Mountain Valley Pipeline Project

Individual Permit Application

Attachment C: Virginia Marine Resources Commission Permit Modification Request and Materials

February 2021

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1.0 PROJECT & APPLICATION INFORMATION

Mountain Valley Pipeline, LLC (Mountain Valley[1]) is seeking an Individual Permit from the United States Army Corps of Engineers (USACE) Pittsburgh, Huntington, and Norfolk Districts to conduct regulated activities below the ordinary high water elevation of navigable waters under Section 10 of the Rivers and Harbors Act of 1899 and for the discharge of dredged and fill material into Waters of the United States under Section 404 of the Clean Water Act for the Mountain Valley Pipeline Project (Project). In addition to the USACE Individual Permit Application, Mountain Valley is seeking Clean Water Act Section 401 Water Quality Certification from the West Virginia Department of Environmental Protection (DEP) and the Virginia Department of Environmental (DEQ) for portions of the Project within their respective jurisdiction.[2]

Due to the large volume of materials included in this submission and for the convenience of Virginia Marine Resources Commission (VMRC) staff, Mountain Valley has consolidated materials relevant to the VMRC permit modification request in this attachment.

2.0 PERMIT MODIFICATION REQUEST

On January 25, 2018, the Virginia Marine Resources Commission (VMRC) issued a permit (#2017-1609) for impacts to 18 VMRC-regulated streams associated with the Mountain Valley Pipeline Project. The permit authorized Mountain Valley to install the crossing of the Pigg River (S-E11) using the horizontal directional drilling (HDD) method and the Stony Creek (S-S5) crossing using the conventional bore method. The remaining 16 crossings were planned and approved to be constructed using the open cut method. That permit was extended on January 19, 2021 and remains active through January 31, 2024.

In the course of preparing this multi-agency permit application, Mountain Valley has conducted a detailed reevaluation of every stream and wetland associated with the Project to identify opportunities to avoid and minimize aquatic impacts where appropriate and practicable. As a result of that analysis, Mountain Valley is now seeking approval to use trenchless crossing methods on several stream and wetland resources, including eight streams subject to VMRC jurisdiction.

Mountain Valley respectfully requests that its existing VMRC permit (#2017-1609) be modified to reflect the change in proposed crossing method for the streams identified in the Table 1 below.[3] Condition 7 of the permit directs MVP to “minimize the adverse effects of the project upon adjacent properties and wetlands and upon the natural resources of the Commonwealth” to the “greatest extent practicable.” The use of trenchless crossing methods is consistent with Condition 7 because Mountain Valley would avoid or minimize instream impacts to subaqueous bottomlands, thereby eliminating direct impacts to the aquatic

[1] Mountain Valley is a joint venture between EQM Midstream Partners, LP; NextEra Capital Holding, Inc; Con Edison Transmission, Inc.; WGL Midstream; and RGC Midstream, LLC.
[2] Additional detailed Project information can be found in Section 1of the Individual Permit Application narrative.
[3] Mountain Valley understands that VMRC may elect to process this modification request as a new permit application. This application package includes all information necessary to process the request as a new application.

environment at the location of the crossing and reducing downstream sediment impacts.[4] Mountain Valley is not proposing to use the HDD method for any crossings, which means the potential risk of an inadvertent return of drilling fluids to streams is negligible to nonexistent. Lastly, the use of trenchless crossing methods would not change the location or area of any previously authorized encroachment on State-owned bottomlands.

Mountain Valley is proposing to modify the approved crossing method for the following VMRC-jurisdictional streams.

Table 1. Proposed VMRC Stream Crossing Method Modifications

Stream	County	Previously Authorized Crossing Method	Proposed Crossing Method	Other Approvals Needed[5]
Sinking Creek (S-NN17)	Giles	Dry-Ditch Open-Cut	Conventional Bore	FERC
Little Stony Creek (S-Z13)	Giles	Dry-Ditch Open-Cut	Guided Conventional Bore	FERC
Bradshaw Creek (S-C21)	Montgomery	Dry-Ditch Open-Cut	Conventional Bore	FERC
Craig Creek (S-OO6)	Montgomery	Dry-Ditch Open-Cut	Conventional Bore	FERC
Roanoke River (S-NN16)	Montgomery	Dry-Ditch Open-Cut	Microtunnel	FERC USACE
Mill Creek (S-IJ43)	Roanoke	Dry-Ditch Open-Cut	Conventional Bore	FERC
Teels Creek (S-C17)	Franklin	Dry-Ditch Open-Cut	Conventional Bore	FERC
Harpen Creek (S-C3)	Pittsylvania	Dry-Ditch Open-Cut	Conventional Bore	FERC

[4] Due to site logistics trenchless crossings sometimes necessitate that timber mats or other structures are placed in aquatic resources (temporary fill) for the duration of the crossing to support the construction equipment crossing. Trenchless crossings where minor and temporary impacts are anticipated are indicated on the stream impact table and Stream Impact Plans and Cross Sections included in this appendix.

[5] This column lists other federal or state approvals Mountain Valley must obtain to complete trenchless crossing methods for these streams. Note that FERC approval has been issued for the trenchless crossings of the Roanoke River, Craig Creek, and Stony Creek. USACE approval is needed to cross the Roanoke River because it is subject to Section 10 of the Rivers and Harbors Act. Additionally, any temporary impacts associated with equipment crossings (see footnote 4 above) are included in the permit applications to USACE and DEQ.

To date, Mountain Valley has successfully completed 73 trenchless crossings without a failure. Nevertheless, unanticipated subsurface geotechnical conditions may prevent boring equipment from completing the crossing. In those cases, it may become necessary to discontinue the boring operation and complete the crossing with an open cut method. VMRC accounted for that possibility in Mountain Valley's permit by including the following statement in Condition 26: "Permittee agrees to install the proposed pipeline beneath the Pigg River by the horizontal directional drill method, and Stony Creek by the conventional bore method, to minimize impacts to state and federally listed species. . . . If these crossings methodologies cannot be completed successfully due to unfavorable onsite conditions, both may be undertaken utilizing the open-cut dam and pump crossing methodology." Mountain Valley requests that the same or similar condition be applicable to the above-proposed crossing method modifications.

3.0 DESCRIPTION OF TRENCHLESS CROSSING METHODS PROPOSED FOR VMRC JURISDICTIONAL STREAMS

The trenchless crossing methods Mountain Valley proposes to use for the VMRC streams included in the request are discussed in Section 5.1.1 of the application narrative. For convenience, summaries from that section are copied here.

3.1 Conventional Bore

Conventional bore is a technique commonly used in pipeline construction to avoid impacting a sensitive resource, road crossing, or railroad crossing. Mountain Valley has successfully completed conventional bore crossings under 67 resources on the Project to date. When using a conventional bore, the pipe is installed beneath the waterbody or wetland, thereby avoiding open trenching across waterbodies and wetlands and avoiding the aquatic impacts associated with working directly within waterbodies and wetlands. Conventional bores allow for uninterrupted existing streamflow and undisturbed wetland vegetation, thereby minimizing impacts to aquatic resources, preserving wetland and wildlife habitat, and minimizing areas of permanent wetland conversion.

The conventional bore method, or auger bore, requires excavation of launching and receiving pits located in workspace in uplands on each side of the feature being crossed. The bore-pit excavations are sloped or shored to comply with all local, state, and federal safety regulations. Prior to construction, wetlands and waterbodies adjacent to each work site are protected using the erosion and sediment control devices and best management practices appropriate to the specific site. Bore pits produce spoil piles from the excavated material to create the pit, which are monitored and managed until the bore is complete and the bore pits are backfilled. The volume of spoil generated during boring operations is generally comparable to that generated during open-cut crossings—although the pits may be deeper, a trench is longer. The cuttings from the bore may also be stockpiled on site and are used to backfill the bore pits. Any spoil remaining is spread evenly over the right-of-way or hauled away.

Bore-pit dewatering may be required and, if so, is accomplished in accordance with the Project's applicable DEQ-approved erosion and sediment control plans and FERC requirements. Bore-pit dewatering may be required 24 hours per day. The specific need for, and amount of, dewatering required for any given waterbody or wetland crossing can vary over short periods of time due to recent precipitation and other factors. It cannot be determined until each individual trench or bore-pit excavation begins.

Conventional boring's major advantage over some other boring technologies is that the drill pipe is installed as the boring is advanced and the line pipe is installed immediately behind the bore pipe once the boring is completed, leaving no unsupported hole that could potentially collapse. Because the borehole is continuously supported by pipe throughout the process, the risk of bore collapse is minimal.

Conventional boring typically requires the least amount of areal footprint (workspace) of the mechanical trenchless technologies because drilling fluid tanks and mud-mixing systems are not required. Cuttings (spoil) generated by boring operations may be stockpiled temporarily at the site but would ultimately be

reused as backfill in the pipeline right-of-way or transported offsite to an appropriate disposal site. Unlike the Direct Pipe, microtunneling, and guided conventional bore methods that use drilling fluids under pressure as a slurry to convey cuttings to the surface, a conventional bore conveys cuttings to the surface mechanically using a screw auger. Because a conventional bore does not convey cuttings using a high-pressure drilling fluid slurry, this method avoids the potential for an inadvertent return during the crossing. However, in some situations, particularly in longer bores or in bores through mixed ground or clay, small quantities of water, bentonite, or polymer-based lubricant may be applied to the cutting head and exterior of the casing to reduce friction and increase the likelihood of success of the crossing. Any lubricants used will be non- petrochemical based, non-hazardous, and NSF-60-compliant.

3.2 Guided Conventional Bore

For longer bores, it may be advantageous to utilize an additional preparatory step to ensure the boring auger stays on path. This minor variation is referred to as “guided conventional bore.” In these situations, a small diameter “guided pilot” is installed first. The drill string is then attached to the front of the conventional auger during the final hole opening phase. The pilot hole can be installed by a small diameter self-propelled, hydraulic steerable drill unit using a tri-cone cutting head. The tri-cone head is anywhere from 6 to 12 inches and is steered using a bottom-hole assembly. Water typically can be used to carry back cuttings and cool the head; however, in longer bores a bentonite slurry may be utilized. In extremely hard rock, an air hammer can be used to establish the pilot. An air hammer uses air to remove cuttings and does not require a bentonite slurry. When drilling mud or water is needed as the medium to carry back drill cuttings, the down-hole pressure is monitored at the rig during the pilot boring process to mitigate the risk of an inadvertent return; the surface is also monitored for inadvertent returns. After the pilot hole is successfully made across the span, the drill string remains in place and the conventional auger bore machine completes the bore to the required diameter attaching to the drill stem to keep the conventional auger bore in line. Because the drill string stays in place, the risk of borehole collapse is minimal. The stems are removed on the exit side as the auger advances from the launch side. No fluids are utilized during the conventional auger bore phase.

Except for the additional preparatory step, the guided conventional bore method is materially similar to the conventional bore method.

3.3 Microtunneling

Microtunneling is an enhanced drilling technique that allows for trenchless construction below features including roads, railways, rivers, waterbodies, environmentally sensitive areas, landfalls, and shore approaches. As in a conventional bore, microtunneling typically requires two pits to be excavated, one on each side of the feature to be bored. These pits are typically closer to the feature being crossed than they would be for an HDD because HDDs are limited by pipe bend radius and workspace logistics in areas with steep terrain. Unlike a conventional bore, which typically uses a non-steerable auger to establish the bore hole, microtunneling utilizes a microtunneling boring machine (MTBM), which uses remote-operated hydraulic cylinders to steer the machine along the proposed bore path. The primary advantage of microtunneling over conventional boring is that the steerability of the MTBM enables drilling over longer distances and mitigates the risk of the bore deviating from the planned profile. The MTBM is typically the full diameter of the finished bore hole, and the product pipe is inserted behind the MTBM as it completes the bore and thereby protects and supports the integrity of the borehole from collapse. In comparison to HDD, microtunneling only requires one drilling pass compared to multiple drilling passes with a product pipe pullback on an HDD.

The MTBM drilling head uses a drilling mud slurry for lubrication and conveyance of cuttings. While employing this method, the annular pressure (i.e., the pressure between the product pipe and the bore hole wall) is drastically reduced in comparison to the HDD method. This is because the MTBM uses fluid only at the cutting head and the annular space outside the product pipe, while cuttings are conveyed through an isolated slurry pipe that is fully contained within the product pipe. Therefore, the annular pressure in a microtunneling operation consists of only the hydrostatic pressure of drilling fluids. By comparison, HDDs

fill the entire bore hole with drilling fluid and circulate a much larger volume of drilling fluid at higher pressure to both lubricate the hole and remove cuttings. Microtunneling's use of a much smaller volume of drilling fluid at a drastically reduced pressure greatly minimizes the risk of an inadvertent return. An HDD, in comparison, may have downhole pressures up to ten times the downhole pressure in a microtunnel bore. By controlling the thrusting force, rate-of-penetration, and tunneling pressures the risk for inadvertent return is drastically reduced in a microtunneling operation compared to the traditional HDD methodology.

Although unmanned, the microtunneling method, due to its advanced control and guidance system, is capable of installing pipelines to accurate line and grade tolerances and therefore may be preferable in situations where trenchless installation is needed over longer distances ranging from 200 to 1,500 feet in length. A wide range of soil types are suitable for installation by microtunneling, including boulders and rock. Boulders and cobbles up to one-third the diameter of the installed pipe can be accommodated by the MTBM.

Like conventional bore, utilizing the microtunneling method requires measures to dewater the bore pits. This method also avoids direct impacts to streams and wetlands.

4.0 STATUS OF VMRC STREAMS NOT INCLUDED IN THIS REQUEST

The following table provides the current status of the other ten VMRC-jurisdictional streams crossed by the Project.

Table 2. VMRC Streams Not Included in Request

Stream	County	Status
North Fork Roanoke River (S-G36)	Montgomery	Pipeline installed on July 21, 2018. Note, a temporary bridge structure authorized by the current VMRC permit still exists at this crossing to facilitate travel on the right-of-way and will be removed when construction is complete.
Pigg River (S-E11)	Pittsylvania	Crossing successfully completed June 9, 2019.
North Fork Blackwater River (S-D8)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Teels Creek (S-D23)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Teels Creek (S-C14)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Little Creek (S-CD6)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Little Creek (S-II2)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Maggodee Creek (S-C19)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Blackwater River (S-F11)	Franklin	To be completed using open-cut method in accordance with VMRC permit #2017-1609.
Stony Creek (S-S5)	Giles	To be completed using conventional bore in accordance with VMRC permit #2017-1609.

5.0 ADDITIONAL INFORMATION

The following additional information is provided to facilitate VMRC's review of this request.

- The standard Joint Permit Application included in the package is reproduced for convenience in Attachment C-1 hereto.
- A table of proposed VMRC stream crossing method modifications included in this request can be found in Table 1 (Section 2.0).
- A table of VMRC streams not included in this request can be found in Table 2 (Section 4.0).
- A location map of VMRC stream impacts included in this request can be found in Attachment C-2.
- Stream Impact Plans and Cross Sections can be found in Attachment C-3. Note that these plans and cross sections are excerpted from the larger applicatoin package.
- Several of the streams included in this request are in karst terrain and Mountain Valley has reached out to the Virginia Department of Conservation and Recreation (DCR) to request their feedback on the crossing methods proposed in those areas. That correspondence can be found in Attachment C-4. Mountain Valley will continue to coordinate with DCR as necessary.
- Adjacent Property Owner Mapping and Owner Information List can be found in Attachment C-5.
- List of newspapers previously used for publication that cover the eight proposed modified crossings:
    - Chatham Star Tribune
    - The Franklin News-Post
    - The Roanoke Times

ATTACHMENT C-1
Joint Permit Application

FOR AGENCY USE ONLY	
	Notes:
JPA#	

APPLICANTS

PLEASE PRINT OR TYPE ALL ANSWERS. If a question does not apply to your project, please print N/A (not applicable) in the space provided. ***If additional space is needed, attach extra 8 ½ x 11 inch sheets of paper.***

Check all that apply			
☐ Pre-Construction Notification (PCN) ☐ NWP # _____ ☐ RP # 05 (*For NWPs & RP 05 ONLY - No DEQ-VWP permit writer will be assigned*)	☐ SPGP	☐ DEQ Reapplication Existing permit number: _____	☐ Receiving federal funds Agency providing funding: _____
☐ Regional Permit 17 Checklist (RP-17)			

PREVIOUS ACTIONS RELATED TO THE PROPOSED WORK (Include all federal, state, and local pre application coordination, site visits, previous permits, or applications whether issued, withdrawn, or denied)

Historical information for past permit submittals can be found online with VMRC - https://webapps.mrc.virginia.gov/public/habitat/ - or VIMS - http://ccrm.vims.edu/perms/newpermits.html

Agency	Action / Activity	Permit/Project number, including any non-reporting Nationwide permits previously used (e.g., NWP 13)	Date of Action	If denied, give reason for denial
	See Section 1.2 and Table 9 in the attached application			

1. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR INFORMATION
The applicant(s) is/are the legal entity to which the permit may be issued (see How to Apply at beginning of form). The applicant(s) can either be the property owner(s) or the person/people/company(ies) that intend(s) to undertake the activity. The agent is the person or company that is representing the applicant(s). If a company, please also provide the company name that is registered with the State Corporation Commission (SCC), or indicate no registration with the SCC.

Legal Name(s) of Applicant(s)			Agent (if applicable)		
Mountain Valley Pipeline, LLC			Tetra Tech, Inc.		
Mailing address 2200 Energy Drive			Mailing address 661 Anderson Drive ,Foster Plaza 7, Suite 200		
City Canonsburg	State PA	ZIP Code 15317	City Pittsburgh	State PA	ZIP Code 15220
Phone number w/area code (724) 271-7600	Fax		Phone number w/area code (412) 921-7090	Fax	
Mobile	E-mail RCooper@equitransmidstream.com		Mobile	E-mail	
State Corporation Commission Name and ID number (if applicable) Mountain Valley Pipeline, LLC T0586216			State Corporation Commission Name and ID number (if applicable) Tetra Tech, Inc. F0572851		

Certain permits or permit authorizations may be provided via electronic mail. If the applicant wishes to receive their permit via electronic mail, please provide an e-mail address here: RCooper@equitransmidstream.com

1. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR INFORMATION (Continued)

Property owner(s) legal name, if different from applicant See Table 8			Contractor, if known NA		
Mailing address			Mailing address		
City	State	ZIP code	City	State	ZIP code
Phone number w/area code	Fax		Phone number w/area code	Fax	
Mobile	E-mail		Mobile	E-mail	
State Corporation Commission Name and ID number (if applicable)			State Corporation Commission Name ID number (if applicable)		

2. PROJECT LOCATION INFORMATION

(Attach a copy of a detailed map, such as a USGS topographic map or street map showing the site location and project boundary, so that it may be located for inspection. Include an arrow indicating the north direction. Include the drainage area if the SPGP box is checked on Page 7.)

Street Address (911 address if available) See Section 1.4, Table 6, and Table 8	City/County/ZIP Code See Section 1.4, Table 6, and Table 8
Subdivision	Lot/Block/Parcel #

Name of water body(ies) within project boundaries and drainage area (acres or square miles).
See Table 1, Table 2, Table 3, and Table 7

Tributary(ies) to: _____
Basin: See Table 7 Sub-basin: See Table 7
(*Example: Basin: James River Sub-basin: Middle James River*)

Special Standards (based on DEQ Water Quality Standards 9VAC25-260 et seq.): See Section 4.2 in attached application

Project type (check one)

_____ Single user (private, non-commercial, residential)
X Multi-user (community, commercial, industrial, government)
_____ Surface water withdrawal

Latitude and longitude at center of project site (decimal degrees): See Section 1.4 / -_____
(Example: 37.33164/-77.68200)

USGS topographic map name: See Figure 3

8-digit USGS Hydrologic Unit Code (HUC) for your project site (See http://cfpub.epa.gov/surf/locate/index.cfm): See Table 7
If known, indicate the 10-digit and 12-digit USGS HUCs (see http://consapps.dcr.virginia.gov/htdocs/maps/HUExplorer.htm) :
_____ _____

Name of your project (*Example: Water Creek driveway crossing*) Mountain Valley Pipeline Project

Is there an access road to the project? ☑ Yes ☐ No. If yes, check all that apply: ☑ public ☑ private ☑ improved ☑ unimproved

Total size of the project area (in acres): 2,143 acres in Virginia

2. PROJECT LOCATION INFORMATION (Continued)

Provide driving directions to your site, giving distances from the best and nearest visible landmarks or major intersections:

See Section 1.4 and Section 1.8 in the attached application

Does your project site cross boundaries of two or more localities (i.e., cities/counties/towns)? ☑ Yes ☐ No

If so, name those localities: See Table 6

3. DESCRIPTION OF THE PROJECT, PROJECT PRIMARY AND SECONDARY *PURPOSES*, PROJECT *NEED*, INTENDED USE(S), AND ALTERNATIVES CONSIDERED (Attach additional sheets if necessary)

- The purpose and need must include any new development or expansion of an existing land use and/or proposed future use of residual land.
- Describe the physical alteration of surface waters, including the use of pilings (#, materials), vibratory hammers, explosives, and hydraulic dredging, when applicable, and *whether or not tree clearing will occur* (include the area in square feet and time of year).
- Include a description of alternatives considered and measures taken to avoid or minimize impacts to surface waters, including wetlands, to the maximum extent practicable. Include factors such as, but not limited to, alternative construction technologies, alternative project layout and design, alternative locations, local land use regulations, and existing infrastructure
- For utility crossings, include both alternative routes and alternative construction methodologies considered
- For surface water withdrawals, public surface water supply withdrawals, or projects that will alter in stream flows, include the water supply issues that form the basis of the proposed project.

See Section 1.2 and Section 1.4 for Project description and location.

See Section 2 for Project purpose, need, and uses.

See Section 3 for the Project's alternative analysis.

See Section 5 and Table 15 for information on wetland and waterbody crossing methods and a description of impact avoidance, minimization, and compensation.

Date of proposed commencement of work (MM/DD/YYYY)	Date of proposed completion of work (MM/DD/YYYY)
Upon approval	12/31/2021
Are you submitting this application at the direction of any state, local, or federal agency? _____Yes _X___No	Has any work commenced or has any portion of the project for which you are seeking a permit been completed? _X___ Yes _____ No

If you answered "yes" to either question above, give details stating when the work was completed and/or when it commenced, who performed the work, and which agency (if any) directed you to submit this application. In addition, you will need to clearly differentiate between completed work and proposed work on your project drawings.

See Section 1.2, Table 10, Table 11, and Figure 2

Are you aware of any unresolved violations of environmental law or litigation involving the property? _X___Yes ____No
(If yes, please explain)

No unresolved violations of environmental law.
See Section 1.2 for litigation involving the property.

4. PROJECT COSTS

Approximate cost of the entire project, including materials and labor: $ >1,100,000,000
Approximate cost of only the portion of the project affecting state waters (channelward of mean low water in tidal areas and below ordinary high water mark in nontidal areas): $ >500,000

5. PUBLIC NOTIFICATION (Attach additional sheets if necessary)
Complete information for all property owners adjacent to the project site and across the waterway, if the waterway is less than 500 feet in width. If your project is located within a cove, you will need to provide names and mailing addresses for all property owners within the cove. If you own the adjacent lot, provide the requested information for the first adjacent parcel beyond your property line. Per Army Regulation (AR 25-51) outgoing correspondence must be addressed to a person or business.
Failure to provide this information may result in a delay in the processing of your application by VMRC.

Property owner's name	Mailing address	City	State	ZIP code
See Table 8				

Name of newspaper having general circulation in the area of the project: See Section 6.0
Address and phone number (including area code) of newspaper See Section 6.0

Have adjacent property owners been notified with forms in Appendix A? _____Yes X No (attach copies of distributed forms)

6. THREATENED AND ENDANGERED SPECIES INFORMATION

Please provide any information concerning the potential for your project to impact state and/or federally threatened and endangered species (listed or proposed). Attach correspondence from agencies and/or reference materials that address potential impacts, such as database search results or confirmed waters and wetlands delineation/jurisdictional determination. Include information when applicable regarding the location of the project in Endangered Species Act-designated or -critical habitats. Contact information for the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Virginia Dept. of Game and Inland Fisheries, and the Virginia Dept. of Conservation and Recreation-Division of Natural Heritage can be found on page 4 of this package.

7. HISTORIC RESOURCES INFORMATION

Note: Historic properties include but are not limited to archeological sites, battlefields, Civil War earthworks, graveyards, buildings, bridges, canals, etc. Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the USACE from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the USACE, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant.

Are any historic properties located within or adjacent to the project site? X Yes ____ No _____ Uncertain
If Yes, please provide a map showing the location of the historic property within or adjacent to the project site.

Are there any buildings or structures 50 years old or older located on the project site? X Yes ____ No _____ Uncertain
If Yes, please provide a map showing the location of these buildings or structures on the project site.

Is your project located within a historic district? X Yes ____ No ____ Uncertain

If Yes, please indicate which district: See Section 1.9.3 and Section 4.4.6

7. HISTORIC RESOURCES INFORMATION (Continued)

Has a survey to locate archeological sites and/or historic structures been carried out on the property?
_X_ Yes ___ No ___ Uncertain

If Yes, please provide the following information: Date of Survey: See Section 1.9.3 and Section 4.4.6

Name of firm: Tetra Tech, Inc., New South Associates

Is there a report on file with the Virginia Department of Historic Resources? X Yes ____ No ___Uncertain

Title of Cultural Resources Management (CRM) report: See Section 1.9.3 and Section 4.4.6

Was any historic property located? X Yes ____ No __ Uncertain

8. WETLANDS, WATERS, AND DUNES/BEACHES IMPACT INFORMATION

Report each impact site in a separate column. If needed, attach additional sheets using a similar table format. Please ensure that the associated project drawings clearly depict the location and footprint of each numbered impact site. For dredging, mining, and excavating projects, use Section 17.

	Impact site number 1	Impact site number 2	Impact site number 3	Impact site number 4	Impact site number 5
Impact description (use all that apply): F=fill EX=excavation S=Structure T=tidal NT=non-tidal TE=temporary PE=permanent PR=perennial IN=intermittent SB=subaqueous bottom DB=dune/beach IS=hydrologically isolated V=vegetated NV=non-vegetated MC=Mechanized Clearing of PFO (*Example: F, NT, PE, V)*	See Table B-1 and Table B-2 within Attachment B				
Latitude / Longitude (in decimal degrees)					
Wetland/waters impact area (square feet / acres)					
Dune/beach impact area (square feet)					
Stream dimensions at impact site (length and average width in linear feet, and area in square feet)					
Volume of fill below Mean High Water or Ordinary High Water (cubic yards)					

8. WETLANDS/WATERS IMPACT INFORMATION (Continued)					
Cowardin classification of impacted wetland/water or geomorphological classification of stream *Example wetland: PFO; Example stream: 'C' channel and if tidal, whether vegetated or non-vegetated wetlands per Section 28.2-1300 of the Code of Virginia*	See Table B-1 and Table B-2 within Attachment B				
Average stream flow at site (flow rate under normal rainfall conditions in cubic feet per second) and method of deriving it (gage, estimate, etc.)					
Contributing drainage area in acres or square miles (*VMRC cannot complete review without this information*)					
DEQ classification of impacted resource(s): Estuarine Class II Non-tidal waters Class III Mountainous zone waters Class IV Stockable trout waters Class V Natural trout waters Class VI Wetlands Class VII https://law.lis.virginia.gov					
For DEQ permitting purposes, also submit as part of this section a wetland and waters boundary delineation map – see (3) in the Footnotes section in the form instructions.					
For DEQ permitting purposes, also submit as part of this section a written disclosure of all wetlands, open water, or streams that are located within the proposed project or compensation areas that are also under a deed restriction, conservation easement, restrictive covenant, or other land-use protective instrument.					

9. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR CERTIFICATIONS

READ ALL OF THE FOLLOWING CAREFULLY BEFORE SIGNING

PRIVACY ACT STATEMENT: The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and Section 103 of the Marine Protection Research and Sanctuaries Act of 1972. These laws require that individuals obtain permits that authorize structures and work in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters prior to undertaking the activity. Information provided in the Joint Permit Application will be used in the permit review process and is a matter of public record once the application is filed. Disclosure of the requested information is voluntary, but it may not be possible to evaluate the permit application or to issue a permit if the information requested is not provided.

CERTIFICATION: I am hereby applying for permits typically issued by the DEQ, VMRC, USACE, and/or Local Wetlands Boards for the activities I have described herein. I agree to allow the duly authorized representatives of any regulatory or advisory agency to enter upon the premises of the project site at reasonable times to inspect and photograph site conditions, both in reviewing a proposal to issue a permit and after permit issuance to determine compliance with the permit.

In addition, 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.

9. APPLICANT, AGENT, PROPERTY OWNER, AND CONTRACTOR CERTIFICATIONS (Continued)

Is/Are the Applicant(s) and Owner(s) the same? ☐ *Yes* ☑ *No*

Legal name & title of Applicant	Second applicant's legal name & title, if applicable
Robert J. Cooper - SVP, MVP Engineering and Construction	N/A
Applicant's signature	Second applicant's signature
Date 2/19/2021	Date
Property owner's legal name, if different from Applicant	Second property owner's legal name, if applicable
See Table 8	See Table 8
Property owner's signature, if different from Applicant	Second property owner's signature
Date	Date

CERTIFICATION OF AUTHORIZATION TO ALLOW AGENT(S) TO ACT ON APPLICANT'S(S') BEHALF (IF APPLICABLE)

I (we), Mountain Valley Pipeline, LLC (and) N/A ,
APPLICANT'S LEGAL NAME(S) – *complete the second blank if more than one Applicant*

hereby certify that I (we) have authorized Henry Schumacher (and) N/A
AGENT'S NAME(S) – *complete the second blank if more than one Agent*

to act on my (our) behalf and take all actions necessary to the processing, issuance, and acceptance of this permit and any and all standard and special conditions attached. I (we) hereby certify that the information submitted in this application is true and accurate to the best of my (our) knowledge.

Applicant's signature	Second applicant's signature, if applicable
	N/A
Date 2/19/2021	Date N/A
Agent's signature and title Sr. Ecologist	Second agent's signature and title, if applicable
	N/A
Date 2/19/2021	Date N/A

CONTRACTOR ACKNOWLEDGEMENT (IF APPLICABLE)

I (we), N/A (and) N/A ,
APPLICANT'S LEGAL NAME(S) – *complete the second blank if more than one Applicant*

have contracted N/A (and) N/A
CONTRACTOR'S NAME(S) – *complete the second blank if more than one Contractor*

to perform the work described in this Joint Permit Application, signed and dated N/A.

I (we) will read and abide by all conditions as set forth in all federal, state, and local permits as required for this project. I (we) understand that failure to follow the conditions of the permits may constitute a violation of applicable federal, state, and local statutes and that we will be liable for any civil and/or criminal penalties imposed by these statutes.
In addition, I (we) agree to make available a copy of any permit to any regulatory representative visiting the project site to ensure permit compliance. If I (we) fail to provide the applicable permit upon request, I (we) understand that the representative will have the option of stopping our operation until it has been determined that we have a properly signed and executed permit and are in full compliance with all of the terms and conditions.

Contractor's name or name of firm (printed/typed)	Contractor's or firm's mailing address	
N/A	N/A	
Contractor's signature and title	Contractor's license number	Date
N/A	N/A	N/A
Applicant's signature	Second applicant's signature, if applicable	
N/A	N/A	
Date	Date	
N/A	N/A	

END OF GENERAL INFORMATION

The following sections are activity-specific. Fill out only the sections that apply to your particular project.

10. PRIVATE PIERS, MARGINAL WHARVES, AND UNCOVERED BOAT LIFTS

Regional Permit 17 (RP-17), authorizes the installation and/or construction of open-pile piers, mooring structures/devices, fender piles, covered boathouses/boatslips, boatlifts, osprey pilings/platforms, accessory pier structures, and certain devices associated with shellfish gardening, for private use, subject to strict compliance with all conditions and limitations further set out in the RP-17 enclosure located at http://www.nao.usace.army.mil/Missions/Regulatory/RBregional/. In addition to the information required in this JPA, prospective permittees seeking authorization under RP-17 must complete and submit the 'Regional Permit 17 Checklist' with their JPA. A copy of the 'Regional Permit 17 Checklist' is found in Appendix B of this application package. If the prospective permittee answers "yes" (or "N/A", where applicable) to all of the questions on the 'Regional Permit 17 Checklist', the permittee is in compliance with RP-17 and will not receive any other written authorization from the Corps but may not proceed with construction until they have obtained all necessary state and local permits. ***Note: If the prospective permittee answers "no" to any of the questions on the 'Regional Permit 17 Checklist' then their proposed structure(s) does not meet the terms and conditions of RP-17 and written authorization from the Corps is required before commencement of any work.***

If the prospective permittee answers "no" to any of the questions on the 'Regional Permit 17 Checklist' then their proposed structure(s) does not meet the terms and conditions of RP-17 and written authorization from the Corps is required before commencement of any work. In those circumstances, the following information must be included in the application and/or on the drawings in order for the application to be considered complete:

1. The applicant **MUST** provide written justification/need for the encroachment if the proposed structure(s) will extend greater than one- fourth of the distance across the waterway measured from either mean high water to mean high water (including all channelward wetlands) or ordinary high water to ordinary high water (including all channelward wetlands). The measurement should be based on the narrowest distance across the waterway regardless of the orientation of the proposed structure(s).
2. The applicant **MUST** provide written justification/need if the proposed structure(s) is greater than five (5) feet wide or there will be less than four (4) feet elevation between the decking and the vegetated wetlands substrate.
3. The Corps **MAY** require depth soundings across the waterway at increments designated by the Corps project manager. Inclusion of depth sounding data in the original JPA submittal is highly recommended in order to expedite permit evaluation. Depth soundings are typically taken at 10-foot increments for waterways less than 200 feet wide and 20-foot increments for waterways greater than 200 feet wide. Please include the date and time the measurements were taken, whether the data was collected at mean low water (MLW) or MHW, and how the soundings were taken (e.g., tape, range finder, etc.).

Number of vessels to be moored at the pier or wharf: N/A	Do you have an existing pier on your property? ____Yes____ No If yes, will it be removed? ____Yes ____No Is your lot platted to the mean low water shoreline? ____Yes ____No

In the spaces provided below, give the type (e.g., sail, power, skiff, etc.), size, and registration number of the vessel(s) to be moored

TYPE	LENGTH	WIDTH	DRAFT	REGISTRATION #
N/A	N/A	N/A	N/A	N/A

11. BOATHOUSES, GAZEBOS, COVERED BOAT LIFTS, AND OTHER ROOFED STRUCTURES OVER WATERWAYS

Number of vessels to be moored at the proposed structure: _____	Will the sides of the structure be enclosed? _____Yes _____No Area covered by the roof structure _____ square feet

In the spaces provided below, give the type (e.g., sail, power, skiff, etc.), size, and registration number of the vessel(s) to be moored

TYPE	LENGTH	WIDTH	DRAFT	REGISTRATION #
N/A	N/A	N/A	N/A	N/A

12. MARINAS AND COMMERCIAL, GOVERNMENTAL, AND COMMUNITY PIERS

Have you obtained the Virginia Department of Health's approval for sanitary facilities? _____Yes _____No
You will need to obtain this authorization or a variance before a VMRC permit will be issued.

Will petroleum products or other hazardous materials be stored or handled at the facility? _____Yes _____No
If your answer is yes, please attach your spill contingency plan.

Will the facility be equipped to off-load sewage from boats? _____Yes _____No

EXISTING: wet slips: _____ dry storage: _____	*PROPOSED:* wet slips: _____ dry storage: _____

13. FREE STANDING MOORING PILES, OSPREY NESTING POLES, MOORING BUOYS, AND DOLPHINS (not associated with piers)

Number of vessels to be moored: N/A	Type and number of mooring(s) proposed: N/A

In the spaces provided below, give the type (e.g., sail, power, skiff, etc.), size, and registration number of the vessel(s) to be moored

TYPE	LENGTH	WIDTH	DRAFT	REGISTRATION #
N/A	N/A	N/A	N/A	N/A

Give the name and complete mailing address(es) of the owner(s) of the vessel(s) if not owned by applicant (attach extra sheets if needed):
N/A

Do you plan to reach the mooring from your own upland property? _____Yes _____No
If "no," explain how you intend to access the mooring.
N/A

14. BOAT RAMPS

Will excavation be required to construct the boat ramp? _____Yes _____No. If "yes," will any of the excavation occur below the plane of the ordinary high water mark/mean high water line or in wetlands? _____Yes _____No. If "yes," you will need to fill out Section 17 for this excavation.
Where will you dispose of the excavated material?
N/A

What type of design and materials will be used to construct the ramp (open pile design with salt treated lumber, concrete slab on gravel bedding, etc.)?
N/A

Location of nearest public boat ramp N/A	Driving distance to that public ramp N/A miles

Will other structures be constructed concurrent with the boat ramp installation? _____Yes _____No
If "yes," please fill out the appropriate sections of this application associated with those other activities.

15. TIDAL/NONTIDAL SHORELINE STABILIZATION STRUCTURES (INCLUDING BULKHEADS AND ASSOCIATED BACKFILL, RIPRAP REVETMENTS AND ASSOCIATED BACKFILL, MARSH TOE STABILIZATION, GROINS, JETTIES, AND BREAKWATERS, ETC.) Information on non structural, vegetative alternatives (i.e., Living Shoreline) for shoreline stabilization is available at http://ccrm.vims.edu/coastal_zone/living_shorelines/index.html.

Is any portion of the project maintenance or replacement of an existing and currently serviceable structure? _____Yes _____No
If yes, give length of existing structure: N/A_____ linear feet

If your maintenance project entails replacement of a bulkhead, is it possible to construct the replacement bulkhead within 2 feet channelward of the existing bulkhead? N/A Yes _____No If not, please explain below:

N/A

Length of proposed structure, including returns: N/A_____linear feet

Average channelward encroachment of the structure from Mean high water/ordinary high water mark: N/A_____ feet Mean low water: N/A_____feet	*Maximum* channelward encroachment of the structure from Mean high water/ordinary high water mark: N/A_____ feet Mean low water: N/A_____feet
Maximum channelward encroachment form the back edge of the Dune N/A_____feet	*Maximum* channelward encroachment from the back edge of the Beach N/A_____feet

Describe the type of construction including all materials to be used (including all fittings). Will filter cloth be used? ____Yes ____No

N/A

What is the source of the backfill material? N/A_____

What is the composition of the backfill material? N/A_____

If rock is to be used, give the average volume of material to be used for every linear foot of construction: N/A_____cubic yards
What is the volume of material to be placed below the plane of ordinary high water mark/mean high water? N/A_____cubic yards

For projects involving stone:
Average weight of core material (bottom layers): N/A_____pounds per stone (Class_____)
Average weight of armor material (top layers): N/A_____pounds per stone (Class_____)

Are there similar shoreline stabilization structures in the vicinity of your project site? _____Yes _____No
If so, describe the type(s) and location(s) of the structure(s):
N/A

If you are building a groin or jetty, will the channelward end of the structure be marked to show a hazard to navigation? _____Yes _____No	Has your project been reviewed by the Shoreline Erosion Advisory Service (SEAS)? _____Yes _____No If yes, please attach a copy of their comments.

16. BEACH NOURISHMENT

Source of material and composition (percentage sand, silt, clay): N/A_____	Volume of material: N/A_____cubic yards

Area to be covered N/A_____ square feet channelward of mean low water N/A_____square feet channelward of mean high water

N/A_____ square feet landward of mean low water N/A_____square feet channelward of mean high water

Mode of transportation of material to the project site (truck, pipeline, etc.):
N/A

16. BEACH NOURISHMENT (Continued)

Describe the type(s) of vegetation proposed for stabilization and the proposed planting plan, including schedule, spacing, monitoring, etc. Attach additional sheets if necessary.

N/A

17. DREDGING, MINING, AND EXCAVATING

FILL OUT THE FOLLOWING TABLE FOR DREDGING PROJECTS

	NEW dredging				**MAINTENANCE dredging**			
	Hydraulic		Mechanical (clamshell, dragline, etc.)		Hydraulic		Mechanical (clamshell, dragline, etc.)	
	Cubic yards	Square feet	Cubic yards	Square feet	Cubic yards	Square feet	Cubic yards	Square feet
Vegetated wetlands	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Non-vegetated wetlands								
Subaqueous land								
Totals								

Is this a one-time dredging event? ☐ Yes _____ No If "no", how many dredging cycles are anticipated: N/A
(____ initial cycle in cu. yds.) (_____ subsequent cycles in cu. yds.)

Composition of material (percentage sand, silt, clay, rock):
Provide documentation (i.e., laboratory results or analytical reports) that *dredged* material from on-site areas is free of toxics. If not free of toxics, provide documentation of proper disposal (i.e., bill of lading from commercial supplier or disposal site).

N/A

Please include a dredged material management plan that includes specifics on how the dredged material will be handled and retained to prevent its entry into surface waters or wetlands. If on-site dewatering is proposed, please include plan view and cross-sectional drawings of the dewatering area and associated outfall.

N/A

Will the dredged material be used for any commercial purpose or beneficial use? _____Yes _____No
If yes, please explain:

N/A

If this is a maintenance dredging project, what was the date that the dredging was last performed? N/A
Permit number of original permit: N/A *(It is important that you attach a copy of the original permit.)*

17. DREDGING, MINING, AND EXCAVATING (Continued)

For mining projects: On separate sheets of paper, explain the operation plans, including: 1) the frequency (e.g., every six weeks), duration (i.e., April through September), and volume (in cubic yards) to be removed per operation; 2) the temporary storage and handling methods of mined material, including the dimensions of the containment berm used for upland disposal of dredged material and the need (or no need) for a liner or impermeable material to prevent the leaching of any identified contaminants into ground water; 3) how equipment will access the mine site; and 4) verification that dredging: a) will not occur in water body segments that are currently on the effective Section 303(d) Total Maximum Daily Load (TMDL) priority list (available at http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLDevelopment/TMDLProgramPriorities.aspx) or that have an approved TMDL; b) will not exacerbate any impairment; and c) will be consistent with any waste load allocation/limit/conditions imposed by an approved TMDL (see, "What's in my backyard" or subsequent spatial files at http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx to determine the extent of TMDL watersheds and impairment segments).

Have you applied for a permit from the Virginia Department of Mines, Minerals and Energy? _____Yes _____No If Yes:
Existing permit number:_____ Date permit issued: _____

Contributing drainage area: _____square miles	Average stream flow at site (flow rate under normal rainfall conditions): _____cfs

18. FILL (not associated with backfilled shoreline structures) AND OTHER STRUCTURES (other than piers and boathouses) IN WETLANDS OR WATERS, OR ON DUNES/BEACHES

Source and composition of fill material (percentage sand, silt, clay, rock):

N/A

Provide documentation (i.e., laboratory results or analytical reports) that *fill* material from *off-site* locations is free of toxics. If not free of toxics, provide documentation of proper disposal (i.e., bill of lading from commercial supplier or disposal site). Documentation is not necessary for fill material obtained from on-site areas.

Explain the purpose of the filling activity and the type of structure to be constructed over the filled area (if any):

N/A

Describe any structure that will be placed in wetlands/waters or on a beach dune and its purpose:

N/A

Will the structure be placed on pilings? ____ Yes ____ No	Total area occupied by any structure. N/A _____ Square Feet
How far will the structure be placed channelward from the back edge of the dune? N/A feet	How far will the structure be placed channelward from the back edge of the beach? N/A feet

19. NONTIDAL STREAM CHANNEL MODIFICATIONS FOR RESTORATION OR ENHANCMENT, or TEMPORARY OR PERMANENT RELOCATIONS

If proposed activities are being conducted for the purposes of compensatory mitigation, please attach separate sheets of paper providing all information required by the most recent version of the stream assessment methodology approved by the Norfolk District of the U.S. Army Corps of Engineers and the Virginia Department of Environmental Quality, in lieu of completing the questions below. Required information outlined by the methodology can be found at:
http://www.nao.usace.army.mil/Missions/Regulatory/UnifiedStreamMethodology.aspx *or*
http://www.deq.virginia.gov/Programs/Water/WetlandsStreams/Mitigation.aspx.

For all projects proposing stream restoration provide a completed Natural Channel Design Review Checklist and Selected Morphological Characteristics form. These forms and the associated manual can be located at:
https://www.fws.gov/chesapeakebay/StreamReports/NCD%20Review%20Checklist/Natural%20Channel%20Design%20Checklist%20Doc%20V2%20Final%2011-4-11.pdf

Has the stream restoration project been designed by a local, state, or federal agency? ____ Yes ____ No. If yes, please include the name of the agency here: N/A.

Is the agency also providing funding for this project? _____ Yes _____ No

Stream dimensions at impact site (length and average width in linear feet, and area in square feet):
L: N/A (feet) AW: N/A (feet) Area: N/A (square feet)

Contributing drainage area: N/A acres *or* N/A square miles

19. NONTIDAL STREAM CHANNEL MODIFICATIONS FOR RESTORATION OR ENHANCMENT, or TEMPORARY OR PERMANENT RELOCATIONS (Continued) **19. NONTIDAL STREAM CHANNEL MODIFICATIONS FOR RESTORATION OR ENHANCMENT, or TEMPORARY OR PERMANENT RELOCATIONS (Continued)****19. NONTIDAL STREAM CHANNEL MODIFICATIONS FOR RESTORATION OR ENHANCMENT, or TEMPORARY OR PERMANENT RELOCATIONS (Continued)**

Existing average stream flow at site (flow rate under normal rainfall conditions): _____cfs	Proposed average stream flow at site after modifications (flow rate under normal rainfall conditions): _____cfs

Explain, in detail, the method to be used to stabilize the banks:

N/A

Explain the composition of the existing stream bed (percent cobble, rock, sand, etc.):

N/A

Will low-flow channels be maintained in the modified stream channel? _____Yes _____No.
Describe how:

N/A

Will any structure(s) be placed in the stream to create riffles, pools, meanders, etc.? _____Yes _____No
If yes, please explain:

N/A

20. UTILITY CROSSINGS

Type of crossing: _____overhead X____trenched X____directionally-drilled

Method of clearing corridor of vegetation (check all that apply): ☒ mechanized land clearing that disturbs the soil surface
☒ cutting vegetation above the soil surface

Describe the materials to be used in the installation of the utility line (including gravel bedding for trenched installations, bentonite slurries used during direction-drilling, etc.) and a sequence of events to detail how the installation will be accomplished (including methods used for in-stream and dry crossings).

See Section 1.3, Attachment H, and Attachment J

Will the proposed utility provide empty conduits for any additional utilities that may propose to co-locate at a later date? ____Yes X__ No.

For overhead crossings over navigable waterways (including all tidal waterways), please indicate the height of other overhead crossings or bridges over the waterway relative to mean high water, mean low water, or ordinary high water mark:

N/A

Nominal system voltage, if project involves power lines: N/A

Total number of electrical circuits: N/A

20. UTILITY CROSSINGS (Continued)

Will there be an excess of excavated material? _____Yes _X___No
If so, describe the method that will be undertaken to dispose of, and transport, the material to its permanent disposal location and give that location:

Will any excess material be stockpiled in wetlands? _x___Yes _____No
If so, will the stockpiled material be placed on filter fabric or some other type of impervious surface? _x___Yes _____No

Will permanent access roads be placed through wetlands/streams? _X__Yes _____No
If yes, will the roads be (check one) ☐ at grade ☒ above grade?

Will the utility line through wetlands/waters be continually maintained (e.g. via mowing or herbicide)? _X__Yes _____No
If maintained, what is the maximum width? _10_____feet

21. ROAD CROSSINGS

Have you conducted hydraulic studies to verify the adequacy of the culverts? _____Yes _X___No
If so, please attach a copy of the hydraulic study/report.
Virginia Department of Transportation (VDOT) standards require that the backwater for a 100 year storm not exceed 1 foot for all road, culvert, and bridge projects within FEMA-designated floodplains. Virginia Department of Environmental Quality (DEQ) requires pipes and culverts 24 inches or less in diameter to be countersunk three inches below the natural stream bed elevations, and pipes and culverts greater than 24 inches to be countersunk at least six inches below the natural stream bed elevations. Hydraulic capacity is determined based on the reduced capacity due to the countersunk position.

Will the culverts be countersunk below the stream bottom? _X___Yes _____No. If no, explain:
Where possible, existing culverts will be used. Culvert enhancement/installation will follow best management practices. See Sections 1.3.2 and 4.2.7.

If the project entails a bridged crossing and there are similar crossings in the area, what is the vertical distance above mean high water, mean low water, or ordinary high water mark of those similar structures? _N/A_____feet above _N/A_____
For all bridges proposed over navigable waterways (including all tidal water bodies), you will be required to contact the U.S. Coast Guard to determine if a permit is required of their agency.

On separate sheets of paper, describe the materials to be used, the method of construction (including the use of cofferdams), the sequence of construction events, and if bedrock conditions may be encountered. Include cross-sections and profile plans of the culvert crossings including wing walls or rip rap. See Attachment H and J and Section 1.3

22. IMPOUNDMENTS, DAMS, AND STORMWATER MANAGEMENT FACILITIES
If the impoundment or dam is a component of a water withdrawal project, also complete Sections 24 through 26.

Will the proposed impoundment, dam, or stormwater management facility be used for agricultural purposes (e.g., in the operation of a farm)? For DEQ permitting purposes, a farm is considered to be a property or operation that produces goods for market.
___ Yes ___ No

What type of materials will be used in the construction (earth, concrete, rock, etc.)? _N/A_____

What is the source of these materials? _N/A_____

Provide the dimensions of proposed impoundment, dam, or stormwater management facility, including the height and width of all structures.

N/A

Storage capacity* of impoundment: _N/A_____acre-feet *should be given for the normal pool of recreational or farm ponds, or design pool for stormwater management ponds or reservoirs (the elevation the pond will be at for the design storm, e.g., 10-year, 24-hour storm)	Surface area** of impoundment: _N/A_____acres **should be given for the normal pool of recreational or farm ponds, or design pool for stormwater management ponds or reservoirs (the elevation the pond will be at for the design storm, e.g., 10-year, 24-hour storm)

22. IMPOUNDMENTS, DAMS, AND STORMWATER MANAGEMENT FACILITIES (Continued)

Is the proposed project excluded from the Virginia Dam Safety Regulations? ___ Yes ___ No ___ Uncertain

If not excluded, does your proposed project comply with the Virginia Dam Safety Regulations? ___ Yes ___ No ___ Uncertain

Does the proposed design include a vegetation management area per §10.1-609.2? ___ Yes ___ No ___ Uncertain
If your answer to these questions is no or uncertain, you should contact the Virginia Department of Conservation and Recreation's Dam Safety Program at (804) 371-6095, or reference the regulations on the Web at http://www.dcr.virginia.gov/dam_safety_and_floodplains/index.shtml

For stormwater management and flood control facilities:

Design storm event: N/A year storm Retention time: N/A hours

Current average flow (flow rate under normal rainfall conditions): N/A cfs

Method used to derive average flow: N/A

Proposed peak outflow for the design storm provided above: N/A cfs

Has the facility been designed as an Enhanced Extended Detention Basin or an Extended Detention Basin in accordance with the Minimum Standard 3.07 of the Virginia Stormwater Management Handbook, Volume I (published by the Virginia Department of Conservation and Recreation, 1999), or in accordance with the latest version of this handbook? _____Yes _____No

Will the impoundment structure be designed to pass a minimum flow at all times? _____Yes _____No

If so, please give the minimum rate of flow: N/A cfs

What is the drainage area upstream of the proposed impoundment? N/A square miles

How much of your proposed impoundment structure will be located on the stream bed? _____square feet

What is the area of vegetated wetlands that will be excavated and/or back-flooded by the impoundment? _____ square feet

What is the *area and length* of streambed that will be excavated and/or back-flooded by the impoundment? _____ square feet
_____ linear feet

Are fish ladders being proposed to accommodate the passage of fish? _____Yes _____No

23. OUTFALLS NOT ASSOCIATED WITH PROPOSED WATER WITHDRAWAL ACTIVITIES

Type and size of pipe(s): N/A - See Section 4.1.4

Daily rate of discharge: N/A - See Section 4.1.4 mgd

If the discharge will be thermally-altered, provide the maximum temperature: N/A - See Section 4.1.4

Contributing drainage area: N/A - See Section 4.1.4 square miles Average daily stream flow at site: N/A - See Section 4.1.4 cfs

Have you received a Virginia Discharge Elimination System (VPDES) permit for the proposed project? ___ Yes ___ No.

If yes, please provide the VPDES permit number: N/A - See Section 4.1.4 .

If no, is there a permit action pending? ___ Yes ___ No. If pending, what is the facility name? N/A - See Section 4.1.4 .

The following sections are typically related to surface water withdrawal activities; Federal Energy Regulatory Commission license projects; or impacts likely to require instream flow limits. Examples of such projects include, but are not limited to, reservoirs, irrigation projects, power generation facilities, and public water supply facilities that may or may not have associated features, such as dams, intake pipes, outfall structures, berms, etc.

If completing these sections, enter "N/A" in any section that does not apply to the project.

24. INTAKES, OUTFALLS, AND WATER CONTROL STRUCTURES (INCLUDING ALL PROPOSED WATER WITHDRAWAL ACTIVITIES)

For intakes:

Type and size of pipe(s): N/A - See Section 4.1.4

Type and size of pump(s): N/A - See Section 4.1.4

Average and Maximum daily rate of withdrawal: N/A - See Section 4.1.4 and N/A - See Section 4.1.4 mgd

Velocity of withdrawal: N/A - See Section 4.1.4 fps

Screen mesh size: N/A - See Section 4.1.4 inches / N/A - See Section 4.1.4 mm

If other sizing units, please specify:
N/A - See Section 4.1.4

Contributing drainage area at withdrawal point(s): N/A - See Section 4.1.4 square miles

Average daily stream flow at withdrawal point(s) (flow rate under normal rainfall conditions): N/A - See Section 4.1.4 cfs

Method(s) used to derive average daily stream flow

N/A - See Section 4.1.4

Average annual stream flow at withdrawal point(s): N/A - See Section 4.1.4 cfs

Latitude and longitude of withdrawal point(s) (degrees, minutes, seconds): N/A - See Section 4.1.4

For outfalls:

Type, size, and hydraulic capacity (under normal conditions) of pipe(s): N/A - See Section 4.1.4, _____, and N/A - See Section 4.1.4

Daily rate of discharge: N/A - See Section 4.1.4 mgd

If the discharge will be thermally-altered, provide the maximum temperature: N/A - See Section 4.1.4

Contributing drainage area at discharge point(s): N/A - See Section 4.1.4 square miles

Average daily stream flow at discharge point(s) (flow rate under normal rainfall conditions): N/A - See Section 4.1.4 cfs

Method(s) used to derive average daily stream flow

N/A - See Section 4.1.4

Latitude and longitude of discharge point(s) (degrees, minutes, seconds): N/A - See Section 4.1.4

For intakes and dams, use the table below to provide the median monthly stream flows in cubic feet per second (cfs) at the water intake or dam site (not at the stream gage; if there is not a gage at the intake or dam site, you will need to interpolate flows to the intake or dam site based upon the most closely related watershed in which there is an operational stream gage monitored by the United States Geologic Survey (USGS)). Median flow is the value at which half of the measurements are above and half of the measurements are below. Median is also sometimes referred to as the '50% exceedence flow'. The median flow generally must be calculated from USGS historical data. Please do not provide *mean (average)* flow.

Month	Median flow (cfs)	Month	Median flow (cfs)
January	N/A - See Section 4.1.4	July	N/A - See Section 4.1.4
February		August	
March		September	
April		October	
May		November	
June		December	

24. INTAKES, OUTFALLS, AND WATER CONTROL STRUCTURES (Continued)

Describe the stream flow gages used, USGS stream flow gage site number and site name (e.g., USGS 01671100 Little River near Doswell, VA), the type of calculations used (such as drainage area correction factors), and the period of record that was used to calculate the median flows provided in the table above. Generally, the period of record should span a minimum of 30 years.

N/A - See Section 4.1.4

For interbasin transfer of water resources proposed from either the Chowan River, New River, Potomac River, Roanoke River, Big Sandy River, or Tennessee River basins to another river basin, provide the following information:

Destination location (discharge point) of the transfer:
8-digit USGS Hydrologic Unit Code (HUC) (See http://cfpub.epa.gov/surf/locate/index.cfm): N/A If known, indicate the 10-digit and 12-digit USGS HUCs (see http://consapps.dcr.virginia.gov/htdocs/maps/HUExplorer.htm):

N/A - See Section 4.1.4 _____ N/A - See Section 4.1.4 _____

Latitude and Longitude: _____- _____- _____/ _____- _____- _____

Provide any available historical low-flows at the intake or dam site.

N/A

Describe how the proposed withdrawal at the intake or dam site will impact stream flows in terms of rates, volumes, frequency, etc. (e.g., percent of the flow to be withdrawn, percent of withdrawal returned to the original source, etc.).

N/A

Describe how the withdrawal of water will vary over time. For example, will the withdrawal vary by the time of year, by the time of day, or by the time of week? Examples of projects that should describe variable withdrawals include, but are not limited to: power plant cooling withdrawals that increase and decrease seasonally; golf course irrigation; municipal water supply; nurseries; ski resorts that use water for snowmaking; and resorts with weekend or seasonal variations.

N/A

24. INTAKES, OUTFALLS, AND WATER CONTROL STRUCTURES (Continued)

Provide the amount of water that will be lost due to consumptive use. For the purpose of this application, consumptive use means the withdrawal of surface waters without recycling of said waters to their source or basin of origin. Examples of consumptive uses are water that is evaporated in cooling towers or by other means in power plants; irrigation water (all types); residential water use that takes place outside of the home; and residential water use both inside and outside of homes for residences served by septic systems. Projects that propose a transfer of water from one river basin to another and/or localities that sell water to other jurisdictions, should document the portion of the withdrawal that is not returned to the originating watershed.

Proposed monthly consumptive volume (million gallons): N/A

Attach a map showing the *location* of the withdrawal and of the return of flow, and provide the *amount* of the return flow (million gallons).

For withdrawals proposed on an impoundment, provide a description of flow or release control structures. Include type of structure, rate of flow, size, capacity, invert elevation of outfall pipes referenced to the normal pool elevation, and the mechanism used to control release. Provide a description of available water storage facilities. Include the volume, depth, normal pool elevation, unusable storage volume and dimensions. If applicable, stage-storage relationship at the impounding structure (the volume of water in the impoundment at varying stages of water depth) and volume or rate of withdrawals from the storage facility.

N/A

25. WATER WITHDRAWAL USE(S), NEED, AND ALTERNATIVES *(Attach additional sheets if needed.)*

Describe the proposed use(s) and need for the surface water and information on how demand for surface water was determined. *Golf courses* must provide documentation to justify the amount of water withdrawal, such as the amount of acreage under irrigation, the acreage of fairways versus greens, type of turf grass, evapotranspiration, and irrigation efficiency. *Agricultural* users must supply documentation justifying their requested withdrawal amount, such as type of crop, livestock, or other agriculture animal, number of animals, watering needs, acres irrigated, inches of water applied, and frequency of application. *Other users* of withdrawals for purposes other than those described above must provide sufficient documentation to justify the requested withdrawal amounts.

N/A

25. WATER WITHDRAWAL USE(S), NEED, AND ALTERNATIVES (Continued)

Provide the following information at the water intake or dam site. Specify the units of measurement (e.g., million gallons per day, gallons per minute, cubic feet per second, etc.).

Proposed maximum instantaneous withdrawal N/A

Proposed average daily withdrawal N/A

Proposed maximum daily withdrawal N/A

Proposed maximum monthly withdrawal N/A

Proposed maximum annual withdrawal N/A

Describe how the above withdrawals were calculated, including the relevant assumptions made in that calculation and the documentation or resources used to support the calculations, such as population projections, population growth rates, per-capita use, new uses, changes to service areas, and if applicable, evapotranspiration data and irrigation data.

N/A

For surface water withdrawals, public water supply withdrawals, and projects that will alter instream flows, provide information to establish the local water supply need. Attach additional sheets if needed.

EXISTING	PROJECTED
Existing supply sources, yields, and demands: N/A	Projected demands over a minimum 30-year planning period: N/A
Peak day withdrawal: N/A Average daily withdrawal: N/A Safe yield: N/A Lowest daily flow of record: N/A	Projected demands in local or regional water supply plan (9VAC25-780 et seq.) or demand for the project service area, if that is smaller in area: N/A Statistical population (growth) trends: N/A
Types of water uses (residential, public water supply, commercial, industrial, agricultural): N/A	Projected demands by type of water use: N/A
Existing water conservation measures and drought response plan, including what conditions trigger implementation: N/A	Projected demands without water conservation measures: N/A Projected demands with long-term water conservation measures: N/A

For surface water withdrawals other than public water supply, provide information or documentation that demonstrates alternate sources of water are available for the proposed project during times of reduced instream flow.

N/A

25. WATER WITHDRAWAL USE(S), NEED, AND ALTERNATIVES (Continued)

Provide information from the State Water Resources Plan (http://www.deq.virginia.gov/Programs/Water/WaterSupplyWaterQuantity/WaterSupplyPlanning/StateWaterResourcesPlan.aspx) and the local or regional water supply plan that covers the area in which the proposed water withdrawal project is located (http://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/SWRP%20Final/App%20A%20Water%20Supply%20Plans%20and%20Participating%20Localities.pdf). Include information from the plan that pertains to projected demand, analysis of alternatives, and water conservation measures. Discuss any discrepancies between the water supply plan and the proposed project. For projects that propose a transfer of water resources from the Chowan River, New River, Potomac River, Roanoke River, Big Sandy River, or Tennessee River basins to another river basin, information should be provided from the water supply plans for both the source and receiving basins. Attach additional sheets if needed.

N/A

Provide an alternatives analysis for the proposed water withdrawal project, including the required range of alternatives to be analyzed; a narrative outlining the opportunities and status of regional efforts undertaken; and the criteria used to evaluate each alternative. The analysis must address all of the criteria contained in 9VAC25-360.

N/A

Describe any existing, flow-dependent beneficial uses along the affected stream reach. Include both instream and offstream uses. Describe the stream flow necessary to protect existing beneficial uses, how the proposed withdrawal will impact existing beneficial uses, and any measures proposed to mitigate any adverse impacts that may arise. For projects that propose a transfer of water resources from the Chowan River, New River, Potomac River, Roanoke River, Big Sandy River, or Tennessee River basins to another river basin, this analysis should include both the source and receiving basins. For the purposes of this application, beneficial instream 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. Offstream beneficial uses include, but are not limited to, domestic uses (including public water supply); agricultural uses; electric power generation; commercial uses; and industrial uses.

N/A

Describe the aquatic life known to be present along the affected stream reach. Describe aquatic life that may be impacted by the proposed water withdrawal. Include the species' habitat requirements. For projects that propose a transfer of water resources from either the Chowan River, New River, Potomac River, Roanoke River, Big Sandy River, or Tennessee River basins to another river basin, this analysis should include both the source and receiving basins.

N/A

26. PUBLIC COMMENTS/ISSUES FOR MAJOR WATER WITHDRAWALS OR INTERBASIN TRANSFERS

For new or expanded surface water supply projects, use separate sheets of paper to summarize the steps taken to seek public input per 9VAC25-210-320, and identify the issues raised during the public information process.

For transfer of water resources proposed from either the Chowan River, New River, Potomac River, Roanoke River, Big Sandy River, or Tennessee River basins to another river basin, if public input was not required per 9VAC25-210-320, summarize on separate sheets of paper any coordination and/or notice provided to the public, local/state government, and interested parties in the affected river basins and identify any issues raised.

APPENDIX C

Chesapeake Bay Preservation Act Information

Please answer the following questions to determine if your project is subject to the requirements of the Bay Act Regulations:

1. Is your project located within Tidewater Virginia? ____Yes ____X____No (See map on page 31) - If the answer is "no", the Bay Act requirements do not apply; if "yes", then please continue to question #2.

2. Please indicate if the project proposes to impact any of the following Resource Protection Area (RPA) features:

   ____ Tidal wetlands,

   ____ Nontidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow,

   ____ Tidal shores,

   ____ Other lands considered by the local government to meet the provisions of subsection A of 9VAC25-830-80 and to be necessary to protect the quality of state waters (contact the local government for specific information),

   ____ A buffer area not less than 100 feet in width located adjacent to and landward of the components listed above, and along both sides of any water body with perennial flow.

If the answer to question #1 was "yes" and any of the features listed under question #2 will be impacted, compliance with the Chesapeake Bay Preservation Area Designation and Management Regulations is required. **The Chesapeake Bay Preservation Area Designation and Management Regulations** are enforced through locally adopted ordinances based on the Chesapeake Bay Preservation Act (CBPA) program. Compliance with state and local CBPA requirements mandates the submission of a ***Water Quality Impact Assessment (WQIA)*** for the review and approval of the local government. Contact the appropriate local government office to determine if a WQIA is required for the proposed activity(ies).

The individual localities, not the DEQ, USACE, or the Local Wetlands Boards, are responsible for enforcing the CBPA requirements and, therefore, local permits for land disturbance are not issued through this JPA process. **Approval of this wetlands permit does not constitute compliance with the CBPA regulations nor does it guarantee that the local government will grant approval for encroachments into the RPA that may result from this project.**

Notes for all projects in RPAs

Development, redevelopment, construction, land disturbance, or placement of fill within the RPA features listed above requires the approval of the locality and may require an exception or variance from the local Bay Act ordinance. Please contact the appropriate local government to determine the types of development or land uses that are permitted within RPAs.

Pursuant to 9VAC25-830-110, *on-site delineation of the RPA is required for all projects in CBPAs*. Because USGS maps are not always indicative of actual "in-field" conditions, they may not be used to determine the site-specific boundaries of the RPA.

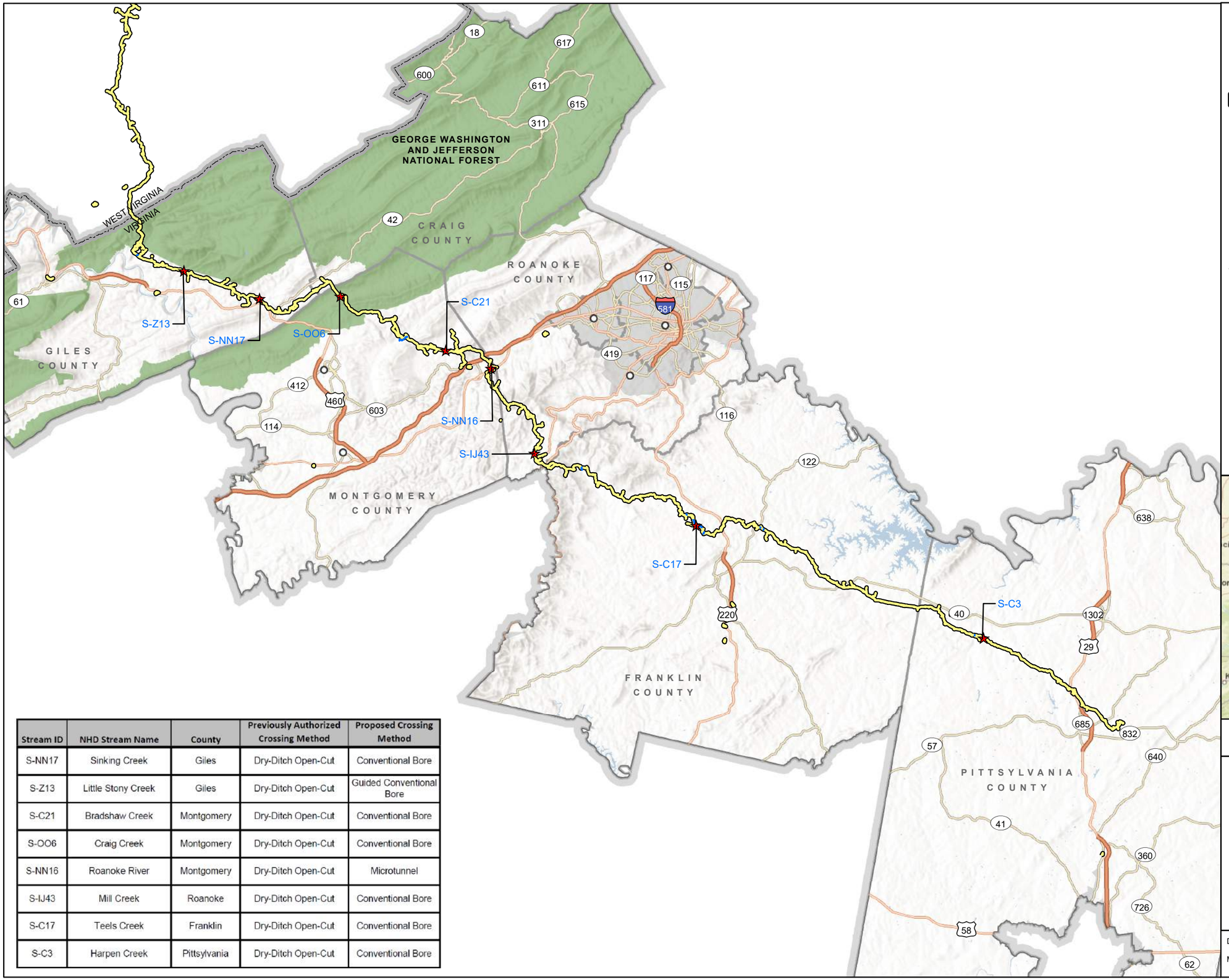
Notes for shoreline erosion control projects in RPAs

Re-establishment of woody vegetation in the buffer will be required by the locality to mitigate for the removal or disturbance of buffer vegetation associated with your proposed project. Please contact the local government to determine the mitigation requirements for impacts to the 100-foot RPA buffer.

Pursuant to 9VAC25-830-140 5 a (4) of the Virginia Administrative Code, shoreline erosion projects are a permitted modification to RPAs provided that the project is based on the "best technical advice" and complies with applicable permit conditions. In accordance with 9VAC25-830-140 1 of the Virginia Administrative Code, the locality will use the information provided in this Appendix, in the project drawings, in this permit application, and as required by the locality, to make a determination that:

1. Any proposed shoreline erosion control measure is necessary and consistent with the nature of the erosion occurring on the site, and the measures have employed the "best available technical advice"
2. Indigenous vegetation will be preserved to the maximum extent practicable
3. Proposed land disturbance has been minimized
4. Appropriate mitigation plantings will provide the required water quality functions of the buffer (9VAC25-830-140 3)
5. The project is consistent with the locality's comprehensive plan
6. Access to the project will be provided with the minimum disturbance necessary.

ATTACHMENT C-2
VMRC Stream Overview Map



Stream ID	NHD Stream Name	County	Previously Authorized Crossing Method	Proposed Crossing Method
S-NN17	Sinking Creek	Giles	Dry-Ditch Open-Cut	Conventional Bore
S-Z13	Little Stony Creek	Giles	Dry-Ditch Open-Cut	Guided Conventional Bore
S-C21	Bradshaw Creek	Montgomery	Dry-Ditch Open-Cut	Conventional Bore
S-OO6	Craig Creek	Montgomery	Dry-Ditch Open-Cut	Conventional Bore
S-NN16	Roanoke River	Montgomery	Dry-Ditch Open-Cut	Microtunnel
S-IJ43	Mill Creek	Roanoke	Dry-Ditch Open-Cut	Conventional Bore
S-C17	Teels Creek	Franklin	Dry-Ditch Open-Cut	Conventional Bore
S-C3	Harpen Creek	Pittsylvania	Dry-Ditch Open-Cut	Conventional Bore

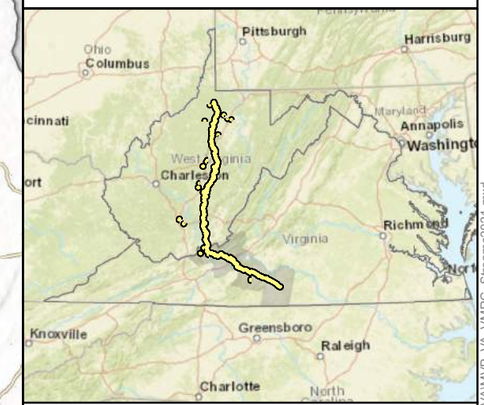
Legend

- February 2021 Modification Request Locations
- VMRC Stream
- Limit of Disturbance
- Cities
- Interstates
- Highways
- Major Roads
- Water Bodies
- Urban Areas
- USDA Forest Service Surface Ownership
- County Boundaries
- State Boundaries

N
W E
S

1 in = 7 miles

7 3.5 0 7 Miles



Mountain Valley Pipeline Project

Mountain Valley PIPELINE

VMRC Stream Overview Map

Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties, Virginia

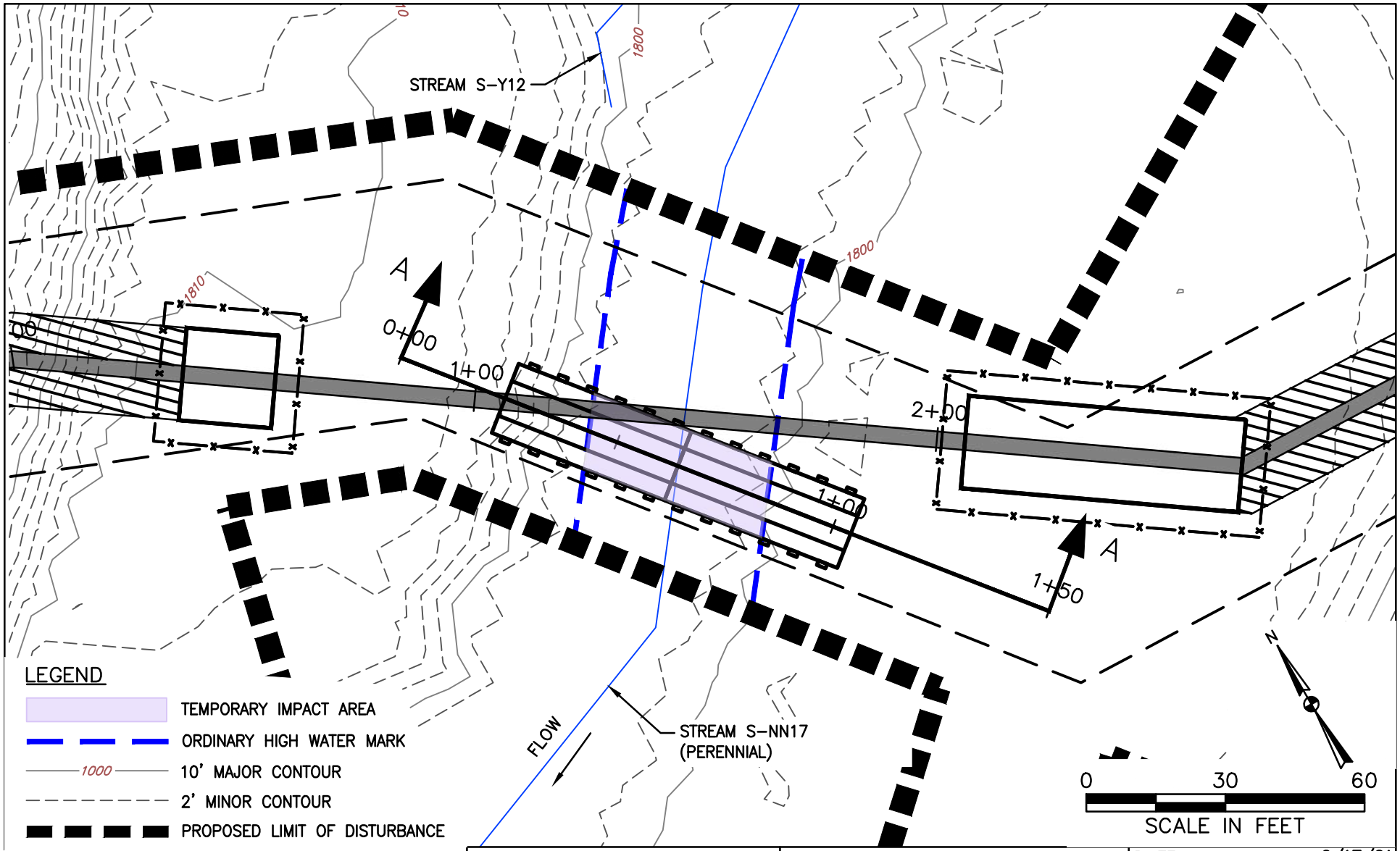
February 2021

Data Sources: ESRI Streaming Data 2014.

Map Projection: NAD 1983 UTM 17N

Document Path: PGH \\ttst010fs2\GIS\GIS\EQT_MVP\MapdocsWetlandsVA\MVP_VA_VMRC_Streams2021.mxd

ATTACHMENT C-3
Stream Impact Plans and Cross Sections



LEGEND

- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK
- 1000 — 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- PROPOSED PIPELINE
- TIMBER MAT/ TEMPORARY CONSTRUCTION ACCESS BRIDGE
- BORE PIT WITH CHAIN LINK FENCE
- PIPELINE TRENCH

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PITTSBURGH, PA 15220
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Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-NN17 (SINKING CREEK)
LAT./LONG. = 37.311616, -80.515786
STATION = 11065+39 – 1+45
COUNTY: GILES
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	ER
CHECKED BY:	RE
SHEET: 1 OF 2	

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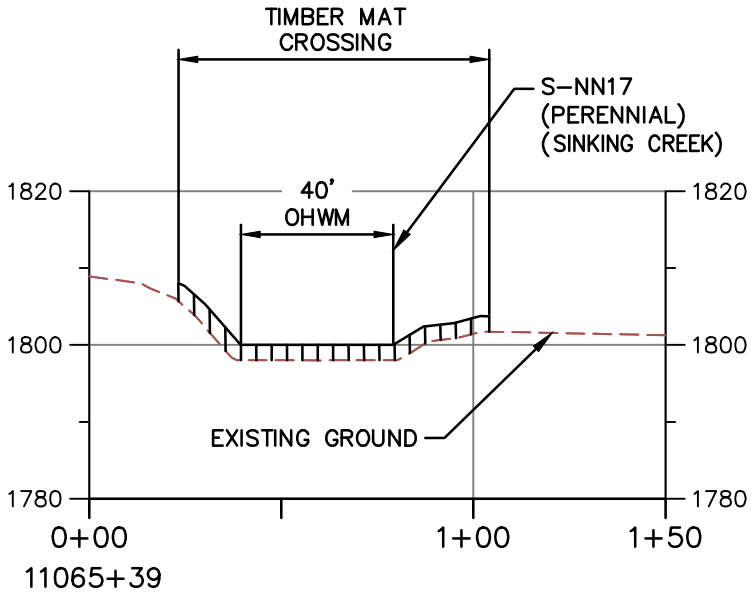

PROFILE A-A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT IS A BORE BELOW SURFACE WATER AND DOES NOT CREATE AN IMPACT.

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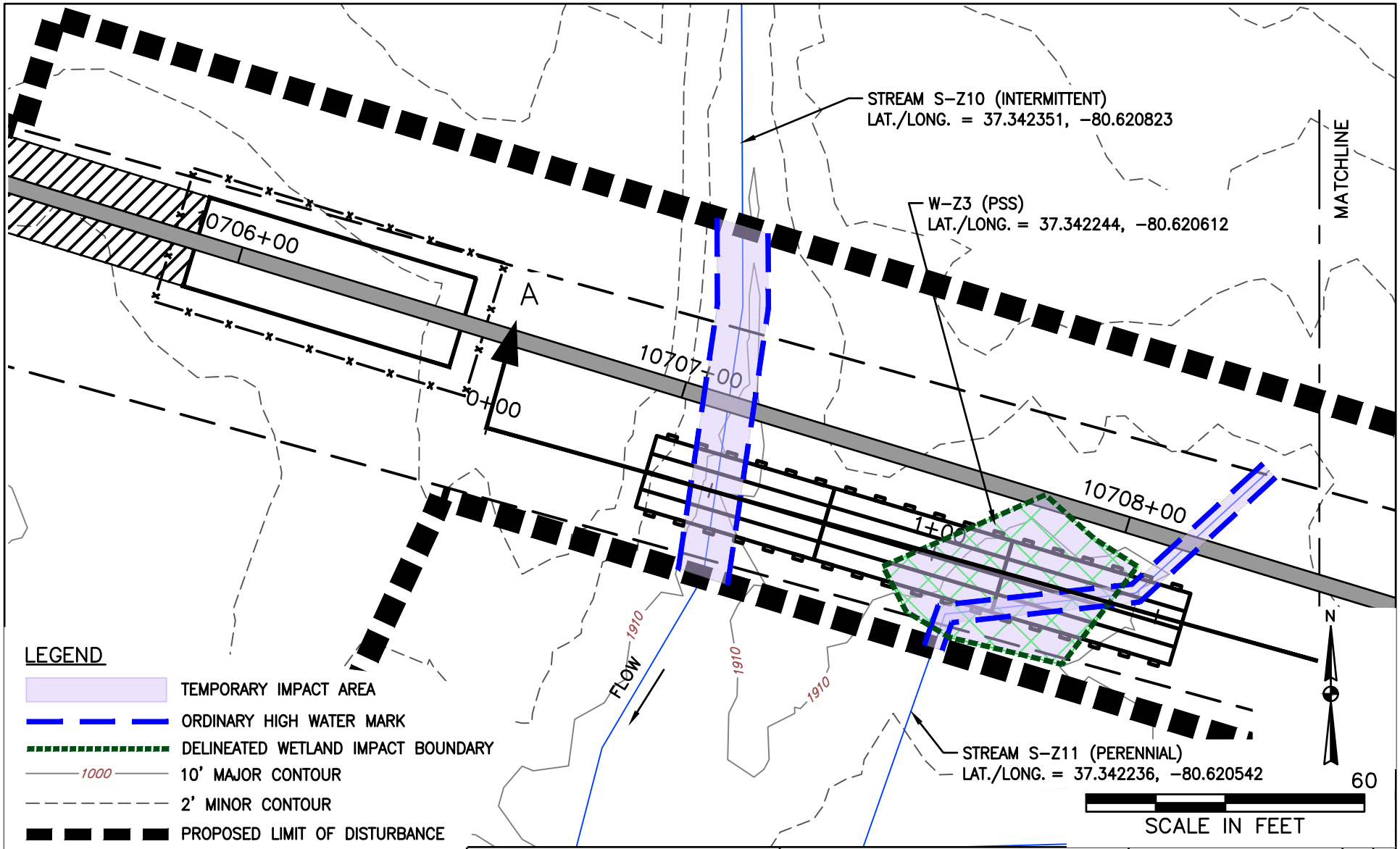

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Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-Z10, S-Z11, S-Z12-EPH, W-Z3, S-Z13 (LITTLE STONY CREEK)
LAT./LONG. = 37.342351, -80.620823
STATION = 10709+32
COUNTY: GILES
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	CC
CHECKED BY:	RE
SHEET: 1 OF 3	

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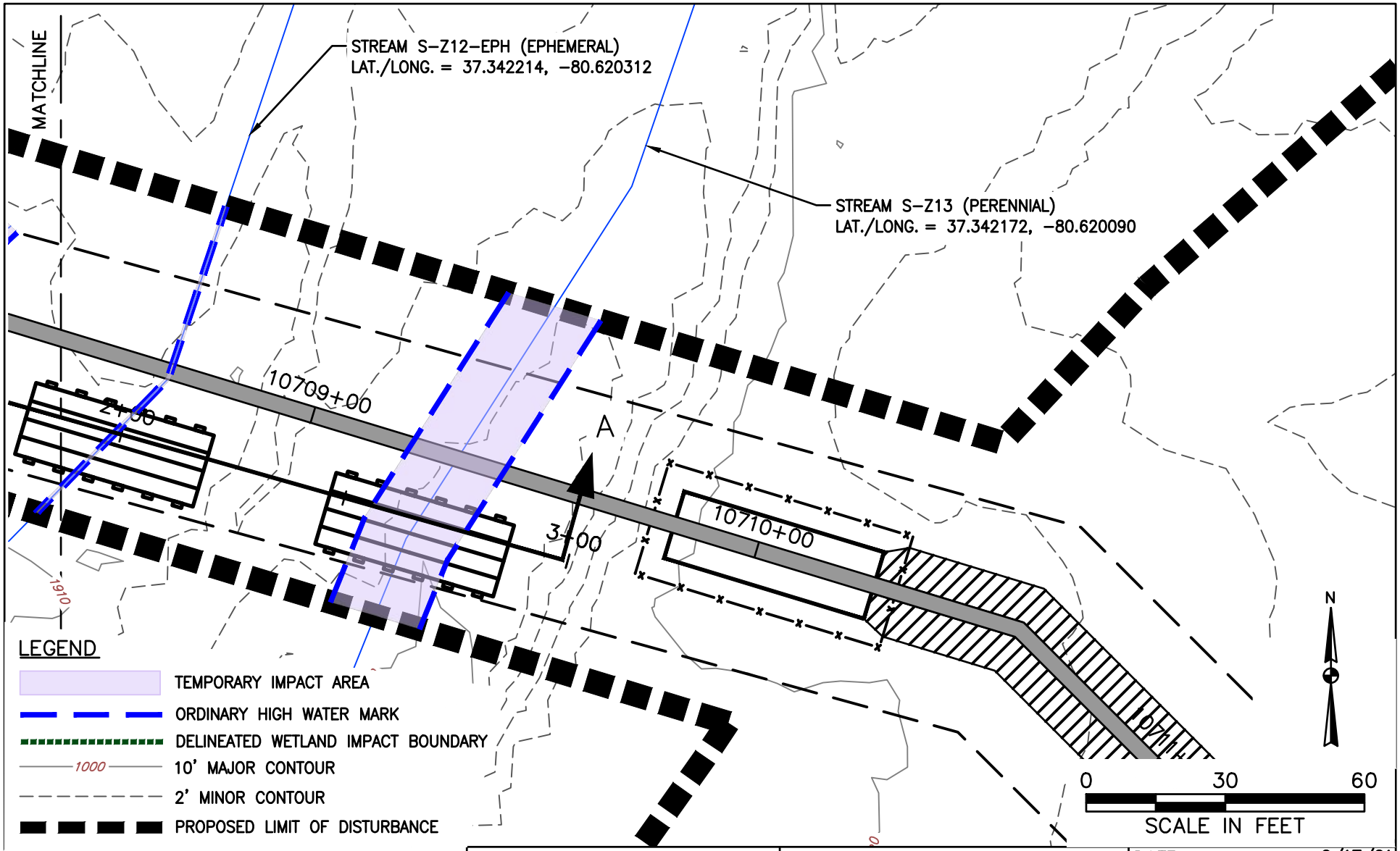

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LAT./LONG. = 37.342351, -80.620823
STATION = 10709+32
COUNTY: GILES
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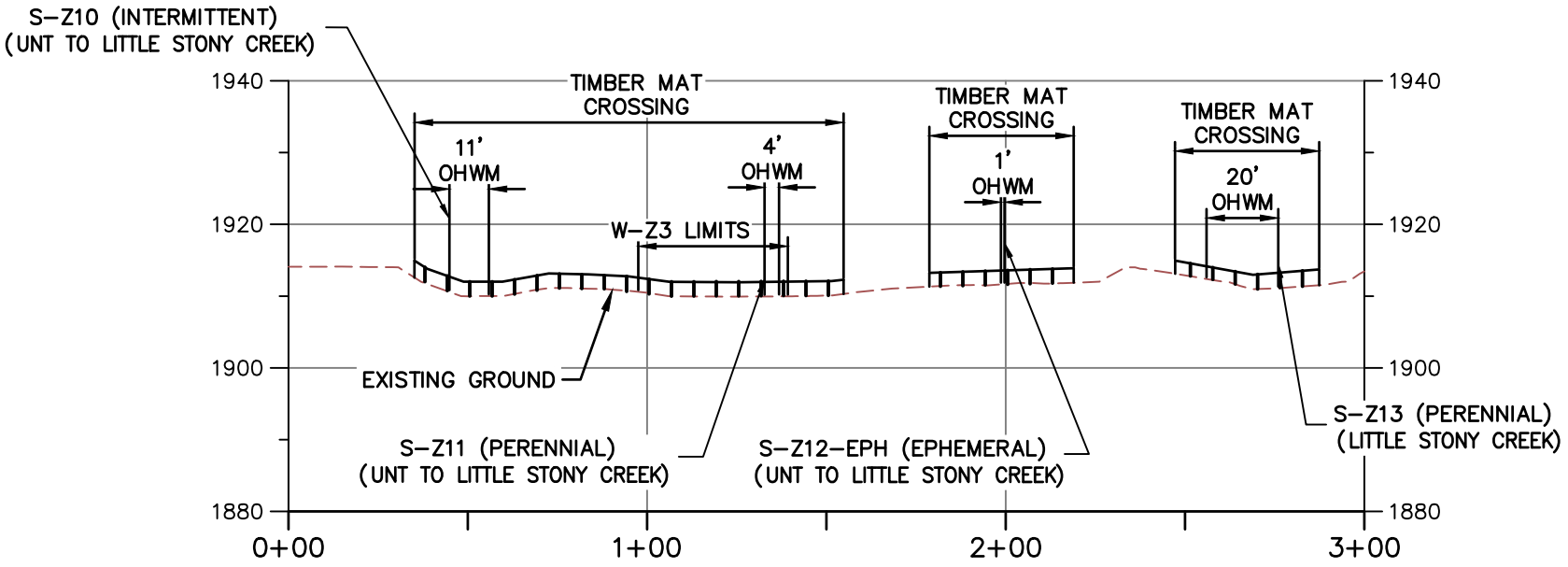
CHECKED BY:	RE
SHEET: 2 OF 3	



PROFILE A–A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAM/WETLAND BED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
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4. PIPELINE NOT SHOWN ON PROFILE BECAUSE IT IS A BORE BELOW SURFACE WATER AND DOES NOT CREATE AN IMPACT.

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Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S–Z10, S–Z11, S–Z12–EPH, W–Z3, S–Z13 (LITTLE STONY CREEK)
LAT./LONG. = 37.342351, –80.620823
STATION = 10709+32
COUNTY: GILES
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
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DESIGNED BY:	DW
DRAWN BY:	CC
CHECKED BY:	RE
SHEET: 3 OF 3	

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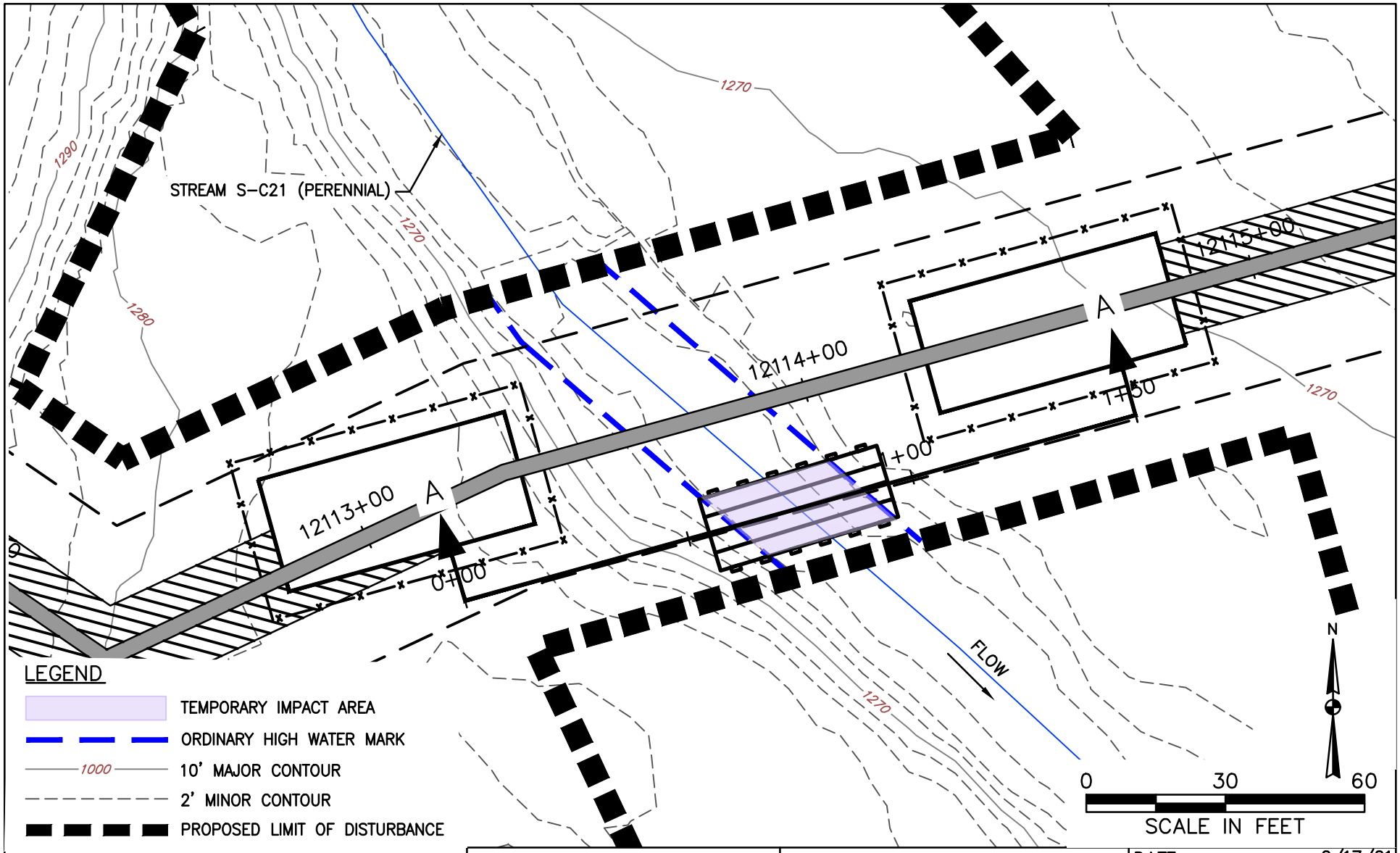

LEGEND

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- 1000 — 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
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Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-C21 (BRADSHAW CREEK)
LAT./LONG. = 37.251791, -80.258990
STATION = 12114+76
COUNTY: MONTGOMERY
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

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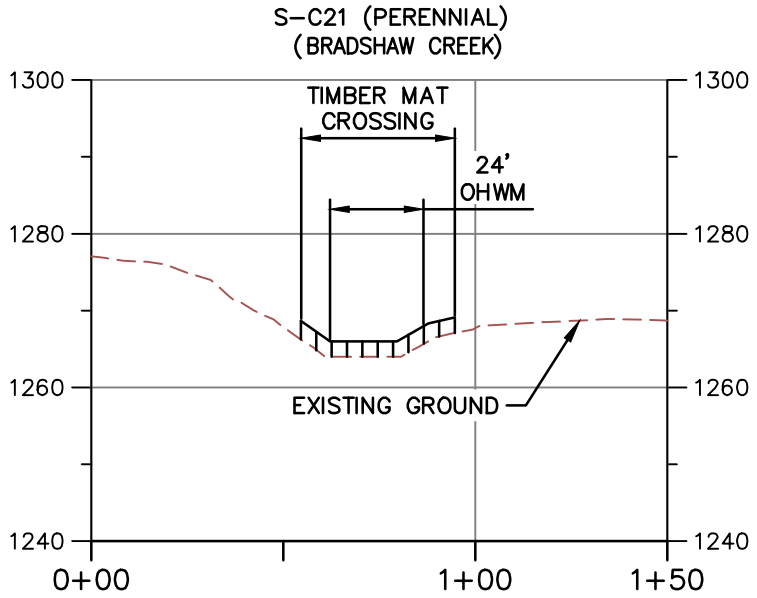

PROFILE A–A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

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SHEET: 2 OF 2	

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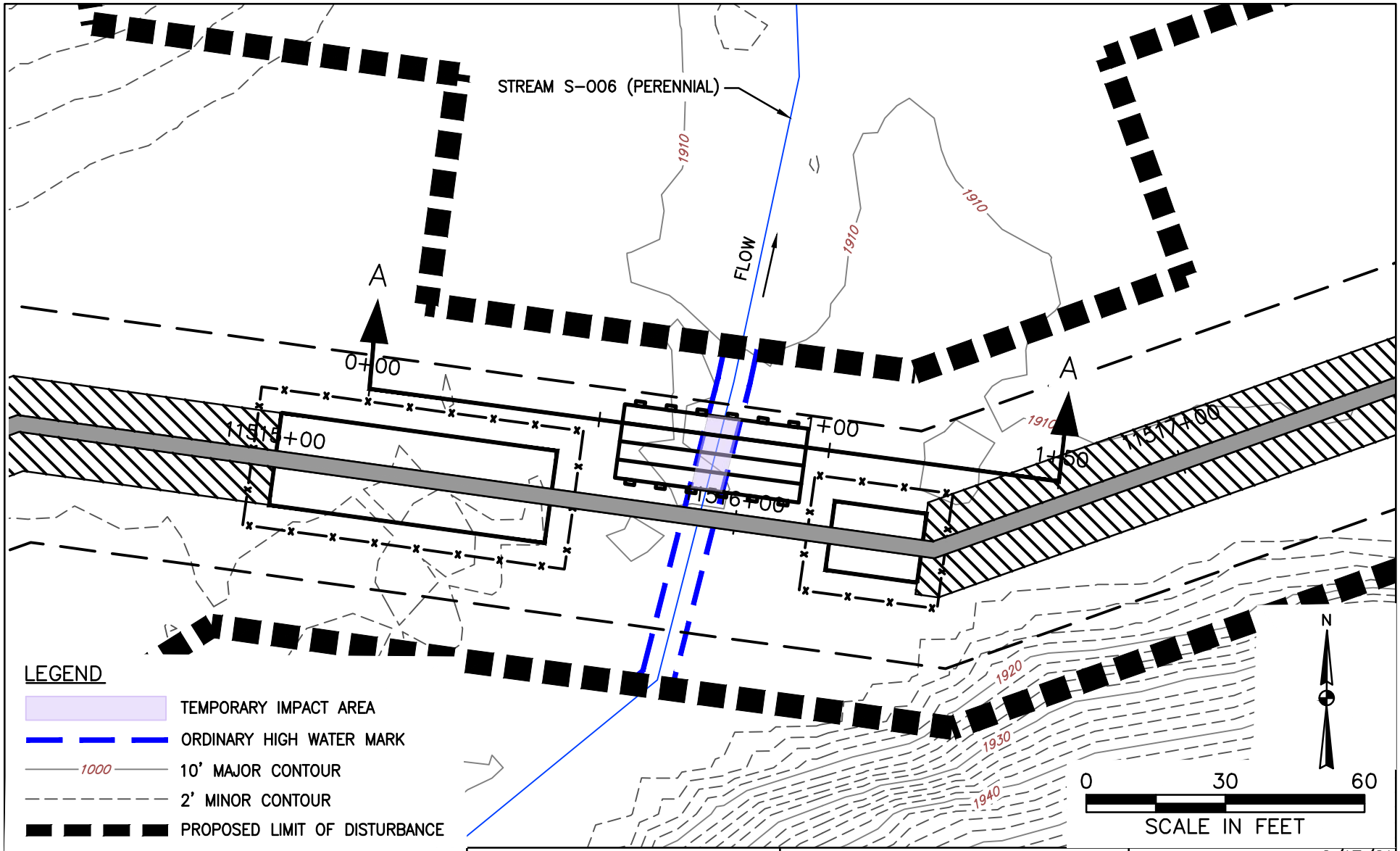

LEGEND

- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK
- 1000 — 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- PROPOSED PIPELINE
- TIMBER MAT/ TEMPORARY CONSTRUCTION ACCESS BRIDGE
- BORE PIT WITH CHAIN LINK FENCE
- PIPELINE TRENCH

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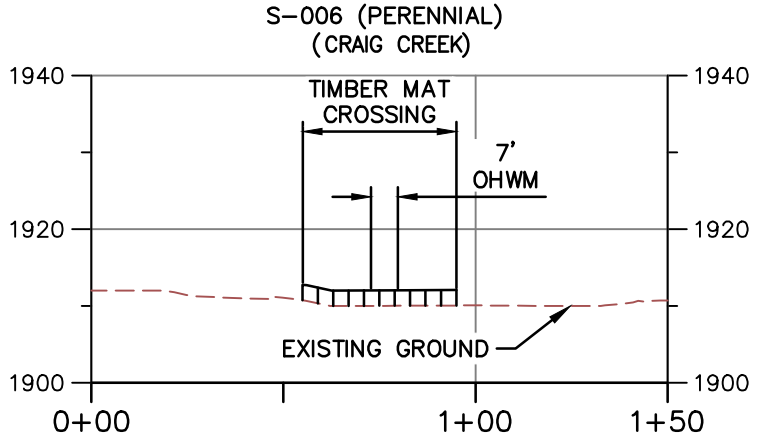
Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-006 (CRAIG CREEK)
LAT./LONG. = 37.313511, -80.404606
STATION = 11515+92
COUNTY: MONTGOMERY
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	ER
CHECKED BY:	RE
SHEET: 1 OF 2	

TETRA TECH CAD FILE PATH: C:\Users\ej.regula\Desktop\Xref\Crossings Round 3\G-037-S-006.dwg PLOTTED ON: 2/15/2021 8:42 PM PLOTTED BY: Regula, EJ PLOT FILE: ENVIRONMENTAL_COLOR.ctb



PROFILE A-A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
2. PROPOSED FILL WILL BE IN TRENCH AND WILL BE RESTORED TO PRECONSTRUCTION ELEVATIONS.
3. APPROVED ESC AND SWM MEASURES ARE NOT SHOWN FOR CLARITY.
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Mountain Valley PIPELINE

STREAM CROSSING
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STATION = 11515+92
COUNTY: MONTGOMERY
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
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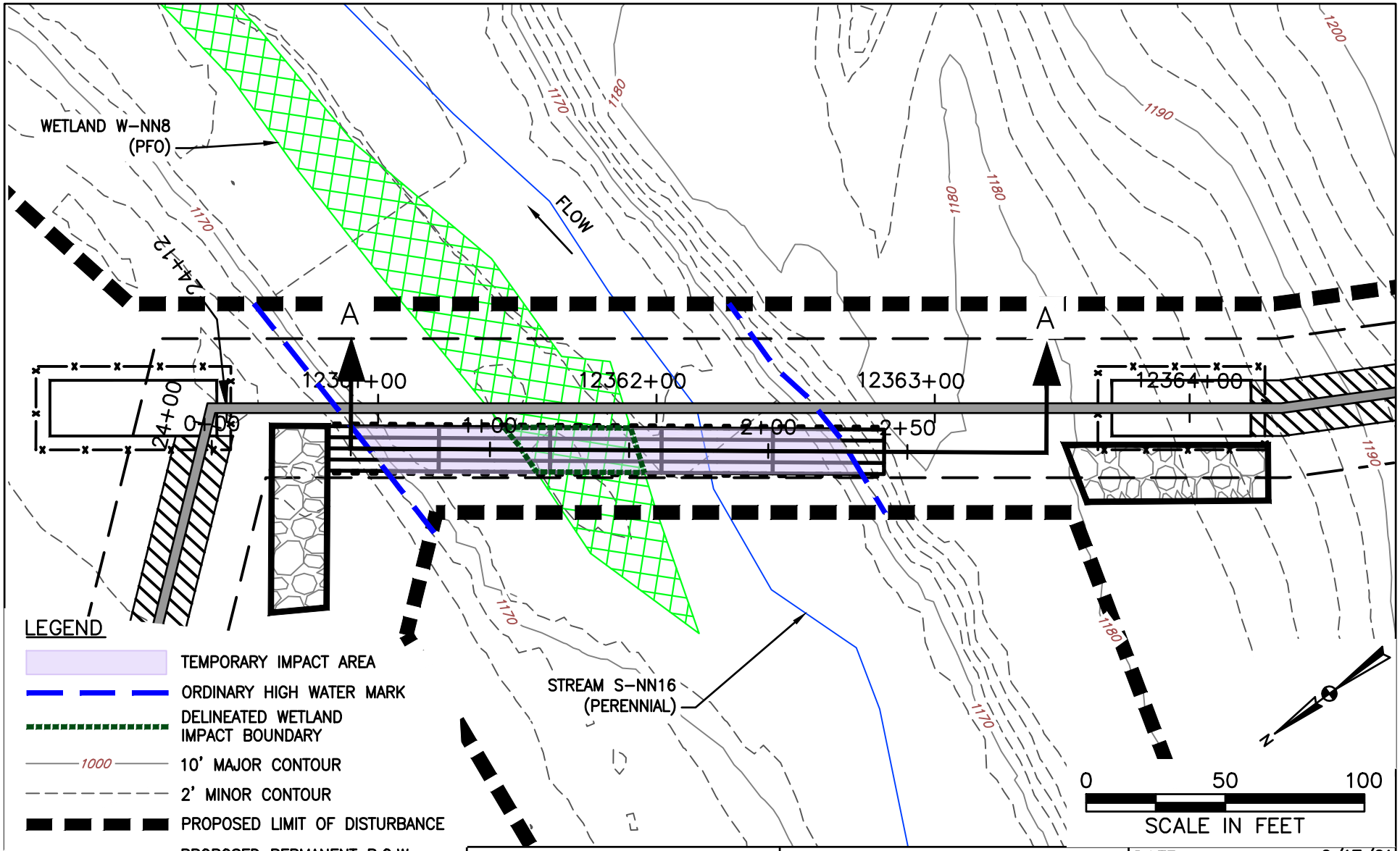
DRAWN BY:	ER
CHECKED BY:	RE
SHEET: 2 OF 2	

TETRA TECH CAD FILE PATH: C:\Users\ej.regula\Desktop\Xref\Crossings Round 3\G-037-S-006.dwg PLOTTED ON: 2/15/2021 8:11 PM PLOTTED BY: Regula, EJ PLOT FILE: ENVIRONMENTAL_COLOR.ctb



LEGEND

- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK
- DELINEATED WETLAND IMPACT BOUNDARY
- 1000 — 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- PROPOSED PIPELINE
- TIMBER MAT/ TEMPORARY CONSTRUCTION ACCESS BRIDGE
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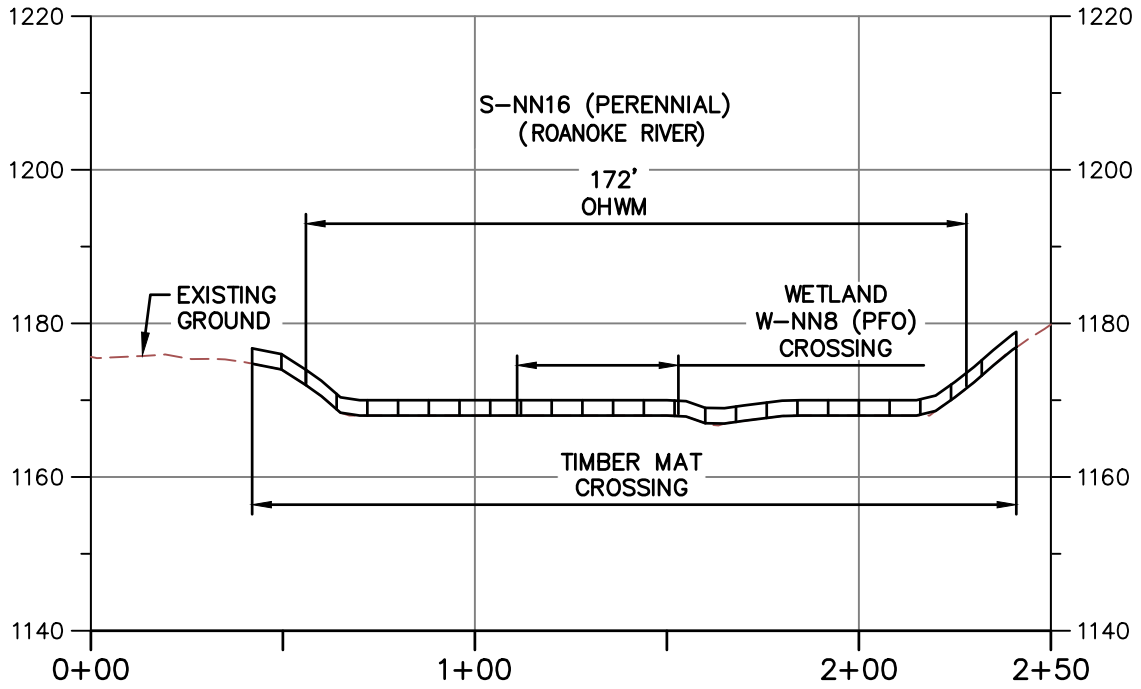
Mountain Valley PIPELINE

STREAM/WETLAND CROSSING
STREAM NAME: S-NN16 (ROANOKE RIVER)
WETLAND NAME: W-NN18
LAT./LONG. = 37.233402, -80.197942
STATION = 12362+23
COUNTY: MONTGOMERY
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	AJL
CHECKED BY:	RE
SHEET: 1 OF 2	

TETRA TECH CAD FILE PATH: C:\Users\Alex.Ludinich\Desktop\20210217_Crossings\Figures\H-019-S-NN16-W-NN8.dwg PLOTTED ON: 2/16/2021 1:31 PM PLOTTED BY: Ludinich, Alex PLOT FILE: ENVIRONMENTAL_COLOR.ctb



PROFILE A-A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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Mountain Valley PIPELINE

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WETLAND NAME: W-NN18
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STATION = 12362+23
COUNTY: MONTGOMERY
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
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DESIGNED BY:	DW
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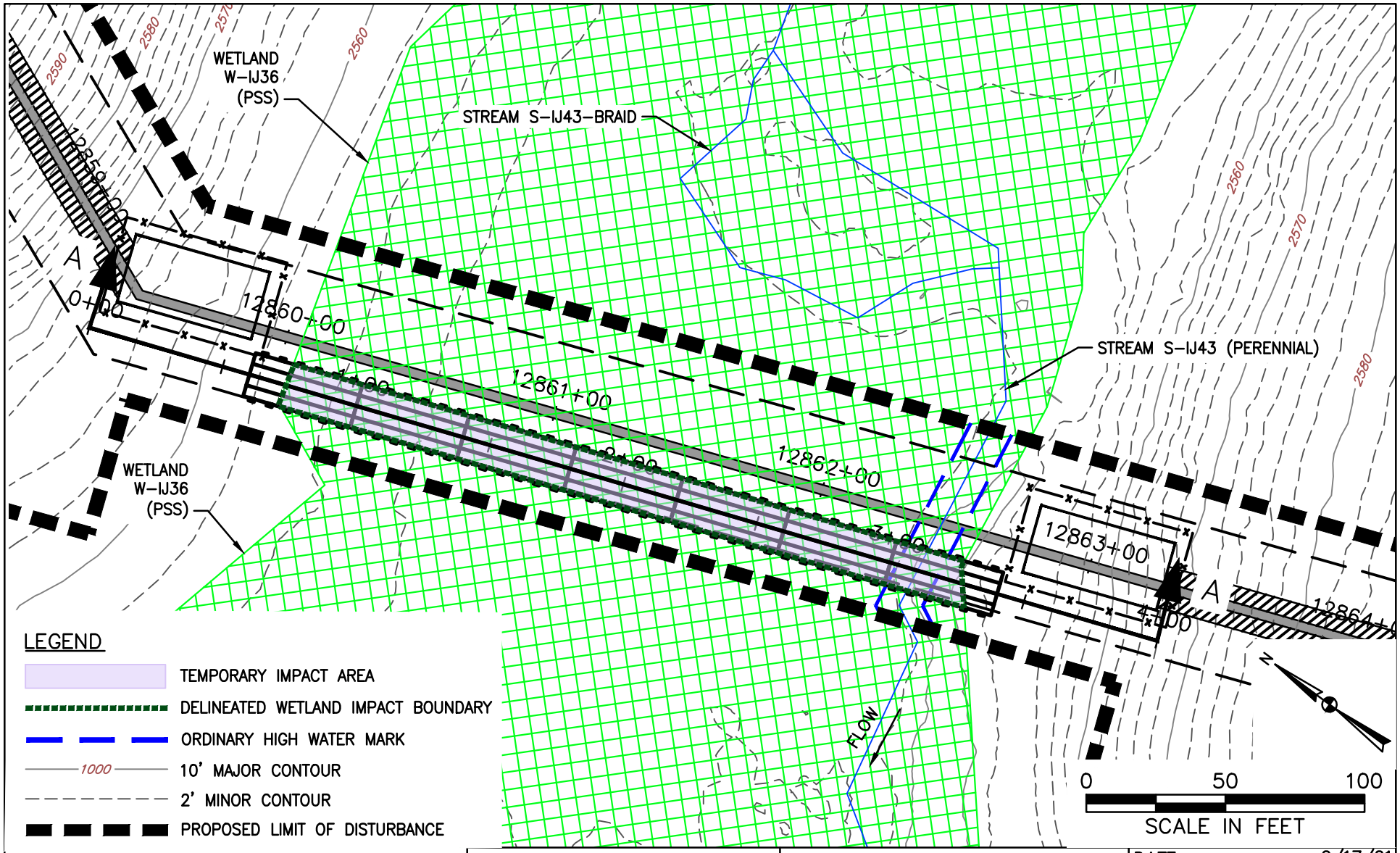
CHECKED BY:	RE
SHEET: 2 OF 2	

TETRA TECH CAD FILE PATH: C:\Users\Alex.Ludinich\Desktop\20210217 Crossings\Figures\H-019-S-NN16-W-NN8.dwg PLOTTED ON: 2/16/2021 1:31 PM PLOTTED BY: Ludinich, Alex PLOT FILE: ENVIRONMENTAL_COLOR.ctb



LEGEND

- TEMPORARY IMPACT AREA
- DELINEATED WETLAND IMPACT BOUNDARY
- ORDINARY HIGH WATER MARK
- 1000 — 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
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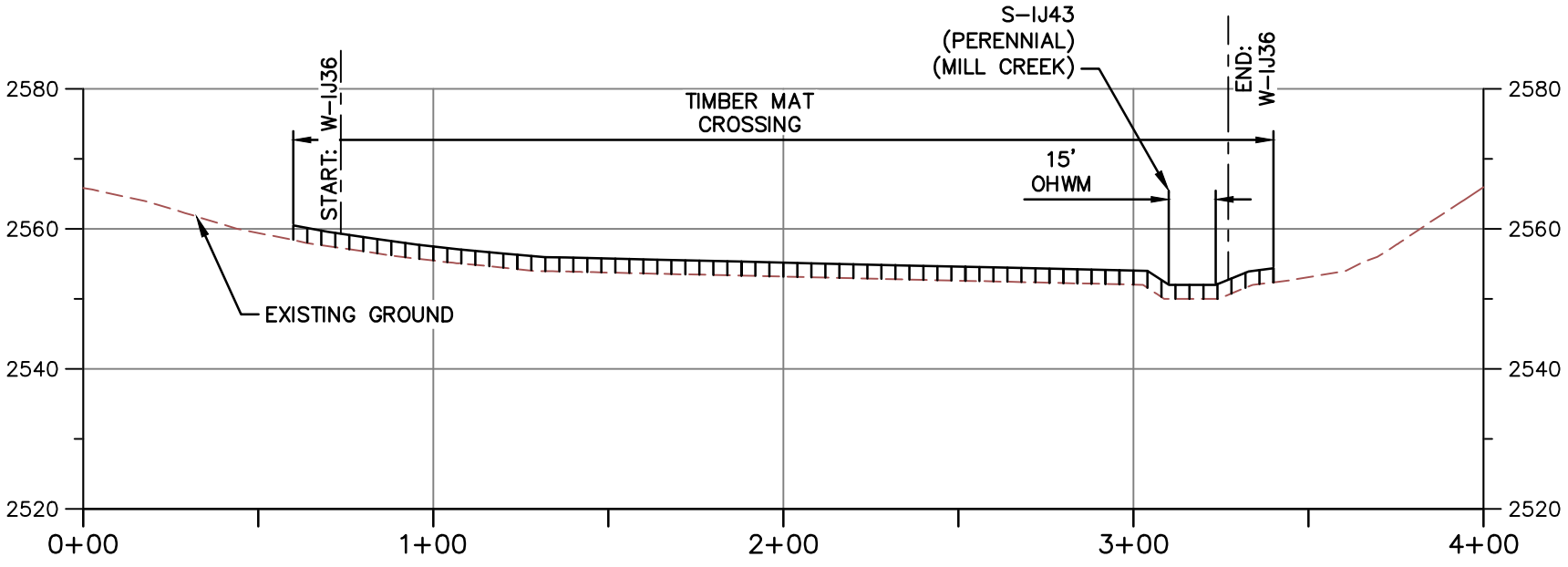
Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-IJ43 (MILL CREEK); W-IJ36
LAT./LONG. = 37.138636, -80.139715
STATION = 12862+45
COUNTY: ROANOKE
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	ER
CHECKED BY:	RE
SHEET: 1 OF 2	

TETRA TECH CAD FILE PATH: C:\Users\ej.regula\Desktop\Xref\Figures\H-045-W-IJ36.dwg PLOTTED ON: 2/16/2021 5:33 PM PLOTTED BY: Regula, EJ PLOT FILE: ENVIRONMENTAL_COLOR.ctb



PROFILE A–A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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Mountain Valley PIPELINE

STREAM CROSSING
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STATION = 12862+45
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REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

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SHEET: 2 OF 2	

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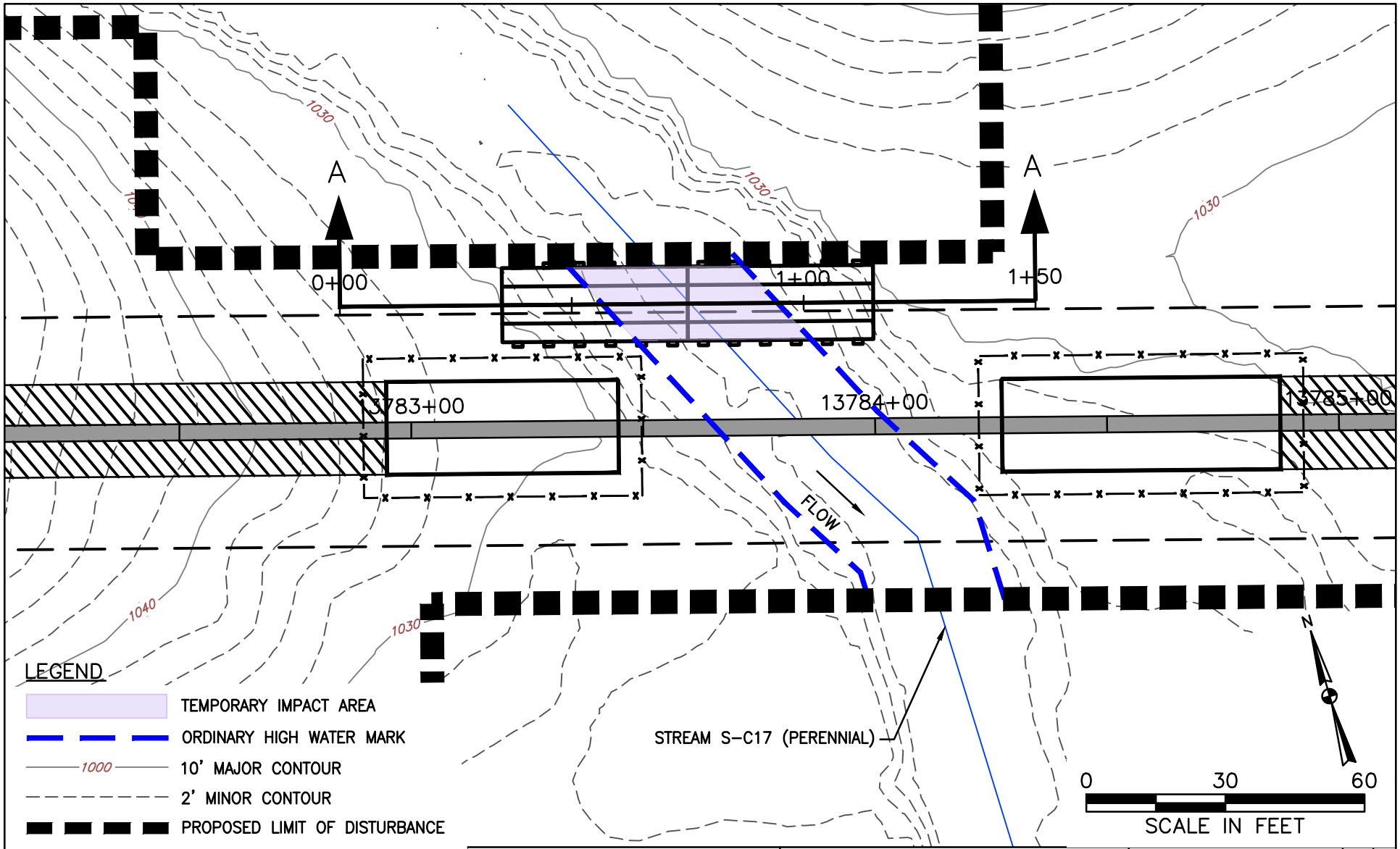

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Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-C17 (TEELS CREEK)
LAT./LONG. = 37.05839, -79.918015
STATION = 13783+84.55
COUNTY: FRANKLIN
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 1 OF 2	

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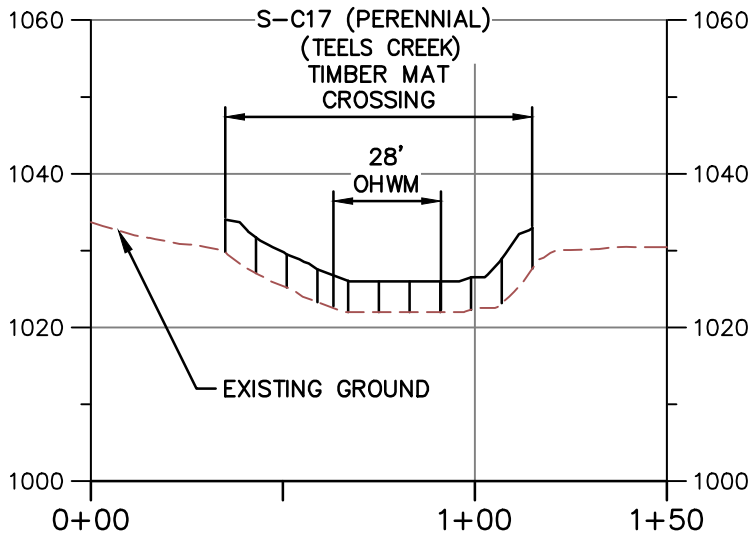

PROFILE A–A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

1. MINIMUM 3' OF COVER BETWEEN STREAMBED AND TOP OF PIPELINE.
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COUNTY: FRANKLIN
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

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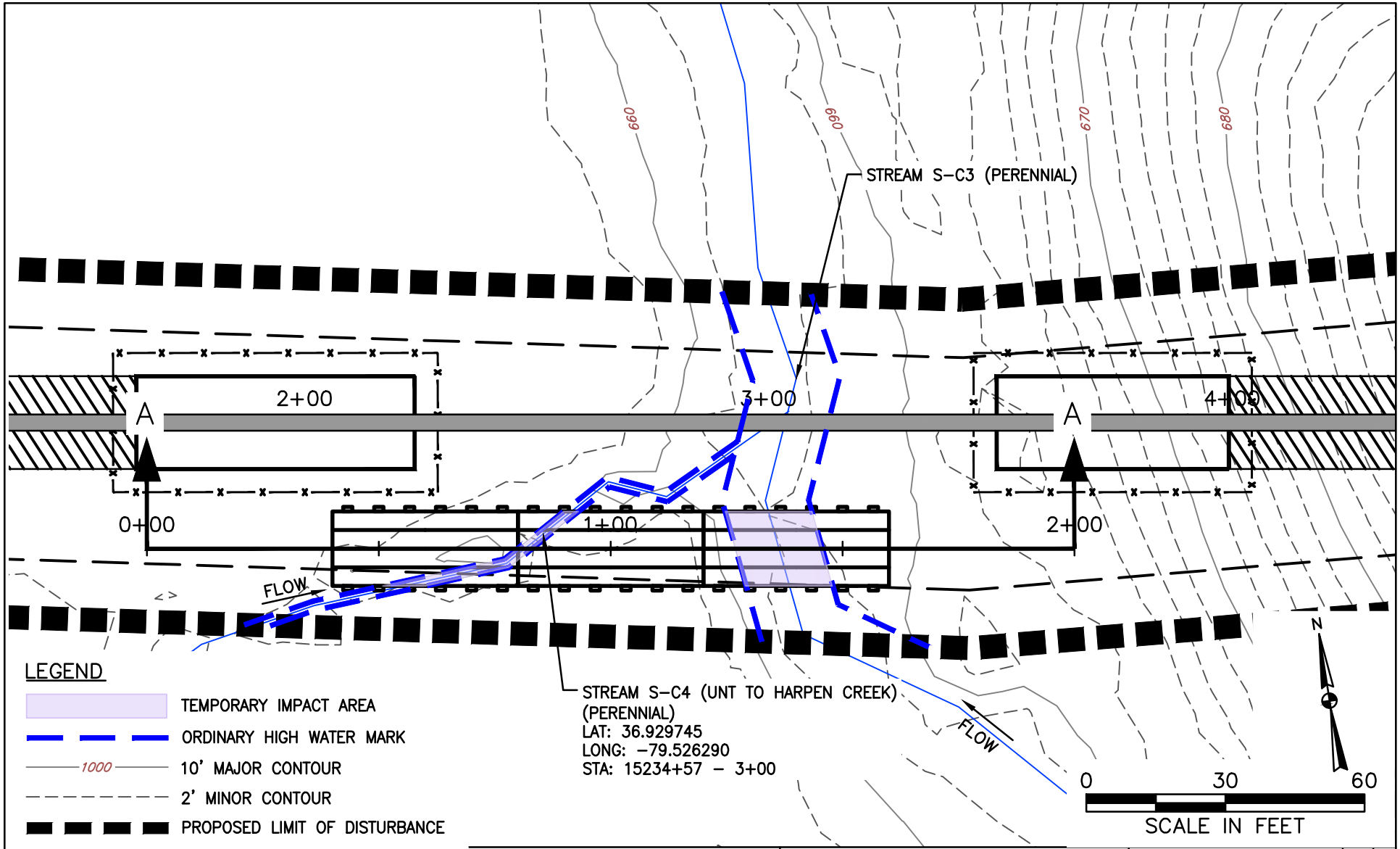
DESIGNED BY:	DW
DRAWN BY:	MP
CHECKED BY:	RE
SHEET: 2 OF 2	



LEGEND

- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK
- 1000 — 10' MAJOR CONTOUR
- 2' MINOR CONTOUR
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PERMANENT R.O.W.
- PROPOSED PIPELINE
- TIMBER MAT/ TEMPORARY CONSTRUCTION ACCESS BRIDGE
- BORE PIT WITH CHAIN LINK FENCE
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Mountain Valley PIPELINE

STREAM CROSSING
STREAM NAME: S-C3 (HARPEN CREEK)
LAT./LONG. = 36.929762, -79.526109
STATION = 15234+57 - 3+03
COUNTY: PITTSYLVANIA
REFER TO TABLE 2 (STREAMS) AND TABLE 3 (WETLANDS) IN THE INDIVIDUAL PERMIT APPLICATION

DATE:	2/17/21
PROJECT NO.:	112IC07157
DESIGNED BY:	DW
DRAWN BY:	JZ
CHECKED BY:	RE
SHEET: 1 OF 2	

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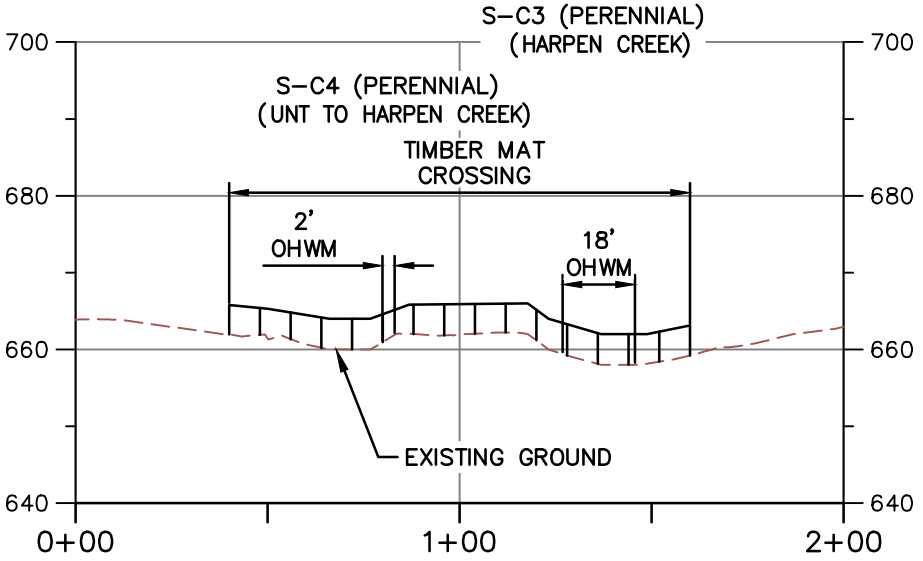

PROFILE A–A

HORIZONTAL

0 50 100

SCALE IN FEET

VERTICAL

0 25 50

SCALE IN FEET

NOTE:

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DATE:	2/17/21
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SHEET: 2 OF 2	

ATTACHMENT C-4
Correspondence with VDCR

EXHIBIT 5

Correspondences (VADCR)

From:	Chalmers, Cory M.
To:	Orndorff, William
Cc:	Neylon, Megan; Clauto, Brian M.; Justin Curtis; Billy Newcomb
Subject:	RE: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification
Date:	Monday, October 26, 2020 8:34:00 AM

Hi Wil,

I don't need anything additional. Glad to see you have no concerns.

Thank you again for your time while reviewing our crossing method modification requests and as always, please let me know if end up having any additional questions.

Cory

From: Orndorff, William <wil.orndorff@dcr.virginia.gov>
Sent: Friday, October 23, 2020 10:14 AM
To: Chalmers, Cory M. <CChalmers@equitransmidstream.com>
Cc: Neylon, Megan <MNeylon@equitransmidstream.com>; Clauto, Brian M. <BClauto@equitransmidstream.com>; Justin Curtis <justin@aqualaw.com>; Billy Newcomb <bnewcomb@daa.com>
Subject: Re: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification

Dear Cory,

Thanks for getting back to me on this. Just making sure we dot all the i's and cross the t's.

As long as it's limited to bentonite in the amounts and pressures specified, I have no issue. Do you need anything more from me on this topic?

Thanks,

Wil Orndorff
Karst Protection Coordinator
VDCR

On Thu, Oct 22, 2020 at 5:44 PM Chalmers, Cory M. <CChalmers@equitransmidstream.com> wrote:

> Hi Wil,
>
> Thank you for the question. After discussing further with the drilling contractor, MVP can confirm that no additional additives will be used besides the previously specified bentonite. For further clarity, I've attached the SDS sheet for reference. This SDS sheet was also submitted and approved as part of the FERC variance approval.

As always, please let me know if I can provide additional information or clarify further.

Thanks,
Cory

From: Orndorff, William <wil.orndorff@dcr.virginia.gov>
Sent: Monday, October 12, 2020 4:43 PM
To: Chalmers, Cory M. <CChalmers@equitransmidstream.com>
Subject: Re: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification

Hi Corey,

Overall this looks pretty good to me. One sentence causes a little concern: "In the event additional additives (e.g., synthetic or natural polymers) are required, SDSs will be provided to VMRC and DCR." from page 3, first paragraph of MVP response in the document 2020_09_02_comments on stream crossings WDO_MVP Response. I think it would be valuable for VMRC and DCR to know ahead of time what additional additives might be employed. This reads as if MVP's contractor will simply use additional additives as necessary and tell VMRC and DCR what they used.

It's clear that the method used will attempt to avoid loss of drilling slurry to the groundwater (aka "inadvertent return"), and given the relatively low differential pressures it seems reasonable to me.

I would like a little more detail on how and when DCR and VMRC would be notified of the need for/use of additional additives (other than bentonite). If these additives may be used at discretion of MVP and/or its contractors during construction, we need to know what they are ahead of time rather than after the fact.

Thanks,

Wil

On Mon, Oct 12, 2020 at 9:41 AM Chalmers, Cory M. <CChalmers@equitransmidstream.com> wrote:

> Thanks Wil. I appreciate the feedback. If possible, a response to the email I sent previously with the attachment to close the loop there would be helpful. I'll be including that email chain in our VMRC modification request as we've done before.

Cory

From: Orndorff, William <wil.orndorff@dcr.virginia.gov>
Sent: Monday, October 12, 2020 9:36 AM
To: Chalmers, Cory M. <CChalmers@equitransmidstream.com>
Subject: Re: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification

Good morning Cory,

I think we are good. Are you waiting on anything from me?

Please advise.

Wil

On Mon, Oct 12, 2020 at 8:02 AM Chalmers, Cory M. <CChalmers@equitransmidstream.com> wrote:

> Hi Wil,
>
> Just wanted to check in and see if you had any further questions on the information previously provided.
>
> Thanks,
> Cory
>
> ---
>
> **From:** Chalmers, Cory M.
> **Sent:** Thursday, September 24, 2020 10:42 AM
> **To:** Orndorff, William <wil.orndorff@dcr.virginia.gov>
> **Cc:** Neylon, Megan <MNeylon@equitransmidstream.com>; Billy Newcomb (bnewcomb@daa.com) <bnewcomb@daa.com>; Justin Curtis <justin@aqualaw.com>; Clauto, Brian M. <BClauto@equitransmidstream.com>
> **Subject:** RE: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification
>
> Thank you for your feedback, Wil. For ease, I've updated the previously attached comment document with responses to your requests highlighted in yellow. Also attached, please find a Karst Area Contingency Guide that is referenced in one of the responses.
>
> Please let me know if you have any additional questions or if I can clarify the responses further.
>
> Best,
> Cory
>
> **From:** Orndorff, William <wil.orndorff@dcr.virginia.gov>

Sent: Wednesday, September 2, 2020 7:19 PM
To: Chalmers, Cory M. <CChalmers@equitransmidstream.com>
Cc: Neylon, Megan <MNeylon@equitransmidstream.com>; Billy Newcomb (bnewcomb@daa.com) <bnewcomb@daa.com>; Justin Curtis <justin@aqualaw.com>; Clauto, Brian M. <BClauto@equitransmidstream.com>
Subject: Re: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification

Cory et al,

Please see my comments in the attached document. No major issues or concerns, at least from my perspective.

Thanks for the opportunity to comment on the proposed modifications to the stream crossing plans.

Sincerely,

Wil Orndorff

Modification type 1: Change the crossing method for these four additional streams from open-cut dry-ditch to conventional bore (auger bore/bore & jack).

Crossings to which this applies:

Craig Creek (Montgomery County, Figure 3 attached)

North Fork Blackwater River (Franklin County, Figure 4 attached)

Harpen Creek (Pittsylvania County, Figure 5 attached)

Little Stony Creek (Giles County, Figure 6 attached).

Orndorff comments: None of these crossing occur in areas with well-developed karst. In fact, only the Little Stony Creek crossing has any potential for encountering karst, albeit very small. The crossing is show on the Gile County Geology Map as taking place through alluvial deposits (mostly sandstone gravels, cobbles and ,boulders) overlying the calcareous shales and thin argillaceous (clay-rich) limestones of the Reedsville, Eggleston, and Mocassin Formations. While these formations occasionally host small caves and very small karst groundwater systems, this is generally only observed when they crop out on mountain slopes above the more massive limestones of Middle Ordovician age, that host the most significant cave and karst development. I think you are unlikely to encounter any karst associated problems at the Little Stony Creek Crossing, and that if you did the method chose (conventional bore) would cause only minimal impact. The only other concern here is that Little Stony Creek sinks (partially or completely depending on flow) into the limestone underlying its bed downstream of the crossing. This water has been traced to a spring on the New River called the Klotz Quarry Spring, which is identified in the 2018 dye tracing report prepared by DCR for Draper Aden Associates and MVP. MVP should be prepared to set up mitigation at the Klotz Quarry Spring as well as the surface flow of Little Stony Creek, in case of the unlikely event of a discharge of contaminants or significant sediment to Little Stony Creek. It may be wise to 1) have mitigation equipment, materials, and crew on standby during the crossing operation, 2) arrange ahead of time access to the spring, and 3) visit the spring to be able to address any accessibility issue preemptively.

MVP Response: Based on the Karst Area Contingency Guide developed for the project by Draper Aden Associates in March of 2018, the Little Stony Creek stream was identified through dye tests as located within the Klotz Spring karst watershed. This document is attached for your reference. Per the guide, the Project's approved Spill Prevention, Control, and Countermeasure (SPCC) Plan and Unanticipated Discovery of Contamination Plan for Construction Activities in Virginia provides contingency plans and emergency procedures and will therefore be followed for notifications and emergency procedures should they become necessary. Additionally, Section 4 of the SPCC Plan includes specific measures to support MVP construction in karst terrain. As an additional preparative measure, the project is currently working on securing

access to the Klotz Spring area. In doing so, MVP can preemptively address any sedimentation concerns as a result of the conventional bore crossing of Little Stony Creek. Spill kits and other materials will be staged specifically for response to the Klotz Spring area. It is also important to note that the Karst Specialist Team will brief the drilling crews in advance of the Little Stony Creek bore about potential karst hazards and will remain on call to advise the crews and respond if any karst hazards are encountered unexpectedly (in accordance with the Karst Mitigation Plan).

Narrative from Cory Chalmers, MVP (9/2/2020):

Similar to the crossings you reviewed before, the revised permit modification will seek to change the crossing method for these four additional streams from open-cut dry-ditch to conventional bore (auger bore/bore & jack). This modification in crossing method will avoid direct instream disturbance to these four surface water resources. The mitigation measures that will be employed for these four crossings are the same as discussed in the email below. Please note that the open-cut dry-ditch method will become the contingency method of construction in the unlikely event the conventional bore is unsuccessful.

As with the Roanoke River and Sinking Creek crossings, Randy Owen at VMRC suggested that we contact you to see if you have any concerns about potential impacts to karst terrain if the conventional bore crossing method is used at the Craig Creek, North Fork Blackwater River, Harpen Creek, and Little Stony Creek crossing locations. Mountain Valley's preconstruction karst survey did not identify any karst terrain within the vicinity of these four crossings. Since the VMRC approval was issued on January 25, 2018 (#17-1609), Mountain Valley has further confirmed the preconstruction surveys; no karst features were identified. Accordingly, MVP believes there is a negligible potential for encountering any subsurface karst features along the bore path at the Craig Creek, North Fork Blackwater River, Harpen Creek, and Little Stony Creek crossings. Should any unexpected karst features be encountered, however, one advantage of the conventional bore method is that the pipe material is installed at the same time the boring is advanced, so there is no unsupported hole subject to collapse. Additionally, drilling mud is not utilized for a conventional bore so there is effectively no potential for an inadvertent return of drilling mud to surface water or into subterranean karst features.

Modification Type 2 – Conventional bore to microtunneling

Crossings to which this applies: Roanoke River (downstream crossing near Lafayette, Montgomery County, VA)

Orndorff comments: This crossing takes place in the Cambrian Rome formation, which locally has thin limestone beds that exhibit cave development. Most of the Rome formation is shale and siltstone. The closest caves known in the Rome to the crossing are approximately 1.5 miles to the northeast of the proposed crossing in the Dixie Caverns area, and some smaller caves are documented similar distances to the south and west. A couple of sinkholes are documented on the hill north of the crossing, between ¼ and ¾ miles from the crossing. My prediction is that you will

not encounter significant carbonate bedrock, karst, or voids during the bore and I think microtunneling is appropriate for the scenario due to the slight risk of encountering voids, which could create significant impacts if horizontal directional drilling were used.

<u>Orndorff requests:</u> Please let me know what fluid composition and pressure will be used in the microtunneling operation, and what MVPs protocol is should there be a sudden drop in pressure during tunneling indicating intersection with a void.

<u>MVP Response:</u> Small amounts of bentonite and water mixture will be pumped around the annulus for lubrication as the pipe progresses forward. This additive is non-petroleum based, non-hazardous, NSF-60-compliant, and non-toxic to fish based on the low total volumes associated with any inadvertent return, low concentrations of the additive in the drilling fluid, further dilution of the additive by stream water in the unlikely event of inadvertent return, and short duration of exposure. In the event additional additives (e.g., synthetic or natural polymers) are required, SDSs will be provided to VMRC and DCR. Bentonite will be injected from the first pipe to reduce friction and refill the annular space remaining from the over cut of the cutting wheel. The bentonite and polymer will be pumped to ports inside the pipe at a limited pressure not to exceed theoretical pressure of soils overburden at minimum cover location(s).

Given the geotechnical conditions that have been provided it is not expected that bentonite will be required to be added to the water and excavated material slurry system that lubricates the cutting head. The gasket eye (entrance) seal prevents slurry from flowing past the cutter head and back into the jacking shaft while a drive is being tunneled. This prevents groundwater inflow during machine launch. The slurry pumps are fully adjustable from 0-1800 RPM allowing the operator full control of the slurry flow and pressure. The operator will use the "slurry line" pressure reading to set slurry pressure and the magnetic flow meters to set flow keeping the by-pass valve in the "by-pass" or circulation mode. The slurry pressure is generally set at between 1.45 and 2.9 psi above static ground water pressure and is being read on the slurry chamber pressure display while the slurry is in "by-pass" mode. Once the cutter head becomes operational, the pressure sensor in the slurry chamber picks up and monitors the ground water or face pressure, which has been balanced by the pressure in the slurry circuit. This display is constantly monitored, and slight adjustments may be necessary with the speed of the slurry pumps throughout the excavation process.

When the slurry by-pass is closed, as during pipe jacking, the water circuit pressure should exceed the groundwater pressure by 0.73 to 2.90 psi. This pressure is adjusted using the pump speed controls. With the flow rate set correctly to suit ground conditions and the pressure balancing the ground water conditions, the volume of water used in the slurry system will remain constant, meaning the groundwater is neither increasing the volume within the system nor is the system

water being lost due to the ground. During pipe jacking the water pressure at the face will oscillate.

The Microtunnel Boring Machine has flow meters on both the charge and discharge lines servicing the plenum chamber of the machine. If a significant imbalance of returns is observed, the operator will immediately switch the system to bypass mode and isolate the slurry system from the cutter-head until the situation can be investigated. To best mitigate the probability of inadvertent return, the volume and pressure will be closely monitored throughout the short duration of this operation. It is also important to note that the Karst Specialist Team will brief the drilling crews in advance of the Roanoke River bore about potential karst hazards and will remain on call to advise the crews and respond if any karst hazards are encountered unexpectedly (in accordance with the Karst Mitigation Plan).

Narrative from Cory Chalmers, MVP (9/2/2020):

Mountain Valley now plans to use the microtunnel crossing method for the Roanoke River (instead of conventional bore). Similar in methodology to a conventional bore, microtunneling is an enhanced drilling technique that allows for trenchless construction below environmentally sensitive areas. As in a conventional bore, microtunneling typically requires two pits to be excavated, one on each side of the feature to be bored. These pits are typically closer to the feature being crossed than they would be for an HDD because HDD's are limited by pipe bend radius and workspace logistics in areas with steep terrain. Unlike a conventional auger bore, which typically uses a non-steerable auger to establish the bore hole, microtunneling utilizes a microtunneling boring machine (MTBM), which uses remote-operated hydraulic cylinders to steer the machine along the proposed bore path. The primary advantage of microtunneling over conventional auger boring is that the steerability of the MTBM enables drilling over longer distances and mitigates the risk of the bore deviating from the planned profile. The MTBM is typically the full diameter of the finished bore hole, and the product pipe is inserted behind the MTBM as it completes the bore, which significantly reduces the risk of collapse during boring and protects the rock integrity of the borehole. In comparison to HDD, microtunneling only requires one drilling pass compared to multiple drilling passes with a product pipe pullback on an HDD. Microtunneling utilizes a drilling mud (typically bentonite) to lubricate the drill head but the mud is not under pressure like it would be with an HDD, which means that the possibility of an inadvertent return is minimal. Although Mountain Valley does not anticipate any concerns with the microtunnel method, we would appreciate discussing any concerns you might have so that we can properly address them.

Please let us know if you have any concerns regarding the change in crossing technique at these four locations. I'd be happy to provide you any additional information you may need.

Thank you,

Cory

Draper Aden Associates
Engineering • Surveying • Environmental Services

Memorandum

To:	Bill Balfour, P.G., Karst Specialist Manager
From:	Billy Newcomb, Andrea Futrell
Date:	March 23, 2018
Project Name:	Mountain Valley Pipeline, Karst Inspection Services
Project Number:	B14188B-14F, B14188B-14G, B14188B-14H, B14188B-14I
Subject:	Karst Area Contingency Guide
cc:	Mike Futrell

This memorandum comprises the Karst Area Contingency Guide (Guide) to supplement the Mountain Valley Karst Mitigation Plan (latest update October 2017) during karst inspection of land disturbing activities conducted by Mountain Valley and its contractors within karst terrain. The Guide incorporates a series of publicly-available dye trace study results that assist in defining karst watershed boundaries, as well as inferred information from the Mountain Valley Karst Hazards Assessment (latest edition February 2017).

The intent of this Guide is to be used as part of contingency planning to identify specific karst locations that will require monitoring and potentially mitigation in the event of an accidental spill during construction and operation in karst terrain. This Guide contains the following information:

Karst terrain in Virginia begins at approximately Mile Post (MP) 196.5 in Giles County and ends at approximately MP 235.7 in Montgomery County, Virginia along a corridor within which the MVP alignment is proposed for construction (**Figure 1 of 1**). Note that karst terrain is not contiguous throughout the karst zone illustrated in **Figure 1 of 1**. The Appalachian Plateau and Valley and Ridge geologic provinces are characterized by Mississippian to Cambrian age sedimentary bedrock, with folding and ancient thrust faulting resulting in a complicated distribution of rock types through this region. Siliciclastic sedimentary bedrock that does not form karst terrain is interbedded, or otherwise in contact with karst-forming carbonate bedrock sub sections.

1.0 OVERVIEW OF KARST WATERSHEDS

For the purposes of this Guide, there are three types of karst areas in the vicinity of the route:

1. Regional karst watersheds that are defined by dye tracing studies;

2. Regional karst watersheds that are inferred;

3. Other karst areas with unknown watershed boundaries.

Refer to **Figure 1 of 1** for an illustration of the approximate karst watershed boundaries (labeled A through N) defined above. The watersheds A through N are also cross-referenced in **Table 1** as described below.

In the event of an accidental release within the referenced mile posts in **Table 1** that reaches, or potentially may reach, a known or suspected karst feature (e.g., sinkhole, swallet), the Karst Inspectors will immediately notify the Mountain Valley Environmental Inspector, and refer to **Table 1** and **Figure 1 of 1** of this Guide to identify the karst watershed designation that is affected, and implement contingency plans (i.e., monitoring and mitigation if necessary) at the identified downstream areas. Accessing the locations noted in **Table 1** will require coordination with Mountain Valley Land Agents in order to access properties that have not been party to negotiations and access agreements with Mountain Valley.

1.1 Regional karst watersheds that are defined by dye tracing studies

Watersheds **C, D, E, F, H, I, J** and **M** (**Figure 1 of 1; Table 1**) comprise watershed boundaries that are defined by the results of dye trace studies (see discussion below for references).

The Virginia Department of Conservation and Recreation, Natural Heritage Program, Karst Program, performed dye tracing studies to delineate several karst watersheds in the vicinity of the route (Virginia

Department of Conservation and Recreation, 2018). Other studies used to delineate karst watersheds include Fagan and Orndorff, 2008; Holsinger, 1975; Saunders et al, 1981; and Schwartz and Orndorff, 2003.

The dye trace results identified specific spring locations that would be monitored, and mitigated if needed, in the event of an accidental release during construction and operation of the pipeline within the range of mileposts listed in Table 1 that correspond to the above-referenced watersheds.

1.2 Regional karst watersheds that are inferred

Watershed **N** is inferred from local geology and surface topography, and results of the Karst Hazards Assessment. Johnson Spring (**Figure 1 of 1**) is the location within Watershed **N** for monitoring and potential mitigation in the event of an accidental release during construction or operation within **MP 227.2 and 228.1**

1.3 Other karst areas in the vicinity of the route

Finally, watersheds **A, B, G, K, L and O** have not been delineated by dye tracing studies. These watersheds do not have known springs that would be considered resurgence points for subsurface drainages. Contingency planning efforts for these watersheds culminate in the Karst Hazards Assessment, which will be available to the Karst Specialists conducting inspections, and based upon the experience of the Karst Specialist Team, defined in the Karst Mitigation Plan.

2.0 MONITORING AND MITIGATION

The Mountain Valley Erosion and Sediment Control Plan identifies specific karst features that require implementation of Best Management Practices to protect the features and local drainages and watersheds leading to the feature.

The approved Spill Prevention, Control, and Countermeasure (SPCC) Plan and Unanticipated Discovery of Contamination Plan for Construction Activities in Virginia provides Contingency Plans and Emergency Procedures. Follow the SPCC Plan requirements for notifications and emergency procedures.

- Section 4 of the SPCC Plan (Karst Area Erosion and Sediment Control) includes specific measures to support MVP construction in karst terrain. Follow the specific measures in Section 4.

The Karst Mitigation Plan includes measures to avoid impacts to the karst aquifer and environment (Section 4). These measures include compliance with the requirements of the Erosion and Sediment Control Plan, and the SPCC Plan.

3.0 REFERENCES

Fagan, J.F. and Orndorff W.D., 2008, Karst Hydrology Investigations in the Cambrian Elbrook and Conococheague Formations of Pulaski and Montgomery Counties, Virginia, presented at the Second Appalachian Karst Symposium, May 7-10, 2008, East Tennessee State University, Johnson City, Tennessee.

Holsinger, J., 1975, Descriptions of Virginia Caves: Maps. Virginia Division of Mineral Resources, vol. 85.

Saunders, J. W., Ortiz R. K., and Koerschner, W. F.,III,1981, Major Groundwater Flow Directions in the Sinking Creek and Meadow Creek Drainage Basins of Giles and Craig Counties, Virginia, USA. Proceedings of the Eighth International Congress of Speleology, Americus, Georgia, Georgia Southwestern College, vol. 1, p. 398-400.

Schwartz, B.S., and Orndorff, Z. W., 2003, Conservation Sites for Virginia's Significant Caves, unpublished report to the Cave Conservancy of the Virginias, Virginia DCR: Radford, VA. Pages 1-47, Appendix II.

Virginia Department of Conservation and Recreation, Karst Program, 2018, Dye trace report along portions of the FERC approved corridor for the Mountain Valley Pipeline, Giles County, Virginia.

Main

Inset

Klotz Spring

Bell Spring

Rise of Sinking Creek

Smokehole Cave Spring

Tawneys Cave Spring

Steele Acres Spring

Spring by Canoe Cave

Mill Creek Spring

Old Mill Cave, Dam Springs

Hancock Spring

Johnson Cave Spring

Report of high-flow boundary crossing (Saunders 1981)

Note:
Karst watershed area boundaries are approximate.
Upgradient surface watersheds trimmed for some areas.
Area-F is upgradient of the route.

1:120,000

NAD 1983 UTM 17N

0 1 2 3 4 Miles

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Mountain Valley Pipeline Project

Mountain Valley PIPELINE

Karst Watershed Areas in Vicinity of Route

Figure 1 of 1

03-20-18

Draper Aden Associates
Engineering • Surveying • Environmental Services

Legend

- Karst Springs
- Dye Vectors
- Karst Watersheds and Karst Areas
- MVP Approve Route Milepost
- MVP Approved Route

All Locations Are Approximate

Summers
Monroe
Craig
Main
Botetourt
Giles
Roanoke
Salem
Inset
Blacksburg
Montgomery
Pulaski
Radford
Franklin
Floyd

Document Path: P:\B14\100\B14188B\B14188B-00\GIS\FERC Comments\DEQ\DCR Reports 2\Karst Watershed Areas VA.mxd

Table 1. Karst Watershed Areas in Vicinity of Route (Refer to Figure 1 of 1 for illustration of Karst Area)

Regional Karst Watersheds Defined by Dye Tracing Studies in Vicinity of Route				
Karst Area	**Spring Name**	**Mile Post Range***	**County**	**Headwaters Area**
C	Klotz Spring	MP-202 to MP-205.7	Giles	Dry Branch area, Southwest half of Doe Mountain
D	Bell Spring	MP-205.7 to MP-208, possibly to MP-210	Giles	Doe Creek area to nose of Salt Pond Mountain
E	Sinking Creek Spring (or Bell Spring; Karst Area D)	MP-209 to MP-211	Giles	Southwest end of Johns Creek Mountain
F	Smokehole Spring	MP-211	Giles	Clover Hollow (area upgradient of route)
H	Canoe Cave Spring	MP-214.5 to MP-216	Giles	Northwest flank of Sinking Creek Mountain
I	Steele Acres Spring	MP-216 to MP-218.5	Giles/Craig	Northwest flank of Sinking Creek Mountain
J	Mill Creek Spring via Slussers Chapel Cave	MP-220.8 to MP-224	Montgomery	Mount Tabor Sinkhole Plain
M	Old Mill Cave Spring, Dam Spring, Hancock Spring	MP-225.8 to MP-226.9	Montgomery	Lower Dry Branch
Regional Karst Watersheds Inferred in Vicinity of Route				
Karst Area	**Spring Name**	**Mile Post Range***	**County**	**Headwaters Area**
N	Johnson Cave Spring	MP-227.2 to MP-228.1	Montgomery	Northwest flank of Paris Mountain
Other Karst Areas in Vicinity of Route				
Karst Area	**Spring Name**	**Mile Post Range***	**County**	**Headwaters Area**
A	unknown along Big Stony Creek	MP-196.5 to MP-200.4	Giles	Southeast flank of Peters Mountain
B	unknown along Big Stony Creek or in Kimballton mines	MP-200.4 to MP-202	Giles	Nose of Butt Mountain
G	unknown along Greenbrier Branch or Sinking Creek	MP-211 to MP-214.5	Giles	Newport area
K	unknown along Mill Creek	MP-224 to MP-225.8	Montgomery	Hillside north of Mill Creek
L	unknown along Mill Creek or Dry Branch	MP-224 to MP-225.7	Montgomery	Hillside west of Dry Branch
O	unknown along Sawmill Hollow or Roanoke River	MP-234.2 to MP-235.5	Montgomery	Hillside north of Roanoke River

*Mile post ranges are approximate and represent inherent uncertainty in subsurface drainages as well as gaps of non karst areas.

MATERIAL SAFETY DATA SHEET

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

Revision Date: 01-Dec-2014

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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

Manufacturer/Supplier

BENTONITE Performance Minerals LLC
3000 N Sam Houston Parkway East
Houston, TX 77032

Telephone: (281) 871-7900
Fax: (281) 871-7940
Emergency Telephone: (281) 575-5000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	ACGIH TLV-TWA	OSHA PEL-TWA
Bentonite	1302-78-9	60 - 100%	TWA: 1 mg/m^3	Not applicable
Crystalline silica, quartz	14808-60-7	1 - 5%	TWA: 0.025 mg/m^3	$\frac{10\ mg/m^3}{\%SiO2 + 2}$
Crystalline silica, cristobalite	14464-46-1	0.1 - 1%	TWA: 0.025 mg/m^3	1/2 x $\frac{10\ mg/m^3}{\%SiO2 + 2}$
Crystalline silica, tridymite	15468-32-3	0.1 - 1%	0.05 mg/m^3	1/2 x $\frac{10\ mg/m^3}{\%SiO2 + 2}$

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

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, AS/NZS 1715, or equivalent respirator when using this product. Review the Safety Data Sheet (SDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Treat symptomatically.

5. FIRE FIGHTING MEASURES

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

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Fire-Fighters Not applicable.

NFPA Ratings: Health 0, Flammability 0, Reactivity 0
HMIS Ratings: Health 0*, Flammability 0, Physical Hazard 0 , PPE: E

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

Personal Protective Equipment If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Dust/mist respirator. (N95, P2/P3)

Hand Protection Normal work gloves.

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

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Various
Odor:	Odorless
pH:	8-10
Specific Gravity @ 20 C (Water=1):	2.65
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	50-70
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined

Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

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

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Acute Toxicity

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Eye Contact	May cause eye irritation
Skin Contact	May cause mechanical skin irritation.
Ingestion	None known

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Bentonite	1302-78-9	> 5000 mg/kg (Rat) > 2000 mg/kg (Rat)	No data available	> 5.27 mg/L (Rat)
Crystalline silica, quartz	14808-60-7	> 5000 mg/kg (Rat)	No data available	No data available
Crystalline silica, cristobalite	14464-46-1	> 5000 mg/kg (Rat)	No data available	No data available
Crystalline silica, tridymite	15468-32-3	> 5000 mg/kg (Rat)	No data available	No data available

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ecotoxicity Product

Acute Fish Toxicity: TLM96: 10000 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: Not determined
Acute Algae Toxicity: Not determined

Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Bentonite	1302-78-9	EC50(72h): > 100 mg/L (freshwater algae)	TLM96: 10000 ppm (Oncorhynchus mykiss) LC50(96h): 16000 - 19000 mg/L (Oncorhynchus mykiss) LC50(24h): 2800 – 3200 mg/L (black bass, warmouth bass, blue gill and sunfish)	No information available	EC50(96h): 81.6 mg/L (Metacarcinus magister) EC50(96h): 24.8 mg/L (Pandalus danae) EC50(48h) > 100 mg/L (Daphnia magna)
Crystalline silica, quartz	14808-60-7	No information available	LL0(96h): 10000 mg/L(Danio rerio) (similar substance)	No information available	LL50(24h): > 10000 mg/L (Daphnia magna) (similar substance)
Crystalline silica, cristobalite	14464-46-1	No information available	LL0(96h): 10000 mg/L(Danio rerio) (similar substance)	No information available	LL50(24h): > 10000 mg/L (Daphnia magna) (similar substance)

Crystalline silica, tridymite	15468-32-3	No information available	LL0(96h): 10000 mg/L(Danio rerio) (similar substance)	No information available	LL50(24h): > 10000 mg/L (Daphnia magna) (similar substance)

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Bentonite	1302-78-9	The methods for determining biodegradability are not applicable to inorganic substances.
Crystalline silica, quartz	14808-60-7	The methods for determining biodegradability are not applicable to inorganic substances.
Crystalline silica, cristobalite	14464-46-1	The methods for determining biodegradability are not applicable to inorganic substances.
Crystalline silica, tridymite	15468-32-3	The methods for determining biodegradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Bentonite	1302-78-9	No information available
Crystalline silica, quartz	14808-60-7	No information available
Crystalline silica, cristobalite	14464-46-1	No information available
Crystalline silica, tridymite	15468-32-3	No information available

12.4. Mobility in soil

No information available

12.5. Results of PBT and vPvB assessment

No information available.

Substances	PBT and vPvB assessment
Crystalline silica, quartz	Not PBT/vPvB

12.6. Other adverse effects

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

US DOT

UN Number: Not restricted
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable

US DOT Bulk

DOT (Bulk) Not applicable

Canadian TDG ul0

UN Number: Not restricted
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable

IMDG/IMO

UN Number: Not restricted

UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable

IATA/ICAO
UN Number: Not restricted
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable
Special Precautions for User: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory All components listed on inventory or are exempt.

EPA SARA Title III Extremely Hazardous Substances Not applicable

EPA SARA (311,312) Hazard Class Acute Health Hazard
Chronic Health Hazard

EPA SARA (313) Chemicals This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).

EPA CERCLA/Superfund Reportable Spill Quantity Not applicable.

EPA RCRA Hazardous Waste Classification If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.

California Proposition 65 The California Proposition 65 regulations apply to this product.

MA Right-to-Know Law One or more components listed.

NJ Right-to-Know Law One or more components listed.

PA Right-to-Know Law One or more components listed.

Canadian Regulations

Canadian DSL Inventory All components listed on inventory or are exempt.

WHMIS Hazard Class Crystalline silica

16. OTHER INFORMATION

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

Additional information

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

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

Disclaimer Statement

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

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

From:	Chalmers, Cory M.
To:	Orndorff, William
Cc:	Neylon, Megan; Billy Newcomb (bnewcomb@daa.com); Justin Curtis; Clauto, Brian M.
Subject:	RE: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification
Date:	Wednesday, September 2, 2020 10:13:00 AM
Attachments:	Figure-3 Craig Creek Crossing.pdf Figure-4 Blackwater River Crossing.pdf Figure-5 Harpen Creek Crossing.pdf Figure-6 Little Stony Creek Crossing.pdf

---

Hi Wil,

As you recall, Mountain Valley requested last summer that you review and comment on two VMRC-regulated streams (Roanoke River and Sinking Creek) that Mountain Valley was proposing to cross using a conventional bore method instead of the open-cut dry-ditch method. Please see the email chain below for reference. Based in part on your feedback, Mountain Valley submitted a minor permit modification request to VMRC for those crossings. That modification request remains pending.

Mountain Valley is now preparing to revise the pending VMRC permit modification request to change the preferred crossing method for four additional VMRC-regulated crossings: Craig Creek (Montgomery County, Figure 3 attached), North Fork Blackwater River (Franklin County, Figure 4 attached), Harpen Creek (Pittsylvania County, Figure 5 attached), and Little Stony Creek (Giles County, Figure 6 attached). Similar to the crossings you reviewed before, the revised permit modification will seek to change the crossing method for these four additional streams from open-cut dry-ditch to conventional bore (auger bore/bore & jack). This modification in crossing method will avoid direct instream disturbance to these four surface water resources. The mitigation measures that will be employed for these four crossings are the same as discussed in the email below. Please note that the open-cut dry-ditch method will become the contingency method of construction in the unlikely event the conventional bore is unsuccessful.

Along with the addition of the four new crossing method changes, Mountain Valley now plans to use the microtunnel crossing method for the Roanoke River (instead of conventional bore). Similar in methodology to a conventional bore, microtunneling is an enhanced drilling technique that allows for trenchless construction below environmentally sensitive areas. As in a conventional bore, microtunneling typically requires two pits to be excavated, one on each side of the feature to be bored. These pits are typically closer to the feature being crossed than they would be for an HDD because HDD's are limited by pipe bend radius and workspace logistics in areas with steep terrain. Unlike a conventional auger bore, which typically uses a non-steerable auger to establish the bore hole, microtunneling utilizes a microtunneling boring machine (MTBM), which uses remote-operated hydraulic cylinders to steer the machine along the proposed bore path. The primary advantage of microtunneling over conventional auger boring is that the steerability of the MTBM enables drilling over longer distances and mitigates the risk of the bore deviating from the planned profile. The MTBM is typically the full diameter of the finished bore hole, and the product pipe is inserted behind the MTBM as it completes the bore, which significantly reduces the risk of collapse during

boring and protects the rock integrity of the borehole. In comparison to HDD, microtunneling only requires one drilling pass compared to multiple drilling passes with a product pipe pullback on an HDD. Microtunneling utilizes a drilling mud (typically bentonite) to lubricate the drill head but the mud is not under pressure like it would be with an HDD, which means that the possibility of an inadvertent return is minimal. Although Mountain Valley does not anticipate any concerns with the microtunnel method, we would appreciate discussing any concerns you might have so that we can properly address them.

As with the Roanoke River and Sinking Creek crossings, Randy Owen at VMRC suggested that we contact you to see if you have any concerns about potential impacts to karst terrain if the conventional bore crossing method is used at the Craig Creek, North Fork Blackwater River, Harpen Creek, and Little Stony Creek crossing locations. Mountain Valley's preconstruction karst survey did not identify any karst terrain within the vicinity of these four crossings. Since the VMRC approval was issued on January 25, 2018 (#17-1609), Mountain Valley has further confirmed the preconstruction surveys; no karst features were identified. Accordingly, MVP believes there is a negligible potential for encountering any subsurface karst features along the bore path at the Craig Creek, North Fork Blackwater River, Harpen Creek, and Little Stony Creek crossings. Should any unexpected karst features be encountered, however, one advantage of the conventional bore method is that the pipe material is installed at the same time the boring is advanced, so there is no unsupported hole subject to collapse. Additionally, drilling mud is not utilized for a conventional bore so there is effectively no potential for an inadvertent return of drilling mud to surface water or into subterranean karst features. Please let us know if you have any concerns regarding the change in crossing technique at these four locations. I'd be happy to provide you any additional information you may need.

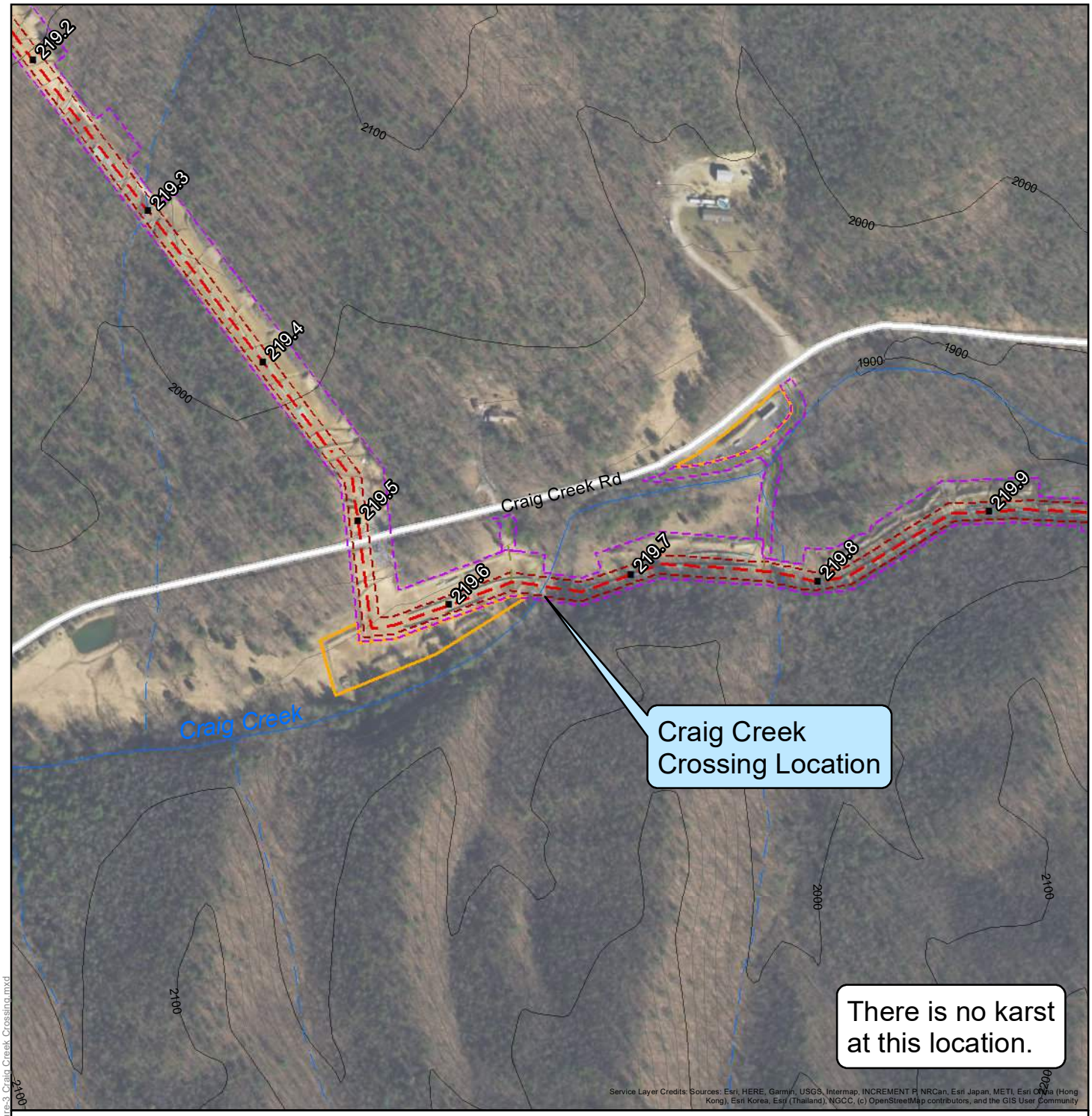
Thank you,

Cory

Cory Chalmers • Environmental Coordinator
Direct: 304.848.0061
cchalmers@equitransmidstream.com

From: Orndorff, William <wil.orndorff@dcr.virginia.gov>
Sent: Friday, August 9, 2019 2:02 PM
To: Clauto, Brian M. <BClauto@equitransmidstream.com>
Cc: Neylon, Megan <MNeylon@equitransmidstream.com>; Chalmers, Cory M. <CChalmers@equitransmidstream.com>; Billy Newcomb (bnewcomb@daa.com) <bnewcomb@daa.com>; Justin Curtis <justin@aqualaw.com>
Subject: Re: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification

Dear Brian et al,



Mountain Valley Pipeline Project

N

1:4,800 NAD 1983 UTM 17N

0 400 800 Feet

Figure 3
Craig Creek
Crossing Location

08-05-20

Mountain Valley PIPELINE

Draper Aden Associates
Engineering • Surveying • Environmental Services

All Locations are Approximate

Legend

- MVP Approved Route
- MVP Approved Access Roads
- MVP Approved Permanent Easement
- MVP Approved Temporary Work Space
- MVP Approved Ancillary and ATWS

Contours: VA: VGIN 2007/2011 Terrain Models. For Visualization Only.
Aerials: VGIN 02/26/2019.

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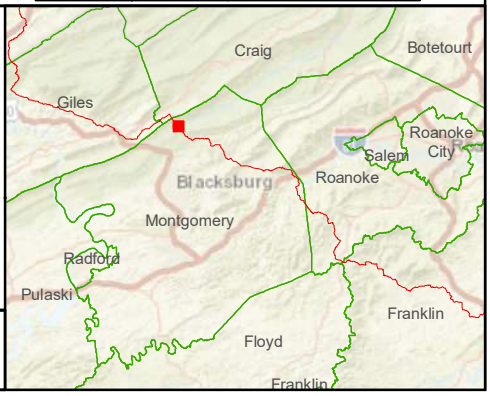

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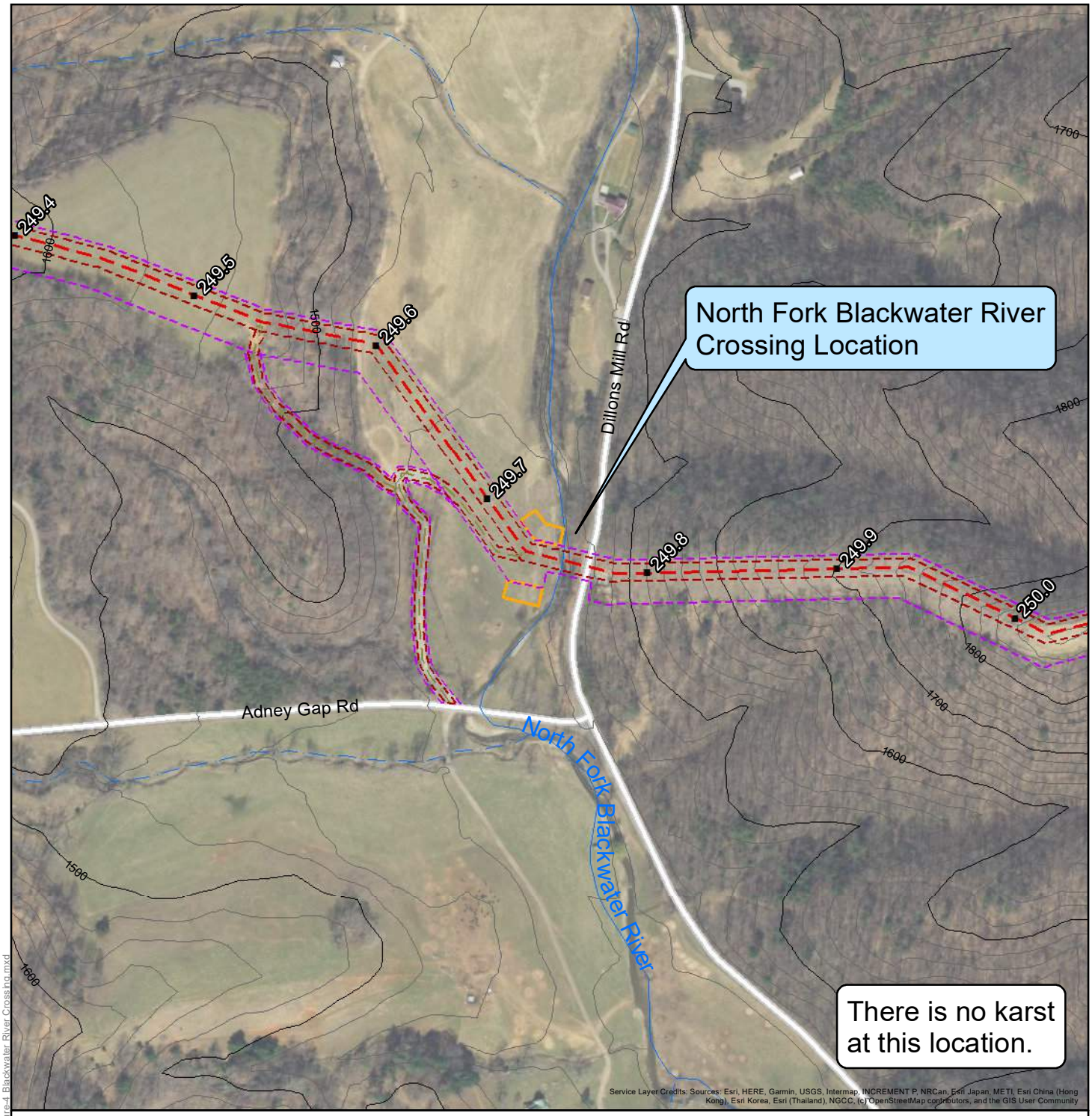

Mountain Valley Pipeline Project

N

1:4,800 NAD 1983 UTM 17N

0 400 800 Feet

Figure 4
North Fork Blackwater River Crossing Location

08-05-20

Mountain Valley PIPELINE

Draper Aden Associates
Engineering • Surveying • Environmental Services

All Locations are Approximate

Legend

- MVP Approved Route
- MVP Approved Access Roads
- MVP Approved Permanent Easement
- MVP Approved Temporary Work Space
- MVP Approved Ancillary and ATWS

Contours: VA: VGIN 2007/2011 Terrain Models. For Visualization Only.
Aerials: VGIN 03/16/2019.

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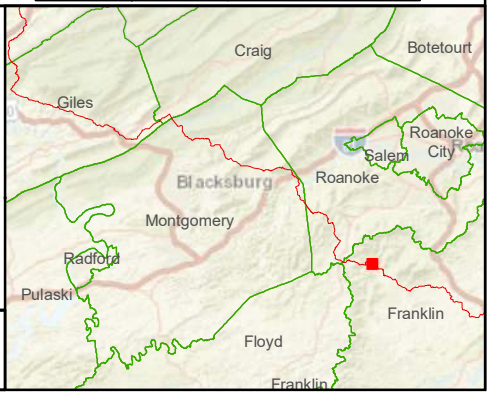

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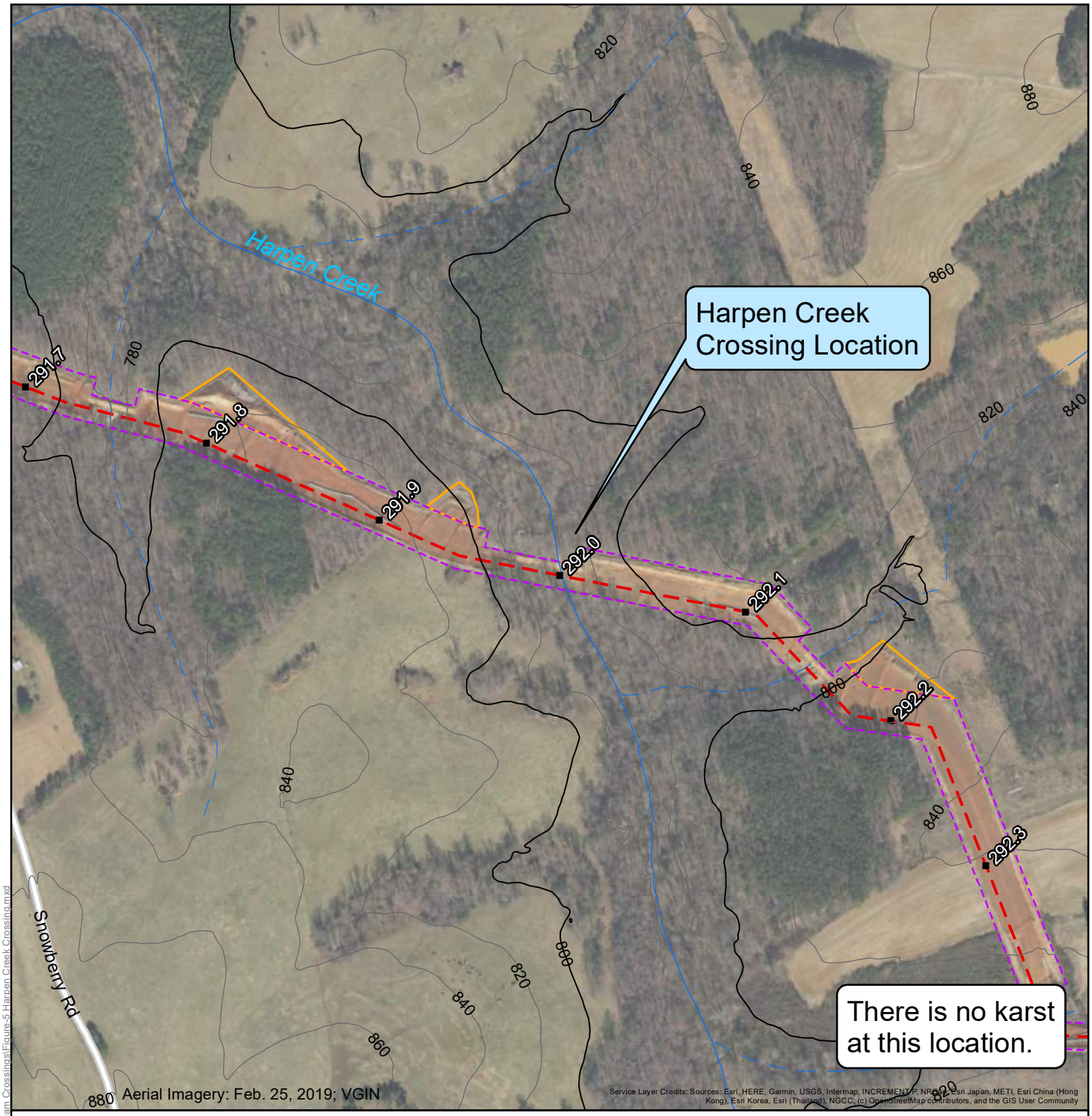


Mountain Valley Pipeline Project

1:4,800 NAD 1983 UTM 17N

0 400 800 Feet

All Locations are Approximate

Figure 5
Harpen Creek
Crossing Location

08-17-20

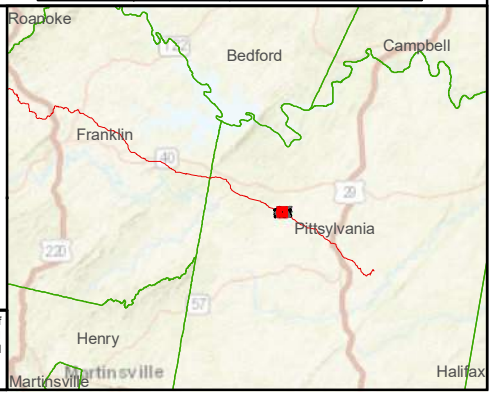
Mountain Valley PIPELINE

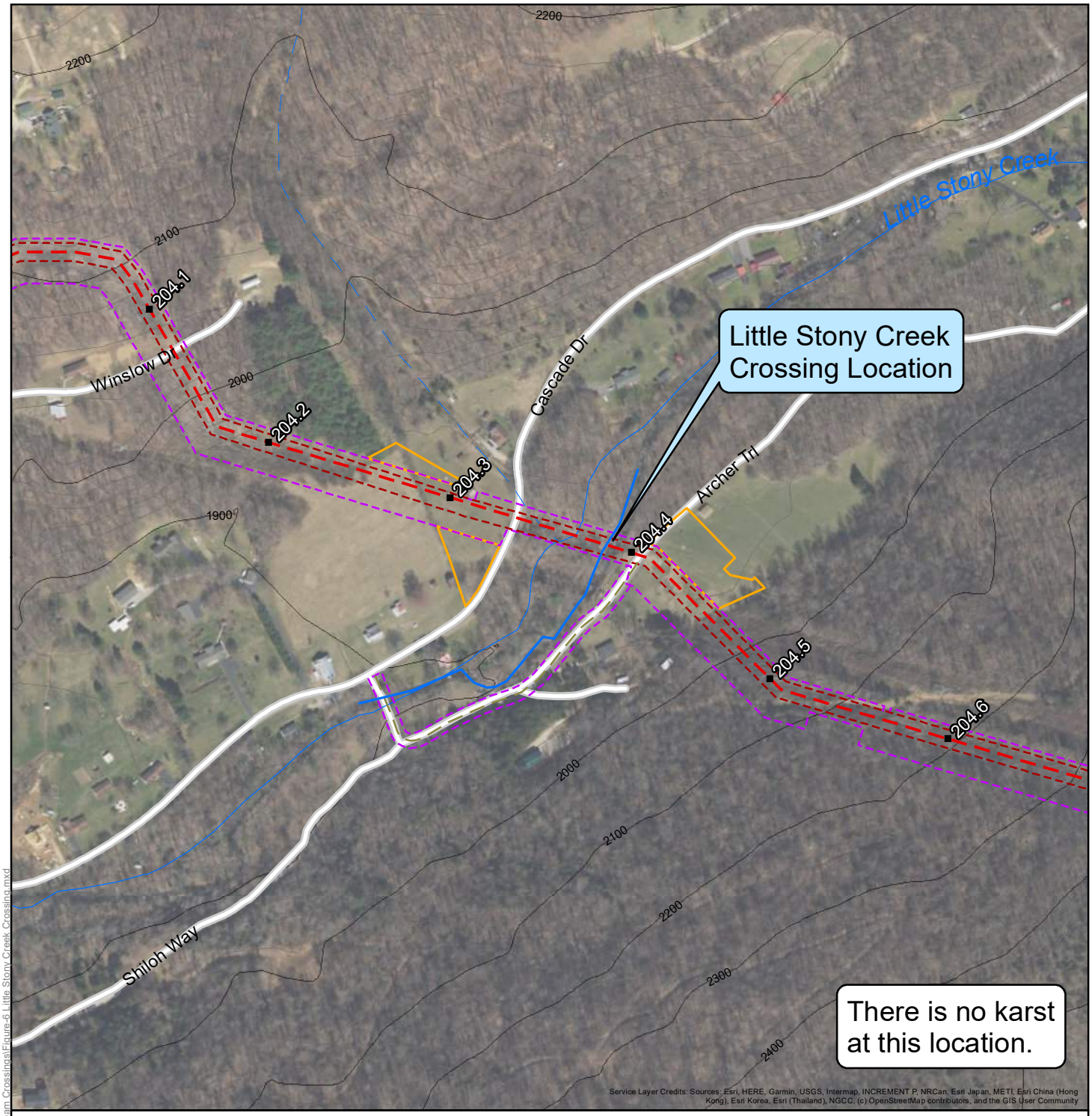
Draper Aden Associates
Engineering • Surveying • Environmental Services

Legend

- MVP Approved Route
- MVP Approved Access Roads
- MVP Approved Permanent Easement
- MVP Approved Temporary Work Space
- MVP Approved Ancillary and ATWS

20-ft contours from the VA FEMA NRCS South-Central 2017-18 Lidar Project, Bare Earth DEM.
Lidar acquired between 414/2017 and 5/24/2018





Mountain Valley Pipeline Project

N

1:4,800 NAD 1983 UTM 17N

0 400 800 Feet

Figure 6
Little Stony Creek Crossing Location

09-01-20

Mountain Valley PIPELINE

Draper Aden Associates
Engineering • Surveying • Environmental Services

All Locations are Approximate

Legend

- MVP Approved Route
- MVP Approved Access Roads
- MVP Approved Permanent Easement
- MVP Approved Temporary Work Space
- MVP Approved Ancillary and ATWS

Contours: VA: VGIN 2007/2011 Terrain Models. For Visualization Only.
Aerials: VGIN 03/17/2019.

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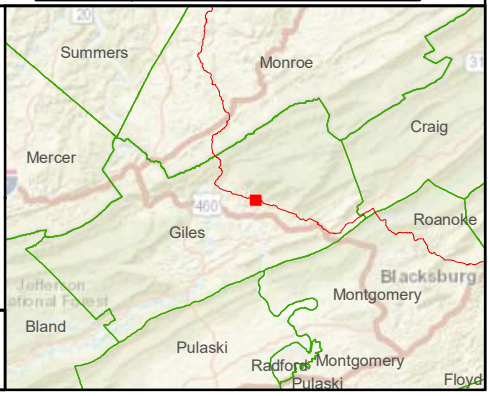


Document Path: P:\B14100\B14188\B14188-001\GIS\Construction\Stream Crossings\Figure-6 Little Stony Creek Crossing.mxd

Thanks for the detailed responses. These address my concerns to my satisfaction regarding reasonable mitigation to prevent impacts to the local karst groundwater system.

Please let me know if you have further questions, and thank you for choosing a relatively low impact method for the stream crossing in this area of surface and groundwater interaction.

Sincerely,

Wil Orndorff

On Thu, Jul 18, 2019 at 10:45 AM Clauto, Brian M. <BClauto@equitransmidstream.com> wrote:

> Wil,
>
> Thanks for the response. Please find additional information (green text) following each of your questions:
>
> - *What contingency plan do you have if turbid water infiltrates the bore pit at a high rate?* Response: The bore contractor will have primary and backup pumps in-place during excavation and operation of the boring activity. Given the distance between the bore pit and the stream channel, we do not anticipate a high volume of water infiltrating the bore pits from the stream or groundwater during the installation. However, backup pumps will be staged and ready should a pump go down or inflow increases. All pumps will be placed within secondary containment to prevent spills. Spill kits will be placed adjacent to the activity should they be needed.
> - *Will there be settling basins or will turbid water be discharged directly back to Sinking Creek? I suspect VMRC has a turbidity standard (or TSS standard) for return of water to a surface stream, and will expect MVP to be in compliance. I think it is unlikely you will have rapid inundation of the bore pit, but you should be prepared for that possibility.* Response: No discharge of bore pit water will occur directly to Sinking Creek. Mountain Valley will install dewatering structures adjacent to the bore pits. Dewatering pumps will discharge directly to the pumped water filter bag placed within each dewatering structure to capture heavy sediment and then flow through the dewatering structure. This is the same process used to cross waterbodies throughout the project. Storage tanks or vac-truck may be used for pit water storage on the west side of Mountain Lake Road due to limited workspace availability.
>
> - Additional ECDs will be utilized between the dewatering structure and stream to provide further filtration. This may include but not limited to the following:
>
> - Compost filter sock
> - Jute netting
> - Silt fence/super silt fence
> - Turbidity curtains (in-stream installation) – as needed
> - Erosion control blanket

- Vegetated buffer area

I've attached a couple photos of a typical dewatering structure for reference.

Please let me know if you have any questions or need anything additional.

Thanks
Brian

Brian M. Clauto
Sr. Environmental Coordinator
Equitrans Midstream Coorporation
724-873-3465 (o)
bclauto@equitransmidstream.com

Please note my updated email addess as it has changed

From: Orndorff, William <wil.orndorff@dcr.virginia.gov>
Sent: Friday, July 12, 2019 5:16 PM
To: Clauto, Brian M. <BClauto@equitransmidstream.com>
Cc: Neylon, Megan <MNeylon@equitransmidstream.com>; Chalmers, Cory M. <CChalmers@equitransmidstream.com>; Billy Newcomb (bnewcomb@daa.com) <bnewcomb@daa.com>; Justin Curtis <justin@aqualaw.com>
Subject: [EXTERNAL] Re: Mountain Valley - VMRC Permit Modification

Brian et al,

Overall this sounds like a reasonable solution. Hopefully you will have pumps heavy duty enough to keep up with any water infiltrating the bore pits from Sinking Creek and the Roanoke River. This should be minimal unless you hit a void.

What contingency plan to you have if turbid water infiltrates the bore pit at a high rate? Will there be settling basins or will turbid water be discharged directly back to Sinking Creek? I suspect VMRC has a turbidity standard (or TSS standard) for return of water to a surface stream, and will expect MVP to be in compliance. I think it is unlikely you will have rapid inundation of the bore pit, but you should be prepared for that possibility.

Also, it may be advisable to notify local property owners using private water supplies to keep a look out for sediment during and subsequent to the boring process.

Thanks,

Wil Orndorff

On Fri, Jul 12, 2019 at 4:39 PM Clauto, Brian M. <BClauto@equitransmidstream.com> wrote:

> Wil,
>
> Mountain Valley is preparing a VMRC permit modification request to change the preferred crossing method for two VMRC regulated crossings. This modification involves a change from open-cut dry-ditch method to conventional bore (auger bore/bore & jack) method at Sinking Creek (Giles County, Figure 1 attached) and Roanoke River (Montgomery County, Figure 2 attached). This modification in crossing method will avoid direct instream disturbance to these two surface water resources. Please note that the open-cut dry-ditch method will become the contingency method of construction in the unlikely event the conventional bore is unsuccessful.
>
> For background on the conventional bore process, below is an excerpt from MVP's bore plan:
>
> > "4.2 CONVENTIONAL BORE (JACK AND BORE)
> > Jack and bore, also known as auger boring, is one of the most popular methods of trenchless technology and
> > has been in use for more than 50 years. Jack and bore consists of a jacking pipe that is advanced, "jacked," and a
> > rotating cutting head that is attached to the leading edge of the auger string. The spoil is transported back by the rotation
> > of auger flights within the steel pipe casing being placed.
> >
> > Auger boring can be used to install pipes ranging in size from 4 to over 60 inches in diameter. Drive lengths
> > for auger bore projects can range from 40 to 600 feet. Soil conditions suitable for this method can range from dry sand
> > to firm clay to hard rock. Additionally, boulders and cobbles up to one third the diameter of the installed pipe can be
> > accommodated.
> >
> > The major advantage of auger boring is that the pipe material is installed as the boring is advanced. Since
> > the pipe advances with the bore there is no unsupported hole subject to collapse.
> >
> > A disadvantage of auger boring is the need to construct launch and receive pits. The launch pit where the
> > jacking machine is located can be 4 to 10 feet wider and 10 to 25 feet longer than the pipe section being installed. Also,

auger boring requires accurate initial setup of equipment to ensure installation of the pipe at the proper depth and
grade. Unstable soils may require shoring or other stabilization of the launch and receive pits and when working below
the water table dewatering will be necessary."

In preliminary discussions with Randy Owen (VMRC) about this proposed permit modification, he suggested that we contact you to see if you have any specific concerns about potential impact to karst terrain if the conventional bore crossing method is used at Sinking Creek and Roanoke River. As you know, both of these crossings are located in areas with karst terrain, and karst features are observed in the general vicinity of the crossings (shown in Figure 1 and Figure 2). Please note that drilling mud is not utilized for a conventional bore - so there is effectively no potential for an inadvertent return of drilling mud to surface water or the local karst terrain. Since the VMRC approval was issued on January 25, 2018 (#17-1609), Mountain Valley conducted additional surveys and evaluations on the crossing locations. Based on these evaluations, MVP anticipates limited to negligible potential for encountering a subsurface karst feature along the bore path at the Roanoke River crossing. That potential is relatively higher at the Sinking Creek crossing due to the nature of local bedrock and degree of karstification. However, conventional borings in karst terrain and other potentially unstable geology are fairly common and the experienced bore contractor will take necessary mitigative measures to maintain the borehole and equipment progress if a karst feature of notable size is encountered. As noted in the excerpt above, one advantage of the conventional bore method is that the pipe material is installed at the same time the boring is advanced, so there is no unsupported hole subject to collapse.

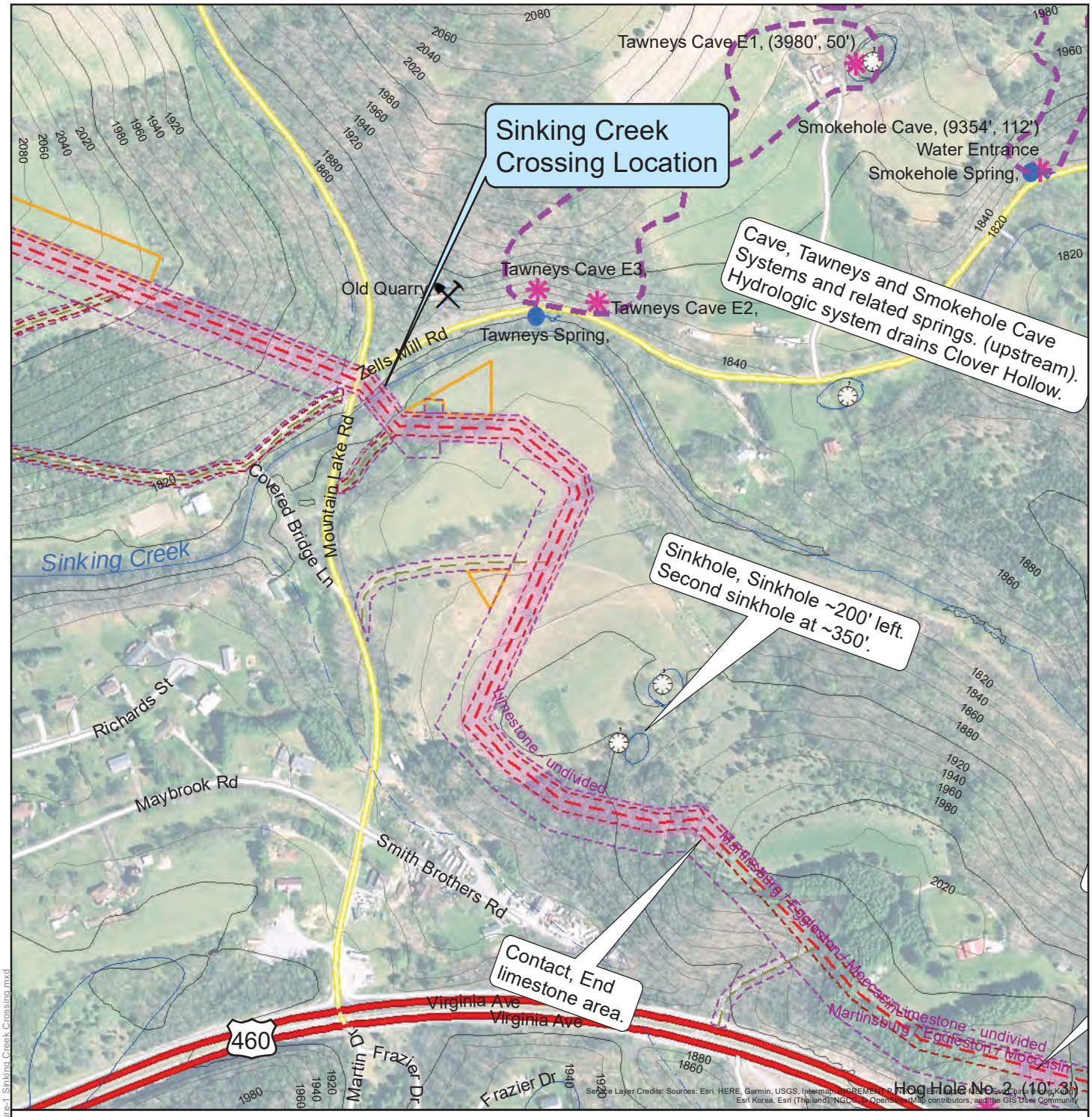
Please let us know if you have any concerns regarding karst as result of the change in crossing technique at these two locations. We greatly appreciate it.

Please let me know if you have any questions or need any additional information.

Thanks
Brian

Brian M. Clauto
Sr. Environmental Coordinator
Equitrans Midstream Coorporation
724-873-3465 (o)
bclauto@equitransmidstream.com

Please note my updated email addess as it has changed



Mountain Valley Pipeline Project

N

1:4,800 NAD 1983 UTM 17N

0 400 800 Feet

All Locations are Approximate

Figure 1
Sinking Creek Crossing Location

07-11-19

Mountain Valley PIPELINE

Draper Aden Associates
Engineering • Surveying • Environmental Services

Legend

- MVP Approved Route
- MVP Approved Access Roads
- MVP Approved Permanent Easement
- MVP Approved Temporary Work Space
- MVP Approved Ancillary and ATWS

Contours: VA: VGIN 2007/2011 Terrain Models. For Visualization Only.
Aerials: USGS NAIP Series. Giles Co. 04/18/2016.

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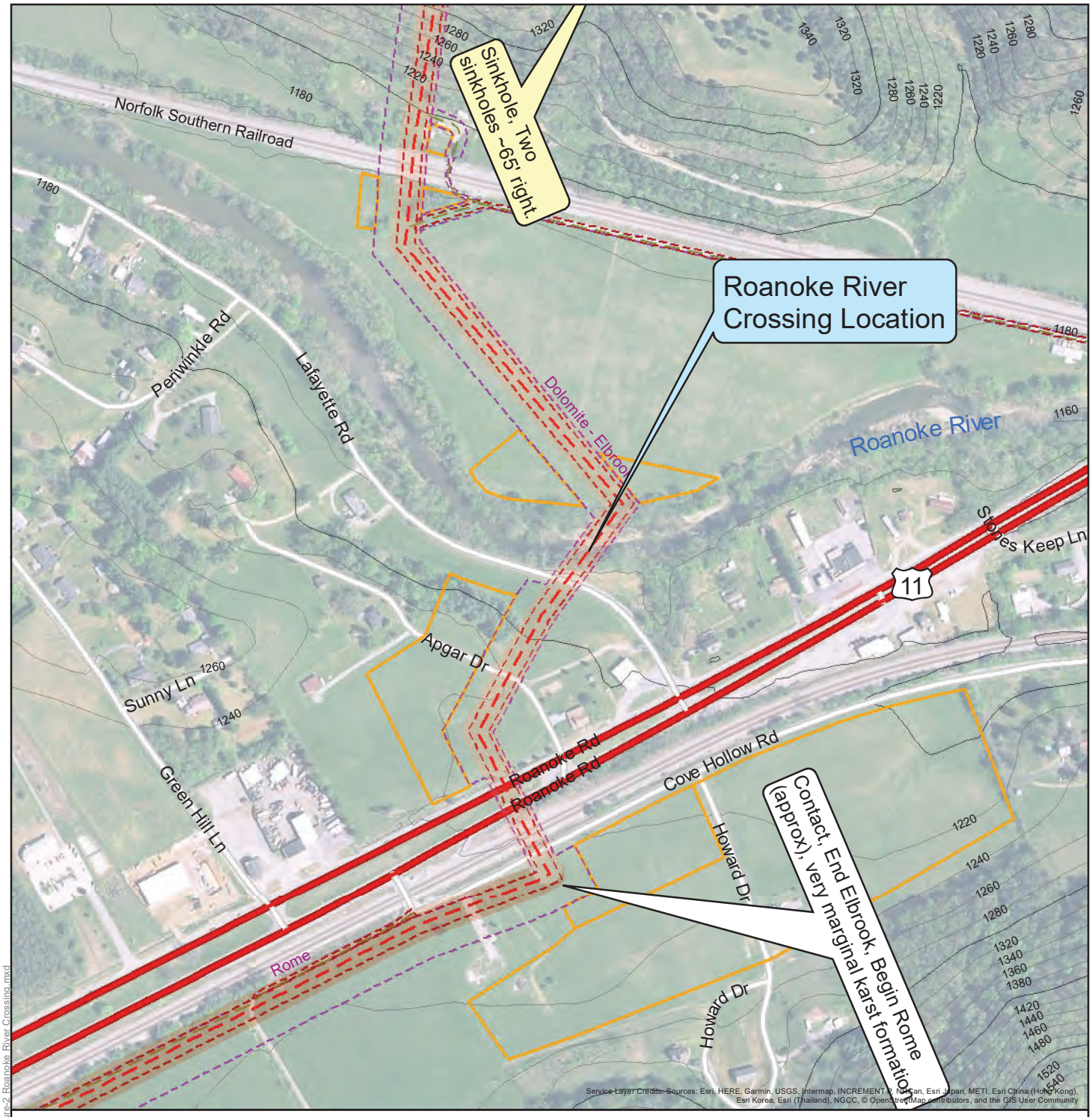
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Document Path: P:\B14100\B14188\B14188-001\GIS\Construction\Figure-1 Sinking Creek Crossing.mxd



Mountain Valley Pipeline Project

N

1:4,800 NAD 1983 UTM 17N

0 400 800 Feet

Figure 2
Roanoke River Crossing Location

07-11-19

Mountain Valley PIPELINE

Draper Aden Associates
Engineering • Surveying • Environmental Services

All Locations are Approximate

Legend

- MVP Approved Route
- MVP Approved Access Roads
- MVP Approved Permanent Easement
- MVP Approved Temporary Work Space
- MVP Approved Ancillary and ATWS

Contours: VA: VGIN 2007/2011 Terrain Models. For Visualization Only.
Aerials: USGS NAIP Series. Montgomery Co. 04/24/2016.

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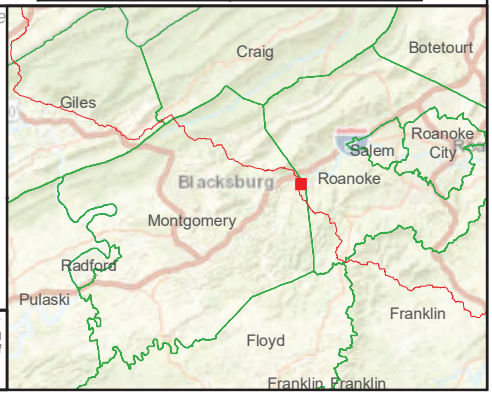


Document Path: P:\B14100\B14188\B14188-00\GIS\Construction\Figure-2 Roanoke River Crossing.mxd


SPILL KIT

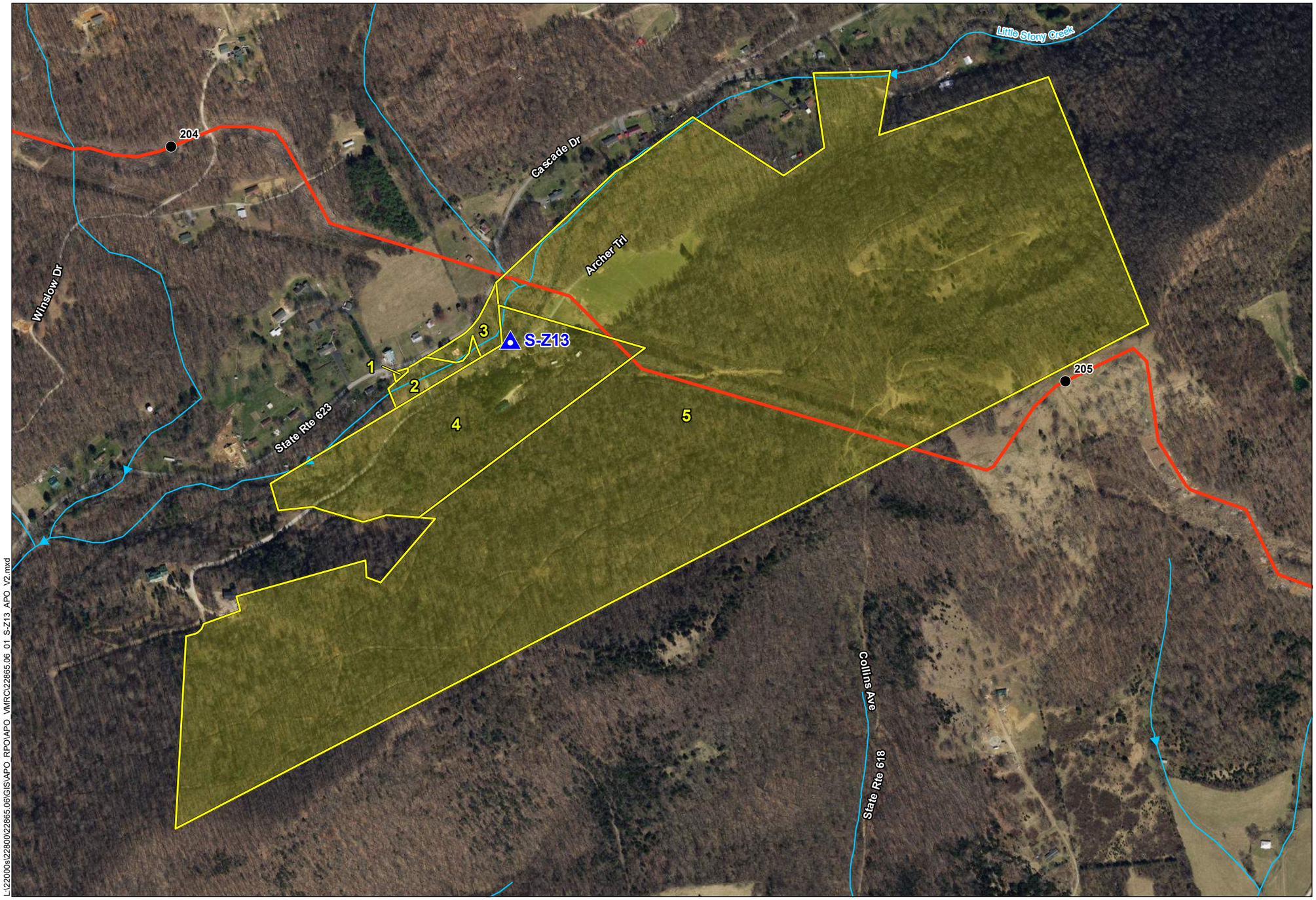

SE
S
SW
W
NW
150
180
210
240
270
300
235°SW (T)
37.268379°, -80.314049° ±32.8ft
1276ft
SPILL KIT
North Fork Roanoke River
MVP-Spread H
20 Jul 2018, 08:03

ATTACHMENT C-5
Adjacent Property Owner Map and Owner Information List

MVP Pipeline Project

Adjacent Property Owners

Mountain Valley PIPELINE



Adjacent Property[1]

Stream Location Centroid
S-Z13

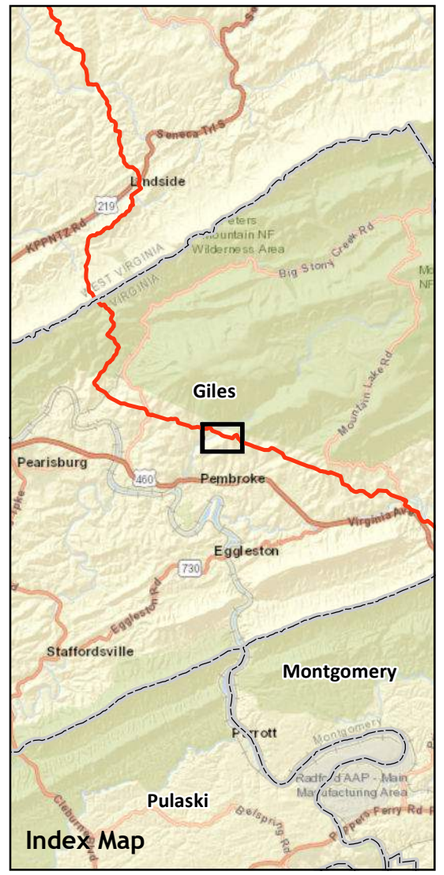
NHD Flowline

MVP Implementation MP Centerline

MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

[1] Additional parcel owner information verified 2/10/2021 at:
Roanoke County: https://taxview.roanokecountyva.gov/TaxView/
Giles County: https://www.webgis.net/va/Giles/
Franklin County: https://gis.franklincountyva.gov/compviewer/index.html
Pittsylvania County: https://parcelviewer.geodecisions.com/Pittsylvania/
Montgomery County: https://maps.montva.com/portal/apps/webappviewer



L:\22000s\22800\22865.06\GIS\APO_RPO\APO_VMRC\22865.06_01_S-Z13_APO_V2.mxd

NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

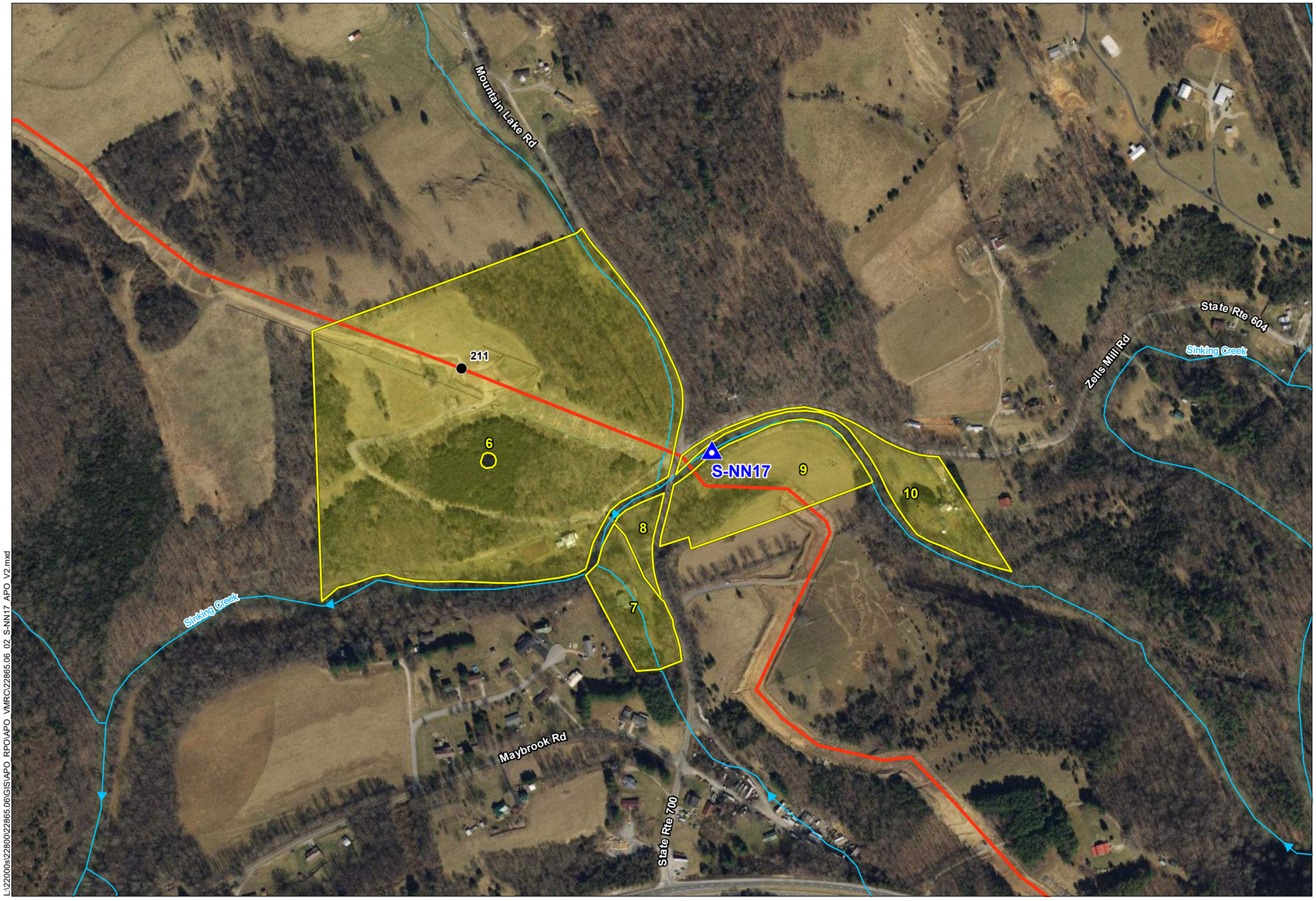
0 500 1,000 Feet

Prepared by:
Wetland Studies and Solutions, Inc.
a DAVEY company

MVP Pipeline Project

Adjacent Property Owners

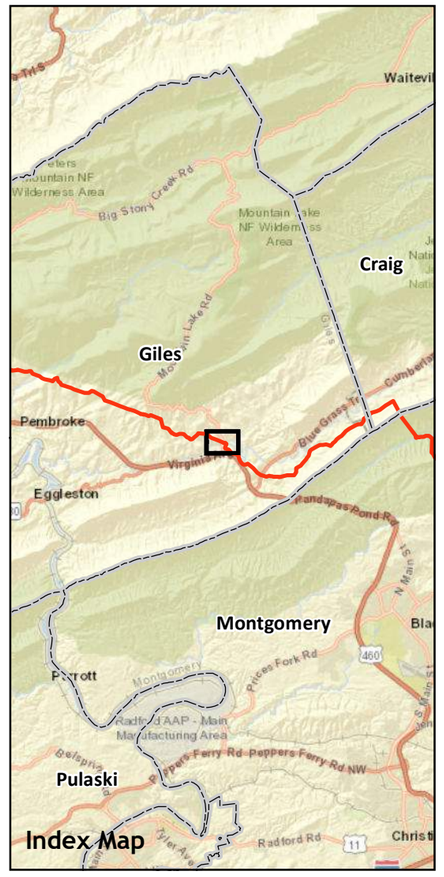
Mountain Valley PIPELINE



- Adjacent Property[1]
- Stream Location Centroid S-NN17
- NHD Flowline
- MVP Implementation MP Centerline
- MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

[1] Additional parcel owner information verified 2/10/2021 at:
Roanoke County: https://taxview.roanokecountyva.gov/TaxView/
Giles County: https://www.webgis.net/va/Giles/
Franklin County: https://gis.franklincountyva.gov/compviewer/index.html
Pittsylvania County: https://parcelviewer.geodecisions.com/Pittsylvania/
Montgomery County: https://maps.montva.com/portal/apps/webappviewer



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NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

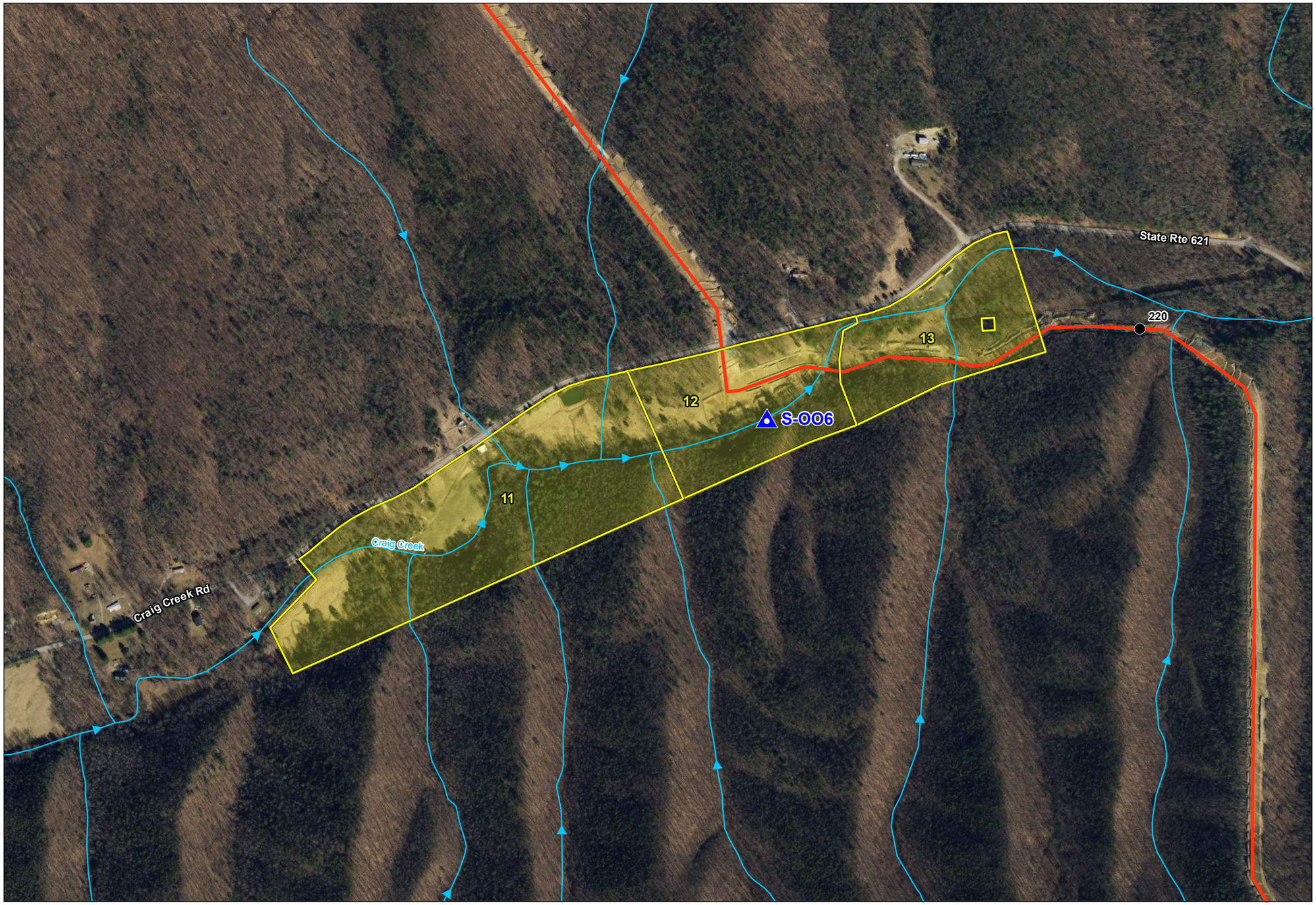
0 400 800 Feet

Prepared by:
Wetland Studies and Solutions, Inc.
a DAVEY company

MVP Pipeline Project

Adjacent Property Owners

Mountain Valley PIPELINE



- Adjacent Property[1]
- Stream Location Centroid S-OO6
- NHD Flowline
- MVP Implementation MP Centerline
- MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

[1] Additional parcel owner information verified 2/10/2021 at:
Roanoke County: https://taxview.roanokecountyva.gov/TaxView/
Giles County: https://www.webgis.net/va/Giles/
Franklin County: https://gis.franklincountyva.gov/compviewer/index.html
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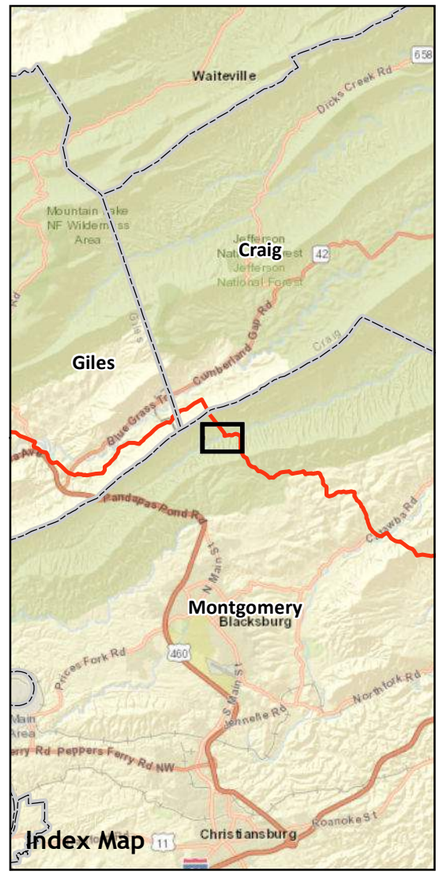

NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

0 500 1,000 Feet

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MVP Pipeline Project

Adjacent Property Owners

Mountain Valley PIPELINE

Adjacent Property[1]

Stream Location Centroid
S-C21

NHD Flowline

MVP Implementation MP Centerline

MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

[1] Additional parcel owner information verified 2/10/2021 at:
Roanoke County: https://taxview.roanokecountyva.gov/TaxView/
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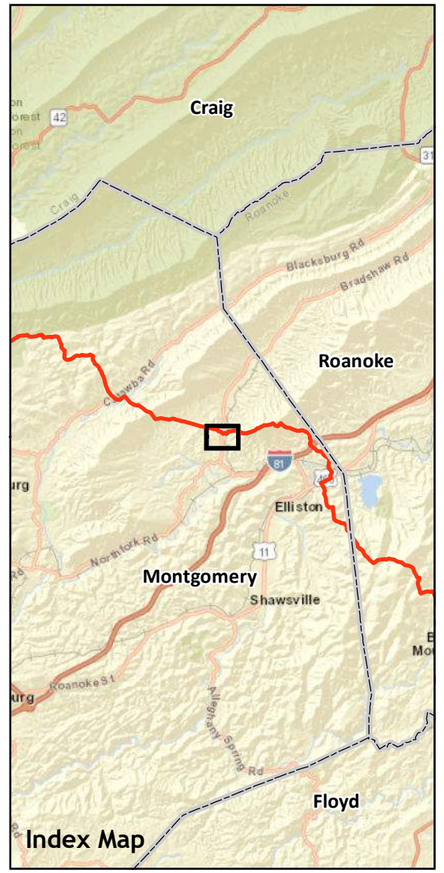

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NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

0 400 800 Feet

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Adjacent Property Owners

Mountain Valley PIPELINE

- Adjacent Property[1]
- Stream Location Centroid S-NN16
- NHD Flowline
- MVP Implementation MP Centerline
- MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

[1] Additional parcel owner information verified 2/10/2021 at:
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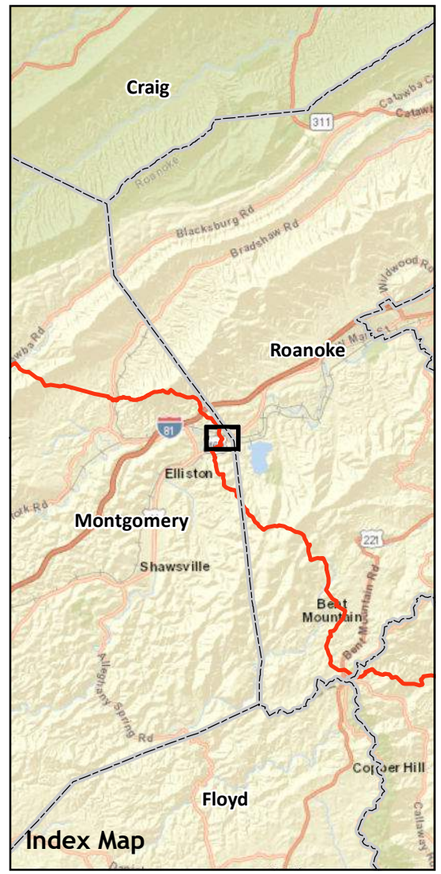

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Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

0 400 800 Feet

Prepared by:
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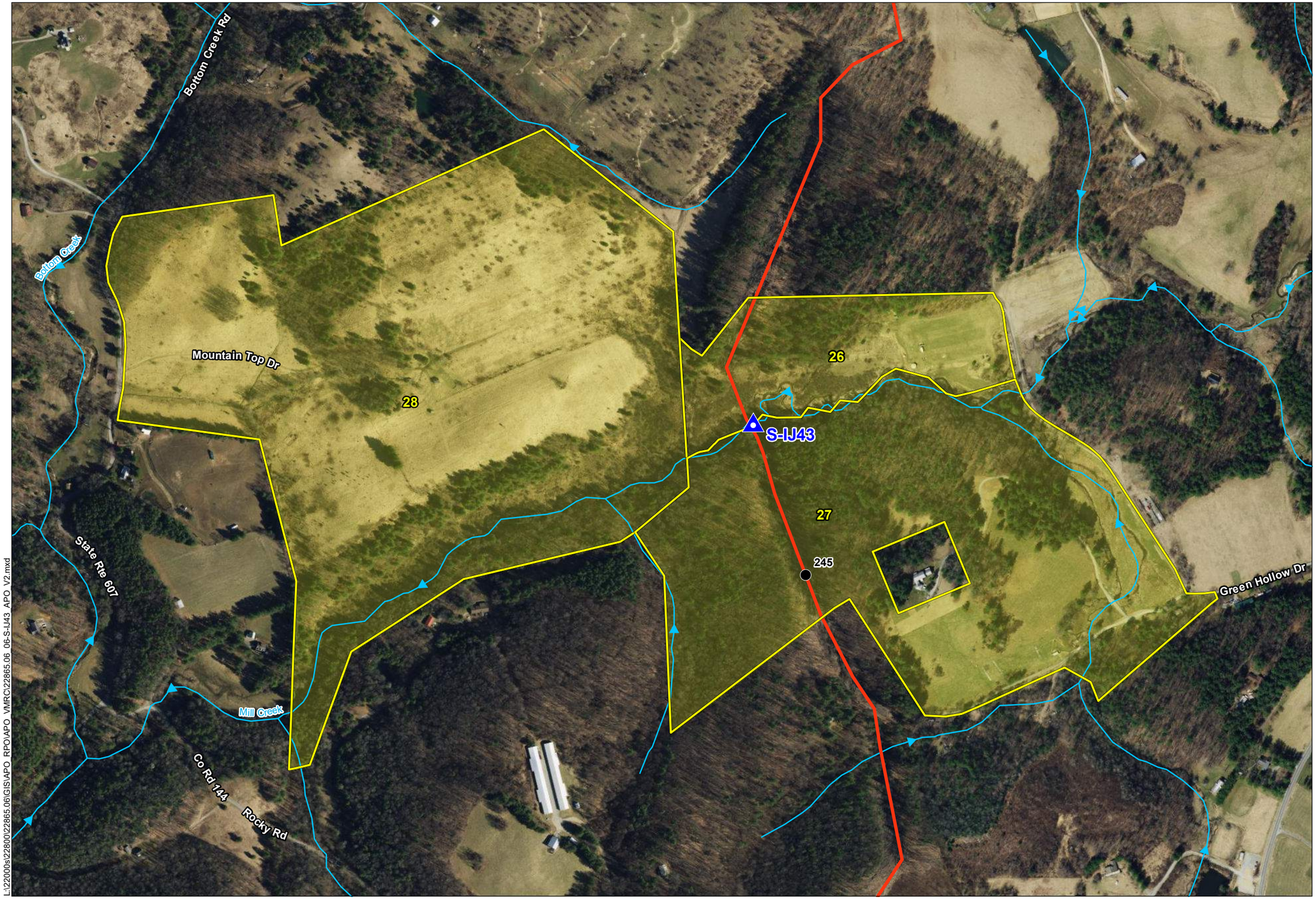
MVP Pipeline Project

Adjacent Property Owners

Mountain Valley PIPELINE



- Adjacent Property[1]
- Stream Location Centroid S-IJ43
- NHD Flowline
- MVP Implementation MP Centerline
- MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

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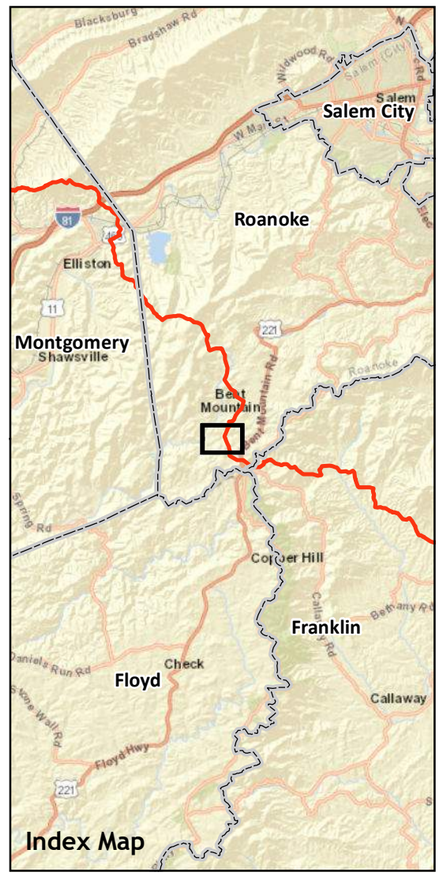

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NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

0 500 1,000 Feet

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MVP Pipeline Project

Adjacent Property Owners

Mountain Valley PIPELINE

Adjacent Property[1]

Stream Location Centroid
S-C17

NHD Flowline

MVP Implementation MP Centerline

MVP Implementation Milepost

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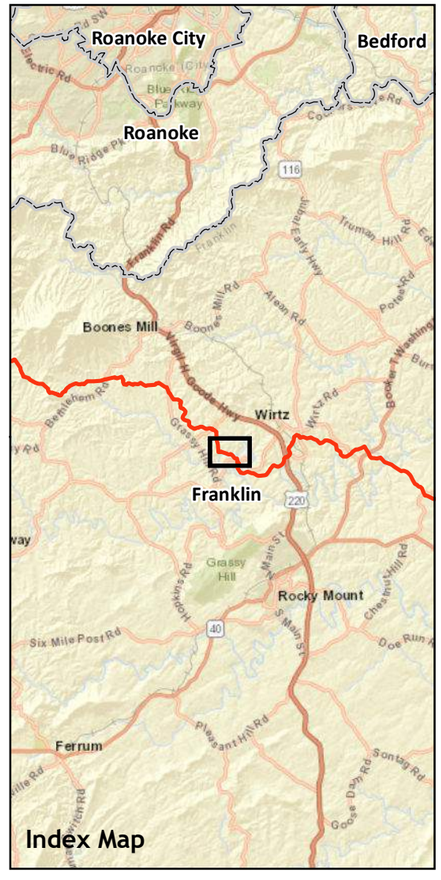

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NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

0 500 1,000 Feet

Prepared by:
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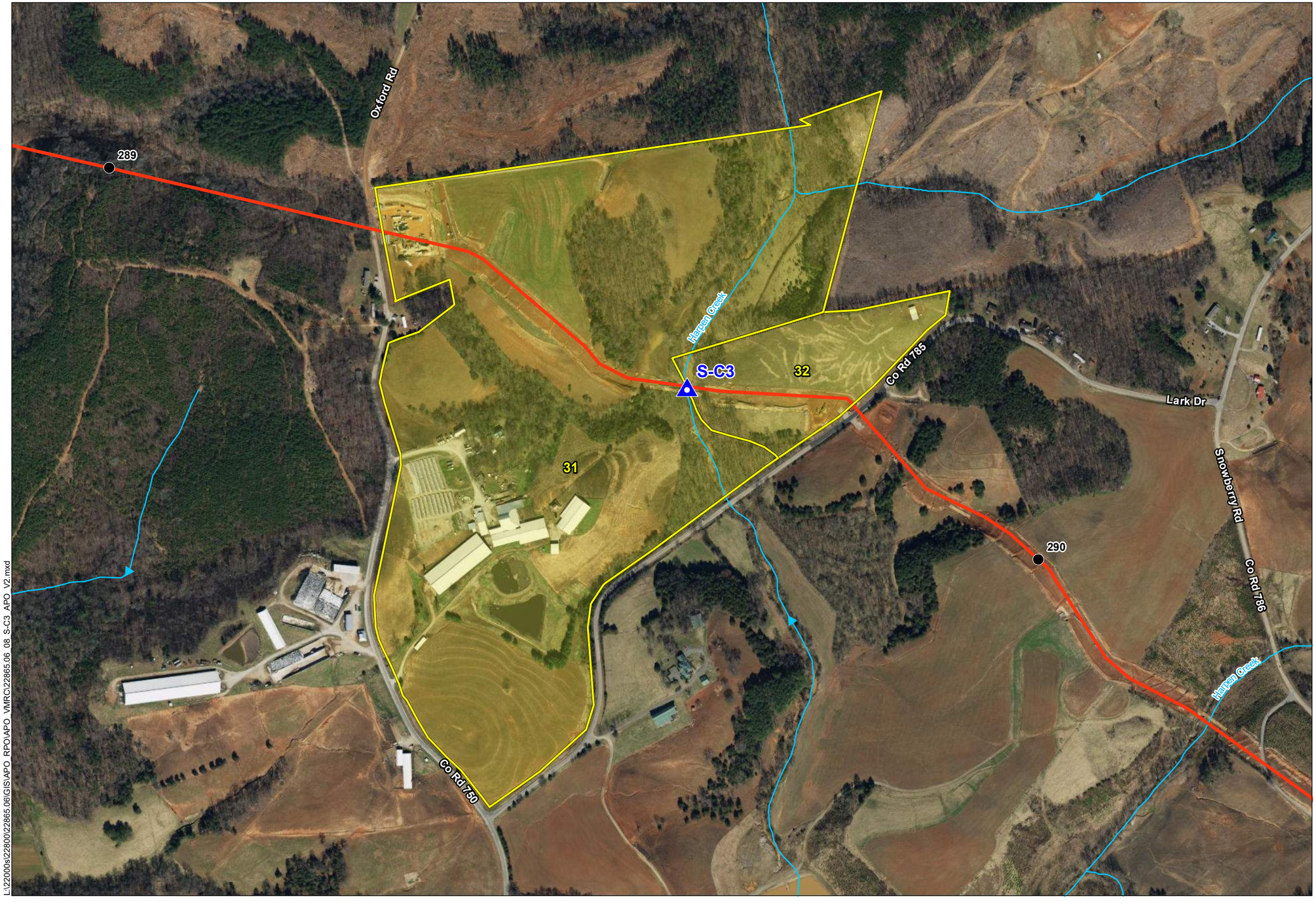
MVP Pipeline Project

Adjacent Property Owners

Mountain Valley PIPELINE



- Adjacent Property[1]
- Stream Location Centroid S-C3
- NHD Flowline
- MVP Implementation MP Centerline
- MVP Implementation Milepost

Parcel owner information provided by MVP and is based on tax map, county assessor, and title research data. This information was verified and updated accordingly per County records, citation below.

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Giles County: https://www.webgis.net/va/Giles/
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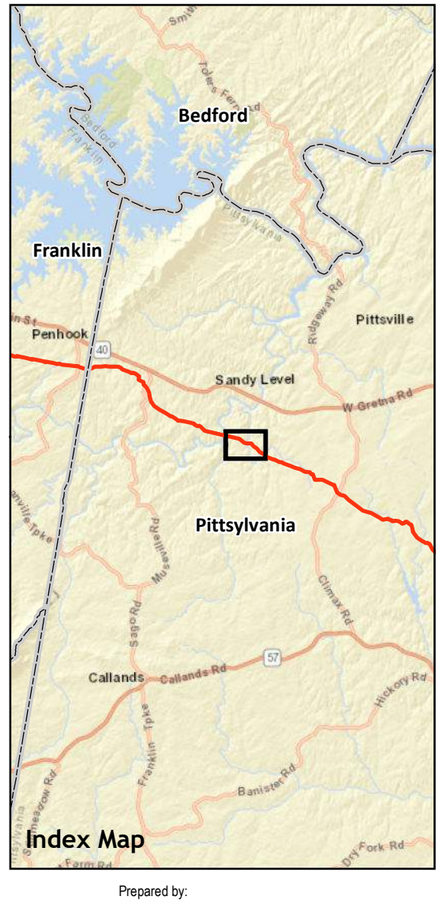

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NORTH

Imagery Source: VGIN
Centerline/Parcel/Impact Source: MVP. January 2021.
Hydrology Source: National Hydrography Dataset (NHD)
Wednesday, February 17, 2021

0 500 1,000 Feet

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Adjacent Property Owners Table

Map ID	PIN	County	Impact ID	Property Owner	Mailing Address	City, State Zip
1	29-17	Giles	S-Z13	DUNCAN BARBARA JEAN MARTIN ET AL	3337 RED SULFUR TURNPIKE	PRINCETON, WV 24740
2	29-17A	Giles	S-Z13	REPPERT SHAUN T	1372 CASCADE DRIVE	PEMBROKE, VA 24136
3	29-18	Giles	S-Z13	VALENTINE DEXTER R	P O BOX 862	PEMBROKE, VA 24136
4	29-25	Giles	S-Z13	EAGLES NEST MINISTRIES INC	P O BOX 8	PEMBROKE, VA 24136
5	29-25B	Giles	S-Z13	SIZEMORE INC	P O BOX 8	PEMBROKE, VA 24136
6	45-43	Giles	S-NN17	LINK JAMES BARRY ET AL	P O BOX 112	NEWPORT, VA 24128
7	45-40C	Giles	S-NN17	LINK JAMES BARRY	P O BOX 112	NEWPORT, VA 24128
8	45-39	Giles	S-NN17	ABEL LLOYD G OR DONNA S	262 ZEPPELIN TRAIL	NEWPORT, VA 24128
9	45-44	Giles	S-NN17	LINK JAMES BARRY ET AL	P O BOX 112	NEWPORT, VA 24128
10	45-46	Giles	S-NN17	LINK JAMES BARRY ET AL	P O BOX 112	NEWPORT, VA 24128
11	008- A 7D	Montgomery	S-OO6	ROCKING C LAND & LIVESTOCK LLC JONATHAN WINSLOW	1283 HWY 139 UNIT 106	DANDRIDGE, TN 37725
12	008- A 7	Montgomery	S-OO6	MILLS MARK	2004 TWIN OAKS AVE	PULASKI, VA 24301
13	008- A 8	Montgomery	S-OO6	WINGO DONALD L C/O DONALD L WINGO ETAL TRS	924 CRAIG CREEK RD	BLACKSBURG, VA 24060
14	045- A 63	Montgomery	S-C21	ZOOK BRENDA	3053 BRADSHAW RD	ELLISTON, VA 24087
15	045- A 63C	Montgomery	S-C21	PARRISH ROBERT CLAYTON	2980 BRADSHAW RD	ELLISTON, VA 24087
16	045- A 63H	Montgomery	S-C21	MOUNTAIN VALLEY PIPELINE LLC, C/O EQUITRANS MIDSTREAM CORP	2200 ENERGY DR	CANONSBURG, PA 15317
17	045- 3 5A	Montgomery	S-C21	CRAIG-BOTETOURT ELECTRIC, COOPERATIVE	ASSESSED BY STATE CORP COMM	ASSESSED BY STATE CORP COMM
18	045- 6 1	Montgomery	S-C21	PERDUE BRENDA L C/O BRENDA L ZOOK; HARTMAN SAMUEL E, HARTMAN CONSTANCE V	3053 BRADSHAW RD	ELLISTON, VA 24087
19	047- A 55	Montgomery	S-NN16	APGAR MILDRED M,	5575 LAFAYETTE RD	ELLISTON, VA 24087
20	047- 2 A,B	Montgomery	S-NN16	MOUNTAIN VALLEY PIPELINE LLC	625 LIBERTY AVE STE 2000	PITTSBURGH, PA 15222
21	047- A 51	Montgomery	S-NN16	BROCKENBROUGH RUSSELL K, BROCKENBROUGH TRACY L	10412 ROANOKE RD	ELLISTON, VA 24087-2333
22	047- A 50	Montgomery	S-NN16	EAST KENNETH L	10430 ROANOKE RD	ELLISTON, VA 24087
23	047- A 69	Montgomery	S-NN16	CLARK TIMOTHY W, CLARK LUCY M	1510 INNSBROOKE DR	SALEM, VA 24153
24	047- A 62	Montgomery	S-NN16	HESLEP RICHARD ARTHUR	821 STONEGATE DR APT 32	SALEM, VA 24153-2621
25	047- A 63A,61A	Montgomery	S-NN16	HALL SEAN L, HALL MICHELLE S	6670 STONES KEEP LN	ELLISTON, VA 24087
26	110.00-01-55.00-0000	Roanoke	S-IJ43	REDDY VENKAT ; REDDY ANITHA	1535 LINKS VIEW DR	SALEM, VA 24153
27	110.00-01-52.00-0000	Roanoke	S-IJ43	WINDALOFT FARM LLC	C/O CLAIRE SULLIVAN 5 PROVINCETOWN COURT	GREENSBORO, NC 27408
28	111.00-01-62.01-0000	Roanoke	S-IJ43	CHANDLER JAMES T; CHANDLER KATHY E	P O BOX 20638	ROANOKE, VA 24018
29	0440004300	Franklin	S-C17	MOUNTAIN VALLEY PIPELINE LLC	C/O SETH LAND 208 E MAIN ST	ABINGDON, VA 24210
30	0440004400	Franklin	S-C17	BUFORD GUY W	3059 HOSKININI CIR	PRESCOTT, AZ 86305
31	1489-29-4509	Pittsylvania	S-C3	OXFORD ROAD FARMS LLC	2625 OXFORD RD	CHATHAM, VA 24531
32	1489-39-5745	Pittsylvania	S-C3	OSBORNE, MARGARET FAYE	4612 TOSHES RD	CHATHAM, VA 24531

Owner Phone Number, Email, Fax, SCC unknown. Not included.