Federal Energy Regulatory Commission
Office of Energy Projects

January 2018

Columbia Gas Transmission, LLC **Docket No. CP17-80-000**

Eastern Panhandle Expansion Project

Environmental Assessment

Washington, DC 20426

Cooperating Agencies:
United States National Park Service
United States Environmental Protection Agency

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 3
Columbia Gas Transmission, LLC
Eastern Panhandle Expansion Project
Docket No. CP17-80-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Eastern Panhandle Expansion Project (Project), proposed by Columbia Gas Transmission, LLC (Columbia) in three counties and states (Fulton County, Pennsylvania; Washington County, Maryland; and Morgan County, West Virginia). Columbia proposes to construct, operate, and maintain approximately 3.4 miles of 8-inch-diameter pipeline and associated appurtenant facilities. The Project would provide an additional 46.6 million cubic feet per day (MMcf/d) of capacity for firm transportation service to markets in West Virginia through Mountaineer Gas Company's (Mountaineer) gathering system. Columbia states the purpose of the Project is to increase supply options and system reliability, and provide firm transportation service to its customers, which will provide service to markets in West Virginia.

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. National Park Service and the U.S. Environmental Protection Agency participated as cooperating agencies in the preparation of the EA. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis.

The FERC staff mailed copies of the EA to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and libraries in the Project area. 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 **February 26, 2018.**

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 (CP17-80-000) with your submission. The Commission encourages electronic filing of comments and has expert staff available to assist you at 202-502-8258 orFERCOnlineSupport@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 that no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.**

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC,** or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP17-80). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

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

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

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TECHNICAL ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
AQCR	Air Quality Control Region
amsl	above mean sea level
BA	biological assessment
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
CWA	construction work area
dBA	Decibels on the A-weighted scale
EA	Environmental Assessment
ECS	*Environmental Construction Standards*
EI	Environmental Inspector
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FERC Plan	FERC *Upland Erosion Control, Revegetation, and Maintenance Plan*
FERC Procedures	FERC *Wetland and Waterbody Construction and Mitigation Procedures*
FWS	United States Fish and Wildlife Service
g	Gravity
GHGs	Green House Gases
HCA	high consequence areas
Ldn	day-night sound level
Leq	24-hour equivalent sound level
MDE	Maryland Department of the Environment
MLV	mainline valve
MSHCP	Multi-Species Habitat Conservation Plan
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NFS	National Forest Systems
NGA	Natural Gas Act

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NOI	Notice of Intent
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
O_3	ozone
OEP	Office of Energy Projects
PADEP	Pennsylvania Division of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
PGA	peak ground acceleration
Project	Eastern Panhandle Expansion Project
PM_{10}	particles with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to 2.5 microns
POD	point of delivery
Secretary	Secretary of the Commission
SHPO	state historic preservation office(r)
SO_2	sulfur dioxide
SPCC	*Spill Prevention, Containment, and Control Plan*
USACE	United States Army Corps of Engineers
USDA-FS	United States Department of Agriculture - Forest Service
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	volatile organic compounds
WVDEP	West Virginia Department of Environmental Protection

A. PROPOSED ACTION

1.0 Introduction

On March 15, 2017, Columbia Gas Transmission, LLC (Columbia) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) in Docket No. CP17-80-000. Columbia seeks a Certificate of Public Convenience and Necessity (Certificate) under Section 7(c) of the Natural Gas Act (NGA) to construct, install, own, and operate a new gas pipeline in three counties and states (Fulton County, Pennsylvania; Washington County, Maryland; and Morgan County, West Virginia). Columbia's proposed project, referred to as the Eastern Panhandle Expansion Project (Project) would include constructing, operating, and maintaining about 3.4 miles of 8-inch-diameter natural gas transmission pipeline, three main line valves, and two new tie-in assemblies to service markets in West Virginia.

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 under Title 40 of the Code of Federal Regulations (CFR) Parts 1500 through 1508 (40 CFR 1500-1508), and the Commission's implementing regulations under 18 CFR 380.

The FERC is the lead federal agency for the preparation of this EA. The U.S. National Park Service (NPS) and the U.S. Environmental Protection Agency (EPA) are cooperating agencies that assisted us in preparing this EA because they have jurisdiction by law or special expertise with respect to environmental impacts associated with Columbia's proposal.

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

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

2.0 Purpose and Need

According to Columbia, the purpose of the Project is to increase supply options and system reliability. Columbia is seeking authorization to construct a new pipeline and

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

associated appurtenant facilities with an aggregate and approximate capacity of 47,500 dekatherms per day or 46.6 million cubic feet per day (MMcf/d). The Project would provide firm transportation service with receipts from Texas Eastern Transmission's (Texas Eastern) Marietta interconnect in Lancaster County, Pennsylvania to a proposed point of delivery (POD) meter station in Columbia's Market Area 25 located in Morgan County, West Virginia. The function of this pipeline is to deliver natural gas from the Texas Eastern pipeline to the POD meter station of the Mountaineer Gas Pipeline (Mountaineer). Columbia states that the Project directly meets the market demand growth that its system continues to experience and benefits both projected and existing shippers by creating an additional point of delivery and providing operational flexibility.

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

Columbia's proposed Project would cross beneath the Chesapeake and Ohio Canal National Historical (CHOH) Park lands along the Potomac River, approximate milepost (MP) 2.94 to MP 3.02 of the Project shown in Appendix A.[3] There is no NPS statutory authority that allows for the issuance of Right-of-Way permits for gas pipelines, unless such authorization is specifically contained in the park's enabling legislation. The CHOH Park does include this language in its enabling legislation, the Chesapeake & Ohio Canal Development Act in 1971 (P.L. 91-664, sec. 6). While the Project would cross beneath the CHOH Park, it is an administrative unit of the NPS, and where the alignment of the pipe intersects any portion of the Park or on land encumbered by a NPS scenic easement, the NPS would be required to issue a Right-of-Way permit. To help inform the decision to issue the Right-of-Way permit, NPS specific information and analysis has been added to this EA. Additional information on these management areas is included in section B.4.

3.0 Public Review and Comment

On April 25, 2017, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed Eastern Panhandle Expansion Project and Request for Comments on Environmental Issues* (NOI). The NOI was published in the Federal Register and was mailed to 161 interested parties, including federal, state, and local government representatives and agencies; elected officials; affected landowners; environmental and public interest groups; potentially interested Native American tribes; other interested parties; and local libraries and newspapers.

The Commission received comment letters from the U.S. Army Corps of Engineers, the NPS, Potomac Riverkeeper Network, Upper Potomac Riverkeeper, Waterkeepers

[3] Maps can be viewed at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170315-5224 in the "Accession Number" field

Chesapeake, Allegheny Defense Project, West Virginia Rivers, 1,761 signatories from the Chesapeake Climate Action Network, and 115 concerned citizens from the region. Several commentors expressed opposition to fossil fuels in favor of renewable energy; and raised concerns regarding health risks associated with natural gas sourced from hydraulic fracturing.

Our authority under NGA relates only to the interstate transportation of natural gas. FERC does not regulate exploration, production, or gathering of natural gas. Rather, those activities are under the purview of individual states. As such, a review and analysis of exploration, production, or gathering of natural gas is outside the scope of this EA.

Additionally, several commentors were concerned with the use of eminent domain. If an easement cannot be negotiated with a landowner and the Project has been certificated by the FERC, Columbia may use the right of eminent domain granted to it under Section 7(h) of the NGA and the procedure set forth under the Federal Rules of Civil Procedure (Rule 71A) to obtain the right-of-way and extra workspace areas. However, a court would determine the level of compensation if a Certificate is issued. In either case, the landowner would be compensated for the use of the land. Eminent domain would not apply to lands under federal ownership. The potential use of eminent domain, however, is also outside the scope of the environmental review within this EA.

Additionally, comments regarding Mountaineer were submitted. Mountaineer is subject to state jurisdiction and would be non-jurisdictional to the FERC. Consequently, Mountaineer is not part of the proposed action considered in this EA. However, available resource impacts are discussed in the related facilities section of the EA to inform stakeholders and decision makers.

We received comments recommending that an Environmental Impact Statement (EIS), rather than an EA, be prepared to assess the impacts of the Project. This EA addresses the impacts that could occur on a wide range of resources if the Project were approved and constructed and concludes that the impacts associated with the Project are limited in scope and could be sufficiently mitigated to support a finding of no significant impact. Consequently, an EA is appropriate and sufficient for disclosing the impacts of the actions requested in Columbia's application.

The environmental comments received are summarized below and addressed, as applicable, in relevant sections of this EA, as shown in table 1.

Table 1 Issues Identified During Public Scoping	
Issue	EA Section Addressing Issue
Air quality, greenhouse gases, and climate change	section B.6
Aesthetics	section B.4.3
Cultural resources	section B.5
Cumulative impacts	section B.8
Flooding	section B1.1
Historic trails	B.5
Horizontal directional drill	sections A.7.2 and B.1.1
Karst	section B.1.1
Land use, recreation, and visual impacts	section B.4
Project purpose and need	section A.2
Safety	section B.7
Soils	section B.1.2
Surface water, groundwater, and wetlands	section B.2
Threatened and endangered species	section B.3.3
Vegetation and wildlife	section B.3
Water supplies	section B.2.1

4.0 Proposed Facilities

Columbia proposes to construct a 3.4-mile-long, 8-inch-diameter pipeline with a maximum allowable operating pressure (MAOP) of 936 pounds per square inch gauge (PSIG). The pipeline begins at Milepost (MP) 0.00 at an interconnection at Columbia's 1804 20-inch-diameter and 10240 24-inch-diameter existing pipelines in Fulton County, Pennsylvania. The pipeline alignment extends through Washington County, Maryland, would cross beneath the Potomac River by horizontal directional drill (HDD), and connects to a proposed POD in Morgan County, West Virginia. The proposed POD is associated with the previously discussed non-jurisdictional Mountaineer natural gas gathering line.

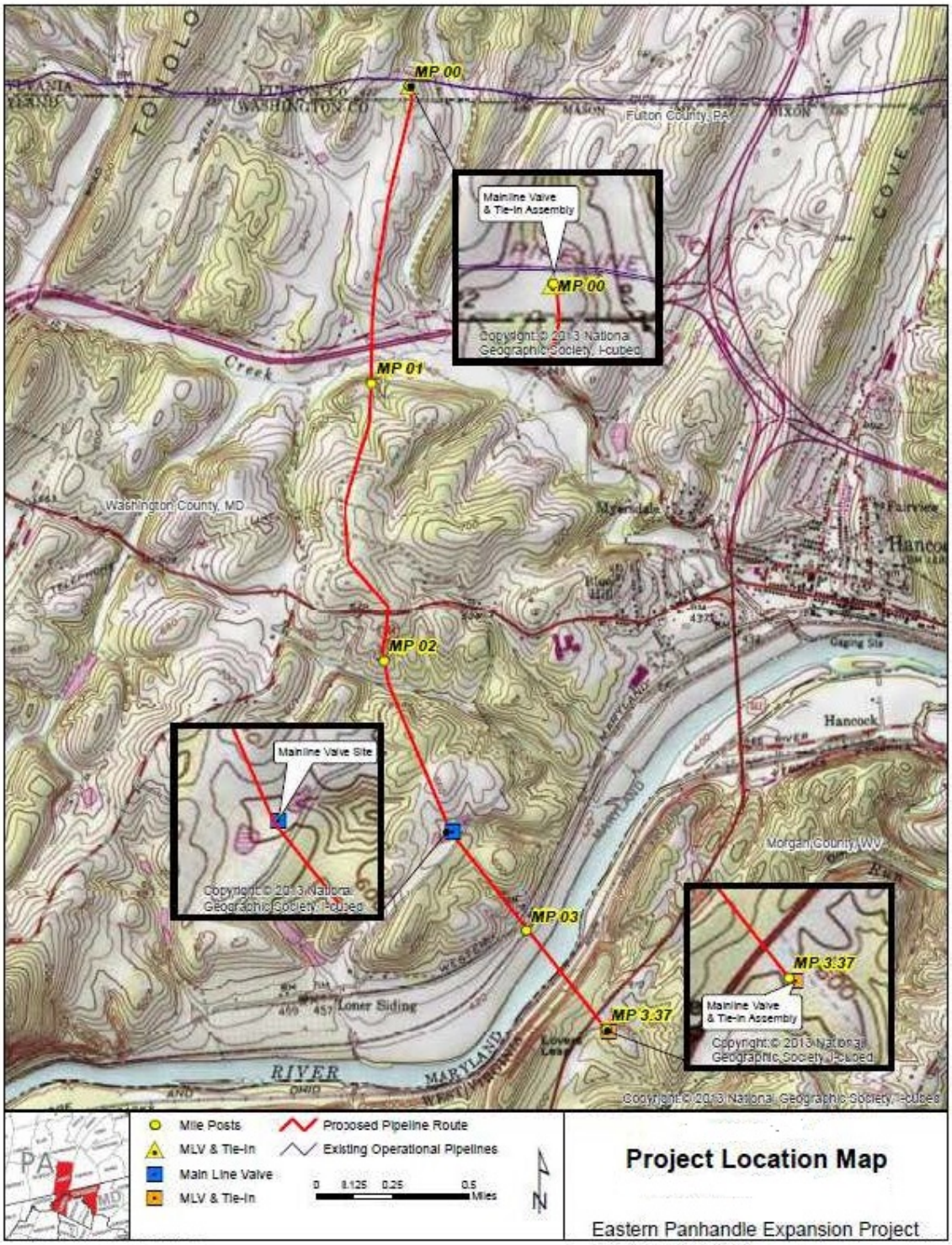
The Project also includes the installation of aboveground facilities associated with pipeline facilities, including three mainline valves and two tie-in assemblies which include bi-directional pig[4] launcher and receivers. One tie-in assembly and one mainline valve would be installed at the interconnection of Columbia's 1804 and 10240 pipelines in Fulton County. One tie-in assembly and one mainline valve would be installed at the interconnection with the Mountaineer POD site located in Morgan County. The third

[4] A pipeline "pig" is a device that internally cleans or inspects the pipeline. A pig launcher/receiver is an aboveground facility where pigs are inserted into or retrieved from the pipeline.

mainline valve would be installed at approximate MP 2.53 associated with the crossing of a CSX Railroad line. The locations of the pipeline and associated facilities are depicted in figure 1 and a map of the pipeline and aboveground facilities are included in appendix A. Columbia would also install an impressed current cathodic protection system along the proposed pipeline right-of-way with ground beds located perpendicular to the right-of-way. Following construction, Columbia would retain a 30-foot-wide ground bed area as permanent facilities equating to about 3.8 acres in Washington County.

Minor alignment shifts or additional temporary workspace may be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to construction, safety, engineering, landowner, and/or environmental concerns. All such alignment shifts or workspace needs would be subject to review and approval by FERC and the other permitting agencies prior to construction, as appropriate.

Figure 1


MP 00
Fulton County, PA
Mainline Valve & Tie-In Assembly
CMP 00
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MP 01
Washington County, MD
MP 02
Mainline Valve Site
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MP 03
Morgan County, WV
MP 3.37
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Mile Posts
MLV & Tie-In
Main Line Valve
MLV & Tie-In
Proposed Pipeline Route
Existing Operational Pipelines
0 0.125 0.25 0.5 Miles
N
Project Location Map
Eastern Panhandle Expansion Project

5.0 Land Requirements

The land requirements for the Project include the temporary construction right-of-way, additional temporary workspace (ATWS) areas, permanent right-of-way, temporary and permanent access roads, and a contractor staging area. Columbia would maintain the new permanent right-of-way, permanent access roads, and minor aboveground facilities.

Construction of the Project would result in both temporary and permanent land disturbance. Following construction, land affected during construction would be restored to preconstruction contours, except for permanent roads and minor aboveground facilities needed for operations of the pipeline. The proposed mainline valves would be operated within the 50-foot-wide permanent easement. The tie-in assemblies are located at the beginning and end of the pipeline and encompass an approximate 100-foot by 145-foot (0.3 acre) permanent right-of-way. The mainline valves and tie-in assembly workspaces for these minor aboveground facilities are located within the workspace for the pipeline. Land requirements for construction and operation of the Project are summarized in table 2.

Table 2
Land Requirements for Pipeline Facilities

Workspace	Land Affected during Construction (acres)[a,b,c]	Land Affected during Operation (acres)[a,b]
Fulton County, Pennsylvania:	2.5	1.3
Washington County, Maryland:	54.4	23.0
Morgan County, West Virginia:	4.2	1.6
Total:	**61.1**	**25.9**

Notes:
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 Based on a 75-foot-wide construction right-of-way and a 50-foot-wide operational right-of-way.
c Land affected during construction includes both temporary and permanent work areas.

5.1 Pipeline Facilities

The land requirements for the construction of the 8-inch-diameter pipeline consist of temporary and permanent right-of-way needed for construction, as well as long-term operation and maintenance of the pipeline. The width of the total construction right-of-way would be 75 feet, with a 50-foot-wide permanent right-of-way, centered on the pipeline following construction for operation of the pipeline. Areas disturbed during construction would be restored in accordance with the Project's Environmental Construction Standards[5] (ECS), agency requirements and landowner stipulations, except for permanent roads and minor aboveground facilities. The Project ECS incorporates the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody*

[5] http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170315-5224 in the "Accession Number" field

Construction and Mitigation Procedures (Procedures), with some modification, which is described in section B.2.4.

Permanent right-of-way would be maintained in an herbaceous state during operation of the pipeline. Location of pipeline facilities are detailed on the topographic map in appendix A

5.2 Aboveground Facilities

The Project would not require modifications to any existing natural gas aboveground facilities. No new compressor stations or modifications to existing compressor facilities would be necessary for the Project.

The Project includes the installation of minor aboveground facilities associated with pipeline facilities, including three mainline valves and two tie-in assemblies which include bi-directional pig launchers and receivers.

Table 3 provides a summary of the aboveground facilities by MP within each township/town, county and state.

Table 3
Summary of Aboveground Facilities

Facility	State	County	Municipality	MP
MLV and Tie-in Assembly	Pennsylvania	Fulton County	Bethel Township	0.00
MLV	Maryland	Washington County	Hancock	2.53
MLV and Tie-in Assembly	West Virginia	Morgan	Berkeley Springs	3.37

Key:
MLV – mainline valve
MP - milepost

5.3 Access roads

The Project proposes constructing eight access roads. The five permanent access roads and three temporary access roads are shown on the maps in appendix A. The temporary access roads would be used for constructing the pipeline facilities only. Once temporary access roads are no longer necessary, they would be returned to their as-found condition or better, subject to provisions of applicable permits and landowner agreements. Access roads would be designed and constructed in accordance with local and state standards and codes (e.g., with respect to specifications, materials, adequate drainage). The Project also proposes constructing two new permanent access roads to access the right-of-way during construction and operation. The three other permanent access roads would utilize existing public roadways with minor improvements such as grading or gravel replacement.

5.4 Contractor Staging Area

One 6.6-acre temporary contractor staging area, located in Washington County, would be required during construction for office trailers, parking, vehicle maintenance and storage of materials and equipment. The contractor staging area is an existing rock quarry and no improvements are anticipated. Following construction, the contractor staging area would be restored to pre-construction conditions, in accordance with any landowner stipulations.

5.5 Cathodic Protection

Columbia would install an impressed current cathodic protection system along the proposed pipeline right-of-way. Based on preliminary design, the system is proposed to include three ground beds. The ground beds would contain arrays of sacrificial anodes to provide a path with low resistance to ground. The ground beds would be 50-feet-wide and located perpendicular to the permanent right-of-way. As previously mentioned, Columbia would retain a 3.8-acre ground bed area as a permanent facility in Washington County.

5.5 Additional Temporary Workspace

ATWS is needed at locations requiring additional excavation; soil stockpiling; or staging of additional equipment and/or materials. Examples include:

- road and railroad crossings;
- wetland and waterbody crossings;
- HDD workspace;
- areas with steep slopes (greater than 25 percent) and side hills;
- areas requiring topsoil segregation (e.g., agricultural lands);
- equipment turn-arounds; and
- equipment and material staging areas.

The size and configuration of an ATWS is dependent upon its purpose as well as the existing site conditions at each proposed work location. The Project proposes to use about 38 separate ATWS covering a total of about 12.6 acres.[6]

6.0 Construction Schedule and Workforce

Columbia anticipates commencing construction in March 2018 subject to the receipt of necessary permits and approvals. Columbia anticipates that all facilities would be placed in-service on or before November 2018. Restoration activities would continue after the Project is placed in-service and will continue until disturbed areas are stabilized in accordance with the Project's ECS and applicable permit requirements.

[6] Maps can be viewed at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20170315-5224 in the "Accession Number" field

Columbia anticipates construction of the proposed pipeline would be accomplished using one construction spread and one mini-spread with a peak temporary workforce of about 60 workers. It is anticipated that Columbia would not need to hire any permanent workers for operation of the pipeline facilities.

7.0 Construction, Operation, and Maintenance Procedures

The Project would be constructed, operated, and maintained in accordance with applicable requirements defined by United States Department of Transportation (USDOT) regulations in 49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards; the Commission's Siting and Maintenance Requirements in 18 CFR 380.15; and other applicable federal and state safety regulations. During the performance of work, contractors would comply with the Minimum Federal Safety Standards adopted by the USDOT 49 CFR 192, as well as Columbia's corporate construction and inspection specifications and procedures.

To avoid, minimize, and mitigate effects of construction, Columbia would implement the procedures and measures contained in the Project's ECS.

7.1 Pipeline Construction Procedures

Columbia developed its ECS as its base environmental standards document that provides the minimum requirements which must be followed by all personnel working on Columbia construction, operation, and maintenance activities. The ECS includes Columbia's standard construction procedures as well as the standards specific to the Project area. The ECS provides Columbia personnel and contractors with instructional information to conduct work in a safe manner that minimizes impacts on stream and wetland ecosystems, wildlife habitat, agricultural land, cultural resources, and the human environment.

Construction of the proposed pipeline would follow industry standard practices and procedures as described below. Construction involves a series of discrete activities typically conducted in a linear sequence. These include survey and staking; clearing and grading; pipe stringing, bending, and welding; trenching; lowering-in and backfilling; hydrostatic testing; final tie-in; commissioning; and right-of-way cleanup and restoration.

Columbia would employ conventional overland construction techniques where the Project is in upland areas. In the typical pipeline construction scenario, each construction spread would proceed along the pipeline rights-of-way in one continuous operation from staking to backfilling and final grading. The process would be coordinated to minimize the total time an individual tract of land is disturbed to the extent practicable. Prior to beginning ground-disturbing activities, Columbia's construction contractor would coordinate to have existing underground utilities (i.e., cables, conduits, and pipelines)

identified and flagged. Excavation near foreign utilities would begin only after completing appropriate utility identification procedures.

Surveying and Staking

Before the start of construction, land surveyors would stake the pipeline centerline, approved construction workspace limits, and the location of approved access roads. Avoidance areas such as wetland and waterbody boundaries, cultural resource sites, and other environmentally sensitive areas would be marked with appropriate fencing or flagging. The centerline for the pipeline would be marked at 100-foot intervals, at known foreign utility line crossings, and at points of intersection. The contractor would cut and brace fences along the right-of-way in accordance with landowner agreements. Affected landowners would be notified before preconstruction survey and staking are conducted.

Clearing and Grading

The construction work area would be cleared to remove brush, trees, roots and other obstructions including large rocks. Crops and other non-woody vegetation may be mowed and some vegetation may be left in place to reduce the potential for soil erosion. Timber removal would be minimized to the extent feasible. Timber would be cut and felled into the approved construction right-of-way to prevent off right-of-way damage to adjacent resources. Merchantable timber may be limbed, cut and removed from the right-of-way or stacked for the landowner along the edge of the right-of-way in accordance with landowner agreements. Merchantable and non-merchantable timber may be disposed of by placing it in select locations off the right-of-way with landowner approval and where applicable surveys have been completed. However, the disposal must result in no adverse environmental impact.[7] Equipment stacking the wood would remain within the approved construction work area. Cleared vegetation and stumps would either be burned, chipped (except in wetlands), hauled offsite to a commercial disposal facility or set aside for beneficial uses such as construction of off-road vehicle barriers (if requested by the landowner). No chips, mulch or mechanically cut woody debris would be stockpiled in wetlands and no woody debris would be disposed of in wetlands or in agricultural areas. Burning would be allowed only where the contractor has acquired all applicable permits and approvals (e.g., agency and landowner) and in accordance with state and local regulations, and only with site-specific approval from Columbia; additionally, burning would be conducted in accordance with the ECS and applicable permit conditions.

The clearing crew and related equipment, as well as equipment necessary for installation of equipment crossings, would be allowed a single pass through streams prior to installation of temporary equipment crossings (bridges) unless restricted by other federal, state or local agency requirements. A fence crew, typically operating in conjunction with

[7] *Upland Erosion Control, Revegetation, and Maintenance Plan*, Disposal of materials for beneficial reuse must not result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

the clearing crews, would cut and brace fences and install temporary gates along the route in accordance with landowner agreements to control livestock and limit public access. Avoidance areas would be fenced to prevent disturbance from construction activities.

Following clearing, the construction work area would be graded where necessary to provide a level work surface to create a safe working area, accommodate pipe-bending equipment and allow the operation and travel of construction equipment. More extensive grading would be required in steep side slope or vertical areas and where necessary to prevent excessive bending of the pipelines.

Topsoil would be segregated in accordance with the ECS. The depth of topsoil removed would depend upon soil conditions and landowner requests or land managing agency requirements. In accordance with the Project's ECS, and in areas where topsoil segregation is required, Columbia would segregate 12 inches of topsoil in deep soils (more than 12 inches of topsoil) and the entire topsoil layer in shallow soils (less than 12 inches of topsoil). Segregated topsoil would be placed on the edge or edges of the construction right-of-way. If the ground is relatively flat and does not require topsoil segregation or grading, rootstock would be left in the ground to facilitate restoration of the right-of-way.

Typically, topsoil would be segregated from subsoil in non-saturated wetlands, cultivated or rotated croplands, managed pastures, hayfields, residential areas and in other areas requested by the landowner or land managing agency unless Columbia is instructed by a landowner or land managing agency not to do so or agreements are established to allow for the importing of topsoil in accordance with the ECS. Columbia would segregate topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil), depending upon landowner requests and the type of terrain being crossed (e.g., side slope construction). In wetlands, Columbia would strip topsoil from the ditch line only.

In areas disturbed by grading, and as required by the ECS, temporary erosion and sediment controls would be installed within the construction work area to minimize erosion. These erosion and sediment controls would be inspected and maintained throughout the construction and restoration phases of the project, as appropriate, and as required by the Project's ECS. Natural drainage would be preserved to the extent practical.

Stringing

Pipe would be moved to the Project area by rail or truck and placed in the contractor staging areas or transported directly onto the right-of-way. Individual joints of pipe typically averaging between 40- and 42-feet-long would be trucked from the contractor staging areas to the construction right-of-way. Trucks or other equipment would travel along the right-of-way and lay or string the individual joints parallel to the centerline of the trench so they are easily accessible to construction personnel. In areas of steep topography, the pipe would be staged at the top or bottom of the hill in approved work areas. The joints are usually strung on the working side of the trench for bending, welding, coating and lowering-in operations and the associated inspection activities.

Trenching

Trenching, which involves excavating a ditch for the pipeline, would be conducted using track-mounted backhoes, rotary trenching machines or other similar equipment. Trench spoil would be deposited adjacent to the trench within the construction work area and adjacent to the topsoil pile. The depth of the trench may vary depending on land use or permit requirements. The trench would be deep enough to provide a minimum of three feet of cover over the pipeline as required by Title 49 CFR Part 192 of the USDOT regulations. At least 12 inches of clearance would be maintained when crossing foreign lines. Additional cover may be required at road crossings and railroad crossings in accordance with applicable regulations. At waterbody crossings, the minimum depth of cover is 48 inches in normal soils and 24 inches in consolidated rock. The bottom width of the trench would be sufficient to accommodate the pipeline. The width at the top of the trench would vary to allow the sides of the trench to be adapted to local conditions at the time of construction and to allow personnel into the excavation where necessary. If trench dewatering is necessary, it would be conducted in a manner that would not cause erosion or result in silt-laden water flowing into waterbodies or wetlands. Columbia would employ best management practices (BMPs) described in its ECS to minimize erosion during trenching operations and construction activities.

Any drain tiles and irrigation systems affected by construction would be restored per landowner agreements after pipeline installation. Existing permanent survey and reference monuments within the right-of-way would be protected during construction.

Bending and Welding

Pipe would be delivered to the construction area in straight sections and bent to conform to changes required for pipeline alignment and to conform to natural ground/trench contours. Bending of the sections would be performed by track-mounted hydraulic pipe-bending machines. Prefabricated sections of bent pipe would be required in certain locations where the required bends exceed the ability to be fabricated in the field.

After the pipe has been delivered to the Project site and bent to conform to the appropriate contours, it would be aligned and welded. As each weld is completed the pipe would be placed on supports adjacent to the trench. Each weld would be visually and radiographically inspected by qualified inspectors. Welding would be conducted in compliance with USDOT Title 49 CFR Part 192 and the latest edition of the American Petroleum Institute Standard 1104 Welding of Pipelines and Related Facilities. Welds that do not meet established specifications would be repaired or removed.

All pipe would be protected with an external coating designed to protect it from corrosion. Except for a small area at the end of the pipe joint, this coating is applied at the pipe mill before shipment to the site. After welding and inspection, girth welds would be coated with similar or compatible protective materials in accordance with required specifications. Before lowering-in, the pipe coating would be inspected for defects with

special attention given to all field applied coatings. All defects would be repaired prior to lowering-in.

In some locations, it may be necessary to provide negative buoyancy to the pipe by means of set-on concrete weights, concrete coating, pipe sacks and/or soil anchors. Set-on weights (i.e., concrete weights or pipe sacks) and concrete coating may be fabricated along the project route or at project contractor yards. No set-on weights or concrete coating fabrications would take place within 100 feet of waterbodies or wetlands without prior agency approval.

Lowering-in

Prior to lowering-in, the trench would be inspected to ensure it is free of rocks and other debris that could damage the pipe or its protective coating. The trench would also be checked for wildlife that may have entered the excavation. Dewatering may be necessary to inspect the bottom of the trench in areas where water has accumulated. If dewatering is required, it would be conducted in accordance with the ECS and applicable permits in a manner that will not cause erosion or result in silt-laden water flowing into a wetland or waterbody.

Side boom equipment (or equivalent) would be used to lift the pipe from the temporary supports and lower the pipe into the trench. If the bottom of the trench contains rock, the pipe may be lowered onto sandbags, support pillows or other suitable padding materials. Topsoil would not be used to pad the pipe. In areas where the excavated trench material may damage the pipe, the pipe would be protected with a protective rock shield wrap or by similar measures. The pipe would be placed in the ditch to conform to the alignment of the ditch and not damage the coating. As necessary, trench breakers (stacked earthen bags) would be installed in the trench around the pipe in steeply sloped areas to prevent movement of subsurface water along the pipeline in accordance with the ECS and/or specifications from applicable regulating agencies.

Backfilling

After lowering the pipe into the trench, the trench would be backfilled with material originally excavated from the trench using bladed equipment or backhoes. If the material excavated from the trench is rocky, the pipeline would be protected with a rock shield or covered with other suitable fill (i.e., crushed limestone rock or screened sand). Excavated rock would then be used to backfill the trench to the top of the existing bedrock profile in the trench. Additionally, excavated rock may be crushed and incorporated into fill or used as gravel to upgrade access roads. Any excess excavated materials or materials unsuitable for backfill would be spread evenly over the construction work area or disposed of at a licensed disposal facility. 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. Backfilling would occur to grade or higher to accommodate soil settling over the trench.

During backfilling, special care would be taken to minimize erosion, restore the natural ground contour and restore surface drainage patterns as close to preconstruction conditions as practical. To minimize the possibility of subsurface water flow on slopes, approved trench breakers would be placed across the trench prior to backfilling. When the trench crosses streams or wetlands, trench plugs may be used to minimize the flow of water from the intersected body into the trench.

Excavated rock including blast rock may be used to backfill the trench to the top of the existing bedrock profile. Excess rock may be used for beneficial uses such as construction of off-road vehicle barriers (if requested by the landowner) or would be hauled off site to a licensed disposal facility.

Hydrostatic Testing

Hydrostatic testing would be conducted in accordance with the requirements of the USDOT pipeline safety regulations, Title 49 CFR Part 192, Columbia's testing specifications, and applicable permit conditions to verify that the system is free from leaks and would provide the required margin of safety at the planned operating pressures. Individual sections of pipeline to be tested would be determined by water availability and terrain conditions. Water for hydrostatic testing would be obtained from municipal sources. As practicable, water would be transferred from one test section to another to reduce the amount of water that is required for testing. Prior to hydrostatically testing the pipeline, cleaning tools would be used to remove loose debris within the pipeline. If leaks are found the defect would be repaired and the section of pipe retested until all required specifications are met. After testing is completed, water would be discharged in accordance with applicable discharge permit requirements. Test water would be discharged into a well vegetated upland area adjacent to the construction work area in accordance with permit conditions and the ECS.

Final Tie-Ins

After hydrostatic testing, the final pipeline tie-ins would be completed and commissioning would commence. Commissioning involves activities to verify that equipment is properly installed and working, controls and communications systems are functional and the pipeline is ready for service. The pipeline would be cleaned, dried and inspected using in-line inspection tools (pigs) to detect anomalies in the pipe that may have been introduced during construction, and prepared for service by purging the line of air and loading the line with natural gas.

Cleanup, Restoration, and Revegetation

Construction work area cleanup and stabilization would commence within seven days of construction completion in an area, as weather permits. Every reasonable effort would be made to complete final cleanup (including final grading and installation of permanent erosion control devices) within timeframes required by permits, in accordance with landowner requests, or in compliance with the ECS.

All disturbed areas would be finish graded and any remaining construction debris would be collected and properly disposed of in compliance with applicable regulations. Contours would be restored to pre-existing conditions as closely as possible. Topsoil would be spread over the surface of the construction work area and permanent erosion controls would be installed. Revegetation measures would be implemented in accordance with the ECS and Project-specific erosion control plans approved by the appropriate agencies. Non-cropland would be revegetated in accordance with recommendations from state or local soil conservation authorities or as requested by the landowner.

At the time of restoration, pipeline markers would be located along the right-of-way and installed in accordance with Title 49 CFR Part 192. The pipeline markers would identify Columbia as the operator and include a list of telephone numbers for emergencies and inquiries. These facilities would generally be located at regular intervals adjacent to road crossings but within the permanent right-of-way. Periodic inspections of the right-of-way would be conducted throughout restoration in accordance with the ECS.

7.2 Special Pipeline Construction Procedures

In addition to the standard construction practices listed above, special construction procedures may be used to install the pipeline, as described below.

Trenchless Construction Methods

Columbia is proposing the use of two methods of trenchless construction: conventional horizontal bore and HDD. These techniques are proposed in order to reduce the impacts typically associated with using conventional (trenching) construction techniques.

To complete a conventional horizontal bore, an entry and exit pit on either side of the feature to be crossed is excavated to provide a working area for the equipment. A boring machine is lowered into one pit, and a horizontal hole is bored to a diameter equal to the diameter of the pipe (or casing, if required) at the depth of pipe installation. The pipe section is then pushed through the bore to the opposite pit. If additional pipe sections are required to span the length of the bore, they are welded to the first section of the pipe in the bore pit prior to being pushed through.

The HDD method is a process that allows for trenchless construction by drilling a hole below the depth of a conventional lay and pulling a prefabricated section of pipe through the hole. The method minimizes disturbance to the surface of the right-of-way between the entry and exit points of the drill and is sometimes used to avoid direct impacts on sensitive environmental features or areas that otherwise present difficulties for standard pipeline construction. The HDD method can provide certain advantages over typical construction methods, such as avoidance of surface disturbance, riparian and forested

wetland tree clearing, or in-stream construction where appropriate subsurface conditions exist. The HDD method is proposed for the crossing of the Potomac River.

For each HDD crossing, electric grid guide wires would be laid by hand on the ground along the pipeline drill path to create an electromagnetic sensor grid. The grid would be used by the HDD operator to steer the drill head during drilling. The sensor grid would be fabricated by stringing an insulated coil wire along either side of the drill path. The wire would be energized with a portable generator, which would create a magnetic field that can be used to track the drilling head. No ground or surface disturbing activities would be required for installation of the guide wires except for minor hand clearing of a one to two-foot-wide path for the wires in thickly vegetated areas. A permit would be required for any clearing or guide wire placement on NPS property.

A drill rig would be placed on the entry side of the HDD crossing and a small-diameter pilot hole would be drilled along a predetermined path beneath the waterbody. As drilling progresses, additional segments of drill pipe would be inserted into the pilot hole to extend the length of the drill. The drill bit would be steered and monitored throughout the process to maintain the designated path of the pilot hole. Once the pilot hole is complete, the hole would be enlarged using a series of reaming tools. The first reaming tool would be installed at the end of the drill string on the exit side of the pilot hole, and then drawn back to the drill rig to enlarge the hole. Drill pipe sections would be added to the rear of the reamer as it advanced toward the rig, allowing a string of drill pipe to remain in the hole at all times. Several passes with progressively larger reaming tools would be required to enlarge the hole to a sufficient diameter to accommodate the pipeline. The final hole would be approximately 14 inches in diameter prior to the pipeline being installed.

During this process, drilling fluid consisting of bentonite clay and water would be circulated through the hole to power and lubricate the cutting bit, remove cuttings to the surface, and maintain the integrity of the hole. If any additives are required for the drilling fluid, Columbia would obtain permission from FERC and the applicable state regulatory agencies and verify they meet water quality standards. Water for the mixture would be pumped from the municipal source to the drill site through a hose or temporary network of irrigation-type piping or trucked in from a municipal source. Small pits would be dug at or near the entry and exit points for the HDD to temporarily store the drilling fluid and cuttings. The fluid and cuttings would be pumped from the pits to an on-site recycling unit where the fluid would be processed for reuse.

The pipeline segment (also called a pull section) to be installed beneath the surface feature would be fabricated on the right-of-way or in approved ATWS on the exit side of the crossing while the drill hole is being established. Once assembled, the welds on the pull section would be inspected for defects and then coated with fusion-bonded epoxy (FBE). A sacrificial abrasion resistant overlay would be applied over the FBE coating for protection from abrasive materials that may be encountered as the pull section is installed. Prior to installation, the pull section would be hydrostatically tested prior to installation.

The pipe segment would be hydrostatically tested a second-time following installation with the remainder of the pipeline system. A steel bullhead would be welded onto the front end of the pull section to aid in pulling the pipe through the drill hole. After the hole is completed, the pull section would be attached to the drill string on the exit side of the hole and pulled back through the hole toward the drill rig.

Excess drilling fluid would disposed of at an appropriate facility. If water is left over from the drilling process, it would be discharged in accordance with applicable permits into a well-vegetated upland area or an energy dissipation/sediment filtration device, such as a geotextile filter bag or straw bale (weed-free) dewatering structure, at the site.

If an HDD crossing is successful, there are minimal impacts on the surface feature being crossed. If a natural fracture or weak area in the ground is encountered during drilling, an inadvertent return of drilling fluid to the environment could occur. Substrate consisting of unconsolidated gravel, coarse sand, or fractured bedrock could present circumstances that increase the likelihood of an inadvertent return. Depending on the orientation of the natural fracture or substrate, the drilling fluid may move laterally or vertically from the drill hole. If the drilling fluid moves laterally, the release may not be evident on the ground. For an inadvertent return to be evident on the surface there must be a preferential pathway extending vertically from the drill hole to the surface of the ground. The volume of fluid released in an inadvertent return is dependent on a number of factors, including the size of the pathway, the permeability of the geologic material, the viscosity of the fluid, and the pressure of the hydraulic drilling system. In order to minimize potential impacts of inadvertent releases of drilling fluids, Columbia would implement measures identified in the Project's HDD Contingency Plan (Appendix B). This plan describes procedures to be used to monitor, contain, and clean up any inadvertent releases of drilling fluid. It also identifies contingency measures to be implemented in the event that an HDD is unsuccessful.

We received approximately 70 comments that stated concerns about the HDD proposal. If a release occurs on land, including within a wetland, a small pit would be excavated at the release site to contain the spread of the fluid, and a pump would be used to transfer the fluid from the pit into a containment vessel. If an inadvertent return occurs in a waterbody it would be more difficult to contain because the fluid would be dispersed into the water and carried downstream. In this situation, an attempt would be made to plug the flow path by adding thickening agents to the drilling fluid, such as additional bentonite, cottonseed hulls, or other non-hazardous materials. Columbia would consult with and obtain permission from the FERC and the appropriate state regulatory agencies regarding the use of additives during the HDD (or conventional bore) process, and confirm that additives would not violate water quality standards.

Columbia's Environmental Inspector (EI) would monitor source waters along and near the drill path, such as seeps and springs, for inadvertent returns. Columbia would implement the measures identified in the HDD Contingency Plan to control and clean-up

the inadvertent return, test the water for water quality, and provide an alternate supply of water to affected landowners until the inadvertent return is remediated.

In most cases, horizontal directional drilling can continue during an inadvertent return. In the event of an inadvertent return into a wetland or waterbody, pumps would be stopped and cleanup would commence in accordance with the HDD Contingency Plan. In some situations, however, the HDD may fail due to refusal of the drill bit or collapse of the hole in non-cohesive, unstable substrate. In cases where drilling fails, construction would be completed using either a new drill path or an alternative crossing method, subject to review and approval of the Commission and receipt of all other required permits or authorizations for the crossing.

The site-specific crossing plan for the proposed Potomac River HDD[8] is provided in appendix C.

Waterbody Crossings

Only five waterbodies would be crossed by the pipeline right-of-way. Four of these would be crossed using an HDD. Columbia proposes to use conventional upland construction techniques to cross waterbodies if no flow is present at the time of the crossing. Equipment to complete dry-ditch crossings will be onsite as a contingency should stream flow begin during construction. In the event that flow returns in a waterbody where a dry open-cut crossing is proposed, construction would cease until the appropriate dry crossing method discussed below would be installed.

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

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

[8] http://www.ferc.gov. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 201700315-5224 in the “Accession Number” field

downstream turbidity during trenching by allowing excavation under relatively dry conditions.

Wetland Crossings

Construction of the Project would affect only four wetlands and impact less than one tenth of an acre. In general, Columbia would require a 75-foot construction right-of-way through wetlands to allow for equipment crossings and to safely perform construction. Where soils are unstable, temporary work surfaces would be installed including timber riprap or prefabricated timber mats. ATWS would be located a minimum of 50 feet from the edge of wetlands

Because little or no grading would occur in wetlands, restoration of contours would be accomplished during backfilling. Prior to backfilling, trench breakers would be installed, where necessary, to prevent subsurface drainage of water from wetlands. Where topsoil is segregated, the subsoil would be backfilled first followed by the topsoil. Topsoil would be replaced to the original ground level leaving a slight crown over the trench line for soil settlement. In areas where wetlands overlie rocky soils, the pipe would be padded with rock free soil or sand before backfilling with native bedrock and soil. Equipment mats, gravel fill, and/or geotextile fabric would be removed from wetlands following backfilling. Once revegetation is successful, temporary sediment barriers would be removed from the right-of-way and disposed of at an approved disposal facility.

Road Crossings

Construction across paved roads, highways, unpaved county roads, and railroads would be conducted in accordance with the ECS and requirements identified in road and railroad crossing permits or approvals. All two lane paved roads, highways, and railroads would be crossed by boring or HDD. Typically, there is little or no disruption to traffic at paved road, highway, or railroad crossings during these operations. ATWS would be required on both sides of the crossing. The size of the workspaces would be based on the size of the road crossing and other construction constraints.

One private driveway would be crossed using the open-cut method and then restored to preconstruction condition. Columbia would maintain existing access or provide alternative access so residents have ingress/egress to their homes.

For all road and railroad crossings, the pipeline is designed in accordance with USDOT regulations at Title 49 CFR Part 192, the American Society of Mechanical Engineers' code for gas transmission and distribution piping systems, and the American Petroleum Institute's Recommended Practice 1102 for steel pipelines crossing railroads and highways.

Roadway crossing permits would be obtained from applicable state and local agencies. Additionally, Columbia would obtain a permit from CSX for the crossing of the

railroad right-of-way. Permit conditions would ultimately dictate the day-to-day construction activities at road and railroad crossings.

The construction contractor would be required to develop a traffic management plan for its specific activities. Table 4 provides a list of road and railroad crossings along the Project and the proposed crossing methods.

Table 4
Public Roads and Railroads Crossed by Project

Road/Railroad	MP Crossing	Proposed Crossing Method	Surface Type	Type (Fed/State/Local/Private)
Fulton County, Pennsylvania				
None Identified				
Washington County, Maryland				
Creek Road	0.83	HDD	Asphalt	Local
US-68	0.87	HDD	Asphalt	Federal
Private Drive	1.48	Open Cut	Gravel	Private
State Route 144	1.80	Bore	Asphalt	State
Locker Road	2.58	HDD	Asphalt	Local
Berm Road	2.94	HDD	Asphalt	Local
Morgan County, West Virginia				
CSX Railroad	3.13	HDD	Ballast	Private
State Road 522	3.30	HDD	Asphalt	State

Key:
HDD – Horizontal Directional Drill
MP - milepost

8.0 Environmental Compliance Inspection and Monitoring

Columbia would assign at least one EI to the Project, with additional inspectors as necessary to monitor environmental compliance. The role of the EI would be to verify compliance with the environmental mitigation and construction procedures included in permits issued for the Project. The EI would be required to adhere to the ECS. Columbia would maintain sufficient oversight of construction, stabilization, and restoration activities via the EI; if additional inspectors are required for specific areas or situations, Columbia would provide additional inspectors as necessary.

In addition to Columbia's EIs, Columbia would require the construction contractors to provide at least one Environmental Foreman. The Environmental Foremen would be responsible for the contractor's efforts to correctly install and maintain environmental controls as well as implementing specific controls for construction in environmentally sensitive areas. Environmental Foremen would be available at all times during the duration of the Project and have a sufficient number of employees to implement the Project's compliance standards.

In addition, Commission staff would oversee environmental compliance, including performing periodic inspections, throughout construction and restoration of the Project.

Columbia would train company and contractor personnel to familiarize them with environmental requirements and other conditions. Columbia would be responsible for implementation of environmental requirements during construction of all Project facilities. Columbia would include environmental compliance, training, and inspection information with the Project's Implementation Plan that would be filed with FERC prior to construction.

Columbia would incorporate relevant environmental requirements and project-specific environmental mitigation plans into the construction documents for the Project. This step notwithstanding, the contractor selected for the Project would be required to comply with all relevant requirements regardless of whether they were described in bid documents or discussed at the meeting. During construction, if the construction contractor does not comply with environmental requirements, Columbia would direct the contractor to comply and may take other corrective actions as necessary, including issuing stop-work orders, until the contractor meets the environmental requirements.

During the performance of work, construction contractors would comply with the Minimum Federal Safety Standards adopted by the USDOT under the Natural Gas Pipeline Safety Act of 1968, as well as additional Columbia standards. Columbia would include copies of relevant environmental permits and approvals in the construction bid packages and contracts. Contractors would be required to become familiar with all permits and licenses obtained by Columbia for the Project.

9.0 Operations and Maintenance

Operation of the facilities would be performed in accordance with Columbia's procedures and commitments. Maintenance of the proposed facilities would be performed in accordance with Columbia's ECS.

10.0 Non-jurisdictional Facilities

Under section 7 of the NGA, FERC is required to consider, as part of its decision to authorize interstate natural gas facilities, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. As such, FERC has no authority or jurisdiction over the siting, permitting, licensing, construction, or operation of these facilities. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities (e.g., a power plant at the end of a FERC-jurisdictional pipeline), or they may be related components that would be constructed and operated with the proposed facilities (e.g., a meter station or lateral pipeline connection constructed by a customer of the pipeline).

Mountaineer intends to construct and operate approximately 23 miles of 10-inch-diameter natural gas pipeline in Morgan and Berkeley Counties, West Virginia known as

the Mountaineer Eastern Panhandle Expansion Project. Columbia's Eastern Panhandle Project would interconnect with Mountaineer's proposed gas pipeline. We include in this section the best available information regarding the overall resource-specific impacts for the Mountaineer Project as a whole. Although the Commission has no authority to approve or deny the Mountaineer Project and no ability to require any avoidance or minimization of related impacts, we provide information here to inform stakeholders and decision-makers.

As described previously, the Mountaineer Project consists of constructing and operating approximately 23 miles of 10-inch diameter natural gas pipeline in Morgan and Berkeley Counties, West Virginia. Only a portion of the Mountaineer Project would be located in the same HUC-12 watershed. Work is expected to begin in 2018. Columbia's Eastern Panhandle Expansion Project would interconnect with Mountaineer's proposed gas pipeline. The Mountaineer project is also subject to the authority of the USACE, FWS, and the EPA. The USACE is the lead federal agency and will ensure that all requirements of the Endangered Species Act are met.

The Mountaineer Project would be constructed using conventional industry construction techniques. The total disturbance would be approximately 248.7 acres and would result in temporary impacts to 4,199 linear feet of 54 streams and 0.47 acre of 14 wetlands. No permanent impacts to wetland and waterbodies are proposed as part of the Mountaineer Project; each single and complete crossing would affect less than 0.1 acre. Also, the Mountaineer Project would require the removal of about 142.8 acres of forest.

11.0 Permits, Approvals, and Regulatory Consultation

Table 5 lists the federal and state permits required to construct and operate the Project.

Table 5
Permits, Consultations and Approvals Applicable to the Project

Agency	Permit/Approval/ Consultation	Submittal/Consultation Initiated Date (Anticipated)	Approval Date (Anticipated)
Federal			
Federal Energy Regulatory Commission (FERC)	Section 7 of the Natural Gas Act, Certificate of Public Convenience and Necessity	March 15, 2017	Pending
U.S. Department of Army, Corps of Engineers (USACE), Baltimore District, Maryland-Northern Section	Section 404 of the Clean Water Act, Joint Application	March 15, 2017	(January 2018)
U.S. Department of Interior, Fish and Wildlife Service, Pennsylvania Field Office	Section 7 of the Endangered Species Act, Online Pennsylvania Natural Diversity Inventory (PNDI)	February 8, 2017	February 8, 2017
U.S. Department of Interior, Fish and Wildlife, Maryland Field Office	Section 7 of the Endangered Species Act	March 1, 2017	August 14, 2017
U.S. Department of Interior, Fish and Wildlife Service, West Virginia Field Office	Section 7 of the Endangered Species Act	March 1, 2017	August 10, 2017
U.S. Department of the Interior, National Park Service (NPS), National Capital Regional Office	Special Use Permit (SUPA) for survey access on NPS land (C&O Canal)	September 26, 2016	March 7, 2017

Table 5 Permits, Consultations and Approvals Applicable to the Project			
Agency	**Permit/Approval/ Consultation**	**Submittal/ Consultation Initiated Date (Anticipated)**	**Approval Date (Anticipated)**
U.S. Department of the Interior, National Park Service (NPS), National Capital Regional Office	SUPA, Scenic Easement Right-of-Way permit, and Right-of-Way permits on NPS land (C&O Canal)	June 5, 2017	(February 2018)
	Application for Permit for Archeological Investigations	September 22, 2016	March 6, 2017
	American Battlefield Protection Program, Battle of Hancock Potential National Register of Historic Places (NRHP) Review	November 11, 2016	(January 2018)
Pennsylvania			
Pennsylvania Department of Environmental Protection (PADEP), South Central Regional Office	Chapter 105 General Permit 11 for culvert replacement	March 30, 2017	August 31, 2017
Pennsylvania Department of Environmental Protection (PADEP), South Central Regional Office	Section 401 Water Quality Certification	June 26, 2017	(January 2018)
Pennsylvania Museum Historical Commission	Section 106 of the NHPA Consultation	September 22, 2016	Archeological March 27, 2017 Architectural April 3, 2017
Pennsylvania Fish and Boat Commission (PFBC)	PA T&E Species Consultation and Clearance, Online Pennsylvania Natural Diversity Inventory (PNDI)	February 8, 2017	February 8, 2017
Pennsylvania Game Commission (PGC)	PA T&E Species Consultation and Clearance, Online Pennsylvania Natural Diversity Inventory (PNDI)	February 8, 2017	February 8, 2017
Pennsylvania Department of Conservation and Natural Resources (DCNR), Bureau of Forestry (BoF)	PA T&E Species Consultation and Clearance, Online Pennsylvania Natural Diversity Inventory (PNDI)	February 8, 2017	February 8, 2017

Table 5 Permits, Consultations and Approvals Applicable to the Project			
Agency	**Permit/Approval/ Consultation**	**Submittal/Consultation Initiated Date (Anticipated)**	**Approval Date (Anticipated)**
Maryland			
Maryland Department of the Environment (MDE)	General Waterway Construction Permit for Geotechnical Bore in Potomac River	October 19, 2016	December 9, 2016
Maryland Department of the Environment (MDE)	Section 404 of the Clean Water Act, Joint Application w/USACE	March 15, 2017	(January 2018)
	Discharge Permit No. 11-HT	December 2017	(March 2018)
Maryland Historical Trust	Section 106 of the NHPA Consultation	September 22, 2016	July 25, 2017
Maryland Department of Natural Resources (MDNR)	MD T&E Species Consultation and Clearance	January 30, 2017	March 8, 2017
West Virginia			
West Virginia Division of Culture and History	Section 106 of the NHPA Consultation	April 7, 2017	October 11, 2017
West Virginia Department of Environmental Protection (WV DEP)	Oil and Gas Construction Stormwater General Permit including Stormwater Pollution	April 7, 2017	August 2, 2017
	Hydrostatic Testing General Permit	December 2017	(July 2018)
County			
Fulton County, Pennsylvania			
Fulton County Soil Conservation District	Erosion and Sediment Control General Permit – 2 (ESCGP-2)	April 7, 2017	Redacted April 13, 2017
Washington County, Maryland			
Washington County Soil Conservation District	Erosion and Sediment Control Plan Review and Approval	April 7, 2017	(January 2018)
Washington County Department of Planning and Zoning	Forest Conservation Plan Review Concurrence/Clearance	April 7, 2017	(January 2018)

B. ENVIRONMENTAL ANALYSIS

This analysis describes the condition of the existing natural and human environment and the potential impacts (and affects) on it resulting from construction and operation of the Project. Constructing and operating pipeline would result in temporary, short-term, long-term, and permanent impacts on the environment. A temporary impact generally occurs during construction with the resource returning to pre-construction condition immediately after restoration or within a few months. A short-term impact could last for up to 3 years following construction. A long-term impact would last more than 3 years, but the resource affected would eventually return to its pre-construction condition. A permanent impact would modify a resource to the extent that it would not return to its pre-construction condition. For each resource, our analysis collectively addresses the direct and indirect effects of the proposed action. Cumulative impacts are discussed in section B.8 of this EA, and alternatives are discussed in section B.9.

To minimize impacts on the environment, Columbia would implement numerous impact avoidance, minimization, and mitigation measures as described in its ECS and other Project plans. As appropriate, measures identified in these plans are included in our analysis.

1.0 Geology and Soils

1.1 Geology

The Project is located in the Ridge and Valley Physiographic Province between South Mountain in Washington County and Dans Mountain in western Allegany County, which contains strongly folded and faulted sedimentary formations. The Potomac River flows in the Great Valley and is formed on Cambrian and Ordovician limestone and dolomite. The Project is underlain by the Marcellus Formation (part of Millboro Shale) and Needmore Shale (part of Onondaga Group); Oriskany Sandstone and Helderberg Group; Tonoloway Limestone Wills Creek Shale and Bloomsburg Formation; McKenzie Formation; and Bloomsburg and Mifflintown Formations of the Ridge and Valley Physiographic Province of West Virginia, Maryland and Pennsylvania; and are from the Silurian and Devonian Period.

Joints in these formations have a platy pattern, are steeply dipping, well developed, open and highly fractured. Some solution-channel openings as voids and caves can be expected in these formations. Topographically, elevations above mean sea level (AMSL) across the Project area range from approximately 402ft to 691ft AMSL. The Potomac River crossing of the Project has a steep eastern river bank, and there is rolling hill terrain along the remainder of the proposed pipeline footprint.

Mineral Resources

Columbia investigated the possible presence of wells, mines or mining areas. Historically, this region does not contain significant mineral resources. According to a map created by the Maryland Department of Environment's (MDE), Maryland Bureau of Mines and Coal Division, Washington County has one non-coal surface mine on record (Hancock Quarry) in the vicinity of the Project area; however, publicly available information indicates that it is closed (MDE, 2017). Further research indicated that three other quarries, in addition to the Hancock Quarry, are located in the vicinity of the Project.

The Oriskany Sandstone, deposited as nearly pure silica in areas, has been used as a source of glass sand and is mined in the Berkley Works Quarry at Berkeley Springs, Morgan County, West Virginia.

Table 6 provides proximity distances of known mineral resources in the vicinity of the Project.

Table 6
Mineral Resources in Vicinity of Project

Milepost	Operation	Distance/Direction from Edge of Construction Workspace (feet)
Fulton County Pennsylvania		
0.00	Charlton Quarry	13,040 feet / Northwest
Washington County, Maryland		
0.98	Hancock Quarry	4,420 feet / West
0.48	Barton Deposit (Iron)	3,616 feet / West
Morgan County, West Virginia		
3.34	Berkley Works Quarry (glass sand)	1,410 feet / Southwest
Reference: US Geological Survey, Mineral Resources Data System (USGS, 2017b)		

Information obtained from the Environmental Data Resource report (EDR 2017), Maryland Geological Survey (MGS, 2017), Pennsylvania Department of Conservation and Natural Resources (PADCNR), West Virginia Department of Environmental Protection (WVDEP), and West Virginia Geological and Economic Survey (WVGES) suggest that the Project area does not contain wells that produce oil and gas.

Geologic Hazards

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

Seismicity

The United States Geological Survey (USGS) maintains a database containing information on faults and folds in the United States believed to be sources of earthquakes greater than magnitude 6 in the past 1.6 million years (USGS, 2006). The nearest areas of potential concern are the Central Virginia Seismic Zone, the Eastern Tennessee Seismic Zone, and the Giles County Seismic Zone, all of which are located more than 100 miles from the Project area.

Earthquake activity in the three counties that the pipeline would transect is very low. The USGS probabilistic seismic hazard mapping model characterizes potential earthquake ground shaking from future earthquakes. The model allows for the calculation of peak ground acceleration (PGA) for various return periods and for specific locations. The Project area has a PGA of 0-4 percent gravity (g) with a 2 percent probability of exceedance in a 50-year period. For a 10 percent probability of exceedance in a 50-year period, the entire corridor has a PGA of 0-2 percent g (USGS, 2014a, b).

Maps generated by MGS, PADCNR, and WVGES indicate that there have been four earthquakes historically on record in these counties. All four earthquakes occurred between 1962 and 1978 and have ranged from 2.8 to 3.6 on the Richter scale. The infrequent occurrence of the earthquakes and the low magnitude indicates there is a very low risk of earthquakes causing damage in the Project area.

Soil liquefaction is a phenomenon often associated with seismic activity in which saturated, non- cohesive soils temporarily lose their strength and behave like a viscous liquid when subjected to forces such as intense and prolonged ground shaking.

Soil conditions necessary for liquefaction to occur would likely be present along the pipeline. However, due to the low potential for a seismic event that would cause strong and prolonged ground shaking, the potential for soil liquefaction to occur is very low. Overall, impacts on the Project related to seismic activity are not likely.

Landslides and Steep Slopes

Landslides involve the down slope movement of earth materials under a force of gravity due to natural or man-made causes. The Radbruch-Hall landslide incidence and susceptibility maps summarize geologic, hydrogeologic, and topographic data essential to the assessment of national environmental problems (Radbruch-Hall, 1982). Based on the Radbruch-Hall data, the proposed Project is located in areas with a high incidence and high susceptibility to landslides.

Where possible, Columbia would use special construction techniques in areas where the slope exceeds 15 to 30 percent. Pipe installation and construction activities across steep slopes would be similar to standard upland construction methods, but equipment would be tethered via winch lines to other equipment at the top of slopes. Equipment used to prepare

the construction corridor and excavate the trench would be secured with a series of winch tractors to maintain control of the equipment and provide an additional level of safety.

Permanent trench breakers consisting of sandbags, gravel, cement, cement-filled sacks, or other approved materials would be installed within the ditch over and around the pipe in areas of steep slopes to reduce water channeling along the pipeline. Placement of permanent slope breakers and trench breakers would be in accordance with the ECS and project-specific Erosion and Sedimentation Control (E&SC) Plan. During restoration, seed would be applied at an increased application rate to enhance rapid stabilization. In rugged terrain, additional types of temporary erosion controls including anchored erosion control matting may be required.

If a landslide hazard is identified during construction, Columbia would implement mitigation measures intended to stabilize the area. These techniques may include both temporary and permanent erosion control measures and other best management practices as outlined in Columbia's ECS. Additional mitigation measures could involve burial of the infrastructure below the potential landslide depth, if feasible, and/or drainage control. Drainage control may include frequent permanent erosion controls, subsurface gravel or cobble drains, and culverts and drainage ditches to divert water away from facilities or rights-of-way. With implementation of these construction techniques, it is unlikely that landslides would affect the Project.

Flooding

Consultation with the Federal Emergency Management Agency (FEMA) floodplain maps show a delineated 100-year floodplain along the southern bank, right descending bank, of the Potomac River and Little Tonoloway Creek. The Project would have no impact to the floodplain as an HDD bore would be utilized to cross these waterbodies.

Karst Terrain

Karst is a landscape type or terrain characterized by the presence of sinkholes, caverns, and in some cases a highly irregular, pinnacled bedrock surface. Karst is developed from the dissolution of soluble bedrock, such as limestone, dolomite, marble, or gypsum, by surface water or groundwater. Karst terrain often has unique hydrology and highly productive aquifers. However, these aquifers are highly susceptible to

contamination. Additionally, sinkhole features can present a risk of ground collapse that can damage structures.

Columbia conducted an investigation to ascertain subsurface conditions crossed by the Project. The following resources were consulted to determine karst conditions in the Project area: USGS 2003 Pennsylvania Karst Map, Maryland Sinkhole Map, and West Virginia Tax Districts with Karst Terrain. These maps indicate that karst landscape is present in all three counties that the Project would transect. The maps indicate the type and/or distribution of Karst terrain and possible sinkhole.

In Morgan County, West Virginia, karst areas are present to the south of the Project area (PSI, 2017b). Washington County, Maryland has had recorded sinkholes in the past near the Hagerstown Valley, located approximately 30 miles to the east of the Project (MGS, 2017). Both Fulton County, Pennsylvania and Morgan County, West Virginia have carbonate terrain but no record of sinkholes have been identified (PADCNR, 2015).

Weathering in the bedrock formations crossed by the Project is moderate to highly weathered beginning at depths of 5 feet to 23 feet below grade. Joints have a platy pattern, are steeply dipping, well developed, open and highly fractured. Some solution-channel openings as voids and caves can be expected in these formations. Voids were encountered in two borings during the HDD investigation in the area of the Potomac River crossing.

An HDD Feasibility Report was completed for the HDD crossing of the Potomac River.[9] The proposed HDD crossing is approximately 4,300 feet in length and has an approximately 0.2-acre ATWS at the entry point and approximately 0.8 acre ATWS at the exit point. The drill would cross under the Potomac River about 115 feet below the river bed.

According to the USGS (USGS, 2017a), weathered bedrock is present at depths ranging from approximately 1.7 to 2.0 feet below grade. However, field surveys did not indicate the presence of weathered bedrock shallower than 5 feet along the proposed pipeline. Additionally, any voids that were encountered in borings were sporadic and only present at depths around 50 feet below grade. The excavation for the pipeline, excluding HDDs, would only reach 5 feet.

In the area near the proposed HDD, the geotechnical borings did not encounter a soft soil, indicative of an active weathering zone just above the bedrock, which is a characteristic of sites with active karst feature development. Although some voids were observed in the rock cores associated with the HDD, they were typically small and well above the expected depth of the pipeline.

[9] http://www.ferc.gov. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20170712-5159 in the “Accession Number” field

According to Maryland Geological Survey, if a sinkhole is encountered during construction and operation of the Project, the location of the sinkhole relative to a quarry must be determined. If the sink hole is within one mile of a quarry operation, it falls within the zone of influence (ZOI). If this occurs within the ZOI, on a county road or highway, the Washington County Highway Department must be notified. If it occurs on a state road, the State Highways Administration Engineers Office should be contacted. If it occurs on residential or commercial properties, the local municipality (Hancock Township) should be contacted (MGS, 2017).

Sinkholes are much less likely in the Pennsylvania and West Virginia counties of the Project. In Pennsylvania, Columbia contacted the PADCNR and was advised that the PADEP case manager that permits the pipeline would be contacted in the event of potential sinkhole identification. Similarly, if a sinkhole were encountered in West Virginia, the WVDEP would be notified. Columbia has developed and provided a Karst Mitigation Plan[10] that details the mitigation measures that would be implemented if sinkholes occur during construction. It is unlikely karst features would have an effect on the Project or that the Project would impact karst features.

Blasting

If paralithic (soft) bedrock is encountered at depths less than 60 inches along the Project right-of- way, the technique to allow for bedrock removal would depend on such factors as strength and hardness of the rock. Columbia would attempt to use mechanical methods, such as ripping, hydraulic hammers or conventional excavation, to remove the bedrock where possible. The method(s) chosen would depend upon the conditions encountered at the time of construction. If dense, consolidated bedrock without fractures (lithic bedrock) is encountered and the use of hydraulic hammers or other methods is ineffective, blasting may be required.

PADEP, WVDEP, and the MDE have standard regulations and policies in the event of blasting. Blasting education and certifications are required. If blasting is required, construction would be in accordance with the project specific Blasting Plan.[11] The blasting specifications meet or exceed applicable federal, regional, state, and local requirements, limits, permits, and guidelines governing the use of explosives. In the event that property owners identify damage or change to properties, or if excessive peak particle velocities have been recorded during the blasting operations, Columbia would perform an additional post-blasting survey of the affected properties to verify the damage. Columbia would either repair the damage or fairly compensate the owner for blast-related damages. Blasting would likely not significantly affect the Project area or geologic resources.

[10] http://www.ferc.gov. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20170712-5159 in the “Accession Number” field

[11] http://www.ferc.gov. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20170712-5159 in the “Accession Number” field

Paleontology

Based on publicly available information, there is no evidence of paleontological resources within the Project vicinity. In the event a paleontological resource is found Columbia follow measures described in its Unanticipated Discovery Plan. The Project is not likely to affect paleontological resources.

1.2 Soils

Existing Soil Resources

Soils characteristics were identified and retrieved using the United States Department of Agriculture (USDA), Natural Resource Conservation Service's (NRCS) Web Soil Survey (WSS). This is an online resource providing soil data and information produced by the National Cooperative Soil Survey. Additionally, the most recent published soils surveys by the USDA NRCS for Fulton County, Pennsylvania, Washington County, Maryland, and Morgan County, West Virginia were consulted. The WSS was utilized for obtaining data pertaining to the identification of prime farmland, compaction prone soils, water and wind erodible soils, stony/rocky soils, shallow bedrock, soils with revegetation concerns, and topsoil depth. These characteristics are summarized below and provided in appendix D.

Prime Farmland and Vulnerable Soils

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Generally, prime farmland has an adequate water supply from precipitation or created irrigation, a favorable climate, acceptable soil chemistry, and few or no rocks. These soils are permeable to air and water, and not excessively eroded or saturated with water for long periods of time. Approximately three miles of the route crosses prime farmland.

To prevent mixing of topsoil or surface soil with subsoils, Columbia would segregate topsoil as specified in the ECS in trench and spoil storage areas, actively cultivated or rotated croplands, pastures, hayfields, residential areas, and in other areas agreed upon between the landowner and Columbia.

In deep soils where the topsoil is greater than 12 inches, at least 12 inches of the topsoil would be segregated. As described in the ECS, the segregated topsoil would not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as fill material. Following the installation of the pipe the trench would be backfilled using the excavated subsoil material and rough graded to pre-construction contours minus the depth of topsoil. The topsoil would then be replaced over the right-of-way. Additional measures regarding the treatment of topsoils would be conducted in accordance with the guidance documents provided by each state and the corresponding submitted Erosion and Sediment Control Plans (ESCP).

Compaction Prone Soils

Soil compaction occurs when the pore space between soil particles is reduced due to moist or wet soil particles being pressed together (NRCS Soil Quality Institute, 2003). This results in increased soil density, reduced porosity, and leads to increased penetration resistance and a degradation of soil structure (Penn State, 2004). Soils susceptible to compaction typically exhibit characteristics such as: textures of sandy clay loam or finer and a drainage class of somewhat poorly, poorly, or very poorly drained. Approximately 0.3 mile of the route crosses compaction prone soils.

Major earthwork activities would not be conducted during major rainstorms or when spring thaw is occurring. Frozen materials or soft, mucky, or highly compressible materials would not be incorporated into fills. Fill would not be placed on saturated or frozen surfaces. Topsoil would not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet, or in a condition that may otherwise be detrimental to proper grading and seedbed preparation. In accordance with the Project's ECS, topsoils and subsoils would be tested for compaction at regular intervals in agricultural and residential areas during construction activities.

Following the completion of construction activities, compacted soils would be scarified 6 to 12 inches along the contour whenever possible prior to seeding. Severely compacted soils in agricultural areas would be plowed as a corrective measure

Erodible Soils

Map units are assigned subclass designations based on the consideration of erosion limitations in agricultural use and average slopes. Soils that have severe to extreme susceptibility to water erosion for agricultural usage are on slopes greater than or equal to eight percent. Wind erodibility is determined by wind erodibility group (WEG). Soils considered highly susceptible to wind erosion have sandy-textured soils with poor aggregation. Approximately 0.3 mile of the route crosses erodible soils.

To minimize and avoid impacts associated with the presence of water in these areas, Columbia would implement temporary and permanent site-specific BMPs as indicated in the developed ESCP and the ECS. Prior to the completion of each work day, all temporary and permanent erosion control devices would be inspected or in the event of a precipitation event totaling more than 0.5 inch. Any compromised BMP's would be replaced or remediated. All temporary erosion and sediment control measures would be removed after final site stabilization, or after they are no longer needed.

At the completion of grading activities, temporary erosion and sediment controls would be converted to permanent post-construction stormwater management controls. All disturbed areas to be restored with vegetation would be topsoiled, amended with fertilizer and/or lime, seeded, and covered with erosion control blanket or mulched. Erosion control

measures included in the Columbia's construction and restoration plans, would keep disturbed soils within work areas.

Rocky Soils

Rocky soils are constituted as those with a cobbley, stony, boulder, very gravelly, or extremely gravelly modifier to the textural class. The presence of rocks larger than three inches in diameter with a percent composition in the soil profile of greater than five percent also constitute rocky soils. Approximately 2.9 miles of the route crosses rocky soils.

Rock fragments at the surface and in the surface layer may be encountered during grading, trenching, and backfilling. Excess rock would be removed from the top 12 inches of soils to the extent practicable in all agricultural land, hayfields, pastures, residential areas, and other areas at the landowner's request. Columbia would remove excess rocks from surface soils disturbed by the construction to the extent that the size, density, and distribution of rock along the construction right-of-way mimics that of the adjacent non-right-of-way areas. Rock that is not returned to the trench is considered construction debris, unless approved for use as mulch or other beneficial use on the construction work area by the landowner or land managing agency.

Columbia proposes to windrow excess rock off the edge of the construction work area with landowner's approval, spread it across the right-of-way, 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 or spread it across the right-of-way in a manner inconsistent with pre-construction conditions conflicts with the requirements in our 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 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 Plan. **Therefore, we recommend:**

- **Prior to construction, Columbia should file with the Secretary, for review and written approval by the Director of OEP, a revised ECS that is consistent with the Commission's Plan at sections III.E., V.A.3, V.A.4., and V.A.6.**

Revegetation Potential

Portions of the proposed construction areas pose potential complications regarding restoration and revegetation. Soils that have a poor revegetation potential were identified based on the surface texture, drainage class, and slope as provided by the NRCS. Approximately 0.6 mile of the route crosses soils with poor revegetation potential.

Columbia would cooperate with landowners regarding the restoration of agricultural and residential areas. Restoration would not be performed in agricultural lands from the beginning of the spring thaw through May 15 unless requested by the landowner. All turf, ornamental shrubs, and specialized landscaping would be replaced in accordance with the landowner's request. Vegetative stabilization would be established to reduce the temporary and long-term potential for erosion and sediment transport from disturbed or bare soil areas. Permanent seeding would be applied to provide a protective cover following achievement of final grades. Seed mixtures would vary based on the anticipated land use as specified in the provided ESCP. Special restoration requirements and grazing deferment plans may be coordinated/developed with the landowners for agricultural fields and pastures, respectively, which would take precedence over stabilization practices proposed.

By adopting and incorporating the measures contained in its ECSs, as modified by our proposed recommendations, Columbia would adequately minimize and mitigate impacts on soil resources. We conclude that impacts on soil related to the proposed project would be minimal.

2.0 Water Resources and Wetlands

2.1 Groundwater

Approximately 100 commentors submitted comments with concerns related to the potential effects on groundwater. Clearing, grading, trenching, dewatering, and blasting activities could each temporarily alter overland flow and ultimately change groundwater recharge resulting in minor fluctuations in groundwater levels and turbidity.

Aquifers

The USGS has defined an aquifer as a geologic formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs. Of more significance is the principal aquifer, a regionally extensive aquifer or aquifer system that has the potential to be used as a source of drinking water. The Project is located above the principal aquifer designated as the Valley and Ridge Formation. The Valley and Ridge Formation Aquifer consists of permeable rocks within a sequence of folded and faulted sedimentary formations of Paleozoic age. Water within this formation moves mostly along fractures and bedding planes in all rock types, and in solution openings in the carbonate rocks. The principal aquifer unit in this system is the fractured limestone that underlies the valleys. Because it is fractured, it recharges rapidly, has a high fracture

permeability, and wells drilled along the fractures are highly productive. Recharge is focused on the flanks of the ridges where runoff flows over the less permeable shale and sandstone units, and enters the groundwater through fractures or sinkholes above the limestone at the valley edges. Ground water flow is generally toward the center of the valleys, and springs commonly feed the surface water systems (Demain and Arthur, 2016).

Clearing and grading of the construction right-of-way has the potential to temporarily alter near-surface groundwater recharge. The removal of vegetation could also reduce the infiltration of groundwater recharge. During the last phase of construction, crews would decompact soils as necessary to allow for revegetation, reduce the potential for ponding, and restore near surface groundwater infiltration. After construction, crews would restore contours to pre-existing conditions as closely as possible.

Trenching activities would disturb the upper 5 feet of the existing ground surface, which is above most aquifers and most wells that might be located in a localized shallow aquifer.

Public and Private Water Supply Wells

Amendments to the 1986 Safe Drinking Water Act (SDWA) created the Wellhead Protection Program (WHPP), mandating states to establish Wellhead Protection Areas (WPA). In section 1428(e) of the SDWA, a Wellhead Protection Area is defined as "a surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield."

Columbia consulted PADEP and did not identify any WPAs that would be crossed by the Project (MDE, 2004). Columbia consulted the Washington County, Maryland Division of Environmental Management and the West Virginia Department of Health and Human Resources and did not identify any WPAs that would be crossed by the proposed Project.

Columbia reviewed several resources, including USGS, MDE Geological Survey, and Pennsylvania Groundwater Information, and performed field surveys to identify public and private groundwater supply wells within 150 feet of the Project area. Columbia identified several wells within 150 feet of the Project. These wells are shown in table 7. The Project would not cross any areas designated as 'Zones of Critical Concern' for public or private drinking water sources. The nearest 'Zone of Critical Concern' is 1.5 miles from the Project area (contractor staging yard).

Table 7 Water Supply Wells and Springs within 150 Feet of Construction Workspaces			
Supply Type	**Approximate Milepost**	**Distance from Workspace (feet)**	**Ownership (Public/Private)**
Fulton County, Pennsylvania			
Water Well	Contractor Staging	0	Private
Washington County, Maryland			
Water Well	1.83	102	Private
Water Well [1]	2.06	119	Private
Water Well [1]	2.06	119	Private
Water Well [1]	2.06	119	Private
Water Well [1]	2.06	119	Private
Water Well[1]	2.91	126	Private
Water Well [1]	2.91	126	Private
Water Well [1]	2.91	126	Private
Water Well [1]	2.91	125	Private
Water Well	1.83	102	Private
Water Well	2.06	119	Private
Water Well	2.91	126	Private
[1] Multiple well tags determined to be associated the same location.			

One commentor stated the pipeline would run within 20 feet of his well. Columbia located all the affected landowners and there were no properties or wells owned by this commentor. One private well is within the bounds of the proposed contractor staging area, within the quarry owned by Bluegrass Materials Company, LLC (Environmental Data Resources (EDR), 2017). Columbia is coordinating with the landowner to conduct site activities to minimize impact on this well during the use of the contractor staging area. Columbia would minimize the potential impact of spills of hazardous materials by adhering to the ECS and SPCC Plan. Additionally, no surface grading would be conducted within the contractor staging area, which would minimize the potential impact on the well.

Blasting activities could temporarily alter overland flow and groundwater recharge or could result in minor fluctuations in groundwater levels and/or increased turbidity. Columbia has prepared a project-specific Blasting Plan, which would be adhered to by Columbia and its contractors. If blasting is required, Columbia would inventory public and private groundwater drinking wells in the proximity of the construction work area (typically within 150 feet) and completing pre- and post-blast (within two months of construction work restoration) water quality testing, if requested by the landowner.

Springs

There is one wetland in the Project area that is spring fed. Additionally, there are three ponds that could potentially be spring fed. However, it is unclear whether these ponds

are recharged by precipitation or groundwater. Columbia would ensure preconstruction hydrology is maintained by adhering to its ECS. Columbia would file with the Commission the location of any wells or springs newly identified within 150 feet of the Project area prior to construction. If new wells or springs are discovered in the Project area, Columbia would minimize potential impacts by adhering to the ECS and SPCC Plan.

Columbia would prohibit the storage of fuels, refueling, equipment maintenance, and storage or use of hazardous materials within 200 feet of private water wells. Crews would follow the ECS for overnight storage of equipment and vehicles. Columbia has developed a project-specific SPCC Plan.

Columbia stated it would conduct pre- and post-construction testing of known or identified wells and springs within 150 feet of any construction areas (and within 500 feet of the proposed centerline in locations with karst terrain) for water quality and yield if requested by the landowner. If testing results indicate any significant differences in water quality or quantity between initial testing and post-construction, Columbia would compensate the landowner for repairs, installation of a new well, or other options as agreed upon with the landowner. Testing of the wells is fundamental to determining whether impacts on groundwater resources have resulted from construction of the Project. Testing of wells or springs within 150 feet should be offered regardless of whether the landowner has requested it. Therefore, **we recommend**:

- **<u>Prior to construction</u>, Columbia should 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 the workspaces Columbia should also provide a temporary supply of water if the landowner's water supply is contaminated or damaged by construction activities. Within 30 days of placing the facilities in service, 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.**

Due to the minor and temporary nature of potential impacts on groundwater and Columbia's proposed measures to minimize and/or mitigation construction impacts, we conclude that the Project would not significantly affect groundwater.

2.2 Surface Water Resources

The Project spans three watersheds, all of which are contained within the Upper Potomac River Basin. Information on the sub-basins and watersheds crossed by the Project is summarized in table 8 below.

Table 8 Watersheds Crossed by Project			
Approximate Milepost Crossing	**Twelve-Digit HUC[1] Code**	**Watershed**	**County/State**
0.00-1.61	20700040501	Minnow Run - Little Tonoloway Creek	Fulton, Pennsylvania Washington, Maryland
1.61-3.23	20700040502	Sir Johns Run - Potomac River	Washington, Maryland
3.23-3.37	20700040503	Warm Spring Run	Morgan, West Virginia
[1] HUC = hydrologic unit code			

Waterbodies

Waterbodies are defined as "any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes." FERC also categorizes waterbodies as minor, intermediate and major based on the width of the water's edge at the time of crossing. Minor waterbodies are less than or equal to 10 feet wide, intermediate waterbodies are greater than 10 feet up to 100 feet wide, and major waterbodies are greater than 100 feet wide.

The overall Project would involve one major, five minor, and four intermediate waterbody crossings.[12] Four of these crossings, including the only major waterbody (Potomac River), would be crossed by HDD, and would therefore avoid any in-water work and disturbance to the stream bed and banks. Only one intermediate stream would be directly affected by pipeline construction (a 15.8-foot-wide unnamed tributary to the Potomac River at MP2.04). An additional minor waterbody crossing would occur due to installation of the cathodic protection bed; a 2.7-foot-wide unnamed tributary to the Potomac River. In addition, access roads would cross one intermediate and three minor waterbodies; however impacts would be limited to the replacement of existing culverts in two locations. The waterbodies that would be crossed are all perennial, except for one ephemeral stream. Table 9 provides a list of the waterbodies crossed by the Project. However, restrictions and/or limitations may result following the submittal and review of permits to the proper state authority(s). The state designated water quality classification for each waterbody is described in table 9.

[12] The pipeline would cross five waterbodies: one minor waterbody, three intermediate waterbodies, and one major waterbody.

Table 9
Waterbodies Crossed by Project

Stream ID	Approximate Milepost	Workspace	Name of Waterbody	Flow Regime	Water Edge to Water Edge Crossing Width (ft)	FERC Classification	State Water Quality Classification [a]	Fishery Type [a]	Crossing Method
Fulton County, Pennsylvania									
S1E	--	Access Road PAR-1	Unnamed Tributary to Little Tonoloway	Perennial	13.64	Intermediate	WWF, MF	WWF	Replacement of Culvert
Washington County, Maryland									
S1	--	Access Road PAR-1	Unnamed Tributary to Little Tonoloway	Perennial	8.03	Minor	Tier 1	WWF	Existing Culvert
S2	0.85	Pipeline ROW	Unnamed Tributary to Little Tonoloway	Perennial	8.04	Minor	Tier 1	WWF	HDD
S3	0.91	Pipeline ROW	Little Tonoloway Creek	Perennial	26.94	Intermediate	Tier 1	WWF	HDD
S8D	--	Access Road TAR-2	Unnamed Tributary to Little Tonoloway	Perennial	4.95	Minor	Tier 1	WWF	Existing Culvert – No Improvement
S8B	--	Access Road PAR-2	Unnamed Tributary to Little Tonoloway	Perennial	3.06	Minor	Tier 1	WWF	Replacement of Existing Culvert
S6	2.04	Pipeline ROW	Unnamed Tributary to Potomac River	Perennial	15.78	Intermediate	Tier 1	WWF	Open Cut
S4	2.80	Pipeline ROW	Unnamed Tributary to Potomac River	Ephemeral	12.52	Intermediate	Tier 1	WWF	HDD
S10	3.06	Pipeline ROW	Potomac River and adjacent C&O canal	Perennial	490.49	Major	Tier 1	WWF	HDD
S13	-	Cathodic Protection	Unnamed Tributary to Potomac River	Perennial	2.70	Minor	Tier 1	WWF	Open Cut

Notes:

a WWF - Warm Water Fishes - Maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat. MF - Migratory Fishes - Passage, maintenance and propagation of anadromous and catadromous fishes and other fishes which move to or from flowing waters to complete their life cycle in other waters, I-P (Tier 1) Water Contact Recreation, and Protection of Aquatic Life (Tier 1 - Specifies the minimum standard that must be met – support of balanced indigenous populations and support of contact recreation – this is often referred to as "fishable-swimmable").

Key: ft – feet, HDD – horizontal directional drill, PAR – permanent access road, TAR – temporary access road, ROW – right-of-way,

WWF – warmwater fishery

Columbia's proposed construction methods to cross waterbodies are described in section A.7. As noted above, due to Columbia's proposed HDDs, only one streambed would be directly affected by installation of the pipeline. An unnamed tributary to the Potomac River would be crossed with a dry-ditch open cut crossing (flume or dam and pump). Dry ditch crossing methods minimize the potential for the downstream transport of suspended sediments by isolating the construction work area from the waterbody flow during construction. Dry-ditch crossings also provide for continued fish passage through the construction work area via the flume pipes during the crossing. Columbia would also need to cross one waterbody for installation of cathodic protection. If the stream is flowing during construction, Columbia would minimize impacts by using a dry-ditch open cut method to perform the installation.

Columbia would replace existing culverts at two access road stream crossings. The existing culverts would be replaced with an appropriately sized box culvert. Replacement of the culvert would be conducted in accordance with the ESCP that would be approved by the Washington County Conservation District, Maryland Department of the Environment and the Pennsylvania Department of Environmental Protection prior to the start of construction. Water would be diverted from the stream using dam and pump bypass during the culvert replacement to avoid sedimentation that could be caused by replacing the culvert in wet conditions. Silt fence would also be installed in accordance with the plans to protect the stream from runoff from the surrounding workspace during construction. ATWS for both of these locations would be needed to allow for the culvert replacement.

Columbia's proposed crossing methods would minimize impacts on waterbodies. The HDD method would avoids all in-stream disturbance of the waterbodies. Only two waterbodies would be directly affected by crossing activities which would result in impacts on waterbodies by causing disturbance in stream channels and adjacent slopes and banks. Clearing and grading of stream banks, equipment crossing, blasting, in-stream trenching, trench dewatering, and backfilling could all result in temporary, local modifications of aquatic habitat by causing erosion, sedimentation, turbidity, and decreased dissolved oxygen concentrations. These impacts would be short-term and generally return to pre-construction conditions shortly after stream restoration activities are completed as described in the ECS.

Sedimentation and increased turbidity can occur as a result of in-stream construction activities, trench dewatering, or stormwater runoff from construction areas. Temporary bridges would be installed to reduce the potential for turbidity and sedimentation resulting from construction traffic crossing waterbodies. Construction activities would occur within the appropriate timeframes for coolwater, coldwater, and warmwater fisheries as described in the ECS and in accordance with applicable permit restrictions.

Excavated spoil would be stockpiled at least 10 feet from the edge of the waterbody with appropriate erosion control devices protecting the spoil from entering the waterbody.

During construction, the open trench may accumulate water, either from a high water-table and seepage of groundwater into the trench or from precipitation. In accordance with the ECS, crews would remove water from the trench as necessary and discharge it into an energy dissipation/sediment filtration device where the water can filter back into the ground to prevent the flow of spoil or silt-laden water in any waterbody.

Additionally, in accordance with the ECS, crews would install erosion control devices in uplands adjacent to waterbody crossings subsequent to construction and until there is successful revegetation of the construction right-of-way.

Sensitive Waterbodies

Approximately 100 commentors submitted comments stating concerns on effects to the Potomac River. The Project would cross a segment of the Potomac River that is considered sensitive based on its listing by the Nationwide Rivers Inventory (NRI). This segment of river is noted as having historic and hydrological significance. The 52-mile-long segment of the Potomac between the towns of Old Town and Hancock, Maryland parallels the Chesapeake and Ohio Canal National Historic Park. This area, a National Historic Register Site, is one of the least altered older canals. This segment of river is one of the largest (in cubic feet per second), longest, free-flowing, sparsely developed remaining high order rivers in the state of Maryland (NPS, 2009).

Columbia proposes to cross the segment of the Potomac River identified by the NRI, and the adjacent Chesapeake and Ohio Canal Historic Park via the HDD method. Therefore, the Project is not expected to have an effect on the historic nature or hydrologic value. The main threat to the Potomac River during construction of the Project would be an inadvertent release of drilling fluids during the HDD process. Columbia has developed an HDD Contingency Plan to minimize the impacts of an inadvertent release into the Potomac River or adjacent habitats. We have reviewed the HDD Contingency Plan and find it acceptable. The HDD Contingency Plan is discussed further below.

Hazardous Material Spills and Contaminated Soils

As previously stated, Columbia has developed a project-specific SPCC Plan in conjunction with the ECS to regulate the use, storage, and response to spilling potentially hazardous materials. Maintenance and repairs to equipment used during construction is inevitable. Refueling and maintenance activities would take place in upland areas found at least 100 feet from the edge of any identified waterbodies and/or adjacent wetlands. For equipment being utilized near or within a waterbody essential to construction operations, such as pumps, refueling in place may be required, this would be done by-hand if it is required. Any stationary motorized equipment located within 100 feet of any waterbody would use secondary containment systems.

In the unlikely event that soils or water contamination is discovered during construction, Columbia would implement measures to prevent the spread of contamination

cause by construction of the Project. Columbia has developed a SPCC Plan, which includes the proper handling, agency notification, and disposal methods. We have reviewed this plan and find it acceptable. Recognition of the possible contamination such as discoloration of the soil, chemical-like odors and sheens on soil or water in the early stages of the discovery of the potential contaminant are important. If evidence of contamination is discovered, crews would stop work in the vicinity, restrict access to the area, and notify the Environmental Inspector. Additionally, a qualified consultant or testing lab and any appropriate agencies would be contacted. Work would resume in accordance with requirements from federal, state, and local agencies regarding the proper course of action if contaminated soils or groundwater are encountered during construction.

HDD Installation

The HDD method can provide certain advantages over typical construction methods, such as avoidance of surface disturbance, riparian tree clearing, or in-stream construction where appropriate subsurface conditions exist. However, a temporary, localized increase in turbidity could occur in the event of an inadvertent release of drilling fluid to the waterbody. Drilling fluid would be composed of water and bentonite clay (a naturally occurring mineral). The EPA does not list bentonite as a hazardous substance nor do they list any long-term adverse environmental impacts from inadvertent releases of drilling fluids. While adverse impacts can result when inadvertent releases occur in environmentally sensitive areas or in substantial volumes, it is not likely to occur because Columbia would implement measures identified in its HDD Contingency Plan in the event of an inadvertent release. This plan describes procedures to be used to monitor, contain, and clean up any inadvertent releases of drilling fluid. It also identifies contingency measures to be implemented in the event that an HDD is unsuccessful.

Columbia would provide on-site visual monitoring of the construction area during construction. Columbia's designated EI would walk the construction area at least every four hours during drilling operations where access is permissible to visually monitor for inadvertent releases. Additionally, Columbia would ensure a vacuum truck would be staged at the HDD work pad. The vacuum truck would be mobilized immediately upon the discovery of an inadvertent return event.

In the event of an inadvertent return into wetlands and/or waterbodies, the containment and corrective actions described below would be taken immediately by the onsite crew.

- The source/pumps would be stopped temporarily or the pressure would be decreased.

- The inadvertent return would be contained immediately by installing hay bales or silt fence and/or constructing dikes or pits (do not construct earthen dikes or berms within wetland or stream areas).

- The drilling fluid would be removed from the ground surface and from the site to the greatest extent possible by manual means such as by use of shovels, wheelbarrows and/or vacuum hoses. Earth moving equipment such as backhoes or small bulldozers would be used only if manual means prove to be impractical and only after appropriate measures have been taken to minimize impacts to the resource. These measures would be authorized by Columbia's EI.

- The affected areas would be restored as closely as possible to their previous condition.

- Documentation must be made and maintained by the contractor and provided to Columbia's EI.

- The Contractor must follow any special instructions from Columbia's EI.

Typically, drilling activities would not be suspended unless the inadvertent return creates a threat to public health and safety or unless suspended by Columbia or a regulatory agency. In the event of an inadvertent release into a wetland or waterbody, regulatory agencies would be notified in accordance with the HDD Contingency Plan. In an effort to minimize the overall impacts of an in-stream response to an inadvertent return, Columbia would schedule all drilling efforts beneath the Potomac River and Little Tonoloway Creek outside of the MDNR planned trout stocking period, March 1 through June 15.

Public Watersheds

Columbia consulted with the PADEP, MDE, and WVDHHR to obtain the location data for public water surface intakes within three miles of the Project. No public surface water supply areas were located within three miles of the Project in Pennsylvania. Consultation with MDE revealed the nearest location of a public surface water supply to be in Sharpsburg, Maryland, approximately 52 river miles downstream on the Potomac River. Consultation with WVDHHR revealed the location of a public surface water supply approximately 38 miles upstream from the Project in Berkeley County, West Virginia, on the Potomac River. We determined that these public water supply areas are located far enough downstream that construction of the Project would not likely affect the water supply. Columbia would cross the Potomac using the HDD method and therefore no instream work would occur that could cause turbidity and sedimentation effects downstream. If an inadvertent release of drilling fluids were to occur from the HDD process, Columbia would implement its HDD Contingency Plan which requires crews to immediately stop the pumps or decrease the pressure and contain the spill as described above. Columbia's specific containment and clean up measures for an inadvertent release into a waterbody are detailed in its HDD Contingency Plan provided in Appendix B of this EA.

Contaminated Sediments

In accordance with Section 303(d) of the Clean Water Act (CWA), Columbia reviewed the list of 303(d) impaired waters for Pennsylvania, Maryland, and West Virginia to identify crossings of waterbodies that may contain contaminated sediments and do not meet designated water quality criteria (EPA, 2012). In total the Project would cross eight, 303(d) listed impaired stream segments provided in table 10. The majority of the 303(d) waterbody impairments are associated with biological bacteria, iron, PCBs, pH, sediments, and metals. The identification of streams and stream segments on the 303(d) list were verified using the Integrated Report (IR) Water Quality Assessment Maps provided by MDE (MDE, 2017). No impaired streams are crossed by the Project in Pennsylvania or West Virginia.

Table 10
Section 303(d) Impaired Streams

Stream ID	Waterbody ID	Basin Name	Water Type Detail	Parameter Assessed Indicator(s)
S1	MD-02140509	UNT to Little Tonoloway Creek	1st through 4th order streams	Cause Unknown, pH Low, TSS
S1E	MD-02140509	UNT to Little Tonoloway Creek	1st through 4th order streams	Cause Unknown, pH Low, TSS
S2	MD-02140509	UNT to Little Tonoloway Creek	1st through 4th order streams	Cause Unknown, pH Low, TSS
S3	MD-02140509	Little Tonoloway Creek	1st through 4th order streams	Cause Unknown, pH Low, TSS
S4	MD-02140508 Wadeable Streams	UNT to Potomac River Allegany County	1st through 4th order streams	Cause Unknown
S6	MD-02140508 Wadeable Streams	UNT to Potomac River Allegany County	1st through 4th order streams	Cause Unknown
S8B	MD-02140509	UNT to Little Tonoloway Creek	1st through 4th order streams	Cause Unknown, pH Low, TSS
S8D	MD-02140509	UNT to Little Tonoloway Creek	1st through 4th order streams	Cause Unknown, pH Low, TSS

KEY:
TSS = total suspended solids

Columbia considered the probability to encounter contaminated water or sediments during construction, or to exacerbate impairments during construction. However, the parameters identified, low pH and total suspended solids (TSS), are not indicative of contaminants susceptible to migration upon disturbance. If contaminants are encountered during construction of the Project, Columbia would implement the measures as described in the ECS and requirements identified by applicable agencies. Most of the waterbodies would be crossed using HDD or a dry crossing method, which would not involve in water work that could further impair the waterbody or spread contaminants. Culvert replacement would be needed for two impaired segments, which could result in minor in-water construction activities. However, these activities would be minor and short term and are not likely to result in further impairment or spread of contaminants. Due to the nature of

the contaminants present, the fact that there would be no in-water work in most of these waterbodies, the short-term duration of construction, and Columbia's proposed mitigation measures, we determined that construction of the Project would not cause contaminants to spread or further impairment of the waterbodies.

Floodplains

Several Federal Emergency Management Agency (FEMA) 100-year floodplains would be crossed by the Project listed in table 11. Impacts within floodplains associated with construction would include the clearing of vegetation and possible grading of the area within the workspace, which would not significantly affect flood storage capacity. No aboveground facilities would be located within floodplains, as such no loss of flood storage capacity within the floodplain would occur. Therefore, we conclude that the Project would not have a significant impact on floodplains or flood storage capacity.

Table 11
FEMA Floodplains

Facility	MP Start	MP End	Floodplain Type/Class
Pipeline ROW	0.82	0.82	100 Year - Zone AE
ATWS	0.82	0.82	100 Year - Zone AE
Pipeline ROW	0.84	0.85	100 Year - Zone AE
ATWS	0.92	0.94	100 Year - Zone A
Pipeline ROW	0.92	0.93	100 Year - Zone A
ATWS	0.92	0.93	100 Year - Zone A
Pipeline ROW	2.91	2.93	100 Year - Zone AE

Water Use for HDD operations and Hydrostatic Testing

Hydrostatic testing would be conducted in accordance with the requirements of the USDOT pipeline safety regulations (Title 49 CFR Part 192), Columbia testing specifications, and applicable permit conditions, to verify that the pipeline is free from leaks and would provide the required margin of safety at operating pressures. Columbia would develop a hydrostatic test plan for this testing and provide it to FERC prior to construction. Columbia would obtain the required Hydrostatic Testing General Permits from the WVDEP and MDE prior to conducting hydrostatic testing.

Prior to hydrostatically testing the pipeline, cleaning tools would be used to remove loose debris within the pipeline. Columbia anticipates using approximately 65,600 gallons of test water, which would be trucked to the Project location from a municipal source (City of Hancock). Individual sections of pipeline to be tested would be determined by factors such as hydraulics, pressure, pipe class, and terrain conditions. If defects are found, the

pipe would be repaired, and the section of pipe retested until all required specifications are met.

After testing is completed, water would be discharged into tanks to be hauled off site and disposed of at a municipal source, in accordance with the applicable discharge permit requirements and BMPs as described in the ECS. There would be no discharges to any sensitive waterbodies such as state-designated exceptional value waters, waterbodies that provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

Columbia would also require water for the mix of drilling fluids (non-toxic bentonite clay and water) during the HDD process. Columbia proposed to use about 1.5 million gallons of water for drilling fluids and would obtain this water from a municipal source (City of Hancock). Columbia would dispose of drilling fluids by hauling all materials to a licensed disposal facility for disposal. We conclude that implementation of the measures in the Columbia's' ECS would minimize impacts associated with hydrostatic test and HDD water use and discharge.

Due to Columbia's proposed measures to minimize and mitigate potential impacts on surface waters, including the Projects ECS, SPCC Plan, and HDD Contingency Plan, we conclude that the Project would not significantly affect waterbodies or surface water resources.

2.3 Wetlands

The USACE and EPA jointly define wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." FERC defines wetlands as "any area that is not actively cultivated or rotated cropland and that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands."

Columbia delineated wetlands in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and the Regional Supplement to the Corps of the Engineers Wetland Delineation Manual: Eastern Mountain and Piedmont Region (Version 2.0) (USACE, 1987; 2012). Three broad classes of palustrine freshwater wetlands (Cowardin et al. 1979) are present in the Project area: palustrine forested (PFO), palustrine scrub-shrub (PSS), and palustrine emergent (PEM). PFO wetlands are characterized by woody vegetation that is about 20 feet tall or taller and normally include an understory of young trees or shrubs, and an herbaceous layer. PSS wetlands are generally dominated by woody vegetation less than 20 feet tall. PEM Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes not including mosses and lichens. Wetland vegetation is further addressed in section B.3.

Table 12 provides a complete list of wetlands identified along the proposed pipeline routes with their milepost locations, classification, crossing length, and area affected by construction and operation of the Project.

Table 12
Wetlands Crossed by the Project

Wetland ID	Approximate Milepost	NWI Classification	Crossing Length (ft)	Crossing Method/ Workspace	Area of Construction Impact (acres)	Area of Operation Impact (acres)
Washington County, Maryland						
W2	--	PFO	3.6	Access Road TAR-2	<0.01	0
W2A	--	PFO	12.0	Access Road TAR-2	<0.01	0
W6	2.51	PEM/PSS	37.1	Open Cut	0.06	0
W14	CP	PEM	23.7	Open Cut	<0.01	0
		Total:	76.3		0.06	0

Notes:
NWI Wetland Types: Palustrine: PFO = Forested; PSS = Scrub/Shrub; PEM = Emergent; CP = Cathodic Protection

Impacts and Mitigation

Construction activities could affect wetlands in several ways. Clearing and grading of wetlands, trenching, backfilling, and trench dewatering could affect wetlands through the alteration of wetland vegetation and hydrology, loss or change to wildlife habitat, erosion and sedimentation, and accidental spills of fuels and lubricants. The Project would temporarily affect about 0.06 acres of PEM/PSS wetlands and less than 0.01 acre of PFO wetlands.

Wetland areas would be allowed to return to preconstruction condition after construction is complete. Impacts on forested wetlands would result in permanent conversion to PEM/PSS wetlands due to the long regeneration time required for forest. No wetlands would be permanently filled by the Project and no wetlands would be maintained in the permanent right-of-way. Columbia would minimize impacts on wetlands by following the wetland construction and restoration guidelines contained in the ECS. These guidelines are intended to avoid wetland impacts to the greatest extent practicable, minimize the area and duration of disturbance, reduce soil disturbance, and enhance wetland revegetation after construction. Some of the measures include:

- limiting the construction right-of-way width to 75-feet through wetlands;
- preventing the compaction and rutting of wetland soils that are not excessively saturated by operating equipment off timber mats in wetlands;
- removing woody stumps only from areas directly above the trenchline, or where they would create a safety hazard, to facilitate the reestablishment of woody species by existing root structures;
- segregating topsoil from the trench in non-saturated wetlands and returning topsoil to its surface location during backfilling to avoid changes in

subsurface hydrology and to promote reestablishment of the original plant community by replacing the seed bank found in the topsoil;

- installing temporary and permanent erosion and sediment control devices, and re-establishing vegetation on adjacent upland areas, to avoid erosion and sedimentation into wetlands; and
- returning graded areas to their preconstruction contours to the greatest extent practicable, and returning excavated soil from the trench within the wetlands back to their original soil horizon to maintain hydrologic characteristics.

The Project area is within two USACE Districts: Pittsburgh and Baltimore. Columbia has prepared and submitted the required USACE permits under section 404 of the CWA for wetlands affected by the Project.

2.4 Water Resources - Modifications to FERC Procedures

Columbia is requesting modification to the FERC Procedures section VI.B to locate ATWS within 50 feet of wetlands and waterbodies and construct access roads through wetlands. Table 13 below, provides details on the areas where Columbia is proposing to locate ATWS within 50 feet of a wetland or waterbody and their justification for why it is needed.

Table 13 Justifications for Additional Temporary Workspaces within 50 feet of a Stream or Wetland					
ATWS ID	**Mileposts**	**Justification**	**Total Acres**	**Wetland or Stream within 50 ft**	**Distance to Wetland/ Stream (ft)**
ATWS-36 (on north side of access road PAR-1)	Access Road PAR- 1	ATWS required for culvert replacement for Access Road PAR- 1	0.05	Stream S1E	0
ATWS-37 (on south side of access road PAR-1)	Access Road PAR- 1	ATWS required for culvert replacement for Access Road PAR- 1	0.17	Wetland W4 and Stream S1E	0 – Stream S1E 27 – Wetland W4
ATWS 38	Access Road PAR- 1	ATWS required for culvert replacement for Access Road PAR- 1	0.01	Wetland W4 and Stream S1E	0
ATWS 39	Access Road PAR- 1	ATWS required for culvert replacement for Access Road PAR- 1	0.03	Wetland W4 and Stream S1E	0
ATWS-6	0.79	HDD entry workspace	0.89	Stream S2	20
ATWS-7	0.93	HDD workspace	0.15	Stream S3	26
ATWS-8	0.93	HDD workspace	0.31	Stream S3	24

We agree that most of ATWS areas are justified. However, Columbia has not provided a reason for why culvert replacement is needed for the crossing of stream S1E, which would require ATWS within 50 feet of wetland W4. Columbia is also proposing to modify a temporary access road that would affect less than 0.01 acre of a forested wetland. Columbia did not provide justification for why the ATWS and modifications to these access roads (where they cross through wetlands) are needed or why they could not be avoided. Therefore, **we recommend that:**

- **<u>Prior to construction</u>, Columbia should file with the Secretary, for review and written approval by the Director of OEP, a revised plan for access road TAR-2 that avoids impacts on wetlands, or detailed justification for why wetland impacts cannot be avoided and a detailed justification for the culvert replacement along access road PAR-1 and associated ATWS.**

3.0 Fisheries, Vegetation and Wildlife

3.1 Fisheries and Aquatic Species

The Project would cross freshwater waterbodies in Pennsylvania and Maryland. Water quality information and fishery classifications for streams within the survey corridor were obtained from the Pennsylvania Fish and Boat Commission (PFBC), PADEP, and the Maryland Department of Natural Resources (MDNR). A summary of this information is provided in Section B.2, Table 9. Fish species known to occur in waterbodies crossed or affected by the Project are listed in table 14 below.

Table 14
Representative Game and Commercial Fish Species Known to Occur in Project Area Waterbodies

Anadromous	Warmwater	Catadromous	Invasive
Fulton County, Pennsylvania			
None	Potomac Sculpin (*Cottus girardi*)	American Eel (*Anguilla rostrata*)	None
	White Sucker (Castostomus commersoni)		
	Central Stoneroller (*Campostoma anomalum*)		
	Bluegill (*Lepomis cyanellus*)		
	Fantail Darter (*Etheostoma flabellare*)		
	Bluntnose Minnow (*Pimephales notatus*)		
	Creek Chub (*Semotilus atromaculatus*)		
	Blacknose Dace (*Rhinichthys atratulus*)		
Washington County, Maryland			
American shad (*Alosa sapidissima*)	Potomac Sculpin (*Cottus girardi*)	American Eel (*Anguilla rostrata*)	Northern Snakehead (*Channa argus*)
	White Sucker (*Catostomus commersoni*)		
	Central Stoneroller (*Campostoma anomalum*)		
	Bluegill (*Lepomis cyanellus*)		
	Fantail Darter (*Etheostoma flabellare*)		
	Bluntnose Minnow (*Pimephales notatus*)		
	Creek Chub (*Semotilus atromaculatus*)		
	Blacknose Dace (*Rhinichthys atratulus*)		
	Smallmouth bass (*Micropterus dolomieu*)		
	Largemouth Bass (*Micropterus salmoides*)		
	Tiger Muskie (*Esox masquinongy* X *Esox lucius*)		
	Crappie (*Pomoxis* spp.)		
	Channel Catfish (*Ictalurus punctatus*)		
	Walleye (*Sander vitreus*)		
	Carp (*Cyprinus carpio*)		

State Fish Classifications

The Project would cross waterbodies in both Washington County, Maryland and Fulton County, Pennsylvania. In the Maryland Code of State Regulations, Regulation 26.08.02 (Stream Designations for the Upper Potomac River Area Sub-basin), the

waterbodies crossed by the Project are designated as I-P. This designation includes water contact recreation, protection of aquatic life, and public waters. In the Pennsylvania Code of State Regulations, (Chapter 93, Drainage Lists Z for the Potomac River Basin) the waterbodies crossed by the Project are designated for aquatic life uses, specifically warmwater fishes (WWF) and migratory fishes (MF). Maryland and Pennsylvania state fisheries classifications are detailed in table 15 below.

Table 15
Waterbody and Fisheries Classification for Waterbodies Crossed by the Project

Designation	Classification	Description	Designating Agency
Washington County, Maryland – Upper Potomac River Area Sub-Basin			
Water Contact Recreation, Protection of Aquatic Life, Public Water	I-P	Suitable for water contact sports, leisure activities that encounter surface water, fishing, growth and propagation of fish and wildlife, and water supply for agriculture, industry, and public water.	MDNR
Fulton County, Pennsylvania – Potomac River Basin			
Warmwater Fishes	WWF	Support fish species and additional flora and fauna which are indigenous to warm water habitat.	PADEP
Migratory Fishes	MF	Support fish species that migrate both from freshwater to salt water and back to freshwater to spawn, and supports fish species that migrate from salt water to freshwater and back to saltwater to spawn. Other species of fish are also supported that move to or from flowing waters to other waters.	

Key:
I-P – water contact, recreation, protection of aquatic live, public water
MDNR – Maryland Department of Natural Resources
MF – migratory fishery
PADEP – Pennsylvania Department of Environmental Protection
WWF – warmwater fish

Fisheries of Special Concern

Fisheries of special concern may include waterbodies that provide habitat for federal- or state-listed fish species, support naturally reproducing coldwater fisheries, or support commercial fishing. Based on a review of the designated waterbody and fisheries classifications through MDNR and PADEP, U.S. Fish and Wildlife Service's (FWS) Information Planning and Conservation System (IPaC) and the Pennsylvania Natural Diversity Inventory (PNDI) tool, no fisheries of special concern, exceptional or high quality waterbodies, or habitat for federal or state listed species of concern occur in the Project area. Additionally, based on review of the National Oceanic and Atmospheric Administration (NOAA) Fisheries Essential Fish Habitat (EFH) Mapper (NOAA, 2017), the Project neither crosses nor is located near waterbodies designated as EFH, as defined by the Magnuson-Stevens Fishery Conservation and Management Act.

We received approximately 10 comments that stated concern for effects on fish. Columbia would implement the ECS and BMPs to avoid or minimize impacts on water quality and fisheries resources. Impacts that could potentially occur include increased

sedimentation and turbidity due to construction activities adjacent to and in waterbodies, or introduction of water pollutants from accidental spills or leaks.

The Project would cross most waterbodies using the HDD method, which would avoid impacts on fish and aquatic life. Columbia would cross two waterbodies (unnamed tributaries of the Potomac River) using the dry open cut method (flume or dam and pump), which is described in section B.2. Dry open cut flume crossings would allow fish passage by allowing water to flow around the area that is being trenched. There would be a short temporary pulse of turbidity following completion of the waterbody crossing when construction crews remove the water diversion devices and water is allowed to flow freely again through the stream bed. Additionally, activities such as clearing of vegetation may temporarily increase local stormwater runoff volumes and sediment loading. Because impacts on waterbodies would be temporary and Columbia would implement its ECS, we conclude that the Project would not significantly impact fisheries or aquatic species.

3.2 Vegetation and Wildlife

Vegetation Communities

The Project would cross a variety of terrestrial and wetland habitats that support various wildlife species. There are several categories of vegetation cover types within the Project area that provide habitat for common wildlife species. These vegetation and habitat types and typical wildlife species that inhabit these areas are discussed below. Acreages of these vegetation communities that would be affected by the Project are shown in table 16.

Herbaceous

Vegetation found in herbaceous vegetation communities can be similar to those found in areas of cleared, developed land. Species found in herbaceous communities in the Project area are: Canada wildrye, Japanese stiltgrass, spotted touch-me-knot, arrowleaf tearthumb, New York aster, and wingstem. PEM wetlands are also included in this category. PEM wetlands in the Project area are dominated by spotted touch-me-knot, wingstem, cut-grass, reed canary grass, common rush, Japanese stiltgrass, and various sedge species.

Shrub-Scrub

Upland shrub areas identified throughout the Project consisted of species similar to those found in upland herbaceous regions, with the addition of some woody vegetation such as field brome, curly dock, allegheny blackberry, and multiflora rose. PSS wetlands are also included in this category. PSS wetlands in the Project area are dominated by black willow.

Forest

Forest cover includes deciduous-dominated forest, mixed evergreen/deciduous forest, and woodlands. Species identified in forested areas throughout the Project include: silver maple Sycamore black cherry, Northern red oak, eastern poison ivy, Virginia pine, northern white oak colt's foot, silver maple, and red columbine. PFO wetlands are also included in this category. PFO wetlands in the Project area are dominated by black willow and silver maple.

Table 16
Vegetation Communities Affected

Workspace	Herbaceous		Shrub Scrub		Forest	
	Const.	**Oper.**	**Const.**	**Oper.**	**Const.**	**Oper.**
Pipeline ROW	8.5	8.5	0.77	0.77	7.9	7.9
Existing ROW	0.32	0.32	-	-	-	-
TWS	5.9	-	-	-	3.5	-
ATWS	7.1	-	0.35	-	4.8	-
Access Roads	0.54	0.45	-	-	1.7	1.1
Staging Area	2.7	-	-	-	0.13	-
MLV and Tie-in Assemblies	0.41	0.41	-	-	0.39	0.39
Cathodic Protection	2.8	2.8	-	-	0.86	0.86
Total:	**28.3**	**12.5**	**1.1**	**0.77**	**19.3**	**10.3**

Const. – Construction ROW – right-of-way
Oper. – Operation TWS – Temporary workspace

We received approximately five comments that stated concern for the effect on vegetation. Construction activities include clearing of surface vegetation and grading the ground surface within the designated construction work area. Removal of plants and disturbance to root systems would occur during this process. Indirect impacts from this activity may include increased exposure to elements such as wind, sun, and precipitation, which could alter plant viability. Plants not adapted to different environmental conditions may not survive, while some plants may experience increased growth or distribution.

Crews would conduce pre-construction vegetation clearing and post-construction seeding in accordance with the ECS. The recovery of vegetation in disturbed areas would vary by vegetation type. Land outside the permanent right-of-way (such as temporary workspace, additional temporary workspace, and staging areas) would be allowed to revert back to pre-construction conditions. Most herbaceous and scrub shrub communities would revert back to pre-construction conditions within 1-3 years. Depending on the age class of cleared trees, forested areas are expected to achieve restoration between one and three decades. Impacts on vegetation within the permanent right-of-way may be permanent depending on pre-existing land cover. Herbaceous areas that would be converted to

permanent right-of-way would see the fewest impacts to vegetation because Columbia would maintain the right-of-way in an herbaceous state. Forested and shrub scrub areas within the new permanent right-of-way would be permanently converted to herbaceous communities.

During operation, maintenance of the Project facilities would primarily include maintaining rights-of-way. Routine vegetation maintenance would be performed in accordance with the requirements and timing identified in the ECS. Vegetative maintenance for uplands would involve clearing the entire right-of-way no more often than every three years and maintaining a corridor of 10 feet or less annually. Vegetative maintenance restrictions for wetlands would include not using herbicides within 100 feet of wetlands and not maintaining more than a 10-foot-wide corridor in an herbaceous state.

Plant species that can invade natural areas and displace native species are called invasive species. Noxious weeds are plants officially deemed destructive to agriculture, wildlife, property, recreation, and public health. These plants tend to out-compete other plant species and therefore could possibly cause environmental harm. Invasive species present in the Project area include Tree-of-Heaven, Japanese stiltgrass, multiflora rose, and Japanese knotweed. Columbia would implement BMPs included in the ECS, such as implementing a revegetation plan, monitoring for invasive species, and determining whether remedial action is necessary to limit the spread and invasive species during construction and operation of the Project.

Unique, Sensitive, and Protected Vegetation Communities

The Project would cross beneath the CHOH Park, NPS land, at MP 2.94 to MP 3.04 adjacent to the Potomac River. This area would be crossed via HDD, which would avoid impacts on this sensitive area. No state natural heritage communities have been identified within the Project area.

Wildlife Habitat

The Project would not cross or otherwise impact any significant wildlife habitats or wildlife management areas. Table 17 provides a summary of wildlife habitat crossed by the Project.

Construction and operation of the proposed Project would result in temporary and permanent alteration of wildlife habitat, as well as direct impact on wildlife species including disturbance, displacement, and mortality of smaller less mobile species. The clearing of vegetation would reduce cover, nesting, and foraging habitat for some wildlife. During construction, the more mobile species would be temporarily displaced from the proposed Project and surrounding areas to similar habitats nearby. Some wildlife displaced during construction would return to the newly disturbed area and adjacent, undisturbed habitats soon after completion of construction. Less mobile species, such as small

mammals, reptiles, and amphibians, as well as bird nests located in the construction area, may be killed during construction activities.

Noise from construction, especially near HDD activities, could temporarily affect wildlife behavior, including foraging, mating, nesting, etc. Noise may also cause individuals to temporarily relocate from the area. Because construction noise would be short-term and generally diminishes in a relatively short distance from the source of the project sites, wildlife would not likely experience significant effects due to noise disruption.

The impact of the proposed Project on agricultural and open land habitats and associated wildlife species would be minor and short term because these habitats would regenerate within 1-2 growing seasons after construction. Impacts on forested habitat would be longer term as these areas would require decades to regenerate and some forested areas would be permanently converted to herbaceous communities for pipeline operations.

Impacts on forest dwelling species include temporary and permanent habitat loss, fragmentation of habitat, and the addition of edge-type habitat. Locally, species composition could change as habitats are converted post-construction from forested to scrub/shrub or herbaceous, and edges are created along the new pipeline corridors.

Table 17 Habitat Types Crossed by the Project and Examples of Typical Wildlife				
Habitat Description	**Mammals**	**Birds**	**Reptiles**	**Amphibians/Fish**
Developed Land				
Developed lands often provide habitat for small mammals and birds that take shelter in man-made dwellings or scavenge trash or other unnatural food sources from human occupation.	*Didelphis virginian* (Virginia opossum) *Sylvilagus floridanus* (Eastern cottontail rabbit) *Sciurus carolinensis* (Gray squirrel) *Canis latrans* (Coyote) *Procyon lotor* (Raccoon)	*Cyanocitta cristata* (Blue jay) *Parus atricapillus* (Black capped chickadee) *Zonotrichia albicollis* (White throated sparrow) *Cardinalis cardinalis* (Northern cardinal)	*Thamnophis sirtalis sirtalis* (Eastern gartersnake) *Heterodon platirhinos* (Eastern hognose snake)	*Anaxyrus americanus americanus* (Eastern American toad) *Plethodon cinereus* (Red-backed salamander)
Forest				
Forest habitat includes deciduous, coniferous, and mixed forest types. They typically provide nesting and feeding habitat for species that require canopy cover or leaf litter for shelter and food.	*Tamiasciurus hudsonicus* (Red squirrel) *Urocyon cinereoargentius* (Gray fox) *Odocolleus virginianus* (White-tailed deer) *Microtus pennsylvanicus* (meadow vole)	*Parus bicolor* (Tufted titmouse) *Sitta carolinensis* (White breasted nuthatch) *Picoides pubescens* (Downy woodpecker)	*Pantherophis alleghaniensis* (Eastern ratsnake) *Lithobates sylvaticus* (Wood frog)	*Pseudacris crucifer* (Northern spring peeper) *Hyla versicolor* (Gray treefrog)
Open Land				
Open, herbaceous habitats provide cover for many small mammal species, cover for ground- dwelling birds, and feeding areas for insects, songbirds, and raptors.	*Blarina brevicauda* (Northern short-tailed shrew) *M. pinetorum* (Woodland vole) *Peromyscus leucopus* (White-footed mouse)	*Hirundo rustica* (Barn swallow) *Spinus tristis* (American goldfinch) *Turdus migratorious* (American robin) *Accipiter cooperii* (Coopers hawk)	*Pantherophis alleghaniensis* (Eastern ratsnake) *Terrepone carolina* (Eastern box turtle)	*Lithobates pipiens* (Northern leopard frog) *Plestiodon fasciatus* (Five-lined skink)
Wetlands				
Wetlands are ecologically significant ecosystems that provide habitat for various mammal, bird, reptile, and amphibian species. Wetlands affected by the proposed Project are discussed Section B.2.	*Ondatra zibethicus* (Muskrat)	*Hylocichla mustelina* (Wood thrush) *Agelaius phoeniceus* (Red winged blackbird)	*Sauritus sauritus* (Common ribbonsnake) *Chrysemys picta marginata* (Midland painted turtle) *Chelydra serpentine* (Snapping turtle)	*Lithobates clamitans melanota* (Northern green frog) *Lithobates septentrionalis* (Mink frog) *Anaxyrus fowleri* (Fowler's toad)
Open Water				
Open water habitats would include features such as ponds or lakes. These areas provide habitat for a diverse range of aquatic and amphibious species as well as a source of food and water for many mammals and birds.	*Castor canadensis* (North American beaver)	*Ardea herodias* (Great blue heron) *Buteroides striatus* (Green-backed heron)	*Apalone spinifera* (Spiny softshell turtle) *Nerodia sipedon sipedon* (Northern watersnake)	*Lithobates catesbeiana* (American bullfrog) *Necturus maculosus* (Mudpuppy) *Cottus bairdi* (Mottled sculpin) *Morone Americana* (White perch) *Carpiodes carpio* (river carpsucker)

Routine maintenance activities on the permanent right-of-way would not significantly affect vegetation and wildlife due to the minor extent of those activities. Overall, we conclude that due to the limited amount forest clearing required for the Project (about 19 acres) and Columbia's proposed measures to restore most areas to pre-construction vegetation communities, the Project would not have significant impacts on vegetation and wildlife.

3.3 Threatened, Endangered, and Special Status Species

Federally Listed Species

Special status species are those species for which federal or state agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the Endangered Species Act (ESA) of 1973. Under Section 7 of the ESA, federal agencies are required to ensure that any actions authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed or candidate threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat of a federally listed or candidate species. As the federal lead agency authorizing the Project, FERC is responsible for consulting with the FWS to determine whether federally listed threatened or endangered species or designated critical habitat are found in the vicinity of the Project, and determining the proposed action's potential effects on those species or critical habitats. In accordance with the Commission's regulations contained in 18 CFR 380.13(b), Columbia was designated as the Commission's non-federal representative for purposes of informal consultation with the FWS.

Columbia has been a part of a cooperative effort with the FWS, NPS, USFS, and FERC to develop a Multi-Species Habitat Conservation Plan (MSHCP) under Section 10 of the ESA. The MSHCP was executed with the FWS on September 13, 2013 and became effective as of January 1, 2014. The MSHCP in combination with an Incidental Take Permit (ITP), Biological Opinion (BO), and consultation concurrence letters issued by the FWS are the foundation of Columbia's Habitat Conservation Program (Conservation Program) and serves as the Section 7 consultation under the ESA for most Columbia projects. This includes avoidance and minimization measures (AMM) that would help protect and enhance habitat areas in and around Columbia's pipeline system for 43 different species and mitigation requirements for the 11 MSHCP species covered by the ITP. The Conservation Program covers general operation and maintenance activities, safety-related repairs, replacements, maintenance, pipeline construction, pipeline abandonment, and other projects (collectively referred to as "covered activities") taking place on the covered lands.

The Pennsylvania portion of the Project is entirely covered under the MSHCP. Columbia would implement its MSHCP, approved by the FWS, which serves as the Section 7 ESA consultation for the Project in Pennsylvania. The portions of the Project in Washington County, Maryland and Morgan County, West Virginia are not covered under the MSHCP. The MSCHP checklist is provided as appendix E to this EA.

The Project was run through the iPAC system on February 23, 2017 to determine if any listed, proposed or candidate species may be present in the portion of the project not covered under the MSHCP. The iPAC identified one endangered species, Indiana bat (*Myotis sodalist*), on or within the vicinity of the Project in Maryland. The iPAC also identified one threatened species, Northern long-eared bat (NLEB) (*Myotis septentrionalis*)

and two endangered species, Harperella (*Ptilimnium nodosum*) and Indiana bat on or within the vicinity of the Project in West Virginia. Columbia submitted a request for project review to the FWS West Virginia Field Office for the portion of the Project in West Virginia and the FWS Chesapeake Bay Ecological Services Field Office for the portion of the Project in Maryland on March 1, 2017.

Indiana bat

The Indiana bat is currently listed as endangered under the ESA. From the time of listing in 1967 through 2003, most of the population declines were attributed to declines at high-priority hibernacula. Recently, white-nose syndrome (a fungus-caused disease affecting hibernating bats) has spread rapidly across the eastern and midwestern United States, eastern Canada, and as far south as Mississippi. White-nose syndrome has caused mortality of thousands of hibernating Indiana bats, among other bat species.

Indiana bats are found over most of the eastern United States. Most populations swarm, or gather, at appropriate hibernation sites in the fall and use well-developed limestone caverns for winter hibernation. When active (not hibernating), the Indiana bat roosts in dead or dying trees with crevices and in live trees with exfoliating bark, such as shagbark hickory. During the summer months, reproductive females mostly occupy roost sites that consist of live trees and/or snags that have exfoliating bark, cracks, crevices, and/or hollows and that receive direct sunlight for more than half the day. Roost trees are generally found in canopy gaps in a forest, in a fence line, or along a wooded edge. Maternity roosts are found in riparian zones, wooded wetlands, upland communities, and bottomland and floodplain habitats. Indiana bats forage in semi-open to closed forests, forest edges, and riparian areas.

Potential Indiana bat habitat could exist within the Project area. Columbia conducted FWS-approved mist-net surveys for Indiana bats in May 2017. The mist-net surveys did not capture any Indiana bats. Therefore, we determined that the project **may affect, but would not likely adversely affect** Indiana bats because Indiana bats are not likely utilizing habitat in the Project area and Columbia would follow AMMs approved by FWS in Columbia's MSHCP. A list of the AMMS are provided in Columbia's Habitat Conservation Plan found on the FWS website.[13]

[13] https://www.fws.gov/midwest/endangered/permits/hcp/nisource/2013NOA/pdf/NiSourceHCPfinalChapter6.pdf

Northern long-eared bat

The FWS listed the northern long-eared bat (*Myotis septentrionalis*) as threatened under the ESA on April 2, 2015, due to dramatic population declines attributed to white-nose syndrome. Northern long-eared bats spend their winters hibernating in various-sized caves and mines with constant temperatures, high humidity, and no air currents. Suitable summer habitat consists of a wide variety of forested/wooded areas with varying canopy cover containing live or dead trees with exfoliating bark, cracks, crevices, and/or cavities. These habitats can be found adjacent to or can contain interspersed non-forested habitats such as emergent wetlands, agricultural fields, pastures, and formerly cultivated but now abandoned agricultural fields. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses.

Potential northern long-eared habitat could exist within the Project area. Columbia conducted FWS-approved mist-net surveys for northern long-eared bats in May 2017. The mist-net surveys captured one bat in the Project area in Maryland. The bat was fitted with a transmitter to locate summer roosts and/or conduct foraging telemetry. Telemetry crews were unable to locate the individual. Columbia assumes that the individual is no longer utilizing the Project area. Therefore, because there is habitat in the Project area, but is unlikely that northern long-eared bats are using the Project area, and because Columbia would follow AMMs approved by FWS in Columbia's MSHCP, we conclude that the project **may affect, but would not likely adversely affect** the northern long-eared bat.

Harperella

Harperella is a flower that inhabits riparian banks that experience periodic flooding, including saturated banks of clear, swift-flowing streams. This species is listed as endangered under the ESA. The Project would cross the Potomac River, which contains potential habitat for harperella. During field investigations on August, October, and December 2016, harperella was not identified within the Project area.

Columbia plans to use HDD to cross the Potomac River. Columbia verified that the HDD entry point occurs in upland habitat and does not provide suitable habitat for harerpella. The HDD would not directly affect the banks of the river where harperella could occur. However, FWS pointed out that an inadvertent return from drilling operations could affect river banks downstream that could contain harperella habitat. Columbia would implement several measures to prevent impacts on potential harperella in the event of an inadvertent return. The measures are listed below.

1. Source/pumps would be stopped temporarily.
2. Clean up of all spills would begin immediately.
3. Secondary containment measures including hay bales or silt fences would be installed.
4. Drilling fluid would be removed from ground surfaces to the greatest extent possible.

5. The affected areas would be restored within 30 days as closely as possible to their previous condition.
6. Agencies would be contacted within 24 hours of the event.

Due to the fact that Columbia did not find harperella within the project area and Columbia's agreement to implement the above measures, we conclude that the Project **would not likely adversely affect harperella.**

FWS Concurrence

Columbia conducted FWS-approved mist-net surveys for Indiana and northern long-eared bats and provided the Mist-Net Survey Report to the FWS for comment on June 7, 2017. The West Virginia and Chesapeake FWS Field Offices completed their review of the mist net surveys and, in a letter dated August 14, 2017, indicated that because surveys showed no bats were likely utilizing the area, the Northern Long-eared bat and Indiana bat are not expected to be adversely affected by the Project (FWS, 2017a). Columbia also received clearance on August 10, 2017 from the West Virginia FWS Field Office stating the harperella is not expected to be adversely affected by the Project if the recommended mitigation measures are followed in the event of an inadvertent release. FWS also indicated that if any deviations from the proposed HDD plans are anticipated or if an inadvertent release occurs, Columbia should notify them immediately (FWS, 2017b). The West Virginia FWS Field Office also stated that their letter does not serve as completed section 7 documentation. In order to complete section 7 consultation, FERC would need to submit a formal effects determination to the FWS. In response, we are providing this EA and a cover letter to the West Virginia FWS Field Office as our formal effects determination. However, as section 7 consultation is incomplete at this time, **we recommend that:**

- **<u>Columbia should not begin construction activities until</u>:**

  a. **the staff completes ESA Section 7 consultation with the FWS, and**
  b. **Columbia has received written notification from the Director of OEP that construction or use of mitigation may begin**

State-listed Species

Columbia consulted with state agencies and programs to identify any state-listed species potentially affected by the Project. The MDNR did not identify any state-listed plant or animal species within the Project area. West Virginia does not have any state endangered species legislation; therefore, the only listed species in West Virginia are federally listed species. Columbia submitted an analysis through PNDI, which identified one state-listed species – *Chrysogonum virginianum* – that could occur in the Project area. *Chrysogonum virginianum*, commonly called goldenstar, is a low-growing, herbaceous, perennial that is native to the eastern US. It is primarily found along dry, woodland edges

and forest clearings from Ohio to Georgia, and westward to Louisiana. The results of the PNDI analysis concluded no impact on this species. We concur.

Migratory Birds

The entire Project lies within the Atlantic Flyway, a bird migration route in the eastern United States that includes the Atlantic coast and Appalachian Mountains.

Migratory birds, including Birds of Conservation Concern (BCC) and their active nests, are protected by the Migratory Bird Treaty Act (MBTA) of 1918. Birds protected under the MBTA include some federal and state listed species as well as common native species that migrate during their life cycle. The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. For purposes of the MBTA, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, wound, kill, trap, capture, or collect" (50 CFR 10.12). The MBTA applies to migratory birds that are identified in 50 CFR 10.13. Migratory bird habitat is not protected under the MBTA, although activities that affect habitat and result in direct take of migratory birds or their active nests would violate the MBTA.

On March 30, 2011, the FWS and the Commission entered into a Memorandum of Understanding (MOU) that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the Commission and the FWS by identifying areas of cooperation. This voluntary MOU does not waive legal requirements under the MBTA, the ESA, the Federal Power Act, the NGA, or any other statutes and does not authorize the take of migratory birds.

The FWS developed the BCC to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the country'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 the MBTA. However, BCC includes some non-MBTA-protected species because their conservation status and efforts are of concern to the FWS. 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 distinct levels including a National level, North American Bird Conservation Initiative Bird Conservation Regions (BCR) level, and at a

FWS service regions level. The entire Project lies within the Appalachian Mountains Region (BCR 28).

Priority forest birds for the Appalachian Mountains Region include Cerulean warbler at low elevations, Golden- winged warbler (*Vermivora chrysoptera*) in early-successional areas, and Henslow's sparrow (*Ammodramus henslowii)* in grasslands. A list of migratory BCC species that may be affected by the Project as identified by the FWS is provided in table 18 below.

Table 18
Birds of Conservation Concern Potentially Occurring in the vicinity of the Project

Common Name	Scientific Name	Breeds in Region	Ground Nesting	Shrub Nesting	Tree Nesting
Bald eagle[(a)(d)(e)]	*Haliaeetus leucocephalus*	-	o	o	x
Peregrine falcon[(a)(b)(e)]	*Falco peregrinus*	x	x	o	x
Upland sandpiper[(a)(b)(e)]	*Bartramia longicauda*	x	x	o	o
Northern saw-whet owl[(a)]	*Aegolius acadicus*	-	o	o	x
Whip-poor-will[(a)]	*Caprimulgus vociferus*	x	x	o	o
Red-headed	*Melanerpes erythrocephalus*	x	o	o	x
Yellow-bellied	*Sphyrapicus varius*	x	o	o	x
Olive-sided flycatcher[(a)]	*Contopus cooperi*	-	-	-	-
Loggerhead shrike[(a)]	*lanius ludovicianus*	-	-	-	-
Black-capped chickadee[(a)]	*Poecile atricapillus*	-	-	-	-
Bewick's wren[(a)]	*Thryomanes bewickii*	-	-	-	-
Sedge wren[(a)]	*Cistothorus platensis*	x	x	o	o
Wood thrush[(a)(b)(e)]	*Hylocichla mustelina*	x	o	o	x
Blue-winged	*Vermivora cyanoptera*	x	x	x	o
Golden-winged	*Vermivora chrysoptera*	x	x	x	o
Prairie warbler[(a)(b)(e)]	*Setophaga discolor*	x	o	o	x
Cerulean warbler[(a)(b)(e)]	*Setophaga cerulea*	x	o	o	x
Worm-eating	*Helmitheros vermivorum*	x	x	x	o
Swainson's warbler[(a)]	*Limnothlypis swainsonii*	-	-	-	-
Louisiana	*Parkesia motacilla*	x	x	o	x
Kentucky warbler[(a)(b)(e)]	*Geothlypis formosa*	x	x	x	x
Canada warbler[(a)(b)]	*Cardellina canadensis*	x	x	x	x
Henslow's sparrow[(a)(b)(e)]	*Ammodramus henslowii*	x	x	o	o
Rusty blackbird[(a)(c)(e)]	*Euphagus carolinus*	-	o	x	x
Willow flycatcher[(b)(e)]	*Empidonax traillii*	x	o	x	x
Fox sparrow[(c)(e)]	*Passerella iliaca*	-	x	x	x
Pied-billed grebe[(b)(e)]	*Podilymbus ppodiceps*	x	o	o	o
Short-eared owl[(c)(e)]	*Asio flammeus*	-	x	o	o
Black-billed cuckoo[(b)(e)]	*Coccyzus erthropthalmus*	x	x	x	x
Red crossbill[(a)]	*Loxia curvirostra*	-	-	-	-

Note: "–" = not applicable; "o" = does not nest in habitat type; "x" = present
Nesting habitat type is only provided for those species that breed in Bird Conservation Region 28 or listed by IPaC.

(a) Birds of Conservation Concern, Region 28 – Appalachian Mountains List
(b) Breeding
(c) Wintering
(d) Year-round
(e) IPaC Birds of Conservation Concern

Sources: U.S. Fish and Wildlife Service, 2008; Cornell Lab of Ornithology, 2015.

Construction, operation, and maintenance of the proposed Project could result in impacts on migratory birds. Potential impacts on nesting migratory bird species include direct impacts, noise generated during construction, habitat fragmentation, loss of wooded

habitat, and temporary removal of vegetation, which could cause nesting species to relocate to other suitable habitat.

The greatest potential to impact migratory birds would occur if tree removal and mowing take place during the nesting periods. Construction of the proposed facilities is scheduled to occur from March 2018 to November 2018, and therefore tree-clearing could overlap with the nesting season of migratory birds. However, tree clearing would be limited to only about 19 acres. Columbia has stated it would consult with the FWS, MDNR, PADCNR, and WVDNR and implement appropriate steps to avoid and minimize the potential for the unintentional take of migratory birds during construction and operation of the proposed facilities. However, Columbia has not provided the results of its consultations or identified any specific mitigation measures it would implement in the case that Columbia would need to clear vegetation during the migratory bird nesting season (April 1 - August 31), Columbia has not agreed to implement specific mitigation measures to protect nesting birds. Therefore, **we recommend that**:

- **Prior to any tree clearing during the migratory bird nesting season (April 1 - August 31), Columbia should file with the Secretary a Migratory Bird Conservation Plan developed in consultation with the FWS, along with documentation of consultation with the appropriate FWS field offices regarding project-related impacts on migratory bird species.**

During project operation, the Columbia's ECS prohibits routine vegetation maintenance clearing from occurring between April 15 and August 1 of any year, unless otherwise approved by the FWS, to minimize potential impacts on migratory birds.

Bald Eagles

The Bald and Golden Eagle Protection Act (16 U.S.C.668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

A review of the Project using IPaC did not indicate any known bald eagle nests within the vicinity of the Project span in Maryland, Pennsylvania, or West Virginia. The construction and activities performed on the Project would be in compliance with the National Bald Eagle Management Guidelines. Columbia would continue consultation with the USFWS, WVDNR, and the PADCNR to confirm that no known nest or communal roosts occur within one mile of the Project.

Due to Columbia's adherence to the ECS, Columbia's MSHCP, the limited extent and duration of construction activities, and our recommendation above, we conclude that the Project would not have a significant adverse effect on special status species.

4.0 Land Use, Recreation, and Visual Resources

4.1 Land Use

Columbia's proposed Project would affect approximately 60.9 acres (temporary and permanent) of land during construction. Activities within the permanent right-of-way would include the conversion of forest (forested land) to herbaceous (open land) for the future maintenance of the pipeline. The land use areas include: developed land, forested land, other, open land, open water, and residential. The Project would result in 25.9 acres of conversion of natural vegetation to managed grassland. The remaining acreage would be returned to pre-construction uses or per landowner agreement. Appendix F, provides the summary of land use requirements for construction and operation of the Project.

Developed Land

Developed land includes industrial and commercial areas including manufacturing, landfills, quarries, mines, and retail areas, and transportation corridors including railroads, local, state, and federal roads. Developed land also incorporates residential areas. Temporary impacts on residential areas may include disturbance of lawns, removal of fences, and other minor residential accessory structures. This may include the removal of ornamental shrubs, the disturbance of streets, driveways, and sidewalks; altered traffic patterns; and temporary noise impacts from construction activities. 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 agreements and must not jeopardize the future integrity of the right-of-way or impede access by pipeline personnel for operation and maintenance activities.

Forest Land

Section 3.1 provides a more in depth discussion with regard to the types of upland forests and woodlands crossed by the Project.

The Project would impact forested land associated with the removal of trees and shrubs from the construction work areas (i.e., rights-of-way and ATWS). Following construction, trees and shrubs in the temporary workspace and ATWS areas would be allowed to reestablish to pre-construction conditions through natural succession. The permanent pipeline rights-of-way would be maintained in a manner consistent with Columbia's established plans for maintenance of operational areas, including supporting herbaceous and low scrub-shrub communities. For the Project sections that require new

right-of-way in forested areas, the result would be a permanent conversion of forested land to open land in the maintained right-of-way. Work spaces would be utilized and all equipment would access these areas along the construction right-of-way or approved access roads. About 19 acres of upland forest land would be affected by the Project. Following construction, about 9 acres would be allowed to revert to pre-construction conditions and the remaining 10 acres would be converted to maintained right-of-way. Impacts on upland forest lands would be long-term, as it would take decades for mature trees to re-establish. However, the small amount of acreage cleared would not constitute a significant impact on forest land.

Other

The Project contains land uses categorized as other, which includes the Western Maryland Rail Trail, NPS property, and the U.S. Bicycle Route 50 located on the southern end of the pipeline. The Western Maryland Rail Trail is located at approximately MP 2.89 to MP 2.91. NPS property is located at two locations at approximately MP 2.93 to MP 2.93 and MP 2.96 to MP 3.02. These areas would have no impacts on land use as Columbia is proposing to cross these locations via HDD.

Open Land

Open land is abundant throughout the project area in Pennsylvania, Maryland, and West Virginia. Open land consists of any areas where non-forested land, pastures, and fields exist. These areas would have impacts associated with excavation and construction of the pipeline. All work spaces and staging areas located in open land would have temporary impacts associated with staging equipment and spoil from excavations/drilling.

Construction and restoration would follow the procedure outlined in the ECS. Approximately 26.4 acres of open land would be affected by the Project during construction and would be returned to existing contours and seeded as specified in the restoration requirements or applicable landowner agreements. About 0.3 acre of existing right-of-way associated with the tie-in to the Texas Eastern pipeline would be used for the Project. Following construction, approximately 13.2 acres would continue to be used as permanent rights-of-way. The remaining 13.2 acres would be restored and returned to pre-construction conditions and use.

Open Water

Open water areas within the Project are defined as water crossings that are greater than 100 feet. These areas within the Project area would consist of one waterway, the Potomac River. The C&O canal runs parallel along the Potomac River and in many areas, has connection. The canal is considered a navigable waterway per the USACE. No impacts are anticipated for any open water resources within the project area. Both the Potomac River and C&O canal are proposed to be crossed using HDD.

Residential Land

Land associated with residential yards and housing is considered residential land throughout the Project area. Residential land tracts are located throughout the Maryland portion of the Project area. The Project would not affect residential land in Pennsylvania or West Virginia. Residential land in Maryland would have impacts associated the pipeline right-of-way, TWS, ATWS, and cathodic protection.

Based on a review of aerial photography and field surveys, there are two buildings within 50 feet of the Project's construction work areas associated with the new pipeline and workspaces. There would not be direct effects on these structures and based on the distance from construction workspace, no adverse impacts would occur. There are no residential homes within 50 feet of construction work areas. Table 19 identifies the locations of these buildings by milepost and the approximate distance from the construction right-of-way.

Table 19
Buildings Within 50 Feet of the Construction Work Area

Milepost	Approx. Distance from Construction Work Area (feet)	Approx. Distance from Pipeline Centerline (feet)	Structure Type (House/Barn/Garage)
Fulton County, Pennsylvania			
None Identified			
Washington County, Maryland			
1.88	9.0	34.0	Shed
1.92	9.4	34.3	Barn/Shed
Morgan County, West Virginia			
None Identified			

We received comments that we should assess whether or not environmental justice communities would be disproportionately affected by the Project. In accordance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, we address the potential for disproportionately high and adverse health or environmental effects of the Project on minority and low-income populations. According to the CEQ environmental justice guidance under NEPA (CEQ 1997a), minorities are those groups that include American Indian or Alaskan Native; Asian or Pacific Island; Black, not of Hispanic origin; or Hispanic. Minority populations are defined where either; (a) the minority population of the affected area exceeds 50 percent or, (b) the minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. The CEQ guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. In this EA, low-income populations are defined as those individuals with reported income below the poverty level.

We used EPA's Environmental Justice Screening and Mapping Tool to assess whether any environmental justice communities would be disproportionately impacted by the Project. We assessed the potential for environmental justice areas within 0.25 mile of the Project. The portion of minority populations in the areas crossed by the Project do not exceed 50 percent and is less than the minority population of the surrounding area. Additionally, the poverty levels are below 50 percent for the area. There is no evidence that the Project would cause a disproportionate share of adverse environmental or socioeconomic impacts on any racial, ethnic, or socioeconomic group.

Special Management Areas

The Project would cross or pass within 0.25 miles of areas of land that are publicly owned or managed tracts of land. All areas were identified through geographic information systems review and additional information was reviewed from the NPS. Public and conservation lands crossed are provided in Table 20.

Table 20
Public Land and Designated Recreation, Scenic, or Other Areas

Mileposts		Name of Area	Land Owner	Crossing Length (feet)	Area Affected by Construction (acres)
Begin	End				
2.89	2.91	Western Maryland Rail	State	103.0	None - Crossed via HDD
2.94	2.94	U.S. National Park Service	Federal	26.0	
2.94	2.96	U.S. Bicycle Route 50	Federal	90.0	
2.96	3.02	U.S. National Park Service	Federal	327.0	
3.04	3.06	Potomac River	State	490.3	

4.2 Public, Conservation, or Recreation Lands

We received approximately 40 comments where concern for public and recreational land was stated. The Project would cross NPS property in Washington County. This property is associated with the C&O Canal and towpath trail which parallels the Potomac River. The C&O Canal was originally utilized for the transportation of lumber and agricultural products. The C&O Canal is used today for historical and recreation uses. Also, U.S. Bicycle Route 50 and the Western Maryland Rail Trail are located in Washington County. These trails are used for bicycling, hiking, jogging, and inline skating. No impacts are anticipated for this area, as Columbia is proposing to cross the NPS land via HDD. Lastly, the Potomac River is also located in Washington County. Columbia would obtain the necessary approvals from the State of Maryland for the river crossing. The Project would cross these features using HDD, and no impacts are anticipated.

4.3 Visual Resources

The Project consists of forested land, rolling pastures, and residential development. The physiographic province that is crossed by the proposed Project is known as the Valley

and Ridge or Ridge and Valley Province. This area consists of alternating ridges and valleys that span across the eastern United States for nearly 1,200 miles. This region extends from New York to central Alabama (Encyclopedia Britannica, 2017). The proposed route has been aligned accordingly to avoid any impacts to aesthetic features when practicable. Considering that the Project is in the Valley and Ridge Province, much of the line of sight would be fragmented throughout the span of the Project limiting impacts on visual resources; however, all areas of pipeline alignment have been aligned accordingly to avoid or minimize the impacts associated with any visually appealing features.

The construction and installation of the Project would result in visual impairment of the permanent right-of-way. Approximately 59 percent of the land that would be crossed throughout the Project is not forest. These areas would be returned to their existing pre-construction contours, graded, and seeded, with minimal visual impact. However, approximately 41 percent of the area crossed by the Project is forested. These impacts would be permanent in nature due to the maintenance of the 50-foot wide permanent right-of-way. The right-of-way in these areas would be converted from forested to herbaceous. Due to the limited amount of clearing (19 acres) and the fact that these areas are already fragmented, the right-of-way would not be an entirely new visual element in the area.

As discussed, the Project crosses NPS land which may be sensitive to visual impacts. This land would be crossed via HDD to reduce land impacts, as well as minimize visual impacts in the viewshed of the NPS lands. Minor hand clearing of one to two-foot-wide path for the guide wires would occur in thickly vegetated areas along portions of the right-of-way along the HDD under the NPS land. However, tree clearing for HDD entry/exit points would not occur within 1,000 feet of NPS property or the banks of the Potomac River in West Virginia, which would reduce the extent of visual impacts.

The Project would cross land encumbered by a NPS scenic easement. The crossing is approximately 120 feet long and the HDD installed pipeline would be around 150 feet below ground surface. Columbia would have to obtain a right-of-way permit from the NPS to cross the lands under NPS scenic easement.

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

5.0 Cultural Resources

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

The area of potential effects (APE) for the Project comprises direct effects which includes a 300 foot wide corridor for the pipe line right of way on private lands, a 200 foot wide corridor on NPS lands, and the construction foot print of extra work spaces and above ground facilities. The area of indirect effects for architectural resources includes areas within view of construction of above ground facilities or changes to the landscape.

Pennsylvania

Columbia conducted a cultural resources survey of the pipeline corridor, extra work space, the tie-in location and an access road. No archaeological sites or above ground historic properties were identified. In letters dated October 12, 2016, March 17 and April 3, 2016 the Pennsylvania State Historic Preservation Officer (SHPO) concurred. We also concur.

Maryland

Columbia surveyed the pipeline right-of-way within a 300-foot-wide survey corridor, 6 access roads, 2 cathodic protection areas, one staging area and one main line valve. The survey identified 1 archaeological site, 1 historic cemetery, a boundary stone marking the Pennsylvania/Maryland border, an 1870 log house, and the historic structure, “Old Mr. Flint’s Place”. The archaeological site is recommended not eligible for listing in the NRHP. The cathodic protection area in the vicinity of the cemetery has been removed from the Project, and the boundary stone would not be affected by the pipeline construction. The two historic structures would not be directly or indirectly affected by the project. In a letter dated May 15, 2017 the Maryland SHPO concurred with the recommendations but requested additional mapping of the family cemetery in relation to the right-of-way. Columbia provided the additional mapping showing the removal of the cathodic protection in the vicinity of the cemetery.

The pipeline in Maryland would cross the Chesapeake and Ohio Canal National Historical Park and the Potomac River by HDD. Columbia conducted a survey of the NPS property within a 200-foot-wide survey corridor and identified one archaeological site, 18WA617. The recovery of prehistoric artifacts from depths up to 35.8 inches below ground surface indicates a potential for intact deposits at the site. Since the HDD beneath the Park would be 116-148 feet below the ground surface, the Project is unlikely to affect the site.

The pipeline would be installed under the canal bed and towpath by HDD at a depth of 116 to 148 feet below the ground surface. There are no other structures such as locks, dams, or lock houses in the vicinity of Project area. Columbia recommends that the Project will have no effect to the canal. The Maryland SHPO (July 25, 2017) recommended that the project would have no adverse effect on historic properties. We concur. The NPS made two comments on the draft survey report, which Columbia addressed. In an email dated October 24, 2017 the NPS indicated it had no further comments on the revised report.

Columbia has also prepared a boring plan with a feasibility analysis and contingency plan in the event the drill is not successful. The feasibility analysis indicates a low risk of failure of the HDD at this location.

West Virginia

Columbia surveyed the pipeline corridor, extra width to the pipeline corridor for a total survey width of 300 feet, an access road, a launcher/receiver site and a staging area in West Virginia. The SHPO concurred on April 14 and May 10, 2017 that no archaeological sites were identified. However, they commented that the pipeline would cross the B & O Railroad, which is eligible for listing in the NRHP. Columbia conducted additional research into the B & O Railroad crossing and recommend that since the pipeline would be installed under the railroad by HDD there would be no surface effect to the railroad. Further, no trees would be cut on the side of the hill adjacent to the tracks, so there would be no visual effect to the transportation corridor. One house, No. MN-0260, was identified within the area of indirect effects, and is recommended not eligible for listing in the NRHP. In a letter dated October 11, 2017 the West Virginia SHPO concurred with the recommendations. We also concur.

A small section of the pipeline and proposed tie-in facility are located along a section of US Route 522 that is approximately 0.83 miles south of Orrick's Hill which is part of the Hancock Civil War Battlefield and the Bombardment of Hancock. The area is encompassed in the potential National Register boundary that extends southward along US Route 522 approximately 2 miles. Columbia recommended that there would be no direct effect on the battlefield and the pipeline corridor would not be visible from the Bombardment of Hancock historic property. The West Virginia SHPO concurred. In a letter dated December 15, 2017 the NPS requested additional information before making a determination of effect for the Hancock Civil War Battlefield.

Tribal Consultation

On August 31, 2016 Columbia wrote to the Absentee-Shawnee Tribe of Oklahoma, Catawba Indian Nation, Cayuga Nation of New York, Cherokee Nation of Oklahoma, Delaware Nation, Delaware Tribe of Indians, Eastern Band of the Cherokee Indian, Eastern Shawnee Tribe of Oklahoma, Oneida Tribe of Indians of Wisconsin, Oneida Indian Nation of New York, Onondaga Nation of New York, Seneca-Cayuga Tribe of Oklahoma, Seneca Nation of Indians, Stockbridge-Munsee Community of Wisconsin, Shawnee Tribe, St. Regis Band of Mohawk Indians of New York, Tonawanda Band of Seneca Indians of New York, Tuscarora Nation, and United Keetoowah Band of Cherokee Indians of Oklahoma to request their comment on the Project. We sent our Notice of Intent (April 25, 2017) to the same tribes, and on June 23, 2017 we wrote to the same tribes to request their comments on the Project.

The Delaware Tribe requested copies of the survey forms for the Fulton County portion of the project. Columbia provided the tribe with the survey forms. The tribe responded they had no objections to the Project but requested to be notified in the event of an inadvertent discovery. The Cherokee Nation responded they had no objections to the project. The Delaware Nation and the Shawnee Tribe both responded that they had no objections to the Project but requested to be notified in the event of any unanticipated discovery.

Columbia has prepared plans for each state in the event any unanticipated human remains or historic properties are encountered during construction. We requested revisions to the plans which Columbia made. The plans provide for the notification of interested parties, including Indian tribes, in the event of a discovery. We find the revised plans to be acceptable.

Since consultation with the NPS is not complete for the project, to ensure our responsibilities under the NHPA and its implementing regulations are met, **we recommend:**

- **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 until:**

  a. Columbia files with the Secretary:

  (1) remaining cultural resources survey report(s);
  (2) site evaluation report(s) and avoidance/treatment plan(s), as required; and
  (3) comments on the cultural resources reports and plans from the National Park Service and West Virginia State Historic Preservation Office

b. the Advisory Council on Historic Preservation is afforded an opportunity to comment if historic properties would be adversely affected; and

c. the FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Columbia in writing that treatment plans/mitigation measures (including archaeological data recovery) 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: "CUI//PRIV- DO NOT RELEASE."

6.0 Air Quality and Noise

6.1 Air Quality

Federal and state air quality standards are designed to protect human health. The EPA has developed National Ambient Air Quality Standards (NAAQS) for criteria air pollutants such as oxides of nitrogen (NOx) and carbon monoxide (CO), sulfur dioxide (SO_2), and inhalable particulate matter (PM2.5 and PM10). PM2.5 includes particles with an aerodynamic diameter less than or equal to 2.5 micrometers, and PM10 includes particles with an aerodynamic diameter less than or equal to 10 micrometers. The NAAQS were set at levels the EPA believes are necessary to protect human health and welfare. Volatile organic compounds (VOC) and hazardous air pollutants (HAP) are also emitted during fossil fuel combustion.

Greenhouse Gases (GHG) produced by fossil-fuel combustion are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHGs status as a pollutant is not related to toxicity. GHGs are non-toxic and non-hazardous at normal ambient concentrations, and there are no applicable ambient standards or emission limits for GHG under the Clean Air Act. GHGs emissions due to human activity are the primary cause of increased atmospheric concentration of GHGs since the industrial age. These elevated levels of GHGs are the primary cause of warming of the climate system during the industrial age.

During construction and operation of the Project, GHGs would be emitted from construction equipment and fugitive methane emissions. Emissions of GHGs are typically expressed in terms of CO_2 equivalents (CO_2e).

If measured ambient air pollutant concentrations for a subject area remain below the NAAQS criteria, the area is considered to be in attainment with the NAAQS. The Project areas are in attainment for all NAAQS.

The Clean Air Act is the basic federal statute governing air pollution in the United States. We have reviewed the following federal requirements and determined that they are not applicable to the proposed Project:

- New Source Review;
- Title V;
- National Emissions Standards for Hazardous Air Pollutants;
- New Source Performance Standards;
- Greenhouse Gas Reporting Rule; and
- General Conformity of Federal Actions

Construction Impacts

During construction, a temporary reduction in ambient air quality may result from criteria pollutant emissions and fugitive dust generated by construction equipment. The quantity of fugitive dust emissions would depend on the moisture content and texture of the soils that would be disturbed. Fugitive dust and other emissions due to construction activities generally do not pose a significant increase in regional pollutant levels; however, local pollutant levels could increase. Columbia would implement dust suppression techniques, such as watering the right-of-way may be used as necessary in construction zones near residential and commercial areas to minimize the impacts of fugitive dust on sensitive areas. Construction emissions would be low because the short length of the pipeline, limited soil disturbance, and relatively short duration of expected construction activity. Construction emissions are listed in table 21 below.

Table 21
Construction Emissions
(tons/year)

NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHG (as CO_{2e})	Total HAPS
0.25	2.4	0.12	0.004	19.6	2.8	440	0.03

1: Assuming Columbia using Tier IV construction equipment
2: Assumes Ultra low sulfur fuel used

Operational Impacts

There would be no permanent stationary sources of pollutants during operation of the pipeline with the exception of fugitive methane leaks from the pipeline. These methane emissions would be very low, the resulting GHG emissions would also be low. Columbia did not provide these emissions, however, we have estimated GHG emissions due to methane leaks in table 22 below.

Table 22 Operational Methane GHG Emissions[1] (metric tons per year)	
Component	**GHG (as CO2e)[2]**
Mainline Valve Emissions	0.25 - 1.0
Pipeline Emissions	0.9
1: The API Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry, 2004 2: Using Methane Global Warming Potential of 25	

We recognize the availability of a reasonable EPA-developed methodology to estimate the downstream GHG emissions from a project, assuming all of the gas to be transported is eventually combusted. As such, we estimated the GHG emissions from the end-use combustion of the natural gas to be transported to obtain potential downstream GHG emissions.

The Project can deliver up to 46.6 MMcf/d of new volumes of natural gas, which if combusted would produce 920,000 metric tons of CO_2 per year[14]. This emission range represents an upper bound of GHG emissions because it assumes the total maximum capacity is transported 365 days per year, and not used as an industrial feedstock. As such, it is unlikely that this total amount of GHG emissions would occur. Additionally, were the generation capacity to be fueled by coal or oil; the GHG emissions would be greater. This would result in a less than 1% increase in GHG emissions from fossil fuel combustion in West Virginia[15], or on the national level[16].

Based on the short duration of construction activities, our review of the estimated emissions from construction and operation of the proposed Project, we do not believe there would be either local or regionally significant impacts on air quality.

6.2 Noise

The noise environment can be affected both during construction and operation of pipeline projects. 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. Two measures to relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level (Leq) and day-night sound level (Ldn). The Leq is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The Ldn is the Leq plus 10 decibels on

[14] CO_2, not CO_2e, as we do not account for downstream N_2O in combustion (very minor component) or methane leakage.
[15] Based upon West Virginia fossil fuel GHG emissions of 92 million metric tons for 2015, per year according to U.S. Energy Information Administration (November, 2017). https://www.eia.gov/environment/emissions/state/
[16] Based on 5,411 million metric tons of CO_2 in 2015 as presented by the EPA at https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf.

the A-weighted scale (dBA) added to account for people's greater sensitivity to nighttime sound levels (between the hours of 10 p.m. and 7 a.m.). The A-weighted scale is used because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA; 6 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise.

Construction Noise

Construction noise is highly variable. Many construction machines operate intermittently, and the types of machines in use at a construction site change with the construction phase. The sound level impacts on residences along the pipeline right-of-way due the construction activities would depend on the type of equipment used, the duration of use for each piece of equipment, the number of construction vehicles and machines used simultaneously, and the distance between the sound source and receptor. Nighttime noise due to pipeline construction would be limited since construction generally occurs during daylight hours, Monday through Saturday.

An exception to the typical daytime construction hours would be certain HDD activities, which may continue into nighttime hours and would operate 24 hours per day for about 6 weeks of HDD activity (excluding days for mobilization and demobilization of construction equipment). Because of the nighttime activity and the fact that the equipment used for the HDDs would be stationary for an extended period of time, there is a greater potential for a prolonged noise impact. Columbia proposes to use the HDD method at the Potomac River Crossing (HDD 1) and the I-68 crossing (HDD 2). Two NSAs are located within 0.5 mile of the HDD entry and exit site(s) at the two HDD locations as well as the US Bicycle Route 50 near the HDD 1. Figures 6-1 and 6-2 identify the NSA locations in relation to each HDD entry and exit.

Figure 2

Potomac and US Bicycle Route 50 HDD Location (HDD 1)

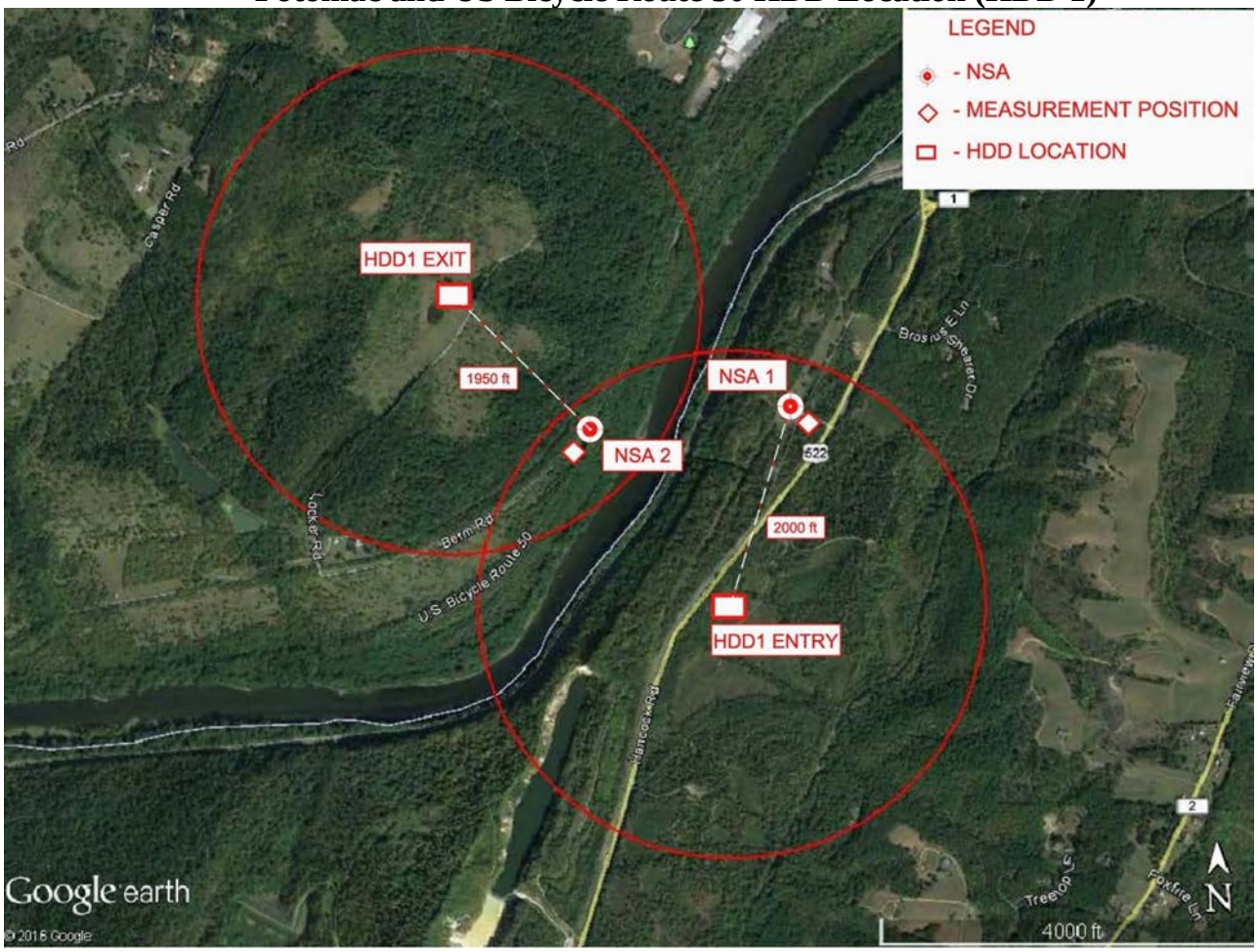
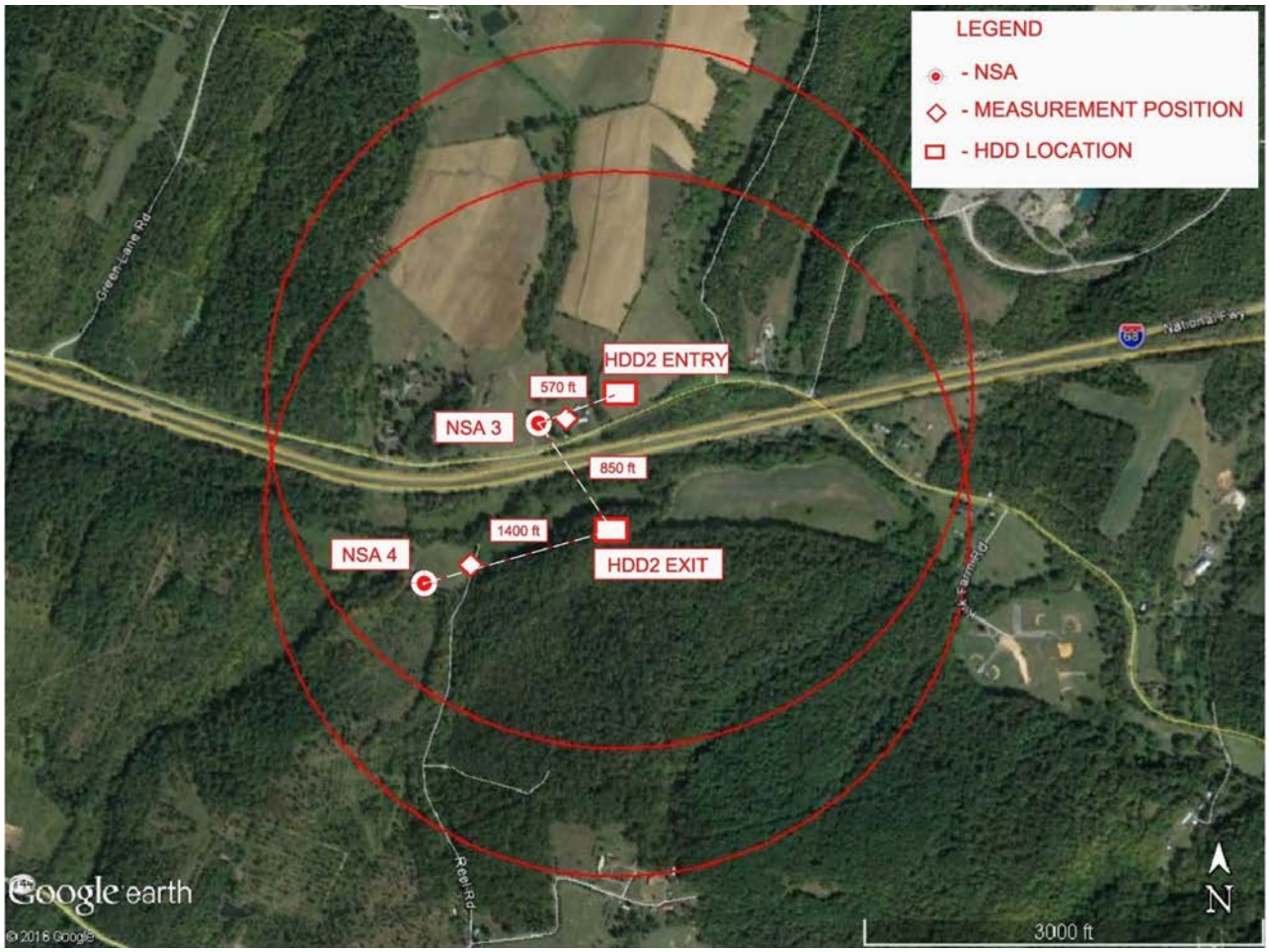


Figure 3
I-68 HDD Location (HDD 2)



Columbia conducted an acoustical analysis to estimate the noise levels attributable to each HDD and the total noise level at each NSA. The estimated noise impacts from the two HDDs are identified in table 23.

Table 23 HDD Noise Impacts				
NSA	**Ambient Noise (dBA)**	**Drilling Noise Impact (dBA, Ldn)**	**Total Resultant Noise (dBA Ldn)**	**Noise Increase (dBA)**
Potomac & US Bicycle Route 50 Crossing (HDD 1)				
1 – Residence	53.6	46.6	54.4	0.8
2 - Residence	51.8	36.1	51.9	0.1
US Bicycle Route 50	51.8	36.1	51.9	0.1
I-68 Crossing (HDD 2)				
3 - Residence	65.9	60.7	67.0	1.1
4 - Residence	61.1	54.5	62.0	0.9

It is possible that the noise impacts during 24 hour drilling would exceed 55 dBA Ldn at the I-68 HDD location NSAs. However, the net noise increase impact would only be slightly above ambient noise conditions. This is primarily due to the traffic noise from I68. The noise impacts at all NSAs and the US Bicycle Route 50 due to the HDD operations would be below 55 dBA for either day or night operations. The noise from HDD operations, and construction may be audible at all NSAs and to the public using the Bike Path, but we conclude that this noise impact would not be significant based on the acoustical analysis. Similarly, we conclude, that these small increases during the short period of HDD operations as well as general pipeline construction would not result in significant noise impacts to the local residents, the public, or the environment.

7.0 Reliability and Safety

The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for accidental release of natural gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

We received about 15 comments stating concerns with regard to safety. Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an auto-ignition temperature of 1,000 degrees Fahrenheit and is flammable at concentrations between 5.0 percent and 15.0 percent in air. An unconfined mixture of methane and air is not explosive, however it may ignite and burn if there is an ignition source. A flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

Safety Standards

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

Title 49, U.S.C. Chapter 601 provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement actions. Pennsylvania, Maryland, and West Virginia have approved intrastate inspection programs, but do not have delegated programs for inspections of interstate natural gas 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 (Memorandum) dated January 15, 1993, between the DOT and the 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 that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection. Alternatively, an applicant must certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert 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.

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

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The DOT

specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

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

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

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. For instance, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

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

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

The DOT Pipeline Safety Regulations require operators to develop and follow a written integrity management program that contain all the elements described in 49 CFR 192.911 and address the risks on each transmission pipeline segment. The rule establishes an integrity management program which applies to all high consequence areas (HCA).

The DOT has published rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for 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 where the potential impact radius[17] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[18], or
- any area in Class 1 or 2 where the potential impact circle includes an identified site.

An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

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

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

No HCAs have been identified along the proposed pipeline route.

Pipeline Accident Data

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

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

[17] The potential impact radius is calculated as the product of 0.69 and the square root of: the MAOP of the pipeline in psig multiplied by the square of the pipeline diameter in inches.
[18] The potential impact circle is a circle of radius equal to the potential impact radius

- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency system shutdown and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

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

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

- caused a death or personal injury requiring hospitalization; or
- involve property damage of more than $50,000 (1984 dollars)[19].

During the 20 year period from 1995 through 2014, a total of 1,265 significant incidents were reported on the more than 300,000 total miles of natural gas transmission pipelines nationwide.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 24 provides a distribution of the causal factors as well as the number of each incident by cause.

The dominant causes of pipeline incidents are corrosion and pipeline material, weld or equipment failure constituting 49.6 percent of all significant incidents. The pipelines included in the data set in table 24 vary widely in terms of age, diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

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

[19] $50,000 in 1984 dollars is approximately $112,955.73 as of May 2015 (CPI, Bureau of Labor Statistics, 2015)

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.

Table 24
Natural Gas Transmission Pipeline Significant Incidents by Cause
1995-2014[1]

Cause	No. of Incidents	Percentage
Corrosion	291	23.0
Excavation[2]	207	16.4
Pipeline material, weld or equipment failure	337	26.6
Natural force damage	147	11.6
Outside force[3]	79	6.2
Incorrect operation	40	3.2
All other causes[4]	164	13.0
TOTAL	1,265	-

1. All data gathered from PHMSA Significant incident files, January 14, 2016. http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends
2. Includes third party damage
3. Fire, explosion, vehicle damage, previous damage, intentional damage
4. Miscellaneous causes or unknown causes

Outside force, excavation, and natural forces are the cause in 34.2 percent of significant pipeline incidents. These result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 25 provides a breakdown of external force incidents by cause.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller-diameter pipelines; which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movement.

Since 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts.

Table 25 Outside Forces Incidents by Cause[1] 1995-2014		
Cause	**No. of Incidents**	**Percent of all Incidents**
Third party excavation damage	172	13.6
Operator excavation damage	24	1.9
Unspecified excavation damage/previous damage	11	0.9
Heavy rain/floods	72	5.7
Earth movement	34	2.7
Lightning/temperature/high winds	26	2.1
Natural force (other)	15	1.2
Vehicle (not engaged with excavation)	47	3.7
Fire/explosion	8	0.6
Previous mechanical damage	6	0.5
Fishing or maritime activity	7	0.5
Intentional damage	1	0.1
Electrical arcing from other equipment/facility	1	0.1
Unspecified/other outside force	7	0.6
TOTAL	433	-
1. Excavation, Outside Force, and Natural Force from Table 2-1		

Impact on Public Safety

The service incidents data summarized in table 24 include natural gas transmission system failures of all magnitudes with widely varying consequences.

Table 26 presents the annual injuries and fatalities that occurred on natural gas transmission lines from incidents for the 5 year period between 2010 and 2014. The majority of fatalities from pipelines are due to local distribution pipelines not regulated by FERC. These are natural gas pipelines that distribute natural gas to homes and businesses after transportation through interstate natural gas transmission pipelines. In general, these distribution lines are smaller diameter pipes and/or plastic pipes which are more susceptible to damage. Local distribution systems do not have large right-of-ways and pipeline markers common to the FERC regulated natural gas transmission pipelines. Therefore, incident statistics inclusive of distribution pipelines are inappropriate to use when considering natural gas transmission projects.

Table 26 Injuries and Fatalities - Natural Gas Transmission Systems		
Year	Injuries	Fatalities
2010[1]	61	10
2011	1	0
2012	7	0
2013	2	0
2014	1	1

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

The nationwide totals of accidental fatalities from various anthropogenic and natural hazards are listed in table 27 in order to provide a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. The data nonetheless indicate a low risk of death due to incidents involving natural gas transmission pipelines compared to the other categories. Furthermore, the fatality rate is much lower than the fatalities from natural hazards such as lightning, tornados, or floods.

Table 27 Nationwide Accidental Deaths[1]	
Type of Accident	Annual No. of Deaths
All accidents	117,809
Motor Vehicle	45,343
Poisoning	23,618
Falls	19,656
Injury at work	5,113
Drowning	3,582
Fire, smoke inhalation, burns	3,197
Floods[2]	81
Lightning[2]	49
Tornado[2]	72
Tractor Turnover[3]	62
Natural gas distribution lines[4]	14
Natural gas transmission pipelines[4]	2

1. All data, unless otherwise noted, reflects 2005 statistics from U.S. Census Bureau, Statistical Abstract of the United States: 2010 (129th Edition) Washington, DC, 2009; http://www.census.gov/statab.
2. NOAA National Weather Service, Office of Climate, Water and Weather Services, 30 year average (1985-2014) http://www.weather.gov/om/hazstats.shtml
3. Bureau of Labor Statistics, 2007 Census of Occupational Injuries
4. PHMSA significant incident files, January 14, 2016. http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends, 20 year average.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 1995 to 2014, there were an average of 63

significant incidents, 9 injuries and 2 fatalities per year. The number of significant incidents over the more than 303,000 miles of natural gas transmission lines indicates the risk is low for an incident at any given location. The operation of the Project would represent a slight increase in risk to the nearby public.

8.0 Cumulative Impacts

European settlement in the Maryland began in the 1630s along the shores of the Chesapeake Bay and its many tributaries. Tobacco cultivation became the economic cornerstone of these early settlements, although the crop was labor intensive and rapidly depleted the soil. As the population grew, settlers began to move westward from the tidewater to the hills and valleys of the piedmont region in search of fertile soil. Wheat quickly overtook tobacco as the primary export of the region. By the end of the eighteenth century, over eighty gristmills operated in western Maryland.

The area remained primarily agricultural after the Civil War. Although the numbers of farms in the area increased, farms sizes decreased. Throughout the twentieth century industry decreased due to consolidations of businesses, but employed more people than ever before. The current primary economic drivers in the area are industry and agriculture.

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

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

As described in the environmental analysis section of this is EA, constructing and operating the Project would temporarily and permanently impact the environment. The Project would affect geology, soils, water resources, vegetation, wetlands, wildlife, cultural resources, visual resources, air quality, noise, and some land uses. However, we conclude that these impacts would not be significant. We also conclude that many of the Project-related impacts would be contained within or adjacent to the temporary construction right-of-way and ATWS. For example, erosion control measures included in the Columbia's

construction and restoration plans, would keep disturbed soils within work areas. For other resources, the contribution to regional cumulative impacts is lessened by the expected recovery of ecosystem function. This is in contrast with other large-scale development projects in which wetlands or other habitats are permanently converted to a different habitat. Similarly, vegetative communities would be cleared, but revegetation would proceed immediately following construction in all temporary work areas.

Based on these conclusions and determinations, Columbia's implementation of impact avoidance, minimization, and mitigation measures as described in their construction and restoration plans, and their adherence to our recommendations, we find that most of the impacts of the Project would be largely limited to the 3-mile-long corridor followed by the pipeline. Furthermore, because the impacts of the Project would generally be localized, they would only contribute incrementally to a cumulative impact in the Project impact zone. As a result, we have calibrated the scope of our analysis to the magnitude of the aforementioned environmental impacts. It is estimated that Project completion would occur within less than 1 year.

We have considered all the anticipated impacts of the Project and determined that it would not contribute cumulative impacts on geology, groundwater, noise, and cultural resources. Cumulative impacts are not expected to occur to geological resources because no mineral resources would be affected by the Project. Given the relative distance to active mining or mineral resource exploration, no anticipated cumulative impacts to geologic resources are expected.

Construction activities for the Project would not require the withdrawal or use of groundwater; therefore, we do not anticipate Project construction or operations would affect groundwater quality or supply. Localized impacts may occur due to trenching and dewatering; however, these impacts would be short-term during construction only and would be minimized through the use of best management practices. Given this, we do not expect the Project's minor additive impacts on groundwater would contribute to any cumulative impacts associated with groundwater quality or quantity.

The Project could contribute to cumulative noise impacts through construction. However, the impact of noise is highly localized and attenuates quickly as the distance from the noise source increases. Therefore, cumulative impacts are unlikely unless one or more of the local projects is constructed at the same time in the same location. Therefore, we conclude that cumulative noise impacts would not be significant.

The geographic scope for cultural resources is the APE for both direct and indirect effects. The APE is comprised of new pipeline rights-of-way, staging areas and an access road, and is located on private and public lands. There are no other projects affecting cultural resources within the Project's Area of Potential Effects. Therefore, there is no potential for cumulative effects on cultural resources.

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

- Impacts on soils would be largely contained within the proposed Project workspaces, and therefore we evaluated other projects/actions within the same construction footprint as the proposed Project.

- Impacts on water resources (primarily increased turbidity) could extend outside of the workspaces, but would also be contained to a relatively small area. Furthermore, impacts on water resources are traditionally assessed on a watershed level. Therefore, for these resources we evaluated other projects/actions within the Hydrologic Unit Code (HUC) 12 subwatersheds crossed by the Project.

- Impacts on wetlands, vegetation, and wildlife could extend outside of the workspaces but would generally be contained to a relatively small area within or adjacent to proposed Project workspaces. We conclude the watershed scale is most appropriate to evaluate impacts as it provides a natural boundary to accommodate general wildlife habitat and ecology characteristics in the Project area. Therefore, we evaluated projects within the HUC-12 subwatersheds crossed by the Project.

- Impacts on land use, recreation, and visual resources would be restricted to the construction workspaces and the immediate surrounding vicinity. However, in recognition of the scenic attributes of the project area, the geographic scope for land use, recreation, and visual resources is 1 mile.

- Temporary impacts on air quality, including fugitive dust, would be largely limited to areas within 0.25 mile of active construction.

Other Projects Considered

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

Potential cumulative impacts associated with current, proposed, or reasonably foreseeable projects or activities in the Project geographic scope for this cumulative impacts analysis were identified and are listed in appendix G. For this analysis we included publicly known or recorded current or reasonably foreseeable future projects.

No current, approved, or reasonably foreseeable FERC projects were identified within the defined geographic scopes. Many regional and county planning agencies, such

as planning and zoning departments, department of transportation offices, and chambers of commerce were contacted to determine what projects in the geographic scope would contribute to cumulative impacts. We considered eight projects which have the potential to contribute to cumulative impacts within the geographic scope. One of those projects, the Mountaineer Project, involves intrastate natural gas pipeline construction. The remaining seven projects involve other types of construction including transportation related activity (new road construction, transportation upgrades, road paving), a municipal project (water line installation), an industrial project, and commercial development.

The following discussion describes the resources for which we conclude that a cumulative impact could result from construction and/or operation of the Project.

8.1 Soils

Potential cumulative impacts associated with soil resources may include loss of agricultural land use at a regional level or diminished fertility of soils directly affected by projects. However, no active agricultural lands would be affected by the Project. Two projects, the Route 522 Resurfacing (1) project and the Mountaineer Project would intersect the Project right-of-way. Impacts to soils from the Route 522 Resurfacing (1) project are likely to be from use of heavy equipment. The Mountaineer project would also require or has already completed significant grading and excavation for pipeline construction, and would result in similar impacts on soils as the Project within the vicinity. When construction of these two projects overlaps in time with the Project, there would be localized, repetitive impacts on soil resources at these sites.

Columbia would implement construction techniques and measures in accordance with the Project ECS to protect soil conditions within the construction work areas, ensure soil conditions remain stable, and provide for successful restoration. Detailed Erosion and Sediment Control Plans have been prepared for each county in Pennsylvania, Maryland and West Virginia. Mitigation measures would be employed for individual soil characteristics. Consequently, any cumulative impacts on soil resources are anticipated to be minor and temporary during construction.

8.2 Waterbodies and Wetlands

Waterbodies

The Project would affect three HUC-12 watersheds – Minnow Run-Little Tonoloway Creek Watershed, Sir Johns Run-Potomac River Watershed, and Warm Spring Run Watershed. There are 8 other past/ongoing, present, and reasonably foreseeable projects within the Warm Spring Run Watershed in Morgan County, West Virginia. No other projects would occur within the HUC-12 watersheds affected by the Project in Maryland or Pennsylvania. Columbia would not directly cross or affect waterbodies in the Warm Spring Run Watershed. Therefore, the Project would not contribute directly to cumulative impacts on waterbodies within this watershed. The two open cut crossings of

waterbodies proposed by this Project would occur in the Sir Johns Run-Potomac River Watershed. Upland construction has the potential to cause runoff into nearby waterbodies and contribute indirectly to sedimentation, turbidity, and fuel/chemical contamination in streams. Due to Columbia's proposed erosion control and spill prevention and control measures, we conclude that the Project is not likely to contribute indirectly to cumulative impacts on waterbodies.

Where Columbia would directly cross a waterbody using the open cut method, there is the potential for sedimentation and turbidity to occur downstream and contribute to cumulative impacts in the watershed. Waterbodies crossed by the HDD method and existing access roads would not be affected. Waterbodies crossed by the open cut method and culvert replacements would be affected through trenching and bank disturbance resulting in erosion, sedimentation, and turbidity. Although we don't know specific data for waterbody impacts within the same HUC-12 watersheds as the Project, we know the entire Mountaineer Project would impact 54 waterbodies totaling about 4,000 linear feet.

Impacts on waterbodies from turbidity caused by the open cut method are temporary due to the fact that turbidity persists for only a short amount of time. Impacts from sedimentation could be longer term particularly where sediments accumulate downstream and affect aquatic habitat and stream morphology. In general, other projects in the same watershed would need to take place in the same timeframe as the Project for cumulative turbidity impacts to occur. As previously stated, we did not identify any other projects within the watersheds where Columbia would directly cross waterbodies.

Due to the limited number of waterbodies crossed using open cut method and Columbia's mitigation measures to protect waterbodies and downstream resources, we conclude that the Project would not significantly contribute to cumulative impacts on waterbodies when considered with other projects in the geographic scope.

Wetlands

As previously stated, 8 other projects recently constructed/ongoing or planned are within the Warm Spring Run watershed. While we don't know specific data for wetland impacts for each HUC-12 watershed it crosses, we know the entire Mountaineer project would impact 14 wetlands totaling about 0.5 acre. No wetlands would be affected by the Project in the Warm Spring Run watershed. Therefore, the Project would not contribute to cumulative impacts on wetlands. In the watersheds where the Project would affect wetlands, we would not expect there to be significant cumulative impacts on wetlands if other projects occur within the geographic scope because each project (including the Eastern Panhandle Expansion Project) would be required to comply with applicable federal and state permit requirements to protect wetland resources and the Project would only contribute impacts on 0.06 acre of wetland.

8.3 Vegetation, Fisheries, Wildlife, and Special Status Species

Vegetation

Multiple projects occurring within similar geographic areas and construction timelines could result in cumulative impacts on forest and vegetation communities. In general, the impacts from forest clearing are long-term and loss of forested areas results in various changes to ecosystem functions.

Clearing of vegetation can also result in changes in vegetation communities over the long term and introduce the spread of invasive species. Multiple projects occurring in the same area can cumulatively increase the chance for introduction and spread of invasive or noxious plants. To prevent further spread of noxious weeds that may occur in Project work areas, Columbia would implement BMPs included in the ECS to limit the spread and invasive species during construction and operation of the Project.

As stated previously, there are three HUC-12 watersheds affected by the Project. For the purposes of this analysis, in this section we are only discussing upland vegetation communities. Impacts on wetlands are discussed above. The project would affect herbaceous communities (26 acres) and scrub shrub communities (1 acre) and forest (19 acres).

Other projects identified in the Warm Spring Run Watershed have affected or would affect similar vegetation communities. Restoration for some of the projects would be complete before the construction of the Project commences; however, forested areas may take decades to return to pre-construction conditions. The entire Mountaineer Project would require the removal of about 142.8 acres of forest, which would result in long term or permanent loss of forest. However, only a portion of this impact would occur in a subwatershed common to this Project.

Due to the limited amount of forest clearing that would occur as a result of the Project, and Columbia's commitment to restore temporary workspace areas to pre-construction vegetation communities, we conclude that the Project would not significantly contribute to cumulative impacts on vegetation when considered with other projects in the geographic scope.

Fisheries, Wildlife, and Special Status Species

Loss of forested areas, vegetation communities, and wetlands can result in cumulative impacts on habitat for wildlife and sensitive species. Additionally, sedimentation and turbidity caused by in-water work from multiple projects could result in cumulative impacts on fish and aquatic species through alteration of habitat and changes to the aquatic environment.

Protection of threatened, endangered, and special status species is part of the federal

and state permitting process, so cumulative impacts on those species would be minimized through conservation and mitigation measures identified through the individual consultations. Therefore, the other projects identified in combination with the Project are anticipated to have only minor impacts on protected species.

The Project would contribute long-term cumulative impacts on forested habitats used by wildlife. However, due to the limited amount of forest clearing that would occur as a result of the Project, the prevalence of similar habitat in close proximity, and Columbia's commitment to restore temporary workspace areas, the Project would not significantly contribute to cumulative impacts on wildlife when considered with other projects in the geographic scope.

8.4 Land Use, Recreation, and Visual Resources

The geographic scope that was identified for cumulative impacts on land use, recreation, and visual resources is within a 1-mile radius of the Project. Based on the spatial magnitude of the Project, impacts to land use would not be significant, and the cumulative effects of the Project would be negligible. The construction and operation of the pipeline facilities would have minor, temporary effects on existing and future land use. Travel corridors on the right-of-way would be blocked to prevent off road vehicle use. Temporary workspace areas would be restored to prior use in accordance with Columbia's ECS as well as individual landowner agreements.

Projects with permanent aboveground components, such as buildings and roads would generally have greater impacts on land use than the operational impacts of a pipeline which would be buried and thus allow for most uses of the land following construction. Therefore, with the exception of the permanent right-of-way (including a permanent conversion of forested land to herbaceous cover), pipeline projects typically only have temporary impacts on land use. The majority of long-term or permanent impacts on land use are associated with vegetation clearing and maintenance of the pipeline right-of-way.

The Project crosses the NPS C&O Canal, U.S. Bicycle Path 50, and the Western Maryland Rail Trail. These would all be crossed via HDD, and no impacts to these recreation areas are anticipated.

The visual qualities of the Project landscape are influenced by existing linear installations such as roadways, pipelines, and electrical transmission and distribution lines. Within this context, the other projects listed in appendix G would have the greatest cumulative impact on visual resources in the proposed Project area. The Project would add incrementally to this impact, but the overall contribution would be relatively minor.

Given that the Projects' contribution to cumulative impacts on land use, recreation, and visual resources would mostly be limited to the construction phase and would be temporary and minor, we conclude that cumulative impacts on these resources would not be significant.

8.5 Air Quality and Noise

Columbia would not install new permanent air emission sources for this Project. There would be no increase in operational emissions resulting from this Project with the exception of minor fugitive methane and VOC emissions. The potential cumulative impacts resulting from short-term construction activities would be limited due to the short term nature of the construction activities.

The combined effect of multiple construction projects occurring in the same airshed and timeframe could temporarily add to the ongoing air quality effects of existing activities. Typically, smaller local projects have varying construction. We conclude that the Project would not have a significant short term or long-term adverse impact on air quality and would not add significantly to the long term cumulative air quality impact.

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.

Climate Change has already resulted in a wide range of impacts across every region of the country and that impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, and human health. The United States and the world are warming; global sea level is rising and acidifying; and certain extreme weather events are becoming more frequent and more severe. These changes are driven by accumulation of GHG in the atmosphere through combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture and clearing of forests. These impacts have accelerated throughout the end 20th and into the 21st century. Although climate change is a global concern, for this analysis, we will focus on the potential cumulative impacts in the Project area.

The following observations of environmental impacts with a high or very high level of confidence are attributed to climate change in the Appalachian Mountain Plateau:

• Heat waves, and river flooding will pose a growing challenge to the region's environmental, social, and economic systems. This will increase the vulnerability of the region's residents, especially its most disadvantaged populations;

• Increasing temperatures and the associated increase in frequency, intensity, and duration of extreme heat events will affect public health, natural and built environments, energy, agriculture, and forestry;

• Decreased water availability, exacerbated by population growth and land-use change, will continue to increase competition for water and affect the region's economy and unique ecosystems;

• Agriculture, fisheries, and ecosystems will be increasingly compromised over the next century by climate change impacts. Farmers can explore new crop options, but these adaptations are not cost- or risk-free. Moreover, adaptive capacity, which varies throughout the region, could be overwhelmed by a changing climate; and

• While a majority of states and a rapidly growing number of municipalities have begun to incorporate the risk of climate change into their planning activities, implementation of adaptation measures is still at early stages.

The FERC staff has presented the direct and indirect GHG emissions associated with construction and operation of the Project in Section 6.1. Burning natural gas emits less CO_2 compared to other fuel sources (e.g., fuel oil or coal). Because coal is widely used as an alternative to natural gas in the region in which the Project would be located, it is anticipated that this would result in the displacement of existing coal or fuel oil use, thereby potentially offsetting some regional GHG emissions.

There is no standard methodology to determine whether, and to what extent, a project's incremental contribution to greenhouse gas emissions would result in physical effects on the environment for the purposes of evaluating the Project's impacts on climate change, either locally or nationally. Further, we cannot find a suitable method to attribute discrete environmental effects to greenhouse gas emissions. We have looked at atmospheric modeling used by the Intergovernmental Panel on Climate Change, Environmental Protection Agency, National Aeronautics and Space Administration, and others and we found that these models are not reasonable for project-level analysis for a number of reasons. For example, these global models are not suited to determine the incremental impact of individual projects, due to both scale and overwhelming complexity. We also reviewed simpler models and mathematical techniques to determine global physical effects caused by greenhouse gas emissions, such as increases in global atmospheric CO_2 concentrations, atmospheric forcing, or ocean CO_2 absorption. We could not identify a reliable, less complex model for this task and we are not aware of a tool to meaningfully attribute specific increases in global CO_2 concentrations, heat forcing, or similar global impacts to project-specific greenhouse gas emissions. Similarly, the ability to determine localized or regional impacts from greenhouse gases by use of these models is not possible at this time.

8.6 Conclusion on Cumulative Impacts

Construction of the Project, in addition to other projects within the same watersheds crossed by the pipeline, would have cumulative impacts on a range of environmental resources, as discussed above. We provided information about Project-related impacts and

mitigation measures for specific environmental resources where available, and were able to make some general assumptions about other projects identified in appendix G. For the federal projects, there are laws and regulations in place that protect waterbodies and wetlands, threatened and endangered species, and historic properties, and limit impacts from air and noise pollution. We only have limited information about potential or foreseeable private projects in the region. For some resources, there are also state laws and regulations that apply to private projects as listed in appendix G. Given the small scope and short duration of the Project, we conclude that when added to other past, present, and reasonably foreseeable future actions, the Project would not have significant adverse cumulative impacts on environmental resources.

9.0 Alternatives

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

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

The purpose of the Project is to increase natural gas supply options and system reliability for Columbia's customers, and to provide 46.6 million cubic feet per day of firm transportation service to serve markets in West Virginia through the Mountaineer Gas Pipeline. The alternatives were reviewed against the evaluation criteria in the sequence presented above and if the alternative would not meet the Project's objective or is not feasible, it was not brought forward to the next level of review.

The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the project. An alternative that cannot achieve the purpose for the project cannot be considered as an acceptable replacement for the project. All of the alternatives considered here are able to meet the project purpose stated in section A.2 of this EA.

Some alternatives are technically and economically feasible. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique or experimental construction method may not be technically practical because the required technology is not available or unproven. Economically practical alternatives would result in an action that generally maintains the economic viability of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render the project economically impractical.

Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

One of the goals of an alternatives analysis is to identify alternatives that avoid significant impacts. In this EA, we evaluated each environmental resource potentially affected by the Project and concluded that constructing and operating it would not significantly impact these resources. Consistent with our conclusions, the value gained by further reducing the (not significant) impacts of the Project when considered against the cost of relocating the route/facility to a new set of landowners was also factored into our evaluation.

9.1 No-Action Alternative

The No-Action Alternative would consist of not constructing the facilities as described. The Project is intended to increase supply options and system reliability, thereby greatly reducing the risk of interruptions to Columbia's markets. While the no-action alternative would entirely avoid potential impacts to environmental resources within the Project footprint, it would provide no ability to increase supply and source options needed to better service Columbia's customers in the region, which are already at capacity. The no-action alternative is not considered a viable option because it does not meet the current Project's purpose and need. In addition, Columbia's need to increase the reliability and supply options for its system would have to be addressed through the addition of infrastructure. Although the impacts for these actions could be less than, equal to, or greater than those proposed for the Project, some level of impact would be incurred in order to meet this need.

9.2 System Alternatives

System alternatives to the proposed action would make use of existing or other proposed natural gas transmission systems/facilities to meet the stated purpose of the Project. Implementing a system alternative would make it unnecessary to construct all or part of the Project, although some modifications or additions to an existing transmission system/facility or other proposed transmission system/facility may be necessary.

In addition to the Project objectives stated previously, the Project would facilitate access to increased natural gas supplies within the Appalachian Basin and increase supply options ensuring that Columbia's regional customer needs and markets are met on a consistent, safe, and reliable basis. No new compressor stations or upgrades to existing

stations are proposed. Increasing compression would allow for a greater delivery volume without new pipeline construction; however, it would not provide an alternate means of delivery or provide the supply options needed to meet the Project purpose and need.

Columbia has existing transmission infrastructure in close proximity to the Project. The greatest overall conservation of environmental resources is attained through utilizing the shortest practical route from their nearest accessible transmission line to the POD with Mountaineer. The proposed route uses the most direct alignment that provides delivery to Mountaineer. We conclude that alternative systems would not provide a significant environmental advantage and do not consider them further in this analysis.

9.3 Route Alternatives, Variations, and Construction Alternatives

No comments were received during our scoping process that requested that we consider alternatives to the proposed route, route variations, or construction alternatives for the Project. Route variations are relatively small alignment deviations that could avoid or further reduce impacts on resources. Our review of the proposed Project found no significant environmental impacts that would drive an evaluation of additional route alternatives.

However, based on the analysis presented in this EA, we identified two resources that warranted additional consideration of route variations or construction alternatives. Route variations are relatively small alignment deviations that could avoid or further reduce impacts on resources.

First, the Potomac River is a major waterbody (at the point of crossing the Potomac River is approximately 490 feet wide). Consequently, we consider alternative crossing locations and alternative crossing techniques that would minimize impacts on the Potomac River. The other resource for which we considered impact avoidance and minimization was forested lands. While other land types would be impacted, the impact on other types would be temporary and would revert back to the previous use in a relatively short period. However, forested land within the right-of-way would be permanently impacted.

Aboveground River Crossing Alternatives

We considered an aboveground alternative crossing of the Potomac River by utilizing the existing Route 522 Bridge. While an aboveground crossing attached to a bridge would also avoid impacts on the Potomac River, it would extend the pipeline by more than 2 miles and require about 0.5 mile of the pipeline to be rerouted through a residential and commercial area. This route would increase impacts on nearby landowners and would not decrease the impact on the river in comparison to the proposed HDD crossing.

An aboveground crossing in the proposed location was also considered. This crossing would require piers to cross the 490-foot-wide span. This alternative would increase visual impacts significantly as compared with the proposed HDD crossing. In

addition, this alternative would result in permanent impacts on the Potomac River stream bed. We conclude that aboveground crossings in either location would not provide a significant environmental advantage and do not consider them further.

Alternative River Crossing Locations

We reviewed technically feasible alternative river crossing locations, as shown in figure 2, to determine if another location would have less environmental impact on the river and surroundings. A quantitative comparison of the variations is included in table 26.

Route Variation 1

The first route considered follows the same alignment as the proposed route. However, rather than commencing the HDD at the promontory above the Potomac River, this route heads northeast along a ridgeline toward the Town of Hancock, crossing Route 522 before turning southeast to cross the Potomac River. From there, the alternative would continue in a southeast alignment across the CSX Transportation, Inc. yard and River Road before turning southwest to parallel Stonewall Jackson Hill and Hancock Road to the west.

Route Variation 1 could provide a more feasible engineering HDD of the Potomac River by making use of an existing power line crossing of the Potomac River; however, the analysis revealed other encumbrances to the route variation. In addition to increasing the overall length of this section of the Project, the route variation brought the alignment in closer proximity to areas such as the Hancock Middle Senior High School, the Church of the Nazarene, and Fort Tonoloway State Park. Also, this route would require an almost 20-acre increase in forested land clearing associated with the right-of-way and HDD activities. Due to the additional impacts, we conclude that this variation would not provide a significant environmental advantage.

Route Variation 2

The second route variation represents a slight variation from the proposed route. From the proposed Pennsylvania interconnection at Columbia's existing 1804 and 10240 pipelines in Fulton County Pennsylvania, this route follows the same alignment as the proposed route. However, rather than the HDD extending from the promontory above the Potomac River in a southeasterly alignment, this route follows a southward HDD alignment. This route would have the smallest overall impact; however this alignment is not the most direct river crossing, would require a longer drill, and have more forested

impact. Due to the additional forest impacts, we conclude that this variation would not provide a significant environmental advantage.

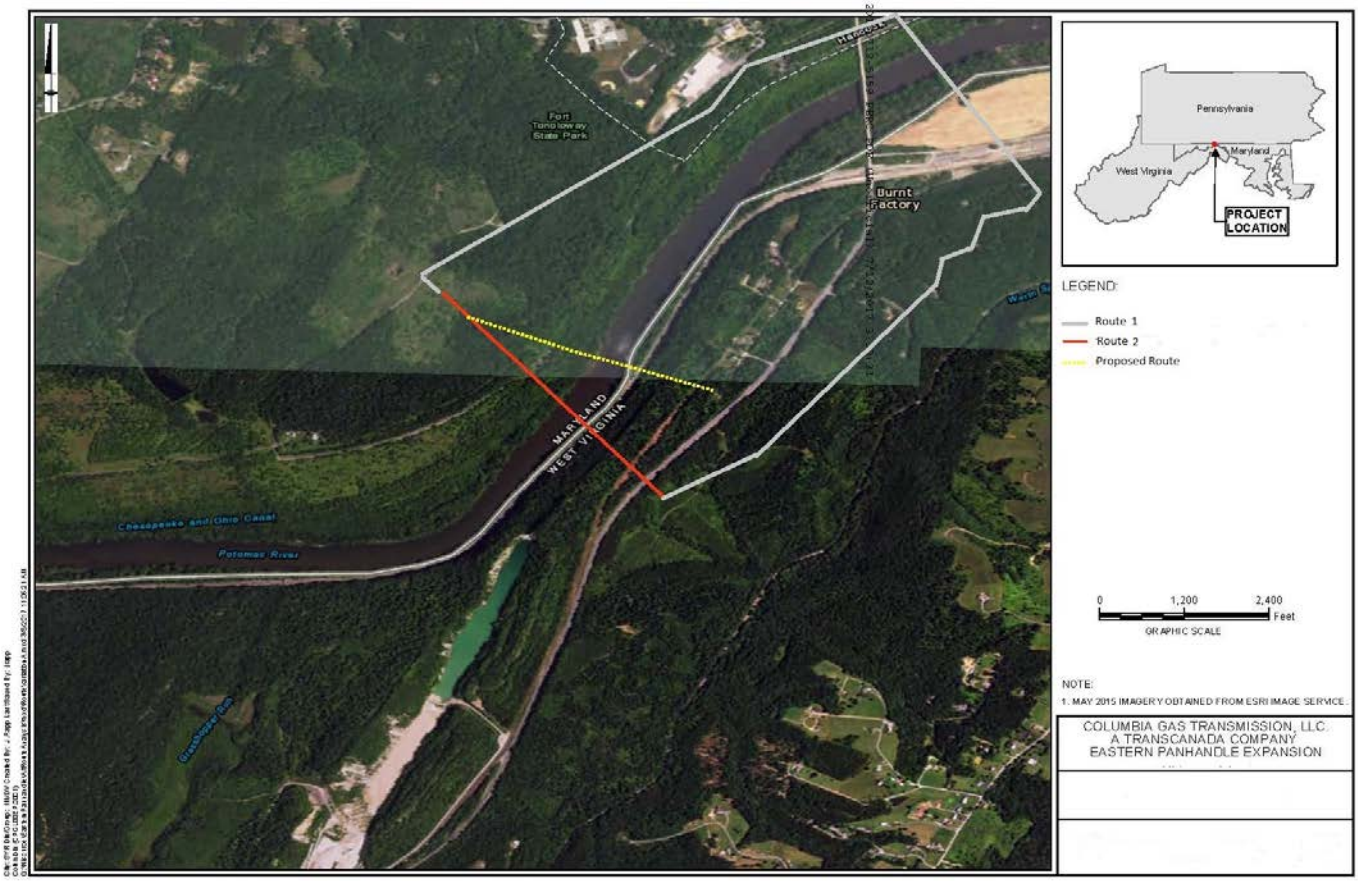
Table 28 summarizes the factors and data used to compare the three alternative crossing locations.

Table 28
Alternative Potomac River Crossing Locations Comparison

Resource	Proposed Route	Variation 1	Variation 2
Total Length (mi)	0.55	2.9	0.48
Right-of-Way Requirements[1]			
Construction (acres)	5.0	26.7	4.3
Operation (acres)	3.34	17.8	2.9
Wetland (acres)	<0.01	<0.01	0.00
Major River Crossing (>100ft)	1	1	1
Forested (acres)	4.3	24.1	9.6
National Register of Historic Places (no.)	0	2	0
Residences with 50ft (no.)	0	3	0
National Parks (mi)	0.11	0.87	0.11

[1] Represents a standard 75 foot construction right-of-way and 50-foot operational right-of-way.

Figure 4



9.4 Conclusion

We did not identify any alternatives that would meet all three evaluation criteria to be considered a preferred alternative to the proposed Project. In summary, we have determined that the proposed action, as modified by our recommended mitigation measures, is the preferred alternative that can meet the Project's objectives.

C. CONCLUSIONS AND RECOMMENDATIONS

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

1. Columbia shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. Columbia must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;
    b. justify each modification relative to site-specific conditions;
    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
    d. receive approval in writing from the Director of the OEP **before using that modification.**

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

    a. the modification of conditions of the Order;
    b. stop-work authority; and
    c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction,** Columbia shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction,** Columbia shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental

conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

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

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

   This requirement does not apply to extra workspace allowed by the Commission's Plan, and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;
   b. implementation of endangered, threatened, or special concern species mitigation measures;
   c. recommendations by state regulatory authorities; and
   d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the authorization and before construction begins**, Columbia shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Columbia must file revisions to the plan as schedules change. The plan shall identify:

   a. how Columbia will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;

b. how Columbia will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
c. the number of EIs assigned, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;
d. company personnel, including EIs and contractors, who will receive copies of the appropriate material;
e. the location and dates of the environmental compliance training and instructions Columbia will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change);
f. the company personnel and specific portion of Columbia's organization having responsibility for compliance;
g. the procedures (including use of contract penalties) Columbia will follow if noncompliance occurs; and
h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:
    (1) the completion of all required surveys and reports;
    (2) the environmental compliance training of onsite personnel;
    (3) the start of construction; and
    (4) the start and completion of restoration.

7. 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 the correction of acts that violate the environmental conditions of the Order, and any other authorizing document;
    d. responsible for documenting compliance with the environmental conditions of that Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
    e. 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. Columbia must receive written authorization from the Director of OEP **before commencing construction of any Project facilities.** To obtain such authorization, Columbia must 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 in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or
    b. identifying which of the Order conditions Columbia has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

12. **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 Commission's Upland Erosion Control, Revegetation, and Maintenance Plan at sections III.E., V.A.3, V.A.4., and V.A.6.

13. **Prior to construction**, Columbia shall 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 the workspaces Columbia shall also provide a temporary supply of water if the landowner's water supply is contaminated or damaged by construction activities. Within 30 days of placing the facilities in service, Columbia shall also file a report with the Secretary discussing whether any complaints were received concerning well yield or water quality and how each was resolved.

14. **Prior to construction**, Columbia shall file with the Secretary for review and written approval by the Director of OEP, a revised plan for access road TAR-2 that avoids impacts on wetlands, or detailed justification for why wetland impacts cannot be avoided and a detailed justification for the culvert replacement along access road PAR-1 and associated ATWS.

15. **Columbia shall not begin construction activities until**:

    a. the staff completes ESA Section 7 consultation with the FWS, and
    b. Columbia has received written notification from the Director of OEP that construction or use of mitigation may begin.

16. **Prior to any tree clearing during the migratory bird nesting season (April 1 - August 31),** Columbia shall file with the Secretary a Migratory Bird Conservation Plan developed in consultation with the FWS, along with documentation of consultation with the appropriate FWS field offices regarding project-related impacts on migratory bird species.

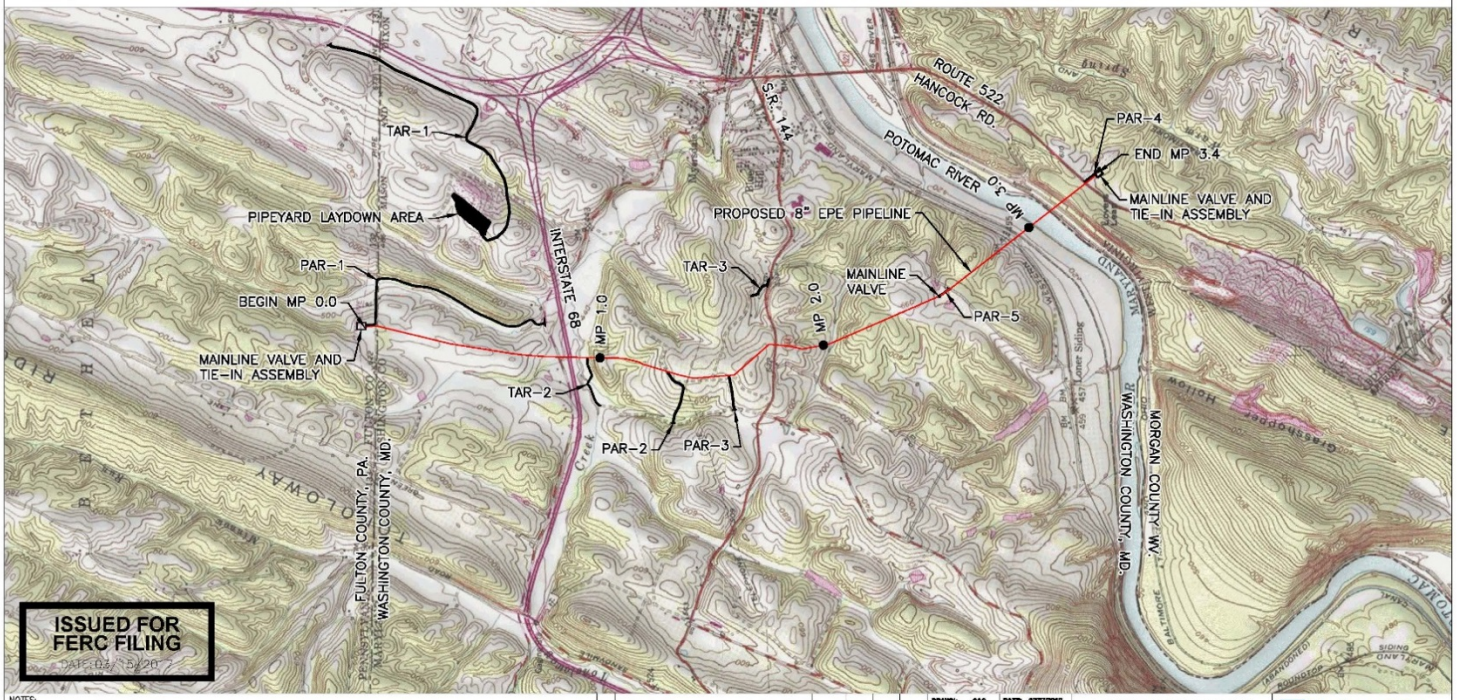
17. Columbia **shall not begin construction** of facilities and/or use of all staging, storage, or temporary work areas and new or to-be-improved access roads **until**:

    a. Columbia files with the Secretary:
       (1) remaining cultural resources survey report(s);
       (2) site evaluation report(s) and avoidance/treatment plan(s), as required; and
       (3) comments on the cultural resources reports and plans from the National Park Service and West Virginia State Historic Preservation Office.
    b. the Advisory Council on Historic Preservation is afforded an opportunity to comment if historic properties would be adversely affected; and
    c. the FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Columbia in writing that treatment plans/mitigation measures (including archaeological data recovery) 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: "**CUI//PRIV- DO NOT RELEASE.**"

Appendix A
Maps of the Pipeline Route and Facilities for the Eastern Panhandle Expansion Project

FULTON COUNTY, PA., WASHINGTON COUNTY, MD. & MORGAN COUNTY WV.



NOTES:
1. COORDINATE SYSTEM USED IS N.A.D. 83, MARYLAND STATE PLANE, SURVEY FEET.
2. BACKGROUND SHOWN IS THE LATEST AVAILABLE U.S.G.S. 24K DRG IMAGE.

LEGEND:
PROPOSED PIPELINE

SCALE: 1"=2000'

2,000 1,000 0' 2,000 4,000'

NO.	REVISION	DATE	DRAWN	CHK'D.	APP'D.
P5	ISSUED FOR FERC FILING	02/15/2017	CAC	JHB	
P4	ISSUED FOR 50% REVIEW	12/13/2016	CAC	JHB	
P3	RE-ISSUED FOR 30% REVIEW	09/22/2016	CAC	JHB	
P	ISSUED FOR 30% REVIEW	09/16/2016	CAC	JHB	

DRAWN: CAC DATE: 12/07/2016
CHECKED: JAB DATE: 12/08/2016
ENGINEER: JHB DATE: 12/08/2016
APPROVED: DATE:
REVISED: DATE:
SCALE: 1" = 2,000' SHEET: 1 OF 1
JOB NO. 6483
CLIENT/CLIENT AFE NO. 23154
DOCUMENT NO.

PROJECT DELIVERY
PROJECT ENGINEERING
5151 SAN FELIPE, SUITE 2400, HOUSTON, TX 77056

Columbia Gas Transmission

PL-10376
EASTERN PANHANDLE EXPANSION
PROJECT QUAD LOCATION MAP
FULTON CO. PA., WASHINGTON CO. MD. & MORGAN CO. WV.

DRAWING NO. B23154-QUAD-1 REV. P5

Appendix B
HDD Contingency Plan

HORIZONTAL DIRECTIONAL DRILLING CONTINGENCY PLAN

If an inadvertent release of drilling fluid is detected, call the Columbia Monitoring Center immediately at 1-800-835-7191.

1.0 INTRODUCTION AND DESCRIPTION OF WORK

Columbia Gas Transmission, LLC (Columbia), a TransCanada Company proposes to construct a new 3.36-mile 8-inch diameter natural gas transmission pipeline equipped with a launcher/receiver at each end of the proposed pipeline. The Eastern Panhandle Expansion (Project) will tie-in to the existing Columbia 1804 and 10240 pipelines in Fulton County, Pennsylvania. The Project is located within three counties and states (Fulton County, Pennsylvania; Washington County, Maryland; and Morgan County, West Virginia).

Columbia is proposing to utilize horizontal directional drilling (HDD) technique for selected crossings located along the Project.

Directional drilling operations have a potential to release drilling fluids, such as bentonite, into the surface environmental through inadvertent returns (a condition where drilling mud is released through a fractured bedrock into the surrounding rock and sand and travels toward the surface). Drilling muds typically consist largely of a bentonite clay-water mixture and are not classified as toxic or hazardous substances. However, if it is released into a waterbody, bentonite has the potential to adversely impact fish and invertebrates. A Safety Data Sheet for bentonite has been included in this Plan as Attachment 1.

All personnel and sub-contractors responsible for the work must adhere to this plan during the directional drilling process.

The specific objectives of this plan are to:

1. Minimize the potential for an inadvertent return of drilling materials associated with directional drilling activities;
2. Provide for the timely detection of inadvertent returns of drilling materials;
3. Protect the environmentally sensitive waterbodies and wetlands within the Project workspace and within the vicinity of the Project workspace;
4. Ensure an organized, timely, and minimum-impact response in the event of an inadvertent return of drilling materials; and
5. Ensure that all appropriate notifications are made immediately to the customer, management and safety personnel.

2.0 INADVERTENT RETURN DETECTION

The most obvious signs of an inadvertent return are surface seepage or loss of circulation/pressure of the drilling fluid. One of the functions of the drilling fluid is to seal the hole to maintain the downhole pressure. The loss of the returning fluid is a sign that pressure is not being contained in the drill hole

and surface seepage is occurring outside the hole. If there is a reduction in the quantity of drilling fluid returning to the drilling site (loss of circulation), this could be an initial indication of failure. However, minor loss of drilling fluid is normal in the drilling process. There can be instances during the drilling process when a small layer of loose sand, a small gravel layer or a small rock fracture is encountered. These occurrences will require minimal addition of drilling fluids to fill in the voids. Consequently, a minor drilling fluid loss in and of itself is not an indication of a potential inadvertent release condition. It is the loss of drilling fluid in combination with other factors, which may indicate a potential inadvertent release condition. For example, if there is a loss of drilling fluid and the return of cuttings do not show a large quantity of gravel that could indicate a loss of containment pressure within the hole.

Drilling pressures shall be closely monitored so they do not exceed those needed to penetrate formation. Pressure levels shall be monitored randomly by the Operator. Pressure levels shall be set at a minimum level to prevent inadvertent returns. Cutters and reamers will also be pulled back into previously-drilled sections after each new joint of pipe is added.

Drilling operations will be halted by the drill rig operators immediately upon detection of a drop in drilling pressure or other evidence of an inadvertent return. The clean-up of all spills shall begin immediately. Management and safety departments shall be notified immediately of any spills and shall be consulted regarding clean-up procedures. A spill kit shall be on-site and used if an inadvertent return occurs. Containment materials, such as straw bales, shall also be on-site prior to and during all operations.

Columbia must only use firms who specialize in HDD to perform the proposed stream and wetland crossings. Columbia is responsible for the supervision of the drilling contractor and retains the right to shut down operations.

In an effort to minimize the overall impacts of an in-stream response to an inadvertent return, Columbia will schedule all drilling efforts beneath the Potomac River (S10) and Little Tonoloway Creek (S2) outside of the March 1 through June 15 time of year restriction.

Columbia will provide on-site visual monitoring of the construction area during construction operations and will provide a designated environmental inspector (EI). Columbia's designated EI shall walk the construction area at least every four hours during drilling operations where access is permissible to visually monitor for inadvertent releases. Additionally, Columbia will ensure a vacuum truck shall be staged at the HDD work pad. The vacuum truck would be mobilized immediately upon the discovery of an inadvertent return event.

2.1 GENERAL CORRECTIVE ACTION

Once an inadvertent return is detected, the drilling crew shall take immediate corrective action. The only pressure causing the inadvertent return to occur is the pressure from the drilling fluid pumps. Therefore, the most immediate direct corrective action is:

- To stop the drilling fluid pumps or decrease the pressure (by stopping the pumps or decreasing the pressure, the pressure in the hole will quickly bleed off. With no/reduced pressure in the hole, the inadvertent return will stop or decrease significantly).

- As soon as an inadvertent return is detected, the circulation of mud will only be stopped or reduced temporarily until the response process has been initiated. Once the response/ containment process (Sections 2.1.1, 2.1.2 and 2.2) has been initiated and is under control, the drilling activities will resume.

There is greater potential for an inadvertent return is at the entry and exit locations. In the contingency planning for the pipeline crossing, inadvertent returns at the entry and exit locations have been considered and the following preventive actions have been developed:

- The entry and exit locations on all directionally drilled crossings shall have dry (upland) land segments where an inadvertent return can be easily detected, contained, and remediated.

- To isolate and contain a potential inadvertent return at each of the drill sites, there must be a berm around the downslope side of the drilling rig set-up area. Hay bales or silt fence must be part of the berm on the resource side of the drilling area (see appropriate Erosion and Sediment Control Plans).

- A spill kit will be on site and utilized if an inadvertent return should occur.

- If necessary, barriers (such as straw bales or sedimentation fences) between the bore site and the edge of the water source shall be constructed prior to drilling, to prevent released bentonite material from reaching the water.

2.1.1 In the event of an inadvertent return in an Upland Area, the following corrective actions will be taken immediately:

- The source/pumps will be stopped temporarily or the pressure will be decreased.

- The inadvertent return will be contained immediately by installing hay bales or silt fence and/or constructing dikes or pits.

- The drilling fluid will be removed from the ground surface to the greatest extent possible and removed from the site using manual equipment such as shovels and wheel barrows or earth-moving equipment such as backhoes or small bulldozers, portable pumps and/or vacuum trucks.

- The affected areas will be restored within 30 days as closely as possible to their previous condition.

- Documentation must be made and maintained by the contractor and provided to Columbia.

- The Contractor must follow any special instructions from Columbia's EIs.

2.1.2 In the event of an inadvertent return into wetlands and/or waterbodies, the containment and corrective actions described below must be taken immediately and the Contractor must make the appropriate contacts in accordance with Section 2.2 below.

- The source/pumps will be stopped temporarily or the pressure will be decreased.

- The inadvertent return will be contained immediately by installing hay bales or silt fence and/or constructing dikes or pits (do not construct earthen dikes or berms within wetland or stream areas).

- The drilling fluid will be removed from the ground surface and from the site to the greatest extent possible by manual means such as by use of shovels, wheelbarrows and/or vacuum hoses. Earth moving equipment such as backhoes or small bulldozers will be used only if manual means prove to be impractical and only after appropriate measures have been taken to minimize impacts to the resource. These measures will be authorized by Columbia's EI.

- The affected areas will be restored as closely as possible to their previous condition.

- Documentation must be made and maintained by the contractor and provided to Columbia's EI.

- The Contractor must follow any special instructions from Columbia's EI.

Typically, drilling activities will not be suspended unless the inadvertent return creates a threat to public health and safety or unless suspended by Columbia or a regulatory agency.

2.2 Response and Reporting Personnel

If an inadvertent return of drilling fluids is detected, the drilling contractor will immediately notify Columbia's EI and Chief Inspector. The EI has been given "stop work authority" by Columbia and his/her instructions must be followed.

Chief Inspector/EI Responsibilities:

The Chief Inspector and/or EI have overall responsibility for implementing this Plan. The Chief Inspector/EI will ensure that all employees are trained prior to drilling activities. The Columbia U.S. Environmental Planning and Permitting Principal shall be notified immediately when an inadvertent return is detected. They will be responsible for ensuring Columbia's environmental health department is aware of the inadvertent return, coordinating appropriate personnel, response, cleanup, regulatory

agency notification and coordination to ensure proper clean-up, disposal of recovered material and timely reporting of the incident. They shall ensure waste materials are properly containerized, labeled, and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud.

The Chief Inspector and/or EI shall be familiar with all aspects of the drilling activity, the contents of this Plan, and the conditions of approval under which the activity is permitted to take place. They shall have stop work authority and commit the resources (personnel and equipment) necessary to implement this Plan. They shall assure that a copy of this Plan is available (onsite) and accessible to all construction personnel. They shall ensure that all workers are properly trained and familiar with the necessary procedures for response to an inadvertent return, prior to commencement of drilling operations.

2.3 Training

Prior to the commencement of drilling activities, the Chief Inspector and/or Columbia's EI shall ensure that the contractors receive training in the following:

- The provisions of this Plan, equipment maintenance and site-specific permit and monitoring requirements;
- Inspection procedures for release prevention and containment equipment and materials;
- Contractor obligation to immediately stop the drilling operation upon first evidence of the occurrence of an inadvertent return and to immediately report any releases;
- Contractor responsibilities in the evet of an inadvertent return of drilling materials;
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate; and
- Protocols for communication with agency representatives who maybe on-site during the clean-up effort.

The Chief Inspector and/or Columbia's EI shall ensure that a job briefing meeting is held at the start of each day of drilling to review the appropriate procedures to be followed in case of an inadvertent return or to advise new hires. Questions will be answered and clarification given on any point over which the drilling crew or other Project staff has concerns.

2.4 Response Equipment

The drilling contractor will be responsible for having all response materials and equipment required for containment and remediation of an inadvertent return. Such materials must be stored within the drilling sites.

The materials should include at a minimum: lumber for temporary shoring, equipment mats, sand, portable pumps, hand tools, and hay bales and silt fence. The drilling contractor will also have heavy equipment such as backhoes available, which can be utilized to control and clean up large inadvertent returns.

The Chief Inspector and/or Columbia's EI shall ensure that:

- All equipment and vehicles are checked and maintained daily to prevent leaks of hazardous materials;
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good, working order;
- Equipment required to contain and clean up an inadvertent return release will either be available at the work site or readily available at an offsite location within a reasonable distance from the drilling activities; and
- If equipment is required to be operated near a waterbody, absorbent pads and/or secondary containment structures shall be used as necessary to protect the waterbody or wetland from engine fluids.

2.5 Follow-Up

After the inadvertent return, has been contained, the drilling contractor and Columbia will make every effort to determine the root cause of the inadvertent return. Columbia will amend the HDD procedures to control the factors which caused the inadvertent return and to minimize the chance of recurrence. Developing the corrective measure will be the joint effort of Columbia and the drilling contractor.

In some cases, the corrective measure may involve a determination that the existing hole encountered a void, which could be bypassed with a slight change in profile. In other cases, it may be determined that the existing hole encountered a zone of unsatisfactory soil material and the hole may have to be abandoned. Any such activity must be documented by the contractor and Columbia.

2.5.1 Response Close-out Procedures

When the release has been contained and cleaned up, response closeout activities will be conducted at the direction of the Chief Inspector/ Columbia's EI and shall include the following:

- The recovered drilling fluid will either be recycled or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source;
- All inadvertent return excavation and clean-up sites will be returned to pre-construction contours using clean fill, as necessary; and
- All containment measures (fiber rolls, straw bales, etc) will be removed, unless otherwise specified by the Chief Inspector and/or Columbia's EI.

2.5.2 Construction Restart

For small releases not requiring external notification, drilling may continue if 100 percent containment has been achieved through the use of a leak stopping compound or redirection of the bore and the clean up crew remains at the site throughout the construction period.

For releases requiring external notification related to an inadvertent release of drilling mud, construction will not restart without prior approval.

3.0 NOTIFICATION

In the event of an inadvertent return that reaches a water source, the Chief Inspector and/or Columbia's EI will notify the Columbia U.S. Environmental Planning and Permitting Principal so they can notify the appropriate resource agencies. All agency notifications will occur within 24 hours and proper documentation will be accomplished in a timely and complete manner. The following information will be provided:

- Name and telephone number of person reporting;
- Location of the release;
- Date and time of the release;
- Type and quantity, estimated size of release;
- How the release occurred;
- The type of activity that was occurring around the area of the release;
- Description of any sensitive areas, and their location in relation to the release;
- Description of the methods used to clean up or secure the site; and
- Listing of the current permits obtained for the Project.

3.1 Communicating with Regulatory Agency Personnel

All employees and contractors will adhere to the following protocols when permitting Regulatory Agency Personnel arrive on site. Regulatory Agency personnel will be required to comply with appropriate safety rules. Only the Columbia U.S. Environmental Planning and Permitting Principal or their designated EI are to coordinate communication with Regulatory Agency personnel.

4.0 Drill Failure

In addition to inadvertent return concerns, there is also a potential for failure of the drilling apparatus. If the drilling apparatus becomes inextricably lodged, and cannot be withdrawn without exiting the construction work limits (unless the appropriate approvals are first obtained by the Columbia's Environmental Planning and Permitting Department), or damaging the resource(s) the directional drill was performed to protect, the apparatus and hole will be abandoned. If the hole is abandoned, it will be filled with HDD cuttings and drilling fluid. Once the abandoned hole is filled, a second attempt will be made to complete the drill. The second attempt must be performed within the confines of the approved construction work limits as shown on the Environmental Construction Drawings. The second attempt will generally be offset slightly from the original entry-hole location.

Attachment 1

Material Data Safety Sheet for Bentonite (Drilling Fluid)

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARA-KADE® BENTONITE**

Revision Date: 31-Mar-2005

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARA-KADE® BENTONITE
Synonyms: None
Chemical Family: Mineral
Application: Additive

Manufacturer/Supplier
BPM Minerals LLC
3000 N Sam Houston Parkway East
Houston, TX 77032

Telephone: (281) 871-7900
Fax: (281) 871-7940
Emergency Telephone: (800) 666-9260 or (713) 753-3000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.05 mg/m³	$1/2 \times \frac{10\ mg/m^3}{\%SiO2 + 2}$
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m³	$1/2 \times \frac{10\ mg/m^3}{\%SiO2 + 2}$
Crystalline silica, quartz	14808-60-7	1 - 5%	0.05 mg/m³	$\frac{10\ mg/m^3}{\%SiO2 + 2}$
Bentonite	1302-78-9	60 - 100%	Not applicable	Not applicable

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview	**CAUTION! - ACUTE HEALTH HAZARD** May cause eye and respiratory irritation. **DANGER! - CHRONIC HEALTH HAZARD** Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physician	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 0*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Various
Odor:	Odorless
pH:	8-10
Specific Gravity @ 20 C (Water=1):	2.65
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	50-70
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur

Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.
Chronic Effects/Carcinogenicity	Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis. Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2). There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information	For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 10000 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials (Crystalline silica)

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

REDMOND MINERALS, INC.

SAFETY DATA SHEET

Product Code: AB3A005 (BENTONITE)
Updated: 12/23/14

SECTION 1: IDENTIFICATION

PRODUCT NAME(s):	Swell Clay, Pond Seal, Conditioner		
GENERIC NAME:	Bentonite	**MSDS CODE NO.**	A202PABA005
SYNONYMS:	Calcium Bentonite, Sodium Bentonite, Montmorillonite, Smectite Clay		
CHEMICAL NAME:	Sodium / Calcium Aluminum Silicate	**CASE REGISTRY NO.**	1302-78-9
MANUFACTURING ADDRESS:	Western Clay Company 620 East SR 24 Aurora, UT 84620	**CONTACT NUMBERS:**	Emergency: 435-657-3605 Redmond Minerals: 435-529-7402
DISTRIBUTOR ADDRESS:	Redmond Minerals, Inc. 2725 North 100 West Redmond, UT 84652		
RECOMMENDED USE:	Bentonite has a variety of uses. It can be used as a rheology modifier, binding agent, absorbent, filler and other i.e. for applications like: foundry, iron ore agglomeration, drilling, construction - civil engineering, filtration (i.e. oil, wine, beer), pharmaceutical and cosmetics, cat litter, food processing aids and feed additives.		
USE RESTRICTIONS:	There are no identified uses advised against.		

SECTION 2: HAZARD IDENTIFICATION

GHS CLASSIFICATION

Signal: Danger
Causes damage to the lungs through prolonged or repeated exposure if inhaled

HEALTH/PHYSICAL HAZARDS: Material dusts containing less than 1% free crystalline silica (quartz) are classified as nuisance particulates. Exposure to these dusts may cause irritation to eyes, ears, throat, and upper respiratory tract. This materials dust may contain more than 1% free silica as Quartz. Chronic (long term) exposure to air born free silica at levels higher than TLV=s may lead to the development of silicosis or other respiratory problems. (See Section VI)

HAZARD LISTING: Nuisance Particles are listed by ACGIH. Free Crystalline Silica as Quartz is listed by OSHA and ACGIH as a Hazardous Material.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCES:	CAS #	Percent (w/w)
Bentonite	1302-78-9	80-100%
Crystalline silica, quartz	14808-60-7	0-5%
Crystalline silica, cristobalite	14464-46-1	0-1%
Crystalline silica, tridymite	15468-32-3	0-1%
Water	7732-18-5	8-12%

SECTION 4: FIRST AID MEASURES

INHALATION:	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
SKIN:	Wash with soap and water. Get medical attention if irritation persists.
EYES:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
INGESTION:	Under normal conditions, first aid procedures are not required.

NOTES TO PHYSICIAN: Treat symptomatically.

SECTION 5: FIRE-FIGHTING MEASURES

FLASH POINT RANGE:	Non-flammable Silicate Mineral	**FLAMMABLE LIMITS:**	LEL: NA UEL:NA
FIRE EXTIGUISHING MEDIA:	All standard firefighting media	**SPECIAL EXPOSURE HAZARDS:**	Not Applicable
NFPA RATINGS:	Health 0, Flammability 0, Reactivity 0	**HMIS RATINGS:**	Health 0*, Flammability 0, Reactivity 0, PPE: At

SPECIAL FIRE FIGHTING PROCEDURES: Not applicable

SECTION 6: ACCIDENTAL RELEASE MEASURES

MATERIAL SPILL OR RELEASE: Avoid breathing dust; wear respirator approved for silica veering dust. Vacuum up to avoid generating airborne dust. Avoid using water. Product is slippery when wet.

WASTE DISPOSAL METHOD: Product should be disposed of in accordance with applicable local, state, and federal regulations. There are no known environmental precautionary measures. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage, and disposal.

SECTION 7: HANDLING AND STORAGE

HANDLING PRECAUTIONS: This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposer limits below permissible limits. Material is slippery when wet.

STORAGE INFORMATION: Do not reuse empty container. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Keep from excessive heat.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION REQUIREMENTS: Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in section VI.

RESPIRATOR: Use respirator approved by NIOSH/MSHA for silica bearing dust.

EYE PROTECTION: Use safety glasses or goggles to protect against exposure.

HAND PROTECTION: Normal work gloves.

SKIN PROTECTION: Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

OTHER PPE: None known.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	powder	**COLOR:**	Tan, Light Green, Red
BULKING VALUE:	90 lbs.	**DENSITY:**	70 lb/ft^3 powder or compact granular
MELTING POINT:	1450 ^{o}C	**pH:**	8-10
SOLUBILITY IN WATER:	Insoluble, Forms Colloidal Suspension	**ODOR:**	Mild earthy

SECTION 10: STABILITY AND REACTIVITY

STABILITY:	Stable	**HAZARDOUS POLYMERIZATION:**	None
INCOMPATIBILITY:	None	**HAZARDOUS DECOMPOSITION PRODUCTS:**	None

SECTION 11:TOXICOLOGICAL INFORMATION

TOXICITY TESTS:

Oral	ND	Genotoxicity	ND
Dermal	ND	Reproductive	ND
Inhalation	ND	Primary Irritation Effect	ND

PRINCIPLE ROUTE OF EXPOSURE: Eye or skin contact, inhalation

SKIN: Possible dying resulting in dermatitis

EYES: Mechanical irritant

INGESTION: Accidentally this material will generally cause no adverse effects. Minor intestinal irritation is possible.

INHALATION: (Acute, Short Term) Exposure to excessive concentrations of dust may cause irritation of the Nose, Throat, and Upper Respiratory Tract. (Chronic, Long Term) Chronic exposure to crystalline silica such as quartz where levels exceed TLV=s can cause Silicosis and other respiratory problems. Short term exposure to very high concentrations may lead to increased risk and accelerated onset of silicosis and respiratory damage. Silicosis is a progressive, degenerative, disabling, and sometimes fatal lung disease characterized by coughing, shortness of breath, wheezing, and fibrotic changes in the lungs with scarring and nodular formation.

PERMISSIBLE EXPOSURE LIMITS:
(For air contaminants 8 hour TWA)

Bentonite as Nuisance Dust	OSHA PEL	ACGIH TLV
Total Dust	$15mg/m^3$	Not determined
Respirable Dust	$5mg/m^3$	Not determined
Crystalline Quartz (respirable)	$0.1mg/m^3$	$0.1mg/m^3$

CARCINOGENICITY: Bentonite is not listed by NTP, IARC, or OSHA. The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans, and experimental evidence that tridymite as a carcinogen in animals. The National Toxicology Program (NTP) classifies respirable crystalline silica as "Known to be a human carcinogen".

SECTION 12: ECOLOGICAL INFORMATION

MOBILITY (water/soil/air):	ND	**FISH TOXICITY:**	TLM96: 10000 ppm (Oncorhynchus mykiss)
PERSISTENCE/DEGRADABILITY:	ND	**CRUSTACEANS TOXICITY:**	ND
BIO-ACCUMULATION:	ND	**ALGAE TOXICITY:**	ND
CHEMICAL FATE INFORMTION:	ND	**OTHER INFORMATION:**	ND

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Product should be disposed of in accordance with applicable local, state, and federal regulations. There are no known environmental precautionary measures. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage, and disposal.

SECTION 14: TRANSPORTATION INFORMATION

SHIPPING NAME: Common Ground Clay (NOIBN) **HAZZARD CLASS:** Not Hazardous **CAUTIONARY LABELING:** None required

LAND TRANSPORTATION RESTRICTIONS: **DOT:** Not Restricted **CANADIAN TDG:** Not Restricted **ADR:** Not Restricted

AIR TRANSPORTATION RESTRICTIONS: **ICAO / IATA:** Not Restricted

SEA TRANSPORTATION RESTRICTIONS: **IMDG:** Not Restricted

SECTION 15: REGULATORY INFORMATION

U.S. REGULATIONS:

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311, 312) Hazard Class	Acute Health Hazard, Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372)
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

CANADIAN REGULATIONS:

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials Crystalline Silica

SECTION 16: OTHER INFORMATION

ADDITIONAL INFORMATION: This SDS was updated on 12/23/14. For additional information on the use of this product, or for questions about the Safety Data Sheet for this or other Redmond Minerals, INC. products, please contact:

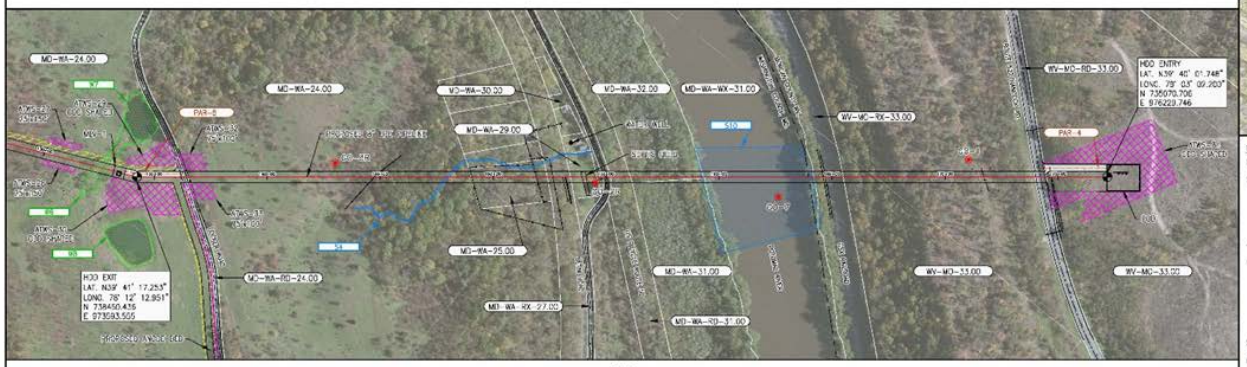
REDMOND MINERALS, INC.

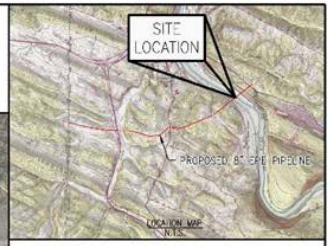
Redmond Minerals, INC.
Toll Free 866 735-7258 Telephone 435 529-7402 Fax 435 529-7486
6005 North 100 West ● Redmond, UT 84652

This information is taken from sources or based upon data believed to be reliable, however, Redmond Minerals, INC. makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other special protective measures may not be required under unusual or particular conditions which may be associated with normal use of this product. Since the use or misuse of this product is not within the control of Redmond Minerals, INC. it is the users' obligation to assure conditions of safe use and disposal of this product. Seller warrants that this product conforms to the specifications stated herein. Buyer assumes all risks associated with the possession, use, mixing, blending, treatment, storage, disposal, transportation, and handling of the product, whether alone or in combination with other substances. SELLER MAKES NO OTHER WARRANTY OF ANY KIND WHATEVER, EXPRESS OR IMPLIED AND ALL OTHER WARRANTIES, INCLUDING WARRANTIES OF QUALITY MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. Seller's liability is limited to the product price.

Appendix C
Crossing Plan for the Potomac River

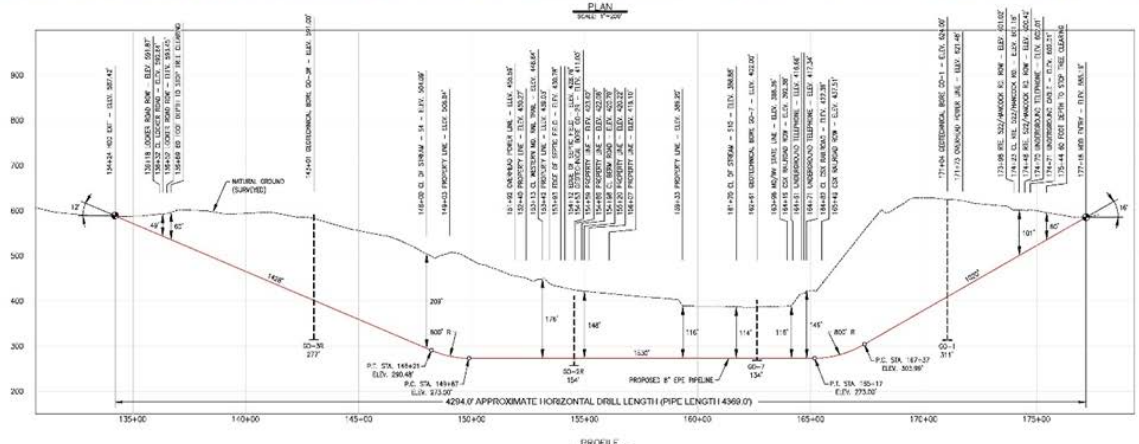
WASHINGTON COUNTY, MD – MORGAN COUNTY, WV





PLAN

SCALE: 1"=200'



PROFILE

HORIZ. SCALE: 1"=200'
VERT. SCALE: 1"=100'

DIRECTIONAL DRILL CONSTRUCTION NOTES:

1. ALL EQUIPMENT WILL ACCESS THE SITE ALONG THE CONSTRUCTION WORK SPACE OR FROM APPROVED ACCESS ROADS.
2. WORK STAKE, WORKING WORK STAKE LINES ARE DEFINED, BETTERMENT, RELATED TO THE WORK SPACE INDICATED AT THE ENTRY AND EXIT POINTS AND PROVIDED HERE, SUPERIMPOSED ON AERIAL ALONG THE CONSTRUCTION WORK SPACE. CHANGES BETWEEN THE ENTRY AND EXIT POINTS REQUIRES PRIOR APPROVAL FROM THE ENVIRONMENTAL INSPECTOR AND IS SUBJECT TO THE AVOIDANCE OF WETLANDS, STREAMS, SURFACE WATER AND WETLANDS, PLANTS AND BEING TO OBTAIN WATER QUALITY APPROVALS.
3. WALLS, BUILDINGS, SHED, SHRUB AND TREES ARE NOT SHOWN SHALL BE DAMAGED FROM AN APPROVED SCHEME.
4. HYDROSTATIC TEST, PRE-VERIFICATION AND POST-VERIFICATION HYDROSTATIC TESTS SHALL BE COMPLETED IN ACCORDANCE WITH THE APPROVED TEST PLAN. TEST WATER SHALL BE SAMPLED AND TESTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. TEST WATER SHALL BE DISCHARGED IN AN UPLAND AREA INTO AN EROSION CONTROL STRUCTURE AND FOR SUCH PURPOSES, GEOTEXTILE FILTER BAG OR SIMILAR IN A TRUCK AND HAULED TO AN APPROVED DISPOSAL SITE. UPON COMPLETION OF STARTPACKS AND SPIKING, A GALVEN PIG SUPPOSE SHALL BE COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
5. SPILL PREVENTION, CONTROL OF ANY POLLUTANT SHALL BE COMPLETED IN ACCORDANCE WITH THE SPCC PLAN.
6. EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
7. WETLANDS THE WETLANDS STATED THE EPC PIPELINE CROSSING PLAN, BE WELL OR WITHIN THE APPROVED CONSTRUCTION RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN AFTER THE PILOT HOLE IS COMPLETE. CONTRACTOR'S AERIAL EXIT PROVIDE SHALL BE SUBMITTED TO COLUMBIA FOR APPROVAL. CONTRACTOR SHALL ASSESS THE AREA FOR ANY SURVEY APPROPRIATE BEFORE DURING THE DRILL.
8. DRILLING FLUID DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING FLUID AS DIRECTED BY COLUMBIA'S ENVIRONMENTAL INSPECTOR AS PER PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISCHARGED OR WASTE INTO OR WETLANDS, AND DRILLING FLUID WHICH INADVERTENTLY SURFACES AT POINTS OTHER THAN THE ENTRY OR EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICABLE AND DISPOSED OF AS DIRECTED BY COLUMBIA'S ENVIRONMENTAL INSPECTOR IN ACCORDANCE WITH PERMIT CONDITIONS.
9. DRILLING FLUID RETENTION OR REMOVAL: DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS, DISTURBED AREAS SHALL BE RESTORED AS SPECIFIED IN THE CLEAN-UP AND RESTORATION REQUIREMENTS. THE TEMPORARY ACCESS AND ACCESS BY WHEELS, CONTRACTOR SHALL BE USE FOR GROUND PRESSURE EQUIPMENT OR OTHER EQUIPMENT APPROVED BY COLUMBIA TO AVOID POST CONTAMINATE AND DISPOSAL OF ANY NONWOVEN MATERIALS THAT COULD DAMAGE THE DRILL INSTALLATION PROCESS.
10. GEOTECHNICAL DATA: BORE HOLES ARE OFFSET FROM THE PIPELINE CENTERLINE AS SHOWN ON THE PLAN VIEW. THE GEOTECHNICAL CONDITIONS WILL BE PROVIDED TO THE CONTRACTOR.
11. CONTRACTOR IS RESPONSIBLE FOR DRILLING PILOT HOLE IS MAINTAINED WITHIN AND DEVIATING ALL UNDERGROUND UTILITIES PRIOR TO BEGINNING CONSTRUCTION. IF ANY UTILITY IS LOCATED WITHIN 15 FEET OF THE DESIGNED HDD PROFILE AND ALTERNATIVE, CONTRACTOR SHALL OBTAIN APPROVAL FROM COLUMBIA PRIOR TO STARTING HDD OPERATIONS.
12. IT IS THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY AND PROTECT ANY FORCES UTILITY THAT MAY BE AFFECTED BY THE HDD OPERATIONS.
13. CONTRACTOR SHALL ADHERE TO THE SPECIFICATIONS AND TOLERANCES PER COLUMBIA'S SPECIFICATIONS, CONTRACT DOCUMENTS AND SPECIAL PERMIT CONDITIONS, EXCEPT AS NOTED ON THE DRAWING.
14. WET AND ARCS AT THE TIME OF HDD TO BE WATER.
15. MINIMUM ALLOWABLE BEND RADIUS 800'.
16. FINAL HOLE DRILL DIAMETER SHALL BE 10".

LEGEND:

ISSUED FOR FERC FILING
DATE: 09/16/2017

No.	REVISIONS	APPROVED BY	DATE
	ISSUED FOR FERC FILING		

No.	REVISIONS	APPROVED BY	DATE
	ISSUED FOR 50% REVIEW		
	RE-ISSUED FOR 30% REVIEW		

No.	REVISIONS	APPROVED BY	DATE
	RE-ISSUED FOR 30% REVIEW		
	ISSUED FOR 30% REVIEW		

DWG NO. REFERENCE

ALIGN. ALIGNMENT SHEET

PROJECT DELIVERY
PROJECT ENGINEERING

Columbia Gas Transmission

PL-10376

TITLE: EASTERN PANHANDLE EXPANSION
HORIZONTAL DIRECTIONAL DRILL POTOMAC RIVER

DRAWN	CHK	DATE	DRAWING NUMBER	SHEET	REV.
	CAD	09/14	D23154-HDD-2	1 OF 1	P5

1

Appendix D
Table of Characteristics of Soils Crossed by the Project

Milepost		Map Unit Symbol	Component Name	Component Percent	Crossing Length (miles)	Prime Farmland (Y/N)[a]	Compaction Prone (Y/N)[b]	Highly Erodible		Revegetation Concerns[e] (Y/N)	Stony/ Rocky[f] (Y/N)	Shallow to Bedrock[g] (Y/N)
Begin	End							Water[c] (Y/N)	Wind[d] (Y/N)			
Fulton County, Pennsylvania												
0.00	0.05	WuB	Wurno	50	0.05	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
Washington County, Maryland												
0.05	0.05	WuB	Wurno	50	0.00	Y	N	N	N	N	Y	Y
0.05	0.42	NoB	Nollville	85	0.37	Y	N	N	N	N	Y	Y
0.42	0.56	WuB	Wurno	50	0.13	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
0.56	0.56	WuD	Wurno	50	<0.01	Y	N	Y	N	Y	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
0.56	0.59	WuB	Wurno	50	0.02	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
0.59	0.65	WuD	Wurno	50	0.06	Y	N	Y	N	Y	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
0.65	0.66	NoC	Nollville	85	0.01	Y	N	N	N	N	Y	Y
0.66	0.69	WuB	Wurno	50	0.03	Y	N	N	N	N	Y	Y
0.69	0.84	NoC	Nollville	85	0.15	Y	N	N	N	N	Y	Y
0.84	0.92	Ln	Lindside	85	0.03	Y	N	N	N	N	N	N
0.92	0.95	MhB	Monongahela	85	0.15	Y	N	N	N	N	Y	N
0.95	0.99	WuE	Wurno	50	0.08	Y	N	Y	N	Y	Y	Y
			Nollville	35		Y	N	N	N	N	Y	Y
0.99	1.15	NoB	Nollville	85	0.03	Y	N	N	N	N	Y	Y
1.15	1.21	WuD	Wurno	50	0.04	Y	N	Y	N	Y	Y	Y
			Nollville			Y	N	N	N	N	Y	Y
1.21	1.23	NoB	Nollville	85	0.16	Y	N	N	N	N	Y	Y
1.23	1.31	WuC	Wurno	60	0.06	Y	N	N	N	Y	Y	Y

Milepost		Map Unit Symbol	Component Name	Component Percent	Crossing Length (miles)	Prime Farmland (Y/N)[a]	Compaction Prone (Y/N)[b]	Highly Erodible		Revegetation Concerns[e] (Y/N)	Stony/ Rocky[f] (Y/N)	Shallow to Bedrock[g] (Y/N)
Begin	End							Water[c] (Y/N)	Wind[d] (Y/N)			
			Nollville	40		Y	N	N	N	N	Y	Y
1.31	1.35	WuB	Wurno	50	0.02	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
1.35	1.38	WuC	Wurno	60	0.08	Y	N	N	N	Y	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
1.38	1.45	WuB	Wurno	50	0.03	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
1.45	1.59	WuC	Wurno	60	0.03	Y	N	N	N	Y	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
1.59	1.62	MgC	Monongahela	85	0.07	Y	N	N	N	Y	N	N
1.62	1.64	MgB	Monongahela	85	0.14	Y	N	N	N	N	N	N
1.64	1.68	MgC	Monongahela	85	0.04	Y	N	N	N	Y	N	N
1.68	1.75	WuB	Wurno	50	0.07	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
1.75	1.79	WuC	Wurno	60	0.04	Y	N	N	N	Y	Y	Y
			Nollville	40		Y	N	N	N	Y	Y	Y
1.79	1.84	WuB	Wurno	50	0.05	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
1.84	1.99	WuC	Wurno	60	0.03	Y	N	N	N	Y	Y	Y
			Nollville	40		Y	N	N	N	Y	Y	Y
1.99	2.04	WuD	Wurno	50	0.05	Y	N	Y	N	Y	Y	Y
			Nollville	40		Y	N	Y	N	Y	Y	Y
2.04	2.06	Me	Melvin	85	0.02	N	Y	N	N	N	N	N
2.06	2.11	WuD	Wurno	50	0.05	Y	N	Y	N	Y	Y	Y
			Nollville	40		Y	N	Y	N	Y	Y	Y
2.11	2.49	WuC	Wurno	60	0.02	Y	N	N	N	Y	Y	Y

Milepost		Map Unit Symbol	Component Name	Component Percent	Crossing Length (miles)	Prime Farmland (Y/N)[a]	Compaction Prone (Y/N)[b]	Highly Erodible		Revegetation Concerns[e] (Y/N)	Stony/ Rocky[f] (Y/N)	Shallow to Bedrock[g] (Y/N)
Begin	End							Water[c] (Y/N)	Wind[d] (Y/N)			
			Nollville	40		Y	N	N	N	Y	Y	Y
2.49	2.57	CkB	Clearbrook	85	0.05	Y	Y	N	N	N	Y	Y
2.57	2.61	WuB	Wurno	50	0.04	Y	N	N	N	N	Y	Y
			Nollville	40		Y	N	N	N	N	Y	Y
2.61	2.75	DoB	Downsville	85	0.08	Y	N	N	N	N	N	N
2.75	2.77	WuC	Wurno	60	0.04	Y	N	N	N	Y	Y	Y
			Nollville	40		Y	N	N	N	Y	Y	Y
2.77	2.89	WuD	Wurno	50	0.12	Y	N	Y	N	Y	Y	Y
			Nollville	40		Y	N	Y	N	Y	Y	Y
2.89	2.94	DoB	Downsville	85	0.02	Y	N	N	N	N	N	N
2.94	3.00	Pn	Pope	85	0.12	Y	N	N	N	N	N	N
3.00	3.02	Co	Combs	85	0.05	Y	N	N	N	N	N	N
3.02	3.10	W	Water	100	0.06	--	--	--	--	--	--	--
3.10	3.11	SnF	Schaffenaker-Vanderlop	80	0.02	N	N	Y	Y	Y	Y	Y
3.11	3.20	SnF	Schaffenaker	80	0.09	N	N	Y	Y	Y	Y	Y
			Vanderlip	40		N	Y	N	Y	Y	Y	Y
3.20	3.26	WbC	Weikert	50	0.07	Y	N	Y	N	Y	Y	Y
			Berks	40		Y	N	N	N	Y	Y	Y
3.26	3.36	BeC	Berks	55	0.10	Y	N	N	N	N	Y	Y
			Clearbrook	40		Y	Y	N	N	Y	Y	Y
3.36	3.37	WbC	Weikert	50	0.01	Y	N	Y	N	Y	Y	Y
			Berks	40		Y	N	Y	N	Y	Y	Y

Notes: a As designated by the Natural Resource Conservation Service.
b Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.
c Includes land in capability subclasses 4E through 8E and soils with an average slope greater than or equal to 9 percent.
d Includes soils with Wind Erodibility Group classification of one or two.
e Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained and soils with an average slope greater that or equal to 9 percent.
f Includes soils that have either: 1) a very gravelly, extremely gravelly, cobbley, stony, bouldery, flaggy or channery modifier to the textural class, or 2) have >5 percent (weight basis) of rock fragments larger than 3 inches in any layer within the profile.
g Includes soils that have bedrock within 60 inches of the soil surface. Paralithic refers to "soft" bedrock that will not likely require blasting during construction. Lithic refers to "hard" bedrock that may require blasting or other special construction techniques during installation of the proposed pipeline segments.
h Y = Yes; N = No

Appendix E
Multi-Species Habitat Conservation Plan

INTERAGENCY ENDANGERED SPECIES ACT CONSULTATION CHECKLIST FOR THE Columbia Pipeline Group MULTI-SPECIES HABITAT CONSERVATION PLAN

APPLICANT SECTION

ACTION AGENCY (Recipient): Federal Energy Regulatory Commission (FERC)

OTHER INVOLVED FEDERAL AGENCIES: US Army Corps of Engineers (USACE)

PROJECT NAME: Eastern Panhandle Expansion Project

PROJECT I.D. NO. (if applicable): N/A

The Columbia Pipeline Group comprised of Columbia Gas Transmission, Columbia Gulf Transmission, Columbia Midstream and Crossroads Pipeline (Columbia)) has provided the attached documentation to involved federal agencies in accordance with "Project Review and Documentation Protocols" of Columbia MSHCP Consultation Implementation Guidance [4]. This documentation describes if and how the project is covered by the Columbia 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:

- Columbia MSHCP Chapter 2.3 Covered Lands (pp 2-11)
- Columbia MSHCP Chapter 2.4 Covered Activities (pp 11- 25)
- Columbia MSHCP Consultation Implementation Guidance Quick Reference for Species Consultation Categories (pp 5-6)
- Columbia Pipelines', "Habitat Conservation Program Best Management Practices Guidebook", v.3.0, June 19, 2017 (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.

Columbia representative — Date: 07/06/17

☑ 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 Columbia Pipelines' MSHCP Consultation Implementation Guidance. May 8, 2014. Pg 11.

[5] See Columbia Pipeline MSHCP Consultation Implementation Guidance. May 8, 2014. Pg. 5.

Wildlife Service's Columbia Pipeline MSHCP Implementation Coordinator (Erik Olson, 612.713.5488, erik_olson@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 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?
   __X__Yes. Go to #3.
   _____ 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?
   __X__Yes. Go to #6.
   _____No. Go to #5.

5. Does the proposed action include any of the 11 Likely to Adversely Affect (LAA) species that are not included in the MSHCP (i.e., LAA non-MSHCP species) as addressed in the BO?
   _____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 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]
   _____ Yes. Consultation is complete.
   __X__ 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:

Project area in PA is covered under MSHCP. Additional consultation needed for Maryland and West Virginia. See attached.

Federal Agency representative

1/11/2018
Date

[7] See the Columbia Pipeline's, "Habitat Conservation Program Best Management Practices Guidebook", v.3.0, June 19, 2017.

[8] Per the MSHCP, explanation for non-mandatory AMM use is not required for the Indiana Bat or northern long-eared bat.

FERC Comments on Columbia Gas Transmission, LLC's Multi-species Habitat Conservation Plan Checklist for Consultation under Section 7 of the Endangered Species Act:

The Eastern Panhandle Expansion Project (Project) area in Pennsylvania is covered entirely under Columbia Gas Transmission, LLC's (Columbia) Multi-species Habitat Conservation Plan (MSHCP). The Project would not involve tree clearing in Pennsylvania. The Project is not covered by the MSHCP in Maryland and West Virginia. Columbia performed additional consultation with the U.S Fish and Wildlife Service (FWS) Chesapeake, Maryland Field Office and West Virginia Field Office. According to results of mist net surveys for bats, there are no bats currently utilizing the Project area. FWS confirmed that based on the mist net surveys, bats are not likely utilizing the Project area and therefore would not likely be affected by the Project (see attached letters).

The Project may affect, but would not likely adversely affect harperella. Columbia did not identify individuals during field surveys. Additionally, Columbia would follow FWS recommendations to protect harperella in the case of an inadvertent release of drilling fluids during the horizontal directional drilling process across the Potomac River.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

August 14, 2017

Nikki Wiefling
Ecologist, Arcadis US
6041 Wallace Road Extension, Suite 300
Wexford, PA 15090

RE: Not likely to adversely affect the Indiana bat (Myotis sodalis) and northern long-eared bat (Myotis septentrionalis) determination for the Columbia Gas Transmission, LLC Eastern Panhandle Expansion Project, Washington County, MD, Fulton County, PA, and Morgan County, WV.

Dear Ms. Wiefling:

The U.S. Fish and Wildlife Service (Service) has reviewed the information that you have sent regarding the proposed pipeline project, particularly information provided in your email of August 1, 2017 and in the report entitled, "Indiana and Northern Long-eared Bat Mist-net Survey Report" prepared by Wildlife Specialists, LLC and dated June 2017. The comments provided below are in accordance with Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

From the information provided we understand that this pipeline project occurs primarily in Washington County, Maryland, but extends a small distance into Fulton County, Pennsylvania and Morgan County, West Virginia. Forest clearing for this project will include 15.3 acres of forest in Maryland and 4.1 acres in West Virginia. No forest clearing will occur in Pennsylvania. You have conducted a mist net survey for possible presence/absence of Indiana bats and northern long-eared bats along this pipeline using the protocol recommended by the Service (https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html) and with a survey plan submitted to and approved by the Service on May 8, 2017.

We received the results of that survey data and note that you did not capture any Indiana bats and captured only one northern long-eared bat that could not be tracked to a roost tree. As described in the Eastern Panhandle Expansion Project Mist-net Report (p. 14), considerable effort was made to relocate that individual and despite these efforts, there were no additional records of northern long-eared bats using the project area. "Mist netting efforts resulted in 30 bat captures representing 6 species. The predominance of captures consisted of red bats (43 percent) and big brown bats (30 percent). Captured species composition is representative of the habitats available for survey and commonly utilized by these species. One northern long-eared bat (federally

TAKE PRIDE IN AMERICA

threatened) was captured and fitted with a transmitter in an effort to locate summer roosts and/or conduct foraging telemetry. Telemetry crews were unable to relocate the individual and it was determined that it was no longer utilizing the Project area."

Given these survey results and the project description we conclude that this project is not likely to adversely affect these species. This survey completes a reasonable effort to ascertain that Indiana bats are not likely to be utilizing habitats within the Project area and are not likely to be directly impacted as a result of the proposed project construction. While a northern long-eared bat was captured in the project area, that bat was not tracked to a maternity roost tree, therefore, no restrictions on forest clearing are needed due to the 4(d) rule for this species (https://www.fws.gov/Midwest/endangered/mammals/nleb/index.html).

We appreciate the opportunity to provide information relevant to threatened and endangered fish and wildlife resources. This Endangered Species Act determination does not exempt this project from obtaining all other permits and approvals that may be required by other state or Federal agencies. If you have any questions or concerns regarding this letter, please contact Cherry Keller of my Endangered Species staff at (410) 573-4532 or by email at cherry_keller@fws.gov.

Sincerely,

Daniel Murphy

for Genevieve LaRouche
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

August 10, 2017

Mr. Jacob Dunnell
Arcadis, U.S., Inc.
6041 Wallace Road Extension, Suite 300
Wexford, Pennsylvania 15090

Re: Eastern Panhandle Extension Project, Morgan County, West Virginia
(FWS File Numbers 2017-I-0345 and 2017-CPA-0477)

Dear Mr. Dunnell:

This letter is in response to your request dated July 2, 2017, for updated information regarding the potential occurrence of federally listed endangered and threatened species and their designated critical habitats within the vicinity of the project mentioned above. Columbia Gas Transmission, LLC, is proposing to construct 3.4 miles of new greenfield 8-inch diameter pipeline through Pennsylvania, Maryland, and West Virginia. The project proposes approximately 4.1 acres of tree clearing, as well as the use of a previously disturbed contractor staging area, in Morgan County, West Virginia. Columbia also proposes to cross the Potomac River using a horizontal directional drilling (HDD) method. These comments are provided pursuant to the Endangered Species Act (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). This project has been assigned FWS File numbers 2017-I-0345 and 2017-CPA-0477; please reference these numbers in all future correspondence.

The U.S. Fish and Wildlife Service (Service) has determined that there are three federally listed species that may occur within the project area and may be affected by the construction of this project. These species are the endangered Indiana bat (*Myotis sodalis*), threatened northern long-eared bat (*Myotis septentrionalis*) (NLEB), and endangered harperella (*Ptilimnium nodosum*). These comments only pertain to the portion of the project proposed within West Virginia.

Federally Listed Bats

The Service has reviewed the report on the bat mist net survey conducted in the proposed project area and submitted on June 7, 2017. The survey followed the protocol outlined in the current Range-wide Indiana Bat Summer Survey Guidelines. These Guidelines are acceptable to address the Indiana bat and NLEB. The survey covered 4.1 acres of potential bat habitat in West Virginia and was conducted at 1 net site from May 16, 2017 to May 21, 2017. No Indiana bats or NLEB were captured in West Virginia.

Survey results are considered current for 5 years (the summer they are completed and the following four summer seasons). In this case, the survey will expire on May 15, 2021. If a significant amendment is proposed to change or expand this project, or if timber will be removed after that date, a new survey may be necessary and the Service should be contacted.

Harperella

The project occurs within the range of harperella. Harperella is a flower occurring on the saturated banks of clear, swift-flowing streams. Periodic flooding is essential for the plant, for it prevents soil build-up around its roots. Harperella can tolerate small amounts of soil and shallow water, though excess sediment or prolonged flooding will negatively impact the plants.

The project proposes to cross the Potomac River, which contains potential habitat for harperella, using a HDD method. This method would place the pipeline under the stream without direct disturbance to the river. The HDD method uses bentonite clay in its pressurized drilling that, on occasion, can result in an inadvertent release of bentonite clay into waterways.

Correspondences dated July 2, 2017, and July 24, 2017, demonstrated that the HDD entry point, which is in West Virginia, is in an upland area which does not contain any streams or wetlands that could provide potential habitat for harperella. The HDD will not directly affect the bank of the Potomac River where harperella could occur. However, harperella could occur downstream or on the riverbanks near the drilling site and could be affected by an inadvertent return.

In correspondence dated July 24, 2017, Columbia Gas Transmission, LLC, stated their commitment to the following measures that will be followed in the event of an inadvertent return that could cause the sudden release of bentonite clay substrate into waterways:

1. Source/pumps will be stopped temporarily. Clean up of all spills will begin immediately.
2. Secondary containment measures including hay bales or silt fences will be installed.
3. Drilling fluid will be removed from ground surfaces to the greatest extent possible.
4. The affected areas will be restored within 30 days as closely as possible to their previous condition.
5. Agencies will be contacted within 24 hours of the event.

In the event of an inadvertent return, the Service believes that implementation of the measures outlined above will minimize, to the extent practicable, the likelihood of adverse impacts to waterways that could provide habitat for harperella near the project area. This office should be notified immediately if any deviations from the submitted plans are anticipated, or if an inadvertent return occurs during construction of the project.

Conclusion

Based on the information provided to us, the Service anticipates that effects to harperella will be insignificant or discountable and that no Indiana bats or northern long-eared bats are expected to be adversely affected by the project.

This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If there is a Federal nexus for the project (e.g., Federal funding provided, Federal permits required to construct), no tree clearing or any project construction activities on any portion of the parcel should occur until consultation under section 7 of the ESA, between the Service and the Federal action agency, is completed. Section 7 consultation is not complete until the Federal action agency submits a determination of effects to this office, the Service concurs with the Federal action agency's determination.

Should project plans change or amendments be proposed that we have not considered in your proposed action, or if additional information on listed and proposed species becomes available, or if new species become listed or critical habitat is designated, this assessment may be reconsidered.

If you have any questions regarding this letter, please Amanda Selnick of my staff at (304) 636-6586, Ext. 24, or amanda_selnick@fws.gov, or at the letterhead address.

Sincerely,

Barbara Douglas
for

John Schmidt
Field Supervisor

Appendix F
Land Requirements during Construction and Operation of the Project

Appendix F
Land Requirements during Construction and Operation of the Project

County, State	Developed[a,b]		Forest[a,c]		Other[a,g]		Open Land[a,d]		Open Water[a,f]		Residential[a,e]		TOTALS	
	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Fulton County, Pennsylvania														
Pipeline Right of Way	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.27	0.00	0.00	0.00	0.00	**0.27**	**0.27**
Existing Permanent Right	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.00	**0.32**	**0.32**
TWS	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	**0.01**	**0.00**
ATWS	0.02	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	**0.32**	**0.00**
Access Roads	0.96	0.12	0.00	0.00	0.00	0.00	0.24	0.24	0.00	0.00	0.00	0.00	**1.20**	**0.36**
Staging Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Mainline Valve and Tie- in Assemblies[h]	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.00	0.00	0.00	0.00	**0.35**	**0.35**
Cathodic Protection[i]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
												Total:	**2.47**	**1.30**
Washington County, Maryland														
Pipeline Right of Way	0.13	0.13	7.01	7.01	0.00	0.00	8.93	8.93	0.00	0.00	0.59	0.59	**16.66**	**16.66**
Existing Permanent Right	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
TWS	0.06	0.00	3.34	0.00	0.00	0.00	5.88	0.00	0.00	0.00	0.28	0.00	**9.55**	**0.00**
ATWS	0.13	0.00	2.25	0.00	0.00	0.00	7.19	0.00	0.00	0.00	0.35	0.00	**9.92**	**0.00**
Access Roads	6.00	1.35	1.46	0.92	0.00	0.00	0.30	0.21	0.00	0.00	0.00	0.00	**7.76**	**2.47**
Staging Area	6.48	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.61**	**0.00**
Mainline Valve and Tie- in Assemblies[h]	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	**0.06**	**0.06**
Cathodic Protection[i]	0.00	0.00	0.86	0.86	0.00	0.00	2.77	2.77	0.00	0.00	0.18	0.18	**3.81**	**3.81**
												Total:	**54.37**	**23.01**
Morgan County, West Virginia														
Pipeline Right of Way	0.06	0.06	0.84	0.84	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	**0.99**	**0.99**
Existing Permanent Right	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
TWS	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**	**0.00**
ATWS	0.00	0.00	2.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.37**	**0.00**
Access Roads	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.20**	**0.20**
Staging Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**

Appendix F

Land Requirements during Construction and Operation of the Project

	Developed[a,b]		Forest[a,c]		Other[a,g]		Open Land[a,d]		Open Water[a,f]		Residential[a,e]		TOTALS	
County, State	**Construction**	**Operation**	**Construction**	**Operation**	**Construction**	**Operation**	**Construction**	**Operation**	**Construction**	**Operation**	**Construction**	**Operation**	**Construction**	**Operation**
Mainline Valve and Tie- in Assemblies[h]	0.00	0.00	0.39	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.39**	**0.39**
Cathodic Protection[i]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
												Total:	**4.510**	**1.58**
Total														
Pipeline Right of Way	0.19	0.19	7.86	7.86	0.00	0.00	9.29	9.29	0.00	0.00	0.59	0.59	**17.92**	**17.92**
Existing Permanent Right	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.00	**0.32**	**0.32**
TWS	0.06	0.00	3.48	0.00	0.00	0.00	5.89	0.00	0.00	0.00	0.28	0.00	**9.71**	**0.00**
ATWS	0.15	0.00	4.62	0.00	0.00	0.00	7.49	0.00	0.00	0.00	0.35	0.00	**12.61**	**0.00**
Access Roads	6.96	1.47	1.66	1.12	0.00	0.00	0.54	0.45	0.00	0.00	0.00	0.00	**9.16**	**3.03**
Staging Area	6.48	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.61**	**0.00**
Mainline Valve and Tie- in Assemblies[h]	0.00	0.00	0.39	0.39	0.00	0.00	0.41	0.41	0.00	0.00	0.00	0.00	**0.79**	**0.80**
Cathodic Protection[i]	0.00	0.00	0.86	0.86	0.00	0.00	2.77	2.77	0.00	0.00	0.18	0.18	**3.81**	**3.81**
Total:	**13.84**	**1.65**	**19.00**	**10.72**	**0.00**	**0.00**	**26.70**	**13.23**	**0.00**	**0.00**	**1.40**	**0.77**	**60.93**	**25.89**

Notes:

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 Developed (e.g., electric power or gas utility stations, manufacturing or industrial plants, landfills, mines, quarries, commercial or retail facilities, and roads/improved driveways).
c Upland and wetland forest.
d Herbaceous upland, emergent and scrub-shrub wetland.
e Residential land.
f Water crossings greater than 100 feet wide.
g Miscellaneous special use areas (e.g., land associated with schools, parks, places of worship, cemeteries, sports facilities, camp grounds, golf courses, and ball fields).
h Acreage for land affected during construction at mainline valve locations and tie-in locations has been included in the TWS for the pipeline construction.
i Acreage for land affected during construction along the Cathodic Protections beds are included with the TWS for the pipeline construction.
Key: ATWS – additional temporary workspace TWS – temporary workspace

Appendix G
Past, Present, and Reasonably Foreseeable Projects within the Geographic Scopes of the Eastern Panhandle Expansion Project

Recently Completed, Contemporary or Ongoing, and Reasonably Foreseeable Future Projects in the Cumulative Impact Assessment Area											
Project Name	**Project Type**	**Proponent**	**State**	**County**	**Closest Distance and Direction**	**Description**	**Status of Project**	**Review Required**	**Potentially Affected Resources**	**In same HUC-12 waters hed as**	**Anticipated Environmental Cumulative Impacts**
Berkeley Springs Restaurant	Commercial Development	Private	WV	Morgan	5.0 miles south-southwest of MP3.37	Construction of a 3,830 square foot restaurant south of Berkeley Springs, WV	Building permit issued. Construction has not started. Timeline unknown.	Not Listed	- Aquatic Resources -Fisheries, Wildlife, and Vegetation -Geological -Soils -Land Use	Yes	Depends on project timeline.
Bath Water Line	Municipal – Water line replacement	Town of Bath (Berkeley Springs), WV	WV	Morgan	4.1 miles south-southwest of MP 3.37	Replacement of existing water line in the town of Berkeley Springs, WV	Project in the planning phase of next stage. Timeline unknown.	Not Listed	- Aquatic Resources -Fisheries, Wildlife, and Vegetation -Geological -Soils -Land Use	Yes	Depends on project timeline.
Sheetz Convenience Store	Commercial Development	Private	WV	Morgan	6.1 miles south-southwest of MP 3.37	Construction of a 5,420 square foot store.	Construction started. Timeline for completion unknown.	Not Listed	- Aquatic Resources -Fisheries, Wildlife, Vegetation -Geological -Soils -Land Use	Yes	Project details unknown.
Tractor Supply Retail Store (2)	Commercial Development	Private	WV	Morgan	7.6 miles south-southwest of MP 3.37	Construction of a 18,750 square foot retail store.	Completed. Construction completed within last year.	Not Listed	- Aquatic Resources -Fisheries, Wildlife, Vegetation -Geological -Soils -Land Use	Yes	Project details unknown.

Recently Completed, Contemporary or Ongoing, and Reasonably Foreseeable Future Projects in the Cumulative Impact Assessment Area											
Project Name	**Project Type**	**Proponent**	**State**	**County**	**Closest Distance and Direction**	**Description**	**Status of Project**	**Review Required**	**Potentially Affected Resources**	**In same HUC-12 watershed as the Project?**	**Anticipated Environmental Cumulative Impacts**
Route 522 Resurfacing (1)	Municipal – Road Resurfacing	West Virginia Department of Transportation	WV	Morgan	0.0 miles (crosses MP 3.29)	Resurfacing of an approximately 3.0 mile stretch of Route 522.	Completed. Resurfacing completed within last year.	Not Listed	-Aquatic Resources -Fisheries, Wildlife, Vegetation -Geological -Soils -Land Use -Air Quality and Noise	Yes	Project details unknown.
Route 522 Resurfacing (2)	Municipal – Road Resurfacing	West Virginia Department of Transportation	WV	Morgan	1.6 miles south-southwest of MP 3.37	Resurfacing of an approximately 2.0 mile stretch of Route 522.	Resurfacing planned for 2017.	Not Listed	- Aquatic Resources -Fisheries, Wildlife, Vegetation -Geological -Soils -Land Use	Yes	Construction will in 2017 occur just prior to the EPE Project.
Mountaineer Pipeline	Natural Gas (non- FERC)	Mountaineer Gas	WV	Morgan	0.0 miles (crosses MP 3.37)	Non-FERC project consisting of an approximately 24 mile natural gas pipeline; pipeline to connect to Columbia Project pipeline in West Virginia	Construction to be started in 2017 pending approval. Total construction impact: 248.7 acres Waterbody: 54 Streams crossed (4,199 linear ft) Wetlands: 14 wetland (0.47 acres)	NWP 12 Section 7 ESA Consultation Section 106 Consultation Stream Activity Permit General Stormwater Construction Permit	- Aquatic Resources -Fisheries, Wildlife, and Vegetation -Geological -Soils -Land Use -Air Quality and Noise	Yes	Approval and construction anticipated to occur concurrently with construction of the EPE Project
Berkeley Works Quarry	Mining	U.S. Silica	WV	Morgan	0.3 miles south-southwest of MP 3.37	U.S. Silica company's Berkeley Works Quarry as a source of glass sand.	Current activities unknown; ongoing mining activities.	Not Listed	- Aquatic Resources -Fisheries, Wildlife, and Vegetation -Geological -Soils -Land Use	Yes	No planned expansion activities have been identified for the mine.

Appendix H
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Appendix I
List of Preparers

List of Preparers

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