

## **APPENDIX C-3**

### **Erosion and Sediment Control Sheets**

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Project plans must specify how each of these guidelines will be met.

- Placement of sequestered topsoil prior to seeding.
- Seed shall be Virginia or West Virginia certified seed (bag tags attached; seed certification shall meet each state's standards for their certified seed classification) or alternative seed sourced from approved distributors.
- USFS approval of treatments outside normal seeding seasons.
- All leguminous seed shall be either be pre-inoculated from a supplier, or mixed with inoculant specified for use on that particular seed according to manufacturer's directions. Inoculants shall be manually applied at double the manufacturer's rate. Inoculant shall be mixed with legume seed prior to mixing with other seeds. For hydro-seeding, use a minimum of five times the dry seeding rate of inoculant. (Flynn, 2015; Monsanto 2015)
- A minimum of 100 lbs/ac of seed will be applied when seeding for permanent erosion control (VA BMP) unless otherwise specified by the seed mix provider.
- A success standard/threshold, such as 70-85% ground cover, must be delineated, and provisions to monitor and report on site conditions. Please describe plans for implementing mitigation measures (in case of planting failures) to ensure planting success.
- Describe how subsoil will be tested for compaction, and loosened prior to topsoil replacement if necessary.
- Dry fertilizer and lime may need to be incorporated into the top 2-5 inches of soil after application, at rates indicated by the results of site-specific soil tests. Please describe plans for doing so. (FERC 2013, Virginia DEQ)
- All seeding must occur promptly after construction halts, either temporarily or permanently. Erosion control seed mixtures must be sufficient to stabilize sites for varying lengths of time, and seed mixes may need to vary depending on that timeframe. Please describe how quickly seeding will occur, and the decision thresholds for applying temporary versus permanent erosion control seed mixtures.
- Areas to be planted with species beneficial for wildlife after pipeline installation will be treated with temporary erosion control mix during a normal seeding season.
- Areas not to be treated with wildlife seed species will be treated with permanent erosion control seeding during a normal seeding season.
- Seeding rates should be doubled when hydroseeding (Steinfeld et. al., 2007)

Appropriate seasons for seeding can vary dramatically depending on elevation. Spring seeding can be conducted from March 15<sup>th</sup> – June 1<sup>st</sup>, and fall seeding can be done from August 15<sup>th</sup> – October 15<sup>th</sup>, but neither timeframe is appropriate in its entirety at all elevations. Please describe the timeframe in which seeding is proposed according to site specific elevations. Seeding windows should allow time for application, germination, and survival.

In the absence of soil chemistry tests, the following guidelines can be used to develop fertilizer and liming rates. **Whenever possible, nutrient additions should be based on soil chemistry data in the interpretations provided with the order 1 soil survey.**

**Fertilizer:** 600-800 lbs/ac, 10-20-10 (Nitrogen, Phosphorous, Potassium), 400 lbs/ac 15-30-15, 800-1000 lbs/ac 10-10-10.

**Lime:** 1500-4000 lbs/ac (pelletized or dust), 4000 lbs/ac, Hydro Lime (2.5 gal container is equivalent to 1000 lbs limestone)—5-10 containers /ac.

Use of mulch materials and binders will be needed. Use of hay is prohibited on National Forest land due to invasive species concerns. Below are some guidelines that apply when selecting these materials for various sections of the ROW. Please describe how each of these issues will be addressed. All techniques must be appropriate for the % slope on which they will be applied. Please describe how mulching, seeding, and binding techniques will be adjusted to accommodate different slope classes (for example, 0-8%, 8-15%, 15-30%, 30-50%, etc.)

- Materials must be certified weed free or be accompanied by vendor's test results for noxious weed content.
- Seeded areas can be mulched with weed free straw at a rate of 2-4K lbs/ac, hand spread or blown, fiber mulch hydro-seeded at 1500-2000 lbs/ac., or other appropriate material.
- Natural biodegradable products are preferred. Materials must be demonstrated to be free of invasive species, including but not limited to plants, pests, and pathogens.
- Hydraulic erosion control products (HEPC) must be suitable for wildlife.
- If the use of stabilization netting is required/permitted, wildlife friendly geotextiles must be used. These products must either not contain netting, or netting must be made of 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber. Plastic netting (such as polypropylene, nylon, polyethylene, and polyester), even if advertised as biodegradable, is not an acceptable alternative. Any netting used must also have a loose weave design with movable joints between horizontal and vertical twines to reduce the chance for wildlife entanglement, injury, or death. (CA Coastal Commission, 2012)
- Avoid the use of silt fences reinforced with metal or plastic mesh.
- When no longer required, (after soils are stable and the vegetative cover is established), temporary erosion control and sediment control products should be promptly removed.
- Any products that require mixing with water need to have a Forest Service-approved water source. The source of water must not be contaminated with non-native invasive organisms that could spread into streams.

- Wood-fiber hydraulic mulches are generally short-lived and require a 24-hour period to dry before rainfall occurs.

- Wood fiber naturally has tackifying properties, but fiber alone may not be sufficient on steep slopes. In those cases the addition of a tackifier will help keep the seeds in contact with the soil. Describe plans to assess when this will be necessary, and describe the tackifier and application methods to be used.
- As wood chips, shredded woody materials, and other high-carbon materials decompose, they remove plant nutrients such as nitrogen from the soil. This can reduce soil fertility and make it difficult for grasses to grow. This should be taken into account when planning restoration seeding.

- The use of hydroseeding with binders will most likely be required in many areas on FS lands due to the steep terrain. Please describe site conditions where this will be used.
- The success of soil binders are somewhat dependent on the soil type present. If soil is compacted or high in clay and silt, soil binders may not penetrate soil surfaces.
- Whether short-life or long-life, soil binders should be non-toxic and organic based, such as guar, psyllium, or pitch and rosin emulsions. Please describe type of binder to be used under what circumstances, and specific application rates and methods.
- Materials or additives used as binders or emulsifiers cannot be toxic to soil organisms or otherwise prevent or inhibit seed germination.

Scientific Name	Common Name	Growth Habit	pH Preference
Upland Areas - Non-native Species for Erosion Control			
<i>Lolium perenne</i> subsp. <i>multiflorum</i>	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
<i>Urochloa ramosa</i> ( <i>Panicum ramosum</i> )	Browntop millet	Graminoid	5.5 – 6.9
<i>Secale cereale</i>	Cereal rye	Graminoid	5.2 – 8.0
<i>Setaria italica</i>	Foxtail millet	Graminoid	5.3 – 6.9
Upland Areas - Native Species			
<i>Chasmanthium laxum</i> <sup>a</sup>	Slender woodoats	Graminoid	4.5 – 7.0
<i>Eragrostis spectabilis</i> <sup>a</sup>	Purple lovegrass	Graminoid	4.0 – 7.5
<i>Panicum virgatum</i>	Switchgrass	Graminoid	4.5 – 8.0
<i>Sorghastrum nutans</i>	Indiangrass	Graminoid	5.0 – 7.8
<i>Tridens flavus</i> <sup>a</sup>	Purpletop	Graminoid	4.5 – 6.5
<i>Apocynum cannabinum</i> <sup>a</sup>	Indian hemp	Forb	4.5 – 7.0
<i>Chamaecrista fasciculata</i>	Partridge pea	Forb	5.5 – 7.5
<i>Desmodium canadense</i>	Showy ticktrefoil	Forb	wide tolerance
<i>Desmodium paniculatum</i>	Panicleleaf ticktrefoil	Forb	6.0 – 7.0
<i>Elymus virginicus</i> <sup>a</sup>	Virginia wildrye	Graminoid	5.0 – 7.4
<i>Geum canadense</i> <sup>a</sup>	White avens	Forb	4.5 – 7.5
<i>Helleopsis helianthoides</i>	Oxeye sunflower; Smooth oxeye	Forb	unknown
<i>Monarda fistulosa</i> <sup>a</sup>	Wild bergamot	Forb	6.0 – 8.0
<i>Pycnanthemum</i> spp. <sup>b</sup>	Mountain mint	Forb	unknown
<i>Rubus allegheniensis</i> <sup>a</sup>	Common blackberry; Allegheny blackberry	Forb/ Subshrub	4.6 – 7.5
<i>Rudbeckia hirta</i>	Blackeyed Susan	Forb	6.0 – 7.0
<i>Solidago canadensis</i> <sup>a</sup>	Canada goldenrod	Forb	4.8 – 7.5
<i>Tradescantia virginiana</i> <sup>a</sup>	Virginia spiderwort	Forb	4.0 – 8.0

Scientific Name	Common Name	Habit	pH Preference
Non-native Species for Erosion Control			
<i>Lolium perenne</i> subsp. <i>multiflorum</i>	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
<i>Urochloa ramosa</i> ( <i>Panicum ramosum</i> )	Browntop millet	Graminoid	5.5 – 6.9
<i>Secale cereale</i>	Cereal rye	Graminoid	5.2 – 8.0
<i>Setaria italica</i>	Foxtail millet	Graminoid	5.3 – 6.9
Native Species			
<i>Agrostis perennans</i>	Autumn bentgrass; upland bentgrass	Graminoid	5.5 – 7.5
<i>Elymus virginicus</i>	Virginia Wildrye	Graminoid	5.0 - 7.4
<i>Sorghastrum nutans</i>	Indiangrass	Graminoid	5.0 - 7.8
<i>Asclepias incarnata</i>	Swamp milkweed	Forb	5.0 – 8.0
<i>Chamaecrista fasciculata</i>	Partridge pea	Forb	5.5 – 7.5
<i>Eutrochium fistulosum</i> ( <i>Eupatorium fistulosum</i> )	Joe pye weed	Forb	4.5 – 7.0
<i>Eupatorium maculatum</i>	Spotted Joe pye weed	Forb	5.5 – 7.0
<i>Eupatorium perfoliatum</i>	Boneset	Forb	unknown
<i>Helenium autumnale</i>	Common sneezeweed	Forb	4.0 – 7.5
<i>Senna hebecarpa</i>	Wild senna; American senna	Forb	unknown
<i>Senna marilandica</i>	Maryland senna	Forb / Subshrub	4.0 – 7.0
<i>Vernonia noveboracensis</i>	North Ironweed	Forb	4.5–8.0

Scientific Name	Common Name	Growth Habit	pH Preference
<b>Non-native Species for Temporary Erosion Control</b>			
<i>Lolium perenne</i> subsp. <i>multiflorum</i>	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
<i>Urochloa ramosa</i> ( <i>Panicum ramosum</i> )	Browntop millet	Graminoid	5.5 – 6.9
<i>Secale cereale</i>	Cereal rye	Graminoid	5.2 – 8.0
<i>Setaria italica</i>	Foxtail millet	Graminoid	5.3 – 6.9
<b>Native – Highly Preferred</b>			
<i>Sorghastrum nutans</i>	Indiangrass	Graminoid	5.0 – 7.8
<i>Tridens flavus</i>	Purpletop	Graminoid	4.5 – 6.5
<b>Native – Preferred</b>			
<i>Agrostis perennans</i>	Autumn bentgrass; Upland bentgrass	Graminoid	5.5 – 7.5
<i>Dichanthelium clandestinum</i>	Deertongue	Graminoid	4.0 – 7.5
<i>Elymus canadensis</i>	Canada wildrye	Graminoid	5.0 – 7.9
<i>Desmodium canadense</i>	Showy ticktrefoil	Forb	wide tolerance
<i>Heliopsis helianthoides</i>	Oxeye sunflower; Smooth oxeye	Forb	unknown
<i>Lespedeza virginica</i>	Slender bushclover; Slender spepedeza	Forb	acid tolerant
<i>Liatris spicata</i>	Dense blazing star; Spiked gayfeather	Forb	5.6 - 7.5
<i>Senna hebecarpa</i>	Wild senna; American senna	Forb	unknown
<b>Native – Moderately Preferred</b>			
<i>Panicum virgatum</i>	Switchgrass	Graminoid	4.5 – 8.0
<i>Chamaecrista fasciculata</i>	Partridge pea	Forb	5.5 – 7.5
<i>Rudbeckia hirta</i>	Blackeyed Susan	Forb	6.0 – 7.0

Name	Ph preference	Wetland Indicator Status
Annual Ryegrass ( <i>Lolium Multiflorum</i> (L. perenne var. italicum))	5.0–7.9	NI/moderate
German/Foxtail Millet ( <i>Setaria italica</i> )	5.3–6.9	FACU
Cereal Rye ( <i>Secale cereale</i> )	5.2–8.0	NI/damp
Browntop Millet ( <i>Panicum ramosum</i> ) (introduced in VA & south; possibly ok for WV?)	5.5–6.9	FACU

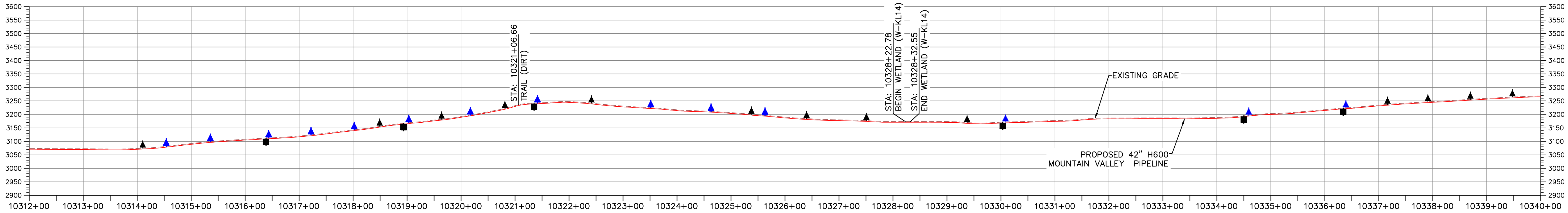
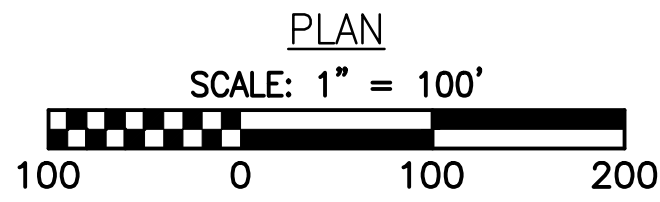
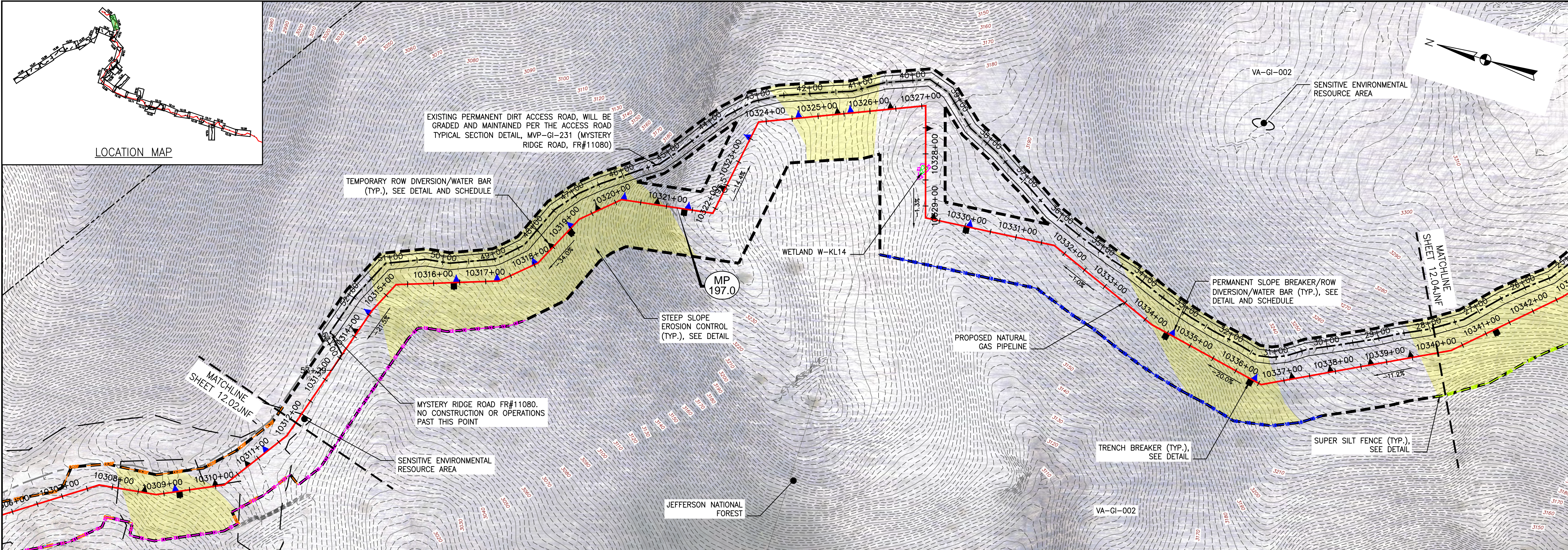
NOTES:

- 1): A MINIMUM OF (2) OF THE ABOVE LISTED SPECIES SHALL BE UTILIZED
- 2): APPLY WHENEVER EROSION CONTROL IS NEEDED OUTSIDE OF NORMAL (PERMANENT) SEEDING SEASONS
- 3): APPLY CONCURRENT WITH PERMANENT EROSION CONTROL
- 4): APPLY PRIOR TO PERMANENT SEEDING WITH WILDLIFE MIXES

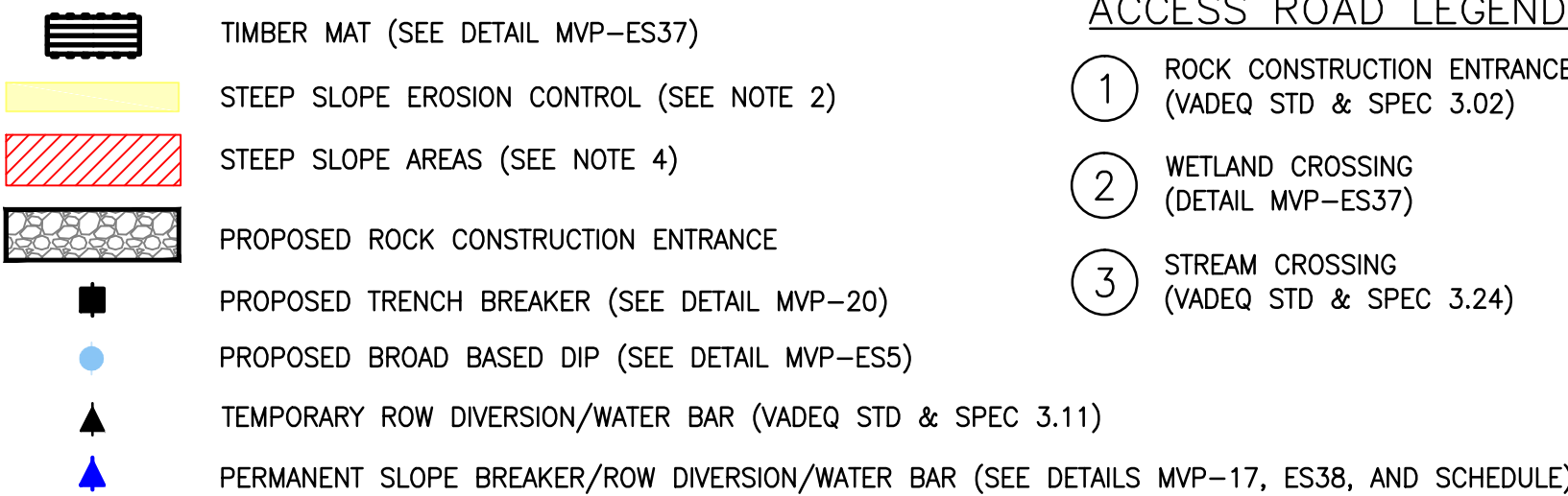
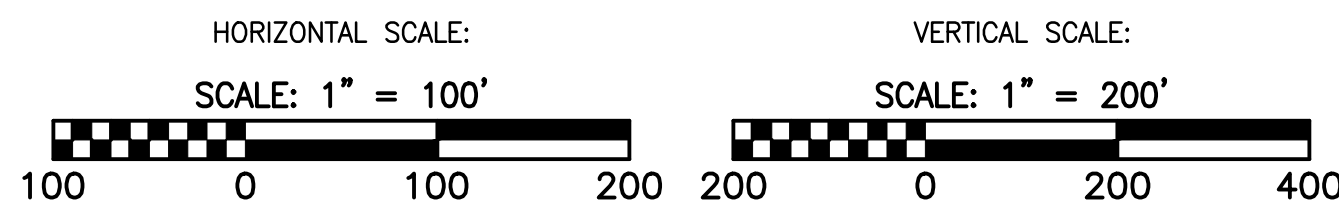
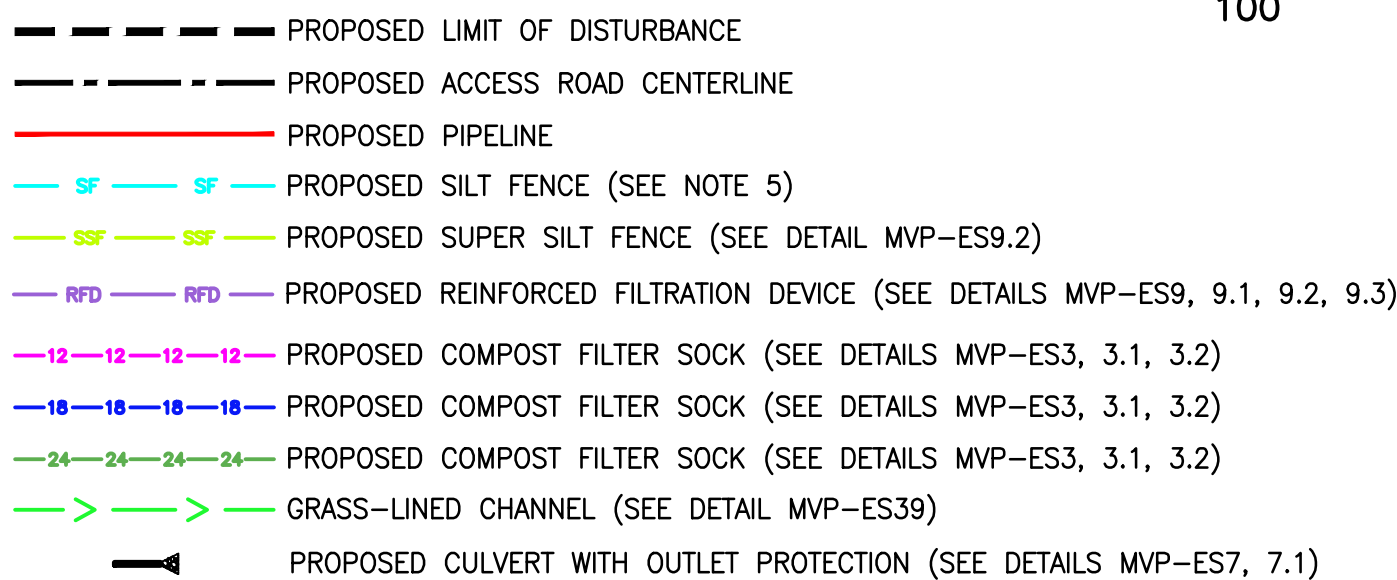
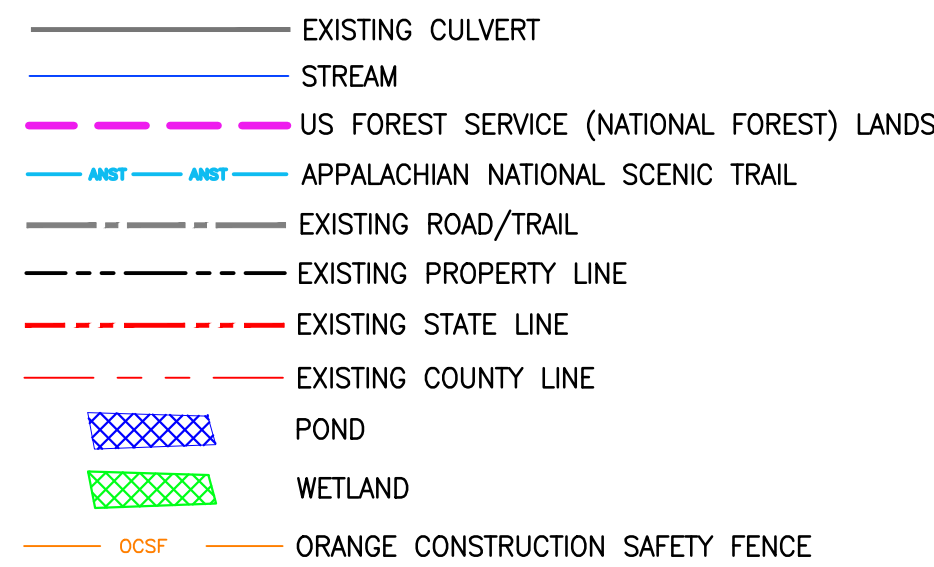




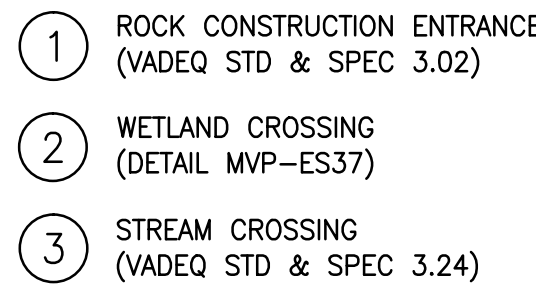




LEGEND



ACCESS ROAD LEGEND



NOTES:

- TOPSOIL SEGREGATION TO BE CONDUCTED THROUGHOUT THE JEFFERSON NATIONAL FOREST.
- FLEXITERRA, EARTHGUARD OR EQUIVALENT MAY BE USED AS A SUBSTITUTE TO EROSION CONTROL BLANKET AS DIRECTED BY MVP.
- CONTRACTOR IS RESPONSIBLE TO IDENTIFY ALL UTILITIES. THE UTILITY LINES SHOWN ON THE PLAN ARE FOR INFORMATIONAL PURPOSES ONLY AND DO NOT REPRESENT SURVEYED LINE INFORMATION.
- SLOPES OF 30° OR GREATER EXIST. CONSTRUCTION FOR STEEP SLOPES TO BE PERFORMED USING STEEP SLOPE TECHNIQUES IDENTIFIED IN THE DETAIL SHEETS. ALSO REFER TO THE SITE-SPECIFIC DESIGN OF STABILIZATION MEASURES IN SELECTED HIGH-HAZARD PORTIONS OF THE ROUTE OF THE PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT.
- WHERE CONSTRUCTION CONDITIONS PRECLUDE THE USE OF DIVERSION DITCHES DUE TO SITE CONDITIONS THE CONTRACTOR WILL INSTALL SILT FENCE AT THE DIRECTION OF MVP.
- IMPROVEMENTS TO PERMANENT AND TEMPORARY ACCESS ROADS WILL BE PERFORMED PER THE SITE SPECIFIC ACCESS ROAD DETAILS.
- TEMPORARY ACCESS ROAD CROSSING OF STREAMS AND WETLANDS WILL UTILIZE TIMBERMATS. ANY PERMANENT ROAD CROSSINGS WILL BE CONDUCTED VIA CULVERTS.
- IF THE USE OF STABILIZATION NETTING IS REQUIRED/PERMITTED, WILDLIFE FRIENDLY GEOTEXTILES MUST BE USED. THESE PRODUCTS MUST EITHER NOT CONTAIN NETTING, OR NETTING MUST BE MADE OF 100% BIODEGRADABLE NON-PLASTIC MATERIALS SUCH AS JUTE, SISAL, OR COIR FIBER. PLASTIC NETTING (SUCH AS POLYPROPYLENE, NYLON, POLYETHYLENE, AND POLYESTER), EVEN IF ADVERTISED AS BIODEGRADABLE, IS NOT AN ACCEPTABLE ALTERNATIVE. ANY NETTING USED MUST ALSO HAVE A LOOSE-WEAVE DESIGN WITH MOVABLE JOINTS BETWEEN HORIZONTAL AND VERTICAL TWINES TO REDUCE THE CHANCE FOR WILDLIFE ENTANGLEMENT, INJURY, OR DEATH. (CA COASTAL COMMISSION, 2012)

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September 8, 2017

Mountain Valley Pipeline		JEFFERSON NATIONAL FOREST - PLAN OF DEVELOPMENT		MOUNTAIN VALLEY PIPELINE PROJECT - H600 LINE		GILES COUNTY, VIRGINIA		MOUNTAIN VALLEY PIPELINE, LLC		555 SOUTHPOINTE BOULEVARD, SUITE 200		CANONSBURG, PA 15311	
NO.		DATE:		DWN.:		CHKD.:		APPD.:		DESCRIPTION:		REVISIONS:	
1		08/17/2017		AS SHOWN		REVISION		SHT. NO. 12.03JNF OF 13.06JNF					

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661 ANDERSEN DRIVE  
FOSTER PLAZA 7  
PITTSBURGH, PA 15220

EROSION AND SEDIMENT CONTROL PLANS

COMMONWEALTH OF PENNSYLVANIA

DAVID J. WALLNER  
Lic. No. 0402057598

DRAWN BY: JWK

CHECKED BY: KAL

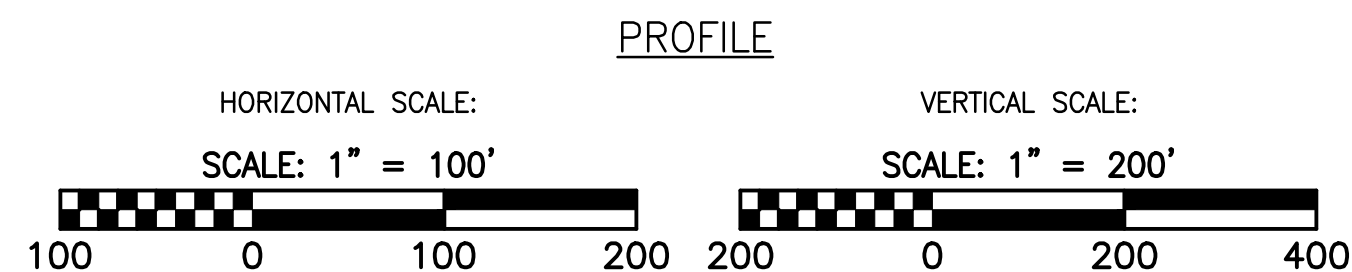
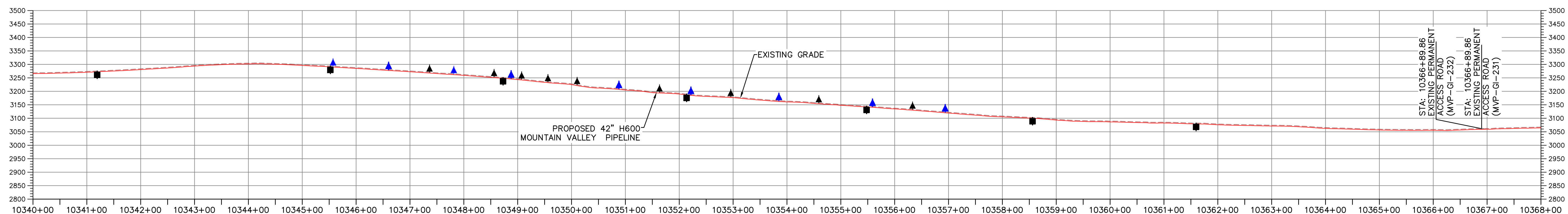
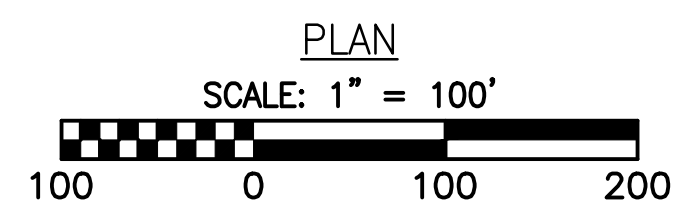
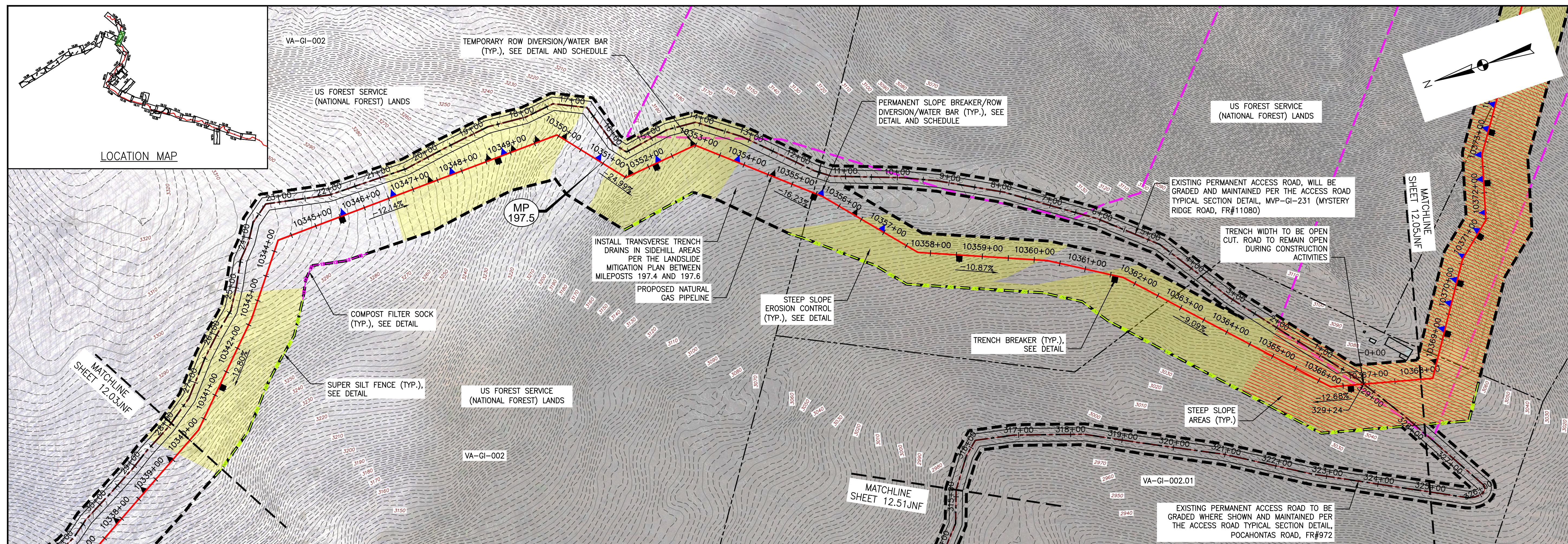
APPROVED BY: RE

DATE: 08/17/2017

SCALE: AS SHOWN

SHT. NO. 12.03JNF OF 13.06JNF





LEGEND

- |  |   |  |  |
|--|---|--|--|
|  | EXISTING CULVERT                          |  | PROPOSED LIMIT OF DISTURBANCE  |
|  | STREAM                                    |  | PROPOSED ACCESS ROAD CENTERLINE  |
|  | US FOREST SERVICE (NATIONAL FOREST) LANDS |  | PROPOSED PIPELINE  |
|  | APPALACHIAN NATIONAL SCENIC TRAIL         |  | PROPOSED SILT FENCE (SEE NOTE 5)   |
|  | EXISTING ROAD/TRAIL                       |  | PROPOSED SUPER SILT FENCE (SEE DETAIL MVP-ES9.2)                           |
|  | EXISTING PROPERTY LINE                    |  | PROPOSED REINFORCED FILTRATION DEVICE (SEE DETAILS MVP-ES9, 9.1, 9.2, 9.3) |
|  | EXISTING STATE LINE                       |  | PROPOSED COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)               |
|  | EXISTING COUNTY LINE                      |  | PROPOSED COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)               |
|  | POND                                      |  | PROPOSED COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)               |
|  | WETLAND                                   |  | PROPOSED COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)               |
|  | ORANGE CONSTRUCTION SAFETY FENCE          |  | PROPOSED COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)               |
|  |   |  | GRASS-LINED CHANNEL (SEE DETAIL MVP-ES39)                                  |
|  |   |  | PROPOSED CULVERT WITH OUTLET PROTECTION (SEE DETAILS MVP-ES7, 7.1)         |

### ACCESS ROAD LEGEND

- ① ROCK CONSTRUCTION ENTRANCE  
(VADEQ STD & SPEC 3.02)
- ② WETLAND CROSSING  
(DETAIL MVP-ES37)
- ③ STREAM CROSSING  
(VADEQ STD & SPEC 3.24)

NOTES:

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3. CONTRACTOR IS RESPONSIBLE TO IDENTIFY ALL UTILITIES. THE UTILITY LINES SHOWN ON THE PLAN ARE FOR INFORMATIONAL PURPOSES ONLY AND DO NOT REPRESENT SURVEYED LINE INFORMATION.
4. SLOPES OF 30' OR GREATER EXIST. CONSTRUCTION FOR STEEP SLOPES TO BE PERFORMED USING STEEP SLOPE TECHNIQUES IDENTIFIED IN THE DETAIL SHEETS. ALSO REFER TO THE SITE-SPECIFIC STABILIZATION TECHNIQUES IN SELECTED HIGH-HAZARD PORTIONS OF THE ROUTE OF THE PROPOSED MOUNTAIN VALLEY PIPELINE PROJECT.
5. WHERE CONSTRUCTION CONDITIONS PRECLUDE THE USE OF DIVERSION DITCHES DUE TO SITE CONDITIONS THE CONTRACTOR WILL INSTALL SILT FENCE AT THE DIRECTION OF MVP.
6. IMPROVEMENTS TO PERMANENT AND TEMPORARY ACCESS ROADS WILL BE PERFORMED PER THE SITE SPECIFIC ACCESS ROAD DETAILS.
7. TEMPORARY ACCESS ROAD CROSSING OF STREAMS AND WETLANDS WILL UTILIZE TIMBERMATS. ANY PERMANENT ROAD CROSSINGS WILL BE CONDUCTED VIA CULVERTS.
8. IF THE USE OF STABILIZATION NETTING IS REQUIRED/PERMITTED, WILDLIFE FRIENDLY GEOTEXTILES MUST BE USED. THE NETTING MUST EITHER NOT CONTAIN NETTING, OR NETTING MUST BE MADE OF 100% BIODEGRADABLE NON-PLASTIC MATERIALS SUCH AS JUTE, SISAL, OR COIR FIBER. PLASTIC NETTING (SUCH AS POLYPROPYLENE, NYLON, POLYETHYLENE, AND POLYESTER), EVEN IF ADVERTISED AS BIODEGRADABLE, IS NOT AN ACCEPTABLE ALTERNATIVE. ANY NETTING USED MUST ALSO HAVE A LOOSE-WEAVE DESIGN WITH MOVABLE JOINTS BETWEEN HORIZONTAL AND VERTICAL TWINES TO REDUCE THE CHANCE FOR WILDLIFE ENTALEMENT, INJURY, OR DEATH. (CA COASTAL COMMISSION, 2012)

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September 8, 2017

Appendix C Attachment 3-6

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