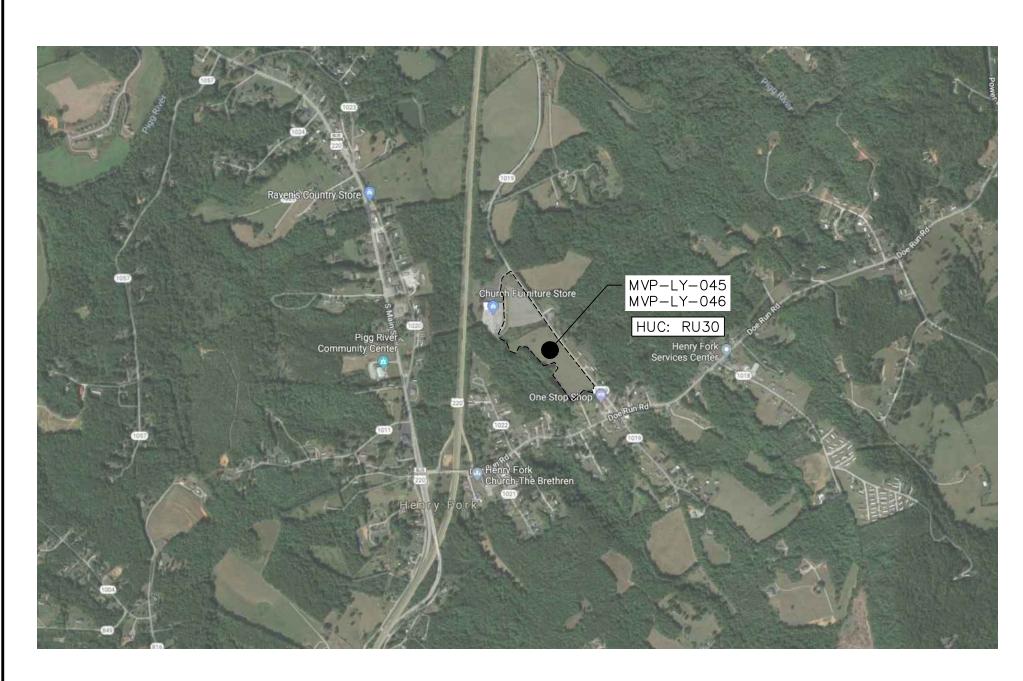
# MOUNTAIN VALLEY PIPELINE

## EROSION AND SEDIMENT CONTROL PLAN

# MOUNTAIN VALLEY PIPELINE MVP-LY-045-046 FRANKLIN

APRIL 4, 2018



OCATION MAP

1000 2000

SCALE IN FEET

### **Sheet List Table**

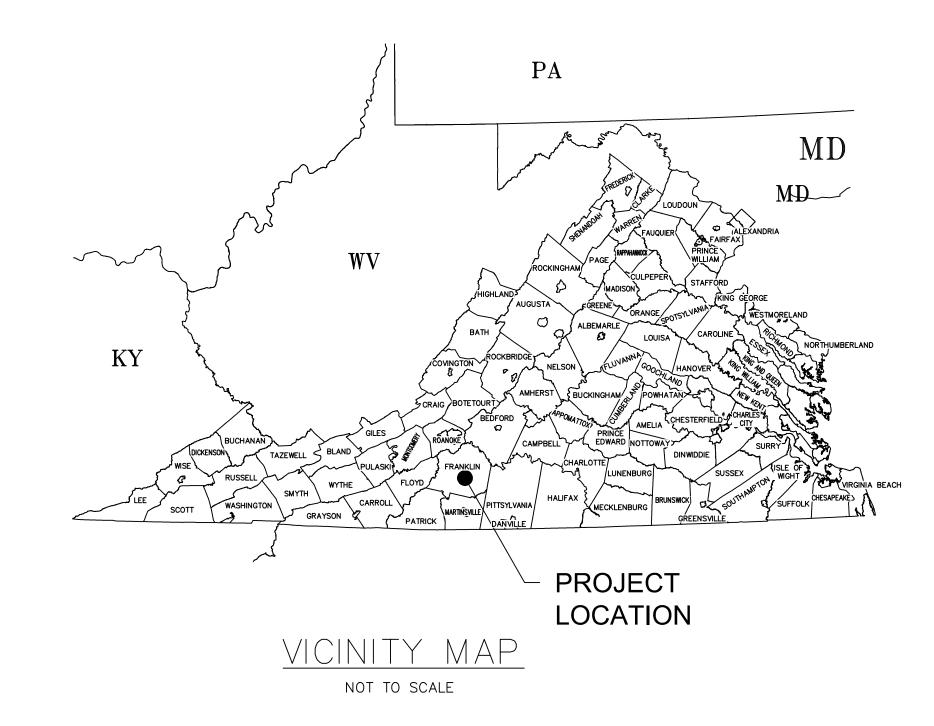
Sheet Number	Sheet little
LY-045-046-001	COVER SHEET
LY-045-046-002	EROSION AND SEDIMENT CONTROL DETAILS
LY-045-046-003	EROSION AND SEDIMENT CONTROL DETAILS
LY-045-046-004	RESTORATION DETAILS
LY-045-046-005	RESTORATION DETAILS
LY-045-046-006	GENERAL DETAILS
LY-045-046-007	ESC NARRATIVE
LY-045-046-008	ESC NARRATIVE
LY-045-046-009	EXISTING CONDITIONS PLAN
LY-045-046-010	EROSION AND SEDIMENT CONTROL PLAN



CALL VA ONE CALL SYSTEM TOLL FREE 811

> OR 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.



NOTE: ALL SHEETS RELATED TO THE ORIGINAL SITE PLANS MAY APPLY FOR THIS LAY-DOWN YARD.

Draper Aden Associates 2206 South Main Street Blacksburg, VA 24060 540-552-0444 www.daa.com

COVER SHEET

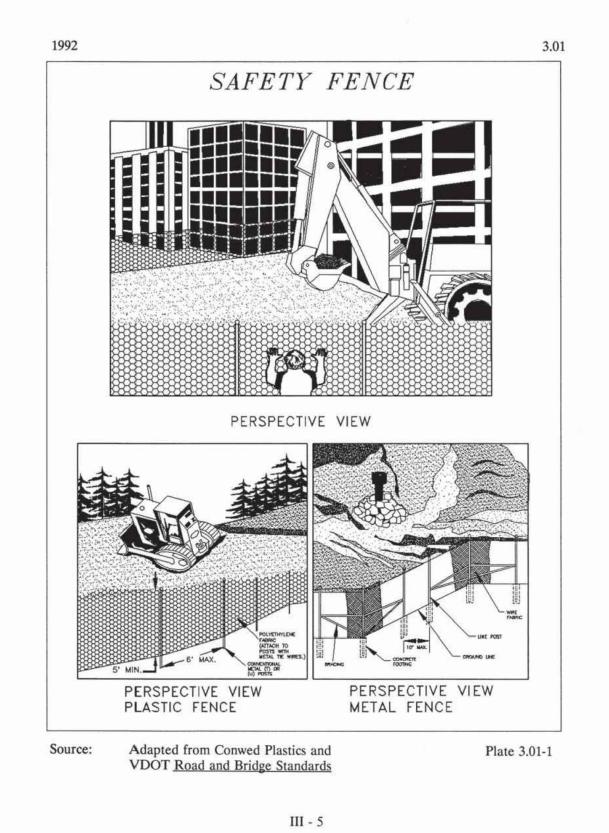
04/04/2018

SHT. NO. LY-045-046-001 OF

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ON THE PLAN ARE FOR IAL PURPOSES ONLY EPRESENT SURVEYED NFORMATION.



SIDE ELEVATION

SIDE ELEVATION

TO' MIN.

10' MIN.

POSITIVE BRAINAGE (OPTIDNAL)

POSITIVE BRAINAGE TO SCIDEN TO SEDIMENT TRAPPING DEVICE

PLAN VIEW

12' MIN.

SECTION A—A

6'-7

SECTION B—B

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

III - 9

STONE CONSTRUCTION ENTRANCE

SAFETY FENCE

TAKEN FROM VADEQ 1992 MANUAL

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.

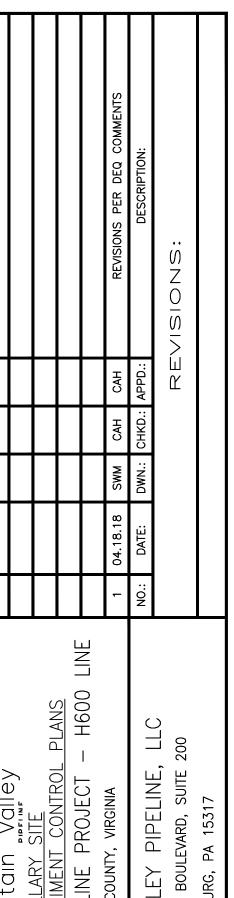
SEDIMENT DEPOSITED ON PAVED ROADWAYS SHOULD BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.

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.

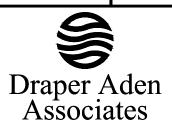
STONE CONSTRUCTION ENTRANCE
TAKEN FROM VADEQ 1992 MANUAL

Plate 3.02-1

3.02

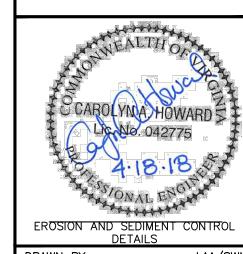


ANC ANC EROSION AND SI MOUNTAIN VALLEY PIP



2206 South Main Street Blacksburg, VA 24060 540-552-0444 www.daa.com

CONSTRUCTION
PLANS



EROSION AND SEDIMENT CONTRO
DETAILS

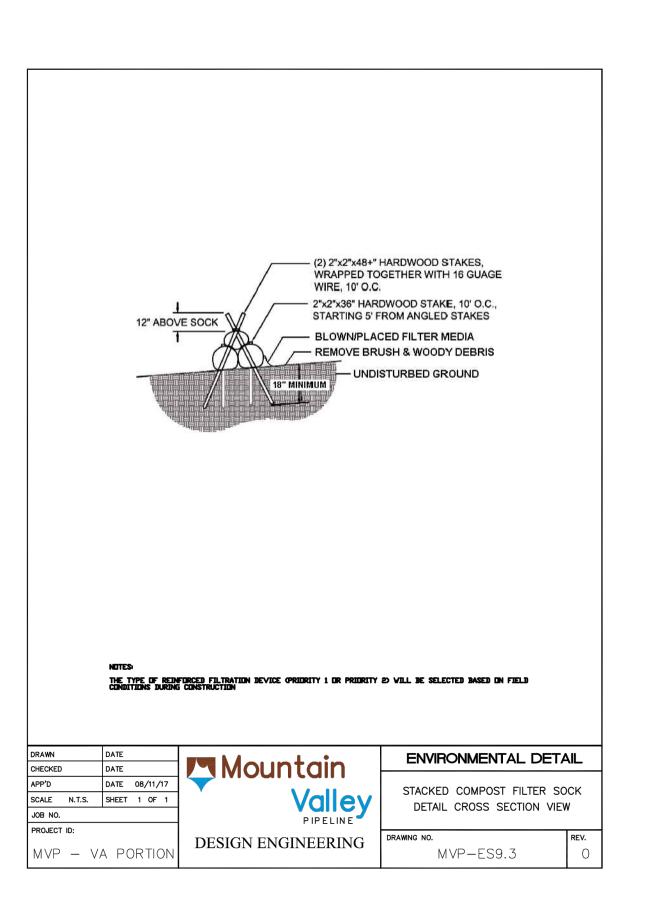
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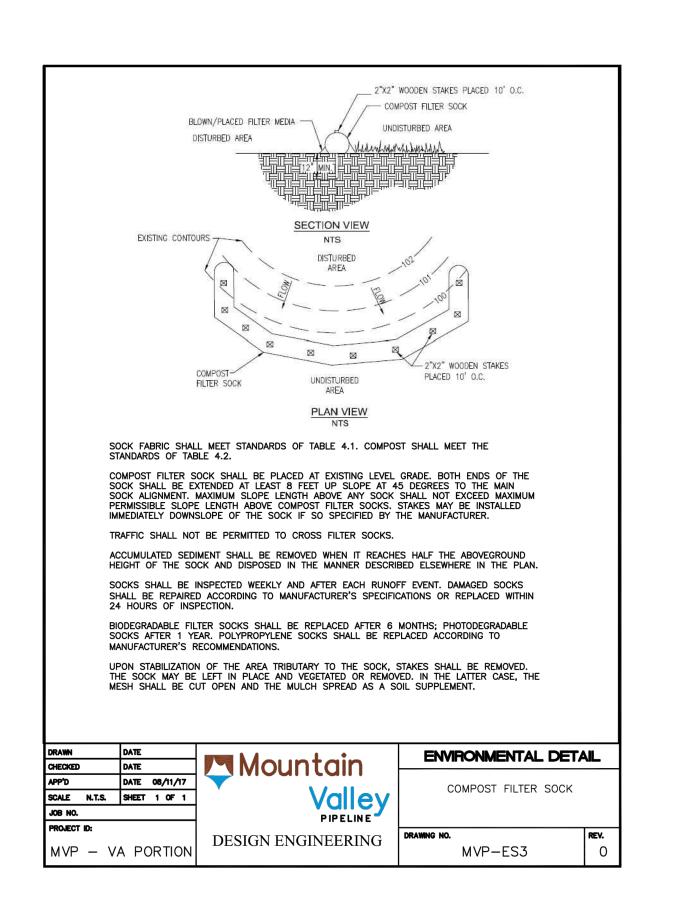
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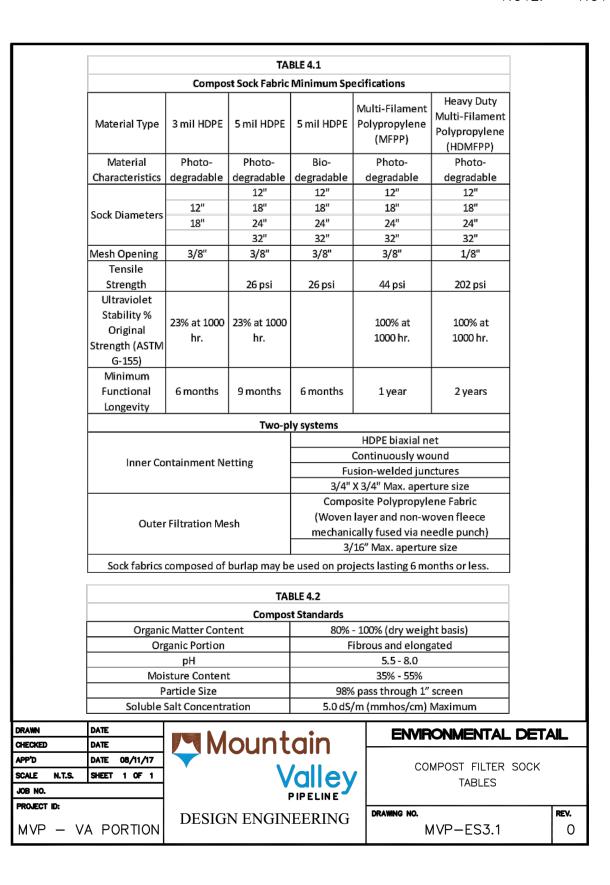
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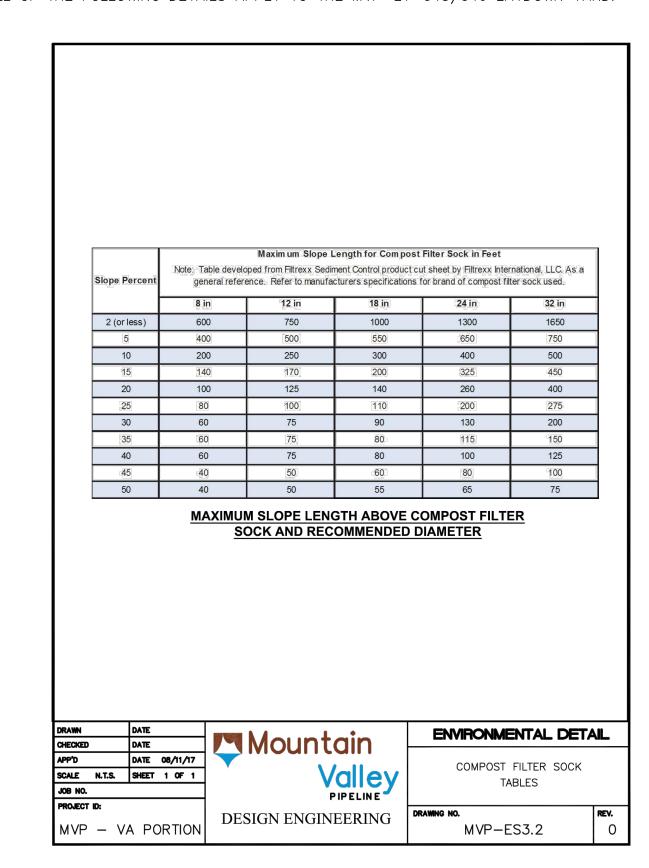
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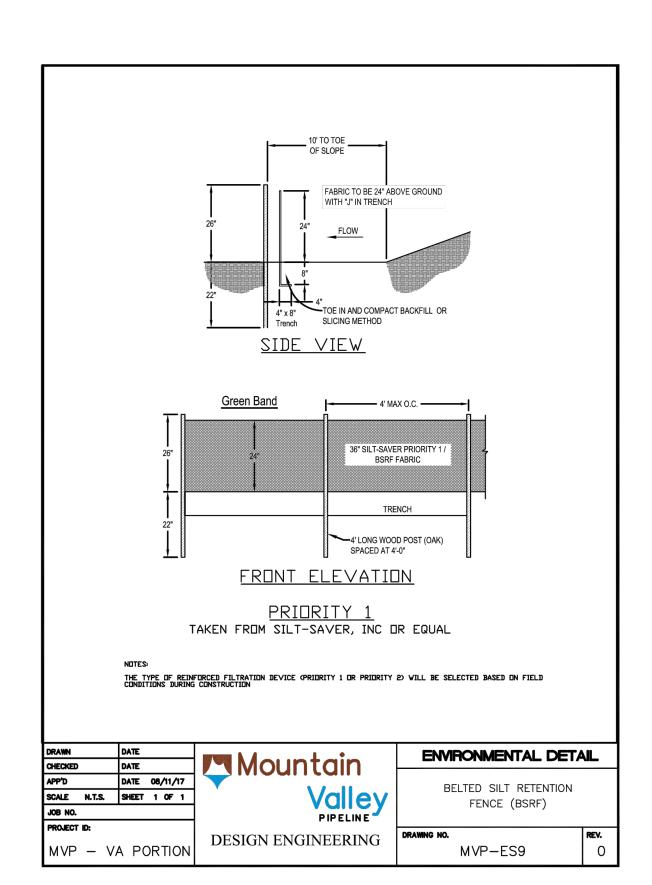
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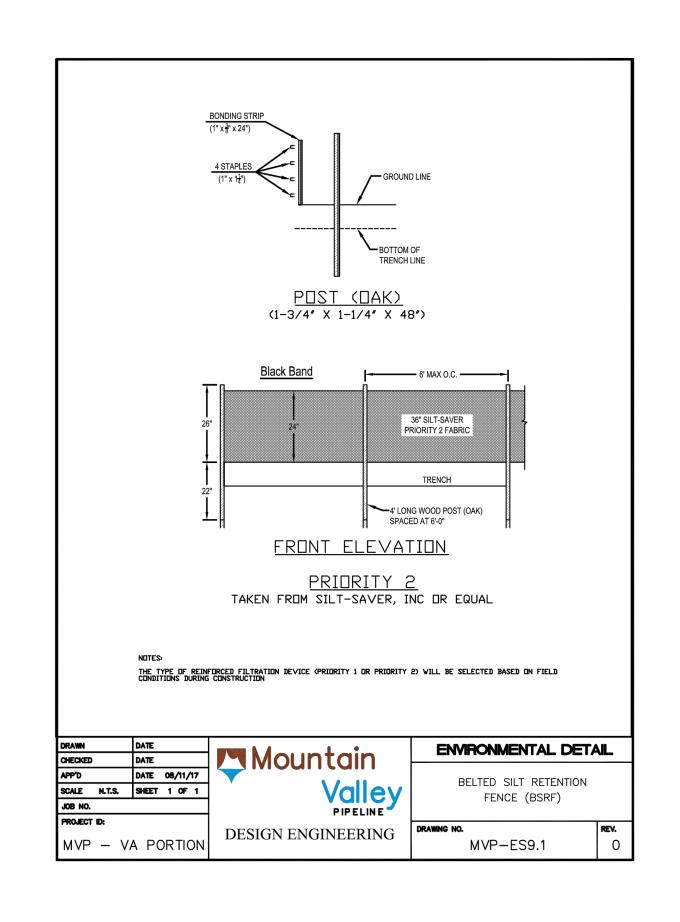


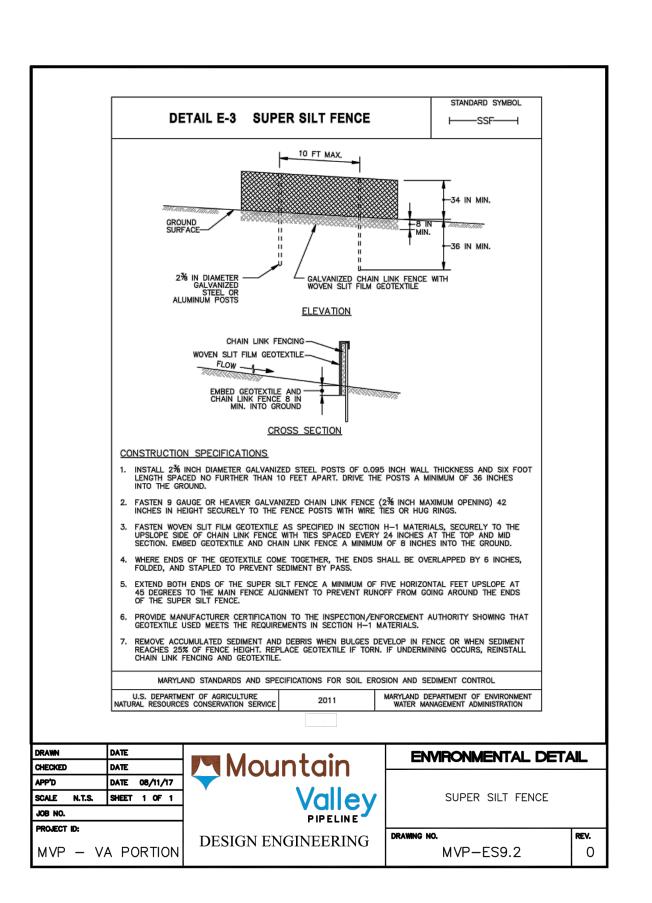


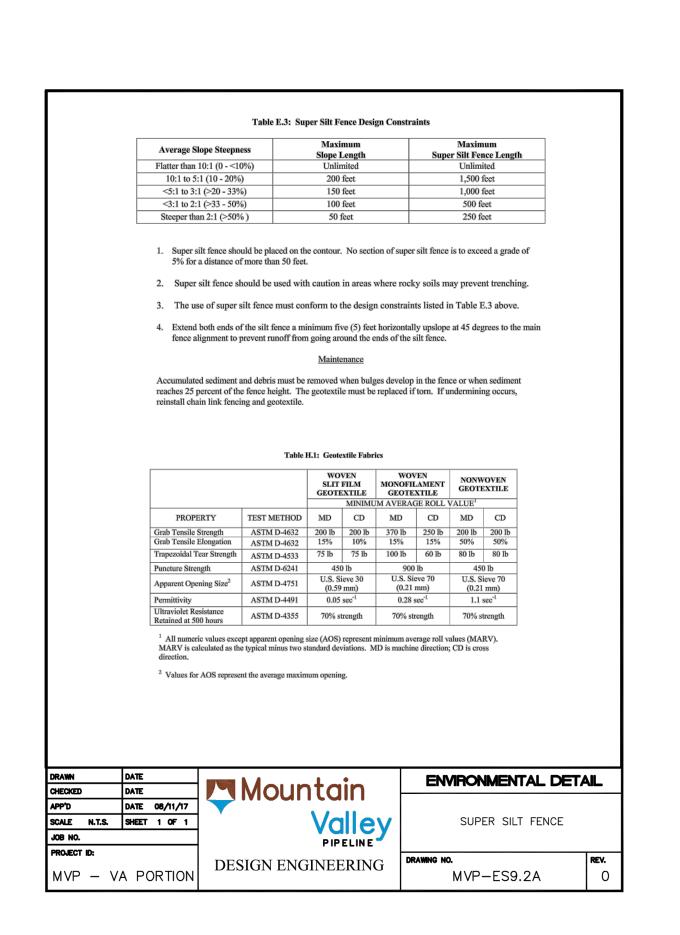


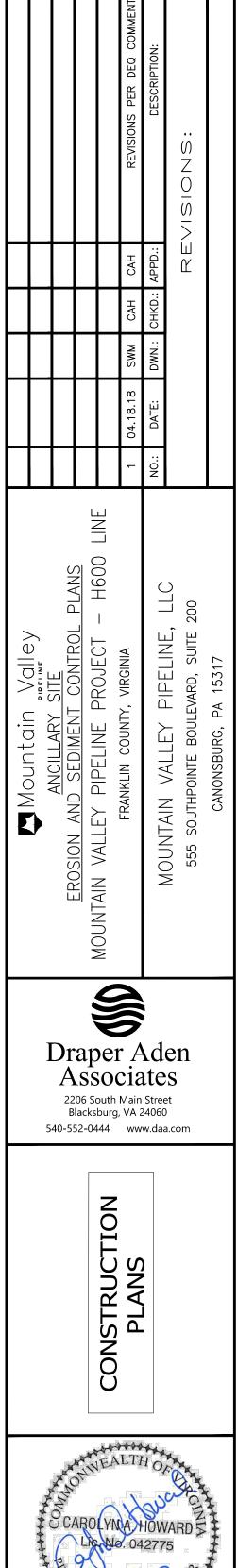












EROSION AND SEDIMENT

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SCALE:

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APPROVED BY:

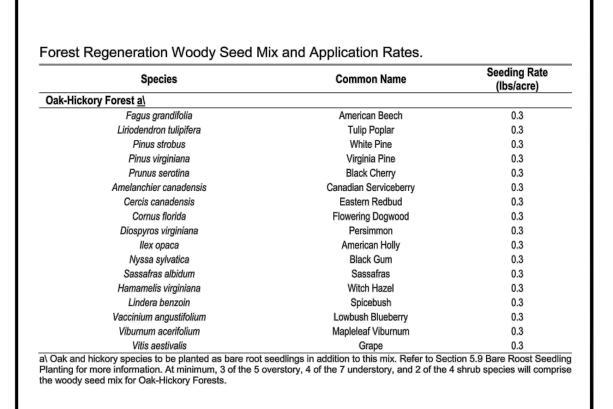
CONTROL DETAILS

04/04/2018

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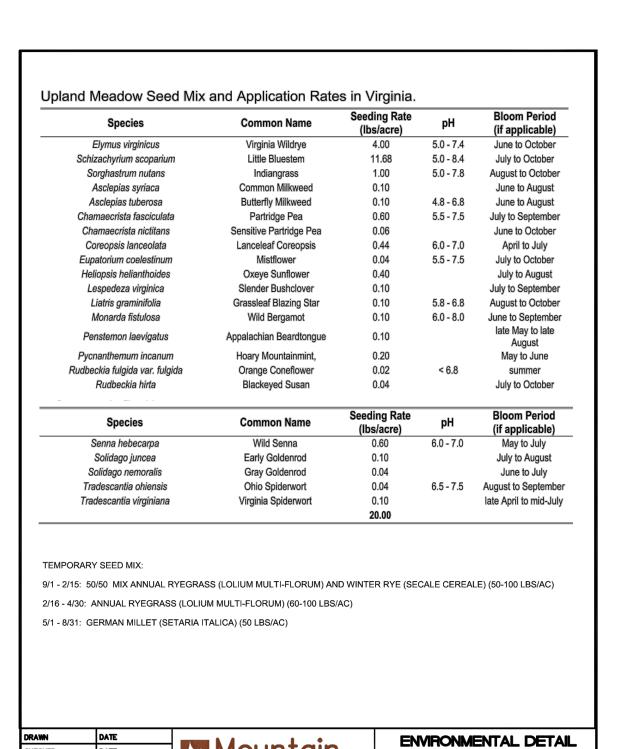
LAA/SWM



NOTE:

WOODY SEED MIX TO BE USED IN COMBINATION WITH MVP-ES11.2 UPLAND MEADOW SEED MIX.

DRAWN	DATE	•	ENVIRONMENTAL DETAIL			
CHECKED	DATE	Mountain		<b></b>		
APP'D	DATE 08/11/17		FOREST REGENERATION WOODY	SEED		
SCALE N.T.S.	SHEET 1 OF 1	Valley	MIX AND APPLICATION RATES			
JOB NO.		PIPELINE	MIX AND AFFEIGATION NATE	3		
PROJECT ID:			DRAWING NO.	REV.		
MVP - V	A PORTION	DESIGN ENGINEERING	MVP-ES11.1	0		



PIPELINE

DESIGN ENGINEERING

UPLAND MEADOW SEED MIX

AND APPLICATION RATES

MVP-ES11.2

DATE 08/11/17

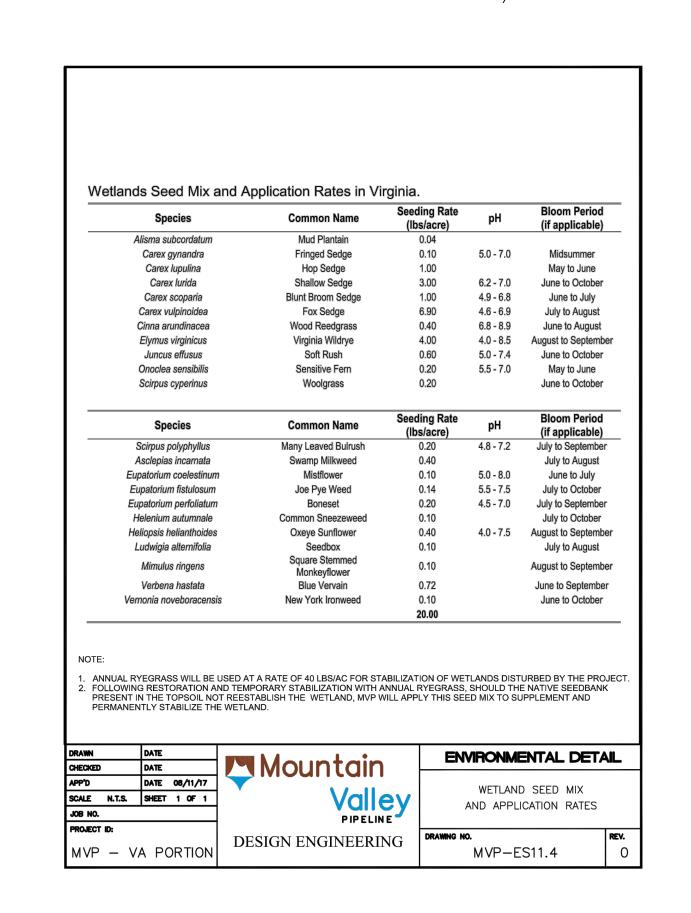
SCALE N.T.S. SHEET 1 OF 1

MVP - VA PORTION

JOB NO.

PROJECT ID:

	Species	Common Name	Seeding Rate (lbs/acre)	pН	Bloom Period (if applicable)
	tis perennans	Autumn Bentgrass	3.15	5.5 - 7.5	Midsummer
-	nus virginicus	Virginia Wildrye	9.05	5.0 - 7.4	June to October
	m clandestinum	Deertongue	4.50	4.0 - 7.5	May to September
	nyrium scoparium	Little Bluestem	11.25	5.0 - 7.4	July to October
-	astrum nutans	Indiangrass	14.40	5.0 - 7.8	August to October
	epias syriaca	Common Milkweed	0.09		June to August
	ter pilosus	Heath Aster	0.05	5.4 - 7.0	After fall frost
	crista fasciculata	Partridge Pea	0.45	5.5 - 7.5	July to September
	osis lanceolata	Lanceleaf Coreopsis	0.45	6.0 - 7.0	April to July
	ium coelestinum	Mistflower	0.05	5.5 - 7.5	July to October
	is helianthoides	Oxeye Sunflower	0.45	## *·	July to August
	s graminifolia	Grassleaf Blazing Star	0.09	5.8 - 6.8	August to October
	arda fistulosa	Wild Bergamot	0.23	6.0 - 8.0	June to September
-	hemum incanum	Hoary Mountainmint	0.05	< 6.8	summer
	lbeckia hirta	Blackeyed Susan	0.45	6.0 - 7.0	May to July
	na hebecarpa	Wild Senna	0.23	e = = =	July to August
	ago nemoralis	Gray Goldenrod	0.05	6.5 - 7.5	August to Septembe
irades	cantia ohiensis	Ohio Spiderwort	0.05 <b>45.00</b>		late April to mid-July
CKED DA	TE 08/11/17	Mountain Valle	LIBI		<b>ENTAL DETA</b> P SLOPE SEED N
CKED DA	TE	Mountain Valle PIPELIN	LIBI	AND STEEF	

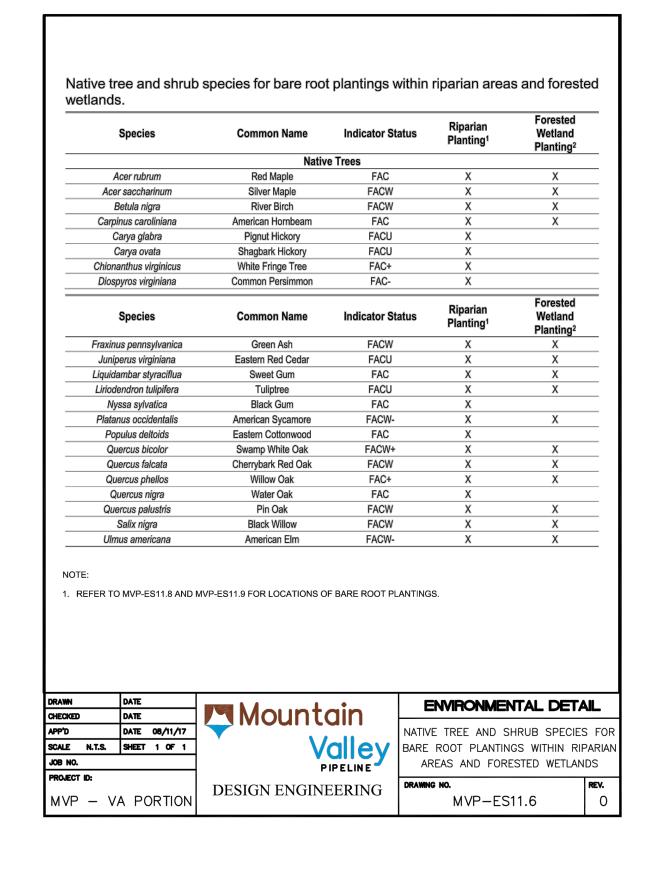


	Species	Common Name	Seeding Rate (lbs/acre)	pН	Bloom Period (if applicable)
,	Agrostis perennans	Autumn Bentgrass	0.04	5.0 - 7.0	Midsummer
A	Andropogon gerardii	Big Bluestem	0.10		May to June
	Elymus virginicus	Virginia Wildrye	1.00	6.2 - 7.0	June to October
	Juncus effusus	Soft Rush	3.00	4.9 - 6.8	June to July
	Juncus tenuis	Path Rush	1.00	4.6 - 6.9	July to August
Pá	anicum clandestinum	Deertongue	6.90	6.8 - 8.9	June to August
8	Sorghastrum nutans	Indiangrass	0.40	4.0 - 8.5	August to September
/	Asclepias incarnata	Swamp Milkweed	4.00	5.0 - 7.4	June to October
Cha	amaecrista fasciculata	Partridge Pea	0.60	5.5 - 7.0	May to June
Eu	patorium coelestinum	Mistflower	0.20		June to October
	upatorium fistulosum	Joe Pye Weed	0.20	4.8 - 7.2	July to September
Εu	ıpatorium perfoliatum	Boneset	0.20		July to August
	Geum canadense	White Avens	0.40	5.0 - 8.0	June to July
H	lelenium autumnale	Common Sneezeweed	0.10	5.5 - 7.5	July to October
	eliopsis helianthoides	Oxeye Sunflower	0.14	4.5 - 7.0	July to September
	Monarda fistulosa	Wild Bergamot	0.20		July to October
Pyci	nanthemum tenuifoliun		0.10	4.0 - 7.5	August to September
	Rudbeckia hirta	Blackeyed Susan	0.40		July to August
	Senna hebecarpa	Wild Senna	0.10		August to September
	Verbena hastata	Blue Vervain	0.10		June to September
Ver	nonia noveboracensis	New York Ironweed	0.72 20.00		June to October
TEMPOR. 9/1 - 2/15: 2/16 - 4/30	ARY SEED MIX: : 50/50 MIX ANNUAL D: ANNUAL RYEGRA	New York Ironweed  RYEGRASS (LOLIUM MULTI-FLORUM) A SS (LOLIUM MULTI-FLORUM) (60-100 LB SETARIA ITALICA) (50 LBS/AC)	20.00	ECALE CERE	
TEMPOR. 9/1 - 2/15: 2/16 - 4/30 5/1 - 8/31:	ARY SEED MIX: : 50/50 MIX ANNUAL D: ANNUAL RYEGRA	. RYEGRASS (LOLIUM MULTI-FLORUM) A .SS (LOLIUM MULTI-FLORUM) (60-100 LB SETARIA ITALICA) (50 LBS/AC)	20.00  AND WINTER RYE (S S/AC)	Revised	ALE) (50-100 LBS/AC)
TEMPOR. 9/1 - 2/15: 2/16 - 4/30	ARY SEED MIX: : 50/50 MIX ANNUAL D: ANNUAL RYEGRA : GERMAN MILLET (3	. RYEGRASS (LOLIUM MULTI-FLORUM) A .SS (LOLIUM MULTI-FLORUM) (60-100 LB	20.00  AND WINTER RYE (S S/AC)	Revised	ALE) (50-100 LBS/AC)

PIPELINE

DESIGN ENGINEERING

MVP - VA PORTION



		Native S			
	nus serrulata	Brook-side Alder	OBL		X
	nchier canadensis	Canada Serviceberry	FAC	X	
	nia arbutifolia	Red Chokecherry	FACW	X	X
	haris halimifolia	Groundsel Bush	FACW-	X	X
	nthus occidentalis	Buttonbush	OBL		X
	nus amomum	Silky Dogwood	FACW	X	X
	nus stolonifera	Red-osier Dogwood	FAC	Х	Х
	melis virginiana	American Witchhazel	FAC-	X	
	ex verticillata	Common Winterberry	FACW+	X	Х
	ea virginica	Virginia Willow	OBL		X
	a frutescens	Marsh Elder	FACW+	X	X
	othoe racemosa	Fetter-bush	FACW	X	X
	dera benzoin	Spicebush	FACW-	Х	X
	onia ligustrina	Maleberry	FACW	X	X
Mag	nolia virginiana	Sweetbay Magnolia	FACW+	Х	Х
Physo	carpus opulifolius	Eastern Ninebark	FACW-	Х	Х
Samb	ucus canadensis	American Elder	FACW-	X	X
Vaccin	ium corymbosum	Highbush Blueberry	FACW-	Х	Χ
Virbu	rnum dentatum	Arrow-wood	FAC	X	
	num prunifolium	Black-haw	FACU	Х	
Vibui					
Vibu					
DRAWN CHECKED APP'D SCALE N.T.S.	DATE  DATE  DATE  DATE  DATE  OB/11/17  SHEET 1 OF 1	<b>™</b> Mounta		ATIVE TREE AND SI	GS WITHIN RIPAR
DRAWN CHECKED APP'D	DATE DATE DATE DATE DATE		iley B	ATIVE TREE AND S	HRUB SPECIES F GS WITHIN RIPAR

SCALE N.T.S. SHEET 1 OF 1 JOB NO. PROJECT ID:	*	Valle	E _	BARE ROOT SEEDING PLANTINGS  RAWING NO. REV
DRAWN         DATE           CHECKED         DATE           APP'D         DATE         08/11/17	Mc	ountain		ENVIRONMENTAL DETAIL  STREAM CROSSINGS PROPOSED FO
Harpen Creek	292.0	Pittsylvania	VA	orangefin madtom
Harpen Creek	289.9	Pittsylvania	VA	Roanoke logperch suitable habitat, orangefin madtom
Pigg River	289.1	Pittsylvania	VA	Roanoke logperch present, orangefin madtom, mussels present including yellow lampmussel (VA threatened)
UNT to Rocky Creek	287.1	Pittsylvania	VA	orangefin madtom
Jonnikin Creek	284.4	Pittsylvania	VA	orangefin madtom
Parrot Branch	282.9	Franklin	VA	orangefin madtom
Strawfield Creek	282.3	Franklin	VA	orangefin madtom
Turkey Creek	280.5	Franklin	VA	orangefin madtom
UNT to Jacks Creek	278.8	Franklin	VA	orangefin madtom
Blackwater River	269.7	Franklin	VA	Roanoke logperch present, non-listed mussels present
Maggodee Creek	269.4	Franklin	VA	Roanoke logperch suitable habitat
Little Creek	263.3	Franklin	VA	Roanoke logperch suitable habitat, non- listed mussels present, numerous crossings upstream contributing sediment impacts
Little Creek	262.6	Franklin	VA	Roanoke logperch suitable habitat, numerous crossings upstream contributing sediment impacts
Teels Creek	262.3	Franklin	VA	Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek contributing sediment impacts
Teels Creek	261.8	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	261.0	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	260.3	Franklin	VA	crossings of Teels Creek upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	258.2	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project
Waterbody Name	MP	County	State	Valuable Resource
North Fork Blackwater River	249.7	Franklin	VA	Roanoke logperch suitable habitat, coldwater stream wild trout stream
Green Creek	247.4	Franklin	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
Green Creek	247.1	Franklin	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
Mill Creek	245.1	Roanoke	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout

				CAH	APPD.:	Я Э
				САН	CHKD.:	
				SWM	DWN.:	
				04.18.18 SWM CAH CAH	DATE: DWN.: CHKD.: APPD.:	
				1	NO.:	
	ANCILLARY SIIE EDOSION AND SEDIMENT CONTBOL BLANS	MOLINITAIN VALLEY DIDELINE DED LOT 1600 LINE	MOUNIAIN VALLET PIPELINE PROJECT — HOUG LINE	FRANKLIN COUNTY, VIRGINIA	_	MUUNIAIN VALLET PIPELINE, LLU 555 SOUTHPOINTE BOULEVARD, SUITE 200
	A 22 B	SS 206 Sc	O( outh burg	<b>C1</b> 2 Main , VA 2	stree	et
			ONSTRUCTION	PLANS		

RESTORATION DETAILS

04/04/2018

SHT. NO. LY-045-046-004 OF

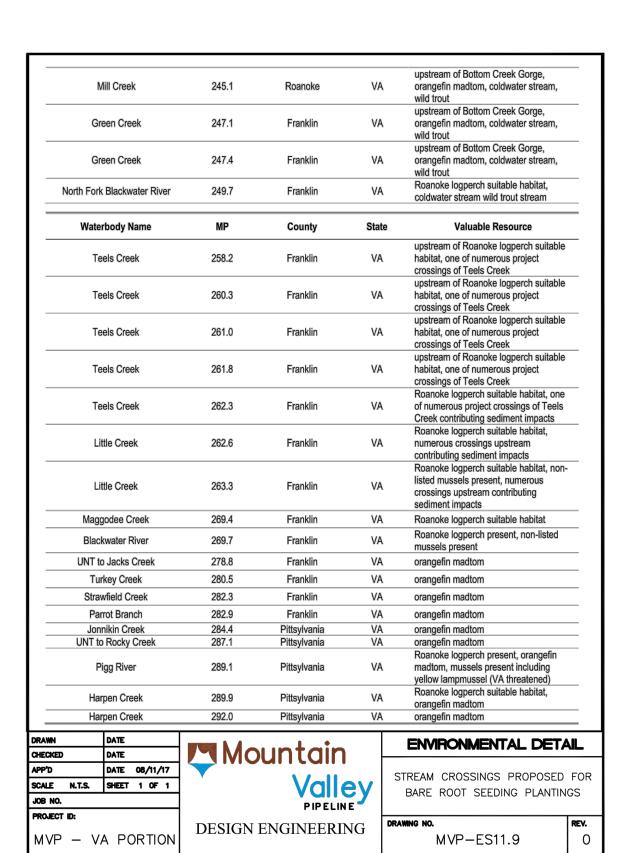
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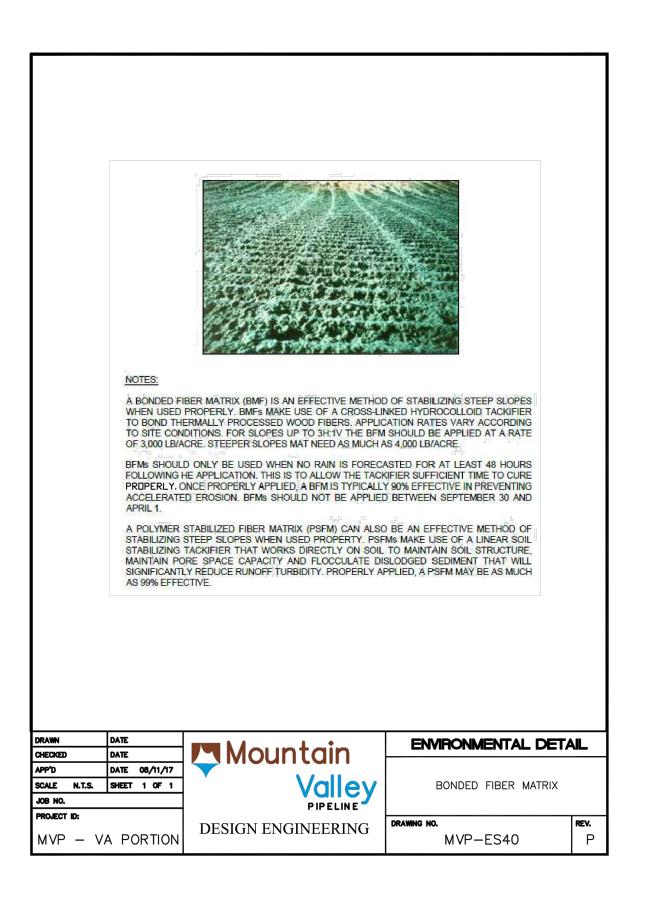
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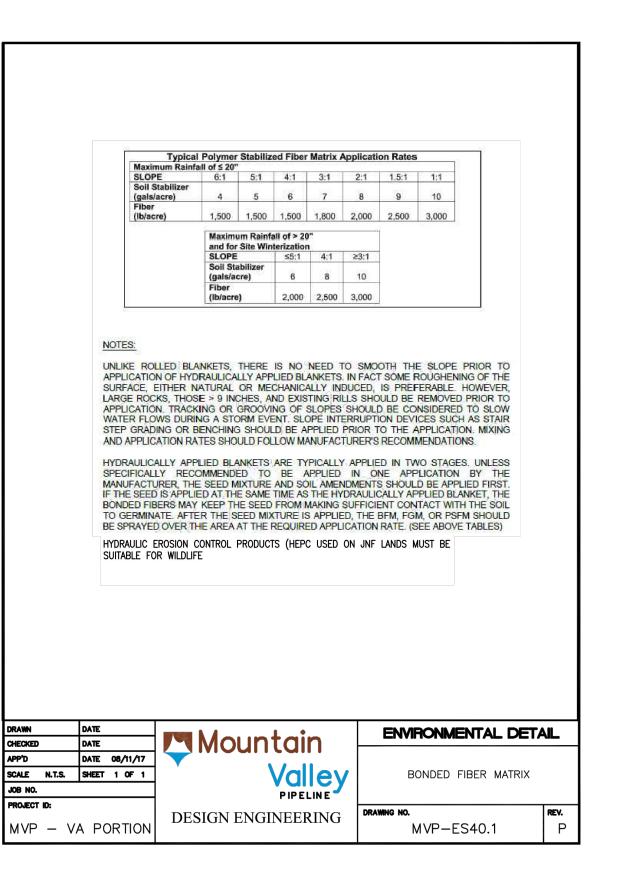
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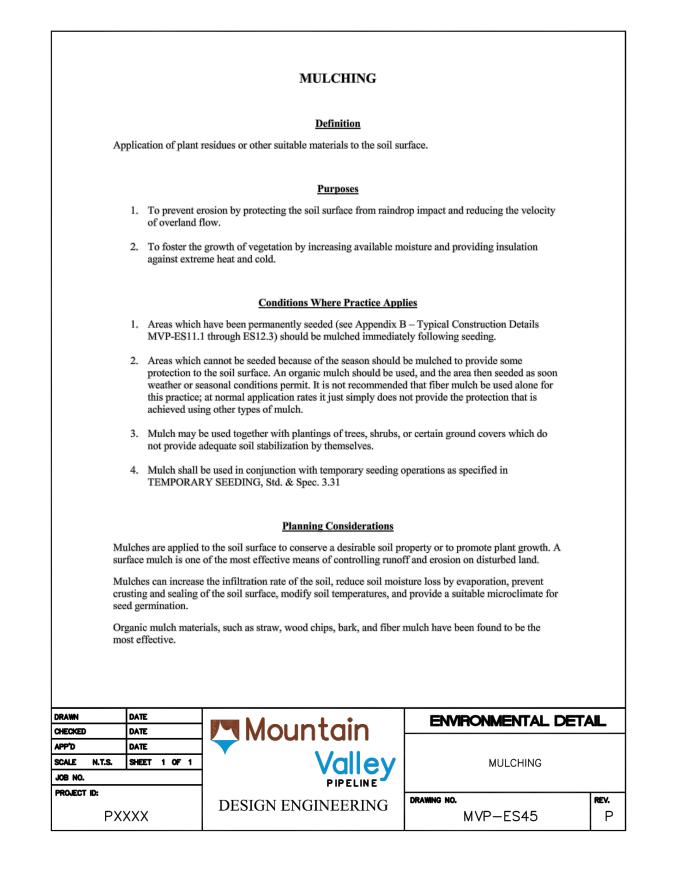
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APPROVED BY:

MVP-ES11.5









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 surface.

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.

 $\underline{\text{Hay}}-\text{Hay}$  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

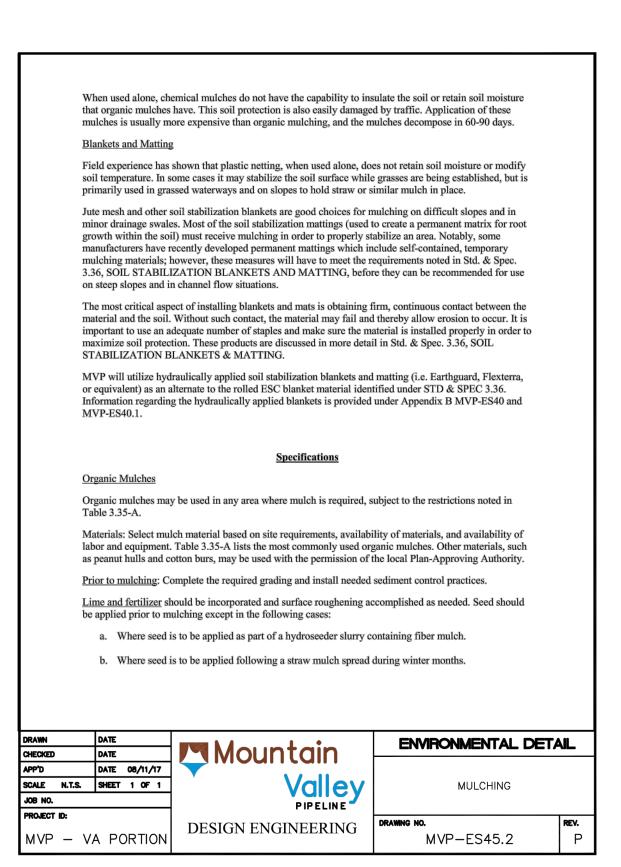
<u>Fiber Mulch</u> - Used in hydroseeding operations and applied as part of the slurry. It creates the best seed-soil contact when applied over top of (as a separate operation) newly seeded areas. These fibers do not require tacking, although tacking agents or binders are sometimes used in conjunction 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 susceptible to displacement.

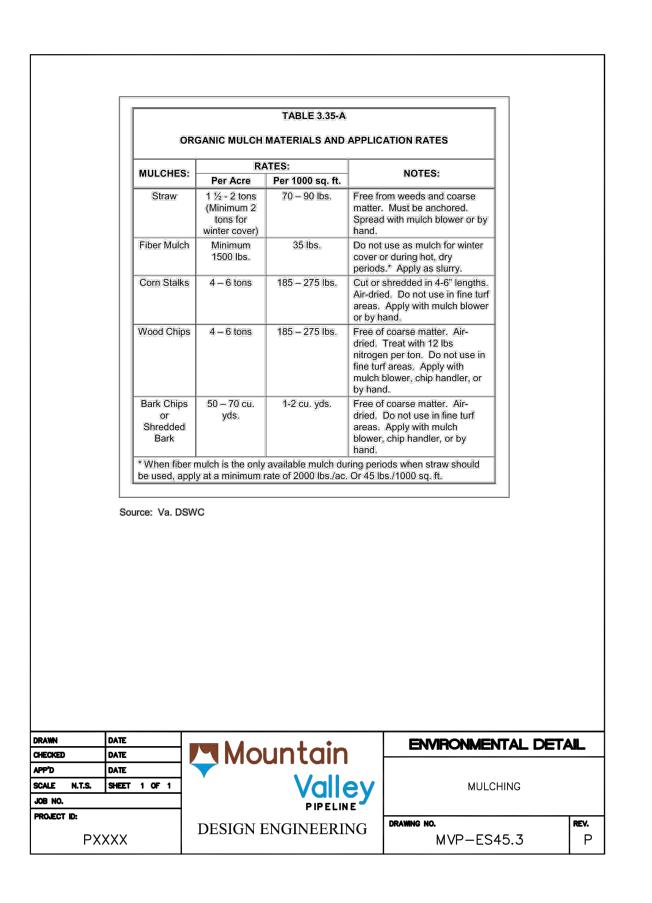
There are other organic materials which make excellent mulches but are only available locally or seasonally. Creative use of these materials can reduce costs.

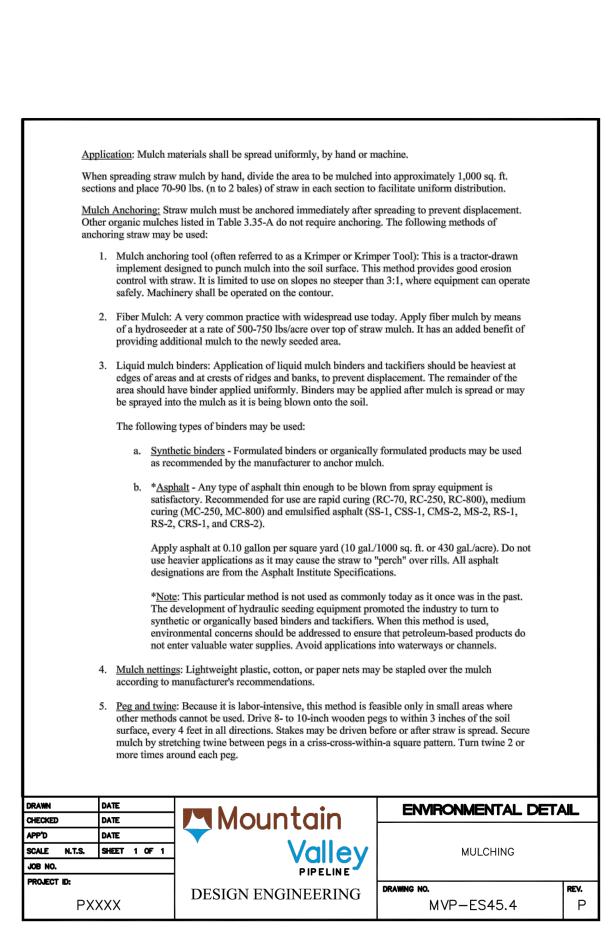
### Chemical Mulches and Soil Binders

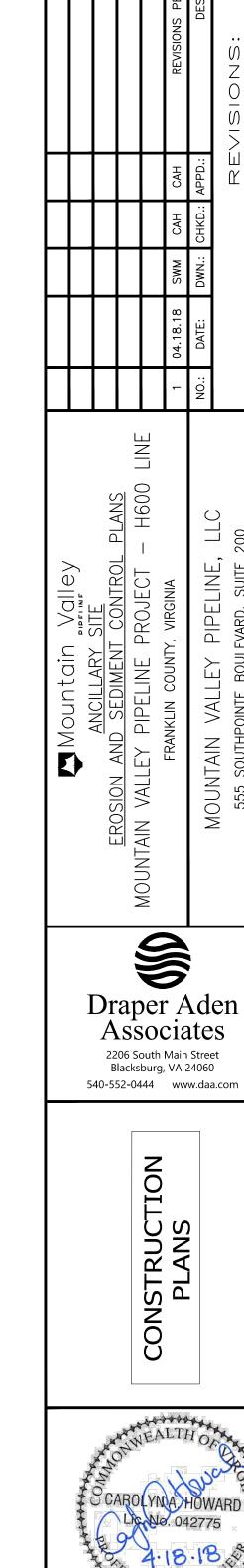
A wide range of synthetic, spray-on materials are marketed to stabilize and protect the soil surface. These are emulsions or dispersions of vinyl compounds, rubber or other substances which are mixed with water and applied to the soil. They may be used alone in some cases as temporary stabilizers, or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

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









RESTORATION DETAILS

04/04/2018 AS SHOWN

SHT. NO. LY-045-046-005 OF

LAA/SWM

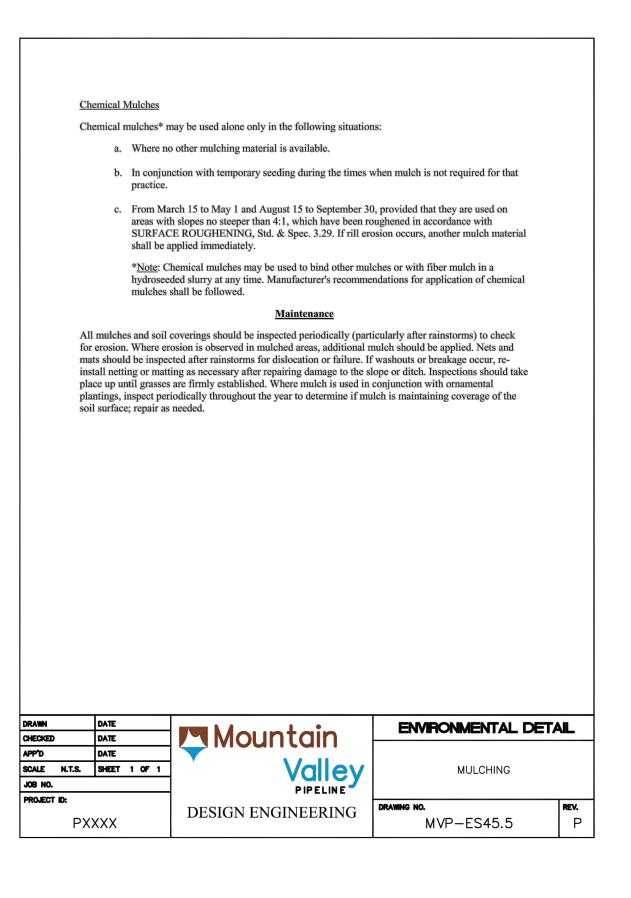
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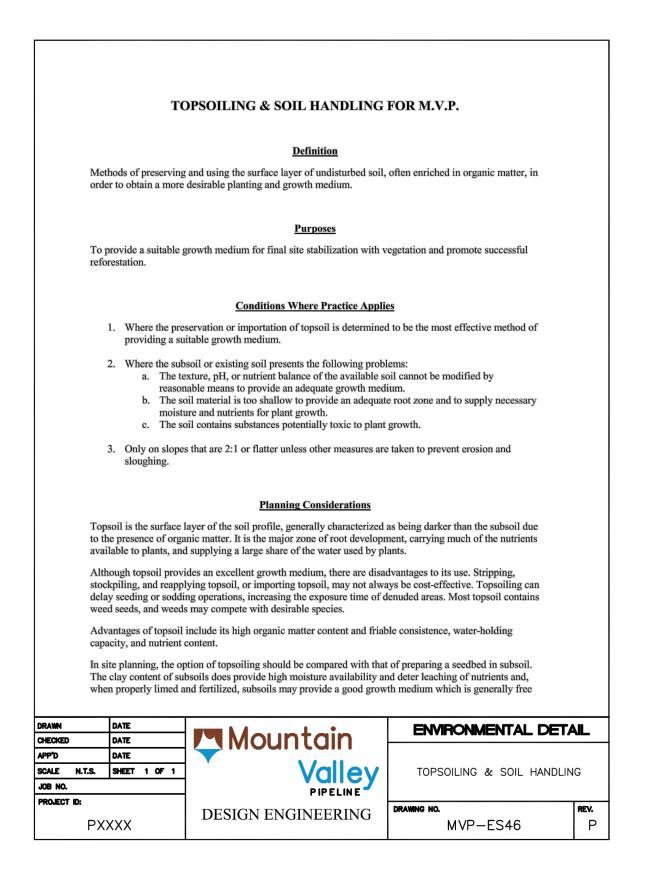
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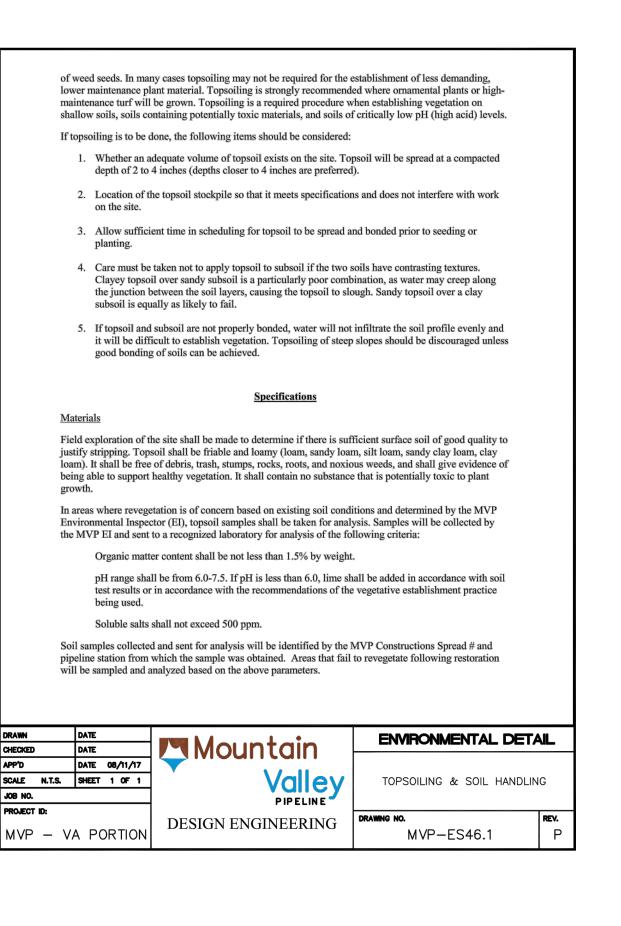
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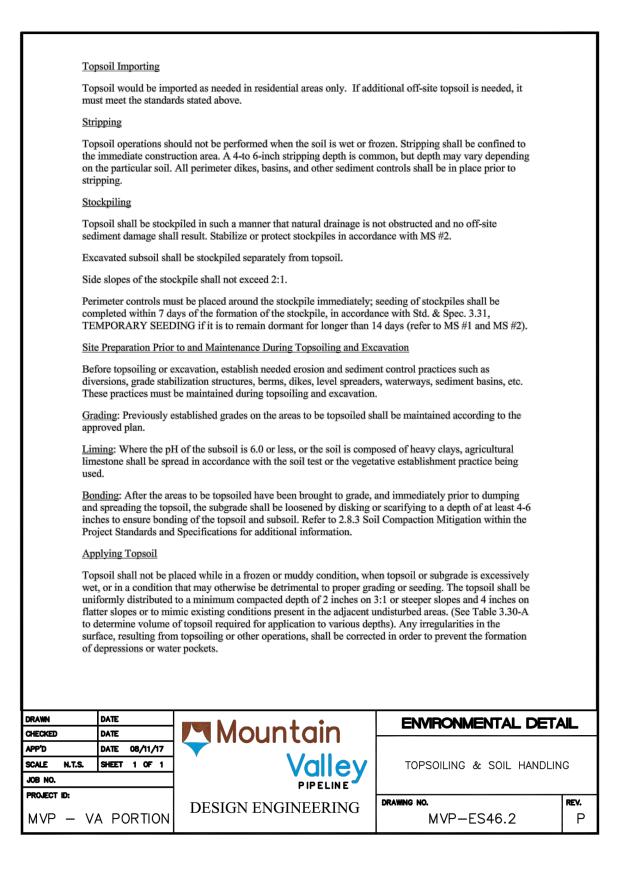
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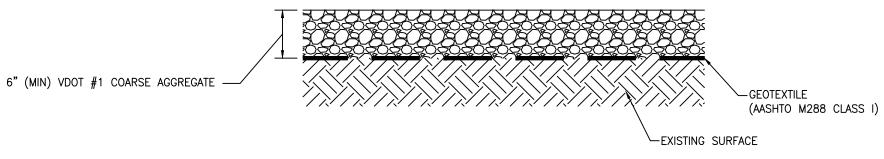
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### TEMPORARY GRAVEL SURFACE SPECIFICATIONS

- · NO LAND DISTURBANCE WILL OCCUR AND THE GRAVEL WILL BE PLACED ON EXISTING GRADE.
- THE EXISTING SURFACE SHALL BE CLEARED OF ALL VEGETATION AND OTHER OBJECTIONABLE MATERIAL.
- A 6-INCH COURSE OF VDOT #1 COARSE AGGREGATE (AS PEER SECTION 203 OF VDOT'S ROAD AND BRIDGE SPECIFICATIONS) SHALL BE PROVIDED AS SOON AS VEGETATION REMOVAL IS COMPLETE.
- IN "HEAVY DUTY" TRAFFIC SITUATIONS THE AGGREGATE SHOULD INSTEAD BE PLACED AT AN 8- TO 10-INCH DEPTH TO AVOID EXCESSIVE DISSIPATION OR MAINTENANCE NEEDS.
- IF THE GRAVEL SURFACE BECOMES CLOGGED WITH SEDIMENT AND OTHER DEBRIS, A TOP DRESSING OF NEW GRAVEL SHOULD BE APPLIED.
- GEOTEXTILE SHALL BE NON-WOVEN WITH AASHTO M288 SURVIVABILITY CLASS (1) AND A MIN. PERMITIVITY OF 90 GAL/MIN/FT2.

TYPICAL GRAVEL SURFACE DETAIL

3.10 Sanitary Waste Facilities

Recommended Practices

Portable toilets should be conveniently located conducive to use. Anchor portable toilets to prevent tipping, and provide secondary containment in the form of berms or other containment to prevent pollutants from discharging into streets, gutters, storm drains, or surface waters due to accidental spills or discharges. Inspect portable toilets daily for cleanliness and proper operation, and arrange for regular service by a licensed service provider for proper maintenance and waste collection.

- ✓ Provide a convenient and safe location.
- ✓ Place on level ground or gravel pad. ✓ Anchor to prevent tipping.
- ✓ Inspect and maintain daily and service regularly.

✓ Conveniently locate portable toilets throughout the project site (for large

- Place portable toilets on level ground to prevent accidental tipping or Ensure that portable toilets are accessible for regular maintenance and
- ✓ The locations of the portable toilets should be identified in the SWPPP.
- preferably on the record Set of Plans or on a site map.

**Prohibitions** 

Sanitary discharge from portable toilets is harmful to the environment and should never be discharged to surface waters. Never locate portable toilets over storm drains or gutters or near

conveyance channels. Never allow discharge from portable toilets to leak or spill into streets, gutters, storm drains, or surface waters.

Inspections and Maintenance

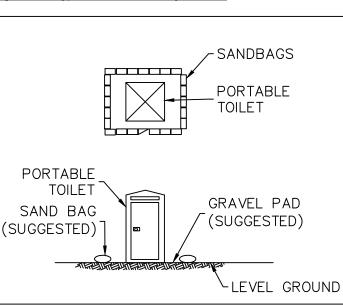
✓ Inspect portable toilets daily to detect leaks.

✓ Keep facilities safe and clean.

✓ Provide regular maintenance and waste collection by a licensed service provider to ensure proper disposal of waste into a sanitary sewer system for treatment.

Figure 3-10: Typical Detail for Sanitary Facilities

PORTA-JOHN DETAIL



3.7 Fueling Areas

**Recommended Practices** 

from entering.

functional spill kit available at the fueling area.

and Safety Data Sheets (SDS).

response in the event of a spill.

should be secured at all times.

✓ Always leave original labels on fuel containers.

✓ Locate the fueling area a minimum of 100 feet from gutters, storm

Onsite storage of fuel should be avoided, whenever possible. If onsite

storage and handling of fuel is necessary, a designated, secure fueling area

should be established away from heavily trafficked areas. Always keep a

✓ Always provide secondary containment for all fuel storage containers.

✓ Always store fuel in accordance with manufacturers' recommendations

✓ Post emergency phone numbers in the fueling area to aid in a quick

✓ Provide berms around the fueling area to prevent stormwater runoff

✓ Do not leave the fueling area unattended when in use. The area

✓ Do not utilize a mobile fueling operation within 100 feet of any

drains, conveyance channels, or surface waters. ✓ Locate the fueling area on level ground. ✓ Secure the fueling area with fencing or similar perimeter controls to

gutterstorm drain, conveyance channel, or surface waters.

discourage vandalism. ✓ Place a sign at the location identifying it as the fuel storage and

handling area. ✓ The location of the fuel handling and storage area should be identified in the SWPPP, preferably on the record Set of Plans or on a site map.

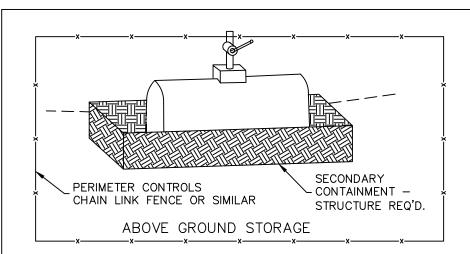
Do not "top off" fuel tanks when fueling equipment or vehicles.

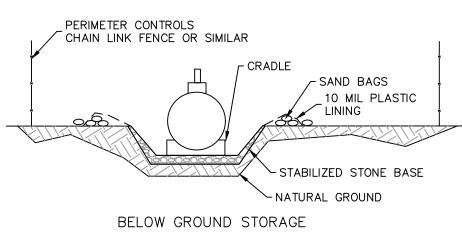
**Inspections and Maintenance** 

- ✓ Inspect the facility daily to detect leaks or spills. ✓ Use spill kit supplies to immediately clean up any leaks and spills and dispose of used materials properly.
- ✓ Inspect spill kit regularly to ensure that all supplies are readily available and functional in the event of a leak or spill.

A Spill Prevention Control and Countermeasure (SPCC) Plan conforming to 40 CFR 112 is required if the aggregated volume of Oil stored within the project limits at any one time is greater than 1320 gallons (see Road and Bridge Specification 107.16(e)3 for additional information).

Figure 3-7: Typical Detail for Fuel Storage Area





GENERAL DETAILS DRAWN BY: LAA/SWM CHECKED BY:

04/04/2018

AS SHOWN

SHT. NO.LY-045-046-006 OF

APPROVED BY:

SCALE:

**\*\*** 

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CONSTRUC PLANS

TETRA TECH CAD FILE PATH: \\draperaden.net\daa\Projects\B14\100\B14188B\b14188b-15\CAD\sdi-ly045-046-franklin\B14188B-15\_ESC DETAILS.dwg PLOTTED ON: 4/18/2018 11:56 AM PLOTTED BY: Sydney Mitchell PLOT FILE: DAA.stb

### EROSION AND SEDIMENT CONTROL NARRATIVE

THE MOUNTAIN VALLEY PIPELINE PROJECT (PROJECT) WILL EXTEND FROM THE EXISTING EQUITRANS, L.P TRANSMISSION SYSTEM AND OTHER NATURAL GAS FACILITIES IN WETZEL COUNTY, WEST VIRGINIA TO TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC'S ZONE 5 COMPRESSOR STATION 165 IN PITTSYLVANIA COUNTY, VIRGINIA. IN ADDITION, THE PROJECT WILL INCLUDE APPROXIMATELY 171,600 HORSEPOWER OF COMPRESSION AT THREE COMPRESSOR STATIONS CURRENTLY PLANNED ALONG THE ROUTE, AS WELL AS MEASUREMENT, REGULATION, AND OTHER ANCILLARY FACILITIES REQUIRED FOR THE SAFE AND RELIABLE OPERATION OF THE PIPELINE. THE PIPELINE IS DESIGNED TO TRANSPORT UP 1. IN NON-TMDL WATERSHEDS: TO 2.0 MILLION DEKATHERMS PER DAY OF NATURAL GAS.

LAYDOWN YARD 045-046 (MVP-LY-045-046) CONSISTS OF APPROXIMATELY OF AGRICULTURAL LAND IN FRANKLIN COUNTY TO BE CONVERTED TO A TEMPORARY PIPE LAYDOWN AREA. TEMPORARY ACCESS TO MVP-LY-045-046 WILL BE PROVIDED BY EXISTING ROADS. DISTURBED LAND WILL BE RETURNED TO APPROXIMATE PRE-EXISTING CONTOURS AND COVER CONDITIONS. THE TOTAL MVP-LY-045-046 LOD AREA IS APPROXIMATELY 12.27 ACRES.

### 2. EXISTING SITE CONDITIONS

EXISTING TOPOGRAPHY IS VARIABLE WITH GRADES RANGING FROM 0.5% TO 10%. THE SITE SLOPES IN A SOUTHWESTERN DIRECTION TOWARDS THE EXITING TREELINE. EXISTING GROUND COVER INCLUDES FOREST, AGRICULTURAL ACTIVITY AREAS, GRAVEL, DIRT & ASPHALT.

### ADJACENT AREAS INCLUDE: FORESTED AREAS, AGRICULTURAL ACTIVITY AREAS (E.G. CROPS, HAY PRODUCTION), PONDS, ROADS AND A RAILROAD.

NO OFF-SITE LAND DISTURBING ACTIVITIES ARE PROPOSED. ANY OFF-SITE LAND-DISTURBING ACTIVITY ASSOCIATED WITH THE PROJECT MUST HAVE AN APPROVED ESC PLAN.

THE SOILS LOCATED WITHIN THE LOD INCLUDE:

### FRANKLIN COUNTY:

CLIFFORD FINE SANDY LOAM - 8 TO 15% SLOPES (7C) - GROUP B, CLIFFORD FINE SANDY LOAM - 15 TO 25% SLOPES (7D) - GROUP B,

### 6. CRITICAL AREAS:

THERE ARE NO STREAMS AND WETLANDS WITHIN THE LOD. PRIOR TO CONSTRUCTION ACTIVITIES, SEDIMENT BARRIERS WILL BE INSTALLED DOWNGRADIENT OF THE CONSTRUCTION 11. CALCULATIONS WORK AREA AS NEEDED TO PREVENT THE FLOW OF SOIL OFF-SITE. SEDIMENT BARRIERS WILL BE PROPERLY MAINTAINED THROUGHOUT CONSTRUCTION AND REINSTALLED AS NECESSARY UNTIL REPLACED BY PERMANENT EROSION CONTROLS OR RESTORATION OF DISTURBED ADJACENT UPLAND AREAS IS COMPLETE. DISTURBANCE MUST NOT ENCROACH INTO ROADSIDE DITCHES ALONG TRIPPLE CREEK ROAD.

### 7. EROSION AND SEDIMENT CONTROL MEASURES:

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992, AS WELL AS ANY ADDITIONAL MEASURES REQUIRED BY APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

### 1. STRUCTURAL PRACTICES 3.01 - SAFETY FENCE

3.02 - CONSTRUCTION ENTRANCE

MVP-ES3 - COMPOST FILTER SOCK

MVP-ES9 - BELTED SILT RETENTION FENCE

MVP-ES9.2 - SUPER SILT FENCE

MVP-ES9.3 - STACKED COMPOST FILTER SOCK

### 2. VEGETATIVE PRACTICES

3.30 - TOPSOIL (STOCKPILE)

3.31 - TEMPORARY SEEDING

3.32 - PERMANENT SEEDING

3.35 - MULCHING

3.36 - SOIL STABILIZATION BLANKETS AND MATTING

MVP-ES11.0 - TEMPORARY EROSION CONTROL SEEDING MIX MVP-ES11.1 - FOREST REGENERATION WOODY SEED MIX AND APPLICATION RATES

MVP-ES11.2 - UPLAND MEADOW SEED MIX AND APPLICATION RATES MVP-ES11.3 - UPLAND STEEP SLOPE SEED MIX AND APPLICATION RATES

MVP-ES11.4 - WETLAND SEED MIX AND APPLICATION RATES

MVP-ES11.5 - RIPARIAN SEED MIX AND APPLICATION RATES

MVP-ES11.6 - NATIVE TREE AND SHRUB SPECIES FOR BARE ROOT PLANTINGS WITHIN RIPARIAN AREAS AND FORESTED WETLANDS

MVP-ES11.7 - NATIVE TREE AND SHRUB SPECIES FOR BARE ROOT PLANTINGS

WITHIN RIPARIAN AREAS AND FORESTED WETLANDS

MVP-ES11.8 - STREAM CROSSINGS PROPOSED FOR BARE ROOT SEEDING PLANTINGS MVP-ES11.9 - STREAM CROSSING FOR BARE ROOT SEEDING PLANTING

MVP-ES46 - 46.2 - TOPSOILING & SOIL HANDLING

### PERMANENT STABILIZATION:

ALL DISTURBED AREAS SHALL BE STABILIZED WITH PERMANENT SEEDING WITHIN SEVEN WORKING DAYS OF FINAL GRADING, WEATHER AND SOIL CONDITIONS PERMITTING, AS SPECIFIED IN THE PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS FOR VIRGINIA.

### 9. STORMWATER RUNOFF CONSIDERATIONS:

THE PROJECT SITE WILL BE USED FOR PARKING AND STORING VEHICLES AND EQUIPMENT DURING PIPELINE CONSTRUCTION. THIS ACTIVITY WILL REQUIRE THAT TEMPORARY GRAVEL BE PLACED OVER A LARGE PORTION OF THE SITE. HOWEVER, THE GRAVEL WILL BE PLACED OVER A NON-WOVEN GEOTEXTILE WITH A PERMITIVITY OF 90 GALLONS PER MINUTE PER SQUARE FOOT TO MAINTAIN INFILTRATION RATES OF THE EXISTING SOIL SURFACE BELOW. SINCE THERE IS NO PROPOSED GRADING OR LAND DISTURBANCE, AND THE INFILTRATION RATES OF THE EXISTING SOIL SURFACE ARE BEING MAINTAINED, NO ADDITIONAL STORMWATER CONTROLS ARE REQUIRED.

### 10. 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 PROJECT SPECIFIC 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

CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS ON AT LEAST THE FOLLOWING FREQUENCIES:

- - 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.
- 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.

REPAIR OF ALL INEFFECTIVE TEMPORARY ESC MEASURES SHALL OCCUR WITHIN 24 HOURS OF IDENTIFICATION, OR AS SOON AS CONDITIONS ALLOW IF COMPLIANCE WITH THIS TIME FRAME WOULD RESULT IN GREATER ENVIRONMENTAL IMPACTS.

TEMPORARY BMPS WILL BE REMOVED UPON ACHIEVING VEGETATIVE STABILIZATION. DISTURBED AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RE-SEEDED AS NEEDED UNTIL STABILIZATION IS ACHIEVED.

TEMPORARY ESC 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.

BMP SIZING AND INSTALLATION HAS BEEN BASED ON THE FOLLOWING CRITERIA INCLUDED BY REFERENCE IN BOTH THE ANNUAL STANDARDS AND SPECIFICATIONS AND THE GENERAL DETAILS INCLUDED WITH THE EROSION AND SEDIMENT CONTROL PLANS:

COMPOST FILTER SOCK - MVP-ES3.0, MVP-ES3.1, MVP-ES3.3

STACKED COMPOST FILTER SOCK - MVP-ES9.3

### 11. GENERAL EROSION AND SEDIMENT CONTROL NOTES:

- ES-1: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS 9VAC25-840 EROSION AND SEDIMENT CONTROL REGULATIONS.
- ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION. ES-3: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO
- OR AS THE FIRST STEP IN CLEARING. ES-4: A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE
- MAINTAINED ON THE SITE AT ALL TIMES. ES-5: PRIOR TO COMMENCING LAND-DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN
- APPROVING AUTHORITY. ES-6: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
- ES-7: ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
- ES-8: DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.
- ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

### 13. MINIMUM STANDARDS (MS):

ALL LAND-DISTURBING ACTIVITIES UNDERTAKEN ON PRIVATE AND PUBLIC LANDS IN THE COMMONWEALTH OF VIRGINIA MUST MEET THE 19 "MINIMUM STANDARDS" FOR ESC IN SECTION 4VAC50-30-40 OF THE VIRGINIA ESC REGULATIONS. THE APPLICANT WHO SUBMITS THE ESC PLAN TO THE PROGRAM AUTHORITY FOR APPROVAL IS RESPONSIBLE FOR ENSURING COMPLIANCE WITH THE MINIMUM STANDARDS THAT APPLY TO HIS/HER ACTIVITIES.

MS-1 SOIL STABILIZATION. PERMANENT OR TEMPORARY STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

MS-2 SOIL STOCKPILE STABILIZATION. DURING CONSTRUCTION, SOIL STOCKPILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. TEMPORARY PROTECTION AND PERMANENT STABILIZATION SHALL BE APPLIED TO ALL SOIL STOCKPILES ON THE SITE AND BORROW AREAS OR SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

MS-3 PERMANENT STABILIZATION. PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE, AND WILL INHIBIT

### EROSION.

MS-4 SEDIMENT BASINS & TRAPS. SEDIMENT BASINS, SEDIMENT TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS, AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

MS-5 STABILIZATION OF EARTHEN STRUCTURES. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKE'S AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

MS-6 SEDIMENT TRAPS & SEDIMENT BASINS. SEDIMENT TRAPS AND BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN AS FOLLOWS:

- SEDIMENT TRAPS:
  - 1.1. ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES.
  - 1.2. MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA.
- 2. SEDIMENT BASINS:
  - 2.1. CONTROL DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES. 2.2. MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE
  - 2.3. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A TWENTY-FIVE YEAR STORM OF 24-HOUR

MS-7 CUT AND FILL SLOPES DESIGN & CONSTRUCTION. CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

MS-8 CONCENTRATED RUNOFF DOWN SLOPES. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME, OR SLOPE DRAIN STRUCTURE.

MS-9 SLOPE MAINTENANCE. WHENEVER WATER SEEPS FROM A SLOPE FACE. ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.

MS-10 STORM SEWER INLET PROTECTION. ALL STORM SEWER INLETS MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE STORMWATER CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED / TREATED TO REMOVE SEDIMENT.

MS-11 STORMWATER CONVEYANCE PROTECTION. BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.

MS-12 WORK IN LIVE WATERCOURSE. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.

MS-13 CROSSING LIVE WATERCOURSE. WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL SHALL BE PROVIDED.

MS-14 REGULATION OF WATERCOURSE CROSSING. ALL APPLICABLE FEDERAL STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.

MS-15 STABILIZING OF WATERCOURSE. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.

MS-16 UNDERGROUND UTILITY LINE INSTALLATION. UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:

- a.NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME. b.EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES. c.EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
- d.MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION. e.RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE
- REGULATIONS. f. COMPLY WITH APPLICABLE SAFETY REGULATIONS.

MS-17 VEHICULAR SEDIMENT TRACKING. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS:

- a.PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE.
- ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. c.SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL

b. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE

MS-18 REMOVAL OF TEMPORARY MEASURES. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL PROGRAM AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.

MS-19 STORMWATER MANAGEMENT. PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CRITERIA. STREAM RESTORATION AND RELOCATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN CONCEPTS ARE NOT MAN-MADE CHANNELS AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS:

- a. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITE SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE NATURAL OR MAN-MADE RECEIVING CHANNEL, PIPE OR STORM SEWER SYSTEM. FOR THOSE SITES WHERE RUNOFF IS DISCHARGED INTO A PIPE OR PIPE SYSTEM, DOWNSTREAM STABILITY ANALYSES AT THE OUTFALL OF THE PIPE OR PIPE SYSTEM SHALL BE PERFORMED b. ADEQUACY OF ALL CHANNELS AND PIPES SHALL BE VERIFIED IN THE FOLLOWING
- MANNER:
- THE APPLICANT SHALL DEMONSTRATE THAT THE TOTAL DRAINAGE AREA TO THE POINT OF ANALYSIS WITHIN THE CHANNEL IS ONE HUNDRED TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE PROJECT IN QUESTION; OR
- (a) NATURAL CHANNELS SHALL BE ANALYZED BY THE USE OF A TWO—YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED OR BANKS.
  - (b) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A TWO-YEAR STORM TO DEMONSTRATE THAT STORMWATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND (c) PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE
- PIPE OR SYSTEM. c.IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL: IMPROVE THE CHANNELS TO A CONDITION WHERE A 10-YEAR STORM WILL NOT OVERTOP THE BANKS AND A TWO-YEAR STORM WILL NOT CAUSE EROSION TO THE CHANNEL, THE BED, OR THE BANKS; OR

2. IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE 10-YEAR STORM IS CONTAINED WITHIN THE APPURTENANCES: 3. DEVELOP A SITE DESIGN THAT WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK

RUNOFF RATE FROM A TWO-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A NATURAL CHANNEL OR WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A 10-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A MAN-MADE CHANNEL: OR

4. PROVIDE A COMBINATION OF CHANNEL IMPROVEMENT, STORMWATER DETENTION OR OTHER MEASURES WHICH IS SATISFACTORY TO THE VESCP AUTHORITY TO PREVENT DOWNSTREAM EROSION.

- d.THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS.
- e. ALL HYDROLOGIC ANALYSES SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT CONDITION OF THE SUBJECT
- f. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION HE SHALL OBTAIN APPROVAL FROM THE VESCP OF A PLAN FOR MAINTENANCE OF THE DETENTION FACILITIES. THE PLAN SHALL SET FORTH THE MAINTENANCE REQUIREMENTS OF THE FACILITY AND THE PERSON RESPONSIBLE FOR PERFORMING THE MAINTENANCE.
- g.OUTFALL FROM A DETENTION FACILITY SHALL BE DISCHARGED TO A RECEIVING CHANNEL, AND ENERGY DISSIPATORS SHALL BE PLACED AT THE OUTFALL OF ALL DETENTION FACILITIES AS NECESSARY TO PROVIDE A STABILIZED TRANSITION FROM THE FACILITY TO THE RECEIVING CHANNEL.
- h.ALL ON-SITE CHANNELS MUST BE VERIFIED TO BE ADEQUATE. i. INCREASED VOLUMES OF SHEET FLOWS THAT MAY CAUSE EROSION OR
- SEDIMENTATION ON ADJACENT PROPERTY SHALL BE DIVERTED TO A STABLE OUTLET, ADEQUATE CHANNEL, PIPE OR PIPE SYSTEM, OR TO A DETENTION FACILITY. j. IN APPLYING THESE STORMWATER MANAGEMENT CRITERIA, INDIVIDUAL LOTS OR PARCELS IN A RESIDENTIAL, COMMERCIAL OR INDUSTRIAL DEVELOPMENT SHALL NOT
- BE CONSIDERED TO BE SEPARATE DEVELOPMENT PROJECTS. INSTEAD, THE DEVELOPMENT, AS A WHOLE, SHALL BE CONSIDERED TO BE A SINGLE DEVELOPMENT PROJECT. HYDROLOGIC PARAMETERS THAT REFLECT THE ULTIMATE DEVELOPMENT CONDITION SHALL BE USED IN ALL ENGINEERING CALCULATIONS. k. ALL MEASURES USED TO PROTECT PROPERTIES AND WATERWAYS SHALL BE
- EMPLOYED IN A MANNER WHICH MINIMIZES IMPACTS ON THE PHYSICAL, CHEMICAL AND BIOLOGICAL INTEGRITY OF RIVERS, STREAMS AND OTHER WATERS OF THE

I. ANY PLAN APPROVED PRIOR TO JULY 1, 2014, THAT PROVIDES FOR STORMWATER

- MANAGEMENT THAT ADDRESSES ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS SHALL SATISFY THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS IF THE PRACTICES ARE DESIGNED TO (I) DETAIN THE WATER QUALITY VOLUME AND TO RELEASE IT OVER 48 HOURS: (II) DETAIN AND RELEASE OVER A 24-HOUR PERIOD THE EXPECTED RAINFALL RESULTING FROM THE ONE YEAR, 24-HOUR STORM; AND (III) REDUCE THE ALLOWABLE PEAK FLOW RATE RESULTING FROM THE 1.5, 2, AND 10-YEAR, 24-HOUR STORMS TO A LEVEL THAT IS LESS THAN OR EQUAL TO THE PEAK FLOW RATE FROM THE SITE ASSUMING IT WAS IN A GOOD FORESTED CONDITION, ACHIEVED THROUGH MULTIPLICATION OF THE FORESTED PEAK FLOW RATE BY A REDUCTION FACTOR THAT IS EQUAL TO THE RUNOFF VOLUME FROM THE SITE WHEN IT WAS IN A GOOD FORESTED CONDITION DIVIDED BY THE RUNOFF VOLUME FROM THE SITE IN ITS PROPOSED CONDITION, AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS AS DEFINED IN ANY REGULATIONS
- m. FOR PLANS APPROVED ON AND AFTER JULY 1, 2014, THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF § 62.1-44.15:52 A OF THE ACT AND THIS SUBSECTION SHALL BE SATISFIED BY COMPLIANCE WITH WATER QUANTITY REQUIREMENTS IN THE STORMWATER MANAGEMENT ACT (§ 62.1-44.15:24 ET SEQ. OF THE CODE OF VIRGINIA) AND ATTENDANT REGULATIONS, UNLESS SUCH LAND-DISTURBING ACTIVITIES ARE IN ACCORDANCE WITH 9VAC25-870-48 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) REGULATION OR ARE EXEMPT PURSUANT TO SUBDIVISION C 7 OF § 62.1-44.15:34 OF THE ACT.

9VAC25-870-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP)

n.COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN

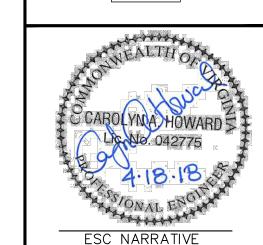
REGULATION SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF THIS

PROMULGATED PURSUANT TO \$ 62.1-44.15:54 OR 62.1-44.15:65 OF THE ACT.



**Associates** 2206 South Main Street Blacksburg, VA 24060 540-552-0444 www.daa.com

CONSTRUC PLANS



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### MS-19 COMPLIANCE DURING CONSTRUCTION

### A. INTRODUCTION

THE PRIMARY INTENT OF MS-19 IS TO ENSURE THAT DOWN GRADIENT PROPERTIES ARE PROTECTED FROM ADVERSE IMPACTS RESULTING FROM INCREASES IN STORMWATER RUNOFF FROM DEVELOPMENT ACTIVITIES. IN ACCORDANCE WITH 9VAC25-870-66. WATER QUANTITY, COMPLIANCE WITH THE WATER QUALITY REQUIREMENTS CONTAINED IN THAT SECTION SATISFIES THE REQUIREMENTS OF M.S. 19:

"COMPLIANCE WITH THE MINIMUM STANDARDS SET OUT IN THIS SECTION SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF SUBDIVISION 19 OF 9VAC25-840-40 (MINIMUM STANDARDS; VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS)."

THERE IS ONE PRIMARY FLOW REGIME ASSOCIATED WITH THE CONSTRUCTION PHASE OF THE PROJECT THAT WILL NEED TO BE ASSESSED FOR COMPLIANCE WITH MS-19. THIS FLOW REGIME INCLUDE FLOWS GENERATED DIRECTLY WITHIN THE PROJECT LIMIT OF DISTURBANCE (LOD) THAT ARE CONTROLLED BY PERIMETER CONTROLS CONSISTING OF COMPOST FILTER SOCKS (CFS) OR SILT FENCE AS WELL AS FLOWS ROUTED TO SEDIMENT TRAPS AND/OR SEDIMENT BASINS.

REGARDLESS OF THE SPECIFIC LOCATION AND/OR FLOW REGIME, ALL EROSION AND SEDIMENT CONTROL MEASURES INCLUDED IN THE DESIGN PLANS FOR THE PROJECT HAVE BEEN DEVELOPED AND DESIGNED TO BE IN FULL COMPLIANCE WITH STATE REQUIREMENTS, AS CONTAINED IN THE <u>VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK</u> (VESCH), AS WELL AS THE APPROVED PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS. AS A RESULT, ALL IMPLEMENTED PRACTICES (SILT FENCE, CFS, SOIL STABILIZATION, ETC.) WILL MEET ALL STATE REQUIREMENTS.

IN ALL INSTANCES OF OFFSITE STORMWATER FLOW DURING THE CONSTRUCTION PHASE OF THE PROJECT, COMPLIANCE WITH MS-19 IS PROVIDED THROUGH THE PROVISION OF SHEETFLOW BELOW THE RESPECTIVE EROSION AND SEDIMENT CONTROL PRACTICES ALONG THE PERIMETER (CFS OR SILT FENCE); SITE-SPECIFIC ANALYSES WILL BE COMPLETED WHEN SITING SEDIMENT TRAPS/BASINS AND LEVEL SPREADERS TO DEMONSTRATE COMPLIANCE WITH MS-19. A DESCRIPTION OF THE FLOW REGIME FOR DIRECT RUNOFF FROM DISTURBED AREAS OF THE PROJECT IS PROVIDED BELOW, FOLLOWED BY AN ANALYSIS THAT DEMONSTRATES THAT FLOW FROM THE PROPOSED PRACTICES WILL PROVIDE FOR NON-EROSIVE SHEET FLOW AND IS THEREFORE IN FULL COMPLIANCE WITH MS-19.

### B. RUNOFF FROM PROJECT SITE

PROPERLY DESIGNED AND IMPLEMENTED EROSION AND SEDIMENT CONTROLS IN THE FORM OF SOIL STABILIZATION, STAND—ALONE CFS, AND/OR SILT FENCE WILL ENSURE DISTURBED AREAS WITHIN THE PROJECT SITE ARE PROTECTED IN ACCORDANCE WITH VESCH SPECIFICATIONS. PERIMETER CONTROLS (CFS AND/OR SILT FENCE, DEPENDING ON THE SPECIFIC LOCATION) WILL FILTER RUNOFF AND PROVIDE SHEETFLOW TO DOWNGRADIENT AREAS IN A NON—EROSIVE MANNER. THIS WILL RESULT IN RUNOFF FROM THE PROJECT SITE MEETING MS—19 REQUIREMENTS.

### 1. SHEETFLOW DISCHARGES

THE RELEVANT STANDARD REFERRED TO IN 9VAC25-870-66 IS IN SECTION D THAT CONTAINS THE REQUIREMENTS WHEN DISCHARGING STORMWATER IN THE FORM OF SHEETFLOW:

"A. INCREASED VOLUMES OF SHEET FLOW RESULTING FROM PERVIOUS OR DISCONNECTED IMPERVIOUS AREAS, OR FROM PHYSICAL SPREADING OF CONCENTRATED FLOW THROUGH LEVEL SPREADERS, MUST BE IDENTIFIED AND EVALUATED FOR POTENTIAL IMPACTS ON DOWN—GRADIENT PROPERTIES OR RESOURCES. INCREASED VOLUMES OF SHEET FLOW THAT WILL CAUSE OR CONTRIBUTE TO EROSION, SEDIMENTATION, OR FLOODING OF DOWN GRADIENT PROPERTIES OR RESOURCES SHALL BE DIVERTED TO A STORMWATER MANAGEMENT FACILITY OR A STORMWATER CONVEYANCE SYSTEM THAT CONVEYS THE RUNOFF WITHOUT CAUSING DOWN—GRADIENT EROSION, SEDIMENTATION, OR FLOODING. IF ALL RUNOFF FROM THE SITE IS SHEET FLOW AND THE CONDITIONS OF THIS SUBSECTION ARE MET, NO FURTHER WATER QUANTITY CONTROLS ARE REQUIRED."

SHEETFLOW DOWN GRADIENT OF THE LOD DURING THE CONSTRUCTION PHASE WILL BE PROVIDED BY PERIMETER CONTROLS THAT HAVE BEEN DESIGNED IN ACCORDANCE WITH THE APPROVED PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS, AS WELL AS THE RELEVANT SPECIFICATIONS CONTAINED IN THE VESCH (AS NOTED ABOVE). EACH PRACTICE (SILT FENCE AND CFS) HAS BEEN SELECTED BASED ON THE SITE SPECIFIC CONDITIONS TO MAKE CERTAIN THAT THEY WILL FUNCTION PROPERLY AND AS INTENDED. CONFIRMATION THAT SHEETFLOW WILL BE PROVIDED DOWNGRADIENT OF EACH PRACTICE IS PROVIDE BELOW.

### a) <u>SILT FENCE</u>

BY DEFINITION, SILT FENCE IS A FILTERING PRACTICE THAT HAS A STATED PERMEABILITY OF 0.3 GAL/MIN/SF (VESCH TABLE 3.05-A). ASSUMING A MAXIMUM PONDING DEPTH OF 24-IN, THIS WILL RESULT IN A FLOW RATE THROUGH THE FENCING OF 0.6 GAL/MIN/LF OF FENCING. CONVERTING, THIS EQUATES TO APPROXIMATELY 0.00134 CFS/LF (448.83 GPM = 1 CFS). THIS FLOW RATE CAN BE INSERTED INTO MANNING'S EQUATION TO SOLVE FOR THE CORRESPONDING DEPTH OF FLOW:

Q = (1.49/N) A R 2/3 S 1/2

### WHERE:

Q = OVERLAND FLOW RATE, CFS

A = CROSS-SECTIONAL FLOW AREA PER LF OF FENCE (I.E. DEPTH X 1), FT2

### N = MANNING'S COEFFICIENT:

THIS PARAMETER WAS ASSUMED TO BE 0.24 FOR SHEETFLOW IN 'DENSE GRASSES' (TR-55, TABLE 3-1. AREAS BELOW THE END TREATMENTS WILL BE SEEDED WITH A NATIVE GRASSES AND WOODY SPECIES, SO THE 'DENSE GRASSES' N VALUE WAS DEEMED TO BE THE MOST APPROPRIATE VS THE "SHORT PRAIRIE GRASS" (N = 0.15) OR "BERMUDA GRASS" (N = 0.41) ALTERNATIVES).

### R = HYDRAULIC RADIUS, FT:

THIS TERM IS DEFINED AS THE CROSS—SECTIONAL FLOW AREA DIVIDED BY THE WETTED PERIMETER. HOWEVER, FOR SHALLOW, WIDE FLOW THIS CAN BE ASSUMED TO BE EQUAL TO THE FLOW DEPTH. TO ILLUSTRATE, ASSUME A FLOW DEPTH OF 0.10 FT OVER A LENGTH OF 10 FT:

R = A / WP = (0.1 FT \* 10 FT) / (0.1 FT + 10 FT + 0.1 FT) = 1.0 FT2 / 10.2 FT = 0.098 FT

DEPTH = 0.10 FT IS A VALID ASSUMPTION

### S = DOWN-GRADIENT OVERLAND SLOPE, FT/FT:

ASSUMING AN OVERLAND SLOPE OF 0.5 FT/FT AND AN "N" VALUE OF 0.24 (MEADOW), RESULTS IS A NOMINAL FLOW DEPTH OF 0.0078 FT:

0.00134 = (1.49/0.24) (DEPTH X 1) DEPTH 2/3 0.5 1/2

### REARRANGING,

DEPTH 5/3 = 0.000305

DEPTH = 0.0078 FT

THIS FLOW DEPTH CAN THEN BE USED TO COMPUTE THE VELOCITY IN ACCORDANCE WITH:

V = Q/A

= 0.00134 / 0.0078

= 0.17 FPS

THIS VALUE IS AN ORDER OF MAGNITUDE LOWER THAN THE CONSERVATIVELY ASSUMED ALLOWABLE VELOCITY OF 2 FPS (BARE EARTH). THIS RESULT IS NOT UNEXPECTED AS THE PURPOSE OF SILT FENCE IS TO SLOWLY FILTER STORMWATER RUNOFF.

### b) <u>CFS</u>

THE OTHER PERIMETER CONTROL THAT WILL BE IMPLEMENTED, DEPENDING ON THE SPECIFIC LOCATION, WILL BE CFS. THE COMPOST FILTER SOCKS ARE RATED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) IN THE DOCUMENT "FILTER BERMS AND FILTER SOCKS: STANDARD SPECIFICATIONS FOR COMPOST FOR EROSION/SEDIMENT CONTROL" TO PASS A RANGE OF FLOWS, FROM 4 TO OVER 10 GPM/LF (TABLE 2). A PRODUCT SPECIFIC CITATION OBTAINED FROM FILTREXX® STIPULATES A FLOW THROUGH RATE OF 22.5 GAL/MIN/LF FOR A 24-IN DIAMETER CFS (THE EFFECTIVE SIZE THAT WILL BE USED FOR THIS PROJECT). IN ORDER TO ENSURE A SHEETFLOW DEPTH OF NOT MORE THAN 0.10 FT BELOW THE CFS, AN EVEN HIGHER FLOW RATE OF 43 GPM WAS ASSUMED (VERY CONSERVATIVE).

ASSUMING A WORST CASE OF 43 GPM, THIS EQUATES TO A FLOW RATE OF 0.095 CFS/LF. USING MANNING'S EQUATION TO SOLVE FOR THE DEPTH OF FLOW USING THE SAME ASSUMPTIONS AND METHODOLOGY NOTED ABOVE RESULTS IN AN OVERLAND FLOW DEPTH OF 0.10 FT:

0.095= (1.49/0.24) (DEPTH X 1) DEPTH 2/3 0.5 1/2

### REARRANGING,

DEPTH 5/3 = 0.022 FT

DEPTH = 0.10 FT

THIS FLOW DEPTH CAN THEN BE USED TO COMPUTE THE VELOCITY IN ACCORDANCE WITH:

### V = Q/A

= 0.095 / 0.10

= 0.95 FPS

THUS, THE CFS WILL ALSO PRODUCE SHEETFLOW IN A NON-EROSIVE MANNER THAT WILL NOT IMPACT DOWN GRADIENT PROPERTIES. AS A RESULT, SHEETFLOW DOWNGRADIENT FROM THE CFS PERIMETER CONTROL IMMEDIATELY FOLLOWING CONSTRUCTION IS ALSO IN FULL COMPLIANCE WITH M.S. 19.

### c) FLOODING

BECAUSE SHEETFLOW HAS BEEN DEMONSTRATED FOR DOWNGRADIENT FLOWS DURING THE CONSTRUCTION PROCESS, COMPLIANCE WITH THE FLOODING PROVISION OF THE REGULATIONS (9VAC25-870-66 C. FLOOD PROTECTION) IS NOT REQUIRED. HOWEVER, THE SHEETFLOW PROVISION CITED IN THIS NARRATIVE DOES REQUIRE THAT "FLOODING" OF DOWNGRADIENT PROPERTIES OR RESOURCES" DOES NOT OCCUR. THE DEFINITION OF "FLOODING" PROVIDED IN THE REGULATIONS IS:

"FLOODING" MEANS A VOLUME OF WATER THAT IS TOO GREAT TO BE CONFINED WITHIN THE BANKS OR WALLS OF A STREAM, WATER BODY, OR CONVEYANCE SYSTEM AND THAT OVERFLOWS ONTO ADJACENT LANDS, THEREBY CAUSING OR THREATENING DAMAGE."

IN THIS INSTANCE, THERE ARE NO CONVEYANCES (I.E. SHEETFLOW), THEREFORE THE APPLICABLE PORTION OF THE DEFINITION IS RELATED TO OVERLAND FLOW THAT CAUSES OR THREATENS TO CAUSE DAMAGE. THIS ANALYSIS HAS DEMONSTRATED THAT THE SHEETFLOW FROM EITHER THE SILT FENCE OR CFS IS NON-EROSIVE. THEREFORE, THE TEMPORARY, NOMINAL INCREASES IN DOWN GRADIENT FLOW RATES THAT MAY OCCUR IN SOME SITUATIONS (NOTE - IN MANY INSTANCES THE FLOW RATES WILL ACTUALLY BE REDUCED AS A RESULT OF PONDING BEHIND THE SILT FENCE AND/OR CFS) WILL NOT RESULT IN DAMAGE AND THEREFORE COMPLIES WITH THE REQUIREMENTS OF MS-19.

### 2.DISCHARGE TO A CONVEYANCE SYSTEM

SEDIMENT TRAPS/BASINS WILL BE DESIGNED IN ACCORDANCE WITH THE VESCH AND TO CONTROL THE 2-YEAR STORM EVENT TO ENSURE THAT THERE IS NO INCREASE IN THE PEAK RATE OF RUNOFF AT THE DOWNSTREAM POINT OF DISCHARGE.

### C. SUMMARY

SINCE IT HAS BEEN DEMONSTRATED THAT UNDER THE MOST CONSERVATIVE ASSUMPTIONS THAT SHEETFLOW DOWN GRADIENT OF THE PERIMETER CONTROLS WILL NOT "CAUSE OR CONTRIBUTE TO EROSION, SEDIMENTATION, OR FLOODING OF DOWN GRADIENT PROPERTIES" DURING AND IMMEDIATELY FOLLOWING CONSTRUCTION, THE CONSTRUCTION PHASE OF THE PROJECT WILL BE IN FULL COMPLIANCE WITH MS—19.

### 14. BEST MANAGEMENT PRACTICES INSTALLATION AND 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 PIPEYARD AND LAYDOWN AREA CONSTRUCTION ACTIVITIES.

- A STONE CONSTRUCTION ENTRANCE, SHOWN ON DETAIL SHEET, SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROAD DIRECTLY FROM A DISTURBED AREA.
- VEGETATION WILL BE REMOVED BY BRUSH HOGGING THE AREA; ANY TREES TO BE REMOVED WILL BE CONDUCTED BY HAND FELLING/CUTTING OF STUMPS AT THE GROUND SURFACE. TEMPORARY GRAVEL OVER GEOTEXTILE (SEE DETAIL) WILL BE INSTALLED AFTER ALL VEGETATION/TREES ARE REMOVED.
- WETLANDS (IF PRESENT) WILL BE PROTECTED WITH SILT FENCE OR BELTED SILT RETENTION FENCE (BSRF). IN ADDITIONAL, ORANGE CONSTRUCTION SAFETY FENCE WILL BE INSTALLED TO PROTECT WETLANDS FROM DISTURBANCE. STREAM CROSSINGS (IF PRESENT) WILL EITHER UTILIZE EXISTING CULVERTS OR BE SPANNED USING TIMBER MAT BRIDGES.
- 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.
- ALL DISTURBED AREAS WILL BE GRADED IN PREPARATION FOR SEEDING AND MULCHING. 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.
- 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 OTHERWISE.

### GENERAL CONSTRUCTION SEQUENCE

THE FOLLOWING IS A GENERAL SEQUENCE OF ACTIVITIES ASSOCIATED WITH CONSTRUCTION OF THE PIPEYARDS AND LAYDOWN AREAS:

- 1. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS PRIOR TO EARTH DISTURBANCE. APPROPRIATE BMPS SHOULD BE PLACED AROUND SENSITIVE AREAS PRIOR TO EARTH DISTURBANCE. STONE CONSTRUCTION ENTRANCES (SCE) ARE TO BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROAD DIRECTLY FROM A DISTURBED AREA.
- 2.INSTALL PERIMETER CONTROLS PRIOR TO VEGETATION REMOVAL.
- 3.REMOVE VEGETATION BY BRUSH HOGGING THE AREA; REMOVE TREES (IF NECESSARY) BY HAND FELLING/CUTTING STUMPS AT THE GROUND SURFACE.
- 4.INSTALL TEMPORARY GRAVEL OVER GEOTEXTILE.
- 5. FOLLOWING PROJECT USE, ALL GRAVEL AND UNDERLYING GEOTEXTILE WILL BE REMOVED.
- 6.PRIOR TO SEEDING MVP WILL DISC AREAS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION.
- 7.REVEGETATE DISTURBED AREA PER THE TABLES ON DETAILS MVP—ES11.1 TO 11.9 OR PER LANDOWNER REQUEST.
- 8. 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". AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RESEEDED AS NEEDED UNTIL THE ENDPOINT IS ACHIEVED.
- 9.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.

### 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.
- CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS AT LEAST ONCE EVERY FOUR 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 PIPEYARD / LAYDOWN AREA AND FINAL CLOSURE OF THE PROJECT DEFINED AS "ACHIEVING VEGETATIVE STABILIZATION". THE SEQUENCE IS:

1. REMOVE TEMPORARY GRAVEL AND UNDERLYING GEOTEXTILE.

2.DISC/AERATE SOILS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION.

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

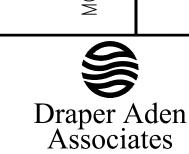
4.APPLY MULCH IN THE FORM OF ORGANIC MULCH (PER MVP-ES45), SOIL STABILIZATION MATTING (PER VADEQ STD & SPEC 3.36), OR HYDRAULIC EROSION CONTROL PRODUCT (PER MVP-ES40).

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.

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ALLEY PIPELINE PROJECT – HE FRANKLIN COUNTY, VIRGINIA

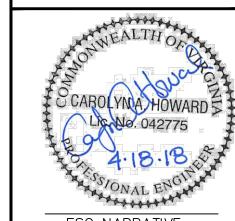
JNTAIN VALLEY PIPELINE, LLC
5 SOUTHPOINTE BOULEVARD, SUITE 200



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Blacksburg, VA 24060 540-552-0444 www.daa.com

CONSTRUCTION



ESC NARRATIVE

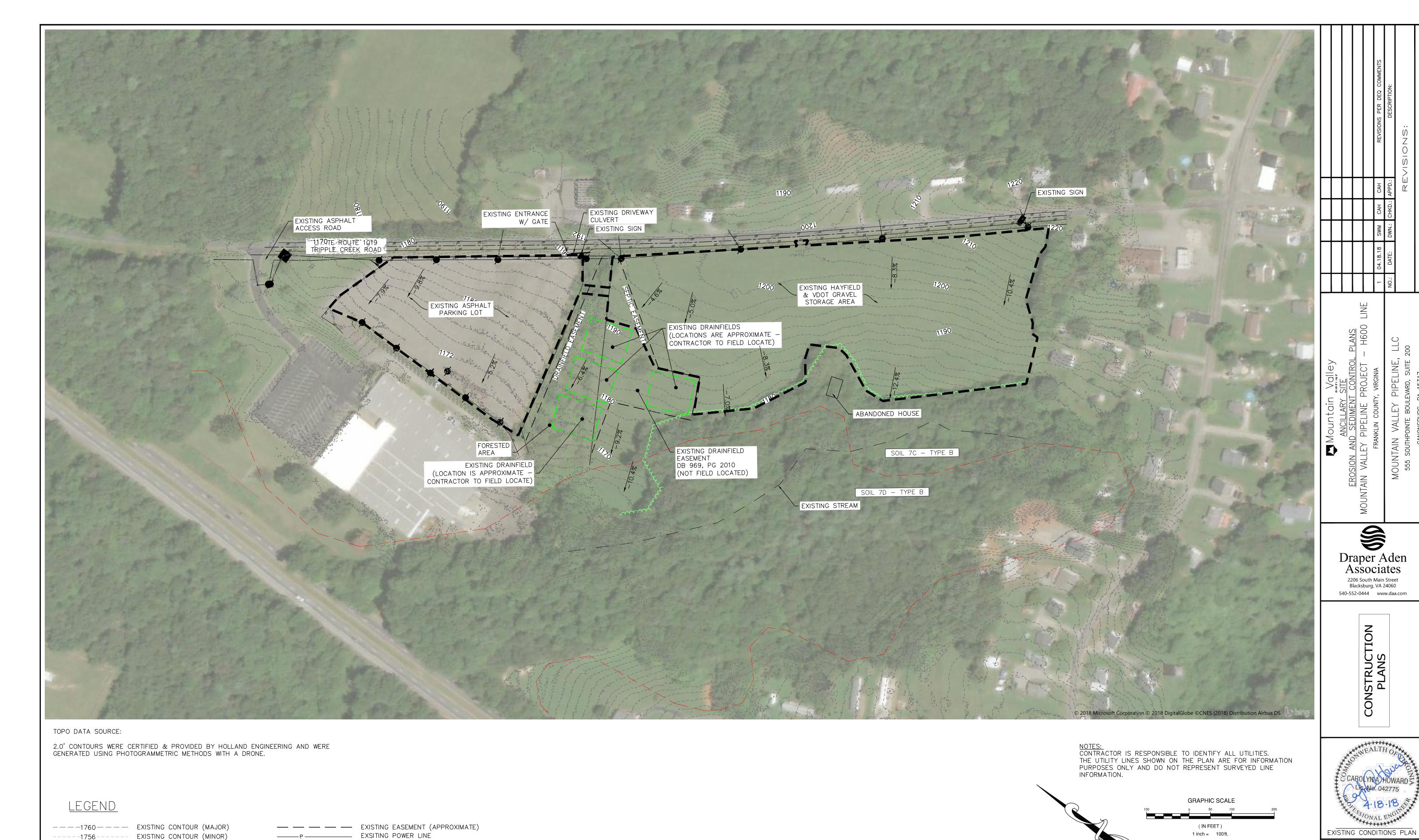
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CHECKED BY: C

DATE: 04/04/2018

SCALE: AS SHOWN REVISION
SHT. NO.LY-045-046-008 OF

TETRA TECH CAD FILE PATH: \\draperaden.net\daa\Projects\B14\100\B14188B\b14188b-15\CAD\sdi-|y045-046-franklin\B14188B-15\_ESC NOTES.dwg PLOTTED ON: 4/18/2018 11:57 AM PLOTTED BY: Sydney Mitchell PLOT FILE: DAA.stb



DRAWN BY:

CHECKED BY:

APPROVED BY:

04/04/2018

SHT. NO. LY-045-046-009 OF 1

AS SHOWN

TETRA TECH CAD FILE PATH: \\draperaden.net\\daa\Projects\B14\100\B14188B\b14188b-15\CAD\sdi-ly045-046-franklin\B14188B-15\_EXIST CONDITIONS.dwg PLOTTED ON: 4/18/2018 9:42 AM PLOTTED BY: Sydney Mitchell PLOT FILE: ENVIRONMENTAL\_COLOR.ctb

— ··· — ··· — EXISTING STREAM

EXISTING FENCE

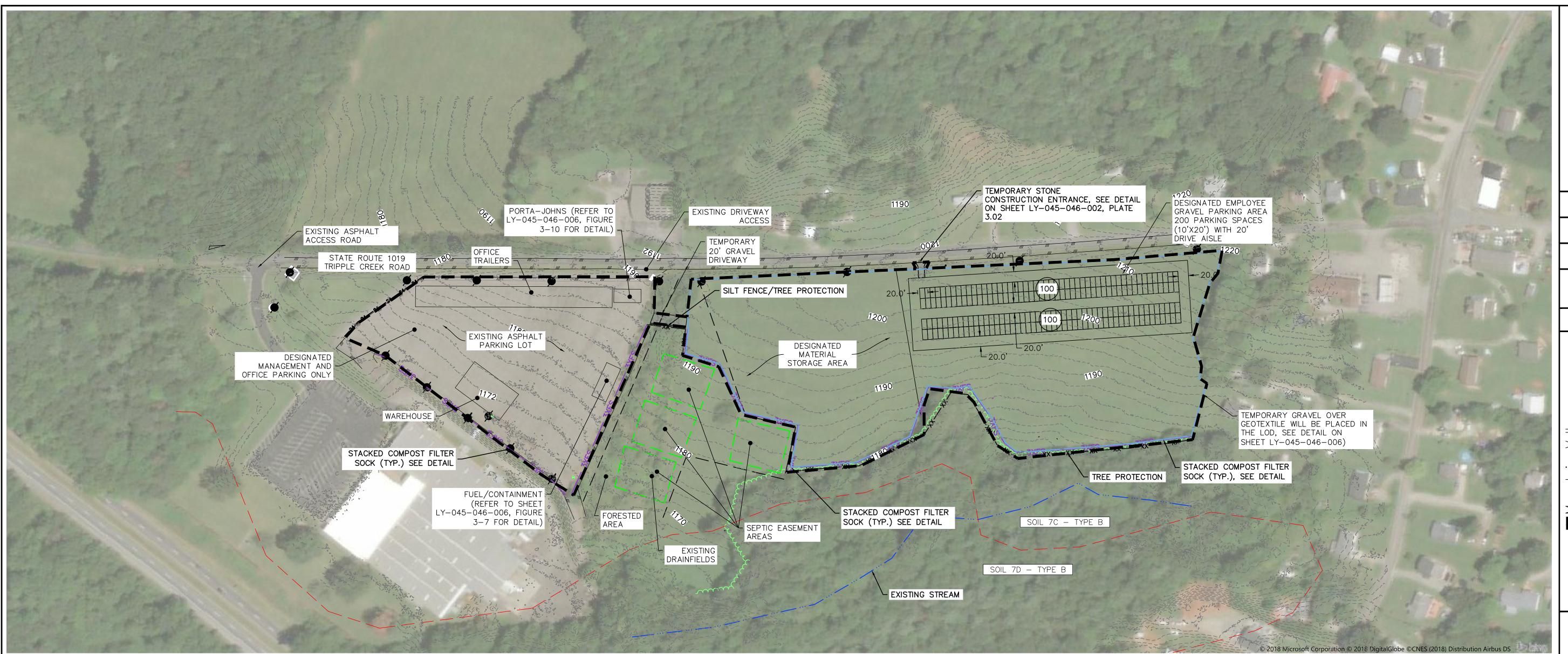
— — — EXISTING SOIL DIVIDE

EXISTING TREE LINE

\_\_\_\_\_\_\_\_EDGE OF ROAD/ASPHALT

- EXISTING UTILITY POLE

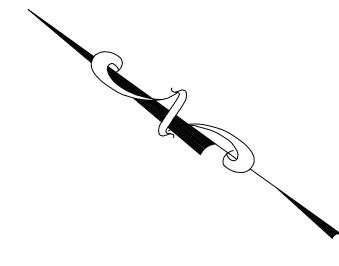
EXISTING DRAINFIELD (APPROXIMATE)



TOPO DATA SOURCE:

2.0' CONTOURS WERE CERTIFIED & PROVIDED BY HOLLAND ENGINEERING AND WERE

GENERATED USING PHOTOGRAMMETRIC METHODS WITH A DRONE.



GRAPHIC SCALE (IN FEET)

### LEGEND

---1760--- EXISTING CONTOUR (MAJOR) ---1756--- EXISTING CONTOUR (MINOR)

— — — EXISTING SOIL DIVIDE

--- --- PROPOSED LIMIT OF DISTURBANCE

X X SUPER SILT FENCE (REFER TO SHEET LY-045-046-003, DRAWING NO. MVP-ES9.2 FOR DETAIL)

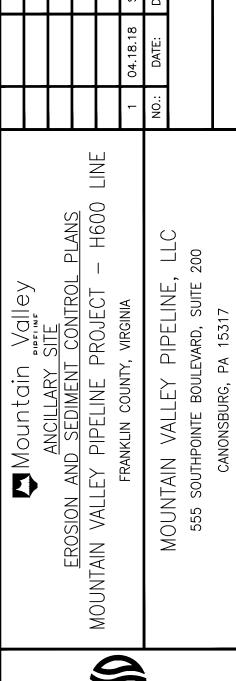
PROPOSED STACKED COMPOST FILTER SOCK (REFER TO SHEET LY-045-046-003, DRAWING NO. MVP-ES9.3 FOR DETAIL)

PROPOSED ROCK CONSTRUCTION ENTRANCE (REFER TO SHEET LY-045-046-002, PLATE 3.02 FOR DETAIL)

LIMITS OF TEMPORARY GRAVEL (REFER TO SHEET LY-045-046-006 FOR TYPICAL GRAVEL SURFACE DETAIL)

### NOTES:

- 1. 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.
- 2. FUEL CONTAINMENT METHODS ARE DISCUSSED IN THE PY-006 STORMWATER POLLUTION PREVENTION PLAN (SWPPP). REFER TO SHEET LY-045-046-006, FIGURE 3-7 FOR TYPICAL DETAIL FOR FUEL STORAGE AREA.
- 3. VEGETATION WILL BE REMOVED BY BRUSH HOGGING THE AREA; ANY TREES TO BE REMOVED WILL BE CONDUCTED BY HAND FELLING/CUTTING OF STUMPS AT THE GROUND SURFACE. TEMPORARY GRAVEL OVER GEOTEXTILE (SEE DETAIL) WILL BE INSTALLED AFTER ALL VEGETATION/TREES ARE REMOVED.
- 4. NO GRUBBING OR OTHER SOIL DISTURBING ACTIVITIES WILL BE CONDUCTED, AND TOPSOIL STRIPPING WILL NOT OCCUR. 5. ALL FACILITIES ARE TEMPORARY AND WILL BE REMOVED FOLLOWING CONSTRUCTION. ALL
- GRAVEL WILL BE REMOVED AND THE LOD WILL BE REVEGETATED PER THE TABLES ON DETAILS MVP-ES11.1 TO MVP-ES11.9 OR PER LANDOWNER REQUEST. 6. ALL MOBILE EQUIPMENT WILL HAVE SPILL KITS. IN ADDITION, SPILL KITS WILL BE STAGED AT THE FUELING STATION. ADDITIONAL SPILL KIT MATERIALS WILL BE STORED IN THE
- 7. ALL EQUIPMENT BROUGHT TO SITE BY CONTRACTOR WILL BE CLEAN, SO NO WASH RACKS



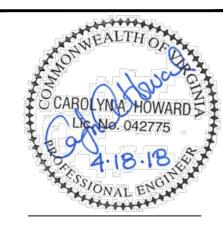
Draper Aden Associates

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Blacksburg, VA 24060

540-552-0444 www.daa.com

CONSTRUCTION PLANS



				_
ROSION	AND	SEDIMENT	CONTROL	PLAN
DRAWN	BY:		LAA/	'SWM
CHECKE	D BY	•		CAH
APPROV	ED B	Y:		CAH

04/04/2018

SHT. NO.LY-045-046-010 OF

AS SHOWN

SCALE:

REQUIRED.