage of oaks, blueberry, and other plants. It is the only species of its subfamily known to feed on plants from more than one family, and even to feed on other caterpillars.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Appalachian Tiger Beetle *(Cicindela ancocisconensis)*	G3/S3	Prefers open sand or a matrix of sand and cobble along permanent streams or medium-sized rivers. Usually found along rocky mountain streams and small rivers in partially shaded areas such as sand banks and sand bars (in Randolph County, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Northern Barrens Tiger Beetle *(Cicindela patruela)*	G3/S2S3	Specialized to sandy/coarse gravel or eroding sandstone throughout the species' range in Grant, Monongahela, and Pendleton Counties, WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Cow Path Tiger Beetle *(Cicindela purpurea)*	G5/S3	Upland habitats with shale soils. Found in forest clearings, often along dirt paths through grassy areas in Fayette and Pendleton Counties, WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Early Hairstreak *(Erora laeta)*	GU/S2	Hardwood forests or hardwood-northern conifer mixed forests in Monroe, Pendleton, Randolph, and Summers Counties, WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Columbine Duskywing *(Erynnis lucilius)*	G4/S2	Wooded areas including many kinds of glades, barrens, ridgetops as well as gullies and openings in richer woods with an abundance of columbines in Grant , Hampshire, Jefferson, Mineral, and Pendleton Counties, WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Rapids Clubtail *(Gomphus quadricolor)*	G3G4/S2S3	Clear streams and brooks with strong current over clean gravel, cobbles or bedrock, on comparatively unproductive soils (in Pendleton and Randolph Counties, WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Green-faced Clubtail *(Gomphus viridifrons)*	G3/S2	Small to large moderate-gradient rivers; free flowing with high water quality; larvae burrow in silt, adults forage in trees (in Pendleton and Randolph Counties, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Bronze Copper *(Lycaena Hyllus)*	G5/S2	Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right-of-ways through marshlands (in Pendleton and Randolph Counties, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT

TABLE 4.3-1

WB XPress Project
MNF RFSS Faunal Species with Potential to Occur in the Project Area

Species	Global/ State Conser-vation Rank[1]	Pre-field Review: Usual Habitat in WV	Pre-field Review: Within Known Range?	Field Review: Habitat Present?	Field Review: Species Present?	Effect Determination for Proposed Project
West Virginia White *(Pieris virginiensis)*	G3	Mesic hardwood or hardwood-northern conifer-mixed forests on rich soils. Also can occur in hardwood swamps. Colonies do not occur in any kind of open habitat and adults do not readily leave the forests or cross powerlines, unshaded roads etc. (in Pendleton and Randolph Counties, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Southern Grizzled Skipper *(Pyrgus wyandot)*	G1G2Q/S1	shale barrens, pastures and powerlines on south to west facing shale slopes, always with much bare rock or soil in Greenbrier, Hampshire, Hardy, Kanawha, Mineral, and Pendleton Counties, WV.	YES	YES	No species surveys conducted – assumed presence.	MIINLT
Diana Fritillary *(Speyeria diana)*	G3G4/S2S3	Deciduous or mixed forest with a lot of violets in the understory in most of the range (in Randolph County, WV).	YES	YES	No species surveys conducted – assumed presence.	MIINLT

Source: NatureServe 2015

[1] Global/State Conservation Rank: G1 = Globally Critically Imperiled, G2 = Globally Imperiled, G3 = Globally Vulnerable, G4 = Globally Apparently Secure, G5 = Globally Secure, T# = Rank of subspecies or variety, S1 = State Critically Imperiled, S2 = State Imperiled, S3 = State Vulnerable, Q = Questionable Taxonomy, U = Unrankable, B = Breeding Populations, N = Non-Breeding Populations

[2] Impact Determinations: NI = No impacts, BE = Beneficial effects, MIINLT = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability, LT = Likely to result in a trend to federal listing or loss of viability

Once the scope was narrowed to 34 species, a determination was made as to what species should be surveyed to evaluate potential presence in the Project area and what species were known to occur in the area or would be difficult to evaluate presence based on survey and therefore, presence would be assumed.

4.3.2 Flora

Impacts to RFSS plants were evaluated using a desktop study that includes known locations (WVDNR database and MNF database), coordination with MNF staff on target species that could potentially occur within the Project area, and a botanical survey for MNF RFSS plants as well as federally listed plant species with suitable habitat or documented occurrences within the study corridor. The study area is a 300-foot-wide corridor centered on the proposed pipeline centerline, and a 50-foot-wide corridor on access roads centered on the road centerline. Sixty-one RFSS were evaluated during this study. Because of the large size of the MNF, MNF staff provided guidance to Columbia on the probability that RFSS plants would be present in the study corridor in the form of a Likelihood of Occurrence (LOO) Table (Table 4.3-2):

TABLE 4.3-2

WB XPress Project
Monongahela National Forest RFSS Plants Likelihood of Occurrence Screening Table

Scientific Name	Common Name	Species is present in suitable habitat	Suitable habitat found; species not confirmed	No suitable habitat, OR project area exceeds species range
Mammals				
(Agrostis mertensii)	Arctic Bentgrass		x	
(Allium allegheniense)	Allegheny Onion	x		
(Allium oxyphilum)	Lillydale Onion			x
(Amelanchier bartramiana)	Bartram Shadbush			x
(Arabis patens)	Spreading Rockcress		x	
(Astragalus neglectus)	Cooper's Milkvetch			x
(Baptisia australis var. australis)	Blue Wild Indigo			x
(Botrychium lanceolatum var. angustisegmentum)	Lanceleaf Grapefern			x
(Botrychium oneidense)	Bluntlobe Grapefern		x	
(Carex roanensis)	Roan Mountain Sedge		x	
(Clematis occidentalis var. occidentalis)	Purple Clematis		x	
(Corallorhiza bentleyi)	Bentley's Coralroot			x
(Cornus rugosa)	Roundleaf Dogwood		x	
(Cypripedium reginae)	Showy Lady's-slipper			x
(Delphinium exaltatum)	Tall Larkspur		x	
(Eriogonum alleni)	Shalebarren Wild-buckwheat			x
(Euphorbia purpurea)	Darlington's Spurge		x	
(Gaylussacia brachycera)	Box Huckleberry			x
(Gymnocarpium appalachianum)	Appalachian Oak Fern			x
(Hasteola suaveolens)	Sweet-scented Indian-plantain		x	
(Heuchera alba)	White Alumroot	x		
(Hexalectris spicata)	Crested Coralroot		x	
(Hypericum mitchellianum)	Blue Ridge St. John's-wort			x
(Ilex collina)	Long-stalk Holly			x
(Juglans cinerea)	Butternut	x		
(Juncus filiformis)	Thread Rush		x	
(Juncus trifidus)	Highland Rush		x	
(Liatris turgida)	Turgid Blazing Star			x
(Linum sulcatum)	Grooved Yellow Flax			x
(Listera cordata)	Heartleaf Twayblade			x
(Marshallia grandiflora)	Large-flowered Barbara's-buttons		x	
(Menyanthes trifoliata)	Bog Buckbean			x
(Monarda fistulosa ssp. Brevis)	Smoke Hole Bergamot		x	
(Ophioglossum engelmannii)	Limestone Adder's-tongue			x
(Paronychia argyrocoma)	Silvery Nailwort	x		
(Paronychia virginica)	Yellow Nailwort		x	
(Paxistima canbyi)	Canby's Mountain-lover		x	
(Pedicularis lanceolata)	Swamp Lousewort			x
(Phlox buckleyi)	Swordleaf Phlox			x

TABLE 4.3-2

WB XPress Project
Monongahela National Forest RFSS Plants Likelihood of Occurrence Screening Table

Scientific Name	Common Name	Species is present in suitable habitat	Suitable habitat found; species not confirmed	No suitable habitat, OR project area exceeds species range
(Piptatherum (=Oryzopsis) canadensis)	Canada Mountain Ricegrass		x	
(Platanthera shriveri)	Shriver's Frilly Orchid		x	
(Poa paludigena)	Bog Bluegrass			x
(Polemonium vanbruntiae)	Bog Jacob's-ladder		x	
(Potamogeton tennesseensis)	Tennessee Pondweed			x
(Pycnanthemum beadle)	Beadle's Mountain mint		x	
(Ranunculus pensylvanicus)	Pennsylvania Buttercup			x
(Rhamnus lanceolata ssp. Lanceolata)	Lanceleaf Buckthorn		x	
(Ribes lacustre)	Bristly Black Currant			x
(Scutellaria saxatilis)	Rock Skullcap		x	
(Silene virginica var. robusta)	Fire Pink		x	
(Stellaria borealis ssp. Borealis)	Boreal Starwort			x
(Taenidia montana)	Mountain Pimpernel		x	
(Taxus Canadensis)	Canada Yew			x
(Tortula ammonsiana)	Ammons' Tortula Moss			x
(Trichomanes boschianum)	Bristle-fern			x
(Trichostema setaceum)	Narrow-leaved Blue-curls		x	
(Trifolium virginicum)	Kate's Mountain Clover		x	
(Triphora trianthophora)	Nodding Pogonia			x
(Viola appalachiensis)	Appalachian Blue Violet		x	
(Vitis rupestris)	Sand Grape			x
(Woodwardia areolata)	Netted Chainfern			x

Source: *Recommended Environmental Resource Surveys for Proposed Columbia Gas Transmission, LLC, WB XPress Pipeline,* MNF, July 27[h], 2015.

Impact Determinations: -NI = No impacts, BE = Beneficial effects, MIINLT = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability, LT = Likely to result in a trend to federal listing or loss of viability,

1.0 FIELD INVESTIGATIONS

Columbia conducted biological field surveys for the Project, starting in August 2015 and continuing through August 2016. Surveys within the Project area included habitat and vegetation mapping, wetlands and waters surveys (attached as Appendix 2C to FERC Resource Report 2), and a Botanical Survey for TES and RFSS Plant Species (Columbia 2015a, 2016b). During field review for wetlands and waterbodies, crews verified habitat types initially identified during the desktop analysis. In addition, specialized habitats such as rock outcrops, large stick nests, cave and other openings, bedding areas, were documented during field reviews.

Species-specific surveys were conducted for the federally listed CMS and federally listed plants including running buffalo clover, shale barren rock cress, and small-whorled pogonia (Table 5-1).

TABLE 5-1

WB XPress Project
Federally Listed Threatened and Endangered Species that Potentially Occur in the Vicinity of the Project

Species	Status	State	MSHCP Covered (C) or Non-Covered Lands (NC)	Facilities Where Species May Occur According to MSHCP and IPaC
Indiana bat (*Myotis sodalis*)	Endangered	VA, WV	C, NC	MNF [All, except Chantilly CS and Line VA-1]
Virginia big-eared bat (*Corynorhinus townsendii*)	Endangered	VA, WV	C, NC	MNF [Nineveh MS, Strasburg CS, Dysart VS, Panther Mountain, Line WV from Glady to Smokehole, Elk River CS, Files Creek CS, Seneca CS Lost River, CS]
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	VA, WV	C, NC	MNF [All]
Cheat Mountain salamander (*Plethodon nettingi*)	Threatened	WV	C, NC	MNF [Line WB from Glady to Smokehole]
Diamond darter (*Crystallaria cincotta*)	Endangered	WV	C	Non-MNF [Elk River CS]
Clubshell (*Pleurobema clava*)	Endangered	WV	C	Non-MNF [Elk River CS]
Northern riffleshell (*Epioblasma torulosa rangiana*)	Endangered	WV	C	Non-MNF [Elk River CS]
Pink mucket (*Lampsilis abrupta*)	Endangered	WV	C	Non-MNF [Elk River CS]
Snuffbox mussel (*Epioblasma triquetra)*	Endangered	WV	C	Non-MNF [Elk River CS]
Rayed bean (*Villosa fabalis*)	Endangered	WV	C	Non-MNF [Elk River CS]
Spectaclecase (*Cumberlandia* monodonta)	Endangered	WV	C	Non-MNF [Elk River CS]
Madison cave isopod (*Antrolana lira*)	Threatened	VA	C	Non-MNF [Nineveh MS, Strasburg CS, Dysart VS]
Small whorled pogonia (*Isotria medeoloides*)	Threatened	VA, WV	C, NC	MNF [Chantilly CS, Line VA-1, Line WB from Glady to Smokehole]
Running buffalo clover (*Trifolium stoloniferum*)	Endangered	WV	C	MNF [Files Creek CS, Seneca CS, Line WB from Glady to Smokehole]
Shale barren rock cress (*Arabis serotina*)	Endangered	VA, WV	C	MNF [Nineveh MS, Strasburg CS, Dysart VS, Line WB from Glady to Smokehole, Lost River CS]
Virginia spiraea (*Spiraea virginiana*)	Threatened	WV	C	Non-MNF [Cleveland CS] *Note: MNF staff indicated this species has suitable habitat on MNF land*
Northeastern bulrush (*Scirpus ancistrochaetus*)	Endangered	VA, WV	C	Non-MNF [Lost River CS, Dysart CS]
Smooth coneflower (*Echinacea laevigata*)	Endangered	VA	NC	Non-MNF [Chantilly CS, Line VA-1]
Sensitive joint vetch (*Aeschynomene virginica*)	Threatened	VA	NC	Non-MNF [Chantilly CS, Line VA-1]
Swamp pink (*Helonias bullata*)	Threatened	VA	NC	Non-MNF [Chantilly CS, Line VA-1]

Source: MSHCP and IPaC

RFSS for which either suitable habitat studies or presence/absence surveys were conducted are as follows:

- West Virginia northern flying squirrel (WVNFS) (Habitat Suitability Survey) (Columbia 2016c)
- Eastern small-footed myotis (Habitat Suitability, Mist Net, and Acoustic Surveys) (Columbia 2016d, 2016e)
- Allegheny woodrat (Habitat Suitability and Small Mammal Trapping) (Columbia 2016e)
- Southern rock vole (Habitat Suitability and Small Mammal Trapping) (Columbia 2016e)
- Long-tailed shrew (Habitat Suitability and Small Mammal Trapping) (Columbia 2016e)
- Eastern spotted skunk (Habitat Suitability and Mammal Trapping) (Columbia 2016e)
- Timber rattlesnake (Habitat Suitability and Small Mammal Trapping) (Columbia 2016e, 2016f)
- Green salamander (Habitat Suitability and Small Mammal Trapping) (Columbia 2016e, 2016g)

Bird and nest surveys were not specifically conducted (except for Bald eagle); however, all bird observations (both visual and vocalizations) and stick nests within the survey area were documented during surveys conducted in June through October 2015 and in May and July 2016 by an experienced biologist with significant birding experience. A species list of visual and vocal recordings as well as a summary memo of bald eagle observations was provided to the MNF (Columbia 2016h). Subsequently, an aerial bald eagle nest survey was conducted on February 20, 2017, with no nests located.

A stream habitat quality evaluation based on a visual field review of stream and adjacent riparian habitats was conducted for the aquatic species (eastern hellbender, Cheat minnow, pearl dace, Rapids clubtail, and green-faced clubtail). This report was provided to the MNF (Columbia 2016i).

5.1 Habitat Suitability Studies

During initial biological surveys and wetland delineations, surveyors took notes and global positioning system (GPS) points of areas that appeared to be unique habitats. Information collected by surveyors was used to inform initial resource impact discussion and as justification for additional habitat-specific surveys. In addition to these initial habitat surveys, habitat suitability assessments were conducted around rocky features and in areas of modelled WVNFS habitat. These habitat suitability assessments were led by qualified biologists, approved by MNF staff, and included walk-through surveys of the Project area to identify rock features and WVNFS habitat. Information about the identified rock features was used to determine whether the features provided suitable habitat for a variety of RFSS and thus whether species-specific presence/absence surveys would be required. The result of this survey was provided to the MNF (Columbia 2016j). The results of the WVNFS habitat assessment were also provided to the MNF (Columbia 2016c). Additionally, qualified biologists assessed the suitability of certain areas for CMS habitat on multiple occasions, as described in section 6.1.3.1 and in Columbia's CMS reports (Columbia 2015b, 2016k).

1.0 Species-Specific Surveys

After initial desktop and field habitat suitability studies were conducted, it was determined that species-specific surveys would be required for CMS, green salamander, timber rattlesnake, eastern small-footed myotis, Allegheny woodrat, southern rock vole, long-tailed shrew, and eastern spotted skunk. Details of these surveys and species are provided in section 6.2. Because bald eagles are known from West Virginia and were opportunistically observed during select surveys, an aerial survey was conducted on February 20, 2017, prior to construction, to confirm the absence of bald eagle nests. The survey was conducted within one-half-mile upstream and downstream of the Project workspace along perennial streams or rivers and extends one-half-mile on either side of the stream or river. If construction is delayed to 2018, Columbia would conduct additional aerial bald eagle nest surveys prior to construction in early 2018. The results of this survey will be provided to MNF staff upon completion.

MNF staff also recommended a complete vegetation inventory of the Project area to determine community composition and presence or absence of RFSS plants. Details of this effort and results are provided in section 6.3.

2.0 ANALYSIS OF SPECIES POTENTIALLY FOUND IN THE STUDY AREA

Species presented in this section were determined to require a detailed analysis of impacts based on a preliminary presence/absence analysis. Where suitable habitat was documented for a species but species-specific surveys were not conducted for that species, presence was assumed and the potential effects of the Project are analyzed here.

This section provides information on the species' range, habitat, life history, potential presence in the Project area, field observations of species or their signs, and potential effects of the Project on the species. In addition, measures planned to avoid, minimize, and in some cases, mitigate for potential impacts on the species are provided as well as a final impact determination based on planned measures.

5.1 FEDERAL SPECIES

6.1.1 Golden Eagle

Golden eagles range throughout western North America and north to Alaska (NatureServe 2015). This eagle is rare in the eastern part of the country with only a few documented nests. The species is not known to nest in West Virginia, however they migrate in relatively large numbers along the Appalachian Mountain ridgelines of the state in Spring and Fall (Katzner et al. 2012, Nelson et al. 2015). The north-central Appalachian Mountains of Pennsylvania, West Virginia, and Virginia also support the greatest number of Golden Eagles from breeding populations in northern Quebec and Labrador (Katzner et al. 2012).

Golden eagles are large birds-of-prey with a seven-foot wingspan and can weigh up to 12.5 pounds. They generally forage in open habitats where small mammal prey is available, and trees or snags are often used for perches if they are near open areas where prey can be easily seen. Golden Eagles are less efficient predators in areas of dense cover vs open areas, as abundant shrub cover provides hiding and escape cover for prey (Tesky 1994). In addition to small mammals, Golden Eagles will prey on grouse, pheasants and other birds as well as rattlesnakes, frogs, and carrion (Tesky 1994; WVDNR 2006a).

Using the MNF tree stand Geographic Information System (GIS) layers, potential habitat was predicted based on information published by the WVDNR. It was found that the MNF contains approximately 48,461 acres of potentially suitable open or upland shrub habitat. In contrast, the desktop analysis of the study corridor indicated a presence of approximately 64 acres of potential open habitat within the Project area.

Globally, this species is listed as secure (G5) (NatureServe 2015). However, many eastern states list this eagle as S1, critically imperiled. There is no indication of a species status for this species in West Virginia (NatureServe 2015). Throughout the United States, golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) which prohibits take or disturbance of individuals. In addition, the Act prohibits the possession and sale of feathers or golden eagle parts (USFWS 2011).

Direct Effects on Individuals: Construction noise and activity could alter the behavior of golden eagles that stop during migration in surrounding areas. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: The proposed Project would maintain the right-of-way in an herbaceous state and may result in an increase in foraging habitat.

Conservation Measures: During construction, environmental inspectors (EI) will be on site during the winter and migratory season and will have stop work authority in the event a golden eagle is identified near the Project area. Work will be re-initiated once the eagle moves to a location where it is no longer observed by the onsite inspector.

Determination of Effect for Golden Eagles

It is not likely that the Project will impact golden eagle populations nor negatively impact individuals; therefore, the Project determination for this species is “no impact”.

6.1.2 USFWS Listed Species

The USFWS determined that there are 16 federally listed species that could potentially occur within the Project limits in West Virginia (Table 5-1). Of these 16 species, six federally listed mussels, the diamond darter, and Virginia spiraea are not known to occur within the counties where the Project crosses the MNF.

A plant survey was conducted for the federally listed small whorled pogonia, running buffalo clover, shale barren rock cress, and northeastern bulrush with potential suitable habitat within the counties crossed by the Project. Neither federally listed plants nor suitable habitat was identified in the study area during these surveys for these species. On March 7, 2016, the USFWS provided a letter concurring that Columbia would be in compliance with Columbia’s Multi Species Habitat Conservation Plan (MSHCP) because no federally listed plants were found during surveys.

The federally listed species remaining with known or potential suitable habitat or known occurrences in the Project area include: Virginia big-eared bat, northern long-eared bat (NLEB), Indiana bat, and CMS.

6.1.2.1 **Federally Listed Bats**

The Indiana bat (*Myotis sodalis*) is listed as federally endangered and has been protected under this listing since 1967 (FWS 2015b). Populations are in decline because of disturbance of cave and abandoned mine hibernacula, summer roosting and foraging habitat loss, and a fungal infection known as White-Nose Syndrome. Indiana bats are found within all of the counties that would be affected by the Project except Loudoun and Fairfax counties in Virginia.

The Virginia big-eared bat (*Corynorhinus townsendii*) has been protected as a federally endangered species since 1979 and is in decline primarily due to winter hibernacula habitat loss and summer habitat loss or degradation through pesticide use and exposure to contaminants (FWS 1979). Virginia big-eared bats have been documented to occur within Shenandoah and Warren counties in Virginia and Grant, Hardy, Kanawha, Randolph, and Pendleton counties in West Virginia (NiSource/Columbia 2013). Within Pendleton County, there are four caves that have been designated as critical habitat as documented in the MSHCP. These caves range from three to seven miles from the Project (FWS 2015).

The NLEB (*Myotis septentrionalis*) was listed as federally threatened in April 2015. The NLEB was primarily listed because of declining populations as a result of White-Nose Syndrome. Other factors that may be contributing to population loss include habitat loss or degradation, pesticides and environmental contaminants, and wind-farm operation. The distribution of the NLEB is widespread and it is found throughout the states of Virginia and West Virginia (FWS 2015a).

MSHCP-covered Lands

Columbia has developed a MSHCP in coordination with the USFWS, which identifies common pipeline activities that may take place within potential federally listed species habitat. The MSHCP outlines detailed monitoring, reporting, and management protocols for multiple Endangered Species Act (ESA) listed species known to occur in the project area, including the three federally listed bat species, and covers most of the Project area. There are approximately 1.8 miles of the Line WB replacement on NFS lands that have a reduced MSHCP-covered lands corridor (covering the existing right-of-way only), and a portion of the construction area is outside MSHCP covered lands. In the MSHCP non-covered portions of the 1.8mile length, a Myotid Bat Conservation Plan (MBCP) for MSHCP Non-Covered Lands in West Virginia (Columbia 2017a) was prepared in accordance with USFWS consultation (see MSHCP Non-Covered Lands section below).

All three federally listed bats occupy caves or other subterranean voids during winter hibernation. Virginia big-eared bats also occupy these habitats during summer, and are thus considered year-round cave residents. A Karst Terrain and Preliminary Geohazard Investigation was conducted in October 2015 to identify caves and other karst features in the vicinity of the Project. Areas of potential karst were identified using desktop methods within a Karst Review Area, which encompassed a one-mile-wide corridor extending 0.5-mile on each side of the proposed pipeline. Using the areas of potential karst identified during the desktop review, field surveys covering a 300-foot-wide corridor centered on the pipeline centerline were performed to identify surface karst features.

Twenty-four caves and karst features were identified in the one-mile corridor during the desktop review of potential karst areas. None of the cave or karst features identified were located in or within one-mile of MSHCP non-covered lands. A Karst Terrain and Preliminary Geohazard Investigation Report was provided to the MNF (Columbia 2015c).

Columbia has agreed to implement MSHCP avoidance and minimization measures associated with federally listed bats as they relate to cave and karst features. In addition, Columbia has prepared a Karst Mitigation Plan that was provided to the MNF (Columbia 2016l).

Within the majority of lands covered by the MSHCP, the Project is within known Indiana bat Priority 1 through 4 spring staging and fall swarming habitat and Virginia big-eared bat summer foraging and fall swarming habitat. Because of documented collocation of hibernacula with Indiana bat, Columbia has assumed NLEB are also present in these areas. In these areas Columbia would implement applicable avoidance and minimization measures (AMMs) from the MSHCP.

Within lands covered by the MSHCP, AAMs to protect bats would include:

- implementing size and quantity limitations on brush burning within 0.25-mile of known winter hibernacula;
- prohibiting vegetation or spoil disposal within 100 feet of known or presumed occupied winter hibernacula;
- prohibiting the clearing of suitable spring staging and fall swarming habitat within a 10-mile radius of known Priority 1 and 2 presumed occupied hibernacula from April 1 to May 31 and August 15 to November 14;
- implementing minimization criteria on blasting and drilling within 0.5-mile of known or presumed occupied winter hibernacula;
- prohibiting equipment service and maintenance within 300 feet of streambeds, sinkholes, and drainage areas to these features;
- educating contractors regarding the biology of the species and avoidance of the species; creating and maintaining open, herbaceous habitat within the pipeline right-of-way;
- restricting the use of herbicides within 10 miles of known or presumed occupied habitat winter hibernacula to those approved for use in karst and water areas;
- protecting potential recharge areas of cave streams and other karst features that are connected to potentially occupied hibernacula by employing Columbia’s ECS;
- prohibiting the clearing of known maternity colony summer habitat or trees greater than nine inches diameter at breast height within any existing right-of-way and/or appurtenant facilities from April 1 to October 15 to avoid direct affects to female and juvenile Indiana bats;
- prohibiting the clearing of suitable summer habitat from June 1 to August 1 to protect juvenile Indiana bats or side-trimming of suitable summer habitat from April 15 to September 1 to avoid direct affects to female and juvenile Indiana bats; and

- drilling within 0.5-mile of potentially occupied habitat only in a manner that would not compromise the structural integrity of the cave.

Additional measures to be implemented in MSHCP covered lands include those in known or presumed occupied caves/winter habitat, spring staging/fall swarming habitat, and summer habitat. Columbia may also conduct summer surveys to determine presence or probable absence of the three listed bats species in areas of the Project that are covered by the MSHCP but outside of Priority 1 and 2 or Priority 3 and 4 spring staging and fall swarming habitat for Indiana bat, or summer foraging and fall swarming habitat Virginia big-eared bat. If Columbia elects not to conduct presence or probable absence surveys in these areas, it would assume the bats are present and implement the applicable AMMs required in the MSHCP.

MSHCP Non-covered Lands

Portions of the Project are on lands not covered by the MSHCP. These include a small portion of the Line WB Replacement (about 2.1 miles) where the MSHCP only covers the existing right-of-way, and portions of the Project in Virginia including MPs 0.7 to 2.2 along Line VA-1 and the Line VA-1 Receiver Site. A MBCP was prepared by Columbia to provide avoidance, minimization, and conservation measures in Project areas of West Virginia not covered by the MSHCP.[1] The MBCP discusses background, habitat evaluation, and avoidance, minimization, and conservation measures in detail. In lands not covered by the MSHCP, Columbia assumed presence of listed bats and will implement the AMMs and conservation measures determined in the MBCP through consultation with FWS West Virginia Field Office.

Cave/mine portal surveys for lands not covered by the MSHCP were completed once the Karst Terrain and Preliminary Geohazard Investigation determined the areas of potential karst caves. Within karst habitats, survey areas encompassed a 300-foot-wide corridor centered on the pipeline centerline. No caves or karst features were located in or within one-mile of MSHCP non-covered lands during this survey.

As part of the MBCP process, Columbia performed habitat surveys in the Priority 1 and 2 and Priority 3 and 4 areas for potential roost trees (PRTs) and maternity habitat for Indiana bat and NLEB between May 16 and August 2, 2016 to determine suitable avoidance, minimization, and conservation measures. A total of 65 PRTs were documented, of which 29 were considered potential primary maternity roost trees (PMRT), and 36 were considered secondary PRTs. Of the PRTs identified, one potential PMRT was identified in workspace areas where tree clearing cannot be avoided for the Line WB Replacement. No PRTs were identified at Files Creek Compressor Station, Highway 48 Contractor Yard, Columbia Elkins Contractor Yard, United Parcel Service Contractor Yard, and Seneca Contractor Yard. A Roost Tree Survey Report is provided as Appendix G of Columbia's Myotid Bat Conservation Plan (MBCP) (Columbia 2017a).

A draft MBCP was provided to USFWS on December 4, December 15, 2015, and March 7, 2016. Columbia requested comments from the USFWS with those submittals and during phone calls on January 21, May 10, and May 31, 2016. The USFWS indicated that formal comments will not be provided on the MBCP; however, during a phone

[1] The Myotid Bat Conservation Plan was filed on January 27, 2016 and can be found on the FERC website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170127-5025 in the "Numbers: Accession Number" field.

conversation on June 27, 2016, the USFWS requested that Columbia provide a revised MBCP to include the results of the roost tree surveys and proposed conservation measures to offset the roost trees to be cleared in areas that are not covered by the MSHCP. Revised drafts of the MBCP were submitted in August 2016 and November 2016. Further comments were received from the USFWS in December 2016 and a final MBCP was submitted in January 2017 (Columbia 2017a).

Columbia will implement the following conservation measures to avoid and minimize potential impacts on Indiana bat and NLEB in Project areas not covered by the MSHCP: These measures, which are found in the MBCP, are based on the USFWS *Guidance on Developing and Implementing a Myotid Bat Conservation Plan.*

- Operators, employees, and contractors will be educated on the biology of the Indiana bat and NLEB, activities that may affect bat behavior, and ways to avoid and minimize these effects.
- Collocate Project Features with Previously Disturbed or Cleared Areas: The Project is collocated with an existing utility corridor.
- Avoid Cutting Potential Roost Trees/Minimize Limits of Disturbance: As the Project was originally designed, it would have required impacts to 6 PMRT and 10 PRT. Columbia reduced and reconfigured Project workspace to require the removal of only one PMRT and avoid the remaining PMRTs and PRTs.
- Pollution Control Plan in Place: Equipment servicing and maintenance areas will be sited at least 300 feet away from streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features. Columbia's ECS (Columbia 2016a) will be implemented throughout the Project.
- Strong Erosion and Sedimentation Best Management Practices: Adherence to sediment and erosion control measures will be strictly enforced within known or presumed occupied spring staging and fall swarming habitat to ensure restoration of topographic contours after any ground disturbance and successful restoration of native vegetation (where possible) as specified in Columbia's ECS (Columbia 2016a) upon completion of work. Columbia will obtain all necessary federal, state, and local permits, which also require implementation of best management practices.
- Seasonal Tree Clearing Restrictions: No clearing of trees greater than three inches in diameter at breast height will be allowed in suitable Indiana bat or NLEB habitat between April 1 and November 14. This includes side-trimming and tree removal (i.e., felling).
- Pollution Control Plan in Place: Use of tanks will be required to store waste fluids between April 1 and November 14 to ensure no loss of bats by entrapment in waste pits in known maternity colony summer habitat within the covered lands of the MSHCP.
- Avoid High Quality Foraging Areas: Construction activities will be avoided after sunset in known or suitable summer habitat to avoid harassment of foraging Indiana bat and NLEB.

- Avoid Use of Invasive, Exotic Plant Species When Stabilizing Soils: The right-of-way will be seeded with a native species mix on NFS lands. On privately owned lands, Columbia will use seed mixes approved by the WVDEP and listed in the ECS (Columbia 2016a) unless otherwise requested by landowners. Measures will be implemented to control the spread of invasive plants and invasive weeds as described in Columbia's ECS (Columbia 2016a) and the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures*.
- Erect artificial roosting structures: One artificial roosting structure will be erected to replace one PMRTs that would be lost during construction of the Project (a 1:1 ratio). The location of this structure will be coordinated with landowners and placed outside the right-of-way so that continued maintenance of the pipeline right-of-way does not interfere with the effective use by Myotid bats. The purpose of this conservation measure is to avoid net loss of PMRTs. The roosting structure will be monitored twice yearly for a period of two full years following the year of installation to determine occupancy.

Based on the proposed measures described above, the USFWS Virginia Field Office concurred on November 3, 2015 that the Project *may affect* but is *not likely to adversely affect* the Virginia big-eared bat, Indiana bat, and NLEB in Virginia.

In addition to coordination with USFWS, the Project must be in compliance with the MNF Forest Plan Standards and Guidelines for Indiana bats, as well as those for those bat species that are included in the Forest's RFSS list. Compliance requires mitigation for any potential roost trees that are lost. Such mitigation would involve girdling of live trees to facilitate creation of additional snags to serve as replacement potential roost trees. This mitigation will be performed in consultation with MNF staff.

Determinations of Effect for Indiana Bat, NLEB, and Virginia Big-eared Bat

Based on the implementation of the MSHCP and all of its applicable AMMs for these species, portions of the Project on covered lands comply with the MSHCP for the Virginia big-eared bat, Indiana bat, and NLEB.

Through proper implementation of all AMMs and conservation measures set forth in the MBCP, Columbia requested that Project activities in MSHCP non-covered lands of the Project may affect, but are not likely to adversely affect Virginia big-eared bat, Indiana bat, and NLEB. The USFWS decision on determination for federally listed bats is pending.

6.1.2.2 **Cheat Mountain Salamander (*Plethodon nettingi*)**

Background Information

The following paragraphs describe technical assistance and consultations with the USFWS under Section 7 of the Endangered Species Act.

In its March 7, 2016 letter, the USFWS indicated that based on the information provided, they could not concur with the determination of may affect, not likely to adversely affect for the CMS because they felt that the implementation of the MSHCP may adversely affect CMS individuals. This decision was based on the presence of suitable habitat within the existing right-of-way, tree clearing required in the existing right-of-way, and a misperception of survey results. While an individual was identified near the right-of-way, this individual was not identified within the existing right-of-way or an area that would be directly impacted by the Project. The letter also indicated that a site visit with Columbia staff, Dr. Thomas Pauley, and other agencies could clarify some questions remaining about the potential impacts to CMS and their habitat.

An on-site meeting was subsequently held on April 22, 2016 with staff from the USFWS, the WVDNR, the MNF, Dr. Thomas Pauley, ERM, and Columbia representatives. A walkthrough was conducted to review potential habitat within and along the existing right-of-way. During this visit, MNF requested that the boundaries of some of the suitable habitat be further refined since the mapped polygons appeared to be too general and uniform in shape (rectangular). Columbia agreed to have Dr. Pauley further refine the polygons previously created from the survey from August through October 2015.

Additional communication occurred between USFWS and Columbia on June 6, 2016, June 27, 2016, and July 7, 2016. Additional information regarding trees present within the right-of-way as well as the refined suitable habitat polygons were provided and discussed during these meetings. USFWS also requested that Columbia provide the most recent CMS survey report, an evaluation of habitat within the existing right-of-way and an analysis on the feasibility of avoidance of suitable habitat within the existing right-of-way that would assist them in making a determination.

On December 13, 2016, a meeting was held with staff from the USFWS, United States Forest Service (USFS), ERM, and Columbia representatives to further discuss potential impacts to CMS and their habitat. Based on discussions during the meeting, USFWS requested more information regarding the suitability of a small patch of bedrock and forested habitat extending into the southern side of the existing right-of-way. Based on follow-up information from Dr. Thomas Pauley, the USFWS issued a letter dated December 21, 2016. In that letter, the USFWS concluded that the CMS habitat in question is considered suitable, and since it is contiguous with habitat containing known CMS occurrences, it must also be considered occupied habitat. Due to unavoidable impacts to occupied CMS habitat within the existing right-of-way, the USFWS determined that adverse effects to CMS are likely to occur as a result of activities such as tree/vegetation removal and trenching, even with implementation of AMMs associated with the MSHCP. Therefore, the USFWS recommended that FERC submit an initiation package in order to initiate formal consultation under Section 7 of the ESA. A draft Biological Assessment (BA) was developed to evaluate effects to CMS within occupied habitat on lands not covered by the MSHCP.

Cheat Mountain Salamander Habitat Buffer on NFS Lands

In June 2016, additional habitat suitability studies and presence/absence surveys were conducted in areas previously identified by Dr. Pauley as suitable habitat for CMS within the Project study area. This survey was conducted based on recommendations by MNF staff during the April 22, 2016 site visit to further refine the boundaries of the suitable habitat.

Surveys were completed north and south of the existing right-of-way. Habitat at this site is in some respects not typical for CMS. It includes forest composed of deciduous trees with isolated single red spruce trees or small stands of red spruce trees. *Bazzania* *trilobata* is virtually absent. The presence of rock outcrops, the elevation, the proximity of this site to a known CMS population (approximately one-mile north on Spruce Mountain), and results of a CMS habitat model which indicated the area as potential habitat, rendered this site suspect for CMS occurrences.

Because habitat at this location generally contains only one main component (rocks) of habitat used by most known CMS populations, the area of potential habitat was defined during the initial delineations in 2015 as encompassing all of the rock outcrops and emergent rock areas. In the spring of 2016, four additional salamander surveys were completed in the areas exhibiting these rock characteristics to better define the limits of occupied CMS habitat. These four surveys were completed around the rocks on the south and north sides of the right-of-way. These surveys were conducted by Dr. Pauley and other qualified surveyors during optimal weather conditions (i.e., rainfall within 48 hours of the surveys) and included turning over rocks to search for salamanders and where rocks were too large to be moved by hand surveying the areas around the rocks.

Upon completion of the 2016 surveys, delineated boundaries of potentially suitable CMS habitat areas were revised. Although no CMS are known to occupy suitable habitat on NFS lands intersected by the Project, occupied CMS habitat is directly adjacent; therefore, the 300-foot buffer surrounding this CMS habitat extends onto NFS lands.

The areas of previously identified potential habitat north of the right-of-way were also surveyed to determine the full extent of occupied CMS habitat. A total of two additional live CMS's were observed during the 2016 surveys. A CMS survey report explaining the methodology and findings was provided to the MNF (Columbia 2016k).

Conservation Measures: In addition to the avoidance and minimization measures prescribed by Columbia's MSHCP for CMS (Columbia 2016m), Columbia proposed the following measures to avoid and minimize impacts to this species:

- Provide a CMS specialist onsite prior to construction to oversee the placement of barriers (such as silt fencing) to prevent CMS from entering the construction areas.

- Provide a CMS specialist onsite during construction of the pipeline within CMS habitat to reduce the likelihood of impacts to CMS. The CMS specialist will check open trenches daily for the entrapment of CMS or any other protected species.

- During construction, place temporary soil piles (consisting of soil excavated from the pipeline trench and vegetative debris removed for construction purposes) on the northern side of the workspace (within the existing right-of-way), adjacent to occupied habitat on the northern side of the right-of-way that would create a physical, wind, and noise barrier during construction. Dr. Pauley indicated that the soil piles could be beneficial for the CMS since there might be residual soil left after the soil piles were removed which could increase moisture on the north side of the right-of-way.

- Install silt fences around construction/soil disturbance activities near known CMS-occupied habitat and a 300-foot-wide habitat buffer. The silt fencing would isolate the work area from the remainder of the occupied habitat and 300-foot-wide buffer to prevent CMS from entering the work area, and to prevent or minimize the transfer of sediment from the work area into undisturbed parts of the occupied habitat and 300-foot-wide buffer. Soil on either side of the silt fence would be leveled with the surrounding grade and pressed against the inside and outside of the silt fence, to reduce the potential for CMS to approach the fence and fall into a trench on either side of the fence. The silt fencing would be inspected each morning prior to work to identify and fix any breaches in the fence. Construction work would not begin until the fence repairs are completed. If there is a breach in the silt fence, another CMS survey would be conducted within the fenced work area prior to re-starting work activities. When work activities are finished and the site is stabilized, the silt fencing would be removed from the occupied habitat and 300-foot-wide buffer and trenches or furrows would be filled in to grade under the supervision of a CMS specialist.

- Relocate red spruce growing within the existing right-of-way (which is also the proposed workspace). In addition to purchased red spruce plantings, Dr. Thomas Pauley suggested that Columbia relocate red spruce growing within the existing right-of-way to areas on the inside or outside edges of the proposed workspace to create a wind barrier.

- Within 300 feet of Cheat Mountain salamander habitat where it overlaps with NFS land, plant spruce saplings along the northwestern edge of the existing cleared right-of-way, at a distance of 25 feet from the existing WB-5 Pipeline. Seedlings will be planted westward to the limits of the 300-foot buffer (including within forested areas). Because of the paucity of spruce saplings in the area, saplings, three to five feet in height will be sourced from alternative areas on the MNF that will be identified by the MNF. Should suitable native saplings become available from a commercial source, those may also be used after approval by MNF. These saplings are intended to provide a wind break and potential future seed source in the area. As such, they will be planted six feet on center along the cleared section of the planting area (approximately 350 feet in length). Seedlings will be planted eight feet on center throughout the remainder of the area. Transplanting of saplings from alternative areas and planting of commercial seedlings will be based on optimal planting conditions within a two-year period. If fewer than 75 percent of the plantings survive the three-year monitoring period, they will be replaced with commercially-sourced native evergreen shrubs (e.g., rhododendron), species and size to be approved by the MNF.

- Enhance Columbia-owned land within and/or adjacent to CMS habitat. Columbia will use this land for conservation purposes in perpetuity and will transfer ownership of the property to the Government to become part of the National Forest system [following construction and restoration of temporary construction areas per the Construction, Operation, and Maintenance Plan (COMP)]. Columbia will develop habitat enhancement plans in this area in cooperation with Dr. Pauley of Marshall University, the MNF, USFWS, and other conservation partners. Habitat enhancement plans may include planting and or substrate enhancement for CMS; this enhancement may also occur on NFS lands, depending on areas deemed most suitable for restoration/enhancement. The extent and type of enhancement must be approved by the MNF as suitable mitigation for habitat lost within the 300-foot CMS habitat buffer (refer to the COMP and Restoration Plan (Appendix D of the COMP) for more details regarding this work).

- Following construction, Columbia will plant woody shrubs with shallow roots (e.g., rhododendron and mountain laurel) in areas used for temporary workspace on NFS lands that fall within the 300-foot-wide habitat buffer around CMS-occupied habitat east of the existing right-of-way.

- In coordination with MNF staff, Columbia may enhance or restore other off-site areas within or adjacent to NFS lands.

- Post-construction surveys will be conducted on NFS land within the 300-foot buffer of occupied CMS habitat for three years following construction, to document where CMS are active and to determine if CMS are expanding their use of habitat into adjacent areas previously not mapped as suitable habitat. Specifically, these surveys will evaluate if CMS are using the enhanced habitat areas Columbia will create in the vicinity of occupied habitat. Surveys will be developed and conducted by a qualified biologist, approved by the MNF.

- No lime will be used during restoration efforts within the 300-foot buffer zone around occupied CMS habitat.

- Columbia determined through discussions with the manufacturer that both *Proganics*™ and *Flexterra*™ can be applied with a high degree of accuracy. As such, Columbia believes the potential to accidentally spray these materials off the construction right-of-way is low. However, as an additional precaution, Columbia will leave the exclusion silt fencing in place within the 300-foot buffer zone around occupied CMS habitat during restoration activities.

Determination of Effect for Cheat Mountain Salamander

For the small area of occupied habitat not covered by the MSHCP, the BA determined that the Project *may affect* and is *likely to adversely affect* CMS. Anticipated level of take is based on occupied habitat affected by the Project, including 0.08-acre of directly impacted habitat and 1.15 acres of indirectly impacted habitat.

For lands covered by the MSHCP, including NFS lands, the Project is in compliance with ESA Section 7 regarding CMS, based on the implementation of the MSHCP and all of its applicable AMMs for this species, including installing the Line WB pipeline entirely within the existing right-of-way in areas that are within 300 feet of occupied habitat.

Based on site conditions, AMMs, and conservation measures proposed, the MNF finds that the portion of the project on NFS lands is in compliance with Forest Plan Standards and Guidelines for the species.

2.0 REGIONAL FORESTER SENSITIVE SPECIES - FAUNA

6.2.1 West Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*)

WVNFS was first listed as an endangered species in 1985 due to habitat loss. It was then delisted by the USFWS in 2008, the decision was reversed in 2011, and then a final rule was reinstated to delist the species in 2013. Increasing acreage of maturing forest and red spruce forest ecosystem restoration, such as in the NMF, have helped the WVNFS populations to stabilize in recent years.

The WVNFS is a small nocturnal animal that is covered with soft, dense, silky fur that is brownish above and grayish beneath. Individuals are about a foot long, half of which is the broad, flat tail, and weigh less than five ounces. These squirrels glide in the air on the parachute created by loose folds of skin between their fore and hind legs. These squirrels live in small groups and commonly share nests. They communicate with high-pitched chirps. Unlike other squirrels, WVNFS remain active in the winter. Their large, dark eyes enable these squirrels to see in low light. During the night, the squirrels are very active moving among trees and on the ground. West Virginia northern flying squirrels usually forage on lichen and fungi growing above and below ground.

Populations of the WVNFS can be found in isolated clusters atop the central Appalachian Mountains in the highest elevations of West Virginia and adjacent Highland County, Virginia. They live in high-elevation, spruce-northern hardwood forests of the Allegheny Highlands consisting of red spruce (*Picea rubens*), fir (*Abies* spp.), beech (*Fagus* spp.), yellow birch (*Betula allegheniensis*), sugar or red maple (*Acer* spp.), hemlock (*Tsuga* spp.) and black cherry (*Prunus serotina*) (USFWS 2006).

The WVNFS has been documented in seven West Virginia counties, including the Project counties of Grant, Randolph, and Pendleton.

Per the Land and Resource Management Plan (LRMP), presence will be assumed within all areas defined as suitable habitat for the WVNFS. Suitable habitat was evaluated by groundtruthing within the 300-foot-wide study corridor on NFS lands using MNF provided modelling of potential suitable habitat. Approximately 4.3 miles of the Project within NFS lands was subsequently mapped as suitable habitat for the WVNFS.

Columbia adjusted the Project workspace to avoid and minimize impacts to WVNFS suitable habitat to the maximum extent practicable. The Project has reduced tree clearing impacts in WVNFS potential suitable habitat from 31.9 acres (the August 2016 Project workspace boundaries) to the clearing of 517 trees[2] (the equivalent of 3.0 acres using MNF's standard density of 175 trees per acre) within suitable habitat on NFS lands. Columbia would provide mitigation for trees that cannot be avoided because they are growing within the proposed or existing right-of-way or within workspace that is necessary to construct the Project.

2 Trees were defined based on consultations with MNF staff and include red spruce and eastern hemlock that are >4" dbh; black locust that are >8"dbh, and all other tree species that are >5" dbh.

Direct Effects on Individuals: During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct effects would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: The Project could result in the loss of mixed hardwood/conifer forest and red spruce forest that could impact quantities and connectivity of WVNFS habitat.

Conservation Measures: To avoid, minimize, and mitigate potential impacts to the WVNFS, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible, as described above.
- Fragmentation of habitat will be minimized because of the use of existing right-of-way.
- Reduce the width of the SUP Authorized right-of-way to no more than 25 feet from the outermost pipelines located in the right-of-way. In some areas, the current SUP Authorized right-of-way is up to 150 feet wide. In most areas, the reduced authorized right-of-way will be 100 feet wide or less.
- Avoid clearing trees by confining vegetation clearing to the maintained right-of-way associated with Columbia's existing pipelines to the greatest extent practicable. Trees that cannot be avoided within WVNFS suitable habitat are identified in the COMP. The number of trees that will be cleared in WVNFS suitable habitat is provided in Table 6.2-1.

TABLE 6.2-1

WB XPress Project
Number of Trees to be Cleared within WVNFS Suitable Habitat [a]

Milepost Range	Number of Trees Cleared [b]
0.3-0.57	14
1.7-2.2	8
4.0-4.68	2
5.14-5.61	0
9.84-10.47	14
11.0-12.2	159
13.45	0
15.74-16.07	243
19.74-19.84	55
19.97-20.10	22
TOTAL	**517**

[a] As delineated during field surveys conducted in 2016.
[b] Trees to be cleared include trees meeting the following criteria: 1) red spruce and Eastern hemlock that are >4" diameter at breast height (dbh), 2) black locust that are >8"dbh, and 3) all other tree species that are >5" dbh for all other tree species. Trees not falling into one of the three listed categories will be cleared as needed in the workspace.

- In accordance with Table 6.2.-2, Columbia will relocate red spruce saplings within the construction workspace that are between 1 and 5 feet tall located within WVNFS suitable habitat. The saplings will be replanted along the edge of right-of-way near the removal site. A qualified team will walk through WVNFS suitable habitat prior to clearing to identify the red spruce saplings that meet this size criterion and the locations where they will be replanted. The number of seedlings (< one foot) within the workspace will also be estimated.
  - As part of the sapling identification process, Columbia will determine the estimated number of saplings to be moved and evaluate the feasibility of their relocation within the WVNFS suitable habitat. Columbia will coordinate with MNF staff on trees that may be too difficult to relocate based on specific conditions (e.g., conditions that would preclude the use of excavation equipment in areas without access or where soil conditions may preclude or make salvage impracticable). In these cases and where agreed upon by MNF, Columbia will either transplant into the area saplings meeting the height criterion from other locations recommended by MNF staff to the outside edge of the right-of-way, or plant commercially produced seedlings.
  - Columbia will coordinate with MNF on the anticipated number and feasibility of planting purchased seedlings in lieu of transplanting from within the right-of-way prior to the start of the transplanting process.
  - The timing of relocation of saplings to areas outside the right-of-way will be within appropriate timing windows (e.g., avoiding the heat of summer and snowpack of winter) as feasible with construction timing limitations.

TABLE 6.2-2

WB XPress Project
Red Spruce Saplings within WVNFS Suitable Habitat to be Relocated

Milepost Range	Miles	Estimated Number of Saplings Potentially Relocated [a]
0.3-0.57	0.27	27
1.7-2.2	0.50	50
4.0-4.68	0.68	68
5.14-5.61	0.47	47
9.84-10.47	0.63	63
11.0-12.2	1.20	120
13.45	0	0
15.74-16.07	0.33	33
19.74-19.84	0.10	10
19.97-20.10	0.13	13
TOTAL	**4.31**	**431**

[a] The exact number is unknown until the field crew is able to walk and identify all spruce saplings to be relocated,.

- Plant red spruce at a ratio of 1.5 red spruce seedlings per tree cleared (See Table 6.2-1 above). Based on surveys of trees located within the Project workspace, Columbia estimates that 517 trees will be cut within suitable habitat, and thus plans to plant 828 red spruce seedlings to mitigate for those trees. In addition, seedlings will be planted to offset the estimated number of seedlings (< 1 foot) that will be impacted by construction within the right-of-way. The planting locations will be selected with the assistance of MNF biological staff to improve forest moisture regimes to optimize WVNFS habitat. Areas identified for planting to date are shown on figures included the Restoration Plan (Attachment D of the COMP). Seedlings may be planted at the following locations:
    - immediately outside of the workspace (including but may not be limited to MP 11.7 to MP 12.0, MP 9.85 to MP 10.45),
    - in areas of the right-of-way where spacing between existing pipelines is greater than 35 feet (including but may not be limited to MP 11.25),
    - in the previously maintained Line WB pipeline right-of-way north of MP 11.7,
    - following construction in temporary workspace that is not part of long-term right-of-way, and
    - on or adjacent to or near NFS lands as recommended by MNF staff.
- The planted red spruce will be monitored for three years following construction to evaluate the success of the planting effort. If, at the end of three years, the planting effort is determined to be unsuccessful, Columbia will work with the MNF to determine what additional measures are required. This may include extending the duration of the monitoring program, or planting with additional red spruce seedlings. The monitoring is described in the Restoration Plan (Attachment D of the COMP). The Restoration Plan will also provide the protocol for field observations and data collection, and will establish the criteria for success of the red spruce seedling plantings.
- Place 10 artificial nesting structures. Nest box locations and specifications will be coordinated with MNF staff for appropriate placement and usefulness for West Virginia northern flying squirrel. Nest boxes will be constructed and placed in the field within one year following construction completion.
- Provide post-construction maintenance and monitoring to evaluate the condition and possible use of nest boxes for three years following box installation. Protocol to conduct the maintenance and monitoring will be coordinated with MNF staff prior to initiation of monitoring.
- Unless otherwise approved by MNF, no tree clearing associated with construction will occur in areas mapped as West Virginia northern flying

squirrel suitable habitat from April 1 to October 31 to avoid impacts during West Virginia northern flying squirrel nesting and lactating periods.

- EIs trained in the identification of WVNFS and their nests will be onsite during construction activity and will have stop work authority in the event a WVNFS individual or nest is identified near the Project area. Work will be re-initiated once the WVNFS moves to a location where it is no longer seen by the onsite inspector. If a nest is identified within the Project workspace, work will stop until MNF can be notified and coordination regarding mitigative efforts can be evaluated and implemented.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan prepared for the Project (Attachment E of the COMP), and in accordance with the MSHCP.

Determination of Effect West Virginia Northern Flying Squirrel

The Project may impact WVNFS individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.2 Tri-colored Bat (*Perimyotis subflavus*)

The tri-colored bat is a small bat, ranging from 2.9 - 3.5 inches long. Its color varies from yellowish or grayish brown to reddish brown with its underside somewhat paler. The tri-colored bat can be distinguished from *Myotis* species by its tri-colored pelage: the bases and tips of individual hairs are dark, while the middle sections are light. The ears, muzzle, and membranes on the forearms are light-colored and often appear pinkish, compared to the dark brown or black of *Myotis*. The tragus (fleshy projection in the ear) is short and blunt. The basal third of the tail membrane is furred dorsally, but on some individuals these hairs are sparse (Minnesota Department of Natural Resources 2015).

Tri-colored bats are found throughout southern Canada, eastern United States and Mexico. In the United States this species ranges as far west as New Mexico (NatureServe, 2015). In West Virginia, the bat is non-migratory (WVDNR 2015).

Suitable foraging habitat includes open woods near the edges of water, and over open water where this species feeds on aerial insects. They are not usually found in open fields or deep forests. Summer roosting habitat includes rock crevices, caves, buildings, and tree foliage. During the winter, caves, mines, and deep crevices serve as hibernacula (Arroyo-Cabrales et al, 2008a). Snags and hollowed trees are an important habitat feature. West Virginia, habitat types include caves and karst terrain, dry calcareous forests, oak-pine forests, high Allegheny wetlands, montane red oak forests, northern hardwood forest and riparian habitats (WVDNR 2015).

Using the National Wetlands Inventory (NWI) GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on NWI and field-surveyed open water habitat and did not take into account elevation, presence of suitable hibernaculum/maternity habitat and tree species. Since tri-colored bats typically avoid deep forested habitat, a desktop analysis of forest cover was not found to be a good representation of suitable habitat. Within the MNF, approximately 2,054 acres of open water and riverine habitat was present. NWI did not indicate a presence of open water habitat within the survey corridor. However, field survey data indicated that 27 waterbodies with open water habitat are located within the Project corridor. As a result, impacts to tri-colored bat habitat could be expected. Past data from mist-netting conducted on the MNF resulted in several captures of tri-colored bats within about one-half-mile of the Project right-of-way (USFS unpublished data)

Throughout their range, tri-colored bats have a global status of G2, imperiled. The status in West Virginia is S3, vulnerable (NatureServe, 2015). In West Virginia, tri-colored bats have suffered a 95 percent population decline, which has been attributed to white-nose syndrome. White-nose syndrome, which is caused by the fungus *Pseudogymnoascus destructans,* has been documented in Pendleton County, West Virginia since 2009 (WVDNR, 2015) and is now prevalent in hibernacula throughout the state. This species has also been impacted by wind turbines (NatureServe, 2015).

A Karst Terrain and Preliminary Geohazard Investigation was conducted in October 2015 to identify caves and other karst features. Areas of potential karst were identified using desktop methods within a Karst Review Area, which encompassed a one-mile-wide corridor extending 0.5-mile on each side of the proposed right-of-way. Using the areas of potential karst identified during the desktop review, field surveys covering a 300-foot-wide corridor centered on the pipeline centerline were performed to identify surface karst features.

Twenty-four caves and karst features were identified in the one-mile corridor during the desktop review of potential karst areas but none of these surface karst features (including caves) were identified within the NFS-owned parcels. A Karst Terrain and Preliminary Geohazard Investigation Report was provided to the MNF (Columbia 2015c, 2016l).

In an attempt to define suitable habitat for another RFSS bat, the eastern small-footed myotis, three sites were surveyed with both mist net and acoustic survey equipment. No tri-colored bats were captured incidentally either by mist net nor acoustic recordings during this study. An Eastern-Small Footed Bat Mist Net and Acoustic Survey Report was provided to the MNF (Columbia 2016d).

Based on the documented occurrence of several bat species in the area, including three federally listed bat species, and the known occurrence of Priority 1 and 2 Indiana bat staging/swarming habitat as well as Priority 3 and 4 Indiana bat staging/swarming habitat (known occupied winter hibernacula within 5 miles for Priority 1 and 2 and known occupied winter hibernacula within 10 miles for Priority 3 and 4), presence of the tri-colored bat on NFS land is assumed. Avoidance and minimization measures from the Columbia MSHCP applicable to the Indiana bat, NLEB, and Virginia big-eared bat will be implemented along the Project on NFS lands.

Direct Effects on Individuals: Noise and construction activity may be a temporary nuisance during the summer months, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Tree removal associated with the Project could decrease forest cover in an already-fragmented area, creating a local decrease in potential roosting habitat and an increase in suitable foraging habitat. However, the Project would be within or directly adjacent to the existing Columbia rights-of-way, thereby minimizing habitat loss and fragmentation. There will be no impacts to caves on NFS lands as a result of the Project. Therefore, no tri-colored bat hibernacula would be affected.

Conservation Measures: To avoid and minimize potential impacts to the tri-colored bat, Columbia will implement the conservation measures for the federally listed bat species found in section 6.1.2.1 above.

Determination of Effect for the Tri-colored Bat

The Project may impact tri-colored bat individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.3 Little Brown Myotis (*Myotis lucifugus*)

The little brown myotis is a very small bat with an overall body size that ranges from two and one-half inches to four inches, with a weight of no more than half an ounce. Their wingspan, when outstretched, can be up to 11 inches. The bat has glossy brown colored fur on the back and head with pale gray coloration below. The little brown myotis has short, round ears that reach the nostril when laid forward (NatureServe 2015; BioExpedition 2015).

Suitable habitat is typically deciduous woodlands near water. Foraging occurs in aerial habitat over forested wetlands and riverine habitat (NatureServe 2015). Upland habitat, including grasslands, shrublands, and deciduous forests, can also provide suitable habitat (NatureServe 2015). Some subspecies are found in dry climates where water is not readily available. In those habitats, drinking water is provided by moisture on cave walls or condensation on the fur (Arroyo-Cabrales and Álvarez-Castañeda 2008a). In West Virginia, the little brown myotis has been observed in a variety of habitats including agricultural areas, caves and karst formations, developed areas, dry-mesic oak forests, mixed mesophytic forests, northern hardwood stands, pine-oak rocky woodlands, river floodplains, sinkhole ponds, small lentic waterbodies, and small stream riparian habitat (WVDNR 2015). Most maternity colonies in West Virginia are located in human-made structures, such as abandoned buildings (WVDNR 2015). Roosting requires the presence of dead tree snags, caves and human-made structures. Little brown myotis live over a wide latitudinal and elevational range. During the winter, the timing of hibernation depends on altitude and location of the roosts. It usually starts between September and November and ends in March to May. They do not migrate long distances for hibernation roosts. Individuals travel only up to 100 miles. This species does not show territoriality at roosts, and large colonies up to 300,000 bats have been reported in a single roost (Arroyo-Cabrales and Álvarez-Castañeda 2008a).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on tree species composition and did not take into account elevation, presence of karst formations or caves. It was found that the MNF contains approximately 303,368 acres of potentially suitable northern hardwood forest and mixed hardwood-red spruce stands. In contrast, the analysis of the study corridor indicated a presence of approximately 45 acres of potential habitat within the Project area. Past data from mist-netting conducted on the MNF resulted in several captures of little brown myotis, including reproductive females, within one-half-mile of the Project right-of-way (USFS unpublished data)

Although once common and widespread throughout their range, little brown myotis is currently considered vulnerable, with a global status of G3. In West Virginia, this species is ranked S3, vulnerable and is considered a Priority 1 species by the WVDNR. Declines in West Virginia have largely been attributed to white-nose syndrome caused by the fungus *Pseudogymnoascus destructans* (WVDNR 2015; NatureServe 2015). White-nosed syndrome was first discovered in Pendleton County in 2009. Results from the West Virginia 2014-2015 winter bat survey indicated 97 percent population declines (WVDNR 2015). Other factors include human disturbance of bat maternity caves and mortality due to wind farming operation (NatureServe 2015).

A Karst Terrain and Preliminary Geohazard Investigation was conducted in October 2015 to identify caves and other karst features (Columbia 2015c). Areas of potential karst were identified using desktop methods within a Karst Review Area, which encompassed a one-mile-wide corridor extending 0.5-mile on each side of the proposed right-of-way. Using the areas of potential karst identified during the desktop review, field surveys covering a 300-foot-wide corridor centered on the pipeline centerline were performed to identify surface karst features.

Twenty-four caves and karst features were identified in the one-mile corridor during the desktop review of potential karst areas but none of these surface karst features (including caves) were identified within the NFS-owned parcels. A Karst Terrain and Preliminary Geohazard Investigation Report was provided to the MNF (Columbia 2015c, 2016l).

In an attempt to define suitable habitat for another RFSS bat, the eastern small-footed myotis, three sites were surveyed with both mist net and acoustic survey equipment. No little brown bats were incidentally captured either by mist net or acoustic recordings during this study. An Eastern-Small Footed Bat Mist Net and Acoustic Survey Report was provided to the MNF (Columbia 2016d).

Based on the documented use of several bat species in the area, including three federally listed bat species, and the known occurrence of Priority 1 and 2 Indiana bat staging/swarming habitat as well as Priority 3 and 4 Indiana bat staging/swarming habitat (known occupied winter hibernacula within 5 miles for Priority 1 and 2 and known occupied winter hibernacula within 10 miles for Priority 3 and 4), presence of little brown bat in all areas of NFS land will be assumed. Avoidance and minimization measures from the MSHCP applicable to the Indiana bat, NLEB, and Virginia big-eared bat will be implemented along the Project on NFS lands.

<u>Direct Effects on Individuals:</u> During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Tree removal associated with the Project could decrease forest cover in an already-fragmented area, creating a local increase in suitable foraging habitat and a decrease in suitable roosting habitat. From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared. Maintenance of the right-of-way in an herbaceous state may increase suitable foraging habitat for the little brown myotis.

Conservation Measures: To avoid and minimize for potential impacts to the little brown bat, Columbia will implement the conservation measures for the federally listed bat species found in section 6.1.2.1 above.

Determination of Effect for Little Brown Bat

The Project may impact little brown bat individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.4 Southern Water Shrew (*Sorex palustris punctatus*)

The southern water shrew is a small mammal that resembles a mouse-like rodent; however, it is not a rodent and not closely related. The southern water shrew is a relatively large shrew that grows to six inches in length including the tail. As with others in the genus *Sorex,* the snout is long and narrow and the ears are inconspicuous. The coloration includes dark gray fur above and pale gray below (Felbaum et al. 1995).

The range of the southern water shrew extends through the Appalachian-Allegheny Region from southern Pennsylvania to North Carolina (Felbaum et al. 1995; Natureserve 2015), and is documented to occur in five counties in West Virginia. This includes Pendleton and Randolph Counties where the Project crosses the MNF (Felbaum et al. 1995).

This species inhabits coniferous and northern hardwood forests with shaded, swift moving streams where the shrew forages for aquatic insect larvae (Natureserve 2015; Felbaum et al. 1995). Favorable streams contain moss covered rocks, banks with yellow birch (*Betula alleghaniensis)* with an understory of rhododendron (*Rhododendron Spp.)*. Other suitable overstory trees include maple (*Acer spp.*), hemlock (*Tsuga spp.*), and red spruce (*Picea rubens)* (Natureserve 2015). In West Virginia, suitable habitat is primarily located within the MNF (WVDNR 2015).

Using the NWI and tree cover type layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This waterbody analysis was based only on NWI and field-surveyed open water habitat, but did not take into account elevation or the presence of suitable habitat, or tree species. Within the MNF, approximately 1,581 acres of riverine habitat was present. Tree cover type analysis indicated approximately 303,368 acres of potentially suitable northern hardwood and 74,654 acres of coniferous forest exist within the entire MNF. In contrast, 45 acres of northern hardwood forest, and less than one acre of coniferous forest, is present within the survey corridor. There are 23 waterbodies crossed by the Project pipeline or associated access roads, within the MNF. Several waterbodies may contain suitable habitat for the southern water shrew.

Globally, the southern water shrew is considered G5T3, vulnerable, and within West Virginia, it is ranked S1 critically imperiled. Threats include pollution of waterways from coal mining operations, pesticide usage and siltation (NatureServe 2015; WVDNR 2015). Construction, logging, and road building have resulted in declines of this species (NatureServe 2015).

Because of the southern water shrew's use of rocky features as part of its habitat preferences, a rocky features habitat survey was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Line WB replacement centerline and within a 50-foot-wide corridor centered on access road centerlines in May 2016. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as at least marginally suitable habitat for use by small mammals were identified as locations where small mammal trapping would be conducted to further identify areas being used by RFSS rocky feature dependent small mammals. Additionally, small mammal traps were placed near WVDNR documented Allegheny woodrat locations near MP 22 and along TAR-48.1 (near MP 25.4). Small mammal presence/absence surveys were conducted using live traps and camera traps in July and early August 2016. While several non-RFSS small mammals were captured, no southern water shrews were captured in the live traps or by camera traps during the presence/absence surveys. The small mammal trapping survey was provided to the MNF (Columbia 2016e). Although no southern water shrews were captured during trapping surveys, the southern water shrew is known to also prefer non-rocky habitat types such as wetlands and streams, therefore, with only part of the southern water shrew's habitat surveyed, absence of this species cannot be confirmed.

<u>Direct Effects on Individuals:</u> The Project may impact this species at waterbody crossings. Clearing and grading of stream banks, instream trenching, trench dewatering and backfill could impact the southern water shrew. Increased sediment loading can result in turbidity. In addition, tree cutting associated with the Project may reduce favorable riparian bank habitat.

<u>Indirect Effects on Individuals:</u> Increase in turbidity, as a result of the Project, may temporarily reduce populations of favorable prey items such as aquatic insects.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the southern water shrew, Columbia will implement the following measures:

- Minimize impacts to wetland and riparian habitat by using existing right-of-way to the greatest extent possible.
- An EI trained in the identification of this species will be onsite during construction that will inspect open trenches for the presence of southern water shrew or any other RFSS and will relocate the species out of the workspace.
- Narrow the construction right-of-way to 75 feet wide through wetlands to allow for the installation of equipment crossings and to safely perform special construction methods at these locations.

- Within wetlands, vegetation will be cut to ground level. Grading and stump removal will be performed only over the trench, except where safety conditions dictate additional removal on the working side of the right-of-way.

- Where soils are unstable and saturated, stable temporary work surfaces in the wetlands may be constructed. Travel pads or gravel on geotextile fabric are possible methods of stabilization.

- The construction procedures used to cross unsaturated wetlands, areas where the wetland soil is firm enough to avoid rutting, will be similar to those used in upland areas.

- Topsoil will be segregated in unsaturated wetlands over the trench only. If the trench contains water, trench plugs will be used prior to its entrance to the wetland. The trench plugs are designed to minimize sediment discharges into the wetland from the open upland trench. Points at which the trench enters and exits the wetland will be sealed with trench breakers or foam breakers to maintain the hydrologic integrity of the wetland where required.

- Best Management Practices (BMP), as included in the Project-specific Erosion and Sediment Control Plans, will be installed at edges of the work areas in wetlands where there is a possibility for spoil to flow into undisturbed areas of the wetlands. Backfill will be well compacted, especially near the edges of the wetlands. Excess backfill will be spread over adjacent upland areas and stabilized during cleanup. Original topographic conditions and contours will be restored after completion of construction.

- Columbia will restore hydrologic conditions and soil profiles following construction, preserve the existing seed bank, and follow its ECS for restoration of wetlands. This includes but not limited to the installation of trench breakers at the base of slopes near the boundary between the wetland and adjacent upland areas, installation of permanent slope breaker/interceptor diversions across the construction right-of-way at the base of a slope greater than five percent where the base of the slope is less than 50 feet from the wetland, and installation of sediment barriers/sediment transport into a wetland.

- Non-biodegradable mats, erosion control fabric, or other materials that are used to stabilize soils during construction will be removed from wetlands and the construction right-of-way, when they are no longer needed.

- Columbia will conduct post-construction wetland monitoring events in accordance with FERC's Wetland and Waterbody Construction and Mitigation Procedures (Procedures) (2013a) and/or other permit requirements.

- Reseed wetlands and riparian areas with a native species mix as identified in Columbia's Restoration Plan.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan attached as part of the COMP.

- Columbia will construct stream crossings according to site-specific waterbody crossing plans for waterbody crossings that occur on NFS land which are included in the COMP.

- Complete in-stream work between June 1 and September 15 in coldwater fishery streams or during a period expressly permitted or required by MNF and WVDNR unless a site-specific waiver is issued by the WVDNR and consultation with a MNF fisheries biologist.

- Additional Temporary Work Space (ATWS) will be located at least 25 feet back from ephemeral streams, 50 feet back from small intermittent (drainage <50 acres) waterbody boundaries, and at least 100 feet back from perennial and large intermittent (drainage >50 acres) waterbody boundaries.

- Spoil piles will be placed at least 10 feet from the stream banks and immediately protected with erosion and sediment controls to reduce the potential for sedimentation into the waterbody.

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

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

- Design and maintain equipment bridges to prevent soil from entering the waterbody. Equipment bridges will be removed once access to the area is no longer required.

- With the exception of ephemeral waterbodies with no perceivable flow, the pipeline will be installed using a dry crossing method (e.g., flume or dam and pump). Each stream crossing with perceptible flow at the time of crossing will be treated as a separate construction entity such that trenching, pipe installation, backfilling, and temporary stabilization or final restoration are completed in a minimum number of calendar days possible.

- For smaller streams equal to or less than five feet wide, Columbia will attempt to complete trenching and backfilling within 24 to 48 hours barring unforeseen circumstances such as extensive removal of rock to achieve the required pipe depth or other field constraints. For larger streams (streams greater than five feet in width), Columbia will attempt to complete trenching and backfilling within five days, unless site-specific field constraints such as rock make this infeasible.

- Temporary construction-related impacts associated with the dry crossing method will be limited primarily to short periods of increased turbidity before installation of the pipeline, during the installation of the upstream and downstream dams, and following installation of the pipeline when the dams are pulled and flow across the restored work area is re-established. Streambed and bank stabilization will be conducted before returning flow to the waterbody channel.

- Where the Project crosses an ephemeral waterbody with no flow, the pipeline will be installed using an open cut method. Where this method is used, Columbia will attempt to restore and stabilize the waterbody bed and banks and buffers within 24 hours of backfilling, if feasible.

- A Spill Prevention, Control, and Containment (SPCC) Plan will be implemented during construction activities to mitigate potential adverse impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids. Specific measures in the SPCC include requirements to:

    - store bulk quantities of diesel fuel and gasoline in a designated fuel depot;
    - install adequate spill containment measures, such as containment dikes, combined with impervious lining before fuel storage tanks are filled;
    - keep sorbent booms and clean-up kits at storage locations;
    - locate fuel storage areas at least 100 feet from streams, ponds, or wetlands, and at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Columbia property;
    - not locate fuel storage areas within designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority);
    - service, lubricate, and refuel equipment in accordance with these same requirements whenever possible, and if not possible conduct these activities in accordance with a supplemental SPCC plan prepared by Columbia, based on field conditions;
    - place impervious or sorbent materials under the work area before conducting vehicle maintenance;
    - collect waste materials created during maintenance (e.g., used oil) for proper disposal;
    - inspect the work site and the vehicle after the maintenance work is complete to ensure that all hazardous materials are properly contained and collected for proper disposal; and
    - equip each construction crew with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.

- Following construction, the bed and banks will be seeded. Specific measures include backfilling the trench with native material. If present, native cobbles will be included in the upper one foot of trench backfill in waterbodies that contain coldwater fisheries. Where required by the MNF, streambed restoration would also include the replacement of stones on the surface of the bed similar to what was there prior to construction to create turbulence and riffles that would enhance the habitat value, as applicable. Columbia will return waterbody banks to pre-construction contours or to a stable angle of repose as approved by the EI.

- Columbia will install biodegradable erosion control fabric or a functional equivalent on waterbody banks at the time of final bank re-contouring. Synthetic monofilament will not be used on waterbody banks as an erosion prevention measure. Columbia does not anticipate using rip-rap for bank stabilization. If any rip-rap is deemed necessary at the time of construction, Columbia would comply with appropriate permit terms and conditions regarding its application.

Determination of Effect for the Southern Water Shrew

The Project may impact southern water shrew individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.5 Southern Bog Lemming (*Synaptomys cooperi*)

The southern bog lemming is a small rodent, similar in appearance to a vole, with a rounded snout, dark eyes, inconspicuous ears and a short tail. Adults are approximately five inches in length. The southern bog lemming is uniformly grayish brown with no apparent sexual dimorphism (Massachusetts Division of Fisheries and Wildlife 2015).

The range extends from Quebec, south to Georgia and as far west as Nebraska. The southern bog lemming occurs in 19 West Virginian counties including Pendleton and Randolph, where the Project crosses the MNF.

Favorable habitat for the southern bog lemming includes forested and emergent wetlands, riparian habitat, and sphagnum bogs (NatureServe 2015). Individuals also have been known to frequent open habitat including fields. In West Virginia, this species inhabits grassland, meadow and shrubby areas (WVDNR 2015). Southern bog lemmings are primarily herbivores feeding on plant material including sedge (*Carex spp*.). Behavior is both diurnal and nocturnal. Nesting occurs within a burrow that is lined with leaves, grass, and sedges. The burrows of several individuals can occur together in small colonies (NatureServe 2015). Local signs of the southern bog lemming activity include piled grass clippings and a characteristic bright green scat (Massachusetts Division of Fisheries and Wildlife 2015).

Local data and conversations with the WVDNR concluded that there are no known bog lemming populations in the area. However, while large wetland systems are not crossed, some wetland habitat (2.32 acres) will be temporarily impacted in 19 non-contiguous wetlands.

With an extensive range, the global status is secure (G5). However, due to a lack of open habitat in West Virginia, southern bog lemmings have been historically uncommon within the state. As a result, they are currently ranked S3, vulnerable (NatureServe 2015). Threats include competition with other rodent species, land development, diseases, and disturbance from human activity (WVDNR 2015).

Direct Effects on Individuals: During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. Construction may also disrupt lemming nests, causing juvenile and adult injury or mortality. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Since this species inhabits open land and emergent wetlands, the right-of-way may have limited impacts or could be beneficial. Regular maintenance of the permanent right-of-way during operation could provide suitable open habitat. Wetlands within the permanent right-of-way would be maintained in an emergent state.

Conservation Measures: To avoid and minimize potential impacts to the southern bog lemming, Columbia will implement the conservation measures for the southern water shrew found in section 6.2.4 above.

Determination of Effect for Southern Bog Lemming

The Project may impact southern bog lemming individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.6 Rock Outcrop Species

Within the MNF, there are rocky features (including rock outcrops, talus slopes, rocky ledges, rock clusters, etc.) located within the survey area for the Project. Rock features are considered sensitive habitat by MNF and impacts to rock features identified on NFS land during surveys will be minimized using methods developed in coordination with MNF staff. A rocky features habitat walkthrough was conducted in May 2016 to determine where rocky features are located that have characteristics that indicate they could be used as suitable habitat for rock-dependent RFSS. A rocky features habitat walkthrough study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as potential suitable habitat for RFSS were further surveyed using species-specific surveys. RFSS that are dependent on rock features are discussed below.

6.1.2.1 Southern Rock Vole (Microtus chrotorrhinus carolinensis)

Southern rock voles are small mouse-like rodents measuring 5.5 to 7.3 inches from snout to tail tip. The tail is approximately 25 percent of their total length. The fur is brownish above and grayish-white below. The area between the nostrils and the eyes usually ranges from yellowish to deep orange-rufous. (Linzey and NatureServe 2008a). The southern rock vole is endemic to the central and southern Appalachians located in Maryland, North Carolina, Tennessee, Virginia, and West Virginia (WVDNR 2015; NatureServe 2015). It has been documented in seven counties in West Virginia including the Project counties of Pendleton and Randolph (NatureServe 2015).

The vole prefers cool, damp, moss-covered rocks, and talus slopes in vicinity of streams in coniferous and mixed forests at higher elevations in the Appalachians (Smithsonian National Museum of Natural History 2015a). It also occupies deciduous forest/spruce clear-cuts (mainly recent cuts), forest ecotones, grassy balds near forest, and sterile-looking rocky road fills. (Linzey and NatureServe 2008a). In West Virginia, this species is found in high elevation red spruce forests, and northern hardwoods within the Allegheny Mountain ecoregion (WVDNR 2015).

Throughout their range southern rock voles are considered T3, vulnerable. In West Virginia, this species is ranked S2, vulnerable (WVDNR 2015). This species is vulnerable to loss of red spruce forest (WVDNR 2015). There are no known locations of southern rock vole within the Project area. However, suitable habitat may exist within the Project boundary.

Because of the vole's dependence on rocky features, a rocky features habitat survey was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Line WB replacement centerline and within a 50-foot corridor centered on access road centerlines in May 2016. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as marginally suitable habitat for use by small mammals were identified as locations where small mammal trapping could be conducted to further identify areas being used by RFSS rocky feature dependent small mammals. Small mammal presence/absence surveys were conducted using live traps and camera traps in July and early August 2016. While several non-RFSS small mammals were captured, no southern rock voles were captured in the live traps or by camera traps during the presence/absence surveys. The small mammal trapping survey was provided to the MNF (Columbia 2016e). Although no southern rock vole were captured during trapping surveys, MNF staff believes that the southern rock vole is known to be somewhat difficult to capture with trapping and therefore suggests that the absence of this species cannot be confirmed.

<u>Direct Effects on Individuals:</u> During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> The Project would result in loss of suitable rock outcrop and red spruce forest.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the southern rock vole, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- An EI will be onsite during construction that will inspect open trenches for the presence of southern rock vole or any other RFSS and will relocate the species out of the workspace.
- Install silt fences or other obstructive barriers around construction/soil disturbance activities near known suitable small-mammal rocky features. The obstructive barriers would isolate the work area to prevent southern rock vole from entering the work area. The obstructive barriers would be

inspected each morning prior to work to identify and fix any breaches in the fence. Construction work would not begin until the fence repairs are completed.

- Blasting will be conducted in a manner that will not compromise the structural integrity or alter karst hydrology (e.g., maximum charge of two inches per second ground acceleration avoids impact to nearby structures). All blasting shall be subject to the following limitations.
    - Maximum peak particle velocity of 1.25 inches per second in any of three mutually perpendicular axes, measured at the lesser distance of the nearest facility or the edge of the permanent easement.
    - Maximum drill size shall be 2.5 inches unless approved by Columbia.
    - Maximum quantity of explosive per delay shall be governed by the recorded measurements as influenced by work site conditions.
    - Explosive agents and ignition methods shall be approved by Columbia. Ammonium nitrate-fuel oil and other free flowing explosives and blasting agents are not acceptable and shall not be used.
    - Drill holes shall not be left loaded overnight.
    - Good stemming material is to be used in all holes.
- Rock structures located within the workspace may be permanently relocated to areas outside of the workspace. When relocating rocks to areas outside of the workspace, EIs will work with construction staff to recreate rocky habitat for southern rock vole. This includes placement of rocks in a structure with an abundance of interstices and crevices, layered rocks, and shade so that moss and other moisture dependent conditions can develop.
- Reseed the right-of-way with a native species mix that will encourage the use southern rock vole which is known to forage at forest edges.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with red spruce and other native trees and shrubs. The replanting plan is included as Attachment D to the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan included as Attachment E to the COMP.

- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat).

Determination of Effect for Southern Rock Vole

The Project may impact southern rock vole individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Allegheny Woodrat (*Neotoma magister*)

Allegheny woodrats have brown-gray fur with a white underside and a long, bicolored and fur-covered tail. At first glance the Allegheny woodrat may seem physically similar in appearance to the exotic Norway rats, but they can be distinguished from Norway rats by their blunt nose, long whiskers, big ears, and furry tail (Pennsylvania State University 2015).

The Allegheny woodrat range extends from western Connecticut, southeastern New York, northern New Jersey, and northern Pennsylvania southwestward through western Maryland, Tennessee, Kentucky, West Virginia, and northern and western Virginia to northeastern Alabama (observed in several cave systems) and northwestern North Carolina, with isolated populations north of the Ohio River in southern Ohio.

In West Virginia, woodrats are common in caves, rock shelters, outcrops with deep crevices, and riverbanks with an abundance of sandstone rocks and boulders. (Linzey and NatureServe 2008b). It is considered a habitat specialist because it is found only in rock patches within large forests. These rock features are essential because they provide protective cover and serve as locations for nests and food caches. Active denning sites are found on steep southeast- and southwest-facing slopes. South-facing slopes are warmer and drier than north-facing slopes because they receive more sunlight. Woodrats that select these slopes may have a greater probability of surviving harsh winters (Pennsylvania State University 2015).

The Allegheny woodrat has a unique pattern of defecating repeatedly in the same location, known as latrine areas. They are apparently used over several years by multiple individuals and can become eight to 10 inches wide. This unusual behavior can be helpful in determining the current or historical presence of woodrats. These nocturnal animals are not commonly observed, so biologists rely on sign such as latrine sites to detect woodrats. (Pennsylvania State University 2015).

Globally, this species is ranked G3 vulnerable and is declining in many parts of its range. In West Virginia, the Allegheny woodrat is ranked S3, vulnerable (NatureServe 2015). Populations are susceptible to habitat disturbance such as roads or highways. In West Virginia, a major threat to woodrat colonies includes high raccoon (*Procyon lotor*) populations. Raccoons transmit parasites such as the raccoon roundworm (*Baylisascaris procyonis*) around den sites that can cause mortality in woodrats (WVDNR 2015). Human garbage and food scraps and attract raccoons and increase raccoon population density (WVDNR 2015).

Population declines may be caused by increased predation by great horned owls, changes in the landscape such as forest fragmentation and changing forest composition, reduced availability of acorns and American chestnuts, and infection with *Baylisascaris procyonis* which they contract by ingesting dried raccoon feces (USFS 2002a).

Four known locations of Allegheny woodrat are documented in the WVDNR Natural Heritage Database (NHD) in the Project vicinity. The closest known location to the Project is approximately 0.25-mile north of the Line WB replacement at MP 22.2. There is also a known identification site 1.6 miles south of the Line WB replacement at MP 23.4 and two additional locations located 0.9-mile and 1.9 miles southeast of the eastern end of the Line WB replacement (MP 25.4).

Because of the woodrat's dependence on rocky features, a rocky features habitat survey was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Line WB replacement centerline and within a 50 foot corridor centered on access road centerlines in May 2016. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as at least marginally suitable habitat for use by small mammals were identified as locations where small mammal trapping would be conducted to further identify areas being used by RFSS rocky feature dependent small mammals. Additionally, small mammal traps were placed near WVDNR documented Allegheny woodrat locations near MP 22 and along temporary access road (TAR)-48.1 (near MP 25.4). Small mammal presence/absence surveys were conducted using live traps and camera traps in July and early August 2016. While several non-RFSS small mammals were captured, no Allegheny woodrat were captured in the live traps or by camera traps during the surveys. The small mammal trapping survey was provided to the MNF (Columbia 2016e).

<u>Direct Effects on Individuals:</u> Movement of heavy equipment could result in individuals being crushed. Construction could disrupt burrows and may cause mortality or abandonment. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals</u>: This Project could result in alteration nor loss of rock outcropping habitats, reducing the suitable habitat within the forest.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the Allegheny woodrat, Columbia will implement the following measures:

- The conservation measures for the southern rock vole in section 6.2.6.1 above.

- Within the areas identified as potential suitable rocky feature habitat for Allegheny woodrat, replant native trees on the inside or outside edge of the right-of-way to provide mast material for the woodrat. Additionally, the planting of native trees on either side of the right-of-way will encourage meta-population connectivity across the width of the right-of-way.

- From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

Determination of Effect for Allegheny Woodrat

The Project may impact Allegheny woodrat individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Long-tailed Shrew (*Sorex dispar*)

The long-tailed shrew is a small mammal that resembles a mouse-like rodent; however, it is not a rodent and not closely related. This species is identified as a medium-sized, gray shrew measuring approximately five inches in length, including a two inch tail (Laerm and Ford 2007; NatureServe 2015). The facial features include a characteristically long and narrow snout, inconspicuous eyes and reddish brown teeth (Laerm and Ford 2007). Adult tails are usually rounded at the tip (NatureServe 2015). There is no obvious sexual dimorphism; however, males are usually slightly heavier than females (NatureServe 2015). The long-tailed shrew could be confused with the smoky shrew (*S. fumeus*), another uncommon West Virginian species. The smoky shrew has similar fur color and size. However the bicolored tail of the smoky shrew can be used as a distinguishing feature (Laerm and Ford 2007).

The long-tailed shrew is found in eastern North America, from Quebec south to Georgia. This species has been documented in nine West Virginian counties including Randolph County where the Project crosses the MNF (NatureServe 2015).

Suitable habitat includes cool, damp deciduous and coniferous forests with bare rocks. Soil, detritus and coarse woody debris are required for burrowing and nest sites (NatureServe 2015). Mature stands with moss-covered soils over talus slopes are preferred. In West Virginia, this species inhabits the Allegany Mountain, Cumberland Mountain, and ridge and valley ecoregions. The state has documented individuals inhabiting oak woodlands, red spruce forests, as well as, along streams and riparian habitat. This species tends to occur in mountainous regions with rocky habitat and outcroppings (WVDNR 2015).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR. This desktop analysis was based only on tree species composition and did not take into account elevation or the presence of rock habitat. It was found that the MNF contains approximately 374,915 acres of potentially suitable oak woodlands and 53,814 acres of spruce habitat. The analysis of the study corridor indicated a presence of approximately 125 acres of potential oak habitat within the Project area and no spruce habitat.

Globally, this species is ranked G4, apparently secure. In West Virginia the long-tailed shrew is ranked S2, imperiled, and is at risk from habitat loss from development, fragmentation, parasites, and decline of tree species due to disease (WVDNR 2015; Laerm and Ford 2007). There are no known locations of long-tailed shrew within the Project area. However, suitable habitat may exist within the Project boundary.

Because of the long-tailed shrew's dependence on rocky features, a rocky features habitat survey was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Line WB replacement centerline and within a 50-foot-wide corridor centered on access road centerlines in May 2016. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as at least marginally suitable habitat for use by small mammals were identified as locations where small mammal trapping would be conducted to further identify areas being used by RFSS rocky feature dependent small mammals. Additionally, small mammal traps were placed near WVDNR documented Allegheny woodrat locations near MP 22 and along TAR-48.1 (near MP 25.4). Small mammal presence/absence surveys were conducted using live traps and camera traps in July and early August 2016, though long-tailed shrew was not a target species of this survey effort. While several non-RFSS small mammals were captured, no long-tailed shrews were incidentally captured in the live traps or by camera traps during the presence/absence surveys. The small mammal trapping survey was provided to the MNF (Columbia 2016e). Although no long-tailed shrews were captured during trapping surveys, the long-tailed shrew is known to be somewhat difficult to capture with trapping and therefore, with the presence of marginally suitable habitat, absence of this species cannot be confirmed.

<u>Direct Effects on Individuals:</u> Movement of heavy equipment could result individuals being crushed. Construction could disrupt burrows and may cause mortality or abandonment. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals</u>: This Project could result in alteration, fragmentation or loss of rock outcropping habitats, reducing the suitable habitat within the forest.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the long-tailed shrew, Columbia will implement the conservation measures for the southern rock vole found in section 6.2.6.1 *<u>except for</u>* the following two measures:

- Reseed the right-of-way with a native species mix that will encourage the use southern rock vole which is known to forage at forest edges.
- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat).

Determination of Effect for Long-tailed Shrew

The Project may impact long-tailed shrew individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.6.4 Eastern Spotted Skunk (*Spilogale putorius*)

Spotted skunks are smaller than striped skunks and are more weasel-like in appearance. This is one of the smallest skunks with short legs and a long, bushy tail with a white tip. It has a black coat with 4 broken white stripes and a white patch on the nose and front of the ears. The average total length is 18 to 22 inches with an average weight being 1.0-1.5 pounds. (Virginia Department of Game and Inland Fisheries [VDGIF] 2015a). Like all skunks, they have anal scent glands that can emit a foul-smelling spray for self-protection. The spotted skunk usually sprays as a last resort, if stomping with its front paws or doing a handstand is not sufficient to warn off an intruder (Smithsonian National Museum of Natural History 2015b).

The eastern spotted skunk ranges east to North Carolina, Virginia and as far west as Wyoming. Agriculture helped expand the range west into the Great Plains region. In West Virginia, this species has been documented in nine counties, including the Project County of Pendleton (NatureServe 2015). Eastern spotted skunks have inhabited several areas of the Appalachian Mountains of the eastern United States since the early 1900s (Cuarón et al. 2008).

Preferred habitat includes forested areas or habitats with significant cover. They are also found in open and brushy areas, rocky canyons, and outcrops in woodlands and prairies (Cuarón et al. 2008). In West Virginia, this species inhabits acidic and calcareous rock outcrops, cliffs and talus slopes, as well as, caves and karst features usually associated with dry oak or mixed mesophytic forest. Eastern spotted skunks inhabit the Allegheny, Cumberland Mountain, and Ridge and Valley Ecoregions (WVDNR 2015). The eastern spotted skunk does not truly hibernate but has short inactive periods in the winter to conserve body fat. Several may den together in the winter. Underground dens are either excavated or abandoned by other animals and have two to five entrances with one to three nest chambers (VDGIF 2015a). Soil, fallen logs, and hollow trees make suitable den sites. Most activity is nocturnal, but also can occur during the late evening and the early morning hours (NatureServe 2015).

Although once an abundant species, in many parts of their range, populations have declined from 50-90 percent. In West Virginia, eastern spotted skunks are ranked critically imperiled. This species is vulnerable to disease such as rabies and distemper. In addition, eastern spotted skunks are susceptible to collisions with vehicles (NatureServe 2015). There are no known locations of eastern spotted skunk within the Project area and discussions with WVDNR staff indicate that use of the area by eastern spotted skunk would be unlikely (Stihler 2016). However, suitable habitat may exist within the Project boundary.

Because of the eastern spotted skunk's use of rocky features, a rocky features habitat survey was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Line WB replacement centerline and within a 50-foot corridor centered on access road centerlines in May 2016. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as at least marginally suitable habitat for use by small mammals were identified as locations where mammal trapping would be conducted to further identify areas being used by RFSS rocky feature dependent mammals. Mammal presence/absence surveys were conducted using live traps and camera traps in July and early August 2016. While several non-RFSS small mammals were captured, no eastern spotted skunk were captured in the live traps or by camera traps during the presence/absence surveys. The mammal trapping survey was provided to the MNF (Columbia 2016e). Although no eastern spotted skunk were captured during trapping surveys, MNF staff believes that the eastern spotted skunk is known to be somewhat difficult to capture with trapping and absence of this species cannot be confirmed.

Direct Effects on Individuals: The Project would increase local vehicular traffic along forest roads, possibility resulting in a greater risk of skunk mortality. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Construction noise and activities could alter behavior causing stress or temporary displacement. Available habitat for this species may decline as a result of the Project.

Conservation Measures: To avoid and minimize potential impacts to the eastern spotted skunk, Columbia will implement the conservation measures required for southern rock vole found in section 6.2.6.1 above.

Determination of Effect for Eastern Spotted Skunk

The Project may impact eastern spotted skunk individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Eastern Small-footed Myotis (*Myotis leibii*)

The eastern small-footed myotis is a small bat species with a total length of 2 $^{7}/_{8}$ to 3 ¼ inches. It is the smallest myotis in the United States. It has brown fur that is long and glossy with black accents. Its foot and forearm are small and short. It has a flat skull and keeled calcar (Bat Conservation International 2014).

The eastern small-footed myotis can be found from western Arkansas north and east through southern New England. To date the largest seemingly contiguous area occupied by the bat is mountainous areas of New York, Pennsylvania, West Virginia and Virginia (Bat Conservation International 2014).

Suitable habitat is located in hilly or mountainous areas, in or near deciduous or evergreen forest and sometimes in open farmland. In winter, the bat uses caves or abandoned or inactive mines as hibernacula. Warm-season roosts include buildings, towers, hollow trees, spaces beneath the loose bark of trees, cliff crevices, and bridges (Arroyo-Cabrales and Álvarez-Castañeda 2008b). Suitable habitat in West Virginia includes dry woodlands, pine-oak forests, talus slopes, and areas with boulder, cliffs, caves and karst habitat (WVDNR 2015).

Globally, eastern small-footed myotis is ranked G4, apparently secure. In West Virginia, however, the species is ranked critically imperiled, yet state survey data suggests a slight increase in population from 2013-2015 (WVDNR 2015). Unlike most bats, declines resulting from white-nose syndrome, estimated at 12 percent, and wind turbine mortality have been more limited than declines seen in other bat species. The most significant factor resulting in the decline of the eastern small-footed myotis is loss or fragmentation of karst or rock habitat due to land development. Loss of this habitat has been attributed to utility rights-of-way, forestry, and other human disturbance (WVDNR 2015).

According to data managed and provided by WVDNR, one eastern small-footed myotis was documented previously at the North Fork Mountain Lookout Tower located immediately adjacent to the Project workspace at MP 23.3.

In May 2016, a habitat survey for rock features was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Project centerline and within a 50-foot corridor centered on Project access road centerlines. These features were evaluated for potential to support eastern small-footed myotis. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Three rock features identified as potentially suitable roost and maternity habitat for eastern small-footed myotis were surveyed in July 2016 using a combination of either emergence counts, mist netting, and/or acoustic monitoring. No bats were detected at two of the features; however, one unidentified bat emerged from Area 10A, a talus slope on the edge of the existing right-of-way. In the absence of any further information to the contrary, it is assumed that bat was an eastern small-footed myotis, even though only one eastern red bat (*Lasiurus borealis*) was captured in mist nets.

Direct Effects on Individuals: Area 10A is not located within the Project limits of disturbance; therefore, no direct effects are anticipated to that habitat or any individuals that may occupy it.

Indirect Effects on Individuals: Construction noise and activity may be a temporary nuisance to individuals, potentially resulting in altered behavior. These indirect effects would be temporary and only occur during the construction phase if the species is occupying Area 10A during construction. This Project would result in alteration, fragmentation or loss of other unoccupied rock features that may be suitable for future use.

Conservation Measures: To avoid and minimize potential impacts to the eastern small-footed myotis, Columbia will implement the following measures:

- Minimize impacts to rock features by using existing right-of-way to the greatest extent possible.

- Rock features located within the workspace may be permanently relocated to areas outside of the workspace. When relocating rocks to areas outside of the workspace, EIs will work with construction staff to recreate rocky habitat for eastern small footed myotis with crevices and areas where bats can roost. Rocky features will be placed on both south facing slopes with full sun and in shaded, north facing slopes to encourage seasonal use by bats.

- No blasting will occur within 100 feet of Area 10A, where presence is assumed for eastern small-footed bats based on surveys conducted in July 2016.

- In areas farther than 100 feet from Area 10A, blasting will be conducted in a manner that will not compromise the structural integrity of rock features (e.g., maximum charge of two inches per second ground acceleration avoids impact to nearby structures). Blasting shall be subject to the following limitations.

    - Maximum peak particle velocity of 1.25 inches per second in any of three mutually perpendicular axes, measured at the lesser distance of the nearest facility or the edge of the permanent easement.

    - Maximum drill size shall be 2.5 inches unless approved by Columbia.

  - Maximum quantity of explosive per delay shall be governed by the recorded measurements as influenced by work site conditions.
  - Explosive agents and ignition methods shall be approved by Columbia. Ammonium nitrate-fuel oil and other free flowing explosives and blasting agents are not acceptable and shall not be used.
  - Drill holes shall not be left loaded overnight.
  - Good stemming material is to be used in all holes.
- If the EI observes bat activity directly associated with a rock feature located near construction activities, the following measures will be implemented to prevent adverse impacts:
  - If removal of rock features is proposed, Columbia will delay the removal of the rock until the eastern-small footed bat maternity season (May 15 to August 15) is complete.
  - If subsequent bat studies or observations reveal that a maternity colony is present, a 150-foot buffer will be placed around the maternity roost rock feature, and construction activities will not occur until the maternity season (May 15 to August 15) is complete.
- Reseed the right-of-way with a native species mix that will encourage the use of insects and other prey that eastern small-footed bat may hunt at forest edges.
- Control the spread of non-native invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

The following avoidance and minimization measures for Indiana bat, NLEB, and Virginia big-eared bat from the MSHCP may also be applicable to the conservation of eastern small-footed myotis:

- No woody vegetation or spoil (e.g., soil, rock, etc.) disposal within 100 feet of known or presumed occupied hibernacula entrances and associated sinkholes, fissures, or other karst features.
- Protect potential recharge areas of cave streams and other karst features that are hydrologically connected to known or presumed occupied hibernacula by employing the relevant ECS standards such as Section III, Stream and Wetland Crossings, and Section IV, Spill Prevention, Containment and Control.

- Blasting within 0.5-mile of known or presumed occupied hibernacula will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the hibernacula (e.g., maximum charge of two inches per second ground acceleration avoids impact to nearby structures).
- If authorized by the landowner, block (e.g., gate) access roads and rights-of-way leading to known or presumed occupied hibernacula from unauthorized access.
- Equipment servicing and maintenance areas will be sited at least 300 feet away from streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features.
- Contaminants, including but not limited to oils, solvents, and smoke from brush piles, should be strictly controlled as provided for in the ECS, Section II.C.2, and Section IV so the quality, quantity, and timing of prey resources are not affected.
- Implement strict adherence to sediment and erosion control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible) as specified in the ECS upon completion of work within suitable summer habitat and known or presumed occupied spring staging and fall swarming habitat.

Determination of Effect for Eastern Small-footed Myotis

The Project may impact eastern small-footed myotis individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Timber Rattlesnake (*Crotalus horridus*)

The timber rattlesnake is venomous and is a stout-bodied rattlesnake that grows to lengths of 36 to 60 inches. The color markings of the snake can either be yellow, brown, black, dark brown, or gray with black or dark brown cross-bands which may be V-shaped. The bands break up anteriorly to form a row of darker spots down the back, and a row along each side of the body. The head is typically black with facial pits and vertical pupils (Virginia Herpetological Society 2015). This species emerges from hibernation in April and May, and mates soon thereafter, sometimes before leaving the den. They give birth to 5 to 19 young in August and September. In the fall, they congregate in considerable numbers near favored den sites and often hibernate with copperheads and other snakes. This snake does not defend a territory. It is diurnal in the spring and fall and nocturnal during hot summers (VDGIF 2015b).

This species occurs at elevations up to 6,000 feet and sometimes higher, in the Blue Ridge, in the far western mountains, and in the western Piedmont. It inhabits upland hardwood and mixed pine-hardwood forests, in areas where there are sunny, rocky slopes and ledges. This snake needs places to hibernate that allow it to stay below the frost line, such as large cracks in rock outcroppings (VDGIF 2015b).

In May 2016, a habitat survey for rock features was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Project centerline and within a 50-foot corridor centered on Project access road centerlines. These features were evaluated for potential to support timber rattlesnakes. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j).

The three rock features identified as potentially suitable habitat for the timber rattlesnake were surveyed by a team led by Dr. Thomas Pauley. Surveys were conducted following guidelines developed by the Pennsylvania Fish and Boat Commission's Natural Diversity Section (revised 2/11/2010). Researchers documented the color phase, sex, total length, snout-vent length, and reproductive condition (Pennsylvania Fish and Boat Commission 2010). Standard protocol to survey for the species includes two to four visits to each potential suitable habitat on overcast rainy days and at night.

Thirteen timber rattlesnakes were identified at locations within the study area that were identified as potential suitable gestation and denning habitat. Twelve of these were located within two habitat areas (the same feature presumed to be occupied by the eastern small-footed myotis), where seven yellow phase and five black phase adults were identified. One black phase adult appeared to be gravid. The remaining snake was identified as a black phase gravid female located in a rocky feature approximately 11 miles away. A copy of the timber rattlesnake survey report identifying the locations of the timber rattlesnakes seen was provided to the MNF (Columbia 2016f).

In addition to snakes associated with the identified den, six other sightings of timber rattlesnakes were documented during field visits conducted by non-herpetologists. The locations of these sightings were reviewed by Dr. Thomas Pauley during walkthroughs to look for potential gestation and denning habitat but no potential gestation/denning habitat was documented within the 300-foot-wide study corridor in the immediate areas around the sightings.

Direct Effects on Individuals: The den is outside the Project limits of disturbance, and no blasting will occur within 100 feet. Therefore, the den is not expected to be directly impacted by Project construction. Because no direct impacts are expected, potential direct effects to individuals would be temporary and only occur during active construction. Construction activities are expected to be completed during summer months (June 1 to August 31) to avoid interference with rattlesnakes returning to the den. Monitoring (including survey information and telemetry) will further minimize the potential for impacts to individuals and will provide information regarding pre- and post- activity and survival. On-site inspection and species awareness training (see Conservation Measures below) will prevent and abate injury or mortality to snakes that may wander into the workspace. If any snakes are found in the workspace, qualified rattlesnake biologists will safely move them. Timber rattlesnake inspection/monitoring is a technique employed and regulated closely by wildlife agencies in the nearby states of Pennsylvania, New Jersey, and New York. When performed according to guidelines, it is considered safe for the species.

Incidental mortality could occur due to vehicle or equipment traffic; however, the presence of on-site biologists, monitoring of roads, awareness training, and strict adherence to speed limits will abate this risk.

Indirect Effects on Individuals: The Project is not expected to result in damage or alteration of denning habitat, and only temporary disturbance to gestational habitat; therefore, no loss of viability is expected to the local population. Construction activity may result in altered behavior if conducted while snakes are present in the vicinity; however, this effect would be temporary, and on-site monitoring will ensure that disturbance to individuals is minimized and that any snakes attempting to return to the den are able to do so (in case constructions activities extend outside the expected time period due to extenuating circumstances). Potential foraging habitat within the workspace will also be temporarily made unavailable during the construction process. Movement pathways to and from denning or gestational habitat could be altered, potentially inhibiting the ability of snakes to access these habitats during or after construction.

Conservation Measures: To avoid and minimize potential impacts to the timber rattlesnake, Columbia will implement the following measures:

- Minimize impacts to forested and rocky habitat by using existing right-of-way to the greatest extent possible.

- In areas near identified timber rattlesnake basking, denning, gestation habitat, or areas where individuals were identified, a qualified rattlesnake biologist (with certifications/permits) will inspect workspaces during construction to handle and relocate any rattlesnakes identified within or near the Project workspace for the safety of both the snake and construction personnel.

- Conduct pre-construction species awareness training for construction personnel that may be working on NFS lands. Training will include the identification, proper avoidance, and protective measures for timber rattlesnakes, including a strict no kill or harassment policy.

- Install obstructive barriers (such as silt fencing) around active construction areas. The obstructive barriers would isolate the work area to deter timber rattlesnakes from entering. The obstructive barriers and all active construction workspaces would be inspected each morning prior to work. If breaches are found in the barriers, construction work would not begin until repairs are completed and the workspace is re-inspected for timber rattlesnakes.

- As stated, blasting will not occur within 100 feet of the potential denning sites. Columbia has used the methods described in the Blasting Plan as close as 10 feet to active gas pipelines without altering the integrity of the pipeline. While Columbia believes that these techniques would also protect nearby potential denning sites in rock formations at similar distances, Columbia has agreed to prohibit blasting within this larger buffer to protect identified potential denning habitat:

    - If removal of bedrock is required within 100 feet of the potential denning site to accommodate deeper placement of the pipe, rock hammering will be used but will be limited to the construction timing window of June 1 to August 31 when denning activities are not anticipated to occur.

- In the event that field conditions are encountered that would prevent the completion of rock hammering during this period, Columbia will request a variance to this window if no impacts to the rattlesnake are anticipated to result from extension of the rock hammering window.

- In areas where blasting may occur (outside the 100-foot buffer around potential denning sites), blasting will be conducted in a manner that will not compromise the structural integrity or alter karst hydrology (e.g., maximum charge of two inches per second ground acceleration avoids impact to nearby structures). All blasting shall be subject to the following limitations:
  - Maximum peak particle velocity of 1.25 inches per second in any of three mutually perpendicular axes, measured at the lesser distance of the nearest facility or the edge of the long-term right-of-way.
  - Maximum drill size shall be 2.5 inches unless approved by Columbia.
  - Maximum quantity of explosive per delay shall be governed by the recorded measurements as influenced by work site conditions.
  - Explosive agents and ignition methods shall be approved by Columbia. Ammonium nitrate-fuel oil and other free flowing explosives and blasting agents are not acceptable and shall not be used.
  - Drill holes shall not be left loaded overnight.
  - Good stemming material is to be used in all holes.

- In areas not identified as known timber rattlesnake habitat, some rock structures located within the workspace may be permanently relocated to areas outside of the workspace. When relocating rocks to areas outside of the workspace, EIs will work with construction staff to re-create rocky habitat for timber rattlesnake. This includes placement of the structures on south-facing slopes that receive direct sunlight at a quantity of one for every one-tenth of a mile. The structures will consist of flat rocks in a two-layered stack structure with an open crevice and exposed flat surfaces so that rattlesnakes can use the warm surfaces to bask.

- The construction workspace corridor will be narrowed and limited to a width of 50 feet within the existing maintained right-of-way at denning and gestation sites.

- Unless otherwise authorized by MNF, construction activities (with the exception of tree clearing which will be done by hand) will occur between June 1 to August 31 at denning and gestation sites.

- If determined to be necessary by MNF of on-site biological monitors, high-visibility fencing will be placed around the site to protect any denning and gestating rattlesnakes; however, the timing and placement of any such barriers will not inhibit the movement of snakes into the den. Placement of soil and debris piles will be avoided in the identified denning and gestation sites. Any necessary relocation of snakes within or near the project workspace will be conducted under the supervision of an EI certified to relocate any for the safety of both the snake and construction personnel.

- Pre-construction monitoring of the denning and gestation sites will be conducted by a qualified rattlesnake biologist. Post-construction monitoring of these same areas will be conducted by a qualified rattlesnake biologist following construction to ensure that timber rattlesnakes are still successfully using the denning and gestation site. Columbia will coordinate with MNF staff and species specialists to develop details regarding an appropriate monitoring plan. Columbia will use external transmitters and conduct telemetry to assess and minimize potential indirect impacts to rattlesnakes using denning and gestational habitat and may also use pit tags or camera traps to assess survival as part of a joint monitoring program between Columbia and MNF. This monitoring requirement and details will be included in Columbia's COMP.

Determination of Effect for Timber Rattlesnake

The Project may impact timber rattlesnake individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 **Green Salamander *(Aneides aeneus*)**

The green salamander is a long-legged, slender salamander with bright green to yellow lichen-like patches on a dark background, making this species easy to identify. Its flattened body and head and its expanded, square-tipped toes are distinctive adaptations for climbing and living in rock crevices. The eyes are large and protuberant. The ventral surface is light bluish or yellowish gray and unmarked except for faint yellow coloration at base of each leg (USFS 2004a).

The green salamander is usually active at night due to the cooler and wetter conditions produced by mountain fog and evening dew. Although it sometimes lives in decaying tree cavities, this rare salamander will usually inhabit rock outcrops with deep, narrow crevices. Its flat body allows it to squeeze into tiny rock crevices which provide necessary high humidity and protection from predators (North Carolina Wildlife Resources Commission 2005).

The range of the green salamander extends throughout the Appalachian mountain region. Eastern Tennessee and Kentucky harbor stronghold populations, and scattered populations also exist in the Blue Ridge Mountains of north Georgia, western North Carolina, and northwestern South Carolina (University of Georgia 2015). There are no documented occurrences of green salamander within the Project study area.

Because of the green salamanders' dependence on rocky features, a rocky features habitat survey was conducted on NFS lands within the 300-foot-wide survey corridor centered on the Line WB replacement centerline and within a 50-foot corridor centered on access road centerlines in May 2016. A rock features habitat suitability study summary and map was provided to the MNF (Columbia 2016j). Rocky features identified as potential suitable habitat for use by green salamander were then surveyed specifically for the presence/probable absence of the species by a team led by one of the leading experts on green salamander, Dr. Thomas Pauley. Dr. Pauley used a standard protocol to survey for the species that included two to four visits to each potential suitable habitat on overcast rainy days and at night. The biologists used flashlight searches to locate salamanders by looking for reflection on the skin or eyes and attempts to lure the salamander from its crevice for proper identification. No green salamanders were identified at any of the locations within the study area that were identified as potential suitable habitat. A copy of the green salamander survey report was provided to the MNF (Columbia 2016g). Although no green salamanders were captured during trapping surveys, MNF staff believes that with the presence of potentially suitable habitat, even of poor quality, absence of this species cannot be confirmed.

<u>Direct Effects on Individuals:</u> Injury or mortality could result from salamanders becoming trapped in excavated trenches or crushed by construction machinery. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> This Project would result in alteration, fragmentation or loss of rock outcropping habitats. Tree clearing would also result in a reduction of decaying trees with cavities, further reducing suitable green salamander habitat.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the green salamander, Columbia will implement the following measures:

- Minimize impacts to forested and rocky habitat by using existing right-of-way to the greatest extent possible.

- Install silt fences or other obstructive barriers around construction/soil disturbance activities near known suitable green salamander rocky features. The obstructive barriers would isolate the work area to prevent green salamander from entering the work area. The obstructive barriers would be inspected each morning prior to work to identify and fix any breaches in the fence. Construction work would not begin until the fence repairs are completed.

- Blasting will be conducted in a manner that will not compromise the structural integrity or alter karst hydrology (e.g., maximum charge of two inches per second ground acceleration avoids impact to nearby structures). Blasting shall be subject to the following limitations.

    - Maximum peak particle velocity of 1.25 inches per second in any of three mutually perpendicular axes, measured at the lesser distance of the nearest facility or the edge of the permanent easement.

- Maximum drill size shall be 2.5 inches unless approved by Columbia.
- Maximum quantity of explosive per delay shall be governed by the recorded measurements as influenced by work site conditions.
- Explosive agents and ignition methods shall be approved by Columbia. Ammonium nitrate-fuel oil and other free flowing explosives and blasting agents are not acceptable and shall not be used.
- Drill holes shall not be left loaded overnight.
- Good stemming material is to be used in all holes.

- Rock structures located within the workspace may be permanently relocated to areas outside of the workspace. When relocating rocks to areas outside of the workspace, EIs will work with construction staff to recreate rocky habitat for green salamander. This includes placement of rocks in a structure with an abundance of interstices and crevices, layered rocks, and shade so that moss and other moisture dependent conditions can develop. Rock features should be placed in cool, shaded areas such as northern facing slopes to encourage appropriate green salamander preferred conditions.
- Within the areas identified as potential suitable rocky feature habitat for green salamander, replant native trees including red spruce. The planting of native trees on the inside or outside edge of either side of the right-of-way will encourage meta-population connectivity across the width of the right-of-way. The replanting plan is included as Attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Green Salamander

The Project may impact green salamander individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.7 Birds

6.1.2.1 Northern Goshawk (*Accipiter gentilis*)

The northern goshawk is a large raptor with a long tail and broad, rounded wings. The top of its head is dark with a stripe through the eye area and a white eyebrow stripe. It has a gray belly with a blue-gray back (Cornell Laboratory of Ornithology 2015a). Though normally shy and secretive, the northern goshawk will make itself known when the safety of its nest and young are in question. Famous for a vigorous defense of its nest, this powerful bird of prey has been known to aggressively chase off animals much larger than itself (Peregrine Fund 2015). Northern goshawks typically nest from mid-February to April (USFS 2016).

The MNF lies at the southern end of the range for northern goshawk in eastern North America. In West Virginia, it is found in five counties, including Randolph (NatureServe 2015). It may be a somewhat uncommon year-round resident and may be more common in the winter months (Audubon 2015).

Goshawks are forest interior species and inhabit northern hardwood or red spruce forests of the Alleghany Mountains ecoregion (WVDNR 2015). It maneuvers through dense woods, taking prey as small as squirrels and as large as grouse, crows, and snowshoe hare (Cornell Laboratory of Ornithology 2015a). This species is generally restricted to wooded areas, but may occur in relatively open woods or along edges. It prefers breeding in mixed forests over coniferous forests. During winter incursions to the south, often when northern prey is scarce, it may be found in any forest type (Audubon 2015).

Northern goshawk is currently considered globally secure (G5). In West Virginia, this species is considered S1, critically imperiled. Logging operations and other tree removal practices, result in declines of suitable habitat. Nearby logging activity can result in nest abandonment. Reducing canopy cover and stand density also attracts long-eared owls, red-tailed hawks (*Buteo jamaicensis*) and great-horned owls (*Bubo virginianus*), which compete or even prey upon goshawks (NatureServe 2015). In West Virginia, goshawks are jeopardized by forest fragmentation (WVDNR 2015).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on tree species composition and did not take into account elevation. It was found that the MNF contains approximately 303,368 acres of potentially suitable northern hardwood forest and mixed hardwood-red spruce stands. In contrast, the analysis of the 300-foot-wide study corridor indicated a presence of approximately 45 acres of potential habitat within that area.

The MNF does not have documented individuals or habitat for northern goshawk in the Project area. While a specific northern goshawk survey was not conducted within the study area based the MNF's analysis of suitable habitat for nesting, biological survey teams opportunistically observed the study area for large stick nests that could be used by raptors and none were identified within a 300-foot-wide survey corridor centered on the Project centerline. Survey crews also documented any birds either observed or heard during their walkthroughs and no goshawks were noted. This species is most likely absent from the Project area.

<u>Direct Effects on Individuals:</u> During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> The construction of this Project would result in tree clearing which could result in habitat loss, fragmentation, and habitat degradation. This could decrease suitable nest areas and attract goshawk competitors.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the northern goshawk, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.

- If tree clearing will occur in northern goshawk nesting season, conduct pre-construction walkthroughs to verify that no nests will be disturbed by clearing activities. If a northern goshawk nest is identified within the Project area, work in the area will stop and the MNF Forest Wildlife Biologist will be contacted to determine the appropriate no-disturbance buffer to maintain until chicks have fledged, as well as other possible measures. Nesting trees will not be removed until chicks have fledged the nest, in accordance with the Migratory Bird Treaty Act (MBTA).

- During construction, EIs will be on site during construction activity and will have stop work authority in the event a northern goshawk individual or nest is identified near the Project area. Work will be re-initiated once the northern goshawk moves to a location where it is no longer seen by the onsite inspector.

- Provide construction staff with MNF's flyer regarding northern goshawk (Columbia 2016n) so that staff working on NFS lands can contact MNF staff at the contact point referenced on the flyer if a northern goshawk is identified in the Project area.

- Reseed the right-of-way with a native species mix that will encourage the use of prey species since the northern goshawk is known to forage at forest edges.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat).

Determination of Effect for Northern Goshawk

The Project may impact northern goshawk individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 **Long-eared Owl (*Asio otus*)**

The long-eared owl breeds throughout the northern and western United States and Canada. This species winters in the central and southern portions of the United States and Mexico. Long-eared owls are year-round residents throughout the central portion of their range, including West Virginia (NatureServe 2015). The Monongahela National Forest lists the long-eared owl as a year-round resident of the Forest (USFS 2016).

The long-eared owl is a medium sized owl that is approximately 14 inches in length (NatureServe 2015). This owl has brown streaking on the breast, mottled brown on the back with horizontal barring on the tail and flight feathers. The eyes of this owl are yellow and the facial disk displays a pale orange color. Most noticeably, the long-eared owl has two ear-like plumicorn feathers that extend on either side of the head (Cornell Laboratory of Ornithology 2015b).

This species inhabits both deciduous and coniferous forest with dense vegetation. Eastern populations tend to prefer deciduous forests. In addition to woodlands, this species also inhabits orchards, parks and farm woodlots (NatureServe 2015). In West Virginia, this species occupies early successional woodlands, dry-mesic oak forests, high Allegheny wetlands, and northern hardwood forests (WVDNR 2015). The nests are placed in trees using old nests of other large avian species. Occasionally long-eared owls will nest in tree cavities (NatureServe 2015).

Long-eared owls are opportunistic carnivores and feed largely on small rodents, such as voles and mice. Foraging occurs in open areas, such grassy fields (Cornell Laboratory of Ornithology 2015b). This species is mostly nocturnal (NatureServe 2015).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on tree species composition and did not take into account elevation. It was found that the MNF contains approximately 303,368 acres of potentially suitable northern hardwood forest and mixed hardwood-red spruce stands. In contrast, the analysis of the 300-foot-wide study corridor indicated a presence of approximately 45 acres of potential habitat within that area. In addition, it was determined that 48,461 acres of potentially suitable open or upland shrub habitat is present within the MNF. In contrast, the analysis of the study corridor indicated a presence of approximately 64 acres of potential open and shrubby habitat within the Project area.

The long-eared owl is not a federally listed species or a candidate for listing. Throughout much of the range, this species is considered secure (NatureServe 2015). However, in West Virginia long-eared owls are considered S1, critically imperiled under the S-Ranking system and a Priority 1 species (WVDNR 2015). Holt (1997) found that there is limited information regarding the cause of population trends in the long-eared owl. However, human development, competition with other owl species, loss of grasslands and riparian areas may be the cause of declining long-eared owl populations (Holt 1997).

Long-eared owl habitat has been determined to be present within Pendleton and Randolph Counties where the Project crosses the MNF. Although no long-eared owls were observed during the bird surveys conducted, the presence of this species is assumed due to the presence of suitable habitat.

<u>Direct Effects on Individuals:</u> During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> The construction of this Project would result in tree clearing reducing suitable habitat and habitat degradation. This could decrease suitable nest areas and attract competitors. However, tree clearing along the existing right-of-way could also improve and increase foraging habitat for this species.

Conservation Measures: To avoid and minimize potential impacts to the long-eared owl, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- If tree clearing will occur in long-eared owl nesting season, conduct pre-construction walkthroughs to verify that no nests will be disturbed by clearing activities. If a long-eared owl nest is identified within the Project area, the nesting tree will not be removed until owlets have fledged the nest, in accordance with the MBTA.
- During construction, EIs will be on site during construction activity and will have stop work authority in the event a long-eared owl individual or nest is identified near the Project area. Work will be re-initiated once the long-eared owl moves to a location where it is no longer seen by the onsite inspector.
- Reseed the right-of-way with a native species mix that will encourage the use of prey species since the long-eared owl is known to forage at forest edges.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15.
- Avoid impacts to the nesting of migratory birds.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).
- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat).
- From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

Determination of Effect for Long-eared Owl

The Project may impact long-eared owl individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Olive-sided Flycatcher *(Contopus cooperi)*

The Olive-sided flycatcher is a neotropical migrant that breeds in the northern and western United States and Canada. Wintering range occurs in South and Central America (NatureServe 2015). This species has a widespread range but can be uncommon. In West Virginia, this species is considered a rare breeder (WVDNR 2006b). The MNF lists the olive-sided flycatcher as a breeding bird within the forest (USFS).

The olive-sided flycatcher is a large flycatcher in the family Tyrannidae. This flycatcher is dark gray with faint wing bars. The breast and flanks are grey contrasting with a white belly (NatureServe 2015)

The olive-sided flycatcher feeds and breeds in coniferous forests in West Virginia (WVDNR 2006b). In southern areas of the breeding range, such as West Virginia, olive-sided flycatchers inhabit high elevation red spruce forest and high Allegheny wetlands (WVDNR 2015). This species tends to prefer nesting along forest openings, such as bogs, recently burned areas, and clearings that result from logging operations. Their well concealed nests are often built in conifers (NatureServe 2015).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on tree species composition and did not take into account elevation. It was found that the MNF contains approximately 53,814 acres of potentially suitable conifer forest. The desktop analysis of the study corridor indicated a lack of red spruce. However, field surveys conducted for West Virginia northern flying squirrel identified areas of red spruce present within the survey corridor.

This flycatcher actively forages for aerial insects. Often this species is observed perched on a snag where it flies out to catch an insect before returning to the same snag to consume it. This species has a preference for honey bees (NatureServe 2015).

In West Virginia, this species has an S-rank of S1B critically imperiled (NatureServe 2015; WVDNR 2015). There has been an observed decline of this species throughout its range. The cause of the decline is not well known, however, it may be the result of extensive deforestation in South American wintering habitat. In a study conducted by Robert and Hutto (2007) logged areas attracted olive-sided flycatchers. Although recently logged areas had a higher population of olive-sided flycatcher, nest success was reduced. Robert and Hutto hypothesized there were a greater number of nest predators present in logged forest clearings (2007).

During bird field surveys, olive-sided flycatchers were not observed. However, historical point count data in the forest has determined a presence of olive-sided flycatchers along forested survey routes. Suitable northern montane coniferous forest is present within the forest in both Randolph and Pendleton Counties.

<u>Direct Effects on Individuals:</u> During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> Tree clearing could reduce suitable nesting and perching trees. This new open habitat could provide suitable open areas for foraging.

Conservation Measures: To avoid and minimize potential impacts to the olive-sided flycatcher, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- If tree clearing will occur in olive-sided flycatcher nesting season, conduct pre-construction walkthrough to verify that no nests will be disturbed by clearing activities. If an olive-sided flycatcher nest is identified within the Project area, the nesting tree will not be removed until chicks have fledged the nest, in accordance with the MBTA.
- Reseed the right-of-way with a native species mix that will encourage the use olive-sided flycatcher which is known to forage at forest edges.
- Replant on the inside or outside edge of the permanent right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).
- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

Determination of Effect for Olive-sided Flycatcher

The Project may impact olive-sided flycatcher individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.6.4 Bald Eagle (Haliaeetus leucocephalus)

Bald eagles range throughout North America. Their breeding range extends throughout Canada and Alaska. They are residents in the Great Lakes region, Mississippi River Valley, the Northeast and along the Atlantic Coast. West Virginia is part of the winter range for bald eagles (NatureServe 2015). Breeding has been observed in West Virginia since 1981. Nesting eagles has been observed in Pendleton County, West Virginia (WVDNR 2002).

Adult bald eagles are large birds of prey with a wingspan of approximately seven feet. Adults display a characteristic white head and tail and dark brown body. The beak and talons are yellow. Juveniles are typically brown with varied amounts of white mottling throughout (NatureServe 2015).

Breeding habitat usually is associated with large bodies of water. Preferable habitat includes lakes, ponds, rivers, bays and coastal areas (WVDNR 2002). Nesting occurs near water, usually in a tall tree or cliff up to 180 feet off the ground. Winter habitat is closely associated with populations of waterfowl and fish. Wintering eagles usually flock where open water is present (NatureServe 2015).

The bald eagle is federally delisted. Historically, the use of the pesticide dichlorodiphenyltrichloroethane (DDT) in the 1940s caused bald eagle populations to decline throughout much of their range. In 1967, the bald eagle was listed under the Endangered Species Preservation Act of 1966. This was followed by listing under the Endangered Species Act of 1973. Through conservation programs, banning of DDT, and government protection, the bald eagle has recovered in much of its range (NatureServe 2015). In 1999, the bald eagle was delisted from the endangered species list. The bald eagle still has federal legal protection under the BGEPA, which prohibits take and disturbance of nests (WVDNR 2002). In West Virginia, Bald Eagles are considered imperiled with an S-rank of S2. Despite protection, bald eagles are still susceptible to water pollution, habitat loss, human disturbances, and illegal shooting (NatureServe 2015).

In 2011, one eagle nest was observed 0.15-mile from an area of the existing Line WB where MAOP restoration will occur, which is located outside of NFS lands. At its nearest point to the Project location on NFS lands, this nest is 0.98-mile away. It should be noted that no ground disturbance will occur in this area of the Project. A map showing the location of the bald eagle nest, its proximity to MAOP restoration areas and the distance from the nest to the closest ground disturbance proposed as part of the Project can be found in Figure 6.2-1.

Bald eagles have been opportunistically observed in the vicinity of the Project in Randolph and Pendleton Counties, West Virginia in both 2015 and 2016.

On October 23, 2015, four juvenile bald eagles were observed roosting in a dead tree at 38.8963, -79.4863 (see photograph below and Figure 6.2-2), 4.7 miles north of the Project centerline. Also in October, 2015, a bald eagle was observed in a river valley at 38.7038, -79.3130, 10.1 miles south of the Project centerline, while surveyors were driving to the Project area.

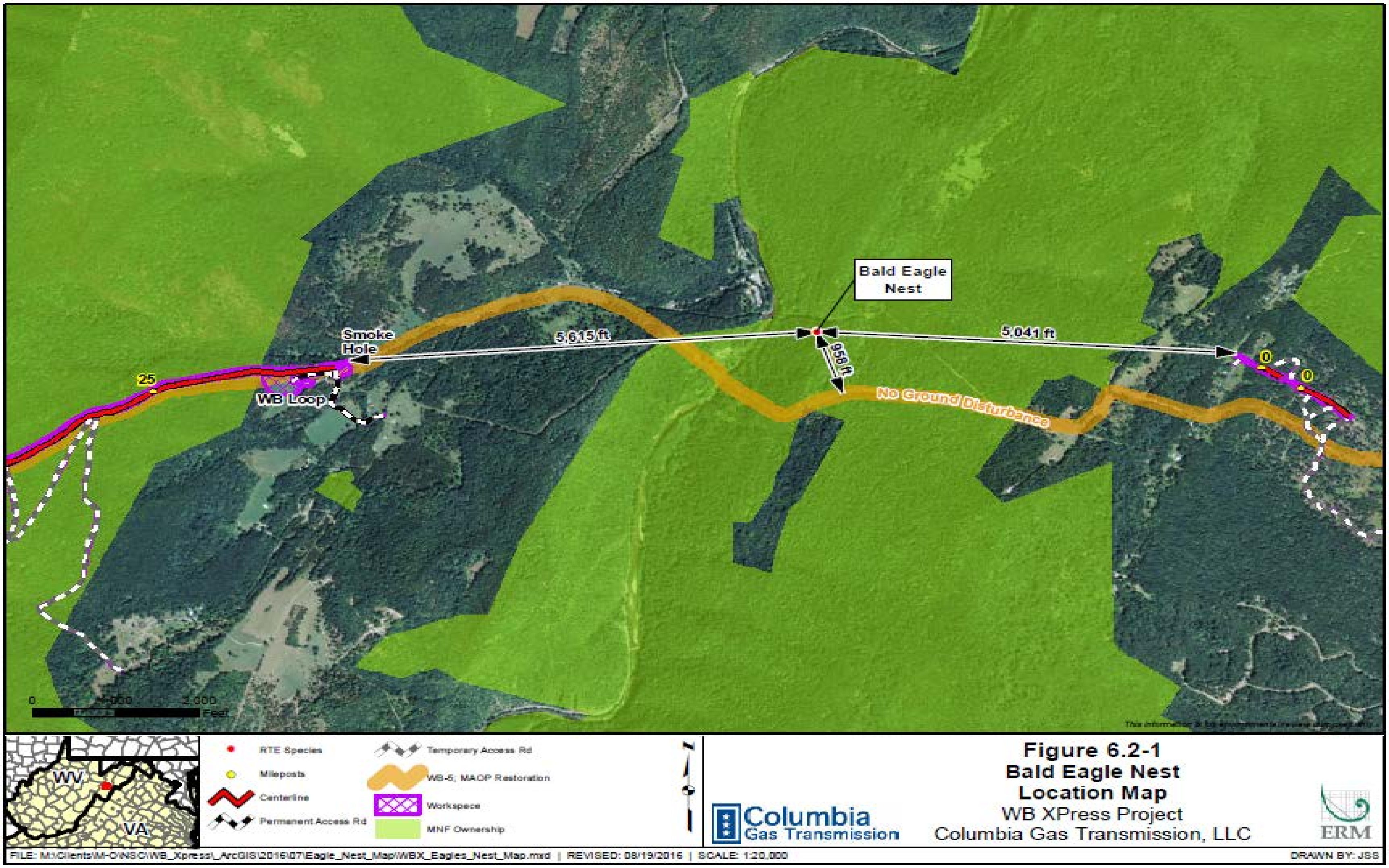


Figure 6.2-1
Bald Eagle Nest Location Map
WB XPress Project
Columbia Gas Transmission, LLC

In May, 2016, surveyors observed a bald eagle approximately three-quarter-mile north of the Project centerline along the North Fork South Branch Potomac River, at 38.8594, -79.3691. This is the nearest sighting of a bald eagle to the Project workspace. In July, 2016, surveyors observed an adult bald eagle flying through a river valley approximately 4.5 miles east of the Project centerline, at approximately 38.8683, -79.2163.

Columbia conducted an aerial bald eagle nest survey on February 20, 2017 in accordance with Columbia's West Virginia Bald Eagle Survey Plan. Weather conditions were optimal for survey. Columbia observed no bald eagle nests within one-half-mile of any perennial streams crossed by the proposed pipeline route or within one-half-mile of the Line WB pipeline right-of-way. Columbia documented several adult and juvenile bald eagles flying and one adult bald eagle perching. Columbia searched within one-half-mile of the perched eagle and did not find any signs of nests.

The BGEPA prohibits disturbing or taking bald or golden eagles, their nests, eggs, or any part of the eagle. Disturbing eagles is defined as any activity that could result in injury to the eagle, reduce nesting success, or cause nest abandonment. In addition any activity that causes the eagle to deviate significantly form normal behavior (e.g., breeding, feeding, roosting, sheltering, etc.) is prohibited (USFWS 2016).

Four juvenile bald eagles in Randolph County, West Virginia.

<u>Direct Effects on Individuals:</u> During construction, associated noise and activity could disturb bald eagles within the vicinity of the Project area. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> Tree clearing within 0.5-mile of a perennial waterbody could reduce suitable nesting and perching trees for the bald eagle. In-stream work could reduce suitable foraging areas for short durations during construction.

Figure 6.2-2
Bald Eagle Sightings in Project Vicinity
WB XPress Project
Columbia Gas Transmission, LLC

Conservation Measures: To avoid and minimize potential impacts to the bald eagle, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Columbia would conduct an additional aerial bald eagle nest survey, in leaf-off conditions, if construction does not commence prior to 2018.
- An SPCC Plan would be implemented during construction activities to mitigate potential adverse impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids. Specific measures in the SPCC include requirements to:
  - store bulk quantities of diesel fuel and gasoline in a designated fuel depot;
  - install adequate spill containment measures, such as containment dikes, combined with impervious lining before fuel storage tanks are filled;
  - keep sorbent booms and clean-up kits at all storage locations;
  - locate fuel storage areas at least 100 feet from streams, ponds, or wetlands, and at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Columbia property;

  - not locate fuel storage areas within designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority);
  - service, lubricate, and refuel equipment in accordance with these same requirements whenever possible, and if not possible conduct these activities in accordance with a supplemental SPCC plan prepared by Columbia, based on field conditions;
  - place impervious or sorbent materials under the work area before conducting vehicle maintenance;
  - collect waste materials created during maintenance (e.g., used oil) for proper disposal;
  - inspect the work site and the vehicle after the maintenance work is complete to ensure that all hazardous materials are properly contained and collected for proper disposal; and
  - equip each construction crew with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.

- During construction, EIs trained in the identification of this species will be on site during construction activity and will have stop work authority in the event a bald eagle individual is roosting near the Project area. Work will be re-initiated once the bald eagle moves to a location where it is no longer seen by the onsite inspector.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs as described elsewhere in this document. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

Determination of Effect for Bald Eagle

The Project may impact bald eagle individuals but is not likely to cause a trend towards federal listing or loss of viability. The conservation measures will avoid disturbance and take of bald eagles as prohibited by the Bald and Golden Eagle Protection Act.

6.1.2.2 Red-headed Woodpecker (*Melanerpes erythrocephalus*)

Red-headed woodpeckers are distributed throughout the eastern and mid-western United States. This species is a permanent resident in throughout much of east central United States, including West Virginia (Cornell Laboratory of Ornithology 2015c; NatureServe 2015). The red-headed woodpecker is listed as a resident breeder by the MNF (USFS).

Adult red-headed woodpeckers have a bright red head, dark eyes and a long gray bill. The upper back and wings are glossy black. A large, white patch is present on both wings. Immature red-headed woodpeckers have a grey or brownish head (Cornell Laboratory of Ornithology 2015c).

This species inhabits oak woodlands that contain an open canopy and limited understory (Luensmann 2006). Habitat also includes open areas with scattered trees, forest edges and forest gaps. In West Virginia, this species has been observed in early successional areas (WVDNR 2015). Nests are excavated in snags which are an important habitat feature that provides nest sites, forage and roosting sites. Red-headed woodpeckers favor snags with a diameter at breast height of 20 to 30 inches (Luensmann 2006).

Red-headed woodpecker population trends have shown a decline. Removal of suitable nesting snags, clear cutting, competition with invasive European starlings, and pesticide usage have contributed to the decline of this species. In West Virginia, red-headed woodpeckers are ranked S2 (imperiled).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR. This desktop analysis was based only on tree species composition and did not take into account presence or absence of understory cover. It was found that the MNF contains approximately 374,915 acres of potentially suitable oak woodlands. The analysis of the 300-foot-wide study corridor indicated a presence of approximately 125 acres of potential oak habitat within that area.

Red-headed woodpecker habitat has been observed in Randolph and Pendleton Counties. No red-headed woodpeckers were observed during bird surveys conducted within the Project area.

<u>Direct Effects on Individuals</u>: During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals</u>: Cutting of trees, especially snags would reduce favorable roosting, foraging and nesting habitat for this species. Where tree clearing is required, Columbia plans on removing snags, live, dead and dying trees.

Conservation Measures: To avoid and minimize potential impacts to the red-headed woodpecker, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- If tree clearing will occur in red-headed woodpecker nesting season (April through August), conduct pre-construction walkthrough to verify that no nests will be disturbed by clearing activities. If a red-headed woodpecker nest is identified within the Project area, the nesting tree will not be removed until chicks have fledged the nest, in accordance with the MBTA.
- Reseed the right-of-way with a native species mix that will encourage use by red-headed woodpecker which is known to forage at forest edges.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Control the spread of invasive species and noxious weed as detailed in the Invasive Species Management Plan (Attachment E of the COMP).
- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

Determination of Effect for Red-headed Woodpecker

The Project may impact red-headed woodpecker individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 **Vesper Sparrow (Pooecetus gramineus)**

Vesper sparrows range throughout the United States and into Canada. The breeding range occurs across the northern and western United States, with individuals usually arriving in March or April. Wintering range occurs throughout the southern United States from Florida to California and south to Mexico (NatureServe 2015). Vesper Sparrows breed in West Virginia and are listed as a breeding bird in the MNF. This species does not winter in the MNF (USFS). Only a few have been identified on NFS land and none of the individuals were identified near the Project area.

The vesper sparrow is a medium-sized brown and gray sparrow with a long tail. This species presents a heavily streaked back and pale colored head. The bill is light-colored. The chest is white and lightly streaked with brown. Adults can display a rust colored shoulder patch on each wing (Cornell Laboratory of Ornithology 2015d).

This species breeds in open habitat (NatureServe 2015; WVDNR 2006b). Preferable habitat includes plains, prairies, dry scrubland, pastures, fields, and woodland clearings (WVDNR 2006b). In West Virginia, this species' habitat includes native grassland and agricultural fields (WVDNR 2015). This species feeds on seeds and insects (NatureServe, 2015). The nests are located in a slight depression on the ground, typically associated with grass clumps (Cornell Laboratory of Ornithology 2015d). A West Virginia study found that Vesper Sparrow nest success is higher with nests associated with greater amounts vertical density of vegetation and litter (Wray and Whitmore 1979). Wray and Whitmore also found that nest associated with bare ground reduces nest success (1979).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on general tree species composition and did not take into account elevation or type of open habitat. It was found that the MNF contains approximately 33,391 acres of open habitat that could provide potentially suitable vesper sparrow habitat. In contrast, the analysis of the study corridor indicated a presence of approximately 56 acres of potential habitat within the Project area.

In West Virginia, the vesper sparrow is considered S2B, S2N breeding and nonbreeding imperiled. The WVDNR notes that this species is a Priority 1 Species for the state. Threats to this species include habitat loss from development, conversion of grassland to forest, and farming practices such as mowing and haying of fields (NatureServe 2015; WVDNR 2015).

The vesper sparrow has the potential to be impacted by the Project. During construction phase, suitable habitat, foraging sites, and nesting areas could be disturbed or destroyed. In addition, construction activity during the nesting season could negatively impact nests. Noise and activity during construction could also negatively impact this species.

Direct Effects on Individuals: Since it is a ground nesting species, it is possible that ground disturbance during construction could impact a hidden nest. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Long term and permanent maintenance of the right-of-way could provide nesting and foraging habitat for this species.

Conservation Measures: To avoid and minimize potential impacts to the vesper sparrow, Columbia will implement the following measures:

- Conduct a pre-construction walkthrough of the ground disturbance area to verify that no nests will be disturbed by clearing activities.
- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Reseed the right-of-way with a native species mix that will encourage the use vesper sparrow which is known to forage and nest in meadow/open field habitats such as those that would be created within the right-of-way.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

NFS Determination of Effect for Vesper Sparrow

The Project may impact vesper sparrow individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Golden-winged Warbler (*Vermivora chrysoptera)*

Golden-winged warblers breed in the North Central, Mid-Atlantic, and southern Northeastern regions of the United States. Golden-winged warblers breed in West Virginia and winters in Central and South America (NatureServe 2015).

Adult male golden-winged warblers have a light gray body and tail. The throat and ear region is black contrasted with white stripes above and below the eye. Yellow markings are present on the crown and on the shoulder wing patch. The female has a duller coloration and lacks the black face mask (Cornell Laboratory of Ornithology 2015e).

This species requires open areas such as old fields and overgrown pastures with a thick layer of underbrush. Habitat such as abandoned farms, powerline rights-of-way and logged areas provide important breeding habitat for this species. In West Virginia, early successional habitat provides the most favorable habitat for this species (WVDNR 2015). Nests are placed directly on the ground associated with dense grass, ferns or weed clumps or shrubs. This species feeds on insects, particularly caterpillars and spiders (NatureServe 2015).

Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on tree species composition and did not take into account elevation. GIS analysis found that the MNF contains approximately 15,069 acres of lowland and upland shrub habitat that could be potentially suitable for golden-winged warblers. In contrast, according to the desktop analysis, the study corridor contained approximately eight acres of shrub habitat.

In West Virginia, this species is considered S1B, critically imperiled breeding (WVDNR 2015). Unless an area is continuously disturbed, the species' favorable habitat only remains for a short period (WVDNR 2003b). Threats to this species include loss of early successional breeding habitat to forest and destruction of habitat for human development. However, it has been noted that declines occurred in regions with suitable habitat (Confer et al. 2003). Brood parasitism, competition and hybridization have resulted in population declines of this species (NatureServe 2015). Nest parasitism by brown-headed cowbirds has caused significant declines. Hybridization and competition with blue-winged warbler, another species breeding in West Virginia, has also resulted in a decline in golden-winged warbler populations (NatureServe 2015; WVDNR 2015).

Two known locations of golden-winged warbler are documented in the WVDNR NHD within the study area of the Project approximately 2.1 and 2.4 miles from its closest point on the Line WB replacement at MP 16.6.

Direct Effects on Individuals: During the construction phase of the Project, there is a potential for destruction of nests and eggs located within the existing right-of-way. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Due to the preference of regenerating habitat, maintenance of the rights-of-way could be beneficial for this species. Mowing would be conducted once every three years during the non-breeding season keeping the right-of-way in a regenerating state throughout the operational life of the Project.

Conservation Measures: To avoid and minimize potential impacts to the golden-winged warbler, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Conduct a pre-construction walkthrough of the work area prior to commencement of ground disturbing activities to verify that no nests will be disturbed by clearing activities.
- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintain access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.
- Reseed the right-of-way with a native species mix that will encourage the use by golden-winged warbler which is known to forage and nest in meadow/open field habitats such as those that would be created within the right-of-way.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).
- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

Determination of Effect for Golden-winged Warbler

The Project may impact golden-winged warbler individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.8 Aquatic Species

There are 23 waterbodies within the Project area on NFS lands. Many of the aquatic RFSS require clear, well-oxygenated water for respiration and successful breeding (NatureServe 2015). An Order 1 soil survey was completed in summer 2016. The results of the soil survey did not provide information indicating potential risks to aquatic habitats other than to confirm characteristics of soils that could potentially accumulate in aquatic habitats if erosion and sediment controls installed during construction did not perform as intended. The primary indicator for potential for sedimentation to occur at the bottom of a slope where most aquatic habitats are present is the steepness of the slope. The steeper the slope, the more potential for soil to detach and accumulate at the base of the slope when soils are disturbed and an erosive precipitation event occurs. The Project could impact RFSS aquatic species as a result of sedimentation and loss of riparian vegetation during construction. Construction could also introduce other types of pollution, such as oils and grease, from machinery and construction activities.

6.1.2.1 Eastern Hellbender (Cryptobranchus alleganiensis)

The eastern hellbender is a large, stout-bodied, fully-aquatic salamander. Its color is usually brown with darker or lighter markings on the back, but can range from gray, to yellowish brown, to almost black. The belly is lighter and sparsely spotted if at all. It has a large, flattened head with small and widely separated eyes. Fleshy skin folds run down both sides of the body ending at a keeled tail. The toes have a rough pad that allows for traction on slick river rocks. The entire skin surface is photosensitive, especially on the tail. Juveniles will lose their external gills when they reach between four and five inches long (approximately 18 months of age). Hellbenders are known to live to 30 years in the wild and over 50 years in captivity (VDGIF 2015c).

Eastern hellbenders occupy the Susquehanna, Missouri, Ohio, Tennessee, and Mississippi River drainages. Eastern hellbenders are completely aquatic. They prefer clear, fast-flowing, well-oxygenated streams and rivers. The stream bottom should contain many large flat boulders, logs, and debris (VDGIF 2015c; North Carolina Wildlife Resources Commission 2012).

Because of their preference for clean streams and rivers, hellbenders serve as indicators of stream health. The presence of hellbenders is synonymous with good water quality (VDGIF 2015c). Water pollution and impoundments are major factors in the decline of hellbenders. Removal of streamside vegetation and soil disturbance can cause sedimentation. Sedimentation affects hellbender survival by suffocating eggs, filling in hiding places of the young and food sources, such as crayfish (VDGIF 2015c). Populations are also affected by acidification of streams, particularly from acid mine drains and streambed gravel mining. Gas exchange mostly occurs through the skin of the adults and, as a result, hellbenders are affected by decreases in pH (USFWS 2003).

A visual stream quality evaluation and habitat assessment were performed at each of the streams crossed by the Project within MNF. Information collected included bed material composition, water clarity, a visual assessment of bank stability and soil erosion potential, the presence of aquatic faunal species, the presence of optimal habitat, a sketch of the waterbody in relation to its Project location, and notes relevant to the condition of the stream. Based on a visual evaluation of stream quality, 5 of the 23 streams crossed by Project possess characteristics of streams that may be used by eastern hellbender. A Water Quality Report for Stream Crossings within the MNF was provided to the MNF (Columbia 2016i).

There are no known locations of eastern hellbender within the Project area. However, suitable habitat may exist within larger streams such as Gandy Creek, Laurel Fork, and Seneca Creek. Species surveys were not conducted to verify presence/probable absence prior to construction therefore, suitable habitat, such as perennial stream crossings within the Cheat River System will be considered occupied by MNF.

<u>Direct Effects on Individuals:</u> In-stream construction impacts to individual hellbenders may include temporary displacement, injury or death. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. Additionally, removal of vegetation and in-stream work at crossings could cause an increase in turbidity and other changes in water quality. In the impacted streams where suitable habitat for eastern hellbender may be present (Columbia 2016i), the surrounding soils are highly erodible and somewhat to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of eastern hellbender downstream of the crossing by increasing turbidity, as well as, acidification of the waterbody.These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals: Erosion and</u> sedimentation from failed erosion and sedimentation control measures from upland earth disturbance of the Project or failed stream bank restoration could result in impacts on the Eastern Hellbender. Removal of vegetation and failed erosion and sedimentation control measures or failed stream bank restoration could result in an increase in turbidity, substrate embeddedness, and other changes in water quality in streams. In the impacted streams where suitable habitat for eastern hellbender may be present (Columbia 2016i), the surrounding soils are highly erodible and somewhat to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of eastern hellbender downstream or downslope of any earth disturbance by increasing turbidity, as well as, acidification of the waterbody.

<u>Cumulative Effects Analysis:</u> A list of existing and proposed projects evaluated for potential cumulative impacts in conjunction with the WB Xpress Project is provided in Table B.10-2 of the Environmental Assessment. There are several pipeline and construction projects within the same sub-watersheds as the WB Xpress project. Time and space crowding due to multiple sequential projects in the Project area could increase the possibility of accumulation of direct and indirect effects on the river and streams such as increases in sedimentation and turbidity. It is assumed that the other projects would implement similar erosion and sediment control measures, which would minimize any cumulative effects on local populations of eastern hellbenders.

Conservation Measures: To avoid and minimize potential impacts to the eastern hellbender, Columbia will implement the following measures:

- Minimize impacts to wetland and riparian habitat by using existing right-of-way to the greatest extent possible.
- Reseed wetlands and riparian areas with a native species mix as identified in Columbia's Restoration Plan.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).
- Columbia will construct stream crossings according to site-specific waterbody crossing plans for waterbody crossings that occur on NFS land and will construct stream crossings outside the MNF following state approved crossing methods.
- Complete in-stream work between June 1 and November 30 in warmwater fishery streams and between June 1 and September 15 in coldwater fishery streams or during a period expressly permitted or required by MNF and WVDNR unless a site-specific waiver is issued by the WVDNR and consultation with a MNF fisheries biologist.
- Maintain reduced workspace areas near waterbodies.
- Conduct pre-construction water quality testing for turbidity and pH, as well as rapid visual habitat assessment for upstream and downstream of perennial waterbody crossings to determine a baseline with which to compare water quality post-construction. Following construction, water quality will be re-evaluated within one year following construction to determine if conditions post-construction have returned to normal.
- ATWS will be located at least 50 feet back from ephemeral and small intermittent (drainage <50 acres) waterbody boundaries and at least 100 feet back from perennial and large intermittent (drainage >50 acres) waterbody boundaries.
- Spoil piles will be placed at least 10 feet from the stream banks and immediately protected with erosion and sediment controls to reduce the potential for sedimentation into the waterbody.
- Require temporary erosion and sediment control measures to be installed across the construction right-of-way as necessary to prevent the flow of spoil or heavily silt-laden water into any waterbody.
- Maintain adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses.
- Design and maintain equipment bridges to prevent soil from entering the waterbody. Equipment bridges will be removed once access to the area is no longer required.

- With the exception of ephemeral waterbodies with no perceivable flow, the pipeline will be installed using a dry crossing method (e.g., flume or dam and pump). Each stream crossing with perceptible flow at the time of crossing will be treated as a separate construction entity such that trenching, pipe installation, backfilling, and temporary stabilization or final restoration are completed in a minimum number of calendar days possible.

- For smaller streams equal to or less than five feet wide, Columbia will attempt to complete trenching and backfilling within 24 to 48 hours barring unforeseen circumstances such as extensive removal of rock to achieve the required pipe depth or other field constraints. For larger streams (streams greater than five feet in width), Columbia will attempt to complete trenching and backfilling within five days, unless site-specific field constraints such as rock make this infeasible.

- Temporary construction-related impacts associated with the dry crossing method will be limited primarily to short periods of increased turbidity before installation of the pipeline, during the installation of the upstream and downstream dams, and following installation of the pipeline when the dams are pulled and flow across the restored work area is re-established. Streambed and bank stabilization will be conducted before returning flow to the waterbody channel.

- Where the Project crosses an ephemeral waterbody with no flow, the pipeline will be installed using an open cut method. Where this method is used, Columbia will attempt to restore and stabilize the waterbody bed and banks and buffers within 24 hours of backfilling, if feasible.

- An SPCC Plan would be implemented during construction activities to mitigate potential adverse impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids. Specific measures in the SPCC include requirements to:

    - store bulk quantities of diesel fuel and gasoline in a designated fuel depot;

    - install adequate spill containment measures, such as containment dikes, combined with impervious lining before fuel storage tanks are filled;

    - keep sorbent booms and clean-up kits at all storage locations;

    - locate fuel storage areas at least 100 feet from streams, ponds, or wetlands, and at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Columbia property;

    - not locate fuel storage areas within designated municipal watershed areas (except at locations designated for these purposes by an appropriate governmental authority);

- service, lubricate, and refuel equipment in accordance with requirements laid out in the SPCC plan (Attachment A of the COMP) whenever possible, and if not possible conduct these activities in accordance with a supplemental SPCC plan prepared by Columbia's EIs, prepare based on field conditions;
- place impervious or sorbent materials under the work area before conducting vehicle maintenance;
- collect waste materials created during maintenance (e.g., used oil) for proper disposal;
- inspect the work site and the vehicle after the maintenance work is complete to ensure that hazardous materials are properly contained and collected for proper disposal; and
- equip each construction crew with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.

- Following construction, the bed and banks will be restored and seeded. Specific measures include backfilling the trench with native material. If present, native cobbles will be included in the upper one foot of trench backfill in waterbodies that contain coldwater fisheries. Where required by the MNF, streambed restoration would also include the replacement of stones on the surface of the bed similar to what was there prior to construction to create turbulence and riffles that would enhance the habitat value, as applicable. Columbia will return waterbody banks to pre-construction contours or to a stable angle of repose as approved by the EI.
- Columbia will install biodegradable erosion control fabric or a functional equivalent on waterbody banks at the time of final bank re-contouring. Synthetic monofilament will not be used on waterbody banks as an erosion prevention measure. Columbia does not anticipate using rip-rap for bank stabilization. If any rip-rap is deemed necessary at the time of construction, Columbia would comply with appropriate permit terms and conditions regarding its application.

Determination of Effect for Hellbender

The Project may impact eastern hellbender individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Pearl Dace (Margariscus margarita)

The pearl dace is a small fish that has a dark dorsum, sides that are dusky-silver, and a white underside. Scattered dark lines give some individuals a speckled appearance. Young have a dusky midline band that fades on large specimens but may be distinct on the caudal peduncle. Breeding males are orange-red on the sides and below. A small, flaplike barbel is present in the groove of the upper lip just above each corner of the mouth, and is sometimes absent from one or both sides. Pearl dace also have a lateral line, usually complete (Montana Field Guide 2015).

The pearl dace is a native of both the eastern and northern drainages within the upper United States. Pearl dace are sparse even when found in optimal habitat such as the cool, small streams and ponds they are known to inhabit. Pearl dace is a glacial relic that prefers spring fed, small, and cool streams, either clear or turbid. They spawn in clear water at depths of one to two feet over a gravel or sand bottom, usually in the spring. They eat a variety of aquatic organisms including insects, crustaceans, worms, and small fish (Fuller and Nico 2015). Beaver dams can create suitable habitat for this species. In some parts of its range, the pearl dace inhabits slightly acidic streams and lakes (Cunningham 2006).

Throughout the pearl dace's range, the species is ranked G4, apparently secure (NatureServe 2015). West Virginia ranks this species S2, imperiled. In parts of its range, introduction of predatory, non-native fish species has resulted in declines. Introduced fish from the family Centrarchidae, such as bass, can have direct impacts on pearl dace populations as a result of predation. In addition, sedimentation from construction and forestry practices could degrade habitat suitability.

A visual stream quality evaluation and habitat assessment were performed at each of the streams crossed by the Project within MNF. Based on a visual evaluation of stream quality, 14 of the 23 streams crossed by Project possess characteristics of streams that may be used by pearl dace. A Water Quality Report for Stream Crossings within the MNF was provided to the MNF (Columbia 2016i).

There are no known locations of pearl dace within the Project area. However suitable habitat may exist within Gandy Creek and some tributaries, the Cheat system, and the west side of North Fork South Branch of the Potomac. Stream crossings with suitable habitat will be considered occupied.

Direct Effects on Individuals: In-stream construction may cause impacts to individual pearl dace. These impacts include temporary displacement. Injury or death could occur as a result of heavy machinery or entrapment in intake hoses. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. Additionally, removal of vegetation and in-stream work at crossings could cause an increase in turbidity and other changes in water quality. In the impacted streams where suitable habitat for pearl dace may be present (Columbia 2016i), the surrounding soils are highly erodible and somewhat to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of pearl dace downstream of the crossing by increasing turbidity, as well as, acidification of the waterbody.These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Erosion and sedimentation from failed erosion and sedimentation control measures from upland earth disturbance of the Project or failed stream bank restoration could result in impacts on the pearl dace. Removal of vegetation and failed erosion and sedimentation control measures or failed stream bank restoration could result in an increase in turbidity, substrate embeddedness, and other changes in water quality in streams. In the impacted streams where suitable habitat for pearl dace may be present, the surrounding soils are highly erodible and somewhat to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of pearl dace downstream of the crossings or downslope of any earth disturbance downstream by increasing turbidity, as well as acidification of the waterbody.

Cumulative Effects Analysis: A list of existing and proposed projects evaluated for potential cumulative impacts in conjunction with the WB Xpress Project is provided in Table B.10-2 of the Environmental Assessment. There are several pipeline and construction projects within the same sub-watersheds as the WB Xpress project. Time and space crowding due to multiple sequential projects in the Project area could increase the possibility of accumulation of direct and indirect effects on the river and streams such as increases in sedimentation and turbidity. It is assumed that the other projects would implement similar erosion and sediment control measures, which would minimize any cumulative effects on local populations of pearl dace.

Conservation Measures: To avoid and minimize potential impacts to the pearl dace, Columbia will implement the conservation measures for the eastern hellbender found in section 6.2.8.1.

Determination of Effect for Pearl Dace

The Project may impact pearl dace individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Cheat Minnow (Pararhinichthys bowersi)

The Cheat minnow is a bottom dwelling or low-water column freshwater fish endemic to the United States, most commonly found in the Ohio River. It can reach up to almost five inches in length. It is either documented or believed to occur in Pennsylvania, West Virginia, and Maryland (USFWS 2015). The species is non-migratory (NatureServe 2015). Suitable habitat includes small to medium waterbodies that have not been impacted by acidification. They inhabit streams and mountain rivers with a gravel or rocky bottom (NatureServe 2015).

Globally, the cheat minnow is ranked G1, critically imperiled. In West Virginia cheat minnows are ranked S1S2, critically imperiled (NatureServe 2015). Populations have declined as a result of acidification of streams from mine drainage. Flood-control dams have also been detrimental to the cheat minnow (NatureServe 2015).

A visual stream quality evaluation was conducted at each of the streams crossed by the Project within MNF. Based on a visual evaluation of stream quality, nine of the 23 streams crossed by Project possess characteristics of streams that may be used by Cheat minnow. A Water Quality Report for Stream Crossings within the MNF was provided to the MNF (Columbia 2016i).

The Cheat minnow has been documented in the Cheat River but there are no known locations of Cheat minnow within the Project area. However, suitable habitat may exist within the Cheat River system, a watershed that includes headwaters and tributaries such as Glady Fork, Daniels Creek, Laurel Fork, Mud Run, and Bennett Run that eventually discharge into the Cheat River. Stream crossings with suitable habitat will be considered occupied.

Direct Effects on Individuals: In-stream construction may cause impacts to individual Cheat minnow. These impacts include temporary displacement. Injury or death could occur as a result of heavy machinery or entrapment in intake hoses. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. Additionally, removal of vegetation and in-stream work at crossings could cause an increase in turbidity and other changes in water quality. In the impacted streams where suitable habitat for Cheat minnow may be present (Columbia 2016i), the surrounding soils are highly erodible and somewhat to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of Cheat minnows downstream of the crossing by increasing turbidity, as well as, acidification of the waterbody.These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Erosion and sedimentation from failed erosion and sedimentation control measures from upland earth disturbance of the Project or failed stream bank restoration could result in impacts on the Cheat minnow. Removal of vegetation and failed erosion and sedimentation control measures or failed stream bank restoration could result in an increase in turbidity, substrate embeddedness, and other changes in water quality in streams. In streams where potential habitat for the cheat minnow exists, the surrounding upland soils are highly erodible and somewhat to extremely acidic. Sedimentation could create turbid stream conditions and result in suffocation of adults and eggs. In addition, changes to water chemistry from erosion could result in morality and population declines.

Cumulative Effects Analysis: A list of existing and proposed projects evaluated for potential cumulative impacts in conjunction with the WB Xpress Project is provided in Table B.10-2 of the Environmental Assessment. There are several pipeline and construction projects within the same sub-watersheds as the WB Xpress project. Time and space crowding due to multiple sequential projects in the Project area could increase the possibility of accumulation of direct and indirect effects on the river and streams such as increases in sedimentation and turbidity. It is assumed that the other projects would implement similar erosion and sediment control measures, which would minimize any cumulative effects on local populations of Cheat minnows.

Conservation Measures: To avoid and minimize potential impacts to the Cheat minnow, Columbia will implement the following conservation measures:

- The conservation measures for eastern hellbender found in section 6.2.8.1 above.
- If dam and pump construction techniques are employed, screens will be installed on water pumping intakes to minimize the potential for fish entrapment.

Determination of Effect for Cheat Minnow

The Project may impact Cheat minnow individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.6.4 Rapids Clubtail (*Gomphus quadricolor*)

The Rapids clubtail dragonfly, like other members of *Gomphidae*, has eyes distinctly separated dorsally. It is a dull, dark dragonfly species, striped with blackish brown, and with a blackish abdomen. The thorax has a contrasting color pattern of brownish-black and yellowish-green stripes. The legs are black. The long, slender abdomen is black with linear yellow spots on the top and small lateral spots of the same color. Its face is hairy, light green with two transverse dark lines. The neonate stage of the Rapids clubtail, like all gomphids, has four-segmented antenna with Segment 1-3 large and robust, and Segment 4 relatively small and sometimes inconspicuous (Michigan Natural Features Inventory 2007).

Rarely seen, Rapids clubtail occur throughout much of eastern United States and Ontario, Canada. It is found in 13 counties in West Virginia, including the Project counties of Randolph, and Pendleton (NatureServe 2015).

Important habitat characteristics of Rapids clubtail sites include clean larger streams with rapids and projecting rocks, substrates of boulders, rocks, gravel, and sand, and quiet water pools downstream from the rapids. The quiet pools usually contain *Typha* and/or other emergent plants. It is believed that adults seek out running water or small rapids to lay their eggs. The eggs or young nymphs presumably drift downstream as exuviae have been found only on the quiet parts of streams. Adults are usually found resting on rocks, low vegetation, or the ground some distance removed from the river on bare sunny spots (Michigan Natural Features Inventory 2007). A desktop analysis of NWI data, indicated that 1,582 acres of riverine habitat within the MNF boundaries. NWI data did not indicate waterbody habitat within the Project study corridor; however, waterbody field surveys indicated 23 streams within the Project area.

Throughout its range, this species is ranked G3, vulnerable. In West Virginia, Rapids clubtail is ranked S3, vulnerable (NatureServe 2015). Threats to this species include habitat alteration, sedimentation, changes in hydrology, and contamination. These may adversely impact the Rapids clubtail and other invertebrate species by altering the microclimate and reducing the amount of feeding habitat and shelter during the maturation period prior to breeding (Michigan Natural Features Inventory 2007). Specific threats include impoundments, road construction that constricts flow, and toxic pollutants. Invasive species have also resulted in declines (NatureServe 2015).

One known location of Rapids clubtail is documented in the WVDNR NHD within the study area of the Project approximately 0.85-mile from its closest point on the Line WB replacement at MP 25.4 (the easternmost end of Line WB replacement). This identification site is immediately adjacent to the South Branch Potomac River. This point along the South Branch Potomac is upstream of the confluence of this river and the North Fork South Branch Potomac, which will be crossed by the Project. Therefore, impacts associated with the Project would not likely affect this location.

MNF aquatic biologists have indicated that wetlands and waterbodies located within the Project area may be habitat for breeding dragonflies and nymphs. A detailed Wetlands and Waterbodies report for the Project is included as Appendix 2C to the FERC Resource Report 2.

<u>Direct Effects on Individuals:</u> In stream construction may cause impacts to larval clubtails. These impacts include temporary displacement, injury or death. Adults could collide with machinery. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. Additionally, removal of vegetation and in-stream work at crossings could cause an increase in turbidity and other changes in water quality. In the impacted streams where suitable habitat for clubtail larva may be present (Columbia 2016i), the surrounding soils are highly erodible and somewhat

to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of clubtail larva downstream of the crossing by increasing turbidity, as well as, acidification of the waterbody. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Erosion and sedimentation from failed erosion and sedimentation control measures from upland earth disturbance of the Project or failed stream bank restoration could result in impacts on clubtail larva. Sedimentation may result in mortality of aquatic dragonfly larva. Sedimentation could therefore result in a decrease in local clubtail numbers. Impacts to stream habitats could also reduce breeding success.

Cumulative Effects Analysis: A list of existing and proposed projects evaluated for potential cumulative impacts in conjunction with the WB Xpress Project is provided in Table B.10-2 of the Environmental Assessment. There are several pipeline and construction projects within the same sub-watersheds as the WB Xpress project. Time and space crowding due to multiple sequential projects in the Project area could increase the possibility of accumulation of direct and indirect effects on the river and streams such as increases in sedimentation and turbidity. It is assumed that the other projects would implement similar erosion and sediment control measures, which would minimize any cumulative effects on local populations of rapids clubtail.

Conservation Measures: To avoid and minimize potential impacts to the Rapids clubtail, Columbia will implement the following measures:

- The conservation measures for the eastern hellbender required in section 6.2.8.1 above.
- Narrow the construction right-of-way to 75 feet wide through wetlands to allow for the installation of equipment crossings and to safely perform special construction methods at these locations.

Determination of effect for Rapids clubtail

The Project may impact Rapids clubtail individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.1.2.2 Green-faced Clubtail (*Gomphus viridifrons*)

The green-faced clubtail dragonfly is distinguished by having mid-dorsal thoracic stripes that are widened to form a triangle, yellow markings on the tibia, no facial markings, and almost entirely black abdominal segments with yellow markings on segments eight and nine (USFS 2002b). It is larger than others in the subgenus (*Hylogomphus*) and tends to have less yellow on the abdomen (Paulson 2011). The green-faced clubtail lives in clean streams that are typically highly oxygenated, small to large in size (though they tend to be large), with a moderate gradient, and substrate of gravel-sand and lightly silted rocks (NatureServe 2015).

This dragonfly species ranges throughout the Mid-Atlantic States north to New York and Ontario, and west to Wisconsin and Minneapolis. In West Virginia, green-faced clubtails occur in 10 counties including Pendleton and Randolph, where the Project crosses the MNF.

A desktop analysis of NWI data indicated that 1,582 acres of riverine habitat exist within the MNF boundaries. NWI data did not indicate any waterbody habitat within the Project study corridor; however, waterbody field surveys indicated 23 streams within the Project area on NFS land.

Primary threats to this species include degradation of water quality by resource extraction, changes in riparian vegetation due to forest management practices, and sedimentation and pollution of streams from agricultural inputs into watersheds. Management considerations include protecting high quality streams in the MNF from future impacts (USFS 2002b).

Wetlands and other waterbodies located within the Project area may be habitat for breeding dragonflies and nymphs. A detailed Wetlands and Waterbodies report for the Project is included as Appendix 2C to the FERC Resource Report 2. This Project could result in impacts to this species. Sedimentation may result in mortality of aquatic dragonfly larva.

One known location of green-faced clubtail is documented in the WVDNR NHD within the study area of the Project approximately 0.85-mile from its closest point on the Line WB replacement at MP 25.4 (the easternmost end of Line WB replacement). This identification site is immediately adjacent to the South Branch Potomac River. This point along the South Branch Potomac is upstream of the confluence of this river and the North Fork South Branch Potomac, which will be crossed by the Project. Therefore, watershed impacts associated with the Project would not likely affect this location.

Direct Effects on Individuals: In-stream construction may cause impacts to larval clubtails. These impacts include temporary displacement, injury or death. Adults could collide with machinery. Removal of rocks and vegetation could impact dragonfly perching substrates. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. Additionally, removal of vegetation and in-stream work at crossings could cause an increase in turbidity and other changes in water quality. In the impacted streams where suitable habitat for clubtails may be present (Columbia 2016i), the surrounding soils are highly erodible and somewhat to extremely acidic. Due to the erodibility and acidic nature of the soil, sedimentation could have an impact on local populations of clubtails downstream of the crossing by increasing turbidity, as well as, acidification of the waterbody.These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Erosion and sedimentation from failed erosion and sedimentation control measures from upland earth disturbance of the Project or failed stream bank restoration could result in impacts on clubtail larva. Sedimentation may result in mortality of aquatic dragonfly larva. Sedimentation could therefore result in a decrease in local clubtail numbers. Impacts to stream habitats could also reduce breeding success.

Cumulative Effects Analysis: A list of existing and proposed projects evaluated for potential cumulative impacts in conjunction with the WB Xpress Project is provided in Table B.10-2 of the Environmental Assessment. There are several pipeline and construction projects within the same sub-watersheds as the WB Xpress project. Time and space crowding due to multiple sequential projects in the Project area could increase the possibility of accumulation of direct and indirect effects on the river and streams such as increases in sedimentation and turbidity. It is assumed that the other projects would implement similar erosion and sediment control measures, which would minimize any cumulative effects on local populations of rapids clubtail.

Conservation Measures: To avoid and minimize potential impacts to the green-faced clubtail, Columbia will implement the following measures:

- The conservation measures for the eastern hellbender required in section 6.2.8.1 above.
- Narrow the construction right-of-way to 75 feet wide through wetlands to allow for the installation of equipment crossings and to safely perform special construction methods at these locations.

Determination of Effect for Green-faced Clubtail

The Project may impact green-faced clubtail individuals but is not likely to cause a trend towards federal listing or loss of viability.

6.2.9 Non-Aquatic Invertebrates

6.1.2.1 Boreal Fan Moth (Brachionycha borealis)

The boreal fan moth is found in five states and two Canadian provinces. This species is located in Michigan, Pennsylvania, Virginia, West Virginia, and Wisconsin. In West Virginia, this species occurs in Pendleton, Grant and Hardy counties (NatureServe 2015).

The boreal fan moth has a wing span of 1.7 inches. The head, thorax, and abdomen are covered in whitish grey hair. The wings are mottled white and grey with black streaks but the species has a tendency for melanism (black or dark coloration). The hind wings are much lighter in color with dark spots along the margin and in the upper middle part of the wing. Male and females have similar coloration, however, males can be distinguished from the females with their comb-like antennae (Aneweiler 2007).

This species is ranked as S1, critically impaired in West Virginia. Globally, this species is considered G4, Apparently Secure (NatureServe 2015).

Very limited information is known regarding the life history of this insect (NatureServe 2015). It is known however that larvae feed on lowbush blueberry (*Vaccinium angustifolium*), oak (*Quercus* spp.), and possibly birch (*Betulaceae*) (Anweiler 2007).

In West Virginia, this species is found in the ridge and valley ecoregion. The boreal fan moth inhabits high elevation (2,000 feet of greater) Appalachian wetlands and red spruce or oak forests. This species is also found in northern hardwood forests (WVDNR 2015). Threats to these habitats include invasive species, land development and over browsing by white-tailed deer (*Odocoileus virginianus*) (WVDNR 2015). Using the MNF tree stand GIS layers, potential habitat was predicted based on information published by the WVDNR and NatureServe. This desktop analysis was based only on tree species composition and did not take into account elevation. It was found that the MNF contains approximately 303,368 acres of potentially suitable northern hardwood forest and mixed hardwood-red spruce stands. In contrast, the analysis of the study corridor indicated a presence of approximately 45 acres of potential habitat within the Project area. No surveys for are planned for the boreal fan moth and presence of this species is assumed.

One known location of the boreal fan moth is documented in the WVDNR NHD within vicinity of the Project is approximately 0.02-mile from its closest point on TAR-48.1. This identification site is immediately adjacent to the South Branch Potomac River. No tree clearing is proposed for this access road at this location therefore, impacts associated with the Project would not likely affect this location.

<u>Potential Direct Effects on Individuals</u>: This species could be directly impacted by construction equipment. Larva and adults located within the foliage could perish from tree and brush removal, large equipment, or human trampling. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Potential Indirect Effects on Individuals:</u> This Project would result in a permanent loss of trees within the proposed right-of-way. In addition, the temporary loss of trees may take longer than 20 years to regenerate, resulting in loss of suitable habitat. Non-native, introduced species could also impact their food sources and create competition for resources.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the boreal fan moth, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Include lowbush blueberry, if available, in suitable areas that will be replanted post-construction. The replanting plan is included as Attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Boreal Fan Moth

The Project may impact boreal fan moth individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 **Early Hairstreak (*Erora laeta*)**

The early hairstreak is a small butterfly that ranges from Maine, south to Georgia, and as far west as Wisconsin. The range extends north into Canada (NatureServe 2015). This species is found in West Virginia and within the MNF (WVDNR 2015).

The underside of the wings are light green with two rows of orange streaks. The underside of the wings also are fringed with orange. The upper side of the wings are dark gray or black with patches of dark blue (Brock and Kaufman 2003). The wingspan is no greater than 1.4 inches (NatureServe 2015).

Throughout their range, early hairstreaks inhabit hardwood or mixed forests (NatureServe, 2015). In West Virginia, this species inhabits mixed mesophytic and oak or American beech forests (*Fagus grandifolia*) (WVDNR 2015). Beech and beaked hazelnut (*Corylus cornuta*) are the primary larval food for this species (Brock and Kaufman 2003). The female oviposits within beech nuts and the larvae feed on beech foliage. Southern adults, particularly in West Virginia and North Carolina populations, have been observed nectaring common flowers including oxeye daisy (*Leucanthemum vulgare*), fleabane (*Erigero* spp.), and spring beauty (*Claytonia virginica*) (NatureServe 2015)

Using GIS analysis of the MNF forest stand layers, a general prediction of suitable habitat coverage was determined. Habitat was predicted based on information published by the WVDNR and NatureServe. Analysis was based only on tree species composition and did not take into account elevation or the presence of flowering herbaceous plants. The analysis determined that the MNF contains approximately 379,743 acres of forest dominated by oak and beech. Approximately 125 acres of oak dominated forest was identified within the 300-foot-wide study corridor using this analysis. A botanical field survey conducted in August 2015 identified American beech (*Fagus grandifolia)* within the survey study corridor.

Unless visiting flowers, this species is rarely seen due to its arboreal behavior (Brock and Kaufman 2003). In West Virginia, this species is considered S2, imperiled (WVDNR 2015; NatureServe 2015). The status of the entire population is considered GU, unknown (NatureServe 2015). The loss of beech due to non-native beech canker fungus (*Neonectria ditissima*) has had an impact of the early hairstreak (WVDNR 2015).

No surveys are planned for the early hairstreak and presence of this species is assumed.

<u>Direct Effects on Individuals:</u> Larva and adults located within the Project area, foraging and resting in foliage, could be disturbed or perish from tree removal, large equipment, and human trampling. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> Other impacts include loss of suitable oak and beech habitat furthering the decline of this species in the area. However, maintenance of the right-of-way may benefit adult individuals. The right-of-way would be maintained in an herbaceous state potentially increasing nectar bearing flowers such as fleabane. Non-native, introduced species could also impact their food sources and create competition for resources.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the early hairstreak, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.
- Reseed the right-of-way with a native species mix that includes fleabane, if available.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with a regionally native mix of trees and shrubs, as necessary. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Early Hairstreak

The Project may impact early hairstreak individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 Columbine Duskywing (*Erynnis lucilius*)

The columbine duskywing is a butterfly that ranges from New York, Northern Pennsylvania, and west to Minnesota. This species also has an isolated range throughout eastern West Virginia (Brock and Kaufman 2003). This species is found in the MNF within Pendleton County (NatureServe 2015).

This is a small butterfly that is dark brown to gray, mottled with white on the forewing. It is very similar in appearance to the wild indigo duskywing (*Erynnis baptisiae*) and can be challenging to identify in the field (Brock and Kaufman 2003).

This species inhabits rich wooded areas with limestone slopes, barrens, gorges and ravines. It requires an abundance of columbine (*Aquilegia* spp.) for larval food. The species can have two to three broods per year (Brock and Kaufman 2003). According to WVDNR, mixed oak and pine forests are suitable forest habitats for the columbine duskywing. Using GIS analysis of MNF forest stand layers, potential habitat was predicted based on information published by the WVDNR. Analysis of this layer was based only on forest species composition and did not take into account the distribution of limestone slopes, barrens, gorges, and ravines. It was determined that the MNF contains approximately 68,067 acres of mixed oak and pine forests. Approximately 18 acres of oak pine forest was identified during the desktop analysis of the study corridor. A botany field survey conducted in 2015 identified wild columbine (*Aquilegia canadensis)* within the Project survey corridor.

Although globally this species is considered G4, apparently secure, in West Virginia it is ranked as S2, imperiled. Declines have also been observed in the northeastern United States. The overall threat is not known; however, it is speculated that over-browsing by deer have reduced suitable habitat for this species. In addition, competition with the related wild indigo duskywing (*Erynnis baptisiae*) may cause a decline of columbine duskywings. No surveys for are planned for the columbine duskywing and presence of this species is assumed.

One known location of columbine duskywing is documented in the WVDNR NHD within the study area of the Project approximately 0.9-mile from its closest point on the Line WB replacement at MP 25.4 (at the easternmost end of Line WB replacement).

Direct Effects on Individuals: Columbine duskywing within the Project vicinity could be directly impacted by construction equipment. Larva and adults foraging and resting in foliage could perish from tree removal, heavy equipment, and human trampling. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Long term impacts include loss of forested habitat potentially reducing local populations. Non-native, introduced species could also impact their food sources and create competition for resources.

Conservation Measures: To avoid and minimize potential impacts to the columbine duskywing, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.

- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Reseed the right-of-way with a native species mix that includes wild columbine, particularly from approximately MP 24 to the easternmost end of Line WB replacement.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs, including low bush blueberry, as described in the replanting plan. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Columbine Duskywing

The Project may impact columbine duskywing individuals but is not likely to cause a trend towards federal listing.

6.2.6.4 Bronze Copper (*Lycaena hyllus*)

The bronze copper is a small butterfly that ranges from the east coast United States to the Midwest and north into Canada. In West Virginia, this species is found in Pendleton and Randolph counties and within the MNF.

The upper side of the female's wings are orange with black spots. Males have dark purplish wings that are fringed with an orange band. The underside of the forewing in both sexes is pale orange fringed with white. The underside of the hindwing is gray or white with an orange band near the edge and then fringed white. The undersides of both wings are spotted black (Brock and Kaufman 2003).

This species prefers to stay in the vicinity of herbaceous wetlands that contain sedge or scrub-shrub components (NatureServe 2015). It also inhabits open fields and meadows (WVDNR 2015). The Bronze copper caterpillars feed on plants species within the genus *Rumex*. Caterpillars have been observed on water dock and curled dock (NatureServe 2015; Brock and Kaufman 2003). This species is adapted to weedy habitats. Colonies stay close to preferred habitat and do not move long distances. Adults fly from spring to fall (Brock and Kaufman 2003).

Using MNF stand GIS layers, potential habitat was predicted based on habitat information published by the WVDNR and NatureServe. This analysis found that the MNF contains approximately 33,391 acres of open land. The analysis also showed that that there is 56 acres of open land within the study corridor. A desktop analysis of NWI data indicated that 1,416 acres of emergent wetland and 2,302 acres of freshwater forested/shrub wetlands are present within the MNF boundaries. NWI data indicated approximately 0.708-acre of wetlands within the 300-foot-wide study corridor, however pedestrian surveys documented 2.6 acres of emergent wetlands within the Project construction area, of which only 0.1-acre exists within the permanent right-of-way. This analysis does not take into account the presence of the bronze copper's larval food, *Rumex* spp. Botanical field surveys conducted in 2015 found a presence of great water dock (*Rumex acetosella)* and curly dock (*Rumex crispus)* within the Project survey corridor.

Globally this species is G5, secure. However, in West Virginia, this species is ranked S2 imperiled. In West Virginia, habitat loss has contributed to the decline of the species (WVDNR 2015). Factors that have led to the decline of habitat include human development, loss of wetlands, and conversion of open areas to forest (WVDNR 2015).

No surveys are planned for the bronze copper and presence of this species is assumed.

<u>Direct Effects on Individuals</u> At the time of construction, larva and adults that are foraging or resting in the foliage could perish from tree and vegetation removal, large equipment, and human trampling. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> Temporary impacts to emergent wetlands, such removal of vegetation, may cause temporary impacts to local bronze copper populations. No scrub-shrub wetlands would be impacted within the MNF. Non-native, introduced species could also impact their food sources and create competition for resources.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the bronze copper, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Narrow the construction right-of-way to 75 feet wide through wetlands to allow for the installation of equipment crossings and to safely perform special construction methods at these locations.

- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Reseed the right-of-way with a native species mix that includes native docks (*Rumex* spp.) in wetland and riparian areas, if available.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Bronze Copper

The Project may impact bronze copper individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 West Virginia White (*Pieris virginiensis)*

The West Virginia white is a small butterfly that ranges throughout the Great Lakes and Appalachians, and is present in West Virginia and the MNF. This species is largely white and relatively unmarked (NatureServe 2015). The forewings are lightly fringed with a pale gray, especially females. The veins on the underside of the wings are outlined in a light gray which is darker in other similar species (Brock and Kaufman 2003).

The West Virginia white is observed flying only in spring where it inhabits continuous, moist, northern hardwood forests and will not cross unshaded forest openings, large roads, and utility rights-of-way (WVDNR 2014; NatureServe 2015). Using MNF stand GIS layers, potential habitat was predicted based on habitat information published by the WVDNR and NatureServe. Analysis of the forest stand layers, found that the MNF contains approximately 303,368 acres northern hardwood forests. Approximately 45 acres of northern hardwood forest was identified within the study corridor. Although it may appear that this habitat is extensive, this analysis does not take into account the presence of the butterfly's required larval food, toothwort (*Cardamine* spp.). A desktop analysis of toothwort presence could not be performed because publicly available information on toothwort coverage within the MNF is not available. Botanical field surveys in 2015 did not identify the three species of toothwort that are the larval food for this species.

This species has a global status of G3, vulnerable, and is ranked as S3, vulnerable in West Virginia (NatureServe 2015). Threats to this species include loss of habitat from development and over-browsing by white-tailed deer (WVDNR 2015). In addition, forest fragmentation from roads and utility rights-of-way can fragment habitat and isolate populations (NatureServe 2015). Invasive plants have been observed to have an effect on reproductive success of this species. In a laboratory investigation conducted by Davis and Cipollini (2014), West Virginia white laid eggs more frequently on invasive garlic mustard (*Alliaria petiolata*) than on its native host, crinkleroot (*Cardamine diphylla*). Garlic mustard is toxic to the larva and the caterpillars perished within days (Davis and Cipollini 2014). No surveys are planned for the West Virginia white and presence of this species is assumed.

Direct Effects on Individuals: West Virginia white within the Project vicinity could be directly impacted by collisions with construction equipment. Larva and adults foraging and resting in foliage could perish from tree removal and human trampling. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Tree clearing could reduce suitable habitat and could create barriers to movement. The Project is located in an existing right-of-way and, as a result, there would be further fragmentation of forest resulting from Project construction. Non-native, introduced species could also impact their food sources and create competition for resources.

Conservation Measures: To avoid and minimize potential impacts to the West Virginia white, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.
- Reseed the right-of-way with a native species mix that includes pollinator friendly species and native toothwort, if available.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Since garlic mustard can be toxic to larva, control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for West Virginia White

The Project may impact West Virginia white individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 Southern Grizzled Skipper (*Pyrgus wyandot*)

The southern grizzled skipper is a butterfly that ranges from New York south to North Carolina with isolated populations occurring in the Appalachians. In West Virginia, this species is located in six counties including Pendleton (NatureServe 2015).

This species is a small butterfly that is dark colored with white spots. (NatureServe 2015). Its host plant is cinquefoil (*Potentilla* spp.).

Southern grizzled skippers inhabit hardwood forests that contain cliff and open grassland habitat (NatureServe 2015). In West Virginia, this species inhabits shale barrens and eastern oak pine forests along the eastern part of the state (WVDNR 2015). A desktop analysis of potential habitat was based on information published by the WVDNR and NatureServe. Approximately 68,067 acres of oak and oak-pine forest was identified. The desktop analysis also determined that approximately 18 acres of pine-hardwood forest was identified.

Throughout its range, the southern grizzled skipper is considered G1, critically impaired. A once common species, in parts of its range declines of greater than 90 percent have been documented recently. In West Virginia, this species is considered S1, critically impaired. Efforts to control invasive gypsy moths (*Lymantria dispar*) have contributed to the decline of this species. Over-browsing by white-tailed deer is another factor that may have caused great declines (WVDNR 2015). Rights-of-way can create suitable habitat for this species (NatureServe 2015).

No surveys are planned for the southern grizzled skipper and presence of this species is assumed.

<u>Direct Effects on Individuals:</u> Southern grizzled skipper within the Project vicinity could be directly impacted by construction equipment and human trampling. Larva and adults foraging and resting in foliage could perish from vegetation removal. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Indirect Effects on Individuals:</u> Tree clearing could reduce suitable habitat. However, maintenance of the right-of-way could benefit this species by maintaining an herbaceous layer which could increase cinquefoil populations.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the southern grizzled skipper, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.

- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Reseed the right-of-way with a native species mix with pollinator friendly species including cinquefoil, if available.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Southern Grizzled Skipper

The Project may impact southern grizzled skipper individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 Diana Fritillary (*Speyeria diana)*

The Diana fritillary is a butterfly that ranges from Ohio south to Alabama, and as far west as Arkansas, southwest Missouri and eastern Oklahoma. It has been identified throughout West Virginia, including Randolph County in the MNF.

This species is a large butterfly that is brightly colored (NatureServe 2015). Males are dark brown on the upper inner wings contrasting with a bright orange color on the upper outer wings. Females are black with white striping on the upper forewing and light blue and black barring on the upper hindwing (Brock and Kaufman 2003).

The Diana fritillary is a non-migratory butterfly that inhabits forested and scrub-shrub wetlands with an abundance of violets (*Viola* spp.) (NatureServe 2015). This species also inhabits openings and fields (Brock and Kaufman 2003). A desktop analysis of NWI data indicated that 1,416 acres of emergent wetland and 2,302 acres of freshwater forested/shrub wetlands are present within the MNF boundaries. NWI data indicated approximately 0.71-acre of wetlands occurring within the study corridor. Several violet species were identified within the MNF Project study corridor, including common purple violet (*Viola sororia*), blue marsh violet (*Viola cucullata)*, halberd-leaved yellow violet (*Viola hastate)*, sweet white violet (*Viola macloskeyi*), and round-leaved violet (*Viola rotundifolia)*. The overall ranking of the Diana fritillary is G3, vulnerable. In West Virginia, Diana fritillary is considered S2, imperiled. It has been documented that mineral extraction and coal mining operations on mountaintops have contributed to the decline of this species within the state (WVDNR 2015). White-tailed deer over-browsing may also be a factor in the decline due to predation of host plants.

No surveys for are planned for the Diana fritillary and presence of this species is assumed.

<u>Direct Effects on Individuals</u>: Diana fritillary within the Project vicinity could be directly impacted by construction equipment. Larva and adults foraging and resting in foliage could perish from vegetation removal and human trampling.

<u>Indirect Effects on Individuals:</u> This Project would have the potential to impact this species. Vegetation clearing could reduce suitable habitat and kill host plants. Non-native, introduced species could also impact their food sources and create competition for resources. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

<u>Conservation Measures</u>: To avoid and minimize potential impacts to the Diana fritillary, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.

- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Reseed the right-of-way with a native species mix with pollinator friendly species that includes native violets (*Viola* spp.) in wetland and riparian areas.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Diana Fritillary

The Project may impact Diana fritillary individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 Appalachian Tiger Beetle (*Cicindela ancocisconensis)*

The Appalachian tiger beetle ranges from Quebec, Maine south to Georgia along the Appalachian Mountains. It has been identified in 14 counties in West Virginia including Randolph (NatureServe 2015).

This beetle is a dull brown color, with three yellow stripes on each wing covering (Hunt 2015).

This beetle's main habitat is riparian areas along low mountain rivers with sand bars, beaches, or gravel because it requires sand or soil for burrowing (NatureServe 2015). In West Virginia this species is found in river floodplains and small stream riparian habitats within the Allegheny Mountain, Cumberland Mountain, and Ridge and Valley ecoregion (WVDNR 2015).

The Appalachian tiger beetle is considered G3, globally vulnerable. In West Virginia, this species is considered S3, vulnerable (NatureServe 2015). Although this species is listed as declining over much of its range, declines have been limited in West Virginia (NatureServe 2015). It is susceptible to the effects of fragmentation of riparian habitat and river impoundments, although this species can survive temporary flooding (NatureServe 2015). A desktop analysis of NWI data, indicated that 1,582 acres of riverine habitat occur within the MNF boundaries. Waterbody field surveys indicated 23 streams within the Project area.

Direct Effects on Individuals: During the construction phase, Appalachian tiger beetles within the Project vicinity could be directly impacted by construction equipment. Individuals foraging and resting in foliage could perish from vegetation removal. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Construction at waterbodies may temporarily impound waterways, flooding beetle burrows and habitat. They can also be affected by soil compaction, the use of herbicides, and sedimentation. Non-native, introduced species could also impact their food sources and create competition for resources.

Conservation Measures: To avoid and minimize potential impacts to the Appalachian tiger beetle, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Preserve topsoil and/or woody debris where practicable, stockpile it during construction, and then spread it back across the construction right-of-way post-construction.
- Reseed the right-of-way with a native species in riparian and wetland habitats.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Appalachian Tiger Beetle

The Project may impact Appalachian tiger beetle individuals but is not likely to cause a trend towards federal listing.

6.1.2.2 Northern Barrens Tiger Beetle (*Cicindela patruela*)

Northern barrens tiger beetles are distributed throughout the northern two-thirds of eastern North America and into Ontario, Canada (NatureServe 2015). This species has been observed in three counties in West Virginia including the Project county of Pendleton (NatureServe 2015).

The northern barrens tiger beetle is approximately 0.5-inch in length. This species is a metallic emerald green with three yellow spots or bands on each wing covering with the middle spot reaching the outer edge of the wing covering (Minnesota Department of Natural Resources 2016).

Northern barrens tiger beetles are habitat specialists. They inhabit coniferous and deciduous woodlands with sandy or gravel substrate from eroding sandstone (NatureServe 2015). In West Virginia, it inhabits dry mesic oak forests, mixed mesophytic forest, and developed settings (WVDNR 2015). This species will also inhabit shrublands (NatureServe 2015).

Globally this species' status is ranked G3, vulnerable and has declined 10 to 90 percent throughout its range. In West Virginia, this species is ranked S2, imperiled. Loss of habitat due to development, deforestation, and fire suppression has contributed to its decline (NatureServe 2015).

Direct Effects on Individuals: Northern barrens tiger beetle within the Project vicinity could be directly impacted by construction equipment. Larva and adults foraging and resting in foliage could perish from vegetation removal. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Vegetation clearing could reduce suitable habitat, especially the loss of lichens, mosses and low lying vegetation as they seem to prefer low lying vegetation on eroded sandstone. Soil compaction and the use of herbicides may also impact this species. Non-native, introduced species could also impact their food sources and create competition for resources.

Conservation Measures: To avoid and minimize potential impacts to the Northern barrens tiger beetle, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Preserve topsoil and/or woody debris where practicable. Stockpile it during construction and then spread it back across the Project post-construction.
- Reseed the right-of-way with a native species.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.
- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Northern Barrens Tiger Beetle

The Project may impact Northern barrens tiger beetle individuals but is not likely to cause a trend towards federal listing.

6.2.9.10 **Cowpath Tiger Beetle (*Cicindela purpurea*)**

Cowpath tiger beetle is found throughout the United States and Canada. Despite the extensive range, it is not well studied. This species occurs in Fayette and Pendleton counties in West Virginia (NatureServe 2015).

The beetle is highly variable in appearance throughout its range. In West Virginia, most individuals exhibit light metallic green with pale yellow markings on the wing coverings (Eaton and Kaufman 2007).

In West Virginia, this species inhabits a range of habitats including dry oak forest, dry mesic oak forest, agricultural and developed areas (WVDNR 2015). Using MNF stand layers, potential habitat was predicted based on habitat information published by the WVDNR and NatureServe. Analysis of this layer was based only on forest species composition.

Overall, this species is considered G5, secure. In West Virginia, cowpath tiger beetles are ranked S3, vulnerable (NatureServe 2015).

One known location of cowpath tiger beetle is documented in the WVDNR NHD within the study area of the Project approximately 1.72 miles southeast from the closest point on the Line WB replacement #2 beyond the easternmost edge of the MNF.

Direct Effects on Individuals: Cowpath tiger beetle within the Project vicinity could be directly impacted by construction equipment or human trampling. Larva and adults foraging and resting in foliage could perish from vegetation removal, soil compaction, human trampling, and changes in light regimes. During construction, associated noise and activity may be a temporary nuisance, potentially resulting in altered behavior. These direct impacts would be temporary and only occur during the construction phase.

Indirect Effects on Individuals: Because this Project would create open habitat in the form of a maintained right-of-way, there is a potential for this species to benefit from the Project. Soil compaction and the use of herbicides may also impact this species. Non-native, introduced species could also impact their food sources and create competition for resources.

Conservation Measures: To avoid and minimize potential impacts to the cowpath tiger beetle, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.

- Preserve topsoil and/or woody debris where practicable. Stockpile it during construction and then spread it back across the Project post-construction.

- Reseed the right-of-way with a native species.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Control the spread of invasive species and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

Determination of Effect for Cowpath Tiger Beetle

The Project may impact cowpath tiger beetle individuals but is not likely to cause a trend towards federal listing.

2.0 REGIONAL FORESTER SENSITIVE SPECIES - FLORA

The desktop analysis described above in section 4.3.2 was supplemented with the required field survey to document the presence of the species identified in Table 6.3-1. The results of both the pre-field analysis and field survey allow a determination of effect.

6.3.1 Field Survey

6.1.2.1 Methods

A botanical plant survey was conducted for both USFWS-listed plants and RFSS plants (Columbia 2015a, 2016b). The study area is a 300-foot-wide corridor centered on the proposed pipeline centerline and a 50-foot-wide corridor on access roads centered on the road centerline. Field surveys were conducted August through October 2015, with additional surveys conducted in June 2016 to capture access roads added and to characterize the extent of field-verified RFSS populations. The survey was conducted on MNF lands using survey protocol provided by MNF staff as part of the SUP for Survey executed on August 6, 2015 and included the following:

- delineated survey segments up to but no longer than one-mile each with each contiguous major forest community patch considered a survey unit;

- adhered to restricted survey timing windows for certain species, specifically June 1 to August 15 for high probability running buffalo clover (*Trifolium stoloniferum*) habitat;

- used meandering pedestrian surveys with GPS tracking; and

- RFSS individuals and populations were documented with photos and GPS points and polygons.

6.1.2.2 Results

During field surveys conducted in 2015 and 2016, no USFWS-listed plants were identified. Of the 61 RFSS plants identified as having potential habitat in the study corridor in the MNF-provided LOO table and during desktop evaluation of range and habitat, only four species of RFSS plants were identified during field surveys of the study area (Columbia 2015a, 2016b). They are Allegheny onion (*Allium allegheniense*), white alumroot (*Heuchera alba*), butternut (*Juglans cinerea*), and silvery nailwort (*Paronychia argyrocoma*).

6.3.2 Allegheny Onion (*Allium allegheniense*)

The Allegheny onion is a rather large onion, at approximately 1.5 feet, that grows in thin soils around outcrops, generally of mafic rocks (such as amphibolite or hornblende gneiss) or calcareous rocks, primarily at moderate to fairly high elevations (3,200 to 5,200 feet) (North Carolina Native Plant Society, 2013). The flowers are bell-shaped, about 0.25-inch across, and pink or white with yellow pollen and yellow anthers. It flowers in July and August. This plant is edible and has a strong onion flavor, and has often been used in cooking. This species is also cultivated in many places for its attractive flowers (NatureServe 2015).

Allegheny onion has been documented in West Virginia, Virginia, and North Carolina. It grows in dry woods, rock outcrops, and prairies (NatureServe 2015). There are 18 previously documented occurrences of Allegheny onion in the MNF, primarily located in the north central and northeast regions around North Fork Mountain and Chestnut Ridge (Bailey 2016).

Biological surveys for RFSS were conducted during August and September 2015 in coordination with MNF staff (Columbia 2015a, 2016b). During this initial survey, this species was documented within the proposed Project area along the Line WB replacement right-of-way in Pendleton County. Additional field surveys were conducted in June 2016 to characterize the extent of these Allegheny onion populations. The populations identified within the Project area are new populations not previously known to MNF staff.

6.3.3 White Alumroot (*Heuchera alba*)

White alumroot is a perennial plant endemic to a small area of the Central Appalachian Ridge and Valley. It is an herbaceous plant with leaves on long petioles around a thick, almost woody stem. The foliage emerges in spring with a second flush of growth occurring in late summer. The flowers are bell-shaped and greenish white in color. Flowering occurs in late spring and early summer. The name alumroot is derived from the astringent, alum-like properties of the roots which were used by Native Americans (Coombs 2014). The plant prefers exposed and shaded outcrops of quartzite, hematitic sandstone, calcareous sandstone, and siltstone, usually at over 3,000 feet in elevation. It is restricted to and locally frequent in small areas of the mountains (Virginia Botanical Associates 2015). There are 25 previously documented occurrences of white alumroot in the MNF, primarily located on the eastern region in the Potomac, Greenbrier, and Marlinton Ranger Districts (Bailey 2016).

Biological surveys for RFSS were conducted during August and September 2015 in coordination with MNF staff (Columbia 2015a, 2016b). During this initial survey, this species was documented within the proposed Project area along the Line WB replacement right-of-way in Pendleton County. Additional field surveys were conducted in June 2016 to characterize the extent of these white alumroot populations.

6.3.4 Butternut (*Juglans cinerea*)

Butternut grows in well-drained soils on hillslopes, talus and rock outcrops, and streamside in mixed hardwood forests. The MNF encompasses the approximate center of its range, which includes the northeastern portion of the United States. It is found up to 1,500 feet in elevation. It is often scattered and with occasional frequency in habitats that also include basswood (*Tilia* spp.), black cherry, beech, black walnut (*Juglans nigra*), elm (*Ulmus* spp.), hemlock (*Tsuga canadensis*), hickory (*Carya* spp.), oak (*Quercus* spp.), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow-poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), and yellow birch (USFS 1990).

Butternut is a fast growing tree that has a life expectancy of around 75 years. Butternut flowers from April to June, depending on location. Although young trees may withstand competition from the side, butternut does not survive under shade from above. It must be in the overstory to thrive and, therefore, is classed as intolerant of shade and competition. Threats to butternut include insect damage, butternut canker, bunch disease, harvesting for timber, and fire damage (USFS 1990). There are 125 previously documented occurrences of butternut in the MNF, primarily located in the northeast and northwest region (Bailey 2016).

Biological surveys for RFSS were conducted during August and September 2015 in coordination with MNF staff (Columbia 2015a, 2016b). Four individuals of this species were identified within the proposed Project area along the Line WB replacement right-of-way and permanent access road-27A in Randolph County, WV.

6.3.5 Silvery Nailwort (*Paronychia argyrocoma*)

The silvery nailwort has small white flower clusters that appear in May to July atop silvery, hairy bracts that give the silver nailwort its common name. Stems can reach up to one foot in length but remain low to the ground and branch repeatedly to give the plant its tufted mat-like appearance. Individuals develop a large taproot which likely gives the plant the competitive advantage in the harsh wind and water scoured habitats it occupies (USFS 2015a).

Silvery nailwort occurs only in the eastern United States in two distinct regions: the central/southern Appalachians and New England. In both regions, it occupies primarily granitic rock outcrops, cliffs and ledges, or gravel barrens/bars along major rivers. Occupying small pockets of soil that collect between cobbles or in the cracks of bedrock, it seems to be at the very least disturbance tolerant, if not dependent (USFS 2015a). Silvery nailwort is usually found growing in exposed, barren upland areas devoid of any organic material. It is a rare plant that has been further endangered by hiking and the use of ATVs in its natural highland range. It has also been threatened by over-collection of wild specimens (Chafin 2007). There are 30 previously documented occurrences of silvery nailwort in the MNF, primarily in the east region around North Fork Mountain, Smoke Hole, and Cave Mountain (Bailey 2016).

Biological surveys for RFSS were conducted during August and September 2015 in coordination with MNF staff (Columbia 2015a, 2016b). This species was documented within the proposed Project area along the Line WB replacement right-of-way in Pendleton County. Additional field surveys were conducted in June 2016 to characterize the extent of these silvery nailwort populations.

6.3.6 RFSS Plants with Suitable Habitat in the Survey Area

The LOO table identifies 35 RFSS plants that are within range of the Project and can occur in habitats that are found within the Project study area. These plants are grouped by suitable habitat type and described in Tables 6.3-1 through 6.3-3.

TABLE 6.3-1

WB XPress Project
Wetland and Riparian RFSS Plants with Suitable Habitat in the WB Xpress Project Area

Scientific Name	Common Name	Habitat Preferences
Amelanchier bartramiana	Bartram Shadbush	*Northern hardwood and mixed hardwood-coniferous forests, forest edges, opening in forests, and peatlands (in Pendleton and Randolph Counties, WV) in the MNF, prefers high-elevation moist to wet areas; considered disturbance-tolerant.*
Euphorbia purpurea	Darlington's Spurge	*Dry or moist woods, rare; mountain glades and swampy woods (in Pendleton and Randolph Counties, WV).*
Hasteola suaveolens	Sweet-scented Indian-plantain	*Low, moist ground; in rich floodplain forests, thickets, or clearings and in calcareous fens. Occasionally on calcareous bluffs in Berkeley, Greenbrier, Hancock, Mercer, Monongalia, Ohio, Pleasants, Preston, Randolph, Ritchie, and Tucker Counties, WV.*
Juncus filiformis	Thread Rush	*Moist or wet habitats including sandy shores of streams and lakes, bogs and alpine meadows in Pleasants, Randolph, and Tucker Counties, WV; prefers high elevations in the MNF; considered disturbance-tolerant.*
Marshallia grandiflora	Large-flowered Barbara's-buttons	*Along the flood-scoured banks of large, high-gradient rivers in the central Appalachians; prefers full sunlight. The species is also reported from rocky lake shores, creek banks, bluffs and flood plains in Barbour, Fayette, Greenbrier, Marion, Monongalia, Nicholas, Preston, Randolph, Summers, Taylor, Upshur, and Webster Counties, WV.*
Platanthera shriveri	Shriver's Frilly Orchid	*Partial to full shade of damp, open, mixed deciduous and coniferous woods, often along seepage springs or streams, or on roadside banks amid mosses, ferns, grasses, sedges, and/or nettles in mountains in Pocahontas, and Randolph Counties, WV.*
Polemonium vanbruntiae	Bog Jacob's-ladder	*Hardwood and softwood swamps, shrub swamps, marshes, bogs, lakeshores, woodland swales and seeps, spring runs, and wet roadsides, mostly at higher elevations (at least in the southern part of the plant's range). West Virginia populations are mostly at elevations of 2,000-4,000 feet in Grant, Mineral, Pocahontas, Preston, Randolph, and Tucker Counties, WV.*
Rhamnus lanceolata ssp. lanceolata	Lanceleaf Buckthorn	*Dry to moist, brushy thickets with dolomite near the surface, often just below cliffs in Berkeley, Grant, Hardy, and Pendleton Counties, WV.*
Ribes lacustre	Bristly Black Currant	Damp soil on rocky slopes and talus areas, moist to seepy rock outcrops and cliffs, and in cool, shaded wetlands in Grant, Mercer, Mineral, Pocahontas, Randolph, and Tucker Counties, WV.

TABLE 6.3-1

WB XPress Project
Wetland and Riparian RFSS Plants with Suitable Habitat in the WB Xpress Project Area

Scutellaria saxatilis	Rock Skullcap	*Woods, hillsides, and moist rocky areas at high elevations (in Pendleton and Randolph Counties, WV).*
Viola appalachiensis	Appalachian Blue Violet	*Rich, moist forest community matrix, such as mixed mesophytic forest, mesic oak-hickory forest, or cove forest, moist stream banks, clearings, pastures, and other areas associated with human disturbance (in Randolph County, WV).*

Source: NatureServe, 2015; Bailey, 2016.

TABLE 6.3-2

WB XPress Project
Mesic Forest and Cover RFSS Plants with Suitable Habitat in the WB Xpress Project Area

Scientific Name	Common Name	Habitat Preferences
Agrostis mertensii	Arctic Bentgrass	*High elevation, gravelly and rocky soil in Pocahontas and Randolph Counties, WV; considered disturbance-tolerant.*
Botrychium oneidense	Bluntlobe Grapefern	*Low, wet, acid, secondary woods and swamps, and mixed cove forests; considered disturbance-tolerant (in Pendleton and Randolph Counties).*
Carex roanensis	Roan Mountain Sedge	Rich soils on steep slopes of mid- to high-elevation mesic forests in the southern Appalachians, including rich cove and northern hardwood forests, with an open understory in Pendleton, Pocahontas, and Randolph Counties, WV.
Hexalectris spicata	Crested Coralroot	*Dry or mesic woods on basic soils, and limestone glades with sparse forest cover in Grant, Pendleton, and Wayne Counties, WV.*
Paxistima canbyi	Canby's Mountain-lover	*Bluffs and cliffs of limestone or dolomite, usually growing in shallow soils that form over these substrates in Grant, Greenbrier, Hampshire, Mercer, Mineral, Monroe, and Pendleton Counties, WV.*
Silene virginica var. robusta	Fire Pink	*Limestone-related dry, open woods in Grant and Pendleton Counties, WV*
Trichostema setaceum	Narrow-leaved Blue-curls	*Grassland, meadows and fields, sandplains, barrens, and dry oak forests in Fayette, Grant, Hampshire, Mineral, Morgan, and Pendleton Counties, WV.*

Source: NatureServe, 2015; Bailey, 2016.

Natural heritage data provided by the WVDNR in July, 2016 indicates observations of the following species in the MNF within 2.5 miles of the Project survey area:

- Appalachian blue violet (*Viola appalachiensis*);
- Butternut;
- Canada mountain ricegrass (*Piptatherum canadense*);
- Canby’s mountain mint (*Paxistima canbyi*);
- Crested coralroot (*Hexalectris spicata*);
- Long-stalked holly (*Ilex collina*);

- Mountain pimpernel (*Taenidia montana*);
- Robust fire pink (*Silene virginia* var. *robusta*);
- Rock skullcap (*Scutellaria saxatilis*);
- Roundleaf dogwood (*Cornus rugose*);
- Silvery nailwort; and
- White alumroot.

The Project study area was evaluated for these species but no individuals were identified during surveys conducted in August through October 2015 and June 2016.

TABLE 6.3-3

WB XPress Project
Rocky Habitat and RFSS Plants with Suitable Habitat in the WB Xpress Project Area

Scientific Name	Common Name	Habitat Preferences
Arabis patens	Spreading Rockcress	*Moist rocky woods, limestone outcrops, and shady riverbanks in Berkeley, Grant, Hampshire, Hardy, Jefferson, and Pendleton Counties, WV.*
Clematis occidentalis var. occidentalis	Purple Clematis	*Rocky alpine slopes and ridges, and openings in forested areas with cool humus-rich soils and partial shade (in Pendleton County, WV).*
Cornus rugosa	Roundleaf Dogwood	*Well drained, sandy soil in rocky areas on mountains in Fayette, Mineral, and Pendleton Counties, WV.*
Delphinium exaltatum	Tall Larkspur	*Woods (and edges of woods), rocky slopes, semi-open woodlands, glades and prairie openings with calcareous soil and moderate disturbance in Grant, Greenbrier, Hampshire, Hardy, Mercer, Mineral, Monroe, and Pendleton Counties, WV.*
Juncus trifidus	Highland Rush	*Cracks in rocky outcrops and ledges in cool microsites and rocky alpine meadows; mostly restricted to high elevation sites; tolerates calcareous and acidic soil conditions.*
Monarda fistulosa ssp. brevis	Smoke Hole Bergamot	*Mid-Appalachian cedar glades and dry limestone outcrops/ barrens; often found on thin, unstable limestone slopes in Fayette, Grant, Hardy, Mercer, Nicholas, Pendleton, and Summers Counties, WV.*
Paronychia virginica	Yellow Nailwort	*Shallow, rocky soil over magnesium-rich, ultramafic rock, typically limestone glades and barrens in Grant, Hampshire, Hardy, Jefferson, and Pendleton Counties, WV.*
Piptatherum (=Oryzopsis) canadense or canadensis?	Canada Mountain Ricegrass	*Rocky openings with sandy soil just below treeline in Pendleton and Randolph Counties, WV.*
Pycnanthemum beadlei	Beadle's Mountain mint	*Rocky areas in open forests, forest edges, and roadsides (in Pendleton and Randolph Counties, WV).*
Taenidia montana	Mountain Pimpernel	*Shale barrens (calcareous) and mesic and xeric open woods or dense hardwood forests, often up to 15% slope, and associated with red oak and chestnut oak in Grant, Greenbrier, Hampshire, Hardy, Mercer, Mineral, Monroe, Morgan, Pendleton, Summers, and Tucker Counties in WV.*
Trifolium virginicum	Kate's Mountain Clover	*Xeric conditions in shale barrens, limestone woods, and roadsides in Berkeley, Grant, Greenbrier, Hampshire, Hardy, Mineral, Monroe, Morgan, and Pendleton Counties, WV.*

Source: NatureServe 2015

6.3.7 MNF RFSS Plants with No Suitable Habitat or Out of Range

The LOO table identifies 29 RFSS plants that are out of range or have no suitable habitat within the Project study area. It was noted with the LOO table that “a determination of ‘not likely to occur’ should not be construed as a guarantee that a species will not occur” in the Project area. The proposed Project was determined to have “No Impact to these species.” Table 6.3-4 identifies these RFSS plants and provides rationale for the “No Impact” determination.

TABLE 6.3-4

WB XPress Project
MNF RFSS Plants Out of Range or Lacking Suitable Habitat within the Study Corridor

Scientific Name	Common Name	Habitat Preferences	Determination	Reason for Determination
Allium oxyphilum	Lillydale Onion	Acidic shale barrensand sandstone outcroppings in Greenbrier, Mercer, Monroe, and Summers Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Astragalus neglectus	Cooper's Milkvetch	Well-drained sand or gravel borders of glacial lakes; open, calcareous, rocky ridges and bluffs; at the border between prairie and woods; and powerline rights-of-way and roadsides in Grant County, WV.	No Impact	Not within range
Baptisia australis var. australis	Blue Wild Indigo	Moist soils around early successional habitats, open areas, and along rivers and ditches in Fayette, Greenbrier, Hancock, Jefferson, Morgan, Nicholas, Pocahontas, Raleigh, and Summers Counties, WV.	No Impact	Not within range
Botrychium lanceolatum var. angustisegmentum	Lanceleaf Grapefern	Moist shady woods, margins of swamps, and in cool to warm, mostly rich, subacid soils in Pocahontas, Preston, and Tucker Counties, WV.	No Impact	Not within range
Corallorhiza bentleyi	Bentley's Coralroot	Disturbance tolerant; found at edges of deciduous forests in Monroe and Pocahontas Counties, WV.	No Impact	Not within range
Cypripedium reginae	Showy Lady's-slipper	Prefers full sun and constant moisture in cold northern wetlands, swampy thickets, bogs, woodland glades, ravines, stream and lake edges, seepages on limestone or sandstone bluffs, damp calcareous slopes or shores, limestone quarries, wet calcareous meadows, circumneutral seep springs, forested fens, shrub borders of fens, sandy shorelines, and algific talus slopes in Greenbrier and Tucker Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Eriogonum alleni	Shalebarren Wild-buckwheat	Exclusively prefers shale barrens in Fayette, Greenbrier, Monroe, Pendleton, Pocahontas, and Summers Counties, WV.	No Impact	No suitable habitat located in the survey corridor

TABLE 6.3-4

WB XPress Project
MNF RFSS Plants Out of Range or Lacking Suitable Habitat within the Study Corridor

Scientific Name	Common Name	Habitat Preferences	Determination	Reason for Determination
Gaylussacia brachycera	Box Huckleberry	Acidic sandy soil in woodlands and slopes, frequently associated with pine and mountain laurel, often sourwood & black gum; growth habit is consistent with a species tolerant of low to moderate ground fire in Greenbrier, Hardy, Monroe, and Summers Counties, WV.	No Impact	Not within range
Gymnocarpium appalachianum	Appalachian Oak Fern	North-facing slopes and summits in maple-birch-hemlock woods, preferring cool, moist microclimates above 2,000ft on moist sandstone, talus, and boulder areas in Greenbrier, Hampshire, Monongalia, Pendleton, Preston, Randolph, Tucker Counties, WV.	No Impact	No suitable habitat located in the survey corridor
Hypericum mitchellianum	Blue Ridge St. John's-wort	Seepage slopes and spray areas near falls, at higher elevations. Grassy balds, grassy openings, forests, seepages in Pocahontas, Randolph, and Tucker Counties, WV.	No Impact	No suitable habitat located in the survey corridor
Ilex collina	Long-stalk Holly	High elevation oligotrophic wetlands along streams, and streamheads from 2120-4815 ft. It often occurs in association with Tsuga canadensis, Betula lenta, Ilex montana, Picea rubens, and Rhododendron maximum; less common in meadows and bogs in Greenbrier, Nicholas, Pocahontas, Randolph, and Webster Counties, WV.	No Impact	No suitable habitat located in the survey corridor
Liatris turgida	Turgid Blazing Star	Xeric environments associated with clay soils, gravel, shale barrens, and rocky (granitic, amphibolite) outcrops in Fayette, Greenbrier, McDowell, Mineral, Monroe, and Nicholas Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Linum sulcatum	Grooved Yellow Flax	Scattered sites on sandy barrens. Open, sunny, dry limestone and shale areas in Grant and Jefferson Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Listera cordata	Heartleaf Twayblade	Cool peaty swamps Grant, Greenbrier, Pocahontas, Randolph, and Wyoming Counties, WV.	No Impact	No suitable habitat located in the survey corridor
Menyanthes trifoliata	Bog Buckbean	Various wetland habitats such as fens, pools, marshes, and bogs, particularly in acid or oligotrophic conditions in Pocahontas, Preston, Randolph, and Tucker Counties, WV.	No Impact	No suitable habitat located in the survey corridor
Ophioglossum engelmannii	Limestone Adder's-tongue	Limestone-related habitat in Hardy and Tucker Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor

TABLE 6.3-4

WB XPress Project
MNF RFSS Plants Out of Range or Lacking Suitable Habitat within the Study Corridor

Scientific Name	Common Name	Habitat Preferences	Determination	Reason for Determination
Pedicularis lanceolata	Swamp Lousewort	Habitats that are periodically inundated, such as wet meadows and swamps with sun exposure in Greenbrier, Hardy, Jefferson, Pocahontas, Randolph, and Tucker Counties, WV.	No Impact	No suitable habitat located in the survey corridor
Phlox buckleyi	Swordleaf Phlox	Shaly slopes in open woods near shale barrens; often occurs along roads. Shales tend to be of Devonian age; Disturbance-tolerant, preferring open woods near but not within shale barrens in Greenbrier, Monroe, Pocahontas, Summers Counties in WV.	No Impact	Not within range
Poa paludigena	Bog Bluegrass	Occurs among fallen trees and moss in open to shaded spring-fed wetlands (in Pendleton and Randolph Counties, WV).	No Impact	No suitable habitat located in the survey corridor
Potamogeton tennesseensis	Tennessee Pondweed	Streams, ponds, and shallows of rivers in Greenbrier, Harrison, Ohio, and Tucker Counties, WV.	No Impact	Not within range
Ranunculus pensylvanicus	Pennsylvania Buttercup	A wetland species preferring open to filtered light exposure in Cabell, Marshall, Ohio, and Pocahontas County, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Stellaria borealis ssp. borealis	Boreal Starwort	Seeps and spring-fed streamlets and wetlands, usually in wooded areas in Tucker County, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Taxus canadensis	Canada Yew	Gentle to somewhat steep slopes facing southeast, at elevations ranging from 190-200 m (613-650 feet). Cool, rich, damp woods and swamps Grant, Greenbrier, Hancock, Mercer, Mineral, Monongalia, Pendleton, Pleasants, Pocahontas, Preston, Raleigh, Randolph, Summers, Tucker, Tyler, and Wyoming Counties, WV.	No Impact	Not within elevation range and no suitable habitat located in the survey corridor
Tortula ammonsiana	Ammons' Tortula Moss	Occurs in the eastern United States in mixed hardwood forest communities on rock outcrops (often with southern aspect), preferring the wet back walls and shelves of overhanging cliffs in Pocahontas County, VA.	No Impact	Not within range and no suitable habitat located in the survey corridor
Trichomanes boschianum	Bristle-fern	Deep shade on damp acid rocks, usually sandstone, of sheltered canyons, grottos and rock shelters at an altitude of 150 to 800 m. The rock outcrops are generally found within mesic upland forests in Kanawha, Pocahontas, Wayne, and Webster Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor

TABLE 6.3-4

WB XPress Project
MNF RFSS Plants Out of Range or Lacking Suitable Habitat within the Study Corridor

Scientific Name	Common Name	Habitat Preferences	Determination	Reason for Determination
Triphora trianthophora	Nodding Pogonia	Deep leaf litter and leaf-lined depressions on gentle slopes in old-age/maturing forests dominated by Tsuga canadensis and Fagus grandifolia in Barbour, Fayette, Kanawha, Nicholas, Summers, Upshur, and Webster Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Vitis rupestris	Sand Grape	Moist soil in open to partial light at low elevations along gravelly banks, river bottoms, stream beds, washes, and scoured boulders and cobbles. It can also occur along the edges of limestone glades and barrens in Fayette, Greenbrier, Monroe, Ohio, Preston, Raleigh, and Summers Counties, WV.	No Impact	Not within range and no suitable habitat located in the survey corridor
Woodwardia areolata	Netted Chainfern	Acidic soil in forested swamps in Greenbrier, Hancock, Logan, Mineral, Monongalia, Morgan, Pocahontas, Upshur, and Wayne Counties, WV	No Impact	Not within range and no suitable habitat located in the survey corridor

6.3.8 Effects to RFSS Plants

Direct Impacts

During construction, clearing of surface vegetation and grading of ground surface will occur in the Project workspace. Soil compaction and the use of herbicides may also impact the vegetation regime. These activities could directly impact RFSS plant populations of Allegheny onion, white alumroot, and silvery nailwort via trampling and removal from the Project area. Erosion and sedimentation from failed erosion and sedimentation control measures from upland earth disturbance could also directly impact RFSS plant populations. Project workspace was configured to avoid and minimize impacts to RFSS plants to the maximum extent practicable.

Columbia is unable to avoid all Allegheny onion and white alumroot plant impacts because of the limited availability of possible workspace immediately adjacent to the Project workspace. In this area, in addition to the 50-foot-long-term right-of-way, the temporary workspace will be limited to a 10-foot swath on the south side of the long-term right-of-way. Columbia evaluated the possibility of moving the temporary workspace to the northern side of the long-term right-of-way but determined it could not use any space on the northern side due the steep slope and significant drop-off that would not safely support construction equipment or be usable for spoil storage. Because the populations of white alumroot and Allegheny onion extend outside of the Project area and populations of all three RFSS plants (white alumroot, Allegheny onion, and silvery nailwort) are found throughout the MNF, direct loss of individuals resulting from Project construction is not expected to inhibit continued existence of these RFSS plant populations.

Two silvery nailwort populations were identified in the Project workspace, but are located outside of long-term right-of-way.

Four butternut trees were identified in the survey area, but are located outside of Project workspace and along an existing access road that will not be improved, so no direct impacts are expected.

Operation of the Project will generally involve regular vegetation maintenance in the long-term right-of-way, which could alter element exposure for individual plants. Impacts generated by operation activities are not expected to affect RFSS plant populations or individuals identified in the Project area, unless populations adjacent to the long-term right-of-way naturally expand to inhabit the right-of-way. This is possible for each of the four RFSS plants identified during surveys. If this occurs, mowing could disturb or destroy certain individuals. However, these impacts are not guaranteed and would not be expected to negatively impact the species' population as a whole or contribute in a trend toward federal listing for the species. The two identified silvery nailwort populations occur over existing pipelines in areas of the existing right-of-way that are used as a road during the current pipeline operation. Because the silvery nailwort is disturbance tolerant and is currently existing in these conditions, negative impacts are not expected.

Indirect Impacts

Indirect impacts of this activity on RFSS plants adjacent to the Project workspace may include windthrow, increased exposure to elements such as wind, sun, and precipitation, which could alter plant viability and fecundity

Another possible indirect effect resulting from construction of the Project is the introduction of NNIS, which could outcompete the identified RFSS plants and lead to decreases in population sizes. Additionally, NNIS could be introduced to the Project area and outcompete the identified RFSS plants, and lead to decreases in population sizes.

None of the 29 RFSS plants identified in Tables 6.3-1 through 6.3-3 are within range and associated with habitat types crossed by the Project were observed during Project surveys. However, in the unlikely case that surveys inadvertently missed RFSS plants, direct or indirect impacts to these species would unknowingly occur. Individuals located near Project workspace could experience increased or decreased viability and fecundity due to increased wind, sun, and precipitation exposure, and responses would vary depending on habitat preferences and weather conditions during construction and restoration.

6.3.9 Conservation Measures for RFSS Plants on the MNF

Conservation Measures: To avoid and minimize potential impacts to the RFSS plants, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.
- Columbia will install silt fencing between the Project workspace and delineated RFSS plant populations of Allegheny onion and white alumroot to minimize possible indirect impacts.

- Columbia will identify Allegheny onion and white alumroot individuals within the previously identified population areas prior to construction, and relocate individual plants to the extent feasible. During relocation activities, Columbia will also collect seeds, if present, from the relocated individuals and distribute it in nearby areas determined to be favorable habitat.

- As recommended by MNF staff, high visibility fencing will be placed around the two silvery nailwort populations in temporary workspace and project spoil will not be stored on these populations. If it appears that ground disturbance will cause unavoidable impacts to these populations, silvery nailwort individuals will be relocated to existing maintained right-of-way where ground disturbance is at a level that would be favorable for this species (such as mowed areas), since silvery nailwort are successful in regularly disturbed environments.

- Long-term right-of-way would be maintained and mowed every three years for the width of the right-of-way (FERC 2013). However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations, in accordance with the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Procedures, and the Project MNF-specific COMP.

- Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds (FERC 2013b).

- In wetlands, no regular vegetation maintenance will occur (FERC 2013).

- Mowing will be limited near waterbodies to allow a 25-foot riparian area extending from the waterbody's mean high water mark (FERC 2013).

- Per the requirements of the MSHCP restrictions for bats, tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to August 1 and from August 15 to November 15 no tree clearing will occur from MP 8.9 to MP 25.4 (Priority 1 and 2 Indiana bat habitat). From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

- Narrow the construction right-of-way to 75 feet wide through wetlands to allow for the installation of equipment crossings and to safely perform special construction methods at these locations.

- Maintain reduced workspace near waterbodies.

- ATWS will be located at least 50 feet back from ephemeral and small intermittent (drainage <50 acres) waterbody boundaries and at least 100 feet back from perennial and large intermittent (drainage >50 acres) waterbody boundaries.

- The Project will adhere to the LRMP standards and guidelines in wetlands and riparian areas that are suitable habitat for RFSS wetland plants by maintaining, enhancing, and restoring vegetation conditions (LRMP SW31) via:
  - Re-establishing wetland contours and hydrology after construction, as described above.
  - Re-seeding and allowing natural recruitment of species following construction as described in the Project's MNF-specific Restoration Plan included as Attachment D of the COMP.
- Reseed the right-of-way with a native species mix.
- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs, including low bush blueberry, as described in the replanting plan. The replanting plan is included as Attachment D of the COMP.
- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan attached as part of the Construction, Operation, and Maintenance Plan. Treatment of NNIS in areas shared with an RFSS plant population will be tailored specifically to that area so that potentially negative impacts from treatment will not be harmful to the RFSS plants. Specifically, the management of spotted knapweed (*Centaurea maculosa*) in areas surrounding known silvery nailwort populations.
- Relocated Allegheny onion and white alumroot as well as the two silvery nailwort populations identified in temporary workspace will be monitored for three growing seasons following construction to evaluate the success of the relocation effort. If at the end of three years, the relocation effort is determined to be unsuccessful, Columbia will work with the MNF to determine if additional measures are required including extending the duration of the monitoring program. The monitoring plan will also provide the protocol for field observations and data collection, and will establish the criteria for success of the RFSS populations.

6.3.10 Determination for RFSS Plants on the MNF

Four species of RFSS plants were identified during Project surveys. Negative impacts on RFSS plants will be avoided and minimized to the greatest extent possible, in accordance with MNF LRMP Standard VE13. Butternut individuals and populations will be avoided by Project activities. Project workspace was altered to minimize direct impacts on Allegheny onion, white alumroot, and silvery nailwort populations. Where impacts are unavoidable, impacts will be mitigated to the extent possible by Columbia's installation of protective fencing and relocation of plants. The effects of the Project will also be mitigated by natural processes including seed dispersal, and natural recruitment as described in the Project's MNF-specific Restoration Plan attached as part of the Construction, Operation, and Maintenance Plan. As presently configured, the Project will impact 0.29-acre of Allegheny onion populations, 0.12-acre of white alumroot populations, and 0.22-acre of silvery nailwort populations. Because some of these populations overlap, impacts to RFSS plant populations cover only a total of 0.55-acre.

Allegheny Onion

There are a total of 18 previously known occurrences of Allegheny onion throughout the MNF, primarily located in the northeast and north central part of the MNF. The populations identified within the Project area are new populations not previously known to MNF staff. As the Project is currently designed, approximately 0.29-acre of Allegheny onion populations is located within areas proposed for Project workspace and could be impacted by Project activities, and at least 4.54 acres extend outside of Project workspace within the 300-foot survey corridor. Because Allegheny onion prefers high-elevation forests, this indirect disturbance is not expected to contribute to a downward trend in the populations' survival given their current location adjacent to an existing maintained utility corridor. Because of the large amount of suitable habitat and individuals present in adjacent areas, the amount of species populations found elsewhere in the MNF, and the limited amount of disturbance to delineated Allegheny onion habitat and individuals that will take place within the Project action area, the Project may impact Allegheny onion individuals but is not likely to cause a trend towards federal listing or loss of viability.

White Alumroot

There are a total of 25 previously known white alumroot populations throughout the MNF, primarily located on the eastern side of the MNF. The populations identified within the Project area are new populations not previously known to MNF staff. As the Project is currently designed, approximately 0.12-acre of white alumroot populations is located within areas proposed for Project workspace and could be impacted by Project activities, and at least 3.24 acres extend outside of Project workspace within the 300-foot survey corridor. Because White Alumroot prefers high-elevation rocky areas and roadsides, indirect disturbances are not expected to contribute to a downward trend in the population's survival given their current location adjacent to an existing maintained utility corridor. Because of the large amount of suitable habitat and individuals present in adjacent areas, and amount of species populations found elsewhere in the MNF, the limited amount of disturbance to delineated white alumroot habitat and individuals that will take place within the Project action area may impact white alumroot individuals but is not likely to cause a trend towards federal listing or loss of viability.

Silvery Nailwort

There are a total of 30 previously known silvery nailwort populations throughout the MNF, primarily located on the east side of the MNF. The populations identified within the Project area are new populations not previously known to MNF staff. As the Project is currently designed, approximately 0.22-acre of silvery nailwort populations are located within areas proposed for Project workspace and could be impacted by Project activities, and 0.02-acre extend outside of Project workspace within the 300-foot survey corridor. Silvery nailwort is known to be disturbance-tolerant and indirect impacts resulting from the Project and are not expected to negatively impact the populations. Because of the amount of species populations found elsewhere in the MNF, the limited amount of disturbance to delineated silvery nailwort habitat and individuals that will take place within the Project action area may impact silvery nailwort individuals but is not likely to cause a trend towards federal listing or loss of viability.

Four individual butternut trees are located in areas that will not be used for Project workspace and will not be directly impacts by Project activities. For this reason, and the number of individuals found elsewhere in the MNF, a No Impact determination is given for butternut.

TABLE 6.3-5

WB XPress Project
Impact Determination for RFSS Plants on the MNF

Scientific Name	Common Name	Determination
Agrostis mertensii	Arctic Bentgrass	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Allium allegheniense	Allegheny Onion	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Allium oxyphilum	Lillydale Onion	No Impact
Amelanchier bartramiana	Bartram Shadbush	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Arabis patens	Spreading Rockcress	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Astragalus neglectus	Cooper's Milkvetch	No Impact
Baptisia australis var. australis	Blue Wild Indigo	No Impact
Botrychium lanceolatum var. angustisegmentum	Lanceleaf Grapefern	No Impact
Botrychium oneidense	Bluntlobe Grapefern	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Carex roanensis	Roan Mountain Sedge	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Clematis occidentalis var. occidentalis	Purple Clematis	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Corallorhiza bentleyi	Bentley's Coralroot	No Impact
Cornus rugosa	Roundleaf Dogwood	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Cypripedium reginae	Showy Lady's-slipper	No Impact
Delphinium exaltatum	Tall Larkspur	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Eriogonum alleni	Shalebarren Wild-buckwheat	No Impact
Euphorbia purpurea	Darlington's Spurge	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Gaylussacia brachycera	Box Huckleberry	No Impact
Gymnocarpium appalachianum	Appalachian Oak Fern	No Impact
Hasteola suaveolens	Sweet-scented Indian-plantain	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Heuchera alba	White Alumroot	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Hexalectris spicata	Crested Coralroot	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Hypericum mitchellianum	Blue Ridge St. John's-wort	No Impact
Ilex collina	Long-stalk Holly	No Impact
Juglans cinerea	Butternut	No Impact
Juncus filiformis	Thread Rush	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Juncus trifidus	Highland Rush	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability

TABLE 6.3-5

WB XPress Project
Impact Determination for RFSS Plants on the MNF

Liatris turgida	Turgid Blazing Star	No Impact
Linum sulcatum	Grooved Yellow Flax	No Impact
Listera cordata	Heartleaf Twayblade	No Impact
Marshallia grandiflora	Large-flowered Barbara's-buttons	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Menyanthes trifoliata	Bog Buckbean	No Impact
Monarda fistulosa ssp. brevis	Smoke Hole Bergamot	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Ophioglossum engelmannii	Limestone Adder's-tongue	No Impact
Paronychia argyrocoma	Silvery Nailwort	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Paronychia virginica	Yellow Nailwort	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Paxistima canbyi	Canby's Mountain-lover	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Pedicularis lanceolata	Swamp Lousewort	No Impact
Phlox buckleyi	Swordleaf Phlox	No Impact
Piptatherum (=Oryzopsis) canadense	Canada Mountain Ricegrass	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Platanthera shriveri	Shriver's Frilly Orchid	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Poa paludigena	Bog Bluegrass	No Impact
Polemonium vanbruntiae	Bog Jacob's-ladder	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Potamogeton tennesseensis	Tennessee Pondweed	No Impact
Pycnanthemum beadlei	Beadle's Mountain mint	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Ranunculus pensylvanicus	Pennsylvania Buttercup	No Impact
Rhamnus lanceolata ssp. lanceolata	Lanceleaf Buckthorn	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Ribes lacustre	Bristly Black Currant	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Scutellaria saxatilis	Rock Skullcap	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Silene virginica var. robusta	Fire Pink	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Stellaria borealis ssp. borealis	Boreal Starwort	No Impact
Taenidia montana	Mountain Pimpernel	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Taxus canadensis	Canada Yew	No Impact
Tortula ammonsiana	Ammons' Tortula Moss	No Impact
Trichomanes boschianum	Bristle-fern	No Impact
Trichostema setaceum	Narrow-leaved Blue-curls	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Trifolium virginicum	Kate's Mountain Clover	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability
Triphora trianthophora	Nodding Pogonia	No Impact
Viola appalachiensis	Appalachian Blue Violet	May impact individuals but is not likely to cause a trend toward federal listing or loss of viability

TABLE 6.3-5

WB XPress Project
Impact Determination for RFSS Plants on the MNF

Vitis rupestris	Sand Grape	No Impact
Woodwardia areolata	Netted Chainfern	No Impact

2.0 BIRDS OF CONSERVATION CONCERN

The USFWS developed the BCC to accurately identify the migratory and non-migratory bird species (beyond those already designated as Federal threatened or endangered) that represent our nation's highest conservation priorities. Bird species considered for inclusion on lists in this report include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, and ESA candidate, proposed, endangered, or threatened, and recently delisted species. BCC are considered a subset of the MBTA-protected species and receive the same consideration and protection afforded to species under MBTA. However, BCC includes some non-MBTA-protected species because their conservation status and efforts are of concern to the USFWS. The goal of this list is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions and coordinating consultations in accordance with Executive Order 13186.

The BCC identifies species at the distinct levels including a National level, North American Bird Conservation Initiative (NABCI) Bird Conservation Regions (BCR) level, and at a USFWS service regions level. The entire Project lies within USFWS Region 5 which encompasses six BCR's. The Project is located in two of these BCR's: the Appalachian Mountains Region (BCR 28) and the Piedmont Region (BCR 29). MNF in its entirety falls within the Appalachian Mountains Region.

The Appalachian Mountains Region is characterized by rugged terrain generally dominated by deciduous forest types at lower elevations and combinations of pine, spruce, and fir at higher elevations. Most segments of land remain forested, but many portions are used for agriculture. Priority forest birds include cerulean warbler at low elevations, Golden-winged Warbler (*Vermivora chrysoptera*) in early-successional areas, and Henslow's Sparrow (*Ammodramus henslowii*) in grasslands. The region contains many headwaters of river systems that are used by waterfowl during migration (U.S. NABCI Committee 2000).

A list of migratory BCC species that may be affected by the proposed Project on MNF lands as identified by the USFWS is provided in Table 7-1.

TABLE 7-1

WB XPress Project
Birds of Conservation Concern that May Be Affected by the Project

Species	Season of Occurrence in Project Area	Preferred Habitat in Project Area
Bald eagle (*Haliaeetus leucocephalus*) [a]	Year-round	Near lakes, reservoirs, rivers, marshes, and coasts
Black-billed cuckoo (*Coccyzus erythropthalmus*)	Breeding	Forest dwelling

TABLE 7-1

WB XPress Project
Birds of Conservation Concern that May Be Affected by the Project

Species	Season of Occurrence in Project Area	Preferred Habitat in Project Area
Black-capped chickadee (*Poecile atricapillus*)	Year-round	Trees or woody shrubs
Blue-winged warbler (*Vermivora pinus*)	Breeding	Early to mid-succession habitats and forest/field edges
Canada warbler (*Wilsonia canadensis*)	Breeding	Forest dwelling
Cerulean warbler (*Dendroica cerulea*)	Breeding	Tall deciduous trees and open understory
Fox sparrow (*Passerella liaca*)	Wintering	Coniferous forest and dense mountain scrub
Golden-winged warbler (*Vermivora chrysoptera*)	Breeding	Tangled, shrubby habitats
Kentucky warbler (*Oporornis formosus*)	Breeding	Ground nesting. Found in the lower levels of the forest
Least bittern (*Ixobrychus exilis*)	Breeding	Fresh and brackish marsh with tall vegetation
Loggerhead shrike (*Lanius ludovicianus*)	Year-Round	Open country with scattered shrubs and trees
Louisiana waterthrush (*Parkesia motacilla*)	Breeding	Gravel-bottomed streams flowing through hilly, deciduous forest
Northern saw-whet owl (*Aegolius acadicus*)	Year-round	Forest dwelling
Pied-billed grebe (*Podilymbus podiceps*)	Breeding	Small, quiet ponds and marshes with some thick vegetation
Prairie warbler (*Dendroica discolor*)	Breeding	Scrubby fields and forests
Red crossbill (*Loxia curvirostra*)	Year-round	Mature coniferous forests
Red-headed woodpecker (*Melanerpes erythrocephalus*)	Year-round	Open forests with clear understories
Rusty blackbird (*Euphagus carolinus*)	Wintering	Flooded woods, swamps, marshes and the edges of ponds
Short-eared owl (*Asio flammeus*)	Wintering	Prairie, meadows, marshes, savanna, and open woodland
Swainson's warbler (*Limnothlypis swainsonii*)	Breeding	Rhododendron-mountain laurel
Wood thrush (*Hylocichla mustelina*)	Breeding	Deciduous and mixed forests
Worm eating warbler (*Helmitheros vermivorum*)	Breeding	Steep slopes with dense understory
Yellow-bellied sapsucker (*Sphyrapicus varius*)	Breeding	Hardwood and conifer forests up to about 6,500 feet elevation

[a] ESA de-listed species
Source: Cornell Lab of Ornithology, 2015

Direct Effects on Individuals: Construction noise and activities could alter the behavior of the migratory birds, causing stress or temporary displacement. Construction would also have the potential to disturb nest and cause abandonment if present in the construction area.

Indirect Impacts on Individuals: The construction of this Project would involve tree clearing, which could result in habitat loss, fragmentation, and habitat degradation. This could decrease suitable nest areas creating intraspecific competition, and attract migratory bird predators.

Conservation Measures: To avoid and minimize potential impacts to the migratory birds, Columbia will implement the following measures:

- Minimize impacts to forested habitat by using existing right-of-way to the greatest extent possible.

- If tree clearing will occur in migratory bird nesting season, conduct pre-construction walkthroughs to verify that no nests will be disturbed by clearing activities. If a migratory bird nest is identified within the Project area, the nesting tree will not be removed until chicks have fledged the nest, in accordance with the MBTA.

- Conduct a pre-construction walkthrough of the ground disturbance area to verify that no ground nests will be disturbed by clearing activities.

- During construction, EIs will be on site during construction activity and will have stop work authority in the event a nest is identified near the Project area.

- Reseed the right-of-way with a native species mix that will encourage the use by migratory birds.

- Replant on the inside or outside edges of the right-of-way or within another area on NFS lands identified by the MNF with trees and shrubs. The replanting plan is included as Attachment D of the COMP.

- Control the spread of invasive plants and noxious weeds as detailed in the Invasive Species Management Plan (Attachment E of the COMP).

- Tree clearing will not occur from June 1 to August 1 in all areas of NFS lands. From April 1 to October 31 no trees greater than nine inches dbh within the existing right-of-way will be cleared.

- Permanent right-of-way would be maintained and mowed every three years for the width of the right-of-way. However, a 10-foot corridor centered on each pipeline is allowed at any interval necessary to maintaining access for operations. Mowing will not be conducted from April 15 to August 15 to avoid impacts to the nesting of migratory birds.

- Background information on the bald eagle as well as information regarding the presence of suitable habitat and avoidance and minimization measures are discussed in section 6.2.7.4 of this report.

- An SPCC Plan would be implemented during construction activities to mitigate potential adverse impacts on waterbodies due to inadvertent releases of fuel or mechanical fluids. Specific measures in the SPCC include requirements to:

  - store bulk quantities of diesel fuel and gasoline in a designated fuel depot;

  - install adequate spill containment measures, such as containment dikes, combined with impervious lining before fuel storage tanks are filled;

- keep sorbent booms and clean-up kits at all storage locations;
- locate fuel storage areas at least 100 feet from streams, ponds, or wetlands, and at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Columbia property;
- not locate fuel storage areas within any designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority);
- service, lubricate, and refuel equipment in accordance with these same requirements whenever possible, and if not possible conduct these activities in accordance with a supplemental SPCC plan prepared by the EI, based on field conditions;
- place impervious or sorbent materials under the work area before conducting vehicle maintenance;
- collect waste materials created during maintenance (e.g., used oil) for proper disposal;
- inspect the work site and the vehicle after the maintenance work is complete to ensure that all hazardous materials are properly contained and collected for proper disposal; and
- equip each construction crew with appropriately sized spill kits containing absorbent materials approved for petroleum products and have sufficient tools and material to stop leaks.

2.0 SPECIAL HABITATS

5.1 Management Prescription Units

In accordance with the MNF's LRMP, portions of the MNF are managed with various goals and objectives, called Management Prescription Units (MPU). The proposed Project will cross three different MPUs within MNF: MPU 3.0 Vegetation Diversity, MPU 6.1 Wildlife Habitat Emphasis, and MPU 8.1 Special Areas Spruce Knob-Seneca Rocks National Recreation Area (USFS 2011). General descriptions of each MPU and approximate crossing lengths are provided in Table 8.1-1.

MPU 3.0 Vegetation Diversity comprises 21.2 percent of the entire MNF with an elevation range of less than 2,000 feet to over 4,000 feet. Major forest communities include conifer (comprising 0.8 percent within MPU 3.0), northern hardwoods (11 percent), mixed cove hardwoods (62.6 percent), mixed oak (22.4 percent), pine-oak (0.6 percent), and wildlife openings (3 percent). These communities are primarily mid-late successional and mid successional age classes. There are also 15 range allotments in the area. Because of the wide range of land diversity and vegetation types, most wildlife, fish, and plant species are represented within this MPU, as well as many non-NNIS. A primary management goal within this MPU is to enhance diversity of forest vegetative cover (USFS 2011).

MPU 6.1 Wildlife Habitat Emphasis comprises 30.3 percent of the entire MNF with an elevation range of 1,500 to 4,500 feet. Major forest communities include conifer (comprising 0.4 percent within MPU 6.1), northern hardwoods (3.9 percent), mixed cove hardwoods (25.9 percent), mixed oak (54.8 percent), pine-oak (13.7 percent), and open areas (1.3 percent). These communities are primarily mid-late successional and mid successional age classes. Oak communities comprise a majority of the forested vegetative cover, with an equal distribution of white oak, red oak, mixed oak, and black cherry groups. There are 13 range allotments in the area. Primary management goals within this MPU are to maintain water sources and mast-producing trees, and enhance oak communities and diversity of wildlife habitat (USFS 2011).

MPU 8.1 Spruce Knob-Seneca Rocks National Recreation Area is a congressionally designated National Recreation Area ranging in elevation from 1,000 feet to 4,861 feet. Major forest communities include conifer (comprising 3.2 percent within MPU 8.1), northern hardwoods (4.3 percent), mixed cove hardwoods (33.2 percent), mixed oak (44.9 percent), pine-oak (8.8 percent), and openings (5.4 percent). These communities are primarily mid-late successional and mid successional age classes. There are also 11 range allotments in the area. Primary management goals within the MPU are to provide recreation opportunities and conserve scenic, scientific, and historic values (USFS 2011).

TABLE 8.1-1

WB XPress Project
Management Prescription Units Crossed by Project[a]

Management Prescription (MPU)	Description [b]	Approximate Length Crossed (miles)
3.0 – Vegetation Diversity	Enhance diversity of forest vegetative cover (species, type, age); Sustain timber production	6.0
6.1 – Wildlife Habitat Emphasis	Use vegetation management to enhance the variety of wildlife habitat	0.9
8.1 – Special Area: Spruce Knob-Seneca Rocks National Recreation Area	Preservation of unique ecosystems for scientific or recreational purposes; Provide recreation opportunities	4.5

[a] USFS, 2011
[b] USFS, 2009.

2.0 Forest Stands

The types of tree stands crossed within the MNF are described in Table 3.3-1 using modelled data obtained from MNF (MNF 2004). Coniferous forests include species such as hemlock, red pine, and Virginia pine. Deciduous forest include species such as black cherry, white ash, hickory, yellow poplar, chestnut oak, sugar maple, beech, red maple, and mixed upland hardwood communities. Shrubs include both lowland and upland shrub communities.

Inventories of plant species and forest cover types were conducted on NFS land in August and September, 2015. Forest types inventoried in the survey area include mixed mesophytic/cove hardwood forest, northern hardwood forest, oak forest, pine-oak forest, and open land. A full report was provided to the MNF (Columbia 2015a, 2016b).

2.0 Red Spruce Stands

Red spruce (*Picea rubens*) communities are ecologically complex and provide suitable habitat for high-elevation species such as protected salamander, flying squirrel, and bat species. Because these communities have greatly decreased in abundance during recent centuries, the remaining red spruce stands are considered valuable vegetative resources. The amount of modelled red spruce forest crossed by the proposed Project is described in Table 8.3-1. The proposed Project will cross only low- and medium-density red spruce cover, which constitutes approximately 0.2 percent of the total land crossed by the proposed pipeline facilities. Low cover typically represents young red spruce restoration or stands with widely scattered red spruce canopy. Medium cover typically represents a red spruce-northern hardwood mixed canopy (Byers et al. 2013).

TABLE 8.3-1

WB XPress Project
Red Spruce Forest Crossed by Project[a]

Red Spruce Density Cover [b]	Approximate Feet Crossed by Centerline	Approximate Acres Crossed by CWA[c]
Low Cover	88	0.71
Medium Cover	94	0.16
TOTAL	**182**	**0.87**

a as modelled by Byers et al., 2013.
b Low cover based on <10 percent modelled red spruce cover. Medium cover based on 10-50 percent modelled red spruce cover.
c CWA – construction workspace

Because the Project will temporarily and permanently impact areas of red spruce forest, Columbia will mitigate for losses of this ecosystem by restoring red spruce elsewhere in the Project vicinity. A detail of this plan is provided in section 6.2.1 discussing the conservation measures to be implemented for West Virginia northern flying squirrel.

2.0 CONCLUSION

Columbia's Project workspaces, both temporary and permanent, have been specifically routed to maximize collocation with other existing pipelines and therefore minimize disturbance of NFS lands. Columbia currently has authorization to operate and maintain right-of-way within NFS lands. The Line WB replacement would widen the existing authorized right-of-way through NFS lands. The associated reduction in forest habitat will have both positive and negative effects on RFSS species, depending on the particular habitat preferences of each species. Measures that Columbia has committed to implementing for the Project, as detailed in previous sections of this document, will minimize the potential for adverse effects to RFSS species and is not likely to cause a trend towards federal listing. Additional coordination between Columbia, the MNF and USFWS will also address potential effects to federally listed species.

10.0 SIGNATURE

Monongahela National Forest Date

10.0 REFERENCES

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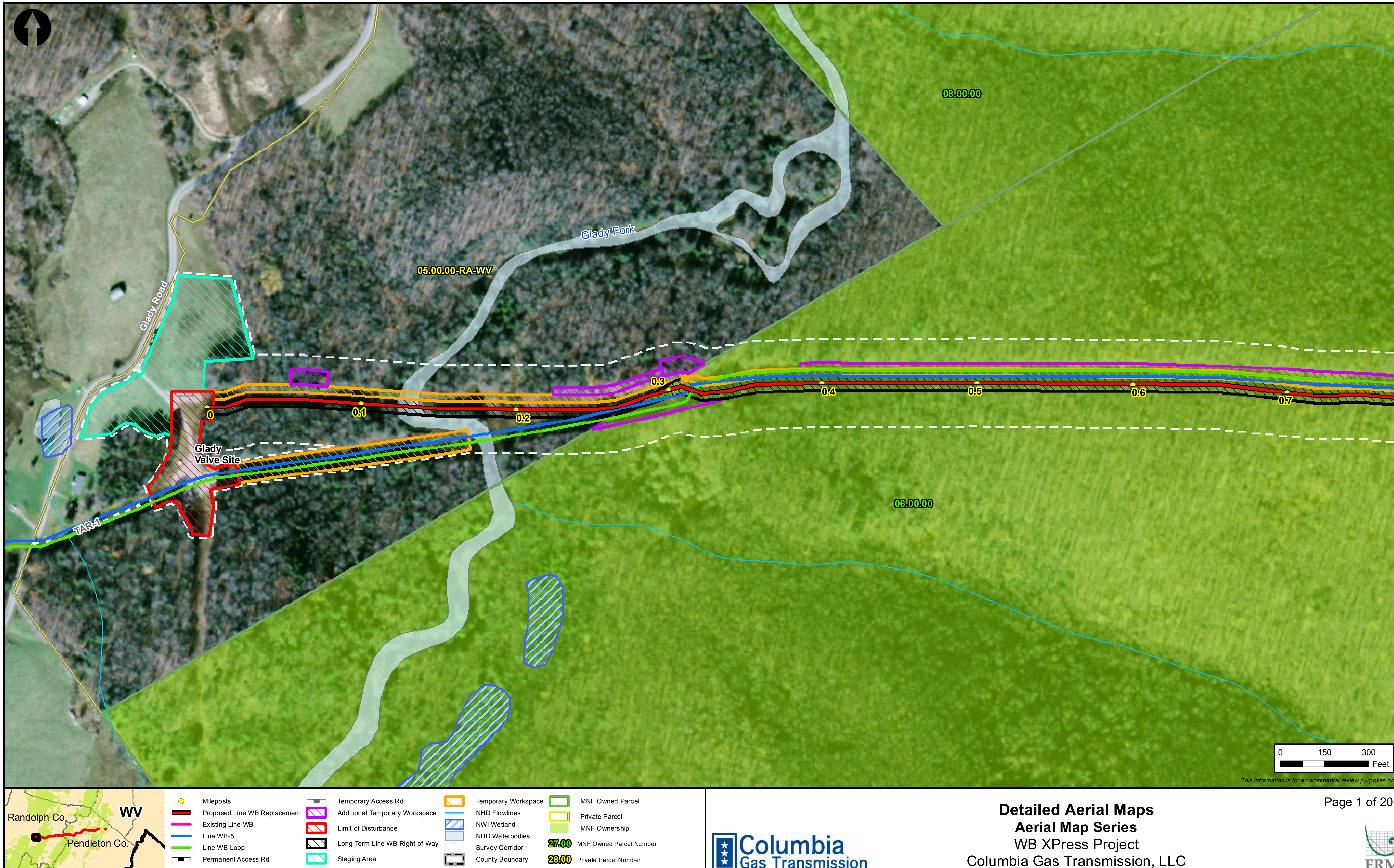
Appendix A
Line WB Replacement Detailed Aerial Mapping



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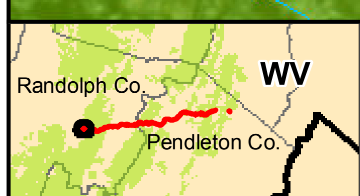

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Limit of Disturbance
Long-Term Line WB Right-of-Way
Staging Area
Temporary Workspace
NHD Flowlines
NWI Wetland
NHD Waterbodies
Survey Corridor
County Boundary
MNF Owned Parcel
Private Parcel
MNF Ownership
27.00 MNF Owned Parcel Number
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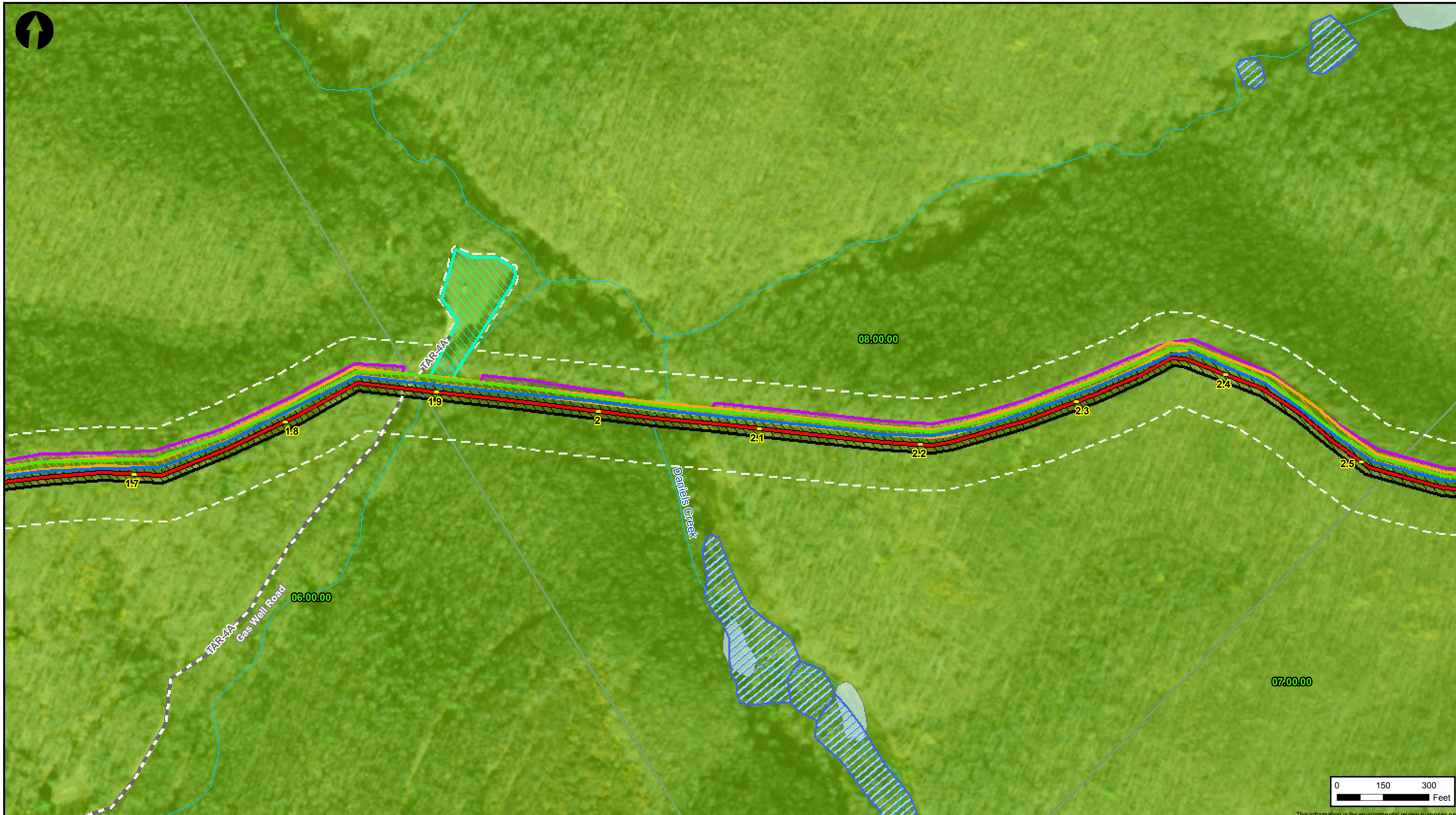

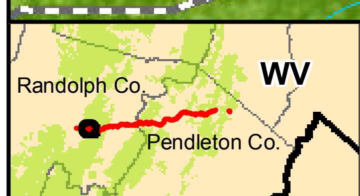

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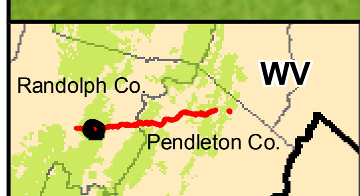

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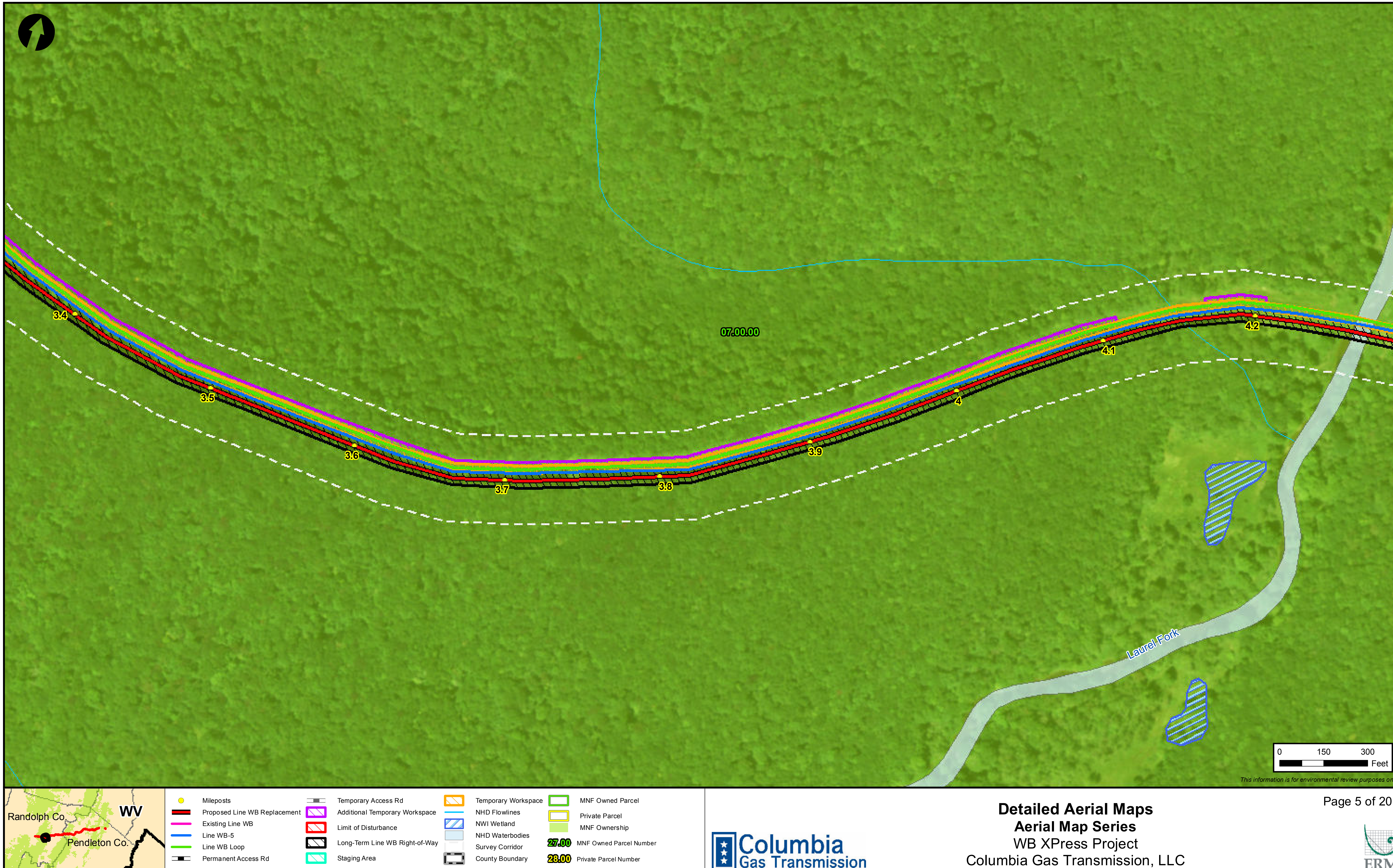

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Randolph Co. WV Pendleton Co.

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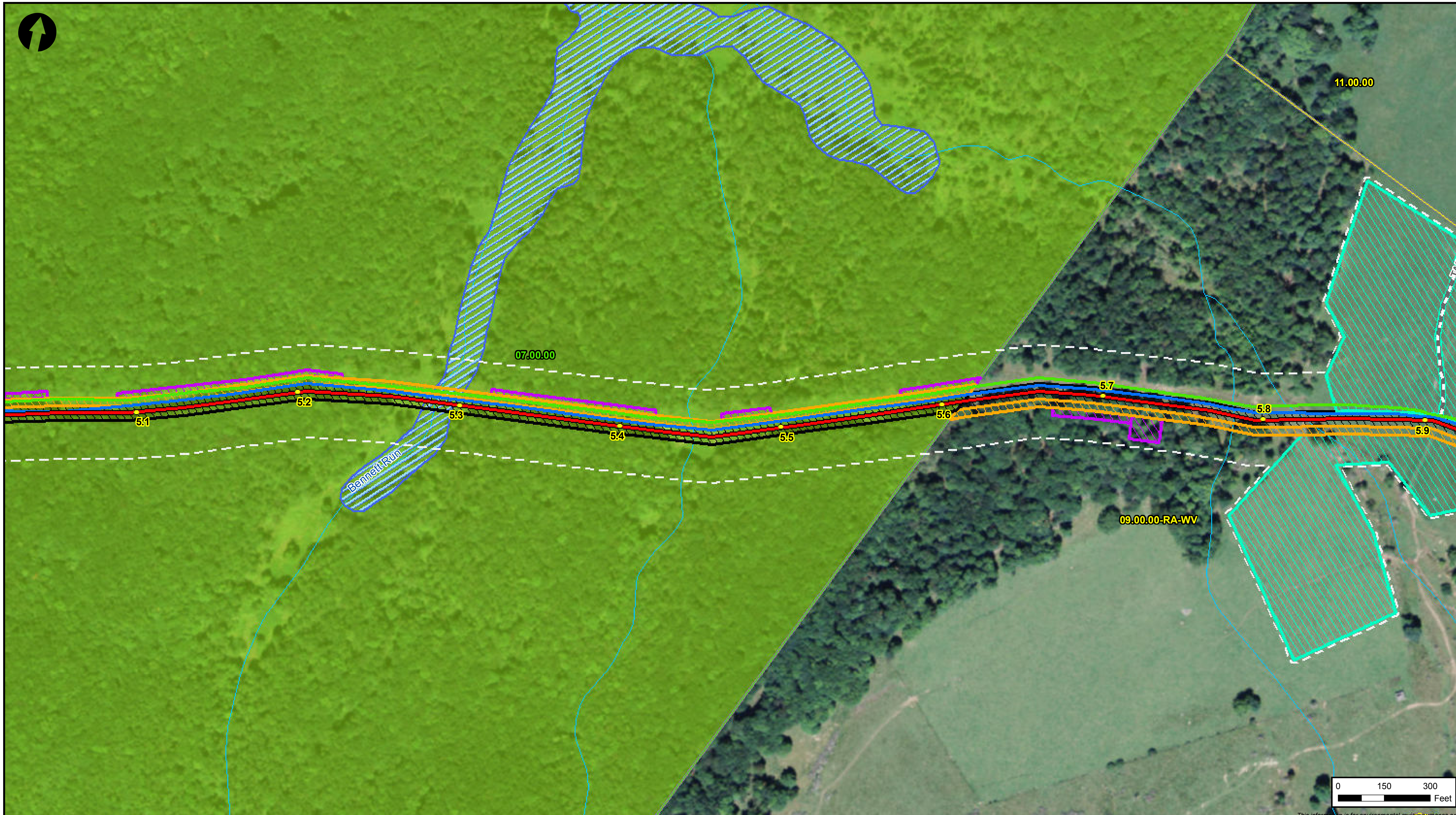

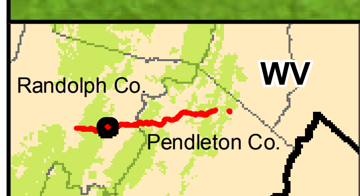

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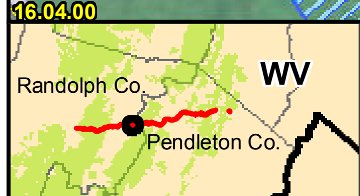

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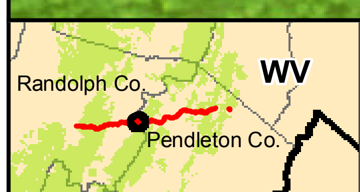

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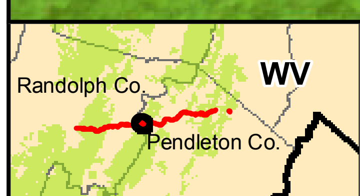

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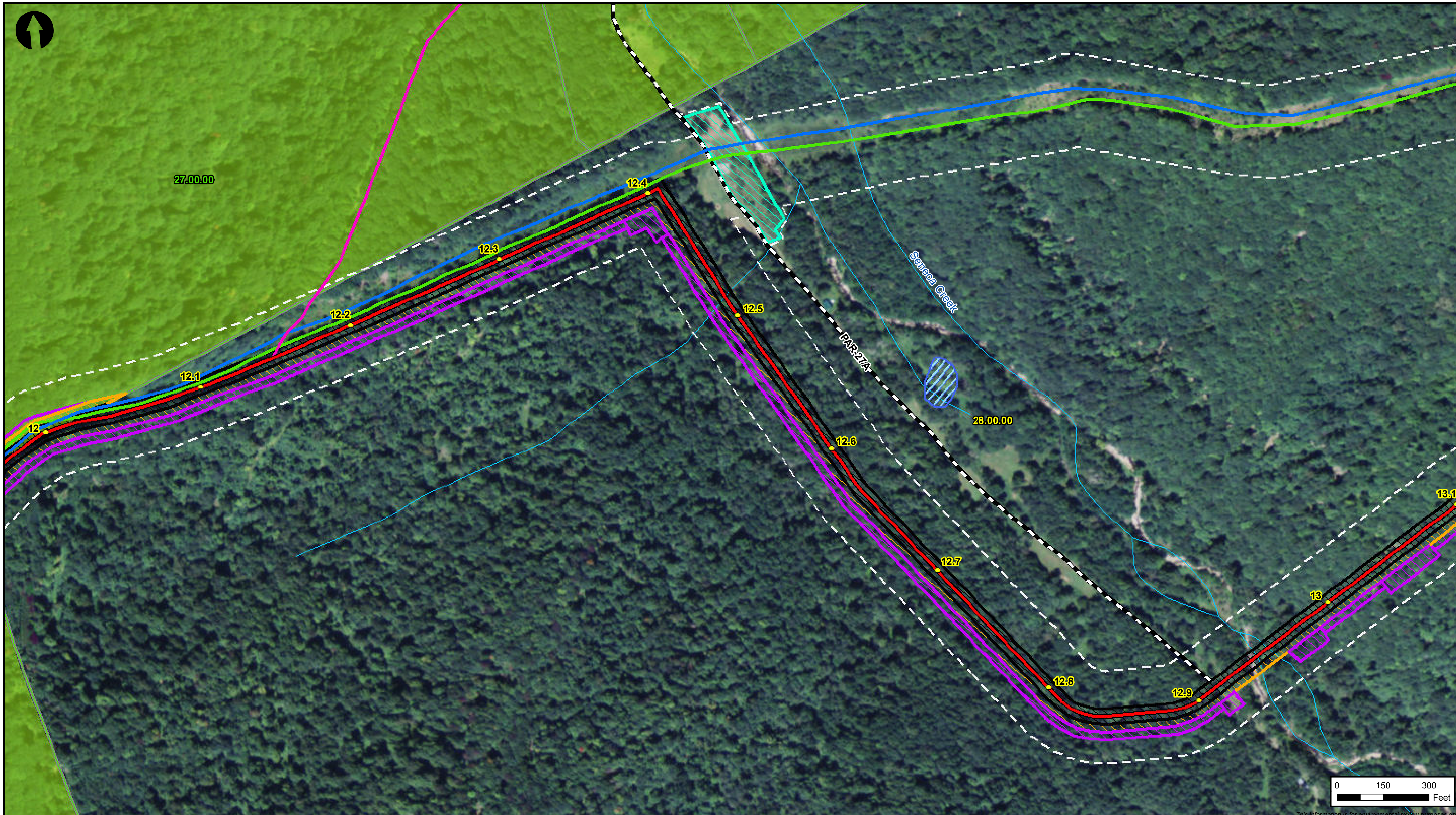

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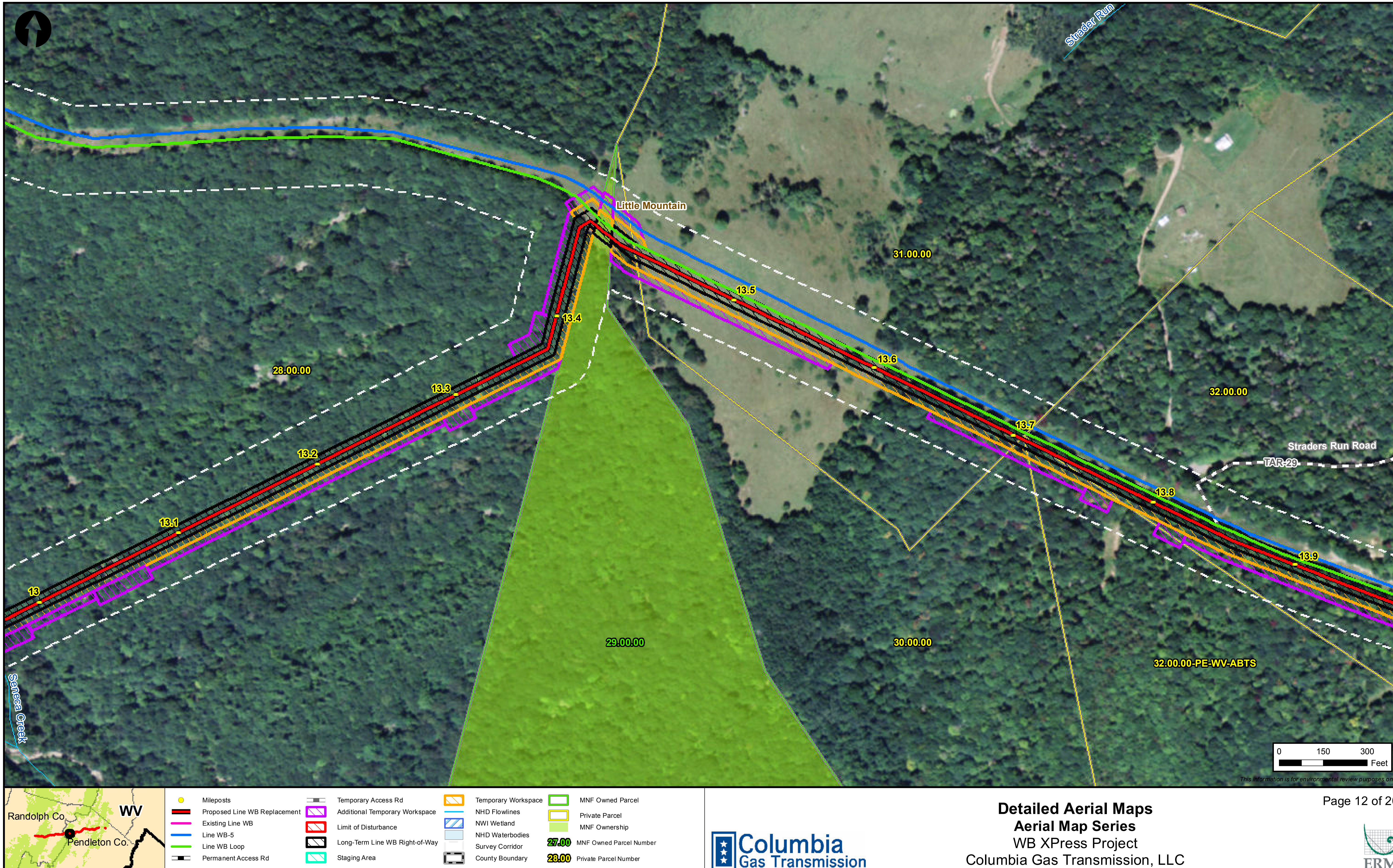

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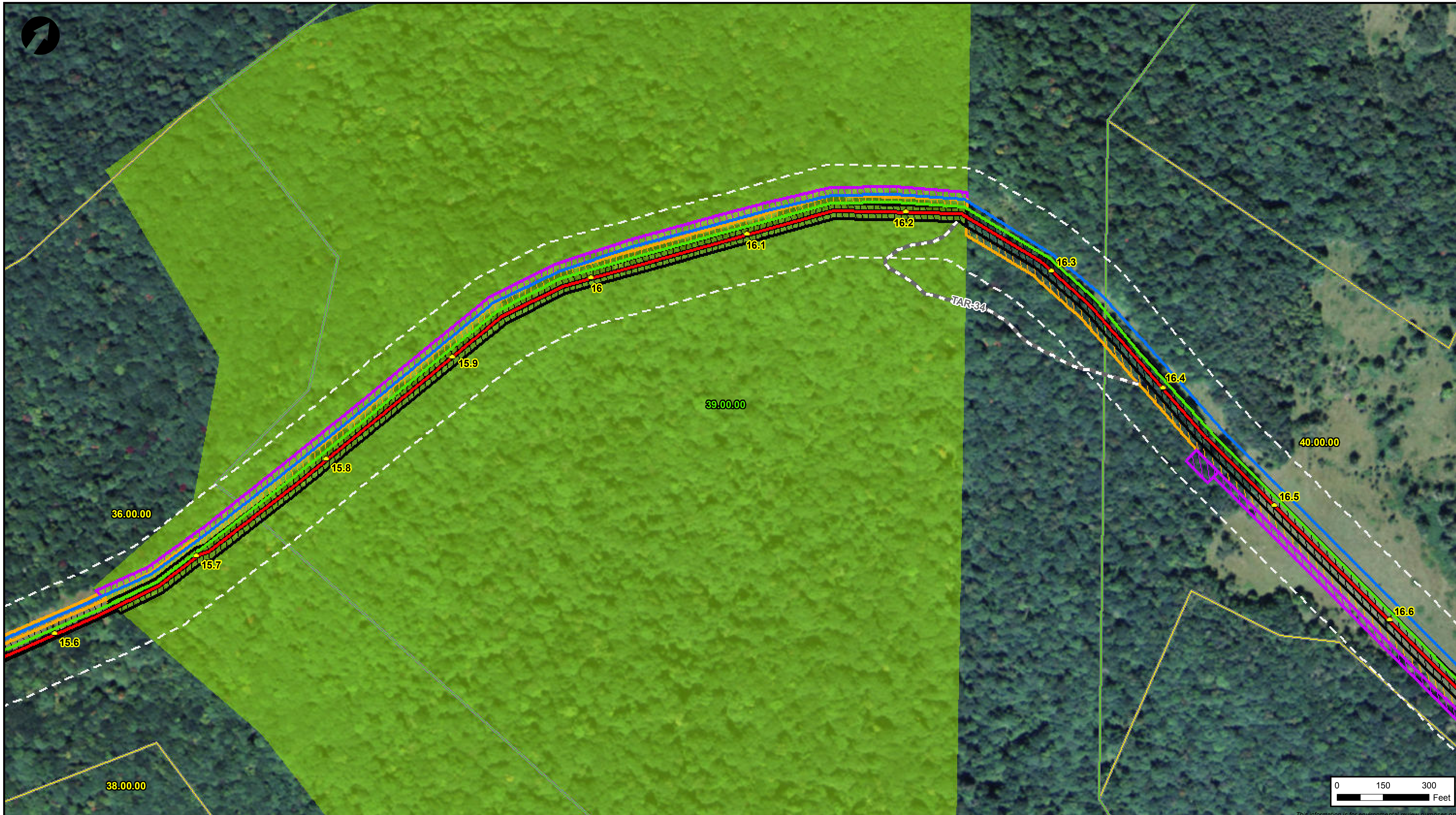

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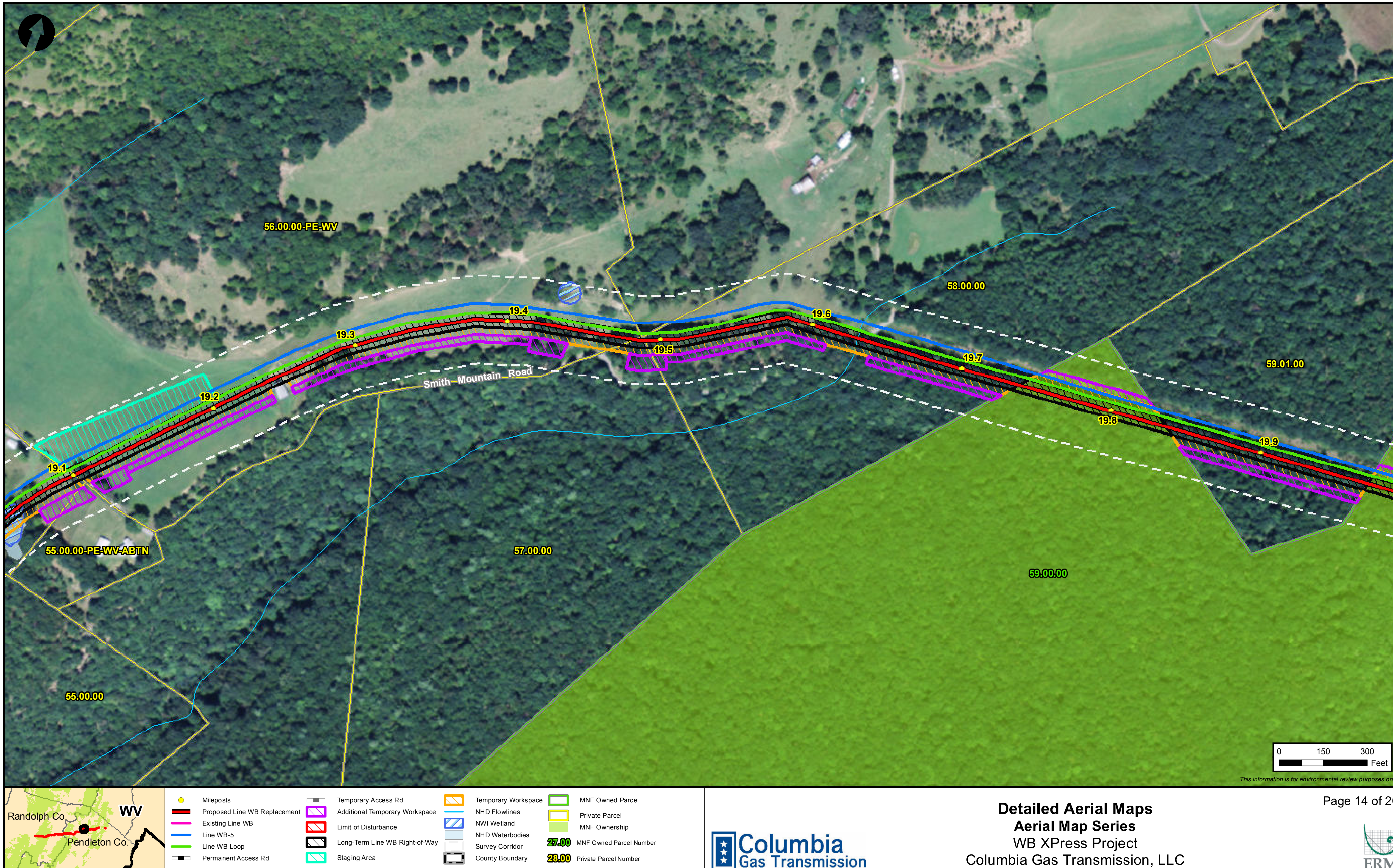

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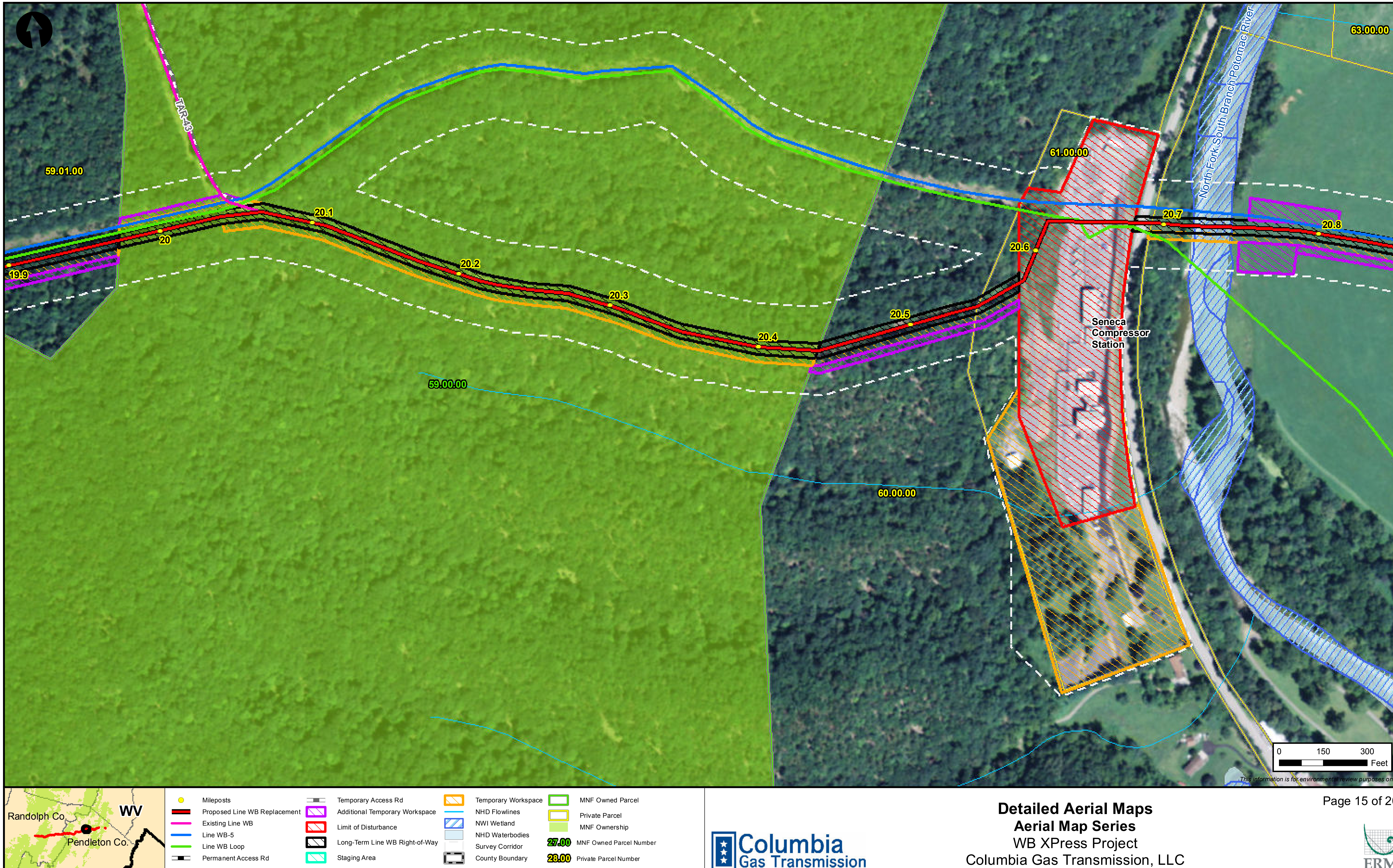

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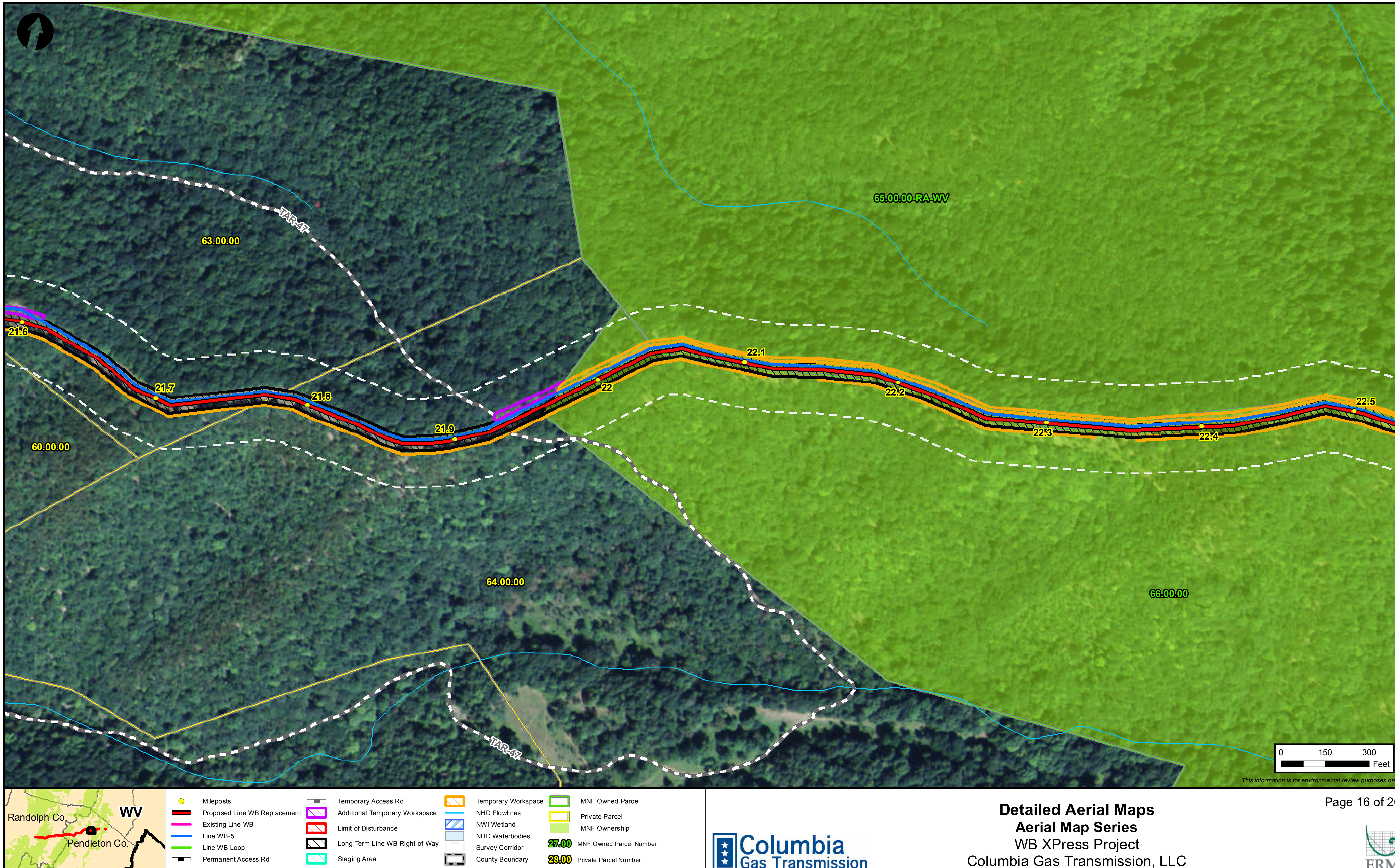

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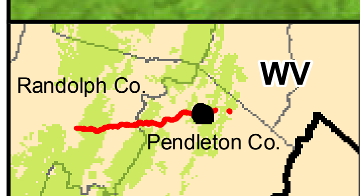

Mileposts	Temporary Access Rd	Temporary Workspace	MNF Owned Parcel
Proposed Line WB Replacement	Additional Temporary Workspace	NHD Flowlines	Private Parcel
Existing Line WB	Limit of Disturbance	NWI Wetland	MNF Ownership
Line WB-5	Long-Term Line WB Right-of-Way	NHD Waterbodies	27.00 MNF Owned Parcel Number
Line WB Loop	Staging Area	Survey Corridor	28.00 Private Parcel Number
Permanent Access Rd		County Boundary	

Detailed Aerial Maps

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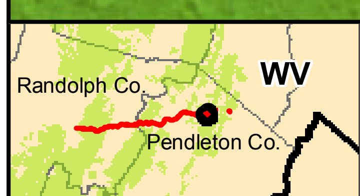

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- County Boundary
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- Private Parcel
- MNF Ownership
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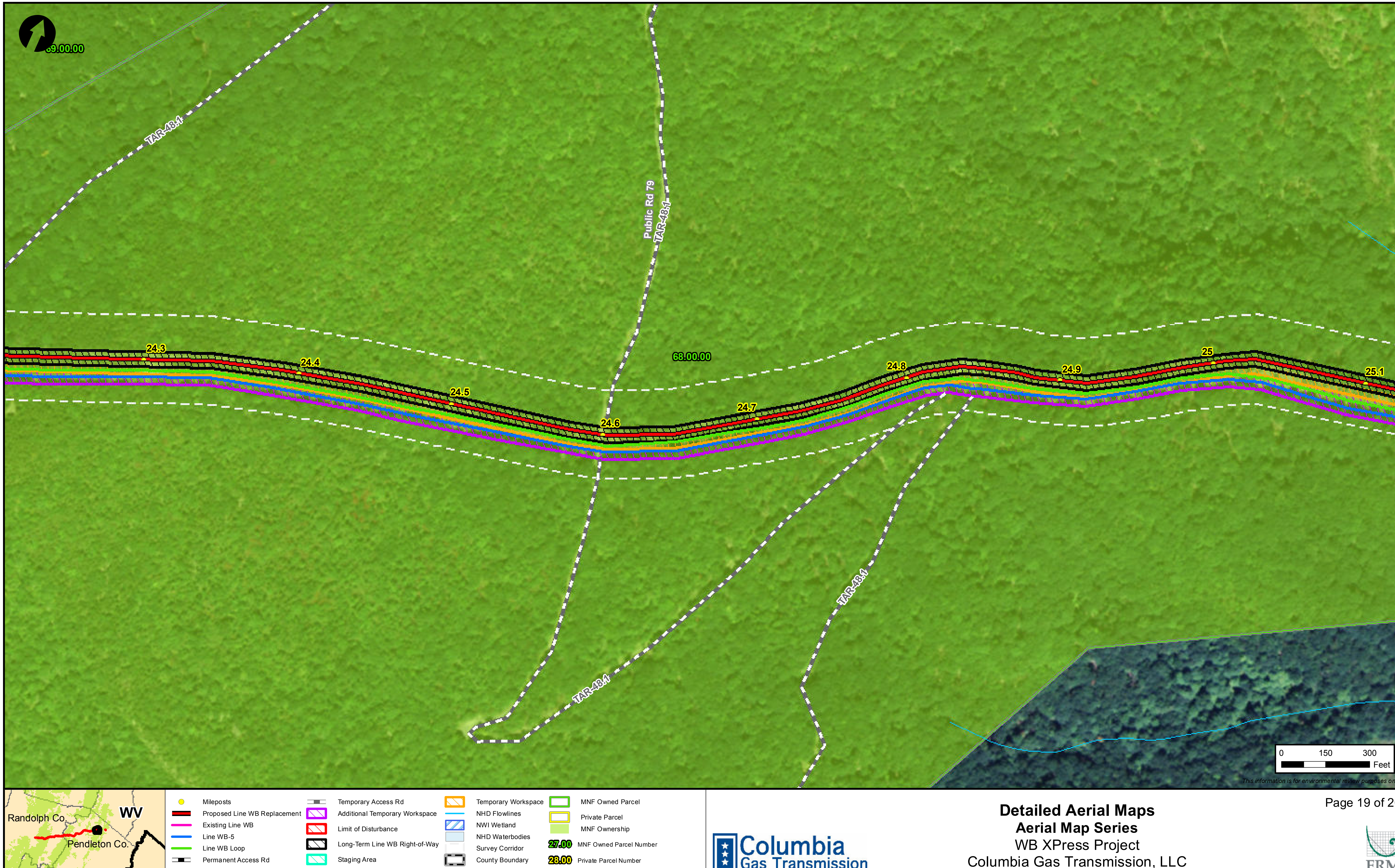

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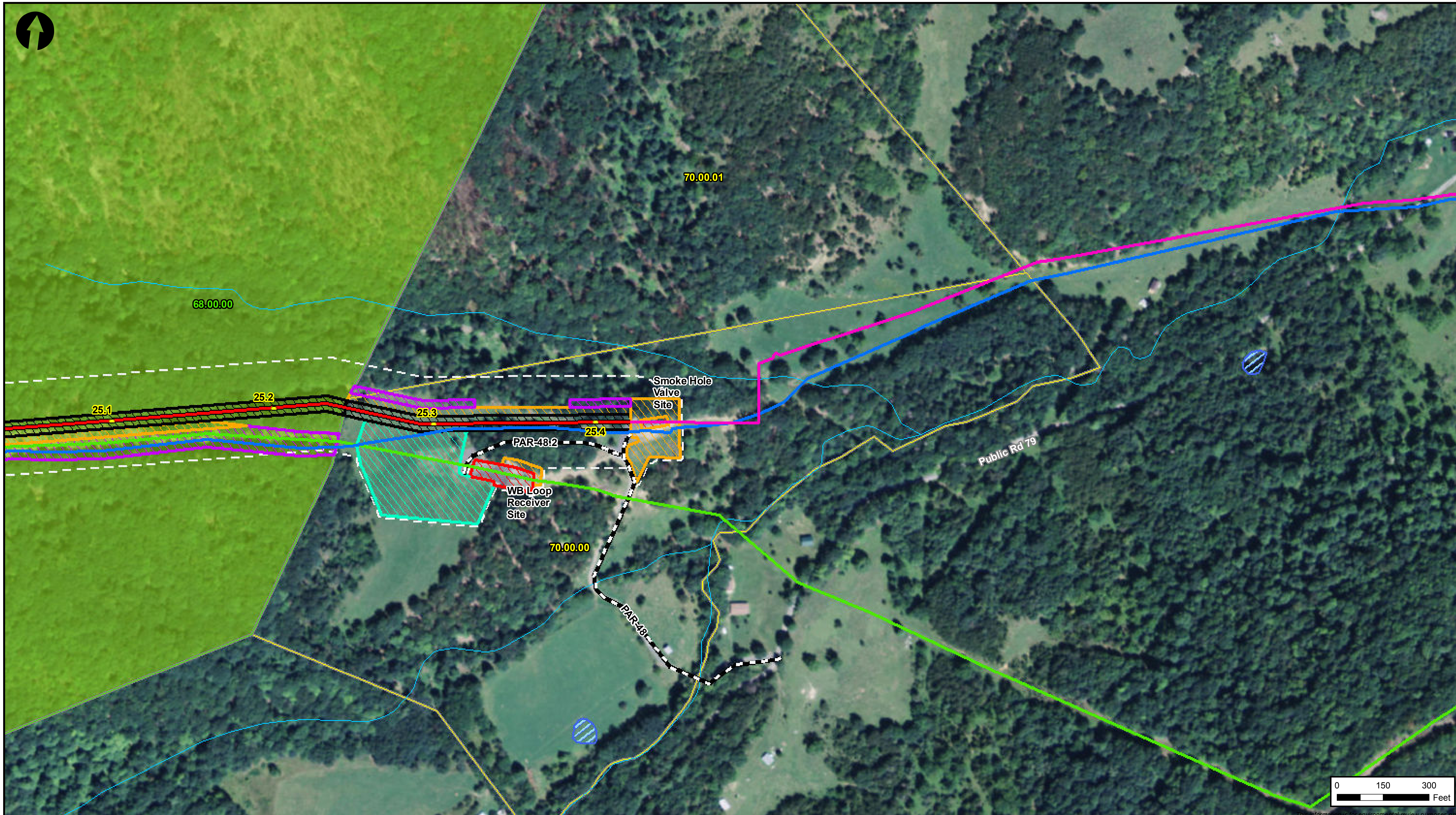

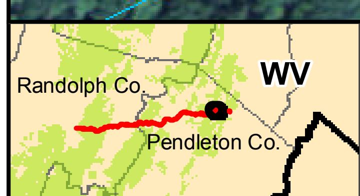

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Appendix B

Monongahela National Forest Regional Forester Sensitive Species List with Analysis of Potential to Occur in the Project Area and Determination of Impact

WB XPress Project
MNF RFSS List with Analysis of Potential to Occur in the Project Area and Determination of Impact

Species	Global/ State Conservation Rank[1]	Prefield Review		Field Review		Effect Determination for Proposed Project
		Usual Habitat in WV	Within Known Range?	Habitat Present?	Species Present?	
MAMMALS						
West Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*)	G5T2/S2	Spruce, fir, spruce-hardwood, and northern hardwood forests, with well-developed understory (in Randolph and Pendleton Counties).	YES	YES	No species surveys conducted – assumed presence in ~~mapped~~ field-verified suitable habitat	MIINLT
Southern Rock Vole (*Microtus chrotorrhinus carolinensis*)	G4T3/S2	Prefer forest habitats with moss-covered rocks and boulders, thick ground cover, and accessible water (in Randolph and Pendleton Counties).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat	MIINLT
Eastern Small-footed Myotis *(Myotis leibii)*	G3/S1	It has a limited range, occurring only in eastern deciduous and coniferous forests. This bat tolerates colder temperatures than many bats, entering hibernation later than many (November to December) and leaving it rather early (in March) in Randolph and Pendleton Counties).	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat	MIINLT
Little Brown Myotis *(Myotis lucifugus)*	G3G4	typically found living around swamp lands (in Randolph and Pendleton Counties)	YES	YES	No species surveys conducted – assumed presence	MIINLT
Allegheny Woodrat *(Neotoma magister)*	G3G4/S3	Rock areas, caves, large boulder, rock slides, mountains, woods and swamps (in Randolph and Pendleton Counties)	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat	MIINLT
Tri-colored Bat *(Perimyotis subflavus)*	G2	associated with forested landscapes, where they forage near trees (including forest perimeters) and along waterways. In many areas, most foraging occurs in riparian areas. In Nova Scotia, they appeared to use primarily areas with intact, unfragmented forest cover. In spring and summer in deciduous forest in western North Carolina, nonreproductive individuals selected mature stands or buffer zones near perennial streams, and they tended to roost near openings (perhaps to minimize commuting costs when openings comprise a small proportion of a densely forested landscape) (in Randolph and Pendleton Counties)	YES	YES	No species surveys conducted – assumed presence	MIINLT

Long-tailed Shrew *(Sorex dispar)*	G4/S2S3	Mountainous, forested areas (deciduous or evergreen) with loose talus. Rocky damp areas with deep crevices covered by leaf mold and roots are preferred (in Randolph County)	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat	MIINLT
Southern Water Shrew *(Sorex palustris punctulatus)*	G5T3/S1	Riparian areas within spruce-fir forests and northern hardwoods (in Randolph and Pendleton Counties)	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat	MIINLT
Eastern Spotted Skunk *(Spilogale putorius)*	G5/S2S3	Forested, open, and brushy areas, rocky canyons and outcrops in woodlands and prairies (in Pendleton County)	YES	YES	No species captured during small mammal trapping but assumed presence in suitable habitat	MIINLT
Southern Bog Lemming *(Synaptomys cooperi)*	G5/S2	Boggy habitat but also common in marshes, meadows, and upland forests with thick humus layer (especially when conditions not hot and dry); areas with intermixture of herbaceous/shrubby vegetation (in Randolph and Pendleton Counties)	YES	YES	No species surveys conducted – assumed presence	MIINLT
BIRDS						
Northern Goshawk *(Accipiter gentilis)*	G5/S1B,S1N	Mainly in coniferous forests, but they may occur in deciduous hardwood forest (in Randolph County)	YES	YES	No nests observed. No recorded bird sightings or vocalizations during site visits	MIINLT
Henslow's Sparrow *(Ammodramus henslowii)*	G4/S3B	Weedy grasslands Brooke, Grant, Hancock, Mason, Ohio, and Tucker Counties in WV	NO	N/A	N/A	NI
Long-eared Owl *(Asio otus)*	G5/S1B,S1N	Combination of grassland or other open country for foraging, and dense tall shrubs or trees for nesting and roosting (in Randolph and Pendleton Counties)	YES	YES	No nests observed. No recorded bird sightings or vocalizations during site visits	MIINLT
Olive-sided Flycatcher *(Contopus cooperi)*	G4/S1B	Northern and montane coniferous forests (in Randolph and Pendleton Counties)	YES	YES	No recorded bird sightings or vocalizations during site visits	MIINLT
American Peregrine Falcon *(Falco peregrinus anatum)*	G4T4/S1B,S2N	Nests on ledges or cliffs, buidlings, bridges, quarry walls. Non-breeding sites, farmland, open country, lakshores, broad river valleys, airports, cities, prefers pigeons and ducks (in Randolph and Pendleton Counties).	YES	NO	N/A	NI

Bald Eagle *(Haliaeetus leucocephalus)*	G5/S2B, S3N	Feeds and nests on or near large lakes and rivers (in Randolph and Pendleton Counties)	YES	YES	No nests observed during site visits. Some of bird sightings and vocalizations approximately 3/4 miles from the line. Aerial nest survey scheduled for leaf-off season immediately prior to construction	MIINLT
Migrant Loggerhead Shrike *(Lanius ludovicianus migrans)*	G4T3Q/S1B, S2N	Open grasslands with trees and shrubs, fencerows (in Randolph and Pendleton Counties).	YES	NO	N/A	NI
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	G5/S2B, S3N	Open forests with clear understories (in Randolph and Pendleton Counties). Rarer in higher elevations	YES	YES	No recorded bird sightings or vocalizations during site visits	MIINLT
Vesper Sparrow *(Pooecetes gramineus)*	G5/S2N, S3B	Grasslands and fields(in Randolph and Pendleton Counties).	YES	YES	No recorded bird sightings or vocalizations during site visits	MIINLT
Golden-winged Warbler *(Vermivora chrysoptera)*	G4/S2B	Brushy edge habitats, openings with saplings, forbs and grasses (in Randolph and Pendleton Counties).	YES	YES	No recorded bird sightings or vocalizations during site visits	MIINLT
REPTILES						
Timber Rattlesnake *(Crotalus horridus)*	G4/S3	Upland hardwood and mixed pine-hardwood forests, in areas where there are sunny, rocky slopes and ledges throughout the Appalachian Mountain Region (in Randolph and Pendleton Counties)	YES	YES	YES	MIINLT
Wood Turtle *(Glyptemys insculpta)*	G3/S2	Clear, hard-bottomed streams and rivers and adjoining forest, woodland and some fields. wood turtles are probably unlikely to occur above 2000 feet elevation (http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5200572.pdf) Deep pools with permanent flow are essential for successful hibernation in Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral, Morgan, and Pendleton Counties, WV	YES	NO	N/A	NI – due to no streams or wetlands in the area of the project below 2000 feet in elevation.
AMPHIBIANS						
Green Salamander *(Aneides aeneus)*	G3G4/S3	The primary habitat of the species includes humid cliff faces with numerous crevices. Suitable habitat contains moist stones and logs in moist forests throughout the Appalachian Mountain Region (in Randolph and Pendleton Counties)	YES	YES	Surveys Conducted May and June 2016. No individuals identified.	MIINLT
Eastern Hellbender *(Cryptobranchus alleganiensis)*	G3G4T3T4/S2	Clear, fast-flowing, rocky or debris bottomed well oxygenated streams and rivers.	YES	YES	No species surveys conducted – assumed presence	MIINLT
Mud Salamander *(Pseudotriton montanus)*	G5/S1	Prefers habitats near freshwater, including swamps, bogs, springs and streams that provide a muddy regions for burrowing. Present at elevations below 700 m, these salamanders sometimes inhabit unoccupied crayfish holes in Boone, Cabell , Fayette, Jackson, Kanawha, Logan Mason, Mingo, Nicholas, Putnam, Raleigh, Summers, Tucker, Wayne, Webster, Wood in WV	NO	N/A	N/A	NI
FISH						

Redside Dace *(Clinostomus elongatus)*	G3G4/S1S2	Habitat includes small to medium, cool, clear, rubble and gravel-bottomed streams; rocky and sandy pools of headwaters, creeks, and small rivers, with the largest populations in clear, spring-fed streams; typically this dace occurs in pools with moderate current and overhanging vegetation in Boone, Hancock, Marion, Marshall, Monongalia, Preston, Taylor, and Tucker Counties, WV	NO	N/A	N/A	NI
Candy Darter *(Etheostoma osburni)*	G3/S2	New River drainage in West Virginia and a small portion of the New River in Virginia. This fish is primarily found in the Greenbrier and Gauley river systems. The candy darter is most abundant in the riffles and runs of swift, rocky creeks in Fayette, Greenbrier, Monroe, Nicholas, Pocahontas, Summers, Webster Counties, WV	NO	N/A	N/A	NI
Pearl Dace *(Margariscus margarita)*	G4/S3S4	Cool, clear headwater streams in the south, bog drainage streams, ponds and small lakes in the north, and in stained, peaty waters of beaver ponds in Cheat River System in WV	YES	YES	No species surveys conducted – assumed presence	MIINLT
New River Shiner *(Notropis scabriceps)*	G4/S2	Cool, clear tributaries and the upper main channel of the New River in Fayette , Greenbrier, Mercer, Monroe, Nicholas, Pocahontas, Raleigh, Summers, Webster Counties, WV	NO	N/A	N/A	NI
Cheat Minnow *(Pararhinichthys bowersi)*	G1G2Q/S1S2	Streams in the Monongahela River Basin (in Randolph County)	YES	YES	No species surveys conducted – assumed presence	MIINLT
Appalachia Darter *(Percina gymnocephala)*	G4/S3	New River system above Kanawha Falls, Greenbrier, Nicholas, Pocahontas, Webster Counties, WV	NO	N/A	N/A	NI
Kanawha Minnow *(Phenacobius teretulus)*	G3G4/S1	It is found only in the New River drainage in Greenbrier, Monroe, Nicholas, Pocahontas, Webster Counties, WV	NO	N/A	N/A	NI
INVERTEBRATES - ARACHNIDS						
Dry Fork Valley Cave Pseudoscorpion (*Apochthonius paucispinosus*)	G1/S1	Damp leaf litter in a Bennett Cave, Tucker County	NO	N/A	N/A	NI
INVERTEBRATES - BIVALVES						
Elktoe (*Alasmidonta marginata*)	G4/S2	shallow to medium-sized creeks or rivers in Monroe, Pocohontas, and Webster Counties, WV	No (not crossing any WVDNR identified mussel streams)	N/A	N/A	NI
Green Floater (*Lasmigona subviridis*)	G3/S2	streams, small rivers, and canals of low to medium gradient with slow pools and eddies, fine gravel and sand bottom, and mid-range calcium concentrations in Fayette, Hampshire, Pocahontas, Raleigh, Summers Counties, WV	No (not crossing any WVDNR identified mussel streams)	N/A	N/A	NI
INVERTEBRATES - CRUSTACEANS						
Cannulate Cave Isopod *(Caecidotea cannula)*	G2G3/S1	Known from nine caves in three counties in West Virginia: Tucker County, Randolph County, and Preston County.	YES	NO	N/A	NI
Holsinger's Cave Isopod *(Caecidotea holsingeri)*	G5/S3	Caves in eastern WV including Randolph County	YES	NO	N/A	NI
A Cave Obligate Isopod *(Caecidotea simonini)*	G1G2/S1	Known from four caves in Randolph County, West Virginia:	YES	NO	N/A	NI
A Cave Isopod *(Caecidotea sinuncus)*	G1G2/S1	Known only from Mystic Cave, Pendelton County, West Virginia.	NO	NO	N/A	NI
Elk River Crayfish *(Cambarus elkensis)*	G2/S1	The species has only been recorded from the upper Elk River above Sutton Lake, and in the Holly and Birch rivers in Webster, Nicholas, and Pocahontas counties, West Virginia	NO	N/A	N/A	NI

Greenbrier Cave Crayfish *(Cambarus nerterius)*	G2/S1	This species was first found in Matts Black Cave in Greenbrier County, West Virginia.. It has since been found in 11 caves in the Greenbrier River Drainage, Greenbrier County and in one cave in the Elk River Drainage in Greenbriar, Pocahontas, and Webster County	NO	N/A	N/A	NI
Culver's Cave Amphipod *(Stygobromus culveri)*	G1G2/S1	Caves in Randolph and Tucker Counties, WV	NO	NO	N/A	NI
Greenbrier Cave Amphipod *(Stygobromus emarginatus)*	G3G4/S3	This species is relatively widespread for a subterranean amphipod, with a including Randolph County, WV	YES	NO	N/A	NI
Pocahontas Cave Amphipod *(Stygobromus nanus)*	G1G2/S3	Piddling Pit Cave, Pocahontas Co., West Virginia	NO	N/A	N/A	NI
Minute Cave Amphipod *(Stygobromus parvus)*	G2G3/S1	Found in mud-bottomed, drip, and seep pools in caves. Apparently tolerant of substrate but preferring standing water in Pocohontas, Randolph, and Tucker Counties, WV	YES	NO	N/A	NI
INVERTEBRATES - GASTROPODS						
Organ Cavesnail (*Fontigens tartarea*)	G2/S2	This species is only known from Organ Cave in Greenbrier Co., Harper Cave in Tucker Co., Simmons-Mingo and Bowden caves in Randolph Co., Rock Camp, McClung-Zenith and Indian Draft caves in Monroe Co. and Dreen, Clay Pit, Swecker Stream and Piddling Pit caves in Pocahontas Co., West Virginia	NO	N/A	N/A	NI
INVERTEBRATES - INSECTS						
Boreal Fan Moth *(Brachionycha borealis)*	G4/S1	Cold mountain oak forests at higher elevations in WV. Larvae of this moth feed on spring foliage of oaks, blueberry, and other plants. It is the only species of its subfamily known to feed on plants from more than one family, and even to feed on other caterpillars.	YES	YES	No species surveys conducted – assumed presence	MIINLT
Northern Metalmark *(Calephelis borealis)*	G3G4/S2	Openings within forested or wooded areas in Greenbriar, Summers, and Mineral Counties	NO	N/A	N/A	NI
Appalachian Tiger Beetle *(Cicindela ancocisconensis)*	G3/S3	Prefers open sand or a matrix of sand and cobble along permanent streams or medium-sized rivers. Usually found along rocky mountain streams and small rivers in partially shaded areas such as sand banks and sand bars (in Randolph County)	YES	YES	No species surveys conducted – assumed presence	MIINLT
Northern Barrens Tiger Beetle *(Cicindela patruela)*	G3/S2S3	Specialized to sandy/coarse gravel or eroding sandstone throughout the species' range in Grant, Monongahela, and Pendleton Counties, WV	YES	YES	No species surveys conducted – assumed presence	MIINLT
Cow Path Tiger Beetle *(Cicindela purpurea)*	G5/S3	Upland habitats with shale soils. Found in forest clearings, often along dirt paths through grassy areas in Fayette and Pendleton Counties, WV	YES	YES	No species surveys conducted – assumed presence	MIINLT
Early Hairstreak *(Erora laeta)*	GU/S2	Hardwood forests or hardwood-northern conifer mixed forests in Monroe, Pendleton, Randolph, and Summers Counties, WV	YES	YES	No species surveys conducted – assumed presence	MIINLT
Columbine Duskywing *(Erynnis lucilius)*	G4/S2	Wooded areas including many kinds of glades, barrens, ridgetops as well as gullies and oepnings in richer woods with an abundance of columbines in Grant , Hampshire, Jefferson, Mineral, and Pendleton Counties	YES	YES	No species surveys conducted – assumed presence	MIINLT
A Geometrid Moth *(Euchlaena milnei)*	G2G4/S2	Hardwood forests in Berkeley, Grant, Greenbrier, Hampshire, Hardy, Monroe, Morgan, and Pocahontas Counties	NO	N/A	N/A	NI
Rapids Clubtail *(Gomphus quadricolor)*	G3G4/S2S3	Clear streams and brooks with strong current over clean gravel, cobbles or bedrock, on comparatively unproductive soils (in Pendleton and Randolph Counties)	YES	YES	No species surveys conducted – assumed presence	MIINLT

Green-faced Clubtail *(Gomphus viridifrons)*	G3/S2	Small to large moderate-gradient rivers; free flowing with high water quality; larvae burrow in silt, adults forage in trees (in Pendleton and Randolph Counties)	YES	YES	No species surveys conducted – assumed presence	MIINLT
A Noctuid Moth *(Hadena ectypa)*	G3G4/S1	Wooded areas or openings in them, but it is known to use more open habitats westward. If this species begins using introduced foodplants widely it will probably be doing so in old fields, roadsides, and meadows in Pocohontas and Preston Counties, WV	NO	N/A	N/A	NI
Cobweb Skipper *(Hesperia metea)*	G4G5/S2S3	Grassy openings in many sorts of xeric woodland or shrubland such as serpentine barrens, shale barrens, pine barrens, oak savannas, trap rock glades, granite glades. Also quite commonly eastward in right of ways and outer margins of airports on sandy soil in Grant, Greenbriar, Pendleton, and Tucker Counties, WV	YES	NO	N/A	NI
Bronze Copper *(Lycaena Hyllus)*	G5/S2	Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right of ways through marshlands (in Pendleton and Randolph Counties).	YES	YES	No species surveys conducted – assumed presence	MIINLT
West Virginia White *(Pieris virginiensis)*	G3	Mesic hardwood or hardwood-northern conifer-mixed forests on rich soils. Also can occur in hardwood swamps. Colonies do not occur in any kind of open habitat and adults do not readily leave the forests or cross powerlines, unshaded roads etc. (in Pendleton and Randolph Counties)	YES	YES	No species surveys conducted – assumed presence	MIINLT
A Cave Beetle *(Pseudanophthalmus fuscus)*	G4/S2	Caves in Greenbriar, Monroe, and Pocohontas, WV	NO	N/A	N/A	NI
Timber Ridge Cave Beetle *(Pseudanophthalmus hadenoecus)*	G1/S1	twilight zone or deeper in or on moist soil, often near streams or drip areas in Pendleton County, WV	YES	NO	N/A	NI
A Cave Beetle *(Pseudanophthalmus hypertrichosis)*	G5/S3	Caves in Poconohontas and Randolph Counties, WV	YES	NO	N/A	NI
Dry Fork Valley Cave Beetle *(Pseudanophthalmus montanus)*	G1G2/S1	Caves in Tucker County, WV	NO	N/A	N/A	NI
Gandy Creek Cave Springtail *(Pseudosinella certa)*	G1/S1	Caves in Randolph County, WV	YES	NO	N/A	NI
A Springtail *(Pseudosinella gisini)*	G3G4/S3	Caves in Greenbriar, Monroe, Pocohontas, and Randolph Counties, WV	YES	NO	N/A	NI
Southern Grizzled Skipper *(Pyrgus wyandot)*	G1G2Q/S1	shale barrens, pastures and powerlines on south to west facing shale slopes, always with much bare rock or soil in Greenbriar, Hampshire, Hardy, Kanawha, Mineral, and Pendleton Counties, WV	YES	YES	No species surveys conducted – assumed presence	MIINLT
A Springtail *(Sinella agna)*	G3G4/S3	Caves in Barbour, Pocohontas, Randolph, and Tucker Counties, WV	YES	NO	N/A	NI
Diana Fritillary *(Speyeria diana)*	G3G4/S2S3	Deciduous or mixed forest with a lot of violetds in the understory in most of the range (in Randolph County)	YES	YES	No species surveys conducted – assumed presence	MIINLT
INVERTEBRATES – OTHER						
Hoffmaster's Cave Planarian *(Macrocotyla hoffmasteri)*	G3G4/S2	Rare subterranean planarian known only from caves in Randolph, Pendleton, Greenbrier and Tucker counties in eastern West Virginia	YES	NO	N/A	NI
A Cave Obligate Planarian *(Phagocata angusta)*	G1/S1	Subterranian species in Tucker County, WV	NO	N/A	N/A	NI
Greenbrier Valley Cave Millipede *(Pseudotremia fulgida)*	G4/S3	The Greenbrier cave milliped is an obligate cavernicolous species known from 21 caves in the Greenbrier Valley of West Virginia in Greenbriar and Pocohontas Counties, WV	NO	N/A	N/A	NI

Germany Valley Cave Millipede *(Pseudotremia lusciosa)*	G1G2/S1	Known only from five caves in the Germany Valley in Pendleton County, West Virginia	YES	NO	N/A	NI
South Branch Valley Cave Millipede *(Pseudotremia princeps)*	G1/S1	It occurs only in caves. This species has been found in only six sites in Pendleton County, West Virginia and one locality in the adjacent part of Virginia	YES	NO	N/A	NI
Culver's Planarian *(Sphalloplana culveri)*	G1/S1	Harper Cave in Tucker County, West Virginia	NO	N/A	N/A	NI
Grand Caverns Blind Cave Millipede *(Zygonopus weyeriensi)*	G3G4/S2	Caves in Greenbrier, Monroe and Pocahontas counties	NO	N/A	N/A	NI
Luray Caverns Blind Cave Millipede *(Zygonopus whitei)*	G3G4/S1	caves in the upper Potomac River drainage in Virginia and West Virginia. Specifically, it has been recorded from Augusta, Page, Rockingham, and Shenandoah counties in Virginia. It is also known from caves in Page, Grant and Pendleton counties	YES	NO	N/A	NI
NON-VASCULAR PLANTS						
Ammons' Tortula Moss (*Tortula ammonsiana)*	G1T3/S1	Occurs in the eastern United States in mixed hardwood forest communities on rock outcrops (often with southern aspect), preferring the backwalls and shelves of overhanging cliffs, although colonies of small plants have been located on exposed cliff-faces in Pocohontas County, VA	NO	N/A	N/A	NI
PLANTS						
Arctic Bentgrass *(Agrostis mertensii)*	G5/S1	High elevation, gravellely and rocky soil in Pocohontas and Randolph Counties, WV	YES	YES	NO	NI
Allegheny Onion *(Allium allegheniense)*	G3/S2	Dry woods, rock outcroppings, and prairies	YES	YES	YES	MIINLT
Lillydale Onion *(Allium oxyphilum)*	G2/S2	Shale barrens, but this species has been noted on sandstone outcroppings as well Greenbriar, Mercer, Monroe, and Summers County	NO	N/A	N/A	NI
Bartram Shadbush *(Amelanchier bartramiana)*	G5/S2	Northern hardwood and mixed hardwood-coniferous forests, forest edges, opening in forests, and peatlands (in Pendleton and Randolph Counties)	YES	NO	NO	NI
Spreading Rockcress *(Arabis patens)*	G3/S2	Moist rocky woods, limestone outcrops, and shady riverbanks in Berkeley, Grant, Hampshire, Hardy, Jefferson, and Pendleton Counties, WV	YES	YES	NO	NI
Cooper's Milkvetch *(Astragalus neglectus)*	G4/S1	Primarily on sites with a periodic disturbance regime. Habitats include the following: well-drained, sand or gravel borders of glacial lakes; open, calcareous, rocky ridges and bluffs; deep, loamy, well-drained soils, at the border between prairie and woods; and powerline rights-of-way, roadsides, and railroad beds in Grant County, WV	NO	N/A	N/A	NI
Blue Wild Indigo *(Baptisia australis var. australis)*	G5/S3	Open areas in Fayette, Greenbrier, Hancock, Jefferson, Morgan, Nicholas, Pocahontas, Raleigh, and Summers Counties, WV	NO	N/A	N/A	NI
Lanceleaf Grapefern *(Botrychium lanceolatum var. angustisegmentum)*	G5/S1	Woods and on hummocks in swamps, and in cool to warm, mostly rich, subacid soils in Pocohontas, Preston, and Tucker Counties, WV	NO	N/A	N/A	NI
Bluntlobe Grapefern *(Botrychium oneidense)*	G4/S3	Low, wet, acid, secondary woods and swamps (in Pendleton and Randolph Counties)	YES	YES	NO	NI
Roan Mountain Sedge *(Carex roanensis)*	G2G3/S2	Rich soils of mid- to high-elevation mesic forests in the southern Appalachians, including rich cove and northern hardwood forests in Pendleton, Pocohontas, and Randolph Counties, WV	YES	YES	NO	NI
Purple Clematis *(Clematis occidentalis var. occidentalis)*	G5T5/S2	Rocky alpine slopes and ridges, and openings in forested areas (in Pendleton County)	YES	YES	NO	NI

Bentley's Coralroot *(Corallorhiza bentleyi)*	G2/S1	Appalachian deciduous forest, often at edges of forest in somewhat disturbed sites in Monroe and Pochontas Counties, WV	NO	N/A	N/A	NI
Roundleaf Dogwood *(Cornus rugosa)*	G5/S1	Well drained to normal moisture soil in Fayette, Mineral, and Pendleton Counties, WV	YES	YES	NO	NI
Showy Lady's-slipper *(Cypripedium reginae)*	G4/S1	Cold northern wetlands (e.g., mossy conifer swamps of Thuja occidentalis, Picea mariana, or Larix laricina), swampy thickets, bogs, woodland glades, ravines, stream and lake edges, seepages on limestone or sandstone bluffs, damp calcareous slopes or shores, limestone quarries, wet calcareous meadows, circumneutral seep springs, forested fens, shrub borders of fens, sandy shorelines, and algific talus slopes in Greenbriar and Tucker Counties, WV	NO	N/A	N/A	NI
Tall Larkspur *(Delphinium exaltatum)*	G3/S2	Woods (and edges of woods), rocky slopes, semi-open woodlands, glades and prairie openings in Grant, Greenbrier, Hampshire, Hardy, Mercer, Mineral, Monroe, and Pendleton Counties, WV	YES	YES	NO	NI
Shalebarren Wild-buckwheat *(Eriogonum alleni)*	G4/S2	Shale barrens (in Pendleton County)	YES	NO	NO	NI
Darlington's Spurge *(Euphorbia purpurea)*	G3/S2	Dry or moist woods, rare; mountain glades and swampy woods (in Pendleton and Randolph Counties)	YES	YES	NO	NI
Box Huckleberry *(Gaylussacia brachycera)*	G3/S2	Acidic sandy soil, woodlands and slopes, frequently associated with pine and mountain laurel, often sourwood & black gum; growth habit is consistent with a species tolerant of low to moderate ground fire in Greenbriar, Hardy, Monroe, and Summers Counties, WV	NO	N/A	N/A	NI
Appalachian Oak Fern *(Gymnocarpium appalachianum)*	G3/S2	Primarily in maple-birch-hemlock woods on mountain slopes and summits, on moist sandstone, talus slopes, or bouldery colluvium in Greenbrier, Hampshire, Monongalia, Pendleton, Preston, Randolph, Tucker Countes, WV	YES	NO	NO	NI
Sweet-scented Indian-plantain *(Hasteola suaveolens)*	G4/S3	Low, moist ground; in rich floodplain forests, thickets, or clearings and in calcareous fens. Occasionally on calcareous bluffs in Berkeley, Greenbrier, Hancock, Mercer, Monongalia, Ohio, Pleasants, Preston, Randolph, Ritchie, Tucker Counties, WV	YES	YES	NO	NI
White Alumroot *(Heuchera alba)*	G2Q/S2	Rocky or shaley wooded ridgetops (in Pendleton and Randolph Counties)	YES	YES	YES	MIINLT
Crested Coralroot *(Hexalectris spicata)*	G5T4T5/S1	Dry or mesic woods on basic soils in Grant, Pendleton, and Wayne Counties, WV	YES	YES	NO	NI
Blue Ridge St. John's-wort *(Hypericum mitchellianum)*	G3/S1	Seepage slopes and spray areas near falls, at higher elevations. Grassy balds, grassy openings, forests, seepages (in Randolph Couty)	YES	NO	NO	NI
Long-stalk Holly *(Ilex collina)*	G3/S2	High elevation oligotrophic wetlands along streams, and streamheads from 2120-4815 ft. It often occurs in association with Tsuga canadensis, Betula lenta, Ilex montana, Picea rubens, and Rhododendron maximum (in Randolph County)	YES	NO	NO	NI
Butternut *(Juglans cinerea)*	G4/S3	Rich mesophytic forests, lower slopes, ravines, and various types of bottomland, including banks and terraces of creeks and streams, and floodplain forests (in Pendleton and Randolph Counties)	YES	YES	YES	NI
Thread Rush *(Juncus filiformis)*	G5/S2	Moist or wet habitats including sandy shores of streams and lakes, bogs and alpine meadows in Pleasants, Randolph, and Tucker Counties, WV	YES	YES	NO	NI
Highland Rush *(Juncus trifidus)*	G5/S1	Cracks in rocky outcrops and ledges in cool microsites and rocky alpine meadows. Mostly restricted to high elevation sites	YES	YES	NO	NI

Turgid Blazing Star *(Liatris turgida)*	G3/S2	Xeric environments associated with clay soils, gravel, shale barrens, and rocky (granitic, amphibolite) outcrops in Fayette, Greenbrier, McDowell, Mineral, Monroe, Nicholas Counties, WV	NO	N/A	N/A	NI
Grooved Yellow Flax *(Linum sulcatum)*	G5T5/S1	Scattered sites on sandy barrens in Grant and Jefferson Counties, WV	NO	N/A	N/A	NI
Heartleaf Twayblade *(Listera cordata)*	G5T5/S2	Cool peaty swamps (in Randolph County)	YES	NO	NO	NI
Large-flowered Barbara's-buttons *(Marshallia grandiflora)*	G2/S2	Along the flood-scoured banks of large, high-gradient rivers in the central Appalachians. The species is also reported from rocky lake shores, creek banks, bluffs and flood plains in Barbour, Fayette, Greenbrier, Marion, Monongalia, Nicholas, Preston, Randolph, Summers, Taylor, Upshur, and Webster Counties, WV	YES	YES	NO	NI
Bog Buckbean *(Menyanthes trifoliata)*	G5/S1	Various wetland habitats such as fens, pools, marshes, older woods, ditches, bogs, lake shores, swampy prairies, particularly in acid or oligotrophic conditions (in Randolph County)	YES	NO	NO	NI
Smoke Hole Bergamot *(Monarda fistulosa ssp. Brevis)*	G5T1/S1	Mid-appalachian cedar glades and dry limestone outcrops/ barrens; often found on thin, unstable limestone slopes in Fayette, Grant, Hardy, Mercer, Nicholas, Pendleton, Summers Counties, WV	YES	YES	NO	NI
Limestone Adder's-tongue *(Ophioglossum engelmannii)*	G5/S1	Limestone related habitat in Hardy and Tucker Counties, WV	NO	N/A	N/A	NI
Silvery Nailwort *(Paronychia argyrocoma)*	G4/S3	Open, non-calcareous habitat at subalpine elevations but can also grow along low elevation riverbanks in Grant, Hardy, Jefferson, and Pendleton Counties, WV	YES	YES	YES	MIINLT
Yellow Nailwort *(Paronychia virginica)*	G5/S2	Shallow, rocky soil over magnesium-rich, ultramafic rock in Grant, Hampshire, Hardy, Jefferson, and Pendleton Counties, WV	YES	YES	NO	NI
Canby's Mountain-lover *(Paxistima canbyi)*	G2/S2	Bluffs and cliffs of limestone or dolomite, usually growing in shallow soils that form over these substrates in Grant, Greenbrier, Hampshire, Mercer, Mineral, Monroe, Pendleton	YES	YES	NO	NI
Swamp Lousewort *(Pedicularis lanceolata)*	G5/S2	Habitats that are periodically inundated, such as wet meadows, prairies, swamps, freshwater tidal marshes, and stream sides and other early-successional habitats (in Randolph County)	YES	NO	NO	NI
Swordleaf Phlox *(Phlox buckleyi)*	G2/S2	Shaly slopes in open woods and shale barrens; often occurs along roads. Shales tend to be of Devonian age in Greenbrier, Monroe, Pocahontas, Summers Counties in WV	NO	N/A	N/A	NI
Canada Mountain Ricegrass *(Piptatherum (=Oryzopsis) canadense)*	G5/S1	Rocky openings just below treelinein Pendleton and Randolph Counties, WV	YES	YES	NO	NI
Shriver's Frilly Orchid *(Platanthera shriveri)*	G3/S1	Partial to full shade of damp, open, mixed deciduous and coniferous woods, often along seepage springs or streams, or on roadside banks amid mosses, ferns, grasses, sedges, and/or nettles in mountains in Pocohontas and Randolph Counties, WV	YES	YES	NO	NI
Bog Bluegrass *(Poa paludigena)*	G3/S1	Spring-fed swamps (in Pendleton and Randolph Counties)	YES	NO	NO	NI
Bog Jacob's-ladder *(Polemonium vanbruntiae)*	G3G4/S2	Hardwood and softwood swamps, shrub swamps, marshes, bogs, lakeshores, woodland swales and seeps, spring runs, and wet roadsides, mostly at higher elevations (at least in the southern part of the plant's range). West Virginia populations are mostly at elevations of 2000-4000 feet in Grant, Mineral, Pocahontas, Preston, Randolph, Tucker Counties, WV	YES	YES	NO	NI
Tennessee Pondweed *(Potamogeton tennesseensis)*	G2/S2	Streams, ponds, and shallows of rivers in Greenbriar, Harrison, Ohio, and Tucker Counties, WV	NO	N/A	N/A	NI

Beadle's Mountainmint *(Pycnanthemum beadle)*	G2T4/S1	Open forests, forest edges, and roadsides (in Pendleton and Randolph Counties, WV)	YES	YES	NO	NI
Pennsylvania Buttercup *(Ranunculus pensylvanicus)*	G5/S1	In Cabell, Marshall, Ohio, and Pocahontas County, WV	NO	N/A	N/A	NI
Lanceleaf Buckthorn *(Rhamnus lanceolata ssp. Lanceolata)*	G5T4T5/S1	Dry to moist, brushy thickets with dolomite near the surface, often just below cliffs in Berkeley, Grant, Hardy, and Pendleton Counties, WV	YES	?	NO	NI
Bristly Black Currant *(Ribes lacustre)*	G5/S2	Damp soil on rocky slopes and talus areas, moist to seepy rock outcrops and cliffs, and in cool woods and swamps in Grant, Mercer, Mineral, Pocahontas, Randolph, and Tucker Counties, WV	YES	YES	NO	NI
Rock Skullcap *(Scutellaria saxatilis)*	G3/S2	Woods, hillsides, and moist cliffs in mountainous (in Pendleton and Randolph Counties)	YES	YES	NO	NI
Fire Pink *(Silene virginica var. robusta)*	G5T1Q/S1	Limestone related habitat in Grant and Pendleton Counties, WV	YES	?	NO	NI
Boreal Starwort *(Stellaria borealis ssp. Borealis)*	G5T5/S1	Seeps and spring-fed streamlets, usually in wooded areas n Tucker County, WV	NO	N/A	N/A	NI
Mountain Pimpernel *(Taenidia montana)*	G3/S3	Shale barrens (calcareous) and mesic and xeric open woods or dense hardwood forests in Grant, Greenbrier, Hampshire, Hardy, Mercer, Mineral, Monroe, Morgan, Pendleton, Summers, and Tucker Counties in WV	YES	NO	NO	NI
Canada Yew *(Taxus Canadensis)*	G5/S2S3	Gentle to somewhat steep slopes facing southeast, at elevations ranging from 190-200 m (613-650 feet). Soils are usually sandy loams (in Pendleton and Randolph Counties)	NO	N/A	N/A	NI
Bristle-fern *(Trichomanes boschianum)*	G4/S1	Deep shade on damp acid rocks, usually sandstone, of sheltered canyons, grottos and rock shelters at an altitude of 150 to 800 m. The rock outcrops are generally found within mesic upland forests in Kanawha, Pocahontas, Wayne, Webster Counties, WV	NO	N/A	N/A	NI
Narrow-leaved Blue-curls *(Trichostema setaceum)*	G5/S2	Grassland, meadows and fields, sandplains and barrens in Fayette, Grant, Hampshire, Mineral, Morgan, and Pendleton Counties, WV	YES	NO	NO	NI
Kate's Mountain Clover *(Trifolium virginicum)*	G3/S3	Shale barrens in Berkeley, Grant, Greenbrier, Hampshire, Hardy, Mineral, Monroe, Morgan, and Pendleton Counties, WV	YES	?	NO	NI
Nodding Pogonia *(Triphora trianthophora)*	G3G4/S2	Leaf-lined depressions on gentle slopes in old-age/maturing forests dominated by Tsuga canadensis and Fagus grandifolia in Barbour, Fayette, Kanawha, Nicholas, Summers, Upshur, and Webster Counties, WV	NO	N/A	N/A	NI
Appalachian Blue Violet *(Viola appalachiensis)*	G3/S3	Rich, moist forest community matrix, such as mixed mesophytic forest, mesic oak-hickory forest, or cove forest (in Randolph County)	YES	YES	NO	NI
Sand Grape *(Vitis rupestris)*	G3/S2	Calcareous or gravelly banks, river bottoms, stream beds, washes, and scoured boulders and cobbles. It also occurs along the edges of limestone glades and barrens in Fayette, Greenbrier, Monroe, Ohio, Preston, Raleigh, and Summers Counties in WV	NO	N/A	N/A	NI
Netted Chainfern *(Woodwardia areolata)*	G5/S2	Foresetd swamps in Greenbrier, Hancock, Logan, Mineral, Monongalia, Morgan, Pocahontas, Upshur, Wayne Counties, WV	NO	N/A	N/A	NI

Source: NatureServe 2015

[1] –Global/State Conservation Rank: G1 = Globally Critically Imperiled, G2 = Globally Imperiled, G3 = Globally Vulnerable, G4 = Globally Apparently Secure, G5 = Globally Secure, T# = Rank of subspecies or variety, S1 = State Critically Imperiled, S2 = State Imperiled, S3 = State Vulnerable, Q = Questionable Taxonomy, U = Unrankable, B = Breeding Populations, N = Non-Breeding Populations

[2] -Impact Determinations: NI = No impacts, BE = Beneficial effects, MIINLT = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability, LT = Likely to result in a trend to federal listing or loss of viability, TBD – To Be Determined

Appendix H
Interagency Endangered Species Act Consultation Checklist for the NiSource Multi-Species Habitat Conservation Plan

INTERAGENCY ENDANGERED SPECIES ACT CONSULTATION CHECKLIST FOR THE NISOURCE MULTI-SPECIES HABITAT CONSERVATION PLAN

APPLICANT SECTION

ACTION AGENCY (Recipient): ____Federal Energy Regulatory Commission (FERC)_______________

OTHER INVOLVED FEDERAL AGENCIES: __U.S. Fish and Wildlife Service (USFWS)___________________

PROJECT NAME: __WB XPress Project____

PROJECT I.D. NO. (if applicable): ____

NiSource and Columbia Pipeline Group (Columbia) has provided the attached documentation to involved federal agencies in accordance with "Project Review and Documentation Protocols" of the NiSource/Columbia Pipeline MSHCP Consultation Implementation Guidance [4]. This documentation describes if and how the project is covered by the NiSource Multi-Species Habitat Conservation Plan (MSHCP), programmatic biological opinion (BO), and/or programmatic concurrence letters. In addition, the action agency could refer to the following sections and/or pages of the MSHCP, BO, and/or concurrence letters to verify that the activity is covered by the MSHCP and associated Section 7 consultation under the Endangered Species Act (ESA):

Reference:

- NiSource MSHCP Chapter 2.3 Covered Lands (pp 2-11)
- NiSource MSHCP Chapter 2.4 Covered Activities (pp 11- 25)
- NiSource/Columbia Pipeline MSHCP Consultation Implementation Guidance Quick Reference for Species Consultation Categories (pp 5-6)
- NiSource/Columbia Pipeline Group's, "Habitat Conservation Program Best Management Practices Guidebook", v.1.0, March 12, 2014 (specific pages for each species are referenced in the attached application material)

By signing below, Columbia certifies that its proposed activity, as outlined in the accompanying application or notification, is consistent with the MSHCP, BO, and/or concurrence letters.

Jennifer Cannon ______________________ August 3, 2016

Columbia Pipeline representative Date

[x] By checking the box, Columbia is notifying the involved federal agencies that the proposed activity will require additional ESA Section 7 consultation because part of the activity may include: (1) any of the 10 Likely to Adversely Affect (LAA) species that are not included in the MSHCP[5], (2) species not addressed in the MSHCP, BO, or concurrence letters[5], (3) non-covered activities, (4) activities outside of the covered lands, or (5) activities otherwise deviating from the MSHCP, BO, and/or concurrence letters. Additional biological information about the species, habitat, or effects of the action may be required. The federal agencies can contact the U.S. Fish and

[4] See NiSource/Columbia Pipeline MSHCP Consultation Implementation Guidance. May 8, 2014. Pg 11.
[5] See NiSource/Columbia Pipeline MSHCP Consultation Implementation Guidance. May 8, 2014. Pg. 5.

Wildlife Service's NiSource/Columbia MSHCP Implementation Coordinator (Karen Herrington, 850.348.6495, karen_herrington@fws.gov) for more information.

FEDERAL AGENCY SECTION

This checklist serves as the official documentation that each action agency involved has completed its Section 7 responsibilities under the ESA for NiSource and Columbia Pipeline Group (Columbia) projects conducted as described in the MSHCP, BO, and/or concurrence letters. Every agency that receives a copy of this checklist should fill it out. The MSHCP, BO, and concurrence letters can be found on the U.S. Fish and Wildlife Service (FWS) NiSource website:

http://www.fws.gov/midwest/endangered/permits/hcp/nisource/index.html

Quick access to the required Avoidance and Minimization Measures (AMMs) and Best Management Practices (BMP) can be found in the Columbia BMP Guidebook, which is also posted on the above website.

1. Does the federal action occur entirely within the covered lands as described in the MSHCP?
   _____ Yes. Go to #2.
   __X__ No. Additional consultation is required because the action is not consistent with the MSHCP, BO, and/or concurrence letters. If the project may affect listed species, contact your local FWS Field Office.

2. Is the proposed action as described in the MSHCP, programmatic BO, and/or concurrence letter?
   _____ Yes. Go to #3.
   __X__ No. Additional consultation is required because the action is not consistent with the MSHCP, BO, and/or concurrence letters. If the project may affect listed species, contact your local FWS Field Office.

3. Does the proposed action pose any effects on species not included in the MSHCP, BO or concurrence letters[6]?
   ___ Yes. Additional consultation is required because the species was not included in the MSHCP, BO, and/or concurrence letters. If the project may affect listed species not included in the consultation, contact your local FWS Field Office.
   ___X__ No. Go to #4.

4. Does the proposed action include MSHCP species[6] only?
   _____ Yes. Go to #6.
   __X__ No. Go to #5.

5. Does the proposed action include any of the 10 Likely to Adversely Affect (LAA) species that are not included in the MSHCP (i.e., LAA non-MSHCP species) as addressed in the BO?
   _X_ Yes. Additional consultation is required. Enter into tiered consultation with your local FWS office for any LAA non-MSHCP species.
   _____ No. Go to #6.

[6] See NiSource/Columbia Pipeline MSHCP Consultation Implementation Guidance. May 8, 2014. Pg. 5

6. Are all mandatory AMMs and/or BMPs for each species included in the action?[7]
   ___X__ Yes. Go to #7.
   _____ No. Additional consultation is required because the proposed action is not consistent with the MSHCP, BO, and/or concurrence letter. Request additional information from Columbia about AMMs.

7. Are all non-mandatory AMMs and/or BMPs for each species included in the action?
   ______ Yes. Consultation is complete because the proposed action is consistent with the MSHCP, BO, and/or concurrence letter.
   _X__ No. Go to #8.

8. Are reasons provided for not including non-mandatory AMMs for each species?[8]
   __X___ Yes. Consultation is complete.
   _____ No. Request justification from Columbia, and attach documentation here. Once justification is provided, consultation is complete.

It is the federal agency's responsibility to comply with ESA Section 7 requirements for this project. The programmatic BO and/or the concurrence letters cover most of Columbia's activities implemented under the MSHCP within the covered lands. By signing below, the federal agency verifies that the proposed action within the agency's authority complies with the programmatic BO, and/or concurrence letters. If additional Section 7 consultation is required, the U.S. Fish and Wildlife Service's supplemental concurrence letter or biological opinion will be attached to this documentation.

AGENCY COMMENTS:

A table showing the various Project components, indicating which of those locations are MSHCP covered, and listing the federally protected species or their habitats that may potentially occur in those locations is provided as an attachment to this form.

Nancy Lynty _________________
Federal Agency representative

2/14/17
Date

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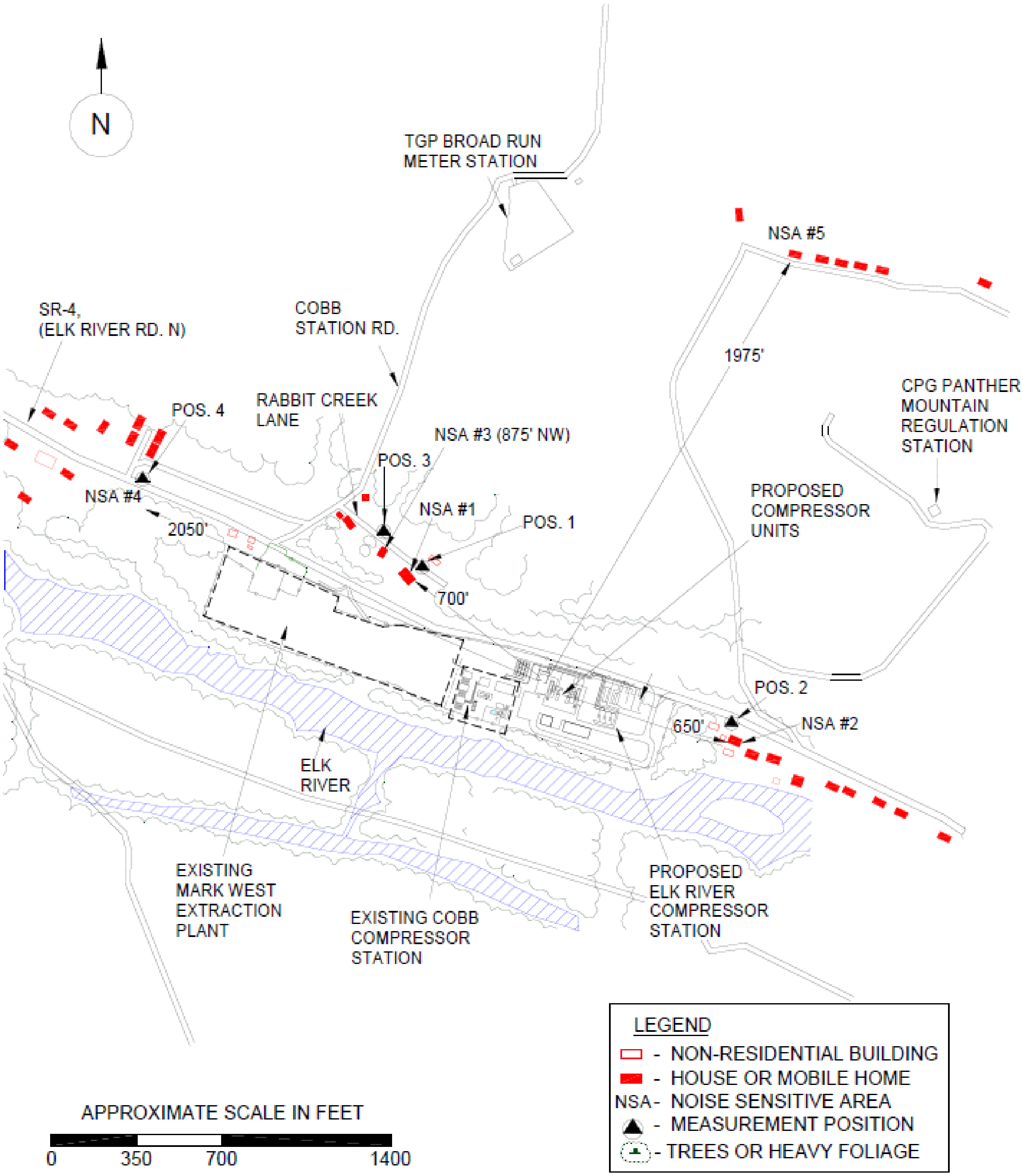
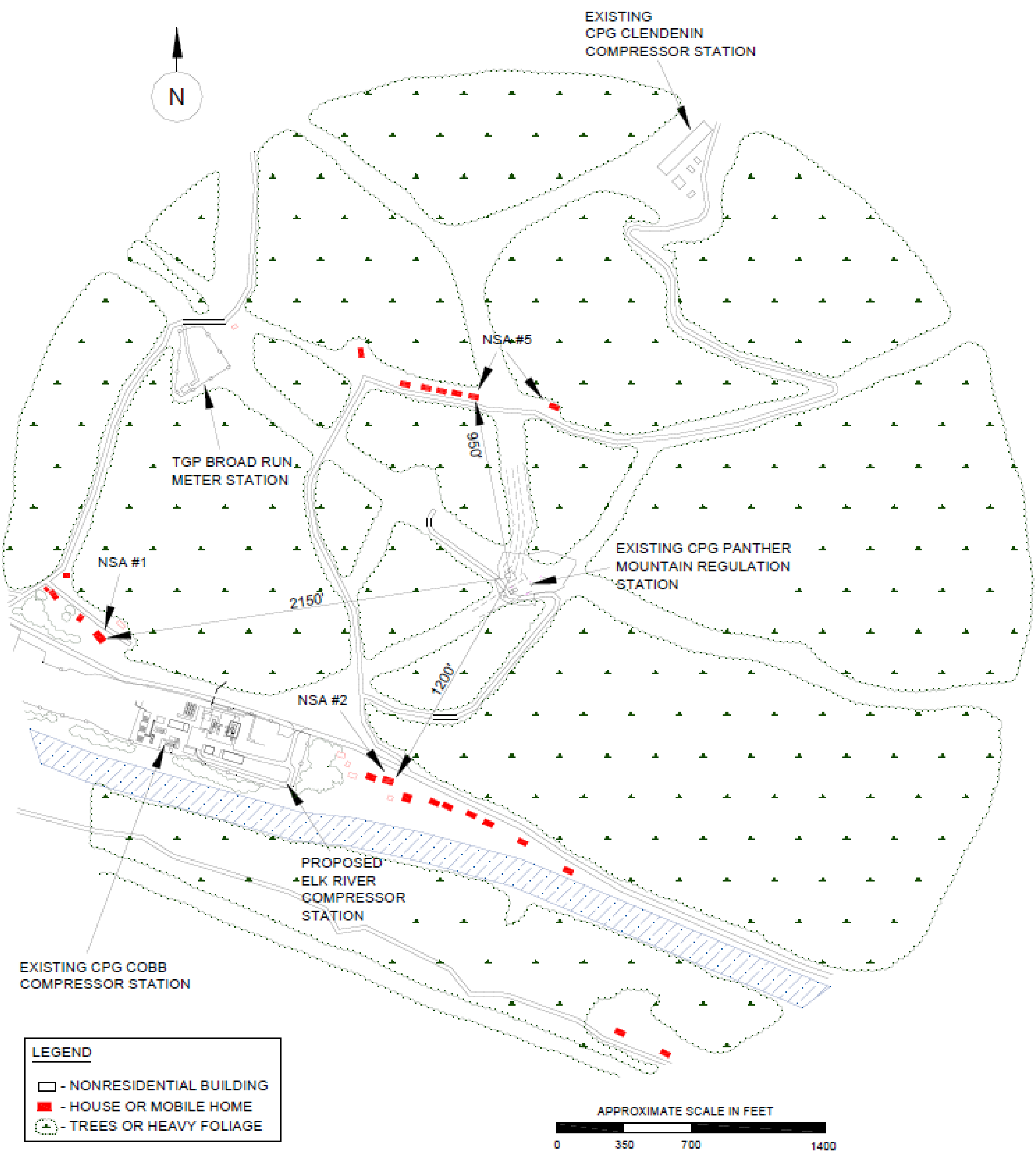
[7] See NiSource/Columbia Pipeline Group's, "Habitat Conservation Program Best Management Practices Guidebook", v.1.0, March 12, 2014.

[8] Per the MSHCP, explanation for non-mandatory AMM use is not required for the Indiana Bat.

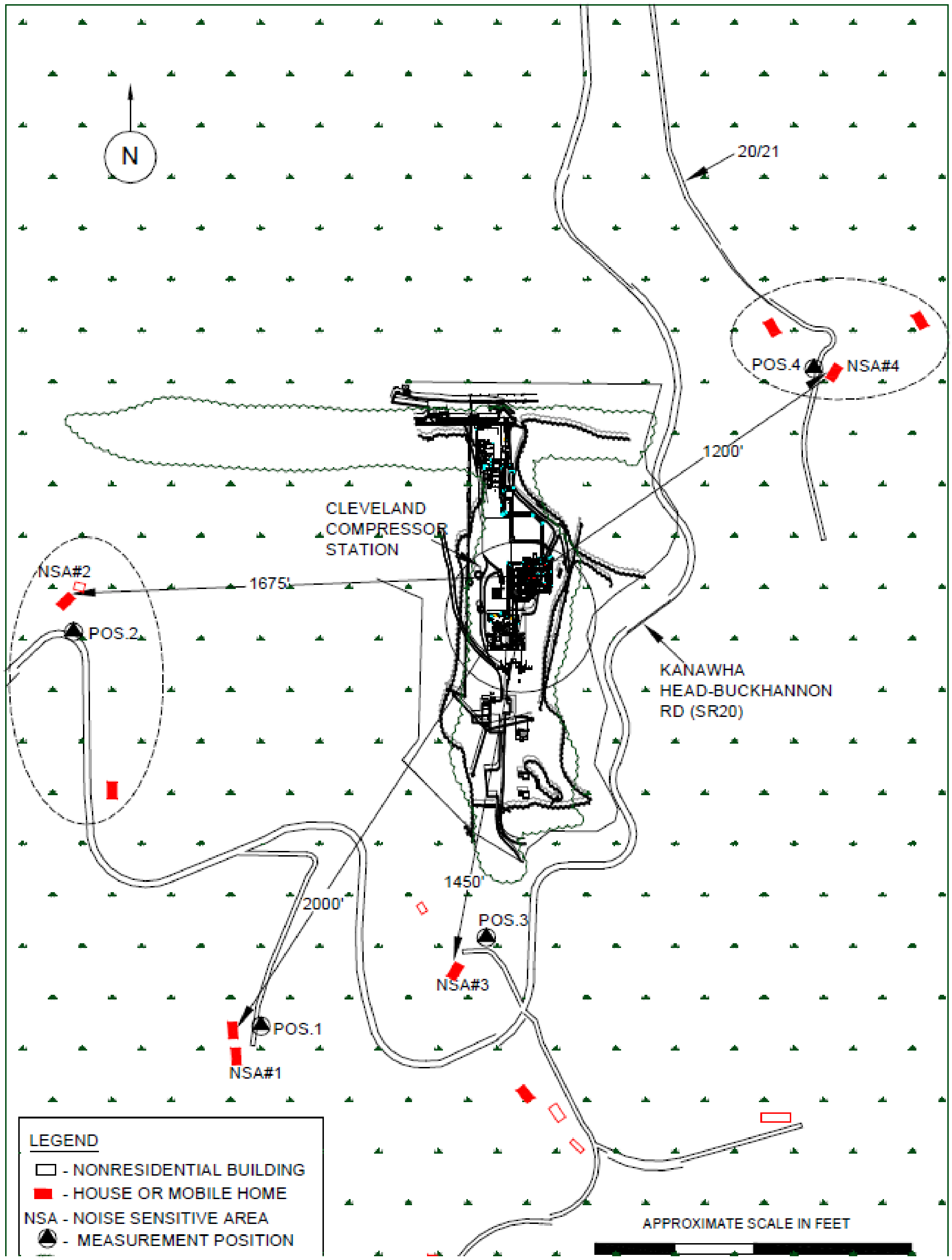
Appendix I
Noise Sensitive Areas



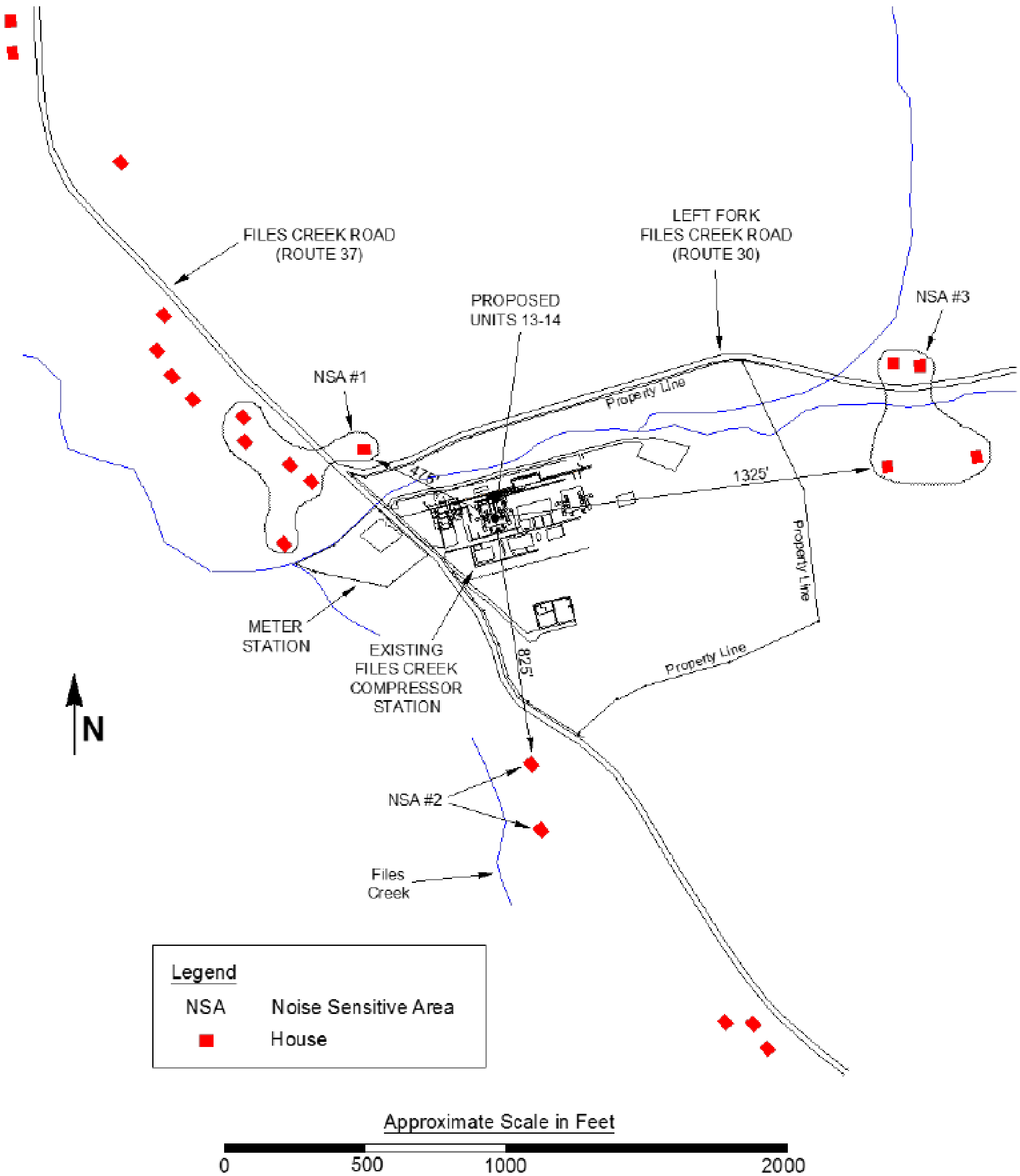
Elk River Compressor Station and Immediate Area



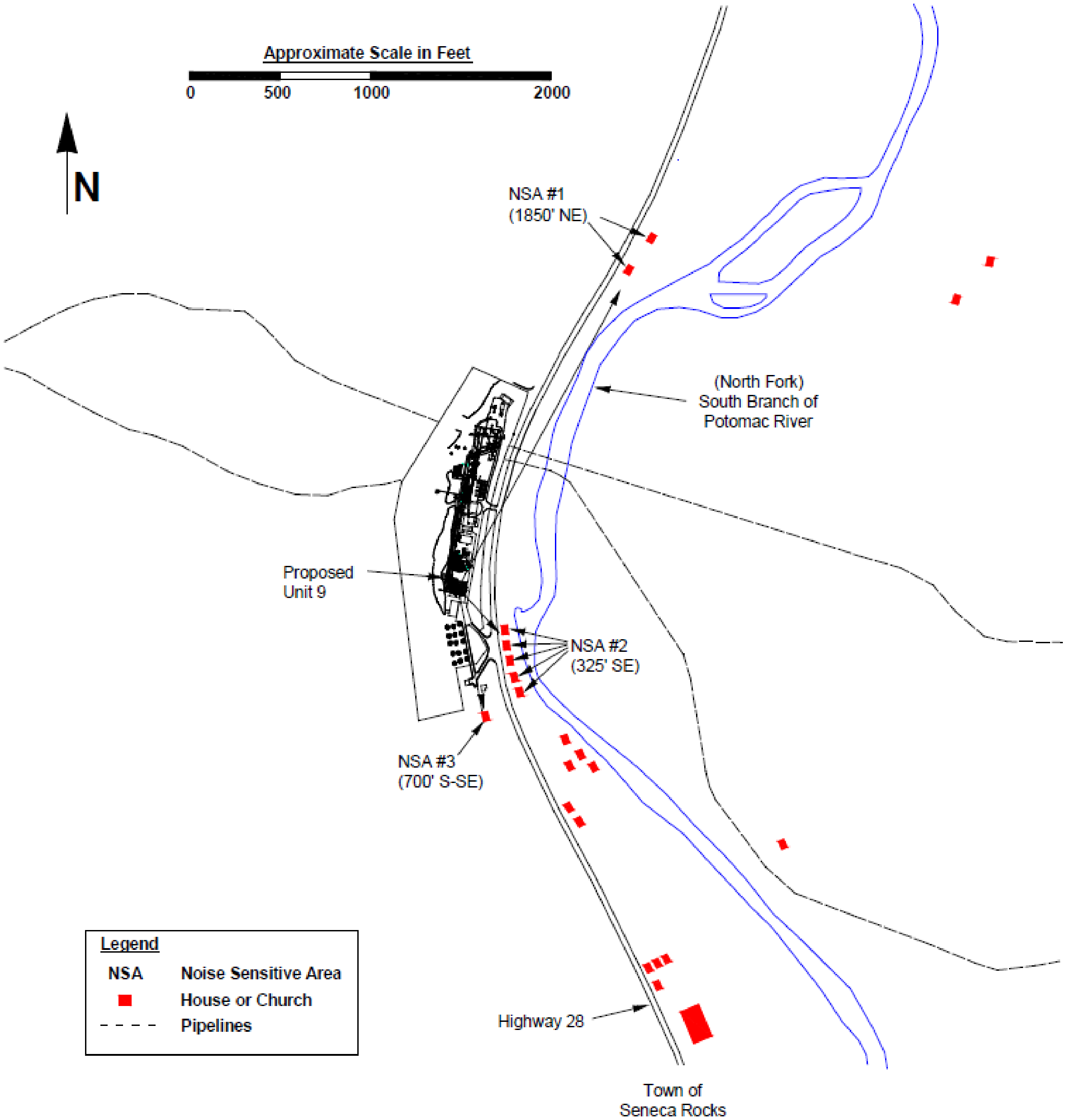
Existing Panther Mountain RS and Surrounding Area



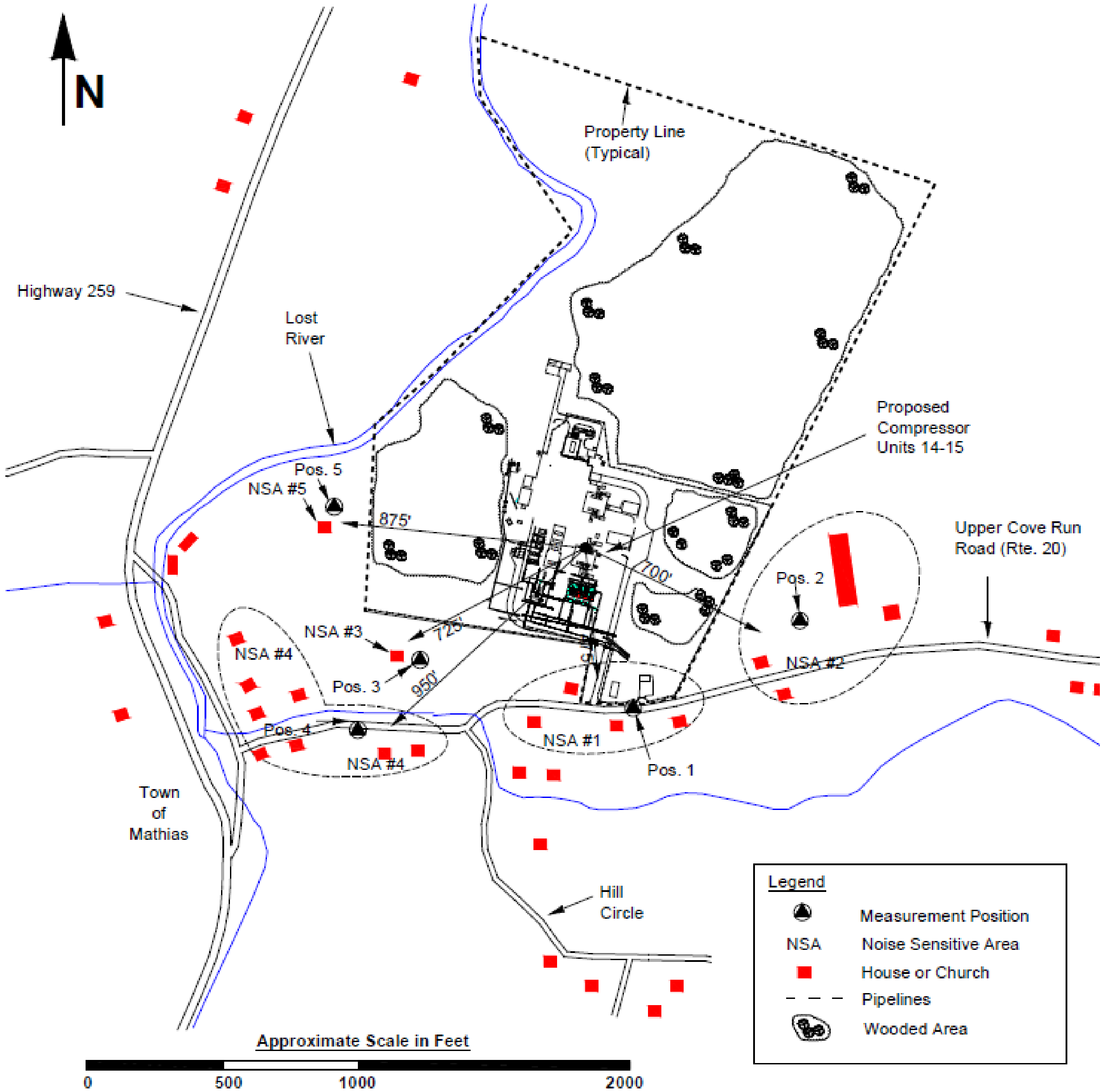
Cleveland Compressor Station and Immediate Area



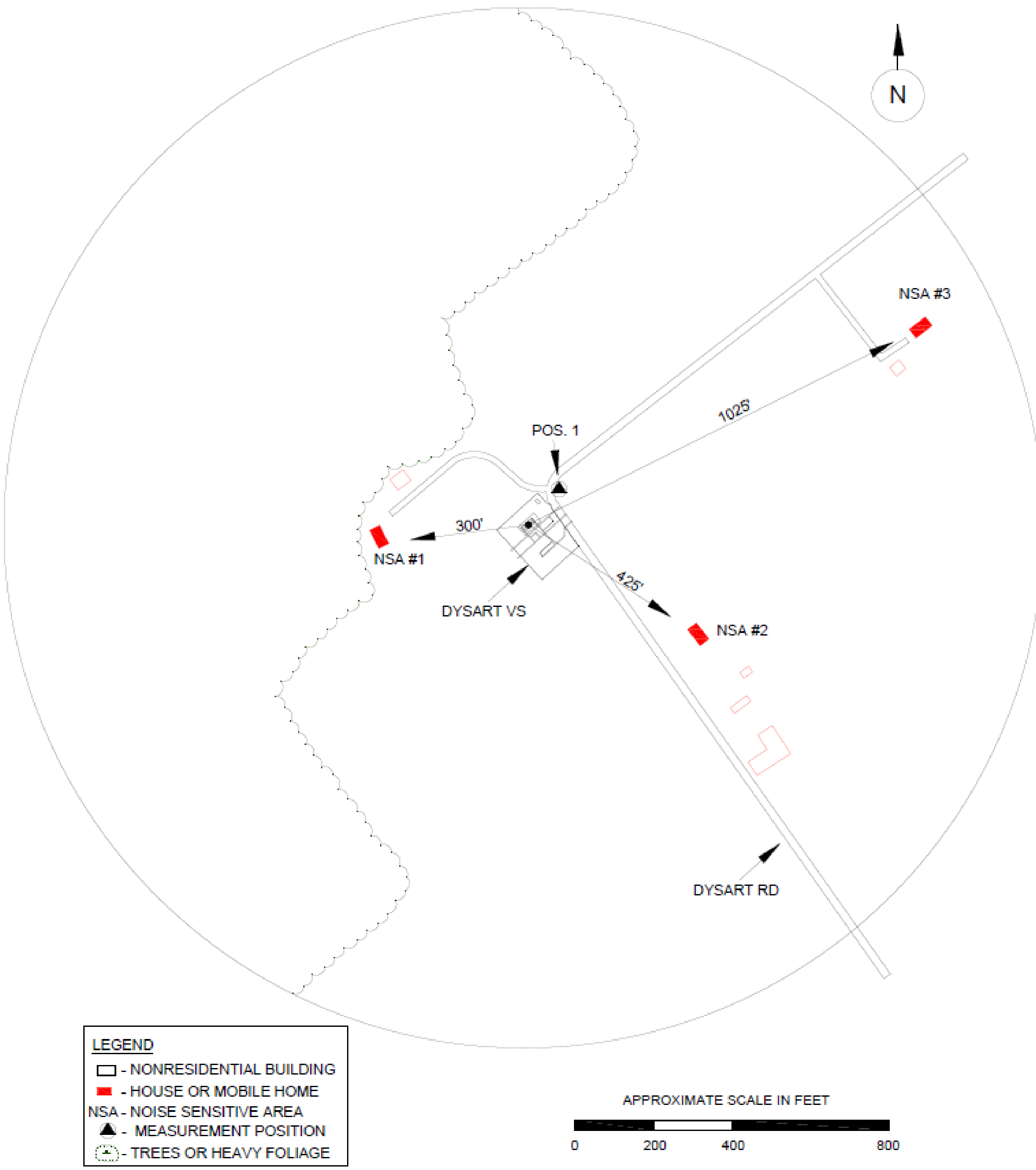
Files Creek Compressor Station and Surrounding Area



Seneca Compressor Station and Surrounding Area



Lost River Compressor Station and Immediate Area



Proposed Dysart Valve Setting and Surrounding Area

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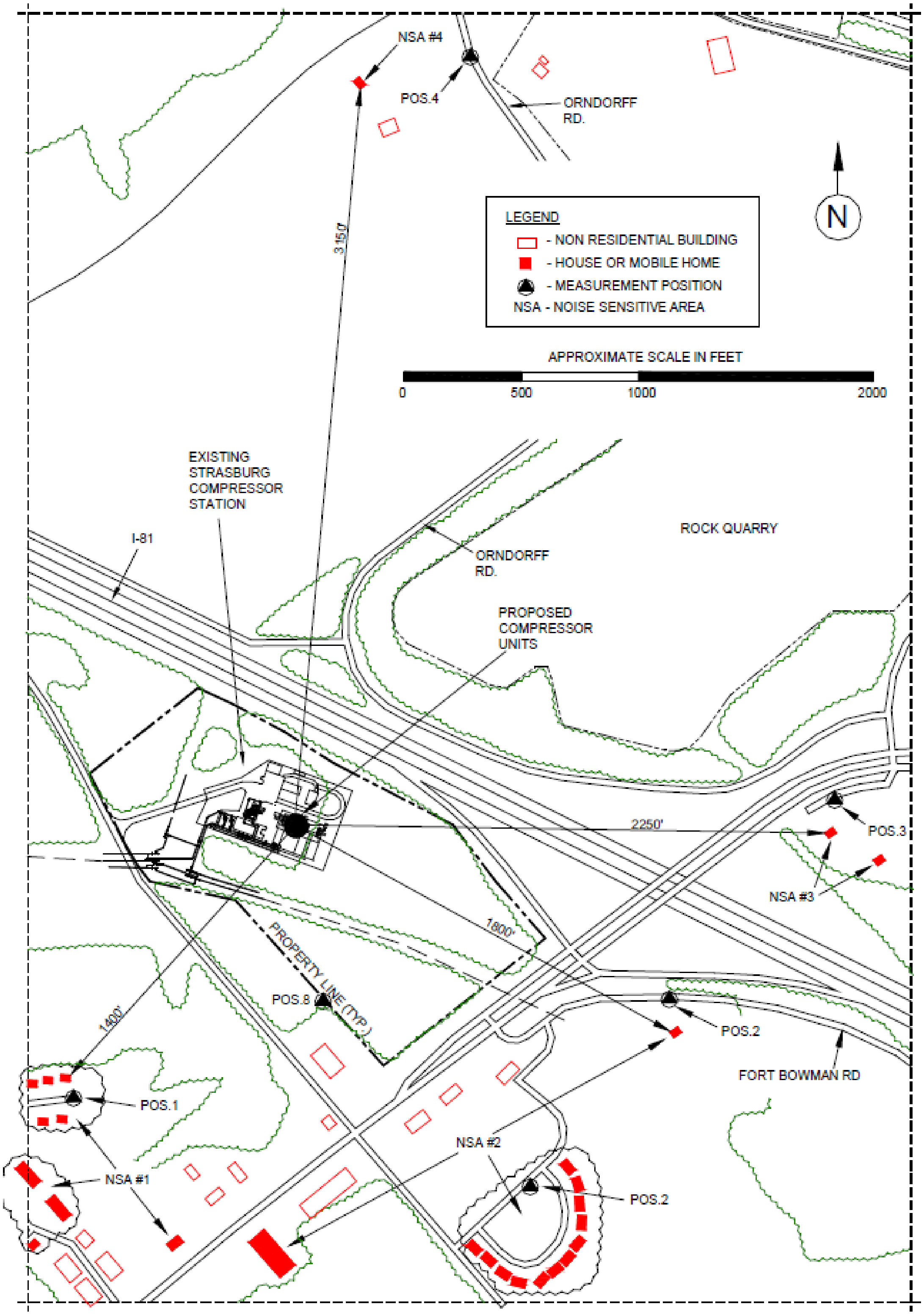

Strasburg Compressor Station and Immediate Area

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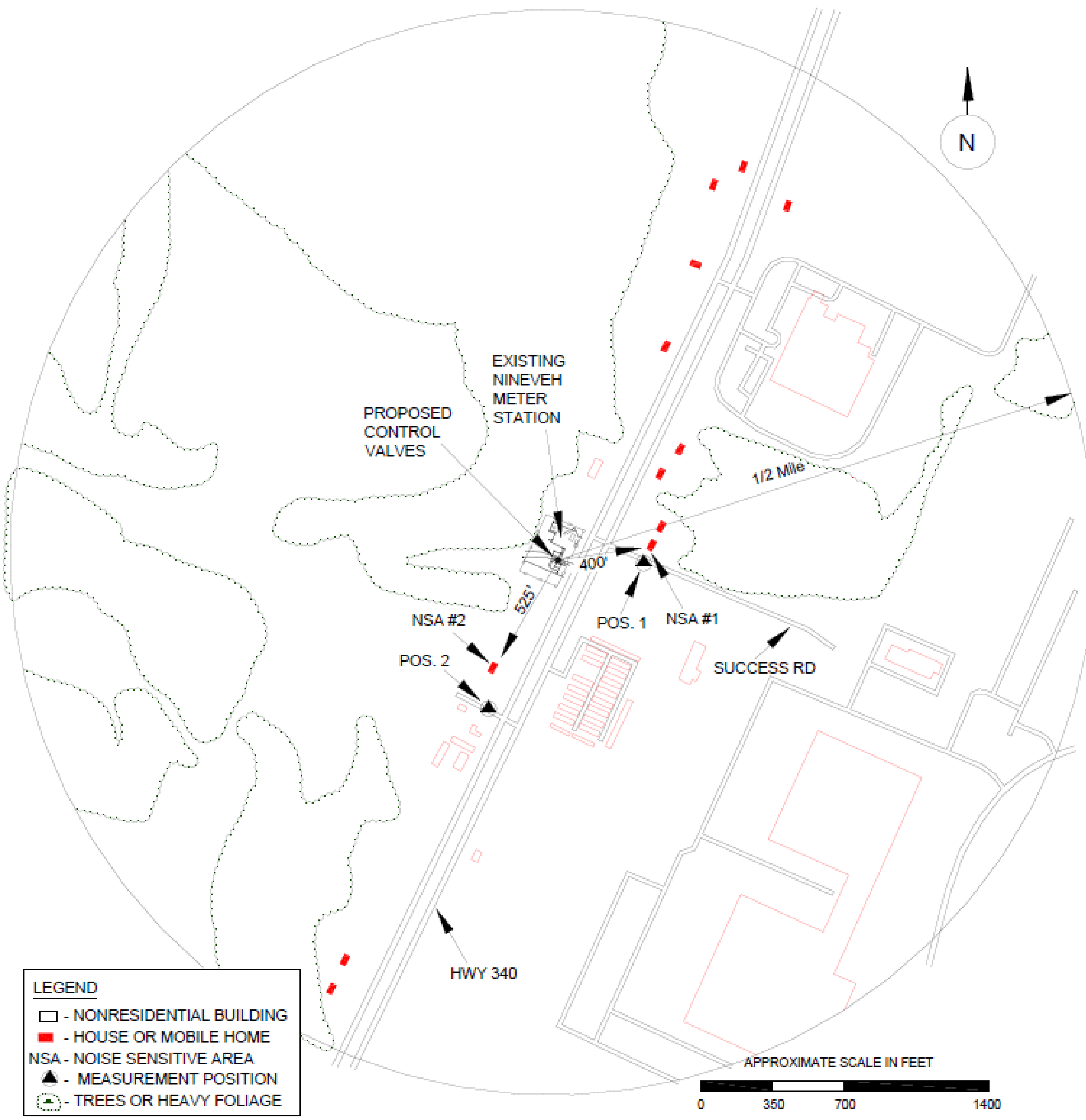
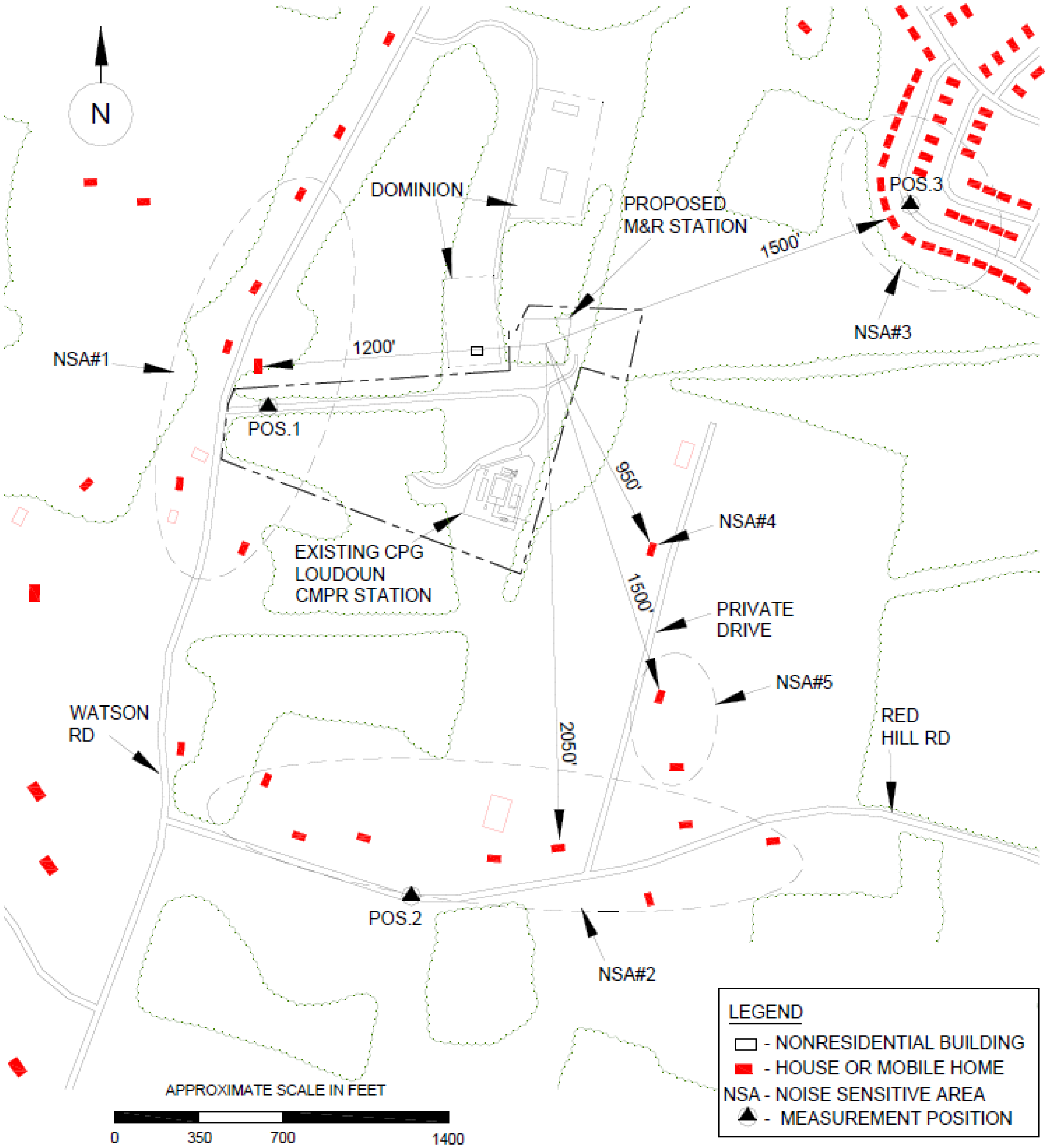
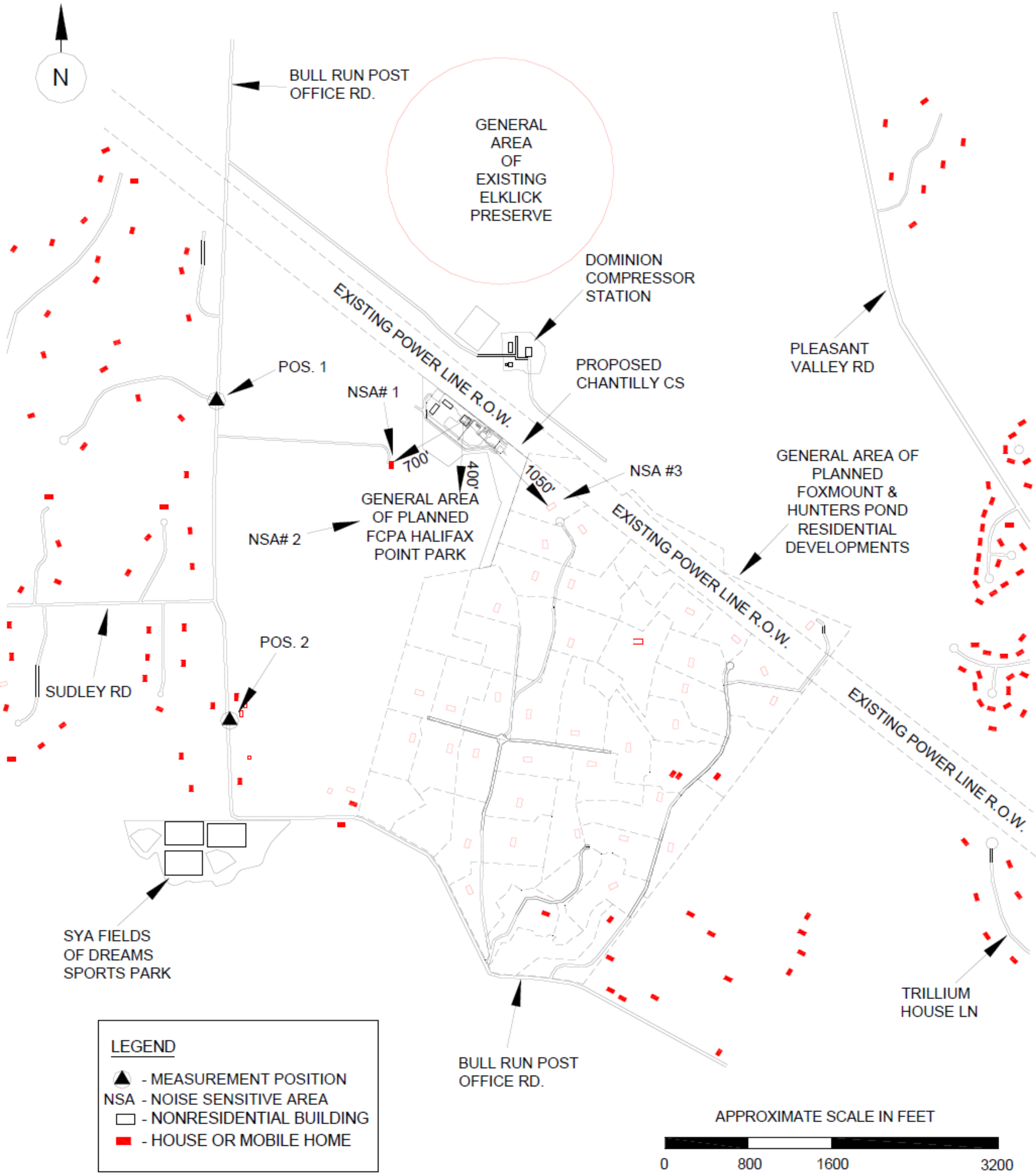


Proposed Nineveh Meter Station Setting and Surrounding Area



Loudoun Compressor Station and Immediate Area



Proposed Chantilly Compressor Station and Immediate Area

Appendix J
Summary of Anticipated Permits, Authorizations, and Consultations for Existing/Proposed Projects within the WB XPress Project Cumulative Impacts Assessment Area

Appendix J

Summary Table of Anticipated Permits, Authorizations, and Consultations for Existing/Proposed Projects within the WB XPress Project Cumulative Impacts Assessment Area

	Federal								West Virginia						
	Federal Energy Regulatory Commission	Federal Aviation Administrative Notification	U.S. Army Corps of Engineers (Sections 10 and 404)	U.S. Fish and Wildlife Service - West Virginia Ecological Field Services Office (Consultation under Section 7)	U.S. Fish and Wildlife Service –Virginia Ecological Field Services Office (Consultation under Section 7)	National Oceanic and Atmospheric Administration - Great Atlantic Regional Office (Consultation under Section 7)	U.S. Department of Agriculture - Forest Service	U.S. Department of Agriculture- Farm Service Agency and Natural Resource Conservation Service	West Virginia Department of Environmental Protection- Division of Air Quality	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Water Quality Certificate)	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Stormwater Associated with Oil and Gas Related Construction Activities)	West Virginia Department of Environmental Protection – Division of Water and Waste Management (Water Pollution Control Permit for Hydrostatic Testing Water)	West Virginia Division of Culture and History (Consultation under Section 106)	West Virginia Division of Natural Resources – Natural Heritage Program	West Virginia Division of Natural Resources – Office of Land and Streams (Stream Activity Permit)
Forest-wide Non-Native Invasive Species Management Program, U.S. Forest Service	No	No	No	Yes	N/A	No	Yes	No	Yes	No	No	No	Yes	Yes	No
Big Mountain Project, U.S. Forest Service	No	No	No	Yes	N/A	No	Yes	No	Yes	No	No	No	Yes	Yes	No
Big Rock Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Lower Williams Wildlife Enhancement Project, U.S. Forest Service	No	No	No	Yes	N/A	No	Yes	Yes	No	No	Yes	No	Yes	Yes	No
Tea Creek Phase II Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Mower Tract Restoration Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes
Tygart Chestnut Ridge Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes
Pike Knob and Panther Knob Preserve Projects, The Nature Conservancy	No	No	No	Yes	N/A	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Bear Rocks Preserve Projects, The Nature Conservancy	No	No	No	Yes	N/A	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Dulles Corridor Metrorail Project, Metropolitan Washington Airports Authority, Virginia Department of Rail and Transportation	No	Yes	Yes	N/A	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
West Fork of Greenbrier Rail with Trail Development Project, West Virginia State Rail Authority	No	No	Yes	Yes	NA	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes
Bickle Run Culvert and Bridge Repair Project, West Virginia Division of Highways	No	No	Yes	No	N/A	No	No	No	No	Yes	No	No	Yes	No	Yes
Music Run ROW Project, Private Landowner	No	No	Yes	No	N/A	No	No	No	No	Yes	No	No	No	No	Yes

Appendix J (Continued)

	Federal								West Virginia						
	Federal Energy Regulatory Commission	Federal Aviation Administrative Notification	U.S. Army Corps of Engineers (Sections 10 and 404)	U.S. Fish and Wildlife Service - West Virginia Ecological Field Services Office (Consultation under Section 7)	U.S. Fish and Wildlife Service –Virginia Ecological Field Services Office (Consultation under Section 7)	National Oceanic and Atmospheric Administration - Great Atlantic Regional Office (Consultation under Section 7)	U.S. Department of Agriculture - Forest Service	U.S. Department of Agriculture- Farm Service Agency and Natural Resource Conservation Service	West Virginia Department of Environmental Protection- Division of Air Quality	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Water Quality Certificate)	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Stormwater Associated with Oil and Gas Related Construction Activities)	West Virginia Department of Environmental Protection – Division of Water and Waste Management (Water Pollution Control Permit for Hydrostatic Testing Water)	West Virginia Division of Culture and History (Consultation under Section 106)	West Virginia Division of Natural Resources – Natural Heritage Program	West Virginia Division of Natural Resources – Office of Land and Streams (Stream Activity Permit)
Forest-wide Non-Native Invasive Species Management Program, U.S. Forest Service	No	No	No	Yes	N/A	No	Yes	No	Yes	No	No	No	Yes	Yes	No
Big Mountain Project, U.S. Forest Service	No	No	No	Yes	N/A	No	Yes	No	Yes	No	No	No	Yes	Yes	No
Big Rock Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Lower Williams Wildlife Enhancement Project, U.S. Forest Service	No	No	No	Yes	N/A	No	Yes	Yes	No	No	Yes	No	Yes	Yes	No
Tea Creek Phase II Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Mower Tract Restoration Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes
Tygart Chestnut Ridge Project, U.S. Forest Service	No	No	Yes	Yes	N/A	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes
Pike Knob and Panther Knob Preserve Projects, The Nature Conservancy	No	No	No	Yes	N/A	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Bear Rocks Preserve Projects, The Nature Conservancy	No	No	No	Yes	N/A	No	Yes	Yes	No	No	No	No	Yes	Yes	No
Dulles Corridor Metrorail Project, Metropolitan Washington Airports Authority, Virginia Department of Rail and Transportation	No	Yes	Yes	N/A	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
West Fork of Greenbrier Rail with Trail Development Project, West Virginia State Rail Authority	No	No	Yes	Yes	NA	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes
Bickle Run Culvert and Bridge Repair Project, West Virginia Division of Highways	No	No	Yes	No	N/A	No	No	No	No	Yes	No	No	Yes	No	Yes
Music Run ROW Project, Private Landowner	No	No	Yes	No	N/A	No	No	No	No	Yes	No	No	No	No	Yes
Union Chapel Church Road ROW Project, Private Landowner	No	No	No	No	N/A	No	No	No	No	No	No	No	No	No	No

Appendix J (Continued)

	Federal								West Virginia						
	Federal Energy Regulatory Commission	Federal Aviation Administrative Notification	U.S. Army Corps of Engineers (Sections 10 and 404)	U.S. Fish and Wildlife Service - West Virginia Ecological Field Services Office (Consultation under Section 7)	U.S. Fish and Wildlife Service –Virginia Ecological Field Services Office (Consultation under Section 7)	National Oceanic and Atmospheric Administration - Great Atlantic Regional Office (Consultation under Section 7)	U.S. Department of Agriculture - Forest Service	U.S. Department of Agriculture- Farm Service Agency and Natural Resource Conservation Service	West Virginia Department of Environmental Protection- Division of Air Quality	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Water Quality Certificate)	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Stormwater Associated with Oil and Gas Related Construction Activities)	West Virginia Department of Environmental Protection – Division of Water and Waste Management (Water Pollution Control Permit for Hydrostatic Testing Water)	West Virginia Division of Culture and History (Consultation under Section 106)	West Virginia Division of Natural Resources – Natural Heritage Program	West Virginia Division of Natural Resources – Office of Land and Streams (Stream Activity Permit)
Corridor H Project, West Virginia Division of Highways	No	No	Yes	Yes	N/A	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Gloucester Parkway Extension Project, Virginia DOT	No	No	Yes	N/A	Yes	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I-66 Widening Project, Virginia DOT	No	No	Yes	N/A	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific Boulevard Extension, Virginia DOT	No	No	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 600 North Fork Bridge Project, Virginia DOT	No	No	Yes	N/A	Yes	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 606/Loudoun County Parkway, Old Ox Road Widening Project, Virginia DOT	No	No	Yes	N/A	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 624 (Morgan Ford Road) Shenandoah Bridge Project, Virginia DOT	No	No	Yes	N/A	Yes	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 663 (Artz Road) North Fork Bridge Project, Virginia DOT	No	No	Yes	N/A	Yes	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
US Highway 1 Widening at Fort Belvoir Project, Virginia DOT	No	No	Yes	N/A	Yes	Yes	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mathias Substation, First Energy	No	No	No	N/A	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chantilly Electric Distribution Line NOVEC (Northern Virginia Electric Cooperative)	No	Yes	No	N/A	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Haymarket 230kV Line & Substation Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Loudoun - Pleasant View 500 kV Rebuild Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brambleton - Mosby 500 kV Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix J (Continued)

	Federal								West Virginia						
	Federal Energy Regulatory Commission	Federal Aviation Administrative Notification	U.S. Army Corps of Engineers (Sections 10 and 404)	U.S. Fish and Wildlife Service - West Virginia Ecological Field Services Office (Consultation under Section 7)	U.S. Fish and Wildlife Service –Virginia Ecological Field Services Office (Consultation under Section 7)	National Oceanic and Atmospheric Administration - Great Atlantic Regional Office (Consultation under Section 7)	U.S. Department of Agriculture - Forest Service	U.S. Department of Agriculture- Farm Service Agency and Natural Resource Conservation Service	West Virginia Department of Environmental Protection- Division of Air Quality	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Water Quality Certificate)	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Stormwater Associated with Oil and Gas Related Construction Activities)	West Virginia Department of Environmental Protection – Division of Water and Waste Management (Water Pollution Control Permit for Hydrostatic Testing Water)	West Virginia Division of Culture and History (Consultation under Section 106)	West Virginia Division of Natural Resources – Natural Heritage Program	West Virginia Division of Natural Resources – Office of Land and Streams (Stream Activity Permit)
Pacific 230 kV Line & Substation Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	Yes	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Warrenton - Wheeler - Gainesville 230 kV Reliability Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Idylwood Substation Rearrangement Project, Dominion Virginia Power	No	No	No	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Poland Road Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yardley Ridge 230 kV Transmission Line Project, Dominion Virginia Power	No	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Davis Drive Project, Dominion Virginia Power	No	Yes	No	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Charleston Area Improvements Project, Appalachian Power	Yes	Yes	Yes	Yes	N/A	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes
Dalton Expansion Project, Transcontinental Gas Pipe Line Company, LLC	Yes	No	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Atlantic Coast Pipeline Project, Atlantic Coast Pipeline, LLC	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monroe to Cornwell Project, Dominion Transmission, INC.	Yes	No	Yes	No	N/A	No	No	No	Yes	No	No	Yes	No	Yes	Yes
Cove Point Liquefaction Project, Dominion Cove Point LNG, LP	Yes	Yes	Yes	N/A	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Line WB2VA Integrity Project, Columbia Pipeline Group, LLC	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Mountaineer XPress Project, Columbia Pipeline Group, LLC	Yes	No	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cleveland Compressor Station Project, Columbia Pipeline Group, LLC	Yes	No	No	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Broad Run Connector Project, Columbia Pipeline Group, LLC	Yes	No	No	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Utica Access Project, Columbia Pipeline Group, LLC	Yes	No	Yes	Yes	N/A	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Appendix J (Continued)															
	Federal								West Virginia						
	Federal Energy Regulatory Commission	Federal Aviation Administrative Notification	U.S. Army Corps of Engineers (Sections 10 and 404)	U.S. Fish and Wildlife Service - West Virginia Ecological Field Services Office (Consultation under Section 7)	U.S. Fish and Wildlife Service –Virginia Ecological Field Services Office (Consultation under Section 7)	National Oceanic and Atmospheric Administration - Great Atlantic Regional Office (Consultation under Section 7)	U.S. Department of Agriculture - Forest Service	U.S. Department of Agriculture- Farm Service Agency and Natural Resource Conservation Service	West Virginia Department of Environmental Protection- Division of Air Quality	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Water Quality Certificate)	West Virginia Department of Environmental Protection - Division of Water and Waste Management (Stormwater Associated with Oil and Gas Related Construction Activities)	West Virginia Department of Environmental Protection – Division of Water and Waste Management (Water Pollution Control Permit for Hydrostatic Testing Water)	West Virginia Division of Culture and History (Consultation under Section 106)	West Virginia Division of Natural Resources – Natural Heritage Program	West Virginia Division of Natural Resources – Office of Land and Streams (Stream Activity Permit)
Clendenin Reliability Improvement Project, Columbia Pipeline Group, LLC	Yes	No	No	Yes	N/A	No	No	No	No	No	Yes	Yes	Yes	No	No
2015 Controls System Upgrades Projects, Columbia Pipeline Group, LLC	Yes	No	No	Yes	N/A	No	No	No	No	No	No	Yes	No	No	No
Files Creek Compressor Station Project, Columbia Pipeline Group, LLC	Yes	No	No	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Broad Run Expansion Project, Tennessee Gas Pipeline Company, LLC	Yes	No	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mountain Valley Pipeline Project, Mountain Valley Pipeline, LLC	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix J (Continued)

	Virginia											Other States						
	Virginia Department of Environmental Quality – Air Division	Virginia Department of Transportation	Virginia Department of Environmental Quality – Water Division (Virginia Water Protection Permit)	Virginia Department of Environmental Quality – Water Division (Water Quality Certificate)	Virginia Department of Environmental Quality – Coastal Zone Management Program	Virginia Marine Resources Commission	Virginia Department of Environmental Quality – Water Division (General Permit for Discharges of Stormwater from Construction Activities)	Virginia Department of Environmental Quality – Water Division (Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests)	Virginia Department of Conservation and Recreation (Natural Heritage/Protected Species Consultation)	Virginia Department of Game and Inland Fisheries (Natural Heritage/Protected Species Consultation)	Virginia Department of Historical Resources (Consultation under Section 106)	Maryland Department of the Environment – Air and Radiation Management Administration	Georgia Environmental Protection Division – Air Protection Branch	North Carolina Department of Environmental Quality – Air Quality Division	Pennsylvania Department of Environmental Protection – Bureau of Air Quality	Tennessee Department of Environment and Conservation - Division of Air Pollution Control	Kentucky Department of Environmental Protection – Division for Air Quality	District of Columbia Department of Energy and Environment – Air Quality Division
Forest-wide Non-Native Invasive Species Management Program, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Big Mountain Project, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Big Rock Project, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lower Williams Wildlife Enhancement Project, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tea Creek Phase II Project, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mower Tract Restoration Project, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tygart Chestnut Ridge Project, U.S. Forest Service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pike Knob and Panther Knob Preserve Projects, The Nature Conservancy	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bear Rocks Preserve Projects, The Nature Conservancy	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dulles Corridor Metrorail Project, Metropolitan Washington Airports Authority, Virginia Department of Rail and Transportation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
West Fork of Greenbrier Rail with Trail Development Project, West Virginia State Rail Authority	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bickle Run Culvert and Bridge Repair Project, West Virginia Division of Highways	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Music Run ROW Project, Private Landowner	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Union Chapel Church Road ROW Project, Private Landowner	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Corridor H Project, West Virginia Division of Highways	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	N/A	N/A	N/A
Gloucester Parkway Extension Project, Virginia DOT	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix J (Continued)

	Virginia											Other States						
	Virginia Department of Environmental Quality – Air Division	Virginia Department of Transportation	Virginia Department of Environmental Quality – Water Division (Virginia Water Protection Permit)	Virginia Department of Environmental Quality – Water Division (Water Quality Certificate)	Virginia Department of Environmental Quality – Coastal Zone Management Program	Virginia Marine Resources Commission	Virginia Department of Environmental Quality – Water Division (General Permit for Discharges of Stormwater from Construction Activities)	Virginia Department of Environmental Quality – Water Division (Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests)	Virginia Department of Conservation and Recreation (Natural Heritage/Protected Species Consultation)	Virginia Department of Game and Inland Fisheries (Natural Heritage/Protected Species Consultation)	Virginia Department of Historical Resources (Consultation under Section 106)	Maryland Department of the Environment – Air and Radiation Management Administration	Georgia Environmental Protection Division – Air Protection Branch	North Carolina Department of Environmental Quality – Air Quality Division	Pennsylvania Department of Environmental Protection – Bureau of Air Quality	Tennessee Department of Environment and Conservation - Division of Air Pollution Control	Kentucky Department of Environmental Protection – Division for Air Quality	District of Columbia Department of Energy and Environment – Air Quality Division
I-66 Widening Project, Virginia DOT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific Boulevard Extension, Virginia DOT	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 600 North Fork Bridge Project, Virginia DOT	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 606/Loudoun County Parkway, Old Ox Road Widening Project, Virginia DOT	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 624 (Morgan Ford Road) Shenandoah Bridge Project, Virginia DOT	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Route 663 (Artz Road) North Fork Bridge Project, Virginia DOT	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
US Highway 1 Widening at Fort Belvoir Project, Virginia DOT	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mathias Substation, First Energy	No	Yes	No	No	No	No	No	Yes	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chantilly Electric Distribution Line NOVEC (Northern Virginia Electric Cooperative)	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Haymarket 230kV Line & Substation Project, Dominion Virginia Power	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Loudoun - Pleasant View 500 kV Rebuild Project, Dominion Virginia Power	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brambleton - Mosby 500 kV Project, Dominion Virginia Power	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific 230 kV Line & Substation Project, Dominion Virginia Power	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Warrenton - Wheeler - Gainesville 230 kV Reliability Project, Dominion Virginia Power	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Idylwood Substation Rearrangement Project, Dominion Virginia Power	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix J (Continued)

	Virginia											Other States						
	Virginia Department of Environmental Quality – Air Division	Virginia Department of Transportation	Virginia Department of Environmental Quality – Water Division (Virginia Water Protection Permit)	Virginia Department of Environmental Quality – Water Division (Water Quality Certificate)	Virginia Department of Environmental Quality – Coastal Zone Management Program	Virginia Marine Resources Commission	Virginia Department of Environmental Quality – Water Division (General Permit for Discharges of Stormwater from Construction Activities)	Virginia Department of Environmental Quality – Water Division (Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests)	Virginia Department of Conservation and Recreation (Natural Heritage/Protected Species Consultation)	Virginia Department of Game and Inland Fisheries (Natural Heritage/Protected Species Consultation)	Virginia Department of Historical Resources (Consultation under Section 106)	Maryland Department of the Environment – Air and Radiation Management Administration	Georgia Environmental Protection Division – Air Protection Branch	North Carolina Department of Environmental Quality – Air Quality Division	Pennsylvania Department of Environmental Protection – Bureau of Air Quality	Tennessee Department of Environment and Conservation - Division of Air Pollution Control	Kentucky Department of Environmental Protection – Division for Air Quality	District of Columbia Department of Energy and Environment – Air Quality Division
Poland Road Project, Dominion Virginia Power	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Yardley Ridge 230 kV Transmission Line Project, Dominion Virginia Power	No	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Davis Drive Project, Dominion Virginia Power	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Charleston Area Improvements Project, Appalachian Power	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dalton Expansion Project, Transcontinental Gas Pipe Line Company, LLC	No	No	No	No	No	No	No	No	No	No	No	No	Yes	N/A	N/A	N/A	N/A	N/A
Atlantic Coast Pipeline Project, Atlantic Coast Pipeline, LLC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	Yes	N/A	N/A	N/A	N/A
Monroe to Cornwell Project, Dominion Transmission, INC.	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cove Point Liquefaction Project, Dominion Cove Point LNG, LP	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A
Line WB2VA Integrity Project, Columbia Pipeline Group, LLC	No	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A
Mountaineer XPress Project, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cleveland Compressor Station Project, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Broad Run Connector Project, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Utica Access Project, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Clendenin Reliability Improvement Project, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix J (Continued)

	Virginia											Other States						
	Virginia Department of Environmental Quality – Air Division	Virginia Department of Transportation	Virginia Department of Environmental Quality – Water Division (Virginia Water Protection Permit)	Virginia Department of Environmental Quality – Water Division (Water Quality Certificate)	Virginia Department of Environmental Quality – Coastal Zone Management Program	Virginia Marine Resources Commission	Virginia Department of Environmental Quality – Water Division (General Permit for Discharges of Stormwater from Construction Activities)	Virginia Department of Environmental Quality – Water Division (Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests)	Virginia Department of Conservation and Recreation (Natural Heritage/Protected Species Consultation)	Virginia Department of Game and Inland Fisheries (Natural Heritage/Protected Species Consultation)	Virginia Department of Historical Resources (Consultation under Section 106)	Maryland Department of the Environment – Air and Radiation Management Administration	Georgia Environmental Protection Division – Air Protection Branch	North Carolina Department of Environmental Quality – Air Quality Division	Pennsylvania Department of Environmental Protection – Bureau of Air Quality	Tennessee Department of Environment and Conservation - Division of Air Pollution Control	Kentucky Department of Environmental Protection – Division for Air Quality	District of Columbia Department of Energy and Environment – Air Quality Division
2015 Controls System Upgrades Projects, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Files Creek Compressor Station Project, Columbia Pipeline Group, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Broad Run Expansion Project, Tennessee Gas Pipeline Company, LLC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	N/A
Mountain Valley Pipeline Project, Mountain Valley Pipeline, LLC	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sources: Publically available information was used to determine which federal, state, and local permits may be applicable to the potential projects in this table.

Yes = Permit acquired or applicable/required

No = Permit not applicable/required in the state where the project is located

N/A = Not applicable because the project does not occur in identified state

APPENDIX K

LOCATIONS FOR BACKGROUND AIR CONCENTRATIONS AND METEOROLOGICAL DATA

APPENDIX K-1

Air Monitoring Locations for Representative Background Concentrations at Project Compressor Stations

Pollutant	Averaging Period	Monitored Value	Compressor Stations				
			Cleveland	Files Creek	Seneca	Lost River	Strasburg
NO_2	1-hour	Three-year average of the 98th percentile or highest of each year's eighth-highest hourly concentration	Harrisonburg, VA (138 km)	Harrisonburg, VA (96 km)	Stack tests [b] and Harrisonburg, VA (64 km)	Harrisonburg, VA (45 km)	Prince William County, VA (64 km)
	Annual	Maximum annual concentration					
CO	1-hour	Highest of each year's second-highest hourly concentration	Piney Run, MD (158 km)	Piney Run, MD (121 km)	Piney Run, MD (100 km)	Piney Run, MD (94 km)	Piney Run, MD (97 km)
	8-hour	Highest of each year's second-highest hourly concentration					
PM_{10}	24-hour	Highest of each year's second-highest hourly concentration	Charleston, WV (119 km)	Charleroi, PA (147 km)	Winchester, VA (111 km)	Winchester, VA (69 km)	Winchester, VA (25 km)
$PM_{2.5}$	24-hour	Three-year average of the 98th percentile or highest of each year's eighth-highest hourly concentration	Clarksburg, WV (59 km)	Clarksburg, WV (67 km)	Harrisonburg, VA (64 km)	Page County, VA (39 km)	Frederick County, VA (38 km)
	Annual	Three-year average of the maximum concentrations					
SO_2	1-hour	Three-year average of the 99th percentile or highest fourth-highest concentration	Morgantown, WV (107 km)	Morgantown, WV (93 km)	Harrisonburg, VA (64 km)	Piney Run, MD (94 km)	Harrisonburg, VA (72 km)
	3-hour	Highest second-highest 1-hour SO2 concentration [a]					

[a] The U.S. EPA's AirData website does not provide the monitored 3-hour background SO2 concentrations.

[b] One of the input requirements for the OLM option is the in-stack NO2/NOx ratio for each source. Although Columbia did not have stack test data for the sources at the Seneca CS, Columbia states that stack test data was available for similar units. Thus, the in-stack NO2/NOx ratios from these units were used by Columbia in the 1-hour NO2 NAAQS compliance demonstration.

APPENDIX K-2

Locations for Meteorological Data (2009 – 2013) for Air Modeling at Project Compressor Stations

Meteorological Data	Compressor Stations				
	Cleveland	Files Creek	Seneca	Lost River	Strasburg
Hourly surface meteorological monitoring station	Elkins-Randolph County Airport (29.1 mi east-northeast)	Elkins-Randolph County Airport (4.5 mi north-northwest)	Grant County Airport (25.8 mi northeast)	Grant County Airport (17.2 mi northwest)	Winchester Regional Airport (22.8 mi northeast)
Concurrent upper air sounding data	Roanoke-Blacksburg Regional Airport	Roanoke-Blacksburg Regional Airport	Washington Dulles International Airport	Washington Dulles International Airport	Washington Dulles International Airport

Document Content(s)