COMPREHENSIVE STREAM AND WETLAND MONITORING, RESTORATION AND MITIGATION FRAMEWORK

Mountain Valley Pipeline Project

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Project No. 0101-21-0244-005

November 9, 2021
Updated March 29, 2022
Updated July 11, 2022
Updated November 23, 2022

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COMPREHENSIVE STREAM AND WETLAND MONITORING, RESTORATION AND MITIGATION FRAMEWORK

Mountain Valley Pipeline Project

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (Mountain Valley) is seeking an Individual Permit (IP) for the Mountain Valley Pipeline Project (the Project) from the United States Army Corps of Engineers (USACE) Pittsburgh, Huntington, and Norfolk Districts to conduct regulated activities in navigable waters under Section 10 of the Rivers and Harbors Act of 1899 and for the discharge ofdredged and fill material into "Waters of the United States" (WOTUS) under Section 404 of the Clean Water Act (CWA). Mountain Valley has also sought and obtained CWA Section 401 Water Quality Certification from the West Virginia Department of Environmental Protection (WVDEP) and the Virginia Department of Environmental Quality (VADEQ) for portions of the Project within their respective jurisdictions.

This Comprehensive Stream and Wetland Monitoring, Restoration and Mitigation Framework (Mitigation Framework) was prepared jointly by a team of experts from Potesta & Associates, Inc.;Tetra Tech, Inc.; and Wetland Studies and Solutions, Inc. at Mountain Valley's request in response to comments from the U.S. Environmental Protection Agency (USEPA) and other parties on Mountain Valley's IP application. Although the application reflected a robust suite of stream and wetland monitoring, restoration, and mitigation measures, those measures were dispersed among various existing regulatory documents and actions proposed in the application and may not have been readily apparent to many commenters. Furthermore, Mountain Valley carefully reviewed the comments by USEPA and others to determine if additional reasonable and prudent actions could be taken to improve the Project's approach to stream and wetland monitoring, restoration, and mitigation. A significant set of additional voluntary measures were developed as a result of that review and further consultation with USACE, WVDEP, and VADEQ. The Mitigation Framework does not replace the mitigation that is required for permanent fills but is a voluntary proffered supplement for temporary impacts associated with the Project.

The purpose of this document is to consolidate the Project's proposed stream and wetland monitoring, restoration, and mitigation measures into a comprehensive framework and to outline a systematic approach to verifying that the impacts to jurisdictional aquatic resources, both wetlands and streams, associated with the construction of the Project are appropriately mitigated. This Mitigation Framework incorporates the following elements, each of which is attached hereto, to meet these objectives:

A. Baseline Assessment Plan
B. Restoration Work Plan
C. Performance Standards
D. Monitoring Plan

E. Maintenance & Adaptive Management Plan
F. Supplemental Credit Determination Methodology

The Baseline Assessment Plan identifies metrics for each stream and wetland. Those metrics are tracked and utilized in the other elements of the Mitigation Framework. For example, the stream survey information collected under the Baseline Assessment Plan is used to restore streams under the Restoration Work Plan. The information is then used to define the restoration success criteria in the Performance Standards which, in turn, are monitored under the Monitoring Plan. If restoration is not proceeding as intended, the survey information will inform the measures to be taken under the Maintenance & Adaptive Management Plan. The relationships between the metrics are summarized in the Mitigation Framework Process Summary table on the following page. The numbering system in the table is consistent through each plan element to show the metrics' relationships through the restoration process.

Mountain Valley Pipeline – Baseline Assessment Plan, Restoration Work Plan, Performance Standards, Monitoring Plan, and Maintenance & Adaptive Management Plan Process Summary

A. Baseline Assessment		B. Restoration Work Plan	C. Performance Standards	D. Monitoring Plan	E. Maintenance & Adaptive Management Plan	F. Supplemental Credit Determination Methodology (Temporary Impacts)
Metric	**Source**			**(annually for 3 years post restoration)**		
1.00 Wetlands - Attributes						
1.0.1 Cowardin Classification	Project Delineation Report and related Preliminary Jurisdictional Determination Table 3 in IP Application	Varies by location in right-of-way (ROW)[1] Construction procedures to support reestablishment of palustrine emergent (PEM) characteristics; hand plantings in accordance with mitigation requirements and Restoration and Rehabilitation Plan	Temporary impacted wetlands will progress to a PEM system at maturity. Palustrine forested (PFO) systems will have bare-root saplings planted with a required success rate of 400/acre.	Wetland Determination Forms[2] to be completed per each monitoring event. Stems per acre to be counted in years 1 and 2 and thereafter if not met.	For all: (a) Check soil fertility, pH, organic matter percentage, and density (b) Correct any issues found in (a) and then replant/reseed during appropriate timeframe (c) Or if no issues found - then replant/reseed during appropriate timeframe (d) Failure after 3 annual attempts – may pursue potential credits/in-lieu fee (ILF) (subject to the approval of the USACE, WVDEP, VADEQ)	In WV, the Stream and Wetland Valuation Metric (SWVM) forms will be used to calculate temporal impacts at a standard 3% per year. In VA, the Unified Stream methodology (USM) forms will be used to calculate temporal impacts at a standard 3% per year. **Temporary wetland impacts associated with pipeline installation:** PEM wetland vegetation is expected to return within one full growing season. To conservatively compensate for any lingering temporal loss following restoration of the wetland crossing, an additional two years of compensatory mitigation will be provided (6% total). **Temporary wetland impacts associated with temporary fill placement:** The duration of the assumed construction impact will extend from the date of the installation of the temporary fill until the date it is removed, plus an additional two years to remain consistent with the pipeline temporary impacts. No additional compensatory mitigation is proposed for restoration of palustrine scrub-shrub (PSS) or PFO vegetation because, as discussed in Section 3.2 (Appendix F), compensatory mitigation has already been provided for those conversion impacts.
1.0.2 Wetland Area	Project Delineation Report and related Preliminary Jurisdictional Determination	Existing topographical surveys and field delineations	Restored wetland area shall be greater than or equal to the original wetland area	Delineated[2] and survey located to compare to pre-crossing area.	Evaluate wetland area; regrade/reseed if necessary; if cannot achieve original size pursue potential credits/ILF (subject to the approval of the USACE, WVDEP, VADEQ)	
1.0.3 Topographical Survey	Existing topographical surveys and field delineations	Existing topographical surveys and field delineations	Return as close as practicable to the preconstruction contours to maintain original wetland hydrology	As-built survey to compare to pre-crossing area.	Evaluate wetland area; regrade/reseed if necessary; if cannot achieve original size pursue potential Credits/ILF (subject to the approval of the USACE, WVDEP, VADEQ)	
1.0.4 Dominant Vegetation	Vegetation Strata - Wetland Determination Data Forms	Restoring upper 12 inches of pre-segregated topsoil with wetland seedbank; seeding if necessary.	More than 50% of all dominant herbaceous plant species shall be facultative (FAC) or wetter (facultative wetland (FACW) or obligate wetland (OBL)).	Vegetation Strata - Wetland Determination Data Forms[2]	See 1.0.1	
1.0.5 Invasive Plant Species Cover	Vegetation Strata - Wetland Determination Data Forms	Manual removal of invasive plant species	Less than 5% coverage	Vegetation Strata - Wetland Determination Data Forms[2]	Remove with herbicides if approved, or mechanical/hand weeding	
1.0.6 Native (non-invasive) Vegetation Coverage	Vegetation Strata - Wetland Determination Data Forms	Restoring upper 12 inchesof pre-segregated topsoil with wetland seedbank; seeding if necessary.	Plant coverage shall be at least 70% unless shrub and/or canopy/crown coverage is at least 30%.	Vegetation Strata - Wetland Determination Data Forms[2]	Same as section 1.0.1	

A. Baseline Assessment		B. Restoration Work Plan	C. Performance Standards	D. Monitoring Plan	E. Maintenance & Adaptive Management Plan	F. Supplemental Credit Determination Methodology (Temporary Impacts)
Metric	**Source**			**(annually for 3 years post restoration)**		
1.0.7 Hydric Soils	Hydric Soil Indicators - Wetland Determination Data Forms	Restoring upper 12 inches of pre-segregated topsoil	Presence of positive indicators of hydric soil formation	Hydric Soil Indicators - Wetland Determination Data Forms[2]	If positive indicators of hydric soils cannot be identified, pursue potential Credits/ILF (subject to the approval of the USACE, WVDEP, VADEQ)	N/A
1.0.8 Hydrology Indicators	Wetland Hydrology Indicators - Wetland Determination Data Forms	Re-establishing original surface hydrology and contours to maintain overland flow patterns	Presence of Group A Hydrology Indicators or the presence of other hydrologic indicators as listed on the Wetland Determination Data Forms	Wetland Hydrology Indicators - Wetland Determination Data Forms[2]	Check precipitation data for drought indices. If it is determined that drought conditions are present, additional actions are not required. If drought conditions do not exist, the following measures will be considered: regrading, redirecting overland flow and/or installing groundwater monitoring wells. If efforts to restore hydrology are not achieved pursue potential Credits/ILF (subject to the approval of the USACE, WVDEP, VADEQ)	
1.0.9 Bulk Density	N/A	Standard decompaction practices (disking, plowing, cultivating, tilling, or incorporation of organic matter into the topsoil horizon)	N/A	N/A	If standard decompaction practices have not sufficiently de-compacted the soil, then bulk density testing may be completed for the topsoil.	
1.1 Wetlands - Resource Valuation						
1.1.1 WV SWVM	Assessment using Delineation Report and Data sheets	Refer to Sections 1.01 through 1.0.9.	The final SWVM score at the end of the three-year monitoring period will be at least consistent with the preconstruction SWVM score. The post-construction SWVM score will be deemed consistent with the preconstruction score if the difference is attributable to a change in the value of one or more input parameters that satisfy the respective performance standard for such parameters.	To be completed after each monitoring event.	If post-construction values differ from baseline information, Sections 1.0.1 through 1.0.9 will be used to determine what component may require adaptive management.	N/A

A. Baseline Assessment			B. Restoration Work Plan	C. Performance Standards	D. Monitoring Plan	E. Maintenance & Adaptive Management Plan	F. Supplemental Credit Determination Methodology (Temporary Impacts)
	Metric	**Source**			**(annually for 3 years post restoration)**		
2.0	**Streams - Attributes**						
	2.0.1 Stream Survey Stream Cross-Section Area (including pool-to-pool spacing, max pool depth, average riffle slope, average reach slope, pebble count)	Longitudinal surveys of field conditions, cross-section analysis, and in-stream surveys	Restoring segregated native stream substrate; restoring according to pre-crossing cross-sectional and longitudinal profiles, cross-sections and visual assessments	Stream Cross-Sectional Area • No increase or decrease of >25% of baseline (Perennial); • Restored to stable configuration (Ephemeral and Intermittent); • Pool-to-Pool Spacing: No increase or decrease of >25% of baseline pool-to-pool range; • Max Pool Depth: No increase or decrease of >50% of baseline (Perennial); restored to stable configuration (Ephemeral and Intermittent); • Average Reach Slope: No increase or decrease >10%; • Average Riffle Slope: No increase or decrease >10%; • Pebble Count: Maintain Category.	Longitudinal surveys of field conditions, cross-section analysis, and in-stream surveys. Longitudinal and cross-section surveys will be completed for the first year only unless conditions indicate additional surveys are required. Supplement for Impaired Waters: Quarterly monitoring by biologist. A modified *USEPA RBP Physical Characterization/Water Quality Field Data Sheet* and *modified Habitat Assessment Field Data Sheet* will be completed for each event. Photographs will be taken facing both upstream and downstream at the following points: downstream edge of ROW, center of ROW, and upstream edge of ROW. Additionally, photos will be taken off both the left descending and right descending banks.	For all: (1) If monitoring indicates that success criteria issues are caused by deficiencies in adjacent ROW - correct issue; (2) If caused by offsite watershed changes (outside of Mountain Valley's control) - propose site-specific stabilization plan to USACE, WVDEP, VADEQ and implement if approved; (3) Pursue potential Credits/ILF (subject to the approval of the USACE, WVDEP, VADEQ)	In WV, the SWVM forms will be used to calculate temporal impacts at a standard 3% per year. In VA, the USM forms will be used to calculate temporal impacts at a standard 3% per year. **Temporary stream impacts associated with pipeline installation:** Mountain Valley will include one year of compensatory mitigation from the date the stream is impacted (3% total) **Temporary stream impacts associated with temporary fill placement:** The duration of the assumed construction impact will extend from the date of the installation of the temporary fill until the date it is removed, plus an additional one year to remain consistent with the pipeline temporary impacts.
	2.0.2 Stream Vegetation	Visual Assessment; See Section 2.1.5	Reseeding as per Federal Energy Regulatory and state requirements; hand planting in PFOs and site-specific locations	Monitor for a stable 70% herbaceous vegetative cover of the riparian buffer and 70% survival of woody stems. Less than 5% coverage by invasivespecies. Supplement for impaired waters: Monitor for a stable 80% herbaceous vegetative cover of the riparian buffer and 80% survival of woody stems. Less than 5% coverage by invasive species.	Visual assessment and photo collection Supplement for Impaired Waters: Refer to Section 2.0.1.	(1) Check soil fertility, pH, organic matter percentage, and density; (2) Correct any issues and then reseed and/or replant; (3) If no issues found, replant/reseed; (4) If the vegetative performance standards are not met after three annual attempts, Mountain Valley will coordinate with the agencies (WVDEP, VDEQ, USACE) to determine if the riparian area is detrimental to the resource restoration and if additional mitigation credits or appropriate ILF contributions are required	

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Metric	**Source**			**(annually for 3 years post restoration)**		
2.1 Streams - Resource Valuation						
2.1.1 Field water quality						
a. Dissolved Oxygen	Field Assessment using YSI water quality meter or similar	Removing instream diversions to restore stream flow to channel	Meet the baseline conditions or the minimum state water quality standards	Field Assessment using YSI water quality meter or similar	Consult with agencies (WVDEP, VADEQ, USACE) to address differences, if any, as watershed/time of year and precipitation will change many of these measurements. Adaptive management actions may include: (a) additional monitoring (to see if the changes are just temporal), (b) additional plantings, (c) adding woody debris, (d) implementing stream structural changes, (e) translocating benthic macroinvertebrates with Habitubes (if appropriate), and/or (f) the purchase of additional credits or ILF contributions.	
b. Specific conductivity		Removing instream diversions to restore stream flow to channel	Where baseline sampling is 100 uS/cm or less, the standard will be 300 uS/cm. Where background or baseline sampling (from Mountain Valley's baseline sampling or from other reliable data) is under 500 uS/cm, the standard will be 500 uS/cm; and Where background or baseline is over 500 uS/cm, the standard will be 110% of the existing baseline.			N/A
c. pH		Removing instream diversions to restore stream flow to channel.	Meet the baseline conditions or the state water quality standards			
2.1.2 Rapid Bioassessment Protocol (RBP)	Field Assessment using USEPA RBP data collection forms	Restoring segregated native stream substrate; Restoring according to pre-crossing cross-sectional and longitudinal profiles,cross-sections, and visual assessments.	Starting with 1st year post construction, continued or maintained scores during Monitoring Period.	Field Assessment using USEPA RBP data collection forms. Supplement for Impaired Waters: Refer to Section 2.0.1.		
2.1.3 Benthic Macroinvertebrates	Field Assessment in accordance with WVDEP Watershed Assessment Branch Standard Operating Procedures and USEPA RBP Methodologies		WVSCI score is ±8 points of the baseline score by the third annual monitoring event.	Field Assessment in accordance with WVDEP Watershed Assessment Branch Standard Operating Procedures and USEPA RBP Methodologies. Supplement for Impaired Waters: Refer to Section 2.0.1.		
2.1.4 Hydrogeomorphic Assessment	Field Assessment according to USEPA Hydrogeomorphic Protocol		Starting with 1st year post construction, continued or maintained scores during Monitoring Period.	Field Assessment according to USEPA Hydrogeomorphic Protocol		

A. Baseline Assessment			B. Restoration Work Plan	C. Performance Standards	D. Monitoring Plan	E. Maintenance & Adaptive Management Plan	F. Supplemental Credit Determination Methodology (Temporary Impacts)
Metric		Source			(annually for 3 years post restoration)		
2.1.5	Visual Assessment Documentation	Field Pictures	N/A	Utilized for visual comparison	Repeat Field Pictures per protocol. Supplement for Impaired Waters: Refer to Section 2.0.1.	Utilized for visual comparison	
2.1.6	WV SWVM	Field Assessment using Hydrogeomorphic Approach	N/A	The final SWVM score at the end of the three-year monitoring period will be at least consistent with the preconstruction SWVM score. The post-construction SWVM score will be deemed consistent with the preconstruction score if the difference is attributable to a change in the value of one or more input parameters that satisfy the respective performance standard for such parameters.	To be completed after each annual monitoring event.	Incorporate adaptive management strategies considered for Sections 2.1.1 through 2.1.4.	
2.1.7	USM	Field Assessment to assign a Reach Conditions Index	N/A	N/A	N/A	As appropriate, Mountain Valley and the applicable agencies may use the data summarized in the baseline USM assessment in the adaptive management decision-making process	N/A

[1]Planting required in select location – see plan
[2]USACE 1987 *Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* Version 2.0 (USACE, 2012)

2.0 BASELINE ASSESSMENT PLAN

The Baseline Assessment Plan (**Appendix A**) was developed to supplement and, in some cases, update the information presented in the IP application. It relies on a broad suite of assessment and monitoring methods that, in concert with the existing information in the application, will provide a detailed picture of each stream and wetland crossing included in the application.

Gathering appropriate baseline data about each proposed stream and wetland impact is valuable for several purposes, including characterizing the resource and the nature of the impact to the resource, developing appropriate mitigation measures, guiding the post-construction restoration of impacts, and assessing whether the resources have been successfully restored. The Baseline Assessment Plan was prepared to ensure that Mountain Valley and the relevant regulatory agencies (USACE, WVDEP, VADEQ) have adequate site-specific information for each temporary impact to fulfill the goals and objectives of the Mitigation Framework. The pre-crossing information collected pursuant to this Baseline Assessment Plan also may provide additional support for the factual determinations the USACE must make under 40 C.F.R. § 230.11. Data collected under the Baseline Assessment Plan will be provided to the USACE, WVDEP, and VADEQ under separate cover.

3.0 RESTORATION WORK PLAN

The Restoration Work Plan (**Appendix B**) provides a comprehensive picture of the stream and wetland construction and restoration procedures to be employed on the Project. The Restoration Work Plan serves two purposes. First, it consolidates various existing construction and restoration procedures into one document. Second, it outlines how the elements of the Mitigation Framework will be implemented in the field during the post-construction restoration of temporarily impacted streams and wetlands.

The Project is subject to rigorous impact restoration requirements imposed by federal and state agencies acting within their respective jurisdictions, which are consolidated in the Restoration Work Plan. As detailed in the Federal Energy Regulatory Commission (FERC) *Mountain Valley Project and Equitrans Expansion Project Final Environmental Impact Statement* (FEIS) issued on June 23, 2017, Mountain Valley agreed to adopt the FERC's general construction, restoration, and operational mitigation measures outlined in the FERC *Upland Erosion Control, Revegetation and Maintenance Plan* and the FERC *Wetland and Waterbody Construction and Mitigation Procedures.* Project construction activities also must adhere to state requirements for pipeline construction. In West Virginia, the Project's stormwater discharges are regulated by a Water Pollution Control General Act Permit for construction authorization and site-specific Erosion and Sediment Control Plans (ESCPs) approved by the WVDEP. In Virginia, Project construction must comply with Mountain Valley's *Annual Standards and Specifications* site-specific ESCPs and site-specific post-construction stormwater management plans approved by the VADEQ.

In addition to consolidating the restoration requirements noted above, the Restoration Work Plan documents how the site-specific data gathered through the Baseline Assessment Plan will be used by environmental work crews in the field to restore the impacted resources. It further explains how the post-construction restoration activities will foster attainment of the performance standards prescribed for restored streams and wetlands.

4.0 PERFORMANCE STANDARDS

Immediately after construction, temporarily impacted streams and wetlands will be restored, and restored resources will be monitored and maintained based on established performance standards. Performance standards are a defined set of measurable goals for restored streams and wetlands that can be evaluated through post-restoration monitoring. The performance standards utilized here are based on mitigation guidance developed by the respective USACE districts. If a restored resource is not meeting one or more performance standards during the monitoring period, targeted maintenance and/or adaptive management actions will be taken. Restoration of a stream or wetland will be considered successful when post-restoration monitoring demonstrates that the resource has met all relevant performance standards.

Performance Standards for assessing the successful restoration of stream and wetland impacts are documented in **Appendix C**.

5.0 MONITORING PLAN

Mountain Valley will conduct post-restoration monitoring of each restored stream and wetland in accordance with the Monitoring Plan in **Appendix D**. The Monitoring Plan is designed to ensure that all necessary data are collected to evaluate whether restored resources are meeting the defined performance standards. If the performance standards are not being met, data collected under the plan also will be used to determine what Maintenance & Adaptive Management Plan actions should be implemented to achieve a successful restoration. It is anticipated that the monitoring period will last up to three years unless relevant performance standards have been met sooner and the agencies agree that restoration has been achieved. If the relevant performance standards at a particular monitored site have not been met after three years, a plan for corrective actions, which may include continued monitoring, will be submitted to the relevant agencies for approval.

To maintain clear communication with the agencies, Mountain Valley will submit annual monitoring reports to the appropriate USACE district and the relevant state agency, WVDEP or VADEQ, that address the previous year’s monitoring activities. Each annual report will include:

- All data collected for each restored stream and wetland site in accordance with the Monitoring Plan;
- Any findings that warrant action under the Maintenance & Adaptive Management Plan and, if necessary, a corrective action plan based on those findings; and
- Recommended determination of whether each monitored site has achieved the applicable performance standards or if additional monitoring is required.

6.0 MAINTENANCE & ADAPTIVE MANAGEMENT PLAN

Mountain Valley's Maintenance & Adaptive Management Plan is attached as **Appendix E**.

6.1 Maintenance

Mountain Valley will conduct annual inspections of the restored aquatic resources for the timeframes prescribed in the Monitoring Plan. This includes inspections for the presence of invasive plant species in restored wetlands. Restoration areas will be maintained and repaired as needed during the monitoring period to meet the objectives of this Mitigation Framework as well as other regulatory requirements.

During the post-restoration monitoring period, Mountain Valley will conduct maintenance as required for all related erosion and sediment control and stormwater management permits issued for this Project. Additionally, as monitoring indicates, any and all maintenance actions needed shall be implemented promptly, such as invasive-species controls, reseeding/replantings or soil modifications, subject to growing season and as weather conditions allow.

6.2 Adaptive Management

Aquatic ecosystems are complex and dynamic entities that will often respond to natural and anthropogenic disturbances in a unique, watershed-specific manner. Adaptive management, which is often referred to as "learning by doing," is a problem-solving environmental management approach for learning through deliberately designing and applying management actions as experiments. Adaptive management is a very useful tool that emphasizes the critical role of ongoing monitoring and evaluation. Adaptive management is a cyclic process where one assesses, designs, implements, monitors, evaluates, and adjusts as projects progress.

If an annual monitoring event identifies a stream or wetland that is not meeting the performance standards, Mountain Valley will utilize adaptive management principles to develop a plan for remedial action. The proposed plan, including a description of the corrective actions and a timeline to implement them, will be included in the annual monitoring report submitted to the USACE, WVDEP, and VADEQ for review. If necessary, corrective actions and any associated supplemental monitoring may extend beyond the three-year post-construction monitoring period.

If Mountain Valley determines that adaptive management has not been and is not likely to be successful in fully restoring an impacted resource, it may propose – subject to approval by the USACE and relevant state agency, WVDEP or VADEQ – that additional compensatory mitigation credits or in-lieu-fee (ILF) payments be provided. This backstop measure provides assurance that there will be no net loss of aquatic resources.

7.0 SUPPLEMENTAL CREDIT DETERMINATION METHODOLOGY

The compensatory mitigation plan included in the IP application complied with the 2008 Compensatory Mitigation Rule (33 C.F.R. Part 332 & 40 C.F.R. §§ 230.91-230.98) and applicable regulations in Virginia and West Virginia. As stated in the application, compensatory mitigation has been provided for all permanent impacts in the form of mitigation bank or ILF credits in appropriate ratios, and restoration was proposed as a primary form of compensatory mitigation for temporary impacts. In consideration of the comments on the application, Mountain Valley developed the Supplemental Credit Determination Methodology in **Appendix F**.

The Supplemental Credit Determination Methodology outlines a proposal to provide voluntary supplemental compensatory mitigation for *each* temporary stream and wetland impact. To determine the quantity of supplemental mitigation credit, Mountain Valley identified the expected duration of each temporary impact associated with Project construction – which includes the time from when the impact first occurs until it is restored. Because resources are not likely to meet the Performance Standards immediately after they are restored, Mountain Valley added one year of additional compensatory mitigation to stream impacts and two years to wetland impacts. Building on a methodology developed by the West Virginia Interagency Review Team, Mountain Valley proposes to provide supplemental compensatory mitigation at a rate of 3% per year for projected period of potential impact (i.e., sum of direct impacts during construction and post-construction restoration period). This approach to supplemental compensatory mitigation exceeds the applicable federal and state regulatory requirements and the standard practices in each of the respective USACE districts. Most importantly, this proposal provides additional assurance that the goal of “no net loss” will be achieved – if not result in a *net lift* in aquatic resources.

8.0 REFERENCES

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National Oceanic and Atmospheric Administration (NOAA). 1999. *Discounting and the treatment of uncertainty in natural resource assessment.* NOAA Damage Assessment andRestoration Program, NOAA. Washington, DC. Available online at https://casedocuments.darrp.noaa.gov/northeast/athos/pdf/NOAA%201999.pdf

USACE and VADEQ, January 2007. Unified Stream Methodology for Use in Virginia. U.S. Army Corps of Engineers, Norfolk District and Virginia Department of Environmental Quality. 37 pp.

APPENDIX A

Appendix A:

BASELINE ASSESSMENT PLAN

Mountain Valley Pipeline Project

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EXHIBITS

APPENDIX A:

BASELINE ASSESSMENT PLAN

Mountain Valley Pipeline Project

Every stream and wetland proposed to be temporarily impacted in the IP application will be evaluated in accordance with this Baseline Assessment Plan.

1.0 WETLANDS – ATTRIBUTES

Wetland evaluations will be completed on all planned wetland crossings (Table 3 of the IP Application) using the West Virginia Stream and Wetland Valuation Metric (WV SWVM) evaluation. Please note that field evaluations are not necessary to complete the WV SWVM evaluation for wetland impacts and will only require desktop analysis utilizing the previously prepared and USACE approved aquatic resources delineation data for this project; the WV SWVM forms can be generated for wetlands based on existing acreages and wetland type information.

1.0.1 Cowardin Classification

All wetlands that are proposed to be temporarily impacted in the application will be classified by their respective Cowardin classifications (Cowardin et al., 1979) using data from the project delineation report (**Attachment I** of the IP application) and its related Preliminary Jurisdictional Determination (PJD) issued by the USACE.

1.0.2 Wetland Area

The area of all wetlands that are proposed to be temporarily impacted or have been temporarily impacted under prior issued permits is provided in the IP application, which will be the source of information for this baseline metric.

1.0.3 Topographical Survey

Existing topographical surveys used in the Project's construction plans and lidar data will be utilized as the Baseline Topographical survey for wetlands areas. Additionally, wetland boundaries mapped during delineation efforts will also be used.

1.0.4 Dominant Vegetation

Existing Wetland Determination Data Forms from the project delineation report and its related PJD will be referenced to determine existing dominant vegetation in wetlands that are proposed to be temporarily impacted or have been temporarily impacted under prior issued permits.

1.0.5 Invasive Species Cover

Existing Wetland Determination Data Forms from the project delineation report and its related PJD will be referenced to determine the prevalence of invasive species cover in wetlands that are proposed to be temporarily impacted.

1.0.6 Native (Non-Invasive) Herbaceous Vegetation Coverage

Existing Wetland Determination Data Forms from the project delineation report and its related PJD will be referenced to determine native (non-invasive) herbaceous vegetation cover in wetlands that are proposed to be temporarily impacted.

1.0.7 Hydric Soils

Existing Wetland Determination Data Forms from the project delineation report and its related PJD will be referenced to determine the presence of hydric soils in wetlands that are proposed to be temporarily impacted.

1.0.8 Hydrology Information

Existing Wetland Determination Data Forms from the project delineation report and its related PJD will be referenced to determine hydrology information in wetlands that are proposed to be temporarily impacted.

1.0.9 Bulk Density

Bulk density for baseline assessment assumptions is assumed not to exceed root growth restriction ranges and thus will not be measured during the baseline assessment. Bulk density may be measured during restoration if the Lead Environmental Inspector determines it is necessary or as part of the adaptive management strategy.

1.1 WETLANDS – RESOURCE EVALUATION

1.1.1 WV SWVM

Wetland valuations will be conducted using the WV SWVM methodology. Additional detail on that methodology can be found in Section 2.1.6.

2.0 STREAMS – ATTRIBUTES

2.0.1 Stream Survey

Longitudinal profile surveys and cross-sections will be confirmed or completed to document stream pattern (sinuosity), profile (habitat types, riffle-run-pool), and dimension (cross-sections) within the limits of disturbance (LOD) as established by the existing perimeter controls, using modern survey techniques (with a Trimble, Leica, or similar unit) to collect data as described below. The longitudinal profile will be used to identify individual bed features, their maximum depth, bed feature spacing, and bed feature slope. This will provide information on the stream's morphology, including the presence of riffles, runs, and pools within the LOD (excluding areas that are inaccessible due to worker safety concerns). A reach-wide, representative pebble count is being utilized for these surveys. This information, along with the longitudinal profile and cross-sections, will be entered into RiverMorph, Excel, or CADD software and will represent the baseline conditions for each crossing.

Please note that it may not be possible to collect these data at every crossing; when that occurs, best professional judgment will be utilized to determine how to proceed. In these instances, additional photo documentation may be necessary (beyond what is required in Table 4), and the field notes will include a detailed explanation as to why data could not be collected as per these methodologies. Please also note that civil surveys were previously completed for a portion of stream crossings in both West Virginia and Virginia and will be included in this assessment. Thalweg points and/or cross section data points may only need to be collected for these crossings in West Virginia and Virginia.

Survey procedures:

1. Collect adequate mapping for field survey. Identify a distinct starting point for mapping that will be easy to correlate in the field. If practicable, use mapping to determine approximate slope of stream segments and whether valleys are confined. Use checklist for field equipment (**Exhibit A**).

2. Where practicable, field observations should only be made during normal flow conditions. High flows will remove bed features and produce inaccurate designations. Low flow or non-normal no flow conditions make it difficult to assess transition points and stream types that are found in the lower portions of the continuum. Proceeding under these conditions should be done with extreme care and only by more experienced investigators. Additionally, data should be flagged as being obtained during low flow.

3. The starting point in the field will be mapped with a GPS unit and marked with surveyor's flagging.

   Longitudinal profiles are measured in a downstream direction. An elevation measurement should be taken at major breaks in the bed topography. Four types of features are measured at each station, unless one or more features are not present: thalweg (deepest part of the channel), water surface, edge of water on both banks, and the top of both banks. The thalweg and water surface measurements should reflect bed elevation and water surface slope changes as the stream progresses through a bed feature sequence (e.g., rifle, run, pool, glide). Note position of cross-section locations along the profile). This information should also be stored in the Trimble, Leica, or similar unit.

The information from the longitudinal profile will be used to develop plan and profile views of the stream facets as well as potential special aquatic sites, such as riffle:pool complexes.

Diagnostic features of channel types and discussions regarding riffle:pool complexes are shown in **Table 1**.

Table 1 - ***Diagnostic Features of Each Channel Type***

	Colluvial	**Cascade**	**Bedrock**	**Step:pool**	**Plane-bed**	**Pool:riffle**	**Dune:ripple**
Typical bed material	Variable	Boulder	Rock	Cobble-boulder	Gravel-cobble	Gravel	Sand
Bedform pattern	Variable	Random	Irregular	Vertically oscillatory	Featureless	Laterally oscillatory	Multilayered
Dominant roughness elements	Grains	Grains, banks	Boundaries (bed and banks)	Bedforms (steps, pools), grains, barks	Grains, banks	Bedforms (bars, pools) grains, sinuosity, banks	Sinuosity, bedforms (dunes, ripples, bars) grains, banks
Dominant sediment sources	Hillslope, debris flows	Fluvial, hillslope, debris flows	Fluvial, hillslope, debris flows	Fluvial, hillslope, debris flows	Fluvial, bank failure, debris flows	Fluvial, bank failure	Fluvial, bank failure
Sediment storage elements	Bed	Lee and stoss sides of flow obstruction	Pockets	Bedforms	Overbank	Overbank, bedforms	Overbank, bedforms
Typical confinement	Confined	Confined	Confined	Confined	Variable	Unconfined	Unconfined
Typical pool spacing (channel widths)	Unknown	<1	Variable	1 to 4	None	5 to 7	5 to 7

Taken from Montgomery and Buffington, 1997

In addition to the longitudinal profile, the reach will be visually inspected for potential riffle:pool complexes that are consistent with the Montgomery and Buffington definition of this feature (**Exhibit B, Figure 1, Photo D**). Specifically, riffle:pool complexes are characterized by sinuous or meandering platforms that contain riffle, pools, and bars (**Exhibit B, Figure 2(D)**) (Chartrand and Whiting, 2000). Leopold et al. (1964) defined pool:riffle complexes as undulating beds that have defined sequences of bars, pools, and riffles or predictable sequences of these stream units. Pools are topographical depressions within the channel, while bars are corresponding high points (**Exhibit B, Figure 3(D)**) (Montgomery and Buffington, 1997). In this channel type (self-formed pool:riffle channels), riffles will be spaced about every five to seven channel widths. The exception to this may be channels that have large amounts of woody debris. These channels have low to moderate gradients (See **Exhibit B, Figure 4**) and are typically unconfined and have a well-developed floodplain. Chartrand and Whiting (2000) reported a median slope for this channel type of 0.0060 and a range of 0.001 to 0.015, while Montgomery and Buffington (1997) found that streams with slopes less than 0.02 were generally composed of pool:riffle channel units (**Exhibit B, Figure 4**). The substrate in these types of channels may vary from sand to cobble, but gravel is the dominant substrate type. If noted as potentially present, these locations will be marked with GPS and within the longitudinal survey. Additional evaluations may be completed to determine if a complex is truly present. Photo documentation will also be completed.

Three cross-sections should be completed, one within the boundaries of the crossing, and in one riffle and one pool, if there is available habitat (this may vary of a site-by-site basis). This will allow for stream classification, as needed, and will provide baseline channel dimensions. The method is summarized as follows:

a. Set up the surveying instrument in a location where the entire cross-section can be viewed. The instrument should be placed in an elevation higher than the highest feature required for the survey.
b. Obtain rod readings at major breaks in bed elevation and key features, such as left edge water, thalweg, and right edge water. Also record top of bank and toe of bank.

Pebble counts will be completed in the right-of-way (ROW). Pebble counts characterize the channel and bed material present through a given study reach. A representative reach-wide pebble count is used to determine stream type, while an active riffle pebble count is used for hydraulic calculations. Because this baseline assessment is not being used for hydraulic calculations, a reach-wide, representative pebble count is being utilized for these surveys. Pebble count instructions are as follows:

a. Pace the entire study reach; estimate and record pool lengths and riffle lengths.
b. Calculate the percentage of the reach composed of pool and riffle bed features.
c. Identify bankfull on both sides of the channel at the first cross-section (transect) location and determine the sampling interval (sample at equal increments across the entire channel).
d. Begin the pebble count below bankfull. Do not include particles if the channel width is small (based on best professional judgement), as 20% of the samples (2 out of 10) may skew the particles that make up the boundary of the channel. Unless conditions dictate otherwise, a 5% bank sample is taken (one sample every other transect). To avoid bias of selecting larger particles, the observer should look away from the channel bed and select the first particle touched by the tip of the index finger at the observers' toe.

e. Measure the length of the B-axis in millimeters. If the particle is linear shaped, average the A-, B-, and C-axes.
f. Continue until 10 particles from 10 different cross-sections (transects) have been measured in proportion to the bed features of the reach.

The methods for longitudinal profiles, cross-sections, and pebble counts are similar to those found in Rosgen's River Stability Field Guide (2008) but have been updated for use with modern survey techniques. Use of data sheets similar to those found in Rosgen publications is being recommended but is not required.

4. As noted, the survey should proceed in a downstream manner. In a headwater reach, the survey should start at the point where the limits of jurisdictional waters have been identified. In some instances, it may be practical to identify valley type upslope of this point.

5. Upon completion of survey, materials should be copied, and the originals should be placed in the project's main file. Photographs should be uploaded on to the server and identified. Information regarding longitudinal profile and cross-sections will be entered into CADD software. A report should be developed including mapping that identifies each channel (stream) reach type and information supporting this designation, which may include photographs and measurements taken in the field.

Please note that Mountain Valley's environmental inspection team conducts a detailed inspection of every aquatic resource immediately prior to the start of construction. As part of those inspections, data collected from the pre-crossing longitudinal surveys, cross-sections, and photographs will be evaluated to determine if there has been a substantial shift in the streambed morphology at each of the crossings between the date the preliminary survey was conducted and the date of the crossing. Evaluations may include, but are not limited to, the assessment of potential changes to elevations in riffles and to top of riffle locations. In the event a substantial shift in streambed morphology is noted during a pre-construction inspection, the environmental inspection team will delay construction of the crossing until a revised longitudinal profile survey and cross section can be prepared.

6. The survey data collected above will be summarized into the following metrics for comparison to performance standards in future monitoring events:

   a. *Stream cross-sectional area*. The survey data will be used to compute the area of each cross-section from the substrate surface to a plane that coincides with the lowest significant change in bank slope. This plane elevation will be utilized in all future monitoring events for each particular cross-section.
   b. *Pool-to-pool spacing*. Will be determined from the longitudinal survey.
   c. *Max. pool depth*. Will be determined from the cross-sectional survey.
   d. *Average riffle slope*. Will be determined from the longitudinal survey.

e. *Average reach slope*. Will be determined from the longitudinal survey.

f. *Pebble Count*. D_{50} will be determined by the pebble count information collected.

2.0.2 Stream Vegetation

Existing stream vegetation will be noted during initial field assessments of each proposed temporary impact and will be captured in the visual assessment documentation as further described in Section 2.1.5.

2.1 STREAMS – RESOURCE VALUATION

Specific data-collection methodologies are outlined in the following Sections

Please note that Mountain Valley has a limited ability to conduct activities outside of the LOD approved by the Federal Energy Regulatory Commission. Accordingly, field-data-collection activities will be limited to the specific LOD width for each crossing and require a modification from the standard reach lengths as outlined in both the U.S. Environmental Protection Agency (USEPA) Rapid Bioassessment Protocol (RBP) Manual (100-meter reach for RBP/Benthic Macroinvertebrates) and the Hydrogeomorphic (HGM) Protocol (suggested 100-foot [ft] reach) and applicable state guidance. The assessment reach will be limited to the 75-ft LOD or less, depending on the proposed impact type (pipeline crossing, temporary or permanent access road, additional temporary workspace, or anode bed). Depending on the crossing angle, stream meanders, and other factors, the actual length of the stream reach available for survey within the LOD may be more or less than 75 ft.

Mountain Valley proposes to will conduct preliminary assessment and survey activities of streams that are proposed to be temporarily impacted in the IP application presently pending before the USACE (**Table 2**, **IP Application**). If new or modified temporary impact locations are proposed, or previously proposed temporary impacts are slated to be avoided, the survey locations will be adjusted accordingly.

Each proposed temporary stream crossing will be assessed and surveyed for parameters prior to the proposed temporary impact, unless doing so proves impracticable or unsafe. Impracticable conditions that may limit data collection would include a dry stream channel, which prevents the collection of benthic, field water quality, and several of the RBP assessment parameters. Adverse weather conditions and/or hazardous site access or stream access conditions due to existing conditions and/or precipitation could prevent crews from completing required sampling activities. Sampling will only be conducted if travel and site conditions are safe for the field crew(s) collecting the data. Safety assessments will be completed by field crews upon traveling to and arriving on-site. Please note that based on topography along the LOD, some sites along sections of the Project that have not been prepared for construction may require strenuous hikes with equipment that would prove unsafe due to steep hillsides and/or steep stream banks. Field crews are advised to not conduct sampling if access conditions to the crossings or stream crossing conditions are determined to be unsafe. Weather or flow conditions could potentially affect the total number of sampling events required to obtain the recommended data. In the event impracticable or unsafe conditions prevent the collection of any data, the crew will utilize data previously collected by Mountain Valley, if relevant data are available. Any data gaps resulting from impracticable or unsafe conditions will be noted in the final report.

2.1.1 Field Water Quality

Water-quality data will be collected concurrently with the biological and physical data using the WVDEP's Watershed Assessment Branch Standard Operating Procedures (WAB SOP) (WVDEP, 2018). Field water-quality parameters will include dissolved oxygen, specific conductivity, and pH per the WV SWVM form. Field water-quality parameters will be collected both at the upstream edge of the pipeline LOD and the downstream edge of the pipeline LOD. Downstream edge LOD water-quality data will be input into the WV SWVM form. Stream flow (velocity and depth measurements) will also be documented at each crossing location, unless water flow is absent, is too low to obtain measurements, or presents high-flow (flooding) conditions that would endanger the survey crew or that would provide data indicative of high-flows rather than normal flows. WVDEP WAB SOP or USEPA Environmental Monitoring and Assessment Protocol (EMAP; Lazorchak et al., 1998) methods will be utilized for collecting stream-flow measurements.

More detailed information on how these samples are to be collected is available in the WVDEP WAB SOP, Chapter 2. Prior to the site visit, meters will be calibrated at least weekly as per the manufacturers' specifications and calibration records will be retained. Probes will be inspected for potential wear, and membranes will be replaced, as necessary. Field data will be collected in an area with adequate depth and flow near mid-stream or in the thalweg.

The data collected above will be summarized into the following metrics for comparison to performance standards in future monitoring events:

1. Dissolved oxygen
2. Specific conductivity
3. pH.

2.1.2 Rapid Bioassessment Protocol (RBP)

For consistency between West Virginia and Virginia, Mountain Valley will utilize the widely accepted USEPA RBP data collection forms provided in **Exhibit C (Data Forms)** for both RBP scoring and benthic macroinvertebrate sampling. Habitat assessments will be completed as outlined in the USEPA RBP Manual (Barbour et al., 1999), with a modified reach length to be applied based on specific ROW crossing width. The USEPA's RBP stream physical characterization field sheets will be completed for each stream crossing. The results of the visual-based habitat assessment will be used to determine the quality of habitat for the overall aquatic community at each sampling location. Weather conditions prior to and during sample collection will also be noted. Sampling locations will be documented with Trimble GPS units or similar equipment, capable of sub-meter accuracy. Stream measurements and velocity data will be taken at a representative location within the sampling reach to calculate stream-flow data during each sampling event. These methods may also be found in Chapter 5 of the RBP Manual (Barbour, et al., 1999). Field forms are included in **Exhibit C**. Stream-velocity readings will also be recorded to calculate stream flow during each benthic macroinvertebrate sampling event. Methods are available in the WVDEP WAB SOP, Chapter 4.

Please note that, for streams without stream flow, a modified RBP will be completed, and the HGM assessment will need to be completed (Refer to Section 2.1.6). The following categories related to stream flow are not recorded on the RBP form when the stream channel lacks flow:

1. Epifaunal substrate/available cover,
2. Velocity/depth regime,
3. Channel flow status, and
4. Frequency of riffles/or bends.

These modifications are listed in the WV SWVM form instructions (Cells D15-D25) for high-gradient ephemeral streams (USACE, 2011).

2.1.3 Benthic Macroinvertebrates

Mountain Valley will utilize methodologies outlined in the WVDEP WAB SOP and USEPA RBP manual, with a modified reach length to be applied based on the constraint of working within the site-specific LOD crossing widths. Single-habitat (kick net) samples will be collected. As per the methodology, samples will be collected using a rectangular dipnet (four-kick composite). Samples will be field sieved, composited, preserved, and returned to a third-party laboratory for processing. Samples will be hand-picked, and organisms will be identified to the family level (when possible) using appropriate taxonomic keys with a target of 200 organisms [200 (+/- 20 %) sub-sample]. The multi-metric West Virginia Stream Condition Index (WVSCI) (Gerritsen, et al., 2000) will be generated from the single habitat data. The WVSCI results in a score for each site ranging from 0 to 100, which is then used by the WVDEP to indicate stream condition or levels of impairment. A more detailed description of this methodology can be found in Chapter 5 of the WVDEP WAB SOP and Chapter 7 of the RBP Manual (Barbour et al., 1999). Information regarding WVSCI scoring is available in Chapter 5, Section E, Part 2 of the WVDEP WAB SOP (WVDEP, 2018).

Benthic macroinvertebrate samples will be collected and sent to a third-party laboratory for sorting, enumeration, and identification. Crews will collect photos (Refer to **Table 3** for Photo Requirements) and complete appropriate field forms and documentation during sampling events. Field data will be entered into Excel workbooks and the data summarized. The benthic macroinvertebrate data will be scored using an Access database provided by the West Virginia Division of Natural Resources, with this information also being entered into Excel workbooks. Summarized data will then be analyzed and presented in a report that discusses the findings of the assessment.

Acceptable collection dates in West Virginia are from April 15 to October 15 unless a deviation is approved by the agencies. This is the timeframe of the data that were used to develop the WVSCI, and any sampling event outside of this window is considered not comparable. Acceptable collection dates in Virginia are from September 1 to November 30 (fall monitoring period) or March 1 to May 31 (spring monitoring period), with a two-week buffer in Virginia between seasons to account for seasonal uncertainties and improve assessment performance provided that there are not excessively high or low flows. Benthic macroinvertebrate samples will only be collected at sites meeting the sampling requirements in the WVDEP WAB SOP habitat protocol. If stream conditions are unsafe or pose a hazard, samples will not be collected. Furthermore, streams should not be sampled after extended dry periods unless the wetted channel width is known. This helps avoid collection of misrepresentative stream condition data due to the lack of colonization in dry streambeds. Please note that if ephemeral and/or intermittent streams are dry and/or there are drought conditions, or if perennial streams are dry during site visits, available data will be collected and notations will be made in site notes documenting the on-site conditions and inability to collect certain data types (water quality and benthics). Samples should also not be collected after a high-flow event (48 hours after a scouring event).

The WVSCI score determined by the methodology above will be used for comparison to performance standards in future monitoring events.

2.1.4 HGM Assessment

USACE developed the HGM assessment guidebook to assess the ecological performance of high-gradient headwater streams and low-gradient perennial streams within the reference domain of eastern Kentucky and western West Virginia and the expanded reference domain including much of the Appalachian Plateau within Tennessee, Ohio, Pennsylvania, and Virginia (Summers, et al., 2017). The assessment protocol is utilized in headwater (ephemeral and intermittent) streams with channel slopes greater than 4% and in perennial streams with a channel slope <4% that are safely wadeable and are "shadeable" (narrow enough that the potential exists for full tree canopy closure over the channel).

Variables utilized for headwater (ephemeral and intermittent) stream subclass (Summers, et al., 2017) include:

1. Channel canopy cover
2. Channel substrate embeddedness
3. Channel substrate size
4. Channel bank erosion
5. Large woody debris
6. Riparian/buffer zone tree diameter
7. Riparian/buffer zone snag density
8. Riparian/buffer zone sapling/shrub density
9. Riparian/buffer zone vegetation species richness
10. Riparian/buffer zone soil detritus
11. Riparian/buffer zone herbaceous cover
12. Watershed land-use

Variables utilized for the perennial stream subclass (Summers, et al., 2017) include:

1. Channel canopy cover
2. Channel substrate embeddedness
3. Channel substrate size
4. Channel bank erosion
5. Large woody debris
6. Percent forest
7. Riparian/buffer zone tree diameter
8. Coefficient of conservation

Data collected during the HGM assessments are input into the appropriate Excel version of the forms, which generates the Functional Capacity Index (FCI) scores based on the data that were input. The FCI is a score ranging from 0 to 1.0, which indicates the capacity of a stream to perform ecological processes relative to the reference standard sites. Specifically, the FCI will evaluate hydrology, biogeochemical cycling, and habitat within the stream corridor.

An example of the FCI Excel forms is available in **Exhibit D**.

Please note that based on the limited assessment reaches (75-ft ROW or less), standard modifications were made to the HGM assessment methods to address recurring conditions at stream crossings, such as timber mat bridges and culverts. General modifications are as follows:

1. **Stream Assessment Reach (SAR) Length and Increments**

   a. As the HGM methodology lists the SAR at a recommended 100-ft length for ephemeral and intermittent streams, SAR length and increments of samples will be scaled back proportionately to fit within the LOD. The calculator generates the same FCI scores as long as the data are proportional. This helps to address the issue of the reduced SAR lengths due to abnormal conditions listed below and LOD width. This proportional reduction also solves the issue of collecting the standard amount of data points for a 100-ft reach in a drastically-reduced assessment reach within the LOD as proper spacing may not always be available.

      i. For instance, in a 75 ft ROW, with an approximate 25 ft timber mat bridge, the approximate SAR would be 50 ft (See 2. Timber mat Bridges below). Rather than collect the total number of increments or total data points for variables as indicated for a 100-ft reach, half that number would be collected as the SAR has been reduced by half the recommended length. Example: V_{EMBED} and $V_{SUBSTRATE.}$ 15 equidistant points in a 50-ft SAR (rather than 30). Or 8 points (rounded up from 7.5) for a 25-ft SAR.

      ii. For simplicity, the following table illustrates the modifications for specific variables, based on SAR length:

Table 2: HGM High-Gradient Assessment SAR Length and Variable Increment/Data Point Modifications

Variables	25' SAR (10' to 29')	50' SAR (30 to 54')	75' SAR (55 to 79')	100' SAR (80' and up)
1 – $V_{CCanopy}$	3 equidistant points	5 equidistant points	8 equidistant points	10 equidistant points
2/3 – V_{Embed} and $V_{Substrate}$	8 particles – collect 4 every 10 ft	15 particles – collect 5 every 10 ft	24 particles – collect 4 every 10 ft	30 particles – collect 3 every 10 ft
10/11 – $V_{Detritus}$ and V_{Herb}	1 plot per bank	2 plots per bank	3 plots per bank	4 plots per bank

2. **Timber Mat Bridges**
    a. Timber mat bridge areas will be documented with the site sketches (RBP forms) and photos and excluded from the SAR.
    b. If the bridge splits the channel (i.e., ≥10 ft on one side and ≤40 ft on the other side) both the upper and lower sections should be included within the SAR. If a portion of the reach is less than 10 ft, it does not allow adequate space for assessment and will be excluded from the SAR.

3. **Culverts and Access Road Timber Mats**
    a. ROWs often have existing culverts or access road timber mats, prohibiting collection of HGM variables (or any other parameters – WQ/RBP/Benthics) within the ROW. Existing culverted crossings or access road timber mats will be documented with the site sketches and photos and excluded from assessment.

4. **Large Woody Debris (LWD)**
    a. Some stream crossings may have excessive riparian growth (briars/willows/etc.) and/or LWD piles that prohibit stream access and collection of HGM variables and/or other parameters. *Hand clearing of vegetation is prohibited in the ROW.* Conditions should be documented with the site sketches and photos and excluded from assessment.

5. **Best Professional Judgment**
    a. Not all site and in-stream crossing conditions have been accounted for in the above listings, just the most commonly anticipated.
    b. Best Professional Judgment will need to be made regarding additional conditions that require HGM modifications.

The FCI score determined by the methodology above will be used for comparison to performance standards in future monitoring events.

2.1.5 Visual Assessment Documentation

Photo documentation of existing conditions will be gathered using the guidance and nomenclature as specified in **Table 3** below:

Table 3. Stream Photo Location Requirements

Stream Type	Photographs
Virginia Streams	
Streams (Bankfull width <10')	• *DS VIEW* – Downstream View of impact area inside LOD • *US VIEW* – Upstream View of impact area inside LOD • *RB C/L* – Standing on Right Bank looking down pipe centerline (C/L) • *LB C/L* – Standing on Left Bank looking down pipe C/L • *DS COND* – Downstream conditions outside LOD
Streams (Bankfull width >10')	• *RB DS VIEW* – Downstream View on Right Bank of impact area inside LOD • *LB DS VIEW* – Downstream View on Left Bank of impact area inside LOD • *RB US VIEW* – Upstream View on Right Bank of impact area inside LOD • *LB US VIEW* – Upstream View on Left Bank of impact area inside LOD • *RB C/L* – Standing on Right Bank looking down pipe C/L • *LB C/L* – Standing on Left Bank looking down pipe C/L • *DS COND* – Downstream conditions outside LOD
Streams (Within the LOD but not crossing pipe centerline)	• *DS VIEW* – Downstream View of impact area inside LOD • *US VIEW* – Upstream View of impact area inside LOD • *DS COND* – Downstream conditions outside LOD
Access Road Crossings	• *DS VIEW* – Downstream View of impact area inside LOD • *US VIEW* – Upstream View of impact area inside LOD • *C/L ACCESS-1* – Standing in Access Road looking towards impact • *C/L ACCESS-2* – Standing in Access Road looking towards impact • *DS COND* – Downstream conditions outside LOD
West Virginia Streams	
All Streams	• US LOD US VIEW – Upstream Edge of LOD Upstream View • US LOD DS VIEW – Upstream Edge of LOD Downstream View • C LOD US VIEW – Center of LOD Upstream View • C LOD DS VIEW – Center of LOD Downstream View • DS LOD US VIEW – Downstream Edge of LOD Upstream View • DS LOD DS VIEW – Downstream Edge of LOD Downstream View

Stream Type	Photographs
Virginia and West Virginia Streams	
All Streams	• If riffle or pool complexes are present, additional photos will be collected illustrating upstream views (from downstream of riffle or pool) and downstream views (from upstream of riffle or pool).

2.1.6 WV SWVM

Assessment and survey activities will be conducted by utilizing specific methodologies required for completion of the WV SWVM (USACE, 2011), supplemented by other data collection measures documented in this section. Note that in a letter provided by the USACE on May 27, 2021, the USEPA recommended that the WV SWVM forms be used for all aquatic impacts in both states. The WV SWVM incorporates the "Hydrogeomorphic Approach" for developing indices and the protocols used to apply these indices to the assessment of ecosystem performance at a site-specific scale. This approach generates an FCI for hydrology, biogeochemical cycling, and habitat. The worksheet utilizes the USEPA RBP physical habitat forms, the USACE's *Operation Draft Regional Guidebook for the Functional Assessment of High-Gradient Headwater Streams and Low-Gradient Perennial Streams in Appalachia* (USACE, 2017), the WVDEP WVSCI, and water-quality data to interpret the physical, chemical, and biological integrity of "waters of the United States" and generate an index score. Wetland evaluations require data on the wetland acreage and wetland Cowardin type designation. Examples of the WV SWVM forms are included in **Exhibit E**.

The use of the WV SWVM methodology, supplemented by other data noted in this section, is appropriate to maintain a consistent data-collection protocol across the entire project area. Although the WV SWVM methodology is not commonly used in Virginia, it is materially consistent with the methodologies typically employed by the USACE Norfolk District and VADEQ for similar purposes. The VADEQ and USACE Norfolk District employ a methodology (the Unified Stream Methodology (USM)) that is similar to, but less detailed than, the WV SWVM methodology for streams. Wetland impacts and mitigation are calculated on a similar basis (ratios of acreage based on Cowardin Classification).

Table 4 illustrates the data-collection activities that will be conducted based on stream flow regime.

Table 4 - Preliminary Data-Collection Activity Summary per Stream Flow Regime Type

Stream-Flow Regime	Ephemeral	Intermittent	Perennial
Field Water Quality	Stream-Flow Dependent	Stream-Flow Dependent	Stream-Flow Dependent
USM (Virginia Only)	Ephemeral Stream Assessment Form (Form 1a)	Stream Assessment Form (Form 1)	Stream Assessment Form (Form 1)
RBP	Stream-Flow Dependent; Modified Scoring Categories if No Flow	Stream-Flow Dependent; Modified Scoring Categories if No Flow	Stream-Flow Dependent; Modified Scoring Categories if No Flow
Benthic Macroinvertebrates	Stream-Flow Dependent	Stream-Flow Dependent	Stream-Flow Dependent
HGM Assessment	High Gradient	High Gradient	Low Gradient (If Stream Slope is <4%; Wadeable/Shadeable)
Longitudinal Profiles Surveys and Cross Sections[a]	✓	✓	✓

[a]Additional surveys may be required prior to completing the crossings, in the event evaluations determine there have been substantial shifts in streambed morphology. Please refer to Section 2.1.7.

Because there are differences between the West Virginia SWVM and Virginia USM, both are being conducted. **Table 5** summarizes and compares the methodologies utilized in West Virginia and Virginia, as required by the specific states.

Table 5 - West Virginia and Virginia Resource Methodology Requirement Comparison

	West Virginia	Virginia
Stream Resource Valuation Metrics	WV SWVM[1]	USM[2]
Physical Attributes	✓	✓
Water Quality	✓	X
Benthic Macroinvertebrate Sampling	✓	X
HGM Assessment	✓	X
Wetland Resource Valuation Metrics	WV SWVM[1]	Standard Mitigation Ratios
Visual Attributes	✓	✓

[1]West Virginia Stream and Wetland Valuation Methodology
[2]Unified Stream Methodology

2.1.7 Virginia USM (Virginia Streams Only)

For Virginia streams, in addition to completing the WV SWVM form, the USM (USACE and VADEQ, 2007) will be utilized to assign a Reach Conditions Index (RCI) to each proposed temporary stream impact, to assess the type or severity of the temporary impact, to determine the compensation that would be required if the impacts were permanent, and to determine what types of and the amount of the various compensation practices that would satisfy the compensation requirement (if the impacts were permanent). Parameters to be assessed in intermittent and perennial streams are channel condition, riparian buffers, instream habitat/available cover, and channel alteration. Riparian buffer is the only parameter to be assessed in ephemeral streams. Condition indices will be determined utilizing the appropriate USM, forms and the RCI will be calculated for each stream crossing (see **Exhibit F** for examples of USM forms).

3.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Field equipment will be inspected and calibrated at least weekly, prior to field crew deployment per the manufacturers' specifications. A calibration log will be kept for each field water-quality meter utilized. Spare supplies, such as batteries/chargers, calibration fluid, tools, etc., will be carried by each field crew for emergency field repairs of equipment.

A field notebook will be maintained to document conditions encountered while samples are collected, including field observations, photographs taken, samples collected, and deviations from the sampling protocol. Appropriate field forms, as mentioned in previous sections, will be completed as required in the field and copied/filed upon return to the office.

Benthic sample containers and lids will be labeled in the field with sample location/ID, sample type (i.e., kicknet/D-net), field crew initials, date and time of sample, project number, and sample preservative. Chain-of-custody (COC) forms will be generated and maintained with the benthic samples. The COC forms will contain information including project identification, laboratory name, sampler's initials, method of sample shipment/transfer, sample numbers, date and time of sample collection, sample matrix, sample type (grab or composite), preservative used, analysis requested, turn-around time requested, date and time samples were relinquished, and signatures of the persons relinquishing and receiving samples.

Benthic sample sorting, identification, and reporting will be conducted in accordance with the WVDEP WAB SOP (2018). A third-party consultant will be contracted to perform the benthic sample sorting and identification.

Manual data entry in spreadsheets and/or calculations performed will be subjected to a QA/QC review to ensure proper data transfer.

4.0 DATA ANALYSIS AND REPORTING PROCEDURES

The raw data in the form of field data forms, photographs, and laboratory bench sheets for benthic macroinvertebrate identification will be provided to Mountain Valley by the field staff. Data will also be summarized in Excel spreadsheets for comparison and evaluation and for inclusion in a formal report to be provided to USACE, WVDEP, and VADEQ.

5.0 REFERENCES

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EXHIBIT A

EXHIBIT A – FIELD EQUIPMENT LIST

Description

Survey Instruments:

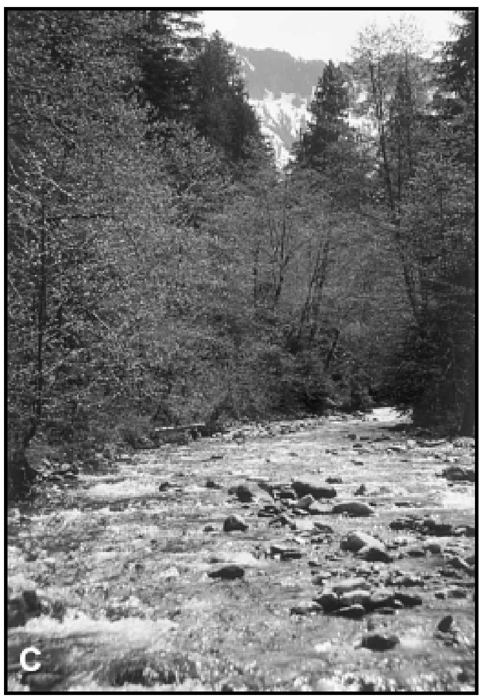
- Laser Level Kit (each includes 2 sensors with brackets or Total Station)
- Survey Rods (25 feet in 10^{ths} and 100^{ths})
- Tripods (aluminum)
- Auto Levels (If Needed)
- Narrow Blade Shovels (4-3/4 x 16)
- Buckets with Bottoms
- Sieve – 600 Micron
- Water Buckets (for wet-sieving)
- Long-Handled Sledge Hammers
- ½ inch x 3 ft. Rebar (for cross-sections)
- Sampling Jars
- Wooden Stakes (3 feet long)

Field Bags:

- 300 ft. Measuring Tape (in 10^{ths} & 100^{ths})
- 100 ft. Measuring Tape (in 10^{ths} & 100^{ths})
- Small Sledge Hammer
- Pocket Rod (in ft., 10^{ths} & 100^{ths})
- Rod Level
- Metal Ruler (12 inch)
- Line Level
- Sand Gauge
- Ballpoint Pens (for imprinting metal tags)
- Permanent Markers
- Rolls of Flagging

EXHIBIT B

EXHIBIT B - FIGURES



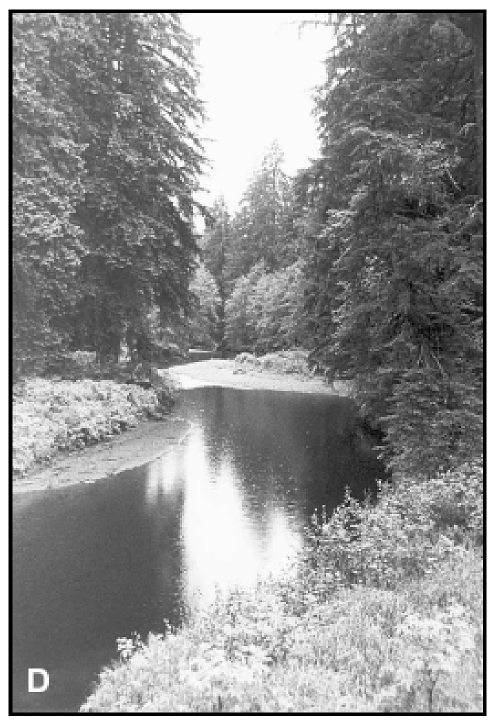


Figure 1. Alluvial channel-reach morphologies: (A) cascade; (B) step pool; (C) plane bed; (D) pool riffle; (E) dune ripple; (F) colluvial (channel in photo is 0.5 m wide); and (G) forced pool riffle.

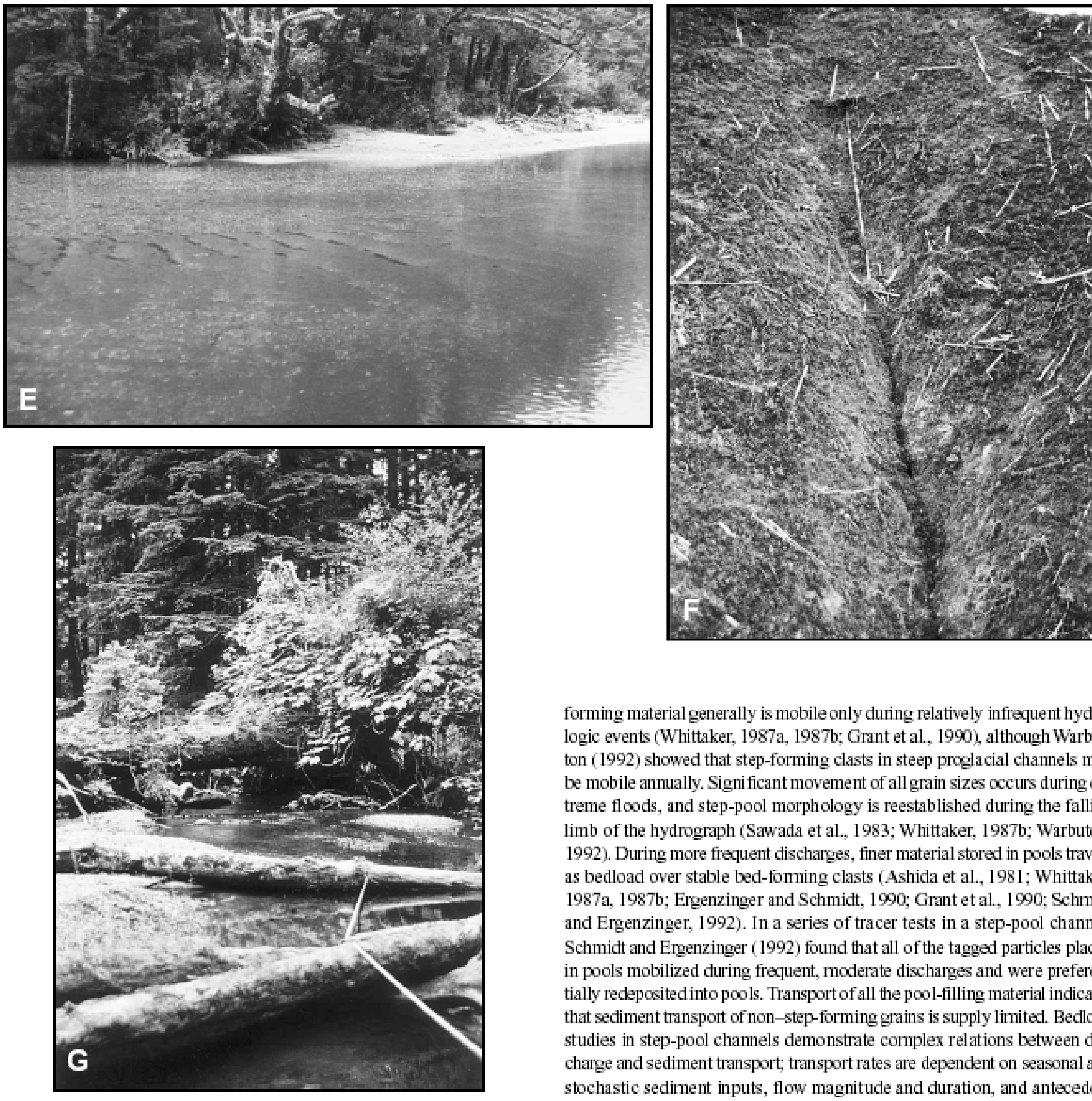


Figure 1. (*Continued—caption on facing page*).

forming material generally is mobile only during relatively infrequent hydrologic events (Whittaker, 1987a, 1987b; Grant et al., 1990), although Warburton (1992) showed that step-forming clasts in steep proglacial channels may be mobile annually. Significant movement of all grain sizes occurs during extreme floods, and step-pool morphology is reestablished during the falling limb of the hydrograph (Sawada et al., 1983; Whittaker, 1987b; Warbuton, 1992). During more frequent discharges, finer material stored in pools travels as bedload over stable bed-forming clasts (Ashida et al., 1981; Whittaker, 1987a, 1987b; Ergenzinger and Schmidt, 1990; Grant et al., 1990; Schmidt and Ergenzinger, 1992). In a series of tracer tests in a step-pool channel, Schmidt and Ergenzinger (1992) found that all of the tagged particles placed in pools mobilized during frequent, moderate discharges and were preferentially redeposited into pools. Transport of all the pool-filling material indicates that sediment transport of non–step-forming grains is supply limited. Bedload studies in step-pool channels demonstrate complex relations between discharge and sediment transport; transport rates are dependent on seasonal and stochastic sediment inputs, flow magnitude and duration, and antecedent events (Nanson, 1974; Griffiths, 1980; Ashida et al., 1981; Sawada et al., 1983; Whittaker, 1987a, 1987b; Warburton, 1992). Ashida et al. (1981), for

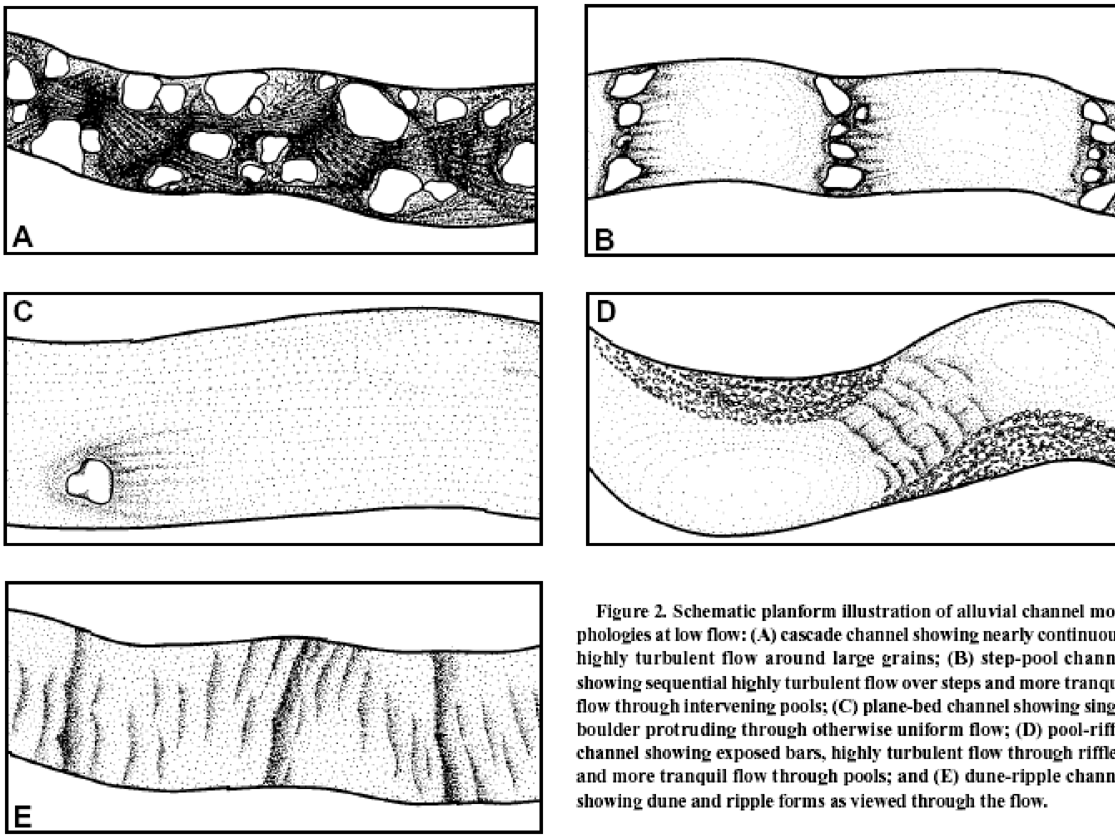


Figure 2. Schematic planform illustration of alluvial channel morphologies at low flow: (A) cascade channel showing nearly continuous, highly turbulent flow around large grains; (B) step-pool channel showing sequential highly turbulent flow over steps and more tranquil flow through intervening pools; (C) plane-bed channel showing single boulder protruding through otherwise uniform flow; (D) pool-riffle channel showing exposed bars, highly turbulent flow through riffles, and more tranquil flow through pools; and (E) dune-ripple channel showing dune and ripple forms as viewed through the flow.

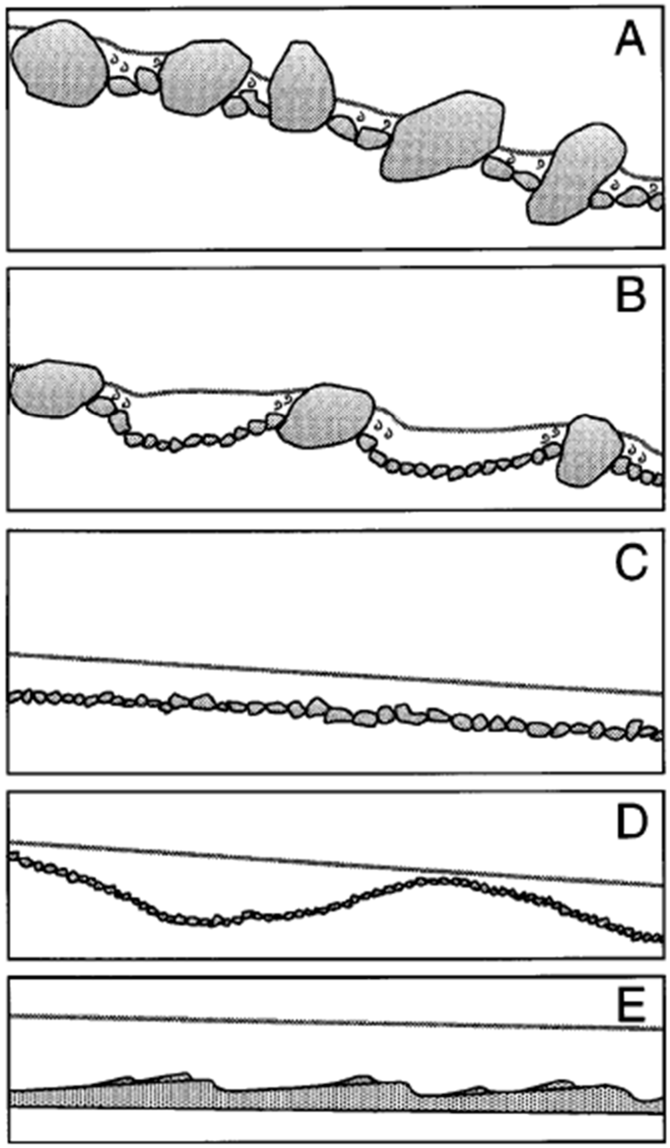


Figure 3. Schematic longitudinal profiles of alluvial channel morphologies at low flow: (A) cascade; (B) step pool; (C) plane bed; (D) pool riffle; and (E) dune ripple.

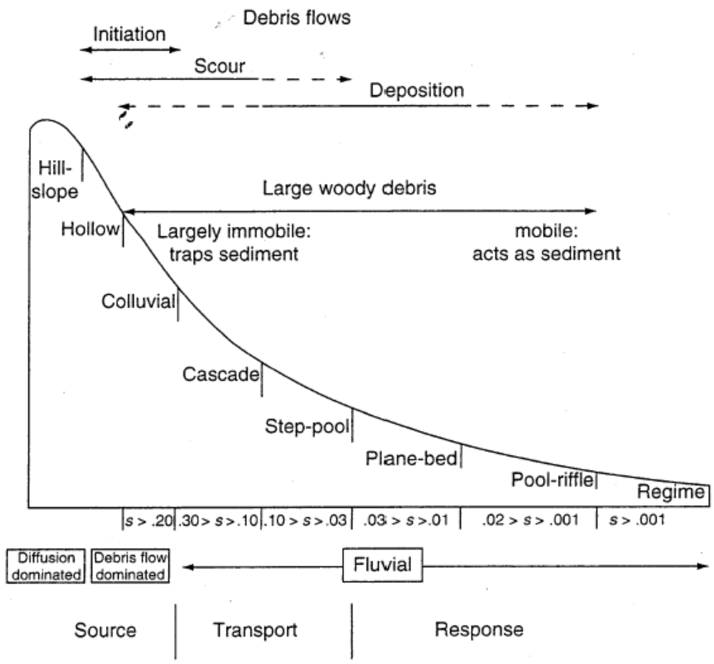


Figure 4 Process domains of Montgomery and Buffington (1997) arranged along a longitudinal gradient (reproduced from Montgomery and Buffington 1997)

EXHIBIT C

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME	LOCATION	
STATION #________ RIVERMILE________	STREAM CLASS	
LAT ______________ LONG ______________	RIVER BASIN	
STOREET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE ________ TIME _________ AM PM	REASON FOR SURVEY

WEATHER CONDITIONS	**Now** / **Past 24 hours** ❑ storm (heavy rain) ❑ ❑ rain (steady rain) ❑ ❑ showers (intermittent) ❑ ____%❑ %cloud cover ❑____% ❑ clear/sunny ❑	**Has there been a heavy rain in the last 7 days?** ❑ Yes ❑ No **Air Temperature**_____ ^{0} C **Other**_________________________________
SITE LOCATION/MAP	**Draw a map of the site and indicate the areas sampled (or attach a photograph)**	
STREAM CHARACTERIZATION	**Stream Subsystem** ❑ Perennial ❑ Intermittent ❑ Tidal **Stream Origin** ❑ Glacial ❑ Spring-fed ❑ Non-glacial montane ❑ Mixture of origins ❑ Swamp and bog ❑ Other__________	**Stream Type** ❑ Coldwater ❑ Warmwater **Catchment Area**__________km^2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	**Predominant Surrounding Landuse** ❑ Forest ❑ Commercial ❑ Field/Pasture ❑ Industrial ❑ Agricultural ❑ Other _______________ ❑ Residential **Local Watershed NPS Pollution** ❑ No evidence ❑ Some potential sources ❑ Obvious sources **Local Watershed Erosion** ❑ None ❑ Moderate ❑ Heavy
RIPARIAN VEGETATION (18 meter buffer)	**Indicate the dominant type and record the dominant species present** ❑ Trees ❑ Shrubs ❑ Grasses ❑ Herbaceous **dominant species present** ____
INSTREAM FEATURES	**Estimated Reach Length** _______m **Estimated Stream Width** _______m **Sampling Reach Area** _______m^2 **Area in km^2 (m^2x1000)** _______km^2 **Estimated Stream Depth** _______m **Surface Velocity (at thalweg)** _______m/sec **Canopy Cover** ❑ Partly open ❑ Partly shaded ❑ Shaded **High Water Mark** _______m **Proportion of Reach Represented by Stream Morphology Types** ❑ Riffle_______% ❑ Run_______% ❑ Pool_______% **Channelized** ❑ Yes ❑ No **Dam Present** ❑ Yes ❑ No
LARGE WOODY DEBRIS	**LWD** _______m^2 **Density of LWD** _______m^2/km^2 **(LWD/ reach area)**
AQUATIC VEGETATION	**Indicate the dominant type and record the dominant species present** ❑ Rooted emergent ❑ Rooted submergent ❑ Rooted floating ❑ Free floating ❑ Floating Algae ❑ Attached Algae **dominant species present** ____ **Portion of the reach with aquatic vegetation** _____%
WATER QUALITY	**Temperature**________ ^{0} C **Specific Conductance**________ **Dissolved Oxygen** ________ **pH** ________ **Turbidity** ________ **WQ Instrument Used** _______________ **Water Odors** ❑ Normal/None ❑ Sewage ❑ Petroleum ❑ Chemical ❑ Fishy ❑ Other________________ **Water Surface Oils** ❑ Slick ❑ Sheen ❑ Globs ❑ Flecks ❑ None ❑ Other_________________________ **Turbidity (if not measured)** ❑ Clear ❑ Slightly turbid ❑ Turbid ❑ Opaque ❑ Stained ❑ Other________
SEDIMENT/ SUBSTRATE	**Odors** ❑ Normal ❑ Sewage ❑ Petroleum ❑ Chemical ❑ Anaerobic ❑ None ❑ Other_________________________________ **Oils** ❑ Absent ❑ Slight ❑ Moderate ❑ Profuse **Deposits** ❑ Sludge ❑ Sawdust ❑ Paper fiber ❑ Sand ❑ Relict shells ❑ Other________________ **Looking at stones which are not deeply embedded, are the undersides black in color?** ❑ Yes ❑ No

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	**Diameter**	**% Composition in Sampling Reach**	**Substrate Type**	**Characteristic**	**% Composition in Sampling Area**
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")		Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")				
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	LOCATION	
STATION #_________ RIVERMILE_________	STREAM CLASS	
LAT ______________ LONG ______________	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		LOT NUMBER
FORM COMPLETED BY	DATE _______ TIME _______ AM PM	REASON FOR SURVEY

HABITAT TYPES	**Indicate the percentage of each habitat type present** ❑ Cobble_____% ❑ Snags_____% ❑ Vegetated Banks_____% ❑ Sand_____% ❑ Submerged Macrophytes_____% ❑ Other ( )_____%
SAMPLE COLLECTION	**Gear used** ❑ D-frame ❑ kick-net ❑ Other ___________________________ **How were the samples collected?** ❑ wading ❑ from bank ❑ from boat **Indicate the number of jabs/kicks taken in each habitat type.** ❑ Cobble_____ ❑ Snags_____ ❑ Vegetated Banks_____ ❑ Sand_____ ❑ Submerged Macrophytes_____ ❑ Other ( )_____
GENERAL COMMENTS	

QUALITATIVE LISTING OF AQUATIC BIOTA
Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS
Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME	LOCATION	
STATION #__________ RIVERMILE__________	STREAM CLASS	
LAT _______________ LONG _______________	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE ________ TIME ________ AM PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score __________

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME	LOCATION	
STATION #__________ RIVERMILE__________	STREAM CLASS	
LAT _______________ LONG _______________	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE _________ TIME _________ AM PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score __________

EXHIBIT D

Ver. 10-20-17

FCI Calculator for the High-Gradient Headwater Streams in Appalachia

To ensure accurate calculations, the UPPERMOST STRATUM of the plant community is determined based on the calculated value for $V_{CCANOPY}$ (≥20% cover is required for tree/sapling strata). Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-Gradient Headwater Streams and Low-Gradient Perennial Streams in Appalachia (Environmental Laboratory U.S. Army Corps of Engineers 2017).

Project Name:
Location:
Sampling Date: Enter dates on Data Form

Choose Site on Data Form | Choose Timing of Data Form

Subclass for this SAR:
Select Stream Type on Data Form

Uppermost stratum present at this SAR:

SAR number:

Functional Results Summary:

Please Fill Out Site and Timing Information on Data Form

Function	Functional Capacity Index
Hydrology	Check Canopy Data
Biogeochemical Cycling	Check Canopy Data
Habitat	Check Canopy Data

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
$V_{CCANOPY}$	Percent canpoy over channel.		
V_{EMBED}	Average embeddedness of channel.		
$V_{SUBSTRATE}$	Median stream channel substrate particle size.		
V_{BERO}	Total percent of eroded stream channel bank.		
V_{LWD}	Number of down woody stems per 100 feet of stream.		
V_{TDBH}	Average dbh of trees.		
V_{SNAG}	Number of snags per 100 feet of stream.		
V_{SSD}	Number of saplings and shrubs per 100 feet of stream.		
V_{SRICH}	Riparian vegetation species richness.		
$V_{DETRITUS}$	Average percent cover of leaves, sticks, etc.		
V_{HERB}	Average percent cover of herbaceous vegetation.		
V_{WLUSE}	Weighted Average of Runoff Score for Catchment.		

High-Gradient Headwater Streams in Appalachia
Field Data Sheet and Calculator

Team: ______ Latitude/UTM Northing: ______
Project Name: ______ Longitude/UTM Easting: ______
Location: ______ Sampling Date: ______
SAR Number: ______ Reach Length (ft): ______ Stream Type: Ephemeral/Intermittent (circle one)
Top Strata: (determined from percent calculated in $V_{CCANOPY}$)
Site and Timing: Project/Mitigation Site (circle one) Before/After Project (Circle One)

Sample Variables 1-4 in stream channel

1 $V_{CCANOPY}$ Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure only if tree/sapling cover is at least 20%. (If less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)

List the percent cover measurements at each point below:

2 V_{EMBED} Average embeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.

Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)

Rating	Rating Description
5	<5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)
4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment
3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment
2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment
1	>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)

List the ratings at each point below:

3 $V_{SUBSTRATE}$ Median stream channel substrate particle size. Measure at no fewer than 30 roughly equidistant points along the stream; use the same points and particles as used in V_{EMBED}.

Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in):

4 V_{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated If both banks are eroded, total erosion for the stream may be up to 200%.

Left Bank: ______ Right Bank: ______

Sample Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank).

5 V_{LWD} Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated.

Number of downed woody stems: ______

6 V_{TDBH} Average dbh of trees (measure only if $V_{CCANOPY}$ tree/sapling cover is at least 20%). Trees are at least 4 inches (10 cm) in diameter. Enter tree DBHs in inches.

List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of the stream below:

Left Side					Right Side				

7 V_{SNAG} Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated.

Left Side: ______ Right Side: ______

8 V_{SSD} Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure only if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated.

Left Side: ______ Right Side: ______

9	V_{SRICH}	Riparian vegetation species richness per 100 feet of stream reach. Check all species present from Group 1 in the tallest stratum. Check all exotic and invasive species present in all strata. Species richness per 100 feet and the subindex will be calculated from these data.

Group 1 = 1.0		Group 2 (-1.0)	
☐ *Acer rubrum*	☐ *Magnolia tripetala*	☐ *Ailanthus altissima*	☐ *Lonicera japonica*
☐ *Acer saccharum*	☐ *Nyssa sylvatica*	☐ *Albizia julibrissin*	☐ *Lonicera tatarica*
☐ *Aesculus flava*	☐ *Oxydendrum arboreum*	☐ *Alliaria petiolata*	☐ *Lotus corniculatus*
☐ *Asimina triloba*	☐ *Prunus serotina*	☐ *Alternanthera philoxeroides*	☐ *Lythrum salicaria*
☐ *Betula alleghaniensis*	☐ *Quercus alba*		☐ *Microstegium vimineum*
☐ *Betula lenta*	☐ *Quercus coccinea*	☐ *Aster tataricus*	☐ *Paulownia tomentosa*
☐ *Carya alba*	☐ *Quercus imbricaria*	☐ *Cerastium fontanum*	☐ *Polygonum cuspidatum*
☐ *Carya glabra*	☐ *Quercus prinus*	☐ *Coronilla varia*	☐ *Pueraria montana*
☐ *Carya ovalis*	☐ *Quercus rubra*	☐ *Elaeagnus umbellata*	☐ *Rosa multiflora*
☐ *Carya ovata*	☐ *Quercus velutina*	☐ *Lespedeza bicolor*	☐ *Sorghum halepense*
☐ *Cornus florida*	☐ *Sassafras albidum*	☐ *Lespedeza cuneata*	☐ *Verbena brasiliensis*
☐ *Fagus grandifolia*	☐ *Tilia americana*	☐ *Ligustrum obtusifolium*	
☐ *Fraxinus americana*	☐ *Tsuga canadensis*	☐ *Ligustrum sinense*	
☐ *Liriodendron tulipifera*	☐ *Ulmus americana*		
☐ *Magnolia acuminata*			
0 Species in Group 1		0 Species in Group 2	

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.

10	$V_{DETRITUS}$	Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36" long are include. Enter the percent cover of the detrital layer at each subplot.

Left Side				Right Side			

11	V_{HERB}	Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do *not* include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot.

Left Side				Right Side			

Sample Variable 12 within the entire catchment of the stream.

12	V_{WLUSE}	Weighted Average of Runoff Score for watershed:

Land Use (Choose From Drop List)	Runoff Score	% in Catch-ment	Running Percent (not >100)

Summary			Notes:
Variable	Value	VSI	
$V_{CCANOPY}$			
V_{EMBED}			
$V_{SUBSTRATE}$			
V_{BERO}			
V_{LWD}			
V_{TDBH}			
V_{SNAG}			
V_{SSD}			
V_{SRICH}			
$V_{DETRITUS}$			
V_{HERB}			
V_{WLUSE}			

Ver. 9-21-17

FCI Calculator for the Low-Gradient Perennial Streams in Appalachia

Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells or drop down menus. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-Gradient Headwater Streams and Low-Gradient Perennial Streams in Appalachia (Environmental Laboratory U.S. Army Corps of Engineers 2015).

Project Name:
Location:
Sampling Date: Enter dates on Data Form

Mitigation Site | Before Project

SAR number:

Enter Results in Section C of the Mitigation Sufficiency Calculator

Functional Results Summary:

Function	Functional Capacity Index
Hydrology	
Biogeochemical Cycling	
Habitat	

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
$V_{CCANOPY}$	Percent canopy over channel.		
V_{EMBED}	Average embeddedness of channel.		
$V_{SUBSTRATE}$	Median stream channel substrate particle size.		
$V_{BANKSTAB}$	Weighted lengths of erosion by class		
V_{LWD}	Number of down woody stems per 100 feet of stream.		
V_{TDBH}	Average dbh of trees.		
V_{TDEN}	Average Density of Trees		
V_{CVALUE}	Average Coefficient of Conservatism of riparian species.		
V_{FOREST}	Percent forest cover for Catchment.		

Low-Gradient Perennial Streams in Appalachia
Field Data Sheet and Calculator

Assessment Team:
Project Name:
Location:
Latitude/UTM Northing:
Longitude/UTM Easting:
Sampling Date:

SAR Number:
Thalweg Length (ft): (300 ft suggested minimum)

Site and Timing: Mitigation Site | Before Project

Sample Variables 1-4 in stream channel

1 $V_{CCANOPY}$ Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure for all streams, even if cover is less than 20%.

List the percent cover measurements at each point below (between 0 and 100):

2 V_{EMBED} Average embeddedness of the stream channel. Measure at no fewer than 60 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.

Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)

Rating	Rating Description
5	<5 percent of surface covered, surrounded, or buried by fine sediment **(or bedrock)**
4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment
3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment
2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment
1	>75 percent of surface covered, surrounded, or buried by fine sediment **(or artificial surface)**

List the ratings at each point below:

3 $V_{SUBSTRATE}$ Median stream channel substrate particle size. Measure at no fewer than 60 roughly equidistant points along the stream; use the same points and particles as used in V_{EMBED}.

Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in):

4	$V_{BANKSTAB}$	This variable is an index incorporating three elements of bank stability: 1) bank erosion length, 2) height category of eroded bank (0.1–2 ft, 2.1–4 ft, >4 ft, or artificial stabilization), and 3) length of artificial stream bank stabilization. Measure the length of the SAR along the thalweg, and enter at the top of the page. Record the length of each eroded area, using the drop down menus to select erosion class. Measure erosion on both sides of the stream. Index ranges from 0 to 200.	

☐ Check here if there is no erosion on either bank.

Length of SAR at thalweg (ft):

Total Weighted Erosion length (ft):

Left Stream Bank				Right Stream Bank			
Height of Erosion Category	Height Index	Length	Contri-bution	Height of Erosion Category	Height Index	Length	Contri-bution
	Left Bank Erosion length:	0 ft			Right Bank Erosion length:	0 ft	

Sample Variable 5 within the entire riparian/buffer zone adjacent to the stream channel (50 feet from each bank).

5	V_{LWD}	Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire buffer: 50' from each bank and within the channel. The amount per 100 feet of stream will be calculated based on the stream reach length entered at the top of the page.	

Number of downed woody stems:

Sample Variable 6-8 within at least four 0.032-acre (21' radius) plots within the riparian/buffer zone adjacent to the stream channel (50 feet from each bank).

6	V_{TDBH}	Average dbh of trees. Trees are at least 4 inches (10 cm) in diameter. Enter tree DBHs in inches.	

Use at least 4 plots.

List the dbh measurements of individual trees (at least 4 in) within 4-6 plots placed in the buffer on each side of the stream:

Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
☐ Plot Used ☐ No Trees	☐ Plot Used ☐ No Trees	☐ Plot Used ☐ No Trees	☐ Plot Used ☐ No Trees	☐ Plot Used ☐ No Trees	☐ Plot Used ☐ No Trees
Plot Average	Plot Average	Plot Average	Plot Average	Plot Average	Plot Average

7	V_{TDEN}	Tree density, based on trees recorded for V_{TDBH} in four to six 0.032-acre plots. At least four plots must be used.	
8	V_{CVALUE}	Coefficient of conservatism. The average published Coefficients of Conservatism for all native trees and all non-natives in any strata. Coefficients of Conservatism range from 0 (non-natives) to 10 (natives with high fidelity to a specific habitat). Use Drop down menus to select species, once per species. Non-natives are recorded if they occur anywhere in the riparian/buffer zone	

Native Trees				**Non-Natives in Any Strata**			
Species	C-Value	Species	C-Value	Species	C-Value	Species	C-Value

Sample Variable 9 within the entire catchment of the SAR.

9	V_{FOREST}	Percent cover of forested area within the entire watershed that provides water to the perennial stream. Using GIS or aerial photos, enter the estimated percent cover of forest directly, or the acreage of the entire watershed and then the acreage of forested area, below (direct measure will take precedence if both are entered) .	

Estimated percent cover of forest in the catchment of the SAR:

OR

Estimated acreage for the catchment of the SAR:

Estimated acreage of forest in the catchment of the SAR:

Summary			Notes:
Variable	Value	VSI	
$V_{CCANOPY}$			
V_{EMBED}			
$V_{SUBSTRATE}$			
$V_{BANKSTAB}$			
V_{LWD}			
V_{TDBH}			
V_{TDEN}			
V_{CVALUE}			
V_{FOREST}			

Add Notes and a Site Sketch in this space:

EXHIBIT E

West Virginia Stream and Wetland Valuation Metric v2.1

(September 2017)

The SWVM is composed of six tabs including the following: Instructions, Stream Parts I-II, Stream Parts III-VI, Multiple Site Unit Comparison, Wetland Parts I-III and Wetland Parts IV-V. The SWVM has been designed to indicate where data entry is required. All cells or fields highlighted in red shall be populated by the applicant, consultant or practitioner. Below are descriptions of the information or data being requested:

Stream Valuation Metric:

Stream Parts I-II

Cell B1 [USACE File No./Project Name] -Enter USACE File Number as well as the overall project name. Mining-related projects should also include the SMCRA Permit No in this field.

Cell L1 [Impact Site Lat.] – Enter latitude coordinate in NAD 83 Decimal Degrees

Cell N1 [Impact Site Long.] – Enter longitude coordinate in NAD 83 Decimal Degrees

Cell R1 [Weather] – Enter the weather conditions on the date the assessment was performed. Ex. Cloudy, 40 degrees.

Cell X1 [Date] – Enter date of the assessment being performed

Cell B2 [Stream Classification] – Enter the classification of stream being assessed. Choices are provided from the drop-down list (i.e. ephemeral, intermittent or perennial)

Cell L2 [Impact Stream/Site ID and Site Description] – Enter the stream name, stream segment identifier (which may correlate to a drawing), % streambed slope, watershed acreage and riparian condition (i.e. mature tree stratum)

Cell W2 [Mitigation Stream Class/ Site ID Description] - Enter stream classification for stream that mitigation will be performed on and stream segment identifier (which may correlate to a drawing), % streambed slope, watershed acreage and riparian condition (i.e. mature tree stratum)

Cell B3 [Stream Impact Length] – Enter the length of the impact (in linear feet)

*Note: when using this metric to only assess mitigation (i.e. preservation) no impact length should be entered and no data is necessary in Column No. 1-Impact Existing Condition (Debit)

Cell F3 [Form of Mitigation] – Enter the form of mitigation. Choices are provided from the drop-down list

Cell L3 [Mitigation Site Lat.] – Enter the mitigation site latitude coordinate in NAD 83 Decimal Degrees

Cell N3 [Mitigation Site Long.] – Enter the mitigation longitude coordinate in NAD 83 Decimal Degrees

Cell R3 [Precipitation Past 48 Hrs] – Enter the past 48 hrs precipitation for the impact site being assessed

Cell X3 [Mitigation Length] – Enter the linear feet of the compensatory mitigation proposed

COLUMN No. 1 – Impact Existing Condition (Debit) – This column establishes the baseline conditions of the proposed impact site. All projects proposing an impact (debit) to waters of the U.S. shall enter data in this column, as follows:

Part I – Physical, Chemical and Biological Indicators

Cells B9 – B11 [HGM] – Input Hydrology, Biogeochemical Cycling and Habitat Functional Capacity Index (FCI) scores generated by completing the HGM assessment, when applicable. HGM data forms should accompany the submittal of SWVM assessments. An average is taken between the three HGM FCI scores. This is then averaged with the overall SWVM score to indicate a final index score.

Cell B5 - Select Impact Stream Classification

Cell D7 - Input Percent Stream Channel Slope for Impact Stream

Cells D15 – D25 [Physical Indicator] - Indicate the physical condition of the stream by applying the USEPA RBP. The Physical descriptor for streams relies upon the data collected for the USEPA RBP Stream Data Sheet. This part of the metric allows the user to choose the High Gradient or Low Gradient Stream Data Sheet, as applicable. This portion of the Part I is required for all stream classifications. When completing impact and mitigation site assessments on high-gradient Ephemeral streams, practitioners should insert “0”s in fields 1, 3, 5 and 7 of the USEPA RBPs.

Cells D31, D34 and D37 [Chemical Indicator] - Indicate the chemical condition or water quality of the stream by inputting the data, which is based upon key parameters historically utilized by the WVDEP. This portion of Part I shall be completed for wadeable perennial, intermittent and ephemeral stream classifications (where applicable). Ephemeral stream water quality data shall be obtained during (or a short period after) a precipitation event within the reach being assessed or immediately downstream. When the immediate downstream method is necessary this shall be noted in Cell L2 or at the bottom of the assessment sheet. In the event data for these fields are not provided, good water quality will be assumed.

Cell D42 [Biological Indicator] - Indicate the biological condition of the stream by inputting the data based upon the West Virginia Stream Condition Index (WVSCI) of the WVDEP Save Our Stream Protocol. It is recommended this portion of Part I be completed for perennial and intermittent stream classifications. In the event this data cannot be obtained (i.e. ephemeral stream), the metric will generate an index score based upon the Physical and Chemical Indicators.

COLUMN No. 2 – Mitigation Existing Condition (Credit) - All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 2. This column is utilized to establish the baseline conditions for the mitigation site. In cases where an impact and mitigation will occur at the exact same site (i.e. sediment pond construction and restoration), this column should reflect baseline mitigation conditions as “0”[1].

Cell G5 - Select Mitigation Stream Classification

Cell I7 - Input Percent Stream Channel Slope for Mitigation Stream

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

COLUMN No. 3 – Mitigation Projected at Five Years Post Completion (Credit) - All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 3. This column is utilized to establish the projected condition of the site after five years of completion. Generally, there should not be a dramatic or substantial increase in functional unit scores between year 5 and 10 projected assessments (i.e. the duration of total stream buffer revegetation will typically be the last element to reach maturity for optimal functional input). The five year post-completion benchmark is also utilized to clearly identify performance standards and success criteria, which will be incorporated into Department of the Army Permits as special conditions (when it is determined five years of monitoring is appropriate by USACE).

For example purposes, a sediment pond restoration site (mitigation site) which formerly required total elimination of the riparian vegetative buffer and received a full re-vegetation application of native tree, shrub and grass stratum species would be expected to score within the following USEPA RBP individual parameter ranges (High Gradient Data Sheet) after five years of restoration.

USEPA RBP									
Epifaunal Substrate	Embeddedness	Velocity Depth Regime	Sediment Deposition	Channel Flow Status	Channel Alteration	Frequency of Riffles	Bank Stability (LB&RB)	Vetetative Protection (LB&RB)	Riparian Vegetative Zone (LB&RB)
8-12	8-12	6-10	8-13	0-20	11-15	11-18	12-16	8-12	0-20

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

COLUMN No. 4 – Mitigation Projected at Ten Years Post Completion (Credit) - All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 4. This column is utilized to establish the projected condition of the site after ten years of completion. The ten year post-completion benchmark is also utilized to clearly identify performance standards and success criteria, which will be incorporated into Department of the Army Permits as special conditions. The ten year post-completion benchmark is also utilized to clearly identify performance standards and success criteria, which will be incorporated into Department of the Army Permits as special conditions (when it is determined ten years of monitoring is appropriate by USACE).

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

COLUMN No. 5– Mitigation Projected Upon Maturity (Credit)
All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 5. This column is utilized to establish the projected condition of the site at maturity. The full restoration of a riparian buffer zone may require 40 or more years of sustained growth to contribute detritus and large woody debris, and provide light and temperature regulation.

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

PART II – Index and Unit Score - No data entry is required in Part II, the Index Score is multiplied by the linear feet of impact (debit) to generate a raw Unit Score.

Stream Parts III-VI

Part III- Impact Factors
Cell C8 [Temporal Loss-Construction] - Enter the number of years reflecting the duration of aquatic functional loss between the time of impact (debit) and completion of compensatory mitigation (credit). For example, if Permittee-Responsible On-site mitigation is proposed and it will be five (5) years before the mitigation will be completed then enter a “5”.

DEFAULT VALUES: The default value for ILF is 4 years and Mitigation Banking (provided Mitigation Bank credits have been approved and are available) is 0 years.

Cell C19 [Temporal Loss-Maturity] - Enter the number of years representing the period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. the full restoration of a riparian buffer zone may require 40 or more years of sustained growth to contribute detritus and large woody debris and provide light and temperature regulation).

Cell H7 [Long-term Protection] - Enter the number of years representing the period of protection proposed for the mitigation site. Long-term protection is obtained via conservation easements or deed restrictions to ensure sustainable gains in values. Perpetual protection should be entered as “101” or “Perpetual”.

DEFAULT VALUES: The default value for Mitigation Banking and/or ILF is “Perpetual” since these projects are required by the IRT to obtain perpetual protection.
Part IV- Comparison of Unit Scores and Projected Balance - No data entry is required. This part depicts the “Final Unit Score (debit)” in comparison with the Mitigation Existing Condition (credit), Mitigation Projected Upon Completion (credit) and the Mitigation Projected at Maturity (credit). The balance of the “Mitigation Projected at Maturity” shall be equal to or greater than the “Final Unit Score (debit)” to adequately offset the proposed impacts and be compliant with the national policy of “no net loss”.

Part IV- Index to Unit Score Conversion - No data entry is required. This section displays the final index score, which is utilized to generate a final debit unit score. For your convenience, this section also indicates the ILF amount that would be required to offset the final debit units.

*Note: All forms of compensatory mitigation now focus upon offsetting the final (debit) units rather than the linear feet except where the SWVM is not applicable (i.e. non-wadeable stream impacts).

Part V – Comparison of Unit Scores and Projected Balance - No data entry is required. This part depicts the “Final Unit Score (debit)” in comparison with the Mitigation Existing Condition-Baseline (credit), Mitigation Projected at Five Years (credit), Mitigation Projected at Ten Years (credit), and Mitigation Projected at Maturity (credit). Functional lift is defined as the balance between the “Mitigation Existing Condition-Baseline” and “Mitigation Projected at Maturity”. The balance of the “Mitigation Projected at Maturity” shall be equal to or greater than the “Final Unit Score (debit)” to adequately offset the proposed impacts and be compliant with the national policy of “no net loss”.

*Note: The yellow highlighted cells (Cells A43, C43 and D43) may be cut and copied to the next tab “Multiple Site Unit Comparison” for compiling data on multiple streams or stream segments. For submittal purposes, the Multiple Site Unit Comparison should be accompanied by individual Stream Valuation Metric spreadsheets for each stream or stream segment.

Part VI - Mitigation Considerations
Extent of Stream Restoration
Cells D32-D34 – Reference the IRT defined levels of Restoration and place an “x” in the appropriate Stream Restoration Level.

Extended Upland Buffer Zone
Cells F34-F37 – Insert the width of the buffer zone up to 150 feet from each stream channel side.

Cells H34-H35 and H37-H38 – Select from pull down box the class of buffer preservation and/or revegetation being performed.

Multiple Site Unit Comparison
When assessing multiple reaches or streams Cell Nos. A43-C43 should be copied and pasted into this table, which keeps a running tally of the debits and credits. When pasting choose "Paste Special" and then select "values and number format".

Wetland Valuation Metric:

Wetland Parts I-III

Cell B1 [USACE File No./Project Name] -Enter USACE File Number as well as the overall project name. Mining-related projects should also include the SMCRA Permit No in this field.

Cell L1 [Lat.] – Enter latitude coordinate in NAD 83 Decimal Degrees

Cell N1 [Long.] – Enter longitude coordinate in NAD 83 Decimal Degrees

Cell G2 [Stream/Site ID and Site Description] – Enter the wetland name, wetland identifier (which may correlate to a drawing), watershed acreage and riparian condition (i.e. mature tree stratum)

Cell B3 [Wetland Impact Acreage] – Enter the acreage of the impact

Cell F3 [Form of Mitigation] – Enter the form of mitigation. Choices are provided from the drop-down list

Cell M3 [Mitigation Acreage] – Enter the acreage of the compensatory mitigation proposed

Cell B4 [Date] – Enter date of the assessment being performed

Cell G3 [Weather Conditions] – Enter the weather conditions from the site during the assessment

Cell M4 [Precipitation Past 48 Hrs] – Enter the past 48 hrs precipitation for the site being assessed

Part I- Wetland Indicators
Cells A7 – A18 [Wetland ID] - Enter the wetland identification for each wetland impact (which may correspond to a drawing)

Cells B7 – B18 [Existing Classification] – Enter the wetland classification being assessed. Choices are provided from the drop-down list.

Cells D7 – D18 [Impacts] – Enter the amount of impacts (in acres) for each wetland.

Cells F7 –F18 [Mitigation Classification] – Enter the wetland classification being mitigated. Choices are provided from the drop-down list.
Part II- Unit Scores - No data entry is required. This part indicates the total Unit Scores or Replacement Units for each individual classification of wetlands.

Part III- Advanced Mitigation - Enter a "Yes" or "No" to indicate compensatory mitigation has been completed and determined sustainable in advance of any proposed impacts.

DEFAULT VALUES: Approved forms of advanced mitigation determined to be sustainable may be provided to offset impacts on a 1:1 ratio, within the same wetland classification.

Estimated In-Lieu Fee Costs – A comparison of the In-Lieu Fee costs associated with the proposed impacts is provided for reference purposes.

Wetland Parts IV-V

Part IV- Factors
Cell C6 [Temporal Loss-Construction] - Enter the number of years reflecting the duration of aquatic functional loss between the time of impact (debit) and completion of compensatory mitigation (credit). For example, if Permittee-Responsible On-site mitigation is proposed and it will be five (5) years before the mitigation will be completed then enter a "5".

DEFAULT VALUES: The default value for ILF is 4 years and Mitigation Banking (providing Mitigation Bank credits have been approved and are available) is 0 years.

Cell C17 [Temporal Loss-Maturity] - Enter the number of years representing the period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function.

Cell H5 [Long-term Protection] - Enter the number of years representing the period of protection proposed for the mitigation site. Long-term protection is obtained via conservation easements or deed restrictions to ensure sustainable gains in values. Perpetual protection should be entered as "101" or "Perpetual".

DEFAULT VALUES: The default value for Mitigation Banking and/or ILF is "Perpetual" since these projects are required to obtain perpetual protection.

Extended Upland Buffer Zone
Cells F16 – Insert the average width of the buffer zone up to 150 feet from wetland boundary.

Cells H16-H17 – Select from pull down box the class of buffer preservation and/or revegetation being performed.

Part V- Final Unit Score - This part is utilized as a reference for obtaining the Replacement Index (debit), Final Unit Score to Offset (credit) and the balance. The Final Unit Score has been adjusted to compensate for the factors input in Part IV and is the final figure necessary to be entirely offset by mitigation (credit).

Cell D25 [Form of Mitigation] – Enter the form of mitigation from the drop-down list.

Cells H25 – H28 [Applicant Input Mitigation (acres)] - Enter the acreage for each classification of wetland mitigation being proposed. The balance should be equal to or greater than the “Final Unit Score to Offset (credit)” to provide an adequate level of compensatory mitigation for offsetting the proposed impacts and be compliant with the national policy of “no net loss”.

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2017

USACE FILE NO./ Project Name: (v2.1, Sept 2015)		**IMPACT COORDINATES:** (in Decimal Degrees)	**Lat.**		**Lon.**		**WEATHER:**	**Sunny**	**DATE:**	**8/15/2015**
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments)			**MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION:** (watershed size {acreage}, unaltered or impairments)						**Comments:**	
STREAM IMPACT LENGTH:		**FORM OF MITIGATION:**	**RESTORATION (Levels I-III)**	**MIT COORDINATES:** (in Decimal Degrees)	**Lat.**		**Lon.**		**PRECIPITATION PAST 48 HRS:**		**Mitigation Length:**	

Column No. 1- Impact Existing Condition (Debit)

Stream Classification:			
Percent Stream Channel Slope			**3**
HGM Score (attach data forms):			
			Average
Hydrology	**0.5**		
Biogeochemical Cycling	**0.5**		**0.5**
Habitat	**0.5**		

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		**0**
Sub-Total			**0**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
100-199 - 85 points	0-90	0-1	
pH			
5.6-5.9 = 45 points	0-80		
DO			
	10-30		
Sub-Total			
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
0	0-100	0-1	
Sub-Total			**0**

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0.450	0	0

Column No. 2- Mitigation Existing Condition - Baseline (Credit)

Stream Classification:			
Percent Stream Channel Slope			
HGM Score (attach data forms):			
			Average
Hydrology			
Biogeochemical Cycling			**0**
Habitat			

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (Low Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Pool Substrate Characterization	0-20		
3. Pool Variability	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		
7. Channel Sinuosity	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		**0**
Sub-Total			**0**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
	0-90	0-1	
pH			
	5-90		
DO			
	10-30		
Sub-Total			**0**
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100	0-1	
Sub-Total			**0**

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0	0	0

Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)

Stream Classification:			**0**
Percent Stream Channel Slope			**0**
HGM Score (attach data forms):			
			Average
Hydrology			
Biogeochemical Cycling			**0**
Habitat			

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		**0**
Sub-Total			**0**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
	0-90	0-1	
pH			
	5-90		
DO			
	10-30		
Sub-Total			**0**
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100	0-1	
Sub-Total			**0**

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0	0	0

Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)

Stream Classification:			**0**
Percent Stream Channel Slope			**0**
HGM Score (attach data forms):			
			Average
Hydrology			
Biogeochemical Cycling			**0**
Habitat			

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		**0**
Sub-Total			**0**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
	0-90	0-1	
pH			
	5-90		
DO			
	10-30		
Sub-Total			**0**
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
	0-100	0-1	
Sub-Total			**0**

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0	0	0

Column No. 5- Mitigation Projected at Maturity (Credit)

Stream Classification:			**0**
Percent Stream Channel Slope			**0**
HGM Score (attach data forms):			
			Average
Hydrology			
Biogeochemical Cycling			**0**
Habitat			

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	**18**
2. Embeddedness	0-20		**18**
3. Velocity/ Depth Regime	0-20		**18**
4. Sediment Deposition	0-20		**17**
5. Channel Flow Status	0-20		**19**
6. Channel Alteration	0-20		**18**
7. Frequency of Riffles (or bends)	0-20		**18**
8. Bank Stability (LB & RB)	0-20		**18**
9. Vegetative Protection (LB & RB)	0-20		**18**
10. Riparian Vegetative Zone Width (LB & RB)	0-20		**18**
Total RBP Score	Optimal		**180**
Sub-Total			**0.9**
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
100-199 - 85 points	0-90	0-1	**170.2**
pH			
6.0-8.0 = 80 points	5-90		**7.01**
DO			
>5.0 = 30 points	10-30		**6.68**
Sub-Total			**0.975**
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	**85**
Sub-Total			**0.85**

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0.908333333	0	0

PART III - Impact Factors
(See instruction page to insert default values for MITIGATION BANKING and ILF)

Temporal Loss-Construction	
*Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).	
Years	
Sub-Total	0

Temporal Loss-Maturity	
*Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide organic matter and detritus within riparian stream or wetland buffer corridor).	
% Add. Mitigation	Temporal Loss-Maturity (Years)
0%	
Sub-Total	0

Long-term Protection	
% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
50% + 20 Year Monitoring	
Sub-Total	0.225

PART IV - Index to Unit Score Conversion

Final Index Score (Debit)	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.675	0	0	$0.00

PART V- Comparison of Unit Scores and Projected Balance

Final Unit Score (Debit) [No Net Loss Value]	0	Mitigation Existing Condition - Baseline (Credit)		Mitigation Projected at Five Years Post Completion (Credit)		Mitigation Projected at Ten Years Post Completion (Credit)		Mitigation Projected At Maturity (Credit)	
FINAL PROJECTED NET BALANCE					0		0		0

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration *Note1: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project *Note2: Place an "X" in the appropriate category (only select one).	
☑ Restoration Level 1	
☐ Restoration Level 2	
☐ Restoration Level 3	

Compensatory Mitigation Plan incorporates HUC 12-based watershed approach? (Yes or No) *Note: HUC 12-based watershed approach required to obtain Stream Restoration incentive	y

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
	0	#DIV/0!

Extended Upland Buffer Zone
*Note[1]: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below)
*Note[2]: Enter the buffer width for each channel side (Left Bank and Right Bank)
*Note[3]: Select the appropriate mitigation type

Buffer Width	Left Bank	
	0-50	Preservation and Re-vegetation
	51-150	Preservation and Re-vegetation
Buffer Width	Right Bank	
	0-50	Preservation and Re-vegetation
	51-150	Preservation and Re-vegetation
Average Buffer Width/Side	0	

	Straight Preservation Ratio (v2.1, Sept 2015)
Final Mitigation Unit Yield	
#DIV/0!	

Multiple Stream Site Unit Comparison

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)	Sub-Totals	Running Balance (Debit or Credit)
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
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			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
Sub-Totals	**0**	**0**		0
TOTAL NET				

West Virginia Stream and Wetland Valuation Metric v2.1

(September 2017)

The SWVM is composed of six tabs including the following: Instructions, Stream Parts I-II, Stream Parts III-VI, Multiple Site Unit Comparison, Wetland Parts I-III and Wetland Parts IV-V. The SWVM has been designed to indicate where data entry is required. All cells or fields highlighted in red shall be populated by the applicant, consultant or practitioner. Below are descriptions of the information or data being requested:

Stream Valuation Metric:

Stream Parts I-II

Cell B1 [USACE File No./Project Name] -Enter USACE File Number as well as the overall project name. Mining-related projects should also include the SMCRA Permit No in this field.

Cell L1 [Impact Site Lat.] – Enter latitude coordinate in NAD 83 Decimal Degrees

Cell N1 [Impact Site Long.] – Enter longitude coordinate in NAD 83 Decimal Degrees

Cell R1 [Weather] – Enter the weather conditions on the date the assessment was performed. Ex. Cloudy, 40 degrees.

Cell X1 [Date] – Enter date of the assessment being performed

Cell B2 [Stream Classification] – Enter the classification of stream being assessed. Choices are provided from the drop-down list (i.e. ephemeral, intermittent or perennial)

Cell L2 [Impact Stream/Site ID and Site Description] – Enter the stream name, stream segment identifier (which may correlate to a drawing), % streambed slope, watershed acreage and riparian condition (i.e. mature tree stratum)

Cell W2 [Mitigation Stream Class/ Site ID Description] - Enter stream classification for stream that mitigation will be performed on and stream segment identifier (which may correlate to a drawing), % streambed slope, watershed acreage and riparian condition (i.e. mature tree stratum)

Cell B3 [Stream Impact Length] – Enter the length of the impact (in linear feet)

*Note: when using this metric to only assess mitigation (i.e. preservation) no impact length should be entered and no data is necessary in Column No. 1-Impact Existing Condition (Debit)

Cell F3 [Form of Mitigation] – Enter the form of mitigation. Choices are provided from the drop-down list

Cell L3 [Mitigation Site Lat.] – Enter the mitigation site latitude coordinate in NAD 83 Decimal Degrees

Cell N3 [Mitigation Site Long.] – Enter the mitigation longitude coordinate in NAD 83 Decimal Degrees

Cell R3 [Precipitation Past 48 Hrs] – Enter the past 48 hrs precipitation for the impact site being assessed

Cell X3 [Mitigation Length] – Enter the linear feet of the compensatory mitigation proposed

COLUMN No. 1 – Impact Existing Condition (Debit) – This column establishes the baseline conditions of the proposed impact site. All projects proposing an impact (debit) to waters of the U.S. shall enter data in this column, as follows:

Part I – Physical, Chemical and Biological Indicators

Cells B9 – B11 [HGM] – Input Hydrology, Biogeochemical Cycling and Habitat Functional Capacity Index (FCI) scores generated by completing the HGM assessment, when applicable. HGM data forms should accompany the submittal of SWVM assessments. An average is taken between the three HGM FCI scores. This is then averaged with the overall SWVM score to indicate a final index score.

Cell B5 - Select Impact Stream Classification

Cell D7 - Input Percent Stream Channel Slope for Impact Stream

Cells D15 – D25 [Physical Indicator] - Indicate the physical condition of the stream by applying the USEPA RBP. The Physical descriptor for streams relies upon the data collected for the USEPA RBP Stream Data Sheet. This part of the metric allows the user to choose the High Gradient or Low Gradient Stream Data Sheet, as applicable. This portion of the Part I is required for all stream classifications. When completing impact and mitigation site assessments on high-gradient Ephemeral streams, practitioners should insert “0”s in fields 1, 3, 5 and 7 of the USEPA RBPs.

Cells D31, D34 and D37 [Chemical Indicator] - Indicate the chemical condition or water quality of the stream by inputting the data, which is based upon key parameters historically utilized by the WVDEP. This portion of Part I shall be completed for wadeable perennial, intermittent and ephemeral stream classifications (where applicable). Ephemeral stream water quality data shall be obtained during (or a short period after) a precipitation event within the reach being assessed or immediately downstream. When the immediate downstream method is necessary this shall be noted in Cell L2 or at the bottom of the assessment sheet. In the event data for these fields are not provided, good water quality will be assumed.

Cell D42 [Biological Indicator] - Indicate the biological condition of the stream by inputting the data based upon the West Virginia Stream Condition Index (WVSCI) of the WVDEP Save Our Stream Protocol. It is recommended this portion of Part I be completed for perennial and intermittent stream classifications. In the event this data cannot be obtained (i.e. ephemeral stream), the metric will generate an index score based upon the Physical and Chemical Indicators.

COLUMN No. 2 – Mitigation Existing Condition (Credit) - All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 2. This column is utilized to establish the baseline conditions for the mitigation site. In cases where an impact and mitigation will occur at the exact same site (i.e. sediment pond construction and restoration), this column should reflect baseline mitigation conditions as “0”[1].

Cell G5 - Select Mitigation Stream Classification

Cell I7 - Input Percent Stream Channel Slope for Mitigation Stream

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

COLUMN No. 3 – Mitigation Projected at Five Years Post Completion (Credit) - All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 3. This column is utilized to establish the projected condition of the site after five years of completion. Generally, there should not be a dramatic or substantial increase in functional unit scores between year 5 and 10 projected assessments (i.e. the duration of total stream buffer revegetation will typically be the last element to reach maturity for optimal functional input). The five year post-completion benchmark is also utilized to clearly identify performance standards and success criteria, which will be incorporated into Department of the Army Permits as special conditions (when it is determined five years of monitoring is appropriate by USACE)

For example purposes, a sediment pond restoration site (mitigation site) which formerly required total elimination of the riparian vegetative buffer and received a full re-vegetation application of native tree, shrub and grass stratum species would be expected to score within the following USEPA RBP individual parameter ranges (High Gradient Data Sheet) after five years of restoration.

USEPA RBP

Epifaunal Substrate	Embeddedness	Velocity Depth Regime	Sediment Deposition	Channel Flow Status	Channel Alteration	Frequency of Riffles	Bank Stability (LB&RB)	Vetetative Protection (LB&RB)	Riparian Vegetative Zone (LB&RB)
8-12	8-12	6-10	8-13	0-20	11-15	11-18	12-16	8-12	0-20

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

COLUMN No. 4 – Mitigation Projected at Ten Years Post Completion (Credit) - All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 4. This column is utilized to establish the projected condition of the site after ten years of completion. The ten year post-completion benchmark is also utilized to clearly identify performance standards and success criteria, which will be incorporated into Department of the Army Permits as special conditions. The ten year post-completion benchmark is also utilized to clearly identify performance standards and success criteria, which will be incorporated into Department of the Army Permits as special conditions (when it is determined ten years of monitoring is appropriate by USACE).

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

COLUMN No. 5– Mitigation Projected Upon Maturity (Credit)
All projects proposing compensatory mitigation (credit) to waters of the U.S. shall enter data in Column No. 5. This column is utilized to establish the projected condition of the site at maturity. The full restoration of a riparian buffer zone may require 40 or more years of sustained growth to contribute detritus and large woody debris, and provide light and temperature regulation.

Part I – Physical, Chemical and Biological Indicators
*Reference Part I above.

PART II – Index and Unit Score - No data entry is required in Part II, the Index Score is multiplied by the linear feet of impact (debit) to generate a raw Unit Score.

Stream Parts III-VI

Part III- Impact Factors
Cell C8 [Temporal Loss-Construction] - Enter the number of years reflecting the duration of aquatic functional loss between the time of impact (debit) and completion of compensatory mitigation (credit). For example, if Permittee-Responsible On-site mitigation is proposed and it will be five (5) years before the mitigation will be completed then enter a “5”.

DEFAULT VALUES: The default value for ILF is 4 years and Mitigation Banking (provided Mitigation Bank credits have been approved and are available) is 0 years.

Cell C19 [Temporal Loss-Maturity] - Enter the number of years representing the period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. the full restoration of a riparian buffer zone may require 40 or more years of sustained growth to contribute detritus and large woody debris and provide light and temperature regulation).

Cell H7 [Long-term Protection] - Enter the number of years representing the period of protection proposed for the mitigation site. Long-term protection is obtained via conservation easements or deed restrictions to ensure sustainable gains in values. Perpetual protection should be entered as “101” or “Perpetual”.

DEFAULT VALUES: The default value for Mitigation Banking and/or ILF is “Perpetual” since these projects are required by the IRT to obtain perpetual protection.
Part IV- Comparison of Unit Scores and Projected Balance - No data entry is required. This part depicts the “Final Unit Score (debit)” in comparison with the Mitigation Existing Condition (credit), Mitigation Projected Upon Completion (credit) and the Mitigation Projected at Maturity (credit). The balance of the “Mitigation Projected at Maturity” shall be equal to or greater than the “Final Unit Score (debit)” to adequately offset the proposed impacts and be compliant with the national policy of “no net loss”.

Part IV- Index to Unit Score Conversion - No data entry is required. This section displays the final index score, which is utilized to generate a final debit unit score. For your convenience, this section also indicates the ILF amount that would be required to offset the final debit units.

*Note: All forms of compensatory mitigation now focus upon offsetting the final (debit) units rather than the linear feet except where the SWVM is not applicable (i.e. non-wadeable stream impacts).

Part V – Comparison of Unit Scores and Projected Balance - No data entry is required. This part depicts the “Final Unit Score (debit)” in comparison with the Mitigation Existing Condition-Baseline (credit), Mitigation Projected at Five Years (credit), Mitigation Projected at Ten Years (credit), and Mitigation Projected at Maturity (credit). Functional lift is defined as the balance between the “Mitigation Existing Condition-Baseline” and “Mitigation Projected at Maturity”. The balance of the “Mitigation Projected at Maturity” shall be equal to or greater than the “Final Unit Score (debit)” to adequately offset the proposed impacts and be compliant with the national policy of “no net loss”.

*Note: The yellow highlighted cells (Cells A43, C43 and D43) may be cut and copied to the next tab “Multiple Site Unit Comparison” for compiling data on multiple streams or stream segments. For submittal purposes, the Multiple Site Unit Comparison should be accompanied by individual Stream Valuation Metric spreadsheets for each stream or stream segment.

Part VI - Mitigation Considerations
Extent of Stream Restoration
Cells D32-D34 – Reference the IRT defined levels of Restoration and place an “x” in the appropriate Stream Restoration Level.

Extended Upland Buffer Zone
Cells F34-F37 – Insert the width of the buffer zone up to 150 feet from each stream channel side.

Cells H34-H35 and H37-H38 – Select from pull down box the class of buffer preservation and/or revegetation being performed.

Multiple Site Unit Comparison
When assessing multiple reaches or streams Cell Nos. A43-C43 should be copied and pasted into this table, which keeps a running tally of the debits and credits. When pasting choose "Paste Special" and then select "values and number format".

Wetland Valuation Metric:

Wetland Parts I-III

Cell B1 [USACE File No./Project Name] -Enter USACE File Number as well as the overall project name. Mining-related projects should also include the SMCRA Permit No in this field.

Cell L1 [Lat.] – Enter latitude coordinate in NAD 83 Decimal Degrees

Cell N1 [Long.] – Enter longitude coordinate in NAD 83 Decimal Degrees

Cell G2 [Stream/Site ID and Site Description] – Enter the wetland name, wetland identifier (which may correlate to a drawing), watershed acreage and riparian condition (i.e. mature tree stratum)

Cell B3 [Wetland Impact Acreage] – Enter the acreage of the impact

Cell F3 [Form of Mitigation] – Enter the form of mitigation. Choices are provided from the drop-down list

Cell M3 [Mitigation Acreage] – Enter the acreage of the compensatory mitigation proposed

Cell B4 [Date] – Enter date of the assessment being performed

Cell G3 [Weather Conditions] – Enter the weather conditions from the site during the assessment

Cell M4 [Precipitation Past 48 Hrs] – Enter the past 48 hrs precipitation for the site being assessed

Part I- Wetland Indicators
Cells A7 – A18 [Wetland ID] - Enter the wetland identification for each wetland impact (which may correspond to a drawing)

Cells B7 – B18 [Existing Classification] – Enter the wetland classification being assessed. Choices are provided from the drop-down list.

Cells D7 – D18 [Impacts] – Enter the amount of impacts (in acres) for each wetland.

Cells F7 –F18 [Mitigation Classification] – Enter the wetland classification being mitigated. Choices are provided from the drop-down list.
Part II- Unit Scores - No data entry is required. This part indicates the total Unit Scores or Replacement Units for each individual classification of wetlands.

Part III- Advanced Mitigation - Enter a "Yes" or "No" to indicate compensatory mitigation has been completed and determined sustainable in advance of any proposed impacts.

DEFAULT VALUES: Approved forms of advanced mitigation determined to be sustainable may be provided to offset impacts on a 1:1 ratio, within the same wetland classification.

Estimated In-Lieu Fee Costs – A comparison of the In-Lieu Fee costs associated with the proposed impacts is provided for reference purposes.

Wetland Parts IV-V

Part IV- Factors
Cell C6 [Temporal Loss-Construction] - Enter the number of years reflecting the duration of aquatic functional loss between the time of impact (debit) and completion of compensatory mitigation (credit). For example, if Permittee-Responsible On-site mitigation is proposed and it will be five (5) years before the mitigation will be completed then enter a "5".

DEFAULT VALUES: The default value for ILF is 4 years and Mitigation Banking (providing Mitigation Bank credits have been approved and are available) is 0 years.

Cell C17 [Temporal Loss-Maturity] - Enter the number of years representing the period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function.

Cell H5 [Long-term Protection] - Enter the number of years representing the period of protection proposed for the mitigation site. Long-term protection is obtained via conservation easements or deed restrictions to ensure sustainable gains in values. Perpetual protection should be entered as "101" or "Perpetual".

DEFAULT VALUES: The default value for Mitigation Banking and/or ILF is "Perpetual" since these projects are required to obtain perpetual protection.

Extended Upland Buffer Zone
Cells F16 – Insert the average width of the buffer zone up to 150 feet from wetland boundary.

Cells H16-H17 – Select from pull down box the class of buffer preservation and/or revegetation being performed.

Part V- Final Unit Score - This part is utilized as a reference for obtaining the Replacement Index (debit), Final Unit Score to Offset (credit) and the balance. The Final Unit Score has been adjusted to compensate for the factors input in Part IV and is the final figure necessary to be entirely offset by mitigation (credit).

Cell D25 [Form of Mitigation] – Enter the form of mitigation from the drop-down list.

Cells H25 – H28 [Applicant Input Mitigation (acres)] - Enter the acreage for each classification of wetland mitigation being proposed. The balance should be equal to or greater than the "Final Unit Score to Offset (credit)" to provide an adequate level of compensatory mitigation for offsetting the proposed impacts and be compliant with the national policy of "no net loss".

EXHIBIT F

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

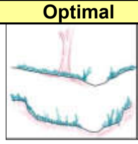
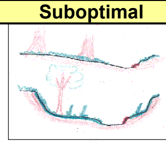
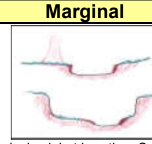
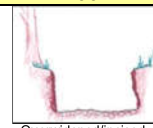
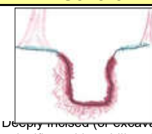
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor

Name(s) of Evaluator(s)	Stream Name and Information

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
						
Channel Condition	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	**CI**
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>							0%	
	Score >								
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>							0%	Rt Bank CI > 0.00
	Score >								Lt Bank CI > 0.00

CI
0.00

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	**CI**
Score	1.5	1.2	0.9	0.5	

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category					
	Negligible	Minor		Moderate		Severe
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 0.00

RCI= (Sum of all CI's)/5

COMPENSATION REQUIREMENT (CR) >> 0

CR = RCI X LF X IF

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
								1

Name(s) of Evaluator(s)	Stream Name and Information

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

NOTES>>

	Conditional Category						
	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>							0%
	Score >							
Left Bank	% Riparian Area>							0%
	Score >							

CI= (Sum % RA * Scores*0.01)/2

		CI
Rt Bank CI >	0.00	
Lt Bank CI >	0.00	0.00

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >> 0.00

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >> 0

CR = RCI X LF X IF

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Summary Form (Form 2)

Unified Stream Methodology
for use in Virginia

Project #	Applicant		Date
Evaluators		**HUC**	**Locality**

Stream Name	Reach ID	Length of Impact (L_I) (feet)	Reach Condition Index (RCI)	Impact Factor (IF)	Compensation Requirement (CR) ($L_I \times RCI \times IF$)
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
					0
	Total L_I	**0**		**Total CR**	**0**

Note: Round all feet & CR's to the nearest whole number.

Compensation Crediting Form (Form 3)

Unified Stream Methodology for use in Virginia

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	Reach #	Reach Length
							100

Name(s) of Evaluator(s)	Steam Name and Information

		Project Credits
Restoration: Includes Priority 1, 2, and 3 restoration activities. Does not include buffer width.	Credit per foot	0
List Reaches that will receive full Restoration: Total length of Full Restoration	1	
Credits = Stream Length X 1.0		
Enhancement With Instream Structures: Addressing Streambank Stability, Grade Control (Vanes, Weirs, Step-Pools), Constructed Riffles	Credit per foot	
Discuss Length Affected by Instream Structures (justify length): Length Affected by Instream Structures	0.3	0
Credits = Stream Length X 0.3		

Enhancement: Addressing Streambank Stability, Entrenchment Ratios, Access to Floodplain

Mitigation Categories					
	Mechanical Bank Work			Biological Bank Work	
	Credit Per Length	Pick One Per Length		May Be Cumulative Per Length	
Activities	Habitat Structures	Create Bankfull Bench	Lay Back Banks	Bio-Remediation Techniques	Stream Bank Plantings
Credit per foot per bank	0.1	0.15	0.1	0.1	0.09

Right Bank	Length							0	
	Credit>								
Left Bank	Length							0	
	Credit >								

CREDITS			
Rt Bank >	0.00	Credit	
Lt Bank >	0.00	*SUM of banks*	0

Σ(Length X Credit) for all areas (banks done separately)

Riparian Areas: Assess the proposed 100 foot buffer on both banks based on the activity proposed. Enter the percentage of area and the credit below. (Widths of buffer above 100' will be determined below)

Activities	Buffer Re-establishment (removal of invasives)	Buffer Planting - Heavy	Buffer Planting - Light	Preservation *High Quality, Restoration, Enhancement*	Preservation *Low Quality*	Buffer area not within preservation width
Credit for 0'-100'	0.4	0.38	0.29	0.14	0.07	0
Credit for beyond 100'	0.2	0.19	0.15	0.07		0

Calculation of "Goal" riparian buffer for each side (SAR length times 100') >>>> 10,000 square feet

WITHIN FIRST 100' - Mitigation Categories

One vegetative community maintained	Subtract 0.03	Ensure the sums of % Riparian Blocks equal 100
Two vegetative communities maintained	Subtract 0.06	

Right Bank	Area #	1	2					
	Sq, Footage							
	% Area	0%	0%	0%	0%	0%	0%	0%
	Credit>							
Left Bank	Area #							
	Sq, Footage							
	% Area	0%	0%	0%	0%	0%	0%	0%
	Credit>							

CREDITS			
Rt Bank >	0.00	Credit	
Lt Bank >	0.00	0.00	0

Σ(% Area X Credit) for all areas (banks done separately)
AVE of credit for banks X length of project

Outside First 100' - Mitigation Categories

One vegetative community maintained	Subtract 0.03	Ensure the sums of % Riparian Blocks equal 100
Two vegetative communities maintained	Subtract 0.06	

Right Bank	Area #							
	Sq, Footage							
	% Area	0%	0%	0%	0%	0%	0%	0%
	Credit>							
Left Bank	Area #							
	Sq, Footage							
	% Area	0%	0	0	0	0	0	0%
	Credit >							

CREDITS			
Rt Bank >	0.00	Credit	
Lt Bank >	0.00	0.00	0

Σ(% Area X Credit) for all areas (banks done separately)
AVE of credit for banks X length of project

Adjustment Factors: These factors are applied as a multiplier to length of a reach for which they apply

Adjustment Factor Categories			
Activity	Rare, Threatened, or Endangered Species or Communities	Livestock Exclusion	Watershed Preservation
Credit	0.1 - 0.3	0.1 - 0.3	0.1 - 0.3
Stream Length Affected			
Credit>			

Credits are cumulative and can apply to more than one reach. Each reach can have more than one Adjustment Factors

Record AF length /credit beneath the AF activity. Provide a narrative explanation of the applicable site conditions that warrant an adjustment and justify the AF credit chosen.

Credits > 0

ΣLength X Credit) for all areas

Total Compensation Credit Provided by Project	0

Compensation Summary Form (Form 4)

Unified Stream Methodology
for use in Virginia

Project #	Applicant	Date

Evaluators	HUC	Locality

Stream Name	Reach ID	Comp. Length (L_c) (feet)	Total Compensation Credit (Total CC) (From Form 3)
	Totals	**0**	**0**

Note: Round all feet & CC's to the nearest whole number.

APPENDIX B

Appendix B:

RESTORATION WORK PLAN

Mountain Valley Pipeline Project

TABLE OF CONTENTS

ATTACHMENTS

EXHIBITS

The purpose of this Restoration Work Plan is to provide details on procedures used at jurisdictional aquatic resource crossings and for the restoration of temporary stream and wetland impacts resulting from the construction of the Mountain Valley Pipeline Project (Project). The successful restoration of temporary stream and wetland impacts, as described below, is an important factor in ensuring the Project's Performance Standards will be met.

1.0 LEGAL, REGULATORY, AND PERMIT REQUIREMENTS

1.1 Pre-construction Compliance Training

Mountain Valley Pipeline, LLC (Mountain Valley) will conduct a resource-crossing training event, including specific training for sensitive waters,[1] for all field personnel before initiating any resource crossings. The training will document permitting requirements, agency notifications, best management practices for sensitive waters, restoration procedures, and monitoring commitments associated with the Project. Appropriate field personnel must have demonstrated experience with resource crossings, environmental controls, and environmental maintenance. New employees hired after the date of the planned pre-construction training will undergo the same training and be held to the same expectations.

1.2 Responsibility for Compliance with Requirements

Mountain Valley has the following expectations of *every person* employed on the Project and participating in stream and wetland crossings and other activities that impact aquatic resources:

- Know the legal, regulatory, and permit requirements applicable to their role in the Project.
- Comply with all legal, regulatory, and permit requirements at all times, without exception.
- Do not tolerate non-compliance by any other person employed on the Project.
- Immediately report any instances of non-compliance and/or unauthorized impacts to aquatic resources to the Project's Environmental Inspectors.

Every person employed on the Project has the *authority* and the *duty* to stop work if they witness any activities, conditions, or circumstances (1) that do not comply with any applicable legal, regulatory, or permit requirements or (2) which have or may cause an unauthorized impact to streams, wetlands, or other environmental resources.

[1] As used in this Restoration Work Plan, "sensitive waters" refers to streams with (1) relevant water quality impairments (listed on Attachment A) and (2) potential presence of threatened or endangered species addressed in the Project's Biological Opinion. The list in Attachment A only focuses on impairments that the construction and operation of the Project may influence.

1.3 Summary of Applicable Requirements

Restoration of stream and wetland impacts falls within the jurisdiction of several federal and state agencies. For reference, the table below lists the sources of applicable requirements for activities in and around streams and wetlands. Note that stream and wetland construction practices and erosion and sediment control measures are not addressed in this Restoration Work Plan except to the extent they specifically pertain to restoration.

Document	Agency	Relevant Activities	Reference Location
All Areas of Project			
Certificate Order, Mountain Valley Pipeline	Federal Energy Regulatory Commission (FERC)	• All activities	Relevant portion attached (Appendix C: Environmental Conditions)
Wetland and Waterbody Construction and Mitigation Procedures	FERC	• Inspections • Stream & wetland crossings • Restoration • Monitoring	Construction Trailer & Field Tablets (digital version)
Upland Erosion Control, Revegetation and Maintenance Plan	FERC	• Upland work near streams & wetlands	Construction Trailer & Field Tablets (digital version)
Clean Water Act § 404/Rivers and Harbors Act § 10 Permit (*pending*)	U.S. Army Corps of Engineers	• Stream & wetland crossings • Restoration • Monitoring	To be attached upon issuance
Specific Areas			
Biological Opinion and Incidental Take Statement	U.S. Fish & Wildlife Service	• Monitoring	To be attached upon reissuance
Right-of-Way Grant	Bureau of Land Management	*MP 196.2 to 198.5 and 218.6 and 221.0* • Upland work near streams & wetlands • Wetland crossings • Restoration	Construction Trailer (Spreads F & G)
Plan of Development	U.S. Forest Service	*MP 196.2 to 198.5 and 218.6 and 221.0* • Upland work near streams & wetlands • Wetland crossings • Restoration	Construction Trailer (Spreads F & G)

Document	Agency	Relevant Activities	Reference Location
West Virginia Only			
Water Pollution Control Act Permit for Construction	WV Department of Environmental Protection (WVDEP)	• Inspections • Upland work near streams & wetlands • Stream & wetland crossings • Restoration • Monitoring	Construction Trailer & Field Tablets (digital version)
Erosion and Sediment Control Plans	WVDEP	• Upland work near streams & wetlands • Stream & wetland crossings	Construction Trailer & Field Tablets (digital version)
Water Quality Certification	WVDEP	• Inspections • Stream & wetland crossings • Restoration • Monitoring	Attached
License and Right of Entry	WV Division of Natural Resources	Stream Crossings	Construction Trailer & Field Tablets (digital version)
Virginia Only			
Annual Standards and Specifications	VA Department of Environmental Quality (VADEQ)	• Inspections • Upland work near streams & wetlands • Stream & wetland crossings • Restoration	Construction Trailer & Field Tablets (digital version)
Erosion and Sediment Control Plans	VADEQ	• Inspections • Upland work near streams & wetlands • Stream & wetland crossings • Restoration	Construction Trailer & Field Tablets (digital version)
Stormwater Management Plans	VADEQ	• Inspections • Restoration • Monitoring	Construction Trailer & Field Tablets (digital version)
Upland Water Quality Certification	State Water Control Board (SWCB)	• Inspections • Upland work near streams & wetlands	Attached

Document	Agency	Relevant Activities	Reference Location
Water Protection Permit	SWCB	• Inspections • Upland work near streams & wetlands • Stream & wetland crossings • Restoration • Monitoring	Attached
Permit for Encroachment on State-Owned Submerged Lands (*modification pending*)	VA Marine Resources Commission (VMRC)	<u>*Listed streams*</u> • Stream & wetland crossings • Restoration	To be attached upon modification
Consent Decree	VADEQ	• Stream & wetland crossings • Monitoring	Relevant portion attached (Compliance Program)

2.0 PRE-CROSSING PROCEDURES

The process of ensuring the successful restoration of streams and wetlands begins *prior to* the initiation of the crossing. The following procedures must be followed to prepare for stream and wetland crossings.

2.1 Agency Notifications

Mountain Valley's Environmental Inspector (EI) is responsible for verifying all necessary pre-crossing notifications have been provided to regulatory agencies. These notifications enable the agencies to exercise oversight of crossings. The required notifications include the following:

<u>Entire Project</u>

- FERC – All crossings via weekly construction schedule updates

<u>West Virginia</u>

- WVDEP – Minimum of 48 hours before each crossing
- Summers County Floodplain Coordinator (Greenbrier River trenchless crossing)
- WVDEP (Gary Kennedy) and Big Bend Public Supply District (John Kesler) – Greenbrier River crossing
- Written notification to WVDEP – Environmental Enforcement must be given 15 days in advance of initiating any activities associated with the 401 Water Quality Certification

Virginia

- VADEQ – Minimum of 48 hours before each crossing
- Western Virginia Water Authority – Roanoke River Crossing
- VMRC – All streams under VMRC jurisdiction

2.2 Pre-Construction Inspection

Prior to commencing the crossing, Mountain Valley's EI is required to complete the Pre-construction Resource Crossing Checklist (Exhibit A), which provides site-specific information and procedures to properly document pre-crossing conditions, ensure that the appropriate equipment and materials are on site, and ensure that everyone has reviewed procedures to successfully complete the crossing.

The pre-crossing inspection includes a visual inspection to confirm that site conditions have not materially changed since the baseline conditions assessment was completed. If the EI observes that conditions have changed, the crossing will not proceed until a new survey is completed to document the pre-crossing condition.

2.3 Waterbody Crossing Plan

It is the responsibility of the contractor to develop a site-specific Waterbody Crossing Plan for each crossing prior to the initiation of the crossing. The plan is intended to provide practical instructions for the construction crew that will be conducting the crossing and restoration activity. It will be developed in consideration of the following:

- Weather, flow, and other relevant site conditions at the time of the crossing;
- Impairment status;
- Potential presence of threatened or endangered species;
- Pre-construction survey data, plan drawings, and/or other relevant information gathered through the Baseline Assessment, including the presence of any sensitive features (e.g., riffles and pools) that must be restored; and
- Applicable regulatory and permit requirements.

2.4 Pre-Crossing Field Meeting

An onsite pre-crossing field meeting will be held shortly (typically 24 to 48 hours) before commencing each stream or wetland crossing. The purpose of the pre-crossing field meeting is to ensure that all parties are in agreement about the plan and preparation for the crossing and restoration. The meeting will be attended by:

- Chief Environmental Inspector or their designee;
- Environmental Inspector;
- Construction Manager;
- Construction Foreman and Crew; and
- Others as appropriate (e.g., agency inspectors and staff, Environmental Auditor).

At the meeting, the parties will jointly review the following:

- Relevant regulatory or permit requirements;
- Suitability of the weather forecast, stream flow, and other site conditions for commencing the crossing;
- Waterbody Crossing Plan prepared by the contractor;
- Location of ordinary high water mark, setbacks, and vegetative buffers and, if necessary, refreshing flagging for same;
- Selected locations for stockpiling of the top 12 inches of stream substrate or wetland topsoil separately from subsoils (where necessary for the activity);
- Pre-construction Resource Crossing Checklist prepared by the EI;
- Equipment and materials on hand (e.g., pumps, dams, backup erosion and sediment controls) to verify that all are properly staged and operational;
- Erosion and sediment controls at the crossing site to ensure that they are installed in accordance with the erosion and sediment control plans;
- Additional stabilizing erosion-control devices such as extra mulch, erosion control blanketing, and/or tackifiers;
- Sufficiency of the dewatering structure and discharge locations (where necessary for the activity);
- Placement and suitability of the temporary equipment bridge (where necessary);
- Inspection requirements–
    - West Virginia:
        - inspection frequency at non-impaired waters is once every seven days and within 24 hours after any storm event greater than 0.25 inch in a 24-hour period;
        - inspection frequency at all applicable impaired waters is every four days, including the 50-foot buffer for each stream crossing. The increased inspection frequency will continue until 80% perennial vegetative coverage is achieved;
    - Virginia:
        - inspection frequency is once every four days for all streams;
- Stabilization must begin immediately once the crossing is complete;
- Task assignments and responsibilities for Construction Foreman and Crew; and
- Stop-work authority and procedures during implementation of the crossing and restoration activities.

The crossing will commence only if and when all parties attending the pre-crossing field meeting are in agreement as to the items in the list above.

3.0 RESTORATION PROCEDURES

This section outlines restoration procedures to be implemented to restore impacts. Where a restoration activity is intended to facilitate the eventual attainment of one or more Performance Standards (PS), that is noted in the text with a bracketed reference (e.g., [PS 1.0.7]).

3.1 Monitoring of Construction and Restoration Activities (All Activities)

Mountain Valley's EIs will provide onsite monitoring for all construction and restoration activities in streams and wetlands. Their responsibilities include, among other things, identifying and promptly remedying any deviations from the field crossing and restoration plan and applicable regulatory requirements. Environmental Auditors will monitor instream biological conditions and compliance with relevant requirements.

Monitoring and oversight provided by the EIs and Environmental Auditors are expected to support the eventual attainment of each applicable Performance Standard.

3.2 Restoration of Temporary Wetland Impacts (Trenches)

After the pipe is installed, the trench is backfilled with the native material that was removed during excavation [PS 1.0.3]. The upper 12 inches of topsoil that were segregated and stockpiled separately from the lower material will then be restored, de-compacted, and brought to match the pre-construction conditions [PS 1.0.1; 1.0.2; 1.0.3; 1.0.7; 1.0.8; 1.0.9]. Original surface hydrology will be re-established in wetlands by maintaining the existing overland flow patterns and surface contours of the surrounding areas [PS 1.0.7; 1.0.8]. Surface flow will not be directed away from the wetland. Trench breakers will be installed outside of the wetland limits to prevent subsurface drainage along the pipeline and to further support the development of hydric conditions [PS 1.0.7; 1.0.8].

Wetlands along the proposed pipeline are expected to exhibit varying degrees of saturation and water elevation, requiring a variety of plant species in order to be re-established. Wetlands will be temporarily seeded in accordance with the typical construction details and state-approved seed mixes [PS 1.0.5]. However, having segregated the upper 12 inches of topsoil will help support the natural restoration of the native seedbank [PS 1.0.1; 1.0.4; 1.0.5; 1.0.6]. Erosion and sediment control devices will be installed around the perimeter of the wetland until the area is stable with vegetation [PS 1.0.4; 1.0.6].

For all affected forested wetlands, restoration activities will be conducted in accordance with approved permit conditions, mitigation requirements, and Mountain Valley's Restoration and Rehabilitation Plan and variance approvals (Exhibit B) [PS 1.0.1; 1.0.4; 1.0.5; 1.0.6]. If saplings are required to be planted within the temporary right-of-way areas, this will be conducted in accordance with the approved erosion and sediment control plans and the Restoration and Rehabilitation Plan, unless otherwise specified by applicable permit conditions.

3.3 Restoration of Temporary Wetland Impacts (Timber Mats/Temporary Fill)

Wetland crossing structures, such as timber mats utilized to support equipment on the construction right-of-way, or other temporary fill material will be removed upon completion of construction. The timber mats will be lifted from and not pulled through the wetland further protecting the soils and native seedbank [PS 1.0.1; 1.0.2; 1.0.4; 1.0.6; 1.0.7]. The equipment used to remove the timber mats will work from upland areas or the existing timber mats – tracking out of the wetland until the mats are removed [PS 1.0.5; 1.0.9]. The area will then be de-compacted or scarified to support plant regrowth [PS 1.0.1; 1.0.2; 1.0.3; 1.0.4; 1.0.6; 1.0.7; 1.0.8; 1.0.9]. Additional seeding measures, if necessary, will be considered as part of the Adaptive Management Plan.

3.4 Restoration of Temporary Stream Impacts (Trenches)

To facilitate successful restoration of streams, the top 12 inches of the streambed substrate will be segregated and stockpiled separately from subsoils [PS 2.0.1; 2.0.3; 2.0.4; 2.0.5; 2.0.6; 2.0.7]. Work will proceed as quickly as practicable until the crossing is completed and the work area is restored. This practice ensures that the duration of temporary impacts to streams from pipeline installation work is minimized. Following pipe installation, the native subsoil material excavated from the trench will be used as backfill. Using the Baseline Assessment information, the stream will be installed to the pre-construction conditions using the cross-sectional and longitudinal profile information, with the segregated streambed substrate being replaced last [PS 2.0.1; 2.0.3; 2.0.4; 2.0.5; 2.0.6; 2.0.7]. Trench breakers of clay, earthen fill, or sand-filled sacks may be used to keep backfill from sloughing in toward the center of the stream and to prevent the pipeline bedding material from acting as a French drain [PS 2.0.1; 2.0.2; 2.0.3; 2.0.7]. The streambanks will be recontoured and stabilized [PS 2.0.2]. Once the EI has verified that the trench has been successfully backfilled and the upper 12 inches of stream substrate and streambanks have been restored to pre-construction contours, the downstream diversion will be removed, followed by the upstream diversion, restoring the natural flow of the stream [PS 2.0.4].

Steam banks and riparian areas will be seeded with the approved mixes applied at the required rates [PS 2.0.2]. In addition to the state and federal requirements, Mountain Valley has committed to handplanting within the portions of the Jefferson National Forest in Virginia, select forested wetlands and perennial streams in West Virginia and Virginia, loggerhead shrike foraging and nesting habitats in Virginia, and other specific upland areas in Virginia. Restoration of the bank and riparian areas would begin following the pipeline installation and continue until the vegetation is successfully established [PS 2.0.2].

3.5 Riffles, Pools, and Riffle-Pool Complexes (All Activities)

Special attention must be paid to the restoration of any riffles, pools, and riffle-pool complexes. Where the Baseline Assessment determined that these features are present in the pre-crossing conditions, these data will be used to stabilize and/or restore the stream physical characteristics/morphology, including the pattern, profile, and dimensions, as close as practicable to the pre-crossing condition [PS 2.0.1; 2.0.3; 2.0.5; 2.0.6; 2.0.7]. This includes utilizing the pre-construction longitudinal profile to recreate riffle and pool sequences at slopes similar to those found pre-crossing data. The cross-section data collected as part of the baseline assessment will be utilized to restore dimensions in the impacted reaches.

4.0 POST-RESTORATION PROCEDURES

4.1 Post-Construction Inspection

The EIs will conduct a post-construction inspection of each completed stream and wetland crossing to verify that the resource was appropriately restored. A state-specific Resource Crossing Inspection Form (Exhibit C) has been developed to standardize the inspection process. The form is completed in stages before, during, and after construction.

During the post-construction inspection, the EI must make a number of determinations, including the following.

For trenching activities:

- All welding, coating, and construction debris was removed from the crossing site;
- The top 12 inches of stream substrate or wetland topsoil was replaced last, on top of the backfilled subsoil; and
- Permanent trench breakers were installed in accordance with the approved plans.

For all restoration activities (e.g., trenching, timber-mat removal):

- All temporary and excess fill was removed from stream, wetland, and buffer areas;
- All disturbed areas were restored to pre-construction contours, including the restoration of riffles and pools;
- Streambanks, riparian areas, and/or wetland topsoils have been properly stabilized; and
- The disturbed area has been seeded with the appropriate permanent seed mix and/or planted with bare-root saplings (as required).

Once the area has been restored and all crossings (timber mats/temporary fills) have been removed, vehicular crossings of the resources are prohibited. Spanning of the resource is acceptable, provided additional fills are not located within the jurisdictional boundaries.

4.2 Environmental Auditor Report

Within 14 days of the completion of a crossing, the Environmental Auditor will submit an independent monitoring and inspection report to Mountain Valley and the relevant state agency (WVDEP or VADEQ).

4.3 Corrective Action (If Necessary)

Any deficiencies observed by the EI and/or Environmental Auditor during the installation or restoration of the crossing or during the post-construction inspection will be documented and promptly communicated to the Construction Foreman. The EI and Construction Foreman will consult on a plan to promptly remedy the deficiency. The corrective action will be undertaken immediately, or as soon as practicable (e.g., end of authorized work hours) if circumstances (e.g., weather conditions) prevent immediate correction. If the deficiency is attributable to human error or oversight, the EI will ensure that appropriate action is taken to prevent recurrence, through field instruction, additional offsite training, or other measures deemed necessary by the EI.

4.4 Subsequent Monitoring

Subsequent topographical survey and monitoring will be completed in accordance with the Monitoring Plan.

ATTACHMENT A
List of Waters with Relevant Impairments

Table 1: List of Streams with FIll Placement for the Mountain Valley Pipeline that Have Relevant Impairments

Stream ID	Stream Name	County	USACE District	Latitude[1]	Longitude[1]	TMDL Watershed	HUC 12	HUC 12 Name	Flow Regime	Water Type[2]	Project Activity	Crossing Status[3]	Proposed/ Remaining Crossing Method	303(d)-Listed Stream	Stream Tier Classification - 303(d) List Impairment(s)[4]	Developed TMDL[2,4]
S-A1a	NORTH FORK FISHING CREEK	Wetzel	Huntington	39.553946	-80.545046	Middle Ohio North	050302010202	North Fork Fishing Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	North Fork Fishing Creek (WVO-69-O)	BIOLOGICAL *FECAL* IRON	*FECAL*
S-A6a	FALLEN TIMBER RUN	Wetzel	Huntington	39.534023	-80.540889	Middle Ohio North	050302010201	Headwaters South Fork Fishing Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Fallen Timber Run (WVO-69-N-8)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON
S-A125	PRICE RUN	Wetzel	Huntington	39.503477	-80.532902	Middle Ohio North	050302010201	Headwaters South Fork Fishing Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Price Run (WVO-69-N-9)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON
S-J51	LITTLE TENMILE CREEK	Harrison	Pittsburgh	39.398116	-80.477174	West Fork	050200020503	Little Tenmile Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Little Tenmile Creek (WVMW-13-B)	BIOLOGICAL *FECAL* IRON	*FECAL* IRON
S-A10a	LITTLE ROCKCAMP RUN	Harrison	Pittsburgh	39.370005	-80.484974	West Fork	050200020504	Outlet Tenmile Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Rock and Flume	Little Rockcamp Run (WVMW-13-F-1)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL FECAL IRON
S-B3a	ROCKCAMP RUN	Harrison	Pittsburgh	39.358871	-80.493707	West Fork	050200020504	Outlet Tenmile Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Rockcamp Run (WVMW-13-F)	BIOLOGICAL *FECAL* IRON	*FECAL* IRON
S-A128	ROCKCAMP RUN	Harrison	Pittsburgh	39.355569	-80.490100	West Fork	050200020504	Outlet Tenmile Creek	Perennial	RPW	Permanent Access Road	Installed, remains in place	Rock/Flume/ Culvert/Timber Mat	Rockcamp Run (WVMW-13-F)	BIOLOGICAL *FECAL* IRON	*FECAL* IRON
S-RR22	UNT TO GRASS RUN	Harrison	Pittsburgh	39.342166	-80.512422	West Fork	050200020502	Headwaters Tenmile Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	UNT/Gras Run RM3.6 (WVMW-13-G-7)	IRON	IRON
S-A11a	GRASS RUN	Harrison	Pittsburgh	39.335511	-80.522421	West Fork	050200020502	Headwaters Tenmile Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Grass Run (WVMW-13-G)	*FECAL* IRON	*FECAL* IRON
S-A11a-Braid-1	GRASS RUN	Harrison	Pittsburgh	39.335500	-80.522502	West Fork	050200020502	Headwaters Tenmile Creek	Intermittent	RPW	Pipeline ROW	Proposed	Open Cut	Grass Run (WVMW-13-G)	*FECAL* IRON	*FECAL* IRON
S-A11a-Braid-2	GRASS RUN	Harrison	Pittsburgh	39.335410	-80.522360	West Fork	050200020502	Headwaters Tenmile Creek	Intermittent	RPW	Pipeline ROW	Proposed	Open Cut	Grass Run (WVMW-13-G)	*FECAL* IRON	*FECAL* IRON
S-B6a	INDIAN RUN	Harrison	Pittsburgh	39.317309	-80.527175	West Fork	050200020502	Headwaters Tenmile Creek	Perennial	RPW	Temporary Access Road	Installed, remains in place	Timber Mat	Indian Run (WVMW-13-H)	*FECAL* IRON	*FECAL* IRON
S-B6a	INDIAN RUN	Harrison	Pittsburgh	39.317023	-80.526157	West Fork	050200020502	Headwaters Tenmile Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Indian Run (WVMW-13-H)	*FECAL* IRON	*FECAL* IRON
S-K73	COBURN FORK	Harrison	Pittsburgh	39.243691	-80.553966	West Fork	050200020502	Headwaters Tenmile Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Coburn Fork (WVMW-13-N)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON
S-K81	TURTLETREE FORK	Harrison	Pittsburgh	39.223263	-80.547928	West Fork	050200020502	Headwaters Tenmile Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Turtletree Fork (WVMW-13-P)	IRON	IRON
S-UU3	SALEM FORK	Harrison	Pittsburgh	39.289870	-80.517903	West Fork	050200020501	Salem Fork	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Salem Fork (WVMW-13-I)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON
S-A111	LAUREL RUN	Doddridge	Huntington	39.200749	-80.553190	Middle Ohio North	050302010403	Meathouse Fork	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Laurel Run (WVOMI-45-Q)	IRON	IRON
S-K94	KINCHELOE CREEK	Lewis	Pittsburgh	39.167831	-80.578867	West Fork	050200020302	Kincheloe Creek	Perennial	RPW	Temporary Access Road	Installed, remains in place	Timber Mat	Kincheloe Creek (WVMW-32)	*FECAL* IRON	*FECAL* IRON
S-K94	KINCHELOE CREEK	Lewis	Pittsburgh	39.167575	-80.578144	West Fork	050200020302	Kincheloe Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Kincheloe Creek (WVMW-32)	*FECAL* IRON	*FECAL* IRON
S-J43	RIGHT FORK FREEMANS CREEK	Lewis	Pittsburgh	39.120579	-80.581328	West Fork	050200020301	Freemans Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Right Fork/Freemans Creek (WVMW-36-D)	*FECAL* IRON	*FECAL* IRON
S-B67	LEFT FORK FREEMANS CREEK	Lewis	Pittsburgh	39.079556	-80.581346	West Fork	050200020301	Freemans Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Left Fork/Freemans Creek (WVMW-36-E)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON

Table 1: List of Streams with FIll Placement for the Mountain Valley Pipeline that Have Relevant Impairments

Stream ID	Stream Name	County	USACE District	Latitude[1]	Longitude[1]	TMDL Watershed	HUC 12	HUC 12 Name	Flow Regime	Water Type[2]	Project Activity	Crossing Status[3]	Proposed/ Remaining Crossing Method	303(d)-Listed Stream	Stream Tier Classification - 303(d) List Impairment(s)[4]	Developed TMDL[2,4]
S-J46	FINK CREEK	Lewis	Huntington	39.094778	-80.584826	Little Kanawha	050302030201	Fink Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Fink Creek (WVLK-75-N)	CNA-BIOLOGICAL	-
S-I63	SAND FORK	Lewis	Huntington	38.969369	-80.593138	Little Kanawha	050302030101	Headwaters Sand Fork	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Sand Fork (WVLK-86)	BIOLOGICAL IRON	IRON
S-I63	SAND FORK	Lewis	Huntington	38.969290	-80.593203	Little Kanawha	050302030101	Headwaters Sand Fork	Perennial	RPW	Permanent Access Road	Proposed	Permanent Fill	Sand Fork (WVLK-86)	BIOLOGICAL IRON	IRON
S-I63	SAND FORK	Lewis	Huntington	38.969239	-80.593244	Little Kanawha	050302030101	Headwaters Sand Fork	Perennial	RPW	Temporary Access Road	Installed, remains in place	Timber Mat	Sand Fork (WVLK-86)	BIOLOGICAL IRON	IRON
S-H160	INDIAN FORK	Lewis	Huntington	38.933179	-80.584562	Little Kanawha	050302030102	Indian Fork	Perennial	RPW	Timber Mat Crossing	Proposed	Bore[5]	Indian Fork (WVLK-86-E)	BIOLOGICAL	-
S-L76	INDIAN FORK	Lewis	Huntington	38.929761	-80.575251	Little Kanawha	050302030102	Indian Fork	Perennial	RPW	Permanent Access Road	Installed, remains in place	Timber Mat	Indian Fork (WVLK-86-E)	BIOLOGICAL	-
S-CV3	THREELICK RUN	Lewis	Huntington	38.913415	-80.571854	Little Kanawha	050302030306	Oil Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Threelick Run (WVLK-94-F)	BIOLOGICAL	-
S-H132	LITTLE KANAWHA RIVER	Braxton	Huntington	38.751499	-80.514919	Little Kanawha	050302030303	Falls Run-Little Kanawha River	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Little Kanawha River (WVLK)	BIOLOGICAL	-
S-A100	LEFT FORK HOLLY RIVER	Webster	Huntington	38.676643	-80.477940	Elk	050500070304	Outlet Holly River	Perennial	RPW	Timber Mat Crossing	Proposed	Bore[5]	Left Fork/Holly River (WVKE-98-C)	BIOLOGICAL	-
S-E67	RIGHT FORK HOLLY RIVER	Webster	Huntington	38.648021	-80.489704	Elk	050500070303	Outlet Right Fork Holly River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Right Fork/Holly River (WVKE-98-B)	BIOLOGICAL	-
S-A79	LAUREL CREEK	Webster	Huntington	38.480782	-80.554682	Elk	050500070201	Headwaters Laurel Creek	Perennial	RPW	Timber Mat Crossing	Installed, remains in place	Timber Mat	Laurel Creek (WVKE-102)	IRON-TROUT BIOLOGICAL	-
S-B29	MEADOW FORK	Webster	Huntington	38.399618	-80.597332	Elk	050500070401	Upper Birch River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Meadow Fork (WVKE-76-Y)	IRON	IRON
S-J24	UNT TO LITTLE LAUREL CREEK	Nicholas	Huntington	38.256302	-80.687350	Gauley	050500050804	Panther Creek-Gauley River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	UNT/Little Laurel Creeek RM 1.12 (WVKG-31-B)	pH	
S-J24	UNT TO LITTLE LAUREL CREEK	Nicholas	Huntington	38.256248	-80.687358	Gauley	050500050804	Panther Creek-Gauley River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	UNT/Little Laurel Creeek RM 1.12 (WVKG-31-B)	pH	
S-L22	LITTLE SEWELL CREEK	Greenbrier	Huntington	37.954035	-80.739868	Gauley	050500050604	Sewell Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Little Sewel Creek (WVKG-19-Q-1)	*FECAL* IRON	*FECAL* IRON
S-D31	INDIAN CREEK	Monroe	Huntington	37.554163	-80.710853	Upper/Middle New	050500020604	Middle Indian Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Indian Creek (WVKN-51)	*FECAL* BIOLOGICAL	*FECAL*
S-E40	DRY CREEK	Monroe	Huntington	37.451003	-80.667795	Upper/Middle New	050500020404	Rich Creek	Perennial	RPW	Temporary Access Road	Installed, remains in place	Timber Mat	Dry Creek (WVKN-61-E)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON
S-E40	DRY CREEK	Monroe	Huntington	37.450757	-80.667719	Upper/Middle New	050500020404	Rich Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Dry Creek (WVKN-61-E)	BIOLOGICAL *FECAL* IRON	BIOLOGICAL *FECAL* IRON
S-C21	BRADSHAW CREEK	Montgomery	Norfolk	37.251791	-80.258990	Upper Roanoke	030101010301	Bradshaw Creek-North Fork Roanoke River	Perennial	RPW	Timber Mat Crossing	Proposed	Bore[5]	Bradshaw Creek	*Escherichia coli* pH	*BACTERIA*
S-E28	TEELS CREEK	Franklin	Norfolk	37.089047	-79.961300	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-E28	TEELS CREEK	Franklin	Norfolk	37.085247	-79.948057	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*

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Stream ID	Stream Name	County	USACE District	Latitude[1]	Longitude[1]	TMDL Watershed	HUC 12	HUC 12 Name	Flow Regime	Water Type[2]	Project Activity	Crossing Status[3]	Proposed/ Remaining Crossing Method	303(d)-Listed Stream	Stream Tier Classification - 303(d) List Impairment(s)[4]	Developed TMDL[2,4]
S-E28	TEELS CREEK	Franklin	Norfolk	37.082875	-79.945556	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-EF12	TEELS CREEK	Franklin	Norfolk	37.073367	-79.939865	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-D23	TEELS CREEK	Franklin	Norfolk	37.070322	-79.931039	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-C14	TEELS CREEK	Franklin	Norfolk	37.063956	-79.921985	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-C17	TEELS CREEK	Franklin	Norfolk	37.058390	-79.918015	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Timber Mat Crossing	Proposed	Bore[5]	Teels Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-CD6	LITTLE CREEK	Franklin	Norfolk	37.057584	-79.913921	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Little Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-II2	LITTLE CREEK	Franklin	Norfolk	37.049219	-79.908513	Upper Roanoke	030101010601	Madcap Creek-Blackwater River	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Little Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-C19	MAGGODEE CREEK	Franklin	Norfolk	37.055147	-79.830098	Upper Roanoke	030101010601	Maggodee Creek	Perennial	RPW	Pipeline ROW	Proposed	Open Cut	Maggodee Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli*	*BACTERIA*
S-F11	BLACKWATER RIVER	Franklin	Norfolk	37.052843	-79.825711	Upper Roanoke	030101010603	Standiford Creek-Smith Mountain Lake	Perennial	TNW	Pipeline ROW	Proposed	Open Cut	Blackwater River	BENTHIC MACROINVERTEBRATE BIOASSESSMENT *Escherichia coli* *MERCURY IN FISH TISSUE* *PCBs IN FISH TISSUE*	*BACTERIA*
S-D2	JONNIKIN CREEK	Pittsylvania	Norfolk	36.965405	-79.599130	Upper Roanoke	030101011002	Tomahawk Creek-Pigg River	Perennial	RPW	Timber Mat Crossing	Proposed	Bore[5]	Jonnikin Creek	BENTHIC MACROINVERTEBRATE BIOASSESSMENT	*BACTERIA*

1 - In decimal degrees
2 - RPW = Relatively Permanent Waters
- NRPW = Non-Relatively Permanent Waters
- TNW = Traditional Navigable Waters
- TMDL = Total Maximum Daily Load
3 - Proposed - Proposed to be constructed under current request.
- Installed, remains in place - Constructed under prior authorization, remains in place.
- Completed - Constructed under prior authorization and completed. See Tables 10 and 11 in the Individual Permit Application.
4 - Only stream segments with relevant impairments are included on this table. Any other impairments or TMDLS for these segments have been included in the table for informational purposes in italicized font.
5 - Impacts associated with bores result from crossing structures used to facilitate equipment crossings.

ATTACHMENT B
West Virginia Water Quality Certification

west virginia department of environmental protection

Division of Water and Waste Management
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Harold Ward, Cabinet Secretary
dep.wv.gov

December 30, 2021

Mr. Michael Hatten
Chief, Regulatory Branch
United States Army Corps of Engineers
Huntington District
502 Eighth Street
Huntington, West Virginia 25701

Re: State §401 Water Quality Certification; LRH-2015-00592 and LRP-2015-798; Mountain Valley Pipeline, LLC; Mountain Valley Pipeline Project; Braxton, Doddridge, Fayette, Greenbrier, Harrison, Lewis, Monroe, Nicholas, Summers, Webster, and Wetzel Counties, West Virginia; WQC-21-0005

Dear Mr. Hatten:

I. Introduction and Project Background

The West Virginia Department of Environmental Protection-Division of Water and Waste Management ("WVDEP-DWWM" or "WVDEP"), in conjunction with the West Virginia Division of Natural Resources - Wildlife Resources Section ("WVDNR-WRS" or "WVDNR"), has completed its review of an application by Mountain Valley Pipeline, LLC ("MVP") for a Section 401 water quality certification. MVP submitted the application on March 4, 2021, for discharges from activities subject to the approval of the U.S. Army Corps of Engineers ("USACE" or "Corps") under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act in conjunction with the Mountain Valley Pipeline Project (the "Project").[1] WVDEP is authorized

[1] Neither the Project nor the pending Section 401 request is entirely new to WVDEP or to the Corps. The history of prior efforts to permit and certify federal licenses and permits is not repeated here but is discussed in prior opinions by the United States Fourth Circuit Court of Appeals. *See Sierra Club v. U.S. Army Corps of Eng'rs*, 981 F.3d 251, 254–56 (4th Cir. 2020) (granting stay of Huntington and Norfolk District verifications under nationwide permit 12); *Sierra Club v. U.S. Army Corps of Eng'rs*, 909 F.3d 635, 639–43 (4th Cir. 2018) (vacating prior version of Huntington District's verification); *Sierra Club v. State Water Control Bd.*, 898 F.3d 383, 384 (4th Cir. 2018) (denying petition

by state law to exercise the State's authority and responsibility under Section 401 of the Clean Water Act to certify the compliance of activities subject to federal permits and licenses with state water quality requirements. W.Va. Code §§ 22-1-6(d)(7) and 22-11-7(a).

Since the application was submitted, two things of note have occurred. First, the Environmental Protection Agency (USEPA) published notice of its intention to reconsider and revise the Section 401 rule that it issued effective September 11, 2020. *See* 86 Fed. Reg. 29541 (June 2, 2021). Second, in late October 2021, a federal court in California vacated the 2020 rule pending remand to USEPA for reconsideration of the rule, resulting in a temporary return to USEPA's prior rule.[2] As a result, USACE advised WVDEP-DWWM in late November 2021 that MVP's certification application should be reviewed under the rule in effect prior to September 11, 2020.

To avoid later confusion should the recent ruling vacating the 2020 rule be stayed or overturned, WVDEP has reviewed the application for compliance with both the 2020 rule and the rule in effect before September 11, 2020. We believe that the Project may proceed in accordance with either version of USEPA's Section 401 rule. As discussed below and in our response to public comments, the Secretary has determined both that (1) there is reasonable assurance that the activity will be conducted in a manner which does not violate water quality standards in accordance with 40 C.F.R. §121.2(a)(3) (2019) and (2) the discharges from the proposed Project will comply with water quality standards in accordance with 40 C.F.R. § 121.7(c) (2020). WVDEP has also imposed certain conditions that it deems desirable and that are set out in Attachment A to this document.

Also, to avoid confusion, the scope of MVP's application and this certification decision are limited to discharges and water quality effects associated with USACE-regulated activities. They do not extend to the discharges from upland activities associated with the Project that are regulated by the Federal Energy Regulatory Commission (FERC) under the Natural Gas Act. In 2016, MVP sought a Section 401 certification for the FERC certificate from WVDEP for Project-related activities that were not also regulated by the USACE. By letter of November 1, 2017, WVDEP provided FERC with a waiver of the requirement that MVP obtain a Section 401 certification for those FERC-regulated discharges that fall outside of the USACE's authority. Today's action is not intended to re-open that 2017 waiver decision.[3] While this certification is limited to discharges and effects from USACE-regulated activities, the determination that those activities will comply with water quality standards includes the cumulative or combined effects of contributions from upland construction activities.

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challenging Virginia §401 certification); *see also Mountain Valley Pipeline, LLC v. N. Carolina Dep't of Env't Quality*, 990 F.3d 818, 824 (4th Cir. 2021) (detailing history of the project and Southgate extension).

[2] *See In re Clean Water Act Rulemaking*, __ F.Supp.3d__, No. C 20-04636, 2021 WL 4924844 (N.D. Cal. Oct. 21, 2021).

[3] WVDEP re-stated that position earlier this year. In February 2021, MVP applied to FERC for an amendment of its certificate. By letter of May 13, 2021, FERC asked our opinion whether any further Section 401 action was required for that amendment. On July 20, 2021, we advised FERC that the modification did not create the potential for new discharges not previously considered in our 2017 waiver. We also noted that it was WVDEP's intention to conduct a Section 401 review of all potential discharges from Corps-regulated activities, thereby assuring that all aspects of the Project were subject either to the 2017 waiver issued to FERC or the separate Section 401 application submitted in 2021 for the Corps-permitted aspects of the Project.

WVDEP has imposed certain conditions to this certification that it deems desirable and that are set out in Attachment A to this document. A list of the primary documents WVDEP has reviewed as part of this decision are set out in Attachment B. WVDEP-DWWM received 406 written comments on the Section 401 application in response to public notice. In addition, a public hearing was requested, which WVDEP held on June 22, 2021. During the public hearing, 22 individuals commented on the proposed activity. Attachment C includes a summary of the substantive comments and WVDEP-DWWM's responses.

II. Project Description and Status

Mountain Valley Pipeline, LLC (MVP) proposes to complete construction of the Mountain Valley Pipeline (Project). The Project is an approximate 304-mile (197 miles of which are in West Virginia), 42-inch diameter natural gas pipeline, proposed to provide access to natural gas for use by local distribution companies, industrial users, and power generation utilities in the Mid-Atlantic and southeastern United States, as well as potentially in the Appalachian region. Construction of the Project commenced in February 2018 and is now substantially complete.

In West Virginia, the completion of the Project will involve 664 crossings of aquatic resources that result in unavoidable temporary and permanent impacts to Waters of the United States falling within the jurisdiction of the USACE, Huntington and Pittsburgh Districts. Of these, MVP plans to conduct 38 bores (including three Section 10 waters) which will cross under 57 aquatic resources using trenchless methods and, except for use of timber mats to gain access at most of the sites, will not require USACE authorization because they will not involve any discharges of dredged or fill material. Three trenchless crossings will take place on Section 10 waters and are required to comply with the requirements of this Certification. Neither temporary nor permanent fills are planned for these Section 10 waters.

The Project will result in permanent impacts to 1,276 linear feet of stream and 0.4458 acres of wetland. Permanent impacts will result from activities such as restoring the pipeline right-of-way, constructing permanent access roads, and installing culverts along these roads to maintain stream connectivity. The permanent impacts are associated with 37 stream crossings and 21 wetland crossings. The Project will result in temporary impacts to 20,868 linear feet of stream and 11.7101 acres of wetland, which includes the conversion of 1.7503 acres of wetland resources from palustrine forested ("PFO") and scrub shrub ("PSS") to palustrine emergent ("PEM"). The Project will also result in wetland resource conversion from PFO and PSS to PEM at 28 wetland crossings affecting 1.7503 acres of wetland resources. The impacts will occur within the project limits at 364 stream crossings and 211 wetland crossings. Most of the temporary impacts will result from the excavation and backfilling of the pipeline trench as the Project crosses wetlands and streams.

III. Water Quality Requirements and Regulatory Reviews

Since 1982, WVDEP-DWWM has administered the Clean Water Act National Pollutant Discharge Elimination System (NPDES) program in West Virginia pursuant to authority granted under the West Virginia Water Pollution Control Act. It has also adopted and administers, subject to USEPA review, water quality standards for the State in accordance with Section 303 of the Clean Water Act. Those standards appear at West Virginia Code of State Rules § 47-2-1, *et seq.* The standards include a list of protected water "uses" and "criteria" to protect them. Some of the criteria are numeric, most often expressed as an allowable concentration of a particular substance. WVDEP-DWWM has not established a water quality criterion for sediment or suspended solids but has issued criteria for metals that may be influenced by sediment (such as iron, manganese, and aluminum) and a criterion for turbidity, which may also be influenced by sediment. Other criteria are narrative and prohibit defined significant impacts to the aquatic ecosystem. W. Va. Code R. § 47-2-3.2.

The water quality standards also include an antidegradation policy required by the Clean Water Act. 33 U.S.C. § 1313(d)(4)(B) and 40 C.F.R. § 131.12. West Virginia's antidegradation policy is at W. Va. Code R. §47-2-4.1. WVDEP-DWWM has also adopted a procedural rule to implement its antidegradation policy. *See* W. Va. Code R. § 60-5-1, *et seq*. Under the antidegradation policy, the State's waters fall into one of three categories or "tiers" of water quality, each of which is subject to a different standard of review and protection similar to USEPA's federal antidegradation provisions. Generally speaking, those tiers of review (1) prohibit lowering of water quality in waters already "impaired," (2) prevent "significant degradation" in the majority of waters absent a detailed socio-economic analysis, and (3) in the most protected waters, allow only a "temporary lowering of water quality." W. Va. Code R. §§ 60-5-4 to -6.

For permanent fills that displace portions of waters and their corresponding "uses" altogether, WVDEP ensures compliance with water quality standards by relying on the USACE's application of the Section 404 program to prevent significant degradation to the aquatic ecosystem as a whole. A component of that program includes mitigation to compensate for the unavoidable losses. *See* W. Va. Code R. § 47-5A-3.2 (recognizing that WVDEP may require mitigation and must provide credit for mitigation that is a required component of a Section 404 permit issued by the USACE).

For discharges of dredged or fill material that do not fully displace waters—such as temporary water crossings associated with the construction of water, sewer, and gas pipelines—WVDEP is charged with evaluating the impact of the discharge on the quality of the surrounding or downstream water. For pipelines, the primary pollutant of concern with both upland construction and USACE-regulated discharges is sediment released from earth-disturbing activities. West Virginia does not, however, have a water quality criterion for sediment. Nor do WVDEP's antidegradation procedures specify how to evaluate the impacts of pipeline construction on water quality. WVDEP's antidegradation procedures were adopted primarily for traditional NPDES permits where the potential impacts on receiving waters of "point sources" with known volumes and specific concentrations of pollutants can readily be calculated. Discharges of stormwater and fill material are not clearly addressed by our procedural rule.[4] For them, consistent with Section 1.5.d of our implementation rule, we turn to USEPA for guidance.[5]

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[4] *See* WVDEP Response to Comments for further discussion of the antidegradation implementation procedures.

[5] WVDEP's antidegradation implementation rule provides that information from other "environmental processes and reviews" and from "facilities plans" "may be used to provide part or all of the requirements of the antidegradation procedure and review." W. Va. Code R. § 60-5-1.5.d.

The USEPA regulates construction stormwater under its Construction General NPDES Permit (CGP), issued originally in 1992. 57 Fed. Reg. 41176 (Sept. 9, 1992). The most recent version was issued in 2017. The USEPA's CGP does not rely on numeric effluent limits. Instead, it relies on the use of engineering controls, i.e., best management practices (BMPs), to protect water quality. *See* USEPA's 2017 Construction General Permit Fact Sheet, pp. 9-11 and 25-51.[6]

Since 2012, USEPA has satisfied federal antidegradation requirements for new discharges of construction stormwater by imposing more stringent or "enhanced" BMPs on projects that discharge to "sensitive waters" (Tier 2, Tier 3, and sediment-impaired waters). The USEPA determined that by requiring faster site stabilization and more frequent inspections than for non-sensitive waters, the CGP "will result in stormwater discharges being controlled as necessary to meet applicable water quality standards (which include state antidegradation requirements)." USEPA's 2012 Construction General Permit Fact Sheet § VIII.3.2; *see also id.* (determining that "compliance with the [CGP] generally will be sufficient to satisfy Tier 2 . . . and Tier 3 antidegradation requirements because the controls will not result in a lowering of water quality, making individualized Tier 2 or Tier 3 review unnecessary.").

The USEPA reissued its CGP in 2017. There, it reinforced that the use of engineering controls on erosion and sedimentation, coupled with increased site inspections and faster site stabilization, would "not result in a lowering of water quality" and would thereby "satisfy Tier 2 and Tier 3 antidegradation review," "making individualized Tier 2 or Tier 3 review unnecessary." USEPA 2017 Construction General Permit—Fact Sheet, § VI, Part 3.2, pp. 53-54. As a result, applicants for coverage under the CGP are not required to collect baseline water quality data and evaluate the site-specific effects of discharges. USEPA also noted that the engineering controls are "designed to prevent the mobilization of sediment and sediment-bound pollutants, such as metals and nutrients." *Id.* § II, p. 9. USEPA also noted that the permit is not static. It requires registrants to take corrective measures where USEPA or the registrant become aware the permit is not meeting its standards. *Id.* § VI, Part 3.1. p. 51.

Section 402(l)(2) of the Clean Water Act exempts the oil and gas industry from USEPA's construction stormwater program. Nevertheless, WVDEP-DWWM has chosen to impose a state general permit program with controls and processes nearly identical to USEPA's construction stormwater program on the oil and gas industry. *See* WVDEP's O&G CGP (Permit No. WV0116815—issued 2013).[7] Like the USEPA's CGP, WVDEP's General Permit relies on engineering controls and adaptive management processes to control sediment and its constituents. The General Permit "establishes minimum standards of practices (best management practices) for specific situations rather than specific effluent limitations for stormwater discharges. *** This general permit allows the meeting of water quality standards with the proper installation of the minimum standards set forth in the general permit . . . ." It requires permittees to submit for review and approval detailed stormwater pollution prevention plans and provides that the plans must be modified as necessary to include additional or modified controls to correct problems. 2013 O&G CGP, Fact Sheet, § G, p. 5.

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[6] Available at https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents.

[7] Available at https://dep.wv.gov/WWE/Programs/stormwater/ogcsw/Pages/default.aspx.

WVDEP has also issued an Erosion and Sediment Control BMP Manual (2006, *rev'd* 2016) (BMP Manual), which describes "standardized and comprehensive erosion and sediment control management practices" for use in "developing sediment control plans for the General . . . Permit for Stormwater Associated with Construction Activities." BMP Manual, p. 1-1. It also includes the use of "instream BMPs" for stream and water crossing activities and removal of water from excavation sites and sumps and notes that "WVDEP expects that the selection and implementation of appropriate BMPs will result in compliance with standards for surface water discharges from construction sites." *Id.* p. 1-3, 3.21-1 to -27 and 3.22-1 to -8. As discussed below, WVDEP has determined that the application of these programs to MVP's USACE-regulated activities will prevent any significant degradation of water quality or water uses.

IV. Review of MVP's USACE-Regulated Activities

The proposed USACE-regulated activities under Section 404 of the Clean Water Act consist of discharges of fill material into waters of the United States for site development, road crossings, and open-cut water crossings. As noted above, some of the fills will be permanent. Other activities, such as open-cut water crossings, will not permanently displace waters. Rather, they will be conducted in areas where water is diverted from the construction site ("in the dry") and will last only so long as necessary to install the pipeline, backfill the open cut, and restore the waterbody before water is returned to the area. The remaining water crossings will be accomplished with trenchless methods, which involve the use of various drilling techniques to bore and install the pipeline beneath waters. Of these trenchless crossings, the only ones directly regulated by the USACE are the three proposed under navigable rivers in West Virginia (Elk, Gauley, and Greenbrier) pursuant to Section 10 of the Rivers and Harbors Act.

A. Permanent Fills or Impacts

These impacts to streams and wetlands were evaluated utilizing the West Virginia Stream and Wetland Valuation Metric system, developed by an interagency team that included the USACE, WVDEP, and USEPA. To compensate for permanent stream and wetland impacts, as well as the conversion of some wetlands from PFO/PSS to PEM, MVP proposes to utilize mitigation bank credits or in-lieu fee credits. *See infra*, p. 8. The use of mitigation bank credits and in-lieu fee credits is identified as appropriate in the Compensatory Mitigation for Losses of Aquatic Resources Final Rule, 33 C.F.R. Part 332 (2008). *See also* West Virginia In Lieu Fee Stream and Wetland Mitigation Program Instrument (2013) (detailing joint USACE-WVDEP program). Compensatory mitigation will be required as a condition of MVP's Corps-issued permit. Pursuant to WVDEP's Section 401 certification rule, "[t]he Secretary shall provide credit for any mitigation that is a required component of the permit issued by the USACE pursuant to 33 U.S.C. 1344." W. Va. Code R. § 47-5A-3.2.a. WVDEP finds these credits are sufficient to compensate for permanent impacts to aquatic resources and thereby preserve the uses of state waters.

WVDEP has also determined that the application of the engineering controls required by WVDEP's O&G CGP and by construction plans submitted to the USACE by MVP will protect water quality from sediment related to the construction of permanent fills. Further discussion of those engineering controls and permits follows in the discussion of temporary impacts caused by water crossings and related construction.

B. Temporary Fills and Impacts

Most of the temporary impacts will consist of waterbody and wetland crossings in which MVP constructs and then backfills the pipeline trench. These construction activities are subject to extensive engineering and process controls described in the plans approved as part of MVP's O&G CGP registration, its Section 404 application to the USACE, its request for State 401 water quality certification, and a supplemental monitoring, restoration, and mitigation plan described below.

V. Engineering Controls and Best Management Practices ("BMPs")

WVDEP previously approved MVP's registration for coverage under the O&G CGP in 2017. The approved controls in MVP's O&G CGP Registration include BMPs for both upland disturbance and waterbody crossings. They include measures for restoring stream bottoms and wetlands with native material and stabilizing them to minimize sediment movement. These measures are consistent with WVDEP's BMP Manual and have proven effective to prevent scour of stream bottoms and sediment movement. MVP's Erosion and Sediment Control Plan, included as part of its O&G CGP registration, includes a narrative construction sequence and description of controls for managing water crossings, dewatering work areas, and preventing spills equipment and industrial fluids. *See* MVP Erosion and Sediment Control Plan ("ESCP"), p. 13 (Nov. 2016). The CGP also requires inspection and maintenance of engineering controls to identify and address issues as they arise. CGP § G.4.d.1.A. If existing controls do not fully control sediment or field conditions warrant, then MVP must revise its site-specific pollution prevention plans. CGP § G.4.c.

The WVDEP approved MVP's proposed controls in 2017. The WVDEP determined, after reviewing public comments, that the site-specific controls proposed by MVP included enhanced BMPs and additional controls that were functionally equivalent to the enhanced BMPs developed by USEPA for ensuring no degradation of "sensitive waters." *See* WVDEP Responsiveness Summary, Registration No. WVR310667 (Nov. 1, 2017), p. 77 (finding that compliance with the O&G CGP would satisfy Tier 2 review and that MVP's site-specific control plans "exceed USEPA required controls to satisfy Tier 3 antidegradation, are sufficient to not result in a lowering of water quality, making individualized Tier 2 or 3 review unnecessary."). Although registration approvals are subject to challenge before the West Virginia Environmental Quality Board, no challenge was filed to WVDEP's approval of MVP's application. As authorized by West Virginia Code of State Rules § 60-5-1.5.d., WVDEP relies on findings made in that review to support its determination here that both the upland and water crossing activities are covered by engineering controls that will prevent lowering of water quality from releases of sediment and its constituents (such as metals and turbidity) and thereby ensure that the individual and cumulative effects of the USACE-regulated discharges will comply with State water quality requirements.

More specifically, the Project will require temporary and permanent impacts to aquatic resources to facilitate the installation of the 42-inch diameter natural gas pipeline. The Project will result in 51 crossings of Tier 1 streams, while the remaining stream crossings will take place on Tier 2 waters. As stated above, the Project will not cross any Tier 3 waters. The WVDEP has conducted extensive water quality monitoring as part of its process to identify impaired waters for inclusion on the State's 303(d) list for TMDL development. The TMDLs consist of approved allocations of pollutant loadings that are designed to restore water quality and uses. The TMDLs authorize future construction activities like this Project, but control sediment releases by restricting the disturbed acreage allowed at any one time and/or by requiring additional erosion and sediment engineering controls.

In October 2017, MVP modified its CGP registration to include both a TMDL Watershed Analysis for the sediment-impaired streams and enhanced controls for the same sites to ensure that its activities complied with the TMDL. *See* MVP TMDL Watershed Analysis (Oct. 2017). Likewise, while MVP does not propose to cross any Tier 3 waters, it will cross some that are located upstream of Tier 3 water segments. In the fall of 2017, MVP provided WVDEP with a Tier 3 Stream Report identifying the Tier 3 waters. To protect those waters, MVP's Erosion and Sediment Control Plan committed to advanced BMPs at upstream crossings. *See* ESCP, pp. 7, 13 and Attachment 2, Table 1. WVDEP relies also on findings made in that review to support its review here.

Impaired waters to be crossed by the Project were identified in the following watersheds: West Fork, Middle Ohio North, Little Kanawha, Elk, Gauley, Lower New, Greenbrier, and Upper New. Impairments identified in Tier 1 waters included fecal coliforms, CNA biological, iron, pH and selenium. The predominant sources of both organic enrichment and fecal coliform bacteria in the Tier 1 waters subject to review are inadequately treated sewage and runoff from agricultural land uses.

In the Gauley River watershed, one proposed Tier 1 stream crossing exhibits pH impairment. Another proposed Tier 1 crossing exhibits selenium impairment. The nature of the proposed Project is not expected to contribute to water quality impairment for pH or selenium. In streams for which iron impairment was identified, sedimentation was a significant stressor and contributed to total iron. TMDLs have been developed for Tier 1 waters with iron impairment and the assessment for iron included representation and allocation of iron loadings associated with sediment. All of the stream segments identified to be crossed by the project have been assessed in accordance with West Virginia Code of State Rules § 60-5-1, *et seq.* and the proposed Project impacts were not deemed to be significant since appropriate best management practices (BMPs) are to be utilized ensuring protection from sediment entering waters

The Project's plans indicate that where permanent fill is placed in waters, there is no reasonable expectation that water quality will be degraded. The permanent fill activities proposed for the Project predominantly include the installation of culverts or box culverts for access road development and compressor stations. These types of fill activities involving the placement of structures have little to no potential to affect water quality. In some ephemeral and intermittent waters, low water access road crossings will be implemented utilizing the discharge of clean and coarse non-erodible material with 15% or less fines and properly sized to withstand expected high flows. None of the proposed permanent impacts are expected to result in water quality impairment or degradation of designated uses when complying with the conditions of this Certification.

The discharge of dredge material associated with the temporary pipeline installation crossings and the temporary and permanent discharges of fill material authorized by the USACE under its §404 authority do not have a significant potential to release pollutants. MVP proposes to conduct all of its "open cut" crossings of waters using "dry" methods. That entails construction techniques that exclude or divert water from the excavation area as MVP excavates and backfills the pipeline trench. MVP Application for Certification, p. 4 (Mar. 4, 2021). No deposits of dredged or fill material will occur in flowing or standing water when they would be susceptible to mobilization. Instead, the areas must be backfilled and stabilized before water is restored to the work area. ESCP, p. 16. There is an extensive body of literature on the effectiveness of these techniques to prevent significant mobilization of sediment into the water column and to protect aquatic life, which WVDEP has reviewed in its attached response to comments. FERC concurs. FERC previously reviewed the impacts of MVP's proposed water crossing construction techniques. *See* Final EIS Mountain Valley Project and Equitrans Expansion Project (June 23, 2017), 4-119 to -120 (citing U.S. Geological Survey study concluding that turbidity from dry cuts is minimal compared to natural runoff events); 4-136 (no long-term or significant water impacts expected based on erosion and sediment control measures, contingency plans for protecting public water supplies and karst mitigation plan).

The WVDEP expects that MVP, at temporary stream and wetland crossings where excavation is required, will comply with Certification conditions that require that the stream bed material and wetland soils be stockpiled separately from other excavated material and will be used in the restoration of the aquatic resource being crossed. The work area during excavation must remain isolated from flowing water through the use of dam and flume or dam and pump method so as to prevent any sediment from being entrained and carried downstream when appropriate BMPs are utilized. The original stream substrate and wetland hydric soils must be placed back on the surface of the ground or stream bed once the trench is backfilled and the BMPs are removed to allow free flowing water back over the wetland and stream work sites. Since this original substrate and soil that existed at the time of construction initiation is also the same material in place prior to the removal of BMPs there is little to no opportunity for any sediment that was not already exposed to flowing water to be exposed post construction, thus the potential for any water quality degradation is not considered to be significant. The WVDEP also anticipates that the temporary discharge of fill material in the form of stream diversions, culverts, and/or timber mats will not contribute to any water quality impairment so long as appropriate BMPs are utilized.

Finally, before work stopped on Project-related water crossings, MVP completed open-cut crossings of approximately 23 streams and nine wetlands in West Virginia. WVDEP inspectors evaluated Project work multiple times per week and conducted dozens of investigations. While there were several minor violations, the WVDEP's Environmental Enforcement group found no significant adverse effects at the stream crossings where MVP conducted work.

VI. Supplemental Assessment and Mitigation

In addition to the engineering controls designed to prevent degradation, MVP proposed to both the USACE and to the WVDEP a six-part plan to assess pre-construction conditions, restore temporary impact sites, react to any unplanned impacts, and to obtain supplemental migration credits. *See* MVP's Comprehensive Stream and Wetland Monitoring, Restoration, and Mitigation Framework ("Stream and Wetland Mitigation Framework").

The Stream and Wetland Mitigation Framework consolidates the Project's proposed stream and wetland monitoring restoration and mitigation measures into a comprehensive framework and outlines a systemic approach to verifying that the temporary impacts to each jurisdictional aquatic resource are appropriately restored to a comparable baseline condition. The Stream and Wetland Mitigation Framework consists of six elements: (1) additional assessment of prescribed baseline conditions at each water crossing (including geomorphic characteristics, vegetation, prescribed water quality criteria, use of USEPA's Rapid Bioassessment Protocol, and evaluation of aquatic insect population diversity); (2) a restoration work plan for restoring temporary impacts after construction; (3) performance standards consisting of measurable restoration goals that can be evaluated through post-restoration monitoring; (4) a three-year monitoring plan to evaluate attainment of restoration performance standards; (5) requirements for developing site-specific corrective actions if any restored stream or wetland is not making expected progress toward attaining the success criteria for restoration; and (6) establishment of a program for supplemental compensatory mitigation for even temporal impacts—which exceeds the requirements of USEPA and the USACE's 2008 mitigation rule. The mitigation for temporal impacts will compensate at three percent of the rate for permanent impacts for the duration of the temporary fill. Once the fills are removed, the mitigation rate will be applied for another year of stream impacts and another two years for wetlands. Impacts will be evaluated using the West Virginia Stream and Wetland Valuation Metric. The combination of the O&G CGP, enhanced erosion and sediment controls, frequent WVDEP inspections, and the Mitigation Framework will enable the USACE-regulated activities to comply with water quality standards, prevent any significant degradation of regulated waters, restore aquatic habitat in wetlands and streams, and provide additional compensatory mitigation for the temporary impacts.

The permanent discharge of fill material resulting in a loss of habitat will be mitigated through the use of the West Virginia Stream and Wetland Valuation Metric (SWVM) functional assessment tool designed to offset the functional loss of aquatic habitat. *See* W. Va. Code R. § 47-5A-6.2 (2014) and Compensatory Mitigation for Losses of Aquatic Resources, 33 C.F.R. § 332 (2008).

Permanent impacts to streams and wetlands were evaluated utilizing the West Virginia Stream and Wetland Valuation Metric (SWVM). The SWVM is a tool utilized to synthesize correlations derived from multiple established individual assessment methodologies. Information required for stream impacts includes: the extent of a proposed impact; a broad spectrum of physical, chemical and biological indicators; and other factors including temporal loss. Individual assessment methodologies utilized within the state of West Virginia and incorporated into the SWVM for streams include the USEPA Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers and the Stream Condition Index for West Virginia Wadeable Streams, as well as water quality data utilized by the WVDEP (Water Quality Data Sheet). These individual assessments are utilized together within the SWVM to interpret the physical, chemical and biological integrity of waters. The SWVM utilizes this data to generate an index score which is multiplied by the linear feet of impact to result in a unit score, which is offset through acquisition of credits via mitigation banks, in-lieu fee programs, or permittee responsible mitigation. Acquired credits offset the functions lost as a result of permanent impacts by implementing mitigation projects in the impact watershed or secondary service area watershed. To compensate for permanent stream and wetland impacts, as well as the conversion of some wetlands from "PFO"/"PSS" to "PEM," the applicant proposes to utilize mitigation bank credits and in-lieu fee credits if necessary. The use of mitigation bank credits is identified as a preferred option in the mitigation hierarchy and appropriately complies with the Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-6.2 (2014) and Compensatory Mitigation for Losses of Aquatic Resources, 33 C.F.R. § 332 (2008).

Project implementation will include the use of appropriate erosion and sedimentation control best management practices in accordance with the WVDEP O&G CGP requirements for all stream crossings and work in Waters of the United States. MVP's WVDEP O&G CGP requires implementation of BMPs throughout the entire Project that are equivalent to those required by the USEPA's Construction General Permit (CGP) for sites discharging to Tier 1 sediment impaired waters, Tiers 2 and Tier 3 waters. The use of appropriate BMPs was determined by USEPA in 2012 to ensure, "stormwater discharges being controlled as necessary to meet applicable water quality standards (which include state antidegradation requirements)." USEPA 2012 CGP Fact Sheet, § VIII.3.2.

Finally, MVP proposes three trenchless crossings of traditionally navigable waters in West Virginia. It proposes a guided conventional bore under the Elk River in Webster County, microtunneling beneath the Gauley River in Nicholas County, and a Direct Pipe crossing of the Greenbrier River in Summers County. MVP explains that these technologies are not reasonably expected to breach river bottoms, contribute to an "inadvertent return" of any drilling fluids, or otherwise result in a discharge. While WVDEP agrees with those assessments, it requires in the attached conditions that MVP adhere to its previously submitted inadvertent return plan for the three bores.

VII. Conclusion

State § 401 Certification, as required by Section 401(a)(1) of the Clean Water Act, is granted subject to the conditions contained in Attachment A. Certification shall be effective 15 days from the date of this letter. Affected parties may request a hearing in accordance with Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-7 (2014).

Sincerely,

Katheryn Emery, P.E.
Acting Director

cc: Robert J. Cooper
Mountain Valley Pipeline, LLC.
2200 Energy Drive
Canonsburg, PA 15317

US Army Corps of Engineers, Huntington District – Adam Fannin
US Army Corps of Engineers, Pittsburgh District – Tyler Bintrim
US Army Corps of Engineers, Pittsburgh District – Jared Pritts
US Environmental Protection Agency – Christine Mazzarella
US Fish and Wildlife Service – Jennifer Norris

WVDNR-Wildlife Resources Section, Elkins – Danny Bennett
WVDEP-Environmental Enforcement – John Hendley

ATTACHMENT A

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
CONDITIONS REQUIRED FOR ISSUANCE OF FEDERAL PERMITS AND LICENSES
REQUIRING STATE SECTION 401 CERTIFICATION

Applicant:	Mountain Valley Pipeline, LLC
WQC No.:	WQC-21-0005
USACE File No.:	LRH-2015-00592 and LRP-2015-798
Date:	December 30, 2021

1. To protect aquatic life and reduce turbidity and disturbance to aquatic resources the operation of equipment in-stream is to be minimized and accomplished during low flow periods when practical. Ingress and egress for equipment outside the immediate work area requires prior approval of the WVDNR Office of Land and Stream. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016) and Wildlife Resources Declaration of Policy, W.Va. Code § 20-2-4 (2017).

2. To protect the designated uses of waters of the state the permittee will investigate for the presence of water supply intakes or other activities within 1/2 mile downstream. The permittee will give notice to operators of any such water supply intakes and such other water quality dependent activities as necessary before beginning work in the watercourse in sufficient time to allow preparation for any unanticipated change in water quality. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016).

3. To protect aquatic resources from unauthorized discharge of pollutants, storage and refueling areas shall not be located within any surface waterbody. All Project-related spills which are likely to impact water or wetlands shall be promptly reported to the State Center for Pollution, Toxic Chemical and Oil Spills, 1-800-642-3074. This condition is required accords with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016) and West Virginia Water Pollution Control Act, W.Va. Code § 22-11-8 (2014).

4. To reduce sedimentation of aquatic resources and increased turbidity it is required that upon completion of in-stream operations, all disturbances below the ordinary high-water mark will be properly stabilized as soon as practicable following completion of the crossing to prevent soil erosion. Where possible, stabilization shall incorporate revegetation using bioengineering as an alternative to riprap. If riprap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created due to its placement. Fill is to be clean, nonhazardous and of such composition that it will not adversely affect the biological, chemical or physical properties of the receiving waters. Unsuitable materials include but are not limited to: copper chromium arsenate (CCA) and creosote treated lumber, car bodies, tires, large household appliances, construction debris, and asphalt. To reduce potential slope failure and/or erosion behind the material, fill containing concrete must be of such weight and size that promotes stability during expected high flows. Loose

large slab placement of concrete sections from demolition projects greater than thirty-six inches in its longest dimension and tires are prohibited. Rebar or wire in concrete should not extend further than one (1) inch. All activities require the use of clean and coarse non-erodible materials with 15% or less of like fines that are properly sized to withstand expected high flows. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016) and the West Virginia Water Pollution Control Act, W.Va. Code § 22-11-8 (2014).

5. To protect aquatic resources from unpermitted discharges consistent with the requirements of the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-4(a)(16) (2014) and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq.* (2016), concrete shall not be permitted to enter the watercourse unless contained by tightly sealed forms or cells. Concrete handling equipment shall not discharge waste washwater into wetlands or watercourses at any time without adequate wastewater treatment as approved by the WV DEP.

6. To protect stream stability and avoid unnecessary degradation of aquatic resources, the Project Proponent should avoid removal of riparian vegetation to the greatest extent possible. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016).

7. Spoil materials from the watercourse or onshore operations, including sludge deposits, will not be dumped in the watercourse, or deposited in wetlands or other areas where the deposit may adversely affect the surface or ground waters of the State consistent with the requirements set forth in the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-4(a)(16) (2014).

8. To protect the water quality of aquatic resources runoff from any storage areas or spills will not be allowed to enter storm sewers without acceptable removal of solids, oils and toxic compounds. Discharges from retention/detention ponds must comply with permit requirements of the National Pollutant Discharge Elimination System permit program of the WVDEP DWWM. This condition is required in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-4(a)(16) (2014) and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016).

9. To protect the integrity of aquatic resources the discharge of untreated sewage temporary sanitary facilities, for use during construction only, will be of a type approved by the County Health Department in which the activity is taking place in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-4(a)(16) (2014) and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016).

10. To ensure that certified activities comply with the requirements of the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-4 (2014) and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016), the permittee will provide written notice (which includes email) of the proposed start-up date to the WVDEP-Environmental Enforcement (EE), fifteen days in advance of initiation of any activity authorized by the certification. The address for EE is 601 57th Street SE, Charleston, West Virginia 25304.

11. To protect the public health, safety and the environment from the effects of the improper, inadequate or unsound management of hazardous wastes, permittees are required to advise the WVDEP DWWM (Hazardous Waste Section), telephone 304-926-0495, should potentially hazardous waste materials be located prior to disturbance of material. This condition is required in accordance with the Hazardous Waste Management Act, W.Va. Code § 22-18-2(b) (2011).

12. To ensure compliance with applicable water quality requirements the permittee shall make the construction contractor(s) aware of conditions of the State §401 Water Quality Certification and any other state permit issued in accordance with the West Virginia Water Pollution Control Act, W.Va. Code § 22-11-4 (2014). A copy of the State 401 Certification shall be available at the project site until the project is complete.

13. To protect mussel populations in accordance with state and federal requirements, should native freshwater mussels be encountered during construction, all activity reasonably expected to jeopardize the population is to cease immediately and the WVDNR Wildlife Resources Section, Wildlife Diversity Program is to be contacted (304-637-0245) to determine significance of the mussel population and the action to be taken. This condition is required in accordance with; Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-3.1 (2014), Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, et seq. (2016), Possession of Wildlife, W. Va. Code § 20-2-4 (2017) and Fishing Regulations W. Va. Code R. § 58-60-5.11 (2020).

14. For permanent installation of pipe, box, and arched culvert crossings the inlet/outlets must be designed in such a manner as to maintain substrate in the bottom of the culvert (culverts installed in bedrock or with a stream gradient of 4% or greater do not need to be countersunk). Countersinking the culvert to the sub-pavement of the streambed, backwatering or the use of a bottomless culvert will generally fulfill this requirement. This condition is required to ensure the protection of the chemical, physical and biological integrity of the aquatic resource in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-8 (2014), Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, et seq. (2008), and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, et seq. (2016).

15. To ensure that work is conducted in accordance with the terms and conditions of this §401 WQC, representatives from WVDEP-DWWM and WVDNR-WRS will be allowed to inspect the authorized activity at any time deemed necessary in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-4(c) (2014).

16. WVDEP-DWWM is to be informed within two business days of the applicant's knowledge of any slips that have impacted a stream and/or wetland. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq*. (2016) and Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq*. (2008).

17. To protect water quality and the designated uses of waters within the vicinity of this project, MVP must adhere to the Inadvertent Return Plan provided to the WVDEP-DWWM with the §401 WQC application when conducting any bore crossing of a Section 10 river. This

condition is required to ensure the protection of the chemical, physical and biological integrity of the aquatic resource in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-8 (2014), Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq.* (2008), and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq.* (2016).

18. To prevent permanent impacts to aquatic resources associated with equipment tracking in wetlands, the use of protective mats is required. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq.* (2016) and Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq.* (2008).

19. To protect water quality and the designated uses of waters within the vicinity of this project, MVP must adhere to the Karst Mitigation Plan provided to the WVDEP-DWWM with the §401 WQC application. This condition is required in accordance with W. Va. Code R. § 47-2-1 *et seq.* (2016) and the Groundwater Protection Regulations, W. Va. Code R. § 47-58 (1994).

20. To protect the integrity of aquatic resources dredging for backfill material is not allowed in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq.* (2016) and Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq.* (2008).

21. Submarine pipeline stream crossings must be designed and constructed to prevent flotation and the possibility of leakage or rupture and the top of pipelines must be buried a minimum of three (3) feet below the stream bottom in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-8 (2014), Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq.* (2008), and Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq.* (2016).

22. To prevent erosion of stream banks at Right of Way (ROW) crossings all waterbody banks are to be returned as close as practicable to preconstruction contours in accordance with the Restoration Plan and Stream and Wetland Mitigation Framework. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq.* (2016) and Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq.* (2008).

23. To ensure water contact recreation (Category C) uses are protected, where it is apparent that small boats, inner tubes, swimmers, etc. could be using the stream in the work area, easily seen warning signs must be placed approximately 50 feet upstream and downstream of the stream crossings construction site to advise stream users of the potential danger. Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-6.4 (2016)

24. To maintain the biological integrity of the state's fisheries a spawning waiver is required for in-stream work in designated warm water streams and their adjacent tributaries during the fish spawning season of April 1 to June 30 and for trout waters and their adjacent tributaries during the trout water fish spawning season of September 15 to March 31. Fish spawning waivers must be requested from the West Virginia Division of Natural Resources

Coordination Unit. In-stream work may occur during the respective spawning season in ephemeral waters without a waiver if all reasonable measures are taken to minimize turbidity and sedimentation downstream associated with the proposed project. This condition is required in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016) and Wildlife Resources Declaration of Policy, W. Va. Code § 20-2-4 (2017).

25. Temporary impacts associated with stream and wetland crossings are to be monitored for a minimum period of 3 years. MVP will adhere to the monitoring procedures, adaptive management procedures, reporting and mitigation requirements set forth in the Stream and Wetland Mitigation Framework. If adaptive management procedures are proposed, then MVP shall submit them to the WVDEP for review. These conditions are imposed to ensure that temporary stream and wetland crossings have no significant adverse impact to aquatic resources and are imposed under the authority of the Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016) and Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq*. (2008).

26. The Stream and Wetland Mitigation Framework shall be followed. The Stream and Wetland Mitigation Framework provides supplemental assurance of compliance with water quality standards. This Condition is imposed pursuant to Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016) and Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq*. (2008).

27. To compensate for the loss of aquatic functions associated with the conversion of PFO and PSS wetland resources to PEM, MVP is to provide evidence of SWVM credit purchase from an approved mitigation bank or in-lieu fee program to WVDEP-DWWM. Wetland conversion impacts from the proposed activity will require the purchase of 1.7503 SWVM wetland credits from a mitigation bank or 3.5006 SWVM wetland credits from an in-lieu fee program or a combination of credits from a mitigation bank or in-lieu fee program. Based on future review of reports required by the Stream and Wetland Mitigation Framework, additional restoration and/or mitigation may be required. This condition is required in accordance with the West Virginia Water Pollution Control Act, W.Va. Code § 22-11-1, et seq. (2014), Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq*. (2008), Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016), Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-6.2 (2014), and Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 33 C.F.R. § 332 (2008).

28. Only open bottom box culverts or solid box culverts, which are countersunk to maintain substrate in the bottom, are to be used for permanent access roads that cross trout streams. This condition is required in accordance with the Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-3.1 (2014), Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-1, *et seq*. (2016), Possession of Wildlife, W. Va. Code R. § 20-2-4 (2017) and Fishing Regulations W. Va. Code R. § 58-60-5.11 (2020).

29. To prevent unnecessary impact of aquatic resources at points of ingress and egress, equipment is to disturb aquatic resources no more than is necessary to accommodate proper

construction and operation in accordance with Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3.2 (2016).

30. To ensure the permanent impacts to aquatic resources are mitigated, MVP is to provide evidence of SWVM credit purchase from an approved mitigation bank or in-lieu fee program to WVDEP-DWWM. A total of 759 SWVM stream credits are required if purchased from a mitigation bank. Permanent wetland impacts from the proposed activity will require the purchase of 0.4458 SWVM wetland credits from a mitigation bank or 1.0080 SWVM wetland credits from an in-lieu fee program. This condition is required in accordance with; Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq*. (2008), Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016), WV Water Pollution Control Act, W.Va. Code § 22-11-1, *et seq*. (2014), Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-6.2 (2014), and Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 33 C.F.R. § 332 (2008).

31. To ensure the temporary impacts to aquatic resources are mitigated in accordance with state water quality requirements and the Stream and Wetland Mitigation Framework, MVP is to provide evidence of SWVM credit purchase from an approved mitigation bank or in-lieu fee program to WVDEP-DWWM. A total of 480.58 SWVM stream credits are required if purchased from a mitigation bank. For temporary wetland impacts a total of 0.876 SWVM wetland credits are required if purchased from a mitigation bank. Based on future review of monitoring reports, provided in accordance with the Stream and Wetland Mitigation Framework, additional restoration and/or mitigation may be required for temporary impacts to aquatic resources. This condition is required in accordance with the West Virginia Water Pollution Control Act, W. Va. Code § 22-11-1, *et seq*. (2014), Antidegradation Implementation Procedures, W. Va. Code R. § 60-5-1, *et seq*. (2008), Requirements Governing Water Quality Standards, W. Va. Code R. § 47-2-3 (2016), Rules for Individual State Certification of Activities Requiring a Federal Permit, W. Va. Code R. § 47-5A-6.2 (2014), and Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, 33 C.F.R. § 332 (2008).

ATTACHMENT B

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Reid, S.M., and Anderson, P.G. 1999. Effects of sediment released during open-cut pipeline water crossings. Can. Water Resour. J. 24: 235–251.

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ATTACHMENT C
Virginia Upland Water Quality Certification

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

December 8, 2017

Certified Mail

John Centofanti
Corporate Director, Environmental Affairs
Mountain Valley Pipeline, LLC
EQT Plaza, Suite 1700
625 Liberty Avenue
Pittsburgh, PA 15222-3111

Re: Issuance 401 Water Quality Certification
No. 17-001

Dear Mr. Centofanti:

Enclosed is Section 401 Water Quality Certification No. 17-001 issued to Mountain Valley Pipeline, LLC (MVP) on December 8, 2017.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty days from date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court with the Director, Department of Environmental Quality. In the event that this decision is served on you by mail, three days are added to that period.

Alternatively, any owner aggrieved by any action of the State Water Control Board taken without a formal hearing, or by inaction of the Board, may petition in writing for a formal hearing of such owner's grievance, provided a petition requesting such hearing is filed with the Board. Said petition must meet the requirements set forth in 9VAC25-230-130 (Procedural Rule No. 1 – Petition for formal hearing). In cases involving actions of the Board, such petition must be filed within thirty days after notice of such action is mailed to such owner by certified mail.

If you have any questions about this Certification, please contact me at (804) 698-4038 or Melanie.Davenport@deq.virginia.gov.

Sincerely,

Melanie D. Davenport

Melanie D. Davenport, Director
Water Permitting Division

Enclosure 401 Certification No, 17-001

CERTIFICATION No. 17-001

401 Water Quality Certification Issued To

Mountain Valley Pipeline, LLC
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

Pursuant to Guidance Memo No. GM17-2003
Interstate Natural Gas Infrastructure Projects -
Procedures for Evaluating and Developing Additional Conditions for Section 401 Water Quality Certification Pursuant to 33 USC § 1341 ("401" Certification)

I. CERTIFICATION

The State Water Control Board finds that, subject to the additional conditions set out in Section V below, there is reasonable assurance that the Mountain Valley Pipeline, LLC activities covered by this Certification will be conducted in a manner that will not violate applicable Water Quality Standards in 9 VAC 25-260-5, *et seq.*, and will comply with the applicable provisions of 33 U.S.C. §§ 1311, 1312, 1313, 1316, and 1317.

II. DEFINITIONS

The following terms as used in this Certification shall have the following meaning:

"Annual Standards and Specifications" means the program for linear utility projects implementing the requirements of the Stormwater Management Act (Va. Code § 62.1-44.15:24, *et seq.*) and Erosion and Sediment Control Law (Va. Code § 62.1-44.15:51, *et seq.*).

"Board" means State Water Control Board.

"Certification" means Clean Water Act Section 401 Water Quality Certification developed in accordance with Guidance Memo No. GM17-2003, Interstate Natural Gas Infrastructure Projects – Procedures for Evaluating and Developing Additional Conditions for Section 401 Water Quality Certification Pursuant to 33 USC § 1341 ("401" Certification).

"Construction material or waste material" means solid waste as defined in the Solid Waste Management Regulations (9 VAC 20-81-95).

"Corps" means U.S. Army Corps of Engineers.

"Department" means the Virginia Department of Environmental Quality.

"Environmental Impact Statement" or "EIS" means the Final Environmental Impact Statement (FEIS) issued by FERC on June 23, 2017.

"FERC" means the Federal Energy Regulatory Commission.

"Guidance" means Guidance Memo No. GM17-2003, Interstate Natural Gas Infrastructure Projects - Procedures for Evaluating and Developing Additional Conditions for Section 401 Water Quality Certification Pursuant to 33 USC § 1341 ("401" Certification) dated May 19, 2017.

"Karst feature" means any sinkhole, sinkhole lineament, cave, cavern, swallet, spring, or similar feature found in an area identified as an area of karst geology characterized by the presence of soluble bedrock such as limestone, dolomite, marble or gypsum. Karst features shall include all such features identified in Appendix L of the EIS and any subsequently identified features in areas of karst geology.

"Owner" means Mountain Valley Pipeline, LLC (MVP) a joint venture between EQT Midstream Partners, LP and affiliates of NextEra US Gas Assets, LLC; Con Edison Gas Midstream, LLC; WGL Midstream; and RGC Midstream, LLC.

"Project" means the Virginia portion of a pipeline project approximately 303 miles in length and 42-inches in diameter to transport up to 2.0 MMDth/d of natural gas from an interconnect point in Wetzel County, West Virginia, to an interconnect with an existing pipeline in Pittsylvania County, Virginia including approximately 106 miles of pipeline, 58 miles of Project access roads, and appurtenances which will be located within Virginia and traverse portions of Giles County, Craig County, Montgomery County, Roanoke County, Franklin County and Pittsylvania County. The 401 Water Quality Certification applies to the location of pipeline right of way, access roads, and appurtenances as described in the EIS and any changes thereto subsequently approved by FERC.

"Riparian buffer" means a vegetated area near a stream, usually forested, which helps shade and partially protect a stream from the impact of adjacent land uses.

III. SCOPE OF CERTIFICATION

This Certification addresses Project activities in upland areas outside of the Corps jurisdictional areas under 33 U.S.C. § 1344 and water withdrawal activities that are exempt from coverage under the Virginia Water Protection Permit Program Regulation (9 VAC 25-210-10, *et seq.*). In the manner and to the extent described herein, this includes all proposed upland activities associated with the construction, operation, maintenance, and repair of the pipeline, any components thereof or appurtenances thereto, and related access roads and rights-of-way as well as certain project-related surface water withdrawals. This Certification covers all relevant upland Project activities within the route identified in the Environmental Impact Statement.

As this Certification and the conditions contained in Section V are intended to address Project activities that are outside the jurisdictional scope of the Virginia Water Protection Permit Program Regulation, this Certification shall not be interpreted as limiting or otherwise relieving the Owner of any conditions for any portion of the Project that are imposed pursuant to the Virginia Water Protection Permit Program Regulation, to any permit issued by the Corps or Virginia Marine Resources Commission in response to the February 26, 2016 joint permit application, or to any other separate state or federal permit, license, or approval required for the Project.

In addition, this Certification operates in conjunction with other regulatory actions including: (a) regulations adopted for land disturbing activities pursuant to the Stormwater Management Act (Va. Code § 62.1-44.15:24, *et seq.*) and Erosion and Sediment Control Law (Va. Code § 62.1-44.15:51, *et seq.*); and, (b) all requirements of the Annual Standards and Specifications applicable to the Project approved by the Department on June 20, 2017. These completed regulatory actions remain in full force and effect, and this Certification shall not be interpreted as limiting, modifying, or otherwise relieving the Owner of any conditions imposed pursuant thereto.

Pursuant to 33 U.S.C. § 1341 (a)(3), the Board reserves the right to impose further conditions if any existing plans and/or mitigation measures are amended by the Owner and/or FERC that may materially reduce the water quality protection provided thereunder.

IV. INFORMATION EXAMINED

In developing this Certification and the additional conditions imposed herein, the Board and Department have considered the record relevant to water quality considerations associated with the Project, including but not limited to:

1. All applicable FERC documents, including Draft and Final Environmental Impact Statements issued by FERC and the associated docket materials including all Appendices, and the FERC order granting a Certificate of Public Convenience and Necessity (Certificate) on October 13, 2017;
2. The Department's initial Request for Information (RFI) dated May 19, 2017 in accordance with the Guidance, the Department's subsequent June 15, 2017 RFI

and the Owner's June 1, 2017, and June 22, 2017 responses including but not limited to requested supplemental responses dated August 8, 2017, October 27, 2017, and November 2 and 6, 2017;

3. Proceedings of the multi-agency technical work session held June 6-7, 2017 (Lexington, Virginia);
4. Documents submitted for approval by the Department pursuant to requirements of the Stormwater Management Act (Va. Code § 62.1-44.15:24, *et seq.*) and Erosion and Sediment Control Law (Va. Code § 62.1-44.15:51, *et seq.*);
5. Corps Nationwide Permit 12 and Norfolk District Regional Conditions;
6. Guidance Memo No. GM17-2003, Interstate Natural Gas Infrastructure Projects-Procedures for Evaluating and Developing Additional Conditions for Section 401 Water Quality Certification Pursuant to 33 USC § 1341 ("401" Certification); and,
7. Public comments submitted during the public comment period, including both written (electronic or paper copy) and oral comments provided during the August 8 and 9, 2017 public hearings.

V. CONDITIONS

In consideration of the recommendations of the Department, the Board finds that there are additional reasonable and prudent conditions that will provide the Commonwealth with an increased degree of assurance that upland Project activities which may result in a discharge to surface waters will be conducted in a manner that will not violate applicable water quality standards. This Certification is only valid provided the Owner complies with the following conditions, limitations, and/or requirements:

1. The Owner shall follow the measures detailed in its June 1, 2017 and June 22, 2017 responses to the Department's May 19, 2017 and June 15, 2017 Requests for Information including but not limited to requested supplemental responses dated August 8, 2017, October 27, 2017, and November 2 and 6, 2017.

2. Riparian Buffer Requirements

   a. Removal of riparian buffers not directly associated with the Project's construction activities is prohibited. Disturbance and removal of riparian buffers from Project-related upland land disturbing activities that would occur within 50 feet of any perennial, intermittent, or ephemeral surface waters shall be avoided where possible, and minimized to the maximum extent practicable if 50 feet is not possible. The Owner shall notify the Department of any and all instances in which it believes 50 feet is not possible and shall proceed only where the Department concurs with the Owner's use of less than 50 feet of buffer. Removal of riparian buffers not associated with crossings shall not be allowed where stream bank stability under normal flow conditions would be compromised.

b. The construction limit of disturbance (LOD) in upland areas approaching waterbody and wetland crossings shall be reduced from 125 feet to 75 feet wide and shall apply 50 feet from each side of the stream or wetland crossing to minimize the extent of riparian buffer disturbance. For any upland area approaching a waterbody or wetland crossing where this reduced LOD is not possible, notification of FERC approval (and Corps approval, if required) shall be provided to the Department prior to initiating land disturbing activity in that area.

c. No refueling, hazardous materials storage, equipment maintenance, or equipment parking will take place within 100-feet of the waterbody or wetland crossing, except as allowed by the approved Annual Standards and Specifications.

3. Karst Terrain Requirements

a. An addendum to the Karst Hazard Assessment (February 2017), and any subsequent revisions or addenda to the same approved by FERC, will be provided to the Department upon completion of field survey activities and final pipeline alignments, and prior to land disturbing activities, that address those properties in Virginia where the Owner could not previously conduct karst surveys due to land access restrictions.

b. The Owner shall follow the measures as detailed in the Karst Mitigation Plan (March 2017), and any subsequent revisions or addenda to the same approved by FERC.

c. To further evaluate flow paths for karst features in the vicinity of the project, the Owner shall develop a Supplemental Karst Evaluation Plan to be submitted to the Department for review and concurrence prior to initiation of land disturbing activities in karst terrain. The Department, with assistance from the Virginia Department of Conservation and Recreation (DCR) identified areas of concern in Attachment B of the Department's June 15, 2017 request letter. The Owner will conduct contingency planning in accordance with the findings and conclusions of the Supplemental Plan, as appropriate, in order to monitor and mitigate a potential accidental release or spill during construction in Virginia's karst terrain.

d. The Owner shall: (1) conduct a survey to identify wells, cisterns, springs, and other surface waters within 1,000 feet of the project centerline in areas known to have karst topography; and, (2) conduct one water quality sampling event to evaluate wells and springs used for human consumption and located between 500 feet to 1000 feet from the project centerline. The sampling shall include the parameters identified in the Water Resources Identification and Testing Plan (February 2017), and any subsequent revisions or addenda to the same approved by FERC. The survey and/or water quality sampling event shall be conducted by the Owner at the request of a property owner and only if the property owner provides permission for access. This survey and/or water quality sampling event shall be conducted before the pipeline is placed into operation. The Owner must complete any survey and water quality evaluation requests received at least 30 days prior to placing the project in service.

e. The Owner shall provide a financial responsibility demonstration to the Department in the amount of five million dollars ($5,000,000), to support the Complaint Resolution Process contained in the Water Resources Identification and Testing Plan (February 2017) in the event a private water supply used for human consumption is impacted from project construction activities.

   This demonstration requirement may be satisfied by any of the financial assurance mechanisms that are set forth in 9 VAC 25-650-90 through 9 VAC 25-650-130. The mechanism or combination of mechanisms shall not be accessible by third parties and shall be used by the Department to implement the Water Resources Identification and Testing Plan when necessary due to the Owner's failure to do the same.

   The mechanism or combination of mechanisms shall be submitted to the Department for review and approval and must contain such wording and terms as specified by the Department to satisfy this condition.

   The demonstration, having been approved by the Department, shall be made available prior to initiation of land disturbing activities in karst terrain and shall be maintained until 180 days after all land disturbing activity associated with the construction of the pipeline, and related access roads and rights-of-way have achieved final stabilization as required by the Erosion and Sediment Control Law (Va. Code § 62.1-44.15:51, *et seq.*). The Department will notify the Owner when the conditions to release the financial demonstration have been met.

4. Surface Water Withdrawals

   a. Any surface water withdrawals for the purposes of hydrostatic testing shall not violate applicable Water Quality Standards and shall be managed so that no more than 10% of the instantaneous flow rate from the channel is removed; the intake screens shall be designed so that screen openings are not larger than 1 millimeter and the screen face intake velocities are not greater than 0.25 feet per second.

   b. Any surface water withdrawals for the purposes of horizontal directional drilling or dust control that do not exceed 10,000 gallons per day from non-tidal waters or two million gallons per day from tidal waters shall not violate applicable Water Quality Standards and shall be managed so that no more than 10% of the instantaneous flow rate from the channel is removed and the intake screens shall be designed so that screen openings are not larger than 1 millimeter and the screen face intake velocities are not greater than 0.25 feet per second.

   c. Daily withdrawals from horizontal directional drilling or dust control activities that exceed 10,000 gallons per day from non-tidal waters and two million gallons per day from tidal waters must comply with the requirements of the Virginia Water Protection Permit Program Regulation. The Owner shall record and track the daily volumes of water withdrawn for horizontal directional drilling or dust control activities and make such records available during inspection or upon request by the Department.

d. Hydrostatic test water shall be released to upland areas through energy dissipating dewatering devices. The energy dissipating dewatering devices must be sized to accommodate the rate and volume of release and be monitored and regulated to prevent erosion and over pumping of the energy dissipating dewatering devices. There shall be no direct point source discharge or intentional indirect discharge of hydrostatic test water to surface waters. The upland discharge of hydrostatic test waters shall be monitored in accordance with the General Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation for Discharges from Petroleum Contaminated Sites, Groundwater Remediation and Hydrostatic Tests (9 VAC 25-120-10, *et seq.*) ("VPDES General Permit"). The Owner shall record and track the daily volumes of water withdrawn for hydrostatic testing activities and make such records available during inspection or upon request by the Department. In the event of an inadvertent indirect discharge to surface waters, the Owner shall be responsible for ensuring that such discharge complies with all requirements of the VPDES General Permit, including the requirement to notify the Department within 14 days.

5. The Owner shall implement water quality monitoring in accordance with the Upland Construction Water Quality Monitoring Plan (May 31, 2017, revised June 19, 2017).

6. The Owner shall implement the measures identified in the Spill Prevention, Control, and Countermeasure (SPCC) Plan (submitted with the June 1, 2017 response to the Department and additional information submitted June 22, 2017), and any subsequent revisions or addenda to the same approved by FERC.

7. All construction and installation associated with the Project, except as permitted by the Corps, shall be accomplished in such a manner that construction material or waste material shall not be placed into any perennial, intermittent, or ephemeral surface waters or karst features.

8. The Owner shall implement the measures intended to minimize the potential for discharges of soil or rock as detailed in the General Blasting Plan (February 2017) and the Landslide Mitigation Plan Revision 4 (February 2017), and any subsequent revisions or addenda to the same approved by FERC. The Owner shall notify the Department immediately, but no later than 24 hours after discovery, if blasting or landslide activity results in unpermitted discharges of soil or rock to any perennial, intermittent, or ephemeral surface waters. Any potential impacts to karst features will be addressed in accordance with the Karst Mitigation Plan.

9. The Owner shall follow the measures intended to minimize the potential for impacts as detailed in the Acid Forming Materials Mitigation Plan (May 2017), and any subsequent revisions or addenda to the same approved by FERC.

10. The Project, including all relevant records, is subject to inspection at reasonable hours and intervals by the Department or any authorized representative of the Department to determine compliance with this Certification.

11. The Owner shall provide the Department with written or electronic notification at least 10 business days prior to any planned Construction Spread pre-construction conferences.

12. The Owner shall immediately notify the Department of any modification of this Project and shall demonstrate in a written statement that said modifications will not violate any conditions listed in this Certification. If such demonstration cannot be made, the Owner shall apply for a modification of this Certification.

13. The Owner shall comply with the requirements of the Stormwater Management Act (Va. Code § 62.1-44.15:24, *et seq.*) and Erosion and Sediment Control Law (Va. Code § 62.1-44.15:51, *et seq.*) and the Virginia Water Protection Permit Program Regulations (9 VAC 25-210-10, *et seq.*). The enforceability under this Certification is in addition to the independent enforcement authority of each individual program and/or permit.

14. This Certification is subject to revocation for failure to comply with the above conditions after a proper hearing. Any unpermitted or unauthorized direct or indirect discharge to State waters shall be subject to enforcement under the State Water Control Law.

15. The terms and conditions of this Certification shall remain in effect until 180 days after all land disturbing activity associated with the construction, operation, maintenance, and repair of the pipeline, and related access roads and rights-of-way have achieved final stabilization as required by the Erosion and Sediment Control Law (Va. Code § 62.1-44.15:51, *et seq.*).

16. This Certification is binding on the Owner and any successors in interest, designees and assigns, jointly and severally.

VI. CONCLUSION

The additional conditions contained in Section V of this Certification along with the requirements imposed by the VWP regulation, the Corps Section 404 permitting requirements, and prior regulatory actions associated with the approval and requirements of the June 2017 Annual Standards and Specifications, and the April 7, 2017 Section 401 Water Quality Certification of the Corps Nationwide Permit 12 provide reasonable assurance that water quality standards will not be violated. The conditions included in this Certification for upland areas are in addition to any other federal or state permit or regulatory requirements with which the Project must comply, including federal resource agency requirements embodied in the FERC certificate.

This Certification constitutes the Commonwealth's final decision on the upland activities associated with the construction, operation, maintenance, and repair of the Project under the requirement of Clean Water Act § 401. The provisions of this Certification are severable and should any provision(s) of this Certification be declared invalid or unenforceable, the remainder of the Certification, including without limitation any additional conditions imposed hereunder, shall continue in full force and effect. The Commonwealth reserves its right to review this certification decision and take any appropriate action in accordance with 33 U.S.C. § 1341(a)(3). This Certification applies solely to upland activities authorized by FERC and shall not waive or otherwise impair or affect the authority of the Board to require additional certification under state or federal law.

By: Melanie D. Davenport Date: December 8, 2017

ATTACHMENT D
Virginia Water Protection Permit

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
P.O. Box 1105, Richmond, Virginia 23218
(800) 592-5482 FAX (804) 698-4178
www.deq.virginia.gov

Ann F. Jennings
Secretary of Natural and Historic Resources

David K. Paylor
Director
(804) 698-4000

December 20, 2021

Mr. Vincent Pero
U.S. Army Corps of Engineers
Norfolk District
Western Virginia Regulatory Section
Charlottesville Field Office
920 Gardens Boulevard, Suite 103-B
Charlottesville, Virginia 22901

SENT VIA E-MAIL: Vincent.D.Pero@usace.army.mil
RECEIPT CONFIRMATION REQUESTED

Re: Virginia Water Protection (VWP) Individual Permit No. 21-0416
Mountain Valley Pipeline Project - Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties, Virginia
Final VWP Individual Permit and Section 401 Water Quality Certification

Dear Mr. Pero:

Pursuant to § 62.1-44.15:21 J of the Code of Virginia, an individual Virginia Water Protection Permit shall be required for impacts to state waters for the construction of any natural gas transmission pipeline greater than 36 inches inside diameter pursuant to a certificate of public convenience and necessity under § 7c of the federal Natural Gas Act (15 U.S.C. § 717f(c)). Pursuant to the Virginia Water Protection (VWP) Permit Program Regulation 9VAC25-210 of the Virginia Administrative Code and § 401 of the Clean Water Act (33 U.S.C. § 1341), the Virginia Department of Environmental Quality (DEQ) is providing the enclosed VWP individual permit for the above-referenced project, including all conditions deemed necessary or desirable with respect to the authorized activities or discharges. This VWP Individual Permit issued by DEQ, as the certifying agency, provides Section 401 Water Quality Certification for any Section 404 permit that may be issued for the above-referenced project.

The name and address of the applicant/permittee is as follows:

Mr. Robert J. Cooper
Mountain Valley Pipeline, LLC
2200 Energy Drive
Canonsburg, PA 15317
rcooper@equitransmidstream.com

DEQ, as the certifying agency, has examined the Joint Permit Application assigned Number 21-0416, as made by the applicant to the licensing or permitting agency and bases its certification upon an evaluation of the information contained and described in (i) the Joint Permit Application dated February 19, 2021, received on March 1, 2021; (ii) all supplemental application materials, revisions and clarifications received through August 17, 2021; (iii) the recommendations and comments from Virginia Department of Conservation and Recreation and Virginia Department of Wildlife Resources; (iv) the sediment and erosion control plans; (v) the federal Environmental Impact Statements (EIS); (vi) the GIS-based Project alignment plan and profile drawings through surface waters; (vii) the Mitigation Framework; and (viii) the public comments received between August 28, 2021 and October 27, 2021, as each of these was considered to be relevant to water quality considerations.

In compliance with § 401 of the Clean Water Act (33 USC § 1341) and the State Water Control Law and regulations adopted pursuant thereto, the State Water Control Board has determined that there is a reasonable assurance that project activities and discharges authorized by this VWP individual permit and its conditions, if complied with, i) will protect instream beneficial uses; ii) will not violate, and will comply with, applicable water quality standards under Virginia Administrative Code 9VAC25-260 *et seq.*, and Sections 301, 302, 303, 306 and 307 of the CWA; and iii) will not, together with other existing or proposed impacts to surface waters, cause or contribute to significant impairment of state waters or fish and wildlife resources.

Please contact me by email at dave.davis@deq.virginia.gov or by phone at 804-698-4105 if you have any questions.

Respectfully,

David L. Davis, CPWD, PWS
Director, Office of Wetlands and Stream Protection

Enclosures: Permit Cover Page, Part I - Special Conditions, Part II - General Conditions, Appendix 1-Impact Tables, Appendix 2-TOYR, Attachment 1 - *VWP Permit Construction Status Update Form*, Attachment 2 - *Monthly VWP Permit Inspection Checklist*, Final Fact Sheet with Attachment 1-Impact Locations

cc: Robert Cooper, Mountain Valley Pipeline, LLC
Clay Roesler, Tetra Tech, Inc.
Todd Normane, EQM Gathering Opco, LLC
Matthew Hoover, Equitrans Midstream Corp.
Cory Chalmers, Equitrans Midstream Corp.
Christie Blevins, Wetland Studies and Solutions, Inc.
Adam Fannin, U.S. Army Corps of Engineers-Huntingdon District
Jared Pritts, U.S. Army Corps of Engineers-Pittsburgh District
Randy Owen, Virginia Marine Resources Commission
Brian Bridgewater, West Virginia Department of Environmental Protection

Commonwealth of Virginia

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Ann F. Jennings
Secretary of Natural and Historic Resources

David K. Paylor
Director
(804) 698-4000

VWP Individual Permit Number 21-0416
Effective Date: December 20, 2021
Expiration Date: December 19, 2031

VIRGINIA WATER PROTECTION PERMIT ISSUED PURSUANT TO THE STATE WATER CONTROL LAW AND SECTION 401 OF THE CLEAN WATER ACT

In compliance with § 401 of the Clean Water Act, as amended (33 USC § 1341) and the State Water Control Law and regulations adopted pursuant thereto, the board has determined that there is a reasonable assurance that this VWP permit, if complied with, will protect instream beneficial uses, will not violate applicable water quality standards, and will not cause or contribute to a significant impairment of state waters or fish and wildlife resources. In issuing this VWP permit, the board has not taken into consideration the structural stability of any proposed activities.

Permittee:	Mountain Valley Pipeline, LLC
Address:	2200 Energy Drive, Canonsburg, PA 15317
Project Name:	Mountain Valley Pipeline Project
Project Location:	In Virginia, the project consists of approximately 107 miles of pipeline and 51 miles of access roads in Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties.

Project Description: The permittee is constructing a 42-inch diameter natural gas pipeline approximately 304 miles in length, running from Wetzel County, West Virginia to Transco Village in Pittsylvania County, Virginia. The portion of the project located within Virginia consists of approximately 107 miles of pipeline and 51 miles of access roads in Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties. Permitted activities shall be conducted as described in the Joint Permit Application dated February 19, 2021, received on March 1, 2021, and supplemental materials, revisions and clarifications received through August 17, 2021.

Authorized Surface Water Impacts:

This permit authorizes the surface water impacts identified in **Table 1 Stream Impacts**, and **Table 2 Wetland Impacts**, attached to this permit in Appendix 1. In summary, this permit authorizes a total of 9.41 acres of impacts to surface waters consisting of 5.90 acres of wetlands and 3.51 acres (17,128 linear feet) of streams.

Impact Type	Surface Water Type	Impact Authorized	
		Square Feet	Linear Feet
Permanent	Palustrine Emergent Wetland (PEM)	1,707	N/A
	Stream Channel	441	63
	Subtotal	*2,148*	*63*
Conversion	PFO to PEM	51,826	N/A
	PSS to PEM	32,948	N/A
	Subtotal	*84,774*	N/A
Temporary	Palustrine Emergent Wetland (PEM)	170,409	N/A
	Stream Channel	152,684	17,065
	Subtotal	*323,093*	*17,065*
	TOTAL	**410,015 (9.41 Acres)**	**17,128**

Authorized surface water impacts shall be as depicted on the materials provided in the application as Attachment H-3, entitled Virginia Plan and Profile Crossing Drawings, and Attachment B, entitled Table B-1 Virginia Stream Impacts, and Table B-2 Virginia Wetland Impacts, dated February 22, 2021, with latest revision date of May 14, 2021, received May 14, 2021.

Approved Compensation:

The Joint Permit Application provides documentation of compensatory mitigation for wetland and stream crossings. The applicant has provided compensation for the proposed permanent and conversion wetland impacts through the purchase of 7.1 wetland credits from Banister Bend Farm, LLC Wetland Mitigation Bank in Pittsylvania County, Virginia, purchase agreement dated November 30, 2017. The permittee has provided compensation for the proposed permanent stream impacts through the purchase of 298 stream credits from Graham and David Mitigation Bank, LLC in Montgomery County, Virginia, purchase agreement dated November 30, 2017. The applicant has provided documentation of a reserved purchase of 0.014 wetland credits from Thompson Place Stream and Wetland Mitigation Bank in Blacksburg, VA, credit availability letter dated August 17, 2021. The Applicant has provided the Comprehensive Stream and Wetland Monitoring, Restoration and Mitigation Framework (*Mitigation Framework*) that addresses restoration of temporarily impacted areas.

The permitted activity shall be in accordance with this Permit Cover Page, Part I - Special Conditions, Part II - General Conditions, Appendix 1-Impact Tables, Appendix 2-TOYR, *Mitigation Framework*, and Final Fact Sheet with Attachment 1-Impact Locations.

David L. Davis, CPWD, PWS
Director, Office of Wetlands and Stream Protection

12/20/2021
Date

Part I – Special Conditions

A. Authorized Activities

1. DEQ authorizes the acreage and linear feet of surface water impacts identified in **Table 1 Stream Impacts**, and **Table 2 Wetland Impacts**, attached to this permit in Appendix 1.

2. The permittee shall conduct authorized activities as described in the Joint Permit Application dated February 19, 2021, and received March 1, 2021, and supplemental materials, revisions and clarifications received through August 17, 2021. Any changes to the authorized activities or impacts map that affect permitted areas shall be submitted to DEQ immediately upon determination that changes are necessary, and DEQ approval shall be required prior to implementing the changes.

3. The permit authorizes the temporary use of mechanical equipment in surface waters in accordance with all applicable permit conditions.

4. The permittee shall notify DEQ of any changes in authorized impacts to surface waters or any changes to the design or type of construction activities in surface waters authorized by this permit. DEQ approval shall be required prior to implementing the changes. Any additional impacts, modifications, or changes shall be subject to individual permit review and/or modification of this permit.

B. Permit Term

1. This permit is valid for **ten (10) years** from the date of issuance. An extension of this permit term or a new permit may be necessary for the continuance of the authorized activities or any permit requirement that has not been completed, including compensation provisions. The permit term, including any granted extensions, shall not exceed 15 years.

2. The permittee shall notify DEQ in writing at least 180 calendar days prior to the expiration of this permit if reissuance will be requested.

C. Standard Project Conditions

1. The activities authorized by this permit shall be executed in such a manner that any impacts to beneficial uses are minimized. As defined in § 62.1-44.3 of the Code, "beneficial use" means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. The preservation of instream flows for purposes of the protection of navigation, maintenance of waste assimilation capacity, the protection of fish and wildlife resources and habitat, recreation, cultural and aesthetic values is an instream beneficial use of Virginia's waters. Offstream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural uses, electric power generation, commercial, and industrial uses.

2. No activity shall substantially disrupt the movement of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the primary purpose of the activity is to impound water.

3. Flows downstream of the project area shall be maintained to protect all uses.

4. No activity shall cause more than minimal adverse effect on navigation.

5. The activity shall not impede the passage of normal or expected high flows, and any associated structure shall withstand expected high flows.

6. Except for temporary impacts authorized by this permit, continuous flow of perennial springs shall be maintained by the installation of spring boxes, French drains, or other similar structures as approved in the stream and wetland restoration plan (*Mitigation Framework*).

7. All excavation, dredging, or filling in surface waters shall be accomplished in a manner that minimizes bottom disturbance and turbidity. Any dredge material dewatering area shall be of adequate size to contain the dredge material and to allow for adequate dewatering and settling out of sediment prior to discharge back into state waters. Runoff from precipitation shall be diverted around the dewatering area.

8. All in-stream activities shall be conducted during low-flow conditions whenever practicable.

9. Erosion and sedimentation controls shall be designed in accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992. These controls shall be placed prior to clearing and grading and maintained in good working order to minimize impacts to state waters. These controls shall remain in place until the area is stabilized and removal of such controls is authorized by permittee's Annual Standards and Specifications.

10. All construction, construction access, and demolition activities associated with this project shall be accomplished in a manner that minimizes construction materials or waste materials from entering surface waters, unless authorized by this permit. Wet, excess, or waste concrete shall be prohibited from entering surface waters.

11. All fill material placed in surface waters shall be clean and free of contaminants in toxic concentrations or amounts in accordance with all applicable laws and regulations.

12. Measures shall be employed at all times to prevent and contain spills of fuels, lubricants, or other pollutants into surface waters.

13. Stream channel restoration activities shall be conducted in the dry or during low flow conditions. When site conditions prohibit access from the streambank or upon prior authorization from the Department of Environmental Quality, heavy equipment may be authorized for use within the stream channel. The equipment shall be stationed on cobble bars.

14. Machinery or heavy equipment in temporarily impacted wetlands shall be placed on mats or geotextile fabric, or other suitable means shall be implemented, to minimize soil disturbance to the maximum extent practical. Mats, fabrics, or other measures shall be removed as soon as the work is complete in the temporarily impacted wetland.

15. Virginia Water Quality Standards shall not be violated in any surface waters as a result of the project activities.

16. All non-impacted surface waters and any required buffers associated with compensation areas that are within the project or right-of-way limits, and that are within fifty feet of any project activities, shall be clearly flagged or demarcated for the life of the construction activity within that area. The permittee shall notify all contractors and subcontractors that *no activities are to occur in these marked areas*.

17. All required notifications and submittals shall include project name and permit number and be submitted electronically to steven.hardwick@deq.virginia.gov or mailed to the DEQ office stated below, to the attention of the VWP project manager, unless directed in writing by DEQ subsequent to the issuance of this permit: Department of Environmental Quality, Central Office, P.O. Box 1105, Richmond, Virginia 23218

18. All reports required by this permit and other information requested by DEQ shall be signed by the permittee or a person acting in the permittee's behalf, with the authority to bind the permittee. A person is a duly authorized representative only if *both* criteria below are met. If a representative authorization is no longer valid because of a change in responsibility for the overall operation of the facility, a new authorization shall be immediately submitted to DEQ.

    a. The authorization is made in writing by the permittee.

    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility. A duly authorized representative may thus be either a named individual or any individual occupying a named position.

19. All submittals shall contain the following signed certification statement:

    "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

20. Any fish kills or spills of fuels or oils shall be reported to DEQ immediately upon discovery at 540-562-6700. If DEQ cannot be reached, the spill or fish kill shall be reported to the Virginia Department of Emergency Management (VDEM) at 1-800-468-8892 or the National Response

Center (NRC) at 1-800-424-8802. Any spill of oil as defined in § 62.1-44.34:14 of the Code of Virginia that is less than 25 gallons and that reaches, or that is expected to reach, land only is not reportable, if recorded per § 62.1-44.34:19.2 of the Code of Virginia and if properly cleaned up.

21. DEQ shall be notified in writing within 24 hours or as soon as possible on the next business day when potential environmentally threatening conditions are encountered which require debris removal or involve potentially toxic substances. Measures to remove the obstruction, material, or toxic substance or to change the location of any structure are prohibited until approved by DEQ.

D. Installation of Utilities and Temporary Impacts

1. This pipelines project is subject to § 62.1-44.15:21 J 2 and shall be constructed in a manner that minimizes temporary and permanent impacts to state waters and protects water quality to the maximum extent practicable, including by the use of applicable best management practices that the Board determines to be necessary to protect water quality.

2. All utility line work in surface waters shall be performed in a manner that minimizes disturbance in each area. Temporarily disturbed surface waters shall be restored in accordance with this Permit, Virginia Water Protection Permit regulations, and the approved stream and wetland restoration plan (*Mitigation Framework*), unless otherwise authorized by this permit.

3. Material resulting from trench excavation may be temporarily sidecast into wetlands not to exceed a total of 90 calendar days, provided the material is not placed in a manner such that it is dispersed by currents or other forces.

4. The trench for a utility line cannot be constructed in a manner that drains wetlands (e.g., backfilling with extensive gravel layers creating a French drain effect).

5. Temporary disturbances to wetlands, stream channels, and/or stream banks during project construction activities shall be avoided and minimized to the maximum extent practicable.

6. All materials (including fill, construction debris and materials, excavated materials, and woody materials, that are temporarily placed in wetlands, in stream channels, or on stream banks) shall be placed on mats or geotextile fabric, shall be immediately stabilized to prevent the material or leachate from entering surface waters, and shall be entirely removed within 90 calendar days following completion of that construction activity. After removal, disturbed areas shall be returned to original contours, shall be stabilized, and shall be restored to the original vegetated state in accordance with the a stream and wetland restoration plan (*Mitigation Framework*) to be approved by the Department.

7. Temporary in-stream construction features such as cofferdams shall be made of non-erodible materials.

8. All temporarily disturbed wetland areas shall be restored to their original elevations and contours. The restoration work shall be completed as approved by DEQ in the stream and wetland restoration plan (*Mitigation Framework*).

9. All temporarily impacted streams and stream banks shall be restored to their original elevations and contours. All temporarily impacted wetlands shall be restored to their pre-construction conditions. The restoration, as defined in 9VAC25-210-10, shall be completed as approved by DEQ in the stream and wetland restoration plan (*Mitigation Framework*). The *Mitigation Framework* shall be approved by DEQ in writing prior to initiating impacts authorized by this Permit. Any revisions to the *Mitigation Framework* shall be submitted for DEQ review and approval prior to implementing the revision(s). The *Mitigation Framework* shall include:

    a. A pre-construction wetland and stream assessment, including contours, elevations, stream geomorphology, vegetation survey and other information sufficient to establish baseline conditions at each temporary impact area;

    b. Temporary impact area restoration methods;

    c. Re-vegetation plan;

    d. Criteria for successful restoration;

    e. A monitoring schedule and report format to document attainment of success criteria;

    f. A corrective action strategy for areas not meeting the success criteria; and,

    g. A supplemental compensatory mitigation strategy addressing temporal loss of stream and wetland functions.

E. Wildlife Resources

The permittee shall implement the time of year restrictions (TOYR) on in-stream construction that have been recommended and approved by the Virginia Department of Wildlife Resources (VDWR), and conditions recommended and approved by the Virginia Department of Conservation and Recreation (VDCR) as specified in and attached to this permit as Appendix 2. The permittee shall notify the Department within three business days of any subsequent revisions or addenda that are approved or required by VDWR and/or VDCR and shall post the most current information on their website at https://www.mountainvalleypipeline.info/news-info/. TOYR and coordination are not necessary if construction is conducted via boring, unless an instream impact is associated with the boring.

F. Stream Modifications, Including Intake/Outfall Structures

1. Redistribution of existing stream substrate for erosion control purposes is prohibited.

2. Material removed from the stream bottom shall not be deposited into surface waters unless otherwise authorized in this permit.

3. Riprap apron for all outfalls shall be designed in accordance with Virginia Erosion and Sediment Control Handbook, Third Edition, 1992, or the most recent version in effect at the time of construction.

4. For streambank protection activities, structures and backfill shall be placed as close to the streambank as practical, while still avoiding and minimizing impacts to surface waters to the maximum extent practical. No material shall be placed in excess of the minimum necessary for erosion protection.

5. Asphalt and materials containing asphalt or other toxic substances shall not be used in the construction of submerged sills, breakwaters, dams, or weirs.

G. Road Crossings

1. Access roads authorized by this permit shall be constructed to minimize the adverse effects on surface waters to the maximum extent practicable and to follow as near as possible pre-construction contours and elevations.

2. Installation of pipes and road crossings shall occur in the dry via the implementation of cofferdams, sheetpiling, stream diversions or other similar structures.

3. All surface waters temporarily affected by a road crossing shall be restored to their original elevations immediately following the removal of that particular temporary crossing. Temporary access roads shall be removed entirely following activity completion.

4. At crossings of streams S-H42 (VWP No. S-314) and S-IJ16a (VWP No. S-60), pipes and culverts must be installed to maintain low flow conditions and shall be countersunk at both inlet and outlet ends of the pipe or culvert, unless otherwise specifically approved by the Department of Environmental Quality on a case-by-case basis, and as follows: The requirement to countersink does not apply to extensions or maintenance of existing pipes and culverts that are not countersunk, floodplain pipes and culverts being placed above ordinary high water, pipes and culverts being placed on bedrock, or pipes and culverts required to be placed on slopes 5.0% or greater. Bedrock encountered during construction must be identified and approved in advance of a design change where the countersunk condition cannot be met. Pipes and culverts 24 inches or less in diameter shall be countersunk three inches below the natural stream bed elevations, and pipes and culverts greater than 24 inches shall be countersunk at least six inches below the natural stream bed elevations. Hydraulic capacity shall be determined based on the reduced capacity due to the countersunk position. In all stream crossings appropriate measures shall be implemented to minimize any disruption of aquatic life movement.

5. When countersinking culverts in streams, the permittee shall install the structure and any riprap or ancillary features in a manner to ensure reestablishment of the stream channel within 15 days post

construction. When installing culverts in any surface water, the permittee shall install the culvert and ancillary features in a manner that will maintain the pre-construction hydrologic regime. Surface water depth within the impact area shall be consistent with depths upstream and downstream of the impact area.

6. Stream bottom elevations at road crossings shall be measured at the inlet and outlet of the proposed structure and recorded prior to construction and within one week after the completion of construction to ensure that the design elevations were met. This information shall be recorded on the *Monthly VWP Permit Inspection Checklist (Attachment 2)* completed after the crossing is installed.

H. Stormwater Management Structures

1. The outfall and overflow structure shall be constructed and maintained to prevent downstream sediment deposition, erosion, or scour that may be associated with normal flow and any expected storm flows. Construction shall include the use of an appropriate outlet protection approved by the Virginia Stormwater Management Program Authority.

2. Maintenance excavation of best management practices shall follow the stormwater management facilities maintenance agreement approved by the Virginia Stormwater Management Program Authority, and, for best management practices constructed in surface waters, shall not exceed the original contours or designated maintenance areas of the facility.

3. Draining of a stormwater management facility shall be performed by a method that prevents downstream sediment deposition, erosion, or scour.

I. Project Construction Monitoring and Submittals (Impact Sites)

1. The permittee shall submit written notification at least **thirty (30) calendar days** prior to the initiation of land disturbance or construction activities in permitted areas. The notification shall include preconstruction photographs, projected schedule for initiating and completing work at each permitted impact area.

    a. Preconstruction photographs shall be taken at each impact area prior to initiation of activities within impact areas.
    b. Photographs shall depict the impact area and the nonimpacted surface waters immediately adjacent to and downgradient of each impact area.
    c. Each photograph shall be labeled to include the following information: permit number, impact area number, date and time of the photograph, name of the person taking the photograph, photograph orientation, and photograph subject description.

2. Site inspections shall be conducted **once every calendar month** and recorded on the *Monthly VWP Permit Inspection Checklist* (*Attachment 2)* by the permittee or the permittee's qualified designee during active construction within authorized surface water impact areas. Monthly inspections shall be conducted by the permittee's environmental inspectors in the following areas within the approved

limits-of-disturbance: all authorized permanent and temporary impact areas; all avoided surface waters, including wetlands, stream channels, and open water; surface water areas within 50 feet of any land disturbing activity; and all on-site areas designated for permanent preservation. The *Monthly VWP Permit Inspection Checklist* (*Attachment 2)* shall be completed in its entirety for each monthly inspection and shall be kept on-site and made available for review by DEQ staff upon request during normal business hours.

3. The *VWP Permit Construction Status Update Form* (*Attachment 1)* enclosed with this permit shall be completed in June and December of every year for the duration of this permit. The *VWP Permit Construction Status Update Form* (*Attachment 1)* shall include reference to the VWP permit authorization number and one of the following statements for each authorized surface water impact location:

    a. Construction activities not yet started;

    b. Construction activities started;

    c. Construction activities started but are currently inactive, or;

    d. Construction activities complete.

4. The *VWP Permit Construction Status Update Form* (*Attachment 1)* shall be submitted and must be received by DEQ no later than January 10 and July 10 of every year.

5. The permittee shall notify DEQ within 24 hours of discovering impacts to surface waters including wetlands, stream channels, and open water that are not authorized by this permit. The notification shall include photographs, estimated acreage and/or linear footage of impacts, and a description of the impacts.

6. The permittee shall submit written notification of completion within 30 calendar days after the completion of all activities in all permitted impact areas authorized under this permit.

J. Compensatory Mitigation

1. The Joint Permit Application provides documentation of compensatory mitigation for wetland and stream crossings. The applicant has provided compensation for the proposed permanent and conversion wetland impacts through the purchase of 7.1 wetland credits from Banister Bend Farm, LLC Wetland Mitigation Bank in Pittsylvania County, Virginia, purchase agreement dated November 30, 2017. The permittee has provided compensation for the proposed permanent stream impacts through the purchase of 298 stream credits from Graham and David Mitigation Bank, LLC in Montgomery County, Virginia, purchase agreement dated November 30, 2017. The applicant has provided documentation of a reserved purchase of 0.014 wetland credits from Thompson Place Stream and Wetland Mitigation Bank in Blacksburg, VA, credit availability letter dated August 17, 2021.

2. To fulfill any additional mitigation requirements of this permit in accordance with 9VAC25-210 et seq. and § 62.1-44.15:23 of the Code of Virginia, the permittee shall first purchase available mitigation bank released credits. The permittee shall then fulfill its remaining credit obligation through the purchase of released mitigation credits from an ILF program. The permittee shall then fulfill its remaining credit obligation through the purchase of advance mitigation credits from an ILF program.

   If the permittee proposes to purchase credits from an ILF program, no more than 45 days prior to initiating work within impact areas authorized by the permit, the permittee shall determine the availability of any mitigation bank released credits with a service area that covers the project and submit its proposed mitigation credit sources to DEQ for approval. Within 15 calendar days of receipt, DEQ shall review and provide any objections to the proposal, or the proposal shall be deemed approved.

   Documentation of the purchase of any required mitigation credits shall be submitted to and received by DEQ prior to initiating work in the impact areas authorized by this permit.

   For the period ending December 31 of each calendar year, the permittee shall submit to DEQ by January 15th a summary of the amount of surface water impacts initiated; the amount of compensation completed and compensation requirement remaining; the status of initiating any remaining surface water impacts; and the status of completing any remaining compensation requirement.

K. Other Regulatory Actions

1. This permit incorporates by reference the conditions set forth in Section IV(b)(2) and Section IV(c) of the Consent Decree between Mountain Valley Pipeline, LLC and DEQ, dated December 11, 2019, requiring:

   a. An Environmental Auditor approved by DEQ to monitor stream and wetland crossing activities;

   b. An independent report submitted to DEQ by the Auditor within fourteen days after the completion of each wetland or waterbody crossing describing instream biological conditions;

   c. Posting of the report to the permittee’s webpage;

   d. Forty-eight hour advance notice to DEQ before any stream or wetland crossing activity.

2. This permit incorporates by reference all conditions of any DEQ approved revision of the Annual Standards and Specifications pertaining to work within and around wetlands and streams.

3. This permit incorporates by reference all conditions of any DEQ approved revisions to the Erosion and Sediment Control General Details, Erosion and Sediment Control Narrative, and Erosion and Sediment Control Plan drawings that pertain to work within and around wetlands and stream crossings.

Part II – General Conditions

A. Duty to Comply

The permittee shall comply with all conditions and limitations of the VWP permit. Nothing in this chapter shall be construed to relieve the permittee of the duty to comply with all applicable federal and state statutes, regulations, toxic standards, and prohibitions. Any VWP permit violation or noncompliance is a violation of the Clean Water Act and State Water Control Law and is grounds for enforcement action, VWP permit termination, VWP permit revocation, VWP permit modification, or denial of an application for a VWP permit extension or reissuance.

Nothing in this VWP permit shall be construed to relieve the permittee from civil and criminal penalties for noncompliance.

B. Duty to Cease or Confine Activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a VWP permit has been granted in order to maintain compliance with the conditions of the VWP permit.

C. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any impacts in violation of the VWP permit that may have a reasonable likelihood of adversely affecting human health or the environment.

D. VWP Permit Actions

A VWP permit may be modified in whole or in part, revoked and reissued, extended, transferred, or terminated in accordance with 9VAC25-210-180 of the Virginia Administrative Code.

1. During the drafting and authorization of a permit modification, only those conditions to be modified shall be addressed with preparing a draft modified permit. VWP permit terms and conditions of the existing permit shall remain in full force and effect during the modification of the permit.

2. This VWP permit may be modified upon the request of the permittee or upon board initiative when any of the following developments occur:

    a. When new information becomes available about the project or activity covered by the VWP permit, including project additions or alterations, that was not available at VWP permit issuance and would have justified the application of different VWP permit conditions at the time of VWP permit issuance;

    b. When a change is made in the promulgated standards or regulations on which the VWP permit was based;

c. When changes occur that are subject to "reopener clauses" in the VWP permit; or

d. When developments applicable to surface water withdrawals occur as specified in 9VAC25-210-380 of the Virginia Administrative Code.

3. When this VWP permit authorizes surface water withdrawals, it may be modified when any of the following developments occur:

   a. When the board determines that minimum instream flow levels resulting directly from the permittee's withdrawal of surface water are detrimental to the instream beneficial use, existing at the time of permit issuance, and the withdrawal of surface water should be subject to further net limitations or when an area is declared a surface water management area pursuant to §§ 62.1-242 through 62.1-253 of the Code of Virginia, during the term of the VWP permit.

   b. Significant changes to the location of the surface water withdrawal system are proposed such that the Department of Environmental Quality determines a new review is warranted due to the potential effect of the surface water withdrawal to existing beneficial uses of the new location.

   c. Changes to the permitted project or the surface water withdrawal, including increasing the storage capacity for the surface water withdrawal, that propose an increase in the maximum permitted withdrawal volumes or rate of withdrawal or that cause more than a minimal change to the instream flow requirements with potential to result in a detrimental effect to existing beneficial uses.

   d. A revision to the purpose of the surface water withdrawal that proposes to include a new use or uses that were not identified in the permit application or a modification of the existing authorized use or uses such that the use description in the permit application and permit is no longer applicable. Examples of uses include, but are not limited to agricultural irrigation, golf course irrigation, public water supply, manufacturing, and electricity generation.

4. When the permittee has submitted a timely and complete application for reissuance of an existing VWP individual permit, but through no fault of the permittee, the board does not reissue or reissue with conditions a VWP individual permit or the board does not provide notice of its tentative decision to deny the application before an existing VWP individual permit expires, the conditions of the expiring VWP individual permit shall be administratively continued in full force and effect until the effective date of a reissued permit or the date on which the board denies the application. Timely application shall be a minimum of 180 days for an individual permit or a minimum of 270 days for an individual permit for a surface water withdrawal, unless otherwise specified in the existing permit.

5. Any permittee desiring to continue a previously permitted activity after the expiration date of this VWP permit shall apply for and obtain a new permit or, if applicable, shall request an extension in accordance with 9VAC25-210-180 of the Virginia Administrative Code. Any permittee with an effective VWP permit for an activity that is expected to continue after the expiration date of the

VWP permit, without any change in the activity authorized by the VWP permit other than as may be allowed under 9VAC25-210-180, shall submit written notification requesting an extension. The permittee must file the request 90 days prior to the expiration date of the VWP permit. VWP permit modifications shall not be used to extend the term of a VWP permit beyond 15 years from the date of original issuance. When a permit term, other than that of an Emergency Virginia Water Protection Permit, is less than 15 years, an extension of the permit terms and conditions may be granted in accordance with 9VAC25-210-180. Emergency Virginia Water Protection Permits shall not exceed a duration of one year or shall expire upon the issuance of a regular Virginia Water Protection Permit, whichever comes first.

6. This VWP permit may be transferred to a new permittee only by modification to reflect the transfer, by revoking and reissuing the permit, or by automatic transfer. Automatic transfer to a new permittee shall occur if the current permittee: a) Notifies the board of the proposed transfer of the permit and provides a written agreement between the current and proposed permittees containing the date of transfer of VWP permit responsibility, authorization, and liability to the new permittee; and b) the board does not within 15 days notify the existing permittee of its intent to modify the VWP permit.

7. After notice and opportunity for a formal hearing pursuant to § 62.1-44.15:02 of the Code of Virginia, a VWP permit can be terminated for cause. Reasons for termination for cause are as follows:

   a. Noncompliance by the permittee with any condition of the VWP permit;

   b. The permittee's failure in the application or during the VWP permit process to disclose fully all relevant facts or the permittee's misrepresentation of any relevant facts at any time;

   c. The permittee's violation of a special or judicial order;

   d. A determination by the board that the permitted activity endangers human health or the environment and can be regulated to acceptable levels by VWP permit modification or termination;

   e. A change in any condition that requires either a temporary or permanent reduction or elimination of any activity controlled by the VWP permit; and

   f. A determination that the permitted activity has ceased and that the compensation for unavoidable adverse impacts has been successfully completed.

8. The board may terminate this permit without cause when the permittee is no longer a legal entity due to death, dissolution, or when a company is no longer authorized to conduct business in the Commonwealth. The termination shall be effective 30 days after notice of the proposed termination is sent to the last known address of the permittee or registered agent, unless the permittee objects within that time. If the permittee does object during that period, the board shall follow the applicable

procedures for termination under § 62.1-44.15:25 of the Code of Virginia and 9VAC25-230 of the Virginia Administrative Code.

9. This VWP permit may be terminated by consent, as initiated by the permittee. The permittee shall submit a request for termination by consent within 30 days of completing or canceling all permitted activities and all required compensatory mitigation requirements. When submitted for project completion, the request for termination by consent shall constitute a notice of project completion. The director may accept this termination on behalf of the board. The permittee shall submit the following information:

    a. Name, mailing address, and telephone number;

    b. Name and location of the activity;

    c. The VWP permit number; and

    d. One of the following certifications:

        i. For project completion: "I certify under penalty of law that all activities and any required compensatory mitigation authorized by a VWP permit have been completed. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit."

        ii. For project cancellation: "I certify under penalty of law that the activities and any required compensatory mitigation authorized by this VWP permit will not occur. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit, nor does it allow me to resume the permitted activities without reapplication and issuance of another permit."

        iii. For events beyond permittee control, the permittee shall provide a detailed explanation of the events, to be approved by DEQ, and the following certification statement: "I certify under penalty of law that the activities or the required compensatory mitigation authorized by this VWP permit have changed as the result of events beyond my control (see attached). I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit, nor does it allow me to resume the permitted activities without reapplication and issuance of another permit.

E. Inspection and Entry

Upon presentation of credentials, the permittee shall allow the board or any duly authorized agent of the board, at reasonable times and under reasonable circumstances, to conduct the actions listed in this section. For the purpose of this section, the time for inspection shall be deemed reasonable during regular business hours. Nothing contained herein shall make an inspection time unreasonable during an emergency.

1. Enter upon any permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the VWP permit conditions;

2. Inspect any facilities, operations or practices (including monitoring and control equipment) regulated or required under the VWP permit; and

3. Sample or monitor any substance, parameter, or activity for the purpose of ensuring compliance with the conditions of the VWP permit or as otherwise authorized by law.

F. Duty to Provide Information

The board may request (i) such plans, specifications, and other pertinent information as may be necessary to determine the effect of an applicant's discharge on the quality of state waters or (ii) such other information as may be necessary to accomplish the purposes of this chapter. Any owner, permittee, or person applying for a VWP permit or general permit coverage shall provide the information requested by the board.

G. Monitoring and Records Requirements

1. Monitoring of parameters, other than pollutants, shall be conducted according to approved analytical methods as specified in the VWP permit. Analysis of pollutants will be conducted according to 40 CFR Part 136 (2017), Guidelines Establishing Test Procedures for the Analysis of Pollutants.

2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

3. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the VWP permit, and records of all data used to complete the application for the VWP permit, for a period of at least three years from the date of permit expiration. This period may be extended by request of the board at any time.

4. Records of monitoring information shall include:

a. The date, exact place and time of sampling or measurements;

b. The name of the individuals who performed the sampling or measurements;

c. The date and time the analyses were performed;

d. The name of the individuals who performed the analyses;

e. The analytical techniques or methods supporting the information such as observations, readings, calculations and bench data used;

f. The results of such analyses; and

g. Chain of custody documentation.

H. Property rights

The issuance of a VWP permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize injury to private property or any invasion of personal rights or any infringement of federal, state or local laws or regulations.

I. Reopener

This VWP permit may be reopened for the purpose of modifying the conditions of the VWP permit to meet new regulatory standards duly adopted by the board. Cause for reopening VWP permits includes, but is not limited to when the circumstances on which the previous VWP permit was based have materially and substantially changed, or special studies conducted by the board or the permittee show material and substantial change, since the time the VWP permit was issued and thereby constitute cause for VWP permit modification or revocation and reissuance.

J. Compliance with State and Federal Law

As to the permitted activity, compliance with a VWP permit constitutes compliance with the VWP permit requirements of the Law and regulations.

K. Severability

The provisions of this VWP permit are severable.

L. Oil and Hazardous Substance Liability

Nothing in this VWP permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Clean Water Act or §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law.

M. Unauthorized Discharge of Pollutants

Except in compliance with a VWP permit, unless the activity is otherwise exempted or excluded, no person shall dredge, fill, or discharge any pollutant into, or adjacent to surface waters; withdraw surface water; otherwise alter the physical, chemical, or biological properties of state waters regulated under this chapter and make them detrimental to the public health, to animal or aquatic life, or to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses; excavate in wetlands; or on or after October 1, 2001, conduct the following activities in a wetland:

1. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;

2. Filling or dumping;

3. Permanent flooding or impounding; or

4. New activities that cause significant alteration or degradation of existing wetland acreage or functions.

ATTACHMENT 1

Attachment 1: VWP PERMIT CONSTRUCTION STATUS UPDATE FORM

Attached to VWP INDIVIDUAL PERMIT NUMBER 21-0416

[DATE]

[PERMIT ACTION]

Date (check one):

☐ June____, ________

☐ December _____, __________

VWP Individual Permit Number: ___________________________________

Project Name and Location: ____

____

Status within each authorized surface water impact location, as identified on MAP NAME, dated MM-DD-YYYY, , and received MM-DD-YYYY: (check one of the following status options for each impact number/location. Attach additional sheet(s) if needed.)

Authorized impact number	Construction activities not started	Construction activities started	Construction activities started but currently not active	Does this impact involve culvert(s)[1]?	Construction activities complete[2]

[1] Provide spot elevations of the stream bottom within the thalweg at the beginning and end of the pipe or culvert, extending to a minimum of 10 feet beyond the limits of the impact, with completion of all culvert installations.

[2] If all construction activities and compensatory mitigation requirements are complete, the permittee completes and signs the Termination Agreement section below within 30 days of last authorized activity and/or compensation completion. A completed and signed Agreement serves as Notice of Project Completion (9VAC25-210-130 F).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Authorized Signature: ____________________________________

Print Name: ____________________________________

Title: ____________________________________ Phone: ______________________

Date: ______________________ Email: ____

TERMINATION AGREEMENT BY CONSENT – PROJECT COMPLETION

Permittee Name: ____

Permittee Mailing Address: ____

Permittee Phone: ______________________________

I hereby consent to the termination of coverage for VWP Individual Permit Number 21-0416.

"I certify under penalty of law that all activities and any required compensatory mitigation authorized by a VWP permit have been completed. I understand that by submitting this notice of termination that I am no longer authorized to perform activities in surface waters in accordance with the VWP permit, and that performing activities in surface waters is unlawful where the activity is not authorized by a VWP permit, unless otherwise excluded from obtaining a permit. I also understand that the submittal of this notice does not release me from liability for any violations of this VWP permit."

Permittee Signature: _____________________________________

Impact Construction Status Table Continued (if needed)

Additional Page [#] of [#]					
Authorized impact number	**Construction activities not started**	**Construction activities started**	**Construction activities started but currently not active**	**Does this impact involve culvert(s)[1]?**	**Construction activities complete[2]**

ATTACHMENT 2

Attachment 2: MONTHLY VWP PERMIT INSPECTION CHECKLIST		
An inspection of all permitted impact areas, avoided waters and wetlands, and permanently preserved waters, wetlands and upland areas must be conducted at least once every month during active construction activities. Maintain this record on-site and available for inspection by DEQ staff.		
Project Name Mountain Valley Pipeline Project	**VWP Permit #** 21-0416	**Inspection Date**
Inspector Name & Affiliation	**Phone # & Email Address**	

I certify that the information contained in this report is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

__________________________________ ____________________

Signature of Inspector Date

	In Compliance?				
PERMIT REQUIREMENT	**Yes**	**No**	**Not Applicable**	**Location, Description, Notes & Corrective Action Taken (use additional note space below if needed)**	**Date Completed**
Surface water impacts are limited to the size and locations specified by the permit. No sedimentation impacts and no impacts to upland preservation areas have occurred[1].	☐	☐	☐		
Within 50 feet of authorized activities, all remaining surface waters and mitigation (preservation) areas that are inside the project area are clearly flagged or marked to prevent unpermitted impacts.	☐	☐	☐		
Authorized temporary impact areas have been restored to original contours, stabilized, and planted or seeded in accordance with the DEQ-approved restoration plan within 30 days of completing work in each area.	☐	☐	☒		
E&S controls consistent with the Virginia ESC Handbook are present and maintained in good working order.	☐	☐	☐		
Exposed slopes/stream banks have been stabilized immediately upon completion of work in each impact area, in accordance with the Virginia ESC Handbook.	☐	☐	☐		
Heavy equipment is placed on mats/ geotextile fabric when working in temporary wetland impact areas. Equipment and materials removed immediately upon completion of work.	☐	☐	☐		
Construction activities are not substantially disrupting the movement of aquatic life.[2]	☐	☐	☐		
New instream pipes and culverts on <5% slope have been installed to maintain low flow conditions and are countersunk at both ends as follows: ≤ 24” diameter: countersunk 3” > 24” diameter: countersunk 6” or more. Any variations were approved in advance by DEQ.	☐	☐	☐		
Time-of-year restrictions are being adhered to.	☐	☐	☐		

[1] If unauthorized impacts have occurred, you **must** email or fax a copy of this report to DEQ within 24 hours of discovery. Email: steven.hardwick@deq.virginia.gov Fax: (804) 698-4032

[2] Substantial disruption means no more than a minimal and/or temporary disruption.

	In Compliance?				
PERMIT REQUIREMENT	**Yes**	**No**	**Not Applicable**	**Location, Description, Notes & Corrective Action Taken (use additional note space below if needed)**	**Date Completed**
For stream channelization or relocation, work in surface waters is being performed in the dry, with all flows diverted until the new channel is stabilized.	☐	☐	☐		
Water quality monitoring is being conducted during permanent stream relocations.	☐	☐	☐		
Streams and wetlands are free from any sheen or discoloration that may indicate a spill of oil, lubricants, concrete or other pollutants.[3]	☐	☐	☐		

Inspection Notes

[3] Any fish kills or spills of fuels or oils shall be reported to DEQ immediately upon discovery at 540-562-6700. If DEQ cannot be reached, the spill or fish kill shall be reported to the Virginia Department of Emergency Management (VDEM) at 1-800-468-8892 or the National Response Center (NRC) at 1-800-424-8802. Any spill of oil as defined in § 62.1-44.34:14 of the Code of Virginia that is less than 25 gallons and that reaches, or that is expected to reach, land only is not reportable, if recorded per § 62.1-44.34:19.2 of the Code of Virginia and if properly cleaned up.

APPENDIX 1

Table 1 - Stream Impacts

Assigned VWP Number	Stream ID	NHD Stream Name	County	Latitude	Longitude	Flow Regime	HUC 8	Impact Type	Temporary Impacts (linear ft)	Permanent Fill Impacts (linear ft)	Temporary Impact Area (square feet)	Permanent Impact Area (square feet)	Application Figure Number (MVP)	Plan & Profile Drawing Number (MVP)
1	S-Q12	UNT to Kimballton Branch	Giles	37.375311	-80.680878	Ephemeral	05050002	Pipeline ROW	86	-	344	-	4-531	G-001
2	S-Q13	Kimballton Branch	Giles	37.374377	-80.682038	Perennial	05050002	Pipeline ROW	90	-	1350	-	4-532	G-002
3	S-P6	UNT to Stony Creek	Giles	37.362202	-80.688092	Ephemeral	05050002	Pipeline ROW	78	-	466	-	4-535	G-003
4	S-S5-Braid-2	Stony Creek	Giles	37.360325	-80.684214	Ephemeral	05050002	Timber Mat Crossing	20	-	122	-	4-536	G-004
5	S-S5-Braid-1	Stony Creek	Giles	37.360276	-80.684193	Ephemeral	05050002	Timber Mat Crossing	20	-	139	-	4-536	G-004
6	S-S5	Stony Creek	Giles	37.360071	-80.68396	Perennial	05050002	Timber Mat Crossing	40	-	802	-	4-536	G-004
7	S-G29	UNT to Dry Branch	Giles	37.35043	-80.658259	Ephemeral	05050002	Pipeline ROW	30	-	122	-	4-541	G-005
8	S-G30	UNT to Dry Branch	Giles	37.350373	-80.65823	Ephemeral	05050002	Pipeline ROW	85	-	680	-	4-541	G-005
9	S-G32	Dry Branch	Giles	37.349095	-80.65204	Intermittent	05050002	Pipeline ROW	110	-	662	-	4-542	G-006
10	S-G33	UNT to Dry Branch	Giles	37.348641	-80.647225	Perennial	05050002	Pipeline ROW	99	-	793	-	4-542	G-007
11	S-G35	UNT to Little Stony Creek	Giles	37.344876	-80.633426	Perennial	05050002	Timber Mat Crossing	25	-	501	-	4-544	G-009
12	S-SS4	UNT to Little Stony Creek	Giles	37.344859	-80.631295	Ephemeral	05050002	Timber Mat Crossing	20	-	61	-	4-544	G-010
13	S-G35	UNT to Little Stony Creek	Giles	37.344779	-80.633379	Perennial	05050002	Timber Mat Crossing	25	-	501	-	4-544	G-009
14	S-Z7	UNT to Little Stony Creek	Giles	37.344278	-80.626185	Intermittent	05050002	Timber Mat Crossing	20	-	61	-	4-545	G-012
15	S-Z7-Braid-1	UNT to Little Stony Creek	Giles	37.344277	-80.626113	Ephemeral	05050002	Timber Mat Crossing	20	-	61	-	4-545	G-012
16	S-Z9	UNT to Little Stony Creek	Giles	37.344163	-80.6284	Perennial	05050002	Timber Mat Crossing	20	-	78	-	4-544	G-011
17	S-Z10	UNT to Little Stony Creek	Giles	37.342351	-80.620823	Intermittent	05050002	Timber Mat Crossing	20	-	240	-	4-545	G-013
18	S-Z11	UNT to Little Stony Creek	Giles	37.342236	-80.620542	Perennial	05050002	Timber Mat Crossing	20	-	100	-	4-545	G-013
19	S-Z12-EPH	UNT to Little Stony Creek	Giles	37.342214	-80.620312	Ephemeral	05050002	Timber Mat Crossing	20	-	122	-	4-545	G-013
20	S-Z13	Little Stony Creek	Giles	37.342172	-80.62009	Perennial	05050002	Timber Mat Crossing	25	-	501	-	4-545	G-013
21	S-Z14	UNT to Little Stony Creek	Giles	37.340977	-80.618031	Intermittent	05050002	Timber Mat Crossing	20	-	78	-	4-545	G-014
22	S-YZ1	Doe Creek	Giles	37.338952	-80.614618	Intermittent	05050002	Temporary Access Road	102	-	1019	-	4-546	S-YZ1
23	S-A34	UNT to Doe Creek	Giles	37.337763	-80.606008	Ephemeral	05050002	Pipeline ROW	86	-	601	-	4-548	G-015A
24	S-A33	UNT to Doe Creek	Giles	37.337639	-80.605571	Ephemeral	05050002	Pipeline ROW	111	-	775	-	4-548	G-015B
25	S-A32	UNT to Doe Creek	Giles	37.335094	-80.596868	Perennial	05050002	Pipeline ROW	78	-	1250	-	4-549	G-016
26	S-QQ2	Sinking Creek	Craig	37.333152	-80.429438	Perennial	05050002	Temporary Access Road	40	-	1398	-	4-581	S-QQ2
27	S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332869	-80.559168	Ephemeral	05050002	Temporary Access Road	15	-	61	-	4-554	S-MN11-Upstream
28	S-MN11-Upstream	UNT to Sinking Creek	Giles	37.332191	-80.559979	Ephemeral	05050002	Temporary Access Road	30	-	122	-	4-554	S-MN11-Upstream
29	S-MN11-Downstream	UNT to Sinking Creek	Giles	37.332146	-80.560079	Ephemeral	05050002	Temporary Access Road	37	-	183	-	4-554	S-MN11-Downstream
30	S-Y3	UNT to Doe Creek	Giles	37.331748	-80.583355	Ephemeral	05050002	Timber Mat Crossing	20	-	200	-	4-551	G-017
31	S-Y2	Doe Creek	Giles	37.331332	-80.583047	Perennial	05050002	Timber Mat Crossing	25	-	501	-	4-551	G-017
32	S-PP4	UNT to Sinking Creek	Craig	37.328329	-80.42281	Intermittent	05050002	Pipeline ROW	84	-	170	-	4-579	G-033
33	S-PP3	UNT to Sinking Creek	Craig	37.326705	-80.425803	Perennial	05050002	Pipeline ROW	82	-	244	-	4-579	G-032
34	S-RR4	UNT to Sinking Creek	Giles	37.326015	-80.556831	Perennial	05050002	Temporary Access Road	85	-	257	-	4-556	S-RR4
35	S-E24	UNT to Sinking Creek	Giles	37.325728	-80.565082	Perennial	05050002	Pipeline ROW	81	-	1620	-	4-553	G-019A
36	S-E25-Downstream	UNT to Sinking Creek	Giles	37.325638	-80.56468	Perennial	05050002	Timber Mat Crossing	20	-	161	-	4-553	G-019B
37	S-E25-Upstream	UNT to Sinking Creek	Giles	37.325607	-80.564373	Perennial	05050002	Pipeline ROW	15	-	148	-	4-553	G-019A
38	S-E25-Downstream	UNT to Sinking Creek	Giles	37.325566	-80.564634	Perennial	05050002	Timber Mat Crossing	20	-	161	-	4-553	G-019B
39	S-PP1	UNT to Sinking Creek	Craig	37.324781	-80.431446	Intermittent	05050002	Pipeline ROW	86	-	257	-	4-578	G-031
40	S-RR5	UNT to Sinking Creek	Giles	37.323702	-80.555627	Perennial	05050002	Pipeline ROW	83	-	832	-	4-555	G-020
41	S-PA07	UNT to Sinking Creek	Giles	37.323533	-80.555257	Intermittent	05050002	Pipeline ROW	115	-	231	-	4-555	G-020
42	S-IJ18-EPH	UNT to Sinking Creek	Giles	37.322737	-80.552396	Ephemeral	05050002	Pipeline ROW	74	-	444	-	4-555	G-020A
43	S-IJ19	UNT to Sinking Creek	Giles	37.322194	-80.553058	Ephemeral	05050002	Temporary Access Road	43	-	170	-	4-555	S-IJ19
44	S-IJ19	UNT to Sinking Creek	Giles	37.321823	-80.55311	Ephemeral	05050002	Temporary Access Road	9	-	35	-	4-555	S-IJ19
45	S-IJ18-INT	UNT to Sinking Creek	Giles	37.321756	-80.553011	Intermittent	05050002	Temporary Access Road	44	-	174	-	4-555	S-IJ18-INT
46	S-PP22	UNT to Craig Creek	Montgomery	37.32109	-80.412831	Intermittent	02080201	Timber Mat Crossing	44	-	174	-	4-584	G-034
47	S-OO12	UNT to Sinking Creek	Giles	37.318956	-80.440648	Ephemeral	05050002	Pipeline ROW	25	-	48	-	4-577	G-030
48	S-OO13	UNT to Sinking Creek	Giles	37.31893	-80.44093	Perennial	05050002	Pipeline ROW	77	-	1542	-	4-577	G-030
49	S-OO14	UNT to Sinking Creek	Giles	37.318647	-80.441619	Perennial	05050002	Pipeline ROW	86	-	344	-	4-577	G-029
50	S-IJ17	UNT to Sinking Creek	Giles	37.318324	-80.54772	Ephemeral	05050002	Pipeline ROW	31	-	248	-	4-558	G-022
51	S-IJ16-b	UNT to Sinking Creek	Giles	37.318246	-80.547711	Ephemeral	05050002	Pipeline ROW	78	-	780	-	4-558	G-022
52	S-PP21	UNT to Craig Creek	Montgomery	37.317187	-80.409235	Perennial	02080201	Timber Mat Crossing	20	-	78	-	4-584	G-035
53	S-PP20	UNT to Craig Creek	Montgomery	37.316523	-80.408646	Perennial	02080201	Timber Mat Crossing	20	-	122	-	4-584	G-036
54	S-RR13	Craig Creek	Montgomery	37.314504	-80.402613	Perennial	02080201	Temporary Access Road	41	-	1433	-	4-585	S-RR13
55	S-HH18	UNT to Craig Creek	Montgomery	37.31391	-80.398683	Perennial	02080201	Timber Mat Crossing	20	-	122	-	4-586	G-039
56	S-RR14	UNT to Craig Creek	Montgomery	37.313615	-80.402521	Ephemeral	02080201	Timber Mat Crossing	20	-	139	-	4-585	G-038
57	S-OO6	Craig Creek	Montgomery	37.313511	-80.404606	Perennial	02080201	Timber Mat Crossing	35	-	701	-	4-585	G-037
58	S-QQ3	UNT to Sinking Creek	Giles	37.311735	-80.532304	Ephemeral	05050002	Temporary Access Road	15	-	30	-	4-560	S-QQ3
59	S-IJ16-a	UNT to Sinking Creek	Giles	37.31173	-80.544091	Ephemeral	05050002	Permanent Access Road	20	-	140	-	4-559	S-IJ16-a
60	S-IJ16-a	UNT to Sinking Creek	Giles	37.31173	-80.544091	Ephemeral	05050002	Permanent Access Road	-	31	-	217	4-559	S-IJ16-a
61	S-NN17	Sinking Creek	Giles	37.311616	-80.515786	Perennial	05050002	Timber Mat Crossing	55	-	1102	-	4-564	G-023
62	S-KL43	UNT to Sinking Creek	Giles	37.307524	-80.466665	Perennial	05050002	Pipeline ROW	75	-	749	-	4-573	G-028
63	S-NN11	UNT to Sinking Creek	Giles	37.305508	-80.467231	Intermittent	05050002	Pipeline ROW	84	-	418	-	4-573	G-027
64	S-NN12	UNT to Sinking Creek	Giles	37.300454	-80.472911	Ephemeral	05050002	Pipeline ROW	88	-	174	-	4-571	G-026
65	S-MN21	UNT to Mill Creek	Montgomery	37.299397	-80.391243	Perennial	03010101	Pipeline ROW	80	-	562	-	4-588	G-040

Table 1 - Stream Impacts														
Assigned VWP Number	Stream ID	NHD Stream Name	County	Latitude	Longitude	Flow Regime	HUC 8	Impact Type	Temporary Impacts (linear ft)	Permanent Fill Impacts (linear ft)	Temporary Impact Area (square feet)	Permanent Impact Area (square feet)	Application Figure Number (MVP)	Plan & Profile Drawing Number (MVP)
66	S-MM17	UNT to Sinking Creek	Giles	37.298226	-80.480624	Perennial	05050002	Temporary Access Road	49	-	96	-	4-569	S-MM17
67	S-MN22	UNT to Mill Creek	Montgomery	37.297166	-80.386612	Ephemeral	03010101	Pipeline ROW	96	-	192	-	4-589	G-041
68	S-RR2	Greenbriar Branch	Giles	37.296666	-80.494174	Perennial	05050002	Timber Mat Crossing	20	-	161	-	4-567	G-024
69	S-YZ6	UNT to Greenbriar Branch	Giles	37.296612	-80.494165	Intermittent	05050002	Timber Mat Crossing	20	-	122	-	4-567	G-024
70	S-EF62	UNT to Mill Creek	Montgomery	37.296356	-80.375118	Perennial	03010101	Pipeline ROW	76	-	836	-	4-590	G-043
71	S-MM18	UNT to Sinking Creek	Giles	37.296226	-80.481455	Ephemeral	05050002	Pipeline ROW	88	-	440	-	4-569	G-025
72	S-IJ52	UNT to Mill Creek	Montgomery	37.296153	-80.36751	Perennial	03010101	Pipeline ROW	84	-	1346	-	4-591	G-044
73	S-EF65	Mill Creek	Montgomery	37.295743	-80.375921	Intermittent	03010101	Pipeline ROW	152	-	910	-	4-590	G-042
74	S-G36	North Fork Roanoke River	Montgomery	37.268586	-80.313161	Perennial	03010101	Temporary Access Road	26	-	518	-	4-602	S-G36
75	S-G38	UNT to North Fork RoanokeRiver	Montgomery	37.267002	-80.312898	Ephemeral	03010101	Timber Mat Crossing	20	-	61	-	4-603	Crossing complete (NWP-12)
76	S-G40	UNT to North Fork RoanokeRiver	Montgomery	37.264882	-80.307302	Perennial	03010101	Timber Mat Crossing	20	-	61	-	4-603	Crossing complete (NWP-12)
77	S-PP23	UNT to North Fork RoanokeRiver	Montgomery	37.264858	-80.307151	Ephemeral	03010101	Timber Mat Crossing	20	-	48	-	4-604	Crossing complete (NWP-12)
78	S-G39	UNT to North Fork RoanokeRiver	Montgomery	37.264817	-80.308486	Intermittent	03010101	Pipeline ROW	82	-	492	-	4-604	H-001
79	S-MM14	UNT to Flatwoods Branch	Montgomery	37.258717	-80.29321	Ephemeral	03010101	Pipeline ROW	105	-	736	-	4-608	H-003
80	S-MM15	UNT to Flatwoods Branch	Montgomery	37.258673	-80.296446	Intermittent	03010101	Pipeline ROW	82	-	492	-	4-608	H-002
81	S-MM11	UNT to Flatwoods Branch	Montgomery	37.258403	-80.288186	Ephemeral	03010101	Pipeline ROW	80	-	640	-	4-609	H-005
82	S-F15	UNT to Flatwoods Branch	Montgomery	37.258198	-80.286029	Intermittent	03010101	Pipeline ROW	129	-	775	-	4-609	H-006
83	S-MM13	UNT to Flatwoods Branch	Montgomery	37.258176	-80.289222	Ephemeral	03010101	Pipeline ROW	85	-	427	-	4-608	H-004
84	S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	37.257998	-80.284735	Ephemeral	03010101	Pipeline ROW	81	-	244	-	4-609	H-007
85	S-C36	UNT to Flatwoods Branch	Montgomery	37.25726	-80.281611	Intermittent	3010101	Pipeline ROW	96	-	287	-	4-609	H-008
86	S-C36	UNT to Flatwoods Branch	Montgomery	37.257133	-80.281475	Intermittent	3010101	Pipeline ROW	36	-	109	-	4-609	H-008
87	S-MM31	UNT to Flatwoods Branch	Montgomery	37.256959	-80.280329	Ephemeral	03010101	Timber Mat Crossing	20	-	78	-	4-609	H-009
88	S-C29	Flatwoods Branch	Montgomery	37.256387	-80.278021	Ephemeral	03010101	Pipeline ROW	46	-	57	-	4-610	H-010
89	S-C25	UNT to Bradshaw Creek	Montgomery	37.254342	-80.267895	Intermittent	03010101	Pipeline ROW	115	-	344	-	4-611	H-013
90	S-C24	UNT to Bradshaw Creek	Montgomery	37.254135	-80.266743	Intermittent	03010101	Pipeline ROW	108	-	322	-	4-611	H-014
91	S-C21	Bradshaw Creek	Montgomery	37.251791	-80.25899	Perennial	03010101	Timber Mat Crossing	25	-	501	-	4-613	H-015
92	S-NN19	UNT to Roanoke River	Montgomery	37.244319	-80.206995	Intermittent	03010101	Pipeline ROW	76	-	266	-	4-627	H-018
93	S-AB16	UNT to Roanoke River	Montgomery	37.231693	-80.198778	Intermittent	03010101	Timber Mat Crossing	20	-	100	-	4-631	H-020
94	S-I1	UNT to Roanoke River	Montgomery	37.231179	-80.19846	Intermittent	03010101	Timber Mat Crossing	20	-	279	-	4-631	H-020
95	S-CD12b	UNT to South Fork Roanoke River	Montgomery	37.229764	-80.201144	Perennial	03010101	Timber Mat Crossing	20	-	122	-	4-631	H-021
96	S-EF19	UNT to Indian Run	Montgomery	37.216102	-80.19739	Ephemeral	03010101	Pipeline ROW	79	-	396	-	4-634	H-023
97	S-EF20a	UNT to Roanoke River	Montgomery	37.210922	-80.193318	Perennial	03010101	Pipeline ROW	80	-	479	-	4-635	H-024
98	S-MM22	UNT to Roanoke River	Montgomery	37.205284	-80.187282	Perennial	03010101	Pipeline ROW	175	-	2627	-	4-637	H-025
99	S-IJ50	UNT to Roanoke River	Roanoke	37.194064	-80.167933	Perennial	03010101	Pipeline ROW	77	-	1925	-	4-641	H-026
100	S-Y13	UNT to Bottom Creek	Roanoke	37.187687	-80.151146	Intermittent	03010101	Pipeline ROW	85	-	680	-	4-644	H-027
101	S-Y14	UNT to Bottom Creek	Roanoke	37.187568	-80.151049	Perennial	03010101	Pipeline ROW	77	-	1076	-	4-644	H-027
102	S-EF57	UNT to Bottom Creek	Roanoke	37.181736	-80.148948	Intermittent	03010101	Temporary Access Road	42	-	335	-	4-645	S-EF57
103	S-EF55	UNT to Bottom Creek	Roanoke	37.181506	-80.149497	Intermittent	03010101	Pipeline ROW	33	-	266	-	4-645	H-028
104	S-EF34b	UNT to Bottom Creek	Roanoke	37.181385	-80.14914	Perennial	03010101	Pipeline ROW	81	-	810	-	4-645	H-028
105	S-EF33	UNT to Bottom Creek	Roanoke	37.179186	-80.141	Intermittent	03010101	Pipeline ROW	148	-	1333	-	4-647	H-029
106	S-IJ82	UNT to Bottom Creek	Roanoke	37.170458	-80.138216	Intermittent	03010101	Timber Mat Crossing	20	-	301	-	4-648	H-030
107	S-IJ85	UNT to Bottom Creek	Roanoke	37.169474	-80.130356	Perennial	03010101	Temporary Access Road	50	-	401	-	4-650	S-IJ85
108	S-IJ83	UNT to Bottom Creek	Roanoke	37.169211	-80.138258	Intermittent	03010101	Timber Mat Crossing	148	-	741	-	4-649	H-031
109	S-IJ88	Bottom Creek	Roanoke	37.168395	-80.138295	Perennial	03010101	Timber Mat Crossing	30	-	1960	-	4-649	H-031
110	S-IJ84	UNT to Bottom Creek	Roanoke	37.168361	-80.138381	Perennial	03010101	Timber Mat Crossing	35	-	527	-	4-649	H-031
111	S-IJ89	UNT to Bottom Creek	Roanoke	37.165862	-80.139317	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-649	H-032
112	S-IJ90	UNT to Bottom Creek	Roanoke	37.165685	-80.139378	Intermittent	03010101	Timber Mat Crossing	20	-	100	-	4-649	H-032
113	S-KL25	UNT to Mill Creek	Roanoke	37.160173	-80.134799	Intermittent	03010101	Pipeline ROW	82	-	409	-	4-651	H-033
114	S-ST9b	UNT to Mill Creek	Roanoke	37.154424	-80.129179	Perennial	03010101	Timber Mat Crossing	20	-	301	-	4-652	H-040
115	S-KL55	UNT to Mill Creek	Roanoke	37.150009	-80.13246	Perennial	03010101	Timber Mat Crossing	20	-	301	-	4-653	H-042
116	S-IJ12	UNT to Mill Creek	Roanoke	37.148333	-80.133919	Perennial	03010101	Timber Mat Crossing	20	-	261	-	4-653	H-043
117	S-EF44	UNT to Bottom Creek	Roanoke	37.143003	-80.138399	Intermittent	03010101	Timber Mat Crossing	20	-	139	-	4-654	H-044
118	S-IJ43	Mill Creek	Roanoke	37.138636	-80.139715	Perennial	03010101	Timber Mat Crossing	20	-	362	-	4-655	H-045
119	S-Y9	UNT to Mill Creek	Roanoke	37.134576	-80.137649	Intermittent	03010101	Timber Mat Crossing	44	-	174	-	4-656	H-046
120	S-Y7	UNT to Mill Creek	Roanoke	37.134481	-80.137622	Intermittent	03010101	Timber Mat Crossing	32	-	126	-	4-656	H-046
121	S-Y8	UNT to Mill Creek	Roanoke	37.134176	-80.137484	Perennial	03010101	Timber Mat Crossing	20	-	78	-	4-656	H-046
122	S-B22	UNT to Mill Creek	Roanoke	37.128922	-80.133769	Perennial	03010101	Timber Mat Crossing	20	-	78	-	4-659	H-047A
123	S-B23	UNT to Mill Creek	Roanoke	37.128853	-80.13391	Intermittent	03010101	Timber Mat Crossing	14	-	26	-	4-659	H-047A
124	S-B25	UNT to Mill Creek	Roanoke	37.12849	-80.132601	Intermittent	03010101	Timber Mat Crossing	76	-	379	-	4-659	H-48A
125	S-B21	UNT to Mill Creek	Roanoke	37.128484	-80.130943	Perennial	03010101	Pipeline ROW	92	-	366	-	4-659	H-048B
126	S-H1	Green Creek	Franklin	37.127733	-80.116787	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-661	Crossing complete (NWP-12)
127	S-G26	UNT to Green Creek	Franklin	37.127077	-80.111387	Intermittent	03010101	Timber Mat Crossing	20	-	139	-	4-662	Crossing complete (NWP-12)
128	S-G27	UNT to Green Creek	Franklin	37.126962	-80.111052	Perennial	03010101	Timber Mat Crossing	20	-	139	-	4-662	Crossing complete (NWP-12)
129	S-G24	UNT to Green Creek	Franklin	37.126412	-80.121398	Intermittent	03010101	Pipeline ROW	75	-	449	-	4-661	H-051
130	S-G25	UNT to Green Creek	Franklin	37.125398	-80.121401	Intermittent	03010101	Pipeline ROW	42	-	292	-	4-661	H-051

Table 1 - Stream Impacts

Assigned VWP Number	Stream ID	NHD Stream Name	County	Latitude	Longitude	Flow Regime	HUC 8	Impact Type	Temporary Impacts (linear ft)	Permanent Fill Impacts (linear ft)	Temporary Impact Area (square feet)	Permanent Impact Area (square feet)	Application Figure Number (MVP)	Plan & Profile Drawing Number (MVP)
131	S-RR18	UNT to Green Creek	Franklin	37.125055	-80.113578	Intermittent	03010101	Permanent Access Road	8	-	17	-	4-662	S-RR18
132	S-D11	UNT to North Fork BlackwaterRiver	Franklin	37.124137	-80.086182	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-666	H-054
133	S-D8	North Fork Blackwater River	Franklin	37.123098	-80.074673	Perennial	03010101	Pipeline ROW	78	-	941	-	4-667	H-055
134	S-D12	UNT to North Fork BlackwaterRiver	Franklin	37.121558	-80.085642	Intermittent	03010101	Pipeline ROW	54	-	322	-	4-666	H-053
135	S-D13	UNT to North Fork BlackwaterRiver	Franklin	37.121513	-80.08568	Intermittent	03010101	Pipeline ROW	117	-	466	-	4-666	H-053
136	S-D14	UNT to North Fork Blackwater River	Franklin	37.121473	-80.088457	Intermittent	03010101	Pipeline ROW	234	-	701	-	4-666	H-052
137	S-II4	UNT to North Fork BlackwaterRiver	Franklin	37.115679	-80.0603	Perennial	03010101	Timber Mat Crossing	20	-	301	-	4-670	Crossing complete (NWP-12)
138	S-GH7	UNT to North Fork BlackwaterRiver	Franklin	37.106614	-80.054219	Perennial	03010101	Timber Mat Crossing	20	-	179	-	4-672	Crossing complete (NWP-12)
139	S-GH15	UNT to North Fork BlackwaterRiver	Franklin	37.106177	-80.050105	Intermittent	03010101	Pipeline ROW	75	-	301	-	4-674	H-057
140	S-GH14	UNT to North Fork BlackwaterRiver	Franklin	37.105883	-80.048861	Perennial	03010101	Pipeline ROW	76	-	305	-	4-674	H-056
141	S-GH11	UNT to North Fork BlackwaterRiver	Franklin	37.104707	-80.04622	Intermittent	03010101	Pipeline ROW	77	-	231	-	4-674	H-058
142	S-GH9	UNT to North Fork BlackwaterRiver	Franklin	37.104329	-80.045343	Perennial	03010101	Pipeline ROW	78	-	314	-	4-674	H-059
143	S-RR08	UNT to North Fork BlackwaterRiver	Franklin	37.10329	-80.041868	Ephemeral	03010101	Timber Mat Crossing	20	-	139	-	4-674	H-060
144	S-RR09	UNT to North Fork BlackwaterRiver	Franklin	37.102491	-80.041046	Ephemeral	03010101	Pipeline ROW	77	-	693	-	4-675	H-061
145	S-RR11	UNT to North Fork BlackwaterRiver	Franklin	37.101127	-80.039653	Ephemeral	03010101	Pipeline ROW	77	-	540	-	4-675	H-062
146	S-IJ1	UNT to North Fork BlackwaterRiver	Franklin	37.093062	-80.027724	Perennial	03010101	Pipeline ROW	107	-	1285	-	4-677	H-063
147	S-IJ2	UNT to North Fork BlackwaterRiver	Franklin	37.092891	-80.027593	Intermittent	03010101	Pipeline ROW	40	-	100	-	4-677	H-063
	S-IJ3	UNT to North Fork BlackwaterRiver	Franklin	37.092555	-80.027314	Intermittent	03010101	Timber Mat Crossing	21	-	105	-	4-677	Crossing complete (NWP-12)
148	S-II6	UNT to Little Creek	Franklin	37.092697	-79.978402	Intermittent	03010101	Timber Mat Crossing	20	-	61	-	4-685	Crossing complete (NWP-12)
150	S-GH6	UNT to Little Creek	Franklin	37.092397	-79.983227	Perennial	03010101	Timber Mat Crossing	20	-	61	-	4-684	Crossing complete (NWP-12)
151	S-II12	UNT to Little Creek	Franklin	37.091608	-79.987839	Intermittent	03010101	Timber Mat Crossing	20	-	39	-	4-684	Crossing complete (NWP-12)
152	S-II11	UNT to Little Creek	Franklin	37.091564	-79.988051	Perennial	03010101	Timber Mat Crossing	20	-	78	-	4-684	Crossing complete (NWP-12)
153	S-II8	UNT to Little Creek	Franklin	37.091413	-79.993944	Intermittent	03010101	Timber Mat Crossing	20	-	39	-	4-683	Crossing complete (NWP-12)
154	S-II9	UNT to Little Creek	Franklin	37.091382	-79.99062	Perennial	03010101	Timber Mat Crossing	20	-	401	-	4-683	Crossing complete (NWP-12)
155	S-II7	UNT to Little Creek	Franklin	37.091354	-79.992013	Intermittent	03010101	Timber Mat Crossing	20	-	78	-	4-683	Crossing complete (NWP-12)
156	S-IJ4	UNT to North Fork BlackwaterRiver	Franklin	37.091189	-80.024366	Perennial	03010101	Timber Mat Crossing	20	-	78	-	4-677	Crossing complete (NWP-12)
157	S-KL2	UNT to Little Creek	Franklin	37.090361	-79.996354	Perennial	03010101	Timber Mat Crossing	20	-	74	-	4-682	Crossing complete (NWP-12)
158	S-GH2	UNT to Teels Creek	Franklin	37.090153	-79.953936	Intermittent	03010101	Timber Mat Crossing	20	-	39	-	4-689	Crossing complete (NWP-12)
159	S-GH4	UNT to Teels Creek	Franklin	37.089812	-79.956077	Perennial	03010101	Timber Mat Crossing	20	-	100	-	4-688	I-001A
160	S-GH3	UNT to Teels Creek	Franklin	37.089745	-79.956042	Perennial	03010101	Timber Mat Crossing	20	-	122	-	4-688	I-001A
161	S-IJ10	Little Creek	Franklin	37.089179	-80.005026	Perennial	03010101	Timber Mat Crossing	20	-	61	-	4-681	Crossing complete (NWP-12)
162	S-E29	UNT to Teels Creek	Franklin	37.089178	-79.95011	Perennial	03010101	Pipeline ROW	80	-	640	-	4-689	I-002
163	S-E28	Teels Creek	Franklin	37.089047	-79.9613	Perennial	03010101	Pipeline ROW	82	-	984	-	4-687	I-005B
164	S-E28	Teels Creek	Franklin	37.085247	-79.948057	Perennial	03010101	Pipeline ROW	76	-	910	-	4-690	I-005B
165	S-E28	Teels Creek	Franklin	37.082875	-79.945556	Perennial	03010101	Pipeline ROW	101	-	1211	-	4-690	I-005B
166	S-EF4	UNT to Teels Creek	Franklin	37.078963	-79.941911	Perennial	03010101	Pipeline ROW	80	-	880	-	4-691	I-006
167	S-EF7	UNT to Teels Creek	Franklin	37.074664	-79.941123	Ephemeral	03010101	Timber Mat Crossing	20	-	39	-	4-692	Crossing complete (NWP-12)
168	S-EF7	UNT to Teels Creek	Franklin	37.074636	-79.941336	Ephemeral	03010101	ATWS	22	-	44	-	4-692	Crossing complete (NWP-12)
169	S-EF12	Teels Creek	Franklin	37.073367	-79.939865	Perennial	03010101	Pipeline ROW	79	-	1581	-	4-692	I-007
170	S-MM42	UNT to Teels Creek	Franklin	37.070703	-79.937069	Ephemeral	03010101	Pipeline ROW	81	-	161	-	4-693	I-008
171	S-D23	Teels Creek	Franklin	37.070322	-79.931039	Perennial	03010101	Pipeline ROW	92	-	2087	-	4-694	I-010
172	S-D22	UNT to Teels Creek	Franklin	37.070101	-79.929732	Intermittent	03010101	Pipeline ROW	83	-	662	-	4-694	I-011
173	S-D18	UNT to Teels Creek	Franklin	37.069560	-79.926213	Ephemeral	03010101	Pipeline ROW	30	-	61	-	4-694	I-012
174	S-RR15	UNT to Teels Creek	Franklin	37.069542	-79.933892	Perennial	03010101	Timber Mat Crossing	20	-	26	-	4-694	I-009
175	S-D20	UNT to Teels Creek	Franklin	37.069485	-79.92623	Intermittent	03010101	Pipeline ROW	76	-	610	-	4-694	I-012
176	S-EF48	UNT to Blackwater River	Franklin	37.064748	-79.87442	Intermittent	03010101	Pipeline ROW	86	-	170	-	4-705	I-026
177	S-YZ4	UNT to Blackwater River	Franklin	37.064723	-79.87819	Ephemeral	03010101	Pipeline ROW	84	-	253	-	4-704	I-025
178	S-C14	Teels Creek	Franklin	37.063956	-79.921985	Perennial	03010101	Pipeline ROW	90	-	3655	-	4-696	I-013
179	S-YZ5	UNT to Blackwater River	Franklin	37.063464	-79.878281	Ephemeral	03010101	Pipeline ROW	86	-	344	-	4-704	I-024
180	S-KL41	UNT to Blackwater River	Franklin	37.062262	-79.862639	Perennial	03010101	Pipeline ROW	75	-	902	-	4-706	I-027
181	S-KL39	UNT to Blackwater River	Franklin	37.061193	-79.880018	Perennial	03010101	Pipeline ROW	121	-	788	-	4-704	I-023
182	S-C16	UNT to Teels Creek	Franklin	37.060610	-79.921179	Perennial	03010101	Timber Mat Crossing	20	-	301	-	4-696	Crossing complete (NWP-12)
183	S-KL54	UNT to Maggodee Creek	Franklin	37.059535	-79.840624	Perennial	03010101	Pipeline ROW	76	-	758	-	4-710	I-031
184	S-C8	UNT to Blackwater River	Franklin	37.059098	-79.853595	Intermittent	03010101	Pipeline ROW	86	-	431	-	4-708	I-028
185	S-F4	UNT to Blackwater River	Franklin	37.059060	-79.853379	Ephemeral	03010101	Pipeline ROW	82	-	819	-	4-708	I-028
186	S-C17	Teels Creek	Franklin	37.058390	-79.918015	Perennial	03010101	Timber Mat Crossing	30	-	601	-	4-696	I-014
187	S-KL52	UNT to Maggodee Creek	Franklin	37.058165	-79.844877	Ephemeral	03010101	Pipeline ROW	105	-	105	-	4-709	I-030
188	S-S11	UNT to Maggodee Creek	Franklin	37.057776	-79.838583	Perennial	03010101	Temporary Access Road	41	-	453	-	4-710	S-S11
189	S-F8	UNT to Maggodee Creek	Franklin	37.057724	-79.836406	Perennial	03010101	Pipeline ROW	83	-	2492	-	4-710	I-032
190	S-CD6	Little Creek	Franklin	37.057584	-79.913921	Perennial	03010101	Pipeline ROW	77	-	4426	-	4-698	I-015
191	S-HH4	UNT to Maggodee Creek	Franklin	37.056594	-79.835785	Intermittent	03010101	Pipeline ROW	97	-	871	-	4-711	I-033
192	S-KL51	UNT to Blackwater River	Franklin	37.056084	-79.850384	Perennial	03010101	Pipeline ROW	67	-	370	-	4-708	I-029
193	S-KL38	UNT to Blackwater River	Franklin	37.055912	-79.883177	Perennial	03010101	Pipeline ROW	78	-	545	-	4-702	I-022
194	S-C20	UNT to Maggodee Creek	Franklin	37.055193	-79.833881	Ephemeral	03010101	Timber Mat Crossing	20	-	78	-	4-711	I-034
195	S-C19	Maggodee Creek	Franklin	37.055147	-79.830098	Perennial	03010101	Pipeline ROW	75	-	3006	-	4-711	I-035

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Assigned VWP Number	Stream ID	NHD Stream Name	County	Latitude	Longitude	Flow Regime	HUC 8	Impact Type	Temporary Impacts (linear ft)	Permanent Fill Impacts (linear ft)	Temporary Impact Area (square feet)	Permanent Impact Area (square feet)	Application Figure Number (MVP)	Plan & Profile Drawing Number (MVP)
196	S-KL36	UNT to Blackwater River	Franklin	37.053336	-79.884604	Perennial	03010101	Timber Mat Crossing	20	-	148	-	4-702	I-021
197	S-F11	Blackwater River	Franklin	37.052843	-79.825711	Perennial	03010101	Pipeline ROW	91	-	6765	-	4-712	I-036
198	S-KL35	UNT to Blackwater River	Franklin	37.052125	-79.886182	Perennial	03010101	Timber Mat Crossing	35	-	87	-	4-702	I-020
199	S-F9b	UNT to Blackwater River	Franklin	37.049238	-79.817223	Perennial	03010101	Pipeline ROW	76	-	1141	-	4-713	I-037
200	S-II2	Little Creek	Franklin	37.049219	-79.908513	Perennial	03010101	Pipeline ROW	76	-	3245	-	4-699	I-018
201	S-F10	UNT to Blackwater River	Franklin	37.048037	-79.813934	Ephemeral	03010101	Timber Mat Crossing	20	-	179	-	4-713	I-038
202	S-CD1	UNT to Blackwater River	Franklin	37.047765	-79.897636	Perennial	03010101	Pipeline ROW	104	-	366	-	4-701	I-019
203	S-F9a	UNT to Blackwater River	Franklin	37.047172	-79.813	Intermittent	03010101	Timber Mat Crossing	20	-	301	-	4-713	I-039
204	S-MM29	UNT to Maple Branch	Franklin	37.043871	-79.822898	Perennial	03010101	Temporary Access Road	42	-	632	-	4-714	S-MM29
205	S-MM23	Maple Branch	Franklin	37.043854	-79.822974	Perennial	03010101	Temporary Access Road	78	-	1559	-	4-714	S-MM23
206	S-GG4	UNT to Blackwater River	Franklin	37.042742	-79.809015	Ephemeral	03010101	Timber Mat Crossing	20	-	200	-	4-716	I-040
207	S-A36	UNT to Foul Ground Creek	Franklin	37.037916	-79.804237	Ephemeral	03010101	Pipeline ROW	77	-	309	-	4-717	I-041
208	S-A38	UNT to Foul Ground Creek	Franklin	37.036271	-79.799442	Intermittent	03010101	Timber Mat Crossing	30	-	270	-	4-718	I-042
209	S-A40	UNT to Foul Ground Creek	Franklin	37.036173	-79.79924	Intermittent	03010101	Timber Mat Crossing	13	-	74	-	4-718	I-042
210	S-A41	Foul Ground Creek	Franklin	37.031714	-79.788213	Perennial	03010101	Pipeline ROW	76	-	910	-	4-720	I-043A
211	S-GH36	UNT to Foul Ground Creek	Franklin	37.031063	-79.778588	Intermittent	03010101	Timber Mat Crossing	20	-	61	-	4-721	I-044A
212	S-KL17	UNT to Foul Ground Creek	Franklin	37.031011	-79.778435	Intermittent	03010101	Timber Mat Crossing	20	-	100	-	4-721	I-044A
213	S-GH37	UNT to Foul Ground Creek	Franklin	37.030974	-79.77819	Intermittent	03010101	Pipeline ROW	46	-	139	-	4-721	I-044A
214	S-GH38	UNT to Foul Ground Creek	Franklin	37.030972	-79.778083	Intermittent	03010101	Pipeline ROW	7	-	22	-	4-721	I-044A
215	S-GH39	UNT to Foul Ground Creek	Franklin	37.030861	-79.778069	Intermittent	03010101	Pipeline ROW	103	-	414	-	4-721	I-044B
216	S-GH40	UNT to Foul Ground Creek	Franklin	37.028893	-79.774785	Ephemeral	03010101	Pipeline ROW	89	-	266	-	4-721	I-045
217	S-GH44	UNT to Foul Ground Creek	Franklin	37.028392	-79.773359	Perennial	03010101	Timber Mat Crossing	103	-	619	-	4-721	I-046
218	S-G22	UNT to Poplar Camp Creek	Franklin	37.019612	-79.761958	Perennial	03010101	Pipeline ROW	80	-	958	-	4-723	I-047
219	S-G23	UNT to Poplar Camp Creek	Franklin	37.019526	-79.762002	Intermittent	03010101	Pipeline ROW	42	-	126	-	4-723	I-047
220	S-G21	UNT to Poplar Camp Creek	Franklin	37.019359	-79.761643	Intermittent	03010101	Pipeline ROW	54	-	161	-	4-723	I-047
221	S-G20	Poplar Camp Creek	Franklin	37.017364	-79.76	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-724	I-048
222	S-G18	UNT to Blackwater River	Franklin	37.009236	-79.754238	Intermittent	03010101	Pipeline ROW	81	-	161	-	4-725	I-049
223	S-G17	UNT to Blackwater River	Franklin	37.005496	-79.752655	Ephemeral	03010101	Timber Mat Crossing	20	-	100	-	4-726	Crossing complete (NWP-12)
224	S-E18	UNT to Blackwater River	Franklin	37.001271	-79.747749	Perennial	03010101	Pipeline ROW	94	-	658	-	4-727	I-050
225	S-E17	UNT to Blackwater River	Franklin	37.000529	-79.74276	Perennial	03010101	Pipeline ROW	95	-	758	-	4-727	I-051
226	S-E14	UNT to Blackwater River	Franklin	36.995814	-79.735144	Perennial	03010101	Pipeline ROW	82	-	1638	-	4-728	I-052
227	S-H38	UNT to Jacks Creek	Franklin	36.989430	-79.722366	Perennial	03010101	Timber Mat Crossing	20	-	240	-	4-730	I-053
228	S-H32	UNT to Jacks Creek	Franklin	36.988273	-79.708199	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-732	I-057
229	S-H37	UNT to Jacks Creek	Franklin	36.988031	-79.71745	Ephemeral	03010101	Pipeline ROW	82	-	492	-	4-731	I-054
230	S-H34	UNT to Jacks Creek	Franklin	36.988009	-79.711881	Perennial	03010101	Timber Mat Crossing	20	-	61	-	4-732	I-056
231	S-H36	UNT to Jacks Creek	Franklin	36.988008	-79.714922	Perennial	03010101	Timber Mat Crossing	20	-	61	-	4-731	I-055
232	S-H30	UNT to Jacks Creek	Franklin	36.987961	-79.702711	Intermittent	03010101	Pipeline ROW	4	-	4	-	4-734	W-H11
233	S-A18	UNT to Jacks Creek	Franklin	36.987818	-79.700634	Intermittent	03010101	Pipeline ROW	87	-	227	-	4-734	I-059
234	S-A19/H26	UNT to Jacks Creek	Franklin	36.987719	-79.698901	Intermittent	03010101	Pipeline ROW	212	-	1485	-	4-734	I-060A
235	S-A20	UNT to Jacks Creek	Franklin	36.987715	-79.698555	Perennial	03010101	Timber Mat Crossing	20	-	139	-	4-734	I-060B
236	S-H28	UNT to Jacks Creek	Franklin	36.985174	-79.692272	Ephemeral	03010101	Pipeline ROW	16	-	96	-	4-735	I-061B
237	S-H27	UNT to Jacks Creek	Franklin	36.985124	-79.692272	Ephemeral	03010101	Pipeline ROW	36	-	362	-	4-735	I-061B
238	S-A22	UNT to Jacks Creek	Franklin	36.984846	-79.69187	Intermittent	03010101	Timber Mat Crossing	20	-	161	-	4-735	I-061A
239	S-MM44	UNT to Little Jacks Creek	Franklin	36.982507	-79.687818	Perennial	03010101	Timber Mat Crossing	20	-	78	-	4-735	I-062
240	S-MM46	UNT to Little Jacks Creek	Franklin	36.982240	-79.6875	Intermittent	03010101	Timber Mat Crossing	9	-	26	-	4-735	S-MM46
241	S-MM45	UNT to Little Jacks Creek	Franklin	36.981971	-79.686901	Ephemeral	03010101	Timber Mat Crossing	33	-	131	-	4-735	S-MM45
242	S-MM48	UNT to Little Jacks Creek	Franklin	36.979223	-79.684192	Perennial	03010101	Timber Mat Crossing	25	-	174	-	4-736	I-063
243	S-H25	Little Jacks Creek	Franklin	36.978529	-79.682186	Perennial	03010101	Timber Mat Crossing	20	-	139	-	4-736	I-064
244	S-H24	UNT to Little Jacks Creek	Franklin	36.978025	-79.680682	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-736	I-065
245	S-H23	UNT to Turkey Creek	Franklin	36.976421	-79.677525	Ephemeral	03010101	Pipeline ROW	92	-	462	-	4-738	I-066
246	S-HH1	UNT to Turkey Creek	Franklin	36.974647	-79.674453	Ephemeral	03010101	Pipeline ROW	18	-	91	-	4-738	S-HH1
247	S-A13	Turkey Creek	Franklin	36.973282	-79.673075	Perennial	03010101	Timber Mat Crossing	20	-	161	-	4-738	I-067
248	S-A11	UNT to Turkey Creek	Franklin	36.973237	-79.669898	Ephemeral	03010101	Pipeline ROW	55	-	166	-	4-740	S-A11
249	S-H17	Dinner Creek	Franklin	36.972125	-79.662987	Intermittent	03010101	Pipeline ROW	101	-	806	-	4-741	I-069B
250	S-A7	UNT to Dinner Creek	Franklin	36.972032	-79.662504	Perennial	03010101	Timber Mat Crossing	20	-	122	-	4-741	I-069A
251	S-SS8	Polecat Creek	Franklin	36.970904	-79.65737	Perennial	03010101	Timber Mat Crossing	20	-	161	-	4-741	I-070
252	S-CD8	UNT to Owens Creek	Franklin	36.970522	-79.653726	Intermittent	03010101	Pipeline ROW	78	-	353	-	4-742	I-071
253	S-AB8	UNT to Owens Creek	Franklin	36.970133	-79.651328	Intermittent	03010101	Pipeline ROW	84	-	335	-	4-742	I-078
254	S-DD3	Owens Creek	Franklin	36.969118	-79.645042	Intermittent	03010101	Timber Mat Crossing	20	-	301	-	4-743	I-073
255	S-G16	Strawfield Creek	Franklin	36.968640	-79.642174	Perennial	03010101	Timber Mat Crossing	30	-	601	-	4-743	I-074
256	S-G15	UNT to Parrot Branch	Franklin	36.967711	-79.63659	Intermittent	03010101	Pipeline ROW	88	-	793	-	4-744	I-075
257	S-G13	Parrot Branch	Franklin	36.967025	-79.630747	Perennial	03010101	Timber Mat Crossing	20	-	161	-	4-744	I-076
258	S-D3	UNT to Jonnikin Creek	Pittsylvania	36.965631	-79.605542	Perennial	03010101	Timber Mat Crossing	20	-	200	-	4-747	I-078
259	S-D4	UNT to Jonnikin Creek	Pittsylvania	36.965600	-79.604894	Intermittent	03010101	Pipeline ROW	105	-	632	-	4-747	I-079
260	S-D2	Jonnikin Creek	Pittsylvania	36.965405	-79.59913	Perennial	03010101	Timber Mat Crossing	20	-	362	-	4-748	I-080

Table 1 - Stream Impacts

Assigned VWP Number	Stream ID	NHD Stream Name	County	Latitude	Longitude	Flow Regime	HUC 8	Impact Type	Temporary Impacts (linear ft)	Permanent Fill Impacts (linear ft)	Temporary Impact Area (square feet)	Permanent Impact Area (square feet)	Application Figure Number (MVP)	Plan & Profile Drawing Number (MVP)
261	S-D7	UNT to Jonnikin Creek	Franklin	36.964763	-79.617043	Intermittent	03010101	Pipeline ROW	80	-	640	-	4-746	I-077
262	S-D1-EPH	UNT to Jonnikin Creek	Pittsylvania	36.964430	-79.595691	Ephemeral	03010101	Pipeline ROW	61	-	610	-	4-748	I-081
263	S-D1-INT	UNT to Jonnikin Creek	Pittsylvania	36.964407	-79.595841	Intermittent	03010101	Pipeline ROW	29	-	292	-	4-748	I-081
264	S-G11	UNT to Jonnikin Creek	Pittsylvania	36.962420	-79.5905	Intermittent	03010101	Pipeline ROW	77	-	462	-	4-749	I-082
265	S-G9	UNT to Jonnikin Creek	Pittsylvania	36.959361	-79.586437	Intermittent	03010101	Pipeline ROW	79	-	318	-	4-751	I-083
266	S-G8	UNT to Jonnikin Creek	Pittsylvania	36.957805	-79.583545	Intermittent	03010101	Pipeline ROW	90	-	362	-	4-751	I-084A
267	S-Q15	UNT to Jonnikin Creek	Pittsylvania	36.957580	-79.583492	Ephemeral	03010101	Pipeline ROW	103	-	514	-	4-751	I-084B
268	S-A6	UNT to Rocky Creek	Pittsylvania	36.952275	-79.58046	Perennial	03010101	Timber Mat Crossing	20	-	100	-	4-750	I-085
269	S-H11-Braid	UNT to Rocky Creek	Pittsylvania	36.949615	-79.579553	Ephemeral	03010101	Pipeline ROW	85	-	170	-	4-750	S-H11-Braid
270	S-F2	UNT to Rocky Creek	Pittsylvania	36.944049	-79.571442	Ephemeral	03010101	Timber Mat Crossing	20	-	139	-	4-753	I-086
271	S-C7	UNT to Rocky Creek	Pittsylvania	36.944016	-79.571517	Perennial	03010101	Timber Mat Crossing	20	-	401	-	4-753	I-086
272	S-C3	Harpen Creek	Pittsylvania	36.929762	-79.526109	Perennial	03010101	Timber Mat Crossing	20	-	362	-	4-758	I-087
273	S-C4	UNT to Harpen Creek	Pittsylvania	36.929745	-79.52629	Perennial	03010101	Timber Mat Crossing	58	-	231	-	4-758	I-087
274	S-H13	Harpen Creek	Pittsylvania	36.925105	-79.51735	Perennial	03010101	Pipeline ROW	77	-	1542	-	4-759	I-088
275	S-G6	UNT to Harpen Creek	Pittsylvania	36.920737	-79.505898	Intermittent	03010101	Pipeline ROW	80	-	479	-	4-761	I-089
276	S-G5	UNT to Harpen Creek	Pittsylvania	36.917694	-79.496604	Ephemeral	03010101	Pipeline ROW	77	-	462	-	4-762	I-090
277	S-G4	Harpen Creek	Pittsylvania	36.916463	-79.492669	Perennial	03010101	Timber Mat Crossing	30	-	601	-	4-762	I-091
278	S-G3	UNT to Harpen Creek	Pittsylvania	36.915658	-79.490029	Perennial	03010101	Timber Mat Crossing	20	-	179	-	4-762	I-092
279	S-CC16	UNT to Harpen Creek	Pittsylvania	36.913003	-79.487838	Perennial	03010101	Timber Mat Crossing	20	-	222	-	4-763	I-093
280	S-CC14	UNT to Cherrystone Creek	Pittsylvania	36.905329	-79.471492	Intermittent	03010105	Timber Mat Crossing	20	-	161	-	4-765	I-094
281	S-CC13	UNT to Cherrystone Creek	Pittsylvania	36.905307	-79.471574	Intermittent	03010105	Timber Mat Crossing	20	-	139	-	4-765	I-094
282	S-MM8	UNT to Cherrystone Creek	Pittsylvania	36.902991	-79.46822	Perennial	03010105	Timber Mat Crossing	20	-	122	-	4-766	I-095
283	S-CC15	UNT to Cherrystone Creek	Pittsylvania	36.901941	-79.466535	Perennial	03010105	Timber Mat Crossing	20	-	122	-	4-766	I-096
284	S-CC8	UNT to Cherrystone Creek	Pittsylvania	36.899437	-79.462685	Intermittent	03010105	Timber Mat Crossing	20	-	161	-	4-766	I-097
285	S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899411	-79.462483	Perennial	03010105	Timber Mat Crossing	20	-	240	-	4-766	I-097
286	S-CC5	UNT to Cherrystone Creek	Pittsylvania	36.899248	-79.462396	Perennial	03010105	Timber Mat Crossing	54	-	649	-	4-766	I-097
287	S-CC9	UNT to Cherrystone Creek	Pittsylvania	36.897740	-79.458046	Ephemeral	03010105	Pipeline ROW	81	-	444	-	4-767	I-098
288	S-CC10	UNT to Cherrystone Creek	Pittsylvania	36.897315	-79.456119	Intermittent	03010105	Pipeline ROW	78	-	701	-	4-767	I-099
289	S-MM10	UNT to Cherrystone Creek	Pittsylvania	36.895915	-79.45296	Intermittent	03010105	Pipeline ROW	9	-	61	-	4-768	I-100
290	S-CC11	UNT to Cherrystone Creek	Pittsylvania	36.895808	-79.45292	Perennial	03010105	Pipeline ROW	87	-	697	-	4-768	I-100
291	S-CC1	Cherrystone Creek	Pittsylvania	36.894043	-79.445744	Perennial	03010105	Pipeline ROW	82	-	1228	-	4-769	I-101B
292	S-CC3	UNT to Cherrystone Creek	Pittsylvania	36.893727	-79.444763	Ephemeral	03010105	Pipeline ROW	91	-	727	-	4-769	I-102
293	S-P5	UNT to Cherrystone Creek	Pittsylvania	36.892751	-79.440053	Ephemeral	03010105	Timber Mat Crossing	20	-	100	-	4-769	I-103
294	S-IJ35-EPH	UNT to Pole Bridge Branch	Pittsylvania	36.891451	-79.433781	Ephemeral	03010105	Pipeline ROW	171	-	684	-	4-770	I-104
295	S-Q4	UNT to Pole Bridge Branch	Pittsylvania	36.886114	-79.430914	Perennial	03010105	Timber Mat Crossing	20	-	100	-	4-771	I-105
296	S-Q3	Pole Bridge Branch	Pittsylvania	36.884444	-79.42822	Perennial	03010105	Pipeline ROW	75	-	1873	-	4-771	I-106B
297	S-Q2	UNT to Pole Bridge Branch	Pittsylvania	36.884284	-79.427914	Perennial	03010105	Timber Mat Crossing	20	-	139	-	4-771	I-106A
298	S-B6	UNT to Pole Bridge Branch	Pittsylvania	36.879063	-79.420189	Ephemeral	03010105	Pipeline ROW	84	-	841	-	4-772	I-108
299	S-B8	UNT to Pole Bridge Branch	Pittsylvania	36.877937	-79.417992	Intermittent	03010105	Pipeline ROW	82	-	327	-	4-773	I-109
300	S-B9	UNT to Pole Bridge Branch	Pittsylvania	36.877416	-79.416255	Perennial	03010105	Pipeline ROW	78	-	545	-	4-773	I-110
301	S-DD4-Braid-1	UNT to Mill Creek	Pittsylvania	36.871651	-79.404061	Intermittent	03010105	Pipeline ROW	67	-	401	-	4-775	I-111
302	S-DD4	UNT to Mill Creek	Pittsylvania	36.871478	-79.403907	Intermittent	03010105	Pipeline ROW	147	-	880	-	4-775	I-111
303	S-KL27	UNT to Mill Creek	Pittsylvania	36.866534	-79.400511	Ephemeral	03010105	Pipeline ROW	84	-	83	-	4-776	I-112
304	S-C1	Mill Creek	Pittsylvania	36.863513	-79.397914	Intermittent	03010105	Pipeline ROW	92	-	553	-	4-777	I-113
305	S-G2	Little Cherrystone Creek	Pittsylvania	36.851931	-79.386051	Perennial	03010105	Timber Mat Crossing	20	-	139	-	4-779	I-114
306	S-B2	UNT to Little Cherrystone Creek	Pittsylvania	36.849394	-79.37778	Ephemeral	03010105	Timber Mat Crossing	20	-	100	-	4-780	I-115
307	S-H55	UNT to Little Cherrystone Creek	Pittsylvania	36.843486	-79.369222	Ephemeral	03010105	Timber Mat Crossing	20	-	61	-	4-781	I-116
308	S-H54	UNT to Little Cherrystone Creek	Pittsylvania	36.841112	-79.366848	Perennial	03010105	Timber Mat Crossing	20	-	240	-	4-781	I-117
309	S-GG11	UNT to Little Cherrystone Creek	Pittsylvania	36.841093	-79.366942	Perennial	03010105	Timber Mat Crossing	46	-	366	-	4-781	I-117
310	S-H3	UNT to Little Cherrystone Creek	Pittsylvania	36.834501	-79.360244	Intermittent	03010105	Pipeline ROW	18	-	109	-	4-783	I-118
311	S-H5	UNT to Little Cherrystone Creek	Pittsylvania	36.833412	-79.359823	Perennial	03010105	Pipeline ROW	83	-	662	-	4-783	I-118
312	S-OO1	UNT to Little Cherrystone Creek	Pittsylvania	36.830285	-79.356618	Intermittent	03010105	Pipeline ROW	84	-	418	-	4-783	I-119
313	S-H44	UNT to Little Cherrystone Creek	Pittsylvania	36.829823	-79.346016	Perennial	03010105	Timber Mat Crossing	33	-	266	-	4-785	I-122
314	S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.828993	-79.344442	Perennial	03010105	Permanent Access Road	-	32	-	224	4-785	S-H42
315	S-H42	UNT to Little Cherrystone Creek	Pittsylvania	36.828958	-79.344315	Perennial	03010105	Timber Mat Crossing	20	-	139	-	4-785	I-123
316	S-OO2	UNT to Little Cherrystone Creek	Pittsylvania	36.828831	-79.353849	Intermittent	03010105	Pipeline ROW	78	-	392	-	4-784	I-120
317	S-EF26	Little Cherrystone Creek	Pittsylvania	36.828207	-79.349814	Perennial	03010105	Timber Mat Crossing	20	-	401	-	4-784	I-121

Note: Grayscale rows indicate timber mat crossings, and one additional temporary workspace (ATWS) completed under NWP-12

Table 2 - Wetland Impacts

Assigned VWP Number	Wetland ID	County	Latitude	Longitude	Cowardin Class	HUC 8	Impact Type	Temporary Impacts (square feet)	Permanent Conversion Impacts (square feet)	Permanent Fill Impacts (square feet)	Application Figure Number (MVP)	Plan & Profile Drawing Number
318	W-Z11	Giles	37.346591	-80.64171	PEM	05050002	Pipeline ROW	1141	-	-	4-543	G-008
319	W-Z3	Giles	37.342244	-80.62061	PSS	05050002	Timber Mat Crossing	-	592	-	4-545	G-013
320	W-CD12	Giles	37.318644	-80.44172	PEM	05050002	Pipeline ROW	906	-	-	4-577	G-029
321	W-MM10	Giles	37.298219	-80.48062	PEM	05050002	Temporary Access Road	1106	-	-	4-569	S-MM17 - W-MM10
322	W-RR1b	Giles	37.29667	-80.49404	PEM	05050002	Timber Mat Crossing	244	-	-	4-567	G-024
323	W-IJ46-	Montgomery	37.296153	-80.36751	PEM	03010101	Pipeline ROW	1281	-	-	4-591	G-044
324	W-AD4	Montgomery	37.286984	-80.33012	PEM	03010101	Temporary Access Road	301	-	-	4-596	W-AD4-A
325	W-NN6	Montgomery	37.268174	-80.31647	PEM	03010101	Timber Mat Crossing	362	-	-	4-603	Crossing completed (NWP-12)
326	W-F9-PFO	Montgomery	37.258109	-80.28589	PFO	03010101	Pipeline ROW	-	736	-	4-609	H-006
327	W-C12-	Montgomery	37.257265	-80.28167	PEM	03010101	Pipeline ROW	8999	-	-	4-609	H-008
328	W-C12	Montgomery	37.257192	-80.28165	PFO	03010101	Pipeline ROW	-	2278	-	4-609	H-008
329	W-C11	Montgomery	37.257107	-80.28135	PSS	03010101	Pipeline ROW	-	2008	-	4-609	H-008
330	W-C6	Montgomery	37.25586	-80.27572	PEM	03010101	Timber Mat Crossing	605	-	-	4-610	W-C6
331	W-C5	Montgomery	37.255606	-80.27424	PEM	03010101	Pipeline ROW	1978	-	-	4-610	H-012
332	W-AB7	Montgomery	37.231426	-80.19862	PEM	03010101	Timber Mat Crossing	174	-	-	4-631	H-020
333	W-KL58	Montgomery	37.229183	-80.20311	PEM	03010101	Permanent Access Road	-	-	1707	4-631	H-022
334	W-EF5-	Montgomery	37.210948	-80.19336	PFO	03010101	Pipeline ROW	-	3711	-	4-635	H-024
335	W-EF18	Roanoke	37.179449	-80.14067	PSS	03010101	Temporary Access Road	-	227	-	4-647	W-EF18 - W-EF17A
336	W-EF17	Roanoke	37.179402	-80.1406	PFO	03010101	Temporary Access Road	-	976	-	4-647	W-EF18 - W-EF17A
337	W-IJ94-	Roanoke	37.170092	-80.13829	PEM	03010101	Timber Mat Crossing	880	-	-	4-649	H-031
338	W-IJ96-	Roanoke	37.169461	-80.13038	PEM	03010101	Temporary Access Road	701	-	-	4-650	S-IJ85 - W-IJ96-PEM - W-IJ97-A
339	W-IJ95-	Roanoke	37.169068	-80.13828	PSS	03010101	Timber Mat Crossing	-	1106	-	4-649	H-031
340	W-IJ102	Roanoke	37.168289	-80.13838	PFO	03010101	Timber Mat Crossing	-	436	-	4-649	H-031
341	W-KL17	Roanoke	37.160152	-80.13477	PSS	03010101	Pipeline ROW	-	1895	-	4-651	H-033-W-KL17-S-KL25
344	W-EF42	Roanoke	37.157611	-80.13372	PEM	03010101	Pipeline ROW	362	-	-	4-652	H-036
345	W-HS02	Roanoke	37.157427	-80.13341	PEM	03010101	Pipeline ROW	12602	-	-	4-652	H-036
346	W-AB6-	Roanoke	37.156825	-80.132	PEM	03010101	Pipeline ROW	14248	-	-	4-652	H-036
347	W-AB6-	Roanoke	37.156713	-80.13168	PFO	03010101	Pipeline ROW	-	2692	-	4-652	H-036
348	W-AB6-	Roanoke	37.15617	-80.13079	PEM	03010101	Pipeline ROW	2818	-	-	4-652	H-036
349	W-AB6-	Roanoke	37.156034	-80.1306	PSS	03010101	Pipeline ROW	-	266	-	4-652	H-036
350	W-AB5	Roanoke	37.15584	-80.13023	PFO	03010101	Pipeline ROW	-	183	-	4-652	H-036
351	W-AB3-	Roanoke	37.155664	-80.12957	PEM	03010101	Pipeline ROW	6739	-	-	4-652	H-036
352	W-EF46	Roanoke	37.154575	-80.12912	PSS	03010101	Timber Mat Crossing	-	2971	-	4-652	H-40
353	W-KL48-	Roanoke	37.152292	-80.13002	PSS	03010101	Pipeline ROW	-	1978	-	4-653	H-41
354	W-KL48-	Roanoke	37.151965	-80.13005	PEM	03010101	Pipeline ROW	274	-	-	4-653	W-KL48-PEM
355	W-KL48-	Roanoke	37.150926	-80.13127	PSS	03010101	Pipeline ROW	-	1150	-	4-653	W-KL48-PSS-2, W-KL50
356	W-KL50	Roanoke	37.150728	-80.13154	PEM	03010101	Pipeline ROW	1777	-	-	4-653	W-KL48-PSS-2, W-KL50
357	W-KL49	Roanoke	37.150297	-80.13219	PEM	03010101	Timber Mat Crossing	662	-	-	4-653	H-042
358	W-KL51-	Roanoke	37.150006	-80.1324	PEM	03010101	Timber Mat Crossing	274	-	-	4-653	H-042
359	W-KL51-	Roanoke	37.149975	-80.13248	PSS	03010101	Timber Mat Crossing	-	348	-	4-653	H-042
360	W-MN7-	Roanoke	37.148328	-80.1339	PEM	03010101	Timber Mat Crossing	505	-	-	4-653	H-043
361	W-EF44	Roanoke	37.142977	-80.13832	PEM	03010101	Timber Mat Crossing	370	-	-	4-654	H-044
362	W-IJ36	Roanoke	37.138922	-80.13985	PSS	03010101	Timber Mat Crossing	-	5388	-	4-655	H-045
363	W-Z7	Roanoke	37.136601	-80.12822	PSS	03010101	Temporary Access Road	-	13	-	4-657	W-Z7 - W-Z6-A
364	W-Z6	Roanoke	37.136466	-80.12824	PFO	03010101	Temporary Access Road	-	122	-	4-657	W-Z7 - W-Z6-A
365	W-IJ62	Roanoke	37.135529	-80.13404	PEM	03010101	Temporary Access Road	4	-	-	4-656	W-IJ62
366	W-Y2	Roanoke	37.134284	-80.13745	PEM	03010101	Timber Mat Crossing	823	-	-	4-656	H-046
367	W-IJ10	Roanoke	37.132561	-80.13174	PEM	03010101	Permanent Access Road	87	-	-	4-656	W-IJ10 - W-Q11 - W-KL1-A

Table 2 - Wetland Impacts												
Assigned VWP Number	**Wetland ID**	**County**	**Latitude**	**Longitude**	**Cowardin Class**	**HUC 8**	**Impact Type**	**Temporary Impacts (square feet)**	**Permanent Conversion Impacts (square feet)**	**Permanent Fill Impacts (square feet)**	**Application Figure Number (MVP)**	**Plan & Profile Drawing Number**
368	W-Q11	Roanoke	37.13247	-80.13164	PEM	03010101	Permanent Access Road	566	-	-	4-656	W-IJ10 - W-Q11 - W-KL1-A
369	W-KL1	Roanoke	37.132456	-80.13146	PEM	03010101	Permanent Access Road	78	-	-	4-656	W-IJ10 - W-Q11 - W-KL1-A
370	W-B25-	Roanoke	37.128942	-80.13377	PEM	03010101	Timber Mat Crossing	405	-	-	4-659	H-047A
371	W-B25-	Roanoke	37.128645	-80.13328	PEM	03010101	Pipeline ROW	8425	-	-	4-659	H-047B-W-B25-PEM-1-W-B25-PEM-1A
372	W-B24-	Roanoke	37.12854	-80.13079	PSS	03010101	Pipeline ROW	-	7131	-	4-659	H-048B
373	W-B24-	Roanoke	37.12853	-80.13106	PEM	03010101	Pipeline ROW	4491	-	-	4-659	H-048B
374	W-B25-	Roanoke	37.128527	-80.13234	PSS	03010101	Timber Mat Crossing	-	3615	-	4-659	H-048
375	W-B25-	Roanoke	37.128449	-80.1328	PEM	03010101	Timber Mat Crossing	610	-	-	4-659	H-048
376	W-B25-	Roanoke	37.128436	-80.13265	PEM	03010101	Timber Mat Crossing	209	-	-	4-659	H-048
377	W-ST2-	Franklin	37.125329	-80.12146	PEM	03010101	Pipeline ROW	4975	-	-	4-661	H-051
378	W-RR4	Franklin	37.125117	-80.11353	PEM	03010101	Permanent Access Road	941	-	-	4-662	W-RR4 - S-RR18 - W-RR3 - W-KL41-A1
379	W-RR3	Franklin	37.124214	-80.11475	PEM	03010101	Permanent Access Road	83	-	-	4-662	W-RR4 - S-RR18 - W-RR3 - W-KL41-A1
380	W-KL41	Franklin	37.123851	-80.1158	PEM	03010101	Permanent Access Road	998	-	-	4-661	W-RR4 - S-RR18 - W-RR3 - W-KL41-A1
381	W-D7-	Franklin	37.121559	-80.08575	PEM	03010101	Pipeline ROW	693	-	-	4-666	H-053
382	W-EF3	Franklin	37.117734	-80.09599	PEM	03010101	Permanent Access Road	1154	-	-	4-665	W-EF3
383	W-IJ1	Franklin	37.092927	-80.02757	PEM	03010101	Pipeline ROW	1812	-	-	4-677	H-063
386	W-GH2	Franklin	37.092404	-79.98318	PSS	03010101	Timber Mat Crossing	-	566	-	4-684	Crossing completed (NWP-12)
387	W-II8	Franklin	37.091357	-79.99201	PEM	03010101	Timber Mat Crossing	383	-	-	4-683	Crossing completed (NWP-12)
388	W-IJ6	Franklin	37.089156	-80.00504	PEM	03010101	Timber Mat Crossing	200	-	-	4-681	Crossing completed (NWP-12)
389	W-E7	Franklin	37.084557	-79.9476	PEM	03010101	Pipeline ROW	9249	-	-	4-690	I-004
390	W-E8	Franklin	37.082843	-79.9461	PEM	03010101	Pipeline ROW	3010	-	-	4-690	I-005
391	W-EF51	Franklin	37.064781	-79.87446	PEM	03010101	Pipeline ROW	579	-	-	4-705	I-026
392	W-KL43b	Franklin	37.059608	-79.84071	PEM	03010101	Pipeline ROW	17	-	-	4-710	I-031
393	W-CD6	Franklin	37.057586	-79.91523	PEM	03010101	Timber Mat Crossing	4069	-	-	4-698	I-016
394	W-CD5	Franklin	37.055438	-79.91062	PFO	03010101	Pipeline ROW	-	4948	-	4-698	I-017
395	W-EF48	Franklin	37.052142	-79.8862	PEM	03010101	Timber Mat Crossing	348	-	-	4-702	I-020
396	W-CD1	Franklin	37.047767	-79.89757	PFO	03010101	Pipeline ROW	-	4818	-	4-701	I-019
397	W-DD1	Franklin	37.031961	-79.78859	PEM	03010101	Pipeline ROW	3541	-	-	4-720	I-043B
398	W-A12-	Franklin	37.031754	-79.7881	PFO	03010101	Pipeline ROW	-	174	-	4-720	I-043A
399	W-A12-	Franklin	37.031643	-79.78811	PEM	03010101	Pipeline ROW	2836	-	-	4-720	I-043A
400	W-GH16	Franklin	37.028394	-79.77324	PFO	03010101	Timber Mat Crossing	-	2862	-	4-722	I-046
401	W-H17	Franklin	36.98939	-79.72209	PFO	03010101	Timber Mat Crossing	-	1607	-	4-730	I-053
402	W-H11	Franklin	36.988077	-79.7028	PEM	03010101	Pipeline ROW	2039	-	-	4-734	I-058
403	W-H16	Franklin	36.988073	-79.71497	PEM	03010101	Timber Mat Crossing	1011	-	-	4-731	I-055
404	W-H14	Franklin	36.988069	-79.71184	PEM	03010101	Timber Mat Crossing	266	-	-	4-732	I-056
405	W-A8	Franklin	36.987947	-79.70084	PEM	03010101	Pipeline ROW	671	-	-	4-734	I-059
406	W-H15	Franklin	36.987938	-79.71483	PSS	03010101	Timber Mat Crossing	-	309	-	4-731	I-055
407	W-H9	Franklin	36.978536	-79.68206	PEM	03010101	Timber Mat Crossing	370	-	-	4-736	I-064
408	W-H6	Franklin	36.972189	-79.66304	PEM	03010101	Pipeline ROW	248	-	-	4-741	I-069B
409	W-D3	Pittsylvania	36.965318	-79.59876	PFO	03010101	Timber Mat Crossing	-	1241	-	4-748	I-080
410	W-MM17	Franklin	36.964731	-79.61707	PEM	03010101	Pipeline ROW	296	-	-	4-746	I-077
411	W-B5	Pittsylvania	36.959293	-79.5862	PEM	03010101	Pipeline ROW	209	-	-	4-751	I-083
412	W-B4-PSS	Pittsylvania	36.957884	-79.58367	PSS	03010101	Pipeline ROW	-	205	-	4-751	I-084A
413	W-C1	Pittsylvania	36.929954	-79.52683	PEM	03010101	Timber Mat Crossing	793	-	-	4-758	W-C1
414	W-H5	Pittsylvania	36.924983	-79.51716	PEM	03010101	Pipeline ROW	9004	-	-	4-759	I-088
415	W-B3	Pittsylvania	36.916508	-79.49236	PEM	03010101	Timber Mat Crossing	57	-	-	4-762	S-G4
416	W-CC2-	Pittsylvania	36.905418	-79.47157	PEM	03010105	Timber Mat Crossing	1185	-	-	4-765	I-094
417	W-MM5	Pittsylvania	36.903012	-79.46819	PSS	03010105	Timber Mat Crossing	-	1699	-	4-766	I-095

Table 2 - Wetland Impacts												
Assigned VWP Number	**Wetland ID**	**County**	**Latitude**	**Longitude**	**Cowardin Class**	**HUC 8**	**Impact Type**	**Temporary Impacts (square feet)**	**Permanent Conversion Impacts (square feet)**	**Permanent Fill Impacts (square feet)**	**Application Figure Number (MVP)**	**Plan & Profile Drawing Number**
418	W-MM9	Pittsylvania	36.894087	-79.44611	PEM	03010105	Timber Mat Crossing	470	-	-	4-769	I-101A
419	W-MM8-	Pittsylvania	36.894034	-79.44549	PEM	03010105	Pipeline ROW	2409	-	-	4-769	I-101B
420	W-MM8-	Pittsylvania	36.89393	-79.44546	PFO	03010105	Pipeline ROW	-	1834	-	4-769	I-101B
421	W-Q2	Pittsylvania	36.884674	-79.42861	PFO	03010105	Pipeline ROW	-	16422	-	4-771	I-106B
422	W-Q1	Pittsylvania	36.883985	-79.42731	PEM	03010105	Pipeline ROW	636	-	-	4-771	I-107
423	W-G2	Pittsylvania	36.851816	-79.38593	PEM	03010105	Timber Mat Crossing	1507	-	-	4-779	I-114
424	W-H1	Pittsylvania	36.836097	-79.3609	PEM	03010105	Pipeline ROW	479	-	-	4-782	I-118-S-H5-W-H3
425	W-EF6	Pittsylvania	36.835004	-79.33913	PFO	03010105	Pipeline ROW	-	2905	-	4-786	I-124
426	W-H2	Pittsylvania	36.834817	-79.36048	PEM	03010105	Pipeline ROW	34791	-	-	4-782	W-H2
427	W-IJ21	Pittsylvania	36.834623	-79.33853	PFO	03010105	Timber Mat Crossing	-	462	-	4-786	W-IJ21
428	W-H3	Pittsylvania	36.833741	-79.36008	PEM	03010105	Pipeline ROW	2217	-	-	4-783	I-118
429	W-MM3	Pittsylvania	36.830361	-79.35663	PSS	03010105	Pipeline ROW	-	1481	-	4-783	I-119
430	W-IJ22-PEI	Pittsylvania	36.82778	-79.35026	PEM	03010105	Timber Mat Crossing	1699	-	-	4-784	I-121
431	W-IJ22-PF(	Pittsylvania	36.827748	-79.3503	PFO	03010105	Timber Mat Crossing	-	3419	-	4-784	I-121
Note: Grayscale rows indicate timber mat crossings completed under NWP-12												

APPENDIX 2

Table 3 - DWR Time of Year Restrictions/DCR Recommendations

Assigned VWP Number	Stream ID	National Hydrogeological Database Stream Name (DEQ)	Flow Regime (MVP)	Proposed Crossing Method (MVP)	DWR Stream Designation	Instream work TOYR recommended by DWR	Sept 2020 TOYR mod request DWR response	VA Dept. of Conservation and Recreation Recommendation(s)	County (DEQ)	Latitude (DEQ)	Longitude (DEQ)	Profile & Plan Drawing Number (MVP)	Application Figure Number (MVP)
1	S-Q12	UNT to Kimballton Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.375311	-80.680878	G-001	4-531
2	S-Q13	Kimballton Branch	Perennial	Dry-Ditch Open-Cut	none, but upstream of wild trout water (Brook Trout, Brown Trout) and TE Water - Stony Creek (Candy Darter)	Brook and Brown Trout: October 1 through March 31; Candy Darter: March 15 through June 30	MVP requested a modification at this site. Without additional information or a change in crossing type, we continue to recommend adherence to the instream work TOYR.		Giles	37.374377	-80.682038	G-002	4-532
3	S-P6	UNT to Stony Creek	Ephemeral	Dry-Ditch Open-Cut	none, but upstream of TE Water - Stony Creek (Candy Darter)	Candy Darter (Stony Creek): March 15 through June 30			Giles	37.362202	-80.688092	G-003	4-535
4	S-S5-Braid-2	Stony Creek	Ephemeral, Ephemeral, Perennial	Conventional Bore	TE Water (Candy Darter)	Candy Darter: March 15 through June 30			Giles	37.360325	-80.684214	G-004	4-536
5	S-S5-Braid-1	Stony Creek	Ephemeral, Ephemeral, Perennial	Conventional Bore	TE Water (Candy Darter)	Candy Darter: March 15 through June 30			Giles	37.360276	-80.684193	G-004	4-536
6	S-S5	Stony Creek	Ephemeral, Ephemeral, Perennial	Conventional Bore	TE Water for Candy Darter	Candy Darter (Stony Creek): March 15 through June 30			Giles	37.360071	-80.68396	G-004	4-536
7	S-G29	UNT to Dry Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.35043	-80.658259	G-005	4-541
8	S-G30	UNT to Dry Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.350373	-80.65823	G-005	4-541
9	S-G32	Dry Branch	Intermittent	Dry-Ditch Open-Cut	none	none			Giles	37.349095	-80.65204	G-006	4-542
10	S-G33	UNT to Dry Branch	Perennial	Dry-Ditch Open-Cut	none	none			Giles	37.348641	-80.647225	G-007	4-542
11	S-G35	UNT to Little Stony Creek	Perennial	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15	MVP requested a TOYR modification - no TOYR necessary if constructed via bore, so, their request is approved.		Giles	37.344876	-80.633426	G-009	4-544
12	S-SS4	UNT to Little Stony Creek	Ephemeral	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15	MVP requested a TOYR modification - no TOYR necessary if constructed via bore, so, their request is approved.		Giles	37.344859	-80.631295	G-010	4-544
13	S-G35	UNT to Little Stony Creek	Perennial	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15			Giles	37.344779	-80.633379	G-009	4-544
14	S-Z7	UNT to Little Stony Creek	Intermittent, Ephemeral	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15	MVP requested a TOYR modification - no TOYR necessary if constructed via bore, so, their request is approved.		Giles	37.344278	-80.626185	G-012	4-545
15	S-Z7-Braid-1	UNT to Little Stony Creek	Intermittent, Ephemeral	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15	MVP requested a TOYR modification - no TOYR necessary if constructed via bore, so, their request is approved.		Giles	37.344277	-80.626113	G-012	4-545
16	S-Z9	UNT to Little Stony Creek	Perennial	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15			Giles	37.344163	-80.6284	G-011	4-544
17	S-Z10	UNT to Little Stony Creek	Intermittent, Perennial, Ephemeral, Wetland	Guided Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15	MVP requested a TOYR modification - no TOYR necessary if constructed via bore, so, their request is approved.		Giles	37.342351	-80.620823	G-013	4-545
18	S-Z11	UNT to Little Stony Creek	Intermittent, Perennial, Ephemeral, Wetland	Guided Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15			Giles	37.342236	-80.620542	G-013	4-545
19	S-Z12-EPH	UNT to Little Stony Creek	Intermittent, Perennial, Ephemeral, Wetland	Guided Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15			Giles	37.342214	-80.620312	G-013	4-545
20	S-Z13	Little Stony Creek	Intermittent, Perennial, Ephemeral, Wetland	Guided Conventional Bore	wild trout water (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15			Giles	37.342172	-80.62009	G-013	4-545

Table 3 - DWR Time of Year Restrictions/DCR Recommendations													
Assigned VWP Number	**Stream ID**	**National Hydrogeological Database Stream Name (DEQ)**	**Flow Regime (MVP)**	**Proposed Crossing Method (MVP)**	**DWR Stream Designation**	**Instream work TOYR recommended by DWR**	**Sept 2020 TOYR mod request DWR response**	**VA Dept. of Conservation and Recreation Recommendation(s)**	**County (DEQ)**	**Latitude (DEQ)**	**Longitude (DEQ)**	**Profile & Plan Drawing Number (MVP)**	**Application Figure Number (MVP)**
21	**S-Z14**	UNT to Little Stony Creek	Intermittent	Conventional Bore	none, but trib to wild trout water Little Stony Creek (Brook and Rainbow Trout)	**IF ANY INSTREAM WORK, TOYR not necessary if constructed via bore** - Brook and Rainbow Trout: October 1 through May 15	MVP requested a TOYR modification - no TOYR necessary if constructed via bore, so, their request is approved.		Giles	37.340977	-80.618031	G-014	4-545
22	**S-YZ1**	Doe Creek	Intermittent	Temporary Access Road	none	none			Giles	37.338952	-80.614618	S-YZ1	4-546
23	**S-A34**	UNT to Doe Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.337763	-80.606008	G-015A	4-548
24	**S-A33**	UNT to Doe Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.337639	-80.605571	G-015B	4-548
25	**S-A32**	UNT to Doe Creek	Perennial	Dry-Ditch Open-Cut	none	none			Giles	37.335094	-80.596868	G-016	4-549
26	**S-QQ2**	Sinking Creek	Perennial	Temporary Access Road	stockable trout water	To ensure avoidance of stocking and/or angling activities, we recommend coordination with our Regional Aquatic Resources Manager, Jeff Williams			Craig	37.333152	-80.429438	S-QQ2	4-581
27	**S-MN11-Upstream**	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.332869	-80.559168	S-MN11-Upstrea	4-554
28	**S-MN11-Upstream**	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.332191	-80.559979	S-MN11-Upstrea	4-554
29	**S-MN11-Downstream**	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.332146	-80.560079	S-MN11-Downst	4-554
30	**S-Y3**	UNT to Doe Creek	Ephemeral, Perennial	Conventional Bore	none	none			Giles	37.331748	-80.583355	G-017	4-551
31	**S-Y2**	Doe Creek	Ephemeral, Perennial	Conventional Bore	none	none			Giles	37.331332	-80.583047	G-017	4-551
32	**S-PP4**	UNT to Sinking Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Craig	37.328329	-80.42281	G-033	4-579
33	**S-PP3**	UNT to Sinking Creek	Perennial	Dry-Ditch Open-Cut	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Craig	37.326705	-80.425803	G-032	4-579
34	**S-RR4**	UNT to Sinking Creek	Perennial	Temporary Access Road	none	none			Giles	37.326015	-80.556831	S-RR4	4-556
35	**S-E24**	UNT to Sinking Creek	Perennial	Dry-Ditch Open-Cut	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.325728	-80.565082	G-019A	4-553
36	**S-E25-Downstream**	UNT to Sinking Creek	Perennial	Conventional Bore	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.325638	-80.56468	G-019B	4-553
37	**S-E25-Upstream**	UNT to Sinking Creek	Perennial	Pipeline ROW	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.325607	-80.564373	G-019A	4-553
38	**S-E25-Downstream**	UNT to Sinking Creek	Perennial	Conventional Bore	none	none			Giles	37.325566	-80.564634	G-019B	4-553
39	**S-PP1**	UNT to Sinking Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Craig	37.324781	-80.431446	G-031	4-578
40	**S-RR5**	UNT to Sinking Creek	Perennial	Dry-Ditch Open-Cut	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.323702	-80.555627	G-020	4-555
41	**S-PA07**	UNT to Sinking Creek	Intermittent	Pipeline ROW	none	none			Giles	37.323533	-80.555257	G-020	4-555
42	**S-IJ18-EPH**	UNT to Sinking Creek	Ephemeral, Intermittent	Dry-Ditch Open-Cut	none	none			Giles	37.322737	-80.552396	G-020A	4-555
43	**S-IJ19**	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.322194	-80.553058	S-J119	4-555
44	**S-IJ19**	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.321823	-80.55311	S-J119	4-555
45	**S-IJ18-INT**	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.321756	-80.553011	S-IJ18-INT	4-555
46	**S-PP22**	UNT to Craig Creek	Intermittent	Conventional Bore	none, but upstream of TE Water Craig Creek (James Spinymussels). Upstream of stockable trout water.	**IF instream work, TOYR not necessary if consructed via bore** - James Spinymussels: May 15 through July 31		According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.32109	-80.412831	G-034	4-584
47	**S-OO12**	UNT to Sinking Creek	Ephemeral, Perennial	Dry-Ditch Open-Cut	none	none			Giles	37.318956	-80.440648	G-030	4-577

Table 3 - DWR Time of Year Restrictions/DCR Recommendations													
Assigned VWP Number	**Stream ID**	**National Hydrogeological Database Stream Name (DEQ)**	**Flow Regime (MVP)**	**Proposed Crossing Method (MVP)**	**DWR Stream Designation**	**Instream work TOYR recommended by DWR**	**Sept 2020 TOYR mod request DWR response**	**VA Dept. of Conservation and Recreation Recommendation(s)**	**County (DEQ)**	**Latitude (DEQ)**	**Longitude (DEQ)**	**Profile & Plan Drawing Number (MVP)**	**Application Figure Number (MVP)**
48	**S-OO13**	UNT to Sinking Creek	Ephemeral, Perennial	Dry-Ditch Open-Cut	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.31893	-80.44093	G-030	4-577
49	**S-OO14**	UNT to Sinking Creek	Wetland, Perennial	Dry-Ditch Open-Cut	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.318647	-80.441619	G-029	4-577
50	**S-IJ17**	UNT to Sinking Creek	Ephemeral	Pipeline ROW	none	none			Giles	37.318324	-80.54772	G-022	4-558
51	**S-IJ16-b**	UNT to Sinking Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.318246	-80.547711	G-022	4-558
52	**S-PP21**	UNT to Craig Creek	Perennial	Conventional Bore	none, but upstream of TE Water Craig Creek (James Spinymussels). Upstream of stockable trout water.	**IF instream work, TOYR and mussel survey not necessary if constructed via bore.** Mussel survey and potential relocation necessary prior to any instream work. TOYR for James Spinymussels: May 15 through July 31		According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.317187	-80.409235	G-035	4-584
53	**S-PP20**	UNT to Craig Creek	Perennial	Conventional Bore	none, but upstream of TE Water Craig Creek (James Spinymussels). Upstream of stockable trout water.	**IF instream work, TOYR and mussel survey not necessary if constructed via bore.** Mussel survey and potential relocation necessary prior to any instream work. TOYR for James Spinymussels: May 15 through July 31		According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.316523	-80.408646	G-036	4-584
54	**S-RR13**	Craig Creek	Perennial	Temporary Access Road	TE Water (James spinymussels)	**IF instream work, TOYR and mussel survey not necessary if constructed via bore.** Mussel survey and potential relocation necessary prior to any instream work. TOYR for James Spinymussels: May 15 through July 31		According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.314504	-80.402613	S-RR13	4-585

Table 3 - DWR Time of Year Restrictions/DCR Recommendations

Assigned VWP Number	Stream ID	National Hydrogeological Database Stream Name (DEQ)	Flow Regime (MVP)	Proposed Crossing Method (MVP)	DWR Stream Designation	Instream work TOYR recommended by DWR	Sept 2020 TOYR mod request DWR response	VA Dept. of Conservation and Recreation Recommendation(s)	County (DEQ)	Latitude (DEQ)	Longitude (DEQ)	Profile & Plan Drawing Number (MVP)	Application Figure Number (MVP)
55	S-HH18	UNT to Craig Creek	Perennial	Conventional Bore	none, but upstream of TE Water Craig Creek (James Spinymussels). Upstream of stockable trout water.	**IF instream work, TOYR and mussel survey not necessary if constructed via bore.** Mussel survey and potential relocation necessary prior to any instream work. TOYR for James Spinymussels: May 15 through July 31	MVP requested TOYR modification. MVP requested to work March 1 - May 14. This is not within the recommended TOYR, so that request is approved.	According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.31391	-80.398683	G-039	4-586
56	S-RR14	UNT to Craig Creek	Ephemeral	Conventional Bore	none, but upstream of TE Water Craig Creek (James Spinymussels). Upstream of stockable trout water.	**IF instream work, TOYR and mussel survey not necessary if constructed via bore.** Mussel survey and potential relocation necessary prior to any instream work. TOYR for James Spinymussels: May 15 through July 31		According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.313615	-80.402521	G-038	4-585
57	S-OO6	Craig Creek	Perennial	Conventional Bore	TE Water (James spinymussels)	**IF instream work, TOYR and mussel survey not necessary if constructed via bore.** Mussel survey and potential relocation necessary prior to any instream work. TOYR for James Spinymussels: May 15 through July 31		According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation.	Montgomery	37.313511	-80.404606	G-037	4-585
58	S-QQ3	UNT to Sinking Creek	Ephemeral	Temporary Access Road	none	none			Giles	37.311735	-80.532304	S-QQ3	4-560
59	S-IJ16-a	UNT to Sinking Creek	Ephemeral	Permanent Access Road	none	none			Giles	37.31173	-80.544091	S-IJ16-a	4-559
60	S-IJ16-a	UNT to Sinking Creek	Ephemeral	Permanent Access Road	none	none			Giles	37.31173	-80.544091	S-IJ16-a	4-559
61	S-NN17	Sinking Creek	Perennial	Conventional Bore	none	none			Giles	37.311616	-80.515786	G-023	4-564
62	S-KL43	UNT to Sinking Creek	Perennial	Dry-Ditch Open-Cut	none	none	MVP asked for TOYR mod, but no TOYR are necessary here anyway, so their request is approved.		Giles	37.307524	-80.466665	G-028	4-573
63	S-NN11	UNT to Sinking Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Giles	37.305508	-80.467231	G-027	4-573
64	S-NN12	UNT to Sinking Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.300454	-80.472911	G-026	4-571
65	S-MN21	UNT to Mill Creek	Perennial	Dry-Ditch Open-Cut	wild trout (Brown Trout)	Brown Trout: October 1 through March 31			Montgomery	37.299397	-80.391243	G-040	4-588
66	S-MM17	UNT to Sinking Creek	Perennial	Temporary Access Road	none	none			Giles	37.298226	-80.480624	S-MM17	4-569
67	S-MN22	UNT to Mill Creek	Ephemeral	Dry-Ditch Open-Cut	none, but upstream of wild trout water (Brown Trout)	Brown Trout: October 1 through March 31			Montgomery	37.297166	-80.386612	G-041	4-589
68	S-RR2	Greenbriar Branch	Perennial, Intermittent, Wetland	Conventional Bore	none	none			Giles	37.296666	-80.494174	G-024	4-567
69	S-YZ6	UNT to Greenbriar Branch	Perennial, Intermittent, Wetland	Conventional Bore	none	none			Giles	37.296612	-80.494165	G-024	4-567
70	S-EF62	UNT to Mill Creek	Perennial	Dry-Ditch Open-Cut	none, but upstream of wild trout water	Brown Trout: October 1 through March 31			Montgomery	37.296356	-80.375118	G-043	4-590
71	S-MM18	UNT to Sinking Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Giles	37.296226	-80.481455	G-025	4-569

Table 3 - DWR Time of Year Restrictions/DCR Recommendations

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72	**S-IJ52**	UNT to Mill Creek	Perennial, Wetland	Dry-Ditch Open-Cut	none, but upstream of wild trout water	Brown Trout: October 1 through March 31			Montgomery	37.296153	-80.36751	G-044	4-591
73	**S-EF65**	Mill Creek	**Intermittent**	Dry-Ditch Open-Cut	wild trout water (Brown Trout)	Brown Trout: October 1 through March 31	MVP requested TOYR modification, but without additional information or a change in crossing method, we continue to recommend adherence to the TOYR		Montgomery	37.295743	-80.375921	G-042	4-590
74	**S-G36**	North Fork Roanoke River	Perennial	Temporary Access Road	TE Water (Roanoke Logperch)	Roanoke Logperch: March 15 through June 30	MVP requested TOYR modification but without additional information or a change in crossing menthod, we continue to recommend adherence to the TOYR		Montgomery	37.268586	-80.313161	S-G36	4-602
78	**S-G39**	UNT to North Fork Roanoke River	Intermittent	Dry-Ditch Open-Cut	none, but upstream of TE Water (Roanoke Logperch)	Roanoke Logperch: March 15 through June 30			Montgomery	37.264817	-80.308486	H-001	4-604
79	**S-MM14**	UNT to Flatwoods Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Montgomery	37.258717	-80.29321	H-003	4-608
80	**S-MM15**	UNT to Flatwoods Branch	Intermittent	Dry-Ditch Open-Cut	none	none			Montgomery	37.258673	-80.296446	H-002	4-608
81	**S-MM11**	UNT to Flatwoods Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Montgomery	37.258403	-80.288186	H-005	4-609
82	**S-F15**	UNT to Flatwoods Branch	Wetland, Perennial (Intermittent?)	Dry-Ditch Open-Cut	none	none			Montgomery	37.258198	-80.286029	H-006	4-609
83	**S-MM13**	UNT to Flatwoods Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Montgomery	37.258176	-80.289222	H-004	4-608
84	**S-F16a/F16b**	UNT to Flatwoods Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Montgomery	37.257998	-80.284735	H-007	4-609
85	**S-C36**	UNT to Flatwoods Branch	Intermittent, Wetland	Dry-Ditch Open-Cut	none	none			Montgomery	37.25726	-80.281611	H-008	4-609
86	**S-C36**	UNT to Flatwoods Branch	Intermittent, Wetland	Dry-Ditch Open-Cut	none	none			Montgomery	37.257133	-80.281475	H-008	4-609
87	**S-MM31**	UNT to Flatwoods Branch	Ephemeral	Conventional Bore	none	none			Montgomery	37.256959	-80.280329	H-009	4-609
88	**S-C29**	Flatwoods Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Montgomery	37.256387	-80.278021	H-010	4-610
89	**S-C25**	UNT to Bradshaw Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Montgomery	37.254342	-80.267895	H-013	4-611
90	**S-C24**	UNT to Bradshaw Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Montgomery	37.254135	-80.266743	H-014	4-611
91	**S-C21**	Bradshaw Creek	Perennial	Conventional Bore	none	none	MVP requested modification, no TOYR is necessary, so their request is approved		Montgomery	37.251791	-80.25899	H-015	4-613
92	**S-NN19**	UNT to Roanoke River	Intermittent	Dry-Ditch Open-Cut	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Montgomery	37.244319	-80.206995	H-018	4-627
93	**S-AB16**	UNT to Roanoke River	Intermittent, Intermittent, Wetland	Conventional Bore	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Montgomery	37.231693	-80.198778	H-020	4-631

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94	S-I1	UNT to Roanoke River	Intermittent, Intermittent, Wetland	Conventional Bore	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Montgomery	37.231179	-80.19846	H-020	4-631
95	S-CD12b	UNT to South Fork Roanoke River	Perennial	Conventional Bore	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Montgomery	37.229764	-80.201144	H-021	4-631
96	S-EF19	UNT to Indian Run	Ephemeral	Dry-Ditch Open-Cut	none	none			Montgomery	37.216102	-80.19739	H-023	4-634
97	S-EF20a	UNT to Roanoke River	Wetland, Perennial	Dry-Ditch Open-Cut	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Montgomery	37.210922	-80.193318	H-024	4-635
98	S-MM22	UNT to Roanoke River	Perennial	Dry-Ditch Open-Cut	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Montgomery	37.205284	-80.187282	H-025	4-637
99	S-IJ50	UNT to Roanoke River	Perennial	Dry-Ditch Open-Cut	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	Roanoke Logperch, Orangefin Madtom: March 15 through June 30			Roanoke	37.194064	-80.167933	H-026	4-641
100	S-Y13	UNT to Bottom Creek	Intermittent, Perennial	Dry-Ditch Open-Cut	none but upstream of trout water (Brook Trout)	Brook trout: October 1 through March 31	MVP requested TOYR modification but without additional information or a change in crossing menthod, we continue to recommend adherence to the TOYR	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.187687	-80.151146	H-027	4-644
101	S-Y14	UNT to Bottom Creek	Intermittent, Perennial	Dry-Ditch Open-Cut	none but upstream of trout water (Brook Trout)	Brook trout: October 1 through March 31	MVP requested TOYR modification but without additional information or a change in crossing menthod, we continue to recommend adherence to the TOYR	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.187568	-80.151049	H-027	4-644
102	S-EF57	UNT to Bottom Creek	Intermittent	Temporary Access Road	none but upstream of trout water (Brook Trout)	Brook trout: October 1 through March 31		In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.181736	-80.148948	S-EF57	4-645

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103	**S-EF55**	UNT to Bottom Creek	Intermittent	Pipeline ROW	none but upstream of trout water (Brook Trout)	Brook trout: October 1 through March 31	MVP requested TOYR modification but without additional information or a change in crossing menthod, we continue to recommend adherence to the TOYR	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.181506	-80.149497	H-028	4-645
104	**S-EF34b**	UNT to Bottom Creek	Perennial, Intermittent	Dry-Ditch Open-Cut	none but upstream of trout water (Brook Trout)	Brook trout: October 1 through March 31	MVP requested TOYR modification but without additional information or a change in crossing menthod, we continue to recommend adherence to the TOYR	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.181385	-80.14914	H-028	4-645
105	**S-EF33**	UNT to Bottom Creek	Intermittent	Dry-Ditch Open-Cut	upstream of trout water Bottom Creek	Brook trout: October 1 through March 31	MVP requested TOYR modification but without additional information or a change in crossing menthod, we continue to recommend adherence to the TOYR	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.179186	-80.141	H-029	4-647
106	**S-IJ82**	UNT to Bottom Creek	Intermittent	Conventional Bore	none but upstream of trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31	MVP requested TOYR modificaition. TOYR not necessary if constructed via bore, so their request is approved	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.170458	-80.138216	H-030	4-648

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107	**S-IJ16a**	UNT to Bottom Creek	Ephemeral	Permanent Access Road	none but upstream of trout water (Brook Trout)	Brook trout: October 1 through March 31		In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.169474	-80.130356	S-IJ85	4-650
108	**S-IJ83**	UNT to Bottom Creek	Wetlands; Intermittent; Perennials; Wetland	Conventional Bore	none but upstream of trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31	MVP requested TOYR modificaition. TOYR not necessary if constructed via bore, so their request is approved	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.169211	-80.138258	H-031	4-649
109	**S-IJ88**	Bottom Creek	Wetlands; Intermittent; Perennials; Wetland	Conventional Bore	wild trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31		In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.168395	-80.138295	H-031	4-649
110	**S-IJ84**	UNT to Bottom Creek	Wetlands; Intermittent; Perennials; Wetland	Conventional Bore	none but upstream of trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31	MVP requested TOYR modificaition. TOYR not necessary if constructed via bore, so their request is approved	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.168361	-80.138381	H-031	4-649

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111	**S-IJ89**	UNT to Bottom Creek	Perennial, Intermittent	Conventional Bore	none but upstream of trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31	MVP requested TOYR modificaition. TOYR not necessary if constructed via bore, so their request is approved	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.165862	-80.139317	H-032	4-649
112	**S-IJ90**	UNT to Bottom Creek	Perennial, Intermittent	Conventional Bore	none but upstream of trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31	MVP requested TOYR modificaition. TOYR not necessary if constructed via bore, so their request is approved	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.165685	-80.139378	H-032	4-649
113	**S-KL25**	UNT to Mill Creek	Wetland; Intermittent	Dry-Ditch Open-Cut	none	none	MVP requested TOYR modificaition. TOYR not necessary here, so their request is approved		Roanoke	37.160173	-80.134799	H-033	4-651
114	**S-ST9b**	UNT to Mill Creek	Wetland; Perennial	Conventional Bore	none	none	MVP requested TOYR modificaition. TOYR not necessary here, so their request is approved		Roanoke	37.154424	-80.129179	H-040	4-652
115	**S-KL55**	UNT to Mill Creek	Intermittent	TImber Mat Crossing	none	none	MVP requested TOYR modificaition. TOYR not necessary here, so their request is approved		Roanoke	37.150009	-80.13246	H-042	4-653
116	**S-IJ12**	UNT to Mill Creek	Wetland; Perennial	Conventional Bore	none	none	MVP requested TOYR modificaition. TOYR not necessary here, so their request is approved		Roanoke	37.148333	-80.133919	H-043	4-653
117	**S-EF44**	UNT to Bottom Creek	Inermittent; Wetland	Conventional Bore	none but upstream of trout water (Brook Trout)	**IF instream work, TOYR not necessary if constructed via bore** - Brook trout: October 1 through March 31	MVP requested TOYR modificaition. TOYR not necessary if constructed via bore, so their request is approved	In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).	Roanoke	37.143003	-80.138399	H-044	4-654

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118	**S-IJ43**	Mill Creek	Wetland; Perennial	Conventional Bore	stockable trout water; TE Water for Orangefin Madtom	**If any instream work, TOYR and coordination not necessary if constructed via bore** - Orangefin Madtom: March 15 through June 30; To ensure avoidance of stocking and angling activities, we recommend coordination with our Regional Aquatic Resources Manager, Scott Smith	MVP requested modification of TOYR. TOYR not necessary if constructed via bore, so their request is approved.		Roanoke	37.138636	-80.139715	H-045	4-655
119	**S-Y9**	UNT to Mill Creek	Intermittent	Timber Mat Crossing	none, but upstream of TE Water (Orangefin Madtom)	Orangefin Madtom: March 15 through June 30	MVP requested modification of TOYR. TOYR not necessary here, so their request is approved.		Roanoke	37.134576	-80.137649	H-046	4-656
120	**S-Y7**	UNT to Mill Creek	Intermittent; Wetland; Perennial	Conventional Bore	none, but upstream of TE Water (Orangefin Madtom)	**If any instream work, TOYR not necessary if constructed via bore** - Orangefin Madtom: March 15 through June 30	MVP requested modification of TOYR. TOYR not necessary if constructed via bore, so their request is approved.		Roanoke	37.134481	-80.137622	H-046	4-656
121	**S-Y8**	UNT to Mill Creek	Intermittent; Wetland; Perennial	Conventional Bore	none, but upstream of TE Water (Orangefin Madtom)	**If any instream work, TOYR not necessary if constructed via bore** - Orangefin Madtom: March 15 through June 30	MVP requested modification of TOYR. TOYR not necessary if constructed via bore, so their request is approved.		Roanoke	37.134176	-80.137484	H-046	4-656
122	**S-B22**	UNT to Mill Creek	Perennial	Conventional Bore	none, but upstream of TE Water (Orangefin Madtom)	**If any instream work, TOYR not necessary if constructed via bore** - Orangefin Madtom: March 15 through June 30	MVP requested modification of TOYR. TOYR not necessary if constructed via bore, so their request is approved.		Roanoke	37.128922	-80.133769	H-047A	4-659
123	**S-B23**	UNT to Mill Creek	Intermittent	Timber Mat Crossing	none, but upstream of TE Water (Orangefin Madtom)	Orangefin Madtom: March 15 through June 30	MVP requested TOYR modification. Without additional information or a changed in crossing method, we continue to recommend adherence to the TOYR		Roanoke	37.128853	-80.13391	H-046	4-659
124	**S-B25**	UNT to Mill Creek	Wetland; Intermittent	Conventional Bore	none, but upstream of TE Water (Orangefin Madtom)	**If any instream work, TOYR not necessary if constructed via bore** - Orangefin Madtom: March 15 through June 30	MVP requested modification of TOYR. TOYR not necessary if constructed via bore, so their request is approved.		Roanoke	37.12849	-80.132601	H-048A	4-659
125	**S-B21**	UNT to Mill Creek	Wetlands; Perennial	Dry-Ditch Open-Cut	none, but upstream of TE Water (Orangefin Madtom)	Orangefin Madtom: March 15 through June 30	MVP requested TOYR modification. Without additional information or a changed in crossing method, we continue to recommend adherence to the TOYR		Roanoke	37.128484	-80.130943	H-048B	4-659
129	**S-G24**	UNT to Green Creek	Wetland; Intermittents	Dry-Ditch Open-Cut	none, but upstream of trout water (Brown Trout)	Brown Trout: October 1 through March 31			Franklin	37.126412	-80.121398	H-051	4-661
130	**S-G25**	UNT to Green Creek	Wetland; Intermittents	Dry-Ditch Open-Cut	none, but upstream of trout water (Brown Trout)	Brown Trout: October 1 through March 31			Franklin	37.125398	-80.121401	H-051	4-661
131	**S-RR18**	UNT to Green Creek	Intermittent	Permanent Access Road	none, but upstream of trout water (Brown Trout)	Brown Trout: October 1 through March 31			Franklin	37.125055	-80.113578	S-RR18	4-662
132	**S-D11**	UNT to North Fork Blackwater River	Perennial	Conventional Bore	none	none			Franklin	37.124137	-80.086182	H-054	4-666
133	**S-D8**	North Fork Blackwater River	Perennial	Dry-Ditch Open-Cut	stockable trout water	To ensure avoidance of stocking and/or angling activities, we recommend coordinattion with Scott Smith			Franklin	37.123098	-80.074673	H-055	4-667
134	**S-D12**	UNT to North Fork Blackwater River	Wetland; Intermittents	Dry-Ditch Open-Cut	none	none			Franklin	37.121558	-80.085642	H-053	4-666
135	**S-D13**	UNT to North Fork Blackwater River	Wetland; Intermittents	Dry-Ditch Open-Cut	none	none			Franklin	37.121513	-80.08568	H-053	4-666
136	**S-D14**	UNT to North Fork Blackwater River	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.121473	-80.088457	H-052	4-666
139	**S-GH15**	UNT to North Fork Blackwater River	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.106177	-80.050105	H-056	4-674
140	**S-GH14**	UNT to North Fork Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.105883	-80.048861	H-057	4-674
141	**S-GH11**	UNT to North Fork Blackwater River	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.104707	-80.04622	H-058	4-674

Table 3 - DWR Time of Year Restrictions/DCR Recommendations													
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142	S-GH9	UNT to North Fork Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.104329	-80.045343	H-059	4-674
143	S-RR08	UNT to North Fork Blackwater River	Ephemeral	Conventional Bore	none	none			Franklin	37.10329	-80.041868	H-060	4-674
144	S-RR09	UNT to North Fork Blackwater River	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.102491	-80.041046	H-061	4-675
145	S-RR11	UNT to North Fork Blackwater River	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.101127	-80.039653	H-062	4-675
146	S-IJ1	UNT to North Fork Blackwater River	Perennial; Wetland; Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.093062	-80.027724	H-063	4-677
147	S-IJ2	UNT to North Fork Blackwater River	Perennial; Wetland; Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.092891	-80.027593	H-063	4-677
159	S-GH4	UNT to Teels Creek	Perennial	Timber Mat Crossing	none	none			Franklin	37.089812	-79.956077	I-001A	4-688
160	S-GH3	UNT to Teels Creek	Perennial	Conventional Bore	none	none			Franklin	37.089745	-79.956042	I-001A	4-688
162	S-E29	UNT to Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.089178	-79.95011	I-002	4-689
163	S-E28	Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.089047	-79.9613	I-001	4-687
164	S-E28	Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.085247	-79.948057	I-003	4-687
165	S-E28	Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.082875	-79.945556	I-005B	4-687
166	S-EF4	UNT to Teels Creek	IPA, TABLE B-1 says Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.078963	-79.941911	I-006	4-691
169	S-EF12	Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.073367	-79.939865	I-007	4-692
170	S-MM42	UNT to Teels Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.070703	-79.937069	I-008	4-693
171	S-D23	Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.070322	-79.931039	I-010	4-694
172	S-D22	UNT to Teels Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.070101	-79.929732	I-011	4-694
173	S-D18	UNT to Teels Creek	Ephemeral	Pipeline ROW	none	none			Franklin	37.06956	-79.926213	I-012	4-694
174	S-RR15	UNT to Teels Creek	Perennial	Conventional Bore	none	none			Franklin	37.069542	-79.933892	I-009	4-694
175	S-D20	UNT to Teels Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.069485	-79.92623	I-012	4-694
176	S-EF48	UNT to Blackwater River	Intermittent; Wetland	Dry-Ditch Open-Cut	none	none			Franklin	37.064748	-79.87442	I-026	4-705
177	S-YZ4	UNT to Blackwater River	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.064723	-79.87819	I-025	4-704
178	S-C14	Teels Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.063956	-79.921985	I-013	4-696
179	S-YZ5	UNT to Blackwater River	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.063464	-79.878281	I-024	4-704
180	S-KL41	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.062262	-79.862639	I-027	4-706
181	S-KL39	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.061193	-79.880018	I-023	4-704
183	S-KL54	UNT to Maggodee Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.059535	-79.840624	I-031	4-710
184	S-C8	UNT to Blackwater River	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.059098	-79.853595	I-028	4-708
185	S-F4	UNT to Blackwater River	Ephemeral	Pipeline ROW	none	none			Franklin	37.05906	-79.853379	I-031	4-708
186	S-C17	Teels Creek	Perennial	Conventional Bore	none	none			Franklin	37.05839	-79.918015	I-014	4-696
187	S-KL52	UNT to Maggodee Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.058165	-79.844877	I-030	4-709
188	S-S11	UNT to Maggodee Creek	Perennial	Temporary Access Road	none	none			Franklin	37.057776	-79.838583	S-S11	4-710
189	S-F8	UNT to Maggodee Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.057724	-79.836406	I-032	4-710
190	S-CD6	Little Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.057584	-79.913921	I-015	4-698
191	S-HH4	UNT to Maggodee Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.056594	-79.835785	I-033	4-711
192	S-KL51	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.056084	-79.850384	I-029	4-708
193	S-KL38	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.055912	-79.883177	I-022	4-702
194	S-C20	UNT to Maggodee Creek	Ephemeral	Conventional Bore	none	none			Franklin	37.055193	-79.833881	I-034	4-711
195	S-C19	Maggodee Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.055147	-79.830098	I-035	4-711
196	S-KL36	UNT to Blackwater River	Perennial	Conventional Bore	none	none			Franklin	37.053336	-79.884604	I-021	4-702
197	S-F11	Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.052843	-79.825711	I-036	4-712
198	S-KL35	UNT to Blackwater River	Perennial; Wetland	Conventional Bore	none	none			Franklin	37.052125	-79.886182	I-020	4-702

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199	S-F9b	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.049238	-79.817223	I-037	4-713
200	S-II2	Little Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.049219	-79.908513	I-018	4-699
201	S-F10	UNT to Blackwater River	Ephemeral	Conventional Bore	none	none			Franklin	37.048037	-79.813934	I-038	4-713
202	S-CD1	UNT to Blackwater River	Perennial; Wetland	Dry-Ditch Open-Cut	none	none			Franklin	37.047765	-79.897636	I-019	4-701
203	S-F9a	UNT to Blackwater River	Intermittent	Conventional Bore	none	none			Franklin	37.047172	-79.813	I-039	4-713
204	S-MM29	UNT to Maple Branch	Perennial	Temporary Access Road	none	none			Franklin	37.043871	-79.822898	S-MM29	4-714
205	S-MM23	Maple Branch	Perennial	Temporary Access Road	none	none			Franklin	37.043854	-79.822974	S-MM23	4-714
206	S-GG4	UNT to Blackwater River	Ephemeral	Conventional Bore	none	none			Franklin	37.042742	-79.809015	I-040	4-716
207	S-A36	UNT to Foul Ground Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.037916	-79.804237	I-041	4-717
208	S-A38	UNT to Foul Ground Creek	Intermittent	Conventional Bore	none	none			Franklin	37.036271	-79.799442	I-042	4-718
209	S-A40	UNT to Foul Ground Creek	Intermittent	Timber Mat Crossing	none	none			Franklin	37.036173	-79.79924	I-042	4-718
210	S-A41	Foul Ground Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.031714	-79.788213	I-043A	4-720
211	S-GH36	UNT to Foul Ground Creek	Intermittents	Conventional Bore	none	none			Franklin	37.031063	-79.778588	I-044A	4-721
212	S-KL17	UNT to Foul Ground Creek	Intermittents	Conventional Bore	none	none			Franklin	37.031011	-79.778435	I-044A	4-721
213	S-GH37	UNT to Foul Ground Creek	Intermittent	Pipeline ROW	none	none			Franklin	37.030974	-79.77819	I-44A	4-721
214	S-GH38	UNT to Foul Ground Creek	Streams, Wetland	Conventional Bore	none	none			Franklin	37.030972	-79.778083	I-046	4-721
215	S-GH39	UNT to Foul Ground Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.030861	-79.778069	I-044B	4-721
216	S-GH40	UNT to Foul Ground Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Franklin	37.028893	-79.774785	I-045	4-721
217	S-GH44	UNT to Foul Ground Creek	Streams, Wetland	Conventional Bore	none	none			Franklin	37.028392	-79.773359	I-046	4-721
218	S-G22	UNT to Poplar Camp Creek	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.019612	-79.761958	I-047	4-723
219	S-G23	UNT to Poplar Camp Creek	Perennial	Conventional Bore	none	none			Franklin	37.019526	-79.762002	I-092	4-723
220	S-G21	UNT to Poplar Camp Creek	Intermittent	Pipeline ROW	none	none			Franklin	37.019359	-79.761643	I-047	4-723
221	S-G20	Poplar Camp Creek	Perennial	Conventional Bore	none	none			Franklin	37.017364	-79.76	I-048	4-724
222	S-G18	UNT to Blackwater River	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	37.009236	-79.754238	I-049	4-725
224	S-E18	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.001271	-79.747749	I-050	4-727
225	S-E17	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	37.000529	-79.74276	I-051	4-727
226	S-E14	UNT to Blackwater River	Perennial	Dry-Ditch Open-Cut	none	none			Franklin	36.995814	-79.735144	I-052	4-728
227	S-H38	UNT to Jacks Creek	Perennial, Wetland	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.98943	-79.722366	I-053	4-730

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228	**S-H32**	UNT to Jacks Creek	Perennnial	Conventional Bore	none	none	MVP requested TOYR mod, but none is necessary here anyway, so their request is granted	DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.988273	-79.708199	I-057	4-732
229	**S-H37**	UNT to Jacks Creek	Ephemeral	Dry-Ditch Open-Cut	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.988031	-79.71745	I-054	4-731
230	**S-H34**	UNT to Jacks Creek	Perennial	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.988009	-79.711881	I-056	4-732
231	**S-H36**	UNT to Jacks Creek	Perennial, Wetland	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.988008	-79.714922	I-055	4-731
232	**S-H30**	UNT to Jacks Creek	Intermittent	Pipeline ROW	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.987961	-79.702711	W-H11	4-734

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233	S-A18	UNT to Jacks Creek	Intermittent	Dry-Ditch Open-Cut	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.987818	-79.700634	I-059	4-734
234	S-A19/H26	UNT to Jacks Creek	Intermittent	Dry-Ditch Open-Cut	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.987719	-79.698901	I-060A	4-734
235	S-A20	UNT to Jacks Creek	Perennial	Conventional Bore	none	none	MVP requested TOYR mod, but none is necessary here anyway, so their request is granted	DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.987715	-79.698555	I-060B	4-734
236	S-H28	UNT to Jacks Creek	Ephemeral	Pipeline ROW	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.985174	-79.692272	I-061B	4-735
237	S-H27	UNT to Jacks Creek	Ephemeral	Dry-Ditch Open-Cut	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.985124	-79.692272	I-061B	4-735

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238	S-A22	UNT to Jacks Creek	Intermittent	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.984846	-79.69187	I-061A	4-735
239	S-MM44	UNT to Little Jacks Creek	Perennial	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.982507	-79.687818	I-062	4-735
240	S-MM46	UNT to Little Jacks Creek	Intermittent	Timber Mat Crossing	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.98224	-79.6875	S-MM46	4-735
241	S-MM45	UNT to Little Jacks Creek	Ephemeral	Timber Mat Crossing	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.981971	-79.686901	S-MM45	4-735
242	S-MM48	UNT to Little Jacks Creek	Perennial	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.979223	-79.684192	I-063	4-736

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243	**S-H25**	Little Jacks Creek	Perennial; Wetland	Conventional Bore	none, but upstream of TE Water(Roanoke Logperch)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch : March 15 through June 31		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.978529	-79.682186	I-064	4-736
244	**S-H24**	UNT to Little Jacks Creek	Perennial	Conventional Bore	none	none		DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources (Not Listed). The natural heritage resources of concern at this site are: Piedmont fameflower, Weak bluegrass, Prairie dropseed, and the Southern Piedmont Ultramafic Barren Significant Community.	Franklin	36.978025	-79.680682	I-065	4-736
245	**S-H23**	UNT to Turkey Creek	Ephemeral	Dry-Ditch Open-Cut	none				Franklin	36.976421	-79.677525	I-066	4-738
246	**S-HH1**	UNT to Turkey Creek	Ephemeral	Pipeline ROW	none				Franklin	36.974647	-79.674453	S-HH1	4-738
247	**S-A13**	Turkey Creek	Perennial	Conventional Bore	none, but upstream of TE Water(Roanoke Logperch)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch : March 15 through June 31	MVP requested a TOYR - no TOYR necessary if the crossing is constructed via bore. So, their request is approved.		Franklin	36.973282	-79.673075	I-067	4-738
248	**S-A11**	UNT to Turkey Creek	Ephemeral	Pipeline ROW	none	none			Franklin	36.973237	-79.669898	S-A11	4-740
249	**S-H17**	Dinner Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	36.972125	-79.662987	I-069B	4-741
250	**S-A7**	UNT to Dinner Creek	Perennial	Conventional Bore	none	none			Franklin	36.972032	-79.662504	I-069A	4-741
251	**S-SS8**	Polecat Creek	Perennial	Conventional Bore	none	none			Franklin	36.970904	-79.65737	I-070	4-741
252	**S-CD8**	UNT to Owens Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	36.970522	-79.653726	I-071	4-742
253	**S-AB8**	UNT to Owens Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	36.970133	-79.651328	I-072	4-742
254	**S-DD3**	Owens Creek	Intermittent	Conventional Bore	none, but upstream of TE Water(Roanoke Logperch)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch : March 15 through June 31	MVP requested a TOYR - no TOYR necessary if the crossing is constructed via bore. So, their request is approved.		Franklin	36.969118	-79.645042	I-073	4-743
255	**S-G16**	Strawfield Creek	Perennial	Conventional Bore	none	none	MVP requested a TOYR modification - no TOYR necessary so, their request is approved.		Franklin	36.96864	-79.642174	I-074	4-743
256	**S-G15**	UNT to Parrot Branch	Intermittent	Dry-Ditch Open-Cut	none	none			Franklin	36.967711	-79.63659	I-075	4-744
257	**S-G13**	Parrot Branch	Perennial	Conventional Bore	none, but upstream of TE Water (Roanoke Logperch and Orangefin Madtom)	**IF instream work, TOYR not necessary if constructed via bore** - Roanoke Logperch and Orangefin Madtom : March 15 through June 31	MVP requested TOYR modification, no TOYR if crosing is constructed as a bore. So, their request is approved.		Franklin	36.967025	-79.630747	I-076	4-744
258	**S-D3**	UNT to Jonnikin Creek	Perennial	Conventional Bore	none	none	MVP requested TOYR modification, no TOYR recommended here so their request is approved		Pittsylvania	36.965631	-79.605542	I-078	4-747
259	**S-D4**	UNT to Jonnikin Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.9656	-79.604894	I-079	4-747
260	**S-D2**	Jonnikin Creek	Perennial; Wetland	Conventional Bore	none	none			Pittsylvania	36.965405	-79.59913	I-080	4-748
261	**S-D7**	UNT to Jonnikin Creek	Intermittent; Wetland	Dry-Ditch Open-Cut	none	none			Franklin	36.964763	-79.617043	I-077	4-746
262	**S-D1-EPH**	UNT to Jonnikin Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.96443	-79.595691	I-081	4-748
263	**S-D1-INT**	UNT to Jonnikin Creek	Intermittent	Pipeline ROW	none				Pittsylvania	36.964407	-79.595841	I-081	4-748
264	**S-G11**	UNT to Jonnikin Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.96242	-79.5905	I-082	4-749
265	**S-G9**	UNT to Jonnikin Creek	Intermittent; Wetland	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.959361	-79.586437	I-083	4-751
266	**S-G8**	UNT to Jonnikin Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.957805	-79.583545	I-084A	4-751
267	**S-Q15**	UNT to Jonnikin Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.95758	-79.583492	I-084B	4-751
268	**S-A6**	UNT to Rocky Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.952275	-79.58046	I-085	4-750
269	**S-H11-Braid**	UNT to Rocky Creek	Ephemeral	Pipeline ROW	none	none			Pittsylvania	36.949615	-79.579553	I-084B	4-750
270	**S-F2**	UNT to Rocky Creek	Ephemeral	Timber Mat Crossing	none	none			Pittsylvania	36.944049	-79.571442	I-086	4-753

Table 3 - DWR Time of Year Restrictions/DCR Recommendations

Assigned VWP Number	Stream ID	National Hydrogeological Database Stream Name (DEQ)	Flow Regime (MVP)	Proposed Crossing Method (MVP)	DWR Stream Designation	Instream work TOYR recommended by DWR	Sept 2020 TOYR mod request DWR response	VA Dept. of Conservation and Recreation Recommendation(s)	County (DEQ)	Latitude (DEQ)	Longitude (DEQ)	Profile & Plan Drawing Number (MVP)	Application Figure Number (MVP)
271	S-C7	UNT to Rocky Creek	Perennial	Conventional Bore	none	none	MVP requested TOYR modification here, but no TOYR recommened so their request is approved.		Pittsylvania	36.944016	-79.571517	I-086	4-753
272	S-C3	Harpen Creek	Perennial; Perennial	Conventional Bore	none	none			Pittsylvania	36.929762	-79.526109	I-087	4-758
273	S-C4	UNT to Harpen Creek	Perennial; Perennial	Conventional Bore	none	none			Pittsylvania	36.929745	-79.52629	I-087	4-758
274	S-H13	Harpen Creek	Perennial; Wetland	Dry-Ditch Open-Cut	none	none	MVP requested TOYR modification, but no TOYR recommended, so their request is approved		Pittsylvania	36.925105	-79.51735	I-088	4-759
275	S-G6	UNT to Harpen Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.920737	-79.505898	I-089	4-761
276	S-G5	UNT to Harpen Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.917694	-79.496604	I-090	4-762
277	S-G4	Harpen Creek	Perennial	Conventional Bore	none	none	MVP requested TOYR modification, but no TOYR recommended, so their request is approved		Pittsylvania	36.916463	-79.492669	I-091	4-762
278	S-G3	UNT to Harpen Creek	Perennial	Timber Mat Crossing	none	none			Pittsylvania	36.915658	-79.490029	I-092	4-762
279	S-CC16	UNT to Harpen Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.913003	-79.487838	I-093	4-763
280	S-CC14	UNT to Cherrystone Creek	Intermittent; Intermittent	Conventional Bore	none	none			Pittsylvania	36.905329	-79.471492	I-094	4-765
281	S-CC13	UNT to Cherrystone Creek	Intermittent; Intermittent	Conventional Bore	none	none			Pittsylvania	36.905307	-79.471574	I-094	4-765
282	S-MM8	UNT to Cherrystone Creek	Perennial; Wetland	Conventional Bore	none	none			Pittsylvania	36.902991	-79.46822	I-095	4-766
283	S-CC15	UNT to Cherrystone Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.901941	-79.466535	I-096	4-766
284	S-CC8	UNT to Cherrystone Creek	Intermittent; Perennial	Conventional Bore	none	none			Pittsylvania	36.899437	-79.462685	I-097	4-766
285	S-CC5	UNT to Cherrystone Creek	Intermittent; Perennial	Conventional Bore	none	none			Pittsylvania	36.899411	-79.462483	I-097	4-766
286	S-CC5	UNT to Cherrystone Creek	Intermittent; Perennial	Conventional Bore	none	none			Pittsylvania	36.899248	-79.462396	I-097	4-766
287	S-CC9	UNT to Cherrystone Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.89774	-79.458046	I-098	4-767
288	S-CC10	UNT to Cherrystone Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.897315	-79.456119	I-099	4-767
289	S-MM10	UNT to Cherrystone Creek	Intermittent	Pipeline ROW	none	none			Pittsylvania	36.895915	-79.45296	I-098	4-768
290	S-CC11	UNT to Cherrystone Creek	Perennial	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.895808	-79.45292	I-100	4-768
291	S-CC1	Cherrystone Creek	Wetlands; Perennial	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.894043	-79.445744	I-101B	4-769
292	S-CC3	UNT to Cherrystone Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.893727	-79.444763	I-102	4-769
293	S-P5	UNT to Cherrystone Creek	Ephemeral	Conventional Bore	none	none			Pittsylvania	36.892751	-79.440053	I-103	4-769
294	S-IJ35-EPH	UNT to Pole Bridge Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.891451	-79.433781	I-104	4-770
295	S-Q4	UNT to Pole Bridge Branch	Perennial	Conventional Bore	none	none			Pittsylvania	36.886114	-79.430914	I-105	4-771
296	S-Q3	Pole Bridge Branch	Wetland; Perennial	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.884444	-79.42822	I-106B	4-771
297	S-Q2	UNT to Pole Bridge Branch	Perennial	Conventional Bore	none	none			Pittsylvania	36.884284	-79.427914	I-106A	4-771
298	S-B6	UNT to Pole Bridge Branch	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.879063	-79.420189	I-108	4-772
299	S-B8	UNT to Pole Bridge Branch	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.877937	-79.417992	I-109	4-773
300	S-B9	UNT to Pole Bridge Branch	Perennial	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.877416	-79.416255	I-110	4-773
301	S-DD4-Braid-1	UNT to Mill Creek	Intermittent	Conventional Bore	none	none			Pittsylvania	36.871651	-79.404061	I-111A	4-775
302	S-DD4	UNT to Mill Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.871478	-79.403907	I-111	4-775
303	S-KL27	UNT to Mill Creek	Ephemeral	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.866534	-79.400511	I-112	4-776
304	S-C1	Mill Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.863513	-79.397914	I-113	4-777
305	S-G2	Little Cherrystone Creek	Perennial; Wetland	Conventional Bore	none	none			Pittsylvania	36.851931	-79.386051	I-114	4-779
306	S-B2	UNT to Little Cherrystone Creek	Ephemeral	Conventional Bore	none	none			Pittsylvania	36.849394	-79.37778	I-115	4-780
307	S-H55	UNT to Little Cherrystone Creek	Ephemeral	Conventional Bore	none	none			Pittsylvania	36.843486	-79.369222	I-116	4-781
308	S-H54	UNT to Little Cherrystone Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.841112	-79.366848	I-117	4-781
309	S-GG11	UNT to Little Cherrystone Creek	Perennial	Timber Mat Crossing	none	none			Pittsylvania	36.841093	-79.366942	I-116	4-781
310	S-H3	UNT to Little Cherrystone Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.834501	-79.360244	I-118	4-783

Table 3 - DWR Time of Year Restrictions/DCR Recommendations													
Assigned VWP Number	Stream ID	National Hydrogeological Database Stream Name (DEQ)	Flow Regime (MVP)	Proposed Crossing Method (MVP)	DWR Stream Designation	Instream work TOYR recommended by DWR	Sept 2020 TOYR mod request DWR response	VA Dept. of Conservation and Recreation Recommendation(s)	County (DEQ)	Latitude (DEQ)	Longitude (DEQ)	Profile & Plan Drawing Number (MVP)	Application Figure Number (MVP)
311	S-H5	UNT to Little Cherrystone Creek	Perennial; Wetlands; Intermittent; Wetland	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.833412	-79.359823	I-118	4-783
312	S-OO1	UNT to Little Cherrystone Creek	Intermittent, Wetland	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.830285	-79.356618	I-119	4-783
313	S-H44	UNT to Little Cherrystone Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.829823	-79.346016	I-122	4-785
314	S-H42	UNT to Little Cherrystone Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.828993	-79.344442	I-123	4-785
315	S-H42	UNT to Little Cherrystone Creek	Perennial	Conventional Bore	none	none			Pittsylvania	36.828958	-79.344315	I-123	4-785
316	S-OO2	UNT to Little Cherrystone Creek	Intermittent	Dry-Ditch Open-Cut	none	none			Pittsylvania	36.828831	-79.353849	I-120	4-784
317	S-EF26	Little Cherrystone Creek	Perennial; Wetlands	Conventional Bore	none	none			Pittsylvania	36.828207	-79.349814	I-121	4-784

FRESHWATER MUSSEL GUIDELINES FOR VIRGINIA

Virginia Field Office
U.S. Fish and Wildlife Service
6669 Short Lane
Gloucester, VA 23061
804-693-6694

Virginia Dept. of Game and Inland Fisheries
P.O. Box 90778
Henrico, VA 23228-0778
804-367-1000

Last Updated: November 16, 2018

DRAFT

LIST OF ENCLOSURES

1 - Federal and State Project Review Process in Virginia
2 - Federally and State Listed Species in Virginia
3 - Mussel Survey and Relocation Guidelines in Virginia
4 - Surveyor List for Atlantic Slope Mussels in Virginia
5 - Surveyor List for Upper Tennessee River Basin Mussels in Virginia
6 - Time of Year Restrictions (See Freshwater Mollusks)
7 - Map of Federally Designated Critical Habitat for Mussels in Virginia

INTRODUCTION

These guidelines are for project applicants and consultants planning certain activities that will impact rivers, streams, creeks, or other waterways in Virginia. The guidelines provide recommendations for conducting freshwater mussel surveys and relocations for small construction projects of short duration involving non-point pollution sources and affecting no more than 100 linear feet of waterway. Larger projects that impact waters containing State or federally listed mussels may require additional coordination or permits from the Virginia Department of Game and Inland Fisheries (VDGIF) and/or the U.S. Fish and Wildlife Service (FWS). Coordination with these agencies should always be initiated to ensure compliance with Federal and State laws. Enclosure 1 provides the web links to the project review process in Virginia for FWS and VDGIF.

FWS is responsible for the conservation and management of *federally* listed freshwater mussel species. VDGIF is responsible for the conservation and management of *all* freshwater mussel species throughout Virginia. If it is known that federally listed species or critical habitat (Enclosure 7) are not present within a two-mile radius of a given site, coordination with VDGIF, but not FWS, is still necessary.

GENERAL LIFE HISTORY

Freshwater mussels are often prominent in benthic stream communities where, for the most part, they are sedentary filter-feeders consuming a major portion of the suspended particulate matter. Therefore, mussel beds act as biological filters by removing inorganic and organic material from the water column while improving water quality downstream. Individuals are typically long-lived, with particular species living for more than 50 years, while some individuals may live for more than 130 years. Because these mussels are long-lived, sedentary filter-feeders, they are prominent indicators of water quality. Freshwater mussels also serve as an important dietary component to a variety of animals, including muskrats, otters, raccoons, and some fishes.

During spawning, male mussels release sperm into the water column that females take in through their gills. The resulting larvae (known as glochidia) may be released by the female into the water column or packaged to attract fish. These larvae must attach to a fish host to survive. While attached to the gills of the fish host, development of the glochidia begins. Once metamorphosis is complete, the juvenile mussel drops off the fish host and continues to develop on the stream bottom.

Freshwater mussels are generally divided into two reproductive categories known as short-term (tachytictic) or long-term brooders (bradytictic). Short-term brooders usually spawn and release glochidia during May through July in Virginia. Long-term brooders usually spawn from August through September and release glochidia the following April through June.

SURVEYS AND RELOCATIONS

Enclosure 2 provides the web links to lists of federally endangered, threatened, and candidate mussels and State endangered and threatened mussels. If a project occurs in an area that may contain suitable habitat for one of these species, FWS and/or VDGIF may recommend a survey. To determine which waterways may contain suitable habitat for State or federally listed species, contact VDGIF for guidance (804-367-2211 or 2733). Applicants should contact FWS and VDGIF early in the planning process to determine whether federally or State-listed species or critical habitat may be impacted by the project. Enclosure 1 provides the web links to the project review process in Virginia for FWS and VDGIF to assist with the planning process. The effects of a project may include direct impacts from construction activities as well as downstream impacts from sedimentation and effluent discharges. If mussels were found during any previous survey/s, however old, coordination with VDGIF and FWS (where applicable) will be required. Surveys where mussels are not found (negative surveys) are typically valid for two years, after which another survey should be performed. Guidelines for freshwater mussel surveys and relocations are found in Enclosure 3. Web links to surveyor lists are included in Enclosures 4 and 5. If listed mussels are found in or downstream of a project area, VDGIF and/or FWS are likely to recommend time of year restrictions on when activities may occur or other restrictions to reduce impact to the mussels. A web link to time of year restrictions is provided in Enclosure 6. If the project “may affect” a federally listed species or critical habitat, consultation with FWS will be required.

LAWS AND REGULATIONS PROTECTING MUSSELS

Federal Endangered Species Act (ESA) (87 Stat. 884; 16 U.S.C. 1531 et seq.; 50 CFR Part 17) Section 7(a)(2) requires Federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed threatened or endangered species, or result in the destruction or adverse modification of critical habitat. The regulations implementing this Act (50 CFR 402) require the Federal agency to review its actions at the earliest possible time to determine whether its actions may affect listed species or critical habitat. If a Federal agency determines that its action "may affect" a listed threatened or endangered species or critical habitat, the agency is required to consult with FWS regarding the degree of impact and measures available to avoid or minimize the adverse effects.

Section 9 of the ESA makes it illegal for any person subject to the jurisdiction of the United States to "take" any federally listed endangered or threatened species of fish or wildlife without a special exemption. "Person" is defined under the ESA to include individuals, corporations, partnerships, trusts, associations, or any other private entity; local, State, and Federal agencies; or any other entity subject to the jurisdiction of the United States. Under the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

Section 10 establishes an incidental take permit provision for private entities that includes the development of habitat conservation plans. This provision authorizes FWS, under some circumstances, to permit the taking of federally listed fish and wildlife if such taking is "incidental to, and not the purpose of carrying out otherwise lawful activities." This process is also intended to be used to reduce conflicts between listed species and private development and to provide a framework that would encourage "creative partnerships" between the private sector and local, state, and Federal agencies in the interest of endangered and threatened species and habitat conservation. When approved by FWS, this regulatory procedure results in the issuance of a permit authorizing incidental take, provided such take is mitigated by appropriate conservation measures for habitat maintenance, enhancement, and protection, coincident with development.

Virginia Endangered Species Act (29.1-563 - 29.1-570) - This law provides that VDGIF is the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth, defining *fish or wildlife* as "*. . . any member of the animal kingdom, vertebrate or invertebrate, except for the class Insecta, and includes any part, products, egg, or the dead body or parts thereof.*" It prohibits the taking, transportation, processing, sale, or offer for sale within the Commonwealth of any fish or wildlife listed as a federally endangered or threatened species, except as permitted by the Board of Game and Inland Fisheries for zoological, educational, scientific, or captive propagation for preservation purposes. State-listed species are provided the same protection per VDGIF Regulation 4 VAC 15-20-130.

The law further authorizes the Board of the Virginia Department of Game and Inland Fisheries to adopt the Federal list of endangered and threatened species, to declare by regulation that species not listed by the Federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations pursuant to this authority (4 VAC 15-20-130 through 140) further define "take" and other terms similarly to the Federal ESA.

Federal Endangered Species Act Cooperative Agreement - Federally listed species are also protected under VDGIF jurisdiction via a cooperative agreement signed in 1976 with FWS pursuant to Section 6 of the ESA. This Cooperative Agreement recognizes VDGIF as the Virginia agency with regulatory and management authority in Virginia over federally listed or threatened animals, excluding insects, and provides for Federal/State cooperation regarding the protection and management of those species.

Enclosure 1: Federal and State Project Review Process in Virginia

U.S. Fish and Wildlife Service: Online Project Review Process
(https://www.fws.gov/northeast/virginiafield/endangered/projectreviews.html)

Virginia Department of Game and Inland Fisheries: Project and Permit Review Process
(https://www.dgif.virginia.gov/environmental-programs/environmental-services-section/)

Enclosure 2: Federal and State Listed Mussel Species in Virginia

U.S. Fish and Wildlife Service: Environmental Conservation Online System (ECOS)
(http://ecos.fws.gov/ecp/)

Virginia Department of Game and Inland Fisheries: Special Legal Status Faunal Species in Virginia
(https://www.dgif.virginia.gov/wp-content/uploads/virginia-threatened-endangered-species.pdf)

Enclosure 3: Mussel Survey and Relocation Guidelines in Virginia

There are four general assessment/survey types including:

A. **Land-based review** - land-based site visit used to determine whether a water-based survey (site assessment, abbreviated, or full survey) is warranted. During a land-based review, the surveyor should look for obvious signs that would negate the need for additional, water-based surveys. For example, if it can be determined that the water body is non-perennial and/or contains no potential mussel habitat, it is unlikely that additional surveys would be needed or recommended by VDGIF or FWS. If it is determined that suitable habitat is present, the appropriate survey will be recommended. Photographs of the project site clearly showing instream habitat conditions, as well as a thorough site description, should be sent to VDGIF and FWS for review in lieu of the site assessment. If it is determined that suitable habitat is present, the appropriate survey will be recommended.

B. **Site assessment** - 20 m upstream / 80 m downstream. A site assessment is recommended to determine if suitable habitat is present at a project location and may be recommended if the presence of a listed species is questionable. If suitable habitat is present, the appropriate survey will be recommended even in the absence of mussels, since the site assessment does not serve as a substitute for a mussel survey; however, the presence of freshwater mussels should be documented during the assessment.

C. **Abbreviated survey** - 100 m upstream / 400 m downstream of project footprint.

D. **Full survey** - 200 m upstream / 800 m downstream of project footprint.

The assessment/survey type is based on the scope of the project, potential impacts, and known species distributions. Survey lengths are measured from the project footprint. *Survey distances have primarily been developed for projects where physical alteration/disturbance of the stream is the primary impact (e.g., bridge repair/replacement, utility line crossings, etc.). Potential impacts from projects involving activities such as point and non-point source discharges, water intakes, and mining may require greater survey lengths and different methods.*

Project applicants should contract with a qualified mussel surveyor. Enclosures 4 and 5 provide web links to lists of pre-approved mussel surveyors. If a pre-approved surveyor is not selected, please provide the proposed surveyor's qualifications and proposed survey design to FWS and VDGIF a minimum of 30 days prior to survey initiation. Individuals who take federally listed threatened and endangered animals must obtain a permit from VDGIF, prior to surveying. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Contact information follows:

Ms. Shirl Dressler
Virginia Department of Game and Inland Fisheries
P.O. Box 90778
Henrico, VA 23228-0778
Phone: (804) 367-6913
CollectionPermits@dgif.virginia.gov

A plan for mussel relocations, including initial surveys, must be presented to VDGIF and FWS (where applicable) for comment and approval prior to initiation of construction. Failure to provide a mussel relocation and/or survey plan may affect review and permitting of the project by VDGIF and FWS.

The recommended time of year to conduct mussel surveys and relocations is April 1 through October 31. Surveying during the cooler months is discouraged because mussels tend to be located deeper in the substrate and a greater percentage of the population is subsurface, therefore making them more difficult to find, particularly rare species. A more specific time frame may be recommended depending on the target species. A survey conducted outside this time frame requires VDGIF and FWS (where applicable) approval.

Guidelines if federally listed mussels are not present

During the initial survey, mussel species within the direct project footprint or within imminent danger from project impacts may be relocated to suitable habitat unless otherwise directed by VDGIF. Suitable habitat typically includes an area upstream of project impacts and which also harbors freshwater mussels. If such an area cannot be found, the surveyor should determine the location of most suitable habitat. The direct project footprint shall be defined as the area of potentially disturbed substrate, any zone of heavy equipment operation, plus the distance downstream that may experience significant sedimentation from construction. If not determined prior to the relocation, the surveyor is responsible for determining the most suitable relocation area. All relocated mussels must be at least partially placed in the substrate, anterior end down.

Project applicants may be required to monitor relocated mussels to determine relocation success/failure.

Standard mussel relocation protocols are outlined below. These protocols may vary based on factors such as the scope of the project and the results of the initial mussel survey. If the relocation protocols vary, VDGIF will clearly outline the appropriate protocols with the project applicant. It is the project applicant's responsibility to ensure that the proper relocation protocols are used and that the contracted mussel surveyor is aware of any modifications to the standard protocols.

The reach from which mussels are to be relocated will be at least 100 m long including the project footprint. The standard protocol is as follows:

- The 1st relocation survey must occur within 30-45 days of instream construction activities and at least 7 days prior to the 2nd relocation survey.

- The 2nd relocation survey must occur within 30 days of instream construction activities and at least 7 days after the 1st relocation survey.

- All relocation surveys must include at a minimum, two passes. The target relocation percentage of the initial number of mussels collected is 80%. If on the 2nd pass, more than 20% of the initial number of mussels is collected, continued passes must be conducted until no more than 20% of the initial number of mussels is collected on the final pass. The target relocation percentage may be adjusted higher or lower depending on the species and numbers collected during the initial survey.

- If a state-listed species is found, continued passes must be conducted until no listed species are found on the final pass. If repeated passes result in continual collection of state-listed species, modification of the survey techniques may be required.

If relocation surveys are not possible due to natural conditions such as high water, contact VDGIF to arrange contingency plans.

The location of all relocated mussels must be accurately documented (preferably with geographic coordinates) and reported to VDGIF. All state-listed mussel species must be tagged and measured for potential future monitoring.

Project applicants may be required to adhere to time of year restrictions for mussel relocations as directed by VDGIF. If this is the case, for the long-term brooders, relocations can occur from June 16 through August 14 and October 1 through October 31. For short-term brooders, relocations can occur from April 1 through May 14 and August 1 through October 31.
All mussel survey and relocation results, including tag and measurement data, must be submitted to VDGIF for review, prior to instream construction activities. Reviews will be expedited due to

the potential short timeframe between surveys and/or relocations and the start of instream work. Reports must contain, at a minimum, number of species found, number of individuals per species and their sizes, and number of individuals tagged.

Guidelines if federally listed mussel species are present

Federally listed mussels must *not* be relocated during the initial survey. If federally listed mussels are found, they must remain exactly where found and all specimens should be photo documented, if possible. Coordination with FWS and VDGIF must occur to determine future actions.

If it is determined that a project may affect a federally listed species, FWS will complete a consultation with the Federal action agency and prepare a biological opinion in accordance with the Federal Endangered Species Act. The relocation procedures for federally listed mussels will be specified in FWS's biological opinion and will be determined on a project-specific basis.

If relocation surveys are not possible due to conditions such as high water, contact FWS and VDGIF to arrange contingency plans. All listed mussels must be moved to suitable habitat upstream of any potential project impacts. Mussels may be relocated downstream if habitat upstream is determined unsuitable by VDGIF and FWS. If not determined prior to the relocation, the surveyor is responsible for determining the most suitable relocation area. All relocated mussels must be at least partially placed in the substrate, anterior end down. Project applicants may be required to monitor relocated mussels to determine relocation success/failure.

The location of all relocated federally listed mussels must be accurately documented (preferably with geographic coordinates) and reported to FWS and VDGIF. All federally listed mussel species also must be tagged and measured for potential future monitoring.

All mussel survey and relocation results must be submitted to FWS and VDGIF for review, prior to instream construction activities. Every effort will be made to expedite reviews due to the potential short timeframe between surveys and/or relocations and the start of instream work. Reports must contain, at a minimum: number of species found, number of individuals per species and their sizes, number of individuals tagged, etc.

Project applicants may be required to adhere to time of year restrictions (Enclosure 6) for mussel relocations as recommended by FWS and VDGIF. Time of year restrictions will be specified in a letter or in FWS's biological opinion.

Enclosure 4: Surveyor List for Atlantic Slope Mussels in Virginia

Approved Surveyors in Virginia for Atlantic Slope Freshwater Mussels (http://www.fws.gov/northeast/virginiafield/pdf/endspecies/Surveyor_Lists/PDF%20Format/SURVEYOR%20LIST%20-%20Atlantic%20Slope%20Mussels.pdf)

Enclosure 5: Surveyor List for Upper Tennessee River Basin Mussels in Virginia

Approved Surveyors in Virginia for Tennessee River Drainage Freshwater Mussels (http://www.fws.gov/northeast/virginiafield/pdf/endspecies/Surveyor_Lists/PDF%20Format/SURVEYOR%20LIST%20-%20TN%20Drainage%20Mussels.pdf)

Enclosure 6: Time of Year Restrictions

Virginia Department of Game and Inland Fisheries Time of Year Restrictions (TOYR) Table (https://www.dgif.virginia.gov/wp-content/uploads/VDGIF-Time-of-Year-Restrictions-Table.pdf)

Enclosure 7: Federally Designated Critical Habitat for Mussels in Virginia

Map of Federally Designated Critical Habitat in Virginia (http://fws.maps.arcgis.com/apps/Viewer/index.html?appid=f6e84e675ba1461b8ae6a351adea1429)

DGIF Fish Relocation Best Practices

Wildlife Information and Environmental Services

804-367-4335

July 17, 2020

I. Purpose

To comply with regulatory requirements regarding protection of state Threatened or Endangered species, and to protect other sensitive fish species from harm during instream construction. Additional relocation efforts may be required if cofferdams are overtopped by high water events.

II. Permits and Certification Requirements

1. The Lead/Supervisor for a fish relocation project in any waters designated as Threatened/Endangered Species Waters due to the likely presence of a Threatened or Endangered species of fish must be authorized (certified) by: (1) successfully completing fish identification and collection techniques training approved by the Virginia Department of Wildlife Resources (DWR), or (2) otherwise documenting competency in fish identification and collection techniques to the satisfaction of VDGIF; and (2) be authorized to lead/supervise fish relocations within Threatened/Endangered Species Waters on the applicable DWR Threatened/Endangered Species Permit. Such authorizations and permits may be specific both with regard to fish species and to stream reaches or river basins.

2. The certified Lead/Supervisor must be present and directly supervise all fish relocation efforts in Threatened/Endangered Species Waters. The certified Lead/Supervisor also must be onsite during the cofferdam installation and dewatering process (or during enactment of other isolation procedures) to ensure these activities do not cause fish stress or injury. Non-certified assistants participating in the fish relocation project must be listed as sub-permittees on the appropriate DWR Threatened/Endangered Species Permit. Additional Threatened/Endangered Species Permit conditions may apply due to the likely presence of Threatened or Endangered species other than fish.

3. The Lead/Supervisor and all assistants participating in any fish relocation project in waters not designated as Threatened/Endangered Species Waters must be named as the permittee or as authorized sub-permittees on an appropriate DWR Scientific Collection Permit.

III. Methods

Fish caught within cofferdammed areas must be removed within 24 hours after placement of the cofferdams. If water depth within the cofferdam is too deep to remove fish, and it has been determined that partial dewatering is necessary prior to removing fish, then the pump intakes must be screened to prevent fish and aquatic biota from entering the intake. Details of the fish relocation efforts will be documented, photographed, and summarized in a final report to be submitted to DWR for state and federally listed species, and to the US Fish and Wildlife Service (USFWS) for federally listed species. Unless otherwise authorized by DWR and USFWS, fish relocation efforts shall not be conducted during applicable Time-of-Year Restrictions (TOYR) for any protected fish species likely to be encountered at the project site, as determined during the pre-project assessment described in step *1a* below.

1. <u>Fish collection and identification:</u> The method(s) used may depend on the stream characteristics or conditions such as depth, flow, substrate, water clarity, and size or area of the potential impact zone. Methods are also dependent upon the target fish. For example, schooling fish like minnows may be more susceptible to seining, while benthic species such as darters may require electroshocking to capture. At some locations, it may be necessary to use a combination of these methods to ensure that all fish have been safely removed from the cofferdammed area. Because there is no flow within a cofferdam, one inherent problem in collection is the turbid conditions once the stream bottom is disturbed. Collection efforts may need to be adjusted to account for these conditions.

    a. *Pre-project assessment:* Prior to collection, the Environmental Lead will determine listed aquatic species that may likely be collected at the project site by accessing an authorized database. Special emphasis will be placed on Threatened or Endangered species and visually similar species.

    b. *Seining and dipnetting:* The least-lethal fish removal techniques include seining and/or dipnetting. These techniques minimize potential risks of distress or injury to the fish. Seining works most effectively when there are few if any instream obstacles such as large rocks, branches, and pilings or other structures. Seining also requires water depth greater than 1 ft. to efficiently capture fish. One advantage of seining over other techniques is that it does not rely on seeing the fish, so seining can be conducted in turbid water. Seines come in varying lengths and mesh sizes: a 10 ft. long by 3 ft. high seine with a mesh of 1/8" mesh is sufficient for most cofferdams. In many cases, three individuals are needed to operate a seine. One individual is positioned on each end holding the brail. Brails are maintained at a 45-degree angle on the stream bottom as the individuals move parallel to one another from one end of the cofferdammed area to the other. During this time, the bottom of the seine (lead line) is kept close to the stream bottom, while the top of the seine (float line) is maintained on the water's surface. While the seine is being pulled, the third individual frees it of any snags and assists in lifting the seine if necessary. Upon reaching the end of the cofferdammed area, the lead line is lifted out of the water, ensuring that the float line is out of the water as well. Visual inspection or observation with viewscopes or polarized sunglasses may be used to determine locations of fish concentrations and the effectiveness of this method. Dipnets may be used in conjunction with seine nets and, in shallow water, aquarium nets may be needed to remove fish.

c. *Electroshocking:* Electroshocking is most effective in clear water conditions or when obstacles prevent seining or dipnetting. It is also useful on alert and active species such as smallmouth bass, which are effective at avoiding nets. The downside of electroshocking is that it is potentially dangerous for staff and target organisms. As with seining, electroshocking requires at least two individuals: one individual operates the shocker while the other dips for fish and holds the bucket. Both individuals should carry a dipnet. The shocker should be tested and controls set outside of the cofferdammed area. Shocking should occur in a sweeping motion from side-to-side, ensuring that the area in front of the shocker is covered before moving forward. Staff should keep ahead of any sediment plumes kicked up during collection. All fish should be netted and immediately transferred to clean, oxygenated water in the bucket. At no time should anyone touch the water unless they are assured the electroshocker is turned off. In the bucket, fish should quickly recover and begin swimming. If this is not the case, shocking unit controls must be adjusted and the voltage reduced. Fish numbers in the bucket must be monitored to ensure overcrowding does not occur. This is especially critical in summer when oxygen can be quickly depleted from warm water. Electrofishing will be conducted in a manner that minimizes harm to fish. The minimum effective voltage, pulse width, and pulse rates necessary to achieve the desired response (stunned fish) will be used. All efforts will be taken to ensure that fish do not come into contact with the electroshocker anode.

d. *Collection effort:* Efforts to capture fish within the cofferdammed area will be repeated until the surveyors are confident that all fish have been removed. This will require a minimum of three seine hauls with no fish collected. Capture or observation of any fish during a haul will precipitate three additional seine hauls (*i.e.*, seining will continue until no fish are collected during three successive hauls). In situations where electroshocking is needed, the entire cofferdammed area should be covered with special emphasis on difficult to reach places (crevices, rocks, etc.). When electroshocking, three passes should be conducted with no additional fish collections. As with seining, three additional passes must be initiated if a fish is caught or observed. If conditions become turbid with low visibility, seining should be conducted after an initial electroshocking effort, using the above-described depletion protocols.

e. *Fish Identification:* All fish will be identified to species level when possible, and at least to the Family level. Photographs will be taken of each species found during the fish removal efforts. All individual fish identified as possibly representing a Threatened or Endangered species will be photographed. Total counts will be taken for all species found. Notes will be taken regarding any fish showing signs of distress, parasitism, anomalies, or injuries.

2. Fish handling and relocation: After workup, captured fish will be relocated to suitable habitat outside of the cofferdam, and away from the work area. Handling of the fish will be minimized to the greatest extent possible. Individuals handling the fish will do so with clean, wet hands that are free of chemicals and toxins such as insect repellent, sunscreen, or lotions.

   If it has been determined that fish need to be relocated at least 100 meters upstream or downstream from the impact area, it may be necessary to place the fish in buckets of fresh streamwater so they can be released to suitable habitat. Fish held in the bucket will be checked often to ensure they are healthy and that water conditions are acceptable. Frequent water changes and a battery operated air pump may be necessary in certain situations. Except as stipulated below for incidentally killed fish, no individual fish will be kept or killed for scientific collection or other purposes.

   Fish will be released in calm, shallow (<1 ft. deep) waters that facilitate their recovery and reorientation to river conditions. The fish will be monitored to ensure they remain upright and are able to actively swim. Any Threatened or Endangered species will be reported to DWR within 24 hours of capture. Any Threatened or Endangered fish incidentally taken (killed) will be preserved and delivered to DWR. Documentation of the fish removal operation will include project location, date, methods, personnel, water temperature, conductivity, flow conditions, water depth and clarity, substrate type, equipment settings, fish species, total numbers, fish condition, fish release location, and digital photographs.

Matthew J. Strickler
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

Russell W. Baxter
Deputy Director of Dam Safety & Floodplain Management and Soil & Water Conservation

Nathan Burrell
Deputy Director of Government and Community Relations

Thomas L. Smith
Deputy Director of Operations

MEMORANDUM

DATE: June 6, 2021

TO: Steve Hardwick, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ-VWP 21-0416, Mountain Valley Pipeline

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage's (DCR-DNH) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

DCR-DNH previously provided comments on the Mountain Valley Pipeline Project under FERC Docket PF15-3-000 on June 11, 2015 (accession number 20150611-5170); and FERC Docket CP16-10 on March 17, 2016 (accession number 20160317-5126), May 20, 2016 (accession number 20160520-5051), September 9, 2016 (accession number 20160909-5315) and December 22, 2016 (accession number 20161222-5394), DEQ 17-091F, MVP Final Environmental Impact Statement and Updated Biological Assessment, Docket No. CP16-10-000, U.S. Forest Service and Bureau of Land Management, Draft Supplemental Impact Statement, Mountain Valley Pipeline and Equitrans Expansion Project (DEQ 20-136F) on December 11, 2020 (accession number 20201211-5170). DCR-DNH reiterates those comments.

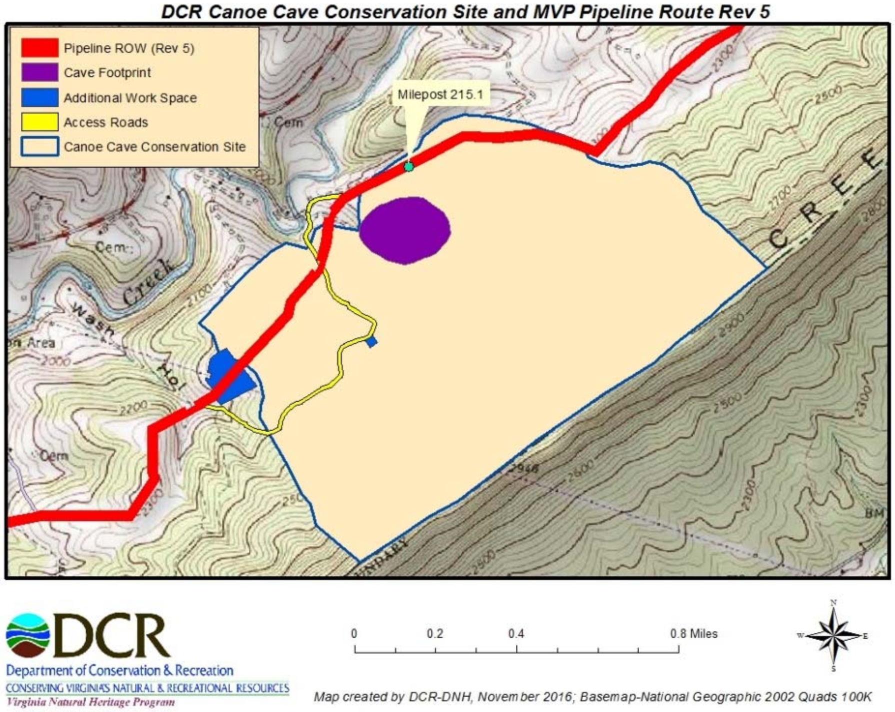
DCR-DNH has reviewed the proposed route alignment, MVP_LOD_IP_April2021 including the wetland and stream (permanent and temporary) impacts and would like to offer the following comments at this time by quadrangle or stream ID:

Newport Quad-Canoe Cave Conservation Site

Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Canoe Cave Conservation Site has a (B2) very high biodiversity significance.

Canoe Cave is classified by USFWS as a known, occupied hibernaculum for the federally threatened and state-endangered northern long-eared bat and has been documented as having contained the state-endangered tri-colored bat. For any portions of the Mountain Valley Pipeline within the Canoe conservation site, appropriate best management practices must be adopted and strictly adhered to in order to minimize the potential for impact. Compensatory mitigation for karst areas permanently disturbed within the conservation site may be appropriate. Monitoring of the spring (resurgence) water for Canoe Cave should take place, and include at a minimum turbidity and volatile organic compounds.

DCR Canoe Cave Conservation Site and MVP Pipeline Route Rev 5



Newport Quad-Clover Hollow Cave Conservation Site

Clover Hollow is a conservation site of outstanding biodiversity significance (B1). The natural heritage resources within the pipeline project area including a 100 foot buffer are the Spotted cave beetle (*Pseudanophthalmus punctatus,* G2G3/S1/SOC/NL) and the Clover Hollow cave beetle (*Pseudanophthalmus gracilis*, G1G2/S1S2/SOC/NL). No extant records of federally listed species are associated with this conservation site. There is a historical record for the Indiana bat. This conservation site protects cave and karst associated element occurrences, including 4 state designated significant caves. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Nineteen additional caves are documented within the conservation site.

A total of 7 cave limited terrestrial species and 3 cave limited aquatic species are known from the site.
Of these six species are globally very rare, cave limited invertebrate. Tawneys cave is the type locality for three of these species, Smokehole cave for one, and Stay High Cave (State Natural Area Preserve) for another. The range for three of these species is limited to the Sinking Creek Valley in Giles and Craig counties, VA.

Two rare bat species, the Eastern small-footed bat and the Indiana bat are known from the conservation site. However, the Indiana bat record is very old and the species has not been observed in the conservation site for decades. The pipeline route is over known cave passage in two designated significant caves – Tawneys and Smokehole. In addition to the invertebrate element occurrences, Tawneys Cave has hosted a modest hibernacula (~800-1000 total individuals) for little brown (*Myotis lucifugus,* G3/S1S3/NL/LE*)*, tricolored (*Perimyotis subflavus,* G2G3/S1S3/SOC/LE*)*, and big brown bats (*Eptesicus fuscus*.) DCR recommends continued coordination with the US Fish and Wildlife Service and VDWR to ensure compliance with the protected species legislation.

Eggleston Quad- Doe Creek Cave Conservation Site

The Doe Creek Cave Conservation Site is within the project area and has a moderate (B4) biodiversity significance due to the presence of a significant cave.

Penhook Quad-Jacks Creek Conservation Site

According to the information currently in our files, the Jacks Creek Conservation Site is immediately adjacent to the pipeline centerline. Jacks Creek Conservation Site has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern at this site are:

Phemeranthus piedmontanus	Piedmont fameflower	G1/S1/SOC/NL
Poa saltuensis	Weak bluegrass	G5/S2/NL/NL
Sporobolus heterolepis	Prairie dropseed	G5/S1/NL/NL
Significant Community	Southern Piedmont Ultramafic Barren	G1/S1/NL/NL

DCR recommends avoidance of the Jacks Creek Conservation Site and associated documented occurrences of natural heritage resources.

Sandy Level Quad-Jonnikin Creek Net Conservation Site and Redwood Quad-Flint Hill Road Net

The Jonnikin Creek Net Conservation Site and Flint Hill Road are located within the project site. Jonnikin Creek Net Conservation Site and Flint Hill Road Net Conservation Site have been given a biodiversity significance ranking of B3, which represents a site of high significance The natural heritage resource of concern at both of these sites is:

Perimyotis subflavus	tri-colored bat	G2G3/S1S3/SOC/LE

The tri-colored bat is a very small bat distinguished from other Myotis species by tricolored individual back hairs and inhabits open woods near water, rock cliffs, buildings and caves in the summer. Since 2008 there has been a significant decline in population numbers (greater than 90%) for both bat species due to white nose syndrome.

Due to the legal status of the tri-colored bat, DCR recommends coordination with the VDWR, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Lindside Quad-Peters Mountain Slopes-Laurel Branch Slopes Conservation Site

The Peter Mountain Slopes-Laurel Branch Slopes Conservation Site is documented within the proposed project area. The Peter Mountain Slopes-Laurel Branch Slopes has been given a biodiversity significance ranking of B2, which represents a site of very good significance. The natural heritage resources of concern associated with this conservation site are:

Aneura sharpii	A liverwort	G1G2/S1/NL/NL
Corallorhiza bentleyi	Bentley's coralroot	G2/S2/LE/NL
Myotis lucifugus	Little brown bat	G3/S1S3/NL/LE
Myotis leibii	Eastern Small-footed Myotis	G4/S2/NL/NL

The Eastern small-footed myotis is a bat species known from southern Canada and New England, south through the Appalachians and Ohio Valley (NatureServe, 2009). This species has been recorded in Virginia most frequently in association with cavernous limestone (karst) areas and sandstone ridges in the western portion of the state. It roosts in rock crevices, rock shelters, caves, mines, human habitations, and trees in mountainous areas with deciduous or evergreen forest.

Threats to the Eastern small-footed myotis include alteration or destruction of its roosting or hibernation habitats including rock outcrops, bridges, trees, and caves.

The Little brown bat is a small brown insect eating bat, which uses a wide range of habitats including caves and human-made structures (NatureServe, 2015). Since 2008 there has been a significant decline in population numbers (greater than 90%) for bat species due to white nose syndrome. The Little brown bat is state listed as "endangered" on April 1, 2016 by the Virginia Department of Wildlife Resources.

DCR recommends avoidance of documented natural heritage resources. Due to the legal status of the little brown bat, DCR recommends coordination with the VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570). DCR supports prudent measures, terms and conditions, and monitoring and compliance-reporting requirements included in the September 4, 2020 revised United States Fish and Wildlife (USFWS) revised biological opinion for the Mountain Valley Pipeline to avoid, minimize impacts to the Indiana bat and Northern-long eared bat.

The Western part, on the southeastern slope of Peters Mountain, consists mostly of a long access road on Devonian-Silurian bedrock that contains a very small percentage of limestone. Because of this, it is included in our new statewide karst screen. However, only very locally are any significant karst features developed. In the project area, there are no caves or sinkholes documented in the unit. Downslope (east) of the project area, streams cross onto the significant karst. Some are likely to sink while others may not. DCR recommends adherence to erosion and sediment control measures as required by the US Forest Service, FERC, and DEQ under the DSEIS protective of the downstream, karst resources. No documented significant cave resources are at risk from activities associated with the construction of the Mountain Valley Pipeline on the southeast slope of Peters Mountain.

McDonald's Mill Quad- Slussers Chapel Cave Conservation Site

Slussers Chapel is a conservation site of high biodiversity significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site. This conservation site protects cave and karst associated element occurrences, including 2 state designated significant caves, both under conservation ownership. The conservation site boundary includes the land overlying the caves and the watershed of the cave streams as determined by dye trace studies and topographic analysis. Six additional caves are documented within the conservation site.

The two significant caves are Slussers Chapel and Mill Creek Caves. Entrances to both caves are in conservation ownership, Slussers Chapel by the Cave Conservancy of the Virginias and Mill Creek Cave by the Nature Conservancy. Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site. Of these, three species are globally very rare, cave limited invertebrates. Slussers Chapel cave is the type locality for one of these species. The range for two of these species is limited to the karst of the upper Roanoke River basin.

A recent biological inventory of Mill Creek Cave (2012) obtained specimens of the millipede genus *Pseudotremia*. They specimens were consistent with the state listed endangered Ellett Valley millipede. However, the specimens were juveniles and not identifiable to the species level. Subsequent collections of adult male *Pseudotremia* will help to determine whether or not the state endangered species is present in the conservation site. Recent exploration by cave divers in Mill Creek Cave has increased the length of the cave by more than 1000', in the direction of the proposed route for the MVP pipeline. Exploration is ongoing, and there is a high likelihood that significant, additional subterranean habitat will be documented. Little brown, tricolored, and big brown bats are known from caves in the site, but not in high numbers.

Pearisburg Quad- Kimballton Quarry Cave Conservation Site

The Kimballton Quarry Cave Conservation Site is within the project area and has a moderate (B4) biodiversity significance due to the presence of a significant cave. Based on dye trace studies, any release to karst features in this area will either resurge at Klotz Spring or be captured by the Kimballton Mine. These features should be specified in the Spill Prevention Controls and Countermeasures Plan (SPCCP).

McDonalds Mill Quad-Old Mill Conservation Site

Old Mill is a conservation site of high biodiversity significance (B3). No extant records of federal or state listed species are associated with this conservation site. There is potential for the state listed endangered Ellett Valley Millipede (*Pseudotremia cavernarum*) in the site.

This conservation site protects cave and karst associated element occurrences, including a state designated significant cave. The conservation site boundary includes the land overlying the cave and the watershed of the cave stream as determined by dye trace studies and topographic analysis. The current boundary should be modified to include the entire watershed of Dry Run, which sinks in its bed supplying the majority of the water in the Old Mill Cave stream. Two additional caves are documented within the conservation site.

Three cave limited terrestrial invertebrate species and two cave limited aquatic invertebrate species are known from the site. Of these, three species are globally very rare, cave limited invertebrates. In addition, a globally rare troglophilic beetle (Ellett Valley Cave Beetle, *Pseudanophthalmus pusio,* G2G3/S1S2/NL/NL) is known from the cave. The range for two of these species is limited to the karst of the upper Roanoke River basin. No information is available regarding bat use of the site.

Elliston Quad-Upper Spring Hollow Reservoir Slopes Conservation Site

The Upper Spring Hollow Reservoir Slopes Conservation Site is located within the project site. The Upper Spring Hollow Reservoir Slopes Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Myotis leibii	Eastern small-footed myotis	G4/S2/NL/NL

The Eastern small-footed myotis is a bat species known from southern Canada and New England, south through the Appalachians and Ohio Valley (NatureServe, 2009). This species has been recorded in Virginia most frequently in association with cavernous limestone (karst) areas and sandstone ridges in the western portion of the state. It roosts in rock crevices, rock shelters, caves, mines, human habitations, and trees in mountainous areas with deciduous or evergreen forest.

Threats to the eastern small-footed myotis include alteration or destruction of its roosting or hibernation habitats. DCR recommends avoiding impacts to roost habitats during the summer or winter months.

Stream ID S-S5 Stony Creek

The Stony Creek Stream Conservation Unit (SCU) is located within or immediately adjacent to the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Stony Creek SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resources associated with this site are:

Etheostoma osburni	Candy darter	G3/S1/LE/NL
Etheostoma caeruleum	Rainbow darter	G5/S2/NL/NL

The Candy darter occurs in the New River drainage of Virginia and the Appalachian Plateaus of West Virginia (Jenkins and Burkhead, 1994). It inhabits rocky, clear, and small to large creeks in unsilted runs and riffles (Burkhead and Jenkins, 1991).

Threats to the habitat of this species include siltation and turbidity (Burkhead and Jenkins, 1991). In addition, the stocking of trout may result in predation of the Candy darter while the spawning sites may be trampled by wading trout fishermen (Burkhead and Jenkins, 1991). Please note, that this species is currently classified as endangered by the United States Fish and Wildlife Service (USFWS).

Stream ID S-C21 Bradshaw Creek and Stream ID S-NN16 Roanoke River

The Roanoke River – North and South Forks Stream Conservation Unit (SCU) is located within the pipeline footprint. The Roanoke River – North and South Forks SCU has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resources of concern associated with this SCU are:

Noturus gilberti	Orangefin madtom	G2/S2/SOC/LT
Percina rex	Roanoke logperch	G1G2/S1S2/LE/LE
Allocapnia simmonsi	Spatulate snowfly	G3/S1S2/NL/NL

The Orangefin madtom is native to the Roanoke and James River systems of North Carolina and Virginia (NatureServe, 2009). The Orangefin madtom inhabits moderate to strong riffles and runs having little or no silt in moderate-gradient, intermontane and upper Piedmont streams. This species is an intersticine dweller, found in or near cavities formed by rubble and boulders (Jenkins and Burkhead, 1993). Please note that this species is currently classified as a species of concern (not a legal designation) by the United States Fish and Wildlife Service (USFWS) and as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF). Threats to the Orangefin madtom include channelization, siltation, various forms of chronic pollution, catastrophic chemical spills, impoundment, dewatering, and bait-seining (NatureServe, 2009). Its low reproductive rate and short life span (Simonson 1997, Simonson and Neves 1992, Simonson 1987) exacerbate these threats (Burkhead and Jenkins 1991).

The Roanoke logperch is endemic to the Roanoke and Chowan River drainages in Virginia (Burkhead and Jenkins, 1991) and inhabits medium and large, warm and usually clear rivers with sandy to boulder spotted bottoms (NatureServe, 2009). Please note that this species is currently classified as endangered by the USFWS and the VDGIF. The Roanoke logperch is threatened by channelization, siltation, impoundment, pollution, and de-watering activities (Burkhead & Jenkins, 1991).

Spatulate snowfly is a stonefly documented in only two locations in Virginia. Stoneflies are generally medium-sized to small, somewhat flattened, soft-bodied, rather drab-colored insects found near streams or rocky lake shores (Borror, 1981). They are poor fliers and are seldom found far from water. Stonefly nymphs are often found under stones in streams but may occasionally be found anywhere in a stream where food is available (Borror, 1981). Stoneflies are highly sensitive to any practices that degrade the quality of its aquatic habitat.

In addition, the North Fork Roanoke River, Roanoke River and Pigg River have been designated by the VDWR as a "Threatened and Endangered Species Waters". The species associated with these T & E Waters are the Orangefin madtom and the Roanoke logperch.

Stream ID S-C3 Harpen Creek and Stream ID S-E11 Pigg River

The Pigg River-Harpen Creek Stream Conservation Unit (SCU) is located 0.25 miles immediately downstream of the pipeline construction right-of-way. The Pigg River-Harpen Creek SCU has been given a biodiversity ranking of B2, which represents a site of very high significance. The natural heritage resource associated with this site is:

Percina rex	Roanoke logperch	G1G2/S1S2/LE/LE

DCR provides the following recommendations for avoiding and minimizing impacts to documented natural heritage resources at the above referenced crossings:

- To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations.
- DCR supports adherence to time of year restrictions for instream work as recommended by the Virginia Department of Wildlife Resources (VDWR) and United States Fish and Wildlife Service (USFWS).
- DCR supports the proposed horizontal directional bore of the Roanoke River to minimize impacts to documented occurrences of natural heritage resources. DCR recommends pre-construction geotechnical investigations and frac-out contingency plan measures to avoid and minimize impacts to sensitive species.
- DCR recommends adherence to the Emergency Spill Plan (APPENDIX D-2 Spill Prevention, Control, and Countermeasure (SPCC) Plan and Unanticipated Discovery of Contamination Plan for Construction Activities in Virginia) updated in October 20, 2017.
- Due to the legal status of the Roanoke logperch, Orangefin madtom, Candy Darter, DCR recommends continued coordination with VDWR and USFWS to ensure compliance with protected species legislation.
- DCR supports the monitoring of water quality in these streams, rivers and creeks supporting rare, threatened and endangered resources to identify and address sediment loads during the construction of the Mountain Valley Pipeline.

- DCR recommends a spill plan be developed to address issues with leaks or ruptures that may occur at or near stream/river crossings, and that spill plan should be evaluated by resource agencies to determine if it addresses concerns for aquatic species, including those associated with subterranean karst streams and aquifers.

Karst

The following stream crossings for the MVP are situated on karst-forming carbonate rock and can be characterized by sinkholes, caves, disappearing streams, and large springs. The Virginia DCR Karst staff screened this project against the Virginia Speleological Survey (VSS) database and the Virginia DMME sinkhole coverage for documented sensitive karst features and caves. Based on this review, DCR provides the following comments:

Stream ID S-S5 Stony Creek

The stream bed in the area of the crossing is underlain by coarse alluvial deposits, mainly comprised of sandstone (orthoquartzite) cobbles. In the unlikely event that the trench intersects the underlying Knox Group dolomite bedrock and encounters solutional voids, these should be mitigate using an inverted filter appropriate to the pre-existing hydrology (e.g. features receiving infiltration prior to construction should continue to do so.) If bedrock solution features are encountered that appear to receive or discharge water, the contractor should coordinate with the DCR Karst Protection Coordinator (540-230-5960, Wil.Orndorff@dcr.virginia.gov) for inspection and documentation. No DCR karst conservation sites will be impacted by this crossing.

Stream ID-S-NN17 Sinking Creek

The northwestern bank of the creek crossing is mostly Ordovician limestone bedrock, while the southeastern bank is underlain by alluvial deposits (gravels, sands, cobbles). Care should be taken in particular with the approach from the northwestern side to be aware of potential solution features in the Ordovician limestone, which is one of the most prolific cave-forming units in the area. If bedrock solution features are encountered that appear to receive or discharge water, the contractor should coordinate with the DCR Karst Protection Coordinator (540-230-5960, Wil.Orndorff@dcr.virginia.gov) for inspection and documentation . The crossing is not expected to impact the Clover Hollow Conservation Site, as it lies downstream of the discharge springs from the karst system.

Stream ID S-G36 North Fork Roanoke River

The streambed at the crossing is likely underlain by a combination of alluvial deposits and carbonate bedrock, and is east of the Ordovician Edinburg formation which has some layers with significant karst development. If bedrock solution features are encountered that appear to receive or discharge water, the contractor should coordinate with the DCR Karst Protection Coordinator (540-230-5960, Wil.Orndorff@dcr.virginia.gov) for inspection and documentation. The crossing is not expected to impact any DCR karst related conservation sites, as it lies downstream of the discharge springs from the karst systems in the vicinity.

Stream ID S-NN16 Roanoke River

The north side of the river crossing is underlain by alluvial deposits, while the south side may expose bedrock of the Rome Formation. The potential for karst features in this formation at the crossing site is very low. However, if bedrock solution features are encountered that appear to receive or discharge water, the contractor should coordinate with the DCR Karst Protection Coordinator (540-230-5960, Wil.Orndorff@dcr.virginia.gov) for inspection and documentation. No DCR karst conservation sites will be impacted by this crossing.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Wildlife Resources (VDWR) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at (804-367-2733) or ernie.aschenbach@dwr.virginia.gov). According to the information currently in our files, Craig Creek, which has been designated by the VDWR as a "Threatened and Endangered Species Water" for the James spinymussel is within the submitted project boundary including a 100-foot buffer. Therefore, DCR-DNH recommends coordination with USFWS and VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with protected species legislation. In addition, Bottom Creek, which has been designated by the VDWR as a Threatened and Endangered Species Water" for the Orangefin madtom is within the submitted project boundary including a 100-foot buffer and DCR-DNH recommends coordination with VDWR, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570). Furthermore, numerous other streams and unnamed tributaries in Table B-1 MVP Project Individual Permit Application: Attachment B support threatened and endangered animal species. Therefore, DCR-DNH recommends coordination with VDWR and USFWS to ensure compliance with protected species legislation.

Division of Dam Safety and Floodplain Management

Floodplain Management Program:

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), and communities who elect to participate in this voluntary program manage and enforce the program on the local level through that community's local floodplain ordinance. Each local floodplain ordinance must comply with the minimum standards of the NFIP, outlined in 44 CFR 60.3; however, local communities may adopt more restrictive requirements in their local floodplain ordinance, such as regulating the 0.2% annual chance flood zone (Shaded X Zone).

All development within a Special Flood Hazard Area (SFHA), as shown on the locality's Flood Insurance Rate Map (FIRM), must be permitted and comply with the requirements of the local floodplain ordinance.

State Agency Projects Only

Executive Order 45, signed by Governor Northam and effective on November 15, 2019, establishes mandatory standards for development of state-owned properties in Flood-Prone Areas, which include Special Flood Hazard Areas, Shaded X Zones, and the Sea Level Rise Inundation Area. These standards shall apply to all state agencies.

1. Development in Special Flood Hazard Areas and Shaded X Zones
    A. All development, including buildings, on state-owned property shall comply with the locally-adopted floodplain management ordinance of the community in which the state-owned property is located and any flood-related standards identified in the Virginia Uniform Statewide Building Code.

B. If any state-owned property is located in a community that does not participate in the NFIP, all development, including buildings, on such state-owned property shall comply with the NFIP requirements as defined in 44 CFR §§ 60.3, 60.4, and 60.5 and any flood-related standards identified in the Virginia Uniform Statewide Building Code.
   (1) These projects shall be submitted to the Department of General Services (DGS), for review and approval.
   (2) DGS shall not approve any project until the State NFIP Coordinator has reviewed and approved the application for NFIP compliance.
   (3) DGS shall provide a written determination on project requests to the applicant and the State NFIP Coordinator. The State NFIP Coordinator shall maintain all documentation associated with the project in perpetuity.

C. No new state-owned buildings, or buildings constructed on state-owned property, shall be constructed, reconstructed, purchased, or acquired by the Commonwealth within a Special Flood Hazard Area or Shaded X Zone in any community unless a variance is granted by the Director of DGS, as outlined in this Order.

The following definitions are from Executive Order 45:

Development for NFIP purposes is defined in 44 CFR § 59.1 as "Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials."

The Special Flood Hazard Area may also be referred to as the 1% annual chance floodplain or the 100-year floodplain, as identified on the effective Flood Insurance Rate Map and Flood Insurance Study. This includes the following flood zones: A, AO, AH, AE, A99, AR, AR/AE, AR/AO, AR/AH, AR/A, VO, VE, or V.

The Shaded X Zone may also be referred to as the 0.2% annual chance floodplain or the 500- year floodplain, as identified on the effective Flood Insurance Rate Map and Flood Insurance Study.

The Sea Level Rise Inundation Area referenced in this Order shall be mapped based on the National Oceanic and Atmospheric Administration Intermediate-High scenario curve for 2100, last updated in 2017, and is intended to denote the maximum inland boundary of anticipated sea level rise.

"State agency" shall mean all entities in the executive branch, including agencies, offices, authorities, commissions, departments, and all institutions of higher education.

"Reconstructed" means a building that has been substantially damaged or substantially improved, as defined by the NFIP and the Virginia Uniform Statewide Building Code.

<u>Federal Agency Projects Only</u>
Projects conducted by federal agencies within the SFHA must comply with federal Executive Order 11988: Floodplain Management.

DCR's Floodplain Management Program does not have regulatory authority for projects in the SFHA. The applicant/developer must contact the local floodplain administrator for an official floodplain determination and comply with the community's local floodplain ordinance, including receiving a local permit. Failure to comply with the local floodplain ordinance could result in enforcement action from the locality. For state projects, DCR recommends that compliance documentation be provided prior to the project being funded.

For federal projects, the applicant/developer is encouraged reach out to the local floodplain administrator and comply with the community's local floodplain ordinance.

To find flood zone information, use the Virginia Flood Risk Information System (VFRIS): www.dcr.virginia.gov/vfris

To find community NFIP participation and local floodplain administrator contact information, use DCR's Local Floodplain Management Directory: www.dcr.virginia.gov/dam-safety-and-floodplains/floodplain-directory

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Cc: Amy Ewing, VDWR
Troy Andersen, USFWS
Wil Orndorff, DCR-Karst

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ATTACHMENT E
Virginia Consent Decree (Excerpt)

VIRGINIA:

IN THE CIRCUIT COURT OF HENRICO COUNTY

DAVID K. PAYLOR, *et al.*, Plaintiffs, v. MOUNTAIN VALLEY PIPELINE, LLC, Defendant.	)))))))))	Case No.: CL18006874-00

<u>CONSENT DECREE</u>

WHEREAS Plaintiffs David K. Paylor, Director of the Department of Environmental Quality, and the State Water Control Board (collectively, "Plaintiffs") have filed a Complaint in this matter asserting alleged violations of the State Water Control Law, the Virginia Stormwater Management Act, the Virginia Erosion and Sediment Control Law, the Virginia Stormwater Management Program Regulations, the Erosion and Sediment Control Regulations, the Virginia Water Resources and Wetlands Protection Program, the Virginia Water Protection Program Permit Regulation, and Clean Water Act § 401 Water Quality Certification No. 17-001 (collectively, the "Allegations") against Defendant Mountain Valley Pipeline, LLC ("MVP" or "Defendant," together with Plaintiffs, the "Parties");

WHEREAS the Parties, as evidenced by the signatures that follow, have consented to the entry of this consent decree ("Consent Decree") without trial of any issues; and

WHEREAS the Parties recognize, and this Court finds by entering into this Consent Decree, that the Parties have negotiated this Consent Decree in good faith, that implementation of this Consent Decree will avoid prolonged and complicated litigation between the Parties, and that the terms of this Consent Decree are fair, reasonable, and in the public interest.

II. JURISDICTION AND VENUE

The Parties agree that this Court has jurisdiction over the subject matter herein and over the Parties and that venue is proper in this Court. The Parties further agree that this Court shall retain jurisdiction over the Parties with respect to this Consent Decree until this Consent Decree is terminated as provided in Section IX (Termination).

III. PARTIES

The obligations of this Consent Decree apply to and are binding upon Plaintiffs and MVP, and any of their respective successors, assigns, or other entities or persons otherwise bound by law. Except as expressly provided herein, this Consent Decree shall not create any rights in any party other than the Parties of this Consent Decree.

IV. COMPLIANCE PROGRAM

(a) **Project Compliance**. Within thirty (30) days of the entry of this Consent Decree, MVP shall provide confirmation that all alleged instances of non-compliance with MVP's Annual Standards and Specifications, MVP's Site Specific ESC and SWM Plans, and Clean Water Act § 401 Water Quality Certification No. 17-001 addressed in this Consent Decree have been corrected. For the duration of this Consent Decree, MVP shall remain in compliance with all applicable provisions of the State Water Control Law, the Virginia Stormwater Management Act, the Virginia Erosion and Sediment Control Law, the Virginia Stormwater Management Program Regulations, the Erosion and Sediment Control Regulations, the Virginia Water Resource and Wetlands Protection Program Permit Regulations, MVP's Annual Standards and Specifications, MVP's Site Specific ESC and SWM Plans, and Clean Water Act § 401 Water Quality Certification No. 17-001.

(b) **Environmental Auditors**. MVP, at its expense, shall retain one or more third-party Environmental Auditors for the duration of this Consent Decree to provide the services discussed in this Section.

(1) Within fifteen (15) days of entry of this Consent Decree, MVP shall submit in writing the name, affiliation, contact information, and detailed summary of qualifications for the work contemplated for any Environmental Auditor required by this Consent Decree to the Department for review. At a minimum, the Environmental Auditor, or staff under the oversight of the Environmental Auditor, selected for this task shall (i) have completed the 3-day "Plan Reviewer for Erosion and Sediment Control" course offered by the Department, the 2-day "Inspector for Erosion and Sediment Control" course offered by the Department, the 3-day "Plan Reviewer for Stormwater Management" course offered by the Department, and the 2-day "Inspector for Stormwater Management" course offered by the Department, including any annual recertification or possess equivalent qualifications as approved in writing by the Department; (ii) have relevant construction related-experience; and (iii) be knowledgeable regarding the erosion and sediment control measures and best management practices required by MVP's Annual Standards and Specifications and MVP's Site Specific ESC and SWM Plans. The submittal shall include the names of the relevant individuals employed by the Environmental Auditor who will perform the services for MVP, as well as the relevant certificates of competence as identified in 9 VAC 25-850-40 related to training courses completed by the Environmental Auditor, or staff under the oversite of the Environmental Auditor. Within fourteen (14) days of the date that MVP identifies any Environmental Auditor pursuant to this paragraph, the Department may object for failure of that Environmental Auditor, or staff under the oversight of the Environmental Auditor, to satisfy the criteria for qualification stated herein. If the Environmental Auditor is disapproved,

the Department shall issue instructions to MVP for resubmitting the names and qualifications of one or more Environmental Auditors. The Parties shall work in good faith to select Environmental Auditors to be reviewed by the Department in accordance with this paragraph, and MVP shall have a reasonable time to make submissions to the Department, as necessary. Upon entry of this Consent Decree, the Environmental Auditor described in this paragraph shall assess, on a bi-weekly basis, whether (i) the best management practices for the Project are in accordance with MVP's Annual Standards and Specifications and MVP's Site Specific ESC and SWM Plans, (ii) the temporary erosion and sediment control measures are properly installed, inspected, and maintained, and (iii) all Ineffective Temporary Erosion and Sediment Control Measures are repaired and ESC Measures in Need of Routine Maintenance are maintained within the timeframes required by MVP's Annual Standards and Specifications or as otherwise provided in this Consent Decree. Any individual performing an inspection for the purpose of completing the assessment referenced in the preceding sentence shall have completed the 2-day "Inspector for Erosion and Sediment Control" course offered by the Department including any annual recertification. The Environmental Auditor described in this paragraph may rely on any relevant and competent information to perform its assessment, including inspection reports and other reliable information obtained from Personnel, Plaintiffs, other regulatory agencies, stakeholders, and property owners. The Environmental Auditor described in this paragraph shall further determine whether additional resources are necessary to ensure that temporary erosion and sediment control measures are properly installed, inspected, and maintained and that all Ineffective Temporary Erosion and Sediment Control Measures are repaired and ESC Measures in Need of Routine Maintenance are maintained within the timeframes required by MVP's Annual Standards and Specifications or as otherwise required by this Consent Decree. Within thirty (30) days of the date of entry of this Consent Decree, the Environmental Auditor described in this paragraph shall submit an independent report of the Environmental Auditor's review to the Department and to MVP. Subsequent reports shall be submitted to the Department and MVP on or before the fifteenth day of each quarter (*e.g.*, January 15, April 15, July 15, and October 15) covering the prior calendar quarter, for the duration of this Consent Decree. MVP will make the reports of the Environmental Auditor available for public review at mountainvalleypipeline.info. The Department will provide a link to such reports on its website.

(2) In addition, MVP, at its expense, shall retain a third-party Environmental Auditor to provide on-site monitoring of instream invertebrate and fisheries resources during all construction activity related to waterbody and wetland crossings and document instream conditions and any impacts to the resources. Within thirty (30) days of the date of entry of this Consent Decree, MVP shall submit in writing to the Department for its review, the name and documentation of the experience, qualifications, and certifications of the Environmental Auditor who will provide the services described in this paragraph, including the names of the individuals who will perform the actual services on behalf of the Environmental Auditor. Within fourteen (14) days of the date that MVP identifies any Environmental Auditor pursuant to this paragraph, the Department may object for failure of that Environmental Auditor to satisfy the criteria for qualification stated herein. If the Environmental Auditor is disapproved, the Department shall issue instructions to MVP for resubmitting the names and qualifications of one or more Environmental Auditors. The Parties shall work in good faith to select Environmental Auditors to be reviewed by the Department, and MVP shall have reasonable times to make submissions to the Department, as necessary. The Environmental Auditor will prepare and submit to the Department and MVP an independent report within fourteen (14) days after the completion of

each wetland or waterbody crossing describing instream biological conditions. Within ten (10) days of submittal of each of the Environmental Auditor's independent reports to the Department and MVP, MVP will make the reports of the Environmental Auditor available for public review at mountainvalleypipeline.info. The Department will provide a link to such reports on its website.

(c) **Notification for Waterbody and Wetland Crossings.** Prior to commencing Land-Disturbing Activity in any waterbody or wetland or boring under a waterbody or wetland, MVP shall provide Plaintiffs at least 48 hours advance notice. The notification shall be sent to standardsandspecs@deq.virginia.gov and shall include the following information:

(i) Crossing name or number as specified in the MVP's Site Specific ESC and SWM Plans;

(ii) Lead Environmental Inspector name and contact information; and

(iii) Anticipated crossing start and anticipated completion date.

(d) **Additional Resources to Repair Previously Damaged or Implemented Ineffective Erosion and Sediment Control Measures.** If the Environmental Auditor reports, in accordance with Section IV(b)(1), that MVP has insufficient resources available to regularly and consistently repair Ineffective Temporary ESC Measures in a timely manner in accordance with this Consent Decree and MVP's Annual Standards and Specifications, MVP shall provide a plan to the Department within seven (7) business days of such report that outlines measures to be taken to ensure that sufficient resources are available. MVP shall implement the plan including any remedial action upon approval by the Department.

(e) **System to Track Timely Maintenance of ESC Measures in Need of Routine Maintenance.** Within thirty (30) days of entry of this Consent Decree, MVP shall create and maintain a system to track and verify timely maintenance of any ESC Measure in Need of Routine Maintenance and shall propose guideline criteria to the Department for review and approval for identifying such measures. Any ESC Measure in Need of Routine Maintenance shall be logged into the tracking system the same day that it is identified by MVP or communicated to MVP by the Department's inspectors if received during normal business hours. Notifications received from the Department's inspectors after normal business hours shall be logged on the following day. Timely maintenance shall be completed as soon as practicable, but within such time as to prevent the erosion and sediment control measure from becoming ineffective and no later than three (3) days from the date the ESC Measure in Need of Routine Maintenance is identified. MVP's environmental inspectors (including any third-party inspector employed by MVP) and MVP's Environmental Auditors shall be responsible for identifying ESC Measures in Need of Routine Maintenance and logging them in the system. On a daily basis, the tracking system shall reconcile all ESC Measures in Need of Routine Maintenance identified by MVP (including any third-party inspector employed by MVP) with those identified by the Department's inspectors.

V. PENALTIES AND PAYMENT OF COSTS

(a) **Civil Penalty.** MVP shall be assessed a civil penalty in the amount of Two Million One-Hundred Fifty Thousand and 00/100 Dollars ($2,150,000). MVP shall make payment within thirty (30) days after the date of entry of this Consent Decree as specified in Section V(d), with notice therefore provided to the individuals identified in Section XI(i)(Notices). If MVP fails to pay the civil penalty in whole or in part when due, MVP shall pay interest on the outstanding balance due at the applicable judgement interest rate.

EXHIBIT A

Pre-construction Resource Crossing Checklist

Pre-construction Resource Crossing Checklist

Resource ID: Spread ID: Date:
Spread ID Crossing Length: Station Begin:
Anticipated Substrate: Station End:

TOYR? Yes☐ No☐ Other species of concern? T&E? Relocations? ______________________

Stream with Relevant Impairment: Yes☐ No☐. List:____

Project Commitment Considerations? List:____

Crossing Preparations:

☐ Anticipated crossing date:
☐ Weather Forecast:
☐ Streamflow conditions:
☐ Waterbody Crossing Plan developed, authorized, and reviewed with crew.
☐ Pre-construction Photos Onsite and Reviewed.
☐ Identify Primary Crew personnel. Tie-In Crew Foreman: ___________________________________
Environmental Crew Foreman:___________________________________
Environmental Inspector: ___________________________
Environmental Auditor: ___________________________
☐ Identify locations for resource streambed soils and subsoil stockpiles.
☐ Adequate materials/measures are in -place / on-site to prevent mixing of resource topsoil.
☐ Trench dewatering locations are identified and verified.
☐ Streambed scour BMPs to be implemented (typical detail ID): ________________________
☐ Pre-construction notifications submitted? Date:________________________

Crossing Materials and Equipment

☐ Spill Kits, adequate number and sizes
☐ Pumps for "pump around"
☐ Cofferdam materials? If so, what?____
☐ Flume pipe(s)? If so, size and number?____
☐ (1) Backup pump for every pump in use for "pump around," verified working, fueled, and ready.
☐ Secondary containment for pumps, light plants, generators etc.
☐ Hoses/clamps/floats. Correct size, length, and condition for immediate use.
☐ Intake Screens.
☐ Energy Dissipator material
☐ Intake Floats
☐ Turbidity Curtains
☐ Sandbags
☐ Ladders
☐ Plastic Sheeting
☐ Trench Dewatering Pump(s)
☐ Filter Bags (appropriately sized)

☐ Straw Bales
☐ Geotech Material
☐ Trench Breaker(s)
☐ Any drain tiles, or other pre-existing conditions?
☐ Silt Fence
☐ Compost Filter Sock
☐ Erosion Control Fabric
☐ Permanent and Temporary Seed Mix
☐Native Cobbles for CWF streambed restoration? Sourced onsite or imported?

I hereby confirm that the above information is accurate to the best of my ability.

Sign and Date:

Tie-in Crew Foreman:____ ______________
Environmental Crew Foreman: _________________________________ _____________
Environmental Inspector: _____________________________________ ______________
Environmental Auditor: ____________________________ _____________

EXHIBIT B

Restoration and Rehabilitation Plan

Mountain Valley Pipeline Project

Docket No. CP16-10-000

Restoration and Rehabilitation Plan

Revised September 2017

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LIST OF TABLES

1.0 Introduction

1.1 Project Description

Mountain Valley Pipeline, LLC (MVP), a joint venture of EQT Midstream Partners, LP, a subsidiary of NextEra Energy, Inc., Con Edison Gas Midstream, LLC, WGL Holdings, Inc., and RGC Midstream, LLC, plans to construct the Mountain Valley Pipeline (Project), an approximately 303-mile, 42-inch diameter natural gas pipeline, to provide timely, cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users and power generation in the Mid-Atlantic and southeastern markets, as well as potential markets in the Appalachian region. MVP is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act (NGA) authorizing it to construct and operate the proposed Project located in 17 counties in West Virginia and Virginia.

The proposed pipeline will extend from the existing Equitrans, L.P. transmission system and other natural gas facilities in Wetzel County, West Virginia to the existing Transcontinental Gas Pipe Line Company, LLC's (Transco) Zone 5 compressor station 165 in Pittsylvania County, Virginia. In addition to the pipeline, the Project will require approximately 171,600 horsepower (hp) of compression at three compressor stations currently planned along the route as well as measurement, regulation, and other ancillary facilities required for the safe operation of the pipeline. The pipeline is designed to transport up to 2.0 million dekatherms per day (MMDth/d) of natural gas.

The Project area consists of the temporary and permanent right-of-way (ROW) established for construction, operation, and maintenance of the pipeline, access roads, and aboveground facilities. The pipeline will require a 125-foot construction ROW and a 50-foot permanent, operational ROW. MVP will neck down to a 75-foot construction ROW in streams and wetlands wherever possible.

1.2 Project Timeline

Tree clearing is expected to occur as early as November 2017, continuing through May 31, 2018 and resuming August 1, 2018 through November 15, 2018. Pipeline construction will be completed by December 2018 with a target full in-service date for the Project of December 2018. Restoration will begin immediately following pipeline installation throughout the construction process and continue through June 2019, or until vegetation is successfully established.

1.3 Purpose of Plan

This *Restoration and Rehabilitation Plan* was prepared to address post-construction restoration, rehabilitation, and habitat mitigation activities. This plan will be implemented in conjunction with the FERC's 2013 *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and 2013 *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) as well as MVP's other construction, restoration, and mitigation plans (e.g., project-specific erosion and sedimentation control plans, *Spill Prevention, Control, and Countermeasure Plans, Karst Mitigation Plan,* and *Exotic and Invasive Species Control Plan*). The following sections provide details regarding MVP's proposed seed mixes, restoration procedures, maintenance and monitoring, and habitat enhancement within select areas of the Project.

2.0 Seed Mixes

MVP is partnering with the Wildlife Habitat Council (WHC), a nonprofit organization dedicated to assisting corporations, conservation organizations, and individuals with restoration and enhancement of wildlife habitat. The WHC is working with MVP on their commitment toward restoration of the Project ROW and establishment of perennial vegetation using native seed mixes created in collaboration with local seed supplier, Ernst Conservation Seeds, Inc. These seed mixes or an approved equivalent from another supplier will be applied along the Project's ROW except where landowners request a specific seed mix or on state or federally managed land where agencies request alternative seed mixes.

Proposed seed mixes will be distributed to representatives within state and federal agencies for approval and comment. These agencies include the United States Forest Service (USFS), West Virginia Department of Environmental Protection (WVDEP), West Virginia Division of Natural Resources (WVDNR), Virginia Department of Environmental Quality (VDEQ), and the Virginia Department of Conservation and Recreation – Division of Natural Heritage (VDCR-DNH).

2.1 Herbaceous Seed Mixes

A temporary cover crop containing annual ryegrass (*Lolium multiflorum* (*L. perenne var*)), german/foxtail millet (*Setaria italica*), cereal rye (*Secale cereale*) and/or browntop millet (*Panicum ramosum*) will be applied at 30 pounds per acre to prevent encroachment of non-favorable vegetation and provide erosion control until permanent vegetation can establish.

An upland herbaceous seed mix (Table 1) containing of forbs and grasses capable of establishing quickly to provide soil stabilization and revegetation will be applied at 20 pounds per acre in areas of the ROW not considered riparian, wetland, or within pollinator enhancement areas. In areas highly susceptible to erosion and characterized as steep slope, the upland mix will be applied at 45 pounds per acre. In West Virginia, slopes are considered steep when above a 3:1 grade (33%). In Virginia, the definition of a steep slope varies by county:

- Craig County – slopes greater than 20%
- Giles County – slopes greater than 25%
- Montgomery County – slopes greater than 33%
- Roanoke County – slopes greater than 25%
- Franklin County – slopes greater than 25%

- Pittsylvania County – slopes greater than 20%

Table 1. Upland, steep slope herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	3.15	3.15	5.5 - 7.5	Midsummer
Elymus virginicus	Virginia Wildrye	9.45	9.05	5.0 - 7.4	June to October
Panicum clandestinum	Deertongue	4.50	4.50	4.0 - 7.5	May to September
Schizachyrium scoparium	Little Bluestem	11.70	11.25	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	13.59	14.40	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	0.23	0.09		June to August
Aster novae-angliae	New England Aster	0.09	n/a	5.1 – 6.8	August to October
Aster pilosus	Heath Aster	0.05	0.05	5.4 - 7.0	After fall frost
Aster prenanthoides	Zigzag Aster	0.09	n/a	5.5 - 7.2	August to October
Chamaecrista fasciculata	Partridge Pea	n/a	0.45	5.5 - 7.5	July to September
Coreopsis lanceolata	Lanceleaf Coreopsis	0.45	0.45	6.0 - 7.0	April to July
Desmodium paniculatum	Panicledleaf Ticktrefoill	0.14	n/a	6.0 - 7.0	July to August
Eupatorium coelestinum	Mistflower	0.05	0.05	5.5 - 7.5	July to August
Heliopsis helianthoides	Oxeye Sunflower	0.36	0.45	5.5 – 7.0	July to August
Liatris graminifolia	Grassleaf Blazing Star	n/a	0.09	5.8 - 6.8	August to October
Monarda fistulosa	Wild Bergamot	0.18	0.23	6.0 - 8.0	June to September
Pycnanthemum incanum	Hoary Mountainmint	0.05	0.05	< 6.8	Summer
Rudbeckia hirta	Blackeyed Susan	0.45	0.45	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.18	0.23		July to August
Solidago juncea	Early Goldenrod	0.09	n/a		June to July
Solidago nemoralis	Gray Goldenrod	0.14	0.05	6.5 - 7.5	August to September
Tradescantia ohiensis	Ohio Spiderwort	0.09	0.05		late April to mid-July
		45.00	45.00		

If this seed mix becomes unavailable, a different, similar mix, that also conforms with requirements from state and federal agencies may be substituted.

An herbaceous seed mix containing facultative wetland species will be applied to forested, emergent, and shrub/scrub wetlands where appropriate (Table 2). In forested wetlands, the herbaceous seed mix will be augmented with the planting of bare-root saplings and shrubs at specified distances from the pipeline centerline. See Section 5.3.1 for more details.

An herbaceous seed mixture containing warm season grass and wildflower species well suited to vegetate the banks of water features will be used within a 100-foot riparian buffer at perennial waterbody crossings (Table 3). At forested perennial stream crossings, a woody seed mixture specific to forest type will be applied with the herbaceous seed mix to temporary workspaces (see Section 2.2), and at 55 select perennial crossings planting of bare root seedlings will occur at specified distances from the pipeline centerline (see Section 5.3.1).

Table 2. Wetland herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Alisma subcordatum	Mud Plantain	0.04	0.04	5.0 - 7.0	Midsummer
Asclepias incarnata	Swamp Milkweed	n/a	0.40		July to August
Aster novae-angliae	New England Aster	0.16	n/a		August to October
Aster prenanthoides	Zigzag Aster	0.14	n/a	5.5 - 7.2	August to October
Aster umbellatus	Flat Topped White Aster	0.10	n/a		August to Late Summer
Carex gynandra	Fringed Sedge	0.10	0.10		May to June
Carex lupulina	Hop Sedge	1.00	1.00	6.2 - 7.0	June to October
Carex lurida	Shallow Sedge	3.00	3.00	4.9 - 6.8	June to July
Carex scoparia	Blunt Broom Sedge	1.00	1.00	4.6 - 6.9	July to August
Carex vulpinoidea	Fox Sedge	7.00	6.90	6.8 - 8.9	June to August
Cinna arundinacea	Wood Reedgrass	0.40	0.40	4.0 - 8.5	August to September
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Eupatorium coelestinum	Mistflower	0.10	0.10	5.5 - 7.5	July to October
Eupatorium fistolosum	Joe Pye Weed	0.14	0.14	4.5 - 7.0	July to September
Eupatorium perfoliatum	Boneset	0.20	0.20		July to October
Helenium autumnale	Common Sneezeweed	n/a	0.10		July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40		July to August
Juncus effusus	Soft Rush	0.60	0.60	5.5 - 7.0	May to June
Ludwigia alternifolia	Seedbox	0.10	0.10		August to September
Mimulus ringens	Square Stemmed Monkeyflower	0.10	0.10		June to September
Onoclea sensibilis	Sensitive Fern	0.20	0.20		June to October
Scirpus cyperinus	Woolgrass	0.20	0.20	4.8 - 7.2	July to September
Scirpus polyphyllus	Many-leaved Bulrush	0.20	0.20		July to August
Verbena hastata	Blue Vervain	0.72	0.72		June to October
Vernonia noveboracensis	New York Ironweed	0.10	0.10	4.5 - 8.0	July to September
		20.00	20.00		

If this seed mix becomes unavailable, a different, similar mix, that also conforms with requirements from state and federal agencies may be substituted.

Table 3. Riparian herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perenans	Autumn Bentgrass	0.54	0.04	5.5 - 7.5	Midsummer
Andropogon gerardii	Big Bluestem	3.00	0.01	6.0 - 7.5	July to October
Elymus virginicus	Virginia Wildrye	4.00	1.00	5.0 - 7.4	June to October
Juncus effusus	Soft Rush	0.20	3.00	5.5 - 7.0	May to June
Juncus tenuis	Path Rush	0.20	1.00	4.5 - 7.0	May to June
Panicum clandestinum	Deertongue	5.60	6.90	4.0 - 7.5	May to September
Sorghastrum nutans	Indiangrass	3.60	0.04	5.0 - 7.8	August to October
Asclepias incarnata	New England Aster	0.20	n/a	5.0 - 8.0	June to July
Aster novae-angliae	Swamp Milkweed	0.20	4.00	5.0 - 7.4	Late Summer
Chamaecrista fasciculata	Partridge Pea	n/a	0.60	5.5 - 7.5	July to September
Eupatorium coelestinum	Mistflower	0.20	0.20	5.5 - 7.5	July to October
Eupatorium fistolosum	Joe Pye Weed	0.14	0.20	4.5 - 7.0	July to September
Eupatorium perfoliatum	Boneset	0.10	0.20		July to October
Geum canadense	White Avens	0.20	0.40	4.5 - 7.5	May to June
Helenium autumnale	Common Sneezeweed	n/a	0.10	4.0 - 7.5	August to September
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.14	4.5 – 7.0	July to August
Monarda fistulosa	Wild Bergamot	0.10	0.20	6.0 - 8.0	June to September
Pycnanthemum tenuifolium	Slender Mountainmint	0.06	0.10		July to September
Rudbeckia hirta	Blackeyed Susan	0.60	0.40	6.0 - 7.0	May to October
Senna hebecarpa	Wild Senna	0.08	0.10		July to August
Senna marilandica	Maryland Senna	0.08	n/a	4.0 - 7.0	Summer
Verbena hastata	Blue Vervain	0.40	0.10		June to October
Vernonia noveboracensis	New York Ironweed	0.10	0.72	4.5 - 8.0	July to September
		20.00	20.00		

If this seed mix becomes unavailable, a different, similar mix, that also conforms with requirements from state and federal agencies may be substituted.

Portions of the ROW within Braxton, Lewis, Fayette, and Nicholas counties, West Virginia and Giles and Montgomery counties, Virginia not considered as steep slope, riparian, or wetland will receive an herbaceous seed mix designed for native pollinators (Table 4). These select counties crossed by the Project contain either historical or extant records for presence of the federally endangered rusty patch bumblebee (*Bombus affinis*). MVP will voluntarily apply the aforementioned pollinator seed mix in an attempt to provide or enhance available foraging habitat necessary for the rusty patched bumblebee's recovery efforts in West Virginia and Virginia.

Table 4. Upland meadow, pollinator herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Schizachyrium scoparium	Little Bluestem	11.66	11.68	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	1.00	1.00	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	n/a	0.10	June to August	*Asclepias syriaca*
Asclepias tuberosa	Butterfly Milkweed	0.20	0.10	4.8 - 6.8	June to August
Aster novae-angliae	New England Aster	0.14	n/a	5.1 – 6.8	August to October
Chamaecrista fasciculata	Partridge Pea	n/a	0.60	5.5 - 7.5	July to September
Chamaecrista nictitans	Sensitive Partridge Pea	n/a	0.06		June to October
Coreopsis lanceolata	Lanceleaf Coreopsis	0.40	0.44	6.0 - 7.0	June to August
Echinacea purpurea	Purple Coneflower	0.60	n/a	6.5 - 7.2	Late Summer
Eupatorium coelestinum	Mistflower	0.10	0.04	5.5 - 7.5	July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40	5.5 – 7.0	July to August
Lespedeza virginica	Slender Bushclover	n/a	0.10		July to September
Liatris graminifolia	Grassleaf Blazing Star	n/a	0.10	5.8 - 6.8	August to October
Liatris spicata	Marsh Blazing Star	0.16	n/a	5.6 - 7.5	July to September
Monarda fistulosa	Wild Bergamot	0.12	0.10	6.0 - 8.0	June to September
Parthenium integrifolium	Wild Quinine	0.10	n/a	unknown	Late May to Late August
Penstemon laevigatus	Appalachian Beardtongue	0.20	0.10	unknown	May to June
Pycnanthemum incanum	Hoary Mountainmint	0.04	0.20	< 6.8	Summer
Rudbeckia fulgida var. fulgida	Orange Coneflower	0.04	0.02		July to October
Rudbeckia hirta	Blackeyed Susan	0.60	0.04	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.10	0.60		July to August
Solidago juncea	Early Goldenrod	0.04	0.10		June to July
Solidago nemoralis	Gray Goldenrod	0.04	0.04	6.5 - 7.5	August to September
Tradescantia ohiensis	Ohio Spiderwort	0.06	0.04		Late April to Mid-July
Tradescantia virginiana	Virginia Spiderwort	n/a	0.10		late April to mid-July
		20.00	20.00		

If this seed mix becomes unavailable, a different, similar mix, that also conforms with requirements from state and federal agencies may be substituted.

2.2 Woody Seed Mix

Herbaceous seed mixes will be augmented with an oak-hickory forest woody seed mix to revegetate temporary workspaces and access roads within impacted forested areas. All species proposed within the woody seed mix are native to the Project area and are summarized in Table 5. At minimum, three of the five overstory, four of the seven understory, and two of the four shrub species will comprise the woody seed mix.

Table 5. Oak-hickory forest woody seed mix and recommended application rate.

Layer	Species	Common Name	Seeding Rate (lbs/acre)
Overstory	*Fagus grandifolia*	American Beech	0.3
	Liriodendron tulipifera	Tulip Poplar	0.3
	Pinus strobus	White Pine	0.3
	Pinus virginiana	Virginia Pine	0.3
	Prunus serotina	Black Cherry	0.3
Understory	*Amelanchier canadensis*	Canadian Serviceberry	0.3
	Cercis canadensis	Eastern Redbud	0.3
	Cornus florida	Flowering Dogwood	0.3
	Diospyros virginiana	Persimmon	0.3
	Ilex opaca	American Holly	0.3
	Nyssa sylvatica	Black Gum	0.3
	Sassafras albidum	Sassafras	0.3
Shrub	*Hamamelis virginiana*	Witch Hazel	0.3
	Lindera benzoin	Spicebush	0.3
	Vaccinium angustifolium	Lowbush Blueberry	0.3
	Viburnum acerifolium	Mapleleaf Viburnum	0.3
	Vitis aestivalis	Grape	0.3

2.3 Jefferson National Forest

MVP will follow the USFS's recommendations for restoration and rehabilitation of the permanent ROW, as defined in the Plan of Development, to reduce impacts to visual resources, in a manner that preserves MVP's ability to access, monitor, patrol, and inspect the ROW in accordance with PHMSA requirements (49 CFR Part 192). MVP consulted with the USFS regarding appropriate seed mixtures for use within the Jefferson National Forest (JNF). The USFS indicated that the initial goal of seeding on the JNF is to establish vegetative cover to minimize surface erosion and sedimentation, while the secondary goal is to establish an assortment of native species congruent with local ecological communities and benefits for wildlife and pollinators. Species recommended by the USFS (Appendix A) for use in upland, riparian, and steep slope areas are comparable to those species contained in the seed mixes prepared by Ernst Conservation Seeds, Inc. As such, MVP will apply the herbaceous seed mixes described in Section 2.1 in appropriate areas within the JNF.

In addition, MVP will add the woody seed mix described in Section 2.2 to herbaceous seed mixes applied within temporary workspaces of the ROW.

As requested by the USFS, all leguminous seeds shall be either pre-inoculated, or mixed with inoculant specified for use on that particular seed according to manufacturer’s directions. Inoculants shall be manually applied at double the manufacturer’s rate and inoculant shall be mixed with legume seed prior to mixing with other seeds. For hydroseeding, a minimum of five times the dry seeding rate of inoculant will be used.

3.0 Restoration Procedures

As mentioned above, MVP will follow the directions and requirements in FERC's Plan and Procedures during restoration efforts. However, MVP will also follow any requirements set forth by federal and state agencies where the Project crosses land under their jurisdiction. These additional requirements and measures that have been identified to-date have been incorporated into this plan.

3.1 Topsoil and Spoil Treatment

MVP will identify and segregate the topsoil layer from the subsoil layer as described in FERC's Plan and Procedures. Within residential, agricultural areas, and the JNF, MVP will prevent the mixing of topsoil and subsoil during construction by stripping topsoil from the permanent and temporary ROW during construction. The stockpiled topsoil and subsoil will be stored separately within the 125-foot construction ROW, and will be replaced in the proper order during backfilling and final grading in order to prevent mixing of the soil horizons. All stockpiled spoils will be stored at least 10 feet from waterbodies, and within approved construction areas (as required by FERC's Plan and Procedures). Erosion controls will be installed around stockpiled spoils to ensure that they do not erode and impact adjacent areas.

3.2 Installation of Erosion Controls

Temporary erosion Best Management Practices (BMPs) will be installed prior to construction activities that can disturb soils, and these BMPs will be inspected and maintained throughout the construction process. The inspections will be conducted on a daily basis in areas that are under active construction or equipment operation, on a weekly basis in areas where no active construction is currently occurring, and within 24 hours in areas that have just received a rainfall event of at least 0.5 inch. Any necessary repairs that are identified during these inspections will be conducted within 24 hours or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts.

Inspection and repair of temporary erosion BMPs will continue until they are replaced by permanent erosion controls or until the area is restored. Temporary erosion BMPs include temporary slope breakers, sediment barriers, trench plugs, and mulch. As requested by the USFS for implementation on the JNF, erosion and sediment control BMPs will be promptly removed after soils are stable and vegetative cover is established.

Temporary slope breakers are intended to reduce runoff velocities and divert water to vegetated areas off the construction ROW. Temporary sediment barriers are installed to stop the movement of sediments and to prevent the deposition of sediments beyond approved workspaces or into sensitive areas. As indicated in FERC's Plan, these structures can be constructed of materials such as soil (e.g., diversion ditches), sand bags, silt-fences, or other approved materials. As requested by the USFS, within the JNF silt fences reinforced with metal or plastic mesh will be avoided if possible. In the case of the temporary slope breaker, water will be directed to a stable well-vegetated area or to an energy-dissipating device. The required spacing for these controls will be outlined in erosion and sedimentation control sheets.

Temporary trench plugs are intended to segment a continuous open trench prior to backfilling in order to prevent pooling and movement of water along the open trench. These plugs will consist of unexcavated portions of the trench (i.e., undisturbed soils), compacted subsoils, sandbags, or some functional equivalent.

If permanent seeding cannot occur immediately following final grading, mulch will be applied to all disturbed slopes that have the potential to erode in order to stabilize the soil and to reduce wind and water erosion. Mulch will be spread uniformly over an affected area to at least 75 percent coverage at a rate of 2-4 tons/acre. In wetland areas FERC's Plan requires that mulch applications will be increased to 3 tons/acre. This rate can be increased or decreased on the JNF based on slope classes. The following describes the USFS requirements regarding mulch applications, which would be followed on the JNF:

- Materials will be certified weed free or be accompanied by vendor's test results for noxious weed content. Hay will not be used on the JNF.
- Seeded areas can be mulched with weed free straw at a rate of 2-4 tons/acre (hand spread or blown), fiber mulch hydro-seeded at 1-2 tons/acre or other appropriate material.
- Natural biodegradable products will be used and materials will be demonstrated to be free of invasive species, including but not limited to plants, pests, and pathogens.
- If the use of stabilization netting is required/permitted, wildlife friendly geotextiles will be used. These products must either be free of netting or netting must be made of 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber. Plastic netting (such as polypropylene, nylon, polyethylene, and polyester), even if advertised as biodegradable, is not an acceptable alternative. Any netting used must also have a loose-weave design with movable joints between horizontal and vertical twines to reduce the chance for wildlife entanglement, injury, or death.
- Water used for any products that require mixing with water will come from a USFS-approved water source. The source of water must not be contaminated with non-native invasive organisms that could spread into streams.

Permanent erosion controls will be installed following completion of construction. Permanent erosion controls consist of vegetation, permanent trench breakers and slope breakers. The placement, number, and composition of these permanent erosion controls will be illustrated on the erosion and sediment control plans and supplemented as determined by the EI, the applicable land management agency, and the FERC Plan and Procedures.

3.3 Re-contouring

All disturbed areas will be regraded and re-contoured to blend into the surrounding landscape, reestablish natural drainage patterns, and be compatible with surrounding drainage patterns, except at locations where permanent changes in drainage will be required to prevent erosion, scour, and possible exposure of the pipeline. The emphasis during re-contouring will be returning the entire ROW to its approximate original contours, stabilize slopes, control surface drainage, and aesthetically blend the area with the contours of adjacent lands. The re-contouring and replacement of topsoil in areas of disturbed wetlands to their original grade is especially critical to maintain wetland hydrology. If existing culverts are damaged or removed during construction, they will be replaced to their original condition in order to maintain the original hydrology.

3.4 Cleanup

Cleanup of an area (including final grading and installation of permanent erosion control structures) will be completed within 20 days after backfilling the trench (10 days in residential areas). All construction debris (e.g., mats, garbage, etc.) will be cleared from the construction area and disposed of in accordance with state and local regulations. Excess rock and spoil materials will be distributed along the construction ROW or disposed of in existing quarries or in permanent disposal sites. Hazardous materials will be handled and disposed of as described in the Project's *Hazardous Materials Management Plan*.

All non-merchantable brush and slash will be windrowed to the edge of the ROW, utilized in downslope areas of the ROW and access roads, burned and chipped, or removed from the area in accordance with local, state, or federal requirements. Windrowing of non-merchantable brush and slash along the ROW will result in habitat for many types of wildlife including: rabbits and other small mammals, ruffed grouse, song birds and reptiles. Over time the windrows will provide food for wildlife as insects will establish residence in the materials. The windrows can serve as escape cover from predators, locations for nesting and shelter from inclement weather. The windrows will generally range from 10 to 20 feet in width and 6 to 8 feet in height. Breaks will be left in the windrows at approximately 100 feet in order to provide for fire breaks and wildlife crossings.

Non-merchantable brush and slash can be utilized in downslope areas of the ROW and access roads to aide in soil stabilization and erosion control. Layering the brush and slash at the toe of a low-side slope along an access road provides for physical protection in the form of soil stabilization, and erosion and sediment control. Layering of brush and slash can promote physical protection to the downslope areas of the ROW. Additionally, the layering can provide long-term support for revegetation in downslope areas of the ROW.

3.5 Seeding

The goals of permanent seeding are to establish a dense, self-propagating, low maintenance ground cover in order to minimize erosion and sedimentation while also providing wildlife habitat.

Seeding will occur promptly after construction is complete; however, if ground conditions delay restoration until the following spring, the ground will be mulched and seeding will take place during the next growing season. A *Winter Construction Plan* has been prepared to address how restoration and revegetation would proceed if seeding could not be completed before the onset of winter. Additionally, if seeding must occur outside the normal seeding season a temporary erosion control seed mix will be applied, and either a permanent erosion control seed mix or native seed mix will be applied during the next normal seeding season. Seed will be uniformly applied using a broadcast seeder, drill, or hydroseeder. These methods are described in more detail below. When dryseeding, the seeding depth should be ¼ to ½ inch. Following application of seed mix, mulch will be applied as described in Section 3.5.5.

3.5.1 Seedbed Preparation

Areas targeted for restoration will be prepared for reseeding before applying the seed in order to establish an environment that is conductive to seed placement and moisture retention (as described in FERC's Plan and Procedures). Permanent erosion control devices will be installed to minimize the risk of erosion and mulch will be used to prevent soils from eroding or desiccating.

Soil compaction can reduce the likelihood of disturbed areas being successfully revegetated. In order to minimize soil compaction, construction activities will be timed to dry periods when possible, and construction mats will be used in wetland habitats. On the JNF, no heavy equipment will be used on plastic soils when the water table is within 12 inches of the surface, or when soil moisture exceeds the plastic limit. Also, on the JNF, heavy equipment will not be used during site preparation on sustained slopes over 35 percent, or on sustained slopes over 20 percent when soils have a high erosion hazard or are failure-prone. If compacted soils are identified by the EI or the USFS within areas targeted for restoration, the compacted soils will be ripped to a depth of at least 6 to 8 inches.

As stated in Section 3.1, MVP will identify and segregate the topsoil layer from the subsoil layer as described in FERC's Plan and Procedures. Stockpiled topsoil and subsoil will be stored separately, and will be replaced in the proper order during backfilling and final grading, and prior to seeding. Following topsoil placement, dry fertilizer and lime will be applied. Unless site-specific recommendations are received from local, state or federal agencies, MVP will incorporate up to 4,000 lbs/acre of agricultural lime and 500 lbs/acre of 10-20-10 (Nitrogen [N], Phosphorous [P], Potassium [K]) fertilizer into the soil.

The following are guidelines for fertilizer and lime application rates recommended by the USFS to be used on JNF:

Fertilizer:

- 600 – 800 lbs/acre of 10-20-10 (N-P-K)) fertilizer;
- 400 lbs/acre of 15-30-15 (N-P-K) fertilizer; or
- 800-1,000 lbs/acre of 10-10-10 (N-P-K)

Lime:

- 1,500-4,000 lbs/acre (pelletized or dust); or
- 4,000 lbs/ac of Hydro Lime (2.5 gal container is equivalent to 1000 lbs limestone; 5-10 containers /acre.

3.5.2 Drill Seeding

Drill seeding is a mechanical seeding method which places seed directly into the soil. Due to the equipment required; however, drill seeding is generally limited to areas with slopes less than 3:1 (USDA 2005). Because native seed mixes need to be drilled or otherwise covered to enhance germination success, drill seeding is the preferred option to be used in areas where a native seed mix will be applied.

3.5.3 Broadcast Seeding

Broadcast seeding will be the preferred seeding method used on steep slopes (i.e., slopes greater than 3:1) or other areas that cannot be accessed with other seeding equipment; areas that will be covered with erosion control fabric; or other areas determined to be appropriate for broadcast seeding by the EI and/or USFS. Seeds will be broadcast with a mechanical seeder immediately after the seedbed has been prepared and the soil is loose. This will allow the seeds to be lightly covered as the soil settles. The seeded area may also be disrupted by lightly dragging the area with chains or other appropriate harrows to lightly cover the seed. Broadcast seeding will occur immediately prior to installation of erosion control fabric or the application of mulch.

3.5.4 Hydroseeding

Hydroseeding may be used in upland areas that can be safely accessed with hydroseeding equipment, on slopes where drill seeding is not feasible (i.e., slopes greater than 3:1), and in areas determined to be appropriate for this method by the EI and/or USFS. Hydroseeding equipment shall be equipped with sufficient tanks, pumps, nozzles, and other devices required for mixing and hydraulically applying the seed, lime, fertilizer, wood fiber mulch, and tackifier mix in slurry form onto the prepared ground. The hydroseeding equipment shall have built-in agitators, which will keep the seed, mulch, tackifier, and water mixed homogeneously until pumped from the tank. Hydroseeding and hydromulching will be done from two directions (e.g., left and right or up and down), where feasible, to ensure maximum coverage of the soil. The amount of tackifier will be adjusted based on the slope of area being hydroseeded. For example, typical application rates for guar (a plant based tackifier) range from 40 lbs/acre for flat areas to 50 lbs/acre for 33 percent (3:1) slopes (CASQA 2003). During hydroseeding, it is recommended to add 50% more seed to the tank if a machinery breakdown occurs. Five times the recommended rate of inoculant will be used during hydroseeding.

In addition, the following USFS recommendations will be implemented in areas that are hydroseeded within the JNF:

- Hydroseeding will occur during a periods of dry weather, whenever possible, as wood-fiber hydraulic mulches are generally short-lived and require a 24-hour period to dry before rainfall occurs.
- Materials or additives used as binders or emulsifiers will not be toxic to soil organisms or otherwise prevent or inhibit seed germination.
- Only products suitable for wildlife will be used.
- Tackifiers will be non-toxic and organic based (e.g., guar, psyllium, or pitch and rosin emulsions).
- Tackifiers to be used, as well as, application rates, and methods of application will be submitted to the USFS for approval prior to use.

3.5.5 Mulching

After dry seeding, mulch will be applied to help the seed remain in place, protect seed from scavengers, and retain soil moisture. Mulch can consist of straw, erosion control fabric, or some functional equivalent, and will be certified as free of noxious weeds. Recommended loose mulch and application rates are provided in Table 6.

Table 6. Recommended mulch and application rates.

Mulch Application	Rate (lbs/acre)	Notes
Straw	4,000	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	1,500	Do not use as mulch for winter cover or during hot, dry periods. Apply as slurry.
Corn Stalks	8,000-12,000	Cut of shredded in 4 – 6 inch lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand
Wood Chips	8,000-12,000	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand. Apply additional 12 lbs slow-release nitrogen/ton of wood chips.

3.5.6 Agricultural Lands

MVP will work with individual landowners to address restoration of active agricultural areas. Following construction, impacted agricultural land will be restored to pre-construction conditions in accordance with the FERC Plan, and any specific requirements identified by landowners, or state or federal agencies with regulatory jurisdiction over or interest in agricultural land. Agricultural land affected by the construction ROW and additional temporary workspace will be allowed to revert to prior use, with the exception of tree crops within the permanent ROW.

4.0 Bare-Root Sapling and Shrub Planting

Planting of bare-root saplings and shrubs will occur within select areas of the Project (Table 7 and Table 8) . The purpose of these plantings is to establish target native tree species comparable to the region, site characteristics (e.g., topography; soil characteristics; adjacent vegetation), and adjacent forest composition in order to encourage the timely reestablishment of habitat removed during Project construction. For small mammals and birds, adequate spacing of planted shrubs can form a large clump or thicket and provide excellent cover, refuge, or brood-rearing habitat often absent in open landscapes. Furthermore, planting a diverse array of native shrubs and saplings with varying blooming periods will provide reliable sources of pollen and nectar for pollinator species during spring, summer, and autumn.

All species planted will be native to the area, and the seed source or ecotype of the saplings and shrubs will be as local as possible with preference given to within-state, then mountainous regions of an adjacent state, followed by within the Appalachian Mountain range.

Handling and storage of saplings is important to ensure viability and to limit loss prior to planting. To the extent practicable, time between delivery of saplings to the restoration site and planting will be limited. In an effort to prevent desiccation and preserve moisture, saplings will be kept in original shipping container (e.g., sack; box) and stored in cool, moist, and shady locations not within direct sunlight and wind. Refrigerated storage will be used when possible. Only one bag or bundle of saplings will be opened at a time, and partially used bundles will be rolled or tied closed to prevent exposure of roots to air. Saplings will be protected from harsh materials such as gasoline, diesel fuels, oils, or other chemicals. Immediately prior to planting, saplings will be inspected for damage that may result in mortality. Saplings will be discarded if the following are present: broken stems or main roots, mold or mildew, stems with missing bark, desiccated roots, or a root system less than 5 inches long.

Saplings deemed suitable will be planted using a spade, auger, or dibble bar between October 1 and April 30 following seed mix application (Section 3.5). Only one sapling at a time will be removed from the planting bag after a suitable hole is dug. Holes will be dug to a depth where groundline is at approximate root collar level, typically between 8 and 10 inches. Before being placed in a vertical position within the debris-free hole, roots will be moistened and treated with root dip absorbent polymers and mycorrhizal root dip inoculates in accordance with manufacturer’s recommendations. One sapling will be placed in each hole with the roots inserted to the bottom and then lifted upward slightly so that the root collar is at or slightly below the finished grade. Each sapling will be fertilized with a 5 gram tablet of controlled release fertilizer. The spade, planting bar, or shovel is inserted behind the planting hole and tilted back to close the bottom of the planting hole. The tool is then tilted forward to close the top of the hole. Soil will be firmly packed around each planting to fill any remaining voids. Tree tubes (minimum of 5 feet tall) will be used to protect saplings from browse damage caused by local wildlife or livestock. In areas experiencing higher than average browse damage or when planting species highly preferred by wildlife (e.g., apple, plum, hazelnut, or persimmon trees), 5- to 6-foot tall, 12- to14-gauge welded wire fence with 2-inch by 4-inch openings is recommended to protect saplings.

4.1 Riparian Stabilization and Restoration

The stabilization of streambanks and areas adjacent to waterbodies is critical to minimize the risk of erosion, slope failure, and impacts to sensitive aquatic species. In general, all affected riparian areas will be revegetated using native species and appropriate seeding prescriptions based upon the preexisting vegetative community within the disturbed area. MVP will restore waterbody banks to preconstruction contours to the extent practical following pipe installation and initial bank stabilization. Permanent bank stabilization and erosion control devices will be installed as necessary to minimize sediment deposition into waterbodies. Areas with steep slopes may require additional grading to reestablish contours capable of supporting preconstruction drainage patterns.

If grubbing has not been extensive, then native shrub and tree species are expected to sprout and regenerate naturally within temporary workspaces. To further avoid and minimize impacts to sensitive wildlife, temporary workspaces at select streams with known or potentially suitable habitat for sensitive aquatic species (i.e., freshwater mussels and fish) MVP is committed to be hand planting with bare-root live shrubs and tree saplings in addition to installing a prescribed herbaceous seed mix (Table 7).

Table 7. Stream crossings proposed for bare-root seedling plantings.

Waterbody Name	MP	County	State	Valuable Resource
Leading Creek	47.9	Lewis	WV	Headwaters of Group 2 Mussel Stream, warmwater
Sand Fork	55.1	Lewis	WV	Non-listed freshwater mussel stream, warmwater
Little Kanawha River	74.8, 74.9	Braxton	WV	Group 2 Mussel Stream, warmwater
Elk River	87.3	Webster	WV	Headwaters of Group 2 Mussel Stream, coldwater stream, B2 trout stream, Elk River Crayfish
Gauley River	118.9	Nicholas	WV	candy darter, warmwater stream, whitewater recreational uses
Hominy Creek	126.9, 127.0	Nicholas	WV	candy darter, coldwater stream, B2 trout stream
Meadow River	144.0	Greenbrier	WV	candy darter, B2 trout stream, Swainson's

Waterbody Name	MP	County	State	Valuable Resource
				Warbler
Greenbrier River	171.4	Summers	WV	Non-listed mussels, candy darter, warmwater stream
Indian Creek	182.7	Monroe	WV	possible hellbenders and mussels (historic); bald eagle
Kimballton Branch	199.1, 199.4	Giles	VA	headwaters of wild trout stream, coldwater stream
Stony Creek	200.4	Giles	VA	candy darter, green floater, coldwater stream, wild trout stream
Little Stony Creek	204.4	Giles	VA	coldwater stream, wild trout stream
Sinking Creek	211.2	Giles	VA	candy darter, green floater, coldwater stream, wild trout stream, non-listed mussels
UNT Craig Creek	219.2	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
UNT Craig Creek	219.3	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
UNT Craig Creek	219.8	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
UNT Craig Creek	220.0	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
Mill Creek	222.2	Montgomery	VA	upstream of Roanoke logperch suitable habitat, orangefin madtom, coldwater stream, wild trout
North Fork Roanoke River	227.2	Montgomery	VA	Roanoke logperch present, non-listed mussels present, orangefin madtom, coldwater stream, wild trout
North Fork Roanoke River	227.4	Montgomery	VA	Roanoke logperch present, non-listed mussels present, orangefin madtom, coldwater stream, wild trout
Bradshaw Creek	230.7	Montgomery	VA	Roanoke logperch suitable habitat, orangefin madtom, coldwater stream, wild trout
Bradshaw Creek	231.5	Montgomery	VA	Roanoke logperch suitable habitat, orangefin madtom, coldwater stream, wild trout
Roanoke River	235.4	Montgomery	VA	Roanoke logperch present, orangefin madtom, non-listed mussels present
Bottom Creek	241.1	Roanoke	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
Bottom Creek	242.5	Roanoke	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
Mill Creek	245.1	Roanoke	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
Green Creek	247.1	Franklin	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout

Waterbody Name	MP	County	State	Valuable Resource
Green Creek	247.4	Franklin	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
North Fork Blackwater River	249.7	Franklin	VA	Roanoke logperch suitable habitat, coldwater stream wild trout stream
Teels Creek	258.2	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	260.3	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	261.0	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	261.8	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	262.3	Franklin	VA	Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek contributing sediment impacts
Little Creek	262.6	Franklin	VA	Roanoke logperch suitable habitat, numerous crossings upstream contributing sediment impacts
Little Creek	263.3	Franklin	VA	Roanoke logperch suitable habitat, non-listed mussels present, numerous crossings upstream contributing sediment impacts
Maggodee Creek	269.4	Franklin	VA	Roanoke logperch suitable habitat
Blackwater River	269.7	Franklin	VA	Roanoke logperch present, non-listed mussels present
UNT to Jacks Creek	278.8	Franklin	VA	orangefin madtom
Turkey Creek	280.5	Franklin	VA	orangefin madtom
Strawfield Creek	282.3	Franklin	VA	orangefin madtom
Parrot Branch	282.9	Franklin	VA	orangefin madtom
Jonnikin Creek	284.4	Pittsylvania	VA	orangefin madtom
UNT to Rocky Creek	287.1	Pittsylvania	VA	orangefin madtom
Pigg River	289.1	Pittsylvania	VA	Roanoke logperch present, orangefin madtom, mussels present including yellow lampmussel (VA threatened)
Harpen Creek	289.9	Pittsylvania	VA	Roanoke logperch suitable habitat, orangefin madtom
Harpen Creek	292.0	Pittsylvania	VA	orangefin madtom

Table 8 lists suitable bare-root native tree and shrub species for use in restoring riparian areas and palustrine forested wetlands. The final species mix will depend on nursery stocks, availability, soil condition, and nearby species composition; however, six different tree species and four different shrub species, at minimum, will be planted at each riparian target area. In general, live, bare-root saplings and shrubs will be at least 18 inches in height, a minimum two years old, and planted no closer than 8 – 10 feet at a rate of approximately 300 to 500 stems per acre. A 10-foot strip centered on the pipeline will be maintained in an herbaceous state and no trees will be planted within 15 feet on either side of the pipeline to avoid the possibility of roots reaching the pipeline and compromising the integrity of the pipeline coating. A mix of shrubs and trees will be planted within the remaining sections of the ROW parallel to the waterbody and extending up to 100 feet, where possible, from the top of either side of the stream bank. Stream banks will be treated with lime and fertilizer, then the bare-root saplings and a riparian herbaceous cover seed will be applied and lightly covered with soil before mulch is added to the area. A sediment barrier will be maintained at the edge of the water until revegetation is successful. Plantings will be completed between October 1 and April 30 of the same year as construction, and no plantings will occur when soils are frozen.

Table 8. Native tree and shrub species for bare root plantings within riparian areas and forested wetlands.

Species	Common Name	Indicator Status	Riparian Planting	Forested Wetland Planting
		Native Trees		
Acer rubrum	Red Maple	FAC	X	X
Acer saccharinum	Silver Maple	FACW	X	X
Betula nigra	River Birch	FACW	X	X
Carpinus caroliniana	American Hornbeam	FAC	X	X
Carya glabra	Pignut Hickory	FACU	X	
Carya ovata	Shagbark Hickory	FACU	X	
Chionanthus virginicus	White Fringe Tree	FAC+	X	
Diospyros virginiana	Common Persimmon	FAC-	X	
Fraxinus pennsylvanica	Green Ash	FACW	X	X
Juniperus virginiana	Eastern Red Cedar	FACU	X	X
Liquidambar styraciflua	Sweet Gum	FAC	X	X
Liriodendron tulipifera	Tuliptree	FACU	X	X
Nyssa sylvatica	Black Gum	FAC	X	
Platanus occidentalis	American Sycamore	FACW-	X	X
Populus deltoids	Eastern Cottonwood	FAC	X	
Quercus bicolor	Swamp White Oak	FACW+	X	X
Quercus falcata	Cherrybark Red Oak	FACW	X	X
Quercus phellos	Willow Oak	FAC+	X	X
Quercus nigra	Water Oak	FAC	X	
Quercus palustris	Pin Oak	FACW	X	X
Salix nigra	Black Willow	FACW	X	X
Ulmus americana	American Elm	FACW-	X	X
		Native Shrubs		
Alnus serrulata	Brook-side Alder	OBL		X
Amelanchier canadensis	Canada Serviceberry	FAC	X	
Aronia arbutifolia	Red Chokecherry	FACW	X	X
Baccharis halimifolia	Groundsel Bush	FACW-	X	X
Cephalanthus occidentalis	Buttonbush	OBL		X

Species	Common Name	Indicator Status	Riparian Planting	Forested Wetland Planting
Cornus amomum	Silky Dogwood	FACW	X	X
Cornus stolonifera	Red-osier Dogwood	FAC	X	X
Hamamelis virginiana	American Witchhazel	FAC-	X	
Ilex verticillata	Common Winterberry	FACW+	X	X
Itea virginica	Virginia Willow	OBL		X
Iva frutescens	Marsh Elder	FACW+	X	X
Leucothoe racemosa	Fetter-bush	FACW	X	X
Lindera benzoin	Spicebush	FACW-	X	X
Lyonia ligustrina	Maleberry	FACW	X	X
Magnolia virginiana	Sweetbay Magnolia	FACW+	X	X
Physocarpus opulifolius	Eastern Ninebark	FACW-	X	X
Sambucus canadensis	American Elder	FACW-	X	X
Vaccinium corymbosum	Highbush Blueberry	FACW-	X	X
Virburnum dentatum	Arrow-wood	FAC	X	
Viburnum prunifolium	Black-haw	FACU	X	

4.2 Forested Wetlands

Bare-root saplings and shrubs (Table 8) will be planted in combination with an herbaceous wetland seed mix (Table 2) to ultimately restore of the impacted palustrine forested wetlands within the temporary ROW and the non-maintained portion of the permanent ROW to their pre-construction condition. Similarly, native shrubs (Table 8) will be planted in combination with an herbaceous wetland seed mix (Table 2) to revegetate the 50-foot-wide portion of the permanent ROW. The final species mix will depend on nursery stocks, availability, soil condition, and nearby species composition; however, six different tree species and four different shrub species, at minimum, will be planted at each forested wetland.

4.3 Loggerhead Shrike Foraging and Nesting Habitat

The Project is expected to impact a total of 57.04 hectares (140.95 ac) of habitat suitable for nesting and foraging, and 1.45 hectares (3.59 ac) of foraging habitat. Of this, 16.01 hectares (39.56 ac) of nesting and foraging habitat and 0.41 hectare (1.01 ac) of foraging habitat will be permanently impacted. Within the permanently impacted areas and temporarily impacted foraging habitat, a native herbaceous vegetation seed mix or landowner-approved seed mix matching pre-construction conditions will be used for revegetation. For temporarily, disturbed areas that are considered suitable for nesting and foraging, either of the aforementioned seed mixes will be used for revegetation along with planting of native shrubs/trees. As recommended by the VDGIF, native shrubs/trees removed from suitable habitat will be replaced with the same native species (e.g., eastern red cedar [*Juniperus virginiana*] will be replaced with eastern red cedar). Nonnative shrubs/trees that provide suitable nesting substrate and are removed as a result of Project-related activities will be replaced with its native, functional counterpart (e.g., Osage orange [*Maclura pomifera*], which is a nonnative, thorny tree, should be replaced with hawthorn [*Crataegus* spp.]). In some cases, it may be beneficial to promote a diversity of shrub/tree species in disturbed areas. For example, if an area is heavily dominated by eastern red cedar, MVP may choose to plant a combination of another native species (e.g., hawthorn) along with red cedar to avoid the potential loss of all red cedar in the event of a pest-infestation or spread of pathogen that may result in death of entire stands of the species. This may also be advantageous in areas where impaling stations (e.g., thorny vegetation; barbed wire) are limited.

Based on field habitat assessments and review of aerial imagery, approximately 1,225 preferred broadleaf shrubs/trees and 1,100 preferred coniferous shrubs/trees will be planted within temporarily disturbed nesting and foraging habitat (41.04 ha [101.41 ac]) and adjacent area (4.52 ha [11.16 ac]) to compensate for the removal of 1,221 broadleaf and 1,085 coniferous shrubs/trees. Shrubs/trees will be planted following completion of construction activities in suitable habitat. While quantity and general assemblage of shrubs and trees planted will be similar to pre-construction conditions, spatial arrangement of plantings will vary from where trees were removed. Spatial arrangement of plantings will be dependent on site conditions (e.g., topography; existing vegetation), proximity to the permanent ROW and roadways, planting technique, and what will best promote habitat enhancement for loggerhead shrike. Shrub/tree-planting efforts may focus more on areas with higher landowner-interest and engagement, as well as areas recommended by the VDGIF.

Of the shrubs/trees proposed for removal in suitable habitat, approximately 63.49 percent are of the preferred shrubs/trees noted by the VDGIF (i.e., eastern red cedar; hawthorn; black locust; Osage orange). MVP is committed to improving habitat quality where feasible and, therefore, have agreed to replace all removed shrubs/trees in suitable habitat in order to enhance conditions for loggerhead shrike. Increasing the number of preferred shrubs/trees within areas containing suitable loggerhead shrike habitat will potentially enhance the overall quality of nesting habitat promoting the conservation of this state-threatened species.

5.0 Maintenance and Monitoring

5.1 Permanent Right-of-Way

A 50-foot-wide permanent ROW will be maintained in a grassland/low-shrub state above the pipeline by periodic mechanical mowing, cutting, and trimming. Mechanical removal of vegetation will not occur more frequently than every three years (per standard FERC procedures) and not during the period of April 15 to August 1 in order to avoid impacts to ground-nesting migratory birds. This permanent ROW will maintain MVP's access to the pipeline's routes for terrestrial patrols, visibility of the pipeline's route for aerial patrols, and maintaining access in the event of emergency repairs. In upland areas, trees or deep-rooted shrubs will not be allowed to grow within the 15 feet of either side of the centerline in order to maintain the integrity of the pipe. Within wetlands or adjacent to waterbodies, MVP will maintain vegetation in a 10-foot corridor centered over the pipeline by mechanical means. Vegetation maintenance is not expected to be required in agricultural areas.

MVP will monitor disturbed areas where seed mixes were applied after the first and second growing seasons to determine the success of revegetation. The permanently maintained ROW will be considered successfully restored when the soils have been stabilized, and a native vegetation community is established (i.e., native grasses and shallow-rooted shrubs). In agricultural areas of the permanent ROW, revegetation will be considered successful when the area has been revegetated and is similar to adjacent undisturbed areas within the same field. As needed, additional seed and fertilizer will be applied to areas where revegetation is not deemed successful.

Management and control of invasive species is critical if disturbed areas are to be successfully revegetated and restored, as invasive species can outcompete and exclude native species. MVP will utilize techniques approved by the FERC and USFS to control invasive species along the construction areas, which will include mechanical methods (e.g., pulling, mowing, disking, etc.) as well as chemical treatments (e.g., herbicides). MVP will comply with all local, state, and federal requirements related to the use of herbicides, including any requirements specified by the USFS on the JNF. See Section 5.4 below for more details

5.1.1 Jefferson National Forest

MVP will follow the USFS's recommendations for restoration and rehabilitation of the permanent ROW, as defined in the Plan of Development, to reduce impacts to visual resources, in a manner that preserves MVP's ability to access, monitor, patrol, and inspect the ROW in accordance with PHMSA requirements (49 CFR Part 192).

5.2 Temporary Right-of-Way

Along the portion of the Project allowed to return to pre-construction conditions (e.g., areas beyond the permanent ROW), successful restoration will be determined by monitoring reclaimed areas for up to two growing seasons and comparing them to adjacent, undisturbed areas. Restoration in these areas will be determined successful if the seeded areas germinate and demonstrate, over time, an ability to achieve species distribution and diversity comparable to the pre-established targeted conditions.

5.3 Bare-Root Sapling and Shrub Plantings

5.3.1 Riparian and Forested Wetland Restoration

Assuming a 70% survival rate (Davis et al. 2010), approximately 380 stems per acre per Planting Area (stems/ac/PA) are expected to be present following the Year 1 planting. During Year 2 (first growing season), habitat assessments will be performed to determine whether the expected average survived. If not, the ratio of surviving stems to total stems planted will be calculated to determine the stem survival rate. The actual survival rate will be used to determine the number of trees necessary to plant in Year 2 in order to achieve the desired average in Year 3. Annual habitat assessments will occur as necessary beyond Year 2 until an average of 300 stems/ac/PA have survived.

5.3.2 Loggerhead Shrike Shrub Plantings

MVP will monitor habitat restoration and enhancement activities by evaluating survival of planted shrubs/trees.

Planted shrubs/trees will be monitored for a minimum of two growing seasons following the initial planting. Planting efforts will be deemed successful with 70 percent survival of shrubs/trees initially planted. This threshold will ensure that there is a net gain in preferred shrubs/trees throughout the study area (i.e., Giles, Craig, Montgomery, and Roanoke counties, Virginia) to promote conservation of loggerhead shrike and other shrub-nesting birds. If survivability drops below this threshold between initial planting and the end of the second growing season, shrubs/trees will be replaced to meet the 70 percent threshold.

The purpose of shrub/tree planting is to promote shrub-nesting bird species, such as loggerhead shrike. Along with monitoring the survival of shrubs/trees, MVP will provide VDGIF with locations as well as pre-construction and post-planting photos of the restored areas so that VDGIF can conduct future surveys of the restored habitat areas.

5.4 Exotic and Invasive Plant Species Control

The introduction and spread of exotic, noxious, and/or invasive plant species can cause significant ecological and/or economic impacts (Pimentel et al. 2005). Excavation for pipeline placement and other construction activities expose the topsoil surface to potential entrance of exotic, noxious, and/or invasive plant species. This can occur either by physical transport onto the exposed soil site by way of equipment, machinery or vehicles, through windborne or wildlife dissemination of seeds, or by introduction of seeds or plant parts contained in mulch or straw bales. Physical disturbance of topsoil can also promote germination of seeds of nonnative, invasive vegetation that already occur in the local seed bed.

MVP will implement the following measures to prevent and control the introduction and spread of nonnative, invasive plant species during construction and operation of the Project:

- Identifying areas supporting significant populations of invasive plants;
- Pre-treating areas with invasive plants prior to construction;
- Avoiding the introduction and spread of invasive plants from construction activities;
- Selecting native seed mixes appropriate for local site conditions (e.g., soils) for restoration efforts;
- Post-construction monitoring of vegetation in areas disturbed by construction in order to identify potential invasive plant infestations;
- Addressing invasive plant infestations that manifest following construction and during restoration.

5.4.1 Pre-Construction Measures

Surveyors noted several non-native plant species during on-site field assessments along the Project's proposed route (Appendix B).

Problem areas will be flagged, staked, or otherwise marked for clear identification. Identifying these problem areas prior to construction will help reduce the potential risk of further spread of invasive plant infestations.

Mechanical (e.g., mowing) and/or chemical measures (i.e., herbicide-application) will be implemented in order to eradicate invasive plants from the identified problem areas. Specific measures will be determined based on site conditions, seasonality, proximity to sensitive resources (e.g., known occurrences of rusty patched bumble bee), and through consultation with appropriate agencies.

Herbicides can be a safe and effective means of controlling both perennial and annual invasive vegetation. MVP will coordinate with appropriate land management agencies when applying herbicides for invasive plant control. The preferred method will be spot application; however, large infestations may require a broader application. Use of herbicides will be dependent on a variety of factors related to specific species (e.g., annual or perennial; woody or herbaceous), site-characteristics (e.g., soils; proximity to wetlands/open water), time of year, and weather conditions. Herbicide-use will be restricted when invasive plant species occur in close proximity to documented occurrences of sensitive resources that may potentially be affected (e.g., rare, threatened, or endangered plants). Other control measures may be used to address invasive plants in areas where herbicide-use is restricted.

A variety of equipment may be used to apply herbicides and will all be inspected on a daily basis, maintained as needed, and in accordance with applicable regulations, including maintaining Safety Data Sheets for all herbicides/materials. For rough terrain and/or areas with low densities of invasive plant species, backpack sprayers or other hand application methods will be used. For open areas that require intensive work and allow access for vehicles, mounted sprayers may be used. Care will be given to avoid excessive quantities of an herbicide on any given site, to the extent practical. The amount of herbicide located at any given site will be dependent on the quantity and density of invasive plants present. All concentrate will be in approved containers and transported using measures to avoid tipping and spilling. Mixing of concentrate will be completed in upland areas away from waterbodies and wetlands (>100 ft), private wells (>200 ft; identified through assistance with landowner), karst features (>300 ft), and public wells (>400 ft).

MVP developed a Project-specific *Spill Prevention, Control, and Countermeasure Plan and Unanticipated Discover of Contamination Plan for Construction Activities* in West Virginia and Virginia. One goal of these documents is to avoid or minimize the risk and potential impact of hazardous material spills during construction and operation. All herbicide applicators/contractors will be responsible for keeping and maintaining spill kits in their vehicles and at herbicide storage areas to ensure quick response to any spills. Spills are handled based on the herbicide/material type, scale, and location of the spill. Priorities of addressing the spill are as follows, 1) ensure safety of personnel and public; 2) contain spill to minimize risk to the environment; 3) complete initial clean-up; and 4) conduct remediation activities. Any spills will be reported to appropriate agencies in accordance with applicable laws and agreements.

5.4.2 Construction Measures

All equipment used for construction will be cleaned and inspected before arriving on site, and the EI will verify that equipment is free of soil and debris that may harbor invasive plant propagules. Cleaning stations will be established along the Project in areas without sensitive resources (e.g., wetlands). All soil/debris is removed from equipment by hand or compressed air. Equipment is also cleaned prior to moving from one construction spread to the next. The EI will maintain a log documenting cleaning and inspection of equipment. Visual markers (e.g., stickers) will be used to identify that equipment has been cleaned and inspected.

Topsoil and vegetation cleared from areas with invasive plants will be marked and stockpiled adjacent to the areas from which they were removed to ensure propagules are not spread to other areas. Barriers will be placed around topsoil and vegetation to eliminate the risk of material being moved. Signs identifying that piles contain invasive plant materials will be placed on barriers. Materials will be returned to areas from which they were removed during the reclamation process. Only certified weed-free mulch, straw and hay bales will be used to construct sediment control devices during construction.

5.4.3 Post-Construction Measures

MVP will adhere to the FERC's Plan and Procedures. Monitoring measures included in these documents and those proposed in the following section will help ensure invasive plant species are identified and addressed through appropriate control measures. Mechanical and chemical control measures—dependent on species, time of year, and site characteristics—will be implemented to reduce the risk of invasive plants becoming heavily established in and adjacent to the Project footprint. MVP is committed to working with adjacent landowners to ensure Project activities have a limited potential to result in the establishment of novel invasive plant species.

Revegetation measures will be performed immediately following construction or the following spring/summer depending on soil conditions (i.e., frozen versus not frozen). MVP will reseed and replant areas of the permanent and temporary ROW using only native species (see Section 2.0).). Immediate revegetation, as soon as practical, will reduce the time that bare soil is exposed and, therefore, minimize the opportunity for invasive plant species to become established.

MVP will monitor the ROW annually after the first and second growing seasons following construction to allow for early detection of exotic or invasive species infestations. If invasive plant species are found in numbers that are substantially greater than adjacent locations, MVP will conduct selective eradications of those species. Mechanical and chemical control measures will be completed, to the degree feasible, prior to maturation of seeds of invasive plants to avoid seed dispersal. As previously mentioned with pre-treatment and preventative measures to control invasive plants, herbicide types will be determined based on species requiring control, time of year, and site characteristics. Spot application of herbicide is the preferred method; however, dense infestations may be more appropriately addressed with a broader application. All herbicides will be applied by applicators appropriately licensed or certified by the state in which the work is conducted. Following herbicide application and based on the specific persistence of the herbicide in the soil, areas treated will be seeded with a native seed mix.

When implementing chemical control measures, as previously mentioned, care is taken to avoid sensitive resources that may be affected by herbicides (e.g., rare, threatened, and/or endangered plants; existing or created habitat for rusty patched bumble bee). In these areas, mechanical control measures, such as mowing or cutting/pulling by hand, will be the preferred method. If these methods result in a disturbance to topsoil, native seed will be applied to the affected area to reduce the risk of subsequent invasive species establishment.

5.4.4 Jefferson National Forest

An Exotic and Invasive Species Control Plan was developed and included in MVP's Plan of Development for the JNF. The document provides four strategies that will be implemented to avoid and minimize the exotic and invasive species introduction and infestation: 1) identifying and subsequent treatment of exotic and invasive species occurring in the Project area prior to any Project-related disturbance; 2) avoiding transportation of exotic and invasive species propagules through cleaning equipment between construction sites, using certified weed-free mulch and straw bales, and using locally sourced topsoil; 3) monitoring and treating any exotic and invasive species encountered during construction and post-construction; and 4) using seed mixes that do not contain any invasive plant species and which have been approved by the USFS for use on the JNF.

MVP will avoid the introduction of novel invasive species and utilize pre- and post-construction techniques approved by the FERC and USFS to control invasive species along construction areas, which will include mechanical methods (e.g., pulling, mowing, disking, etc.) as well as chemical treatments (e.g., herbicides) on the JNF, as requested by the USFS. MVP will comply with all local, state, and federal requirements related to the use of herbicides, including any specified by the USFS on the JNF. Herbicides to be used on the JNF will be approved by the USFS prior to use. For additional details regarding exotic and invasive vegetation control and herbicide use, refer to the Plan of Development for the JNF.

6.0 Literature Cited

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APPENDIX A
USFS RECOMMENDED SPECIES FOR SEED MIXES

Table 1. USFS recommended species for upland areas within the Jefferson National Forest.

Scientific Name	Common Name	Growth Habit	pH Preference
Non-native Species for Erosion Control			
Lolium perenne subsp. *multiflorum*	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
Urochloa ramosa (*Panicum ramosum*)	Browntop millett	Graminoid	5.5 – 6.9
Secale cereale	Cereal rye	Graminoid	5.2 – 8.0
Setaria italica	Foxtail millet	Graminoid	5.3 – 6.9
Native Species			
Chasmanthium laxum[a]	Slender woodoats	Graminoid	4.5 – 7.0
Eragrostis spectabilis[a]	Purple lovegrass	Graminoid	4.0 – 7.5
Panicum virgatum	Switchgrass	Graminoid	4.5 – 8.0
Sorghastrum nutans	Indiangrass	Graminoid	5.0 – 7.8
Tridens flavus[a]	Purpletop	Graminoid	4.5 – 6.5
Apocynum cannabinum[a]	Indian hemp	Forb	4.5 – 7.0
Chamaecrista fasciculata	Partridge pea	Forb	5.5 – 7.5
Desmodium canadense	Showy ticktrefoil	Forb	wide tolerance
Desmodium paniculatum	Panicledleaf ticktrefoil	Forb	6.0 – 7.0
Elymus virginicus[b]	Virginia wildrye	Graminoid	5.0 – 7.4
Geum canadense[a]	White avens	Forb	4.5 – 7.5
Heliopsis helianthoides	Oxeye sunflower; Smooth oxeye	Forb	unknown
Monarda fistulosa[b]	Wild bergamot	Forb	6.0 – 8.0
Pycnanthemum spp.[b]	Mountain mint	Forb	unknown
Rubus allegheniensis[a]	Common blackberry; Allegheny blackberry	Forb/ Subshrub	4.6 – 7.5
Rudbeckia hirta	Blackeyed Susan	Forb	6.0 – 7.0
Solidago canadensis[a]	Canada goldenrod	Forb	4.8 – 7.5
Tradescantia virginiana[a]	Virginia spiderwort	Forb	4.0 – 8.0

a/ This species is more tolerant of low pH soils
b/ Species is a good choice for higher elevation (i.e., areas higher than 3,000 feet or lower sites where the presence of red spruce indicates cold conditions) areas.

Table 2. USFS recommended species for riparian areas within the Jefferson National Forest.

Scientific Name	Common Name	Habit	pH Preference
	Non-native Species for Erosion Control		
Lolium perenne subsp. multiflorum	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
Urochloa ramosa (Panicum ramosum)	Browntop millett	Graminoid	5.5 – 6.9
Secale cereale	Cereal rye	Graminoid	5.2 – 8.0
Setaria italic	Foxtail millet	Graminoid	5.3 – 6.9
	Native Species		
Agrostis perennans	Autumn bentgrass; upland bentgrass	Graminoid	5.5 – 7.5
Elymus virginicus	Virginia Wildrye	Graminoid	5.0 - 7.4
Sorghastrum nutans	Indiangrass	Graminoid	5.0 – 7.8
Asclepias incarnata	Swamp milkweed	Forb	5.0 – 8.0
Chamaecrista fasciculata	Partridge pea	Forb	5.5 – 7.5
Eutrochium fistulosum (Eupatorium fistulosum)	Joe pye weed	Forb	4.5 – 7.0
Eupatorium maculatum	Spotted joe pye weed	Forb	5.5 – 7.0
Eupatorium perfoliatum	Boneset	Forb	unknown
Helenium autumnale	Common sneezeweed	Forb	4.0 – 7.5
Senna hebecarpa	Wild senna; American senna	Forb	unknown
Senna marilandica	Maryland senna	Forb / Subshrub	4.0 – 7.0
Vernonia noveboracensis	New York ironweed	Forb	4.5 -8.0

Table 3. USFS recommended species for steep slope areas within the Jefferson National Forest.

Scientific Name	Common Name	Growth Habit	pH Preference
	Non-native Species for Temporary Erosion Control		
Lolium perenne subsp. *multiflorum*	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
Urochloa ramosa (*Panicum ramosum*)	Browntop millett	Graminoid	5.5 – 6.9
Secale cereale	Cereal rye	Graminoid	5.2 – 8.0
Setaria italic	Foxtail millet	Graminoid	5.3 – 6.9
	Native – Highly Preferred		
Sorghastrum nutans	Indiangrass	Graminoid	5.0 – 7.8
Tridens flavus	Purpletop	Graminoid	4.5 – 6.5
	Native – Preferred		
Agrostis perennans	Autumn bentgrass; Upland bentgrass	Graminoid	5.5 – 7.5
Dichanthelium clandestinum	Deertongue	Graminoid	4.0 – 7.5
Elymus canadensis	Canada wildrye	Graminoid	5.0 – 7.9
Desmodium canadense	Showy ticktrefoil	Forb	wide tolerance
Heliopsis helianthoides	Oxeye sunflower; Smooth oxeye	Forb	unknown
Lespedeza virginica	Slender bushclover; Slender lespedeza	Forb	acid tolerant
Liatris spicata	Dense blazing star; Spiked gayfeather	Forb	5.6 - 7.5
Senna hebecarpa	Wild senna; American senna	Forb	unknown
	Native – Moderately Preferred		
Panicum virgatum	Switchgrass	Graminoid	4.5 – 8.0
Chamaecrista fasciculata	Partridge pea	Forb	5.5 – 7.5
Rudbeckia hirta	Blackeyed Susan	Forb	6.0 – 7.0

APPENDIX B
LIST OF POTENTIAL EXOTIC AND INVASIVE PLANT SPECIES

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Amur Honeysuckle	*Lonicera maackii*	Shrub	Pastures, fields, forest, forest edges, roadsides
Autumn Olive	*Elaeagnus umbellata*	Shrub	Pastures, fields, roadsides
Asian Bittersweet	*Celastrus orbiculata*	Vine	Fields, forest edges, roadsides, grasslands
Beefsteak Plant	*Perilla frutescens*	Herb	Roadsides
Bell's Honeysuckle	*Lonicera bella*	Shrub	Fields, pastures, forest edge, roadsides
Bishop's Goutweed	*Aegopodium podagraria*	Herb	Forests
Border Privet	*Ligustrum obtusifolium*	Shrub	Old fields, forest gaps
Bradford Pear	*Pyrus calleryana*	Tree	Full sun, orchards, parks, roadsides, yards, forest edge
Brittle Naiad	*Najas minor*	Herb	Ponds, streams, lakes, wetlands
Bull Thistle	*Cirsium vulgare*	Herb	Pastures, fields
Bush Honeysuckles	*Lonicera* spp.	Shrub	Pastures, fields, forest edges, roadsides
Butter-and-Eggs	*Linaria vulgaris*	Herb	Fields, pastures, roadsides, disturbed areas
Canada Bluegrass	*Poa compressa*	Grass	Fields, pastures, forest edge, wet sites, forest openings, waste areas
Canada Thistle	*Cirsium arvense*	Herb	Pastures, fields
Celandine	*Chelidonium majus var. majus*	Herb	Fields, roadsides, waste areas, dry to moist woodlands
Cheatgrass	*Bromus tectorum*	Grass	Pastures, fields
Chinese Bushclover	*Lespedeza cuneata*	Herb	Roadsides, rights-of-way, old fields, pasture, woodlands
Chinese Privet	*Ligustrum sinense*	Shrub	Pastures, fields, forest, forest edges, roadsides
Chinese Wisteria	*Wisteria sinensis*	Woody Vine	Forest, forest edges, roadsides, disturbed areas
Chinese Yam	*Dioscorea oppositifolia*	Vine	Streambanks, floodplain forests
Cinnamon Vine	*Dioscorea polystachya*	Vine	Forests, woodlands, thickets
Colonial Bent-grass	*Agrostis capillaris*	Grass	Pastures, fields
Common Buckthorn	*Rhamnus catharticus*	Shrub	Wetlands, old fields
Common Chickweed	*Stellaria media*	Herb	Fields, floodplain forests, disturbed areas, waste areas
Common Privet	*Ligustrum vulgare*	Shrub	Forests, fields, rights-of-way
Common Reed	*Phragmites australis*	Grass	Wetlands
Common Sheep Sorrel	*Rumex acetosella*	Herb	Fields, roadsides, disturbed areas, waste areas
Common Velvetgrass	*Holcus lanatus*	Grass	Meadows, wetlands, riparian areas
Cork Tree	*Phellodendron japonicum*	Tree	Residential, parks, open woodlands, roadsides
Crown Vetch	*Coronilla varia*	Herb	Pastures, fields
Curled Thistle	*Carduus crispus*	Herb	Pastures, fields
Curlyleaf Pondweed	*Potamogeton crispus*	Herb	Wetlands, ponds, lakes
Cut-leaf Teasel	*Dipsacus laciniatus*	Herb	Fields, pastures, roadsides, waste areas
Dame's Rocket	*Hesperis matronalis*	Herb	Fields, forest edges

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Drooping Star of Bethlehem	*Ornithogalum nutans*	Herb	Fields, floodplains, waste areas
English Ivy	*Hedera helix*	Vine	Forests, disturbed areas
Eurasian Water-milfoil	*Myriophyllum spicatum*	Herb	Aquatic ponds, ditches, wetlands
European Barberry	*Berberis vulgaris*	Shrub	Forests, wetlands, pastures
European Privet	*Ligustrum vulgare*	Shrub	Pastures, fields, forests, forest edges, roadsides, streams
European Stinging Nettle	*Urtica dioica*	Herb	Stream edges, marsh, meadows, moist woodlands
Field Hawkweed	*Hieracium caespitosum*	Herb	Fields, pastures, prairies, waste areas, disturbed areas
Fiveleaf Akebia	*Akebia quinata*	Vine	Forests
Fuller's Teasel	*Dipsacus fullonum*	Herb	Riparian areas, meadows, fields, forest openings, disturbed areas
Garden Yellow-rocket	*Barbarea vulgaris*	Herb	Pastures, fields, roadsides, moist meadows
Garlic Mustard	*Alliaria petiolata*	Herb	Forests
Giant Hogweed	*Heracleum mantegazzianum*	Herb	Right-of-ways, riverbanks, ditches
Glossy Buckthorn	*Frangula alnus*	Shrub	Wetlands, old fields
Goatsrue	*Galaga officinalis*	Herb	Pastures, streambanks
Goldern Bamboo	*Phyllostachys aurea*	Grass	Roadsides, disturbed areas, forest openings, forest edge
Goutweed	*Aegopodium podagraria*	Herb	Forests, fields, pastures
Great Mullein	*Verbascum thapsus*	Herb	Fields, meadows, forests, roadsides, disturbed areas
Ground Ivy	*Glechoma hederacea*	Herb	Open forests, disturbed areas, waste areas, lawn
Guelder Rose	*Viburnum opulus*	Shrub	Forests, wetlands, fields
Gypsy-flower	*Cynoglossum officinale*	Herb	Fields, pastures, forest edge, roadsides, disturbed areas
Hairy Cat's Ear	*Hypochaeris radicata*	Herb	Fields, pastures, grasslands, roadsides, disturbed areas
Hydrilla	*Hydrilla verticulata*	Herb	Wetlands, ponds
Indian-strawberry	*Duchesnea indica*	Herb	Fields, prairies, open woodlands, disturbed areas
Ivy-leaved Speedwell	*Veronica hederifolia*	Herb	Fields, forest edge, roadsides, disturbed areas
Japanese Barberry	*Berberis thunbergii*	Shrub	Forests, wetlands, pastures
Japanese Bromegrass	*Bromus japonicus*	Grass	Pastures, fields
Japanese Honeysuckle	*Lonicera japonica*	Vine	Forests, wetlands, fields
Japenese Hops	*Humulus japonicus*	Vine	Roadsides, streambanks, drainage ditch, meadows, disturbed areas, waste areas
Japanese Knotweed	*Polygonum cuspidatum*	Shrubby herb	Wetlands, streambanks, roadsides
Japanese Spiraea	*Spiraea japonica*	Shrub	Fields, forest openings
Japanese Stilt Grass	*Microstegium vimineum*	Grass	Pastures, fields, forests, wetlands
Jetbed	*Rhodotypos scandens*	Shrub	Forests, forest edge, roadsides
Jimsonweed	*Datura stramonium*	Herb	Pastures, fields
Johnson Grass	*Sorghum halepense*	Grass	Fields, wetlands, open forests

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Kentucky Bluegrass	*Poa pratensis ssp. pratensis*	Grass	Fields, grasslands, forest edge
Kudzu	*Pueraria lobata*	Vine	Forests
Lesser Burdock	*Arctium minus*	Herb	Fields, meadows, disturbed areas
Lesser Celandine	*Ranunculus ficaria var. bulbifera*	Herb	Forests
Lesser Periwinkle	*Vinca minor*	Vine	Fields, forest edge, forest openings
Linden Arrowwood	*Viburnum dilatatum*	Shrub	Forests, wetlands, disturbed areas
Long-bristled Smartweed	*Persicaria longiseta*	Herb	Lawns, roadsides, wet meadows, waste areas
Maiden Grass	*Miscanthus sinensis*	Grass	Pastures, fields
Marsh Dewflower	*Murdannia keisak*	Herb	Wetlands
Meadow Brome	*Bromus commutatus*	Grass	Pastures, fields
Meadow Fescue	*Schedonorus pratensis*	Grass	Pastures, fields
Mile-a-minute Vine	*Polygonum perfoliatum*	Vine	Fields, forest edges, roadsides, ditches
Mimosa	*Albizia julibrissin*	Tree	Forest edges, residential areas, roadsides
Moneywort	*Lysimachia nummularia*	Herb	Moist forests, streambanks, wet meadows, wetlands, roadsides, fields
Multiflora Rose	*Rosa multiflora*	Shrub	Pastures, fields, forest edges
Musk Thistle	*Carduus nutans*	Herb	Pastures, fields
Nodding Plumeless-thistle	*Carduus nutans ssp. marcolepis*	Herb	Disturbed sites, waste areas, roadsides
Norway Maple	*Acer platanoides*	Tree	Forests
Oriental Bittersweet	*Celastrus orbiculatus*	Vine	Forest edges, old fields
Oriental Lady's Thumb	*Polygonum caespitosum var. longisetum*	Herb	Wetlands, floodplain forests, upland forests
Oxeye Daisy	*Leucanthemum vulgare*	Herb	Fields, pastures, grasslands, roadsides, disturbed areas
Parrot Feather	*Myriophyllum aquaticum*	Herb	Wetlands, ponds
Perennial Ryegrass	*Lolium perenne ssp. multiflorum*	Grass	Pastures, fields
Plumeless Thistle	*Carduus acanthoides*	Herb	Pastures, fields, roadsides
Poison-hemlock	*Conium maculatum*	Herb	Fields, pastures, roadsides, forest edge, degraded wetlands and prairies
Porcelain Berry	*Ampelopsis brevipedunculata*	Vine	Forests, stream banks, old fields
Poverty Brome	*Bromus sterilis*	Grass	Pastures, fields
Princess Tree	*Paulownia tomentosa*	Tree	Forests
Purple Crown-vetch	*Coronilla varia*	Herb	Pastures, fields, roadsides, utility right-of-ways
Purple Loosestrife	*Lythrum salicaria*	Herb	Aquatic ponds, ditches, wetlands
Reed Canary Grass	*Phalaris arundinacea*	Grass	Wetlands
Rough Bluegrass	*Poa trivialis*	Grass	Pastures, fields, roadsides,
Russian Olive	*Elaeagnus angustifolia*	Shrub	Pastures, fields, roadsides

Common Name	Scientific Name	Growth Form	Typical Habitat(s)
Rye Brome	*Bromus secalinus*	Grass	Pastures, fields
Shattercane	*Sorghum bicolor*	Grass	Pastures, fields
Shrubby Bushclover	*Lespedeza bicolor*	Shrub	Forest edges, field edges, forest openings
Siberian Elm	*Ulmus pumila*	Tree	Forests
Small Carpgrass	*Arthraxon hispidus*	Grass	Wetlands, ponds, streams, river floodplains
Smooth Brome	*Bromus inermis ssp. inermis var. inermis*	Grass	Fields, Pastures
Spotted Knapweed	*Centaurea stoebe ssp. micranthos*	Herb	Pastures, fields, roadsides
Star of Bethlehem	*Ornithogallum umbellatum*	Herb	Forests, fields
Standish's Honeysuckle	*Lonicera standishii*	Shrub	Fields, pastures, forest edge, roadsides, disturbed areas
St, John's-Wort	*Hypericum perforatum*	Herb	Fields, pastures, disturbed areas
Stonecrop	*Sedum sarmentosum*	Herb	Forest, forest edge
Sweetclover	*Melilotus officinalis*	Herb	Fields, pastures, roadsides, waste areas
Sycamore Maple	*Acer Pseudoplatanus*	Tree	Forests
Tall Fescue	*Schedonorus phoenix*	Grass	Pastures, fields
Tartarian Honeysuckle	*Lonicera tatarica*	Shrub	Pastures, fields, roadsides, utility right-of-ways, forest edge
Tree of Heaven	*Ailanthus altissima*	Tree	Forests
Viper's Bugloss	*Echium vulgare*	Herb	Pastures, fields, roadsides, waste areas
Water Chestnut	*Trapa natans*	Herb	Wetlands
Watercress	*Rorippa nasturtium-aquaticum*	Herb	Wetlands, streams, springs
Water Shield	*Brasenia schreberi*	Herb	Ponds, lakes
Wild Carrot	*Daucus carota*	Herb	Fields, pastures, roadsides, degraded prairie, forest edge
Wild Parsnip	*Pastinaca sativa*	Herb	Roadsides
Wine Berry	*Rubus phoenicolasius*	Shrub	Forests, fields
Winged Euonymus	*Euonymus alatus*	Shrub	Forests
Winter Creeper	*Euonymus fortunei*	Vine	Forests, fields
Wocheiner knapweed	*Centaurea nigrescens*	Herb	Fields, pastures, grasslands, field edge, open forests
Yellow Flag	*Iris pseudocorus*	Herb	Wetlands

Source: USDA (2015), VDCR-DNH (2015), WVDNR (2009), WVDNR (2010)

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October 2, 2018

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

Re: Mountain Valley Pipeline, LLC
Docket No. CP16-10-000
Variance Request No. MVP-008

Dear Ms. Bose:

On October 13, 2017, the Federal Energy Regulatory Commission issued an order granting a Certificate of Public Convenience and Necessity to Mountain Valley Pipeline, LLC. In this filing, Mountain Valley submits Variance Request No. MVP-008. A detailed variance request form is attached. Mountain Valley requests approval by October 3, 2018.

If you have any questions, please do not hesitate to contact me at (412) 553-5786 or meggerding@eqt.com. Thank you.

Respectfully submitted,

MOUNTAIN VALLEY PIPELINE, LLC
by and through its operator,
EQM Gathering Opco, LLC

By:

Matthew Eggerding
Senior Counsel, Midstream

Attachments

cc: All Parties
Paul Friedman, OEP
Lavinia DiSanto, Cardno, Inc.
Doug Mooneyhan, Cardno, Inc.

MVP Variance Request Form

Mountain Valley PIPELINE LLC

Variance Request No.:	*MVP-008*
Date Approval Requested by Contractor:	
Date Submitted by Chief Inspector to LEI:	
Date Received by FERC:	
FERC Approval Reference No.:	

Requested By:	*John Uhrin*	**Spread:**	A - F	**Variance Type:**	PM
Request Prepared By *:	*Megan Neylon*			**Variance Sequence Number:**	*MVP-008*

* The FERC compliance monitor should be alerted and given a copy of the draft variance for review prior to submittal

Location (Use either Station or Milepost)

Station:	*Spread A*	**To:**	*Spread F*	**Milepost:**		**To:**	

Alignment Sheet Number: N/A **Tract No.:** *All*

Current Land Use/ Vegetative Cover: *All* **Other Agency Jurisdiction:** *None*

Nearby Features (Water body, T&E Habitat, Wetland, Noxious Weed Area, Residence (distance), Cultural Resource Site (distance) etc.):

- ☐ Noxious Weed Area ☐ Raptor Nest ☐ Residence (Distance)
- ☐ T/E Species Habitat ☐ Cultural Resource Site ☐ Water Well
- ☑ Other (Specify): *Site Specific*

In or w/in 50 feet of a wetland: ☐ Yes ☑ No

In or w/in 50 feet of a waterbody: ☐ Yes ☑ No

Wetland or Waterbody ID: *Site Specific*

Additional Stream footage impacted: *None* **Additional Wetland impacts:** *N/A*

Net acreage affected: *N/A*

Tree Clearing Required: *N/A* **Acreage of tree clearing:** *N/A*

Variance Level: ☐ Level 1 ☐ Level 2 ☑ Level 3

Variance From: ☐ Permit ☑ Plan ☐ Procedures ☐ EPPM ☐ Specification ☐ Drawing ☐ Mitigation Measure ☐ Line List ☐ Other: Describe:

Detailed Description of Variance: Attachments? ☐ Yes ☑ No Photos? ☐ Yes ☑ No

Mountain Valley requests a variance to update Attachment IP-13b (sheet detail from erosion control plan for West Virginia that includes seed mixes) that was submitted as part of the Implementation Plan. MVP is in the process of restoring applicable areas of the project in West Virginia. Some of the species in the upland, steep slope herbaceous seed mix and the upland meadow, pollinator herbaceous seed mix are unavailable or have prohibitive lead times.

In order to address these concerns MVP worked with Ernst to develop a mixture for use in West Virginia that utilizes a majority native species and one nonnative (but not invasive) species. For the upland mixes (upland herbaceous at 20lbs/acre and steep slope at 45 lbs/acre), Mountain Valley added switchgrass and annual ryegrass. Switchgrass is a native species that develops deep rooting systems and is advantageous for erosion control. Annual ryegrass is a non-native species, but neither WVDNR nor the VADCR list it as an invasive species. By adding these species, Mountain Valley is able to adjust the percentages of other species while maintaining a majority native mix. Both of the additions to the mix, Shelter Switchgrass and Annual Rye, are readily available.

The updated IP-13b is included as attachment 1 and the WVDNR approval is included as attachment 2.

List Attachments: *Attachment 1- Updated IP-13b; Attachment 2 - WVDNR Agency Correspondence*

Variance Justification:

See description above.

For MVP Use Only

Additional Surveys Required		Surveyed Corridor Description	Additional Surveys Completed
Cultural Survey	☐ Yes ☑ No	N/A	☐ Yes ☑ No
T & E Survey	☐ Yes ☑ No		☐ Yes ☑ No
Waterbodies/Wetlands	☐ Yes ☑ No		☐ Yes ☑ No

Proof of Previous Biological and Cultural Survey Clearance

N/A

Landowner:

Land Agent Contact
Landowner Approval Obtained ☐ Yes ☐ No

Sign Off:	Name	Signature	Date
Construction Manager	*John Uhrin*	*John Uhrin*	10/2/2018
Lead Environmental Inspector	*n/a*		
Third Party Compliance Manager or monitor	*n/a*		
ROW Land Agent *	*n/a*		
Environmental Supervisor	*Megan Neylon*	*Megan Neylon*	10/2/2018

*signature denotes confirmed landowner approval

For FERC Compliance Monitor and Compliance Manager Use Only

Variance Approved:		Variance Denied:		Beyond Authority:	
Signature:					
Date:					
Stipulations:					

Spread No.:	A - F	Variance Request No.:	MVP-008

VARIANCE CONDITIONS

Name:		Title:		Organization:	

Conditions:

Name:		Title:		Organization:	

Conditions:

Name:		Title:		Organization:	

Conditions:

Mountain Valley Pipeline, LLC
Mountain Valley Pipeline Project
Docket No. CP16-10-000

Updated IP-13b
(WV Seed Mixes)
Attachment 1

SEED MIX AND APPLICATION RATES

Table 1. Upland, steep slope herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	3.15	3.15	5.5 - 7.5	Midsummer
Elymus virginicus	Virginia Wildrye	9.45	9.05	5.0 - 7.4	June to October
Panicum clandestinum	Deertongue	4.50	4.50	4.0 - 7.5	May to September
Schizachyrium scoparium	Little Bluestem	11.70	11.25	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	13.59	14.40	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	0.23	0.09		June to August
Aster novae-angliae	New England Aster	0.09	n/a	5.1 – 6.8	August to October
Aster pilosus	Heath Aster	0.05	0.05	5.4 - 7.0	After fall frost
Aster prenanthoides	Zigzag Aster	0.09	n/a	5.5 - 7.2	August to October
Chamaecrista fasciculata	Partridge Pea	n/a	0.45	5.5 - 7.5	July to September
Coreopsis lanceolata	Lanceleaf Coreopsis	0.45	0.45	6.0 - 7.0	April to July
Desmodium paniculatum	Panicledleaf Ticktrefoill	0.14	n/a	6.0 - 7.0	July to August
Eupatorium coelestinum	Mistflower	0.05	0.05	5.5 - 7.5	July to August
Heliopsis helianthoides	Oxeye Sunflower	0.36	0.45	5.5 – 7.0	July to August
Liatris graminifolia	Grassleaf Blazing Star	n/a	0.09	5.8 - 6.8	August to October
Monarda fistulosa	Wild Bergamot	0.18	0.23	6.0 - 8.0	June to September
Pycnanthemum incanum	Hoary Mountainmint	0.05	0.05	< 6.8	Summer
Rudbeckia hirta	Blackeyed Susan	0.45	0.45	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.18	0.23		July to August
Solidago juncea	Early Goldenrod	0.09	n/a		June to July
Solidago nemoralis	Gray Goldenrod	0.14	0.05	6.5 - 7.5	August to September
Tradescantia ohiensis	Ohio Spiderwort	0.09	0.05		late April to mid-July
		45.00	**45.00**		

Table 2. Wetland herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Alisma subcordatum	Mud Plantain	0.04	0.04	5.0 - 7.0	Midsummer
Asclepias incarnata	Swamp Milkweed	n/a	0.40		July to August
Aster novae-angliae	New England Aster	0.16	n/a		August to October
Aster prenanthoides	Zigzag Aster	0.14	n/a	5.5 - 7.2	August to October
Aster umbellatus	Flat Topped White Aster	0.10	n/a		August to Late Summer
Carex gynandra	Fringed Sedge	0.10	0.10		May to June
Carex lupulina	Hop Sedge	1.00	1.00	6.2 - 7.0	June to October
Carex lurida	Shallow Sedge	3.00	3.00	4.9 - 6.8	June to July
Carex scoparia	Blunt Broom Sedge	1.00	1.00	4.6 - 6.9	July to August
Carex vulpinoidea	Fox Sedge	7.00	6.90	6.8 - 8.9	June to August
Cinna arundinacea	Wood Reedgrass	0.40	0.40	4.0 - 8.5	August to September
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Eupatorium coelestinum	Mistflower	0.10	0.10	5.5 - 7.5	July to October
Eupatorium fistolosum	Joe Pye Weed	0.14	0.14	4.5 - 7.0	July to September
Eupatorium perfoliatum	Boneset	0.20	0.20		July to October
Helenium autumnale	Common Sneezeweed	n/a	0.10		July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40		July to August
Juncus effusus	Soft Rush	0.60	0.60	5.5 - 7.0	May to June
Ludwigia alternifolia	Seedbox	0.10	0.10		August to September
Mimulus ringens	Square Stemmed Monkeyflower	0.10	0.10		June to September
Onoclea sensibilis	Sensitive Fern	0.20	0.20		June to October
Scirpus cyperinus	Woolgrass	0.20	0.20	4.8 - 7.2	July to September
Scirpus polyphyllus	Many-leaved Bulrush	0.20	0.20		July to August
Verbena hastata	Blue Vervain	0.72	0.72		June to October
Vernonia noveboracensis	New York Ironweed	0.10	0.10	4.5 - 8.0	July to September
		20.00	**20.00**		

Table 3. Riparian herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	0.54	0.50	5.5 - 7.5	Midsummer
Andropogon gerardii	Big Bluestem	3.00	3.00	6.0 - 7.5	July to October
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Juncus effusus	Soft Rush	0.20	0.20	5.5 - 7.0	May to June
Juncus tenuis	Path Rush	0.20	0.20	4.5 - 7.0	May to June
Panicum clandestinum	Deertongue	5.60	5.40	4.0 - 7.5	May to September
Sorghastrum nutans	Indiangrass	3.60	3.60	5.0 - 7.8	August to October
Asclepias incarnata	New England Aster	0.20	n/a	5.0 - 8.0	June to July
Aster novae-angliae	Swamp Milkweed	0.20	0.20		Late Summer
Chamaecrista fasciculata	Partridge Pea	n/a	0.40	5.5 - 7.5	July to September
Eupatorium coelestinum	Mistflower	0.20	0.20	5.5 - 7.5	July to October
Eupatorium fistolosum	Joe Pye Weed	0.14	0.14	4.5 - 7.0	July to September
Eupatorium perfoliatum	Boneset	0.10	0.10		July to October
Geum canadense	White Avens	0.20	0.20	4.5 - 7.5	May to June
Helenium autumnale	Common Sneezeweed	n/a	0.10	4.0 - 7.5	August to September
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40		July to August
Monarda fistulosa	Wild Bergamot	0.10	0.10	6.0 - 8.0	June to September
Pycnanthemum tenuifolium	Slender Mountainmint	0.06	0.06		July to September
Rudbeckia hirta	Blackeyed Susan	0.60	0.60	6.0 - 7.0	May to October
Senna hebecarpa	Wild Senna	0.08	0.10		July to August
Senna marilandica	Maryland Senna	0.08	n/a	4.0 - 7.0	Summer
Verbena hastata	Blue Vervain	0.40	0.40		June to October
Vernonia noveboracensis	New York Ironweed	0.10	0.10	4.5 - 8.0	July to September
		20.00	**20.00**		

Table 4. Upland meadow, pollinator herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Schizachyrium scoparium	Little Bluestem	11.66	11.68	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	1.00	1.00	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	n/a	0.10	June to August	*Asclepias syriaca*
Asclepias tuberosa	Butterfly Milkweed	0.20	0.10	4.8 - 6.8	June to August
Aster novae-angliae	New England Aster	0.14	n/a	5.1 – 6.8	August to October
Chamaecrista fasciculata	Partridge Pea	n/a	0.60	5.5 - 7.5	July to September
Chamaecrista nictitans	Sensitive Partridge Pea	n/a	0.06		June to October
Coreopsis lanceolata	Lanceleaf Coreopsis	0.40	0.44	6.0 - 7.0	June to August
Echinacea purpurea	Purple Coneflower	0.60	n/a	6.5 - 7.2	Late Summer
Eupatorium coelestinum	Mistflower	0.10	0.04	5.5 - 7.5	July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40	5.5 – 7.0	July to August
Lespedeza virginica	Slender Bushclover	n/a	0.10		July to September
Liatris graminifolia	Grassleaf Blazing Star	n/a	0.10	5.8 - 6.8	August to October
Liatris spicata	Marsh Blazing Star	0.16	n/a	5.6 - 7.5	July to September
Monarda fistulosa	Wild Bergamot	0.12	0.10	6.0 - 8.0	June to September
Parthenium integrifolium	Wild Quinine	0.10	n/a	unknown	Late May to Late August
Penstemon laevigatus	Appalachian Beardtongue	0.20	0.10	unknown	May to June
Pycnanthemum incanum	Hoary Mountainmint	0.04	0.20	< 6.8	Summer
Rudbeckia fulgida var. fulgida	Orange Coneflower	0.04	0.02		July to October
Rudbeckia hirta	Blackeyed Susan	0.60	0.04	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.10	0.60		July to August
Solidago juncea	Early Goldenrod	0.04	0.10		June to July
Solidago nemoralis	Gray Goldenrod	0.04	0.04	6.5 - 7.5	August to September
Tradescantia ohiensis	Ohio Spiderwort	0.06	0.04		Late April to Mid-July
Tradescantia virginiana	Virginia Spiderwort	n/a	0.10		late April to mid-July
		20.00	**20.00**		

Table 5. Oak-hickory forest woody seed mix and recommended application rate.

Layer	Species	Common Name	Seeding Rate (lbs/acre)
Overstory	*Fagus grandifolia*	American Beech	0.3
	Liriodendron tulipifera	Tulip Poplar	0.3
	Pinus strobus	White Pine	0.3
	Pinus virginiana	Virginia Pine	0.3
	Prunus serotina	Black Cherry	0.3
Understory	*Amelanchier canadensis*	Canadian Serviceberry	0.3
	Cercis canadensis	Eastern Redbud	0.3
	Cornus florida	Flowering Dogwood	0.3
	Diospyros virginiana	Persimmon	0.3
	Ilex opaca	American Holly	0.3
	Nyssa sylvatica	Black Gum	0.3
	Sassafras albidum	Sassafras	0.3
Shrub	*Hamamelis virginiana*	Witch Hazel	0.3
	Lindera benzoin	Spicebush	0.3
	Vaccinium angustifolium	Lowbush Blueberry	0.3
	Viburnum acerifolium	Mapleleaf Viburnum	0.3
	Vitis aestivalis	Grape	0.3

Revised Table 1. Upland, steep slope herbaceous seed mix

Seeds/lb	Seeds/ ounce	Seeds/ lb of mix	% of Mix	Latin Name Used By Ernst Conservation Seeds	Common Name Used By Ernst Conservation Seeds	Type
8,000,000	M	32000	0.4	Agrostis perennans	Autumn Bentgrass	Grass
70,000	4,375	210	0.3	Asclepias syriaca	Common Milkweed	Herb
700,000	43,750	700	0.1	Aster pilosus	Heath Aster	Herb
65,000	4,063	1300	2	Chamaecrista fasciculata	Partridge Pea	Herb
221,000	13,813	2210	1	Coreopsis lanceolata	Lance Leaf Coreopsis	Herb
200,000	12,500	200	0.1	Desmodium paniculatum	Panicled Ticktrefoil	Herb
73,000	4,563	13140	18	Elymus virginicus	Virginia Wildrye	Grass
1,500,000	93,750	1500	0.1	Eupatorium coelestinum	Mistflower	Herb
105,000	6,563	1260	1.2	Heliopsis helianthoides	Ox-Eye Sunflower	Herb
290,000	18,125	290	0.1	Liatris graminifolia	Grassleaf Blazing Star	Herb
1,272,500	79,531	3817.5	0.3	Monarda fistulosa	Wild Bergamot	Herb
280,000	17,500	11200	4	Panicum clandestinum	Deertongue	Grass
6,048,000	378,000	6048	0.1	Pycnanthemum tenuifolium	Narrow Leaved Mountain Mint, NC Ecotype	Herb
1,576,000	98,500	15760	1	Rudbeckia hirta	Black Eyed Susan	Herb
200,000	12,500	41000	20.5	Schizachyrium scoparium	Little Bluestem, NC Ecotype	Grass
22,000	1,375	110	0.5	Senna hebecarpa	Wild Senna	Herb
2,538,000	158,625	2538	0.1	Solidago juncea	Early Goldenrod	Herb
1,008,000	63,000	1008	0.1	Solidago nemoralis	Gray Goldenrod	Herb
175,000	10,938	45500	26	Sorghastrum nutans	Indiangrass, VA Ecotype	Grass
128,000	8,000	128	0.1	Tradescantia subaspera	Zigzag Spiderwort	Herb
259,000	16,188	10360	4	Panicum virgatum	Shelter' - NY & WV-NRCS Variety Releas	Grass
217,000	13,563	43400	20	Lolium multiflorum	Ryegrass, Annual	Grass
		233679.5	100			

Wildflower seed/lb = 37,080 15.9% Wildflower seed/sq ft on 20 lbs/acre seeding rate = 17
Grass seed/lb = 196,600 84.1% Wildflower seed/sq ft on 45 lbs/acre seeding rate = 38.3

If any items are not available, split the percentage between indian grass and little blue stem.

NOTE:
REVISED TABLE 1 MAY BE USED AS AN ALTERNATIVE TO TABLE 1.

Revised Table 4. Upland meadow, pollinator herbaceous seed mix

Seeds/ lb	Seeds/ ounce	Seeds/lb of mix	% of Mix	Latin Name Used By Ernst Conservation Seeds	Common Name Used By Ernst Conservation Seeds	Type
70,000	4,375	210	0.3	Asclepias syriaca	Common Milkweed	Herb
70,000	4,375	350	0.5	Asclepias tuberosa	Butterfly Milkweed	Herb
1,014,000	63,375	0	0	Aster laevis	Smooth Aster	Herb
1,100,000	68,750	0	0	Aster novae-angliae	New England Aster	Herb
700,000	43,750	0	0	Aster prenanthoides	Zig Zag Aster	Herb
65,000	4,063	1625	2.5	Chamaecrista fasciculata	Partridge Pea	Herb
206,570	12,911	619.71	0.3	Chamaecrista nictitans	Sensitive Pea	Herb
221,000	13,813	4420	2	Coreopsis lanceolata	Lance Leaf Coreopsis	Herb
73,000	4,563	9125	12.5	Elymus virginicus	Virginia Wildrye	Grass
1,500,000	93,750	1500	0.1	Eupatorium coelestinum	Mistflower	Herb
105,000	6,563	1575	1.5	Heliopsis helianthoides	Ox-Eye Sunflower	Herb
175,000	10,938	175	0.1	Lespedeza virginica	Slender Bushclover	Herb
290,000	18,125	290	0.1	Liatris graminifolia	Grassleaf Blazing Star	Herb
1,272,500	79,531	3817.5	0.3	Monarda fistulosa	Wild Bergamot	Herb
110,000	6,875	110	0.1	Parthenium integrifolium	Wild Quinine	Herb
350,000	21,875	1050	0.3	Penstemon laevigatus	Appalachian Beardtongue	Herb
6,048,000	378,000	6048	0.1	Pycnanthemum tenuifolium	Narrow Leaved Mountain Mint	Herb
500,000	31,250	500	0.1	Rudbeckia fulgida	Orange Coneflower	Herb
1,576,000	98,500	31520	2	Rudbeckia hirta	Black Eyed Susan	Herb
200,000	12,500	71400	35.7	Schizachyrium scoparium	Little Bluestem	Grass
22,000	1,375	110	0.5	Senna hebecarpa	Wild Senna	Grass
2,538,000	158,625	2538	0.1	Solidago juncea	Early Goldenrod	Herb
1,008,000	63,000	1008	0.1	Solidago nemoralis	Gray Goldenrod	Herb
175,000	10,938	5250	3	Sorghastrum nutans	Indiangrass	Grass
128,000	8,000	384	0.3	Tradescantia ohiensis	Ohio Spiderwort	Herb
217,000	13,563	81375	37.5	Lolium multiflorum	Annual ryegrass	Grass
		225000	100			

Wildflower seed/lb = 57,740.22 25.7% Wildflower seed/sq ft on 28 lbs/acre seeding rate = 37.1
Grass seed/lb = 162,010 74.3%

If item is not available, make up the percentage in little blue stem

NOTE:
REVISED TABLE 4 MAY BE USED AS AN ALTERNATIVE TO TABLE 4.

NOTE – ALL MIXES

FOLLOWING TOPSOIL PLACEMENT, DRY FERTILIZER AND LIME WILL BE APPLIED. UNLESS SITE-SPECIFIC RECOMMENDATIONS ARE RECEIVED FROM LOCAL, STATE, OR FEDERAL AGENCIES, MOUNTAIN VALLEY WILL INCORPORATE 4000LBS/ACRES OF AGRICULTURAL LIME AND 500LB/ACRES OF 10-20-10 (NPK) FERTILIZER INTO THE SOIL.

REVISIONS:

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:
2	10-01-18	JWK	RE	DW	REVISED SEED MIXES ADDED
1	02-21-18	KAL	RE	DW	5.0 IFC ALIGNMENT CHANGES

Mountain Valley PIPELINE

ENHANCED BMPS

MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
WETZEL COUNTY THROUGH MONROE COUNTY, WEST VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC
555 SOUTHPOINTE BOULEVARD, SUITE 200
CANONSBURG, PA 15317

TETRA TECH
complex world | CLEAR SOLUTIONS™
661 ANDERSEN DRIVE
FOSTER PLAZA 7
PITTSBURGH, PA 15220

CONSTRUCTION PLANS

DRAWN BY:	KAL
CHECKED BY:	HT
APPROVED BY:	RE
DATE:	10/01/2018
SCALE:	AS SHOWN
SHT. NO.	12.05 OF 12.05

REVISION 2

Mountain Valley Pipeline, LLC
Mountain Valley Pipeline Project
Docket No. CP16-10-000

WVDNR Agency Correspondence
Attachment 2

Veneziano, Philip

From: Stahl, Megan D.
Sent: Monday, October 1, 2018 2:48 PM
To: Veneziano, Philip
Subject: FW: MVP Request to Modify Seed Mixes

From: Brown, Clifford L <Clifford.L.Brown@wv.gov>
Sent: Thursday, September 27, 2018 4:02 PM
To: Stahl, Megan D. <MStahl@eqt.com>
Subject: [EXTERNAL] Re: MVP Request to Modify Seed Mixes

Megan

Annual ryegrass and switchgrass added to the seed mix, particularly in steep slope areas should provide for restoration and soil stabilization. We do not object to this modification of the seed mix for erosion and sediment control on MVP in WV. Please contact me if we need to discuss this request further.

C

Clifford L. Brown
WVDNR
Environmental Resources Specialist
PO Box 67
Elkins, WV 26241
304-637-0245

From: Stahl, Megan D. <MStahl@eqt.com>
Sent: Thursday, September 27, 2018 3:33:03 PM
To: Brown, Clifford L
Subject: MVP Request to Modify Seed Mixes

Good afternoon Cliff,

MVP is in the process of restoring applicable areas of the project and we are hearing feedback from the contractors requesting revisions to the seed mixes in MVP's approved Restoration and Rehabilitation Plan (attached for your reference). Specifically, some of the species in the upland, steep slope herbaceous seed mix and the upland meadow, pollinator herbaceous seed mix are unavailable or have prohibitive lead times.

In order to address these concerns MVP worked with Ernst to develop a compromise that utilizes a majority native species and one non-native (but not invasive) species. Specifically:
For the upland mixes (upland herbaceous at 20lbs/acre and steep slope at 45 lbs/acre), MVP added Switchgrass and annual ryegrass. Switchgrass is a native species which develops deep rooting systems and is great for erosion control. Annual ryegrass is a non-native species, but neither WVDNR nor the VADCR list it as an invasive species. By adding these species, we are able to adjust the percentages other species while maintaining a majority native mix. Both of the additions to the mix, Shelter Switchgrass and Annual Rye are readily available.

Please review MVP's Proposed Revised Tables 1 and 4 (attached) and let me know if you approve of these changes.

Thank you,
Megan

Megan Stahl
Permitting Supervisor
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222
T 412-553-7783
C 412-737-2587

EQT Where energy meets innovation.
www.eqt.com

To learn about EQT's sustainability efforts visit: https://csr.eqt.com
Zero is Possible – Today!

Document Content(s)

625 Liberty Avenue, Suite 2000 | Pittsburgh, PA 15222
844-MVP-TALK | mail@mountainvalleypipeline.info
www.mountainvalleypipeline.info

August 20, 2019

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

Re: Mountain Valley Pipeline, LLC
Docket No. CP16-10-000
Variance Request No. MVP-017

Dear Ms. Bose:

On October 13, 2017, the Federal Energy Regulatory Commission issued an order granting a Certificate of Public Convenience and Necessity to Mountain Valley Pipeline, LLC. In this filing, Mountain Valley submits Variance Request No. MVP-017.

If you have any questions, please do not hesitate to contact me at (412) 553-5786 or MEggerding@equitransmidstream.com. Thank you.

Respectfully submitted,

MOUNTAIN VALLEY PIPELINE, LLC
by and through its operator,
EQM Gathering Opco, LLC

By: Matthew Eggerding

Matthew Eggerding
Assistant General Counsel

cc: All Parties
Paul Friedman, OEP
Lavinia DiSanto, Cardno, Inc.
Doug Mooneyhan, Cardno, Inc.

MVP Variance Request Form

Mountain Valley PIPELINE LLC

Variance Request No.:	MVP-017
Date Approval Requested by Contractor:	
Date Submitted by Chief Inspector to LEI:	
Date Received by FERC:	
FERC Approval Reference No.:	

Requested By:	*John Uhrin*	**Spread:**	A - F	**Variance Type:**	PM
Request Prepared By *:	*Megan Neylon*			**Variance Sequence Number:**	*MVP-017*

* The FERC compliance monitor should be alerted and given a copy of the draft variance for review prior to submittal

Location (Use either Station or Milepost)

Station:	*Spread A*	**To:**	*Spread F*	**Milepost:**		**To:**	
Alignment Sheet Number:	N/A			**Tract No.:**	*All*		
Current Land Use/ Vegetative Cover:	*All*			**Other Agency Jurisdiction:**	*None*		

Nearby Features (Water body, T&E Habitat, Wetland, Noxious Weed Area, Residence (distance), Cultural Resource Site (distance) etc.):

☐ Noxious Weed ☐ Raptor Nest ☐ Residence (Distance)

☐ Area T/E ☐ Cultural Resource Site ☐ Water Well

☐ Species Habitat

☐ Other (Specify):

In or w/in 50 feet of a wetland: ☐ Yes ☑ No

In or w/in 50 feet of a waterbody: ☐ Yes ☑ No

Wetland or Waterbody ID: *N/A*; *N/A*

Additional Stream footage impacted:	*None*	**Additional Wetland impacts:**	*N/A*
Net acreage affected:	*N/A*		
Tree Clearing Required:	*N/A*	**Acreage of tree clearing:**	*N/A*

Variance Level: ☐ Level 1 ☐ Level 2 ☑ Level 3

Variance From: ☐ Permit ☑ Plan ☐ Procedures ☐ EPPM ☐ Specification ☐ Drawing ☐ Mitigation Measure ☐ Line List ☐ Other: Describe:

Detailed Description of Variance: Attachments? ☐ Yes ☑ No Photos? ☐ Yes ☑ No

Mountain Valley requests a variance to update attachment IP-13b (sheet detail from erosion control plan for West Virginia that includes seed mixes) that was submitted as part of the Implementation Plan in October 2017. MVP is in the process of restoring applicable areas of the project and have received feedback requesting revisions to the seed mixes in MVP's approved Restoration and Rehabilitation Plan. The newly requested seed mixes that have been previously used in other areas of West Virginia and have proven to be very successful in quick growth and stabilization. Incorporating these perennial/permanent seed mixes into the project area will help stabilize the right of way and increase upslope protection of sensitive resources and areas outside of the limits of disturbance. Mountain Valley will not remove the previously approved mixes from the project, but is requesting these additional mixes as alternatives and/or supplements to expedite growth and stabilization. The highlighted information in attachment 1 IP-13b illustrates the species not included in the previously approved seed mixes.

All mixes have been approved by the WVDEP and WVDNR (attachment 2). Several species are nonnative species. However, none of the species have been ranked by the WVDNR as "highly invasive species that establish readily in natural systems and spread rapidly". The WVDNR classifies the following species as moderately invasive species that may “become dominant in the understory layer without threatening all species as found in the community”: perennial ryegrass and Fiji perennial ryegrass. The WVDNR classifies the following species as occasionally invasive species that “spread slowly or not at all from disturbed sites”: Ladino clover, Birdsfoot trefoil, Timothy, orchard grass, white clover, alsike clover, and red top. Mountain Valley does not anticipate that any of these species will become a monoculture of invasive species, but will continue to follow the control measures listed in the Exotic and Invasive Species Control Plan in an effort to control and prevent the spread of invasive species throughout the project area.

These new mixes will not replace or supersede the specific requests by landowners affected by the project.

Per the requirements of the Restoration and Rehabilitation Plan, Mountain Valley will also include the pollinator species listed in attachment 1 to ROW sections within Braxton, Lewis, Fayette, and Nicholas Counties not considered as steep slope, riparian, or wetland.

List Attachments:	*Attachment 1- Updated IP-13b; Attachment 2 - WVDNR and WVDEP Agency Correspondence*	

Variance Justification:

See description above.

For MVP Use Only

Additional Surveys Required		Surveyed Corridor Description	Additional Surveys Completed
Cultural Survey	☐ Yes ☑ No	N/A	☐ Yes ☑ No
T & E Survey	☐ Yes ☑ No		☐ Yes ☑ No
Waterbodies/Wetlands	☐ Yes ☑ No		☐ Yes ☑ No

Proof of Previous Biological and Cultural Survey Clearance

N/A

Landowner:

Land Agent Contact

Landowner Approval Obtained ☐ Yes ☐ No

Sign Off:	Name	Signature	Date
Construction Manager	*John Uhrin*	*John Uhrin*	8/14/2019
Lead Environmental Inspector	*n/a*		
Third Party Compliance Manager or monitor	*n/a*		
ROW Land Agent *	*n/a*		
Environmental Supervisor	*Megan Neylon*	*Megan Neylon*	8/14/2019

*signature denotes confirmed landowner approval

For FERC Compliance Monitor and Compliance Manager Use Only

Variance Approved:		Variance Denied:		Beyond Authority:	
Signature:					
Date:					
Stipulations:					

Spread No.:	A - F	Variance Request No.:	MVP-017

VARIANCE CONDITIONS

Name:		Title:		Organization:	
Conditions:					

Name:		Title:		Organization:	
Conditions:					

Name:		Title:		Organization:	
Conditions:					

Mountain Valley Pipeline, LLC
Mountain Valley Pipeline Project
Docket No. CP16-10-000

Updated
Seed Mixes
Attachment 1

Fertilization Rate:

Uniformly apply 10-20-20 at 500 pounds/acre.

Lime Application Rate:

Uniformly apply Agricultural Grade (Pellet Form) at 3 tons/acre.

Use of Powdered or liquid fast acting lime for Hydroseeding will be considered at the discretion of Mountain Valley's on site Lead Environmental Inspector.

Note: When Hand broadcasting or Hydroseeding, all seed application rates will be doubled in Lbs.

Note: Portions of the ROW within Braxton, Lewis, Fayette, and Nicholas Counties not considered as steep slope, riparian, or wetland will incorporate the following species designed for native pollinators within the appropriate seed mix. These species were extracted from the Upland meadow, pollinator herbaceous seed mix within the Restoration and Rehabilitation Plan:

Pollinator Species	Common Name	WV Seeding Rate (Lbs/acre)
Asclepias tuberosa	Butterfly Milkweed	0.32
Aster novae-angliae	New England Aster	0.22
Echinacea purpurea	Purple Coneflower	0.95
Monarda fistulosa	Wild Bergamot	0.19
Penstemon laevigatus	Appalachian Beardtongue	0.32
Pycanthemum incanum	Hoary Mountainmint	0.06
Solidago juncea	Early Goldenrod	0.06
Solidago nemoralis	Gray Goldenrod	0.06

If any species are not available, they can be replaced with another species on this list

SEED MIXTURES AND MULCH FOR REVEGETATION

Item	**1. Non-Agricultural Land Mix[2,4,7] (Utility ROW & Unmowed Slopes/Banks)**			
Permanent Seed (100 pounds/acre) and Mulch Application Rates			**% Purity**	**Total Germination %**
Seed[1]	Perennial Ryegrass	20% by Species	98	90
Seed[1]	Orchard Grass	20% by Species	95	85

Seed[1]	Creeping Red Fescue	10% by Species	97	85
Seed[1]	Ladino Clover	20% by Species	99	90
Seed[1]	Red Top	5% by Species	98	90
Seed[1]	Birdsfoot Trefoil - upright variety (Inoculated)	25% by Species	98	80
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	2. Hayfield, Pastureland, and Cropland Mix[2,4,7]			
Permanent Seed (75 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
Seed[1]	Orchard Grass	40% by Species	95	85
Seed[1]	Timothy	40% by Species	99	90
Seed[1]	Birdsfoot Trefoil (Inoculated)	10% by Species	98	80
Seed[1]	Ladino Clover	10% by Species	99	90
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	3. Residential Mix[4,7] (Utility ROW in and around Mowed Yards)			
Permanent Seed (250 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
Seed[1]	Kentucky Bluegrass	25% by Species	98	85
Seed[1]	Creeping Red Fescue	30% by Species	97	85
Seed[1]	Fiji Perennial Ryegrass	15% by Species	98	90
Seed[1]	ASP 6006 Perennial Ryegrass	15% by Species	98	90
Seed[1]	ASP 6004 Perennial Ryegrass	15% by Species	98	90
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	4. Wetland/Stream Crossing Mix[5] (Ernst Conservation Seed Mix ERNMX #154)			
Permanent Seed (20 pounds/acre) and Mulch Application Rates			**% Purity**	**Total Germination %**
Seed[1]	Virginia Wild rye, PA Ecotype	25% by Species	99	96
Seed[1]	Big Bluestem, "Niagara"	19% by Species	99	96
Seed[1]	Switchgrass, "Shawnee"	15% by Species	99	68
Seed[1]	Lurid (Shallow) Sedge, PA Ecotype	12% by Species	99	84
Seed[1]	Fox Sedge, PA Ecotype	10% by Species	99	84
Seed[1]	Blue Vervain, PA Ecotype	4% by Species	99	93
Seed[1]	Soft Rush	3% by Species	99	77
Seed[1]	Boneset, PA Ecotype	2% by Species	66	78
Seed[1]	Oxeye Sunflower, PA Ecotype	2% by Species	99	80
Seed[1]	Showy Tick trefoil, PA Ecotype (inoculated)	2% by Species	99	90
Seed[1]	Swamp Milkweed, PA Ecotype	2% by Species	90	90
Seed[1]	Wild Bergamot, PA Ecotype	1.5% by Species	97	90
Seed[1]	Joe Pye Weed, PA Ecotype	1.5% by Species	99	95
Seed[1]	Great Blue Lobelia, PA Ecotype	0.5% by Species	87	57
Seed[1]	Narrowleaf Blue Eyed Grass	0.5% by Species	99	95

Item	5. Droughty Sites Mix[2,4,7] (Areas where rock is blasted or dug. Usually in forested areas with acid soils.)			
Permanent Seed (100 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
Seed[1]	Hard Fescue	15% by Species	98	85
Seed[1]	Sheep Fescue	15% by Species	98	85
Seed[1]	Chewing Fescue	15% by Species	98	85
Seed[1]	Creeping Red Fescue	15% by Species	97	85
Seed[1]	Orchard Grass	20% by Species	95	85
Seed[1]	White Clover	20% by Species	99	90
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	6. Strip Mined or Other Mined/Quarried Site Mix[2,4,7] for Sites Lacking Pre-SMCRA Reclamation Standards (Areas where coal or rock was previously mined with acid soils or conditions with an acidifying component)			
Permanent Seed (100 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
Seed[1]	Hard Fescue	8% by Species	98	85
Seed[1]	Chewing's Fescue	15% by Species	98	85
Seed[1]	Creeping Red Fescue	15% by Species	97	85
Seed[1]	Orchard Grass	12% by Species	95	85
Seed[1]	Deer Tongue Grass	20% by Species	99	90
Seed[1]	Alsike Clover	8% by Species	99	90
Seed[1]	Birdsfoot Trefoil (Inoculated)	20% by Species	99	90
Seed[1]	Red Top	2% by Species	98	90
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	7. Temporary Stabilization Mix[3,6]			
Temporary Seed (50 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
Seed[1,4]	Cereal Ryegrass (Aroostook variety after October 15th)	100% by Species	95	85
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Notes:

1 All seed is pure live seed. Seeding dates are flexible, but ideal during spring through early fall.

2 The Food Plot Mix is no longer an option in 2014+, unless it is specified by lease stipulation. Above seed mixes have plant species used in food plots. Chicory, clovers, and other **perennial** herbs can be utilized as may be required.

3 All cereal ryegrass applied after October 15th will be Aroostook variety.

4 Optimal Seeding Months – April, May and August.

5 Optimal Seeding Months – October through May in full sun or partial shade.

6 **WVDEP Permit No. WVR310667 -** Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily (or permanently) ceased, but in no case more than seven days after the construction activity in that portion of the site has permanently ceased.

Temporary Stabilization also applies to ongoing projects that have not achieved "final grade" between October 15th and April 30th.

7 USDA-NRCS Recommended Seeding Dates for Permanent Cover:

Planting Dates	Suitability
March 1 – April 15 & August 1 – October 1	Best Seeding Periods
April 15 – August 1	High Risk – Moisture Stress Likely
October 1 – December 1	High Risk – Freeze Damage to Young Seedlings
December 1 – March 1	Good Seeding Period – Dormant Seeding

Mountain Valley Pipeline, LLC
Mountain Valley Pipeline Project
Docket No. CP16-10-000

Agency Correspondence Attachment 2

Hoover, Matthew S.

From: Adams, Rick D <Rick.D.Adams@wv.gov>
Sent: Thursday, July 11, 2019 9:06 AM
To: Hoover, Matthew S.
Cc: Board, Larry D; Hendley, John H
Subject: RE: [External] Updated Seed Mix for MVP
Attachments: 711945_2_PipelineHarrisonCo111616 1 of 5.pdf

Good morning Matt,

I have reviewed the proposed changes to the seed mix in your restoration process to the Mountain Valley Pipeline project, WVR310667. This agency has no objection to these seed mix plans. This change will not require submittal of a formal modification by the permittee therefore Mountain Valley may begin using these seed mixes immediately. All other terms and conditions of the existing permit shall remain in effect.

Please let me know if you require additional information.

Thanks,

From: Hoover, Matthew S. <MHoover@equitransmidstream.com>
Sent: Wednesday, July 10, 2019 4:05 PM
To: Adams, Rick D <Rick.D.Adams@wv.gov>
Subject: [External] Updated Seed Mix for MVP

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and are expecting the content. -- WV Office of Technology

Hi Rick,
MVP would like to include the attached seed mix in our restoration process. The intent of changing the mix is to expedite the growth of perennial vegetation throughout the project area. Vegetating disturbed areas is one of the most effective methods to ensure stabilization and prevent off-site sedimentation. The species in the attached mix have proven very effective on projects in West Virginia. Mountain Valley would like to begin using these seed mixes as soon as possible.

Please let me know if the Department approves the attached mix.

Matt Hoover
Sr. Environmental Coordinator
2200 Energy Drive, 2nd Floor
Canonsburg, PA 15317
Office: (724) 873-3009
Cell: (412) 258-5627

mhoover@equitransmidstream.com
*Please note my new email address

Hoover, Matthew S.

From:	Brown, Clifford L <Clifford.L.Brown@wv.gov>
Sent:	Monday, July 15, 2019 1:38 PM
To:	Hoover, Matthew S.
Cc:	Neylon, Megan
Subject:	RE: [External] MVP Seed Mix Request

Matt

The West Virginia Division of Natural Resources, Wildlife Resources Section, does not object to the attached proposed seed mix for revegetation and erosion control on the Mountain Valley Pipeline in West Virginia. In addition to mix #4 for wetland and stream crossings, with landowner approval, we encourage the use of native and pollinator species in the seed mix on slopes of less than 15%. Roundstone, Ernst, Ohio Prairie Nursery and others have a variety of pollinator mixes and individual species that could be incorporated in revegetation efforts. Use of the proposed seed mix should proceed in West Virginia for Mountain Valley Pipeline upon FERC authorization.

Because the request to modify the seed mix does significantly alter the proposed mitigation commitment, we recommend continued coordination in prompt development of habitat conservation measures and completion of a final, executed plan in a timely manner.

Please contact me to schedule the next meeting for review and modification of the MVP mitigation proposal. If you have questions, please contact me.

C

From: Hoover, Matthew S. [mailto:MHoover@equitransmidstream.com]
Sent: Tuesday, July 09, 2019 1:40 PM
To: Brown, Clifford L
Cc: Neylon, Megan
Subject: [External] MVP Seed Mix Request

Cliff,
Based on our previous conversations and meeting on May 28, it was requested that the DNR consider allowing Mountain Valley to change the currently approved seed mix to a combination not entirely composed of native species. The intent of changing the mix is to expedite the growth of perennial vegetation throughout the project area. Vegetating disturbed areas is one of the most effective methods to ensure stabilization and prevent off-site sedimentation. The species in the attached mix have proven very effective on projects in West Virginia. Mountain Valley would like to begin using these seed mixes as soon as possible.

Mountain Valley understands that this request will also influence the mitigation commitments listed in the attached MVP Mitigation Proposal to WVDNR, dated 9/28/18. To that effect, Mountain Valley respectfully requests to begin using the attached seed mix, while the mitigation commitment is being updated with the WVDNR.

Please let me know if you have any questions.

Thanks,
Matt

Fertilization Rate:

Uniformly apply 10-20-20 at 500 pounds/acre.

Lime Application Rate:

Uniformly apply Agricultural Grade (Pellet Form) at 3 tons/acre.

Use of Powdered or liquid fast acting lime for Hydroseeding will be considered at the discretion of Mountain Valley's on site Lead Environmental Inspector.

Note: When Hand broadcasting or Hydroseeding, all seed application rates will be doubled in Lbs.

SEED MIXTURES AND MULCH FOR REVEGETATION

Item	**1. Non-Agricultural Land Mix[2,4,7] (Utility ROW & Unmowed Slopes/Banks)**			
Permanent Seed (100 pounds/acre) and Mulch Application Rates			**% Purity**	**Total Germination %**
Seed[1]	Perennial Ryegrass	20% by Species	98	90
Seed[1]	Orchard Grass	20% by Species	95	85
Seed[1]	Creeping Red Fescue	10% by Species	97	85
Seed[1]	Ladino Clover	20% by Species	99	90
Seed[1]	Red Top	5% by Species	98	90
Seed[1]	Birdsfoot Trefoil - upright variety (Inoculated)	25% by Species	98	80
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	2. Hayfield, Pastureland, and Cropland Mix[2,4,7]			
Permanent Seed (75 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
Seed[1]	Orchard Grass	40% by Species	95	85
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Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	3. Residential Mix[4,7] (Utility ROW in and around Mowed Yards)			
Permanent Seed (250 pounds/acre) and Mulch Application Rates			% Purity	Total Germination %
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Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	**4. Wetland/Stream Crossing Mix[5] (Ernst Conservation Seed Mix ERNMX #154)**			
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Seed[1]	Great Blue Lobelia, PA Ecotype	0.5% by Species	87	57
Seed[1]	Narrowleaf Blue Eyed Grass	0.5% by Species	99	95

Item	5. Droughty Sites Mix[2,4,7] (Areas where rock is blasted or dug. Usually in forested areas with acid soils.)			
Permanent Seed (100 pounds/acre) and Mulch Application Rates			**% Purity**	**Total Germination %**
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Seed[1]	White Clover	20% by Species	99	90
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	6. Strip Mined or Other Mined/Quarried Site Mix[2,4,7] for Sites Lacking Pre-SMCRA Reclamation Standards (Areas where coal or rock was previously mined with acid soils or conditions with an acidifying component)			
Permanent Seed (100 pounds/acre) and Mulch Application Rates			**% Purity**	**Total Germination %**
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Seed[1]	Red Top	2% by Species	98	90
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Item	7. Temporary Stabilization Mix[3,6]			
Temporary Seed (50 pounds/acre) and Mulch Application Rates			**% Purity**	**Total Germination %**
Seed[1,4]	Cereal Ryegrass (Aroostook variety after October 15th)	100% by Species	95	85
Mulch	Weed free straw	3 tons/acre	N/A	N/A

Notes:

1 All seed is pure live seed. Seeding dates are flexible, but ideal during spring through early fall.

2 The Food Plot Mix is no longer an option in 2014+, unless it is specified by lease stipulation. Above seed mixes have plant species used in food plots. Chicory, clovers, and other **perennial** herbs can be utilized as may be required.

3 All cereal ryegrass applied after October 15th will be Aroostook variety.

4 Optimal Seeding Months – April, May and August.

5 Optimal Seeding Months – October through May in full sun or partial shade.

6 **WVDEP Permit No. WVR310667 -** Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily (or permanently) ceased, but in no case more than seven days after the construction activity in that portion of the site has permanently ceased.

Temporary Stabilization also applies to ongoing projects that have not achieved "final grade" between October 15th and April 30th.

7 USDA-NRCS Recommended Seeding Dates for Permanent Cover:

Planting Dates	Suitability
March 1 – April 15 & August 1 – October 1	Best Seeding Periods
April 15 – August 1	High Risk – Moisture Stress Likely
October 1 – December 1	High Risk – Freeze Damage to Young Seedlings
December 1 – March 1	Good Seeding Period – Dormant Seeding

Document Content(s)

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/G3
Mountain Valley Pipeline LLC
CP16-10-000

Via FERC Service

October 4, 2019

Matthew Eggerding, Counsel
Mountain Valley Pipeline LLC
625 Liberty Ave., Suite 1700
Pittsburgh, PA 15222

Re: Approval of Variance Request No. MVP-020

Dear Mr. Eggerding:

I grant your request, filed October 2, 2019, for Mountain Valley Pipeline LLC (Mountain Valley) to use Variance MVP-020. Variance MVP-020 would allow Mountain Valley to modify and supplement the woody seeding mixes in Virginia, Spreads G through I, to enhance vegetation growth and to promote stabilization of the right-of-way. According to Mountain Valley, the new seed mixes contain species native to Virginia, and no invasive species identified by the Virginia Department of Environmental Quality (VADEQ). The VADEQ has reviewed and approved these new seed mixes. We believe the change in seeding mixes would be equally or more protective of the environmental resources. No historic properties, federally-listed threatened and endangered species, waterbodies, or wetlands would be affected by use of this variance.

Your request is in compliance with Environmental Condition Nos. 1 and 5 of the Commission's October 13, 2017 *Order Issuing Certificates and Granting Abandonment Authority* (Order) in the above-referenced docket. I remind you that Mountain Valley must comply with all applicable remaining terms and conditions of the Order.

If you have any questions regarding this authorization, please call me at 202-502-8059.

Sincerely,

Paul Friedman
Environmental Project Manager

MVP Variance Request Form

Mountain Valley PIPELINE LLC

Variance Request No.:	*MVP-020*
Date Approval Requested by Contractor:	*9/3/2019*
Date Submitted by Chief Inspector to LEI:	*9/4/2019*
Date Received by FERC:	
FERC Approval Reference No.:	

Requested By:	*Jeff Klinefelter*	**Spread:**	G - I	**Variance Type:**	PM
Request Prepared By *:	*Megan Neylon*			**Variance Sequence Number:**	*MVP-020*

* The FERC compliance monitor should be alerted and given a copy of the draft variance for review prior to submittal

Location (Use either Station or Milepost)

Station:	*Spread G*	**To:**	*Spread I*	**Milepost:**	*Spread G*	**To:**	*Spread I*

Alignment Sheet Number: N/A — **Tract No.:** *All*

Current Land Use/ Vegetative Cover: *All* — **Other Agency Jurisdiction:** *None*

Nearby Features (Water body, T&E Habitat, Wetland, Noxious Weed Area, Residence (distance), Cultural Resource Site (distance) etc.):

- [ ] Noxious Weed Area
- [ ] Raptor Nest
- [ ] Residence (Distance)
- [ ] T/E Species Habitat
- [ ] Cultural Resource Site
- [ ] Water Well
- [ ] Other (Specify):

In or w/in 50 feet of a wetland: [ ] Yes [x] No

In or w/in 50 feet of a waterbody: [ ] Yes [x] No

Wetland or Waterbody ID: *N/A* / *N/A*

Additional Stream footage impacted: *None*

Additional Wetland impacts: *N/A*

Net acreage affected: *N/A*

Tree Clearing Required: *N/A* — **Acreage of tree clearing:** *N/A*

Variance Level: [ ] Level 1 [ ] Level 2 [x] Level 3

Variance From: [ ] Permit [ ] Plan [ ] Procedures [ ] EPPM [ ] Specification [ ] Drawing [x] Mitigation Measure [ ] Line List [ ] Other: Describe:

Detailed Description of Variance: Attachments? [ ] Yes [x] No Photos? [ ] Yes [x] No

MVP requests a variance to update Environmental Detail No. MVP-ES11.1 (sheet detail from erosion control plan for Virginia that includes seed mixes) that was submitted as part of the Implementation Plan in March 2018. MVP is in the process of restoring applicable areas of the Project and requesting to make revisions to the woody seed mix in MVP's approved Restoration and Rehabilitation Plan. Specifically, MVP is requesting to use species that are more obtainable in the quantities required to provide successful quick growth and stabilization. Incorporating these alternative species into the woody seed mix will help stabilize and restore the temporary portion of the right of way to pre-existing vegetative cover and increase upslope protection of sensitive resources and areas outside of the limits of disturbance. MVP will not remove the previously approved woody seed mix from the Project but is requesting to add this mix to act as an alternative and/or supplement to increase availability and expedite stabilization.

The updated seed mix table is included as Attachment 1. Many of the proposed species were not included in the previously approved woody seed mix, as outlined in the Table 2 in Attachment 1. The VADEQ approval is included as Attachment 2. The species are native to Virginia and none have been identified by the VADEQ as invasive species. MVP will continue to follow the control measures listed in the Exotic and Invasive Species Control Plan in an effort to control and prevent the spread of invasive species throughout the project area.

These new mixes will not replace or supersede the specific requests by landowners affected by the project.

List Attachments: *Attachment 1- Table 1. Updated Woody Species Seed Mix; Table 2. Seed Mix Changes; Attachment 2 - VADEQ Agency Correspondence*

Variance Justification:
See description above.

For MVP Use Only

Additional Surveys Required		Surveyed Corridor Description	Additional Surveys Completed
Cultural Survey	☐ Yes ☑ No	N/A	☐ Yes ☑ No
T & E Survey	☐ Yes ☑ No		☐ Yes ☑ No
Waterbodies/Wetlands	☐ Yes ☑ No		☐ Yes ☑ No

Proof of Previous Biological and Cultural Survey Clearance
N/A

Landowner: **N/A**

Land Agent Contact **N/A**
Landowner Approval Obtained ☐ Yes ☐ No

Sign Off:	**Name**	**Signature**	**Date**
Construction Manager	*Jeff Klinefelter*	*Jeff Klinefelter*	9/26/2019
Lead Environmental Inspector	*n/a*		
Third Party Compliance Manager or monitor	*n/a*		
ROW Land Agent *	*n/a*		
Environmental Supervisor	*Megan Neylon*	*Megan Neylon*	9/26/2019

*signature denotes confirmed landowner approval

For FERC Compliance Monitor and Compliance Manager Use Only

Variance Approved: Variance Denied: Beyond Authority:

Signature:

Date:

Stipulations:

Spread No.:	G - I	Variance Request No.:	MVP-020

VARIANCE CONDITIONS

Name:		Title:		Organization:	

Conditions:

Name:	Title:	Organization:

Conditions:

Name:	Title:	Organization:

Conditions:

Tables 1 & 2
Attachment 1

Table 1. Updated Woody Species Seed Mix

Layer	Species	Common Name	Seeding Rate (lbs/acre)
Overstory	*Platanus occidentalis*	American sycamore	0.3
	Liriodendron tulipifera	Tulip poplar	0.3
	Pinus strobus	White pine	0.3
	Pinus taeda	Loblolly pine	0.3
	Prunus serotina	Black cherry	0.3
Understory	*Rhus glabra*	Smooth sumac	0.3
	Myrica cerifera	Southern wax myrtle	0.3
	Cornus sericea	Red osier dogwood	0.3
	Diospyros Virginiana	Persimmon	0.3
	Robinia pseudoacacia	Black locust	0.3
	Nyssa sylvatica	Black Gum	0.3
	Taxodium distichum	Bald cypress	0.3
Shrubs	*Cephalanthus occidentalis*	Buttonbush	0.3
	Lindera benzoin	Spicebush	0.3
	Prunus angustifolia	Chickasaw plum	0.3
	Fraxinus pennsylvanica	Green ash	0.3
	Parthenocissus quinquefolia	Virginia creeper	0.3

Table 2. Seed Mix Changes

Species Removed	Replacement Species
Pinus virginiana	*Pinus taeda*
Fagus grandifolia	*Platanus occidentalis*
Amelanchier canadensis	*Rhus glabra*
Cercis canadensis	*Myrica cerifera*
Cornus florida	*Cornus sericea*
Ilex opaca	*Robinia pseudoacacia*
Sassafras albidum	*Taxodium distichum*
Hamamelis virginiana	*Cephalanthus occidentalis*
Vaccinium angustifolium	*Prunus angustifolia*
Virburnum acerifolium	*Fraxinus pennsylvanica*
Vitis aestivalis	*Parthenocissus quinquefolia*

Agency Correspondence
Attachment 2

From: "Leach, Benjamin" <benjamin.leach@deq.virginia.gov>
Date: September 10, 2019 at 12:27:17 PM EDT
To: "Chalmers, Cory M." <CChalmers@equitransmidstream.com>
Cc: "Clauto, Brian M." <BClauto@equitransmidstream.com>, "Neylon, Megan" <MNeylon@equitransmidstream.com>
Subject: [EXTERNAL] Re: MVP Proposed Updated Woody Species Seed Mix

Cory you may proceed with the following substitution of the seed mix.

On Thu, Aug 15, 2019 at 6:19 PM Leach, Benjamin <benjamin.leach@deq.virginia.gov> wrote:

> Cory,
>
> At this time I am waiting on DCR to get back to me on if this would be ok or not.
>
> On Tue, Aug 13, 2019 at 3:27 PM Chalmers, Cory M. <CChalmers@equitransmidstream.com> wrote:
>
>> Ben,
>>
>> Attached, please find a proposed updated woody species seed mix. As before and stated within the Restoration and Rehabilitation Plan, a minimum of three of the five overstory, four of the seven understory, and two of the four shrub species will comprise the woody seed mix.
>>
>> Please let me know if you have any questions.
>>
>> Thanks,
>>
>> Cory
>>
>> **Cory Chalmers • Environmental Coordinator**
>>
>> 120 Professional Place, Bridgeport, WV 26330
>>
>> Direct: 304.848.0061 • Mobile: 304.627.8173
>>
>> cchalmers@equitransmidstream.com
>
> ~ Ben
>
> Ben Leach, GISP
> Stormwater Team Lead of the Office of Stormwater Management
> Department of Environmental Quality
> +1 (804) 698-4037 - direct dial
> Benjamin.Leach@deq.virginia.gov
> www.deq.virginia.gov

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/G3
Mountain Valley Pipeline LLC
CP16-10-000

VIA Electronic Mail

September 3, 2020

Matthew Eggerding, Counsel
Mountain Valley Pipeline LLC
625 Liberty Ave., Suite 1700
Pittsburgh, PA 15222
MEggerding@equitransmidstream.com

Re: Approval of Variance Request No. MVP-024

Dear Mr. Eggerding:

I grant your request, filed August 26, 2020, for Mountain Valley Pipeline LLC (Mountain Valley) to use Variance MVP-024. Variance MVP-024 would allow Mountain Valley to use three additional native, non-invasive species within West Virginia as a supplement to the seeding mixes or as a replacement for species that are not currently available. The West Virginia Department of Natural Resources and the West Virginia Department of Environmental Protection have reviewed and approved the use of these three species. We believe the change in seed mixes would be equally or more protective of the environmental resources. No historic properties, federally-listed threatened and endangered species, waterbodies, or wetlands would be affected by use of this variance.

Your request is in compliance with Environmental Condition Nos. 1 and 5 of the Commission's October 13, 2017 *Order Issuing Certificates and Granting Abandonment Authority* (Order) in the above-referenced docket. I remind you that Mountain Valley must comply with all applicable remaining terms and conditions of the Order.

If you have any questions regarding this request, please call me at (202) 502-8059.

Sincerely,

for Paul Friedman
Environmental Project Manager

MVP Variance Request Form

Mountain Valley PIPELINE LLC

Variance Request No.:	MVP-024
Date Approval Requested by Contractor:	7/7/2020
Date Submitted by Chief Inspector to LEI:	7/8/2020
Date Received by FERC:	
FERC Approval Reference No.:	

Requested By:	John Uhrin	**Spread:**	A	**Variance Type:**	PM
Request Prepared By *:	Megan Neylon			**Variance Sequence Number:**	MVP-024

* The FERC compliance monitor should be alerted and given a copy of the draft variance for review prior to submittal

Location (Use either Station or Milepost)

Station:	Spread A	**To:**	Spread F	**Milepost:**	0	**To:**	196.30

Alignment Sheet Number: N/A

Tract No.: All

Current Land Use/ Vegetative Cover: All

Other Agency Jurisdiction: None

Nearby Features (Water body, T&E Habitat, Wetland, Noxious Weed Area, Residence (distance), Cultural Resource Site (distance) etc.):

☐ Noxious Weed Area ☐ Raptor Nest ☐ Residence (Distance)

☐ T/E Species Habitat ☐ Cultural Resource Site ☐ Water Well

☑ Other (Specify): N/A

In or w/in 50 feet of a wetland: ☐ Yes ☑ No

In or w/in 50 feet of a waterbody: ☐ Yes ☑ No

Wetland or Waterbody ID: N/A

Additional Stream footage impacted: None

Additional Wetland impacts: N/A

Net acreage affected: N/A

Tree Clearing Required: N/A

Acreage of tree clearing: N/A

Variance Level: ☐ Level 1 ☐ Level 2 ☑ Level 3

Variance From: ☐ Permit ☑ Plan ☐ Procedures ☐ EPPM ☐ Specification ☐ Drawing ☐ Mitigation Measure ☐ Line List ☐ Other: Describe:

Detailed Description of Variance: Attachments? ☐ Yes ☑ No Photos? ☐ Yes ☑ No

Mountain Valley requests a variance to update attachment IP-13b (sheet detail from erosion control plan for West Virginia that includes seed mixes) that was submitted as part of the Implementation Plan. MVP is in the process of restoring applicable areas of the project in West Virginia. Some of the species in the riparian corridor / wetland mix in MVP's approved Restoration and Rehabilitation Plan are unavailable and needed to be replaced. In addition to the approved seeding mixes being used, MVP is requesting approval to use additional native, non-invasive species as a supplement to the seeding mixes or as a replacement for species that are not currently available. As requested by WVDNR, MVP will use regional ecotypes of the newly added species.

The updated IP-13b with the seed mix additions is included as Attachment 1. The WVDNR and WVDEP approvals are included as Attachment 2.

List Attachments: Attachment 1- Updated IP-13b;
Attachment 2 - WVDNR and WVDEP Agency Correspondence

Variance Justification:

See description above.

For MVP Use Only

Additional Surveys Required		Surveyed Corridor Description	Additional Surveys Completed
Cultural Survey	☐ Yes ☑ No	N/A	☐ Yes ☑ No
T & E Survey	☐ Yes ☑ No		☐ Yes ☑ No
Waterbodies/Wetlands	☐ Yes ☑ No		☐ Yes ☑ No

Proof of Previous Biological and Cultural Survey Clearance

N/A

Landowner: **All in WV**

Land Agent Contact Landowner Approval Obtained ☐ Yes ☑ No

Sign Off:	Name	Signature	Date
Construction Manager	John Uhrin	*John Uhrin*	7/10/2020
Lead Environmental Inspector	Travis Huskins	*Travis Huskins*	8/18/2020
Third Party Compliance Manager or monitor			
ROW Land Agent *	Joe Park	*Joe Park*	8/18/2020
Environmental Supervisor	Megan Neylon	*Megan Neylon*	8/18/2020

*signature denotes confirmed landowner approval

For FERC Compliance Monitor and Compliance Manager Use Only

Variance Approved:		Variance Denied:		Beyond Authority:	
Signature:					
Date:					
Stipulations:					

Spread No.:	A	Variance Request No.:	MVP-024

VARIANCE CONDITIONS

Name:		Title:		Organization:	
Conditions:					

Name:		Title:		Organization:	
Conditions:					

Name:		Title:		Organization:	
Conditions:					

Updated IP-13b (WV Seed Mixes)
Attachment 1

SEED MIX AND APPLICATION RATES

Table 1. Upland, steep slope herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	3.15	3.15	5.5 - 7.5	Midsummer
Elymus virginicus	Virginia Wildrye	9.45	9.05	5.0 - 7.4	June to October
Panicum clandestinum	Deertongue	4.50	4.50	4.0 - 7.5	May to September
Schizachyrium scoparium	Little Bluestem	11.70	11.25	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	13.59	14.40	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	0.23	0.09		June to August
Aster novae-angliae	New England Aster	0.09	n/a	5.1 – 6.8	August to October
Aster pilosus	Heath Aster	0.05	0.05	5.4 - 7.0	After fall frost
Aster prenanthoides	Zigzag Aster	0.09	n/a	5.5 - 7.2	August to October
Chamaecrista fasciculata	Partridge Pea	n/a	0.45	5.5 - 7.5	July to September
Coreopsis lanceolata	Lanceleaf Coreopsis	0.45	0.45	6.0 - 7.0	April to July
Desmodium paniculatum	Panicledleaf Ticktrefoill	0.14	n/a	6.0 - 7.0	July to August
Eupatorium coelestinum	Mistflower	0.05	0.05	5.5 - 7.5	July to August
Heliopsis helianthoides	Oxeye Sunflower	0.36	0.45	5.5 – 7.0	July to August
Liatris graminifolia	Grassleaf Blazing Star	n/a	0.09	5.8 - 6.8	August to October
Monarda fistulosa	Wild Bergamot	0.18	0.23	6.0 - 8.0	June to September
Pycnanthemum incanum	Hoary Mountainmint	0.05	0.05	< 6.8	Summer
Rudbeckia hirta	Blackeyed Susan	0.45	0.45	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.18	0.23		July to August
Solidago juncea	Early Goldenrod	0.09	n/a		June to July
Solidago nemoralis	Gray Goldenrod	0.14	0.05	6.5 - 7.5	August to September
Tradescantia ohiensis	Ohio Spiderwort	0.09	0.05		late April to mid-July
		45.00	**45.00**		

Table 2. Wetland herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Alisma subcordatum	Mud Plantain	0.04	0.04	5.0 - 7.0	Midsummer
Asclepias incarnata	Swamp Milkweed	n/a	0.40		July to August
Aster novae-angliae	New England Aster	0.16	n/a		August to October
Aster prenanthoides	Zigzag Aster	0.14	n/a	5.5 - 7.2	August to October
Aster umbellatus	Flat Topped White Aster	0.10	n/a		August to Late Summer
Carex gynandra	Fringed Sedge	0.10	0.10		May to June
Carex lupulina	Hop Sedge	1.00	1.00	6.2 - 7.0	June to October
Carex lurida	Shallow Sedge	3.00	3.00	4.9 - 6.8	June to July
Carex scoparia	Blunt Broom Sedge	1.00	1.00	4.6 - 6.9	July to August
Carex vulpinoidea	Fox Sedge	7.00	6.90	6.8 - 8.9	June to August
Cinna arundinacea	Wood Reedgrass	0.40	0.40	4.0 - 8.5	August to September
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Eupatorium coelestinum	Mistflower	0.10	0.10	5.5 - 7.5	July to October
Eupatorium fistolosum	Joe Pye Weed	0.14	0.14	4.5 - 7.0	July to September
Eupatorium perfoliatum	Boneset	0.20	0.20		July to October
Helenium autumnale	Common Sneezeweed	n/a	0.10		July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40		July to August
Juncus effusus	Soft Rush	0.60	0.60	5.5 - 7.0	May to June
Ludwigia alternifolia	Seedbox	0.10	0.10		August to September
Mimulus ringens	Square Stemmed Monkeyflower	0.10	0.10		June to September
Onoclea sensibilis	Sensitive Fern	0.20	0.20		June to October
Scirpus cyperinus	Woolgrass	0.20	0.20	4.8 - 7.2	July to September
Scirpus polyphyllus	Many-leaved Bulrush	0.20	0.20		July to August
Verbena hastata	Blue Vervain	0.72	0.72		June to October
Vernonia noveboracensis	New York Ironweed	0.10	0.10	4.5 - 8.0	July to September
		20.00	**20.00**		

Table 3. Riparian herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	0.54	0.50	5.5 - 7.5	Midsummer
Andropogon gerardii	Big Bluestem	3.00	3.00	6.0 - 7.5	July to October
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Juncus effusus	Soft Rush	0.20	0.20	5.5 - 7.0	May to June
Juncus tenuis	Path Rush	0.20	0.20	4.5 - 7.0	May to June
Panicum clandestinum	Deertongue	5.60	5.40	4.0 - 7.5	May to September
Sorghastrum nutans	Indiangrass	3.60	3.60	5.0 - 7.8	August to October
Asclepias incarnata	New England Aster	0.20	n/a	5.0 - 8.0	June to July
Aster novae-angliae	Swamp Milkweed	0.20	0.20		Late Summer
Chamaecrista fasciculata	Partridge Pea	n/a	0.40	5.5 - 7.5	July to September
Eupatorium coelestinum	Mistflower	0.20	0.20	5.5 - 7.5	July to October
Eupatorium fistolosum	Joe Pye Weed	0.14	0.14	4.5 - 7.0	July to September
Eupatorium perfoliatum	Boneset	0.10	0.10		July to October
Geum canadense	White Avens	0.20	0.20	4.5 - 7.5	May to June
Helenium autumnale	Common Sneezeweed	n/a	0.10	4.0 - 7.5	August to September
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40		July to August
Monarda fistulosa	Wild Bergamot	0.10	0.10	6.0 - 8.0	June to September
Pycnanthemum tenuifolium	Slender Mountainmint	0.06	0.06		July to September
Rudbeckia hirta	Blackeyed Susan	0.60	0.60	6.0 - 7.0	May to October
Senna hebecarpa	Wild Senna	0.08	0.10		July to August
Senna marilandica	Maryland Senna	0.08	n/a	4.0 - 7.0	Summer
Verbena hastata	Blue Vervain	0.40	0.40		June to October
Vernonia noveboracensis	New York Ironweed	0.10	0.10	4.5 - 8.0	July to September
		20.00	**20.00**		

Table 4. Upland meadow, pollinator herbaceous seed mix and recommended application rates.

Species	Common Name	WV Seeding Rate (lbs/acre)	VA Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Elymus virginicus	Virginia Wildrye	4.00	4.00	5.0 - 7.4	June to October
Schizachyrium scoparium	Little Bluestem	11.66	11.68	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	1.00	1.00	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	n/a	0.10	June to August	*Asclepias syriaca*
Asclepias tuberosa	Butterfly Milkweed	0.20	0.10	4.8 - 6.8	June to August
Aster novae-angliae	New England Aster	0.14	n/a	5.1 – 6.8	August to October
Chamaecrista fasciculata	Partridge Pea	n/a	0.60	5.5 - 7.5	July to September
Chamaecrista nictitans	Sensitive Partridge Pea	n/a	0.06		June to October
Coreopsis lanceolata	Lanceleaf Coreopsis	0.40	0.44	6.0 - 7.0	June to August
Echinacea purpurea	Purple Coneflower	0.60	n/a	6.5 - 7.2	Late Summer
Eupatorium coelestinum	Mistflower	0.10	0.04	5.5 - 7.5	July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	0.40	5.5 – 7.0	July to August
Lespedeza virginica	Slender Bushclover	n/a	0.10		July to September
Liatris graminifolia	Grassleaf Blazing Star	n/a	0.10	5.8 - 6.8	August to October
Liatris spicata	Marsh Blazing Star	0.16	n/a	5.6 - 7.5	July to September
Monarda fistulosa	Wild Bergamot	0.12	0.10	6.0 - 8.0	June to September
Parthenium integrifolium	Wild Quinine	0.10	n/a	unknown	Late May to Late August
Penstemon laevigatus	Appalachian Beardtongue	0.20	0.10	unknown	May to June
Pycnanthemum incanum	Hoary Mountainmint	0.04	0.20	< 6.8	Summer
Rudbeckia fulgida var. fulgida	Orange Coneflower	0.04	0.02		July to October
Rudbeckia hirta	Blackeyed Susan	0.60	0.04	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.10	0.60		July to August
Solidago juncea	Early Goldenrod	0.04	0.10		June to July
Solidago nemoralis	Gray Goldenrod	0.04	0.04	6.5 - 7.5	August to September
Tradescantia ohiensis	Ohio Spiderwort	0.06	0.04		Late April to Mid-July
Tradescantia virginiana	Virginia Spiderwort	n/a	0.10		late April to mid-July
		20.00	**20.00**		

Table 5. Oak-hickory forest woody seed mix and recommended application rate.

Layer	Species	Common Name	Seeding Rate (lbs/acre)
Overstory	*Fagus grandifolia*	American Beech	0.3
	Liriodendron tulipifera	Tulip Poplar	0.3
	Pinus strobus	White Pine	0.3
	Pinus virginiana	Virginia Pine	0.3
	Prunus serotina	Black Cherry	0.3
Understory	*Amelanchier canadensis*	Canadian Serviceberry	0.3
	Cercis canadensis	Eastern Redbud	0.3
	Cornus florida	Flowering Dogwood	0.3
	Diospyros virginiana	Persimmon	0.3
	Ilex opaca	American Holly	0.3
	Nyssa sylvatica	Black Gum	0.3
	Sassafras albidum	Sassafras	0.3
Shrub	*Hamamelis virginiana*	Witch Hazel	0.3
	Lindera benzoin	Spicebush	0.3
	Vaccinium angustifolium	Lowbush Blueberry	0.3
	Viburnum acerifolium	Mapleleaf Viburnum	0.3
	Vitis aestivalis	Grape	0.3

WV Seeds to be used as a supplement or substitute in approved mixes

Common name	***Scientific Name***
Purplestem Aster	*Symphyotrichum puniceum*
Ditch Stonecrop	*Penthorum sedoides*
Wrinkleleaf Goldenrod	*Solidago rugosa*
Golden Alexanders	*Zizia aurea*

Revised Table 1. Upland, steep slope herbaceous seed mix

Seeds/lb	Seeds/ ounce	Seeds/ lb of mix	% of Mix	Latin Name Used By Ernst Conservation Seeds	Common Name Used By Ernst Conservation Seeds	Type
8,000,000	M	32000	0.4	Agrostis perennans	Autumn Bentgrass	Grass
70,000	4,375	210	0.3	Asclepias syriaca	Common Milkweed	Herb
700,000	43,750	700	0.1	Aster pilosus	Heath Aster	Herb
65,000	4,063	1300	2	Chamaecrista fasciculata	Partridge Pea	Herb
221,000	13,813	2210	1	Coreopsis lanceolata	Lance Leaf Coreopsis	Herb
200,000	12,500	200	0.1	Desmodium paniculatum	Panicled Ticktrefoil	Herb
73,000	4,563	13140	18	Elymus virginicus	Virginia Wildrye	Grass
1,500,000	93,750	1500	0.1	Eupatorium coelestinum	Mistflower	Herb
105,000	6,563	1260	1.2	Heliopsis helianthoides	Ox-Eye Sunflower	Herb
290,000	18,125	290	0.1	Liatris graminifolia	Grassleaf Blazing Star	Herb
1,272,500	79,531	3817.5	0.3	Monarda fistulosa	Wild Bergamot	Herb
280,000	17,500	11200	4	Panicum clandestinum	Deertongue	Grass
6,048,000	378,000	6048	0.1	Pycnanthemum tenuifolium	Narrow Leaved Mountain Mint, NC Ecotype	Herb
1,576,000	98,500	15760	1	Rudbeckia hirta	Black Eyed Susan	Herb
200,000	12,500	41000	20.5	Schizachyrium scoparium	Little Bluestem, NC Ecotype	Grass
22,000	1,375	110	0.5	Senna hebecarpa	Wild Senna	Herb
2,538,000	158,625	2538	0.1	Solidago juncea	Early Goldenrod	Herb
1,008,000	63,000	1008	0.1	Solidago nemoralis	Gray Goldenrod	Herb
175,000	10,938	45500	26	Sorghastrum nutans	Indiangrass, VA Ecotype	Grass
128,000	8,000	128	0.1	Tradescantia subaspera	Zigzag Spiderwort	Herb
259,000	16,188	10360	4	Panicum virgatum	Shelter' - NY & WV-NRCS Variety Releas	Grass
217,000	13,563	43400	20	Lolium multiflorum	Ryegrass, Annual	Grass
		233679.5	100			

Wildflower seed/lb = 37,080 — 15.9% — Wildflower seed/sq ft on 20 lbs/acre seeding rate = 17
Grass seed/lb = 196,600 — 84.1% — Wildflower seed/sq ft on 45 lbs/acre seeding rate = 38.3

If any items are not available, split the percentage between indian grass and little blue stem.

NOTE:
REVISED TABLE 1 MAY BE USED AS AN ALTERNATIVE TO TABLE 1.

Revised Table 4. Upland meadow, pollinator herbaceous seed mix

Seeds/ lb	Seeds/ ounce	Seeds/lb of mix	% of Mix	Latin Name Used By Ernst Conservation Seeds	Common Name Used By Ernst Conservation Seeds	Type
70,000	4,375	210	0.3	Asclepias syriaca	Common Milkweed	Herb
70,000	4,375	350	0.5	Asclepias tuberosa	Butterfly Milkweed	Herb
1,014,000	63,375	0	0	Aster laevis	Smooth Aster	Herb
1,100,000	68,750	0	0	Aster novae-angliae	New England Aster	Herb
700,000	43,750	0	0	Aster prenanthoides	Zig Zag Aster	Herb
65,000	4,063	1625	2.5	Chamaecrista fasciculata	Partridge Pea	Herb
206,570	12,911	619.71	0.3	Chamaecrista nictitans	Sensitive Pea	Herb
221,000	13,813	4420	2	Coreopsis lanceolata	Lance Leaf Coreopsis	Herb
73,000	4,563	9125	12.5	Elymus virginicus	Virginia Wildrye	Grass
1,500,000	93,750	1500	0.1	Eupatorium coelestinum	Mistflower	Herb
105,000	6,563	1575	1.5	Heliopsis helianthoides	Ox-Eye Sunflower	Herb
175,000	10,938	175	0.1	Lespedeza virginica	Slender Bushclover	Herb
290,000	18,125	290	0.1	Liatris graminifolia	Grassleaf Blazing Star	Herb
1,272,500	79,531	3817.5	0.3	Monarda fistulosa	Wild Bergamot	Herb
110,000	6,875	110	0.1	Parthenium integrifolium	Wild Quinine	Herb
350,000	21,875	1050	0.3	Penstemon laevigatus	Appalachian Beardtongue	Herb
6,048,000	378,000	6048	0.1	Pycnanthemum tenuifolium	Narrow Leaved Mountain Mint	Herb
500,000	31,250	500	0.1	Rudbeckia fulgida	Orange Coneflower	Herb
1,576,000	98,500	31520	2	Rudbeckia hirta	Black Eyed Susan	Herb
200,000	12,500	71400	35.7	Schizachyrium scoparium	Little Bluestem	Grass
22,000	1,375	110	0.5	Senna hebecarpa	Wild Senna	Grass
2,538,000	158,625	2538	0.1	Solidago juncea	Early Goldenrod	Herb
1,008,000	63,000	1008	0.1	Solidago nemoralis	Gray Goldenrod	Herb
175,000	10,938	5250	3	Sorghastrum nutans	Indiangrass	Grass
128,000	8,000	384	0.3	Tradescantia ohiensis	Ohio Spiderwort	Herb
217,000	13,563	81375	37.5	Lolium multiflorum	Annual ryegrass	Grass
		225000	100			

Wildflower seed/lb = 57,740.22 — 25.7% — Wildflower seed/sq ft on 28 lbs/acre seeding rate = 37.1
Grass seed/lb = 162,010 — 74.3%

If item is not available, make up the percentage in little blue stem

NOTE:
REVISED TABLE 4 MAY BE USED AS AN ALTERNATIVE TO TABLE 4.

NOTE – ALL MIXES

FOLLOWING TOPSOIL PLACEMENT, DRY FERTILIZER AND LIME WILL BE APPLIED. UNLESS SITE-SPECIFIC RECOMMENDATIONS ARE RECEIVED FROM LOCAL, STATE, OR FEDERAL AGENCIES, MOUNTAIN VALLEY WILL INCORPORATE 4000LBS/ACRES OF AGRICULTURAL LIME AND 500LB/ACRES OF 10-20-10 (NPK) FERTILIZER INTO THE SOIL.

REVISIONS:

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:
3	07-14-20	JK	RE	DW	SUPPLEMENTAL SEEDS TABLE ADDED
2	10-01-18	JWK	RE	DW	REVISED SEED MIXES ADDED
1	02-21-18	KAL	RE	DW	5.0 IFC ALIGNMENT CHANGES

Mountain Valley PIPELINE

ENHANCED BMPS

MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
WETZEL COUNTY THROUGH MONROE COUNTY, WEST VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC
2200 ENERGY DRIVE
CANONSBURG, PA 15317

TETRA TECH
complex world | CLEAR SOLUTIONS™
661 ANDERSEN DRIVE
FOSTER PLAZA 7
PITTSBURGH, PA 15220

CONSTRUCTION PLANS

DRAWN BY:	JK
CHECKED BY:	HT
APPROVED BY:	RE
DATE:	07/14/2020
SCALE:	AS SHOWN
REVISION	
SHT. NO.	12.05 OF 12.05

WVDNR and WVDEP Agency Correspondence
Attachment 2

Ashbaugh, Colleen (Contractor)

From: Brown, Clifford L <Clifford.L.Brown@wv.gov>
Sent: Tuesday, July 7, 2020 1:11 PM
To: Hoover, Matthew S.
Subject: [EXTERNAL] MVP Seed mix Request

Matt

In response to the requested modification (below) to currently approved seed mixes for the Mountain Valley Pipeline, the WVDNR does not object to use of these species as a supplement, provided a regional ecotype is sourced for use on MVP in West Virginia. Please contact me if you have questions or need additional information.

C

In addition to the approved seeding mixes being used for the Mountain Valley Pipeline Project (Permit ID WVR 310667), Mountain Valley is requesting approval to use the following native, non-invasive species as a supplement to the seeding mixes or as a replacement for species that are not currently available.

- Purplestem Aster (Symphyotrichum puniceum)
- Ditch Stonecrop (Penthorum sedoides)
- Wrinkleleaf Goldenrod (Solidago rugosa)
- Golden Alexanders (Zizia aurea)

Please let me know if the species are acceptable.

Clifford L. Brown
Environmental Resources Analyst
WVDNR
738 Ward Road
P.O. Box 67
Elkins, WV 26201
304 637 0245

Ashbaugh, Colleen (Contractor)

From: Adams, Rick D <Rick.D.Adams@wv.gov>
Sent: Tuesday, July 7, 2020 9:09 AM
To: Hoover, Matthew S.
Cc: Board, Larry D; Hendley, John H; Liddle, Jason T
Subject: RE: [External] WV Seed Mixes

Good morning Matt,

I have reviewed the proposed additions to the approved seeding mixes being used for the Mountain Valley Pipeline project, WVR310667 and this agency has no objection to these additions. This change will not require submittal of a formal modification by the permittee therefore Mountain Valley may begin using these seed mixes immediately. All other terms and conditions of the existing permit shall remain in effect.

Please let me know if you require additional information.

Thanks,

Rick Adams

Technical Analyst
WVDEP – Division of Water and Waste Management
601 57th Street, SE
Charleston, WV 25304
Office – 304-926-0499 Ext. 43763
Mobile – 304-928-8543
Rick.d.adams@wv.gov

From: Hoover, Matthew S. <MHoover@equitransmidstream.com>
Sent: Tuesday, July 7, 2020 8:49 AM
To: Adams, Rick D <Rick.D.Adams@wv.gov>
Subject: [External] WV Seed Mixes

Hey Rick,
Hope all is well and you and family are staying safe and healthy. I'm following up on an email I sent earlier and was wondering if the Department would approve the use of the seeds listed below for MVP. Please see below.

In addition to the approved seeding mixes being used for the Mountain Valley Pipeline Project (Permit ID WVR 310667), Mountain Valley is requesting approval to use the following native, non-invasive species as a supplement to the seeding mixes or as a replacement for species that are not currently available.

- Purplestem Aster (Symphyotrichum puniceum)
- Ditch Stonecrop (Penthorum sedoides)

- Wrinkleleaf Goldenrod (Solidago rugosa)
- Golden Alexanders (Zizia aurea)

Please let me know if the species are acceptable.

Thanks,
Matt Hoover
Sr. Environmental Coordinator
2200 Energy Drive, 2nd Floor
Canonsburg, PA 15317
Office: (724) 873-3009
Cell: (412) 258-5627

EXHIBIT C

Resource Crossing Inspection Form

WEST VIRGINIA RESOURCE CROSSING INSPECTION FORM

Resource ID: _______________ **Start Date:** _______________ **Completed Date:** _______________

Milepost: _________________ **Station:** __________________ **Classification:** _________________

Spread: __________________ **Weather:** ________________ **Stream Depth:** ________________

Item #	Pre-Construction		N/A	YES	NO
1.	Resource Name:				
	Stream: Pre-construction photos and survey taken (upstream, downstream, and crossing location)	Date: _______________	☐	☐	☐
	Wetland: Pre-construction photos and survey taken at crossing location	Date: _______________	☐	☐	☐
2.	Resource Crossing Checklist Complete?		☐	☐	☐
3.	24-hour Variance Request Anticipated?		☐	☐	☐
	If yes, FERC approval received?		☐	☐	☐
4.	Temporary equipment crossing to remain after resource crossing installation is complete?		☐	☐	☐
5.	Is chemical storage, equipment maintenance, equipment storage, refueling equipment stored at least 100-feet from the stream or wetland?		☐	☐	☐
6.	Stream crossings to be conducted during low-flow conditions, when possible		☐	☐	☐
7.a	Review local weather forecast for predicted storm events to occur with 72 hours of scheduled in-stream work?		☐	☐	☐
7.b	Are storm events forecast that have potential to impact in-stream work? (Specify in Notes)		☐	☐	☐
8.	Notification submitted to potable water supply intakes within 3 miles downstream (where applicable)? Date notification submitted:		☐	☐	☐

Notes:

Item #	Construction	N/A	YES	NO
1.	Are equipment mats or other suitable methods used to minimize soil compaction and disturbance in Wetlands? (FERC PROCEDURES)	☐	☐	☐
2.a	Was the top 1-foot of wetland soil or stream bed substrate segregated and stockpiled separate from trench spoils?	☐	☐	☐
2.b	For crossings that require blasting, wetland topsoil/stream bed substrate must be segregated PRIOR to drilling of bore holes.	☐	☐	☐
3.	Are spoil piles located a minimum of 10-feet from the resource boundary with use of a sediment barrier? (FERC PROCEDURES)	☐	☐	☐
4.	Were permanent trench breakers installed at the banks of stream channels? (IP and FERC PROCEDURES)	☐	☐	☐
5.	Is water discharged from work area through a properly sized dewatering structure into a well-vegetated or otherwise stable area? (IP and FERC PROCEDURES)	☐	☐	☐

Mountain Valley PIPELINE

WEST VIRGINIA RESOURCE CROSSING INSPECTION FORM

6.	Is there adequate cover over the pipeline in accordance with DOT standards in 49 CFR 192.327and IP? Required Depth of Cover: _____ft.	☐	☐	☐
7.	Was scour mitigation installed per the "Vertical Scour and Lateral Channel Erosion Analysis" report? If so, what mitigation measures were installed? ______________________________	☐	☐	☐
8.	Top of pipe elevation measurements at the stream crossing and HMZ (if appropriate) for scour analysis.	Elevation: ___________		
9.	Are drilling/blasting/rock excavation done in accordance with the General Blasting Plan? (Sections 7.5 and 7.7)	☐	☐	☐
10.	Was excavated material backfilled in the proper order or if not utilized for backfill, removed and disposed of at an upland site? (IP)	☐	☐	☐
Notes:				

Item #	Restoration	N/A	YES	NO
1.	Was in-stream work conducted as continuous activity to minimize crossing duration? (FERC PROCEDURES, IP)	☐	☐	☐
2.	Was all welding and coating debris fully removed from waterbody crossing prior returning flow to the waterbody?	☐	☐	☐
3.	Was the top 1-foot of stream substrate segregated during excavation of the stream utilized during restoration of the stream channel? (FERC PROCEDURES, IP)	☐	☐	☐
4.	Were disturbed areas within riparian buffers restored to pre-construction contours? (FERC PROCEDURES, IP)	☐	☐	☐
5.	Is this stream slated to have bare root saplings installed following restoration? Sapling plantings will be conducted outside of the crossing activity.	☐	☐	☐
6.	Was segregated wetland soil utilized for restoration of the upper 1-foot of the trench? (FERC PROCEDURES)	☐	☐	☐
7.	Was streambank stabilization and ESC fabric applied immediately following construction and prior to re-establishing the flow regime?	☐	☐	☐
8.	Was permanent seed applied to riparian areas and unsaturated wetlands at time of restoration?	☐	☐	☐
9.	Was the proper seed mix and application rate utilized and seed tags saved?	☐	☐	☐
10.	Do post-construction survey conditions meet pre-construction survey conditions in accordance with USACE IP permit conditions?	☐	☐	☐
11.	Was the resource crossing construction sequence adhered to as shown on the Approved ESC General Details?	☐	☐	☐
Notes:				

This report was written by	____________________ *Print Name*	____________________ *Signature*	__________ *Date*

Insert photo pages

VIRGINIA RESOURCE CROSSING INSPECTION FORM

Resource ID: ______________ **Start Date:** ______________ **Completed Date:** ______________

Milepost: ________________ **Station:** _________________ **Classification:** ________________

Spread: _________________ **Weather:** ________________ **Bankfull Width:** _______________

Item #	Pre-Construction		N/A	YES	NO
1.	Survey Information:				
	Streams: Pre-construction thalweg data collected?	Date: _______________	☐	☐	☐
	Streams: Pre-construction cross-sections completed?	Date: _______________	☐	☐	☐
	Wetlands: Pre-construction 6" topo completed?	Date: _______________	☐	☐	☐
	Pre-construction photos taken (upstream, downstream and crossing location)?	Date: _______________	☐	☐	☐
2.	Is this resource a VMRC regulated stream?		☐	☐	☐
3.	Are the VMRC Stream Impact Plans and Cross-Sections (VA) or USACE requirements being adhered to? (IP, Standard JPA: Attachment H-5)		☐	☐	☐
4.	Are there any applicable crossing-specific conditions, including TOYRs, aquatic organism relocations, etc. (specify in Notes)?		☐	☐	☐
5.a	Is this resource a designated wild or stockable trout stream?		☐	☐	☐
5.b	Have fish and mussel species surveys and relocations been completed (where required)? (Specify in Notes)		☐	☐	☐
6.	Crossing Method implemented in accordance with the approved permit authorization (check one)? ☐ Dam & Pump (MVP-ES8 & MVP-15); ☐ Flume (VESCH 3.25-3 & MVP-6); ☐ Cofferdam (VESH 3.25-4 & MVP-ES13.1 -- ES13.2); ☐ Conventional Bore or Horizontal Directional Drill (HDD).				
7.	Have the appropriate agencies and parties been notified in accordance with permit conditions: (FERC, VDGIF, DEQ, DCR, USFWS, etc.)? NOTE: Minimum 48-hour notice required in VA (Consent Decree).		☐	☐	☐
8.	Stream crossings are to be conducted during seasonal low-flow conditions		☐	☐	☐
9.a	Review local weather forecast for predicted storm events to occur within 72 hours of in-stream work		☐	☐	☐
9.b	Are storm events forecast that have potential to impact in-stream work?		☐	☐	☐
10.	Written or electronic notification submitted to potable water supply intakes within 3 miles downstream (where applicable)? Date notification submitted:		☐	☐	☐
11.	Is chemical storage, equipment maintenance, equipment storage, refueling equipment stored at least 100-feet from the stream or wetland? (FERC PROCEDURES and AS&S)		☐	☐	☐

Notes:

VIRGINIA RESOURCE CROSSING INSPECTION FORM

Item #	Construction	N/A	YES	NO
1.	Are equipment mats or other suitable methods used to minimize soil compaction and disturbance in wetlands? (IP, FERC PROCEDURES, MVP-53)	☐	☐	☐
2.a	Was the top 1-foot of wetland soil or stream bed substrate segregated and stockpiled separate from trench spoils?	☐	☐	☐
2.b	For crossings that require blasting, wetland topsoil/stream bed substrate must be segregated PRIOR to drilling of bore holes.	☐	☐	☐
3.	Are spoil piles located a minimum of 10-feet from the resource boundary with use of a sediment barrier? (FERC PROCEDURES)	☐	☐	☐
4.	Were permanent trench breakers installed at the banks of stream channels or the ends of wetlands to prevent accumulated trench water from entering the waterbody? (IP, FERC PROCEDURES and MVP-20)	☐	☐	☐
5.	Is water discharged from work area through a proper dewatering structure into a well-vegetated or otherwise stabled area? (IP, FERC PROCEDURES and MVP-ES2)	☐	☐	☐
6.	Is there adequate cover over the pipeline in accordance with DOT standards in 49 CFR 192.327and IP? Required Depth of Cover: _____ft.	☐	☐	☐
7.	Was scour mitigation installed per the “Vertical Scour and Lateral Channel Erosion Analysis” report? If so, what mitigation measures were installed? ______________________________	☐	☐	☐
8.	Top of pipe elevation measurements at the stream crossing and HMZ (if appropriate) for scour analysis.	Elevation:___________		
9.	Is chemical storage, equipment maintenance, equipment storage, refueling equipment stored at least 100-feet from the stream or wetland? (FERC PROCEDURES and AS&S)	☐	☐	☐
10.	Are drilling/blasting/rock excavation done in accordance with the AS&S Appendix J: General Blasting Plan? (pg. 15; Sections 7.5 and 7.7)	☐	☐	☐
11.	Was excavated material backfilled in the proper order or if not utilized for backfill, removed and disposed of at an upland site? (IP & JPA Attachment H-2 pg. 5)	☐	☐	☐

Notes:

Item #	Restoration	N/A	YES	NO

Mountain Valley PIPELINE

VIRGINIA RESOURCE CROSSING INSPECTION FORM

Wetland Studies and Solutions, Inc.® a DAVEY company

1.	Was in-stream work conducted as continuous activity to minimize crossing duration? (FERC PROCEDURES and AS&S)	☐	☐	☐
2.	Was all welding and coating debris fully removed from waterbody crossing prior returning flow to the waterbody? (AS&S)	☐	☐	☐
3.	Was the top 1-foot of stream substrate segregated during excavation of the stream utilized during restoration of the stream channel? FERC PROCEDURES, IP)	☐	☐	☐
4.	Were disturbed areas within riparian buffers restored to pre-construction contours? (FERC PROCEDURES, IP)	☐	☐	☐
5.	Is this stream slated to have bare root saplings installed following restoration? (NOTE: Sapling plantings will be conducted separately from the crossing activity and completed at a later date.)	☐	☐	☐
6.	Was the segregated topsoil in wetland areas and streambed substrate utilized in restoration of the upper 1-foot of the trench? (FERC PROCEDURES)	☐	☐	☐
7.	Was streambank stabilization and ESC fabric applied immediately following construction (MS-15) and prior to re-establishing the flow regime in a Dam and Pump Method? (VESCH 3.22, VESCH 3.36, AS&S and MVP-23)	☐	☐	☐
8.	Was permanent seed applied to riparian areas and unsaturated wetlands? (IPand MVP-ES11.4 & ES11.5)	☐	☐	☐
9.	Use of fertilizer, lime, or mulch is prohibited in wetland areas. Was this condition adhered to? (FERC PROCEDURES).	☐	☐	☐
10.	Was the proper seed mix and application rate utilized and seed tags saved? (MVP ES11.4 & 11.5)	☐	☐	☐
11.	Was excess spoil material removed from stream and wetland areas (including buffers)?	☐	☐	☐
12.	Are properties and waterways adjacent to the project adequately protected from pollutant discharge, erosion, flooding, and sedimentation? (MS-19)	☐	☐	☐
13.	Do post-construction survey conditions meet pre-construction survey conditions in accordance with USACE IP permit conditions? (V: ±0.3 ft; H: ±1.0 ft)	☐	☐	☐
14	Were permanent water bars/slope breakers installed including a permanent waterbar within twenty-five feet from top of bank? (MVP-ES44.4 – ES44.8, MVP-17 and MVP-18)	☐	☐	☐
15.	Was the resource crossing construction sequence adhered to as shown on the Approved ESC General Details?	☐	☐	☐

Notes:

This report was written by	______________________ *Print Name*	______________________ *Signature*	__________ *Date*

Resource ID: ____________ Spread: ____________ Date: ____________

Additional Notes:

Insert (4) photo pages
Add TOYR restriction dates as attachment

APPENDIX C

Appendix C:

PERFORMANCE STANDARDS

Mountain Valley Pipeline Project

TABLE OF CONTENTS

Appendix C:

PERFORMANCE STANDARDS

Mountain Valley Pipeline Project

This Appendix provides performance standards for the various metrics that will be monitored for wetlands and stream areas that are temporarily impacted by the construction of the Mountain Valley Pipeline Project (Project) and then subsequently restored.

Damage to the restoration areas by anthropogenic activities outside of the control of Mountain Valley Pipeline, LLC (Mountain Valley) and/or by wildlife species (such as deer or beaver) may require adjustment to the criteria for successful establishment of the resource. It also must be understood that some areas would not meet these understory and ground-cover standards simply due to natural but abnormal conditions, such as extreme weather events; therefore, a reasonable determination would be made as to whether failure to meet the relevant standards is a result of a natural occurrence or whether it is an unsuccessful revegetation effort.

1.0 WETLAND ATTRIBUTES[1]

1.0.1 Cowardin Classification

The Cowardin Classification (Cowardin et al., 1979) for each impact area was determined during the delineation of each resource. Three wetland types—Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forest (PFO)—were identified. Conversion impacts to PSS and PFO have been mitigated through the purchase of advanced credits. The restoration goal is to restore each temporarily impacted wetland area to a condition such that it is on a trajectory to become, at maturity, a PEM (unless there is a specific restoration obligation in place that requires otherwise).

Notwithstanding the defined performance standard is to achieve a PEM wetland, where possible, temporarily-impacted wetlands that were previously PSS or PFO will be encouraged to return to that condition by leaving roots and stumps in the areas 15 feet outside pipeline, which allows existing vegetation to recover more rapidly. To further support the re-development of PFO systems, Mountain Valley will plant bare-root saplings and shrubs in impacted PFO in the temporary right-of-way (ROW). During the first monitoring event, a survival rate of approximately 400 stems per acre per planting area will be targeted. During the second monitoring event, habitat assessments will be performed to determine whether the expected average survived. If not, the ratio of surviving stems to total stems planted will be calculated to determine the stem-survival rate. The actual survival rate will be used to determine the number of plantings necessary achieve the desired average in the third monitoring event.

[1] Performance standards are based on the 2018 Mitigation Banking Instrument Template developed by the Norfolk District of the U.S. Army Corps of Engineers (USACE) and the Virginia Department of Environmental Quality.

1.0.2 Area

The restored wetland area shall be greater than or equal to the original wetland area established in the baseline assessment.

1.0.3 Topographical Survey

The restored wetland area elevations shall be restored as close as practicable to the pre-construction contours to maintain the original wetland hydrology. This survey shall use the same horizontal and vertical datums used by the original data. If point data from the original data are not available, to be able to compare topography to this level of precision post-construction to the original topographic survey, a combination of interpolation using surfaces constructed from counter interval data and survey data outside of the limits of disturbance may be needed to calibrate and compare each survey to each other.

1.0.4 Dominant Vegetation

More than 50% of all dominant herbaceous plant species shall be facultative (FAC) or wetter (facultative wetland (FACW) or obligate wetland (OBL)). Wetland vegetation dominance is defined as a vegetation community where more than 50% of all dominant species are FAC or wetter using "routine delineation methods" as described in the 1987 Manual and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Version 2.0).

1.0.5 Invasive-Species

The restored wetlands area shall contain less than 5% aerial coverage of invasive species. The invasive species list for West Virginia is available on the West Virginia Division of Natural Resources website.[2] The list for Virginia is available through the Virginia Department of Conservation and Recreation.[3]

1.0.6 Native (Non-Invasive) Herbaceous Vegetation Coverage

Native or non-invasive herbaceous plant coverage shall be at least 70% by the end of the first growing season and subsequent monitoring years thereafter unless shrub and/or canopy/crown coverage is at least 30%.

1.0.7 Hydric Soils

For restored wetlands where wetland soils were previously sampled to a minimum depth of 12 inches, positive indicators of hydric soil formation (see Field Indicators of Hydric Soils in the United States, Version 8.2 (NRCS, 2018)) must be present by the conclusion of the monitoring

[2] West Virginia Invasive Species Strategic Plan and Voluntary Guidelines, 2014 (http://wvdnr.gov/wp-content/uploads/2021/04/West-Virginia-Invasive-Species-Strategic-Plan-2014-FINAL.pdf).
[3] NH_invasivePlantList_2014.indd (virginia.gov).

period post-construction within the first six inches for sandy (coarse-textured) soils and within the first 12 inches for silts, clays, and loams. Restored wetlands that had refusal at 12 inches or less should also exhibit hydric soil development by the conclusion of the monitoring period; however, as these locations can be seen as problematic, evaluation of wetland restoration should consider procedures found in Chapter 5 of the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE, 2012).

The following standards specific to the soil type must be achieved:

(Required) For coarse-textured (sandy) surface soils, positive indicators of hydric soil formation must be demonstrated within six inches of the soil surface.

(Required) For fine-textured soils (silts, clays, loams), positive indicators of hydric soil formation must be demonstrated within 12 inches of the soil surface.

> If the positive indicators of hydric soil formation identified above are not met, one of the following procedures may be considered to determine if hydric soils are present.

- For all monitoring years after reaching the final grade, piezometers or shallow wells demonstrate free water within 12 inches of the surface for 14 consecutive days during the growing season. Redoximorphic features that must be present include, but are not limited to, redox concentrations, redox depletions, and reduced matrices.

- Demonstrate that positive tests with reagent occur within 60% or more of a specific layer in at least two or three soil samples. A reaction to alpha-alpha-Dipyridyl reagent must occur within a 2-inch layer of the upper four inches in soil that is inundated but not saturated, a 2.5-inch layer of the upper five inches in sandy textured soils, and a 4-inch layer of the upper 12 inches in clayey soils.

- A minimum of three of five "Indicator of Reduction in Soil" tubes must have 30% iron removed from a zone that is six inches or more thick. The zone of removal must begin within six inches of the soil surface for all soil textures.

1.0.8 Hydrology Indicators

The wetland hydrology standard shall be met if an area is inundated (flooded or ponded) or the water table is ≤12 inches below the soil surface for ≥14 consecutive days during the growing season. This can be determined with piezometers or shallow wells that demonstrate free water within 12 inches of the surface for 14 consecutive days during the growing season. Alternatively, the standard may be met by observation of the following wetland hydrology indicators.

For wetlands where Group A Hydrology Indicators (Observation of Surface Water or Saturated Soils) were observed, the standard will be deemed satisfied if these Group A Hydrology Indicators are present by the third full growing season after construction. Observations should be made during the growing season. Note that some locations may lack Group A Hydrology Indicators during the latter half of the growing season or during drier than normal years. This should be considered when evaluating sites that appear to be lacking previous hydrologic indicators. The growing season will be determined in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE, 2012).

For wetland restoration areas that did not previously demonstrate Group A Hydrology Indicators, the standard will be deemed satisfied if other hydrologic indicators as listed on the Wetland Field Data Form are present by the third full growing season post-construction. Note that some locations may have been problematic prior to construction and evaluation of wetland restoration should consider procedures found in Chapter 5 of the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE, 2012).

1.0.9 Bulk Density

As stated in the Baseline Assessment, bulk density is assumed to not exceed root-growth restriction ranges and thus will not be measured during the baseline assessment. Bulk density may be measured during restoration if the Lead Environmental Inspector determines it is necessary or as part of the adaptive management strategy.

1.1 Wetlands Resource Valuation

The final SWVM score at the end of the three-year monitoring period will be at least consistent with the preconstruction SWVM score. The post-construction SWVM score will be deemed consistent with the preconstruction score if the difference is attributable to a change in the value of one or more input parameters that satisfy the respective performance standard for such parameters.

2.0 STREAM ATTRIBUTE

Restored channels will be evaluated to determine if the performance standards have been successfully achieved during the monitoring period. These standards, outlined in Sections 2.0.1 and 2.0.2 below, have been developed to demonstrate that these overall objectives have been achieved:

1. Development and maintenance of a definable bed and bank.
2. Restoration of temporarily impacted streams to configurations that are hydrologically equivalent to what was present prior to stream crossings.

Development of the definable bed and bank will be evaluated utilizing visual observations and supported with physical survey data. A channel must be distinguishable upon visual inspection. This visually verifies the presence of stream channel which, in some instances, may not contain year-round flow.

The most common way to describe and quantify channel form is dimension, pattern, and profile. A longitudinal profile of the restoration area will be generated and will include the thalweg, water surface, and lowest bank, where feasible. These data will be used to compare stream pattern to verify that, within the monitoring period, the longitudinal profile of the restored reach is similar to the pre-crossing configuration.

The cross sections at benchmarked locations will be established in riffles, runs, or pools or in a configuration that can determine the maintenance of the defined channel in the restoration reach and that can demonstrate re-establishment of bed and banks as well as the thalweg (in cross sections). The post-construction reach will have dimension similar to pre-crossing configurations. Particle-size distribution and pebble-count data will be collected and utilized to determine change in substrate over time. Restoration reaches will be consistent with the pre-crossing form (will maintain D_{50} size class), as well as material present in upstream and downstream reaches (as applicable).

To be deemed successful, the restored stream reaches must have similar dimension, pattern, and profile to pre-crossing conditions. This will be achieved by comparing the data collected pre- and post-crossing. Locations that deviate greater than the performance requirements described below will be addressed utilizing Mountain Valley's adaptive management plan provided in Appendix E: Maintenance & Adaptive Management Plan.

2.0.1 Stream Survey

The following performance standards shall apply to streams.[4] However, recognizing that these are natural streams that may be influenced by conditions in the watershed outside of the control of Mountain Valley, if the streams fail to meet the performance standards post-crossing, but it can be demonstrated that there are conditions in the watershed affecting the stability of the stream, these performance standards may be waived by the applicable agencies. Similarly, if it can be demonstrated that the stream is in a state of "dynamic stability" (i.e., the stream is shifting due to natural conditions, but is stable), these performance standards may be waived by the applicable agencies.

a. Cross-sectional area

In the perennial streams, the stream cross-sectional area shall not increase or decrease by an amount greater than 25% of the baseline stream cross-sectional area. In the ephemeral and intermittent streams, the cross-sectional area shall be restored to a stable configuration based on the preconstruction contours and site conditions.

[4] Performance standards are based on the 2018 Mitigation Banking Instrument Template developed by the Norfolk District USACE and the Virginia Department of Environmental Quality.

b. Pool-to-pool spacing

The pool-to-pool spacing shall not increase or decrease by an amount greater than 25% of the baseline surveyed pool-to-pool spacing range when more than one pool exists in the subject reach.

c. Maximum pool depth

In the perennial streams, the maximum pool depth shall not increase or decrease by an amount greater than 50% of the baseline surveyed pool depth (measured to bankfull elevation).

In the ephemeral and intermittent streams, the maximum pool depth shall be restored to a stable configuration based on the preconstruction contours and site conditions.

d. Average riffle slope

The average slope of the riffle shall not increase or decrease by an amount greater than one tenth (0.1) of the slope determined by the baseline longitudinal survey or 0.4%, whichever is greater (e.g., a 4% baseline slope can allow a post-construction riffle slope of +/- 0.4%, or a range from 3.6% to 4.4%; a 1% baseline slope can allow a post-construction riffle slope of +/- 0.4%, or a range from 0.6% to 1.4%).

e. Average reach slope

The average slope of the reach shall not increase or decrease by an amount greater than one tenth of the slope determined by the baseline longitudinal survey or 0.4%, whichever is greater.

f. Pebble count

A reach-wide, representative pebble count will be completed post-construction and during the subsequent monitoring periods. The performance metric will be to maintain the same category as the baseline conditions.

2.0.2 Stream Vegetation

Riparian buffer

As referenced in the Restoration Plan, Mountain Valley will stabilize and restore the riparian buffer adjacent to the stream crossings. A 70% survival rate at the areas having bare-root saplings planted will be required. An enhanced 80% survival rate at the areas having bare-root saplings planted will be required at impaired waters crossings. Herbaceous vegetation by native non/invasive species shall achieve 70% coverage unless canopy coverage reaches

30%. Herbaceous vegetation by native non/invasive species achieving 80% coverage will be required at impaired waters crossings unless canopy coverage reaches 30%.

In areas where pre-crossing conditions were such that they preclude successful restoration, these performance standards shall not apply. Such conditions may include, but are not limited to, active agricultural fields or areas not fenced for livestock exclusion that may be grazed or otherwise affected

The restored area shall contain less than 5% aerial coverage of invasive species. The invasive species list for West Virginia is available on the West Virginia Division of Natural Resources website.[5] The list for Virginia is available through the Virginia Department of Conservation and Recreation.[6]

2.1 Stream Resource Valuation

Recognizing that these are natural streams that may be influenced by conditions in the watershed outside of the control of Mountain Valley, if the streams fail to meet the performance standards post-crossing, but it can be demonstrated that there are conditions in the watershed affecting the water quality of the stream, these performance standards may be waived by the appropriate agencies.

2.1.1 Field Water Quality

The following performance standards shall apply to streams, unless waived.

a. Dissolved Oxygen

In Virginia, levels will meet the baseline conditions or the state water-quality standards established at 9VAC25-260-50, i.e., a minimum of 4.0 mg/l in Class III and Class IV waters, a minimum of 5.0 mg/l in Class V waters, and a minimum of 6.0 mg/l in Class VI waters. In West Virginia, levels will meet the water-quality standards established at 47CSR2, i.e., a minimum of 5.0 mg/l in B1 waters, a minimum of 6.0 mg/l in B2 waters, and a minimum of 7.0 mg/l in spawning areas of B2 waters.

b. Specific conductivity

Virginia and West Virginia have not established state water-quality standards for specific conductivity. In addition to the uncertainty about appropriate effects thresholds for conductivity, conductivity levels vary naturally.[7] Therefore,

[5] West Virginia Invasive Species Strategic Plan and Voluntary Guidelines, 2014 (http://wvdnr.gov/wp-content/uploads/2021/04/West-Virginia-Invasive-Species-Strategic-Plan-2014-FINAL.pdf)
[6] NH_invasivePlantList_2014.indd (virginia.gov)
[7] See Comment Responses 31-33 of the January 28, 2022 Corps Request for additional information.

Mountain Valley has developed the following Performance Standards for specific conductivity:

- Where baseline sampling is 100 uS/cm or less, the conductance samples will be less than 300 uS/cm.
- Where background or baseline sampling (from Mountain Valley's baseline sampling or from other reliable data) is under 500 uS/cm, conductance samples will be less than 500 uS/cm; and
- Where background or baseline is over 500 uS/cm, conductance samples will be no more than 110% of the existing baseline.

c. pH

In Virginia, levels will meet the baseline conditions or the state water-quality standards established at 9VAC25-260-50, i.e., 6.0-9.0 in all Classes. In West Virginia, levels will meet the water-quality standards established at 47CSR2, 6.0-9.0 in all waters.

2.1.2 Rapid Bioassessment Protocol (RBP)

It is anticipated that there will be variability in the RBP scores as the resources are restored and become reestablished. It is also anticipated that the scores will be maintained or improved and will progress in a positive manner. The information collected from the first monitoring event will be compared to the second monitoring event to determine if RBP habitat scores are being maintained or improved. The information collected from the second monitoring event will be compared to the third monitoring event to determine if RBP habitat scores are being maintained or improved. As this information is collected and compared, Mountain Valley will continue to work with the agencies to determine if the streams are approaching a satisfactory restoration based on the application of best professional judgment and expertise.

2.1.3 Benthic Macroinvertebrates

Post-construction surveys for benthic macroinvertebrates will be conducted and compared to the West Virginia Stream Condition Index (WVSCI). It is anticipated that there will be variability in these results.[8] If the WVSCI score is within 8 points of the baseline score by the end of the third annual monitoring period, it is consistent with baseline conditions.

2.1.4 Hydrogeomorphic (HGM) Assessment

Similar to Sections 2.1.2 and 2.1.3, it is anticipated that there will be variability in the HGM scores as the resources are restored and become reestablished. The performance standards for this metric will also be measured the same as RBP scores (Section 2.1.2), i.e., improvement in the scores is anticipated to occur from each monitoring event. As this information is collected and compared,

[8] See Comment Responses 31-33 of the January 28, 2022 Corps Request for additional information.

Mountain Valley will continue to work with the agencies to determine if the streams are approaching a satisfactory restoration based on the application of best professional judgment and expertise.

2.1.5 Visual Assessment Documentation

While there is no specific performance standard for visual assessment documentation, this information will be utilized for visual comparisons throughout the post construction monitoring timeframe.

2.1.6 West Virginia Stream and Wetland Valuation Metric

As an additional conservative measure of restoration performance, Mountain Valley will incorporate the following SWVM performance standard metric:

- The final SWVM score at the end of the three-year monitoring period will be at least consistent with the preconstruction SWVM score. The post-construction SWVM score will be deemed consistent with the preconstruction score if the difference is attributable to a change in the value of one or more input parameters that satisfy the respective performance standard for such parameters.

3.0 REFERENCES

Cowardin, L. M., Carter, V., Golet, F. C. & LaRoe, E. T. 1979. Classification of wetlands and deep water habitats of the United States. US Fish and Wildlife Service FWS/OBS 79/31.

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United States Department of Agriculture, Natural Resources Conservation Service. 2018. Field indicators of hydric soils in the United States, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). In cooperation with the National Technical Committee for Hydric Soils.

APPENDIX D

Appendix D:

MONITORING PLAN

Mountain Valley Pipeline Project

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APPENDIX D:

MONITORING PLAN

Mountain Valley Pipeline Project

INTRODUCTION

Assessments and surveys will be conducted for the restored stream and restored wetland crossings in the Mountain Valley Pipeline Project (Project) Area. Restored stream and wetland assessments and surveys will be initiated within the year following restoration activities at each crossing. Monitoring activities, except for the as-built survey, will be completed during the growing season. For the purpose of wetland monitoring, the growing season will be approximated as the timeframe after the last frost in the spring and before the first frost in the fall unless more specific methods are utilized. If site-specific data are unavailable, other biological indicators for the growing season may be utilized, which may include emergence of herbaceous plants from the ground; appearance of new growth from vegetative crowns (e.g., in graminoids, bulbs, and corms); coleoptile/cotyledon emergence from seed; bud burst on woody plants (i.e., some green foliage is visible between spreading bud scales); emergence or elongation of leaves of woody plants; or emergence or opening of flowers. The end of the growing season may be indicated as when woody deciduous species lose their leaves and/or the last herbaceous plants cease flowering and their leaves become dry or brown, generally in the fall due to cold temperatures or reduced moisture availability.

Monitoring will begin after completion of restoration activities. Annual monitoring will start during the growing season that commences after restoration completion (i.e., if the growing season starts March 15 and the restoration was completed June 30, the monitoring will start during the subsequent year's growing season). Longitudinal surveys of field conditions, cross-section analysis, and in-stream surveys will be completed for first year and visually monitored for each subsequent monitoring period, unless conditions indicate additional longitudinal surveys are required. The restored stream and wetland sites will then be evaluated on an annual basis for three years.

If the relevant performance standards have been achieved for a site prior to the three-year commitment, Mountain Valley may request approval from the relevant regulatory agency overseeing the post-construction monitoring to discontinue monitoring of the resource. Confirmation in writing from Mountain Valley Pipeline, LLC (Mountain Valley) and concurrence from the United States Army Corps of Engineers (USACE), West Virginia Department of Environmental Protection (WVDEP), and Virginia Department of Environmental Quality (VADEQ) when Mountain Valley has satisfied the requirements of the restoration plan will end the monitoring period for this Project.

Please note that Mountain Valley has a limited ability to conduct activities outside of the limits of disturbance (LOD) approved by the Federal Energy Regulatory Commission. Accordingly, *field-data-collection activities will be limited to the specific LOD width for each crossing and require a modification from the standard reach lengths as outlined in both the U.S. Environmental Protection Agency (USEPA) Rapid Bioassessment Protocol (RBP) Manual (100-meter reach for RBP/Benthic Macroinvertebrates) and the Hydrogeomorphic (HGM) Protocol (suggested 100-foot [ft] reach) and applicable state guidance. The assessment reach will be limited to the 75-ft LOD or less, depending on the proposed impact type (pipeline crossing, temporary or permanent access road, additional temporary workspace, or anode bed). Depending on the crossing angle, stream meanders, and other factors, the actual length of the stream reach available for survey within the LOD may be more or less than 75 ft.*

1.0 WETLAND MONITORING

1.0.1 Cowardin Classification

Cowardin Classification (Cowardin et al., 1979) for each wetland will be determined using the Wetland Determination Data Form for that wetland. The delineator will record the existing Cowardin classification as well as the classification of the type of wetlands that the vegetation community suggests it is on a trajectory to achieve.

1.0.2 Wetland Area

The wetland areas will be delineated utilizing the USACE 1987 *Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* Version 2.0 (USACE, 2012). The delineated wetlands will be survey-located for comparison to the pre-construction area.

Photo documentation will occur during each sampling event. Specific photo locations are provided in **Table 1**. For wetland crossings or impacts, in addition to those listed in **Table 1**, the investigators will include various photographs of the restored wetland inside the LOD as well as conditions outside the LOD (based on size, shape, and total area of the restored wetlands). All photographs will be geo-referenced with GPS coordinates. Each crossing will include a photo location map indicating the specific location where photos were taken.

Table 1
Wetland Photo Location Requirements

Stream Type	Photographs
West Virginia Wetlands	
All Wetlands and Uplands	• Photos of cardinal directions at the center of the wetland • Photos of cardinal directions of each wetland sample pit • Photo of pit • Photo of core sample
Virginia and West Virginia Wetlands	
All Wetlands	• *WL-(#) – (#)* photos of the impacted wetland area inside the LOD • *EX COND – (#) – (#)* photos of the conditions outside the LOD

1.0.3 Topographical Survey

Mountain Valley will complete an as-built survey at each restored wetland crossing. If surface water is present, water elevation should be documented in addition to the surface of the wetland soil in cross-section. Hard control points should be established for future reference. Contour intervals should be a minimum of six inches with 25-ft grids and spot shots indicated if ground survey work is conducted versus aerial or remote sensing. Wherever possible, survey-grade spot shots will be taken outside of the LOD to assist in calibrating the datum of the pre-construction topographic survey with this post-construction topographic survey.

1.0.4 Dominant Vegetation

Dominant vegetation will be determined based on the methodology found in the USACE's *Wetland Delineation Manual* and recorded on the Wetland Determination Data Form for each wetland.

1.0.5 Invasive Species Cover

Invasive-species cover will be recorded on the Wetland Determination Data Form for each wetland. The delineator will also note and identify all invasive plant species and their percent cover located within the wetland but outside the data plot, if any.

1.0.6 Native (Non-Invasive) Herbaceous Vegetation Cover

Native herbaceous vegetation cover will be recorded on the Wetland Determination Data Form for each wetland.

1.0.7 Hydric Soils

The presence of hydric soils will be determined based on the methodology found in the USACE's *Wetland Delineation Manual* and recorded on the Wetland Determination Data Form for each wetland.

1.0.8 Hydrology Indicators

The presence of wetland hydrology indicators will be determined based on the methodology found in the USACE's *Wetland Delineation Manual* and recorded on the Wetland Determination Data Form for each wetland.

1.0.9 Bulk Density

As stated in Baseline Assessment Plan, bulk density is assumed to not exceed root-growth restriction ranges and thus will not be measured during the baseline assessment. Bulk density may be measured during restoration if the Lead Environmental Inspector determines it is necessary or as part of the adaptive management strategy.

1.1 Wetland – Resource Evaluation

1.1.1 West Virginia Stream and Wetland Valuation Metric (WV SWVM)

The West Virginia SWVM forms will be completed after each monitoring event to document progress of restoration to baseline scores.

2.0 STREAM ATTRIBUTE MONITORING

2.0.1 Stream Survey

Stream cross-sections, longitudinal profile, and pebble counts will be conducted in the same fashion as specified in the baseline assessment. The collected data will then be used to compare to baseline and/or previous monitoring years as applicable:

a. Stream cross-sectional area
b. Pool-to-pool spacing
c. Maximum pool depth
d. Average riffle slope
e. Average reach slope
f. Pebble counts

2.0.2 Stream Vegetation

Riparian buffer vegetation will be assessed using a 50-foot-long, 5-foot-wide belt transect placed above the top of bank. All woody stems within the transect will be counted to determine if the stem density requirement has been met. Herbaceous coverage will be visually assessed using a randomly placed $1m^2$ quadrat. Invasive species cover will be visually assessed within the riparian buffer to determine if the success criterion has been met. All observed invasive plant species and their approximate percent cover within the riparian area will be recorded.

2.1 Stream Resource Valuation

2.1.1 Field Water Quality

Data for dissolved oxygen, specific conductivity, and pH will be collected in the field using in-field probes (YSI water quality meters or similar). This is a snapshot approach; continuous monitoring of these parameters will not be conducted.

2.1.2 Rapid Bioassessment Protocol (RBP)

RPB data for each stream crossing will be collected using the same methodology stated in the Baseline Assessment Plan and scored to monitor restoration progress.

2.1.3 Benthic Macroinvertebrates

Benthic macroinvertebrate data for each stream crossing will be collected and scored to monitor restoration progress. Benthic collections will be streamflow dependent and will follow the same guidelines for collection as in the Baseline Assessment Plan.

2.1.4 HGM Assessment

HGM Assessments for each stream crossing will be collected using the same methodology stated in the Baseline Assessment Plan and scored to monitor restoration progress.

2.1.5 Visual Assessment Documentation

Photo documentation will occur during each sampling event. Specific photo locations are provided in **Table 2**. For resource crossings or temporary impacts, in addition to those listed in **Table 2**, the investigators should include various photographs of the restored wetland inside LOD as well as conditions outside the LOD (based on size, shape, and total area of the restored resource). Photographs will be geo-referenced with GPS coordinates.

Table 2
Stream Photo Location Requirements

Stream Type	Photographs
Virginia Streams	
Streams (Bankfull width <10’)	• *DS VIEW* – Downstream View of impact area inside LOD • *US VIEW* – Upstream View of impact area inside LOD • *RB C/L* – Standing on Right Bank looking down pipe centerline (C/L) • *LB C/L* – Standing on Left Bank looking down pipe C/L • *DS COND* – Downstream conditions outside LOD
Streams (Bankfull width >10’)	• *RB DS VIEW* – Downstream View on Right Bank of impact area inside LOD • *LB DS VIEW* – Downstream View on Left Bank of impact area inside LOD • *RB US VIEW* – Upstream View on Right Bank of impact area inside LOD • *LB US VIEW* – Upstream View on Left Bank of impact area inside LOD • *RB C/L* – Standing on Right Bank looking down pipe C/L • *LB C/L* – Standing on Left Bank looking down pipe C/L • *DS COND* – Downstream conditions outside LOD

Stream Type	Photographs
Streams (Within the LOD but not crossing pipe centerline)	• *DS VIEW* – Downstream View of impact area inside LOD • *US VIEW* – Upstream View of impact area inside LOD • *DS COND* – Downstream conditions outside LOD
Access Road Crossings	• *DS VIEW* – Downstream View of impact area inside LOD • *US VIEW* – Upstream View of impact area inside LOD • *C/L ACCESS-1* – Standing in Access Road looking towards impact • *C/L ACCESS-2* – Standing in Access Road looking towards impact • *DS COND* – Downstream conditions outside LOD
West Virginia Streams	
All Streams	• *US LOD US VIEW* – Upstream Edge of LOD Upstream View • *US LOD DS VIEW* – Upstream Edge of LOD Downstream View • *C LOD US VIEW* – Center of LOD Upstream View • *C LOD DS VIEW* – Center of LOD Downstream View • *DS LOD US VIEW* – Downstream Edge of LOD Upstream View • *DS LOD DS VIEW* – Downstream Edge of LOD Downstream View
Virginia and West Virginia Streams	
All Streams	• *CS LB UG 1* – Cross-section 1 Left Bank Upgradient View • *CS LB DG 1* – Cross-section 1 Left Bank Downgradient View • *CS RB UG 1* – Cross-section 1 Right Bank Downgradient View • *CS RB DG 1* – Cross-section 1 Right Bank Downgradient View • Additional cross-section photos will be collected as needed, to document each cross-section in the sampling reach, if applicable.

2.1.6 WV SWVM

The West Virginia SWVM forms will be completed after each monitoring event to document progress of restoration to baseline scores. If the post-construction scores are different from the baseline scores, Mountain Valley will use the information collected from Sections 2.1.1 through 2.1.4 to determine what component of the SWVM form may require adaptive management.

2.1.7 Unified Stream Methodology (USM)

No additional evaluations of streams are proposed using this methodology, as the purpose of the USM is solely for determination of stream impact and voluntary compensatory mitigation for temporary impacts.

3.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Field equipment will be inspected and calibrated each day prior to field crew deployment per the manufacturers' specifications. A field notebook will be maintained to document conditions encountered while samples are collected, including field observations, photographs taken, samples collected, and deviations from the sampling protocol. Appropriate field forms, as mentioned in previous sections, will be completed as required in the field and copied/filed upon return to the office. Manual data entry in spreadsheets and/or calculations performed will be subjected to a QA/QC review to ensure proper data transfer.

4.0 DATA ANALYSIS AND REPORTING PROCEDURES

Raw data in the form of field data forms from the stream surveys will be archived once relevant information has been transferred on to spreadsheets or other applicable programs. Wetland data sheets will be evaluated to determine the presence of hydric soils, hydrology, and vegetation. Wetland forms and photographs will then be filled out so that this information may be used in annual monitoring reports. Data will also be compared (annually) and evaluated to determine if performance standards are being met. To maintain clear communication with the agencies, Mountain Valley will submit annual monitoring reports to the applicable USACE district and relevant state agency, WVDEP or VADEQ, that address the previous year's monitoring activities. Each annual report will include:

- All data collected, including quarterly monitoring reports for impaired waters, for each restored stream and wetland site in accordance with the Monitoring Plan;
- Any findings that warrant action under the Maintenance & Adaptive Management Plan and, if necessary, a corrective action plan based on those findings; and
- Recommended determination of whether each monitored site has achieved the applicable performance standards or if additional monitoring is warranted.

5.0 ADDITIONAL MONITORING OF STREAMS WITH ENDANGERED SPECIES

Under the Biological Opinion and Incidental Take Statement issued by the U.S. Fish and Wildlife Service (USFWS) on September 4, 2020, Mountain Valley is obligated to conduct continuous water-quality monitoring of suspended sediment concentrations (using turbidity as a surrogate) at various stream locations along the Project route that may host the endangered Roanoke logperch, endangered candy darter, and/or candy darter critical habitat.[1] The Biological Opinion requires that corrective action measures be taken if sediment concentrations at the monitoring locations exceed prescribed thresholds.

The monitoring required by the Biological Opinion is principally designed to capture potential sediment inputs from upland construction activities. This is because the Federal Energy Regulatory Commission (FERC) and USFWS determined that the potential for downstream sediment contributions from stream-crossing activities is minimal in magnitude and duration in comparison to the potential for sediment contributions from upland construction activities. That monitoring will continue until FERC and USFWS determine that sufficient vegetation has been re-established on upland areas of the ROW to prevent any likelihood of adverse turbidity or sedimentation effects on the species of concern.

1 The Biological Opinion was vacated and remanded by a court of February 2, 2022. This section will be revised as necessary when the Biological Opinion is reissued.

Although not its principal focus, the water-quality monitoring conducted in accordance with the Biological Opinion will reflect the marginal sediment contributions of the Project's crossings of streams in the vicinity of federally listed species. That monitoring program and the corrective action protocols are, therefore, complementary of the monitoring proposed in this plan – and shall be submitted separately and in accordance with the applicable approvals.

6.0 SUPPLEMENTAL MONITORING OF IMPAIRED STREAMS

In addition to the monitoring procedures described above, streams with relevant water-quality impairments (e.g., benthic macroinvertebrates, sedimentation) identified by WVDEP or VADEQ will be monitored by qualified biologists at least once per quarter to supplement the annual monitoring and post-construction inspections.[2]

Quarterly monitoring will include a visual assessment, to be conducted by biologists, which provides an overview of restored stream status and progress towards meeting performance standards. Biologists will provide a narrative summary of site conditions, including overall stream conditions, recent and current weather conditions, evidence of flooding or other in-stream disturbances, and more specifically, bank stability, sediment deposition, and embeddedness. A modified[3] *USEPA RBP Physical Characterization/Water Quality Field Data Sheet* and modified *Habitat Assessment Field Data Sheet* will be completed for each event so each crew will be collecting the same information during each quarterly monitoring period. Photographs will be taken facing both upstream and downstream at the following points: downstream edge of ROW, center of ROW, and upstream edge of ROW. Additionally, photos will be taken off both the left descending and right descending banks. A list of the relevant impaired streams may be found in the Restoration Plan (Attachment A).

2 For clarity, each impaired stream will be monitored a minimum of four times per year. That includes the three quarterly monitoring events and the annual monitoring event in the final quarter.

3 The modified approach is explained in the Introduction of this document.

7.0 REFERENCES

Cowardin, L. M., Carter, V., Golet, F. C. & LaRoe, E. T. 1979. Classification of wetlands and deepwater habitats of the United States. US Fish and Wildlife Service FWS/OBS 79/31.

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APPENDIX E

Appendix E:

MAINTENANCE & ADAPTIVE MANAGEMENT PLAN

Mountain Valley Pipeline Project

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APPENDIX E:

MAINTENANCE & ADAPTIVE MANAGEMENT PLAN

Mountain Valley Pipeline Project

INTRODUCTION

Mountain Valley Pipeline, LLC's (Mountain Valley's) Adaptive Management Plan (AMP) anticipates likely challenges associated with resource restoration and provides a menu of actions available to address those challenges. During the three years of post-restoration monitoring, Mountain Valley shall also be conducting maintenance as required for all related erosion and sediment control and stormwater management permits issued for the Mountain Valley Pipeline Project (Project). All maintenance actions needed—such as invasive species controls, reseeding/replanting, or soil modifications—shall be implemented promptly, subject to growing-season restrictions and as weather conditions allow. Therefore, due to this overlap of maintenance and AMP practice implementation time frames, Mountain Valley has combined these two requirements into this document.

The proposed restoration of the temporary impacts is the responsibility of Mountain Valley. Mountain Valley will maintain the restoration areas until full stabilization is documented. This includes routine inspection every four days in Virginia, every seven days in West Virginia, and after precipitation events that trigger inspection (as per Mountain Valley's stormwater construction permits for the Project), which is a requirement independent of the monitoring outlined in the Monitoring Plan.

The inspections conducted in accordance with the Monitoring Plan will provide the data needed to determine when maintenance and adaptive management actions are needed. If necessary and feasible, corrective actions and any associated supplemental monitoring may extend beyond the three-year post-construction monitoring period. Mountain Valley can address any such requirements since it has inspection, monitoring, and maintenance requirements under its Federal Energy Regulatory Commission (FERC) approvals that continue through the operational life of this Project. Consistent with sound adaptive management principles, the suggested response actions outlined in this AMP may be revised, omitted, supplemented, or substituted when warranted by the circumstances.

1.0 WETLAND ATTRIBUTES

1.0.1 Cowardin Classification

If the Cowardin Classification performance standards identified in Appendix C are not achieved, then the following management procedures may be implemented:

a. Check soil fertility, pH, organic matter percentage, and bulk density, and
b. Correct any issues found in (a) and then seed and/or replant at the appropriate time of year; or
c. If no issues are found in (a), then seed and/or replant at the appropriate time of year.
d. If the vegetation performance standards are not met after three annual attempts, then, subject to approval of the appropriate permitting agencies (United States Environmental Protection Agency, West Virginia Department of Environmental Protection, and/or Virginia Department of Environmental Quality) for said impact area(s), Mountain Valley may purchase mitigation credits or make appropriate in-lieu-fee (ILF) contributions, using the assumption that such area was permanently impacted without taking credit for partially successful restoration. Mountain Valley will work with the agencies to appropriately stabilize the area (if necessary) prior to or concurrently with proposing to purchase mitigation credits or make an ILF contribution.

1.0.2 Area

If the wetland-area performance standard identified in Appendix C is not met, then Mountain Valley will evaluate whether the area required to be a wetland is smaller than baseline due to incorrect grading or disposal of extra subsoil (displaced by the pipe installation) in the wetland area. If incorrect grading or disposal of extra subsoil is determined to be the cause, then, subject to approval of the appropriate permitting agencies, Mountain Valley will regrade and reseed/replant, purchase mitigation credits, and/or make appropriate ILF contributions, using the assumption such an area was permanently impacted without taking credit for partially successful restoration. The preferred response will be to regrade and reseed/replant the wetland. However, providing additional mitigation credits may be the appropriate response in certain conditions, which may include, for example, when previous attempts to regrade or reseed/replant were unsuccessful or when accessing the location with heavy grading equipment would likely result in more harm than potential beneficial.

1.0.3 Topographical Survey

If the requirement for the wetland area elevations to be restored as close as practicable to the pre-construction contours is not met, then the Mountain Valley will evaluate whether the topographical differences relative to baseline is due to incorrect grading or disposal of extra subsoil (displaced by the pipe installation) in the wetlands area. If that is the case, the area shall be regraded and reseeded/replanted subject to approval of the appropriate permitting agencies.

If the contour standard is still not achieved after regrading, then, subject to approval of the appropriate permitting agencies for said impact area(s), Mountain Valley may purchase mitigation credits or make appropriate ILF, using the assumption that such area was permanently impacted.

1.0.4 Dominant Vegetation

If the performance standard identified in Appendix C for dominant vegetation is not met, the management procedures outlined in Section 1.0.1 above will be implemented.

1.0.5 Invasive-Species Cover

If the performance standard for invasive-species cover identified in Appendix C is not satisfied, then invasive plant species shall be removed mechanically (i.e., hand weeding), or with herbicide applications if approved by all applicable regulatory agencies.

If requested by Mountain Valley, this performance metric may be re-evaluated by the permitting agencies for situations where adjacent land cover contains invasive species or factors outside of the control of Mountain Valley prevent this performance standard from being met. Mountain Valley may also request that the permitting agencies re-evaluate this performance metric to consider the ecological tradeoffs of controlling invasive cover to the potential benefit of species richness or other ecologically based measures that identify the benefits of not re-disturbing the area.

If the invasive-species-cover performance standard, as modified, is not met after three seasonal attempts, then, subject to approval of the appropriate permitting agencies for the impact area(s), Mountain Valley may purchase mitigation credits or make appropriate ILF contributions, using the assumption that such area was permanently impacted.

1.0.6 Native (Non-Invasive) Herbaceous Vegetation Coverage

If the performance standard for native (non-invasive) herbaceous vegetation coverage identified in Appendix C is not met, the management procedures outlined in Section 1.0.1 above will be implemented.

1.0.7 Hydric Soils

If the performance standard for hydric soils identified in Appendix C is not met by the end of the three-year monitoring period, then the hydrology and appropriate response actions will be evaluated as outlined in Section 1.0.8. If efforts to restore hydric soils are not successful, subject to approval of the appropriate permitting agencies for the impact area(s), Mountain Valley will purchase mitigation credits or make appropriate ILF contributions, using the assumption that such area was permanently impacted.

1.0.8 Hydrology Indicators

If the performance standard for hydrology indicators identified in Appendix C is not met, the first step will be to check the Palmer Drought Severity Index and the US Drought Monitor for the subject location to determine if the area is in a moderated drought (Palmer Index) or abnormally dry or drier (U.S. Drought Monitor) conditions. If there are such dry conditions, hydrology indicators of a wetlands are not likely to be present, at least for "drier end" wetlands areas, and no actions are necessary.

If such conditions do not exist and wetland hydrology indicators are not identified after three annual seasonal attempts, then shallow groundwater wells may be installed (U.S. Army Corps of Engineers, 2005) to determine if wetlands hydrology is present but not identifiable in the soil media due to the time lag of some soil chemistry parameters. Mountain Valley may also consider regrading or directing overland flow in the wetland area to improve hydrological conditions. This determination will be made prior to the installation of groundwater wells and completed by a wetland professional.

If the hydrology performance standard is not met during a normal, or drier-than-normal, growing season at least once during the three-year monitoring period, then Mountain Valley will evaluate whether additional monitoring is likely to demonstrate that the performance standard has been met. If efforts to restore hydrology indicators are not successful, subject to approval of the appropriate permitting agencies for said impact area(s), Mountain Valley will purchase mitigation credits or make appropriate ILF contributions, using the assumption that such area was permanently impacted.

1.0.9 Bulk Density

If it is determined that soil density may be restricting root-growth conditions, and if standard decompaction practices (disking, plowing, cultivating, tilling, or incorporation of organic matter into the topsoil horizon) have not sufficiently de-compacted the soil, then bulk density testing may be completed for the topsoil (upper 6 to 12 inches depending on soil profile). The upper 12 inches of the soil profile shall have a bulk density of less than the following levels so that root growth is not restricted, dependent on soil texture:

Clayey: 91.7 pounds/cubic foot (lbs/cf) or 1.47 grams/cubic centimeter (g/cm^3)
Silty: 103.0 lbs/cf or 1.65 g/cm^3
Sandy: 112.3 lbs/cf or 1.80 g/cm^3

The bulk density for textures in between these classes shall be linearly interpolated based on the in-situ soil texture percentages of these three soil particle size classes.

The area may then be further de-compacted to meet these standards, or coordination with the agencies will be conducted to determine if mitigation banking or ILF contributions would be more appropriate, depending on site access and location.

1.1 Wetland – Resource Evaluation

1.1.1 West Virginia Stream and Wetland Valuation Metric (WV SWVM)

If the post construction scores are different from the baseline scores at the end of the third annual monitoring period, Mountain Valley will determine if the difference is likely the result of natural or statistical variability. Mountain Valley will then use the information collected from Sections 1.0.1 through 1.0.9 to determine what component of the restored wetland may require adaptive management. The specific action to be taken will be dictated by which elements of the SWVM appear to be responsible for the score falling below the Performance Standard.

2.0 STREAM ATTRIBUTES

The main areas of maintenance and adaptive management concern or focus are as follows:

- Maintaining appropriate geomorphology, i.e., monitored stream dimension (cross section), bed material, and photo documentation.
- Maintaining a stable channel.
- Minimizing bank erosion.
- Maintaining appropriate bedforms and particulates.
- Establishing early riparian vegetation.
- Controlling invasive species.

The physical features of any natural channel, as well as restored channels, change periodically, and such changes do not always require maintenance. However, when these changes adversely affect the stability, structural integrity, and/or habitat quality within the channels, actions should be taken. Stream attributes may be assessed using visual inspections (observations), longitudinal profiles, cross-section surveys, and pebble counts.

Note, as discussed, not all changes are considered detrimental (such changes occur in natural stream channels as well). For example, considerable reconfiguration of physical features may be allowed as long as they do not adversely affect conveyance, bank stability, structural integrity, or habitat quality.

<u>Channel Stability</u>:

The longitudinal profiles and steam cross-sections will be compared with previous surveys and assessed to determine changes or make recommendations, as necessary, regarding the configuration of the re-established channel. The key areas of concern are erosion of stream banks, aggradation of channel that could impair flood capacity or change channel stability, and aggradation of the overbank channel or damage to the floodplain. The process for addressing erosion problems will be highly proactive with annual surveys, as well as ongoing monitoring as per the Project's Erosion and Sediment Control Plans in West Virginia and *Annual Standards and Specifications* in Virginia. This will allow Mountain Valley to identify potential problems early so that low-tech vegetative methods can be employed to slow down erosion. If the problems become severe enough to warrant structural treatment, then a design process will be initiated (after contacting the appropriate resource agencies).

The proposed restoration measures should be self-maintaining after an initial vegetation establishment period and should require little, if any, maintenance. However, additional action may need to be taken if the flood capacity of the channel is reduced (some type of infringement on the channel or in the floodplain) or if the geomorphic stability of the restored channel is compromised. These problems could occur due to excess sediment deposition, erosion, topographic changes, higher-than-expected channel roughness, or differences in the predicted channel dimensions and associated flow regime versus pre-construction data.

Mountain Valley will undertake an evaluation of options in the unlikely event of such a channel failure or compromise. Changes that may be necessary if such events were to occur may include, but are not limited to, the following:

- Removal of vegetation.
- Modification of channel dimensions.
- Addition of more structure.
- Regrading of vegetative areas.

If appropriate, Mountain Valley may choose to utilize a "wait and see" approach. Other measures may be undertaken if anticipated ecological benefits do not come to fruition, including increases or decreases in vegetative plantings, modification of instream habitat, or introduction of large woody debris.

Riffle and Pool Features:

After stream restoration, should the riffle and pool depth/dimensions become unstable or depart from the baseline and performance parameters, adaptive management may become necessary. In watersheds with elevated sediment loads unrelated to the Project, pool features may require structures to maintain appropriate or acceptable dimensions. Similarly, constructed riffle may also be utilized to provide additional sediment transport, benthic macroinvertebrate habitat enhancement, and pool maintenance. Monitoring pool features (using the survey data) will be critical to determining the effectiveness of the restoration efforts and if adaptive management in the riffle and pool features will be necessary.

2.0.1 Stream Survey

The data being collected with detailed stream surveys are to be analyzed utilizing the following six metrics and compared to their specific performance standards:

a. Stream Cross Section Area
b. Pool-to-Pool Spacing
c. Maximum Pool Depth
d. Average Riffle Slope
e. Average Reach Slope
f. Pebble Counts

If the performance-standard specifications are not met for the above metrics and have not been waived via a "dynamic stability" determination, the following Maintenance and Adaptive Management Actions may be implemented:

1. If monitoring indicates that performance-standard issues are caused by erosion in adjacent right-of-way (ROW), correct the erosion and sediment control issue and remove sediment.
2. If the issues are being caused by offsite watershed changes, Mountain Valley may propose a site-specific stabilization plan to the applicable agencies and, if approved, implement promptly.
3. Alternatively, subject to approval of the appropriate permitting agencies for the impact area(s), Mountain Valley may purchase mitigation credits or make appropriate ILF contributions, using the assumption that such area was permanently impacted.

2.0.2 Stream Vegetation

a. Riparian Buffer

If the performance standards do not match those outlined in Appendix C then following adaptive strategies may be completed:

1. Check soil fertility, pH, organic matter percentage, and/or bulk density, and
2. Correct any issues found in (a) and then reseed and/or replant at the appropriate time of year; or
3. If no issues are found in (a), then seed and/or replant at the appropriate time of year.
4. If the vegetation performance standards are not met after three annual attempts, then Mountain Valley will coordinate with the agencies to determine if the riparian area is detrimental to the resource restoration and if additional mitigation credits or appropriate ILF contributions are required.

b. Invasive Species Cover

1. If the performance standards identified in Appendix C for invasive-species cover are not satisfied, then invasive species shall be removed mechanically (i.e., hand weeding) or with herbicide applications if approved by all applicable regulatory agencies.
2. If requested by Mountain Valley, this performance metric may be re-evaluated by the permitting agencies for situations where adjacent land cover contains invasive species or factors outside of the control of Mountain Valley prevent this performance standard from being met. Mountain Valley may also request that the permitting agencies re-evaluate this performance metric to consider the ecological tradeoffs of controlling invasive cover to the potential benefit of species richness or other ecologically based measures that identify the benefits of not re-disturbing the area.
3. If the invasive-species cover performance standard, as modified, is not met after three annual seasonal attempts, then, subject to approval of the

appropriate permitting agencies for the impact area(s), Mountain Valley may purchase mitigation credits or make appropriate ILF contributions.

2.1 Streams-Resource Valuation

2.1.1 - 2.1.4 Field Assessments

Sections 2.1.1 – 2.1.4 in Appendix C identify performance standards for the following parameters:

- Field Water Quality (dissolved oxygen, specific conductivity, pH)
- Rapid Bioassessment Protocol (RBP)
- Benthic Macroinvertebrates
- Hydrogeomorphic (HGM) Assessment

If monitoring shows a deviation from the performance standards for any of these parameters, Mountain Valley will consult with the permitting agencies regarding the probable cause of the deviations, if any. Causes not related to the Project may include, but are not limited to, watershed land-use changes, time of year, and precipitation amounts and patterns. Adaptive management actions may include (a) additional monitoring (to see if the changes are just temporal or caused by upstream conditions), (b) additional plantings, (c) adding woody debris, (d) implementing stream structural changes, (e) translocating benthic macroinvertebrates with HabiTubes, and/or (f) the purchase of additional credits or ILF contributions.

2.1.5 Visual Assessment Documentation

These photographs shall be utilized by Mountain Valley, its contractor(s), and the agencies to assist in visualization of the ultimate restoration goal – to match baseline conditions.

2.1.6 West Virginia Stream and Wetland Valuation Metric (WV SWVM)

Due to the interrelatedness of the field water quality data, RBP, benthic macroinvertebrates, and HGM assessment, if the final WV SWVM scores are not comparable to the baseline scores, Mountain Valley will consider the appropriate adaptive management strategies listed in Section 2.0.5. These include (a) additional monitoring (to see if the changes are just temporal or caused by upstream conditions), (b) additional plantings, (c) adding woody debris, (d) implementing stream structural changes, (e) translocating benthic macroinvertebrates with HabiTubes, and/or (f) the purchase of additional credits or ILF contributions. The adaptive management strategy will be subject to approval by the United States Army Corps of Engineers and relevant state agency, West Virginia Department of Environmental Protection or Virginia Department of Environmental Quality.

2.1.7 Unified Stream Methodology (USM)

As appropriate, Mountain Valley and the applicable agencies may use the data summarized in the baseline USM assessment in the AMP decision-making process.

3.0 SITE PROTECTION AND LONG-TERM MANAGEMENT

The restoration areas are located within the Project's ROW and construction access areas where future disturbance will be limited. Per FERC requirements, Mountain Valley is responsible for inspecting and maintaining the ROW for the operational life of the Project. Upon the completion of requirements found in the stormwater construction permit (West Virginia) or Stormwater Management Plan (Virginia) and pursuant to authorizations issued under Section 10 of the Rivers and Harbors Act and Section 404 and 401 of the Clean Water Act, monitoring the restoration areas will fall under the monitoring program Mountain Valley utilizes for utility ROWs as required by its FERC certification. Furthermore, the restored stream channels are considered waters of the U.S. and will, therefore, be protected from future disturbances in the form of pollutant discharges, channel alterations, or filling by existing laws and regulations limiting such impacts.

4.0 REFERENCES

Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (2008). Corps of Engineers 33 CFR Parts 325 and 332 Environmental Protection Agency 40 CFR Part 230, Federal Register Vol. 73, No. 70, Thursday, April 10, 2008, pp 19594-19705.

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APPENDIX F

Appendix F:

SUPPLEMENTAL CREDIT DETERMINATION METHODOLOGY

Mountain Valley Pipeline Project

Appendix F:

SUPPLEMENTAL CREDIT DETERMINATION METHODOLOGY

Mountain Valley Pipeline Project

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SUPPLEMENTAL CREDIT DETERMINATION METHODOLOGY

Mountain Valley Pipeline Project

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (Mountain Valley) has contracted Potesta & Associates, Inc. (POTESTA), Tetra Tech, Inc. (Tetra Tech), and Wetland Studies and Solutions, Inc. (Project Team) to develop a to discuss mitigation for impacts to aquatic resources associated with the West Virginia and Virginia portions of the. The purpose of this document is to provide a clear understanding on how aquatic resource temporary impacts mitigation in West Virginia and Virginia are being determined for the Mountain Valley Pipeline (Pipeline) project (the Project). This Supplemental Credit Determination Methodology document (CDMD) is a companion to the *Comprehensive Stream and Wetland Monitoring, Restoration, and Mitigation Framework* (Framework Document) which contains a compendium of the discussion contained herein. The methods utilized for credit determination of permanent impacts follow applicable regulations in Virginia and West Virginia; however, voluntary additional mitigation being provided by Mountain Valley for temporal loss during temporary impacts has been developed specifically for this project.

Under Section 404 of the Clean Water Act, an applicant for a Department of the Army Permit must comply with provisions found in Section 404(b)(1) as well as other applicable regulations and statutes. Section 404(b)(1) guidelines require that applicants mitigate by avoiding and minimizing potential impacts to aquatic resources to the maximum extent practicable. In addition to Section 404(b)(1) guidelines, projects authorized by the United States Army Corps of Engineers (USACE) should be consistent with the mitigation rules found in 33 CFR Part 332 Compensatory Mitigation for Losses of Aquatic Resources (Mitigation Rule) (33 U.S.C. 401 et seq.: 33 U.S.C. 1344; and Pub. L. 108-136). The proposed approach to compensatory mitigation for unavoidable impacts outlined in this document has been developed to meet or exceed the above-mentioned regulations and guidance.

2.0 COMPENSATORY MITIGATION CREDIT REQUIREMENTS

In addition to complying with federal regulations, projects must comply with regulations that are often state specific. In Virginia, in the USACE Norfolk District, mitigation may take the form of options listed in 9 VAC 25-210-116 (C)(2)-(C)(3). This includes the use of mitigation banking (banking), in-lieu fee programs (ILF), and permittee-responsible mitigation. Mitigation amounts are determined using the Unified Stream Methodology (USM) (Streams) and compensation ratios (Wetlands). Applicants in West Virginia utilize a different methodology that was developed for both stream and wetland impacts in the West Virginia portions of the Huntington and Pittsburgh Districts.

2.1 Virginia Methodology

The USM was developed by the USACE and the Virginia Department of Environmental Quality (VADEQ) to rapidly assess stream compensation requirements for permitted streams. The USM process assigns a Reach Condition Index to a stream reach, assesses the type or severity of impact and then can assist in determining the compensation that may be required. This method is used by both the USACE for Department of the Army authorizations and by the VADEQ's Virginia Water Protection Permit Program. It may be applied to projects where compensation is performed on-site, off-site, banking, and ILF.

VADEQ has established "standard mitigation ratios" by regulation (9 VAC 210-80(C)). These ratios are generally recognized by the Norfolk District. The standard mitigation ratios are as follows:

- 2:1 (2 acres compensation for each 1 acre of impact) for forested wetland impacts.
- 1.5:1 for scrub-shrub wetland impacts.
- 1:1 for emergent wetland impacts.
- 1:1 for conversion impacts (ex. forested wetland converted to emergent wetland).
- Project-specific ratios for other surface water impacts.

Alternative ratios may be used for individual permits.

2.2 West Virginia Methodology

In an effort to quantify a project's effects to aquatic resources, the USACE has developed a system to quantify existing and future conditions. The approach is often referred to as the USACE's West Virginia Stream and Wetland Valuation Metric (WVSWVM) (USACE 2011) and its purpose is to provide a suitable metric to assess and to correlate baseline conditions of proposed impacts and of compensatory mitigation. The WVSWVM utilizes existing conditions of a proposed impact reach to determine a "debit" or impact unit yield. The WVSWVM can also be used to determine a "credit" or mitigation unit yield.

The WVSWVM incorporates the "Hydrogeomorphic Approach" for developing functional indices and the protocols used to apply these indices to the assessment of ecosystem functions at a site-specific scale. This approach generates a functional capacity index for hydrology, biogeochemical cycling, and habitat functions. The worksheet utilizes the United States Environmental Protection Agency's Rapid Bioassessment Protocol (Barbour et al., 1999) physical habitat forms, the USACE's *Operational Draft Regional Guidebook for the Functional Assessment of High-gradient Headwater Streams and Low-Gradient Perennial Streams in Appalachia* (Summers, et al, 2017), the West Virginia Department of Environmental Protection's West Virginia Stream Condition Index (Gerritsen, et al., 2000) and water quality data to interpret the physical, chemical, and biological integrity of "waters of the United States" and generate an index score. Wetland evaluations require data on the wetland acreage and wetland Cowardin (1979) type designation.

3.0 MITIGATION FOR PERMANENT IMPACTS

Mountain Valley has provided mitigation for permanent impacts using banking and ILF programs in both Virginia and West Virginia. A list of the permanently-impacted streams and wetlands and their associated mitigation may be found in **Tables 17 and 18 of the IP Application**. Mitigation purchases are listed in **Tables 1, 2,** and **3**. A discussion of each of these banks or ILF programs is provided in **Exhibit A**. Mountain Valley has provided compensatory mitigation for all proposed permanent impacts in quantities that meet or exceed the applicable regulatory requirements. Accordingly, no additional compensatory mitigation is proposed in this CDMD for permanent impacts.

3.1 Permanent Stream Impacts Associated with Access Roads

All of the proposed permanent stream impacts result from the installation, repair, or replacement of culverts associated with access roads. Properly-sized and countersunk culverts are necessary to maintain natural stream flow across access roads. Nevertheless, they are considered permanent impacts. The compensatory mitigation provided for these impacts is summarized in the following table.

Table 1
Banking Credits Previously Purchased for Permanent Stream Impacts

	Impacts (ft)	Credits Required	Credits Purchased
Foster Run Mitigation Bank			
Primary	330	186	362
Hayes Run Mitigation Bank			
Primary	326	218	356
Kincheloe Mitigation Bank			
Primary	192	108	283
Spanishburg Stream and Wetland Mitigation Bank			
Primary	135	77	675
Secondary	293	170	
Thompson Place Farm, LLC			
Secondary	63	60	60
Total	**1,339**	**819**	**1,736**

*Additional credits were also purchased from Graham and David Mitigation Bank, LLC

3.2 Permanent Wetland Conversion Impacts

Approximately 90% of proposed permanent wetland impacts for the Project result from the conversion of Palustrine Forested (PFO) or Palustrine Scrub-Shrub (PSS) wetlands to Palustrine

Emergent (PEM). Mountain Valley's ability to restore PFO and PSS wetlands to their preconstruction condition is limited by the need to maintain vegetation on the right-of-way (ROW) to allow inspections of the pipeline and to protect the pipe coating from damage by woody vegetation roots. Although vegetation maintenance will be limited to the extent necessary in wetlands, Mountain Valley has erred on the side of caution by deeming all conversion impacts to be permanent for the purpose of calculating compensatory mitigation. Nevertheless, conversion impacts will be restored to PEM wetlands so that there is no loss in wetland area resulting from these impacts. Additionally, most of the "permanent" conversion impacts are not expected to be permanent in fact. Except for actively-maintained areas of the ROW, Mountain Valley will plant bare root saplings in the temporary ROW associated PFO wetlands, allowing these systems to return to PFO conditions. The compensatory mitigation provided for wetland conversion impacts is summarized in the following table.

Table 2
Banking Credits Previously Purchased for Wetland Conversion Impacts

	Impacts (acres)	Credits Required	Credits Purchased
Beverly Mitigation Bank Site			
Secondary	0.4420	0.4420	1.3775
Kincheloe Mitigation Bank			
Primary	0.1554	0.1554	0.997
Secondary	0.1049	0.1049	
Spanishburg Stream and Wetland Mitigation Bank			
Primary	0.2020	0.2020	2.839
Secondary	0.8460	0.8460	
Banister Bend Mitigation Bank			
Primary	1.2847	1.2847	7.1
Secondary	0.6479	0.6479	
Total	**3.6829**	**3.6829**	**12.3787**

3.3 Permanent Wetland Fill Impacts

Approximately 10% of the total permanent wetland impacts for the Project result from the placement of fill. Those unavoidable impacts are associated with the construction of permanent access roads or other permanent above-ground facilities. The compensatory mitigation provided for permanent wetland fill impacts is summarized in the following table.

Table 3
Banking Credits Previously Purchased for Permanent Wetland Impacts

	Impacts (acres)	Credits	Purchased
Beverly Mitigation Bank Site			
Secondary	0.1307	0.1307	1.3775
Kincheloe Mitigation Bank			
Primary	0.0115	0.0115	0.9770
Secondary	0.1078	0.1078	
Spanishburg Stream and Wetland Mitigation Bank			
Primary	0.0228	0.0228	2.839
Secondary	0.1730	0.1730	
Banister Bend Mitigation Bank			
Secondary	0.0392	0.0392	7.1
Total	**0.485**	**0.485**	**12.3787**

4.0 SUPPLEMENTAL MITIGATION FOR TEMPORARY IMPACTS

Temporary impacts occur when fill is placed in "Waters of the United States" that are then restored to similar preconstruction contours when construction is complete. These impacts do not result in changes in the bottom elevation of streams and wetlands; thus, are not considered a loss of aquatic resources. Therefore, compensatory mitigation for temporary impacts is typically provided by the restoration of the resources.

To account of the temporary loss of use, Mountain Valley proposes to voluntarily mitigate for temporal impacts associated with stream and wetland crossings. This section discusses the methodology for calculating the quantity of supplemental compensatory mitigation credit to be provided to compensate for temporal mitigation.

4.1 Temporal Mitigation Credit Determination Methodology

Compensatory mitigation for temporal impacts is not typically provided for actions regulated by the respective Corps districts, West Virginia Department of Environmental Protection (WVDEP), or VADEQ. Mountain Valley reviewed authorities from the relevant agencies, as well as approaches to temporal loss mitigation in other districts, to develop a consistent approach across all three Corps districts.

The WVSWVM credit determination approach developed by the West Virginia Interagency Review Team [IRT] (which includes the Huntington and Pittsburgh Districts, WVDEP, USEPA, and other agencies) includes credit debit modifiers for temporary impacts during construction of 3% per year and for a period of post-restoration lag in vegetative maturity that ranges from 0 - 2% per year. Consistent with the WVSWVM approach, the WVDEP has promulgated a regulation endorsing mitigation for temporal loss at a rate of 3% per year for the duration of the impact (W. Va. Code R. § 47-5A-6.2.b). Neither the Norfolk District nor VADEQ have adopted a standard approach to mitigating temporal loss.

To be consistent across all three districts, Mountain Valley proposes to provide supplemental compensatory mitigation for temporal loss at a standard rate of 3% per year for all temporary impacts. The same rate (3%) will be applied both to the duration of the construction impact and an assumed period of post-construction restoration. This approach is more conservative than the WVSWVM approach, which would assign a 0% credit debit for temporal loss for impacts that (1) last less than one year and (2) will reach maturity within 5 years of post-impact restoration.

Mountain Valley has calculated the amount of supplemental compensatory mitigation to be provided using WVSWVM forms in West Virginia, with the modified 3% per year debit assumptions noted above. In Virginia, supplemental compensatory mitigation has been calculated by applying a 3% credit per year credit debit to the mitigation requirement that would be generated for a hypothetical permanent impact using the USM (streams) or wetland area (i.e., Supplemental compensatory mitigation in Virginia = impact duration x 3% per year x hypothetical mitigation requirement for a permanent impact).

4.2 Temporary Impacts Associated with Pipeline Crossings

Streams and wetlands will be temporarily impacted by preparation of the ROW and excavation of the trench to all the installation of the pipeline. Once an aquatic resource crossing is commenced, it is completed as expeditiously as possible to minimize the duration of instream work. The impact location is restored immediately upon completion of the pipeline installation activity.

For temporarily-impacted streams, the preexisting substrate and contours will be restored and stream flow (if flowing water present) will be returned. Elevated sediment and turbidity levels are expected to dissipate within several days. To conservatively compensate for any lingering temporal loss following restoration of the stream crossing, Mountain Valley will include one year of compensatory mitigation from the date the stream is impacted, which will also include the de minimis duration of the instream work. For temporarily-impacted wetlands, the preexisting contours will be restored with the segregated wetland topsoil (except in rare situations in which saturated or flooded conditions prevent topsoil segregation). Through a combination of the natural seedbank, seeding, and, where required, bare root sapling or shrub plantings, PEM wetland vegetation is expected to return within one full growing season. No additional compensatory mitigation is proposed for restoration of PSS or PFO vegetation because, as discussed in Section 3.2, compensatory mitigation has already been provided for those conversion impacts. To conservatively compensate for any lingering temporal loss following restoration of the wetland crossing, an additional two years of compensatory mitigation will be provided.

In summary, for the purpose of calculating the supplemental compensatory mitigation proposed for each impact described above, the duration of temporal loss is assumed to be the post-restoration period of one or two years for streams and wetlands (respectively), which also includes the estimated de minimis duration to complete the crossing. The duration of temporal loss will be mitigated at a rate of 3% per year.

4.3 Temporary Impacts Associated with the Placement of Temporary Fill

Temporary fills may be placed in aquatic resources in several circumstances. The most common type of temporary fill is timber mat crossings. Timber mats that are used at stream crossings are often included because they are located below the ordinary high water mark and do not change or alter the stream bottom. Timber mats are used in wetlands, as required by Federal Energy Regulatory Commission and recommended by other resource agencies, to reduce potential impacts to these resources from equipment passage. Timber mats may remain in place for an extended duration during the construction phase of the Project because they are necessary to maintain access to parts of the ROW for the purposes of construction, inspection, and maintenance of the Project's erosion and sediment controls. Other temporary fills may be necessary to construct and maintain temporary access roads and workspaces. When no longer needed for construction of the Project, temporary fills will be removed, and the affected resources will be restored to preconstruction conditions.

To calculate the supplemental compensatory mitigation to be provided for temporary fill impacts, Mountain Valley has first calculated the anticipated duration of the fill. For temporary fills that are currently in place (such as existing timber mat bridges), the duration of the assumed construction impact will run from date the fill was first placed until the anticipated date it will be removed. For temporary fills that have not yet occurred, Mountain Valley has estimated the expected duration the temporary fill will remain in place. Although resources with temporary fills are expected to be restored quickly, Mountain Valley has applied the same assumed post-restoration period of temporal loss as for crossings. That is, an additional one year of compensatory mitigation will be provided for streams and two years for wetlands.

In summary, for the purpose of calculating the supplemental compensatory mitigation proposed for each impact described above, the duration of temporal loss is assumed to be the duration of the temporary fill placement and the post-restoration period of one or two years for streams and wetlands (respectively). The duration of temporal loss will be mitigated at a rate of 3% per year. To be conservative, for the purpose of calculating additional temporal mitigation Mountain Valley will assume a 6-year time period for the temporary fills that have been installed in wetlands and 5 year time period for temporary fills that have been installed in streams.

4.4 Proposed Supplemental Compensatory Mitigation

Applying the methodology described above, Mountain Valley will calculate an additional compensatory mitigation commitment to be provided for *each* temporary impact in the IP application. Mountain Valley intends to provide this supplemental compensatory mitigation though the following order of preference: (1) using previously purchased (but unused) credits from mitigation banks; (2) purchasing mitigation bank credits; and (3) making contributions to ILF programs. The data presently being collected for the Baseline Assessment will be used to value the temporary impacts and calculate compensatory mitigation. Tables identifying the proposed supplemental mitigation for each impact will be provided to the Corps, WVDEP, and VADEQ concurrently with the submission of the Baseline Assessment data.

Mountain Valley recognizes that the supplemental compensatory mitigation methodology relies on certain forward-looking assumptions, including the timely success of restoration activities. If the assumptions underlying this CDMD prove incorrect and the mitigation provided for temporal loss is inadequate as a result, Mountain Valley will address any additional compensatory mitigation needs in the conjunction with its implementation of Maintenance and Adaptive Management Plan.

Exhibit B contains a summary of the proposed temporal mitigation requirements for streams and wetlands.

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EXHIBIT A

SITE SELECTION

EXHIBIT A – SITE SELECTION

1.0 MITIGATION BANK CREDITS AND IN-LIEU-FEE FUND CONTRIBUTIONS

Mountain Valley has purchased credits from several different banks and contributed to one In-Lieu-Fee Fund (ILF). The following sections provide additional information on the mitigation banks that have supplied credits for permanent and conversion impacts associated with the Project, and/or are expected to be utilized for temporal losses associated with temporary impacts.

1.1 Kincheloe Mitigation Bank

The Kincheloe Mitigation Bank (Kincheloe Bank) (LRP-2014-1128) includes a total of 632 acres located approximately 3 miles west of Kincheloe in Harrison and Lewis Counties, West Virginia in the West Fork River 8-digit Hydrologic Unit Codes (HUC) (05020002). The Kincheloe Bank operates under WV Bunrootis LLC's umbrella banking instrument and provides both wetland and stream credits. The bank's umbrella instrument was approved by West Virginia's Interagency Review Team (IRT) in August 2012. The primary service area for the bank is the West Fork River watershed with the secondary service area covering the Monongahela (05020003), Middle Ohio North (05030201), Little Kanawha (05030203), and Tygart Valley (05020001) 8-digit HUCs. The Kincheloe Bank began releasing credits in 2015 and has provided mitigation for both private and State funded projects. To date, at least six credit releases have occurred. Mountain Valley utilized the Kincheloe bank to offset permanent stream and wetland impacts in the West Fork watershed and for permanent wetland impacts in the Middle Ohio North. The use of secondary credits has been approved by the IRT. Credits at this bank have been generated using the WVSWVM.

1.2 Foster Run Mitigation Bank

The Foster Run Mitigation Bank (Foster Run Bank) (LRH-2009-150-LKR) is located in Tyler County, West Virginia. The bank is sponsored by Resource Environmental Solutions, LLC (RES) and operates under RES' umbrella instrument. The RES umbrella agreement was originally held by EarthMark, approved by the IRT in 2008 (the first in West Virginia). The Foster Run Bank provides both stream and wetland credits. Its primary service area is Middle Ohio North 8-digit HUC with an approved secondary service area that includes Monongahela, West Fork, Little Kanawha, Upper Ohio North (5030101), and Upper Ohio South (05030106) 8-digit HUCs. The Foster Run Bank began releasing credits in 2017 and has provided mitigation for both private and State funded projects. Foster Run provided credits for permanently-impacted streams in the Middle Ohio North 8-digit HUC.

1.3 Hayes Run Mitigation Bank

The Hayes Run Mitigation Bank (Hayes Run Bank) (LRH-2009-150-LKR) is located in Roane County, West Virginia east of Roxalana. The Hayes Run Bank operates under WV Bunrootis LLC's umbrella banking instrument and provides both wetland and stream credits. Its primary service area is the Little Kanawha. The IRT-approved secondary service areas include Middle Ohio South (05030202), Middle Ohio North, Upper Ohio North, and Upper Ohio South 8-digit HUCs. The Hayes Run Bank began releasing credits in 2013 and has provided mitigation for both private and State funded projects. Hayes Run provided credits for permanently-impacted streams in the Little Kanawha 8-digit HUC. Credits at this bank have been generated using the WVSWVM.

1.4 Beverly Mitigation Bank Site

The Beverly Mitigation Bank Site (Beverly Bank) (LRH-2013-574-OHR) is located in Randolph County, West Virginia near the town of Beverly. The Beverly Bank operates under Green Rivers LLC's umbrella instrument and provides both wetland and stream credits. The primary service area for the bank is the Tygart Valley with the IRT-approved secondary service area covering the Monongahela, West Fork, Little Kanawha, Elk (05050007) and Cheat (05020004) 8-digit HUCs. The Beverly Bank was established in 2015 and began releasing credits in 2016. The Beverly Bank provided credits for permanent wetland impacts in the Elk 8-digit HUC utilizing the WVSWVM.

1.5 Spanishburg Stream and Wetland Mitigation Bank

The Spanishburg Stream and Wetland Mitigation Bank (Spanishburg Bank) (LRH-2010-00116-NEW) is located on a 64-acre parcel in Mercer County, West Virginia approximately 3 miles west of Spanishburg. The Spanishburg Bank operates under WV Bunrootis LLC's umbrella banking instrument and provides both wetland and stream credits. The primary service area for the Spanishburg Bank is the Upper New (05050002) 8-digit HUC. The IRT-approved secondary service area includes the Greenbrier (05050003), Lower New (05050004), Gauley (05050005), Elk, Coal (05050009), Upper Kanawha (05050006), and Lower Kanawha (05050008) 8-digit HUCs. The first credits were sold in 2014. The Spanishburg Bank provided credits for permanent stream and wetland impacts in the Upper New 8-digit HUCs. The IRT also approved the use of the Spanishburg Bank for stream credits for permanent impacts in the Elk, Gauley, Greenbrier, and Lower New 8-digit HUCs and wetland credits were approved for purchase in the Gauley and Greenbrier 8-digit HUCs.

1.6 Thompson Place Farm, LLC

The Thompson Place Farm, LLC is located in Montgomery County, Virginia. The Thompson Place Farm operates under the Thompson Place Farm, LLC banking instrument which was approved by Virginia's IRT in 2020. The service area for the Thompson Place Farm bank includes the Upper New River (05050001) 8-digit HUC and the adjacent 8-digit HUC Middle New River (05050002). Stream credits from this bank were developed using the Unified Stream Methodology (USACE and VADEQ, 2007). Mountain Valley utilized credits from the Thompson Place Farm Bank to offset permanent stream impacts in the Middle New 8-digit HUC.

1.7 Banister Bend Mitigation Bank

The Banister Bend Mitigation Bank (Banister Bend Bank) (NAO-2009-0523) is located in Pittsylvania County, Virginia. The banking instrument for this bank is held by Banister Bend

Farms and was approved in 2004 and amended in 2008. The primary service area for the Banister Bend Bank is the Banister 9-digit HUC. Pursuant to the Virginia Standards for Use and Development of Wetlands (Code of Virginia, Chapter 1, Title 33, Article 15 28.2-1308), a mitigation bank can have a mitigation service area of all Hydrologic Unit Codes within the same river basin. Under this ruling, the bank may also service the adjacent HUCs Upper Roanoke, Middle Roanoke, Upper Dan, and Lower Dan. Mountain Valley utilized credits from the Graham and David Bank to offset permanent wetland impacts in the Upper Roanoke and Banister 8-digit HUCs. The one exception to this was the use of the Virginia Aquatic Resources Trust Fund (VARTF) for forested wetland conversion impacts in the Upper Roanoke 8-digit HUC (See Section 5.3.8).

EXHIBIT B

PROPOSED TEMPORAL MITIGATION REQUIREMENTS FOR STREAMS AND WETLANDS

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-ST18	UNT to Mobley Run	Wetzel	Huntington	Middle Ohio-North	North Fork Fishing Creek	Intermittent	Permanent Access Road	21	0.584	12.26				1.84		1.84
S-A1a	North Fork Fishing Creek	Wetzel	Huntington	Middle Ohio-North	North Fork Fishing Creek	Perennial	Pipeline ROW	80	0.722	57.76					1.73	1.73
S-A3a	UNT to North Fork Fishing Creek	Wetzel	Huntington	Middle Ohio-North	North Fork Fishing Creek	Intermittent	Pipeline ROW	80	0.610	48.80					1.46	1.46
S-J66	UNT to North Fork Fishing Creek	Wetzel	Huntington	Middle Ohio-North	North Fork Fishing Creek	Intermittent	Timber Mat Crossing	20	0.756	15.12				2.27		2.27
S-A5a	UNT to Fallen Timber Run	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Timber Mat Crossing	30	0.580	17.40				2.61		2.61
S-A124	UNT to Price Run	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Pipeline ROW	100	0.667	66.70					2.00	2.00
S-A118	UNT to Price Run	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Pipeline ROW	79	0.763	60.28					1.81	1.81
S-A120	Stout Run TEMP AR 1	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Temporary Access Road	8	0.570	4.56				0.68		0.68
S-A120	Stout Run TEMP AR 2	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Temporary Access Road	9	0.533	4.80				0.72		0.72
S-A120	Stout Run TM	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Timber Mat Crossing	20	0.631	12.62					0.38	0.38
S-A119	UNT to Stout Run	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Timber Mat Crossing	134	0.612	82.01					2.46	2.46
S-QR34	UNT to Stout Run TEMP AR	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Ephemeral	Temporary Access Road	8	0.467	3.74				0.56		0.56
S-J60	Sams Run	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Perennial	Timber Mat Crossing	20	0.697	13.94				2.09		2.09
S-J56	Manion Run TEMP AR	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Perennial	Temporary Access Road	23	0.857	19.71				2.96		2.96
S-J59	UNT to Manion Run TEMP AR	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Intermittent	Temporary Access Road	10	0.565	5.65				0.85		0.85
S-J58	UNT to Manion Run	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	Perennial	Permanent Access Road	26	0.728	18.93				2.84		2.84
S-J62	Right Fork Big Elk Creek	Harrison	Pittsburgh	West Fork	Little Tenmile Creek	Perennial	Timber Mat Crossing	20	0.813	16.26				2.44		2.44
S-B79	UNT to Big Elk Creek	Harrison	Pittsburgh	West Fork	Little Tenmile Creek	Ephemeral	Temporary Access Road	11	0.431	4.74				0.71		0.71
S-B79	UNT to Big Elk Creek	Harrison	Pittsburgh	West Fork	Little Tenmile Creek	Ephemeral	Temporary Access Road	24	0.515	12.36				1.85		1.85
S-J51	Little Tenmile Creek	Harrison	Pittsburgh	West Fork	Little Tenmile Creek	Perennial	Timber Mat Crossing	20	0.765	15.30				2.30		2.30
S-A10a	Little Rockcamp Run	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	Perennial	Timber Mat Crossing	20	0.698	13.96				2.09		2.09
S-B2a	UNT to Rockcamp Run	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	Ephemeral	Pipeline ROW	115	0.502	57.73					1.73	1.73
S-B3a	Rockcamp Run	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	Perennial	Pipeline ROW	97	0.793	76.92					2.31	2.31
S-RR22	UNT to Grass Run	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Timber Mat Crossing	20	0.721	14.42				2.16		2.16
S-A11a	Grass Run	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Pipeline ROW	113	0.838	94.69					2.84	2.84
S-A11a-Braid-1	Grass Run	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Intermittent	Pipeline ROW	11	0.625	6.88					0.21	0.21
S-A11a-Braid-2	Grass Run	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Intermittent	Pipeline ROW	77	0.610	46.97					1.41	1.41
S-B6a[1,A]	Indian Run TEMP AR[1,A]	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Temporary Access Road	30	0.835	25.05				3.76		3.76
S-B6a	Indian Run TM	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Timber Mat Crossing	20	0.835	16.70				2.51		2.51
S-B7a	UNT to Indian Run	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Intermittent	Timber Mat Crossing	20	0.548	10.96				1.64		1.64
S-UU3	Salem Fork	Harrison	Pittsburgh	Middle Ohio-North	Salem Fork	Perennial	Pipeline ROW	76	0.858	65.21					1.96	1.96
S-UU5	Halls Run	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Pipeline ROW	79	0.632	49.93					1.50	1.50
S-K73	Coburn Fork	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Pipeline ROW	110	0.598	65.78					1.97	1.97
S-K74	UNT to Coburn Fork	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Ephemeral	Pipeline ROW	36	0.549	19.76					0.59	0.59
S-K75	UNT to Coburn Fork	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Intermittent	Pipeline ROW	96	0.443	42.53					1.28	1.28
S-K77 (1)	Traugh Fork (1)	Doddridge	Huntington	Middle Ohio-North	Buckeye Creek	Intermittent	Pipeline ROW	37	0.641	23.72					0.71	0.71
S-K77 (2)	Traugh Fork (2)	Doddridge	Huntington	Middle Ohio-North	Buckeye Creek	Intermittent	Pipeline ROW	93	0.730	67.89					2.04	2.04
S-CV10	UNT to Turtletree Fork	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	Perennial	Timber Mat Crossing	20	0.789	15.78				2.37		2.37
S-K67	UNT to Big Issac Creek	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	Intermittent	Pipeline ROW	77	0.630	48.51					1.46	1.46
S-K65	UNT to Big Issac Creek	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	Intermittent	Pipeline ROW	90	0.605	54.45					1.63	1.63
S-K60	UNT to Big Issac Creek	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	Ephemeral	Timber Mat Crossing	20	0.570	11.40				1.71		1.71
S-A110/K62	UNT to Laural Run ROW	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	Intermittent	Pipeline ROW	59	0.362	21.36					0.64	0.64
S-A111	Laural Run	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	Perennial	Pipeline ROW	77	0.828	63.76					1.91	1.91
S-A106[1]	UNT to Kincheloe Creek	Harrison	Pittsburgh	West Fork	Kincheloe Creek	Ephemeral	Timber Mat Crossing	168	0.538	90.38				13.56		13.56
S-A105	UNT to Kincheloe Creek	Harrison	Pittsburgh	West Fork	Kincheloe Creek	Ephemeral	Timber Mat Crossing	20	0.538	10.76				1.61		1.61
S-K82	UNT to Kincheloe Creek	Harrison	Pittsburgh	West Fork	Kincheloe Creek	Perennial	Pipeline ROW	110	0.788	86.68					2.60	2.60
S-K94	Kincheloe Creek TEMP AR	Lewis	Pittsburgh	West Fork	Kincheloe Creek	Perennial	Temporary Access Road	18	0.874	15.73				2.36		2.36
S-K94	Kincheloe Creek ROW	Lewis	Pittsburgh	West Fork	Kincheloe Creek	Perennial	Pipeline ROW	79	0.688	54.35					1.63	1.63
S-I67	Smoke Camp Run	Lewis	Pittsburgh	West Fork	Freemans Creek	Perennial	Timber Mat Crossing	22	0.735	16.17					0.49	0.49
S-J43	Right Fork Freemans Creek	Lewis	Pittsburgh	West Fork	Freemans Creek	Perennial	Timber Mat Crossing	22	0.815	17.93				2.69		2.69
S-J44	UNT to Right Fork Freemans Creek	Lewis	Pittsburgh	West Fork	Freemans Creek	Perennial	Pipeline ROW	79	0.848	66.99					2.01	2.01
S-J46	Fink Creek	Lewis	Huntington	Little Kanawha	Fink Creek	Perennial	Timber Mat Crossing	22	0.783	17.23				2.58		2.58
S-K46	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	West Fork	Freemans Creek	Ephemeral	Pipeline ROW	93	0.597	55.52					1.67	1.67
S-B67	Left Fork Freemans Creek	Lewis	Pittsburgh	West Fork	Freemans Creek	Perennial	Timber Mat Crossing	22	0.679	14.94				2.24		2.24
S-B69	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	West Fork	Freemans Creek	Ephemeral	Temporary Access Road	86	0.503	43.26				6.49		6.49
S-H180	UNT to Left Fork Freemans Creek	Lewis	Pittsburgh	West Fork	Freemans Creek	Intermittent	Pipeline ROW	68	0.431	29.31					0.88	0.88
S-KK5 (1)	UNT to Laurel Run (1)	Lewis	Huntington	Little Kanawha	Headwaters Sand Fork	Intermittent	Timber Mat Crossing	22	0.673	14.81				2.22		2.22
S-I63	Sand Fork ROW	Lewis	Huntington	Little Kanawha	Headwaters Sand Fork	Perennial	Pipeline ROW	60	0.729	43.74					1.31	1.31
S-I63	Sand Fork TEMP AR	Lewis	Huntington	Little Kanawha	Headwaters Sand Fork	Perennial	Temporary Access Road	8	0.725	5.80				0.87		0.87
S-H160	Indian Fork	Lewis	Huntington	Little Kanawha	Indian Fork	Perennial	Timber Mat Crossing	23	0.770	17.71					0.53	0.53
S-L76	Indian Fork	Lewis	Huntington	Little Kanawha	Indian Fork	Perennial	Permanent Access Road	33	0.790	26.07				3.91		3.91
S-H153	UNT to Sugar Camp Run	Lewis	Huntington	Little Kanawha	Indian Fork	Perennial	Pipeline ROW	76	0.845	64.22					1.93	1.93

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-H145	UNT to Indian Fork	Lewis	Huntington	Little Kanawha	Indian Fork	Perennial	Pipeline ROW	91	0.885	80.54					2.42	2.42
S-H165	UNT to Indian Fork	Lewis	Huntington	Little Kanawha	Indian Fork	Ephemeral	Pipeline ROW	144	0.665	95.76					2.87	2.87
S-CD16	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Intermittent	Timber Mat Crossing	173	0.843	145.84					4.38	4.38
S-VV13	Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Perennial	Timber Mat Crossing	80	0.843	67.44					2.02	2.02
S-VV13d	Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Perennial	Temporary Access Road	61	0.860	52.46				7.87		7.87
S-VV13b	Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Perennial	Temporary Access Road	42	0.845	35.49				5.32		5.32
S-VV11	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Pipeline ROW	7	0.696	4.87					0.15	0.15
S-VV12	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Perennial	Pipeline ROW	77	0.738	56.83					1.70	1.70
S-VV20	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	40	0.547	21.88				3.28		3.28
S-VV19	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	62	0.799	49.54				7.43		7.43
S-VV18	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	41	0.554	22.71				3.41		3.41
S-VV16 (1)	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	293	0.608	178.14				26.72		26.72
S-VV16 (2)	UNT to Second Big Run	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	211	0.592	124.91				18.74		18.74
S-UV11	Oil Creek ROW	Lewis	Huntington	Little Kanawha	Oil Creek	Perennial	Pipeline ROW	51	0.970	49.47					1.48	1.48
S-VV22	UNT to Oil Creek	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	43	0.649	27.91				4.19		4.19
S-VV21	UNT to Oil Creek	Lewis	Huntington	Little Kanawha	Oil Creek	Ephemeral	Temporary Access Road	18	0.616	11.09				1.66		1.66
S-VV2	Clover Fork	Braxton	Huntington	Little Kanawha	Oil Creek	Perennial	Pipeline ROW	90	0.873	78.57					2.36	2.36
S-L51	Barbecue Run	Braxton	Huntington	Little Kanawha	Burnsville Lake-Little Kanawha River	Perennial	Timber Mat Crossing	22	0.825	18.15					0.54	0.54
S-J37[1]	UNT to Barbecue Run[1]	Braxton	Huntington	Little Kanawha	Burnsville Lake-Little Kanawha River	Intermittent	Timber Mat Crossing	22	0.825	18.15					0.54	0.54
S-L57	UNT to Barbecue Run	Braxton	Huntington	Little Kanawha	Burnsville Lake-Little Kanawha River	Ephemeral	emporary Access Road/ATW	25	0.360	9.00				1.35		1.35
S-L60	Left Fork Knawl Creek	Braxton	Huntington	Little Kanawha	Burnsville Lake-Little Kanawha River	Perennial	Pipeline ROW	75	0.883	66.23					1.99	1.99
S-LL1	Knawl Creek	Braxton	Huntington	Little Kanawha	Burnsville Lake-Little Kanawha River	Perennial	Pipeline ROW	88	0.880	77.44					2.32	2.32
S-QR30	UNT to Little Knawl Creek	Braxton	Huntington	Little Kanawha	Burnsville Lake-Little Kanawha River	Perennial	Pipeline ROW	79	0.943	74.50					2.23	2.23
S-JJ1	UNT to Keith Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Timber Mat Crossing	22	0.778	17.12					0.51	0.51
S-I60	UNT to Falls Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Intermittent	Timber Mat Crossing	22	0.392	8.62					0.26	0.26
S-J70	Falls Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Pipeline ROW	77	0.973	74.92					2.25	2.25
S-J70	Falls Run Access Road	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Temporary Access Road	66	0.735	48.51				7.28		7.28
S-K34	Hemp Patch Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Intermittent	Timber Mat Crossing	22	0.810	17.82					0.53	0.53
S-K33	UNT to Hemp Patch Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Ephemeral	Timber Mat Crossing	22	0.533	11.73					0.35	0.35
S-H123 (1)	UNT to Elliott Run (1)	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Pipeline ROW	82	0.650	53.30					1.60	1.60
S-H123 (2)	UNT to Elliott Run (2)	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Pipeline ROW	82	0.645	52.89					1.59	1.59
S-H127	UNT to Elliott Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Intermittent	Timber Mat Crossing	22	0.528	11.62				1.74		1.74
S-H132	Little Kanawha River	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Timber Mat Crossing	120	0.816	97.92				14.69		14.69
S-QR26	UNT to Little Kanawha River	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Temporary Access Road	54	0.775	41.85				6.28		6.28
S-H129	UNT to Little Kanawha River	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Intermittent	Timber Mat Crossing	22	0.595	13.09				1.96		1.96
S-H131	UNT to Little Kanawha River	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Ephemeral	Timber Mat Crossing	64	0.506	32.38					0.97	0.97
S-H117	Stonecoal Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Pipeline ROW	82	0.814	66.75					2.00	2.00
S-L46	UNT to Laurel Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Pipeline ROW	78	0.793	61.85					1.86	1.86
S-L44	UNT to Laurel Run	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	Perennial	Pipeline ROW	81	0.837	67.80					2.03	2.03
S-I57	Mudlick Run	Braxton	Huntington	Elk	Outlet Holly River	Perennial	Pipeline ROW	77	0.805	61.99					1.86	1.86
S-A96/A103	UNT to Left Fork Holly River	Webster	Huntington	Elk	Left Fork Holly River	Ephemeral	Pipeline ROW	83	0.515	42.75					1.28	1.28
S-A97	UNT to Left Fork Holly River	Webster	Huntington	Elk	Left Fork Holly River	Intermittent	Pipeline ROW	125	0.458	57.25					1.72	1.72
S-A99	UNT to Left Fork Holly River	Webster	Huntington	Elk	Left Fork Holly River	Ephemeral	Pipeline ROW	34	0.595	20.23					0.61	0.61
S-A98[1]	UNT to Left Fork Holly River[1]	Webster	Huntington	Elk	Left Fork Holly River	Intermittent	ine ROW/Temporary Access	392	0.458	179.54					5.39	5.39
S-A100	Left Fork Holly River	Webster	Huntington	Elk	Outlet Holly River	Perennial	Timber Mat Crossing	22	0.893	19.65					0.59	0.59
S-E78/E82/R1	UNT to Left Fork Holly River	Webster	Huntington	Elk	Outlet Holly River	Perennial	Pipeline ROW	102	0.818	83.44					2.50	2.50
S-E76	UNT to Left Fork Holly River	Webster	Huntington	Elk	Outlet Holly River	Ephemeral	Timber Mat Crossing	22	0.742	16.32				2.45		2.45
S-KK2	UNT to Left Fork Holly River	Webster	Huntington	Elk	Outlet Holly River	Ephemeral	Pipeline ROW	75	0.593	44.48					1.33	1.33
S-KK3b	UNT to Left Fork Holly River	Webster	Huntington	Elk	Outlet Holly River	Ephemeral	Pipeline ROW	100	0.619	61.90					1.86	1.86
S-KK4b	UNT to Left Fork Holly River	Webster	Huntington	Elk	Outlet Holly River	Ephemeral	Pipeline ROW	88	0.616	54.21					1.63	1.63
S-E74[1]	UNT to Left Fork Holly River[1]	Webster	Huntington	Elk	Outlet Holly River	Perennial	Pipeline ROW	68	0.818	55.62					1.67	1.67
S-F40	Oldlick Creek	Webster	Huntington	Elk	Outlet Holly River	Perennial	Timber Mat Crossing	22	0.927	20.39					0.61	0.61
S-S1	UNT to Oldlick Creek	Webster	Huntington	Elk	Outlet Holly River	Ephemeral	Pipeline ROW	21	0.527	11.07					0.33	0.33
S-S4	UNT to Oldlick Creek	Webster	Huntington	Elk	Outlet Holly River	Ephemeral	Temporary Access Road	45	0.655	29.48				4.42		4.42
S-F43	UNT to Oldlick Creek	Webster	Huntington	Elk	Outlet Holly River	Perennial	Pipeline ROW	101	0.743	75.04					2.25	2.25
S-E67	Right Fork Holly Creek	Webster	Huntington	Elk	Outlet Right Fork Holly River	Perennial	Pipeline ROW	92	0.865	79.58					2.39	2.39
S-E71	UNT to Elk River	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	Intermittent	Pipeline ROW	44	0.528	23.23					0.70	0.70
S-H111 (1)	UNT to Elk River (1)	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	Intermittent	Timber Mat Crossing	22	0.595	13.09					0.39	0.39
S-H111 (2)	UNT to Elk River (2)	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	Intermittent	Timber Mat Crossing	22	0.488	10.74					0.32	0.32
S-H114	UNT to Elk River	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	Ephemeral	Timber Mat Crossing	22	0.521	11.46					0.34	0.34
S-H112	UNT to Elk River	Webster	Huntington	Elk	Big Run-Elk River	Intermittent	Timber Mat Crossing	22	0.466	10.25					0.31	0.31
S-H113 (1)	UNT to Elk River (1)	Webster	Huntington	Elk	Big Run-Elk River	Perennial	Pipeline ROW	74	0.828	61.27					1.84	1.84
S-H113 (2)[1]	UNT to Elk River (2)[1]	Webster	Huntington	Elk	Big Run-Elk River	Perennial	Pipeline ROW	9	0.828	7.45					0.22	0.22

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-H113 (3)	UNT to Elk River (3)	Webster	Huntington	Elk	Big Run-Elk River	Perennial	Pipeline ROW	9	0.800	7.20					0.22	0.22
S-H110	UNT to Houston Run	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	Ephemeral	Timber Mat Crossing	22	0.464	10.21					0.31	0.31
S-T29	Houston Run	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	Perennial	Pipeline ROW	76	0.660	50.16					1.50	1.50
S-A83/A91	UNT to Camp Creek	Webster	Huntington	Elk	Outlet Laurel Creek	Perennial	Pipeline ROW	75	0.778	58.35					1.75	1.75
S-A93[1]	UNT to Camp Creek TEMP AR	Webster	Huntington	Elk	Outlet Laurel Creek	Ephemeral	Temporary Access Road	13	0.429	5.58					0.17	0.17
S-A93[1]	UNT to Camp Creek ROW	Webster	Huntington	Elk	Outlet Laurel Creek	Ephemeral	Pipeline ROW	105	0.429	45.05					1.35	1.35
S-A92[1]	UNT to Camp Creek	Webster	Huntington	Elk	Outlet Laurel Creek	Ephemeral	Pipeline ROW	59	0.429	25.31					0.76	0.76
S-H108	Lower Laurel Fork	Webster	Huntington	Elk	Outlet Laurel Creek	Perennial	Pipeline ROW	78	0.858	66.92					2.01	2.01
S-H105	UNT to Camp Creek	Webster	Huntington	Elk	Outlet Laurel Creek	Perennial	Pipeline ROW	121	0.723	87.48					2.62	2.62
S-H107	UNT to Camp Creek	Webster	Huntington	Elk	Outlet Laurel Creek	Intermittent	Pipeline ROW	10	0.429	4.29					0.13	0.13
S-H107	UNT to Camp Creek ROW	Webster	Huntington	Elk	Outlet Laurel Creek	Intermittent	Pipeline ROW	90	0.420	37.80					1.13	1.13
S-H104	Camp Creek	Webster	Huntington	Elk	Outlet Laurel Creek	Perennial	Pipeline ROW	104	0.806	83.82					2.51	2.51
S-H103	UNT to Camp Creek	Webster	Huntington	Elk	Outlet Laurel Creek	Intermittent	Pipeline ROW	37	0.485	17.95					0.54	0.54
S-B34	Amos Run	Webster	Huntington	Elk	Outlet Laurel Creek	Perennial	Pipeline ROW	81	0.538	43.58					1.31	1.31
S-B35	UNT to Amos Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Intermittent	Pipeline ROW	80	0.775	62.00					1.86	1.86
S-B36	UNT to Amos Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	72	0.750	54.00					1.62	1.62
S-B37	UNT to Amos Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Intermittent	Pipeline ROW	82	0.600	49.20					1.48	1.48
S-B38	UNT to Amos Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	43	0.683	29.37					0.88	0.88
S-B42	UNT to Amos Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	101	0.450	45.45					1.36	1.36
S-B39b (1)	UNT to Amos Run (1)	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	142	0.442	62.76					1.88	1.88
S-B45	UNT to Amos Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	177	0.448	79.30					2.38	2.38
S-B39a/B46 (1)	UNT to Amos Run (1)	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	110	0.467	51.37					1.54	1.54
S-B39b (2)	UNT to Amos Run (2)	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	3	0.470	1.41					0.04	0.04
S-B39a/B46 (2)	UNT to Amos Run (2)	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Pipeline ROW	11	0.450	4.95					0.15	0.15
S-O4	Lost Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Perennial	Pipeline ROW	92	0.671	61.73					1.85	1.85
S-O5	UNT to Laurel Creek	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Timber Mat Crossing	22	0.311	6.84				1.03		1.03
S-A81	UNT to Laurel Creek	Webster	Huntington	Elk	Headwaters Laurel Creek	Ephemeral	Temporary Access Road	81	0.590	47.79				7.17		7.17
S-A79	Laurel Creek	Webster	Huntington	Elk	Headwaters Laurel Creek	Perennial	Timber Mat Crossing	55	0.776	42.68				6.40		6.40
S-A80	UNT to Laurel Creek	Webster	Huntington	Elk	Headwaters Laurel Creek	Intermittent	Temporary Access Road	104	0.390	40.56				6.08		6.08
S-E58	Little Glade Run	Webster	Huntington	Elk	Headwaters Laurel Creek	Perennial	Timber Mat Crossing	22	0.836	18.39				2.76		2.76
S-E55	UNT to Laurel Creek	Webster	Huntington	Elk	Upper Birch River	Ephemeral	Timber Mat Crossing	22	0.508	11.18					0.34	0.34
S-F35	UNT to Birch River	Webster	Huntington	Elk	Upper Birch River	Perennial	Timber Mat Crossing	5	0.575	2.88				0.43		0.43
S-F34	UNT to Birch River	Webster	Huntington	Elk	Upper Birch River	Perennial	Timber Mat Crossing	22	0.809	17.80				2.67		2.67
S-F36a (1)	UNT to Birch River (1)	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	5	0.730	3.65				0.55		0.55
S-F36a (2)	UNT to Birch River (2)	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	23	0.795	18.29				2.74		2.74
S-F36a (3)	UNT to Birch River (3)	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	23	0.638	14.67				2.20		2.20
S-F36a (4)	UNT to Birch River (4)	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	20	0.691	13.82				2.07		2.07
S-F36b (1)	UNT to Birch River (1)	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	65	0.661	42.97				6.44		6.44
S-F36b (2)	UNT to Birch River (2)	Webster	Huntington	Elk	Upper Birch River	Perennial	Pipeline ROW	78	0.673	52.49					1.57	1.57
S-F36b (3)	UNT to Birch River (3)	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	16	0.813	13.01				1.95		1.95
S-F37	UNT to Birch River	Webster	Huntington	Elk	Upper Birch River	Perennial	Temporary Access Road	20	0.825	16.50				2.48		2.48
S-C49	UNT to Birch River	Webster	Huntington	Elk	Upper Birch River	Ephemeral	Timber Mat Crossing	22	0.484	10.65				1.60		1.60
S-B33	UNT to Meadow Fork	Webster	Huntington	Elk	Upper Birch River	Intermittent	Timber Mat Crossing	22	0.466	10.25				1.54		1.54
S-B32-Braid	UNT to Meadow Fork	Webster	Huntington	Elk	Upper Birch River	Perennial	Timber Mat Crossing	22	0.550	12.10					0.36	0.36
S-B32	UNT to Meadow Fork	Webster	Huntington	Elk	Upper Birch River	Perennial	Timber Mat Crossing	22	0.843	18.55					0.56	0.56
S-B29	Meadow Fork	Webster	Huntington	Elk	Upper Birch River	Perennial	Pipeline ROW	85	0.753	64.01					1.92	1.92
S-E50 (1)	UNT to Gauley River (1)	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Pipeline ROW	93	0.803	74.68					2.24	2.24
S-E52	UNT to Gauley River	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	Intermittent	Timber Mat Crossing	22	0.453	9.97				1.49		1.49
S-E50 (2)	UNT to Gauley River (2)	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Pipeline ROW	82	0.753	61.75					1.85	1.85
S-E49	UNT to Gauley River	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Ephemeral	Pipeline ROW	88	0.498	43.82					1.31	1.31
S-E46	Strouds Creek TM	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Timber Mat Crossing	22	0.698	15.36					0.46	0.46
S-E46	Strouds Creek TEMP AR	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Temporary Access Road	43	0.830	35.69				5.35		5.35
S-F21	Barn Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Timber Mat Crossing	18	0.675	12.15				1.82		1.82
S-F20	Barn Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Timber Mat Crossing	22	0.643	14.15					0.42	0.42
S-IJ57	UNT to Barn Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Pipeline ROW	82	0.748	61.34					1.84	1.84
S-IJ59	UNT to Barn Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Ephemeral	Timber Mat Crossing	22	0.511	11.24					0.34	0.34
S-IJ60	UNT to Rockcamp Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Pipeline ROW	77	0.833	64.14					1.92	1.92
S-IJ62	UNT to Cherry Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Intermittent	Pipeline ROW	79	0.408	32.23					0.97	0.97
S-B28	Cherry Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Timber Mat Crossing	22	0.593	13.05					0.39	0.39
S-B26	UNT to Cherry Run	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Intermittent	Temporary Access Road	43	0.495	21.29				3.19		3.19
S-J32	Big Beaver Creek	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	Perennial	Timber Mat Crossing	22	0.658	14.48					0.43	0.43
S-A76	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Pipeline ROW	77	0.680	52.36					1.57	1.57
S-A75	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Pipeline ROW	84	0.813	68.29					2.05	2.05

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-A74	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Ephemeral	Pipeline ROW	75	0.398	29.85					0.90	0.90
S-A73	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Intermittent	Pipeline ROW	83	0.475	39.43					1.18	1.18
S-A72	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Ephemeral	Timber Mat Crossing	22	0.740	16.28					0.49	0.49
S-A71	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Timber Mat Crossing	22	0.613	13.49					0.40	0.40
S-A71-Braid	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Intermittent	Timber Mat Crossing	22	0.486	10.69					0.32	0.32
S-A67	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Pipeline ROW	76	0.835	63.46					1.90	1.90
S-A69(1)[A]	**UNT to Big Beaver Creek (1)[A]**	**Nicholas**	**Huntington**	**Gauley**	Big Beaver Creek	**Intermittent**	**Pipeline ROW**	**82**	**0.605**	**49.61**					**1.49**	**1.49**
S-A69(2)[1,A]	UNT to Big Beaver Creek (2)[1,A]	Nicholas	Huntington	Gauley	Big Beaver Creek	Intermittent	Pipeline ROW	16	0.605	9.68					0.29	0.29
S-H99	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Pipeline ROW	96	0.813	78.05					2.34	2.34
S-H96	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Intermittent	Temporary Access Road	39	0.426	16.61				2.49		2.49
S-H95	UNT to Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Ephemeral	Temporary Access Road	259	0.568	147.11					4.41	4.41
S-A65	Big Beaver Creek	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Pipeline ROW	77	0.720	55.44					1.66	1.66
S-A64	UNT to Granny Run	Nicholas	Huntington	Gauley	Big Beaver Creek	Ephemeral	Pipeline ROW	54	0.400	21.60					0.65	0.65
S-N15	UNT to Granny Run	Nicholas	Huntington	Gauley	Big Beaver Creek	Intermittent	Timber Mat Crossing	22	0.456	10.03					0.30	0.30
S-N14 (1)	Granny Run (1)	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Timber Mat Crossing	22	0.628	13.82					0.41	0.41
S-N14 (2)	Granny Run (2)	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Timber Mat Crossing	22	0.700	15.40					0.46	0.46
S-I43	UNT to Big Run	Nicholas	Huntington	Gauley	Big Beaver Creek	Intermittent	Timber Mat Crossing	22	0.563	12.39					0.37	0.37
S-I44	Big Run	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Timber Mat Crossing	22	0.820	18.04					0.54	0.54
S-I45	UNT to Big Run	Nicholas	Huntington	Gauley	Big Beaver Creek	Perennial	Timber Mat Crossing	22	0.815	17.93					0.54	0.54
S-I47	UNT to Gauley River	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Intermittent	Pipeline ROW	80	0.658	52.64					1.58	1.58
S-I48	UNT to Gauley River	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Perennial	Timber Mat Crossing	22	0.803	17.67					0.53	0.53
S-J28	UNT to Little Laurel Creek	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Intermittent	Pipeline ROW	79	0.711	56.17					1.69	1.69
S-J25	UNT to Little Laurel Creek	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Ephemeral	Pipeline ROW	77	0.863	66.45					1.99	1.99
S-J24 (1)	UNT to Little Laurel Creek (1)	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Perennial	Pipeline ROW	76	0.770	58.52					1.76	1.76
S-J24 (2)	UNT to Little Laurel Creek (2)	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Perennial	Pipeline ROW	76	0.858	65.21					1.96	1.96
S-J23-EPH	UNT to Little Laurel Creek	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Ephemeral	Pipeline ROW	109	0.525	57.23					1.72	1.72
S-J22	UNT to Little Laurel Creek	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	Intermittent	Pipeline ROW	85	0.587	49.90					1.50	1.50
S-N10	Skelt Run	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Pipeline ROW	78	0.633	49.37					1.48	1.48
S-N10-Braid	Skelt Run	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Intermittent	Pipeline ROW	101	0.448	45.25					1.36	1.36
S-EE1	UNT to Skelt Run	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Ephemeral	Timber Mat Crossing	22	0.540	11.88					0.36	0.36
S-N13-Braid	UNT to Skelt Run	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Intermittent	Pipeline ROW	37	0.439	16.24					0.49	0.49
S-N13[1]	UNT to Skelt Run	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Intermittent	Pipeline ROW	89	0.439	39.07					1.17	1.17
S-L41	Jims Creek	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Pipeline ROW	76	0.831	63.16					1.89	1.89
S-L38	UNT to Riley Branch	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Pipeline ROW	75	0.725	54.38					1.63	1.63
S-L35	Riley Branch TEMP AR	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Temporary Access Road	52	0.790	41.08				6.16		6.16
S-L35 (1)	Riley Branch (1)	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Pipeline ROW	86	0.683	58.74					1.76	1.76
S-L35 (2)	Riley Branch (2)	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Pipeline ROW	87	0.710	61.77					1.85	1.85
S-L35 (3)	Riley Branch (3)	Nicholas	Huntington	Gauley	Outlet Hominy Creek	Perennial	Pipeline ROW	79	0.773	61.07					1.83	1.83
S-I37[1]	UNT to Hominy Creek[1]	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Ephemeral	Pipeline ROW	40	0.485	19.40					0.58	0.58
S-I38	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Pipeline ROW	77	0.598	46.05					1.38	1.38
S-I39	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Pipeline ROW	79	0.574	45.35					1.36	1.36
S-I40	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Pipeline ROW	82	0.650	53.30					1.60	1.60
S-I41[1]	UNT to Hominy Creek[1]	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Pipeline ROW	78	0.574	44.77					1.34	1.34
S-I36	Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Perennial	Pipeline ROW	77	0.878	67.61					2.03	2.03
S-I31	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Ephemeral	Pipeline ROW	73	0.485	35.41					1.06	1.06
S-N8a	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Perennial	Timber Mat Crossing	22	0.671	14.76				2.21		2.21
S-VV1	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Timber Mat Crossing	22	0.684	15.05				2.26		2.26
S-H88	Sugar Branch	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Perennial	Pipeline ROW	76	0.685	52.06					1.56	1.56
S-H71	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Perennial	Pipeline ROW	93	0.710	66.03					1.98	1.98
S-H67	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Perennial	Pipeline ROW	85	0.623	52.96					1.59	1.59
S-H64	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Pipeline ROW	87	0.449	39.06					1.17	1.17
S-V3	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Perennial	Timber Mat Crossing	22	0.829	18.24					0.55	0.55
S-EF41	UNT to Hominy Creek	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	Intermittent	Pipeline ROW	82	0.595	48.79					1.46	1.46
S-J19	UNT to Meadow Creek	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	Ephemeral	Timber Mat Crossing	22	0.445	9.79				1.47		1.47
S-J20	UNT to Meadow Creek	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	Perennial	Timber Mat Crossing	22	0.578	12.72					0.38	0.38
S-I25	UNT to Meadow Creek	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	Intermittent	Pipeline ROW	75	0.477	35.78					1.07	1.07
S-I26	UNT to Meadow Creek	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	Intermittent	Pipeline ROW	78	0.442	34.48					1.03	1.03
S-I27	UNT to Meadow Creek	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	Intermittent	Timber Mat Crossing	22	0.444	9.77					0.29	0.29
S-L26 (2)	UNT to Meadow River (2)	Greenbrier	Huntington	Gauley	Big Clear Creek-Meadow River	Perennial	Pipeline ROW	166	0.730	121.18					3.64	3.64
S-L24	UNT to Little Sewell Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Intermittent	Timber Mat Crossing	22	0.390	8.58				1.29		1.29
S-L30	UNT to Little Sewell Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Intermittent	Pipeline ROW	136	0.446	60.66					1.82	1.82
S-L22	Little Sewell Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Perennial	Pipeline ROW	75	0.740	55.50					1.67	1.67

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4] Impact Factor	Reach Condition Index[3]	Compensatory Value	Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
S-L20	UNT to Little Sewell Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Perennial	Pipeline ROW	96	0.713	68.45					2.05	2.05
S-L10	UNT to Boggs Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Perennial	Pipeline ROW	103	0.655	67.47					2.02	2.02
S-L11	UNT to Boggs Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Intermittent	Pipeline ROW	26	0.435	11.31					0.34	0.34
S-I21 (1)	UNT to Boggs Creek (1)	Greenbrier	Huntington	Gauley	Sewell Creek	Perennial	Pipeline ROW	30	0.932	27.96					0.84	0.84
S-I21 (2)	UNT to Boggs Creek (2)	Greenbrier	Huntington	Gauley	Sewell Creek	Perennial	Pipeline ROW	77	0.850	65.45					1.96	1.96
S-I22	UNT to Boggs Creek	Greenbrier	Huntington	Gauley	Sewell Creek	Intermittent	Pipeline ROW	94	0.588	55.27					1.66	1.66
S-K17	Buffalo Creek	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Perennial	Pipeline ROW	75	0.815	61.13					1.83	1.83
S-K19	UNT to Buffalo Creek	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Intermittent	Pipeline ROW	93	0.708	65.84					1.98	1.98
S-K21	UNT to Buffalo Creek	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Perennial	Pipeline ROW	82	0.658	53.96					1.62	1.62
S-K22	UNT to Buffalo Creek	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Perennial	Pipeline ROW	78	0.610	47.58					1.43	1.43
S-UV6	UNT to Morris Fork	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Perennial	Pipeline ROW	88	0.723	63.62					1.91	1.91
S-UV2	Morris Fork ROW	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Perennial	Pipeline ROW	88	0.735	64.68					1.94	1.94
S-U22	UNT to Meadow River	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Intermittent	Pipeline ROW	80	0.480	38.40					1.15	1.15
S-FF1	UNT to Meadow River	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	Ephemeral	Permanent Access Road	11	0.523	5.75					0.17	0.17
S-EE4	UNT to Red Spring Branch	Summers	Huntington	Lower New	Lick Creek	Intermittent	Pipeline ROW	137	0.594	81.38					2.44	2.44
S-M6	UNT to Red Spring Branch	Summers	Huntington	Lower New	Lick Creek	Intermittent	Pipeline ROW	110	0.520	57.20					1.72	1.72
S-J13 (1)	UNT to Patterson Creek (1)	Summers	Huntington	Gauley	Otter Creek-Meadow River	Ephemeral	Pipeline ROW	92	0.661	60.81					1.82	1.82
S-J13 (2)	UNT to Patterson Creek (2)	Summers	Huntington	Gauley	Otter Creek-Meadow River	Ephemeral	Pipeline ROW	96	0.616	59.14					1.77	1.77
S-J13 (3)	UNT to Patterson Creek (3)	Summers	Huntington	Gauley	Otter Creek-Meadow River	Ephemeral	Pipeline ROW	124	0.603	74.77					2.24	2.24
S-M4	UNT to Red Spring Branch	Summers	Huntington	Lower New	Lick Creek	Ephemeral	Temporary Access Road	47	0.588	27.64				4.15		4.15
S-I17	UNT to Lick Creek	Summers	Huntington	Lower New	Lick Creek	Ephemeral	Pipeline ROW	78	0.775	60.45					1.81	1.81
S-I19	Lick Creek	Summers	Huntington	Lower New	Lick Creek	Perennial	Pipeline ROW	77	0.835	64.30					1.93	1.93
S-I20	UNT to Lick Creek	Summers	Huntington	Lower New	Lick Creek	Perennial	Pipeline ROW	92	0.600	55.20					1.66	1.66
S-N5	UNT to Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Pipeline ROW	87	0.548	47.68					1.43	1.43
S-K14	UNT to Righthand Fork Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Ephemeral	Pipeline ROW	97	0.528	51.22					1.54	1.54
S-N3	UNT to Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Ephemeral	Timber Mat Crossing	22	0.625	13.75					0.41	0.41
S-N2	Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Timber Mat Crossing	22	0.795	17.49					0.52	0.52
S-CD23[1]	UNT to Hungard Creek[1]	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Ephemeral	Timber Mat Crossing	22	0.792	17.42					0.52	0.52
S-N4	UNT to Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Ephemeral	Timber Mat Crossing	22	0.792	17.42					0.52	0.52
S-M3	Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Pipeline ROW	80	0.753	60.24					1.81	1.81
S-KL29	Right Fork Hungard Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Pipeline ROW	75	0.595	44.63					1.34	1.34
S-CV17	UNT to Greenbrier River	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Ephemeral	Pipeline ROW	76	0.829	63.00					1.89	1.89
S-EF53[1]	UNT to Greenbrier River[1]	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Intermittent	Temporary Access Road	51	0.563	28.71					0.86	0.86
S-K10 (1)[1]	UNT to Greenbrier River (1)[1]	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Intermittent	Temporary Access Road	9	0.563	5.07					0.15	0.15
S-K10 (3)[1]	UNT to Greenbrier River (3)[1]	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Intermittent	Temporary Access Road	9	0.563	5.07					0.15	0.15
S-L4	UNT to Greenbrier River	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Pipeline ROW	77	0.485	37.35					1.12	1.12
S-L2	UNT to Greenbrier River	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Intermittent	Pipeline ROW	88	0.563	49.54					1.49	1.49
S-L1	UNT to Kelly Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Pipeline ROW	76	0.568	43.17					1.30	1.30
S-J5	Kelly Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Perennial	Pipeline ROW	103	0.450	46.35					1.39	1.39
S-J4	UNT to Keller Creek	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	Intermittent	Timber Mat Crossing	22	0.399	8.78					0.26	0.26
S-OP1	Stony Creek	Monroe	Huntington	Greenbrier	Stony Creek-Greenbrier River	Perennial	Pipeline ROW	78	0.665	51.87					1.56	1.56
S-A63	Slate Run ROW	Monroe	Huntington	Upper New	Middle Indian Creek	Perennial	Pipeline ROW	88	0.570	50.16					1.50	1.50
S-A61(1)[1]	UNT to Slate Run(1)[1]	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Temporary Access Road	8	0.481	3.85					0.12	0.12
S-A61(2)[1]	UNT to Slate Run(2)[1]	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Temporary Access Road	8	0.481	3.85					0.12	0.12
S-A61	UNT to Slate Run ROW	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	81	0.481	38.96					1.17	1.17
S-A60	Slate Run	Monroe	Huntington	Upper New	Middle Indian Creek	Perennial	Pipeline ROW	87	0.628	54.64					1.64	1.64
S-D31	Indian Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Perennial	Pipeline ROW	75	0.583	43.73					1.31	1.31
S-D25	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Intermittent	Timber Mat Crossing	22	0.624	13.73					0.41	0.41
S-F18	UNT to Hans Creek TM	Monroe	Huntington	Upper New	Middle Indian Creek	Perennial	Timber Mat Crossing	22	0.633	13.93				2.09		2.09
S-Z5	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	75	0.418	31.35					0.94	0.94
S-Z4	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	75	0.613	45.98					1.38	1.38
S-MN2	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Perennial	Pipeline ROW	81	0.720	58.32					1.75	1.75
S-CV19	Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Perennial	Pipeline ROW	77	0.820	63.14					1.89	1.89
S-MN39[1]	UNT to Blue Lick Creek[1]	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	22	0.586	12.89					0.39	0.39
S-MN38	UNT to Blue Lick Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Intermittent	Pipeline ROW	22	0.553	12.17					0.36	0.36
S-MN37	UNT to Blue Lick Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Intermittent	Pipeline ROW	95	0.586	55.67					1.67	1.67
S-MN40[1,A]	UNT to Blue Lick Creek[1,A]	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	37	0.586	21.68					0.65	0.65
S-G44	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	86	0.587	50.48					1.51	1.51
S-G43	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Timber Mat Crossing	22	0.754	16.59					0.50	0.50
S-G42	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Intermittent	Pipeline ROW	79	0.558	44.08					1.32	1.32
S-MN45	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Ephemeral	Pipeline ROW	87	0.600	52.20					1.57	1.57
S-CV27	UNT to Hans Creek	Monroe	Huntington	Upper New	Middle Indian Creek	Intermittent	Pipeline ROW	37	0.590	21.83					0.65	0.65

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-E43	UNT to Dry Creek	Monroe	Huntington	Middle New	Rich Creek	Ephemeral	Pipeline ROW	92	0.530	48.76					1.46	1.46
S-E45	UNT to Dry Creek	Monroe	Huntington	Middle New	Rich Creek	Ephemeral	Pipeline ROW	108	0.648	69.98					2.10	2.10
S-E40	Dry Creek TEMP AR	Monroe	Huntington	Middle New	Rich Creek	Perennial	Temporary Access Road	43	0.693	29.80				4.47		4.47
S-E40	Dry Creek ROW	Monroe	Huntington	Middle New	Rich Creek	Perennial	Pipeline ROW	82	0.739	60.60					1.82	1.82
S-E41	UNT to Dry Creek	Monroe	Huntington	Middle New	Rich Creek	Intermittent	Pipeline ROW	23	0.523	12.03					0.36	0.36
S-C38	UNT to Painter Run	Monroe	Huntington	Middle New	Rich Creek	Intermittent	Pipeline ROW	89	0.643	57.23					1.72	1.72
S-C39	Painter Run	Monroe	Huntington	Middle New	Rich Creek	Perennial	Pipeline ROW	109	0.853	92.98					2.79	2.79
S-C41	UNT to Painter Run	Monroe	Huntington	Middle New	Rich Creek	Intermittent	Pipeline ROW	143	0.606	86.66					2.60	2.60
S-C40[A]	**UNT to Painter Run[A]**	**Monroe**	**Huntington**	**Middle New**	**Rich Creek**	**Perennial**	**Temporary Access Road**	**77**	**0.800**	61.60				9.24		9.24
S-Q12[B]	**UNT to Kimballton Branch**	**Giles**	**Norfolk**	**Middle New**	**Stony Creek**	**Ephemeral**	**Pipeline ROW**	**86**	**0.744**	**63.98**	**1**	**0.43**	**36.98**		**1.11**	**1.11**
S-Q13[B]	**Kimballton Branch**	**Giles**	**Norfolk**	**Middle New**	**Stony Creek**	**Perennial**	**Pipeline ROW**	**90**	**0.945**	**85.05**	**1**	**1.38**	**124.20**		**3.73**	**3.73**
S-P6[B]	**UNT to Stony Creek**	**Giles**	**Norfolk**	**Middle New**	**Stony Creek**	**Ephemeral**	**Pipeline ROW**	**78**	**0.76**	**59.05**	**1**	**0.43**	**33.54**		**1.01**	**1.01**
S-G29	UNT to Dry Branch	Giles	Norfolk	Middle New	Little Stony Creek-New River	Ephemeral	Pipeline ROW	30	0.54	16.20	1	0.38	11.40		0.34	0.34
S-G30	UNT to Dry Branch	Giles	Norfolk	Middle New	Little Stony Creek-New River	Ephemeral	Pipeline ROW	85	0.58	49.30	1	0.35	29.75		0.89	0.89
S-G32	Dry Branch	Giles	Norfolk	Middle New	Little Stony Creek-New River	Intermittent	Pipeline ROW	110	0.55	60.50	1	1.05	115.50		3.47	3.47
S-G33	UNT to Dry Branch	Giles	Norfolk	Middle New	Little Stony Creek-New River	Perennial	Pipeline ROW	99	0.61	60.39	1	0.89	88.11		2.64	2.64
S-YZ1 (North)	Doe Creek	Giles	Norfolk	Middle New	Little Stony Creek-New River	Intermittent	Temporary Access Road	102	0.47	47.43	1	1.32	134.64		4.04	4.04
S-A34	UNT to Doe Creek	Giles	Norfolk	Middle New	Little Stony Creek-New River	Ephemeral	Pipeline ROW	86	0.64	55.04	1	0.37	31.82		0.95	0.95
S-A33	UNT to Doe Creek	Giles	Norfolk	Middle New	Little Stony Creek-New River	Ephemeral	Pipeline ROW	111	0.53	58.83	1	0.40	44.40		1.33	1.33
S-A32	UNT to Doe Creek	Giles	Norfolk	Middle New	Little Stony Creek-New River	Perennial	Pipeline ROW	78	0.70	54.68	1	1.22	95.16		2.85	2.85
S-QQ2	Sinking Creek	Craig	Norfolk	Middle New	Upper Sinking Creek	Perennial	Temporary Access Road	40	0.87	34.80	1	1.36	54.40	8.16		8.16
S-MN11-Upstream[B]	**UNT to Sinking Creek**	**Giles**	**Norfolk**	**Middle New**	**Lower Sinking Creek**	**Ephemeral**	**Temporary Access Road**	**15**	**0.70**	**10.50**	**1**	**0.27**	**4.05**	**0.61**		**0.61**
S-MN11-Upstream[B]	**UNT to Sinking Creek**	**Giles**	**Norfolk**	**Middle New**	**Lower Sinking Creek**	**Ephemeral**	**Temporary Access Road**	**30**	**0.833**	**24.99**	**1**	**0.27**	**8.10**	**1.22**		**1.22**
S-MN11-Downstream[B]	**UNT to Sinking Creek**	**Giles**	**Norfolk**	**Middle New**	**Lower Sinking Creek**	**Ephemeral**	**Temporary Access Road**	**37**	**0.833**	**30.82**	**1**	**0.27**	**9.99**	**1.50**		**1.50**
S-PP4	UNT to Sinking Creek	Craig	Norfolk	Middle New	Upper Sinking Creek	Intermittent	Pipeline ROW	84	0.50	42.00	1	1.10	92.40		2.77	2.77
S-PP3[B]	**UNT to Sinking Creek**	**Craig**	**Norfolk**	**Middle New**	**Upper Sinking Creek**	**Perennial**	**Pipeline ROW**	**82**	**-**	**-**	**1**	**0.54**	**44.28**		**1.33**	**1.33**
S-RR4	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Perennial	Temporary Access Road	85	0.75	64.01	1	1.20	102.00	15.30		15.30
S-E24	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Perennial	Pipeline ROW	81	0.64	51.84	1	1.27	102.87		3.09	3.09
S-E25-Downstream S	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Perennial	Timber Mat Crossing	20	0.77	15.40	1	1.29	25.80		0.77	0.77
S-PP1[B]	**UNT to Sinking Creek**	**Craig**	**Norfolk**	**Middle New**	**Upper Sinking Creek**	**Intermittent**	**Pipeline ROW**	**86**	**0.673**	**57.88**	**1**	**0.96**	**82.56**		**2.48**	**2.48**
S-RR5	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Perennial	Pipeline ROW	83	0.73	60.34	1	1.19	98.77		2.96	2.96
S-PA07	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Intermittent	Pipeline ROW	115	0.46	52.90	1	1.24	142.60		4.28	4.28
S-IJ18-EPH	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Ephemeral	Pipeline ROW	74	0.58	42.92	1	0.39	28.86	4.33		4.33
S-IJ19[B]	**UNT to Sinking Creek**	**Giles**	**Norfolk**	**Middle New**	**Lower Sinking Creek**	**Ephemeral**	**Temporary Access Road**	**43**	**0.68**	**29.37**	**1**	**0.40**	**17.20**	**2.58**		**2.58**
S-IJ19[1,B]	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Ephemeral	Temporary Access Road	9	0.68	6.15	1	0.26	2.34		0.07	0.07
S-IJ18-INT	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Intermittent	Temporary Access Road	44	0.64	27.94	1	1.38	60.72		1.82	1.82
S-OO12	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Ephemeral	Pipeline ROW	25	0.50	12.50	1	0.41	10.25		0.31	0.31
S-OO13	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Perennial	Pipeline ROW	77	0.88	67.91	1	1.29	99.33		2.98	2.98
S-OO14	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Perennial	Pipeline ROW	86	0.86	73.96	1	1.18	101.48		3.04	3.04
S-IJ17	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Ephemeral	Pipeline ROW	31	0.51	15.81	1	0.39	12.09		0.36	0.36
S-IJ16-b	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Ephemeral	Pipeline ROW	78	0.57	44.46	1	0.40	31.20		0.94	0.94
S-RR13	Craig Creek	Montgomery	Norfolk	Upper James	Trout Creek-Craig Creek	Perennial	Temporary Access Road	41	0.94	38.54	1	1.35	55.35	8.30		8.30
S-QQ3[B]	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Ephemeral	Temporary Access Road	15	-	-	1	0.30	4.50		0.14	0.14
S-IJ16-a (TEMP)	UNT to Sinking Creek	Giles	Norfolk	Middle New	Lower Sinking Creek	Ephemeral	Permanent Access Road	20	0.60	12.06	1	0.41	8.20	1.23		1.23
S-KL43	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Perennial	Pipeline ROW	75	0.71	53.33	1	1.33	99.75		2.99	2.99
S-NN11[B]	**UNT to Sinking Creek**	**Giles**	**Norfolk**	**Middle New**	**Upper Sinking Creek**	**Intermittent**	**Pipeline ROW**	**84**	**0.47**	**39.48**	**1**	**1.23**	**103.32**		**3.10**	**3.10**
S-NN12	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Ephemeral	Pipeline ROW	88	0.52	45.76	1	0.44	38.72		1.16	1.16
S-MN21	UNT to Mill Creek	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Perennial	Pipeline ROW	80	0.66	52.80	1	1.20	96.00		2.88	2.88
S-MM17	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Perennial	Temporary Access Road	49	0.65	31.85	1	1.07	52.43	7.86		7.86
S-MN22	UNT to Mill Creek	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Ephemeral	Pipeline ROW	96	0.53	50.88	1	0.38	36.48		1.09	1.09
S-EF62	UNT to Mill Creek	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Perennial	Pipeline ROW	76	0.64	48.87	1	1.27	96.52		2.90	2.90
S-MM18	UNT to Sinking Creek	Giles	Norfolk	Middle New	Upper Sinking Creek	Ephemeral	Pipeline ROW	88	0.65	57.20	1	0.43	37.84		1.14	1.14
S-IJ52	UNT to Mill Creek	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Perennial	Pipeline ROW	84	0.77	64.68	1	1.16	97.44		2.92	2.92
S-EF65[B]	**Mill Creek**	**Montgomery**	**Norfolk**	**Upper Roanoke**	**Dry Run-North Fork Roanoke River**	**Intermittent**	**Pipeline ROW**	**152**	**0.53**	**80.56**	**1**	**1.13**	**171.76**		**5.15**	**5.15**
S-G36	North Fork Roanoke River	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Perennial	Temporary Access Road	26	0.88	22.88	1	1.38	35.88	5.38		5.38
S-G38	UNT to North Fork RoanokeRiver	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Ephemeral	Timber Mat Crossing	20	0.67	13.46	1	0.37	7.40	1.11		1.11
S-G40	UNT to North Fork RoanokeRiver	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Perennial	Timber Mat Crossing	20	0.71	14.20	1	1.18	23.60	3.54		3.54
S-PP23	UNT to North Fork RoanokeRiver	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Ephemeral	Timber Mat Crossing	20	0.60	11.96	1	0.39	7.80	1.17		1.17
S-G39	UNT to North Fork RoanokeRiver	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	Intermittent	Pipeline ROW	82	0.74	60.43	1	1.17	95.94		2.88	2.88
S-MM14	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Ephemeral	Pipeline ROW	105	0.56	58.80	1	0.36	37.80		1.13	1.13
S-MM15	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Intermittent	Pipeline ROW	82	0.46	37.72	1	1.14	93.48		2.80	2.80
S-MM11	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Ephemeral	Pipeline ROW	80	0.60	48.00	1	0.36	28.80		0.86	0.86
S-F15	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Intermittent	Pipeline ROW	129	0.52	67.08	1	1.32	170.28		5.11	5.11

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-MM13	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Ephemeral	Pipeline ROW	85	0.53	45.05	1	0.33	28.05		0.84	0.84
S-F16a/F16b	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Ephemeral	Pipeline ROW	81	0.53	42.93	1	0.37	29.97		0.90	0.90
S-C36[1,B]	**UNT to Flatwoods Branch**	**Montgomery**	**Norfolk**	**Upper Roanoke**	**Wilson Creek-North Fork Roanoke River**	**Intermittent**	**Pipeline ROW**	**96**	**0.55**	**53.09**	**1**	**1.13**	**108.48**		**3.25**	**3.25**
S-C36 (US)	UNT to Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Intermittent	Pipeline ROW	36	0.55	19.91	1	1.22	43.92		1.32	1.32
S-C29	Flatwoods Branch	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	Ephemeral	Pipeline ROW	46	0.66	30.36	1	0.33	15.18		0.46	0.46
S-C25	UNT to Bradshaw Creek	Montgomery	Norfolk	Upper Roanoke	Bradshaw Creek-North Fork Roanoke River	Intermittent	Pipeline ROW	115	0.56	64.40	1	1.11	127.65		3.83	3.83
S-C24	UNT to Bradshaw Creek	Montgomery	Norfolk	Upper Roanoke	Bradshaw Creek-North Fork Roanoke River	Intermittent	Pipeline ROW	108	0.56	60.48	1	1.17	126.36		3.79	3.79
S-NN19	UNT to Roanoke River	Montgomery	Norfolk	Upper Roanoke	Sawmill Hollow-Roanoke River	Intermittent	Pipeline ROW	76	0.52	39.52	1	1.18	89.68		2.69	2.69
S-AB16	UNT to Roanoke River	Montgomery	Norfolk	Upper Roanoke	Sawmill Hollow-Roanoke River	Intermittent	Timber Mat Crossing	20	0.28	5.66	1	1.14	22.80		0.68	0.68
S-EF19	UNT to Indian Run	Montgomery	Norfolk	Upper Roanoke	Brake Branch-South Fork Roanoke River	Ephemeral	Pipeline ROW	79	0.52	41.08	1	0.34	26.86		0.81	0.81
S-EF20a	UNT to Roanoke River	Montgomery	Norfolk	Upper Roanoke	Sawmill Hollow-Roanoke River	Perennial	Pipeline ROW	80	0.65	51.84	1	1.27	101.60		3.05	3.05
S-MM22[B]	**UNT to Roanoke River**	**Montgomery**	**Norfolk**	**Upper Roanoke**	**Sawmill Hollow-Roanoke River**	**Perennial**	**Pipeline ROW**	**175**	**0.66**	**115.50**	**1**	**1.24**	**217.00**		**6.51**	**6.51**
S-IJ50	UNT to Roanoke River	Roanoke	Norfolk	Upper Roanoke	Sawmill Hollow-Roanoke River	Perennial	Pipeline ROW	77	0.73	56.52	1	1.37	105.49		3.16	3.16
S-Y13	UNT to Bottom Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Intermittent	Pipeline ROW	85	0.52	44.20	1	1.09	92.65		2.78	2.78
S-Y14	UNT to Bottom Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Perennial	Pipeline ROW	77	0.95	73.00	1	1.22	93.94		2.82	2.82
S-EF57[B]	**UNT to Bottom Creek**	**Roanoke**	**Norfolk**	**Upper Roanoke**	**Bottom Creek**	**Intermittent**	**Temporary Access Road**	**42**	**0.85**	**35.66**	**1**	**1.48**	**62.16**		**1.86**	**1.86**
S-EF55	UNT to Bottom Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Intermittent	Pipeline ROW	33	0.71	23.43	1	1.28	42.24		1.27	1.27
S-EF34b	UNT to Bottom Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Perennial	Pipeline ROW	81	0.95	77.11	1	1.36	110.16		3.30	3.30
S-EF33	UNT to Bottom Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Intermittent	Pipeline ROW	148	0.60	88.80	1	1.14	168.72		5.06	5.06
S-IJ85[1,B]	**UNT to Bottom Creek**	**Roanoke**	**Norfolk**	**Upper Roanoke**	**Bottom Creek**	**Perennial**	**Permanent Access Road**	**50**	**0.92**	**46.00**	**1**	**1.50[3]**	**75.15**		**2.25**	**2.25**
S-IJ83	UNT to Bottom Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Intermittent	Timber Mat Crossing	148	0.65	96.64	1	1.41	208.68		6.26	6.26
S-KL25[B]	**UNT to Mill Creek**	**Roanoke**	**Norfolk**	**Upper Roanoke**	**Bottom Creek**	**Intermittent**	**Pipeline ROW**	**82**	**0.725**	**59.45**	**1**	**1.15**	**94.30**		**2.83**	**2.83**
S-B21	UNT to Mill Creek	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	Perennial	Pipeline ROW	92	0.76	70.20	1	1.28	117.76		3.53	3.53
S-G24	UNT to Green Creek	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	Intermittent	Pipeline ROW	75	0.65	48.45	1	1.26	94.50		2.84	2.84
S-G25	UNT to Green Creek	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	Intermittent	Pipeline ROW	42	0.41	17.22	1	1.18	49.56		1.49	1.49
S-RR18[B]	**UNT to Green Creek**	**Franklin**	**Norfolk**	**Upper Roanoke**	**South Fork Blackwater River**	**Intermittent**	**Permanent Access Road**	**8**	**0.444**	**3.55**	**1**	**1.24**	**9.92**	**1.49**		**1.49**
S-D8	North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Perennial	Pipeline ROW	78	0.87	67.70	1	1.35	105.30		3.16	3.16
S-D12	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Intermittent	Pipeline ROW	54	0.58	31.10	1	1.10	59.40		1.78	1.78
S-D13	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Intermittent	Pipeline ROW	117	0.45	53.12	1	0.94	109.98		3.30	3.30
S-D14	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Intermittent	Pipeline ROW	234	0.42	98.98	1	0.85	198.90		5.97	5.97
S-GH15	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Intermittent	Pipeline ROW	75	0.47	35.25	1	1.11	83.25		2.50	2.50
S-GH14	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Perennial	Pipeline ROW	76	0.84	63.84	1	1.16	88.16		2.64	2.64
S-GH11[B]	**UNT to North Fork Blackwater River**	**Franklin**	**Norfolk**	**Upper Roanoke**	**North Fork Blackwater River**	**Intermittent**	**Pipeline ROW**	**77**	**0.494**	**38.04**	**1**	**1.12**	**86.24**		**2.59**	**2.59**
S-GH9	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Perennial	Pipeline ROW	78	0.89	69.42	1	1.07	83.46		2.50	2.50
S-RR09	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Ephemeral	Pipeline ROW	77	0.52	40.04	1	0.39	30.03		0.90	0.90
S-RR11	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Ephemeral	Pipeline ROW	77	0.68	52.36	1	0.40	30.80		0.92	0.92
S-IJ1	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Perennial	Pipeline ROW	107	0.73	77.90	1	1.25	133.75		4.01	4.01
S-IJ2	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Intermittent	Pipeline ROW	40	0.39	15.56	1	1.06	42.40		1.27	1.27
S-II6	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Timber Mat Crossing	20	0.48	9.68	1	0.66	13.20	1.98		1.98
S-IJ3[B]	**UNT to North Fork Blackwater River**	**Franklin**	**Norfolk**	**Upper Roanoke**	**North Fork Blackwater River**	**Intermittent**	**Timber Mat Crossing**	**21**	**0.338**	**7.10**	**1**	**1.18**	**24.78**	**3.72**		**3.72**
S-GH6	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.69	13.70	1	1.09	21.80	3.27		3.27
S-II12	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Timber Mat Crossing	20	0.66	13.16	1	1.03	20.60	3.09		3.09
S-II11	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.65	13.06	1	1.10	22.00	3.30		3.30
S-II8	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Timber Mat Crossing	20	0.58	11.68	1	0.74	14.80	2.22		2.22
S-II9	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.79	15.80	1	1.16	23.20		0.70	0.70
S-II7	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Timber Mat Crossing	20	0.59	11.80	1	1.14	22.80	3.42		3.42
S-IJ4	UNT to North Fork Blackwater River	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	Perennial	Timber Mat Crossing	20	0.89	17.74	1	1.22	24.40	3.66		3.66
S-KL2	UNT to Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.77	15.30	1	1.10	22.00	3.30		3.30
S-GH2	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Timber Mat Crossing	20	0.35	6.90	1	0.74	14.80	2.22		2.22
S-GH4[B]	**UNT to Teels Creek**	**Franklin**	**Norfolk**	**Upper Roanoke**	**Madcap Creek-Blackwater River**	**Perennial**	**Timber Mat Crossing**	**20**	**0.82**	**16.30**	**1**	**1.22**	**24.40**		**0.73**	**0.73**
S-GH3	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.82	16.32	1	1.16	23.20		0.70	0.70
S-IJ10	Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.81	16.14	1	1.07	21.40		0.64	0.64
S-E29	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	80	0.84	67.12	1	1.26	100.80		3.02	3.02
S-E28 - West	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	82	0.85	69.95	1	1.26	103.32		3.10	3.10
S-E28 - Mid	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	76	0.82	62.17	1	1.24	94.24		2.83	2.83
S-E28 - East	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	101	0.84	85.14	1	1.20	121.20		3.64	3.64
S-EF4	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	80	0.86	68.64	1	1.36	108.80		3.26	3.26
S-EF7	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	Timber Mat Crossing	20	0.58	11.56	1	0.42	8.40		0.25	0.25
S-EF7 - atws	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	ATWS	22	0.52	11.51	1	0.46	10.12		0.30	0.30
S-EF12	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	79	0.90	71.34	1	1.32	104.28		3.13	3.13
S-MM42	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	Pipeline ROW	81	0.45	36.45	1	0.38	30.78		0.92	0.92

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-D23	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	92	0.77	70.84	1	1.12	103.04		3.09	3.09
S-D22	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Pipeline ROW	83	0.72	59.76	1	1	83.00		2.49	2.49
S-D18	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	Pipeline ROW	30	0.35	10.50	1	0.4	12.00		0.36	0.36
S-RR15	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.78	15.60	1	1.24	24.80		0.74	0.74
S-D20	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Pipeline ROW	76	0.40	30.40	1	0.96	72.96		2.19	2.19
S-EF48	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Pipeline ROW	86	0.46	39.30	1	0.93	79.98		2.40	2.40
S-YZ4	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	Pipeline ROW	84	0.54	45.02	1	0.43	36.12		1.08	1.08
S-C14	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	90	0.78	69.84	1	1.35	121.50		3.65	3.65
S-YZ5	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	Pipeline ROW	86	0.52	44.98	1	0.43	36.98		1.11	1.11
S-KL41	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	75	0.84	63.23	1	1.15	86.25		2.59	2.59
S-KL39	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	121	0.80	96.80	1	1.07	129.47		3.88	3.88
S-C16	UNT to Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.73	14.66	1	0.95	19.00	2.85		2.85
S-KL54	UNT to Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Perennial	Pipeline ROW	76	0.81	61.56	1	1.07	81.32		2.44	2.44
S-C8	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Intermittent	Pipeline ROW	86	0.50	42.74	1	0.93	79.98		2.40	2.40
S-F4	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Ephemeral	Pipeline ROW	82	0.55	45.35	1	0.62	50.84		1.53	1.53
S-C17	Teels Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	30	0.86	25.77	1	1.34	40.20		1.21	1.21
S-KL52	UNT to Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Ephemeral	Pipeline ROW	105	0.45	46.83	1	0.37	38.85		1.17	1.17
S-S11[B]	UNT to Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Perennial	Temporary Access Road	41	-	-	1	1.50[3]	61.62	9.24		9.24
S-F8	UNT to Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Perennial	Pipeline ROW	83	0.94	78.02	1	1.07	88.81		2.66	2.66
S-CD6	Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	77	0.83	63.76	1	1.26	97.02		2.91	2.91
S-HH4	UNT to Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Intermittent	Pipeline ROW	97	0.56	54.03	1	1.10	106.70		3.20	3.20
S-KL51	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	67	0.86	57.42	1	1.15	77.05		2.31	2.31
S-KL38	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	78	0.75	58.66	1	1.03	80.34		2.41	2.41
S-C20	UNT to Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Ephemeral	Timber Mat Crossing	20	0.63	12.60	1	0.29	5.80		0.17	0.17
S-C19	Maggodee Creek	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	Perennial	Pipeline ROW	75	0.77	57.38	1	1.04	78.00		2.34	2.34
S-KL36	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	20	0.87	17.30	1	1.32	26.40		0.79	0.79
S-F11	Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	91	0.59	53.24	1	1.11	101.01		3.03	3.03
S-KL35	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Timber Mat Crossing	35	0.74	25.83	1	1.32	46.20		1.39	1.39
S-F9b	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	76	0.90	68.40	1	1.36	103.36		3.10	3.10
S-II2	Little Creek	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	76	0.88	66.50	1	1.33	101.08		3.03	3.03
S-F10	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Ephemeral	Timber Mat Crossing	20	0.50	10.04	1	0.42	8.40		0.25	0.25
S-CD1	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	Perennial	Pipeline ROW	104	0.71	73.63	1	1.11	115.44		3.46	3.46
S-F9a	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Timber Mat Crossing	20	0.48	9.50	1	1.01	20.20		0.61	0.61
S-MM29[B]	**UNT to Maple Branch**	**Franklin**	**Norfolk**	**Upper Roanoke**	**Standiford Creek-Smith Mountain Lake**	**Perennial**	**Temporary Access Road**	**42**	**0.90**	**37.59**	**1**	**1.33**	**55.86**	**8.38**		**8.38**
S-MM23[1,B]	**Maple Branch**	**Franklin**	**Norfolk**	**Upper Roanoke**	**Standiford Creek-Smith Mountain Lake**	**Perennial**	**Temporary Access Road**	**78**	**0.90**	**69.81**	**1**	**1.21**	**94.38**	**14.16**		**14.16**
S-GG4	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Ephemeral	Timber Mat Crossing	20	0.61	12.20	1	0.37	7.40		0.22	0.22
S-A36	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Ephemeral	Pipeline ROW	77	0.57	43.81	1	0.36	27.72		0.83	0.83
S-A38	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Timber Mat Crossing	30	0.46	13.80	1	1.09	32.70		0.98	0.98
S-A40[B]	**UNT to Foul Ground Creek**	**Franklin**	**Norfolk**	**Upper Roanoke**	**Standiford Creek-Smith Mountain Lake**	**Intermittent**	**Timber Mat Crossing**	**13**	**0.50**	**6.53**	**1**	**1.09**	**14.17**		**0.43**	**0.43**
S-A41	Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	76	0.683	51.91	1	1.02	77.52		2.33	2.33
S-GH36	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Timber Mat Crossing	20	0.45	8.96	1	1.06	21.20		0.64	0.64
S-KL17	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Timber Mat Crossing	20	0.62	12.40	1	1.24	24.80		0.74	0.74
S-GH37	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Pipeline ROW	46	0.47	21.62	1	0.93	42.78		1.28	1.28
S-GH38[B]	**UNT to Foul Ground Creek**	**Franklin**	**Norfolk**	**Upper Roanoke**	**Standiford Creek-Smith Mountain Lake**	**Intermittent**	**Pipeline ROW**	**7**	**0.483**	**3.38**	**1**	**1.00**	**7.00**		**0.21**	**0.21**
S-GH39	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Pipeline ROW	103	0.47	48.31	1	0.93	95.79		2.87	2.87
S-GH40	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Ephemeral	Pipeline ROW	89	0.53	47.35	1	0.43	38.27		1.15	1.15
S-GH44	UNT to Foul Ground Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Timber Mat Crossing	103	0.80	82.81	1	1.15	118.45		3.55	3.55
S-G22	UNT to Poplar Camp Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	80	0.77	61.36	1	1.07	85.60		2.57	2.57
S-G23	UNT to Poplar Camp Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Pipeline ROW	42	0.70	29.53	1	0.95	39.90		1.20	1.20
S-G21[1,B]	UNT to Poplar Camp Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Pipeline ROW	54	0.70	37.96	1	1.03	55.62		1.67	1.67
S-G20	Poplar Camp Creek	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Timber Mat Crossing	20	0.80	16.04	1	0.99	19.80		0.59	0.59
S-G18	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Intermittent	Pipeline ROW	81	0.45	36.05	1	0.85	68.85		2.07	2.07
S-G17[1,B]	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Ephemeral	Timber Mat Crossing	20	0.50	10.04	1	0.33	6.60	0.99		0.99
S-E18	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	94	0.72	67.96	1	0.92	86.48		2.59	2.59
S-E17	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	95	0.89	84.08	1	1.13	107.35		3.22	3.22
S-E14	UNT to Blackwater River	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	Perennial	Pipeline ROW	82	0.83	67.98	1	1.15	94.30		2.83	2.83
S-H38	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.82	16.32	1	1.10	22.00		0.66	0.66
S-H32	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.85	17.00	1	1.27	25.40		0.76	0.76
S-H37	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Pipeline ROW	82	0.52	42.56	1	0.28	22.96		0.69	0.69
S-H34	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.82	16.36	1	1.09	21.80		0.65	0.65
S-H36	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.77	15.42	1	1.17	23.40		0.70	0.70

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-H30[1,B]	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	4	0.69	2.77	1	0.87	3.48		0.10	0.10
S-A18	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	87	0.69	60.29	1	0.96	83.52		2.51	2.51
S-A19/H26	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	212	0.50	105.15	1	0.77	163.24		4.90	4.90
S-A20	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.87	17.40	1	0.81	16.20		0.49	0.49
S-H28	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Pipeline ROW	16	0.64	10.27	1	0.43	6.88		0.21	0.21
S-H27	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Pipeline ROW	36	0.58	20.84	1	0.42	15.12		0.45	0.45
S-A22	UNT to Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Timber Mat Crossing	20	0.58	11.50	1	0.89	17.80		0.53	0.53
S-MM44B	UNT to Little Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.66	13.16	1	1.08	21.60		0.65	0.65
S-MM46[1,B]	UNT to Little Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Timber Mat Crossing	9	0.58	5.18	1	1.44	12.96		0.39	0.39
S-MM45[1,B]	UNT to Little Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Timber Mat Crossing	33	0.58	19.11	1	0.43	14.19		0.43	0.43
S-MM48	UNT to Little Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	25	0.78	19.60	1	1.09	27.25		0.82	0.82
S-H25	Little Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.82	16.40	1	1.13	22.60		0.68	0.68
S-H24	UNT to Little Jacks Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.82	16.40	1	1.05	21.00		0.63	0.63
S-H23	UNT to Turkey Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Pipeline ROW	92	0.78	71.30	1	0.43	39.56		1.19	1.19
S-HH1	UNT to Turkey Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Pipeline ROW	18	0.60	10.76	1	0.43	7.74		0.23	0.23
S-A13	Turkey Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.82	16.40	1	1.09	21.80		0.65	0.65
S-A11	UNT to Turkey Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Ephemeral	Pipeline ROW	55	0.37	20.08	1	0.40	22.00		0.66	0.66
S-H17	Dinner Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	101	0.62	62.82	1	1.27	128.27		3.85	3.85
S-A7	UNT to Dinner Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.55	10.96	1	1.00	20.00		0.60	0.60
S-SS8	Polecat Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.86	17.16	1	1.41	28.20		0.85	0.85
S-CD8	UNT to Owens Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	78	0.61	47.74	1	1.23	95.94		2.88	2.88
S-AB8	UNT to Owens Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	84	0.72	60.31	1	1.10	92.40		2.77	2.77
S-DD3	Owens Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Timber Mat Crossing	20	0.91	18.16	1	1.25	25.00		0.75	0.75
S-G16	Strawfield Creek	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	30	0.84	25.20	1	1.25	37.50		1.13	1.13
S-G15	UNT to Parrot Branch	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Intermittent	Pipeline ROW	88	0.66	57.90	1	1.17	102.96		3.09	3.09
S-G13	Parrot Branch	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.84	16.88	1	1.33	26.60		0.80	0.80
S-D3	UNT to Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.75	14.96	1	1.31	26.20		0.79	0.79
S-D4	UNT to Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Intermittent	Pipeline ROW	105	0.49	51.87	1	1.25	131.25		3.94	3.94
S-D2	Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.81	16.22	1	1.25	25.00		0.75	0.75
S-D7	UNT to Jonnikin Creek	Franklin	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Intermittent	Pipeline ROW	80	0.26	20.80	1	0.70	56.00		1.68	1.68
S-D1-EPH[B]	**UNT to Jonnikin Creek**	**Pittsylvania**	**Norfolk**	**Upper Roanoke**	**Tomahawk Creek-Pigg River**	**Ephemeral**	**Pipeline ROW**	**61**	**0.46**	**27.82**	**1**	**0.33**	**20.13**		**0.60**	**0.60**
S-D1-INT[B]	**UNT to Jonnikin Creek**	**Pittsylvania**	**Norfolk**	**Upper Roanoke**	**Tomahawk Creek-Pigg River**	**Intermittent**	**Pipeline ROW**	**29**	**0.35**	**10.24**	**1**	**1.24**	**35.96**		**1.08**	**1.08**
S-G11	UNT to Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Intermittent	Pipeline ROW	77	0.85	65.30	1	1.05	80.85		2.43	2.43
S-G9	UNT to Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Intermittent	Pipeline ROW	79	0.70	55.14	1	1.00	79.00		2.37	2.37
S-G8	UNT to Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Intermittent	Pipeline ROW	90	0.53	47.97	1	1.02	91.80		2.75	2.75
S-Q15	UNT to Jonnikin Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Ephemeral	Pipeline ROW	103	0.51	52.94	1	0.31	31.93		0.96	0.96
S-A6	UNT to Rocky Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.77	15.40	1	0.95	19.00		0.57	0.57
S-H11-Braid	UNT to Rocky Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Ephemeral	Pipeline ROW	85	0.46	38.76	1	0.40	34.00	5.10		5.10
S-F2	UNT to Rocky Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Ephemeral	Timber Mat Crossing	20	0.63	12.50	1	0.36	7.20	1.08		1.08
S-C7	UNT to Rocky Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.78	15.58	1	1.18	23.60		0.71	0.71
S-C3	Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.63	12.62	1	1.12	22.40		0.67	0.67
S-C4	UNT to Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	58	0.65	37.87	1	0.84	48.72		1.46	1.46
S-H13	Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Pipeline ROW	77	0.76	58.21	1	0.83	63.91		1.92	1.92
S-G6	UNT to Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Intermittent	Pipeline ROW	80	0.79	63.44	1	0.99	79.20		2.38	2.38
S-G5	UNT to Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Ephemeral	Pipeline ROW	77	0.81	62.22	1	0.35	26.95		0.81	0.81
S-G4	Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	30	0.87	26.01	1	1.22	36.60		1.10	1.10
S-G3	UNT to Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.80	16.04	1	0.87	17.40		0.52	0.52
S-CC16	UNT to Harpen Creek	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	Perennial	Timber Mat Crossing	20	0.81	16.24	1	1.15	23.00		0.69	0.69
S-CC14	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Timber Mat Crossing	20	0.46	9.12	1	1.25	25.00		0.75	0.75
S-CC13	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Timber Mat Crossing	20	0.39	7.84	1	1.07	21.40		0.64	0.64
S-MM8	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.64	12.76	1	1.17	23.40		0.70	0.70
S-CC15	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.65	12.96	1	1.13	22.60		0.68	0.68
S-CC8	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Timber Mat Crossing	20	0.70	14.06	1	1.03	20.60		0.62	0.62
S-CC5[B]	**UNT to Cherrystone Creek**	**Pittsylvania**	**Norfolk**	**Banister**	**Cherrystone Creek**	**Perennial**	**Timber Mat Crossing**	**20**	**0.76**	**15.16**	**1**	**1.13**	**22.60**		**0.68**	**0.68**
S-CC5[B]	**UNT to Cherrystone Creek**	**Pittsylvania**	**Norfolk**	**Banister**	**Cherrystone Creek**	**Perennial**	**Timber Mat Crossing**	**54**	**0.71**	**38.34**	**1**	**0.74**	**39.96**		**1.20**	**1.20**
S-CC9	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Ephemeral	Pipeline ROW	81	0.54	43.58	1	0.37	29.97		0.90	0.90
S-CC10	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Pipeline ROW	78	0.63	48.83	1	0.93	72.54		2.18	2.18
S-MM10[B]	**UNT to Cherrystone Creek**	**Pittsylvania**	**Norfolk**	**Banister**	**Cherrystone Creek**	**Intermittent**	**Pipeline ROW**	**9**	**0.39**	**3.48**	**1**	**0.50**	**4.50**		**0.14**	**0.14**
S-CC11	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Pipeline ROW	87	0.94	81.35	1	1.37	119.19		3.58	3.58
S-CC1	Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Pipeline ROW	82	0.83	68.31	1	1.37	112.34		3.37	3.37
S-CC3	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Ephemeral	Pipeline ROW	91	0.63	57.06	1	0.43	39.13		1.17	1.17

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-P5	UNT to Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Ephemeral	Timber Mat Crossing	20	0.60	12.08	1	0.38	7.60		0.23	0.23
S-IJ35-EPH	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Ephemeral	Pipeline ROW	171	0.47	80.88	1	0.55	94.05		2.82	2.82
S-Q4	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.76	15.26	1	1.17	23.40		0.70	0.70
S-Q3	Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Pipeline ROW	75	0.76	56.85	1	1.25	93.75		2.81	2.81
S-Q2	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.73	14.60	1	1.25	25.00		0.75	0.75
S-B6	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Ephemeral	Pipeline ROW	84	0.82	68.63	1	0.55	46.20		1.39	1.39
S-B8	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Pipeline ROW	82	0.56	45.92	1	1.23	100.86		3.03	3.03
S-B9	UNT to Pole Bridge Branch	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Pipeline ROW	78	0.86	66.92	1	1.25	97.50		2.93	2.93
S-DD4-Braid-1	UNT to Mill Creek	Pittsylvania	Norfolk	Banister	Mill Creek-Whitehorn Creek	Intermittent	Pipeline ROW	67	-	-	1	0.96	64.32		1.93	1.93
S-DD4	UNT to Mill Creek	Pittsylvania	Norfolk	Banister	Mill Creek-Whitehorn Creek	Intermittent	Pipeline ROW	147	0.74	108.49	1	0.96	141.12		4.23	4.23
S-KL27	UNT to Mill Creek	Pittsylvania	Norfolk	Banister	Mill Creek-Whitehorn Creek	Ephemeral	Pipeline ROW	84	0.37	31.16	1	0.38	31.92		0.96	0.96
S-C1	Mill Creek	Pittsylvania	Norfolk	Banister	Mill Creek-Whitehorn Creek	Intermittent	Pipeline ROW	92	0.70	63.94	1	1.10	101.20		3.04	3.04
S-G2	Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.82	16.32	1	1.06	21.20		0.64	0.64
S-B2	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Ephemeral	Timber Mat Crossing	20	0.47	9.40	1	0.34	6.80		0.20	0.20
S-H55[B]	**UNT to Little Cherrystone Creek**	**Pittsylvania**	**Norfolk**	**Banister**	**Cherrystone Creek**	**Ephemeral**	**Timber Mat Crossing**	**20**	**0.39**	**7.84**	**1**	**0.39**	**7.80**		**0.23**	**0.23**
S-H54	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.91	18.16	1	1.37	27.40		0.82	0.82
S-GG11[B]	**UNT to Little Cherrystone Creek**	**Pittsylvania**	**Norfolk**	**Banister**	**Cherrystone Creek**	**Perennial**	**Timber Mat Crossing**	**46**	**0.88**	**40.39**	**1**	**1.18**	**54.28**		**1.63**	**1.63**
S-H3[1,B]	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Pipeline ROW	18	0.80	14.45	1	0.75	13.50		0.41	0.41
S-H5	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Pipeline ROW	83	0.82	67.89	1	1.37	113.71		3.41	3.41
S-OO1	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Pipeline ROW	84	0.80	67.45	1	1.21	101.64		3.05	3.05
S-H44	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	33	0.74	24.52	1	0.96	31.68		0.95	0.95
S-H42	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.84	16.86	1	1.38	27.60		0.83	0.83
S-OO2	UNT to Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Intermittent	Pipeline ROW	78	0.69	53.43	1	1.28	99.84		3.00	3.00

Stream ID	NHD Stream Name	County	USACE District	HUC 8	HUC 12	Flow Regime	Impact Type	Proposed Temporary Impact (Linear Feet)	WV SWVM INDEX VALUE	WV SWVM UNIT SCORE	UNITED STREAM METHODOLOGY[4]			Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Years)	Total Temporal Mitigation
											Impact Factor	Reach Condition Index[3]	Compensatory Value			
S-EF26	Little Cherrystone Creek	Pittsylvania	Norfolk	Banister	Cherrystone Creek	Perennial	Timber Mat Crossing	20	0.84	16.88	1	1.50	30.00		0.90	0.90

NOTES:

[1]Assessment data could not be collected for a small number of streams due to limited access (existing spans/perimeter controls) and/or poorly defined stream channels. For these streams, professional judgement was used to assign proxy values based on comparable streams in close proximity.
Where possible, a USM assessment was performed based on best professional judgement.

[2]Benthic sample data could not be collected at some crossing due to either dry stream conditions (no flow) or lack of suitable sampling habitat (riffles).

[3]USM data assumed optimal due to lack of access to resource.

[4]United Stream Methodology not determined at West Virginia Crossings in the Project Area

'---Indicates the parameter was not assessable or was not applicable due to stream conditions during the time of baseline data collection.

NC : Not comparable due to insufficient number of individuals, thus WVSCI score was not reported on SWVM form.

[A]Site revisits were completed in March 2022. BOLD font indicates additional data was able to be collected.

[B]Site revisits were completed in January 2022. BOLD font indicates additional data was able to be collected.

Wetland ID	County	USACE District	HUC 8	HUC 12	Cowardin Class	Project Activity	Proposed Temporary Fill (acres)	Unit Score	Existing Temporary Fill Mitigation (6 years @ 3%)	Wetland Temporal Mitigation (2 years @ 3%)	Total Temporal Mitigation
W-A1a	Wetzel	Huntington	Middle Ohio-North	North Fork Fishing Creek	PEM	Pipeline ROW	0.0038	0.0038	-	0.0002	0.0002
W-A2a	Wetzel	Huntington	Middle Ohio-North	North Fork Fishing Creek	PEM	Timber Mat Crossing	0.0424	0.0424	0.0076	-	0.0076
W-IJ31	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	PEM	ATWS	0.0992	0.0992	0.0179	-	0.0179
W-A27-PEM	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	PEM	Pipeline ROW	0.0497	0.0497	0.0089	-	0.0089
W-A35	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	PEM	Timber Mat Crossing	0.0066	0.0066	0.0012	-	0.0012
W-A34	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	PEM	Pipeline ROW	0.0296	0.0296	0.0053	-	0.0053
W-WX5	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	PEM	Temporary Access Road	0.0011	0.0011	0.0002	-	0.0002
W-WX4	Wetzel	Huntington	Middle Ohio-North	Headwaters South Fork Fishing Creek	PEM	Temporary Access Road	0.0095	0.0095	0.0017	-	0.0017
W-B55	Harrison	Pittsburgh	West Fork	Little Tenmile Creek	PEM	Timber Mat Crossing	0.0054	0.0054	0.0010	-	0.0010
W-J32-PEM-1	Harrison	Pittsburgh	West Fork	Little Tenmile Creek	PEM	Temporary Access Road	0.0417	0.0417	0.0075	-	0.0075
W-A10a	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	PEM	Timber Mat Crossing	0.0153	0.0153	0.0028	-	0.0028
W-B1a	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	PEM	Pipeline ROW	0.0119	0.0119	0.0021	-	0.0021
W-A40	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	PEM	Pipeline ROW/ATWS	0.3111	0.3111	0.0560	-	0.0560
W-A39	Harrison	Pittsburgh	West Fork	Outlet Tenmile Creek	PEM	Permanent Access Road	0.0280	0.0280	0.0050	-	0.0050
W-ST11	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Temporary Access Road/ATWS	0.0228	0.0228	0.0041	-	0.0041
W-ST12-PEM	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Temporary Access Road/ATWS	0.0582	0.0582	0.0105	-	0.0105
W-B2a	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	ATWS	0.1953	0.1953	0.0352	-	0.0352
W-B4a	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Timber Mat Crossing	0.0214	0.0214	0.0039	-	0.0039
W-UU4a	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Pipeline ROW/ATWS	0.1268	0.1268	0.0228	-	0.0228
W-F52	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Temporary Access Road	0.0625	0.0625	0.0113	-	0.0113
W-F54	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Timber Mat Crossing	0.0042	0.0042	0.0008	-	0.0008
W-F53	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Timber Mat Crossing	0.0080	0.0080	0.0014	-	0.0014
W-F55	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Timber Mat Crossing	0.0173	0.0173	0.0031	-	0.0031
W-K43	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Pipeline ROW	0.2086	0.2086	0.0375	-	0.0375
W-K44	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Pipeline ROW	0.0671	0.0671	0.0121	-	0.0121
W-K52	Doddridge	Huntington	Middle Ohio-North	Buckeye Creek	PEM	Permanent Access Road	0.0021	0.0021	0.0004	-	0.0004
W-K45	Doddridge	Huntington	Middle Ohio-North	Buckeye Creek	PEM	Pipeline ROW	0.0401	0.0401	-	0.0024	0.0024
W-CV15	Harrison	Pittsburgh	West Fork	Headwaters Tenmile Creek	PEM	Timber Mat Crossing	0.0512	0.0512	0.0092	-	0.0092
W-K41	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	PEM	Timber Mat Crossing	0.0109	0.0109	0.0020	-	0.0020
W-A23	Doddridge	Huntington	Middle Ohio-North	Meathouse Fork	PEM	Pipeline ROW	0.2701	0.2701	-	0.0162	0.0162
W-J40	Lewis	Pittsburgh	West Fork	Kincheloe Creek	PEM	Pipeline ROW	0.2931	0.2931	-	0.0176	0.0176
W-J40	Lewis	Pittsburgh	West Fork	Kincheloe Creek	PEM	Temporary Access Road	0.1812	0.1812	-	0.0109	0.0109
W-A24	Harrison	Pittsburgh	West Fork	Kincheloe Creek	PEM	Temporary Access Road	0.0002	0.0002	-	0.0000	0.0000
W-VV5	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	ATWS	0.0202	0.0202	0.0036	-	0.0036
W-IJ23	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Temporary Access Road	0.0065	0.0065	-	0.0004	0.0004
W-IJ24	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Temporary Access Road	0.0041	0.0041	-	0.0002	0.0002
W-J20	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Permanent Access Road	0.0081	0.0081	-	0.0005	0.0005
W-J23	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Pipeline ROW	0.0130	0.0130	-	0.0008	0.0008
W-B57	Lewis	Huntington	Little Kanawha	Fink Creek	PEM	Pipeline ROW/Temporary Access Road	0.0336	0.0336	-	0.0020	0.0020
W-K33-PEM	Lewis	Huntington	Little Kanawha	Fink Creek	PEM	Pipeline ROW	0.1544	0.1544	0.0278	-	0.0278
W-K34-PEM	Lewis	Huntington	Little Kanawha	Fink Creek	PEM	Timber Mat Crossing	0.0253	0.0253	-	0.0015	0.0015
W-K31	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Pipeline ROW/Temporary Access Road	0.1135	0.1135	0.0204	-	0.0204
W-ST14	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Anode Bed	0.0394	0.0394	-	0.0024	0.0024
W-ST15	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Anode Bed	0.0711	0.0711	-	0.0043	0.0043
W-B46	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Pipeline ROW/Temporary Access Road	0.1255	0.1255	0.0226	-	0.0226
W-B47	Lewis	Pittsburgh	West Fork	Freemans Creek	PEM	Timber Mat Crossing	0.0682	0.0682	0.0123	-	0.0123
W-H112	Lewis	Pittsburgh	West Fork	Polk Creek-West Fork River	PEM	Pipeline ROW	0.0231	0.0231	-	0.0014	0.0014
W-I22-PEM	Lewis	Huntington	Little Kanawha	Headwaters Leading Creek	PEM	ATWS	0.0018	0.0018	-	0.0001	0.0001
W-I22-PEM	Lewis	Huntington	Little Kanawha	Headwaters Leading Creek	PEM	Timber Mat Crossing	0.0162	0.0162	0.0029	-	0.0029
W-I15	Lewis	Huntington	Little Kanawha	Headwaters Sand Fork	PEM	Pipeline ROW	0.0631	0.0631	0.0114	-	0.0114
W-I20	Lewis	Huntington	Little Kanawha	Headwaters Sand Fork	PEM	Timber Mat Crossing	0.0379	0.0379	-	0.0023	0.0023
W-I21	Lewis	Huntington	Little Kanawha	Headwaters Sand Fork	PEM	Timber Mat Crossing	0.0631	0.0631	0.0114	-	0.0114
W-UU7	Lewis	Huntington	Little Kanawha	Indian Fork	PEM	Pipeline ROW	0.0038	0.0038	-	0.0002	0.0002
W-H107	Lewis	Huntington	Little Kanawha	Indian Fork	PEM	Timber Mat Crossing	0.0328	0.0328	-	0.0020	0.0020
W-H98	Lewis	Huntington	Little Kanawha	Indian Fork	PEM	Temporary Access Road	0.0032	0.0032	0.0006	-	0.0006
W-H108	Lewis	Huntington	Little Kanawha	Indian Fork	PEM	Pipeline ROW	0.0278	0.0278	-	0.0017	0.0017
W-H95	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Timber Mat Crossing	0.0414	0.0414	-	0.0025	0.0025
W-VV9	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Pipeline ROW	0.0534	0.0534	-	0.0032	0.0032
W-CD17	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Timber Mat Crossing	0.0335	0.0335	-	0.0020	0.0020
W-CD16	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Pipeline ROW	0.0226	0.0226	-	0.0014	0.0014
W-CD16	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road/ ATWS	0.0023	0.0023	0.0004	-	0.0004
W-VV8	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Pipeline ROW	0.0708	0.0708	-	0.0042	0.0042
W-CD18	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0322	0.0322	0.0058	-	0.0058

Wetland ID	County	USACE District	HUC 8	HUC 12	Cowardin Class	Project Activity	Proposed Temporary Fill (acres)	Unit Score	Existing Temporary Fill Mitigation (6 years @ 3%)	Wetland Temporal Mitigation (2 years @ 3%)	Total Temporal Mitigation
W-CD19	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0080	0.0080	0.0014	-	0.0014
W-CD21	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0161	0.0161	0.0029	-	0.0029
W-CD23	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0349	0.0349	0.0063	-	0.0063
W-CD24	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0094	0.0094	0.0017	-	0.0017
W-CD36	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0049	0.0049	0.0009	-	0.0009
W-CD25	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0100	0.0100	0.0018	-	0.0018
W-CD26	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0114	0.0114	0.0021	-	0.0021
W-VV10	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0091	0.0091	0.0016	-	0.0016
W-ST16	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Anode Bed	0.0711	0.0711	-	0.0043	0.0043
W-VV11	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0246	0.0246	0.0044	-	0.0044
W-VV12	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Temporary Access Road	0.0277	0.0277	0.0050	-	0.0050
W-VV3-PEM	Lewis	Huntington	Little Kanawha	Oil Creek	PEM	Pipeline ROW	0.0447	0.0447	-	0.0027	0.0027
W-H90	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	PEM	Pipeline ROW	0.0388	0.0388	-	0.0023	0.0023
W-QR13	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	PEM	Temporary Access Road	0.0618	0.0618	0.0111	-	0.0111
W-QR12	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	PEM	Temporary Access Road	0.0881	0.0881	0.0159	-	0.0159
W-QR11	Braxton	Huntington	Little Kanawha	Falls Run-Little Kanawha River	PEM	Temporary Access Road	0.0559	0.0559	0.0101	-	0.0101
W-I11b	Braxton	Huntington	Elk	Outlet Holly River	PEM	Timber Mat Crossing	0.0098	0.0098	-	0.0006	0.0006
W-R2	Webster	Huntington	Elk	Outlet Holly River	PEM	Temporary Access Road	0.0620	0.0620	0.0112	-	0.0112
W-KK3	Webster	Huntington	Elk	Outlet Holly River	PEM	Pipeline ROW	0.0222	0.0222	-	0.0013	0.0013
W-R3	Webster	Huntington	Elk	Outlet Holly River	PEM	Temporary Access Road	0.0155	0.0155	0.0028	-	0.0028
W-F46	Webster	Huntington	Elk	Outlet Holly River	PEM	Timber Mat Crossing	0.0039	0.0039	0.0007	-	0.0007
W-R4	Webster	Huntington	Elk	Outlet Holly River	PEM	Temporary Access Road	0.0432	0.0432	0.0078	-	0.0078
W-H75	Webster	Huntington	Elk	Big Run-Elk River	PEM	Pipeline ROW	0.0108	0.0108	-	0.0006	0.0006
W-H79	Webster	Huntington	Elk	Big Run-Elk River	PEM	Timber Mat Crossing	0.0077	0.0077	-	0.0005	0.0005
W-H81	Webster	Huntington	Elk	Big Run-Elk River	PEM	Timber Mat Crossing	0.0237	0.0237	-	0.0014	0.0014
W-H82	Webster	Huntington	Elk	Big Run-Elk River	PEM	Timber Mat Crossing	0.0128	0.0128	-	0.0008	0.0008
W-H86	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	PEM	Pipeline ROW	0.0013	0.0013	-	0.0001	0.0001
W-H83	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	PEM	Pipeline ROW/Temporary Access Road	0.0177	0.0177	-	0.0011	0.0011
W-T4	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	PEM	Temporary Access Road	0.0403	0.0403	0.0073	-	0.0073
W-H85	Webster	Huntington	Elk	Upper Sutton Lake-Elk River	PEM	Pipeline ROW	0.0069	0.0069	-	0.0004	0.0004
W-A19	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Temporary Access Road	0.0265	0.0265	-	0.0016	0.0016
W-H64-PEM	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0276	0.0276	-	0.0017	0.0017
W-H64-PEM-2	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0289	0.0289	0.0052	-	0.0052
W-H56	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0206	0.0206	-	0.0012	0.0012
W-KL8	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0976	0.0976	-	0.0059	0.0059
W-H60	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0495	0.0495	0.0089	-	0.0089
W-H61	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0094	0.0094	0.0017	-	0.0017
W-H62	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0335	0.0335	-	0.0020	0.0020
W-B39	Webster	Huntington	Elk	Outlet Laurel Creek	PEM	Pipeline ROW	0.0906	0.0906	-	0.0054	0.0054
W-B31	Webster	Huntington	Elk	Headwaters Laurel Creek	PEM	Pipeline ROW	0.0515	0.0515	-	0.0031	0.0031
W-A18	Webster	Huntington	Elk	Headwaters Laurel Creek	PEM	Temporary Access Road	0.2038	0.2038	-	0.0122	0.0122
W-F26	Webster	Huntington	Elk	Upper Birch River	PEM	Timber Mat Crossing	0.0045	0.0045	-	0.0003	0.0003
W-F29	Webster	Huntington	Elk	Upper Birch River	PEM	Timber Mat Crossing	0.0071	0.0071	0.0013	-	0.0013
W-F28	Webster	Huntington	Elk	Upper Birch River	PEM	Timber Mat Crossing	0.0071	0.0071	0.0013	-	0.0013
W-F41	Webster	Huntington	Elk	Upper Birch River	PEM	Temporary Access Road	0.0002	0.0002	-	0.0000	0.0000
W-B30	Webster	Huntington	Elk	Upper Birch River	PEM	Pipeline ROW	0.0429	0.0429	0.0077	-	0.0077
W-B28	Webster	Huntington	Elk	Upper Birch River	PEM	Pipeline ROW	0.0992	0.0992	-	0.0060	0.0060
W-E21	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0389	0.0389	-	0.0023	0.0023
W-E18-PEM	Webster	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0208	0.0208	0.0037	-	0.0037
W-E16	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Timber Mat Crossing	0.0091	0.0091	-	0.0005	0.0005
W-F13	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0394	0.0394	0.0071	-	0.0071
W-F12	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0576	0.0576	0.0104	-	0.0104
W-F11	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0652	0.0652	0.0117	-	0.0117
W-K23	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0489	0.0489	0.0088	-	0.0088
W-K20	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Timber Mat Crossing	0.0100	0.0100	-	0.0006	0.0006
W-IJ51	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0410	0.0410	-	0.0025	0.0025
W-IJ50	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0528	0.0528	-	0.0032	0.0032
W-IJ55	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0218	0.0218	-	0.0013	0.0013
W-B27	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Timber Mat Crossing	0.0874	0.0874	-	0.0052	0.0052
W-B26-PEM-1	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Temporary Access Road	0.0273	0.0273	-	0.0016	0.0016
W-B26-PEM-2	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Temporary Access Road	0.0060	0.0060	-	0.0004	0.0004
W-FF6-PEM	Nicholas	Huntington	Gauley	Big Laurel Creek-Gauley River	PEM	Pipeline ROW	0.0793	0.0793	0.0143	-	0.0143
W-FF3	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Pipeline ROW	0.0444	0.0444	0.0080	-	0.0080

Wetland ID	County	USACE District	HUC 8	HUC 12	Cowardin Class	Project Activity	Proposed Temporary Fill (acres)	Unit Score	Existing Temporary Fill Mitigation (6 years @ 3%)	Wetland Temporal Mitigation (2 years @ 3%)	Total Temporal Mitigation
W-FF4	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Pipeline ROW	0.0037	0.0037	-	0.0002	0.0002
W-A17	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Pipeline ROW	0.1300	0.1300	0.0234	-	0.0234
W-H53	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Pipeline ROW	0.0039	0.0039	-	0.0002	0.0002
W-H50	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Temporary Access Road	0.0114	0.0114	0.0021	-	0.0021
W-N25	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Timber Mat Crossing	0.0104	0.0104	0.0019	-	0.0019
W-N24	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Timber Mat Crossing	0.0031	0.0031	-	0.0002	0.0002
W-N22	Nicholas	Huntington	Gauley	Big Beaver Creek	PEM	Timber Mat Crossing	0.0030	0.0030	-	0.0002	0.0002
W-CV13	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	PEM	Permanent Access Road	0.0159	0.0159	0.0029	-	0.0029
W-CV12	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	PEM	Temporary Access Road	0.0098	0.0098	0.0018	-	0.0018
W-RS04	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	PEM	Temporary Access Road	0.0254	0.0254	0.0046	-	0.0046
W-MN4	Nicholas	Huntington	Gauley	Panther Creek-Gauley River	PEM	Temporary Access Road	0.0463	0.0463	-	0.0028	0.0028
W-N18	Nicholas	Huntington	Gauley	Outlet Hominy Creek	PEM	Pipeline ROW	0.0075	0.0075	-	0.0005	0.0005
W-L28	Nicholas	Huntington	Gauley	Outlet Hominy Creek	PEM	Pipeline ROW	0.0064	0.0064	-	0.0004	0.0004
W-L27	Nicholas	Huntington	Gauley	Outlet Hominy Creek	PEM	Timber Mat Crossing	0.0029	0.0029	0.0005	-	0.0005
W-I11a	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Pipeline ROW	0.0579	0.0579	-	0.0035	0.0035
W-U7	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	ATWS	0.0666	0.0666	-	0.0040	0.0040
W-I5	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Pipeline ROW	0.0082	0.0082	-	0.0005	0.0005
W-VV2	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Timber Mat Crossing	0.0136	0.0136	0.0024	-	0.0024
W-N16	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Timber Mat Crossing	0.0232	0.0232	-	0.0014	0.0014
W-H41	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Timber Mat Crossing	0.0151	0.0151	0.0027	-	0.0027
W-H33	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Pipeline ROW	0.0590	0.0590	-	0.0035	0.0035
W-H31	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Pipeline ROW	0.0139	0.0139	-	0.0008	0.0008
W-EF31	Nicholas	Huntington	Gauley	Headwaters Hominy Creek	PEM	Pipeline ROW/ATWS	0.0208	0.0208	-	0.0012	0.0012
W-M18	Greenbrier	Huntington	Gauley	Anglins Creek	PEM	Timber Mat Crossing	0.0364	0.0364	-	0.0022	0.0022
W-M20	Greenbrier	Huntington	Gauley	Anglins Creek	PEM	Pipeline ROW	0.0031	0.0031	-	0.0002	0.0002
W-M23	Greenbrier	Huntington	Gauley	Anglins Creek	PEM	Pipeline ROW	0.0616	0.0616	0.0111	-	0.0111
W-ST27	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	PEM	Temporary Access Road	0.0075	0.0075	0.0014	-	0.0014
W-KL40	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	PEM	Temporary Access Road	0.0312	0.0312	0.0056	-	0.0056
W-ST28	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	PEM	Temporary Access Road	0.0310	0.0310	0.0056	-	0.0056
W-IJ60	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	PEM	Temporary Access Road	0.0174	0.0174	0.0031	-	0.0031
W-IJ59	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	PEM	Temporary Access Road	0.0024	0.0024	0.0004	-	0.0004
W-IJ58-PEM-3	Greenbrier	Huntington	Gauley	Meadow Creek-Meadow River	PEM	Temporary Access Road	0.0056	0.0056	0.0010	-	0.0010
W-V6	Greenbrier	Huntington	Gauley	Big Clear Creek-Meadow River	PEM	Temporary Access Road	0.0422	0.0422	0.0076	-	0.0076
W-QR2	Greenbrier	Huntington	Gauley	Big Clear Creek-Meadow River	PEM	Pipeline ROW/Temporary Access Road	0.2435	0.2435	0.0438	-	0.0438
W-L16	Greenbrier	Huntington	Gauley	Big Clear Creek-Meadow River	PEM	Pipeline ROW	0.0247	0.0247	-	0.0015	0.0015
W-L19	Greenbrier	Huntington	Gauley	Sewell Creek	PEM	Pipeline ROW/Temporary Access Road	0.1060	0.1060	-	0.0064	0.0064
W-L13	Greenbrier	Huntington	Gauley	Sewell Creek	PEM	Pipeline ROW	0.0316	0.0316	-	0.0019	0.0019
W-L12	Greenbrier	Huntington	Gauley	Sewell Creek	PEM	Pipeline ROW	0.0075	0.0075	-	0.0005	0.0005
W-L11	Greenbrier	Huntington	Gauley	Sewell Creek	PEM	Pipeline ROW	0.0194	0.0194	0.0035	-	0.0035
W-L4	Greenbrier	Huntington	Gauley	Sewell Creek	PEM	Pipeline ROW	0.0404	0.0404	-	0.0024	0.0024
W-L2	Greenbrier	Huntington	Gauley	Sewell Creek	PEM	Pipeline ROW/Temporary Access Road	0.0393	0.0393	0.0071	-	0.0071
W-W10	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Temporary Access Road	0.0488	0.0488	-	0.0029	0.0029
W-K7	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.0078	0.0078	-	0.0005	0.0005
W-K7	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.3206	0.3206	-	0.0192	0.0192
W-IJ30	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.3236	0.3236	-	0.0194	0.0194
W-UV9	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.1090	0.1090	-	0.0065	0.0065
W-UV11	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.0285	0.0285	-	0.0017	0.0017
W-UV10	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.0035	0.0035	-	0.0002	0.0002
W-K9-PEM-1	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.0354	0.0354	-	0.0021	0.0021
W-K10	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.0068	0.0068	-	0.0004	0.0004
W-UV8	Greenbrier	Huntington	Gauley	Otter Creek-Meadow River	PEM	Pipeline ROW	0.4913	0.4913	-	0.0295	0.0295
W-EE4	Summers	Huntington	Lower New	Lick Creek	PEM	Pipeline ROW	0.0453	0.0453	-	0.0027	0.0027
W-M2	Summers	Huntington	Lower New	Lick Creek	PEM	Pipeline ROW	0.1064	0.1064	-	0.0064	0.0064
W-EF40	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	PEM	Pipeline ROW	0.0889	0.0889	0.0160	-	0.0160
W-K2-PEM	Summers	Huntington	Greenbrier	Hungard Creek-Greenbrier River	PEM	Pipeline ROW	0.0140	0.0140	-	0.0008	0.0008
W-OP1	Monroe	Huntington	Greenbrier	Stony Creek-Greenbrier River	PEM	Pipeline ROW	0.1359	0.1359	-	0.0082	0.0082
W-A13	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW/Temporary Access Road	0.2991	0.2991	0.0538	-	0.0538
W-MN14	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW/Access Road/ATWS	0.0390	0.0390	-	0.0023	0.0023
W-MN15	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW	0.0070	0.0070	-	0.0004	0.0004
W-MN18-PEM	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW	0.0510	0.0510	-	0.0031	0.0031
W-MN1	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Timber Mat Crossing	0.0187	0.0187	-	0.0011	0.0011
W-G6	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW	0.0684	0.0684	0.0123	-	0.0123
W-MN24	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW	0.0100	0.0100	-	0.0006	0.0006

Wetland ID	County	USACE District	HUC 8	HUC 12	Cowardin Class	Project Activity	Proposed Temporary Fill (acres)	Unit Score	Existing Temporary Fill Mitigation (6 years @ 3%)	Wetland Temporal Mitigation (2 years @ 3%)	Total Temporal Mitigation
W-CV25-PEM-2	Monroe	Huntington	Upper New	Middle Indian Creek	PEM	Pipeline ROW	0.0200	0.0200	-	0.0012	0.0012
W-E12	Monroe	Huntington	Upper New	Rich Creek	PEM	Pipeline ROW	0.0041	0.0041	-	0.0002	0.0002
W-C14	Monroe	Huntington	Upper New	Rich Creek	PEM	Pipeline ROW	0.0113	0.0113	0.0020	-	0.0020
W-C13	Monroe	Huntington	Upper New	Rich Creek	PEM	Pipeline ROW	0.2172	0.2172	0.0391	-	0.0391
W-C17	Monroe	Huntington	Upper New	Rich Creek	PEM	Temporary Access Road	0.0306	0.0306	0.0055	-	0.0055
W-Z11	Giles	Norfolk	Middle New	Little Stony Creek-New River	PEM	Pipeline ROW	0.0262	0.0262	-	0.0016	0.0016
W-CD12	Giles	Norfolk	Middle New	Upper Sinking Creek	PEM	Pipeline ROW	0.0208	0.0208	-	0.0012	0.0012
W-MM10	Giles	Norfolk	Middle New	Upper Sinking Creek	PEM	Temporary Access Road	0.0254	0.0254	0.0046	-	0.0046
W-IJ46-PEM	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	PEM	Pipeline ROW	0.0294	0.0294	-	0.0018	0.0018
W-AD4	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	PEM	Temporary Access Road	0.0069	0.0069	-	0.0004	0.0004
W-NN6	Montgomery	Norfolk	Upper Roanoke	Dry Run-North Fork Roanoke River	PEM	Timber Mat Crossing	0.0083	0.0083	-	0.0005	0.0005
W-C12-PEM	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	PEM	Pipeline ROW	0.2066	0.2066	0.0372	-	0.0372
W-C6	Montgomery	Norfolk	Upper Roanoke	Wilson Creek-North Fork Roanoke River	PEM	Timber Mat Crossing	0.0139	0.0139	0.0025	-	0.0025
W-C5	Montgomery	Norfolk	Upper Roanoke	Bradshaw Creek-North Fork Roanoke River	PEM	Pipeline ROW	0.0454	0.0454	0.0082	-	0.0082
W-IJ96-PEM	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Temporary Access Road	0.0161	0.0161	-	0.0010	0.0010
W-EF42	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.0083	0.0083	-	0.0005	0.0005
W-HS02	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.2893	0.2893	-	0.0174	0.0174
W-AB6-PEM-2	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.3271	0.3271	-	0.0196	0.0196
W-AB6-PEM-1	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.0647	0.0647	-	0.0039	0.0039
W-AB3-PEM-2	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.1547	0.1547	-	0.0093	0.0093
W-KL48-PEM	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.0063	0.0063	-	0.0004	0.0004
W-KL50	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.0408	0.0408	-	0.0024	0.0024
W-IJ62	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Temporary Access Road	0.0001	0.0001	0.0000	-	0.0000
W-Y2	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Timber Mat Crossing	0.0189	0.0189	-	0.0011	0.0011
W-IJ10	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Permanent Access Road	0.0020	0.0020	-	0.0001	0.0001
W-Q11	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Permanent Access Road	0.0130	0.0130	0.0023	-	0.0023
W-KL1	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Permanent Access Road	0.0018	0.0018	0.0003	-	0.0003
W-B25-PEM-4	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Timber Mat Crossing	0.0093	0.0093	-	0.0006	0.0006
W-B25-PEM-1	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.1934	0.1934	-	0.0116	0.0116
W-B24-PEM	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Pipeline ROW	0.1031	0.1031	-	0.0062	0.0062
W-B25-PEM-1	Roanoke	Norfolk	Upper Roanoke	Bottom Creek	PEM	Timber Mat Crossing	0.0140	0.0140	-	0.0008	0.0008
W-ST2-PEM	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	PEM	Pipeline ROW	0.1142	0.1142	0.0206	-	0.0206
W-RR4	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	PEM	Permanent Access Road	0.0216	0.0216	0.0039	-	0.0039
W-RR3	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	PEM	Permanent Access Road	0.0019	0.0019	0.0003	-	0.0003
W-KL41	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	PEM	Permanent Access Road	0.0229	0.0229	0.0041	-	0.0041
W-D7-PEM	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	PEM	Pipeline ROW	0.0159	0.0159	0.0029	-	0.0029
W-EF3	Franklin	Norfolk	Upper Roanoke	South Fork Blackwater River	PEM	Permanent Access Road	0.0265	0.0265	0.0048	-	0.0048
W-IJ1	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	PEM	Pipeline ROW	0.0416	0.0416	0.0075	-	0.0075
W-IJ2-PEM	Franklin	Norfolk	Upper Roanoke	North Fork Blackwater River	PEM	Timber Mat Crossing	0.0036	0.0036	0.0006	-	0.0006
W-II8	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Timber Mat Crossing	0.0088	0.0088	0.0016	-	0.0016
W-IJ6	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Timber Mat Crossing	0.0046	0.0046	-	0.0003	0.0003
W-E7	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Pipeline ROW	0.2123	0.2123	0.0382	-	0.0382
W-E8	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Pipeline ROW	0.0691	0.0691	0.0124	-	0.0124
W-EF51	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Pipeline ROW	0.0133	0.0133	0.0024	-	0.0024
W-KL43b	Franklin	Norfolk	Upper Roanoke	Maggodee Creek	PEM	Pipeline ROW	0.0004	0.0004	-	0.0000	0.0000
W-CD6	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Pipeline ROW	0.0934	0.0934	0.0168	-	0.0168
W-EF48	Franklin	Norfolk	Upper Roanoke	Madcap Creek-Blackwater River	PEM	Pipeline ROW	0.0080	0.0080	0.0014	-	0.0014
W-DD1	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	PEM	Pipeline ROW	0.0813	0.0813	0.0146	-	0.0146
W-A12-PEM	Franklin	Norfolk	Upper Roanoke	Standiford Creek-Smith Mountain Lake	PEM	Pipeline ROW	0.0651	0.0651	-	0.0039	0.0039
W-H11	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	PEM	Pipeline ROW	0.0468	0.0468	0.0084	-	0.0084
W-H16	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	PEM	Pipeline ROW	0.0232	0.0232	0.0042	-	0.0042
W-H14	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	PEM	Timber Mat Crossing	0.0061	0.0061	-	0.0004	0.0004
W-A8	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	PEM	Pipeline ROW	0.0154	0.0154	-	0.0009	0.0009
W-H9	Franklin	Norfolk	Upper Roanoke	Owens Creek-Pigg River	PEM	Pipeline ROW	0.0085	0.0085	0.0015	-	0.0015
W-H6	Franklin	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	PEM	Pipeline ROW	0.0057	0.0057	-	0.0003	0.0003
W-MM17	Franklin	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	PEM	Pipeline ROW	0.0068	0.0068	0.0012	-	0.0012
W-B5	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	PEM	Pipeline ROW	0.0048	0.0048	0.0009	-	0.0009
W-C1	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	PEM	Timber Mat Crossing	0.0182	0.0182	-	0.0011	0.0011
W-H5	Pittsylvania	Norfolk	Upper Roanoke	Tomahawk Creek-Pigg River	PEM	Pipeline ROW	0.2067	0.2067	0.0372	-	0.0372
W-B3	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Timber Mat Crossing	0.0013	0.0013	-	0.0001	0.0001
W-CC2-PEM	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Timber Mat Crossing	0.0272	0.0272	-	0.0016	0.0016
W-MM9	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.0108	0.0108	0.0019	-	0.0019
W-MM8-PEM	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.0553	0.0553	0.0100	-	0.0100

Wetland ID	County	USACE District	HUC 8	HUC 12	Cowardin Class	Project Activity	Proposed Temporary Fill (acres)	Unit Score	Existing Temporary Fill Mitigation (6 years @ 3%)	Wetland Temporal Mitigation (2 years @ 3%)	Total Temporal Mitigation
W-Q1	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.0146	0.0146	0.0026	-	0.0026
W-G2	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.0346	0.0346	0.0062	-	0.0062
W-H1	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.0110	0.0110	0.0020	-	0.0020
W-H2	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.7987	0.7987	0.1438	-	0.1438
W-H3	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Pipeline ROW	0.0509	0.0509	-	0.0031	0.0031
W-IJ22-PEM	Pittsylvania	Norfolk	Banister	Cherrystone Creek	PEM	Timber Mat Crossing	0.0390	0.0390	-	0.0023	0.0023

HUC 8	Stream			Wetland		
	Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Year)	Total	Existing Temporary Fill Mitigation (6 years @ 3%)	Proposed Temporal Mitigation (1 Year)	Total
Middle Ohio-North	19.13	20.19	39.32	0.0452	0.0188	0.0640
West Fork	50.78	23.11	73.89	0.2852	0.0384	0.3235
Little Kanawha	121.50	42.74	164.24	0.1254	0.0324	0.1577
Elk	54.98	66.25	121.23	0.0558	0.0461	0.1019
Gauley	27.74	115.34	143.08	0.1964	0.1346	0.3310
Lower New	4.15	9.56	13.70	0.0000	0.0091	0.0091
Greenbrier	0.00	18.26	18.26	0.0160	0.0090	0.0250
Upper New	15.80	33.71	49.50	0.1128	0.0090	0.1218
Middle New	42.78	58.09	100.87	0.0046	0.0028	0.0074
Upper James	8.30	0.00	8.30	0.0000	0.0000	0.0000
Upper Roanoke	84.67	309.91	394.57	0.2362	0.0845	0.3206
Banister	0.00	57.47	57.47	0.1665	0.0071	0.1736
Updated Totals	**422.56**	**754.61**	**1177.16**	**1.2439**	**0.3918**	**1.6357**

USACE District	Streams			Wetlands		
	Existing Temporary Fill Mitigation (5 years @ 3%)	Proposed Temporal Mitigation (1 Year)	Total Temporal Mitigation	Existing Temporary Fill Mitigation (6 years @ 3%)	Proposed Temporal Mitigation (2 Years @ 3%)	Total Temporal Mitigation
Huntington	243.30	304.08	547.38	0.5515	0.2590	0.8105
Pittsburgh	50.78	25.06	75.84	0.2852	0.0384	0.3236
Norfolk	135.75	425.46	561.21	0.4072	0.0944	0.5016
Totals	**429.83**	**754.60**	**1,184.43**	**1.2439**	**0.3918**	**1.6357**