By virtue of this seal and signature, all supporting documents included in this package are accurate and support the design presented herein.

DAVID J. WALLNER Lic. No. 0402057593

MOUNTAIN VALLEY PIPELINE, LLC

EROSION & SEDIMENT CONTROL PLAN

MVP PIPELINE PROJECT GILES COUNTY SPREAD 8

A CERTIFIED CONSTRUCTION RECORD DRAWING FOR

PERMANENT SWM FACILITIES SHALL BE SUBMITTED TO

DEQ FOR APPROVAL. CONSTRUCTION INSPECTIONS AND

SURVEYS, PERFORMED BY A LICENSED PROFESSIONAL,

SHALL BE REQUIRED AT EACH STAGE OF INSTALLATION

(CONSTRUCTION) AS NECESSARY TO CERTIFY THAT THE

SWM FACILITY HAS BEEN BUILT IN ACCORDANCE WITH THE

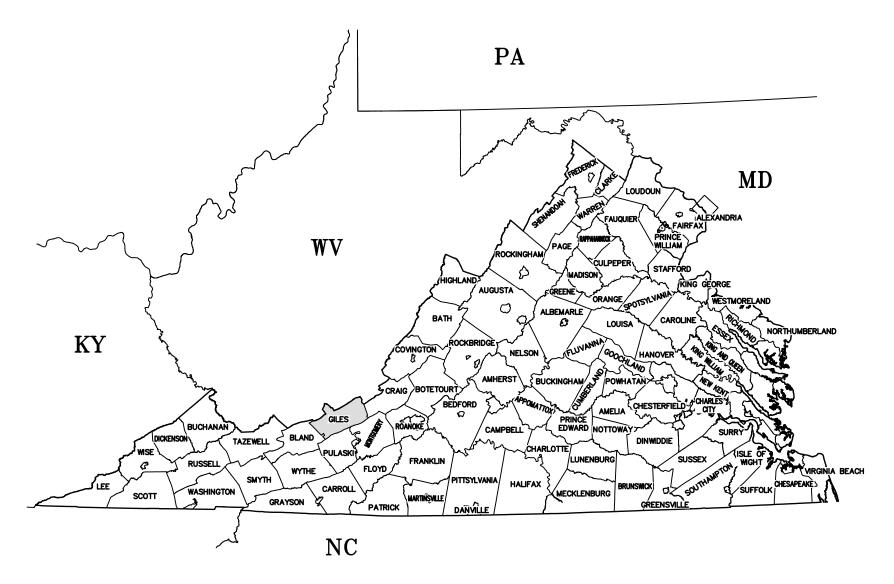
APPROVED PLAN AND DESIGN SPECIFICATIONS. THE

CONTRACTOR SHALL PROVIDE A MINIMUM OF TWO (2)

BUSINESS DAYS' NOTICE TO THE CERTIFYING

PROFESSIONAL TO ALLOW FOR CRITICAL INSPECTIONS.

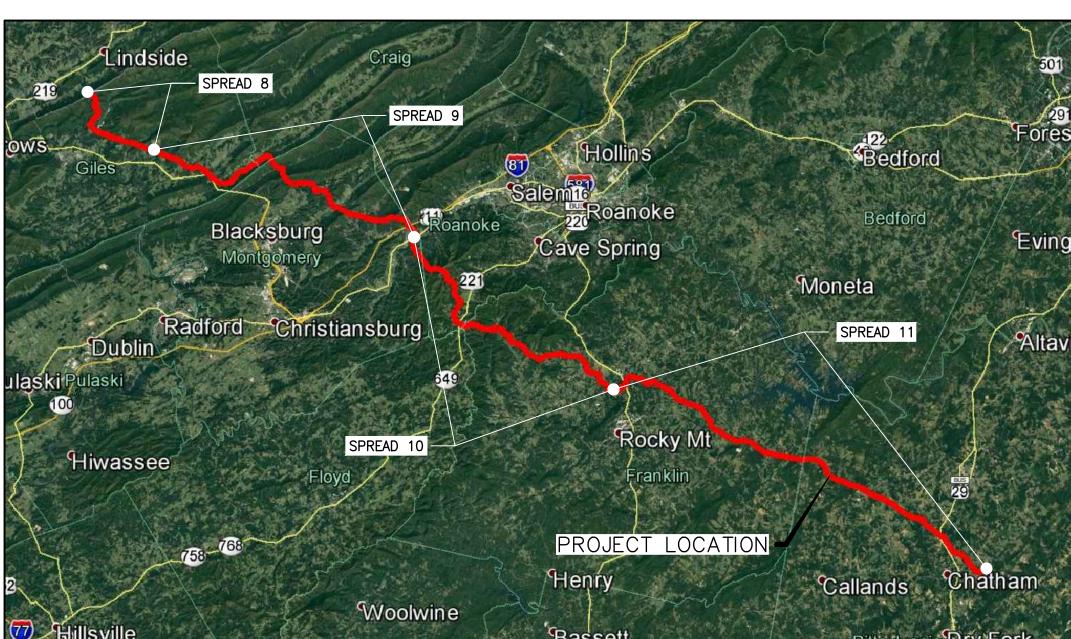
	DRAWING INDEX
SHEET No.	DRAWING TITLE
	GENERAL SET
0.00	COVER SHEET
0.01 TO 0.21	EROSION AND SEDIMENT CONTROL DETAILS
0.22 TO 0.23	GENERAL NOTES AND LEGEND
	SPREAD 8
12.00A	VARIANCE AND EXEMPTION REQUESTS
12.01	KEY PLAN
12.02EX TO 12.33EX	EXISTING CONDITIONS
12.02ES TO 12.34ES	EROSION & SEDIMENT CONTROL PLANS
12.02PC TO 12.33PC	POST CONSTRUCTION STORMWATER AND RESTORATION PLANS



VICINITY MAP N.T.S.

Moneta SPREAD 11 SPREAD 10 Hiwassee PROJECT LOCATION Woolwine

WATERS OF THE U.S. PERMITS CERTIFICATION I HEREBY CERTIFY THAT ALL WETLAND AND WATERBODY PERMITS REQUIRED BY LAW WILL BE OBTAINED PRIOR TO COMMENCING WITH LAND DISTURBING ACTIVITIES. SIGNATURE OWNER/DEVELOPER NOTE: PERMITS MUST BE PRESENTED TO THE COUNTY INSPECTOR PRIOR TO LAND DISTURBANCE.



LOCATION MAP MVP PIPELINE PROJECT GILES COUNTY, VIRGINIA TO PITTSYLVANIA COUNTY, VIRGINIA



THREE DAYS BEFORE YOU DIG

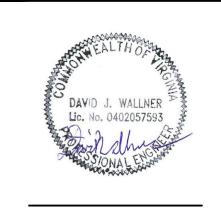
CALL VA ONE CALL SYSTEM TOLL FREE 1-800-552-7001

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.

	7	01/31/18 KAL	KAL	RE	DW	ADDED DETAILS FOR ROADS AND PADS
	9	01/26/18	KAL	RE	DW	ADDRESS VADEQ COMMENTS
	2	01/08/18	KAL	RE	DW	ADDRESS VADEQ COMMENTS
ا	4	11/28/17	KAL	RE	DW	ADDRESS VADEQ COMMENTS
	3	11/01/17	KAL	RE	DW	ADDRESS VADEQ COMMENTS
	2	08/18/17	KAL	RE	DW	ADDRESS VADEQ COMMENTS
	NO.:	DATE:	DWN.:	DWN.: CHKD.: APPD.:	APPD.:	DESCRIPTION:
					K M	REVISIONS:



661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220



CHECKED BY: APPROVED BY: 11/28/2017 SCALE: AS SHOWN

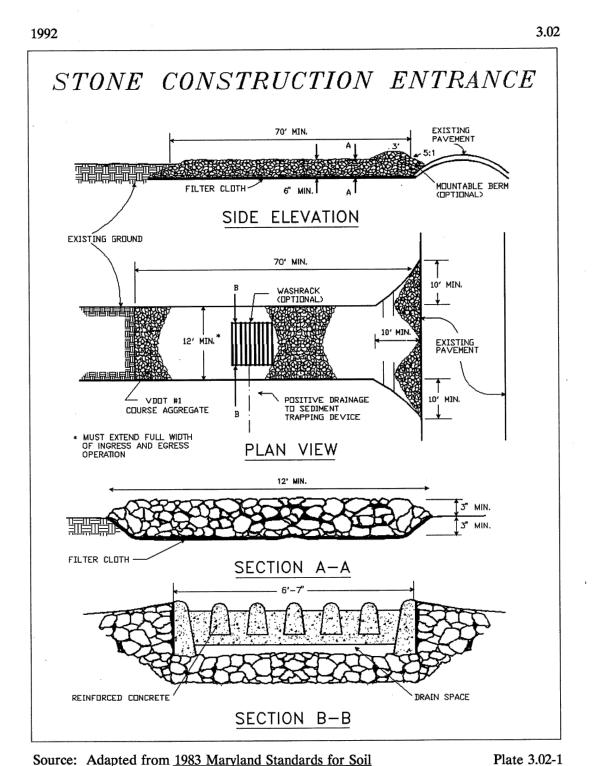
SHT. NO. 0.00 OF 0.23

SAFETY FENCE
TAKEN FROM VADEQ 1992 MANUAL

Plate 3.01-1

Adapted from Conwed Plastics and

VDOT Road and Bridge Standards



Source: Adapted from 1983 Maryland Standards for Soil Erosion and Sediment Control, and Va. DSWC

WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.

WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.

A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.

MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

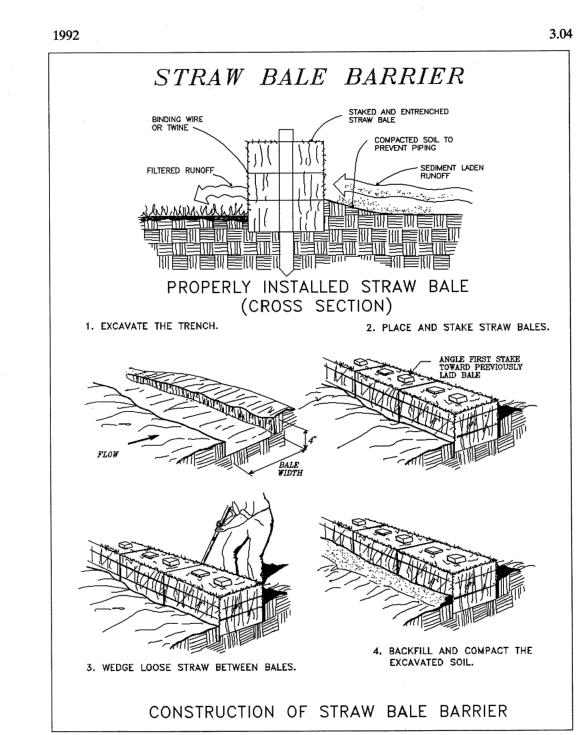
AT A MINIMUM, ROCK CONSTRUCTION ENTRANCES WITH WASH RACKS SHOULD BE CONSTRUCTED TO THE LENGTH, WIDTH, AND THICKNESS DIMENSIONS SHOWN ON STANDARD CONSTRUCTION DETAIL #3-2. A METAL WASH RACK OR LIVESTOCK GRATE IS AN ACCEPTABLE ALTERNATIVE TO THE REINFORCED CONCRETE ONE SHOWN IN THE STANDARD DETAIL. APPROACHES TO THE WASH RACK SHOULD BE LINED WITH AASHTO #1 AT A MINIMUM OF 25' ON BOTH SIDES. THE WASH RACK SHOULD DISCHARGE TO A SEDIMENT REMOVAL FACILITY, SUCH AS A CHANNEL LEADING TO A SEDIMENT REMOVAL DEVICE (E.G. A SEDIMENT TRAP OR SEDIMENT BASIN). ROCK CONSTRUCTION ENTRANCES WITH WASH RACKS SHOULD BE MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK WHEN NECESSARY AT THE END OF EACH WORKDAY. A STOCKPILE OF ROCK MATERIAL SHOULD BE MAINTAINED ON SITE FOR THIS PURPOSE.

SEDIMENT DEPOSITED ON PAVED ROADWAYS SHOULD BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

NOTE: WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE. DAMAGED WASH RACKS SHOULD BE REPAIRED AS NECESSARY TO MAINTAIN THEIR EFFECTIVENESS.

STONE CONSTRUCTION ENTRANCE
TAKEN FROM VADEQ 1992 MANUAL

Plate 3.05-2



Source: Va. DSWC

STRAW BALE BARRIER
TAKEN FROM VADEQ 1992 MANUAL

Plate 3.04-1

2. STAPLE WIRE FENCING TO THE POSTS.

3. ATTACH THE FILTER FABRIC TO THE WIRE
FENCE AND EXTEND IT INTO THE TRENCH.

4. BACKFILL AND COMPACT THE
EXCAVATED SOIL.

EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.

Source: Adapted from Installation of Straw and Fabric Filter
Barriers for Sediment Control, Sherwood and Wyant

CONSTRUCTION OF SILT FENCE

(WITH WIRE SUPPORT)

TAKEN FROM VADEQ 1992 MANUAL

CONSTRUCTION OF A SILT FENCE
(WITHOUT WIRE SUPPORT)

1. SET THE STAKES.

2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.

3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.

SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)

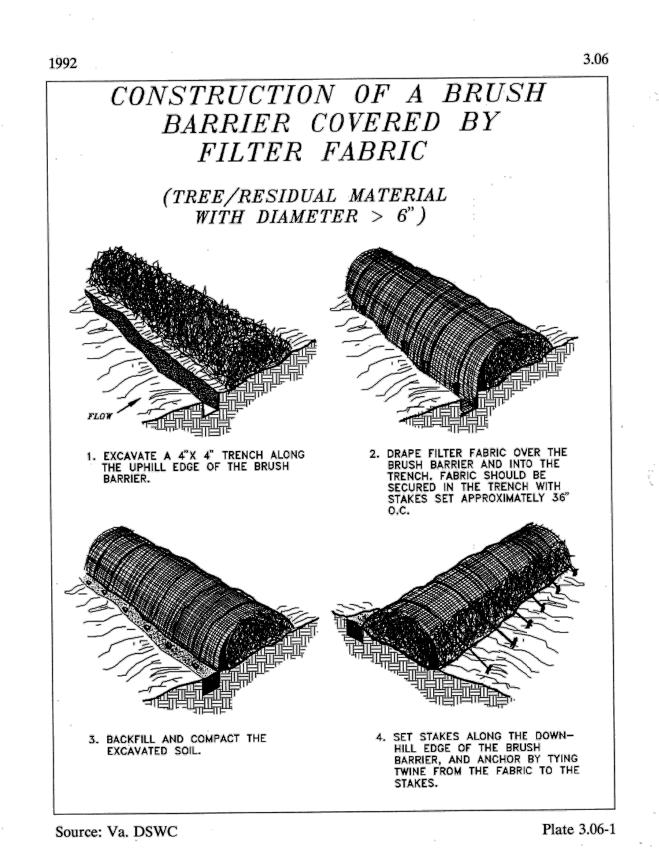
POINTS A SHOULD BE HIGHER THAN POINT B.

DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

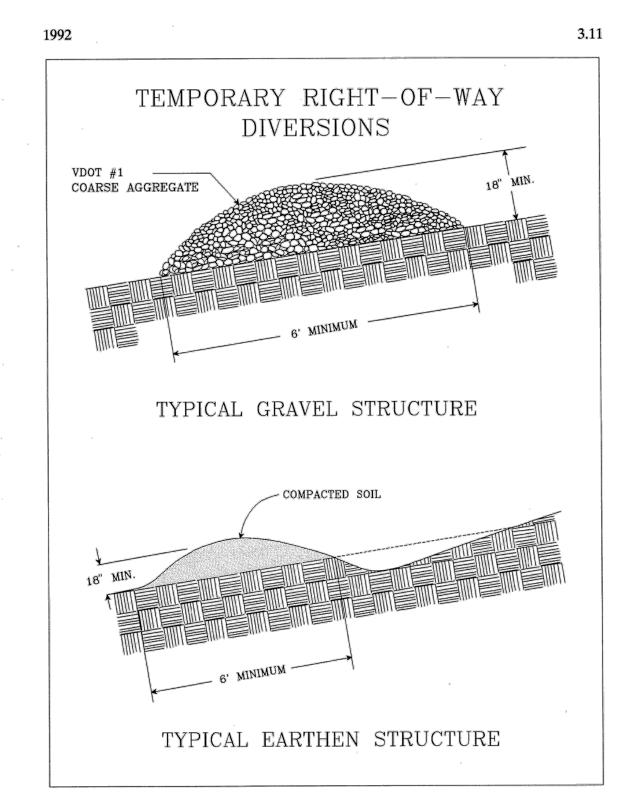
Source: Adapted from <u>Installation of Straw and Fabric Filter</u>

<u>Barriers for Sediment Control</u>, Sherwood and Wyant

CONSTRUCTION OF SILT FENCE
(WITHOUT WIRE SUPPORT)
TAKEN FROM VADEQ 1992 MANUAL



CONSTRUCTION OF A BRUSH BARRIER
TAKEN FROM VADEQ 1992 MANUAL



Source: Va. DSWC Plate 3.11-1

TEMPORARY RIGHT-OF-WAY DIVERSION

DEVELOPED FROM VADEQ 1992 MANUAL

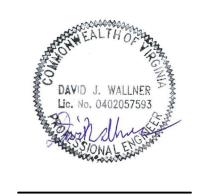
 VOIII E 200
 VOII E

EROSION AND SEDIMENT MOUNTAIN VALLEY PIPELINE P

TETRA TECH

661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220

NERAL DETAILS SET



DRAWN BY: KAL

CHECKED BY: HT

APPROVED BY: RE

DATE: 11/28/2017

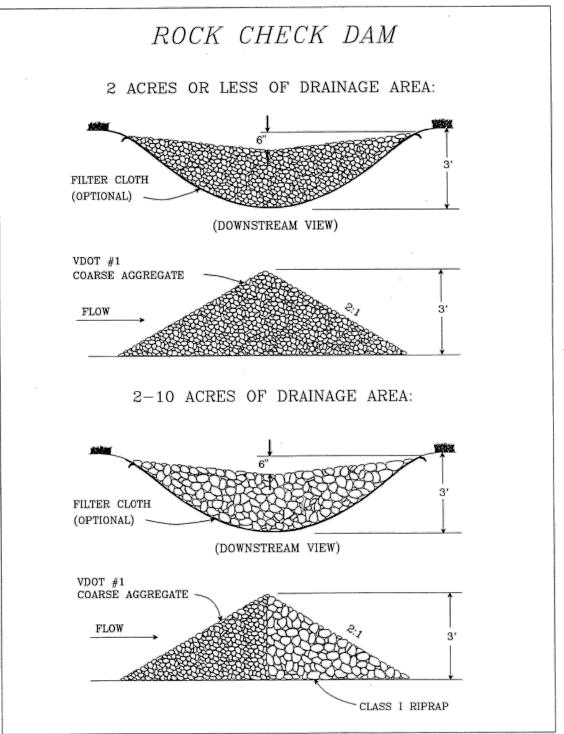
SCALE: AS SHOWN REVISION

SHT. NO. 0.01 OF 0.23

TAKEN FROM VADEQ 1992 MANUAL

Source: Va. DSWC PIPE OUTLET CONDITIONS

Plate 3.18-1

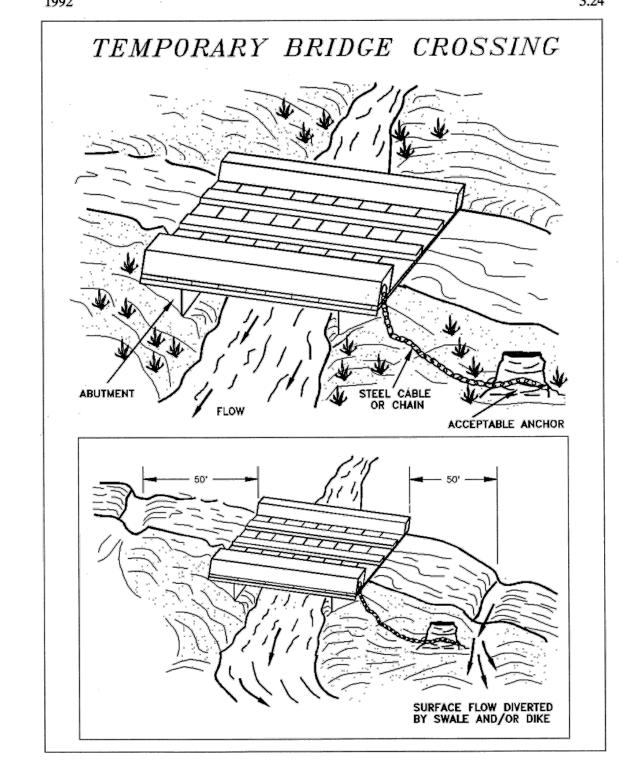


Source: Va. DSWC ROCK CHECK DAM DEVELOPED FROM VADEQ 1992 MANUAL Plate 3.20-1

NOTES:

NO FORMAL DESIGN IS REQUIRED FOR A CHECK DAM, HOWEVER THE FOLLOWING CRITERIA SHOULD BE ADHERED TO WHEN SPECIFYING CHECK DAMS:

- 1. THE DRAINAGE AREA OF THE DITCH OR SWALE BEING PROTECTED SHALL NOT EXCEED 2 ACRES WHEN VDOT #1 COARSE AGGREGATE IS USED ALONE AND SHALL NOT EXCEED 10 ACRES WHEN A COMBINATION OF CLASS I RIPRAP (ADDED FOR STABILITY) AND VDOT #1 COARSE AGGREGATE IS USED.
- 2. THE MAXIMUM HEIGHT OF THE DAM SHALL BE 3.0 FEET
- THE CENTER OF THE CHECK DAM MUST BE AT LEAST 6 INCHES LOWER THAN THE OUTER EDGES. FIELD EXPERIENCE HAS SHOWN THAT MANY DAMS ARE NOT CONSTRUCTED TO PROMOTE THIS "WEIR" EFFECT. STORMWATER FLOWS ARE THEN FORCED TO THE STONE-SOIL INTERFACE, THEREBY PROMOTING SCOUR AT THE POINT AND SUBSEQUENT FAILURE OF THE STRUCTURE TO PERFORM ITS INTENDED FUNCTION.
- 4. FOR ADDED STABILITY, THE BASE OF THE CHECK DAM CAN BE
- KEYED INTO THE SOIL APPROXIMATELY 6 INCHES. THE MAXIMUM SPACING BETWEEN THE DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM DAM.
- HAND OR MECHANICAL PLACEMENT WILL BE NECESSARY TO ACHIEVE COMPLETE COVERAGE OF THE DITCH OR SWALE AND TO INSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES.
- FILTER CLOTH MAY BE USED UNDER THE STONE TO PROVIDE A STABLE FOUNDATION AND TO FACILITATE THE REMOVAL OF THE STONE.



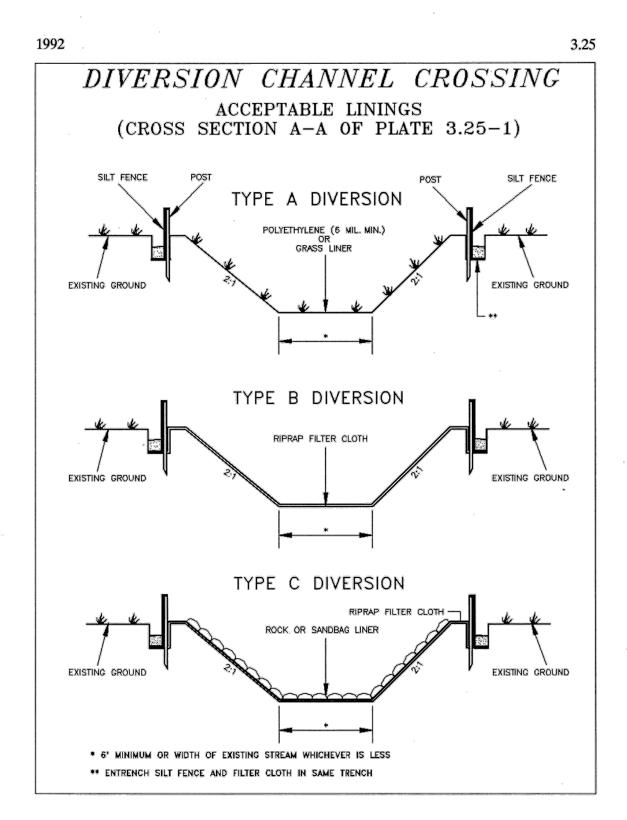
Source: 1983 Maryland Standards and Specifications for Soil Erosion and Sediment Control

Plate 3.24-1

TEMPORARY BRIDGE CROSSING DEVELOPED FROM VADEQ 1992 MANUAL

TEMPORARY CULVERT CROSSING CAPACITY OF PIPE CULVERTS TOGETHER = FLOW VDOT #1 COARSE AGGREGATE 6" DEEP 1/2 DIAMETER OF PIPE OR 12' WHICHEVER IS GREATER **ELEVATION** DIVERSION AND/ / DIVERSION AND/ PLAN VIEW

Source: Va. DSWC Plate 3.24-2 TEMPORARY CULVERT CROSSING TAKEN FROM VADEQ 1992 MANUAL



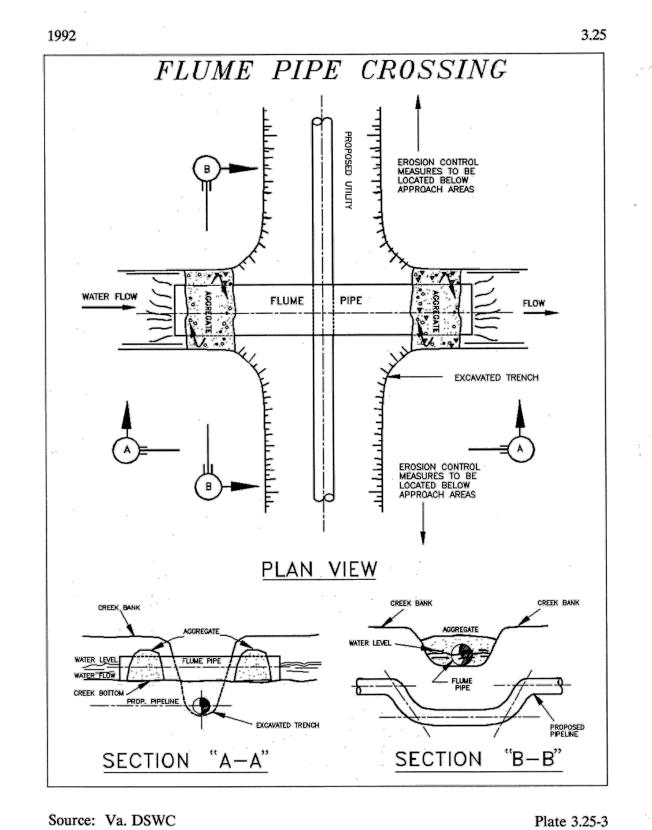
Source: Adapted from VDOT Standard Sheets Plate 3.25-2 DIVERSION CHANNEL CROSSING

DEVELOPED FROM VADEQ 1992 MANUAL

1992 DIVERSION CHANNEL CROSSING & SPEC, 3.24
(TO BE LOCATED AT
ORIGINAL STREAMBED
FOR INITIAL CROSSINGS) FLOW BARRIER APPROACHING TRENCHING OPERATION PERSPECTIVE VIEW

Source: Va. DSWC

Plate 3.25-1 DIVERSION CHANNEL CROSSING DEVELOPED FROM VADEQ 1992 MANUAL



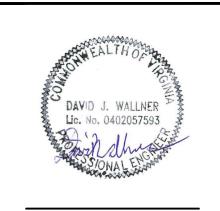
FLUME PIPE CROSSING DEVELOPED FROM VADEQ 1992 MANUAL

	7	7 01/31/18	KAL	RE	MQ	ADDED DETAILS FOR ROADS AND PADS
	9	01/26/18	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
OL PLANS	2	01/08/18	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
T UROO LINE	4	11/28/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
1 1000 LINE	3	11/01/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
	2	08/18/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
	NO.:	DATE:	DWN.:	DWN.: CHKD.: APPD.:	APPD.:	DESCRIPTION:
FE, LLC TE 200					兄	REVISIONS:

EROSION AND MOUNTAIN VALLEY

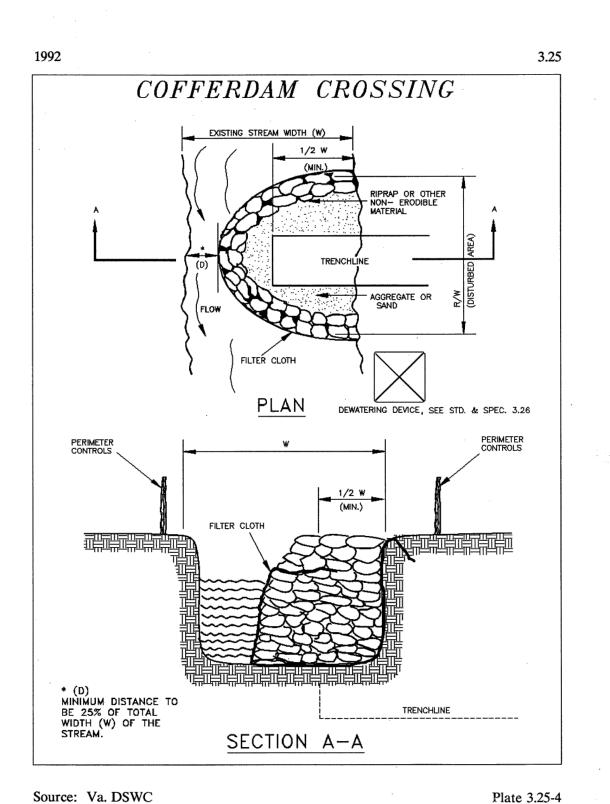
TETRA TECH

complex world | CLEAR SOLUTIONS™ 661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220



DRAWN BY: CHECKED BY: APPROVED BY: 11/28/2017 AS SHOWN

SHT. NO. 0.02 OF 0.23



COFFERDAM STREAM CROSSING

TAKEN FROM VADEQ 1992 MANUAL

3.26 STRAW BALE/SILT FENCE PIT CROSS-SECTION A-A CROSS-SECTION B-B

Source: Va. DSWC Plate 3.26-3 STRAW BALE/SILT FENCE PIT DEVELOPED FROM VADEQ 1992 MANUAL

FILL SLOPE TREATMENT DOZER TREADS CREATE — GROOVES PERPENDICULAR TO THE SLOPE.

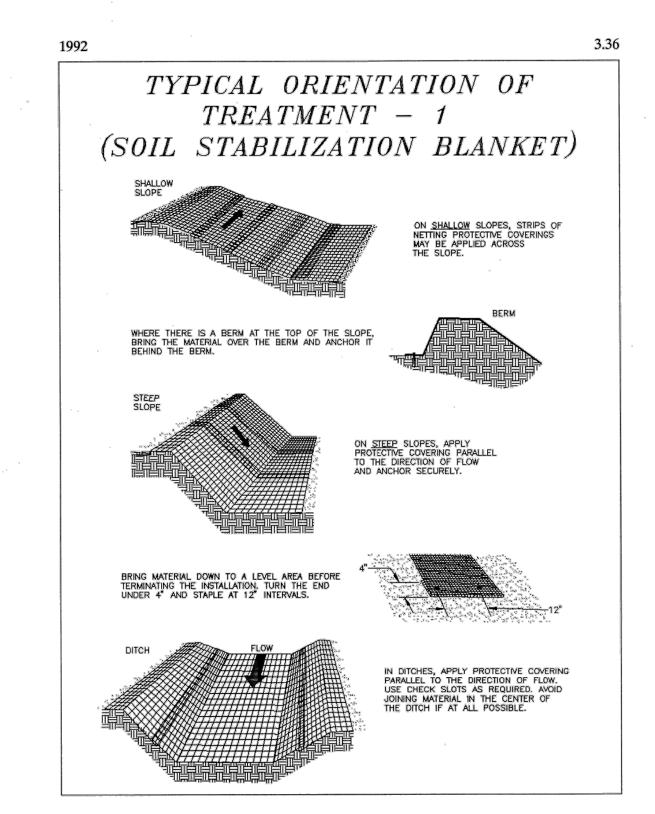
Source: Michigan Soil Erosion and Sedimentation Guide

TRACKING

FILL SLOPE TREATMENT & TRACKING TAKEN FROM VADEQ 1992 MANUAL

Plate 3.29-3

Plate 3.29-4



Source: Adapted from Ludlow Products Brochure

Plate 3.36-1

TYPICAL ORIENTATION OF TREATMENT SOIL STABILIZATION BLANKET DEVELOPED FROM VADEQ 1992 MANUAL

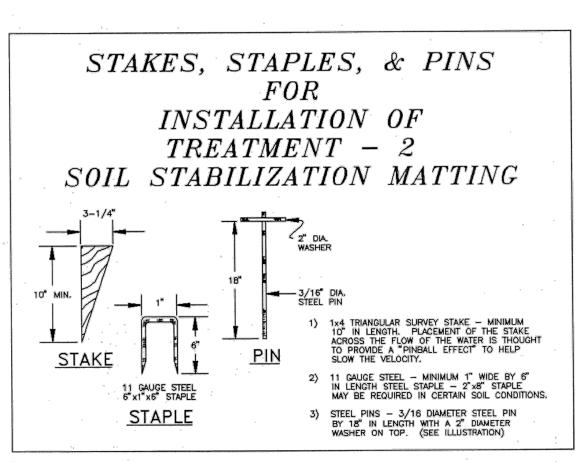
TYPICAL TREATMENT - 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA NOTES

APPROXIMATELY 200 STAPLES REQUIRED PER 100 SQ. YDS. OF MATERIAL ROLL. ANCHOR SLOTS, JUNCTION SLOTS & CHECK SLOTS TO BE BURIED 6" TO 12". 12" MAX. 4:1 OR FLATTER (JUTE MESH WILL HAVE STAPLED LAP JOINT IN LIEU OF EDGE JOINT) - LAP JOINT 2" MIN. (JUTE MESH ONLY) 5' MAX. 4:1 OR FLATTER PLAN VIEW STAPLING DIAGRAM

Source: VDOT Road and Bridge Standards

Plate 3.36-2

SOIL STABILIZATION BLANKET INSTALLATION CRITERIA DEVELOPED FROM VADEQ 1992 MANUAL



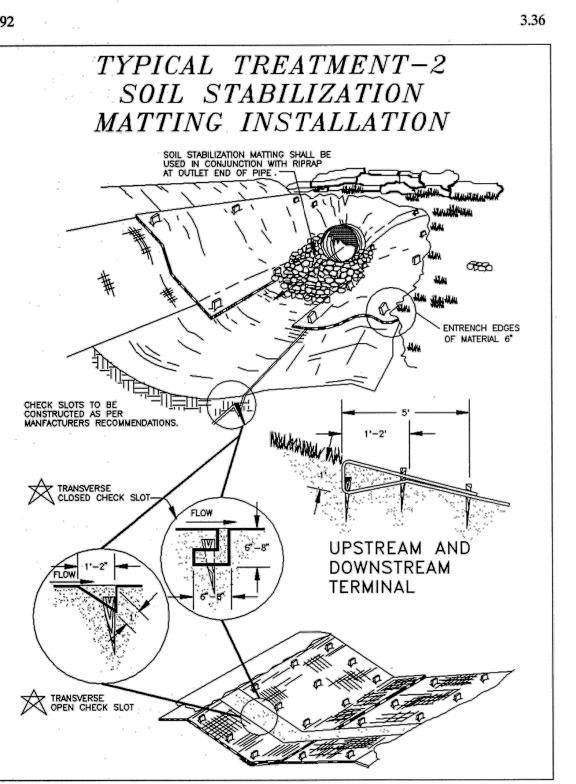
Source: Product literature from Greenstreak, Inc.

Installation Requirements

Plate 3.36-3

<u>Site Preparation</u> - After site has been shaped and graded to approved design, prepare a friable seedbed relatively free from clods and rocks more than 1 inch in diameter, and any foreign material that will prevent contact of the soil stabilization mat with the soil surface. If necessary, redirect any runoff away from the ditch or slope during installation.

STAKES, STAPLES, & PINS FOR INSTALLATION OF SOIL STABILIZATION MATTING DEVELOPED FROM VADEQ 1992 MANUAL



Source: VDOT Road and Bridge Standards

TYPICAL TREATMENT SOIL STABILIZATION MATTING INSTALLATION DEVELOPED FROM VADEQ 1992 MANUAL

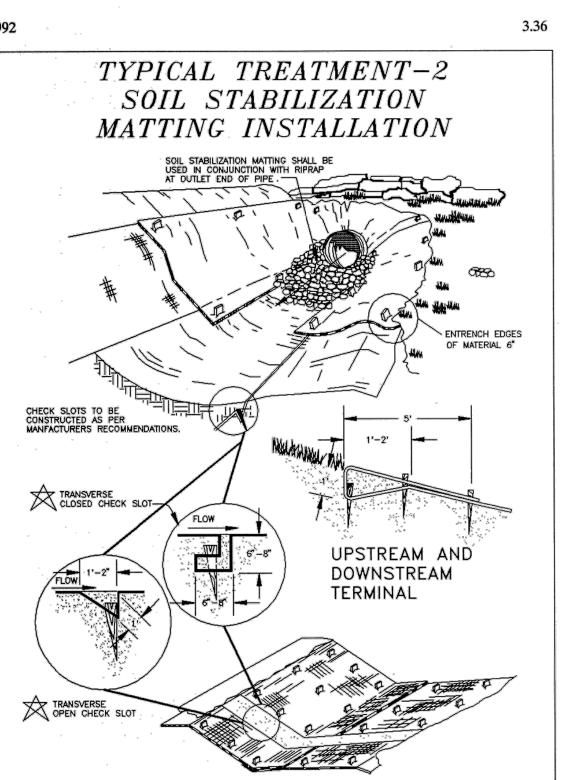
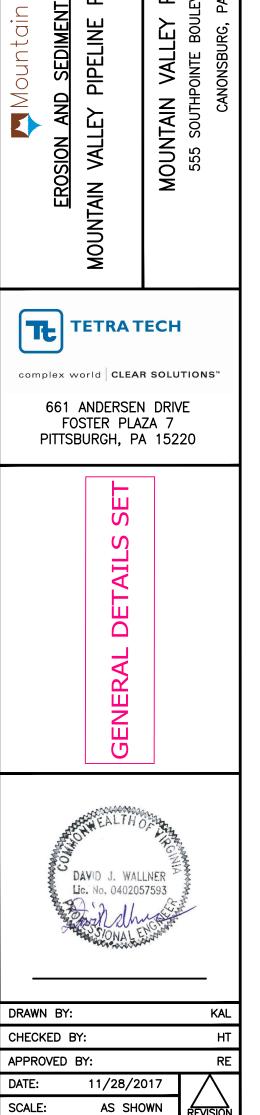
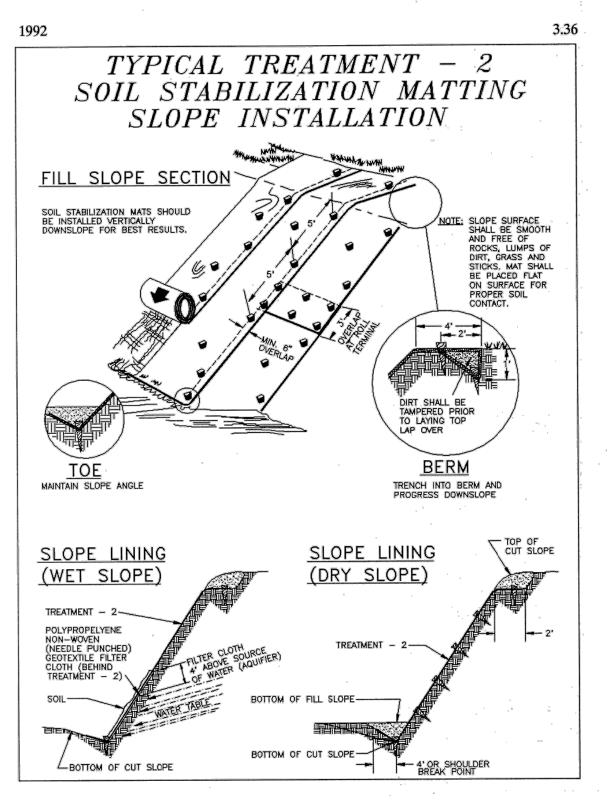


Plate 3.36-4



SHT. NO. 0.03 OF 0.23

TETRA TECH CAD FILE PATH: X:\CADD_Pittsburgh\EQT\7157 - MVP\00 - General\E&S\Spread 8\7157ES003.dwg PLOTTED ON: 2/16/2018 9:32 AM PLOTTED BY: Rickabough, Greg PLOT FILE: ENVIRONMENTAL_COLOR.ctb

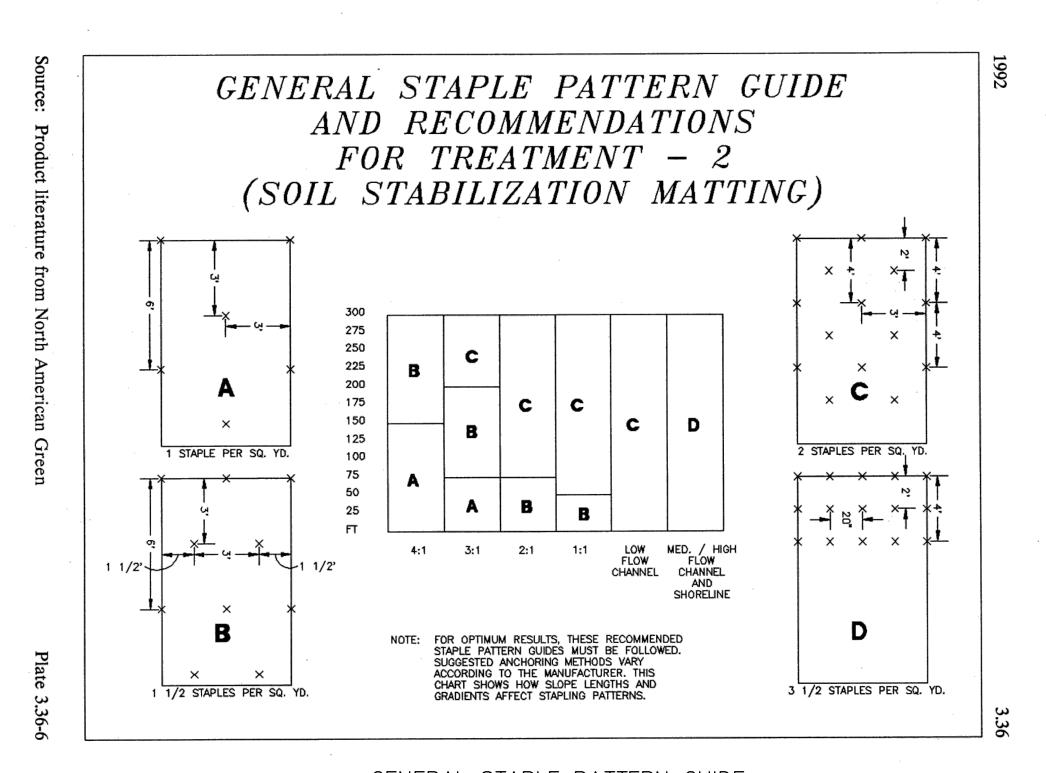


Source: VDOT Road and Bridge Standards

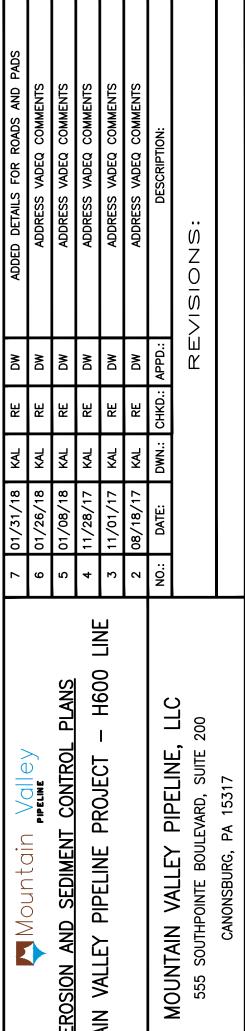
Plate 3.36-5

SOIL STABILIZATION MATTING SLOPE

NOTE:
FOR LANDS ON THE JEFFERSON NATIONAL FOREST, 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 ACCEPTED 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)



GENERAL STAPLE PATTERN GUIDE
& RECOMMENDATIONS FOR TREATMENT
DEVELOPED FROM VADEQ 1992 MANUAL





661 ANDERSEN DRIVE FOSTER PLAZA 7

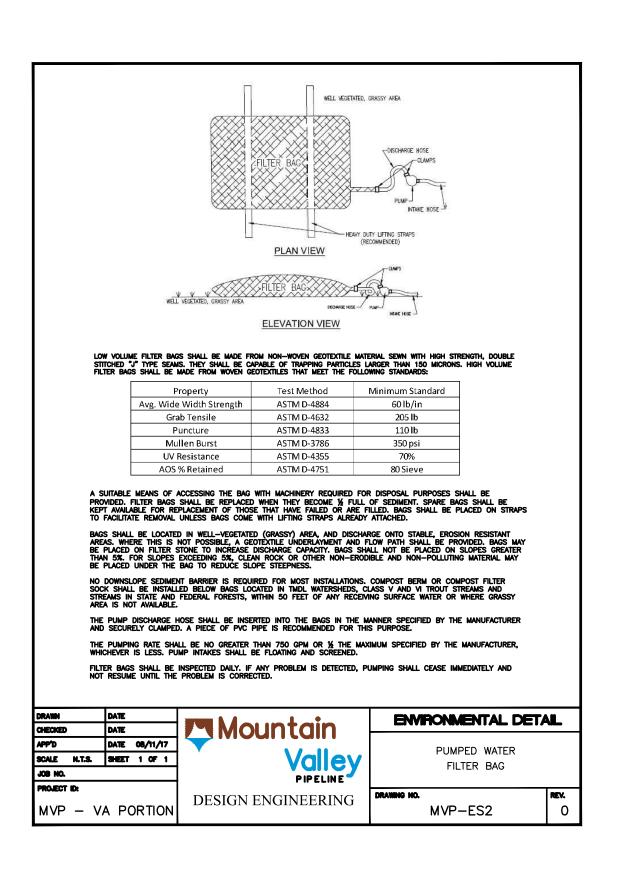
complex world | CLEAR SOLUTIONS™

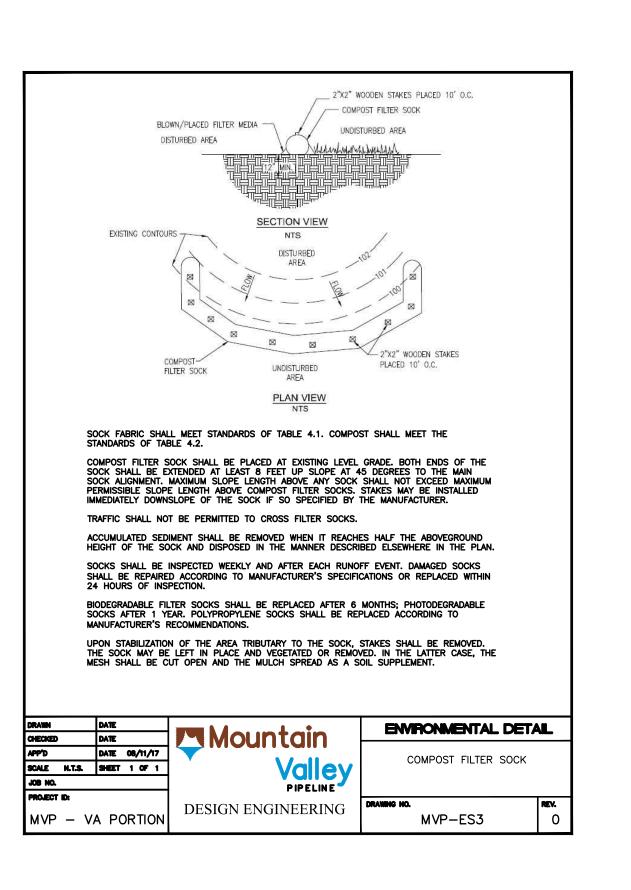
FOSTER PLAZA 7
PITTSBURGH, PA 15220

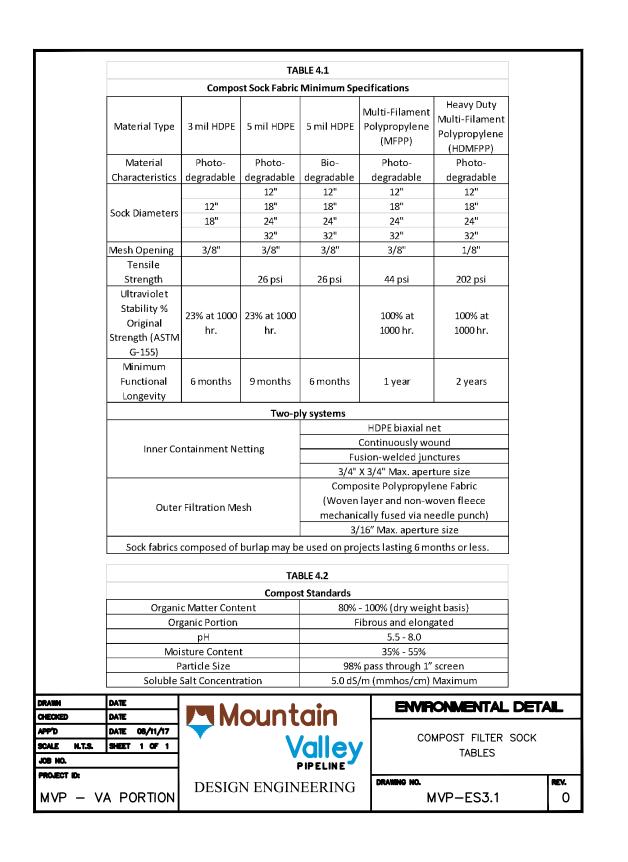


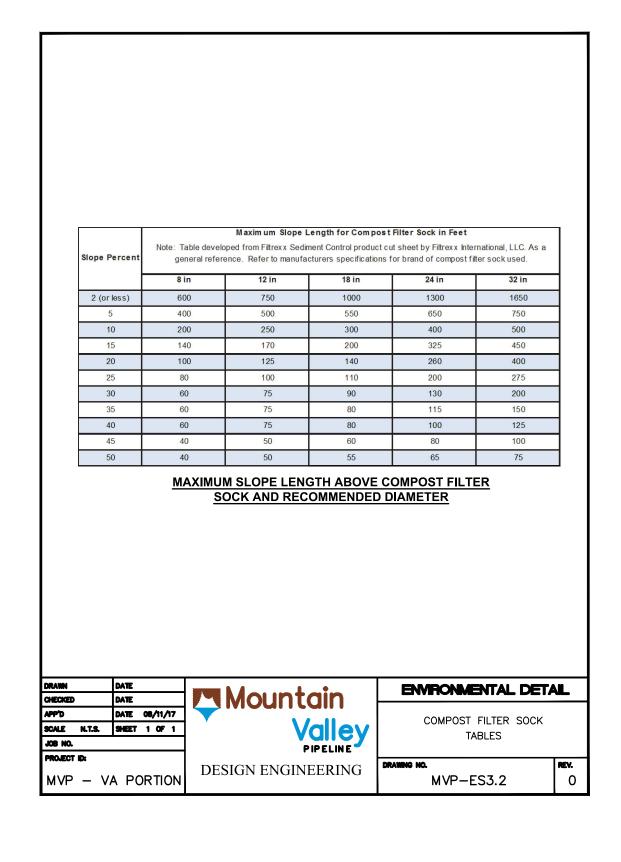


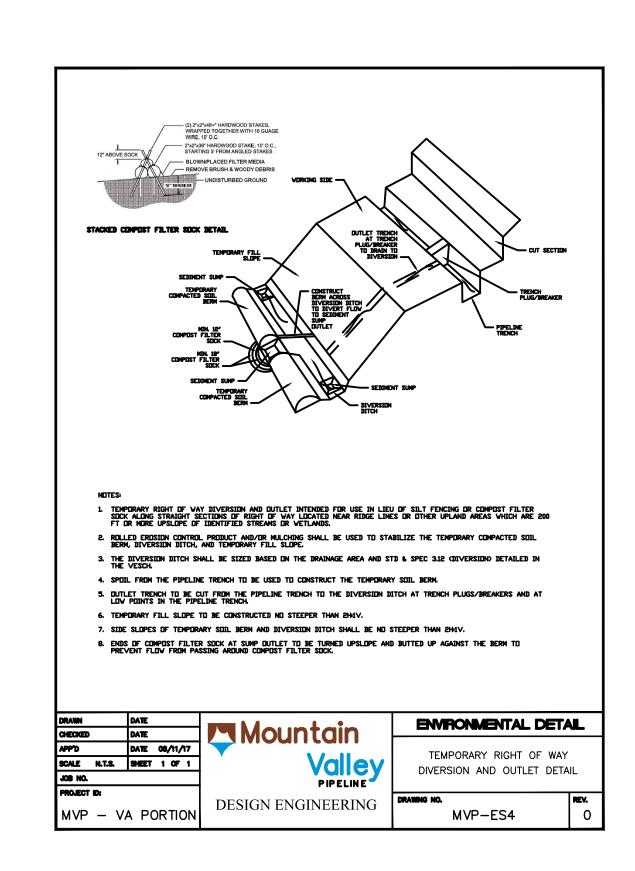
DRAWN BY:			KAL
CHECKED BY	' :		НТ
APPROVED B	Y:		RE
DATE:	11/28/2	017	
SCALE:	AS SHO	OWN	REVISION
SHT. NO.	0.04	OF	0.23

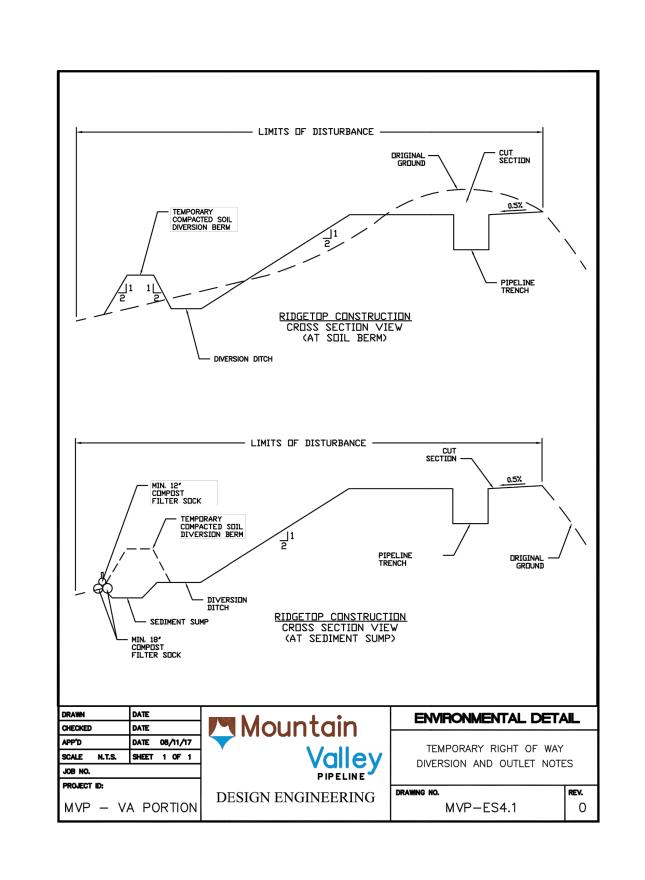


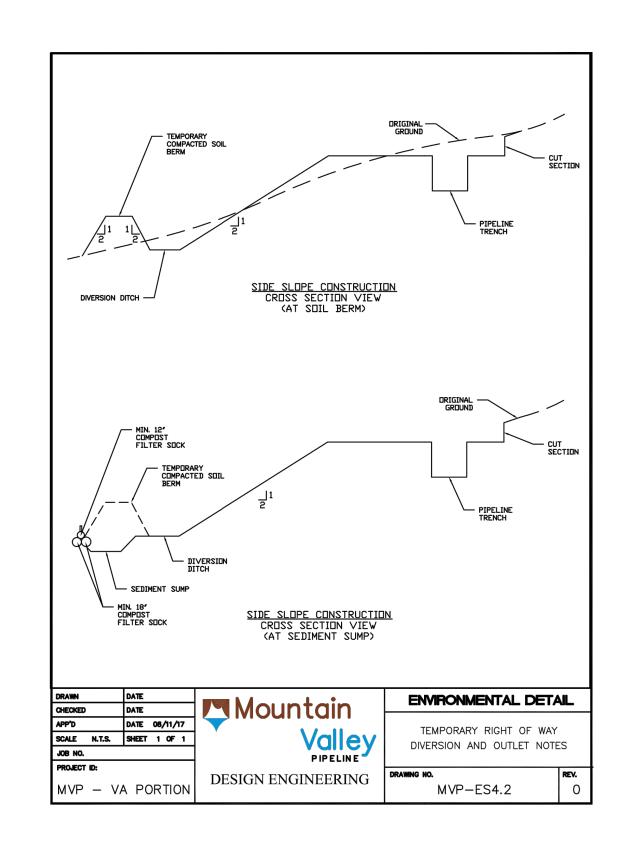


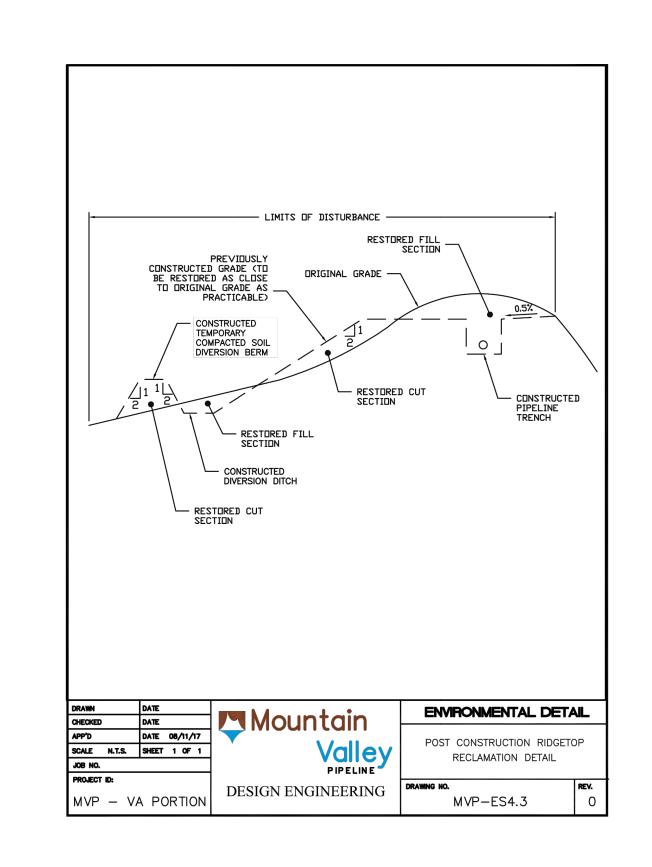


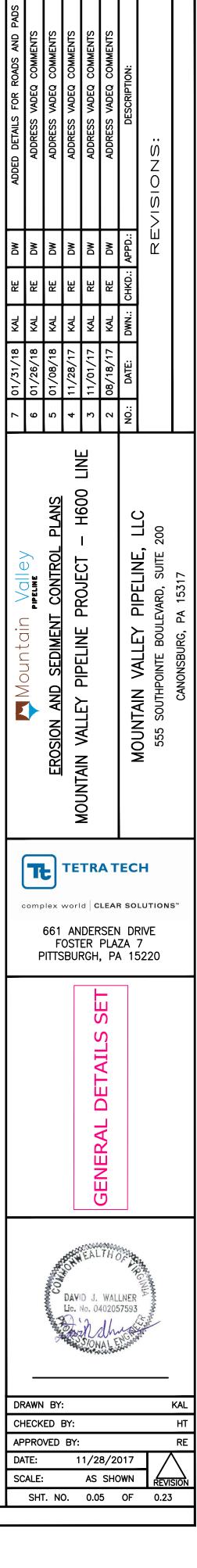


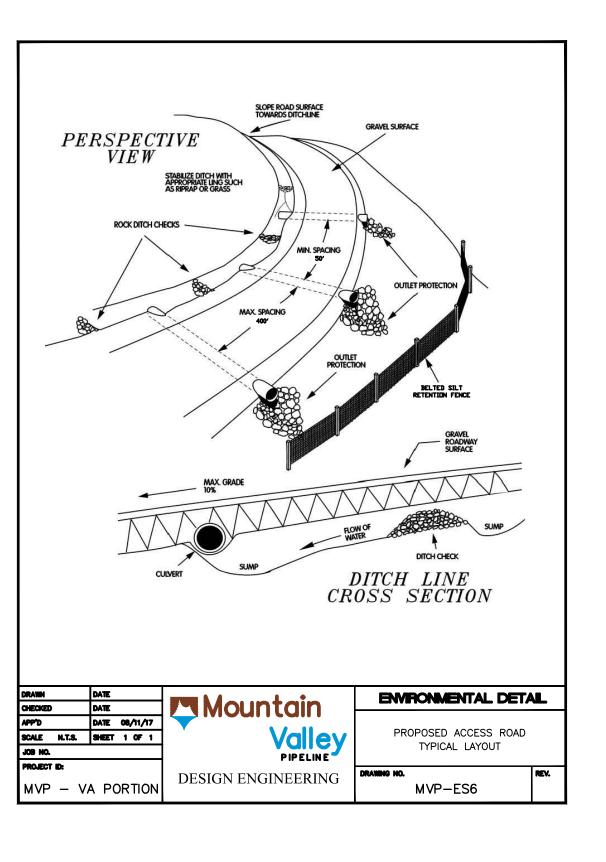


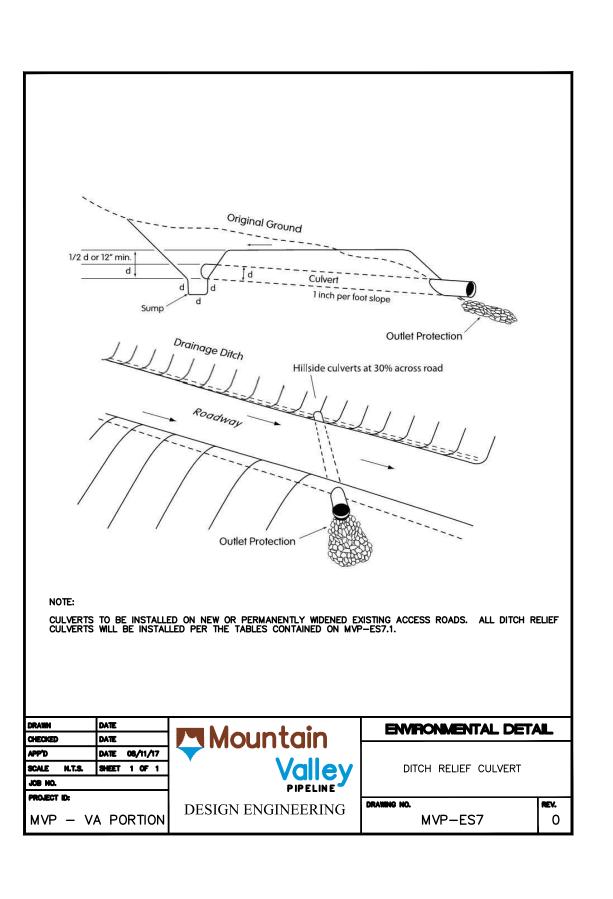


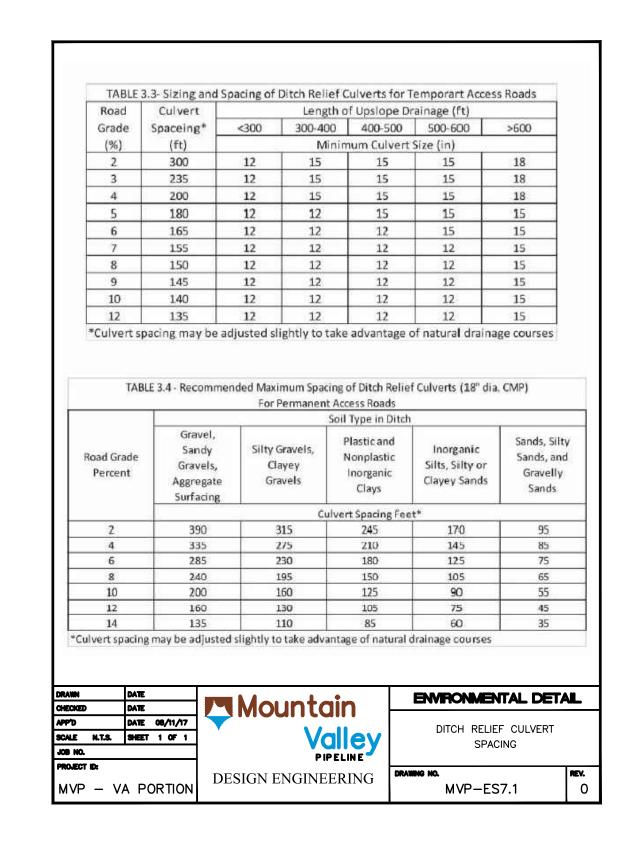


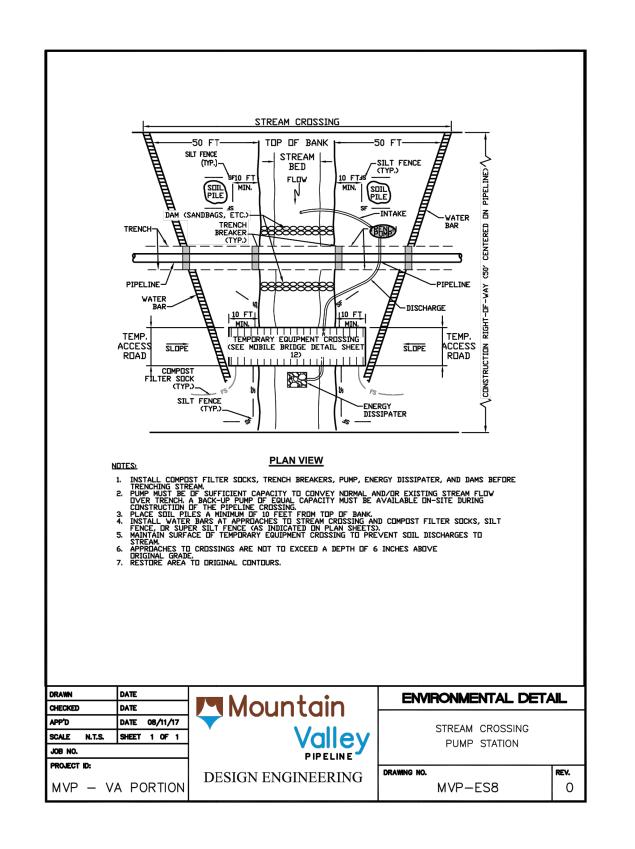


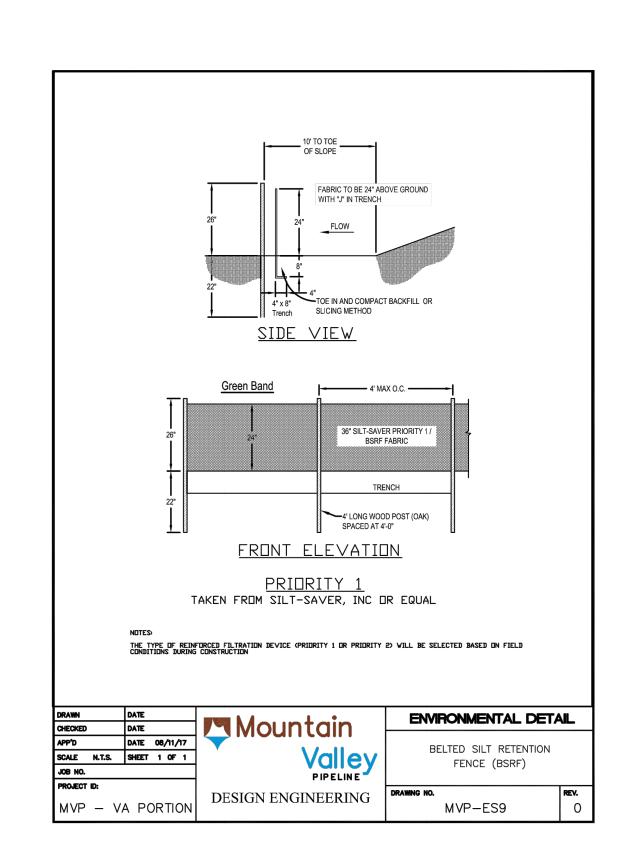


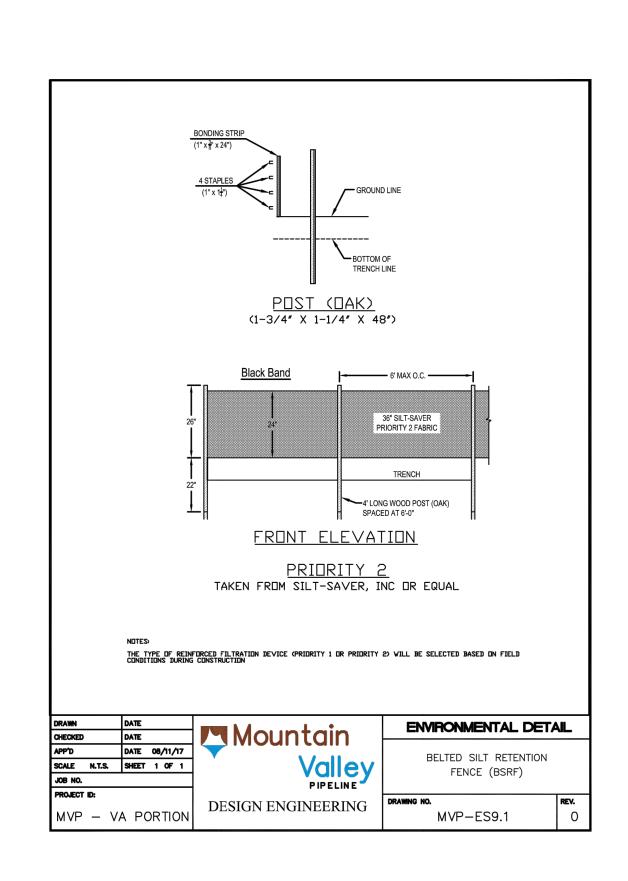


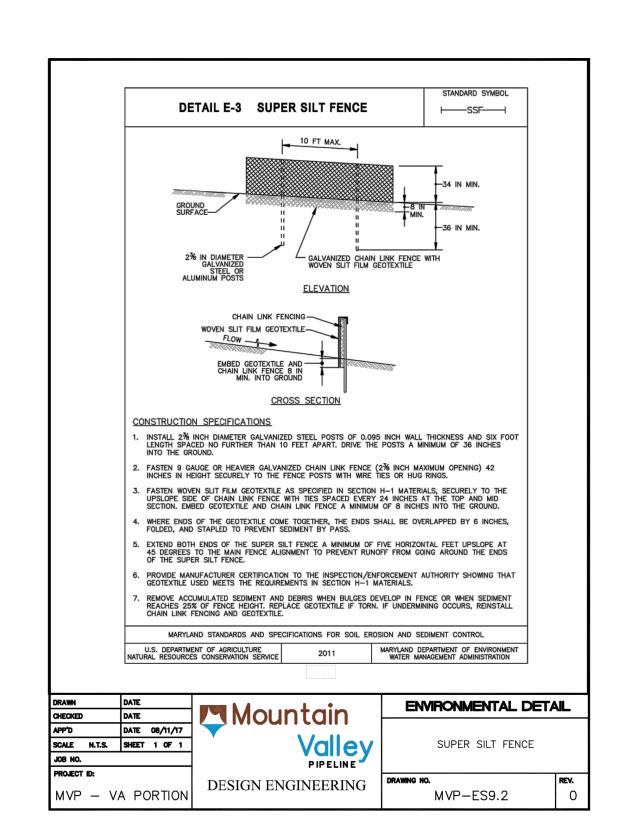


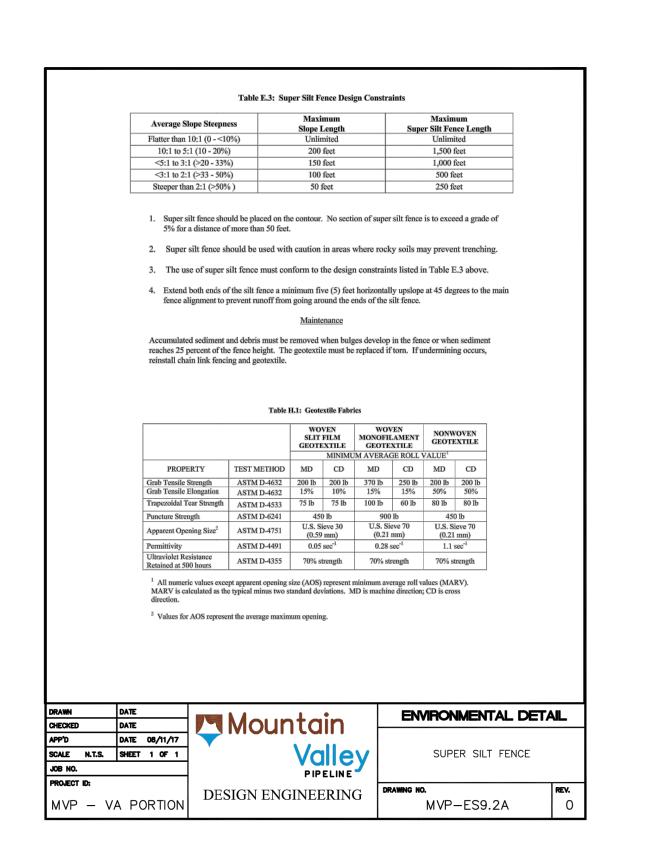






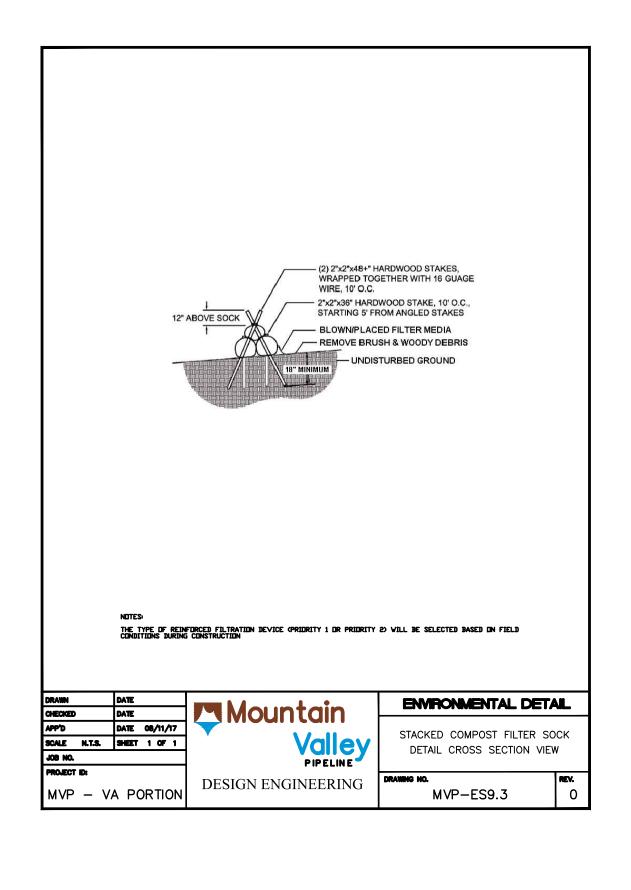


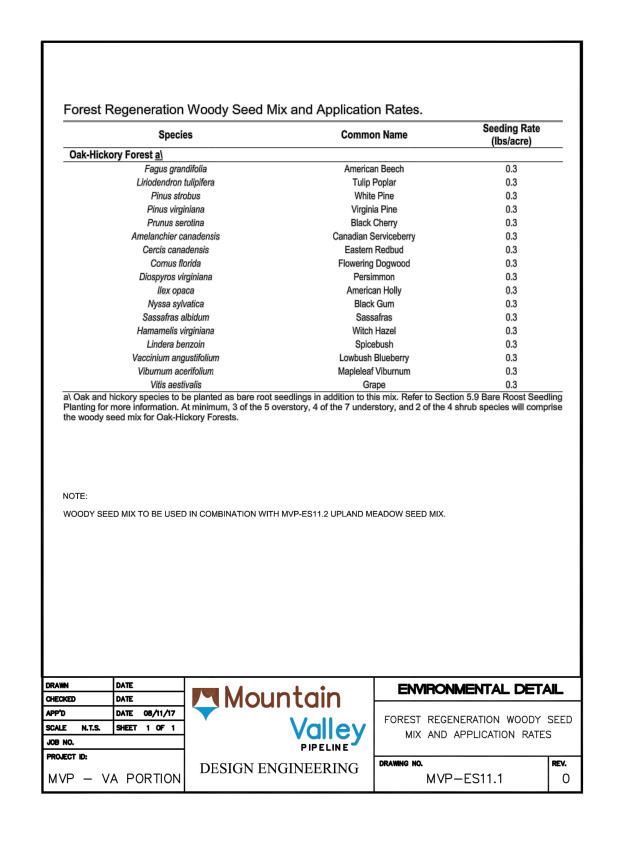


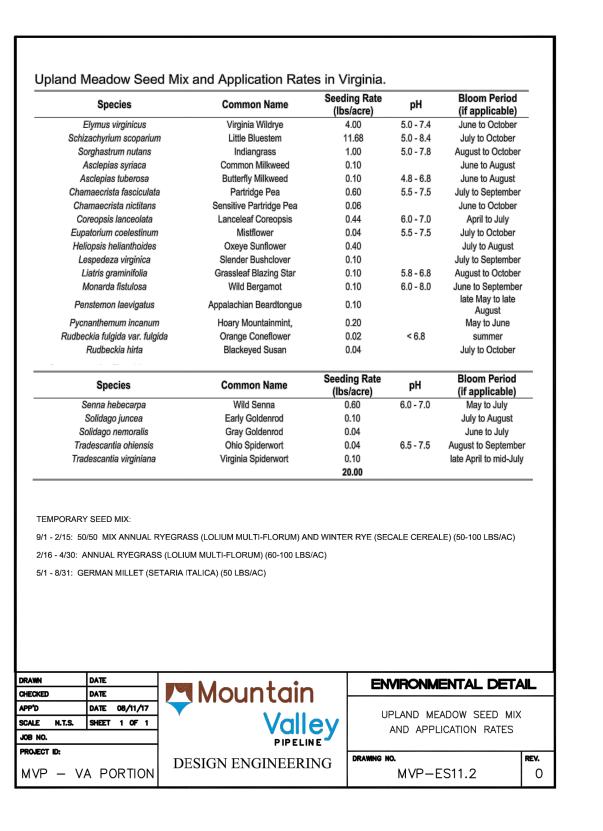


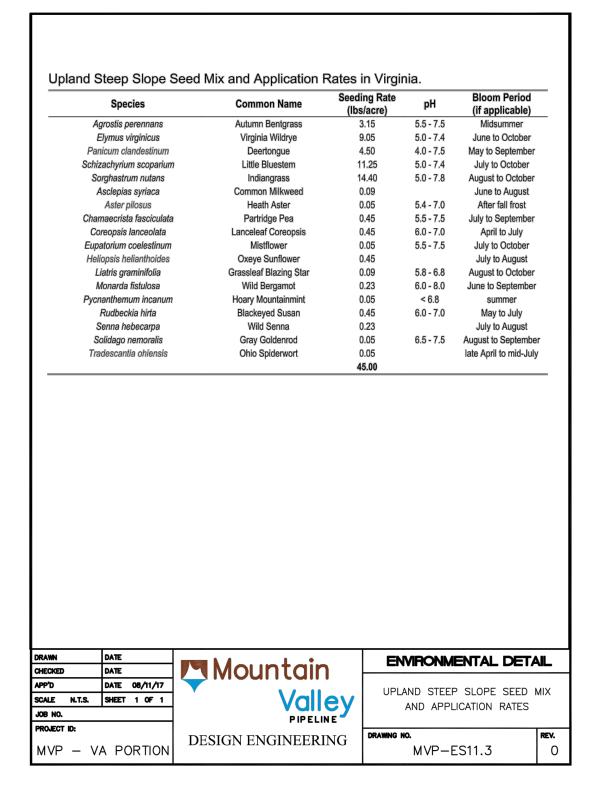


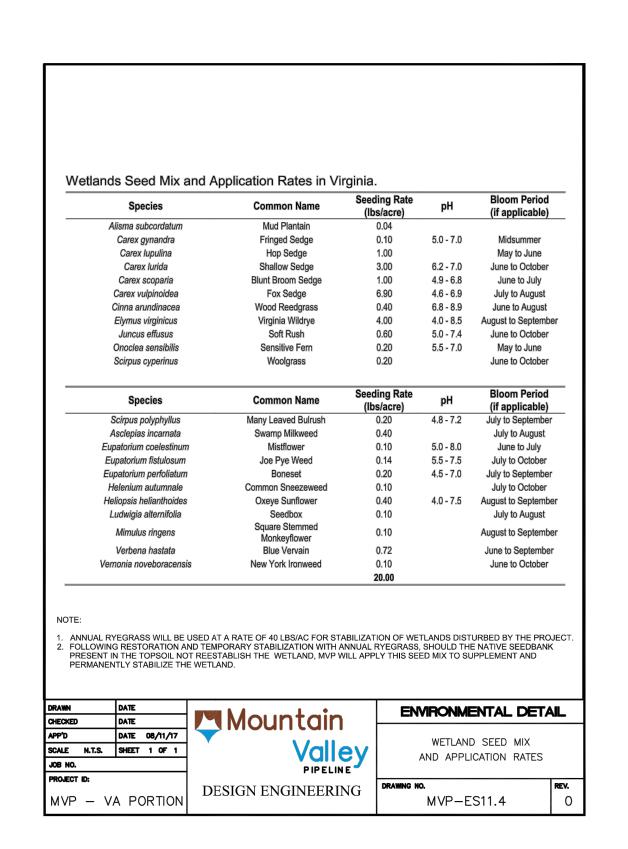
SHT. NO. 0.06 OF 0.23

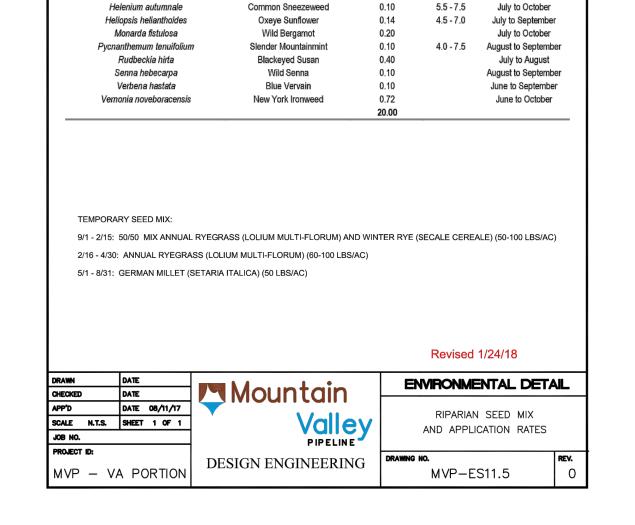












Bloom Period

(if applicable)

May to June

June to October

June to July

July to August

June to August

August to September

June to October

May to June

June to October

July to September

July to August

June to July

5.0 - 7.0

6.2 - 7.0

4.9 - 6.8

6.8 - 8.9

4.0 - 8.5

5.0 - 7.4

5.5 - 7.0

4.8 - 7.2

5.0 - 8.0

4.6 - 6.9

1.00

3.00

6.90

0.40

4.00

0.60

0.20

0.40

Riparian Seed Mix and Application Rates in Virginia

Big Bluestem

Virginia Wildrye

Soft Rush

Deertongue

Indiangrass

Swamp Milkweed

Partridge Pea

Mistflower

White Avens

Joe Pye Weed

Andropogon gerard

Elymus virginicus

Juncus effusus

Juncus tenuis

Panicum clandestinum

Sorghastrum nutans

Chamaecrista fasciculata

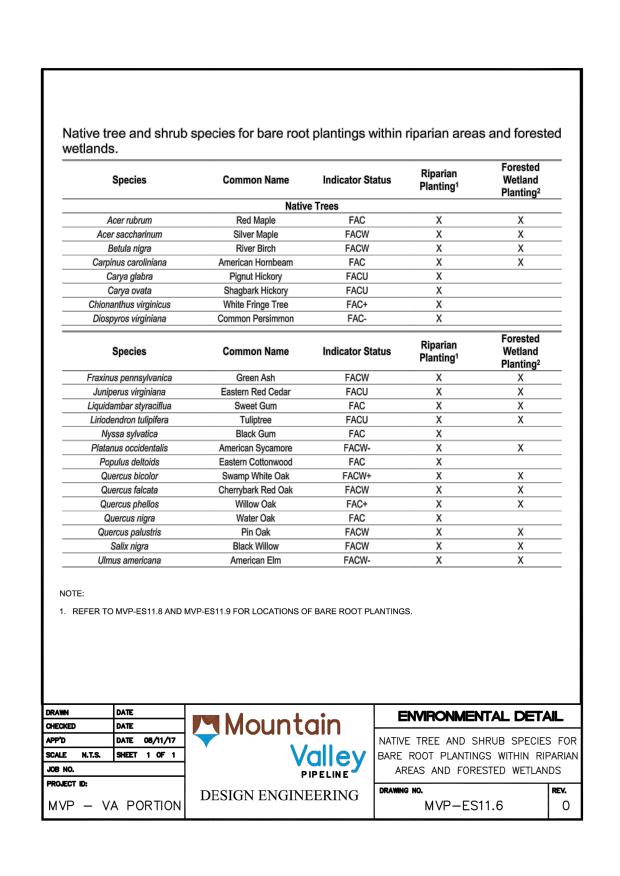
Eupatorium coelestinum

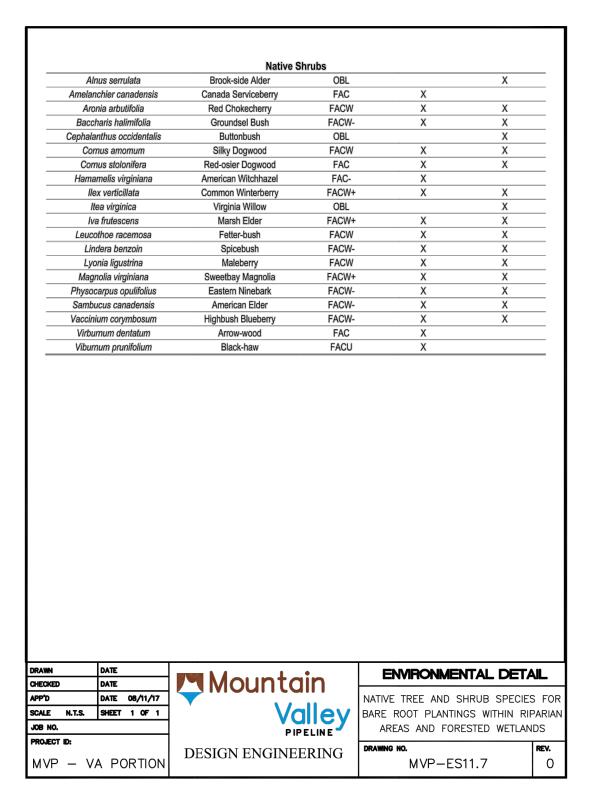
Eupatorium fistulosum

Eupatorium perfoliatum

Geum canadense

Asclepias incarnata







PLANS - H600

PROJECT

VALLEY

TE TETRATECH

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE

FOSTER PLAZA 7

PITTSBURGH, PA 15220

DAVID J. WALLNER Lic. No. 0402057593

11/28/2017

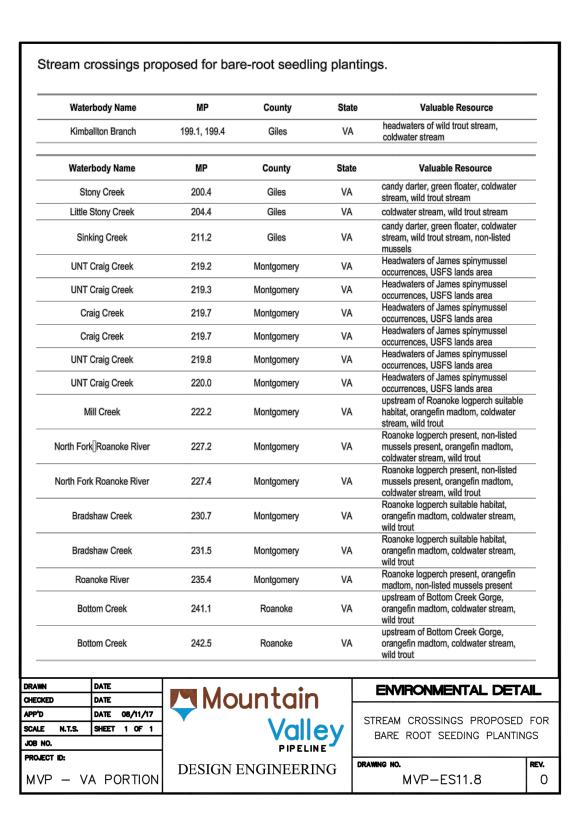
AS SHOWN SHT. NO. 0.07 OF 0.23

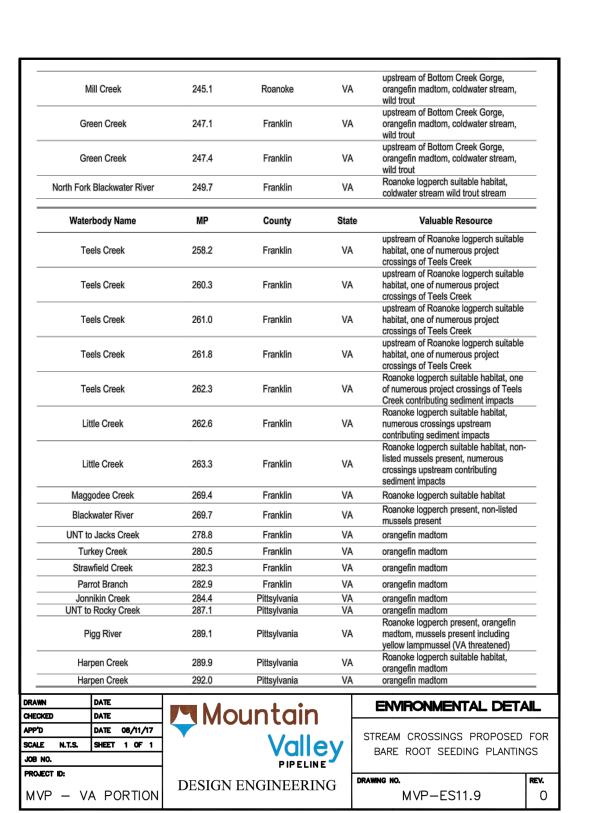
APPROVED BY:

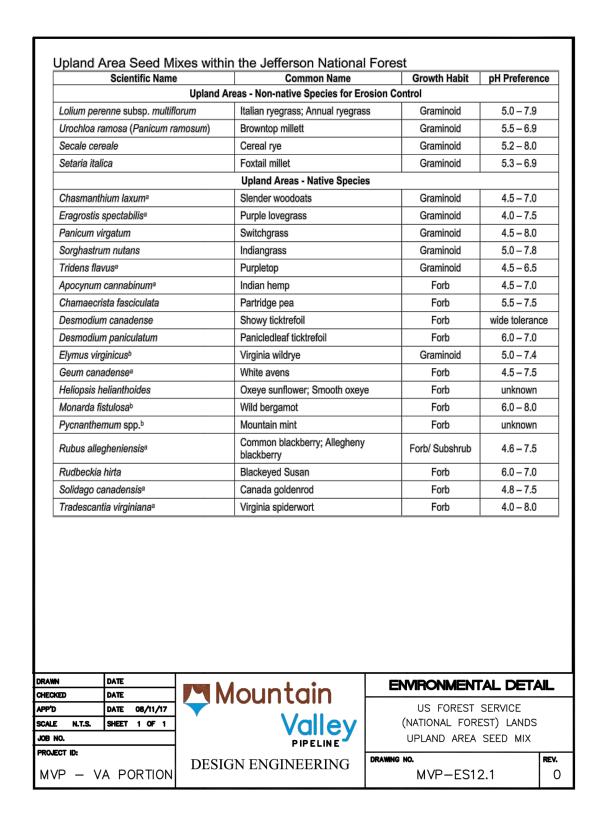
DATE:

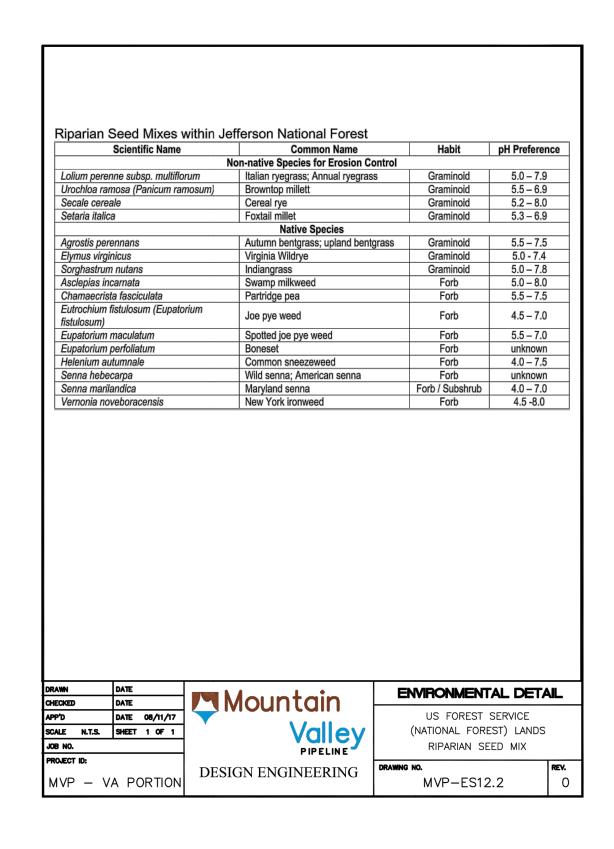
SCALE:

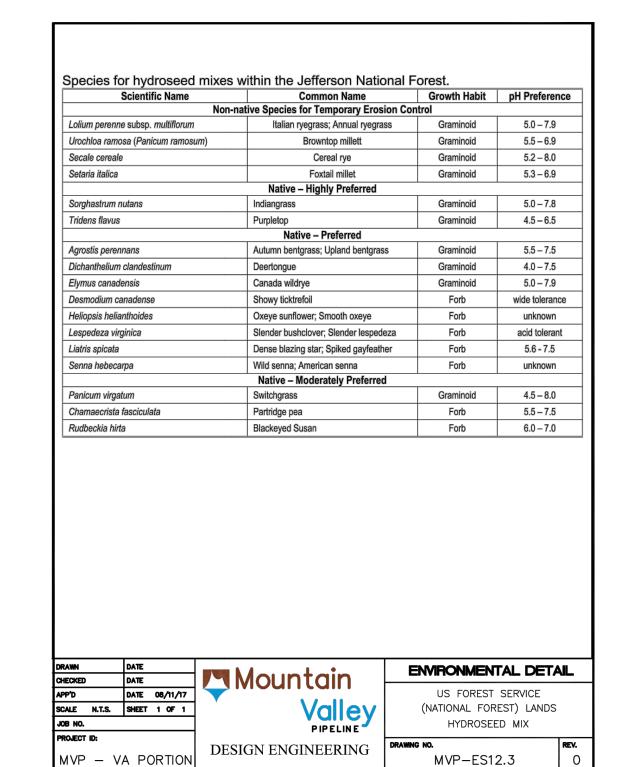
PIPELINE, EVARD, SUITE

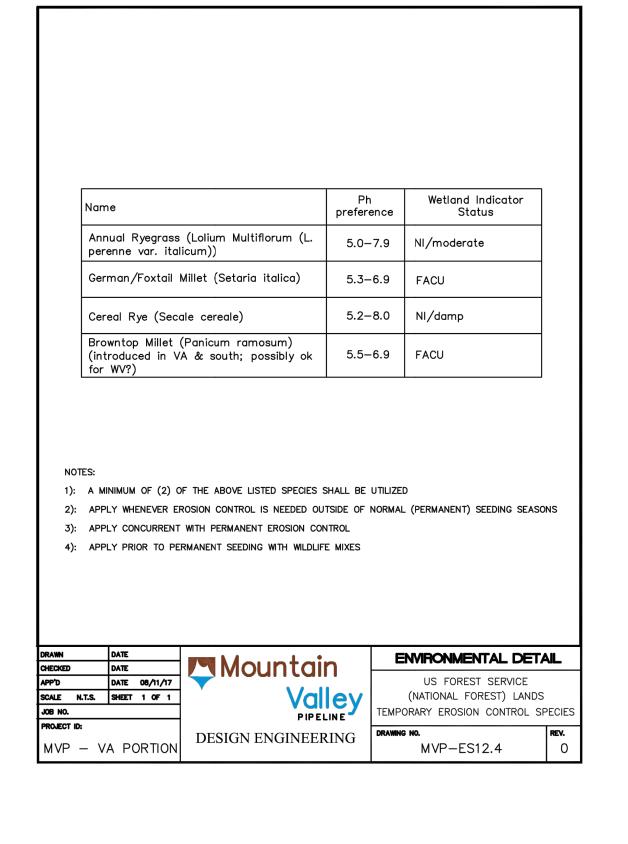


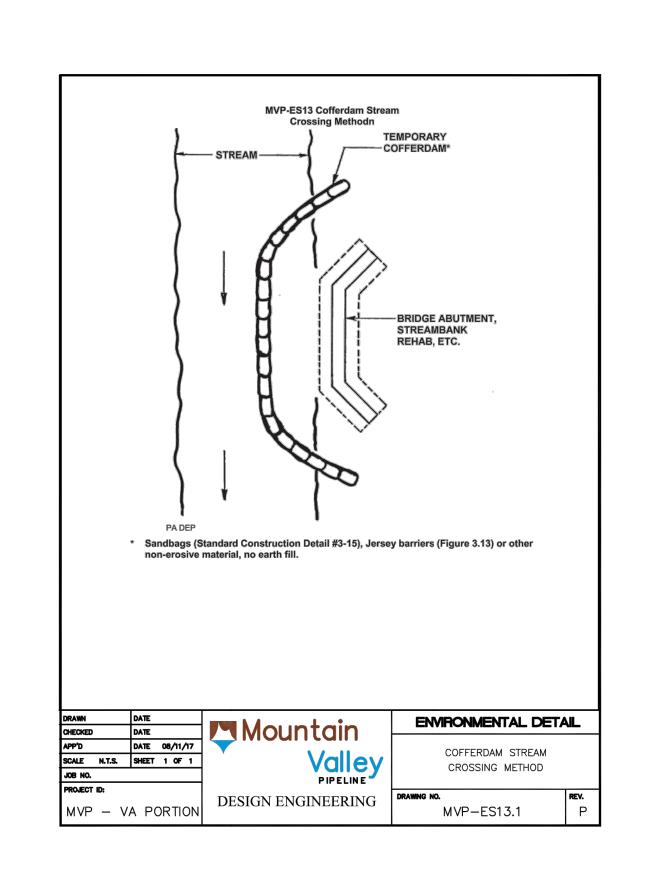


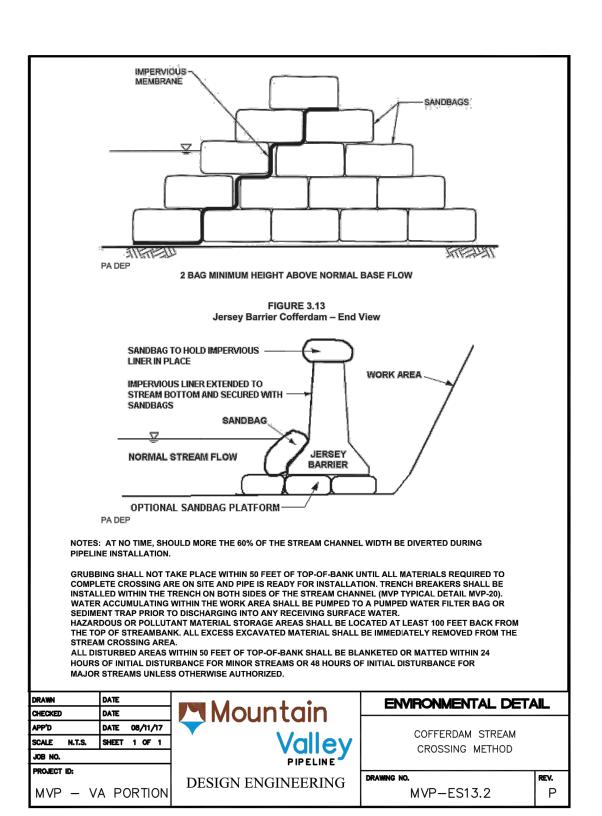














DATE:

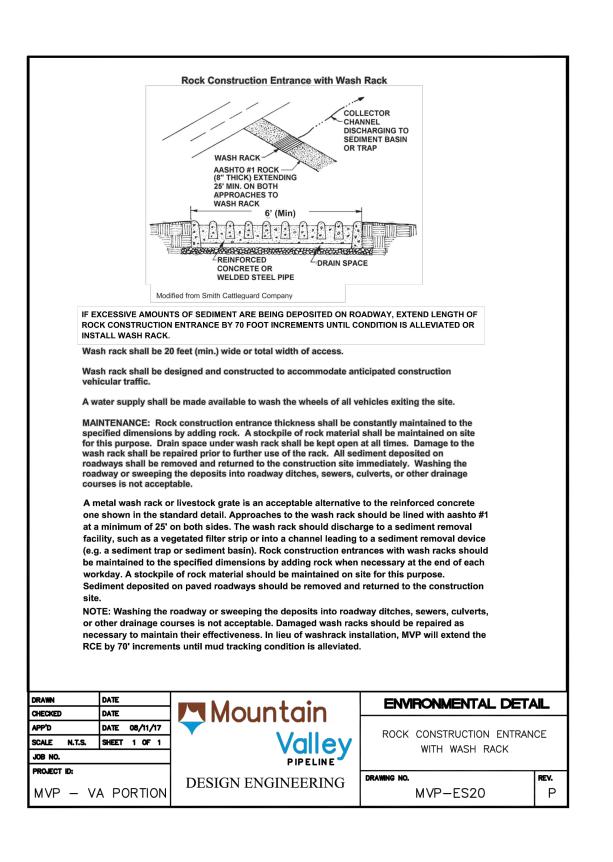
SCALE:

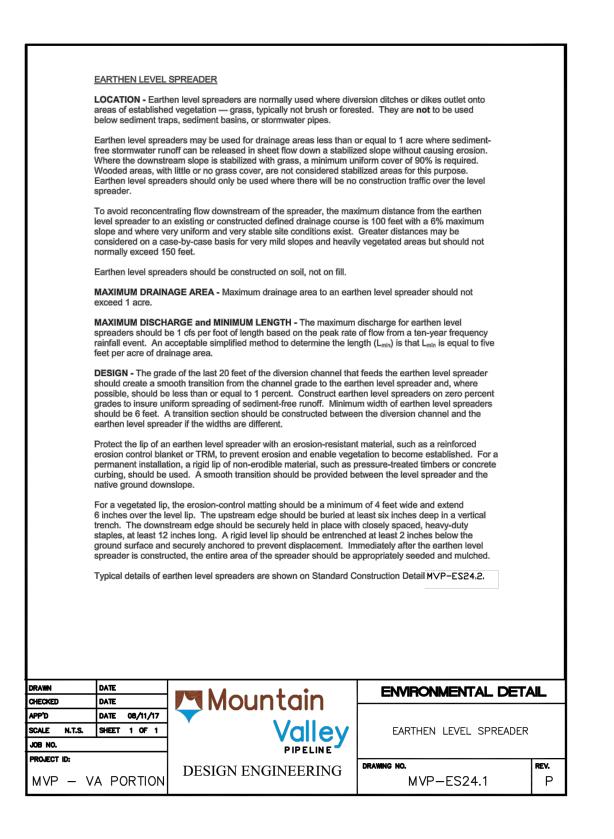
11/28/2017

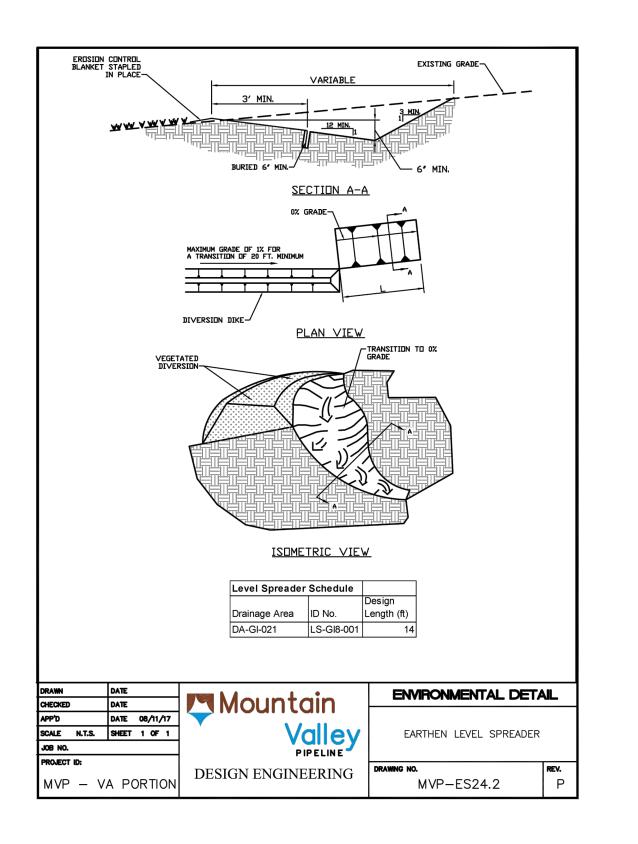
AS SHOWN SHT. NO. 0.08 OF 0.23

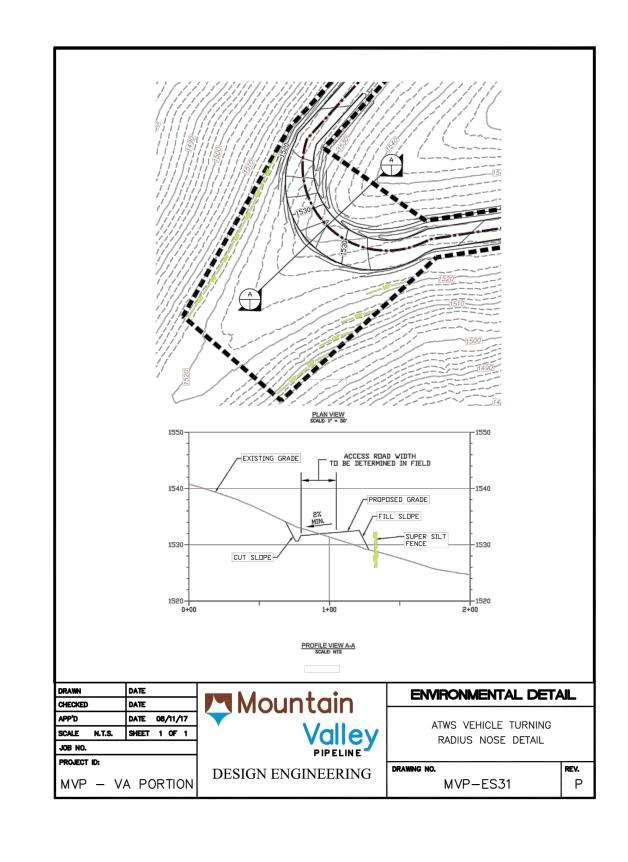
PIPELINE, EVARD, SUITE

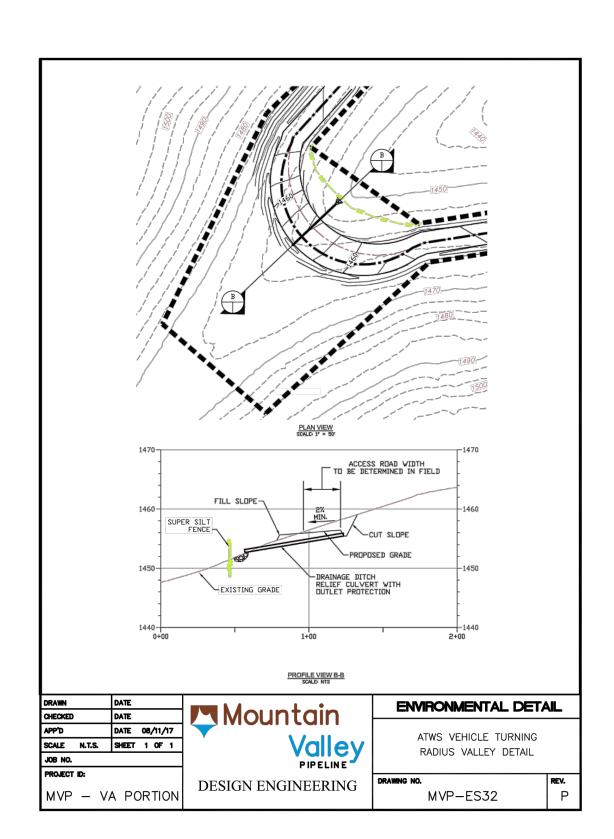
VALLEY
OINTE BOUL

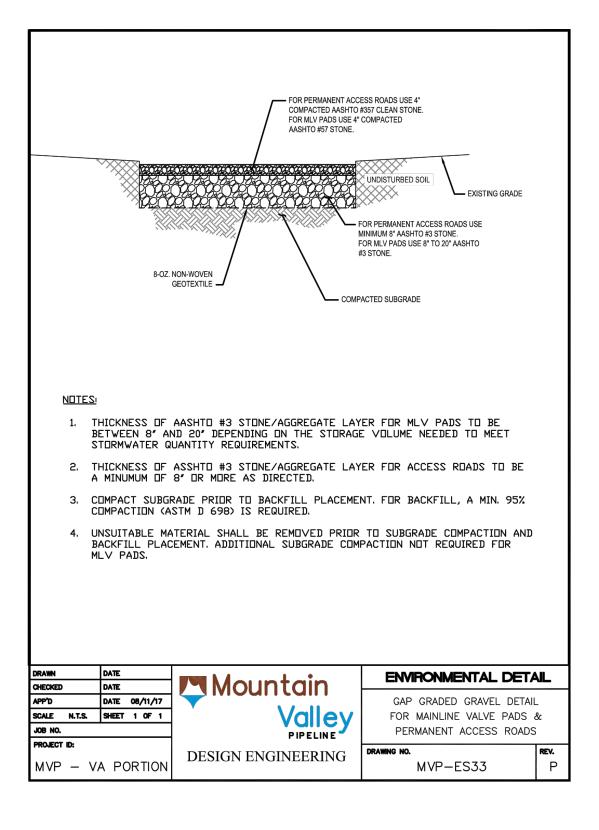


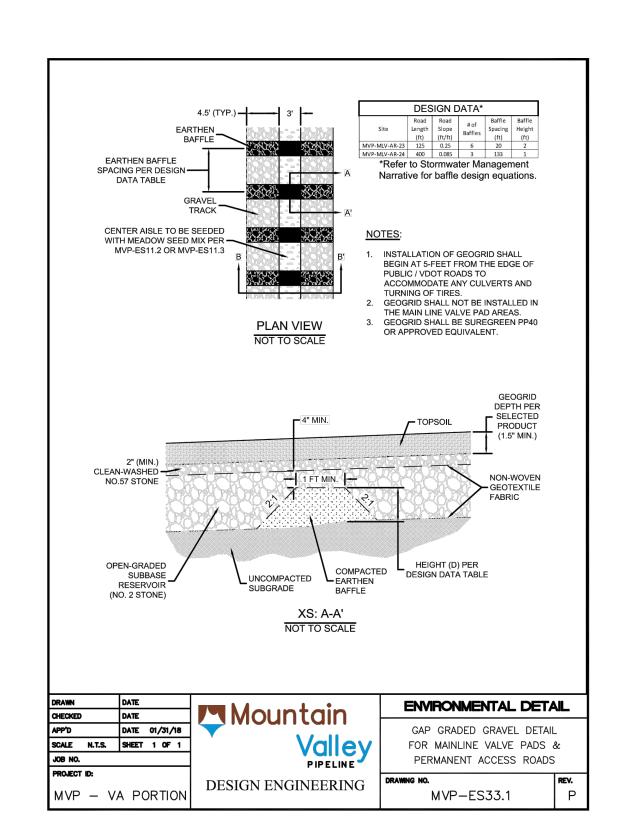


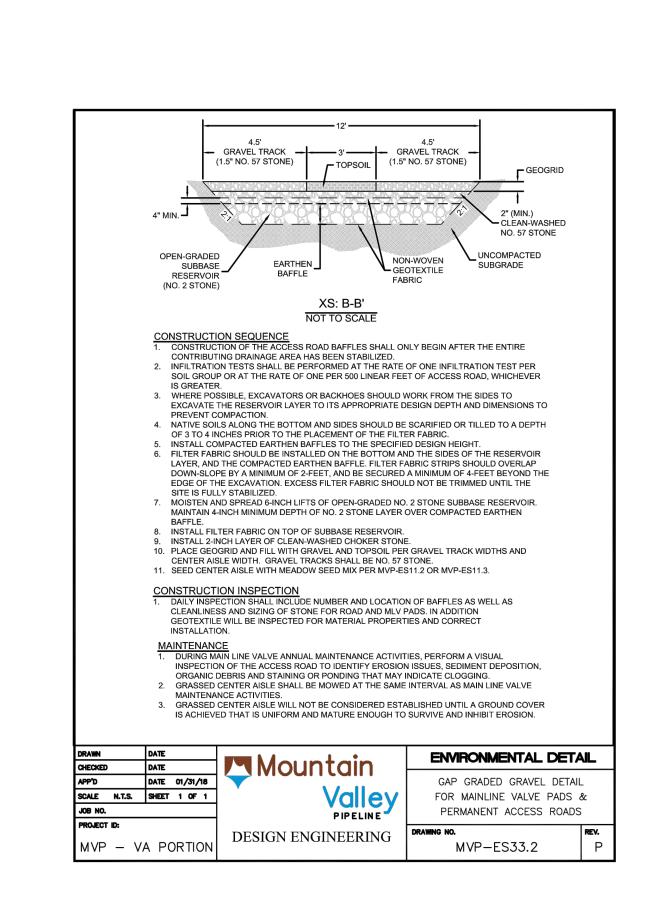


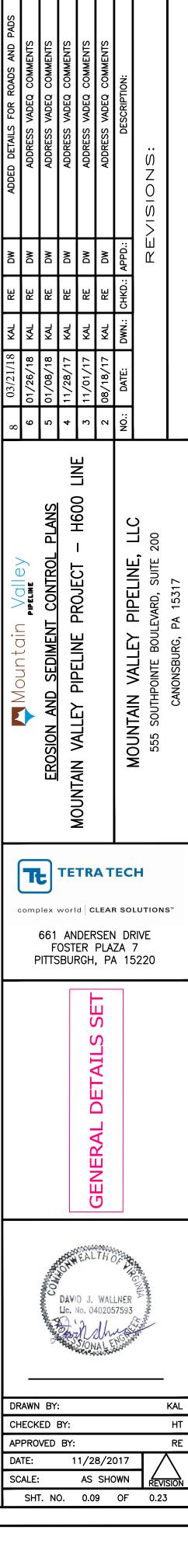


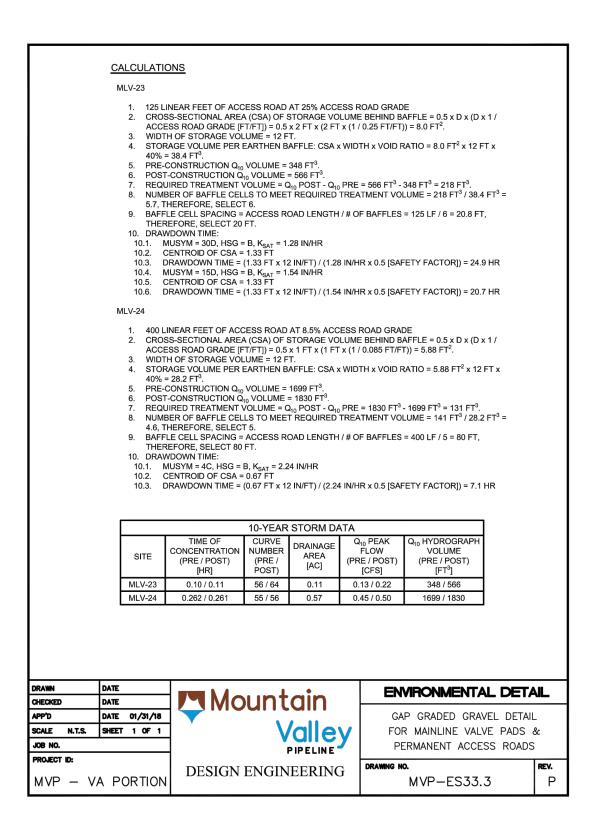


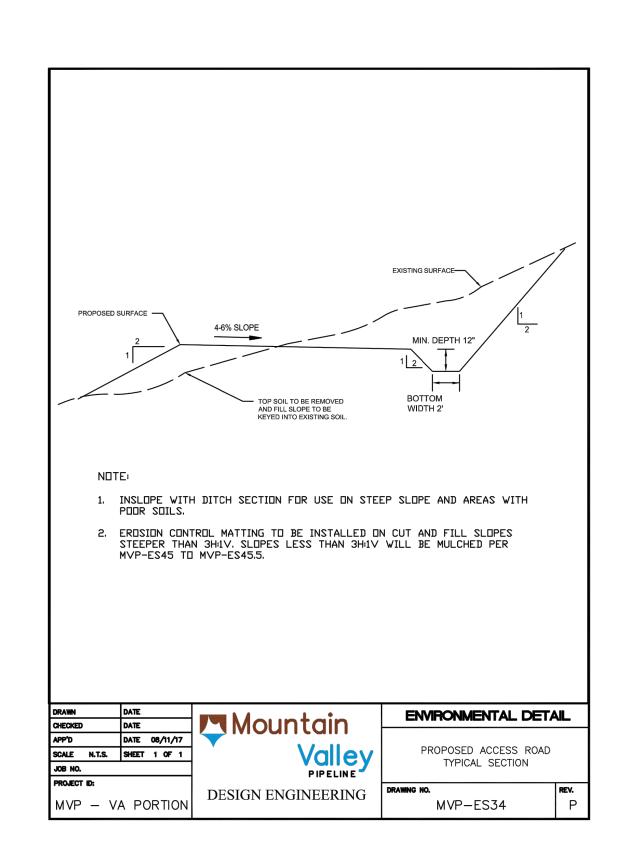


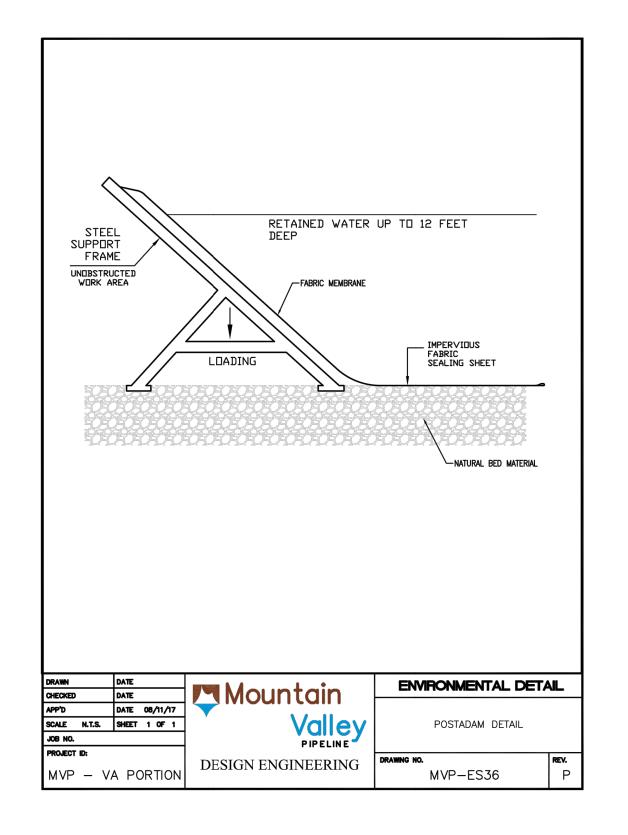


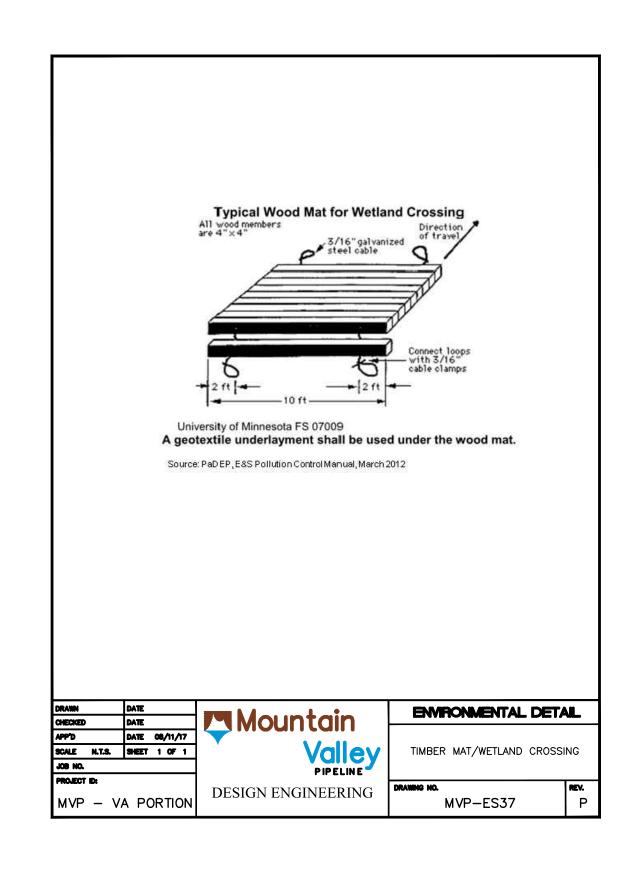


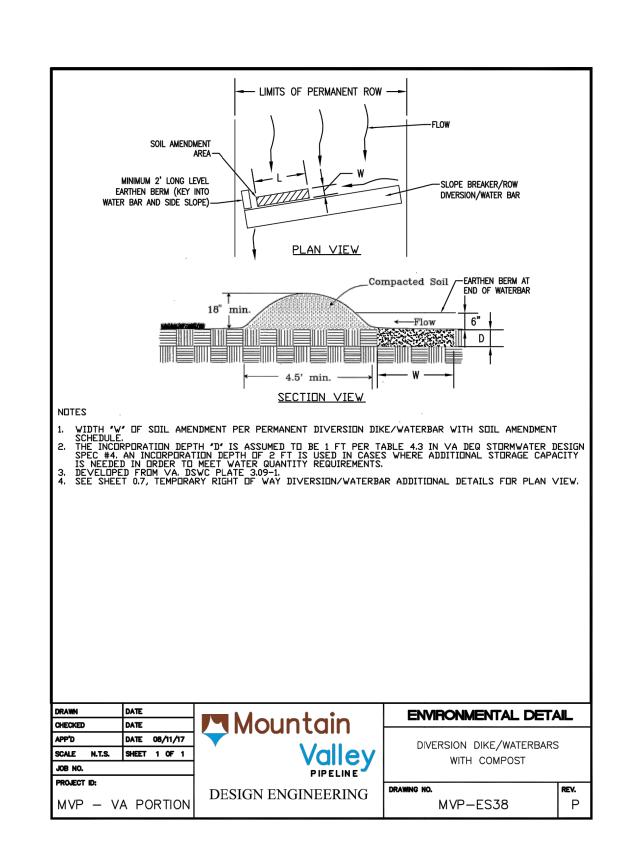


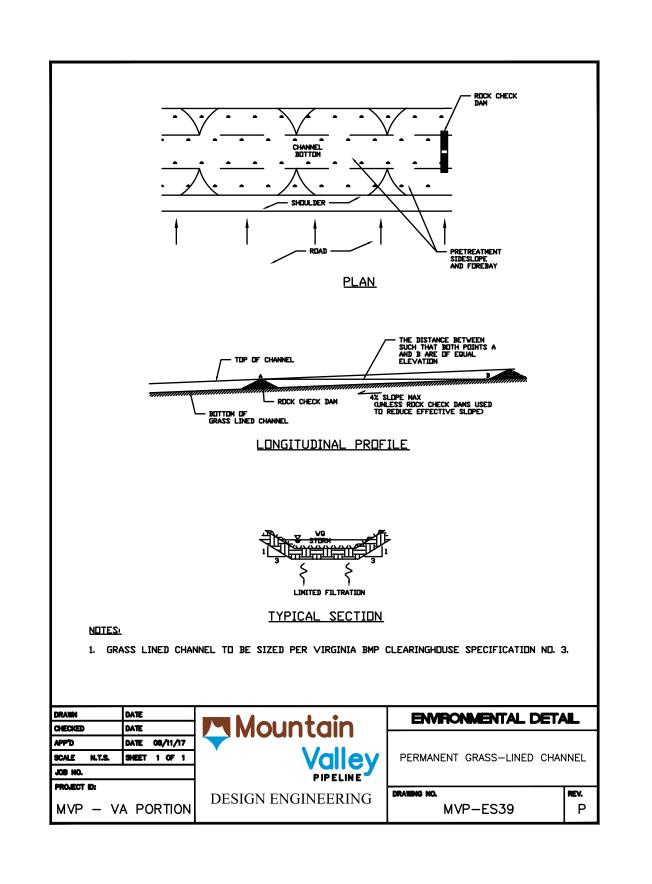


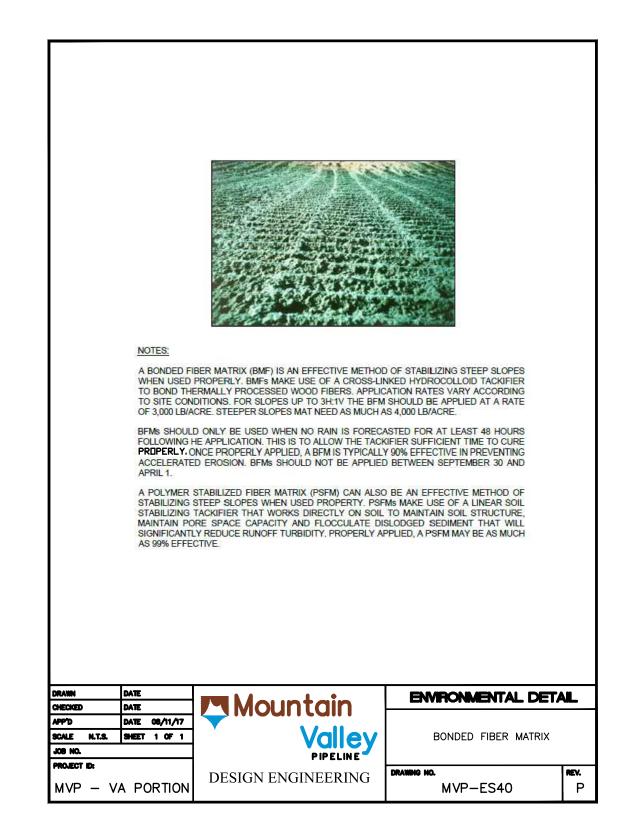


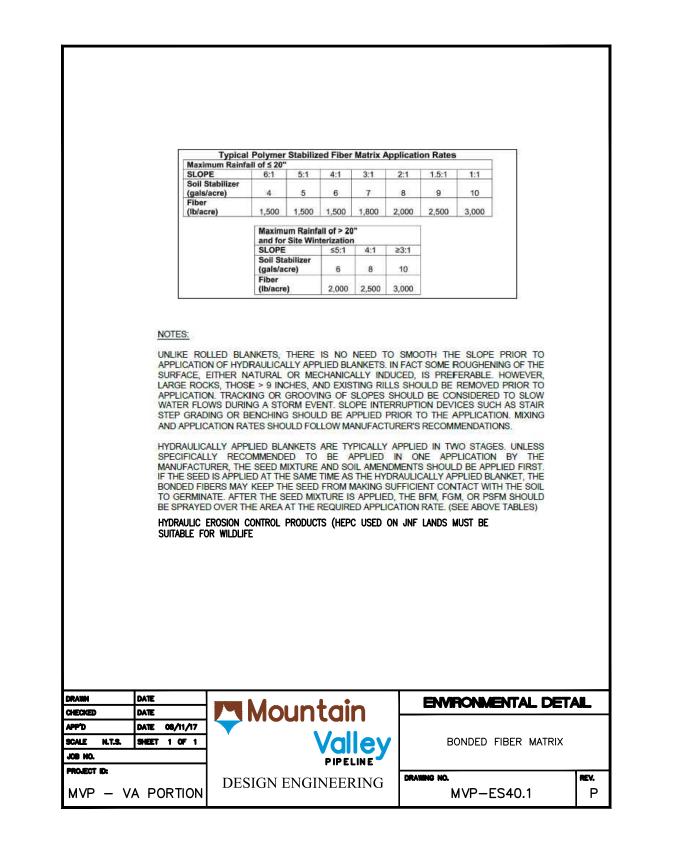


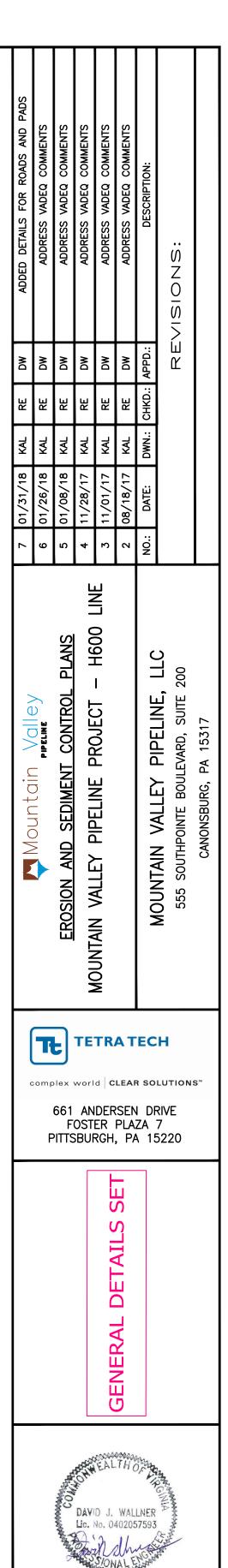












DRAWN BY:

CHECKED BY:

APPROVED BY:

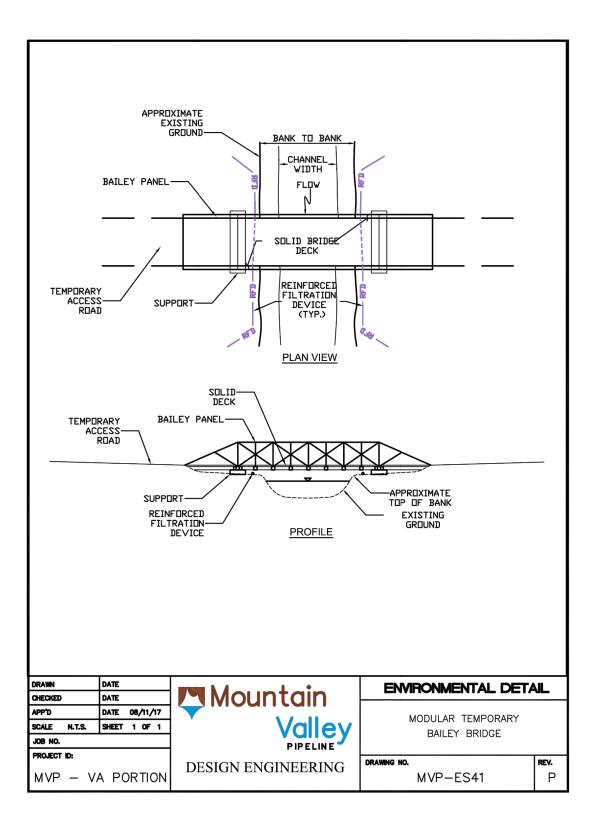
11/28/2017

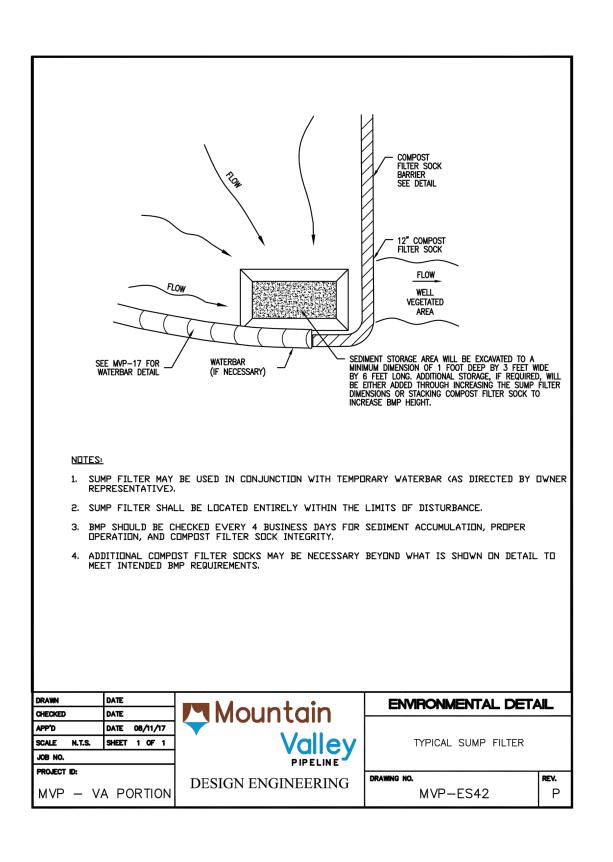
SHT. NO. 0.10 OF 0.23

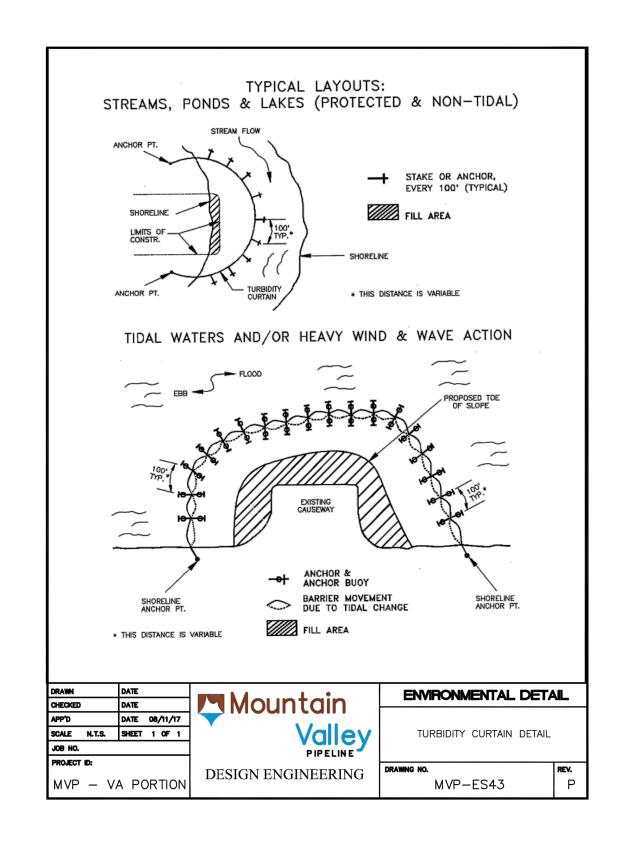
AS SHOWN

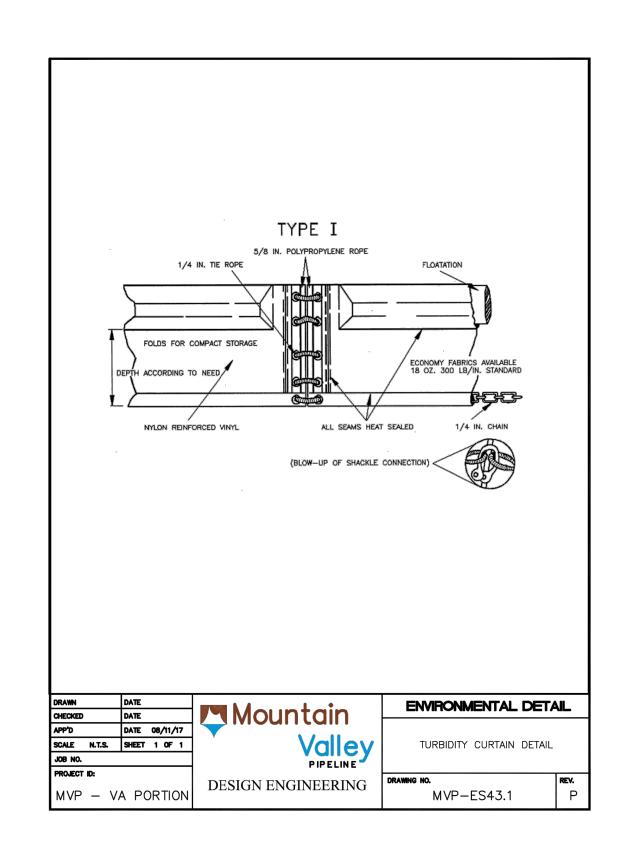
DATE:

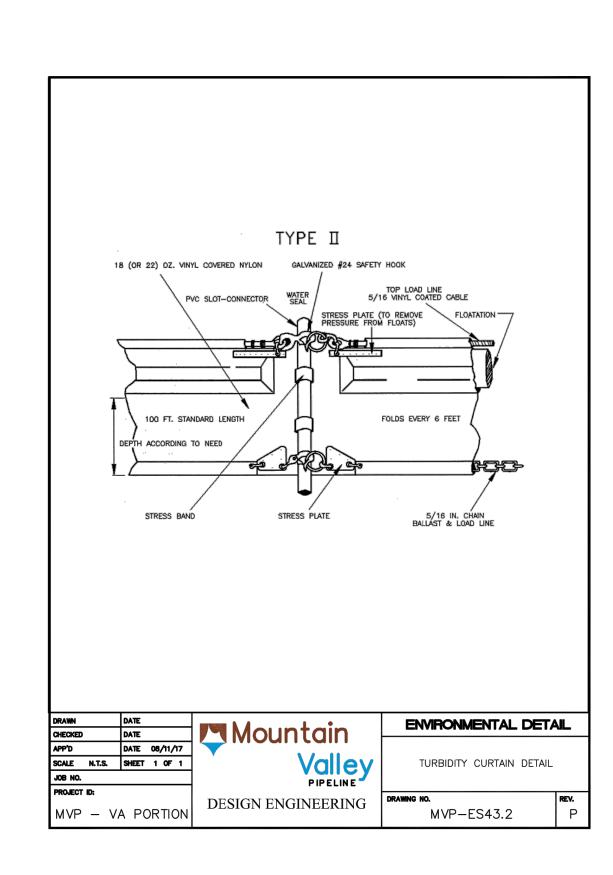
SCALE:

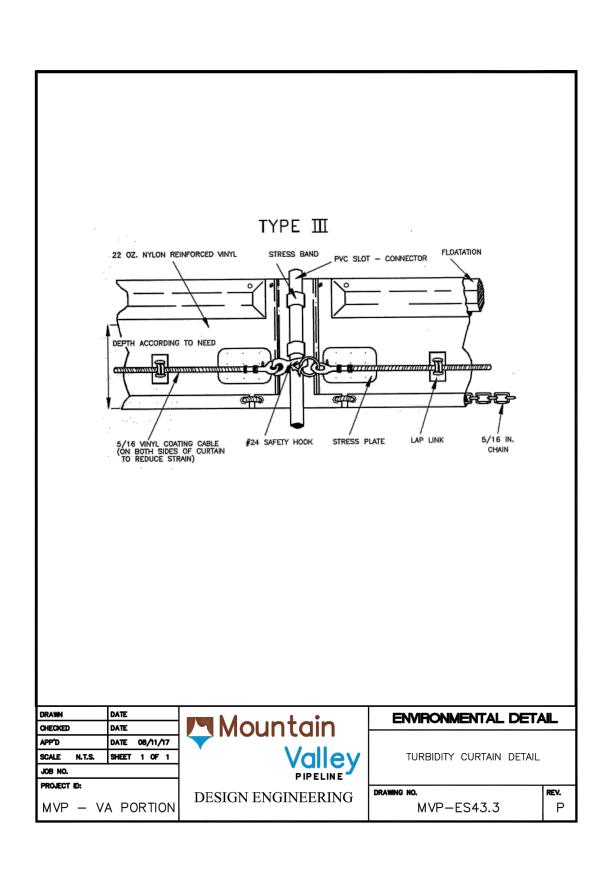


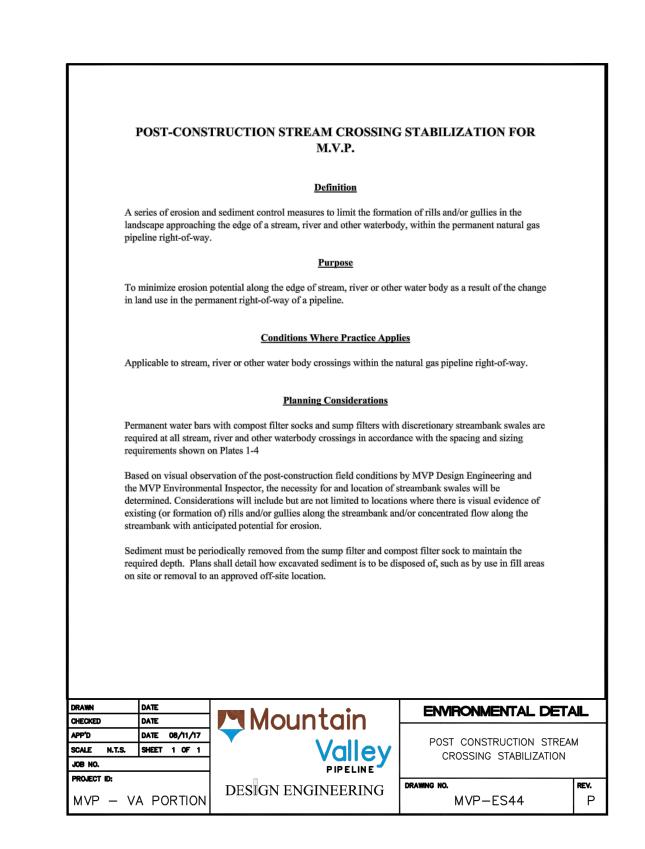


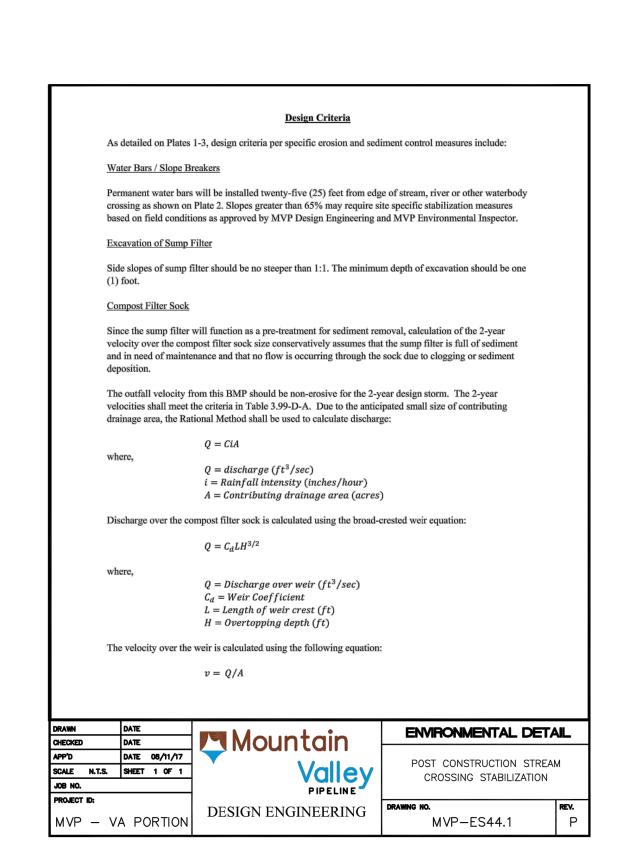




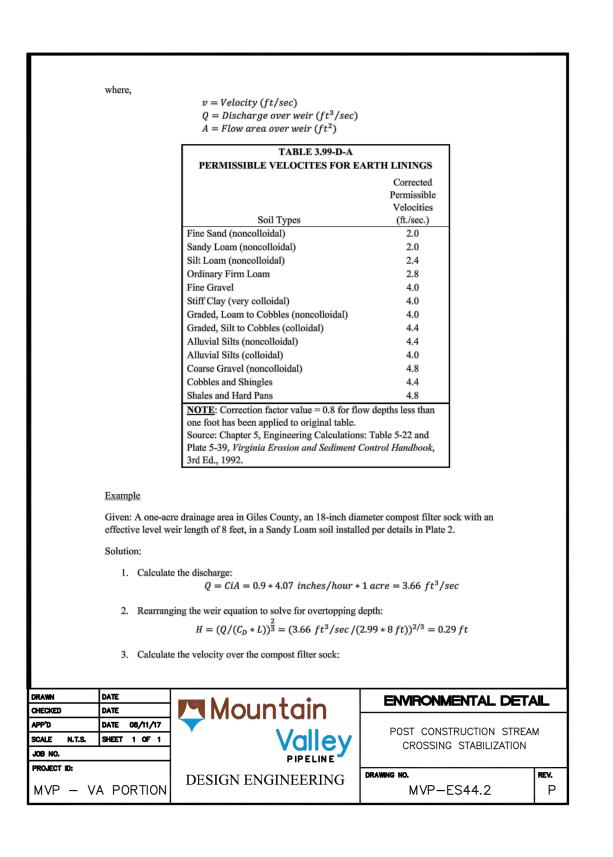


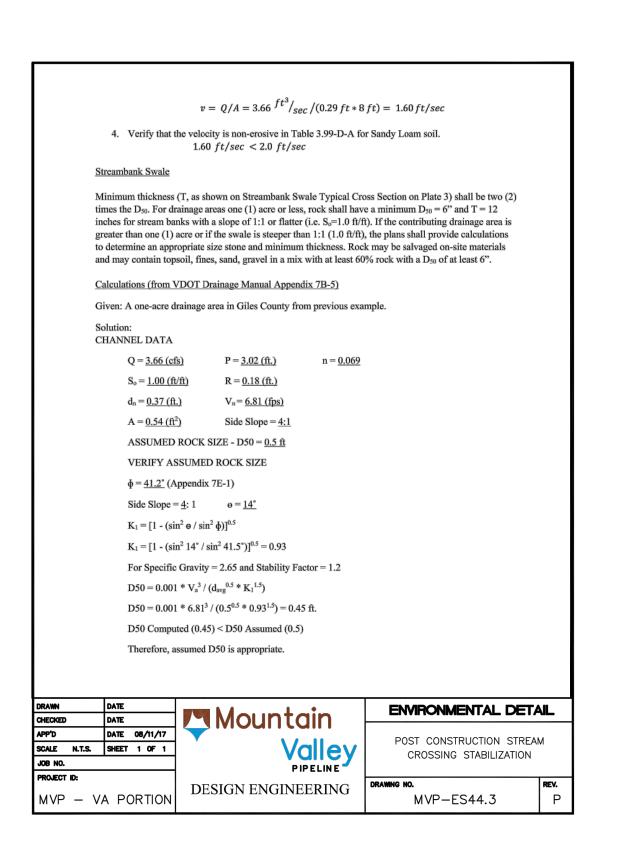


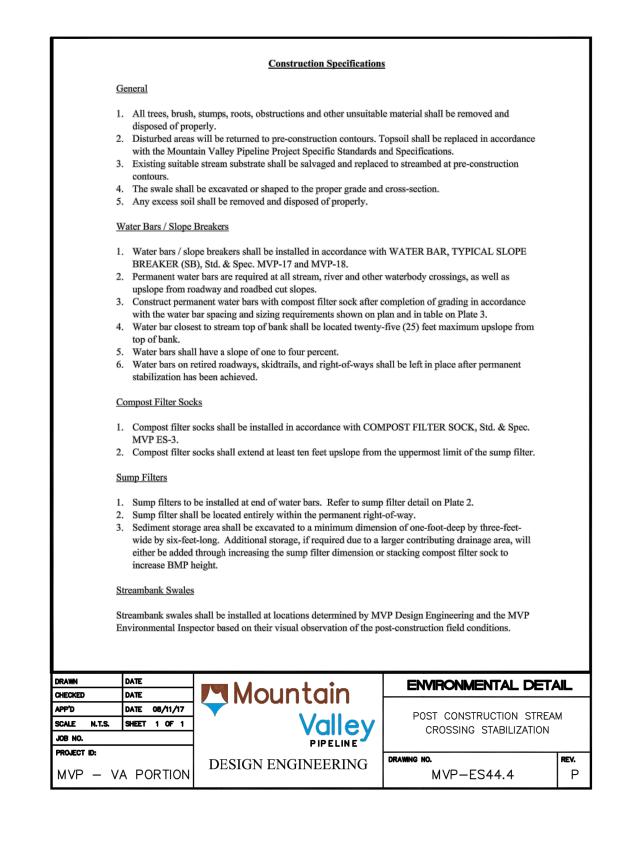


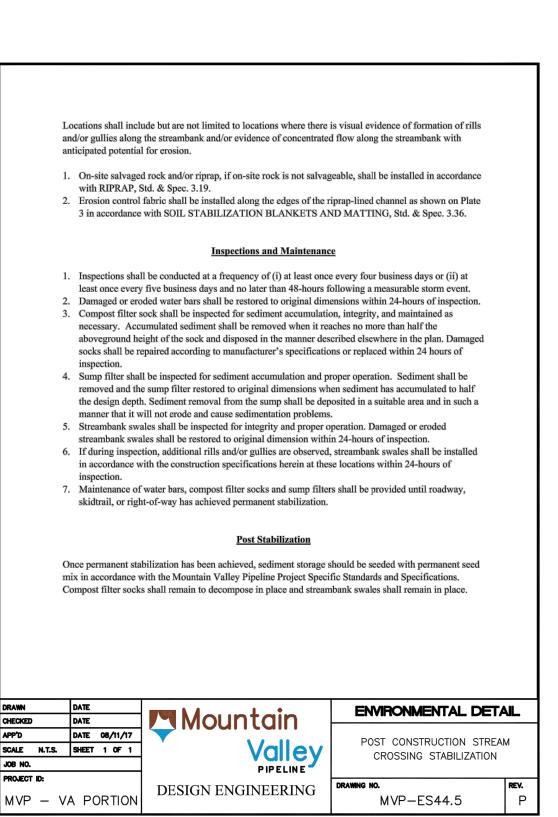


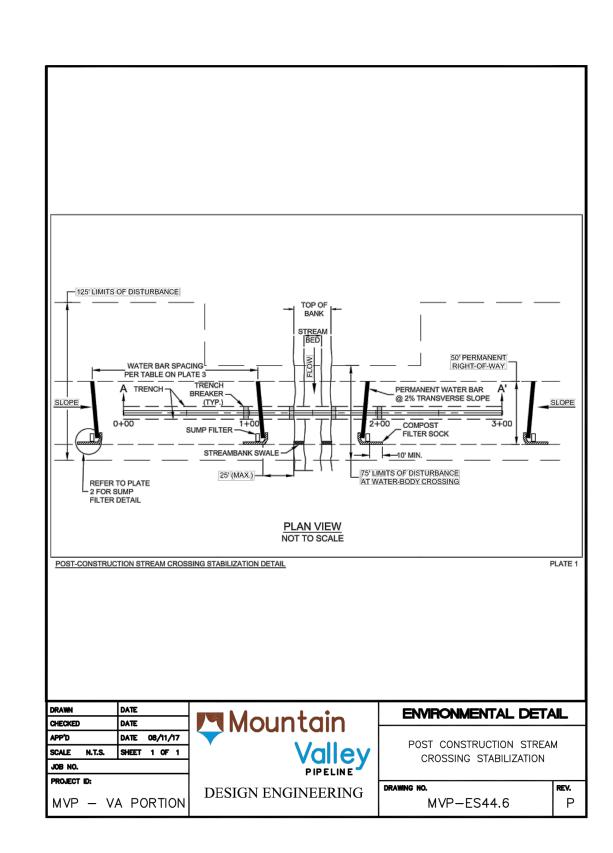


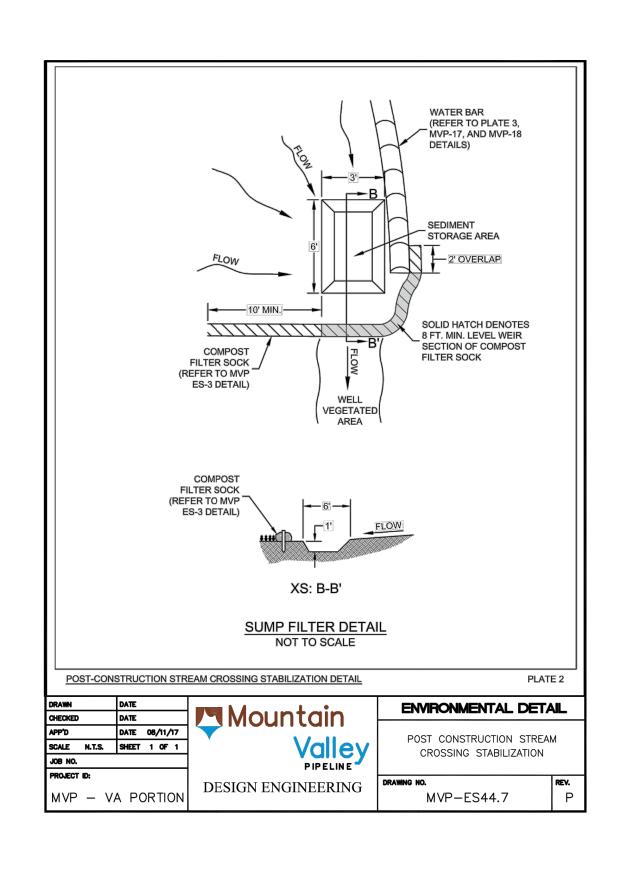


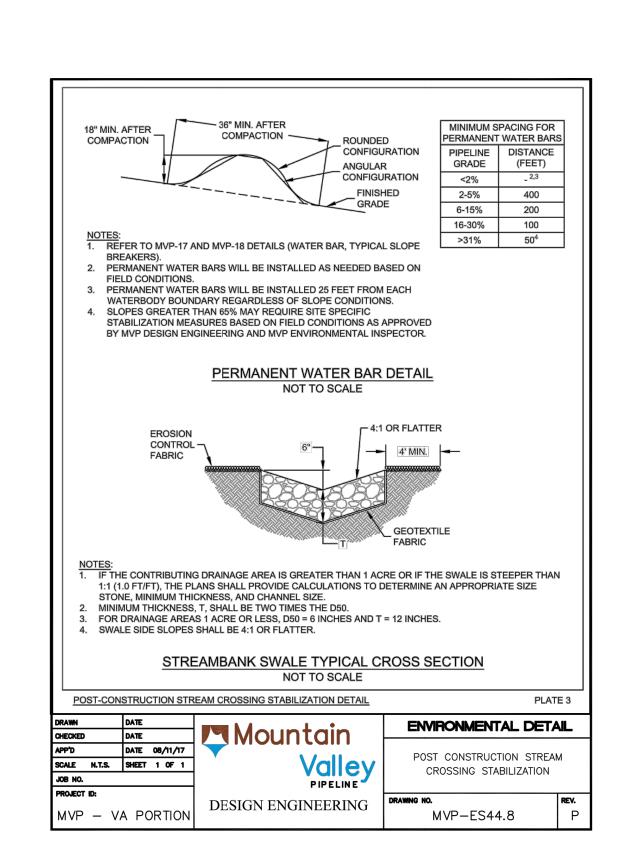


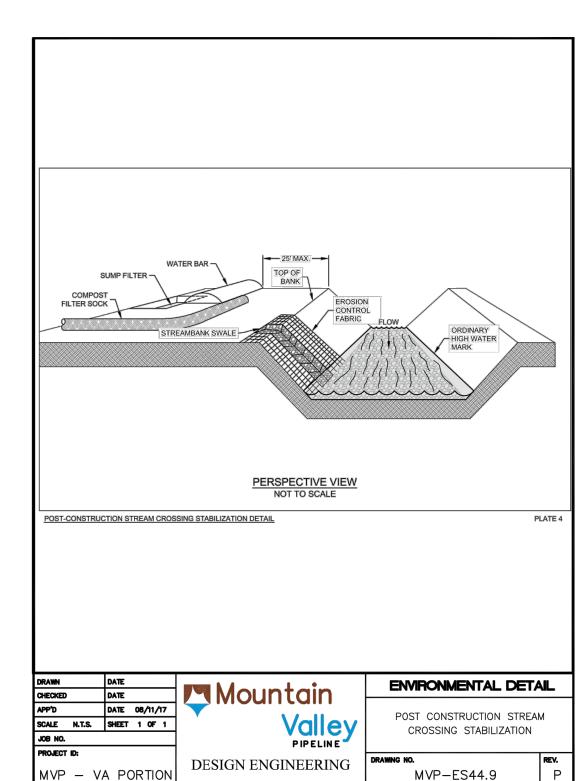














DRAWN BY:

DAVID J. WALLNER Lic. No. 0402057593

PIPELINE, EVARD, SUITE

PROJECT

EROSION AND AIN VALLEY

TETRA TECH

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE

FOSTER PLAZA 7 PITTSBURGH, PA 15220

MULCHING

Definition

Application of plant residues or other suitable materials to the soil surface.

Purposes

- To prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity
 of overland flow.
- To foster the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold.

Conditions Where Practice Applies

- Areas which have been permanently seeded (see Appendix B Typical Construction Details MVP-ES11.1 through ES12.3) should be mulched immediately following seeding.
- 2. Areas which cannot be seeded because of the season should be mulched to provide some protection to the soil surface. An organic mulch should be used, and the area then seeded as soon weather or seasonal conditions permit. It is not recommended that fiber mulch be used alone for this practice; at normal application rates it just simply does not provide the protection that is achieved using other types of mulch.
- Mulch may be used together with plantings of trees, shrubs, or certain ground covers which do not provide adequate soil stabilization by themselves.
- Mulch shall be used in conjunction with temporary seeding operations as specified in TEMPORARY SEEDING, Std. & Spec. 3.31

Planning Considerations

Mulches are applied to the soil surface to conserve a desirable soil property or to promote plant growth. A surface mulch is one of the most effective means of controlling runoff and erosion on disturbed land.

Mulches can increase the infiltration rate of the soil, reduce soil moisture loss by evaporation, prevent crusting and sealing of the soil surface, modify soil temperatures, and provide a suitable microclimate for seed germination.

Organic mulch materials, such as straw, wood chips, bark, and fiber mulch have been found to be the most effective.

ountain 📙	NVIRONMENTAL DETA	\ 00
	**************************************	VIL.
ountain —		
Valley	MULCHING	
PIPELINE		
ENICH HEED DIG DRAWN	3 NO.	REV.
ENGINEERING	MVP-ES45	Р
	Valley	Valley PIPELINE DRAWING NO.

Chemical soil stabilizers or soil binders should not be used alone for mulch. These materials are useful to bind organic mulches together to prevent displacement.

A variety of manufactured SOIL STABILIZATION BLANKETS AND MATTING (see Std. & Spec. 3.36) have been developed for erosion control in recent years. Some of these products can be used as mulches, particularly in critical areas such as waterways. They also may be used to hold other mulches to the soil prefere.

The choice of materials for mulching will be based on the type of soil to be protected, site conditions, season and economics. It is especially important to mulch liberally in mid-summer and prior to winter, and on cut slopes and southern slope exposures.

Organic Mulches

Straw - The mulch most commonly used in conjunction with seeding. The straw should come from wheat or oats (free of troublesome weed seeds) and may be spread by hand or machine. Straw can be windblown and must be anchored down by an acceptable method.

Hay - Hay shall not be used as mulch for Project activities.

Com Stalks - These should be shredded into 4- to 6-inch lengths. Stalks decompose slowly and are resistant to displacement.

<u>Wood Chips</u> - Suitable for areas that will not be closely mowed, and around ornamental plantings. Chips decompose slowly and do not require tacking. They must be treated with 12 pounds of nitrogen per ton to prevent nutrient deficiency in plants; however, can be a very inexpensive mulch if chips are obtained from trees cleared on the site.

<u>Bark Chips, Shredded Bark</u> - These are by-products of timber processing which are used in landscaped plantings. Bark is also a suitable mulch for areas planted to grasses and not closely mowed. It may be applied by hand or mechanically and is not usually toxic to grasses or legumes; additional nitrogen fortilizer is not required.

<u>Fiber Mulch</u> - Used in hydroseeding operations and applied as part of the slurry. It creates the best seed-soil contact when applied over top of (as a separate operation) newly seeded areas. These fibers do not require tacking, although tacking agents or binders are sometimes used in conjunction with the application of fiber mulch. This form of mulch does not provide sufficient protection to highly erodible soils. Additionally, fiber mulch will not be considered adequate mulch when used during the dry summer months or when used for late fall mulch cover. Use straw mulch during these periods. Fiber mulch may be used to tack (anchor) straw mulch. This treatment is well suited for steep slopes, critical areas, and areas

There are other organic materials which make excellent mulches but are only available locally or seasonally. Creative use of these materials can reduce costs.

Chemical Mulches and Soil Binders

A wide range of synthetic, spray-on materials are marketed to stabilize and protect the soil surface. These are emulsions or dispersions of vinyl compounds, rubber or other substances which are mixed with water and applied to the soil. They may be used alone in some cases as temporary stabilizers, or in conjunction with fiber mulches or straw.

DRAWN	DATE		ENVIRONMENTAL DET	ΔII
CHECKED	DATE	Mountain		
APP'D	DATE			
SCALE N.T.S.	SHEET 1 OF 1	Vallev	MULCHING	
JOB NO.		PIPELINE		
PROJECT ID:			DRAWNO NO	I nov
DV'	XXX	DESIGN ENGINEERING	DRAWING NO. MVP—FS45.1	REV.
Ρλ.	^^^		MVP-E343.1	

When used alone, chemical mulches do not have the capability to insulate the soil or retain soil moisture that organic mulches have. This soil protection is also easily damaged by traffic. Application of these mulches is usually more expensive than organic mulching, and the mulches decompose in 60-90 days.

Blankets and Matting

Field experience has shown that plastic netting, when used alone, does not retain soil moisture or modify soil temperature. In some cases it may stabilize the soil surface while grasses are being established, but is primarily used in grassed waterways and on slopes to hold straw or similar mulch in place.

Jute mesh and other soil stabilization blankets are good choices for mulching on difficult slopes and in minor drainage swales. Most of the soil stabilization mattings (used to create a permanent matrix for root growth within the soil) must receive mulching in order to properly stabilize an area. Notably, some manufacturers have recently developed permanent mattings which include self-contained, temporary mulching materials; however, these measures will have to meet the requirements noted in Std. & Spec. 3.36, SOIL STABILIZATION BLANKETS AND MATTING, before they can be recommended for use on steep slopes and in channel flow situations.

material and the soil. Without such contact, the material may fail and thereby allow erosion to occur. It is important to use an adequate number of staples and make sure the material is installed properly in order to maximize soil protection. These products are discussed in more detail in Std. & Spec. 3.36, SOIL STABILIZATION BLANKETS & MATTING.

The most critical aspect of installing blankets and mats is obtaining firm, continuous contact between the

MVP will utilize hydraulically applied soil stabilization blankets and matting (i.e. Earthguard, Flexterra, or equivalent) as an alternate to the rolled ESC blanket material identified under STD & SPEC 3.36. Information regarding the hydraulically applied blankets is provided under Appendix B MVP-ES40 and MVP-ES40.1.

Specifications

Organic Mulches

Organic mulches may be used in any area where mulch is required, subject to the restrictions noted in

Materials: Select mulch material based on site requirements, availability of materials, and availability of labor and equipment. Table 3.35-A lists the most commonly used organic mulches. Other materials, such as peanut hulls and cotton burs, may be used with the permission of the local Plan-Approving Authority.

<u>Prior to mulching</u>: Complete the required grading and install needed sediment control practices.

<u>Lime and fertilizer</u> should be incorporated and surface roughening accomplished as needed. Seed should be applied prior to mulching except in the following cases:

a. Where seed is to be applied as part of a hydroseeder slurry containing fiber mulch.

b. Where seed is to be applied following a straw mulch spread during winter months.

\WN	DATE	- A 1 •	ENVIRONMENTAL DETA	ΔII
ECKED	DATE	Mountain		
ס'י	DATE 08/11/17			
LE N.T.S.	SHEET 1 OF 1	Valley	MULCHING	
3 NO.		PIPELINE		
DJECT ID:			DRAWING NO.	REV.
VP - V	A PORTION	DESIGN ENGINEERING	MVP-ES45.2	P
VI - V/	A I OIVIION		WI VI L3+3.2	'

ORGANIC MULCH MATERIALS AND APPLICATION RATES MULCHES: NOTES: Per Acre Per 1000 sq. ft 1 ½ - 2 tons 70 – 90 lbs. Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by winter cover) Do not use as mulch for winter Fiber Mulch 1500 lbs. cover or during hot, dry periods.* Apply as slurry. 4 – 6 tons 185 – 275 lbs. Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand. Wood Chips 4 – 6 tons 185 – 275 lbs. Free of coarse matter. Airdried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand. Bark Chips 50 – 70 cu. Free of coarse matter. Airyds. dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by *When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. Or 45 lbs./1000 sq. ft. Source: Va. DSWC ENVIRONMENTAL DETAIL MULCHING PIPELINE **DESIGN ENGINEERING** PXXXX MVP-ES45.3

Application: Mulch materials shall be spread uniformly, by hand or machine.

When spreading straw mulch by hand, divide the area to be mulched into approximately 1,000 sq. ft, sections and place 70-90 lbs. (n to 2 bales) of straw in each section to facilitate uniform distribution.

<u>Mulch Anchoring:</u> Straw mulch must be anchored immediately after spreading to prevent displacement. Other organic mulches listed in Table 3.35-A do not require anchoring. The following methods of anchoring straw may be used:

- Mulch anchoring tool (often referred to as a Krimper or Krimper Tool): This is a tractor-drawn
 implement designed to punch mulch into the soil surface. This method provides good erosion
 control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate
 safely. Machinery shall be operated on the contour.
- Fiber Mulch: A very common practice with widespread use today. Apply fiber mulch by means of a hydroseeder at a rate of 500-750 lbs/acre over top of straw mulch. It has an added benefit of providing additional mulch to the newly seeded area.
- 3. Liquid mulch binders: Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent displacement. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread or may be sprayed into the mulch as it is being blown onto the soil.

The following types of binders may be used:

- a. <u>Synthetic binders</u> Formulated binders or organically formulated products may be used as recommended by the manufacturer to anchor mulch.
- b. *Asphalt Any type of asphalt thin enough to be blown from spray equipment is satisfactory. Recommended for use are rapid curing (RC-70, RC-250, RC-800), medium curing (MC-250, MC-800) and emulsified asphalt (SS-1, CSS-1, CMS-2, MS-2, RS-1, RS-2, CRS-1, and CRS-2).

Apply asphalt at 0.10 gallon per square yard (10 gal./1000 sq. ft. or 430 gal./acre). Do not use heavier applications as it may cause the straw to "perch" over rills. All asphalt designations are from the Asphalt Institute Specifications.

*Note: This particular method is not used as commonly today as it once was in the past.

The development of hydraulic seeding equipment promoted the industry to turn to synthetic or organically based binders and tackifiers. When this method is used, environmental concerns should be addressed to ensure that petroleum-based products do not enter valuable water supplies. Avoid applications into waterways or channels.

- Mulch nettings: Lightweight plastic, cotton, or paper nets may be stapled over the mulch according to manufacturer's recommendations.
- 5. Peg and twine: Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8- to 10-inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a square pattern. Turn twine 2 or more times around each peg.

DRAWN DATE		ENVIRONMENTAL DETA	AIL.
CHECKED DATE	Mountain		
APP'D DATE			
SCALE N.T.S. SHEET 1 OF 1	Valley	MULCHING	
JOB NO.	PIPELINE		
PROJECT ID:		DRAWING NO.	REV.
PXXXX	DESIGN ENGINEERING	MVP-ES45.4	P

nemical Mulches

Chemical mulches* may be used alone only in the following situations:

- a. Where no other mulching material is available.
- In conjunction with temporary seeding during the times when mulch is not required for that practice.
- c. From March 15 to May 1 and August 15 to September 30, provided that they are used on areas with slopes no steeper than 4:1, which have been roughened in accordance with SURFACE ROUGHENING, Std. & Spec. 3.29. If rill erosion occurs, another mulch material shall be applied immediately.

*Note: Chemical mulches may be used to bind other mulches or with fiber mulch in a hydroseeded slurry at any time. Manufacturer's recommendations for application of chemical mulches shall be followed.

Maintenance

All mulches and soil coverings should be inspected periodically (particularly after rainstorms) to check for erosion. Where erosion is observed in mulched areas, additional mulch should be applied. Nets and mats should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, reinstall netting or matting as necessary after repairing damage to the slope or ditch. Inspections should take place up until grasses are firmly established. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

DRAWN C	DATE	- 1 ·	ENVIRONMENTAL DETA	M
CHECKED	DATE	Mountain		
APP'D [DATE			
SCALE N.T.S. S	SHEET 1 OF 1	Valley	MULCHING	
JOB NO.		PIPELINE		
PROJECT ID:		FIFELINE		
		DESIGN ENGINEERING	DRAWING NO.	REV.
PXX	XX I	223131.21.011.122141.10	MVP-ES45.5	ΙPΙ

TOPSOILING & SOIL HANDLING FOR M.V.P.

<u>Definition</u>

Methods of preserving and using the surface layer of undisturbed soil, often enriched in organic matter, in order to obtain a more desirable planting and growth medium.

Purposes

To provide a suitable growth medium for final site stabilization with vegetation and promote successful

Conditions Where Practice Applies

- Where the preservation or importation of topsoil is determined to be the most effective method of providing a suitable growth medium.
- Where the subsoil or existing soil presents the following problems:
- Where the subsoil or existing soil presents the following problems:
 a. The texture, pH, or nutrient balance of the available soil cannot be modified by
- reasonable means to provide an adequate growth medium.

 b. The soil material is too shallow to provide an adequate root zone and to supply necessary
- moisture and nutrients for plant growth.

 c. The soil contains substances potentially toxic to plant growth.
- 3. Only on slopes that are 2:1 or flatter unless other measures are taken to prevent erosion and sloughing.

Planning Considerations

Topsoil is the surface layer of the soil profile, generally characterized as being darker than the subsoil due to the presence of organic matter. It is the major zone of root development, carrying much of the nutrients available to plants, and supplying a large share of the water used by plants.

Although topsoil provides an excellent growth medium, there are disadvantages to its use. Stripping, stockpiling, and reapplying topsoil, or importing topsoil, may not always be cost-effective. Topsoiling can delay seeding or sodding operations, increasing the exposure time of denuded areas. Most topsoil contains weed seeds, and weeds may compete with desirable species.

Advantages of topsoil include its high organic matter content and friable consistence, water-holding capacity, and nutrient content.

In site planning, the option of topsoiling should be compared with that of preparing a seedbed in subsoil.

The clay content of subsoils does provide high moisture availability and deter leaching of nutrients and, when properly limed and fertilized, subsoils may provide a good growth medium which is generally free

WN	DATE		ENVIRONMENTAL DETA	AIL.
CKED	DATE	Mountain		
סי	DATE			
LE N.T.S.	SHEET 1 OF 1	Vallev	TOPSOILING & SOIL HANDLIN	IG
NO.		PIPELINE		
DJECT ID:			DRAWING NO.	REV.
		DESIGN ENGINEERING		
PX	XXX		MVP-ES46	P

of weed seeds. In many cases topsoiling may not be required for the establishment of less demanding, lower maintenance plant material. Topsoiling is strongly recommended where ornamental plants or highmaintenance turf will be grown. Topsoiling is a required procedure when establishing vegetation on shallow soils, soils containing potentially toxic materials, and soils of critically low pH (high acid) levels.

If topsoiling is to be done, the following items should be considered:

subsoil is equally as likely to fail.

- Whether an adequate volume of topsoil exists on the site. Topsoil will be spread at a compacted depth of 2 to 4 inches (depths closer to 4 inches are preferred).
- Location of the topsoil stockpile so that it meets specifications and does not interfere with work on the site.
- Allow sufficient time in scheduling for topsoil to be spread and bonded prior to seeding or
- Care must be taken not to apply topsoil to subsoil if the two soils have contrasting textures.
 Clayey topsoil over sandy subsoil is a particularly poor combination, as water may creep along the junction between the soil layers, causing the topsoil to slough. Sandy topsoil over a clay
- If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. Topsoiling of steep slopes should be discouraged unless good bonding of soils can be achieved.

Specification

Materials

Field exploration of the site shall be made to determine if there is sufficient surface soil of good quality to justify stripping. Topsoil shall be friable and loamy (loam, sandy loam, silt loam, sandy clay loam), clay loam). It shall be free of debris, trash, stumps, rocks, roots, and noxious weeds, and shall give evidence of being able to support healthy vegetation. It shall contain no substance that is potentially toxic to plant growth.

In areas where revegetation is of concern based on existing soil conditions and determined by the MVP Environmental Inspector (EI), topsoil samples shall be taken for analysis. Samples will be collected by the MVP EI and sent to a recognized laboratory for analysis of the following criteria:

Organic matter content shall be not less than 1.5% by weight.

pH range shall be from 6.0-7.5. If pH is less than 6.0, lime shall be added in accordance with soil test results or in accordance with the recommendations of the vegetative establishment practice being used.

Soluble salts shall not exceed 500 ppm.

Soil samples collected and sent for analysis will be identified by the MVP Constructions Spread # and pipeline station from which the sample was obtained. Areas that fail to revegetate following restoration will be sampled and analyzed based on the above parameters.

DRAWN	DATE		ENVIRONMENTAL DETA	
CHECKED	DATE	Mountain		
APP'D	DATE 08/11/17			
SCALE N.T.S.	SHEET 1 OF 1	Valley	TOPSOILING & SOIL HANDLIN	G
JOB NO.		PIPELINE		
PROJECT ID:			DRAWING NO.	REV.
MVP - V	A PORTION	DESIGN ENGINEERING	MVP-ES46.1	P

 L PLANS
 FAL
 RE
 DW
 ADDRESS VADEQ COMMENTS

 - H600
 LINE
 FAL
 RE
 DW
 ADDRESS VADEQ COMMENTS

 - H600
 LINE
 FAL
 RE
 DW
 ADDRESS VADEQ COMMENTS

 - H600
 LINE
 RE
 DW
 ADDRESS VADEQ COMMENTS

 2
 08/18/17
 KAL
 RE
 DW
 ADDRESS VADEQ COMMENTS

 3
 11/01/17
 KAL
 RE
 DW
 ADDRESS VADEQ COMMENTS

 4
 0.0.:
 DATE:
 DWN.:
 CHKD.:
 APPD.:
 DESCRIPTION:

TAIN VALLEY PIPELINE PROJECT MOUNTAIN VALLEY PIPELINE,
555 SOUTHPOINTE BOULEVARD, SUITE 3

TETRA TECH

661 ANDERSEN DRIVE
FOSTER PLAZA 7

PITTSBURGH, PA 15220

GENERAL DETAILS



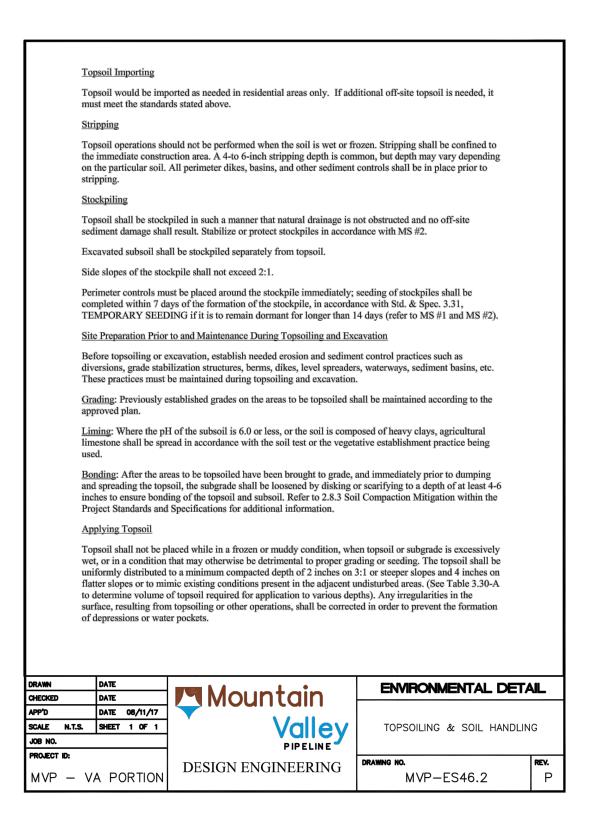
CHECKED BY: HT

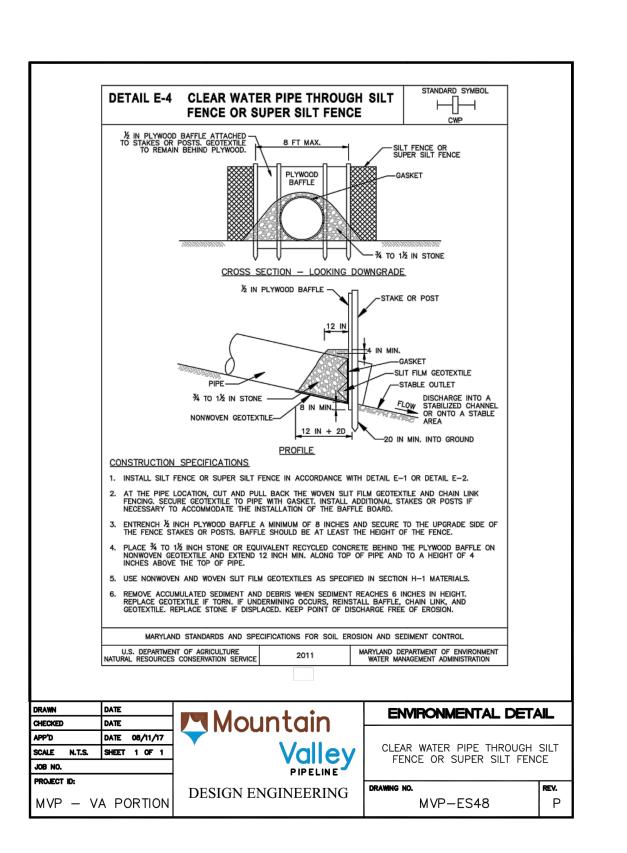
APPROVED BY: RE

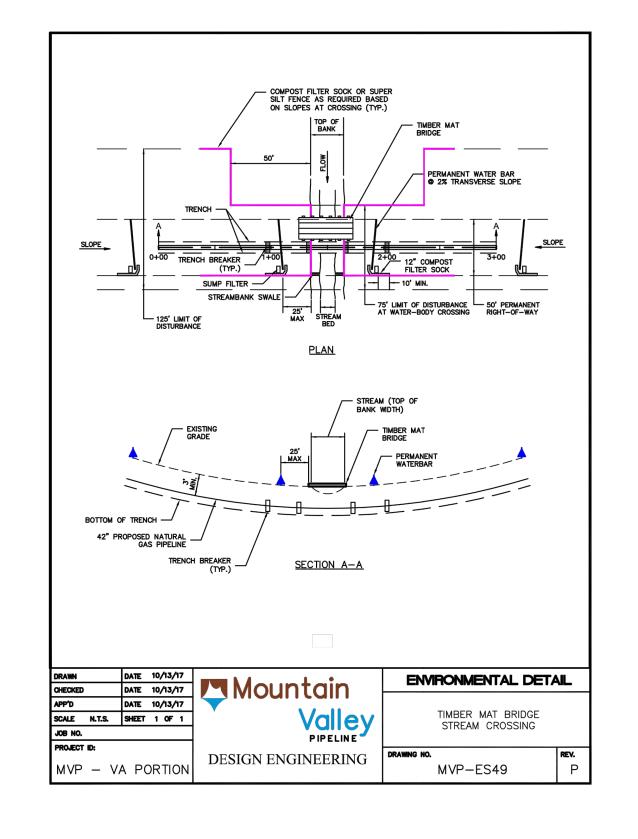
DATE: 11/28/2017

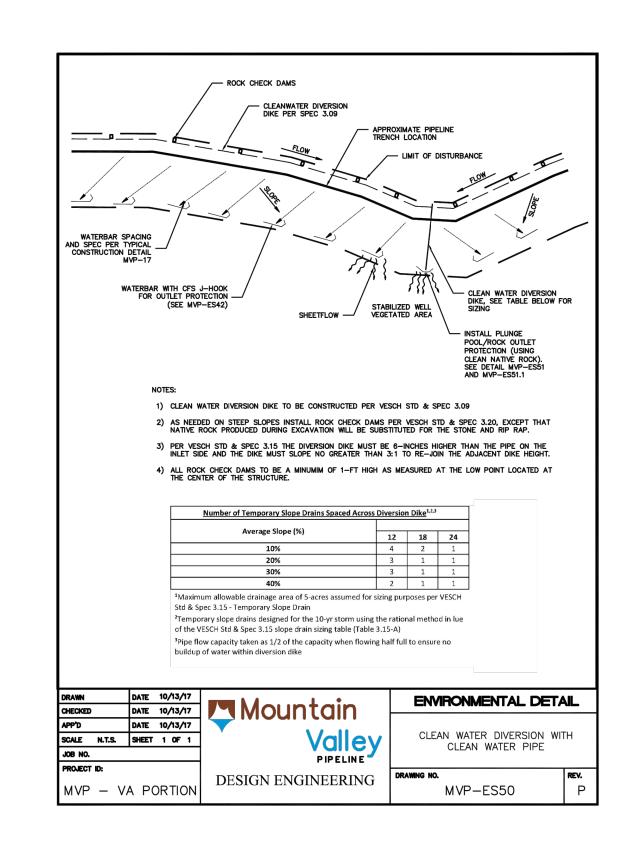
SCALE: AS SHOWN REVISION

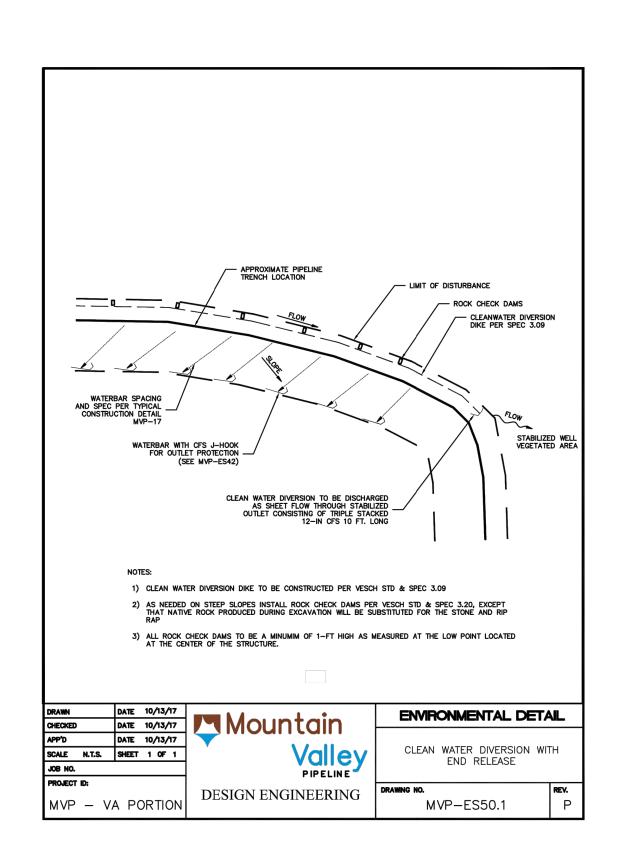
SHT. NO. 0.13 OF 0.23

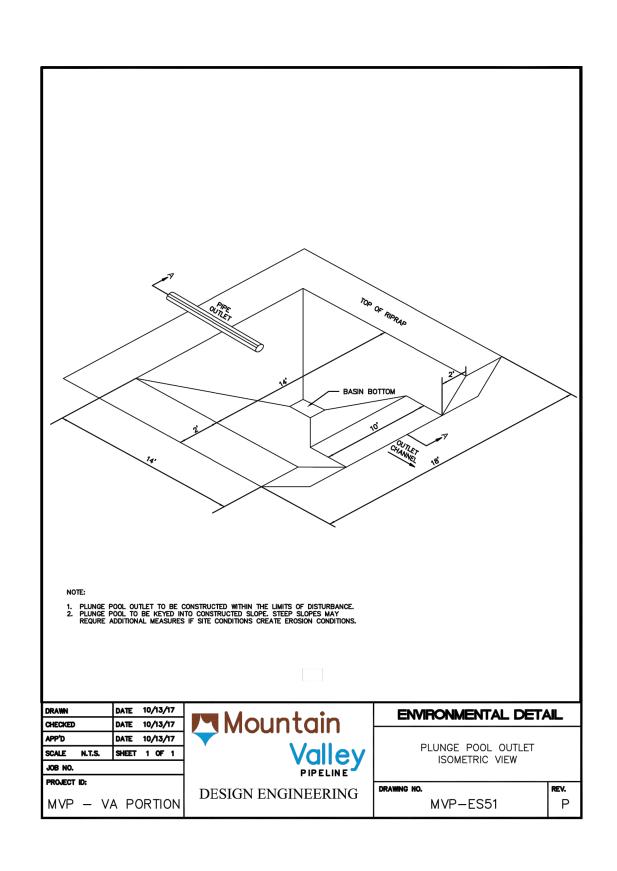


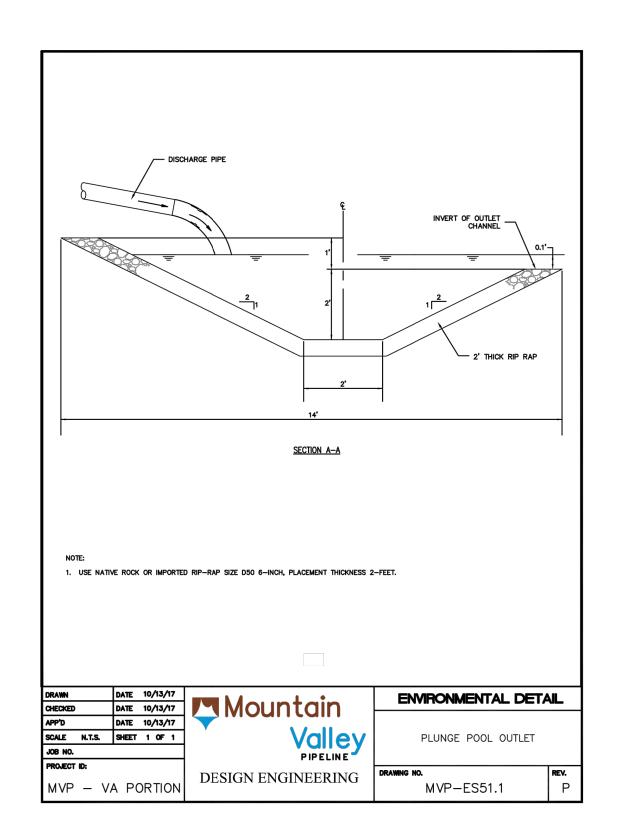


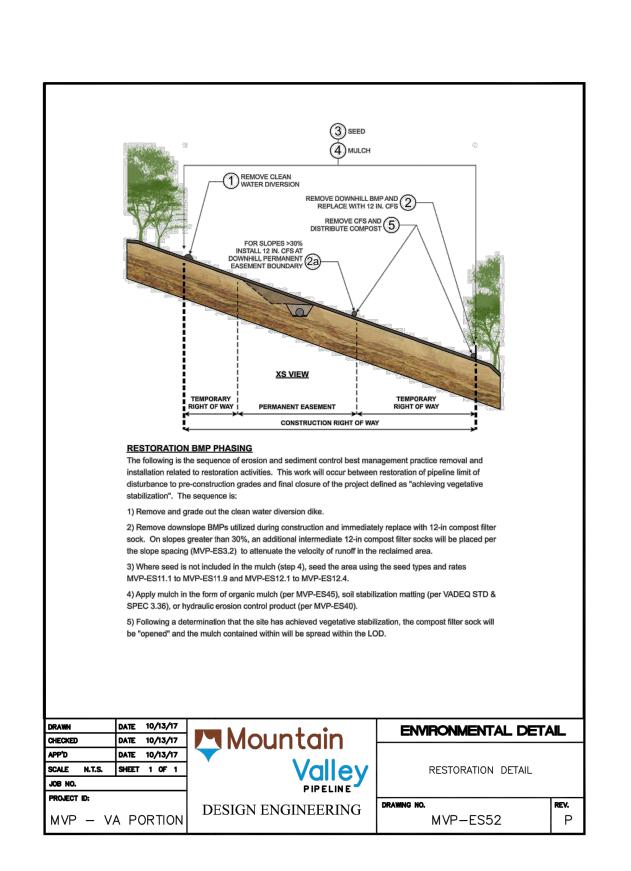


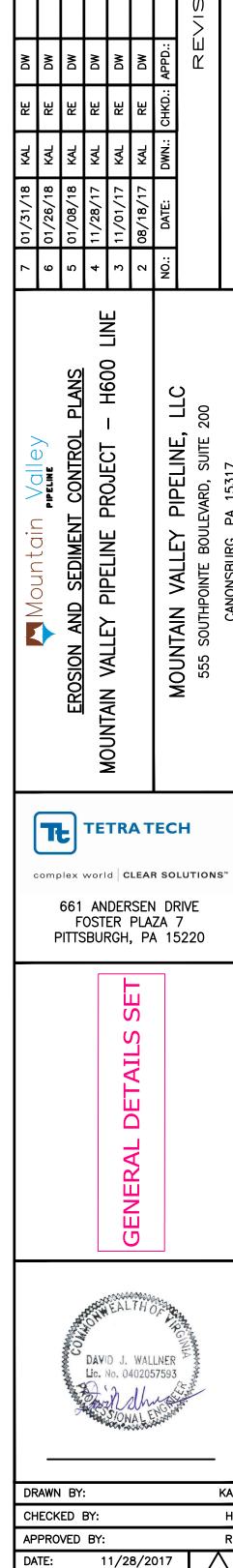






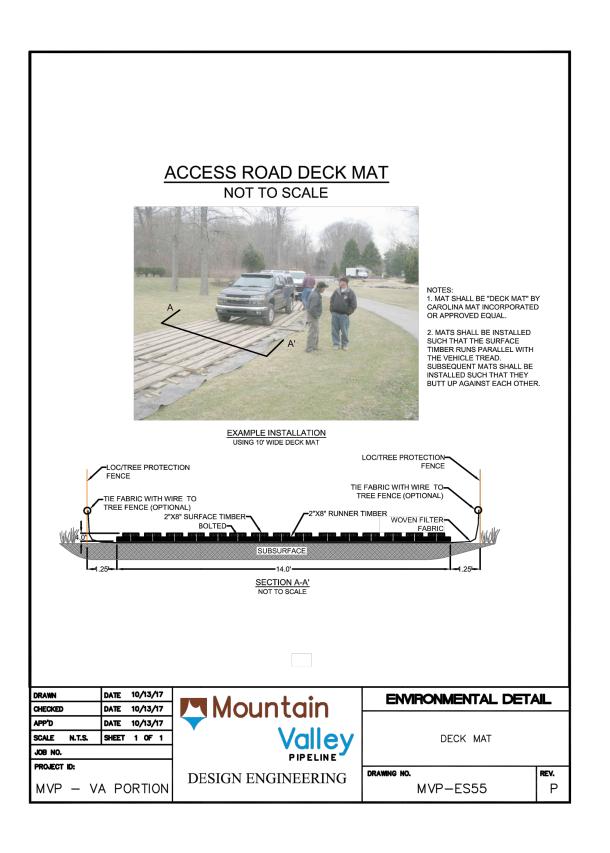


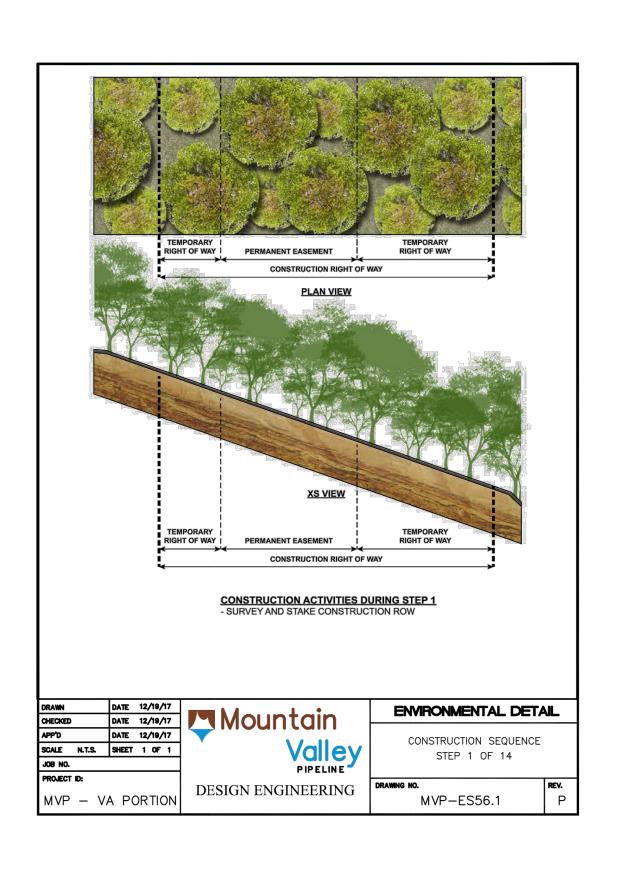


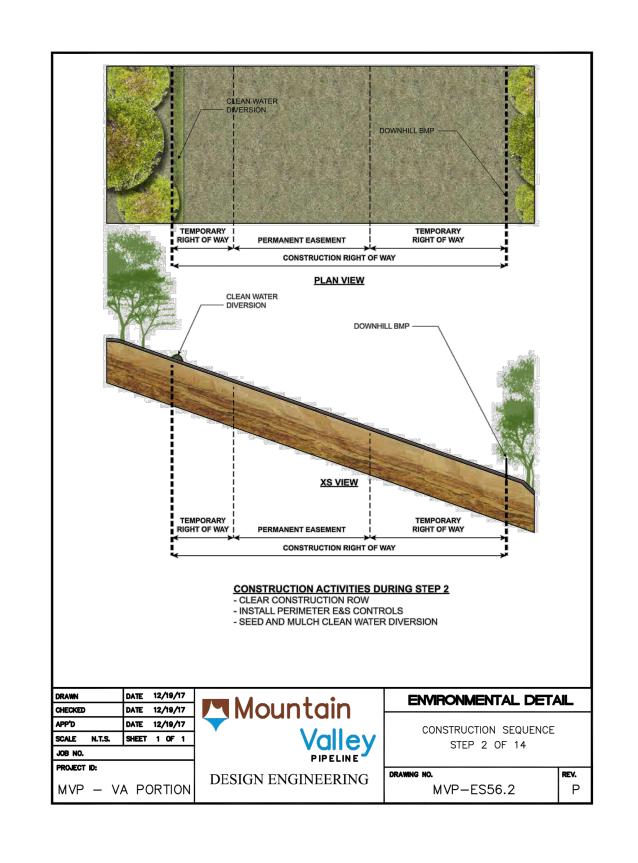


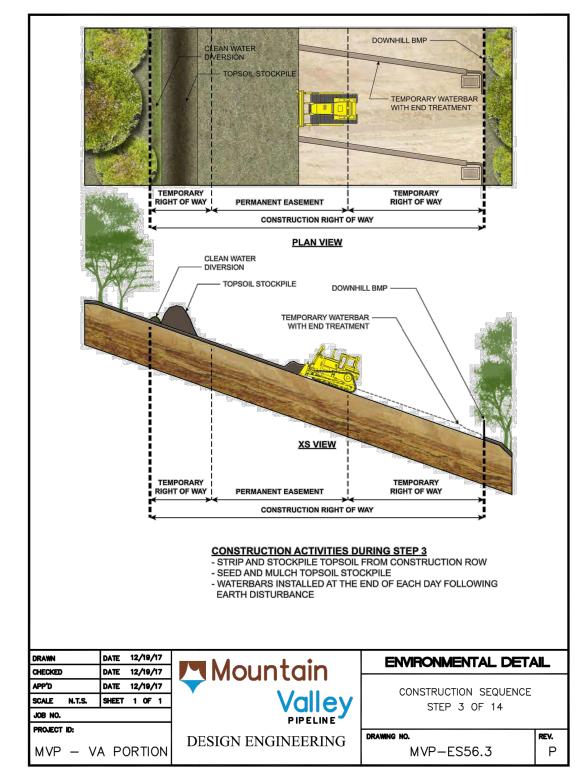
SCALE:

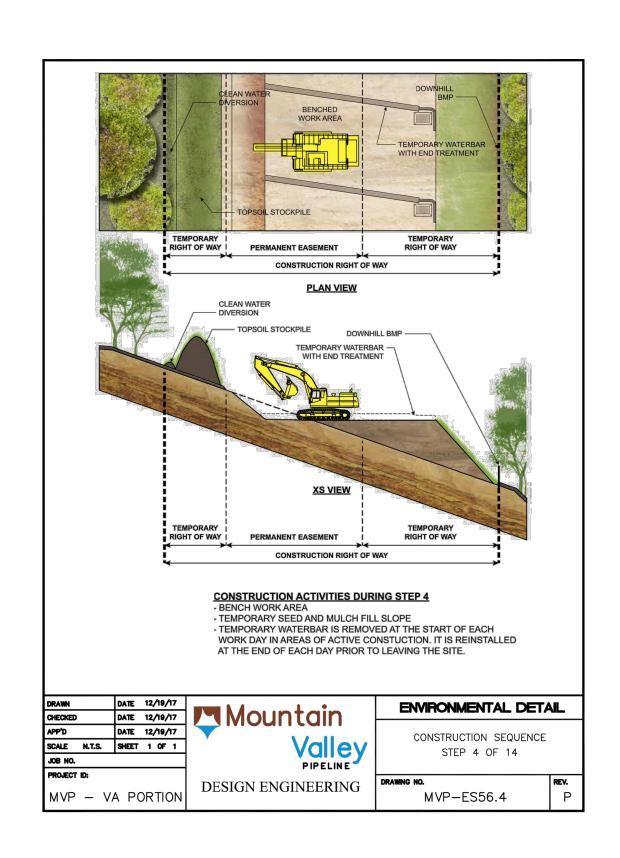
AS SHOWN SHT. NO. 0.14 OF 0.23

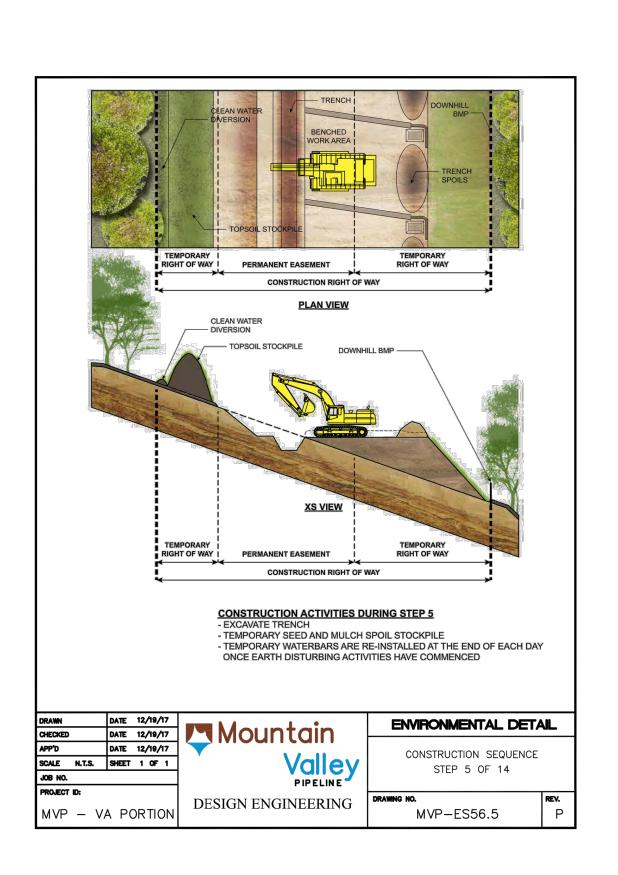


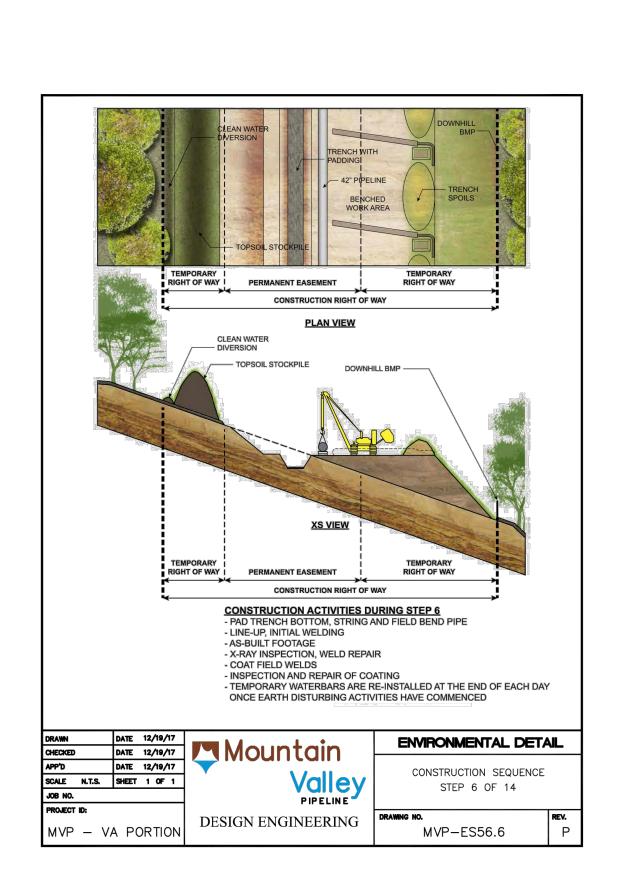


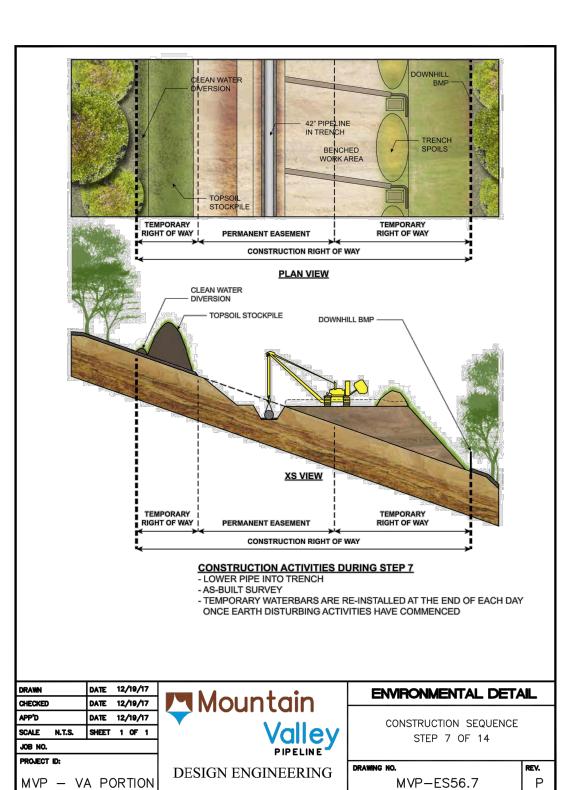


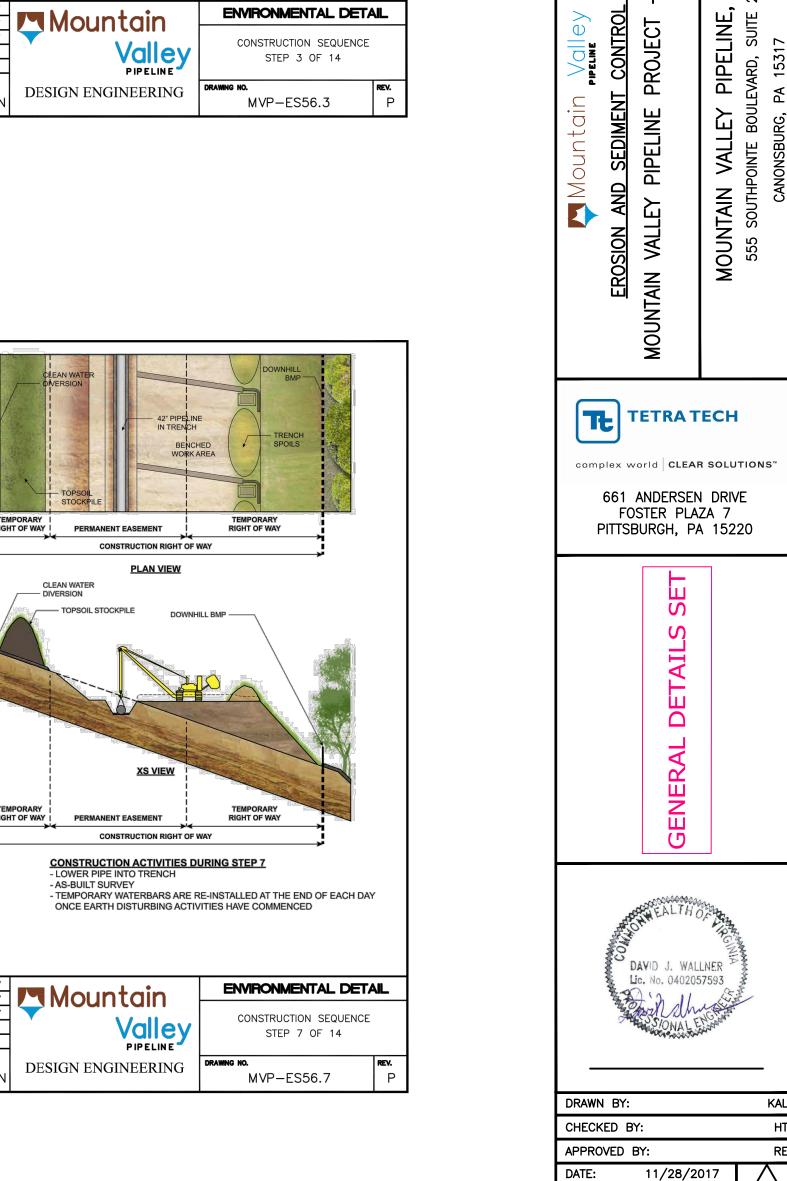






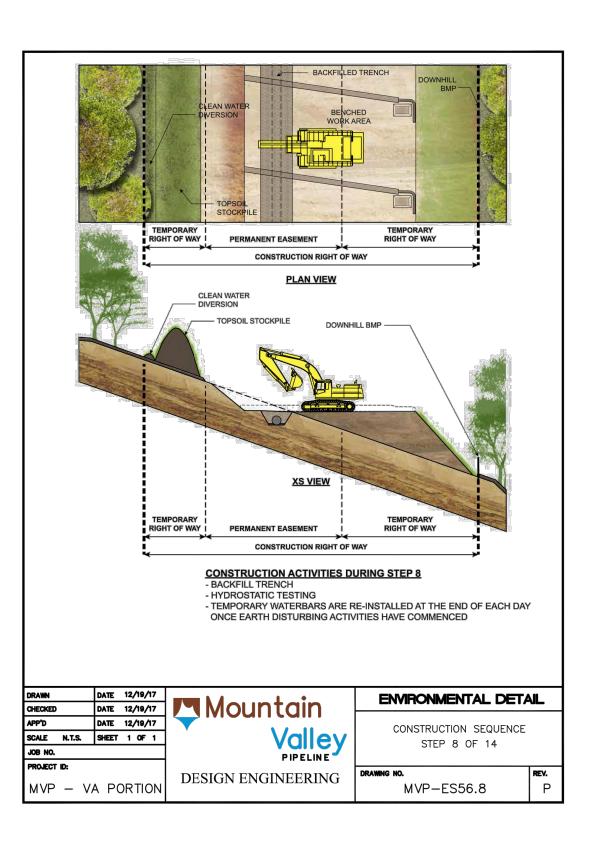


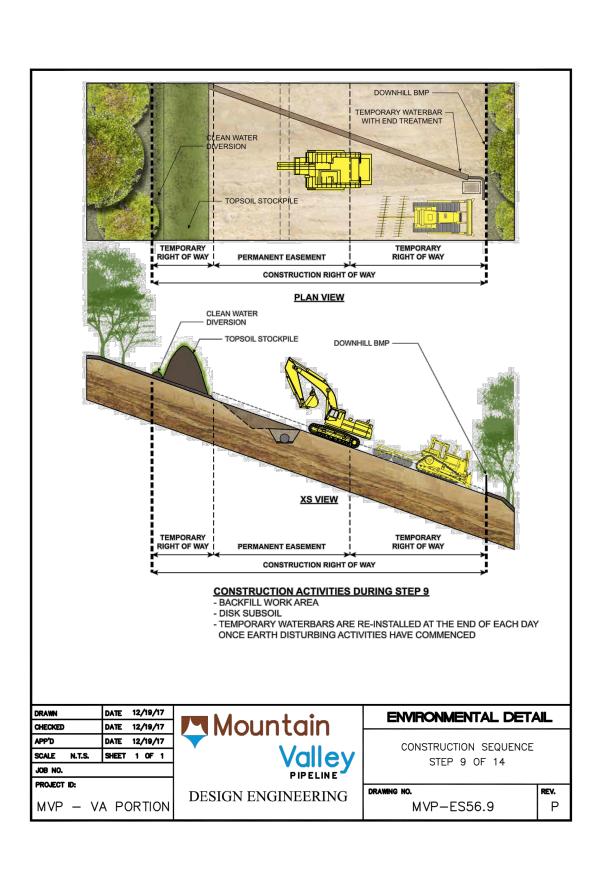


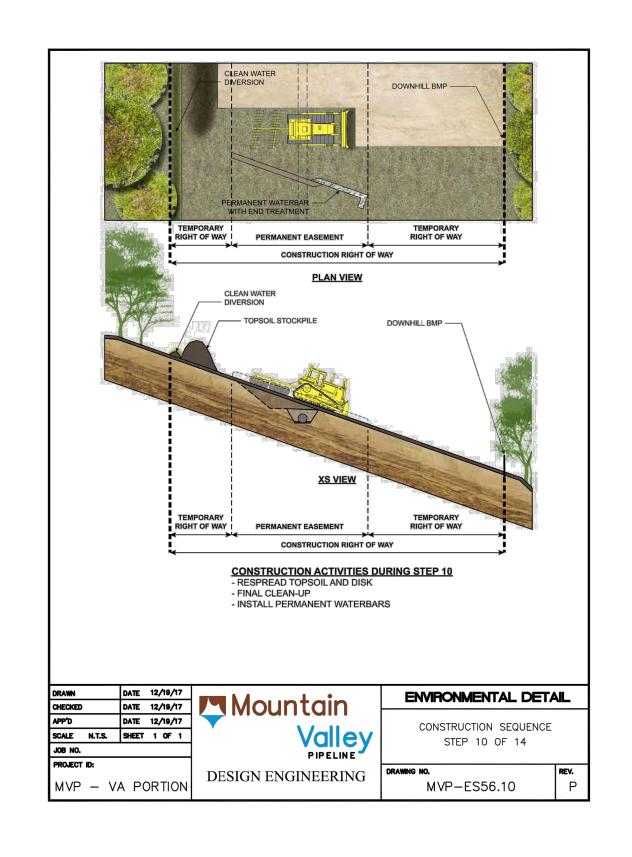


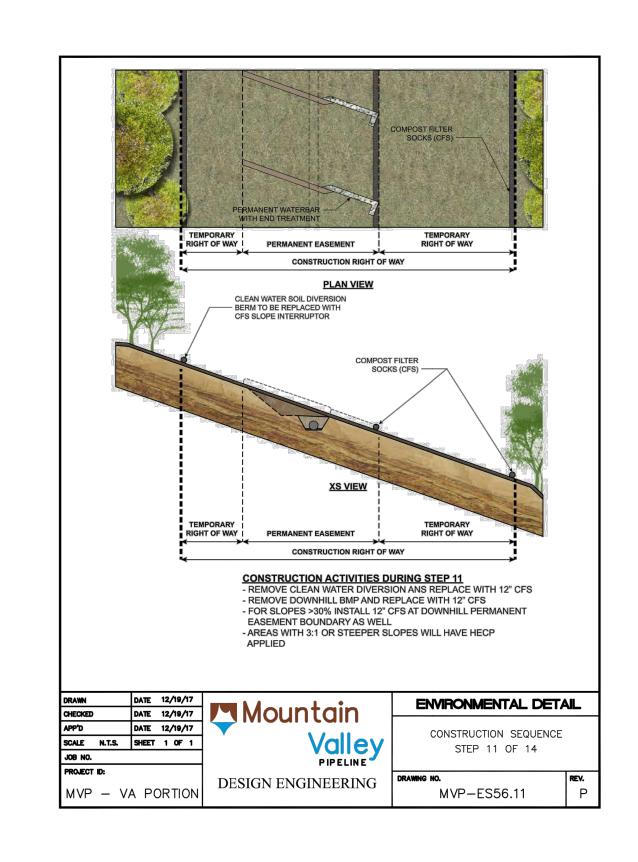
SCALE:

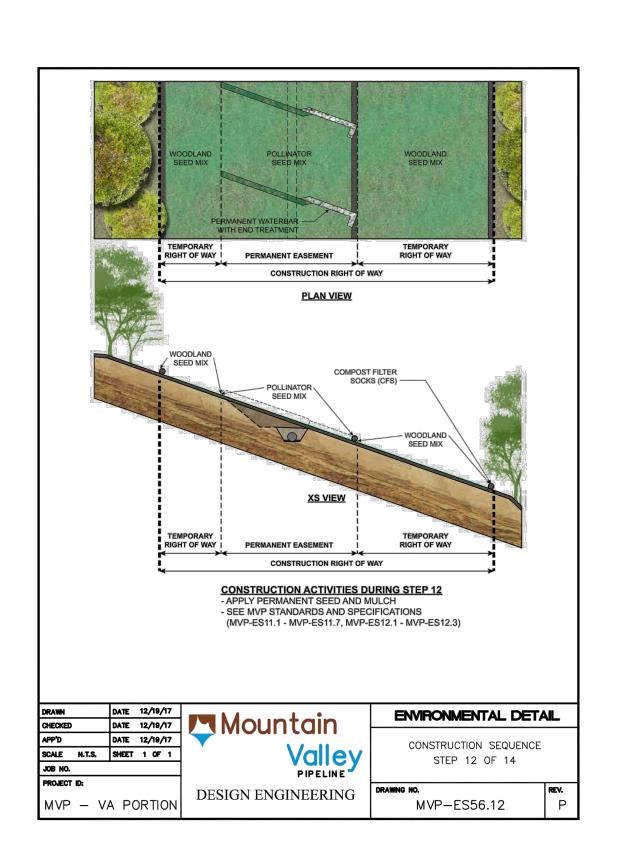
AS SHOWN SHT. NO. 0.15 OF 0.23

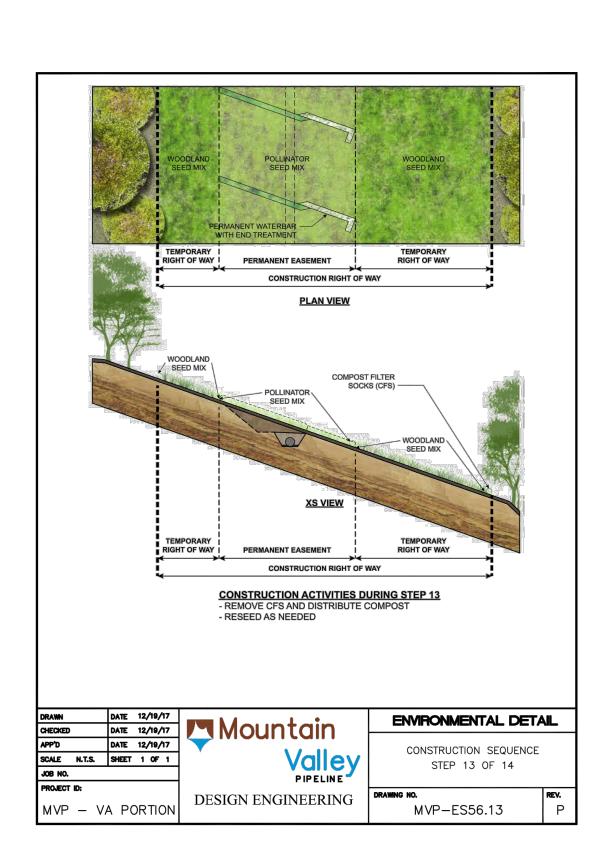


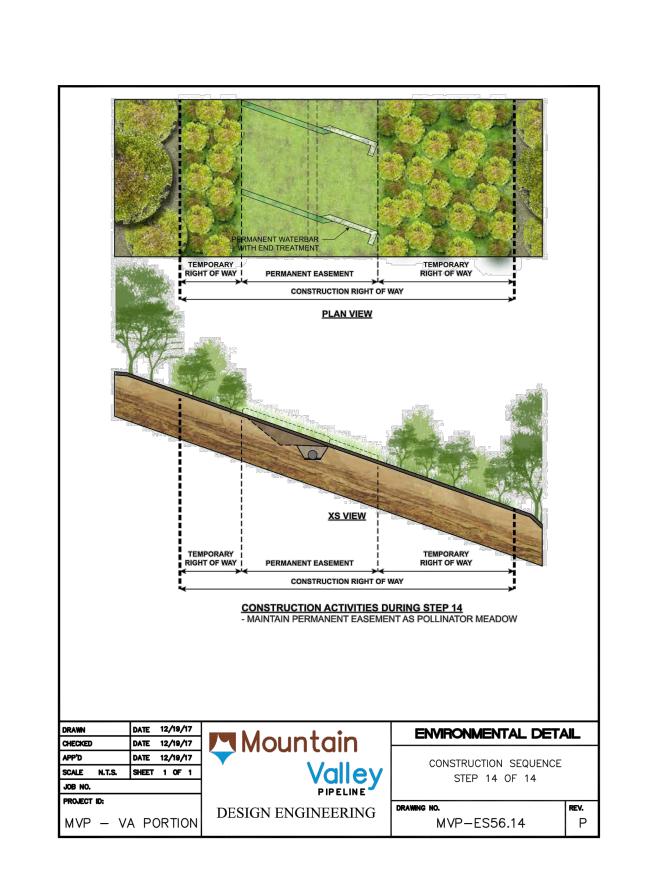


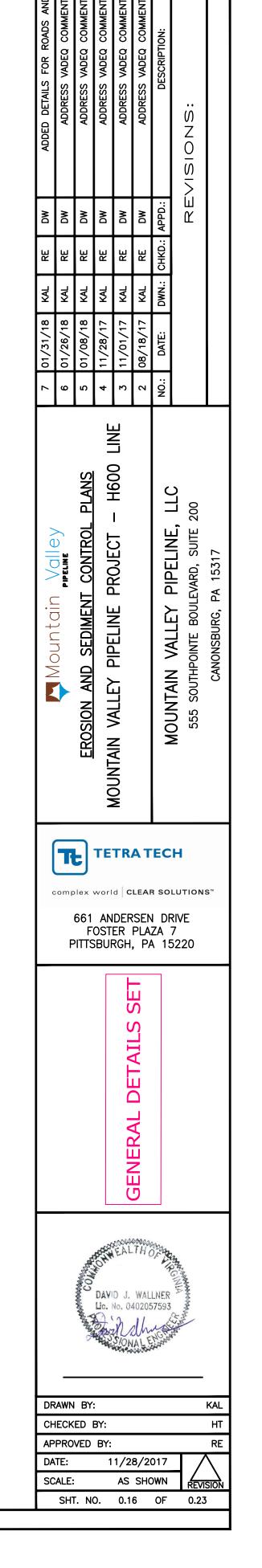


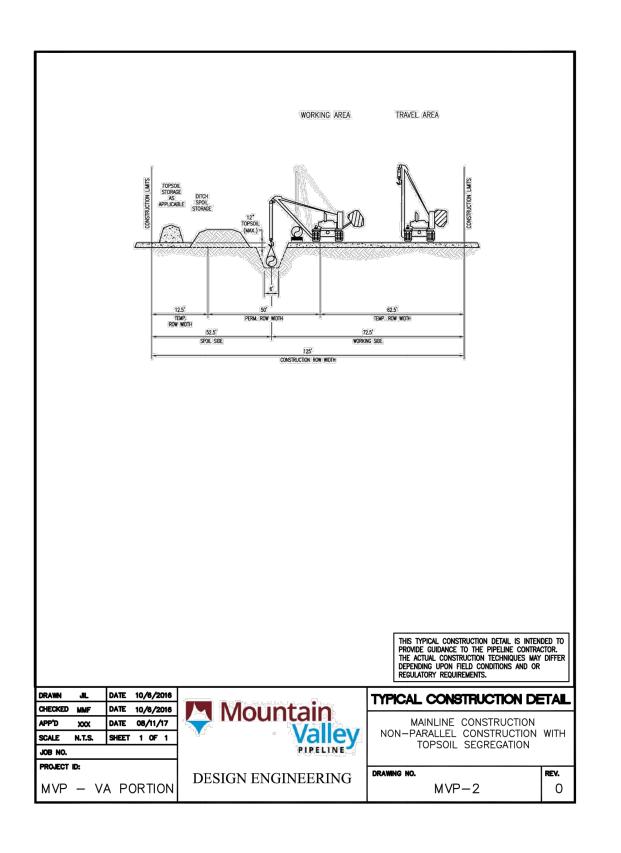


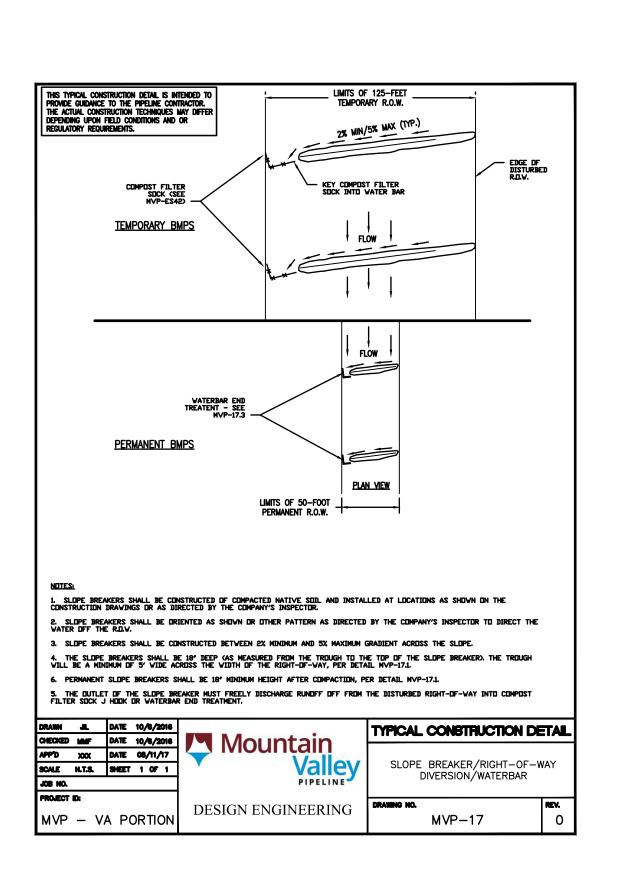


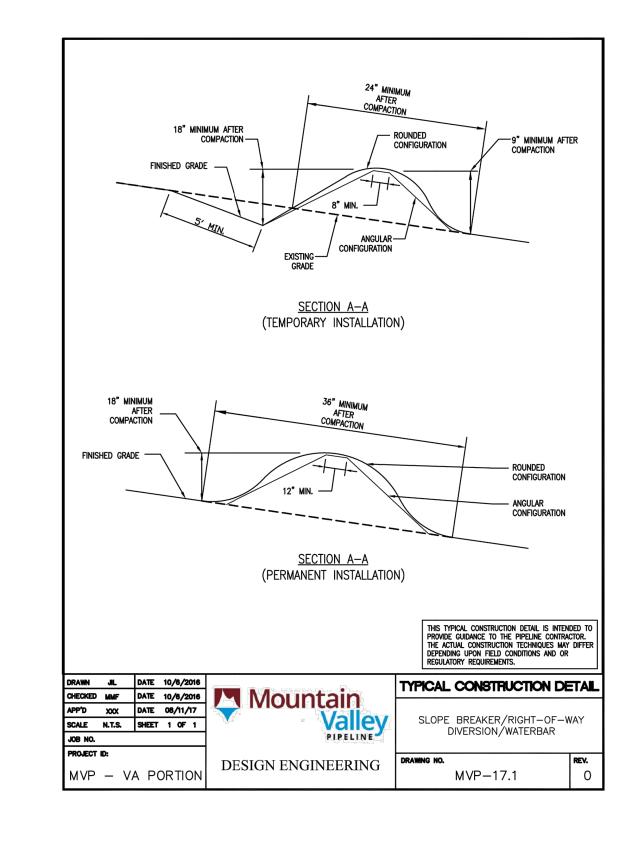


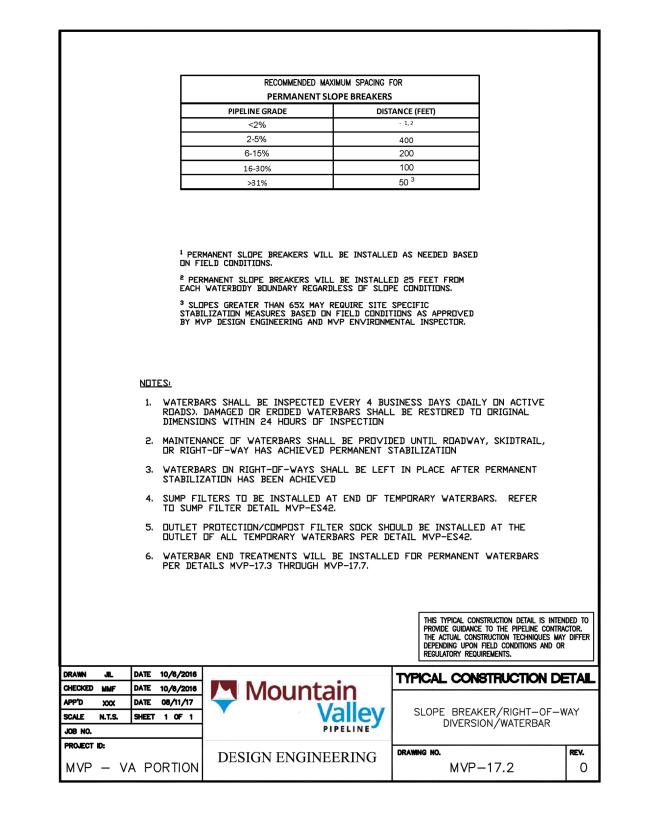


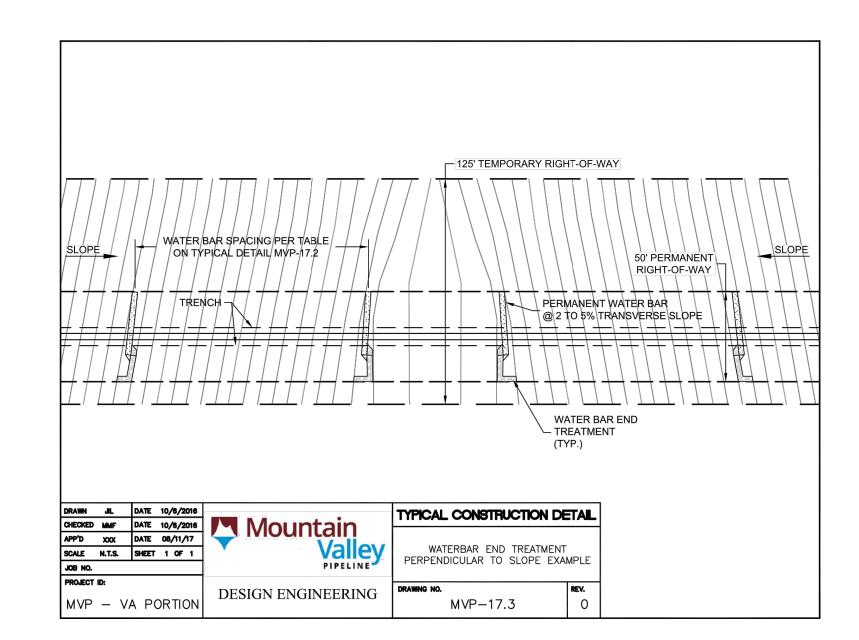


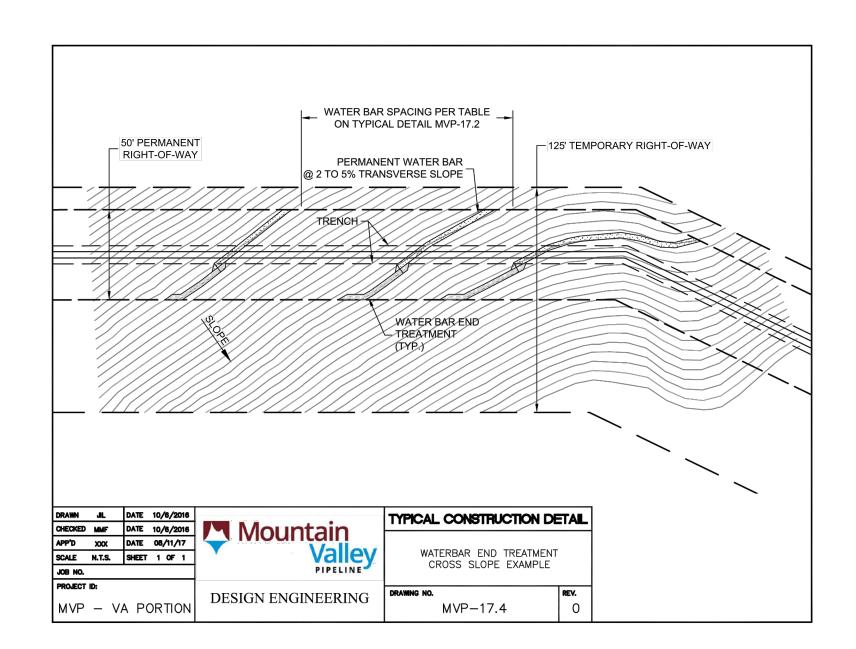


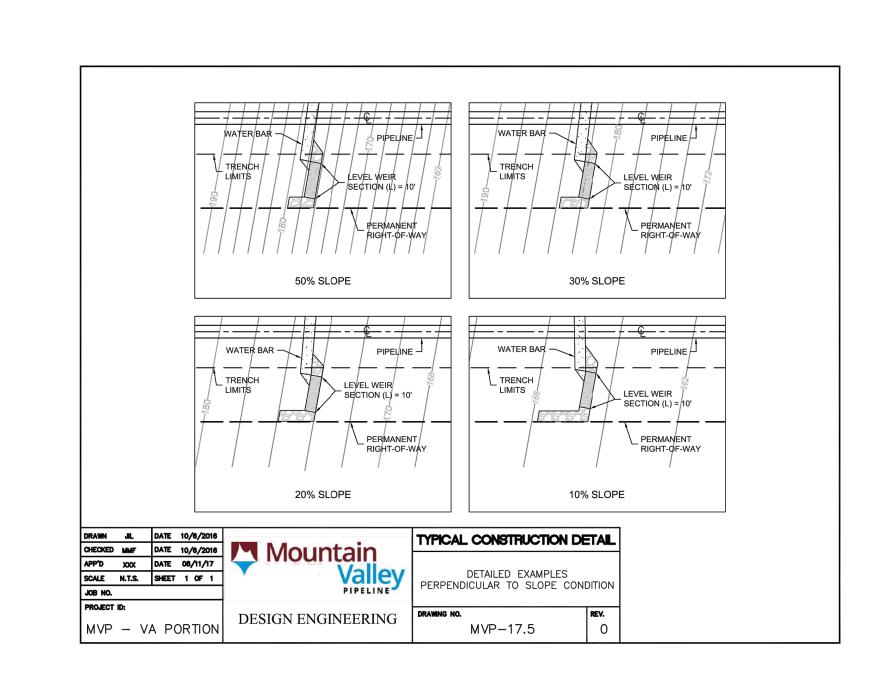




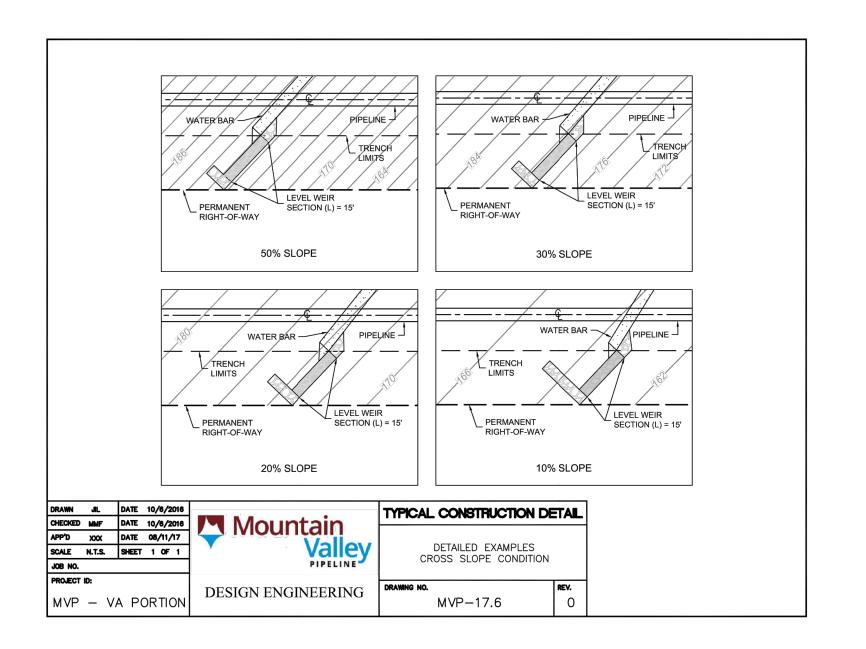


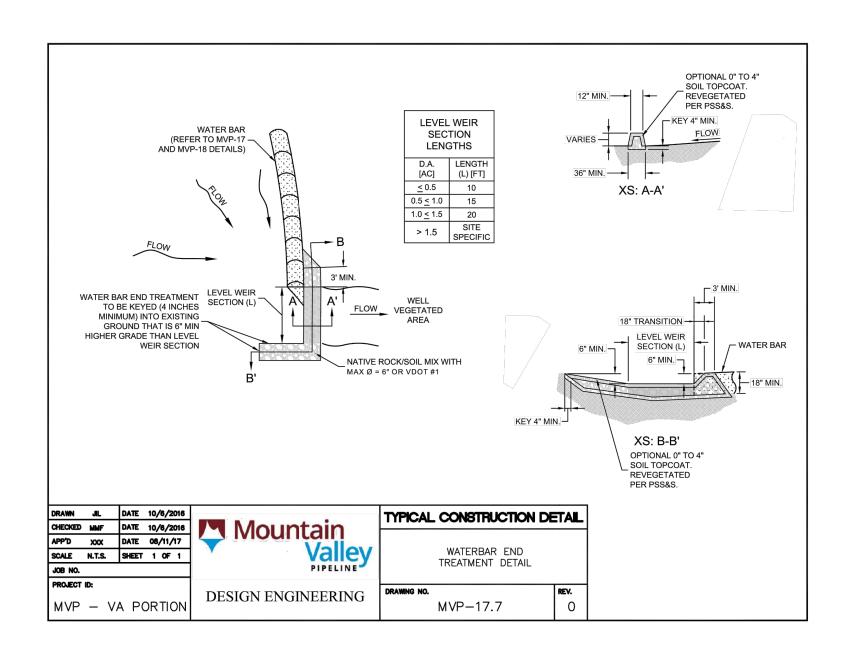


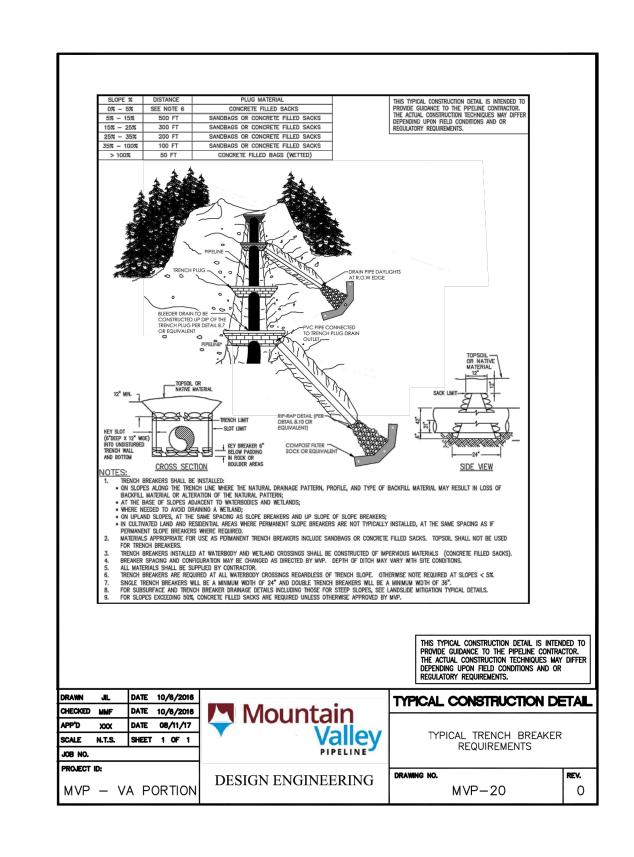


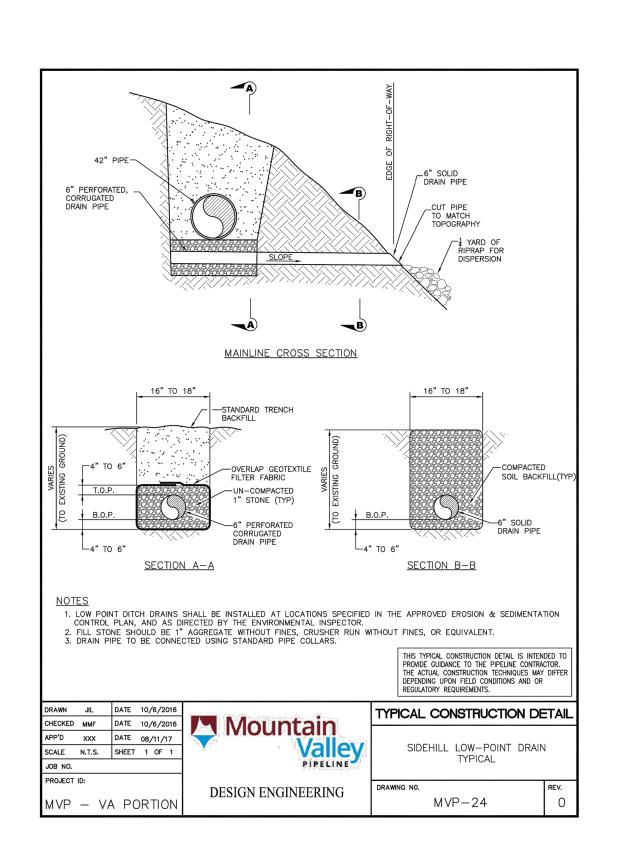


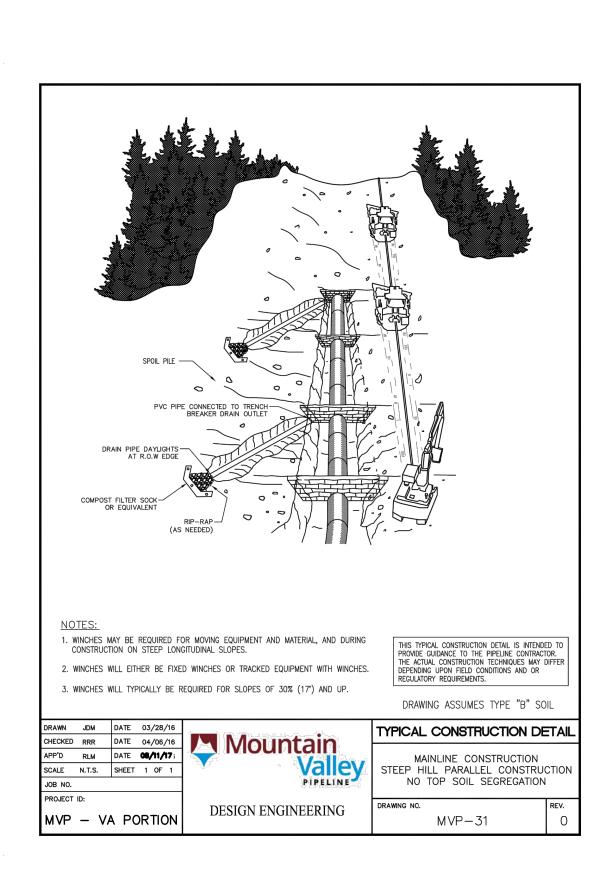


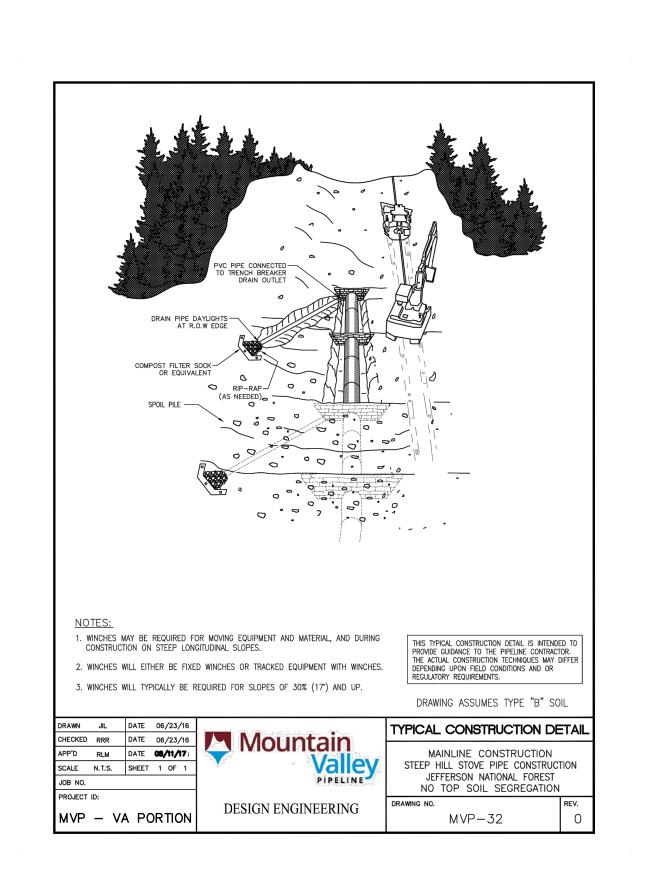


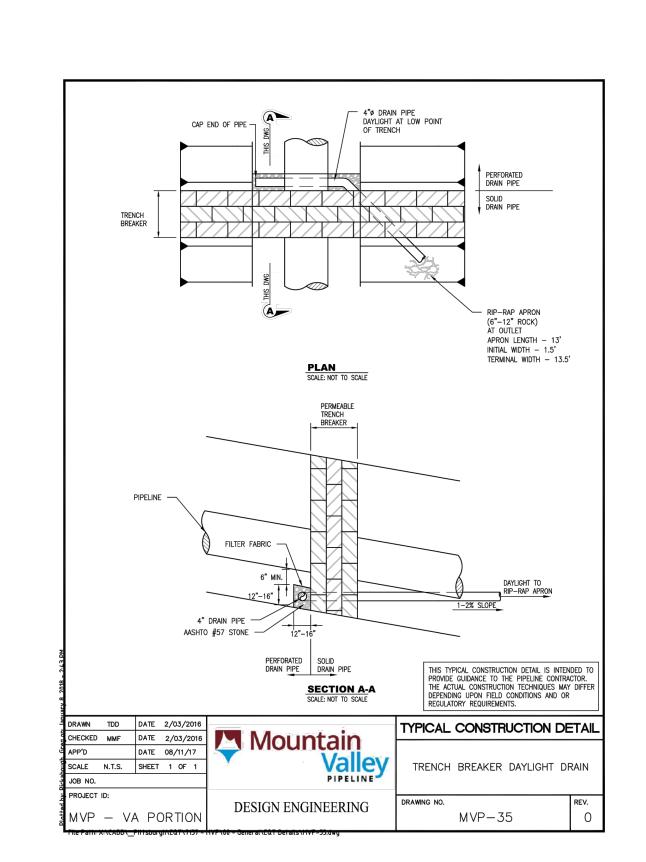


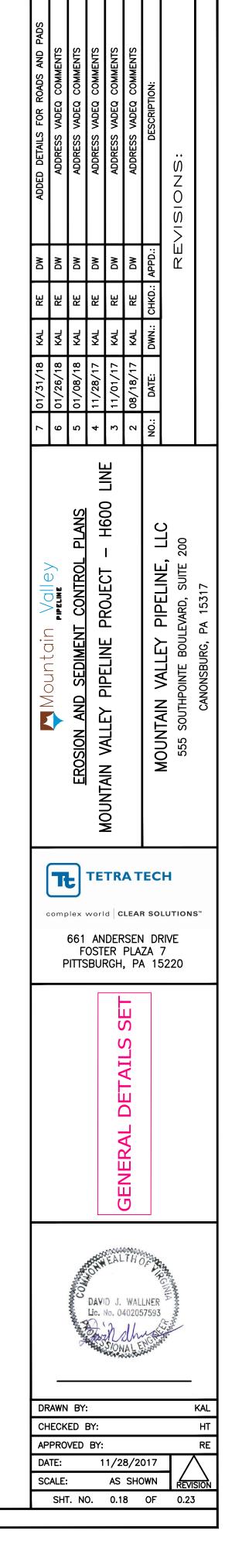


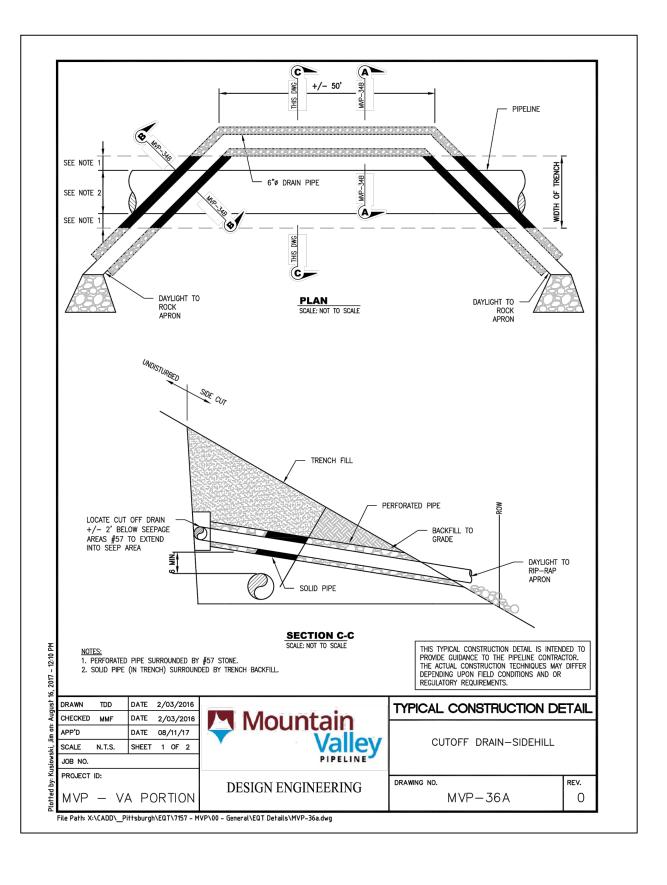


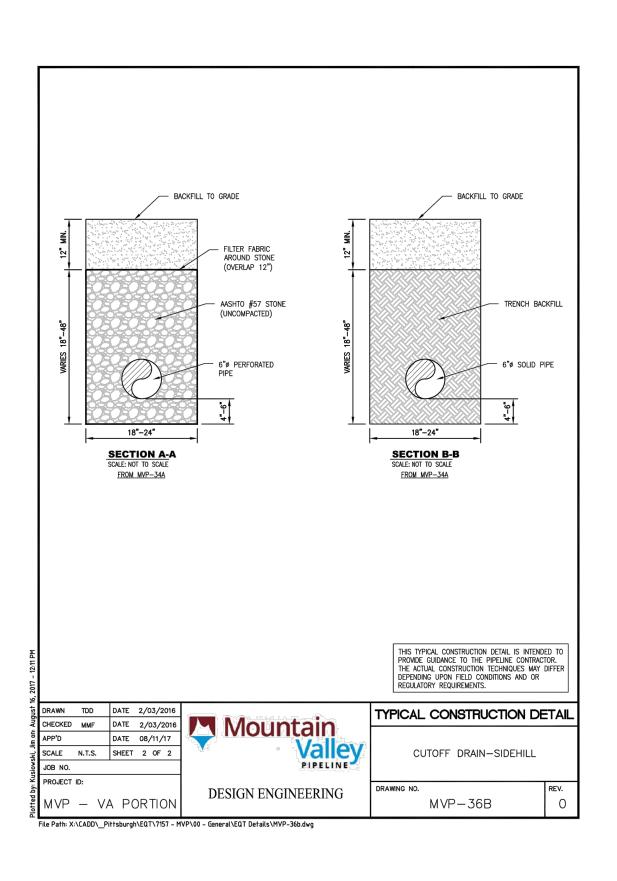


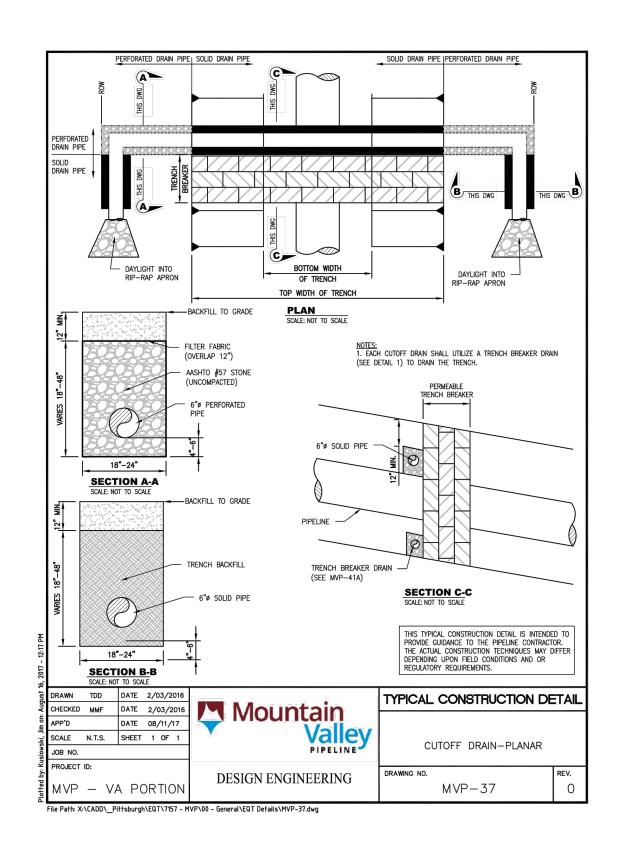


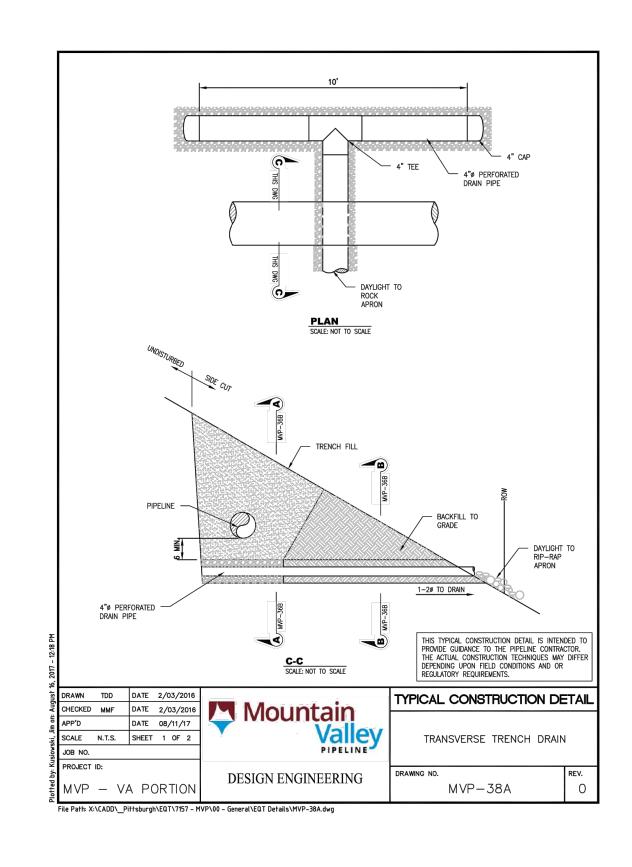


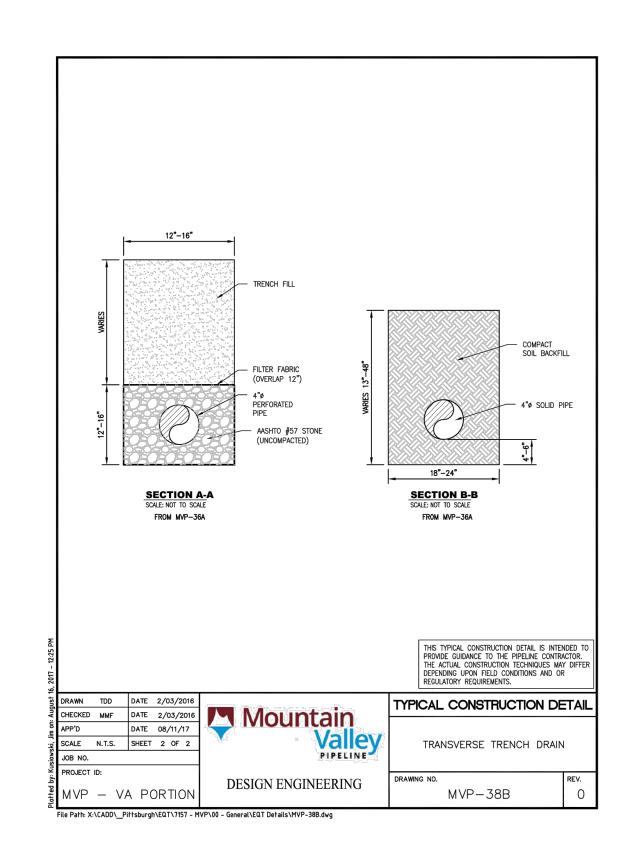


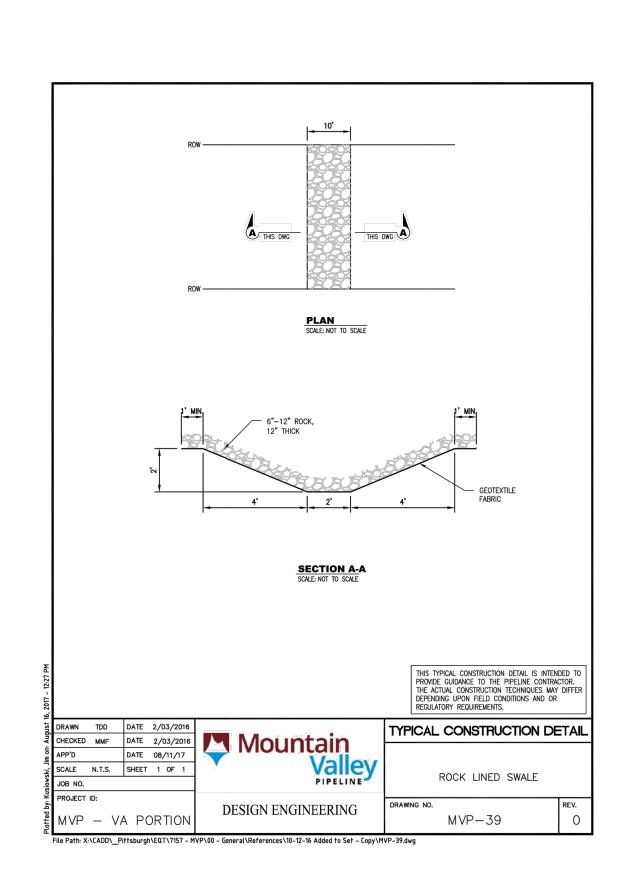


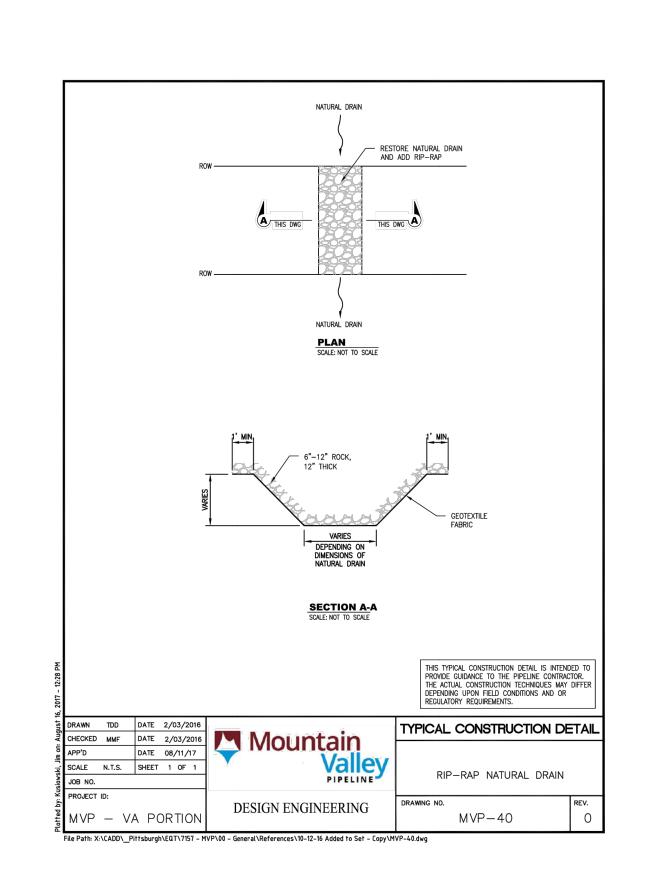


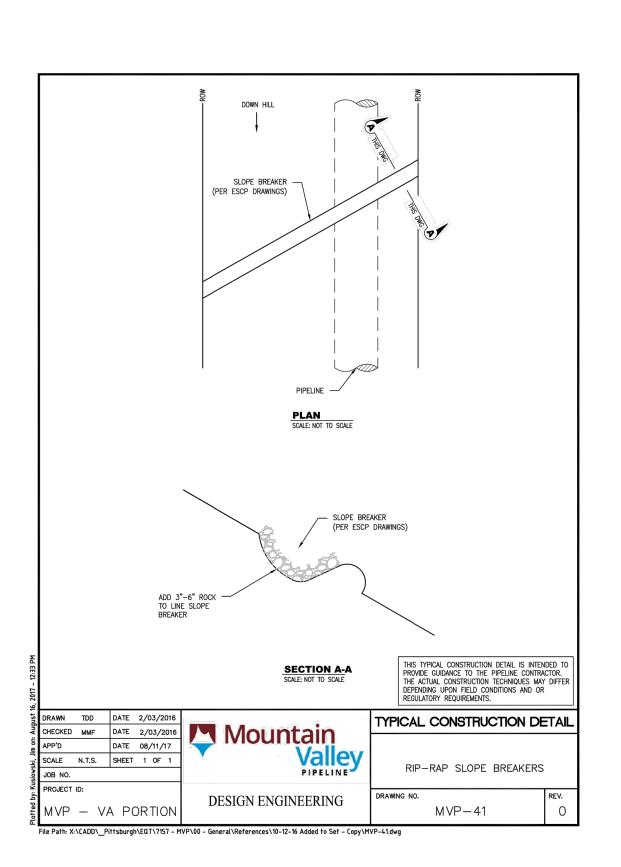




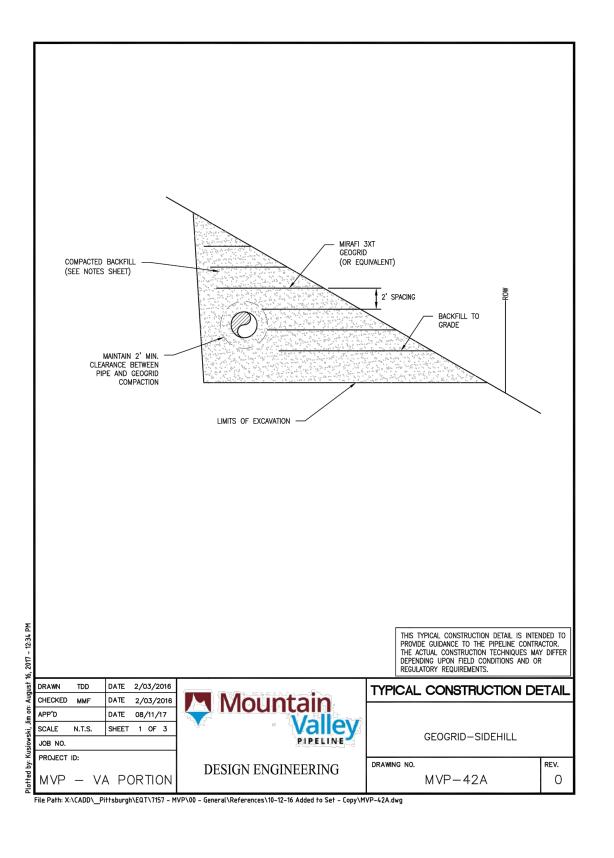


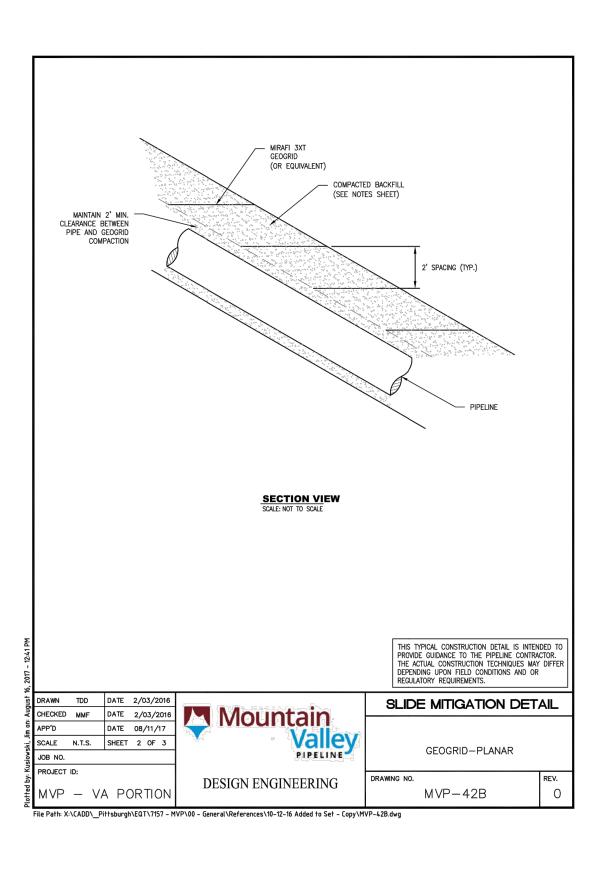


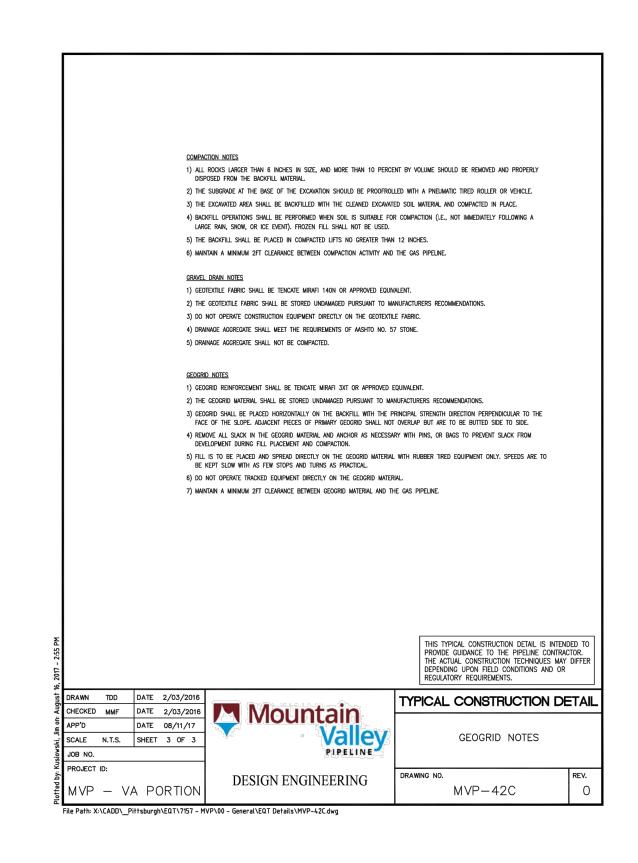


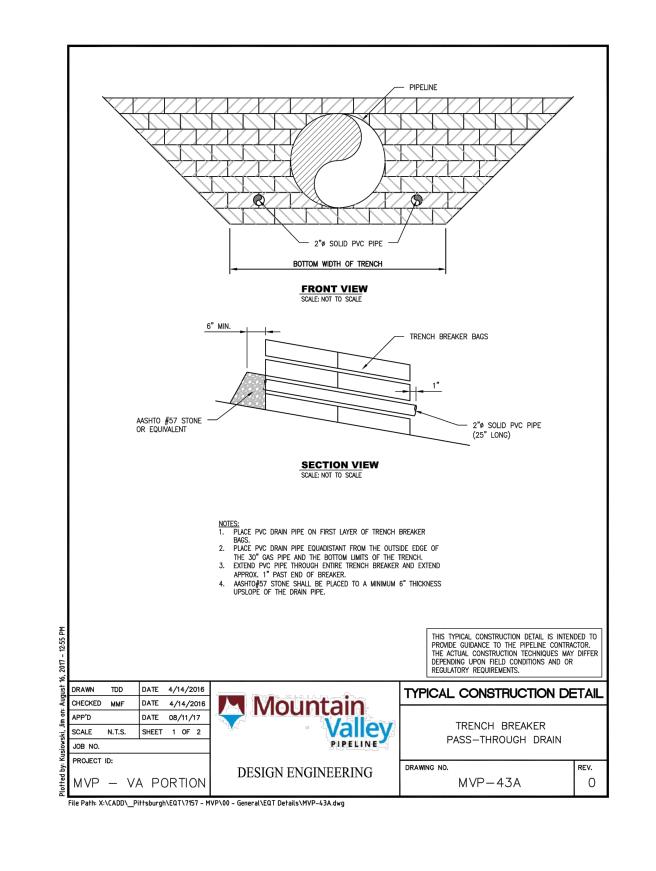


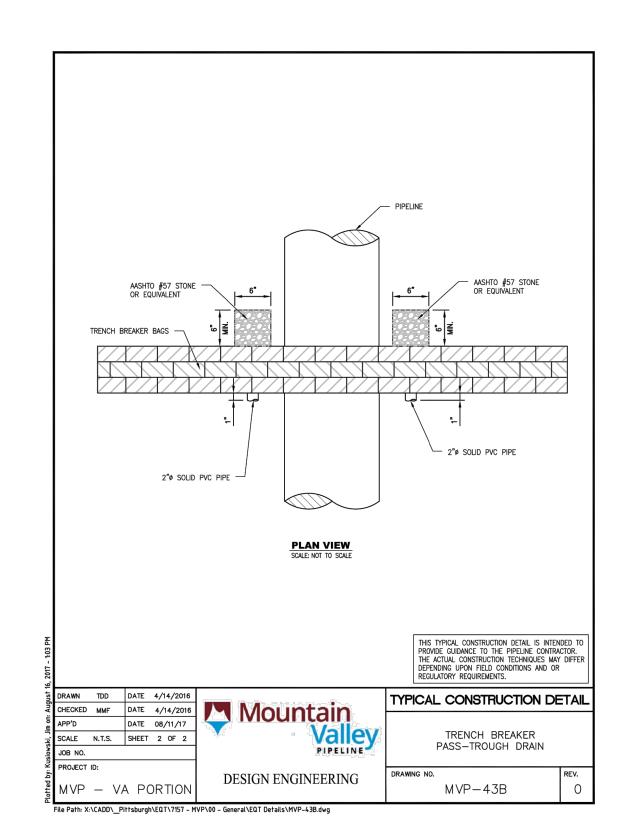


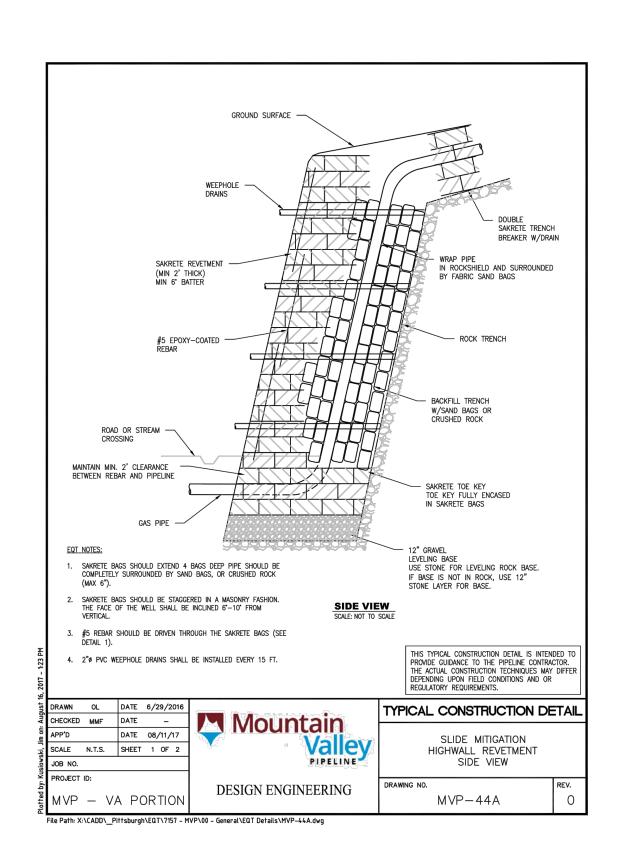


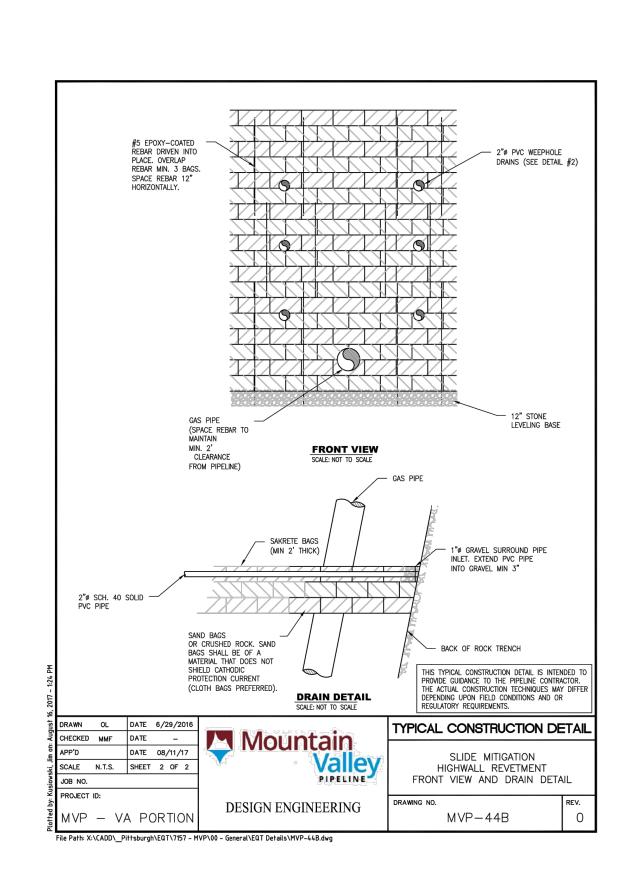


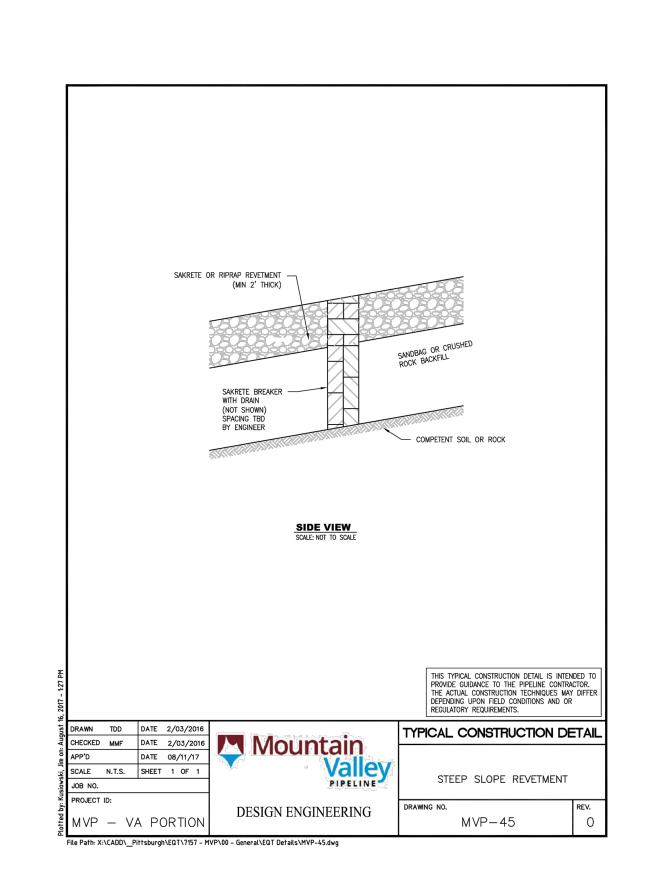




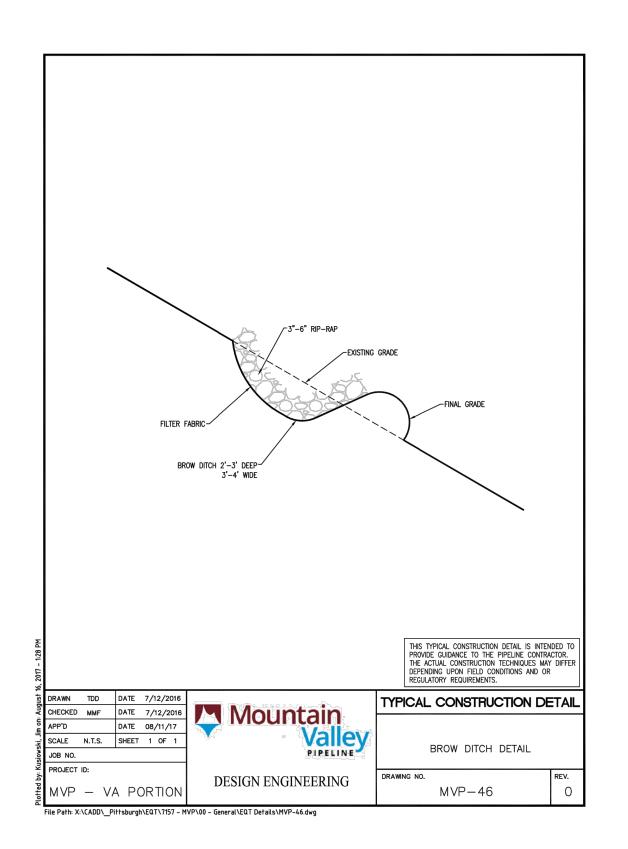










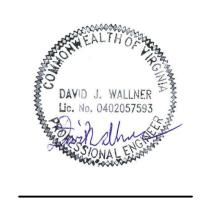


EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT - H600 LLC 200 MOUNTAIN VALLEY PIPELINE, L
555 SOUTHPOINTE BOULEVARD, SUITE 20
CANONSBURG, PA 15317

TETRA TECH

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220



DRAWN BY: CHECKED BY: APPROVED BY: 11/28/2017 SCALE: AS SHOWN

SHT. NO. 0.21 OF 0.23

TETRA TECH CAD FILE PATH: X:\CADD_Pittsburgh\EQT\7157 - MVP\00 - General\E&S\Spread 8\7157ES021(S8).dwg PLOTTED ON: 2/16/2018 9:34 AM PLOTTED BY: Rickabough. Greg PLOT FILE: ENVIRONMENTAL_COLOR.ctb

GENERAL CONSTRUCTION SEQUENCE

THE FOLLOWING IS A GENERAL SEQUENCE FOR EARTHMOVING ACTIVITIES ASSOCIATED WITH CONSTRUCTION OF THE PIPELINE:

- INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS PRIOR TO EARTH DISTURBANCE. REFER TO BEST MANAGEMENT PRACTICES (BMP) INSTALLATION AND REMOVAL NOTES. APPROPRIATE BMPS SHOULD BE PLACED AROUND SENSITIVE AREAS PRIOR TO EARTH DISTÚRBANCE. STONE CONSTRUCTION ENTRANCES (SCE) ARE TO BE PROVIDED AT ALL LOCATIONS WHERE ACCESS ROADS AND PIPELINES WILL BE ACCESSING OR CROSSING A PUBLIC ROADWAY. NOTE THAT SILT FENCE, COMPOST FILTER SOCK AND SUPER SILT FENCE IS BEING INSTALLED AS PART OF A "SYSTEM" OF EROSION CONTROL BMPS INCLUDING CLEAN WATER DIVERSIONS, WATERBARS AND BONDED FIBER MATRIX. THIS BMP SYSTEM APPROACH ALLOWS MVP TO MANAGE SLOPE LENGTH LIMITATIONS OF SUPER SILT BY INTRODUCING SLOPE BREAKS AND ADDITIONAL SURFACE EROSION PROTECTION.
- 2. INSTALL TEMPORARY E&S CONTROLS FOR STREAM CROSSINGS AT LOCATIONS SHOWN ON THE E&S PLAN SHEETS. NO EARTH DISTURBANCE ACTIVITIES WITHIN 50 FEET OF STREAM CHANNELS WILL BE PERFORMED UNTIL MATERIALS NEEDED TO COMPLETE THE CROSSING ARE AT THE NEAREST AVAILABLE LOCATION.
- 3. GENERAL CLEARING AND GRUBBING OF THE TREES AND BRUSH ALONG THE RIGHT-OF-WAY (ROW) FOR PIPELINE TRENCHING MAY COMMENCE TO THE WIDTH SPECIFIED IN THE ROW AGREEMENTS OR CONSTRUCTION ALIGNMENT SHEETS, WHICHEVER IS LESS. SMALLER DEBRIS, SUCH AS SHRUBS OR LIMBS, ARE TO BE CHIPPED AND UTILIZED ON-SITE AS PART OF THE SOIL STABILIZATION. WHERE CHIPPED MATERIAL IS USED AS MULCH, SPREAD AT A RATE NOT TO EXCEED 1 TON/ACRE. UNLESS OTHERWISE DIRECTED BY THE LANDOWNER, LOGS WILL EITHER BE HAULED OFF-SITE OR GIVEN TO THE LANDOWNER UPON THEIR REQUEST; STUMPS AND/OR LOGS WILL BE GROUND, CHIPPED, WINDROWED, OR HAULED OFF-SITE.
- 4. INSTALL CLEAN WATER DIVERSIONS AND CLEAN WATER DIVERSION PIPES IN ACCORDANCE WITH VESCH STD & SPEC 3.09 AND MVP-ES50 AND MCP-ES50.1. IN ADDITION, INSTALL OUTLET STRUCTURES FOR CLEAN WATER PIPES IN ACCORDANCE WITH MVP-ES51 AND MVP-ES51.1. FOLLOWING INSTALLATION OF CLEAN WATER DIVERSION BERMS STABILIZE THE UPHILL SIDE OF THE BERM USING TEMPORARY SEED, EROSION CONTROL MATTING OR BONDED FIBER MATRIX. FINALLY INSTALL ROCK CHECK DAMS IN ACCORDANCE WITH VESCH STD & SPEC 3.20 EXCEPT THAT COMPOST FILTER SOCK OR NATIVE ROCK (SIZED APPROPRIATELY PER VESCH STD & SPEC 3.20) EXCAVATED DURING GRADING WILL BE USED FOR CONSTRUCTION.
- 5. INSTALL TEMPORARY AND PERMANENT RIGHT-OF-WAY DIVERSIONS/WATERBARS IMMEDIATELY AFTER INITIAL DISTURBANCE OF THE SOIL IN ACCORDANCE WITH THE WATERBAR SPACING AND SIZING REQUIREMENTS SHOWN ON THE PLAN AND DETAIL SHEETS (SEE DETAILS VADEQ STD & SPEC 3.11 AND MVP-17). RIGHT-OF-WAY DIVERSIONS/WATERBARS WILL BE CONSTRUCTED OF SOIL, AND USED TO REDUCE RUNOFF VELOCITY AND DIVERT WATER OFF THE PIPELINE ROW. WATERBARS WILL BE INSTALLED WITH SUMP FILTERS (DETAIL MVP-ES42) AT THE DISCHARGE END.
- 6. EXCAVATE PIPELINE TRENCH AND BEGIN GRADING OF PROPOSED METER AND RECTIFIER ANODE BED SITES. THE PROPOSED CONSTRUCTION ROW AND EXTRA WORKSPACES ARE TO BE USED AS A WORK AREA FOR TRENCH EXCAVATION, EQUIPMENT MOVEMENT AND THE TEMPORARY STORAGE OF SOIL STOCKPILES, AS NEEDED. EQUIPMENT, SOIL STOCKPILES, AND OTHER MATERIALS ARE TO REMAIN UPSLOPE OF BMPS DURING CONSTRUCTION ACTIVITIES. REFER TO BMP INSTALLATION AND REMOVAL SEQUENCE FOR THE BMPS TO BE USED FOR PROTECTION DURING TRENCH EXCAVATION AND AROUND TEMPORARY SOIL STOCKPILES. STOCKPILES AND NON-WORK AREA SLOPES WILL BE STABILIZED THROUGH AN APPLICATION OF EITHER MULCH (ORGANIC, EROSION CONTROL BLANKET OR BONDED FIBER MATRIX) OR TEMPORARY SEED. SEGREGATION OF TOPSOIL AND SUBSOIL WILL BE PERFORMED WHERE TRENCH EXCAVATION TAKES PLACE IN AN AGRICULTURAL, WETLAND, OR RESIDENTIAL AREA.
- PIPELINE SECTIONS WILL BE TRANSPORTED TO THE WORK AREA AND STRUNG ALONG THE WORKING SIDE OF THE ROW PARALLEL TO THE TRENCH LINE. WELDING CAN OCCUR IN OR OUT OF THE TRENCH. THE PIPELINE WILL BE BENT TO CONFORM TO THE TRENCH CONTOUR, ALIGNED WELDED AND PLACED ON TEMPORARY SUPPORTS ALONGSIDE THE TRENCH. WELDS WILL BE VISUALLY AND RADIO-GRAPHICALLY INSPECTED AND REPAIRED AS NECESSARY. THE PIPE SECTION WILL BE LOWERED INTO THE TRENCH AND PLACED ON PADDING PER MVP CONSTRUCTION STANDARDS. ANY WETNESS ENCOUNTERED DURING CONSTRUCTION WORK WILL BE DEWATERED BY USING PUMPS, HOSES, AND PUMPED BAGS (DETAIL MVP-ES2), AND WILL BE DISCHARGED TO A WELL VEGETATED, UPLAND AREA.
- 8. STREAM PIPELINE CROSSING CONSTRUCTION METHODS WILL BE INSTALLED AT LOCATIONS SHOWN ON THE E&S PLAN SHEETS AND AS SPECIFIED ON DETAIL SHEET. STREAM BANK STABILIZATION WILL BE INSTALLED IMMEDIATELY FOLLOWING COMPLETION OF PIPELINE INSTALLATION AS SHOWN ON THE DETAIL SHEET.
- 9. INSTALL TRENCH BREAKERS AT LOCATIONS SHOWN ON THE DRAWINGS OR AS DIRECTED BY MVP AND AS SPECIFIED ON THE DETAIL SHEET (DETAIL MVP-20).
- 10. THE TRENCH WILL SUBSEQUENTLY BE BACKFILLED WITH SUITABLE EXCAVATED MATERIAL. THE BACKFILL MATERIAL WILL BE SLIGHTLY CROWNED IN UPLAND AREAS TO ALLOW FOR SETTLEMENT THAT MAY OCCUR. CROWNING THE SOIL SLIGHTLY OVER THE PIPELINE WILL HELP PREVENT FUTURE STORM WATER-RELATED PROBLEMS FROM SETTLING OF THE BACKFILLED AREA. NO CROWNING OF SOILS WILL TAKE PLACE IN WETLANDS, STREAMS, OR FLOOD PLAINS. IN AREAS WHERE TOPSOIL HAS BEEN SEGREGATED, THE SUBSOIL WILL BE REPLACED FIRST, AND THEN THE TOPSOIL WILL BE SPREAD OVER THE AREA FROM WHICH IT WAS REMOVED. DISTURBED AREAS WILL BE RESTORED TO THEIR APPROXIMATE ORIGINAL TOPOGRAPHIC CONTOURS.
- 11. STABILIZE EXPOSED AND UNWORKED SOILS BY APPLICATION OF EFFECTIVE BMPS THAT PROTECT THE SOIL FROM THE EROSIVE FORCES OF RAINDROPS, FLOWING WATER, AND WIND. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. WHERE A DENUDED AREA WILL REMAIN IDLE FOR MORE THAN 7 CALENDAR DAYS, TEMPORARY SEEDING (VA STD & SPEC 3.31, TABLE 3.31-B) WILL BE APPLIED TO THE ROUGH GRADED AREA. PERMANENT STABILIZATION SHALL BE APPLIÈD TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
- 12. IN THE UNLIKELY EVENT THAT THERE ARE EXCESS EXCAVATED MATERIALS REMAINING AFTER THE TRENCH HAS BEEN BACKFILLED, THE MATERIAL IS TO BE DISPOSED OF WITHIN THE EXISTING ROW IN AN UPLAND AREA OUTSIDE OF THE 100-YEAR FLOOD PLAIN. MATERIAL WILL BE SPREAD IN A THIN LAYER AND TIED INTO EXISTING CONTOURS TO CREATE POSITIVE DRAINAGE FOR STORMWATER
- 13. CONSTRUCT PERMANENT RIGHT-OF-WAY DIVERSION/WATERBARS AFTER COMPLETION OF GRADING IN ACCORDANCE WITH THE WATERBAR SPACING AND SIZING REQUIREMENTS SHOWN ON PLAN AND DETAIL SHEETS (DETAIL MVP-17).
- 14. PRIOR TO SEEDING MVP WILL DISC AREAS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION. DISCING WILL BE PERFORMED ON SUBSOILS TO A DEPTH OF 4-6" AND AGAIN FOLLOWING TOPSOILING.
- 15. REVEGETATE DISTURBED AREA PER THE TABLES ON DETAILS MVP-ES11.1 TO 11.9 AND MVP-12.1 TO 12.4 OR PER LANDOWNER REQUEST. FOR 3:1 OR STEEPER SLOPES THE DISTURBED AREA WILL HAVE EROSION CONTROL FABRIC (BLANKETING, HYDROSEEDING, FLEXTERRA, OR APPROVED EQUAL) INSTALLED AS SHOWN ON DETAIL SHEET (DETAILS VA STD & SPEC 3.36, MVP-ES40 AND MVP ES-40.1).
- 16. RE-ESTABLISH APPROPRIATE DRAINAGE IN EXISTING ROAD CHANNELS PRIOR TO SEEDING AND MULCHING.
- 17. CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS ON AT LEAST THE FOLLOWING FREQUENCIES:
 - A. IN NON-TMDL WATERSHEDS • AT LEAST ONCE EVERY FIVE BUSINESS DAYS, OR
 - •AT LEAST ONCE EVERY 10 BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (OR ON THE NEXT BUSINESS DAY IF THE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS. B. IN TMDL WATERSHEDS:
 - AT LEAST ONCE EVERY FOUR BUSINESS DAYS, OR
 - AT LEAST ONCE EVERY 5 BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (OR ON THE NEXT BUSINESS DAY IF THE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS.

TEMPORARY BMP'S WILL BE REMOVED UPON ACHIEVING VEGETATIVE STABILIZATION, WHICH IS DEFINED AS "A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION". DISTURBED AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RESEEDED AS NEEDED UNTIL THE ENDPOINT IS ACHIEVED.

18. ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS THAT OCCUR ON SITE DURING CONSTRUCTION SHALL BE HANDLED AND LEGALLY DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF SURFACE WATERS. WOODY DEBRIS MAY BE CHIPPED AND SPREAD ON-SITE.

FOR STREAM CROSSINGS, REFER TO THE FOLLOWING STEPS:

- 1. INSTALL TEMPORARY EQUIPMENT BRIDGE. BYPASS HOSE. FLUME. PUMP. OR COFFERDAM AS DESCRIBED IN STREAM CROSSING DETAILS AROUND THE WORK AREA.
- 2. DEWATER WORK AREA UTILIZING PUMP WATER FILTER BAGS. WHERE POSSIBLE, EXCAVATION WILL BE FROM THE TOP OF THE STREAM BANK.
- 3. INSTALL TRENCH PLUGS, PIPE, AND BACKFILL
- 4. STABILIZE CHANNEL EXCAVATION AND STREAM BANKS PRIOR TO REDIRECTING STREAM FLOW.
- 5. REMOVE BYPASS HOSE, FLUME, PUMP, AND TEMPORARY DAM AS NEEDED.

IF WORKING WITHIN A WETLAND AREA. FOLLOW THE GENERALIZED CONSTRUCTION SEQUENCE BELOW:

- 1 INSTALL EITHER SUPER SILT FENCE, ORANGE CONSTRUCTION FENCE, OR COMPOST FILTER SOCKS ALONG THE PERIMETERS OF THE SITE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
- 2. MATS, PADS, OR SIMILAR DEVICES WILL BE USED DURING THE CROSSINGS OF WETLANDS. ORIGINAL GRADES THROUGH WETLANDS MUST BE RESTORED AFTER TRENCHING AND BACKFILLING. ANY EXCESS FILL MATERIALS MUST BE REMOVED FROM THE WETLAND AND NOT SPREAD WITHIN WETLANDS.
- 3. SOIL EXCAVATED FROM WETLAND AREAS WILL BE CAREFULLY REMOVED WITH THE ROOTS INTACT. THIS SOIL WILL BE PLACED IN A SEPARATE STOCKPILE TO BE REUSED DURING THE WETLAND SURFACE
- 4. DEWATER WORK AREA UTILIZING PUMPED WATER FILTER BAGS.
- 5. INSTALL PIPE.
- 6. INSTALL TRENCH PLUGS IN WETLAND AREAS TO PREVENT THE TRENCH FROM DRAINING THE WETLAND OR CHANGING ITS HYDROLOGY.
- 7. BACKFILL PIPE TRENCH. BACKFILL THE TOP 12-INCHES OF THE EXCAVATED TRENCH WITH THE STOCKPILED WETLAND SOIL TO MATCH ORIGINAL SURFACE GRADES.
- 8. COMPACT BACKFILL AND GRADE THE SURFACE OF THE TRENCH AREA TO ALLOW FOR POSITIVE DRAINAGE TO SOIL E&SCS AND TO PREPARE DISTURBED AREAS FOR PERMANENT TRENCH RESTORATION.
- 9. MAINTAIN ALL E&SCS DEVICES UNTIL SITE WORK IS COMPLETE AND A GROUND COVER IS ACHIEVED THAT IS UNIFORM AND MATURE ENOUGH TO SURVIVE AND INHIBIT EROSION.
- 10. REMOVE ALL SOIL AND E&SC MEASURES UPON ESTABLISHMENT OF A GROUND COVER THAT IS UNIFORM AND MATURE ENOUGH TO SURVIVE AND INHIBIT EROSION. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL E&SCS.

BMP MAINTENANCE

- TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. MAINTENANCE AND REPAIR SHALL BE CONDUCTED IN ACCORDANCE WITH THE APPROVED STANDARDS AND SPECIFICATIONS.
- IN NON-AGRICULTURAL AREAS THE VISUAL SURVEY SHALL BE COMPARED TO THE DENSITY AND COVER OF ADJACENT UNDISTURBED LANDS. IN AGRICULTURAL AREAS, THE VISUAL SURVEY SHALL BE COMPARED TO THE ADJACENT UNDISTURBED PORTIONS OF THE SAME FIELD, UNLESS THE EASEMENT AGREEMENT SPECIFIES OTHERWISE.
- WETLANDS ALONG THE PROPOSED PIPELINE ARE EXPECTED TO EXHIBIT VARYING DEGREES OF SATURATION AND WATER ELEVATION, REQUIRING A VARIETY OF PLANT SPECIES TO BE RE-ESTABLISHED. IN UNSATURATED WETLANDS, MOST VEGETATION WILL BE REPLACED BY SEEDING. SATURATED WETLANDS WILL TYPICALLY BE ALLOWED TO RE-VEGETATE NATURALLY. WETLAND REVEGETATION WILL BE CONSIDERED SUCCESSFUL WHEN THE COVER OF HERBACEOUS AND/OR WOODY SPECIES IS AT LEAST 80 PERCENT OF THE TYPE, DENSITY, AND DISTRIBUTION OF THE VEGETATION IN ADJACENT WETLAND AREAS THAT WERE NOT DISTURBED BY CONSTRUCTION. REVEGETATION EFFORTS WILL CONTINUE UNTIL WETLAND REVEGETATION IS SUCCESSFUL.
- CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS ON AT LEAST THE FOLLOWING
- FREQUENCIES:
- A. IN NON-TMDL WATERSHEDS AT LEAST ONCE EVERY FIVE BUSINESS DAYS. OR
- AT LEAST ONCE EVERY 10 BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (OR ON THE NEXT BUSINESS DAY IF THE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS.
- B. IN TMDL WATERSHEDS:
- AT LEAST ONCE EVERY FOUR BUSINESS DAYS, OR
- AT LEAST ONCE EVERY 5 BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (OR ON THE NEXT BUSINESS DAY IF THE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS.

TEMPORARY BMPS WILL BE REMOVED UPON ACHIEVING VEGETATIVE STABILIZATION. WHICH IS DEFINED AS "A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION". DISTURBED AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RESEEDED AS NEEDED UNTIL THE ENDPOINT IS ACHIEVED.

TEMPORARY EROSION AND SEDIMENT CONTROL BMPS SHOULD BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON SITE. DISTURBED SOIL RESULTING FROM REMOVAL OF BMPS OR VEGETATION SHALL BE PERMANENTLY STABILIZED.

RESTORATION BMP PHASING

THE FOLLOWING IS THE SEQUENCE OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE REMOVAL AND INSTALLATION RELATED TO RESTORATION ACTIVITIES. THIS WORK WILL OCCUR BETWEEN RESTORATION OF PIPELINE LIMIT OF DISTURBANCE TO PRE-CONSTRUCTION GRADES AND FINAL CLOSURE OF THE PROJECT DEFINED AS "ACHIEVING VEGETATIVE STABILIZATION". THE SEQUENCE IS:

1) REMOVE AND GRADE OUT THE CLEAN WATER DIVERSION DIKE.

REMOVE DOWNSLOPE BMPS UTILIZED DURING CONSTRUCTION AND IMMEDIATELY REPLACE WITH 12-IN COMPOST FILTER SOCK. ON SLOPES GREATER THAN 30%, AN ADDITIONAL INTERMEDIATE 12-IN COMPOST FILTER SOCKS WILL BE PLACED PER THE SLOPE SPACING (MVP-ES3.2) TO ATTENUATE THE VELOCITY OF RUNOFF IN THE RECLAIMED

3) APPLY SPECIALTY SEEDS AS REQUIRED THAT WILL NOT BE INCLUDED IN THE MULCH PHASE (STEP 4), SEED THE AREA USING THE SEED MIXES AND RATES SPECIFIED IN MVP-ES11.1 TO MVP-ES11.9 AND MVP-ES12.1 TO MVP-ES12.4.

4) APPLY MULCH IN THE FORM OF ORGANIC MULCH (PER MVP-ES45), SOIL STABILIZATION MATTING (PER VADEQ STD & SPEC 3.36), OR HYDRAULIC EROSION CONTROL PRODUCT (PER MVP-ES40).

5) FOLLOWING A DETERMINATION THAT THE SITE HAS ACHIEVED VEGETATIVE STABILIZATION, THE COMPOST FILTER SOCK WILL BE "OPENED" AND THE MULCH CONTAINED WITHIN WILL BE SPREAD WITHIN THE LIMITS OF DISTURBANCE.

	,	101/10/10	1	111		
	9	01/26/18	KAL	RE	DW	ADDRESS VADEQ COMMENTS
IL PLANS	2	5 01/08/18	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
JINI L OUST	4	11/28/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
	3	11/01/11	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
	2	08/18/17	KAL	RE	DW	ADDRESS VADEQ COMMENTS
	NO.:	DATE:	DWN.:	DWN.: CHKD.: APPD.:	APPD.:	DESCRIPTION:
:, LLC : 200					Я.	REVISIONS:

PIPELINE, EVARD, SUITE T CONTROL PROJECT SEDIMENT PIPELINE PI VALLEY
OINTE BOUL
ONSBURG, P EROSION ANI FAIN VALLEY



661 ANDERSEN DRIVE FOSTER PLAZA 7

complex world | CLEAR SOLUTIONS

PITTSBURGH, PA 15220



DRAWN BY: CHECKED BY: APPROVED BY: 11/28/2017 DATE: SCALE: AS SHOWN

SHT. NO. 0.22 OF 0.23

BEST MANAGEMENT PRACTICES (BMP) INSTALLATION & REMOVAL NOTES

TEMPORARY AND PERMANENT BMPS WILL BE USED DURING CONSTRUCTION ACTIVITIES TO AVOID AND/OR MINIMIZE ADVERSE ENVIRONMENTAL EFFECTS OF CONSTRUCTION ACTIVITIES.

THE FOLLOWING ARE GENERAL BMP INSTALLATION NOTES FOR PIPELINE CONSTRUCTION ACTIVITIES.

- A STONE CONSTRUCTION ENTRANCE, PER VESCH STD & SPEC 3.02 AND MVP—ES20, SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROAD DIRECTLY FROM A DISTURBED AREA.
- TEMPORARY SEDIMENT BARRIERS, INCLUDING APPROPRIATELY SIZED COMPOST FILTER SOCK, SILT FENCE OR SILT FENCE WILL BE PLACED AROUND SOIL STOCKPILES, AS NEEDED.
- COMPOST FILTER SOCK WILL BE PLACED AROUND WETLANDS AND WATERBODIES IN AND ADJACENT TO THE WORK AREA PRIOR TO ANY TRENCHING ACTIVITIES. COMPOST FILTER SOCK HAS BEEN SIZED PER MVP-ES3 AND THE SIZE IS SPECIFIED ON THE PLAN SETS UTILIZING THE LINE TYPES CONTAINED IN THE LEGEND ON EACH SHEET.
- STOCKPILE SLOPES WILL BE 2:1 OR FLATTER, AND STOCKPILES WILL NOT EXCEED 35 FEET IN HEIGHT.
- TEMPORARY STREAM CROSSINGS SHALL BE INSTALLED AS INDICATED ON THE E&S PLAN SHEETS AND AS PER THE E&S DETAIL SHEETS.
- WATERBARS WILL BE INSTALLED IMMEDIATELY AFTER INITIAL DISTURBANCE OF THE SOIL IN ACCORDANCE WITH THE SPACING AND SIZING REQUIREMENTS SHOWN ON PLAN AND DETAIL SHEET. WATERBARS WILL BE CONSTRUCTED OF SOIL TO REDUCE RUNOFF VELOCITY AND DIVERT WATER OFF THE PIPELINE ROW.
- EXCAVATED TRENCH SPOIL MATERIAL WILL BE USED FOR TEMPORARY RIGHT OF WAY DIVERSIONS AS SHOWN IN THE DETAIL AT THE LOCATIONS INDICATED ON THE PLAN SHEETS.
- TRENCH DEWATERING, IF NEEDED, WILL BE CONDUCTED USING A PUMP AND HOSE. WATER WILL BE RELEASED INTO A FILTER BAG THAT WILL BE LOCATED IN A WELL-VEGETATED UPLAND AREA.
- TRENCH BREAKERS WILL BE INSTALLED ON SLOPES ADJACENT TO STREAMS, WETLANDS, AND ROAD CROSSINGS TO PREVENT SUBSURFACE EROSION. TRENCH BREAKERS WILL BE INSTALLED AS SHOWN ON THE DETAILS.
- THE WORK AREA WILL BE BACKFILLED FOLLOWING PIPELINE INSTALLATION OR OTHER EXCAVATION WORK. IN AREAS WHERE TOPSOIL HAS BEEN SEGREGATED, THE SUBSOIL WILL BE REPLACED FIRST, AND THEN THE TOPSOIL WILL BE SPREAD OVER THE AREA FROM WHICH IT WAS REMOVED. DISTURBED AREAS WILL BE RESTORED TO THEIR ORIGINAL TOPOGRAPHIC CONTOURS.
- PERMANENT WATERBARS, WILL BE CONSTRUCTED WITH A TWO PERCENT (TYPICAL) OUTSLOPE TO DIVERT SURFACE FLOW TO A WELL VEGETATED STABLE AREA.
- IMMEDIATELY FOLLOWING BACKFILLING ALL DISTURBED AREAS WILL BE GRADED IN PREPARATION FOR SEEDING AND MULCHING. PRIOR TO SEEDING MVP WILL DISC AREAS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION. DISCING WILL BE PERFORMED ON SUBSOILS TO A DEPTH OF 4-6" AND AGAIN FOLLOWING TOPSOILING. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL COVER MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. REFER TO TABLES ON THIS SHEET FOR TEMPORARY AND PERMANENT SEEDING SPECIFICATIONS.
- FOR 3:1 OR STEEPER SLOPES THE DISTURBED AREA WILL HAVE EROSION CONTROL BLANKETING INSTALLED AS INDICATED ON DETAIL SHEET.
- TEMPORARY SEDIMENT BARRIERS WILL BE MAINTAINED UNTIL VEGETATION HAS BECOME ESTABLISHED WITH A GROUND COVER THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION. ONCE THIS COVERAGE HAS BEEN OBTAINED, APPROPRIATE CONTROLS WILL BE REMOVED FROM THE WORK AREA. AREAS DISTURBED DURING THE REMOVAL OF THE EROSION CONTROLS WILL BE STABILIZED IMMEDIATELY.
- ALL WASTE MATERIAL WILL BE TRANSPORTED OFFSITE FOR RECYCLING AND/OR DISPOSAL AT A FACILITY APPROVED TO RECEIVE THE MATERIAL.
- IN NON-AGRICULTURAL AREAS THE VISUAL SURVEY SHALL BE COMPARED TO THE DENSITY AND COVER OF ADJACENT UNDISTURBED LANDS. IN AGRICULTURAL AREAS, THE VISUAL SURVEY SHALL BE COMPARED TO THE ADJACENT UNDISTURBED PORTIONS OF THE SAME FIELD, UNLESS THE EASEMENT AGREEMENT SPECIFIES
- WETLANDS ALONG THE PROPOSED PIPELINE ARE EXPECTED TO EXHIBIT VARYING DEGREES OF SATURATION AND WATER ELEVATION, REQUIRING A VARIETY OF PLANT SPECIES TO BE RE-ESTABLISHED. IN UNSATURATED WETLANDS, MOST VEGETATION WILL BE REPLACED BY SEEDING. SATURATED WETLANDS WILL TYPICALLY BE ALLOWED TO RE-VEGETATE NATURALLY. WETLAND REVEGETATION WILL BE CONSIDERED SUCCESSFUL WHEN THE COVER OF HERBACEOUS AND/OR WOODY SPECIES IS AT LEAST 80 PERCENT OF THE TYPE, DENSITY, AND DISTRIBUTION OF THE VEGETATION IN ADJACENT WETLAND AREAS THAT WERE NOT DISTURBED BY CONSTRUCTION REVEGETATION EFFORTS WILL CONTINUE UNTIL WETLAND REVEGETATION IS SUCCESSFUL.

STREAM CROSSING PROCEDURES

GENERAL:

- PROCEDURES THAT WILL BE FOLLOWED AT STREAM CROSSING LOCATIONS INCLUDE THE FOLLOWING:
- MINIMIZE CLEARING AND GRUBBING OF VEGETATION UP TO STREAMS, AS POSSIBLE, UNTIL THE TIME OF THE PIPELINE INSTALLATION;
- ONLY THAT AREA WHICH IS REQUIRED FOR PIPELINE INSTALLATION SHALL BE DISTURBED WITHIN THE PROPOSED LIMIT OF DISTURBANCE OR RIGHT-OF-WAY AT STREAM CROSSINGS; LOCATING STAGING AREAS 50 FEET AWAY FROM THE STREAM, WHERE POSSIBLE;
- STORING CHEMICALS, STORING EQUIPMENT, WASHING EQUIPMENT, OR REFUELING EQUIPMENT MUST BE DONE IN AREAS THAT ARE GREATER THAN 100 FEET AWAY FROM THE STREAM;
- SPOIL PILE PLACEMENT AND BMPS WILL BE MONITORED AT ALL TIMES DURING STREAM CROSSING PROCEDURES; ONCE WORK WITHIN A STREAM AREA IS STARTED, IT WILL BE CONDUCTED CONTINUOUSLY TO COMPLETION; EMPHASIS WILL BE PLACED ON MINIMIZING TIME OF DISTURBANCE;
- SPOILS FROM STREAM CROSSINGS MUST BE PLACED AT LEAST 10 FEET FROM THE WATER'S EDGE; AND
- CONSTRUCTION EQUIPMENT WILL NOT BE ALLOWED IN THE STREAM CHANNEL WHEN EXCAVATION CAN BE DONE FROM EITHER SIDE OR A TEMPORARY CROSSING WHILE WORKING AT THE STREAM CROSSING.
- ESC BMPS WILL BE MONITORED/MAINTAINED AT ALL TIMES FOLLOWING INITIAL EARTH DISTURBANCE AND WILL CONTINUE UNTIL RESTORATION IS DEEMED COMPLETE.

THE FOLLOWING SECTIONS DESCRIBE STREAM CROSSING TECHNIQUES THAT MAY BE USED DURING PIPELINE RELOCATION/INSTALLATION ACTIVITIES. REFER TO THE DETAIL SHEETS AND APPROVED STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

DRY CROSSING TECHNIQUES:

THESE TECHNIQUES WILL BE USED TO PERFORM PIPELINE WORK IN A RELATIVELY DRY WORKING CONDITION OR AROUND THE OPEN EXCAVATION. THESE TECHNIQUES INCLUDE PUMP AROUND AND FLUME PIPE CROSSING METHODS. THE LIMITING FACTORS FOR THESE TECHNIQUES ARE USUALLY STREAM SIZE, FLOW, AND WATER DEPTH.

DIRECTIONAL BORING IS ALSO A TECHNIQUE THAT CAN BE UTILIZED AS IT WILL LESSEN THE IMPACTS ON THE WATERBODIES.

E&S CONTROL MEASURES WILL BE INSTALLED PRIOR TO ANY EARTH DISTURBANCE AND MONITORED/MAINTAINED UNTIL CONSTRUCTION AND RESTORATION THROUGH THE WATER-BODY IS COMPLETE.

FLUME PIPE METHOD: PLEASE SEE DETAIL SHEETS AND SWPPP FOR MORE INFORMATION ON THE FLUME PIPE METHOD. THIS PROCEDURE INVOLVES CONSTRUCTING TWO BULKHEADS, EITHER SANDBAGS OR PLASTIC DAMS, TO DIRECT THE STREAM FLOW THROUGH A FLUME PIPE PLACED OVER THE TRENCH PRIOR TO EXCAVATION. THE FLUME SHALL BE ALIGNED AS TO PREVENT BANK EROSION AND BED SCOUR. THE FLUME WILL NOT BE REMOVED DURING TRENCHING, PIPE LAYING OR BACKFILLING.

PUMP AROUND METHOD: PLEASE SEE THE DETAIL SHEETS AND APPROVED STANDARDS AND SPECIFICATIONS FOR MORE INFORMATION ON THE PUMP AROUND METHOD. THIS PROCEDURE INVOLVES CONSTRUCTING TWO BULKHEADS, EITHER SANDBAGS OR PLASTIC DAMS. THE UPSTREAM DAM WILL CAUSE THE WATER TO POND WHERE IT CAN BE PUMPED AROUND THE WORK AREA AND BE DISCHARGED BEHIND THE DOWNSTREAM BULKHEAD. PUMPS OF SUFFICIENT SIZE TO TRANSMIT THE FLOW DOWNSTREAM WILL BE USED. BACKUP PUMPS MUST BE ON—SITE. PUMP INTAKES MUST BE SCREENED. PUMP DISCHARGES MUST NOT CAUSE SCOUR.

TEMPORARY ROAD CROSSINGS:

TEMPORARY ROAD CROSSINGS, CONSISTING OF BRIDGES OF TIMBER MATS OR CLEAN ROCK FILL AND FLUME(S), WILL BE INSTALLED TO CROSS MINOR OR INTERMEDIATE STREAMS. TIMBER MATS SHALL BE USED TO CROSS SMALLER STREAMS WHERE THE SPAN OF THE MAT WILL STRETCH FROM BANK TO BANK. CLEAN ROCK FILL AND FLUMED CROSSINGS WILL BE UTILIZED WHERE IT IS NOT FEASIBLE TO UTILIZE TIMBER MATS. AS AN ALTERNATIVE, PORTABLE BRIDGES MAY BE USED INSTEAD FOR SMALL CROSSINGS. EQUIPMENT WILL NOT BE ALLOWED TO FORD FLOWING STREAMS DURING CONSTRUCTION ACTIVITIES. TEMPORARY ROAD CROSSINGS OF STREAMS MUST MAINTAIN FOR ADEQUATE FLOW DOWNSTREAM.

STREAM BANK STABILIZATION:

PERMANENT STABILIZATION SHALL OCCUR IMMEDIATELY UPON INSTALLATION, BACKFILLING, AND GRADING AT EACH STREAM CROSSING.

LEGEND

<u>LEGEND</u>	
	CLEAN WATER DIVERSION DIKE (SEE DETAIL MVP-ES50 AND MVP-ES51
	- STREAM
	US FOREST SERVICE (NATIONAL FOREST) LANDS
ANST ANST	- APPALACHIAN NATIONAL SCENIC TRAIL
SF SF	EXISTING ROAD/TRAIL
	- EXISTING PROPERTY LINE
OCSF CSF CSF	EXISTING STATE LINE
OCSF	EXISTING COUNTY LINE
	POND
	WETLAND
— AFM — AFM —	- ACID FORMING MATERIAL
AGRI AGRI	- AGRICULTURAL LAND USE BOUNDARY
DOMN	PROPOSED LIMIT OF DISTURBANCE
DOMN DOMN	PROPOSED ACCESS ROAD CENTERLINE
	PROPOSED PIPELINE
— ER — ER — ER —	PROPOSED SILT FENCE
	PROPOSED SUPER SILT FENCE (SEE DETAIL MVP-ES9.2)
— RFD —— RFD —	PROPOSED REINFORCED FILTRATION DEVICE (SEE DETAILS MVP-ES9, 9.1, 9.2, 9.3)
EQT -	ORANGE CONSTRUCTION SAFETY FENCE
—12—12—12—12—	PROPOSED 12" COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)
—18—18—18—18—	PROPOSED 18" COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)
24242424	PROPOSED 24" COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)
COL	- GRASS-LINED CHANNEL (SEE DETAIL MVP-ES39)
	CLEAN WATER DIVERSION PIPE
	TIMBER MAT (SEE DETAIL MVP-ES37)
	STEEP SLOPE EROSION CONTROL (SEE NOTE 2)
	STEEP SLOPE AREAS (SEE NOTE 4)
	PROPOSED ROCK CONSTRUCTION ENTRANCE
•	PROPOSED TRENCH BREAKER (SEE DETAIL MVP-20)
A	TEMPORARY ROW DIVERSION/WATER BAR (VADEQ STD & SPEC 3.11)
^	PERMANENT SLOPE BREAKER/ROW DIVERSION/WATER BAR
	(SEE DETAILS MVP-17, ES38, AND SCHEDULE)

NOTES

- 1. TOPSOIL SEGREGATION WILL BE PERFORMED IN ALL—CONSTRUCTION AREAS OF THE PROJECT IN ACCORDANCE WITH DETAIL MVP—FS46.1 THROUGH MVP—FS46.3
- ACCORDANCE WITH DETAIL MVP—ES46.1 THROUGH MVP—ES46.3.
- 2. FLEXTERRA, EARTHGUARD OR EQUIVALENT MAY BE USED AS A SUBSTITUTE TO EROSION CONTROL BLANKET AS DIRECTED BY MVP.
- 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
- STABILIZATION MEASURES IN SELECTED HIGH—HAZARD PORTIONS OF THE ROUTE OF THE PROPOSED MOUNTAIN VALLEY PIPLELINE PROJECT.

 5. WHERE CONSTRUCTION CONDITIONS PRECLUDE THE USE OF DIVERSION DITCHES DUE TO SITE CONDITIONS

SLOPE TECHNIQUES IDENTIFIED IN THE DETAIL SHEETS. ALSO REFER TO THE SITE-SPECIFIC DESIGN OF

- 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. ALL NON VMRC STREAM CROSSINGS WILL BE PERFORMED AS DESCRIBED IN THE STREAM CROSSING TABLE INCLUDED IN THIS PACKAGE.

	7	7 01/31/18	KAL	RE	MQ	ADDED DETAILS FOR ROADS AND PADS
PIPELINE	9	01/26/18	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
EROSION AND SEDIMENT CONTROL PLANS	5	01/08/18	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
SINIT OFFI TOSI OGG SINI ISBIG ASTIVA NIVISION	4	11/28/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
MODINIAIN VALLE FIFELINE FROJECI - 1000 LINE	3	11/01/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
	2	08/18/17	KAL	RE	MQ	ADDRESS VADEQ COMMENTS
OII JINI IJOIG AJI IVA INIVENITOM	NO.:	DATE:	DWN.:	DWN.: CHKD.: APPD.:	APPD.:	DESCRIPTION:
MOUNIAIIN VALLEI FIFELINE, LLO 555 SOUTHPOINTE BOULEVARD, SUITE 200					Щ Ш	REVISIONS:

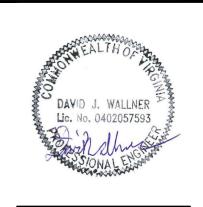


complex world | CLEAR SOLUTIONS™

FOSTER PLAZA 7

PITTSBURGH, PA 15220

VERAL DETAILS SE



DRAWN BY: KAL

CHECKED BY: HT

APPROVED BY: RE

DATE: 11/28/2017

SCALE: AS SHOWN REVISION

SHT. NO. 0.23 OF 0.23