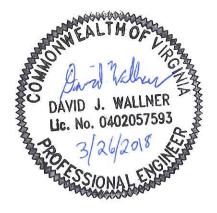
By virtue of this seal and signature, all supporting documents included in this package are accurate and support the design presented herein.



PURSUANT OF VIRGINIA CODE 9VAC25-840-40 ET SEQ, MVP RESPECTFULLY REQUESTS VARIANCES AS OUTLINED BELOW:

THESE VARIANCE REQUESTS HAVE BEEN PREPARED IN ACCORDANCE WITH VADEQ AND VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION (VADCR) GUIDANCE DOCUMENTS. INFORMATION INCLUDED IN THESE VARIANCE REQUESTS IS INTENDED TO SUPPLY VADEQ WITH PROJECT INFORMATION. PERTINENT TO ESC. INCLUDING BUT NOT LIMITED TO: SITE CHARACTERIZATION, SOIL TYPES, CRITICAL AREAS, SOIL ERODIBILITY, AND WATERBODY/WETLAND IDENTIFICATION.

MVP IS REQUESTING THESE VARIANCES DUE TO THE LENGTH OF THE PROJECT, THE DIAMETER OF THE PIPE INVOLVED, THE EQUIPMENT REQUIRED, CONSTRUCTION TECHNIQUES UTILIZED AND THE DESIRE TO CREATE SAFE WORKING CONDITIONS FOR ALL EMPLOYEES INVOLVED IN THE PROJECT. THE VARIANCES RELATED TO THE LENGTH OF TRENCH OPEN DURING PIPELINE INSTALLATION AND THE USE OF SILT FENCE TO PREVENT "RUN-ON" OF STORMWATER FROM UPGRADIENT UNDISTURBED AREAS WHERE STEEP SIDE SLOPES ARE PRESENT AND ARE DESCRIBED BELOW.

IN ORDER TO ENSURE ALL VARIANCE STIPULATIONS ARE MET, MVP WILL HAVE ONE VADEQ CERTIFIED ESC INSPECTOR PER SPREAD (TOTAL OF FOUR) ON DUTY DURING DAYS OF ACTIVE CONSTRUCTION. ALL OTHER MVP ENVIRONMENTAL INSPECTORS WILL HAVE A VADEQ RESPONSIBLE LAND DISTURBER (RLD) CERTIFICATION.

MVP ENVIRONMENTAL INSPECTORS WILL SUBMIT REPORTS DOCUMENTING ESC-RELATED ACTIVITIES ON A WEEKLY BASIS VIA VADEQ'S E-REPORTING SYSTEM. EDUCATING CONTRACTORS ON VARIANCE AND OTHER PERMIT REQUIREMENTS WILL BE ACCOMPLISHED BY ASSIMILATING ALL RELEVANT INFORMATION INTO MVP'S PRE-CONSTRUCTION WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP) TRAINING.

THE DESIGNATION OF MVP'S VADEQ-CERTIFIED INSPECTORS FOR THE PROJECT IS PENDING, AND WILL BE PROVIDED TO VADEQ WHEN AVAILABLE. MVP WILL BE UTILIZING TWO FERC 3RD PARTY MONITORS DURING CONSTRUCTION IN ADDITION TO THE VADEQ CERTIFIED INSPECTORS AND RLDS.

VARIANCE REQUEST MS-16-A LENGTH OF TRENCH

THIS VARIANCE IS REQUESTED DUE TO THE LENGTH OF THE PROJECT, THE DIAMETER OF THE PIPE INVOLVED, THE EQUIPMENT REQUIRED TO FACILITATE INSTALLATION, CONSTRUCTION TECHNIQUES UTILIZED AND THE DESIRE TO CREATE SAFE WORKING CONDITIONS FOR ALL EMPLOYEES INVOLVED IN THE PROJECT. A PROJECT OF THIS TYPE REQUIRES MULTIPLE OVERLAPPING AND SEQUENTIAL ACTIVITIES SUCH AS TREE FELLING, CLEARING, INSTALLATION OF ESC DEVICES, GRUBBING, GRADING, TRENCH EXCAVATION, PIPE STRINGING, PIPE BENDING, PIPE WELDING, PIPE INSPECTION, PIPE INSTALLATION IN THE TRENCH, TRENCH BREAKER INSTALLATION, BACKFILLING OF THE TRENCH, HYDROSTATIC TESTING OF THE PIPELINE AND RECLAMATION/FINAL CLEANUP. SINCE ALL OF THESE TASKS ARE DEPENDENT ON THE TASK BEFORE IT, A SIGNIFICANT LENGTH OF WORK AREA IS REQUIRED TO ELIMINATE THE CONFLICTS THAT OCCUR WITH WORKING IN CLOSE PROXIMITY IN ORDER TO ENSURE THE SAFE AND TIMELY COMPLETION OF THE WORK.

THE PHASE OF CONSTRUCTION THAT BEGINS THE HEART OF THE CONSTRUCTION ACTIVITIES IS THE TRENCHING PHASE. IN ORDER TO MAINTAIN THE PRODUCTION LEVELS NECESSARY TO COMPLETE THE PROJECT IN A SAFE AND TIMELY MANNER, TRENCHING NEEDS TO BE A NON-STOP ACTIVITY, ONCE TRENCHING STARTS, THE CONTRACTOR WILL FOLLOW DIRECTLY BEHIND THE EXCAVATIONS TO BEGIN THE STRINGING AND BENDING (ENGINEERING) THE PIPE, THE NEXT PHASE. WELDING, IS THE KEY COMPONENT TO THE ENTIRE CONSTRUCTION PROCESS TO MEET TIMELY COMPLETION OF THE PROJECT. THE CONTRACTORS CAN WELD UP TO 1800 FEET PER DAY. THEREFORE, IT IS NECESSARY TO HAVE ENOUGH TRENCH OPEN TO BE ABLE TO CONTINUE TO STRING, BEND AND WELD PIPE WITHOUT ANY DELAYS OR DOWN TIME TO FACILITATE IMPLEMENTATION OF THE PROJECT IN AN EFFICIENT AND SAFE MANNER. MVP PROPOSES TO HAVE A MAXIMUM OF FIVE MILES OF TRENCH OPEN AT ANY TIME DURING SPREAD 8 CONSTRUCTION. MVP WOULD ALIGN THE TRENCH EXCAVATION TO MEET THE CONDITIONS OUTLINED BELOW. THIS WILL NOT INCLUDE AREAS OF ROW PREPARATION INCLUDING CLEARING, GRUBBING, TOP-SOILING, STRINGING OF PIPE, BACKFILLING OR OTHER RESTORATION ACTIVITIES THAT ARE ONGOING ONCE THE PIPE HAS BEEN PLACED IN THE TRENCH.

SPECIALIZED CONSTRUCTION ACTIVITIES / CREWS WILL BE UTILIZED TO INSTALL THE PIPELINE AT SPECIFIC LOCATIONS SUCH AS WATERBODIES AND WETLANDS, PUBLIC ROADS, RAILROADS AND STEEP SLOPE AREAS (I.E. TYPICALLY INCLUDES SLOPES APPROACHING 30 DEGREES OR MORE AND WOULD REQUIRE WINCH TRACTORS). INSTALLATION OF THE PIPELINE AT THESE SPECIFIC LOCATIONS WILL BE CONDUCTED AS A SEPARATE AND COMPLETE CROSSING ACTIVITY AND ARE NOT INCLUDED AS PART OF THE CONSTRUCTION DISCUSSED ABOVE. THIS IS NECESSARY TO FACILITATE USE OF SPECIALIZED CONSTRUCTION METHODS REQUIRED TO COMPLETE INSTALLATION AT THESE LOCATIONS OR TO COMPLY WITH PERMITTING RESTRICTIONS THAT APPLY TO THESE CROSSINGS (I.E. TIMING RESTRICTIONS, ETC.).

MVP PROPOSES A TOTAL LENGTH OF TRENCH OPEN AT ANY ONE TIME FOR SPREAD 8 WOULD BE FIVE (5) MILES (CUMULATIVE) FOR MAINLINE CONSTRUCTION AND ONE (1) ADDITIONAL MILE (CUMULATIVE) OF TRENCH OPEN ASSOCIATED WITH AREAS OF SPECIALIZED CONSTRUCTION ACTIVITIES. AREAS OF SPECIALIZED CONSTRUCTION ACTIVITIES INCLUDE:

- ROAD CROSSINGS CONVENTIONAL BORE METHODS,
- STREAM/WETLAND CROSSINGS
- EXISTING BURIED UTILITY CROSSINGS
- STEEP SLOPE (WINCH HILL) CONSTRUCTION
- OTHER AREAS DETERMINED BY MVP AS REQUIRING SPECIALIZED CONSTRUCTION ACTIVITIES (BIOLOGICAL OR CULTURAL RESOURCE MONITORS, ETC.).

IN ADDITION, MVP PROPOSES TO IMPLEMENT THIS VARIANCE REQUEST BASED ON A TIERED APPROACH THAT WILL LIMIT CONTIGUOUS TRENCH LENGTH BASED ON SLOPE CONDITIONS. MVP PROPOSES TO LIMIT THE CONTIGUOUS LENGTH OF TRENCH OPEN WITHIN THE CUMULATIVE 5 MILE SPREAD LIMIT BASED ON A THREE-TIER SYSTEM, SO THAT AS THE STEEPNESS OF THE SLOPE INCREASES, THE ALLOWABLE LENGTH OF CONTINUOUS TRENCH OPEN DECREASES. MVP PROPOSES THE FOLLOWING:

| MV   | P Proposed  | Slope Conditions <sup>1</sup> | Continuous                    |
|------|-------------|-------------------------------|-------------------------------|
| Tier | r Structure |                               | trench length not             |
|      |             |                               | to exceed (ft) <sup>2,3</sup> |
|      | Tier I      | 0 to <10%                     | 7,000                         |
|      | Tier II     | 10% to <33%                   | 5,000                         |
|      | Tier III    | >33%                          | 2,500                         |

1. SLOPE PERCENT IS DETERMINED BASED ON THE PRE-EXISTING SITE CONDITIONS.

2. ANY BREAK IN CONTINUOUS TRENCH LENGTH WILL CONSTITUTE RESET OF THE CONTINUOUS TRENCH FOOTAGE.

3. CONTINUOUS TRENCH LENGTH MAY BE EXCEEDED WHERE SAFETY CONCERNS ARE IDENTIFIED FOLLOWING

CONSULTATION WITH THE ONSITE DEQ, FERC AND MVP (ENVIRONMENTAL AND SAFETY) INSPECTORS.

ACTIVITIES THAT WILL BE CONSIDERED AS A BREAK IN CONTINUOUS TRENCH LENGTH INCLUDE BUT NOT LIMITED TO THE FOLLOWING:

- ROAD CROSSINGS (CONVENTIONAL BORE METHODS)
- STREAM AND/OR WETLAND CROSSINGS
- STOVEPIPE CONSTRUCTION ACTIVITIES
- NATIVE (UNDISTURBED) SOIL PLUG TO REMAIN IN PLACE UNTIL IMMEDIATELY BEFORE PIPE INSTALLATION
- EXISTING UTILITY LINE CROSSINGS THAT WILL UTILIZE SPECIALIZED CONSTRUCTION CREW OR BE CONDUCTED SEPARATE FROM THE MAIN CONSTRUCTION EFFORT
- WINCH HILL CONSTRUCTION (I.E. WHERE EQUIPMENT IS REQUIRED TO BE ANCHORED TO ANOTHER STATIONARY OBJECT DUE TO STEEPNESS OF SLOPE)
- BREAK IN SLOPE CATEGORIES IDENTIFIED IN THIS REQUEST
- TRANSITION OF TRENCH LINE ACROSS RIDGELINES BREAKING THE DIRECTION OF CONTINUOUS FLOW

MVP WILL ADHERE TO THE TIERS IDENTIFIED ABOVE. IN THE EVENT DURING CONSTRUCTION SAFETY CONCERNS ARISE DUE TO SITE CONDITIONS (SLOPE, ADJACENT RESOURCES OR OTHER UTILITY INFRASTRUCTURE) THAT WOULD BE ALLEVIATED BY A MINOR EXCEEDANCE OF THE TRENCH LIMITATIONS, MVP WOULD COORDINATE ANY EXCEEDANCE WITH THE APPLICABLE AGENCY REPRESENTATIVES. INSTANCES WHERE THIS CONDITION MAY APPLY WOULD BE BUT NOT LIMITED TO THE FOLLOWING:

- AREAS OF WINCH HILL CONSTRUCTION
- AREAS THAT WOULD REQUIRE PIPELINE TO BE DEAD MANNED (ANCHORED) DURING WELDING OF PIPE SEGMENTS ON STEEP SLOPE AREAS PRIOR TO BACKFILLING OF THE TRENCH. EXCEEDING THE TRENCH LENGTH IN THESE CONDITIONS WOULD ALLEVIATE THE NEED FOR PERSONNEL TO BE WORKING IN THE DITCH AND RESULT IN REDUCED SAFETY CONCERN FOR WORKERS.

EXCEEDANCE OF THE TRENCH LENGTH IN THESE CONDITIONS WILL BE DISCUSSED WITH APPROPRIATE ONSITE REPRESENTATIVES FROM DEQ. FERC AND MVP (I.E. CONSTRUCTION, ENVIRONMENTAL AND SAFETY STAFF) PRIOR TO IMPLEMENTING ANY INCREASE IN THE TIER TO THE TRENCH LENGTH. EACH INSTANCE WILL BE REVIEWED ON A CASE BY CASE BASIS AND REPORTED IN THE WEEKLY INSPECTION REPORT. FOLLOWING INSTALLATION OF THE PIPELINE WITHIN THE TRENCH AND ONCE PERSONNEL CAN SAFELY ENTER THE TRENCH. MVP CONTRACTORS WILL INSTALL PERMANENT TRENCH BREAKERS IN ACCORDANCE WITH MVP TYPICAL CONSTRUCTION DETAIL MVP-20 (TYPICAL TRENCH BREAKER DETAIL). FOLLOWING INSTALLATION OF THE PERMANENT TRENCH BREAKERS, A SEPARATE CONSTRUCTION CREW WILL BEGIN PADDING AND BACKFILLING OF THE PIPELINE. TRENCH EXCAVATION WILL CONTINUE AS BACKFILLING ACTIVITIES PROGRESS. AT NO TIME, SHALL TOTAL TRENCH EXCAVATION EXCEED 5 CUMULATIVE MILES FOR MAIN CONSTRUCTION ACTIVITIES ON SPREAD 8.

#### DEVIATION REQUEST 24-IN SLOPE DRAIN PIPE SIZE FOR CLEAN WATER DIVERSIONS

THIS DEVIATION REQUEST IS REQUIRED FOR THE USE OF 24-INCH CLEAN WATER DIVERSION PIPE FOR DRAINAGE AREAS UP TO 5 ACRES WHERE TABLE 3.15-A IN VESCH STD & SPEC 3.15 SPECIFIES A 30-INCH DIAMETER. MVP COMPLETED PEAK FLOW CALCULATIONS FOR THE 10-YEAR EVENT USING THE RATIONAL METHOD ASSUMING A DRAINAGE AREA OF 5-ACRES (I.E., THE MAXIMUM ALLOWABLE DRAINAGE AREA FOR TEMPORARY DIVERSION DIKES PER VESCH STD & SPEC 3.09) AND A CONSERVATIVE RUNOFF COEFFICIENT (C=0.35 FOR 'LAWNS, HILLY' LAND USE CONDITION). RAINFALL INTENSITIES CORRESPONDING TO TRAVEL TIMES FOR SLOPES RANGING FROM 10-40% WERE USED TO CALCULATE A RANGE OF PEAK FLOWS REPRESENTATIVE OF THE VARIABLE SLOPES ACROSS THE PIPELINE. TO DETERMINE THE MOST CONSERVATIVE RANGE OF PEAK FLOWS, THE I-D-F CURVE FOR PITTSYLVANIA COUNTY WHICH HAS THE HIGEST RAINFALL INTENSITY ACROSS THE PROJECT FROM THE VA SWM HANDBOOK VOLUME II HAS BEEN APPLIED ACROSS THE PROJECT. PIPE FLOW CAPACITY WAS THEN EVALUATED FOR THE SAME RANGE OF SLOPES. ASSUMING A PIPE FLOW CAPACITY OF 0.5 TIMES THE CAPACITY CALCULATED WHEN FLOWING HALF-FULL, TO ENSURE NO BUILDUP OF WATER BEHIND THE DIVERSION DIKE, IT WAS DETERMINED THAT ONE (1) 24-IN DIAMETER PIPE COULD PASS THE 10-YEAR PEAK FLOW FOR THE SLOPE CONDITIONS. THE SUMMARY TABLE SPECIFYING NUMBER OF SIZED PIPES REQUIRED TO PASS THE DESIGN STORM PER 5 ACRE AREA IS INCLUDED BELOW.

# **MVP PIPELINE PROJECT MVP-LY-026** VARIANCE AND DEVIATION REQUESTS

| 20% | 3 | 1 | 1 |
|-----|---|---|---|
| 30% | 3 | 1 | 1 |
| 40% | 2 | 1 | 1 |
|     |   |   |   |

|  |  |  |  |  |  | OTD | • | 0050 | 74 |
|--|--|--|--|--|--|-----|---|------|----|

| 10% | 4 | 2 | 1 |
|-----|---|---|---|
| 20% | 3 | 1 | 1 |
| 30% | 3 | 1 | 1 |
| 40% | 2 | 1 | 1 |
|     |   |   |   |

<sup>1</sup> MAXIMUM ALLOWABLE DRAINAGE AREA OF 5-ACRES ASSUMED FOR SIZING PURPOSES PER VESCH STD & SPEC 3.15 - TEMPORARY SLOPE DRAIN.

<sup>2</sup> TEMPORARY SLOPE DRAINS DESIGNED FOR THE 10-YR STORM USING THE RATIONAL METHOD IN LIEU OF THE VESCH STD & SPEC 3.15 SLOPE DRAIN SIZING TABLE (TABLE 3.15-A). <sup>3</sup> PIPE FLOW CAPACITY TAKEN AS 1/2 OF THE CAPACITY WHEN FLOWING HALF FULL TO ENSURE NO BUILDUP OF WATER WITHIN DIVERSION DIKE.

DEVIATION REQUEST CLEAN WATER PIPE PLUNGE POOL OUTLET DESIGN

**DEVIATION REQUEST STD & SPEC 3.11 TEMPORARY RIGHT-OF-WAY DIVERSIONS** 

ESC PLAN SET AND ASSOCIATED RED-LINE LOG DESCRIBED IN THE PSS&S (PAGE 6).

PIPELINE GRADE

<2% 2-5%

6-15%

16-30%

>31%

REGARDLESS OF SLOPE CONDITIONS.

AS NOTED ABOVE, ALL OTHER SPECIFICATIONS FOR STD & SPEC 3.11 WILL BE IMPLEMENTED IN ACCORDANCE WITH THIS VADEQ STANDARD. DEVIATION TO STD AND SPEC 3.31 TEMPORARY SEEDING AND 3.32 PERMANENT SEEDING

<sup>1</sup> PERMANENT SLOPE BREAKERS WILL BE INSTALLED AS NEEDED BASED ON FIELD CONDITIONS.

<sup>2</sup> PERMANENT SLOPE BREAKERS WILL BE INSTALLED 25 FEET FROM EACH WATERBODY BOUNDARY

<sup>3</sup> SLOPES GREATER THAN 65% MAY REQUIRE SITE SPECIFIC STABILIZATION MEASURES BASED ON

**RECOMMENDED MINIMUM SPACING FOR** 

PERMANENT SLOPE BREAKERS

DISTANCE (FEET) - 1,2

400

200 100

50 <sup>3</sup>

THIS DEVIATION IS NECESSARY TO COMPLY WITH PROJECT MITIGATION ACTIVITIES THAT ARE BEING PREPARED IN COORDINATION WITH THE US FISH AND WILDLIFE SERVICE, US FOREST SERVICE AND WILDLIFE HABITAT COUNCIL, TO MINIMIZE PROJECT IMPACTS TO SENSITIVE SPECIES. THIS WILL INCLUDE USE OF POLLINATOR SEED MIXES FOR THE PERMANENT ROW AREAS AND WOODLAND HABITAT SEED MIXES / PLANTINGS IN DESIGNATED AREAS. MVP WILL IMPLEMENT THE SEED MIXES SPECIFIED IN THE USFWS MITIGATION PLAN FOR ALL AREAS OF THE PROJECT UNLESS OTHER REQUIREMENTS ARE SPECIFIED BY THE AFFECTED LANDOWNER. MVP REQUESTS A DEVIATION IN REGARD TO STD & SPEC 3.31 (TEMPORARY SEEDING) AND 3.32 (PERMANENT SEEDING) TO ALIGN THESE REQUIREMENTS WITH THE PROJECT'S VEGETATION AND HABITAT MITIGATION PLAN.

AS NOTED IN THE APPROVED PSS&S, MVP DEVELOPED THE PROJECT-SPECIFIC SEED MIXES IN COORDINATION WITH THE US FISH AND WILDLIFE SERVICE (USFWS), US FOREST SERVICE, VA DEPARTMENT OF CONSERVATION AND RECREATION. WILDLIFE HABITAT COUNCIL AND MVP'S THREATENED AND ENDANGERED SPECIES CONSULTANT. MVP DEVELOPED SEED MIXES PROPOSED FOR PERMANENT STABILIZATION TO INCLUDE NATIVE SPECIES. SEED MIXES ARE PRESENTED IN THE PSS&S APPENDIX B, MVP TYPICAL CONSTRUCTION DETAILS MVP-ES11.1 THROUGH MVP-ES11.9. MVP REVIEWED THE DCR'S VIRGINIA INVASIVE PLANT SPECIES LIST DURING DEVELOPMENT OF THE PROJECT SPECIFIC PERMANENT STABILIZATION SEED MIXES. NO SPECIES LISTED ON THE DCR'S VIRGINIA INVASIVE PLANT SPECIES LIST ARE INCLUDED IN MVP'S PROPOSED PERMANENT STABILIZATION MIXES TO BE USED DURING PROJECT ACTIVITIES IN VIRGINIA.

MVP ALSO REVIEWED THE DCR'S NATIVE PLANTS FOR CONSERVATION, RESTORATION AND LANDSCAPING BROCHURES (MOUNTAIN NATIVE PLANTS AND RIPARIAN NATIVE PLANTS) DURING DEVELOPMENT OF THE PERMANENT STABILIZATION MIXES. MVP INCORPORATED MANY OF THE SPECIES INCLUDED IN THE DCR BROCHURES NOTED ABOVE TO THE PROJECT SPECIFIC PERMANENT STABILIZATION SEED MIXES.

FOR PROJECT ACTIVITIES ON JNF LANDS. THE USFS DEVELOPED SPECIFIC SEED MIXES FOR ACTIVITIES OCCURRING ON JNF AND GEORGE WASHINGTON NATIONAL FOREST LANDS. THESE MIXES ARE PRESENTED IN THE PSS&S APPENDIX B, MVP TYPICAL CONSTRUCTION DETAIL MVP-ES12.1 THROUGH ES12.4 AND INCLUDES THE TEMPORARY AND PERMANENT SEED MIXES SPECIFIED BY THE USFS GUIDANCE.

MVP PROPOSES TO UTILIZE THE VESCH STANDARD 3.31 TEMPORARY SEEDING MIX DURING PROJECT ACTIVITIES WITH THE ADDITION OF BROWNTOP MILLET (PANICUM RAMOSUM) TO MATCH THE TEMPORARY SEED MIX REQUIRED BY THE USFS FOR USE ON JEFFERSON NATIONAL FOREST LANDS. WHILE THESE ARE NON-NATIVE ANNUAL SPECIES, THEY ARE NOT LISTED ON THE DCR'S INVASIVE SPECIES LIST REFERENCED ABOVE. MVP PROPOSES TO UTILIZE NON-NATIVE, NON-INVASIVE SPECIES FOR TEMPORARY EROSION CONTROL BASED ON RECOMMENDATIONS OF THE USFS AND DEQ PROVIDED IN VARIOUS GUIDANCE DOCUMENTS. NATIVE PLANTS THAT PROVIDE DIVERSE WILDLIFE BENEFITS AND STRUCTURAL DIVERSITY ON THE LANDSCAPE OFTEN DO NOT GERMINATE OR GROW FAST ENOUGH TO PROVIDE INITIAL EROSION CONTROL. THEREFORE, FAST-GERMINATING, NON-INVASIVE, ANNUAL COVER CROPS ARE RECOMMENDED FOR THE FIRST ROUND OF SEEDING TO STABILIZE EXPOSED SOIL. THE TEMPORARY SEEDING PROPOSED FOR USE ON THE PROJECT ARE PRESENTED IN PSS&S APPENDIX B, MVP TYPICAL CONSTRUCTION DETAIL MVP-ES11.10 AND PROVIDED ON THE GENERAL DETAIL PLAN DRAWINGS INCLUDED WITH THE SPREAD 8 SUBMISSION.

# DEVIATION REQUEST STD AND SPEC 3.05 SILT FENCE

DUE TO THE NATURE OF CONSTRUCTION AND THE STEEP SLOPES EXPECTED ON THE PROJECT, MVP IS REQUESTING A VARIANCE TO INCLUDE SUPER SILT FENCE AS A BEST MANAGEMENT PRACTICE FOR EROSION AND SEDIMENT CONTROL. FOLLOWING DISCUSSIONS WITH THE VADEQ, MVP PROPOSES TO ADOPT THE E-3 STANDARDS AND SPECIFICATIONS FOR SUPER SILT FENCE INCLUDED IN THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. THE MATERIAL SPECIFICATIONS AND CONSTRUCTION SEQUENCE FROM THIS SPECIFICATION HAS BEEN INCLUDED IN THE SPREAD 8 GENERAL DETAILS AS DETAIL MVP-ES9.2 AND MVP-ES9.2A.

| 12" PIPE | 18" PIPE | 24" PIPE |
|----------|----------|----------|
| 4        | 2        | 1        |
| 3        | 1        | 1        |
| 3        | 1        | 1        |
| 2        | 1        | 1        |

THIS DEVIATION REQUEST IS TO REQUEST USE OF COMBINED TECHNIQUES TO PROVIDE ADEQUATE ENERGY MANAGEMENT OF STORMWATER EXITING THE CLEAN WATER DIVERSION. THIS DEVIATION REQUEST IS PRESENTED DUE TO THE LIMITED AREA AVAILABLE AND STEEP SLOPE CONDITIONS AT THE OUTLET THAT INHIBIT THE ABILITY TO UTILIZE TYPICAL TECHNIQUES (I.E. RIPRAP OUTLET PROTECTION). MVP CALCULATED THE MAXIMUM 10-YEAR PEAK FLOW DURING DESIGN OF THE CLEAN WATER PIPES, USING THE METHODS DESCRIBED IN THE SLOPE DRAIN PIPE SIZE FOR CLEAN WATER DIVERSIONS DEVIATION REQUEST. AND ASSUMED A CONSERVATIVE PIPE SIZE OF 24-IN. USING THESE PARAMETERS. A STANDARD PLUNGE POOL OUTLET WAS DESIGNED IN ACCORDANCE WITH NRCS DESIGN GUIDE MD #6. A STANDARD SPREADSHEET DEVELOPED BY THE NRCS THAT IS AVAILABLE FOR DOWNLOAD ONLINE (HTTPS: //WWW.NRCS.USDA.GOV/INTERNET/FSE\_DOCUMENTS/NRCS142P2\_007673.XLS) WAS USED TO SIZE THE PLUNGE POOL APPROPRIATELY BASED ON THE DESIGN DISCHARGE (I.E., THE MAXIMUM 10-YEAR PEAK FLOW), PIPE DIAMETER (24-IN), AND SLOPE OF THE PIPE OUTLET (AGAIN, SLOPES RANGING FROM 10-40% WERE EVALUATED). ADDITIONAL CALCULATIONS WERE ALSO COMPLETED TO SUPPORT THAT DISCHARGE FROM THE PLUNGE POOL WEIR OUTLET IS NON-EROSIVE WITH A 0.1-FOOT HEAD ON THE WEIR AT THE OUTLET OF THE PLUNGE POOL. MVP PLANS TO UTILIZE THE SINGLE PLUNGE POOL OUTLET DESIGN FOR ALL PIPE SIZES, WHICH IS DESIGNED FOR THE CONSERVATIVE CONDITIONS OF 40% SLOPE, MAXIMUM OF 5 ACRES AND 24-INCH CLEAN WATER DIVERSION PIPE DIAMETER. THE PLUNGE POOL OUTLET DIMENSIONS ARE SHOWN ON GENERAL DETAILS MVP-ES51 AND MVP-ES51.1.

MVP PROPOSES TO UTILIZE BOTH TEMPORARY AND PERMANENT RIGHT-OF-WAY DIVERSIONS (ROW DIVERSIONS) ON THIS PROJECT. AS THE VESCH DOES NOT HAVE A STANDARD FOR PERMANENT RIGHT-OF-WAY DIVERSIONS (ROW DIVERSIONS), MVP REQUESTS APPROVAL TO IMPLEMENT THE MVP STANDARD SPECIFICATIONS FOR BOTH TEMPORARY AND PERMANENT ROW DIVERSIONS INSTALLATIONS. MVP DEVELOPED THE DIVERSION SPECIFICATIONS (PRESENTED ON MVP TYPICAL CONSTRUCTION DETAIL MVP-17 INCLUDED IN APPENDIX B OF THE PSS&S) BASED ON EXPERIENCE FROM CONSTRUCTING AND OPERATING PROJECTS IN SIMILAR TERRAIN IN NEIGHBORING STATES IN THE APPALACHIAN MOUNTAINS REGION. WHILE THE SPACING AND SLOPE REQUIREMENTS DIFFER FROM THE VESCH STANDARD 3.11, TEMPORARY ROW DIVERSIONS WILL BE SUPPLEMENTED WITH ADDITIONAL BMPS (I.E. TEMPORARY DIVERSION DIKES, TEMPORARY CLEAN WATER SLOPE DRAINS, ETC.) DURING CONSTRUCTION IN ORDER TO INCREASE SEDIMENT REMOVAL EFFICIENCY. ROW DIVERSIONS WILL BE CONSTRUCTED WITH A MAXIMUM CROSS-SLOPE NOT TO EXCEED 5% TO MINIMIZE POTENTIAL FOR EROSIVE VELOCITIES AS RUNOFF LEAVES THE ROW. DURING TRENCH EXCAVATION, TOPSOIL AND SUBSOIL SPOIL PILES WILL BE LOCATED ALONG THE ROW TO SLOW RUNOFF VELOCITY FROM ADJACENT AREAS. SPOIL PILES WILL BE TEMPORARILY SEEDED AND MULCHED IN ACCORDANCE WITH MS-1. TRENCH BREAKERS WILL BE INSTALLED TO SLOW RUNOFF FROM THE TRENCH. PERIMETER (DOWNSLOPE) ESC MEASURES (I.E. TEMPORARY SEED AND MULCH, SILT FENCE, SUPER SILT FENCE, COMPOST FILTER SOCK, BELTED SILT RETENTION FENCE, ETC.,) WILL BE INSTALLED TO COLLECT AND FILTER RUNOFF AS NECESSARY. THE MVP SPACING WILL FUNCTION AS INTENDED BY VESCH STANDARD 3.11 AND WILL PROVIDE ADEQUATE PROTECTION TO ADJACENT AREAS DURING CONSTRUCTION. MVP WILL MONITOR THE INSTALLATION OF ALL ESC BMPS IN ACCORDANCE WITH MVP'S APPROVED PSS&S INSPECTION FREQUENCIES FOR NON-TMDL AND TMDL WATERSHEDS.

IF DURING CONSTRUCTION MVP'S LEI/EI OR AN AGENCY REPRESENTATIVE DETERMINES THE TEMPORARY ROW DIVERSION SPACING IS NOT FUNCTIONING AS INTENDED AT A SPECIFIC LOCATION, INSTALLATIONS WILL BE FIELD ADJUSTED AS NECESSARY TO ADDRESS SITE-SPECIFIC CONDITIONS AND CONCERNS. ALL CHANGES WILL BE NOTED ON THE SPREAD 8 RED-LINE

FIELD CONDITIONS AS APPROVED BY MVP DESIGN ENGINEERING AND MVP ENVIRONMENTAL INSPECTOR.

| ADDRESS VADEQ COMMENTS  | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS    | ADDRESS VADEQ COMMENTS  | ADDRESS VADEQ COMMENTS    | PLAN SUBMISSION     | DESCRIPTION:               | REVISIONS:              |     |
|---|------------------------|---------------------------|-------------------------|---------------------------|---------------------|----------------------------|-------------------------|-----|
| DW  | DW                     | DW                        | DW                      | DW                        | DW                  | CHKD.: APPD.:              | REV                     |     |
| RE  | RE                     | RE                        | RE                      | RE                        | RE                  |                            |                         |     |
| KAL   | KAL                    | KAL                       | KAL                     | KAL                       | KAL                 | DWN.:                      |                         |     |
| 03/23/18  | 03/16/18               | 02/21/18                  | 02/05/18                | 01/12/18                  | 09/21/17            | DATE:                      |                         |     |
| 6 03  | 5 03                   | 4 02                      | 3 02                    | 2 01                      | 1 09                | NO.:                       |                         |     |
| MOUNTAIN VALLEY BITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>ANCILLARY SITE<br>COUNTAIN VALLEY PIPELINE, LLC<br>S55 SOUTHPOINTE BOULEVARD, SUITE 200<br>S55 SOUTHPOINTE BOULEVARD, SUITE 200<br>CANONSBURG, PA 15317 |                        |                           |                         |                           |                     |                            |                         |     |
|   |                        |                           |                         |                           |                     |                            |                         |     |
| , C   |                        | 661<br>F                  | TE<br>worl<br>AN<br>OST | TR.<br>a   c<br>DER<br>ER | LEAR<br>SEN<br>PLA  | r so<br>I DF<br>ZA         | lutions<br>RIVE         | 5   |
| ļ   | omp                    | 661<br>F                  | TE<br>AN<br>OSTI<br>BUF | TR.<br>a   c<br>DER<br>ER | LEAF<br>PLA<br>, P/ | a so<br>I Df<br>ZA<br>A 15 | lutions<br>RIVE<br>7    | 5"  |
|   | omp                    | 661<br>F                  | TE<br>AN<br>OSTI<br>BUF |                           | SEN PLA<br>, P/     | A DF                       | IUTIONS<br>RIVE<br>5220 | 5"  |
| DR  | P                      | 661<br>FOITTS<br>BY<br>ED | TE<br>AN<br>OST<br>BUF  |                           | SEN PLA<br>, P/     | A DE<br>ZA 1               | RIVE<br>75220           | KAL |
| DR<br>CH<br>DA  | P                      |                           | TE<br>AN<br>OST<br>BUF  |                           | SEN PLA<br>, P/     | LINER<br>TIS               | RIVE<br>75220           | KAL |

# **MVP PIPELINE PROJECT MVP-LY-026** VARIANCE AND DEVIATION REQUESTS

STEEP SLOPE EROSION CONTROL PRODUCTS

FOLLOWING RESTORATION OF THE ROW TO PRE-EXISTING CONTOURS AND CONDITIONS, MVP WILL UTILIZE SOIL STABILIZATION BLANKETS (OR THEIR EQUIVALENT) TO STABILIZE SLOPES EXCEEDING 33% TO PREVENT EROSION OF THE DISTURBED SOILS. THERE ARE SEVERAL VARIATIONS OF THESE PRODUCTS INCLUDING: ROLLED EROSION CONTROL BLANKET, AND HYDRAULICALLY APPLIED EROSION CONTROL PRODUCT.

#### ROLLED EROSION CONTROL BLANKET

ROLLED EROSION CONTROL BLANKET (ECB) IS A WOVEN MAT CONSISTING OF A MONOFILAMENT NETTING (OR SIMILAR) BACKED STRAW MAT THAT IS MECHANICALLY ANCHORED TO THE SOIL. PRIOR TO INSTALLATION, THE SOIL IS SCARIFIED AND SMOOTHED PRIOR TO APPLICATION OF SEEDING AND SOIL AMENDMENTS. ROLLED ECB IS THEN INSTALLED BY HAND OVER THE SEEDING/SOIL AMENDMENTS AND MECHANICALLY ANCHORED TO THE SOIL USING DEGRADABLE METAL ANCHORS.

#### **BONDED FIBER MATRIX**

BONDED FIBER MATRIX (BFM) IS A HYDRAULICALLY APPLIED SOIL STABILIZER THAT IS EFFECTIVE IN STABILIZING STEEP SLOPES. AS PER MANUFACTURER SPECIFICATIONS, BFM APPLICATION RATES VARY DEPENDING ON SLOPE AND SOIL CONDITIONS, BUT APPLICATION RATES ARE TYPICALLY BETWEEN 1,500 TO 4,000 LBS/ACRE. SOME MANUFACTURERS OFFER BFM PRODUCTS IN PELLETIZED FORM FOR APPLICATION VIA BROADCAST SPREADER AND INTENDED FOR USE IN REMOTE AREAS WHERE WATER SUPPLIES ARE LIMITED. WHERE ACCESS VIA HYDROSEEDER IS DIFFICULT OR WHERE SMALL AREA COVERAGE IS NECESSARY. ONCE APPLIED, THE PELLETIZED BFM IS ACTIVATED BY PRECIPITATION EVENT FOLLOWING APPLICATION. BFM SHOULD NOT BE APPLIED WHEN RAIN IS FORECAST WITHIN 24 - 48 HOURS OF APPLICATION. APPLICATION OF BFM IS TYPICALLY 90% EFFECTIVE IN PREVENTING ACCELERATED EROSION FROM OCCURRING WITHIN THE AREA OF APPLICATION. WHEN APPLICATION OF THESE PRODUCTS INCLUDES A POLYMER (ANIONIC) STABILIZER, BFM CAN BE UP TO 99% EFFECTIVE IN REDUCING TURBIDITY AND SEDIMENT RUNOFF FROM DISTURBED AREAS. INFORMATION ON THE USE OF BFM IS PROVIDED UNDER TYPICAL CONSTRUCTION DETAIL MVP-ES40 (BONDED FIBER MATRIX).

#### HYDRAULIC EROSION CONTROL PRODUCTS

HYDRAULIC EROSION CONTROL PRODUCTS (HECP) ARE TYPICALLY INSTALLED USING A HYDROSEEDER TO APPLY A LIQUID SOLUTION OF SEED, SOIL AMENDMENTS, MULCH (WOOD FIBER, WOOD CHIPS OR SIMILAR WOOD MATERIALS OR NEWSPRINT) AND MULCH TACKIFIER TO STABILIZE THE SOIL. UNLIKE ROLLED ECB PRODUCTS, HECP MAKES SOLID CONTACT WITH THE SOIL REGARDLESS OF SOIL SURFACE CONDITIONS AND A ROUGHENED SURFACE IS PREFERRED. REMOVAL OF LARGE ROCKS AND EXISTING RILLS SHOULD BE UNDERTAKEN PRIOR TO APPLICATION. TRACKING OF SLOPES SHOULD BE CONSIDERED TO SLOW RUNOFF DURING A STORM EVENT.

#### HECP TYPE 4

HECP TYPE 4 IS A PRODUCT APPROVED BY THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD BRIDGE SPECIFICATIONS FOR USE ON SEVERE SLOPES UP TO 100% (1V:1H), AND MEETS THE CRITERIA SPECIFIED BY IN TABLE II-22A BELOW. MVP WILL UTILIZE HECP TYPE 4 IN AREAS OF SIDE HILL CONSTRUCTION THAT EXCEED 33% CROSS SLOPE DURING PROJECT RESTORATION ACTIVITIES. THE SPECIFIC MANUFACTURER AND PRODUCT HAVE NOT BEEN DETERMINED AT THIS TIME, BUT MVP INTENDS TO USE PRODUCTS CONTAINED IN THE VDOT MATERIALS DIVISION APPROVED MATERIALS LIST, LIST NO. 79, (79) MULCHES (HECP TYPES 1-4) - (MAINTENANCE DIVISION), (OR THEIR EQUIVALENT) THAT MEET THE MINIMUM REQUIREMENTS DEFINED IN TABLE II-22A AND THE VOOT SPECIAL PROVISION FOR ROADSIDE DEVELOPMENT AND SOIL STABILIZATION, DATED JULY 12, 2016, AND UPDATED JUNE 1, 2017, PERTAINING TO WOOD CELLULOSE FIBER MULCH FOR HYDRAULIC SEEDING MANUFACTURER CERTIFICATIONS.

THE HECP WILL BE APPLIED TO DISTURBED AREAS WHERE UPSLOPE FLOW LENGTH HAS POTENTIAL TO RESULT IN CHANNELIZED EROSION. WHEN APPLIED TO SLOPES OF GREATER THAN 33%, PROFILE PRODUCTS (THE MANUFACTURER OF FLEXTERRA HP-FGM WHICH IS ON LIST 79 AS AN APPROVED MANUFACTURER OF HECP TYPE IV) RECOMMENDED A MAXIMUM SLOPE LENGTH OF 125-FEET WHICH IS EQUAL THE LIMIT OF DISTURBANCE TO BE RECLAIMED ALONG THE PIPELINE RIGHT-OF-WAY. IN LOCATIONS WHERE EXPANDED WORKSPACE AREAS, OR DIAGONAL CROSS SLOPES RESULT IN FLOW LENGTHS EXCEEDING 125-FEET OF DISTURBED AREA, MVP WILL INSTALL AN ADDITIONAL TEMPORARY MEASURE (I.E. COMPOST FILTER SOCK) TO SERVE AS A SLOPE BREAK. COMPOST FILTER SOCK INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS. SIZING WILL BE IN ACCORDANCE WITH THE FLOW LENGTHS OCCURRING WITHIN THE LIMIT OF DISTURBANCE.

FOLLOWING TREATMENT OF DISTURBED STEEP SLOPE SIDE HILL AREAS WITH TYPE 4 HECP, THE DISTURBED AREA WOULD BE CONSIDERED STABILIZED. UPGRADIENT CLEAN WATER DIVERSIONS MAY BE REMOVED IMMEDIATELY PRIOR TO HECP TYPE IV APPLICATION OR LEFT IN PLACE AT THE DISCRETION OF THE MVP LEI/EI DETERMINED ON A CASE BY CASE BASIS. MONITORING AND INSPECTION ACTIVITIES WILL CONTINUE UNTIL THE AREAS ARE PERMANENTLY STABILIZED WITH VEGETATION AS OUTLINED IN THE PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS (APPROVED JUNE 20, 2017).

| TABLE II-22A                  |  |   |                     |                 |                    |  |  |  |  |
|-------------------------------|--|---|---------------------|-----------------|--------------------|--|--|--|--|
| HECP PROPERTY                 | TES T METHOD <sup>1</sup>                        | HECP  | HECP                | HECP            | НЕСР               |  |  |  |  |
|                               | TEST METHOD                                      | TYPE 1  | TYPE 2              | TYPE 3          | TYPE 4             |  |  |  |  |
| PHYSICAL                      |  |   | <b>REQ UIREMENT</b> |                 |                    |  |  |  |  |
| COLOR                         | VISUALLY<br>OBSERVED                             | COLORED TO PROVIDE CONTRAST UPON APPLICATION, SHALL BE STABI<br>AND NOT STAIN CONCRETE OR PAINTED SURFACES. |                     |                 |                    |  |  |  |  |
| ORGANIC MATTER                | ASTM D2974                                       |   | 90% MI              | NIMUM           |                    |  |  |  |  |
| WATER HOLDING                 | ASTM D7367                                       | 400%  | 500%                | 600%            | 700%               |  |  |  |  |
| CAPACITY                      | ASIM DISOT                                       | MINIMUM   | MINIMUM             | MINIMUM         | MINIMUM            |  |  |  |  |
| ACUTE TOXICITY                | ASTM 7101 EPA<br>2021.0-1                        | NON TOXIC   |                     |                 |                    |  |  |  |  |
| ENDURANCE                     | REQUIREMENT                                      |   |                     |                 |                    |  |  |  |  |
| FUNCTIONAL<br>LONGEVITY       | VDOT APPROVED<br>TESTING<br>METHODS <sup>3</sup> | UP TO 2 MONTHS  | UP TO 3 MONTHS      | UP TO 6 MONTHS  | UP TO 12<br>Months |  |  |  |  |
| PERFORMANCE                   | REQUIREMENT                                      |   |                     |                 |                    |  |  |  |  |
| MAXIMUM SLOPE<br>APPLICATION  | OBSERVED   | 4.0 H:1V  | 3.0 H:1V            | 2.0 H:1V        | 1.0 H:1V           |  |  |  |  |
| RAINFALL EVENT (R-<br>FACTOR) | ASTM D6459 <sup>2</sup>                          | N/A   | 75 < R              | 140 < R         | 175 < R            |  |  |  |  |
| COVER FACTOR                  | ASTM D6459 <sup>2</sup>                          | C ≤0.50   | C <u>&lt;</u> 0.10  | C <u>≤</u> 0.05 | C<0.01             |  |  |  |  |
| VEGETATION<br>ESTABLISHMENT   | ASTM D7322 <sup>2</sup>                          | 200%<br>MINIMUM   | 300%<br>MINIMUM     | 400%<br>MINIMUM | 500%<br>MINIMUM    |  |  |  |  |

1 ALL PRODUCTS MUST MEET THE REQUIREMENTS OF THIS SPECIFICATION TO BE LISTED ON THE MATERIALS DIVISION'S APPROVED LIST FOR HECPS. 2 ASTM TEST METHODS DEVELOPED FOR ROLLED EROSION CONTROL PRODUCTS (RECPS) THAT HAVE BEEN MODIFIED TO ACCOMMODATE HYDRAULIC EROSION CONTROL PRODUCTS (HECPS). 3 FUNCTIONAL LONGEVITY PERFORMED AT A VDOT TEST FACILITY OR TEST FACILITY APPROVED BY VDOT.

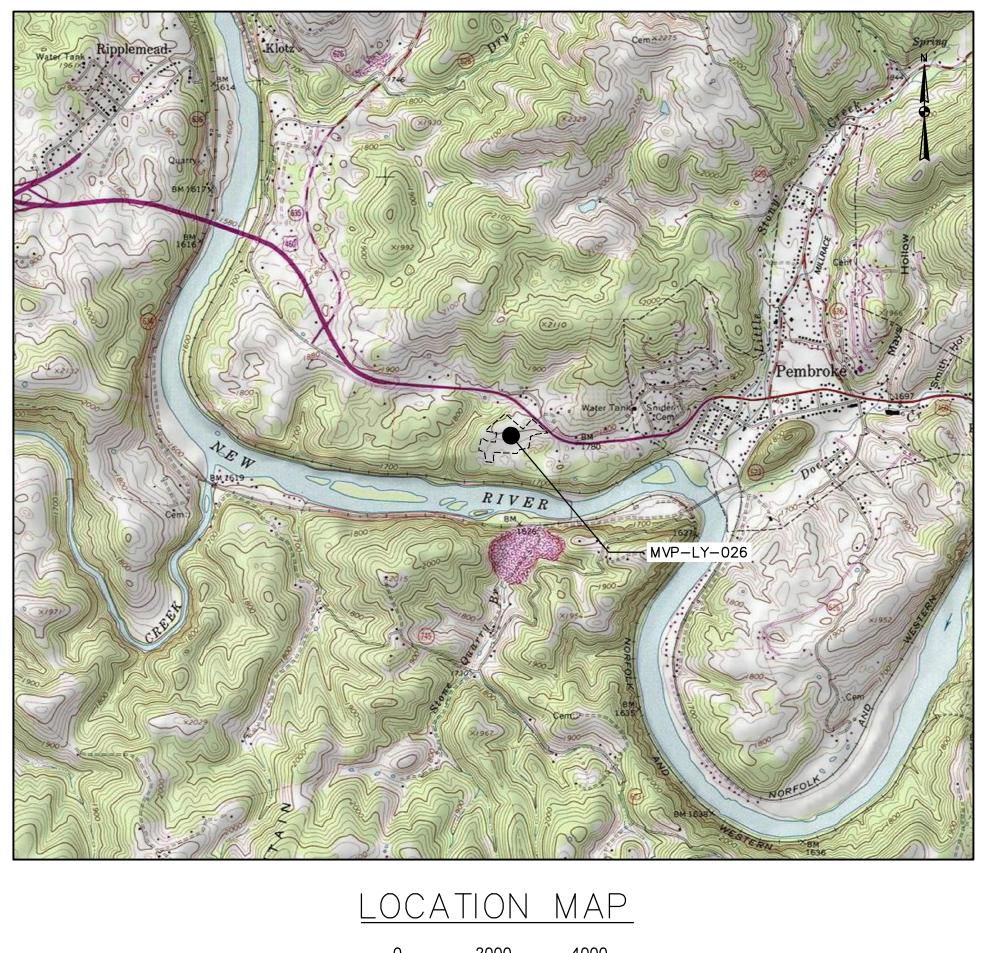
WOOD CELLULOSE FIBER MULCH FOR HYDRAULIC SEEDING MANUFACTURER'S CERTIFICATIONS

| PROPERTY                               | VALUE  |
|--|--------|
| FIBER OR PARTICLE SIZE                 |        |
| LENGTH                                 | ΤΟ ΑΡ  |
| THICKNESS OR DIAMETER                  | APPRC  |
| NET DRY WEIGHT CONTENT (VTM-47)        | MINIMU |
| PH RANGE (TAPPI T509 OR ASTM D 778)    | 4.0 TC |
| ASH CONTENT (TAPPI T413 OR ASTM D 586) | MAXIM  |
| WATER-HOLDING CAPACITY (VTM-46)        | MINIMU |
|  |        |

| ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS  | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | PLAN SUBMISSION      | DESCRIPTION:                   | REVISIONS: |           |
|------------------------|---|------------------------|------------------------|------------------------|----------------------|--------------------------------|------------|-----------|
| 6 03/23/18 KAL RE DW   | 5 03/16/18 KAL RE DW  | 4 02/21/18 KAL RE DW   | 3 02/05/18 KAL RE DW   | 2 01/12/18 KAL RE DW   | 1 09/21/17 KAL RE DW | NO.: DATE: DWN.: CHKD.: APPD.: | REV        |           |
| Mountain Vallev        | Mountain Vallery Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Site<br>Ancillary Project – H600 Line<br>Giles County, virginia<br>Giles County, virginia<br>Anter Project – H600 Line<br>Giles County, virginia<br>Countain Vallery Project – H600 Line<br>Anter Project – H600 Line<br>Anter Project – H600 Line<br>Countain Vallery Project |                        |                        |                        |                      |                                |            |           |
|                        | E TETRATECH<br>Complex world CLEAR SOLUTIONS"<br>661 ANDERSEN DRIVE<br>FOSTER PLAZA 7<br>PITTSBURGH, PA 15220   |                        |                        |                        |                      |                                |            |           |
|                        | CONSTRUCTION<br>PLANS   |                        |                        |                        |                      |                                |            |           |
|                        | DAVID J. WALLNER<br>Lic. No. 0402057593   |                        |                        |                        |                      |                                |            |           |
| СНЕ                    | CK  | BY:<br>ED I            | :<br>3Y:<br>BY:        |                        |                      |                                |            | KAL<br>RE |

PPROXIMATELY 0.39 INCH (10 MM) ROXIMATELY 0.04 INCH (1 MM) IUM STATED ON BAG TO 8.5 MUM 7.0% 1UM 90%

# **MOUNTAIN VALLEY PIPELI** EROSION AND SEDIMENT CONTROL PLAN MOUNTAIN VALLEY PIPELINE MVP-LY-026 GILES COUNTY MARCH 2018



|            | DRAWING INDEX   |
|------------|---|
| SHEET No.  | DRAWING TITLE   |
| LY-026-001 | COVER SHEET   |
| LY-026-002 | EROSION AND SEDIMENT CONTROL DETAILS                    |
| LY-026-003 | EROSION AND SEDIMENT CONTROL DETAILS                    |
| LY-026-004 | EROSION AND SEDIMENT CONTROL DETAILS                    |
| LY-026-005 | EROSION AND SEDIMENT CONTROL DETAILS                    |
| LY-026-006 | EROSION AND SEDIMENT CONTROL DETAILS                    |
| LY-026-007 | ESC NARRATIVE   |
| LY-026-008 | ESC NARRATIVE   |
| LY-026-009 | ESC NARRATIVE   |
| LY-026-010 | EXISTING CONDITIONS PLAN                                |
| LY-026-011 | EROSION AND SEDIMENT CONTROL/STORMWATER MANAGEMENT PLAN |

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THREE DAYS BEFORE YOU DIG

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.

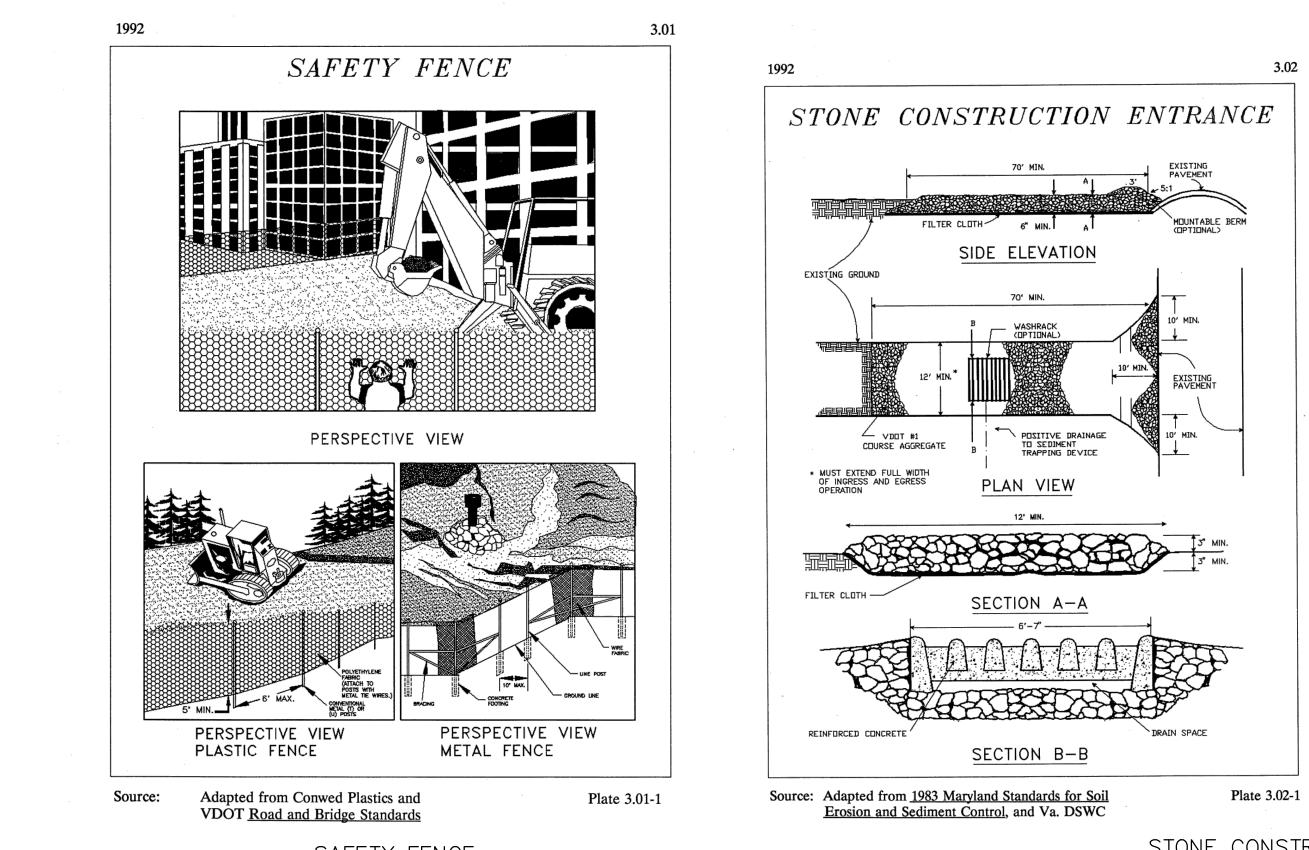
|  | VICINI  |
|--|---|
|  | NOT   |
| RESPONSIBLE LAND                                       | DISTURBER CERTIFICATION/INFORM  |
| CERTIFICATE/<br>LICENSE HOLDER NAME:                   |   |
| ADDRESS:   |   |
| TYPE OF CERTIFICATE:                                   |   |
| APPLICANT/AGENT SIGNATUR                               | RE:   |
|  |   |
| PROJECT AND PRIOR TO THE<br>RESPONSIBLE LAND DISTURBER | R NOTE:<br>A CONTRACT WITH THE SITE CONTRACTOR FOR TH<br>INITIATION OF ANY LAND DISTURBANCE, A NEW<br>CERTIFICATION SHALL BE SUBMITTED TO THE COU<br>A CERTIFIED INDIVIDUAL EMPLOYED BY THE |

CONTRACTOR AS THE DESIGNATED RESPONSIBLE LAND DISTURBER FOR THE PI

TO REPLACE THE INDIVIDUAL NAMED IN THE ABOVE CERTIFICATE.

KY

| NE   | ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>PLAN SUBMISSION<br>DESCRIPTION:<br>VISIONS:   |
|--|---|
|  | 6       03/23/18       KAL       RE       DW         5       03/16/18       KAL       RE       DW         4       02/21/18       KAL       RE       DW         3       02/05/18       KAL       RE       DW         1       02/05/18       KAL       RE       DW         2       01/12/18       KAL       RE       DW         1       09/21/17       KAL       RE       DW         NO::       DATE:       DWN::       CHKD::       APPD:: |
| PA   | MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE<br>BOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE<br>GILES COUNTY, VIRGINIA<br>GILES COUNTY, VIRGINIA<br>ROUNTAIN VALLEY PIPELINE, LLC<br>555 SOUTHPOINTE BOULEVARD, SUITE 200<br>555 SOUTHPOINTE BOULEVARD, SUITE 200<br>CANONSBURG, PA 15317   |
| WV<br>HIGHLAND<br>AUGUSTA<br>ROCKINGHAM<br>AUGUSTA<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ALBEMARLE<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKING<br>ROCKINGHAM<br>ROCKING<br>ROCKINGHAM<br>ROCKINGHAM<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING<br>ROCKING                             | Complex world CLEAR SOLUTIONS"<br>661 ANDERSEN DRIVE<br>FOSTER PLAZA 7<br>PITTSBURGH, PA 15220  |
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| NITY MAP<br>NOT TO SCALE<br>DRMATION   | DAVID J. WALLNER<br>Lic. No. 0402057593   |
| R THIS<br>COUNTY<br>PROJECT  | DRAWN BY: KAL<br>CHECKED BY: RE<br>APPROVED BY: DW<br>DATE: 03/23/18<br>SCALE: AS SHOWN REVISION<br>SHT. NO. LY-026-1 OF 11   |



<u>SAFETY FENCE</u> TAKEN FROM VADEQ 1992 MANUAL

STONE CONSTRUCTION ENTRANCE 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.

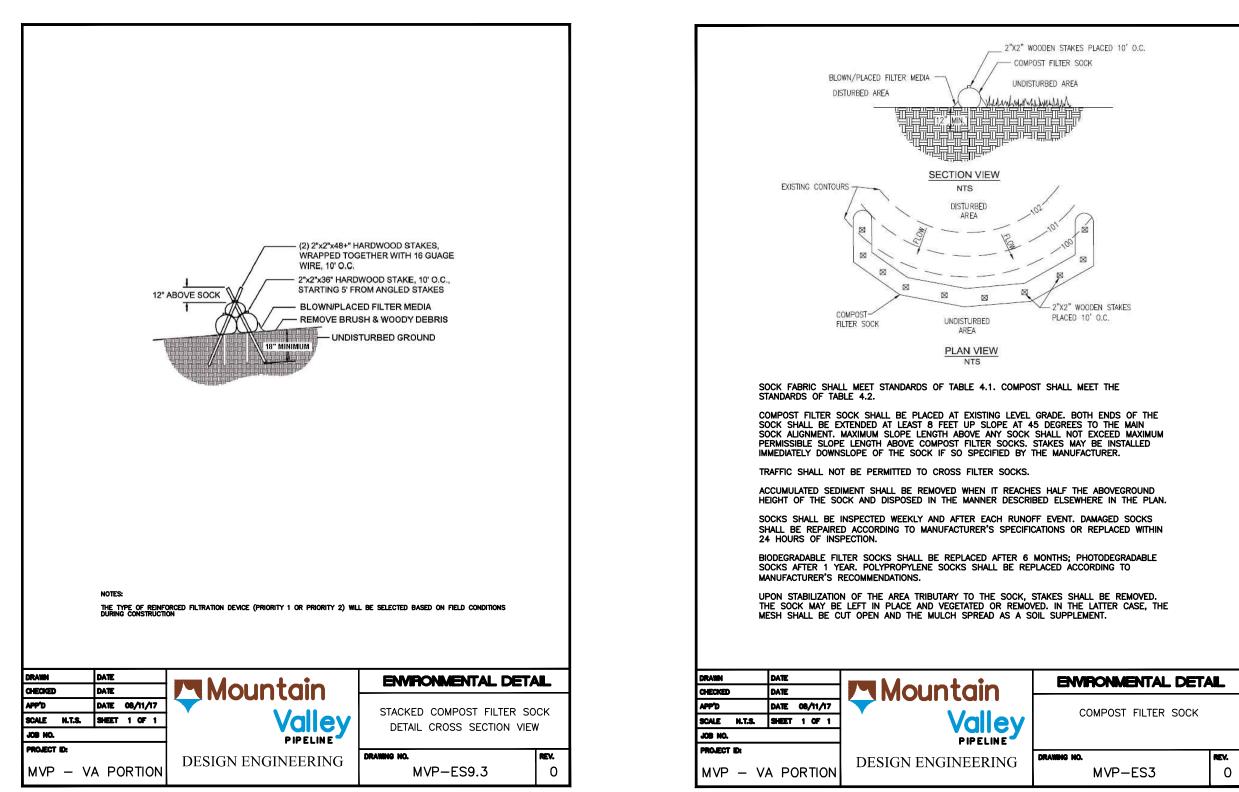
MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED 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.

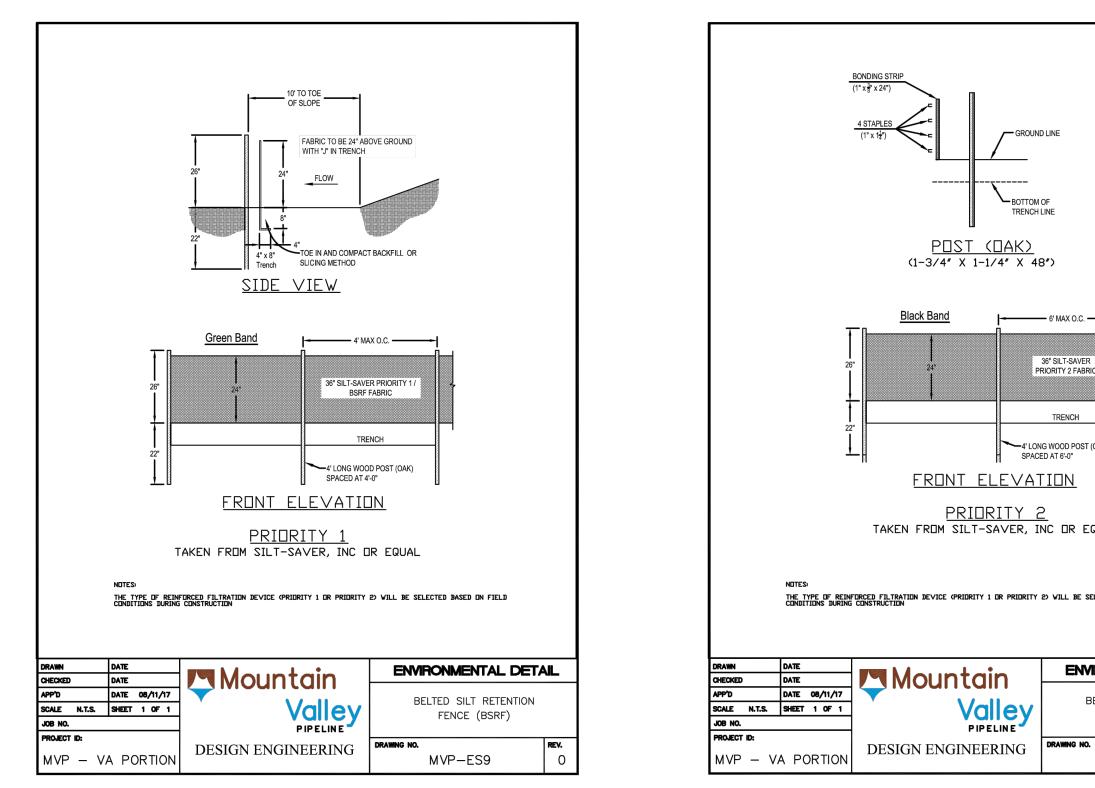
AT A MINIMUM, ROCK CONSTRUCTION ENTRANCES WITH WASH RACKS SHOULD BE CONSTRUCTED TO THE LENGTH, WIDTH, AND THICKNESS DIMENSIONS SHOWN ON STANDARD CONSTRUCTION DETAIL #3-2. A METAL WASH RACK OR LIVESTOCK GRATE IS AN ACCEPTABLE ALTERNATIVE TO THE REINFORCED CONCRETE ONE SHOWN IN THE STANDARD DETAIL. APPROACHES 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.

| <b>—</b> |                        |                        |                                     |                        |                        |                        |              |   |                      |
|----------|------------------------|------------------------|-------------------------------------|------------------------|------------------------|------------------------|--------------|---|----------------------|
|          | AUDRESS VADEQ COMMENIS | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS              | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | PLAN SUBMISSION        | DESCRIPTION: | REVISIONS:  |                      |
|          | DW                     | DW                     | DW                                  | DW                     | DW                     | DW                     | APPD.:       | Ч<br>Ч  |                      |
| -        |                        | RED                    | RE D                                | RE D                   | RE D                   | RE D                   | CHKD.: API   | ш.  |                      |
| ⊢        | KAL I                  | KAL F                  | KAL F                               | KAL F                  | KAL F                  | KAL F                  | DWN.: CH     |   |                      |
|          |                        |                        |                                     |                        |                        |                        |              |   |                      |
| 20/ 20   | 01/cz/cn               | 03/16/18               | 02/21/18                            | 02/05/18               | 01/12/18               | 09/21/17               | DATE:        |   |                      |
| ú        | 0                      | 5                      | 4                                   | 3                      | 2                      | -                      | NO.:         |   |                      |
|          | Mountain Valley        |                        | EDOCION AND SEDIMENT CONTROL DI ANS |                        |                        | GILES COUNTY, VIRGINIA |              | 555 SOUTHPOINTE BOULEVARD, SUITE 200  | CANONSBURG, PA 15317 |
|          | с                      |                        | 661<br>F                            | AN<br>OST              | DER<br>ER              | SEN<br>PLA             | I DF<br>ZA   |   | S⁼                   |
|          |                        |                        |                                     |                        | CONSTRUCTION           | PLANS                  |              |   |                      |
|          |                        | _                      | Classific A COLORIS                 |                        | D J.<br>EAL<br>No. 04  |                        |              | A DAY AND A DAY |                      |
|          |                        |                        | BY:<br>ED I                         | -                      |                        |                        |              |   | KAL<br>RE            |
| _        | AP<br>DA               | PRO'<br>TE:            | VED                                 | BY:                    | 03                     | /23,                   | /18          | 7   | DW                   |
|          | SC                     | ALE:                   |                                     | 1.~                    |                        | SHC                    |              |   |                      |
|          | 11                     | 0                      |                                     | <u> </u>               | 520                    | - 4                    | 0            | . 11  |                      |





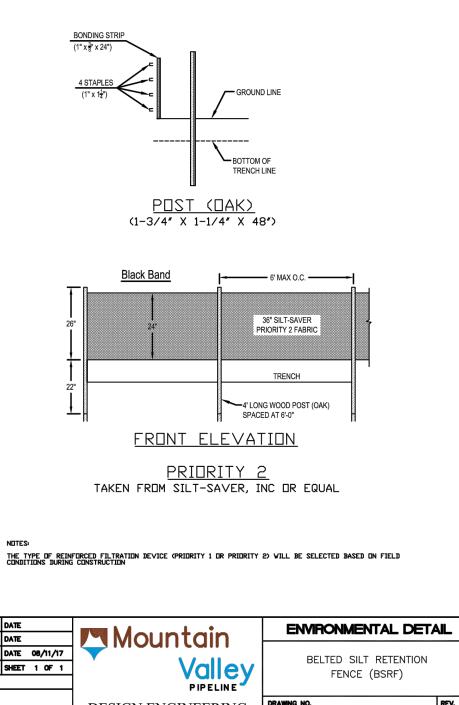
TETRA TECH CAD FILE PATH: X:\CADD\\_Pittsburgh\EQT\7157 - MVP\17 - Pipe Yards\E&S\MVP-LY-026\7157ES0017.003.dwg PLOTTED ON: 3/23/2018 6:14 PM PLOTTED BY: Kusiowski, Jim PLOT FILE: ENVIRONMENTAL\_COLOR.ctb

| tain     | ENVIRONMENTAL DETA     |           |
|----------|------------------------|-----------|
|          | COMPOST FILTER SOCK    |           |
| INEERING | DRAWING NO.<br>MVP-ES3 | rev.<br>O |

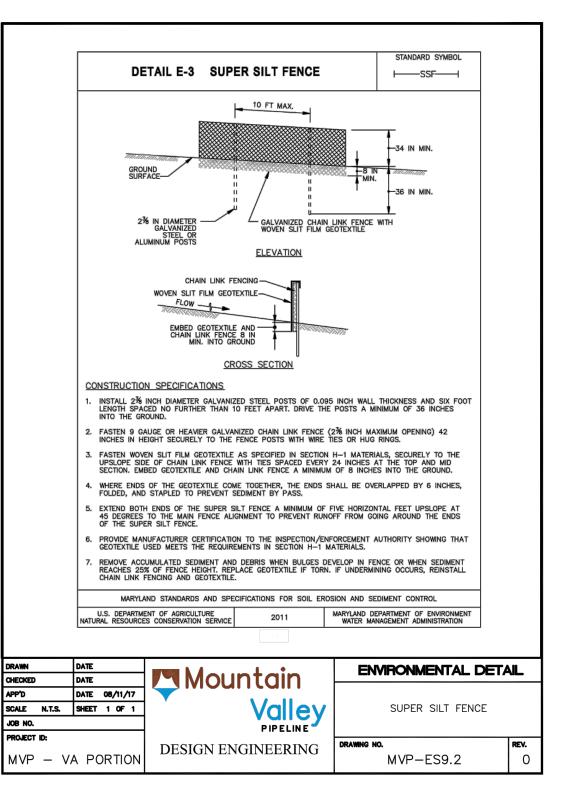
|                                      |                    | TA             | BLE 4.1       |   |   |  |  |
|--------------------------------------|--------------------|----------------|---------------|---|---|--|--|
|                                      | Compo              | st Sock Fabric | Minimum Sp    | ecifications                              |   |  |  |
| Material Type                        | 3 mil HDPE         | 5 mil HDPE     | 5 míl HDPE    | Multi-Filament<br>Polypropylene<br>(MFPP) | Heavy Duty<br>Multi-Filament<br>Polypropylene<br>(HDMFPP) |  |  |
| Material                             | Photo-             | Photo-         | Bio-          | Photo-                                    | Photo-  |  |  |
| Characteristics                      | degradable         | degradable     | degradable    | degradable                                | degradable  |  |  |
|                                      | -                  | 12"            | 12"           | 12"                                       | 12"   |  |  |
| Cool: Diomontom                      | 12"                | 18"            | 18"           | 18"                                       | 18"   |  |  |
| Sock Diameters                       | 18"                | 24"            | 24"           | 24"                                       | 24"   |  |  |
|                                      |                    | 32"            | 32"           | 32"                                       | 32"   |  |  |
| Mesh Opening                         | 3/8"               | 3/8"           | 3/8"          | 3/8"                                      | 1/8"  |  |  |
| Tensile<br>Strength                  |                    | 26 psi         | 26 psi        | 44 psi                                    | 202 psi   |  |  |
| Ultraviolet                          |                    |                |               |   |   |  |  |
| Stability %                          | 23% at 1000        | 23% at 1000    |               | 100% at                                   | 100% at   |  |  |
| Original<br>Strength (ASTM<br>G-155) | 25% at 1000<br>hr. | hr.            |               | 100% at<br>1000 hr.                       | 100% at<br>1000 hr.                                       |  |  |
| Minimum<br>Functional<br>Longevity   | 6 months           | 9 months       | 6 months      | 1 year                                    | 2 years   |  |  |
|                                      | Two-ply systems    |                |               |   |   |  |  |
|                                      |                    | F              |               | HDPE biaxial ne                           | et  |  |  |
|                                      |                    |                |               | Continuously wo                           |   |  |  |
| Inner Co                             | ntainment Ne       | etting         |               | sion-welded jun                           |   |  |  |
|                                      |                    |                | 3/4"          | X 3/4" Max. aper                          | ture size   |  |  |
|                                      |                    |                | Comp          | osite Polypropyle                         | ene Fabric  |  |  |
| Outor                                | Filtration Me      | ch             | (Woven        | layer and non-w                           | oven fleece   |  |  |
| Outer                                | FILTALION WE       | 511            | mechani       | cally fused via ne                        | edle punch)   |  |  |
|                                      |                    |                | 3/            | '16" Max. apertur                         | e size  |  |  |
| Sock fabrics                         | composed of        | burlap may b   | e used on pro | jects lasting 6 mc                        | onths or less.  |  |  |
|                                      |                    | TAI            | 3LE 4.2       |   |   |  |  |
|                                      | Compost Standards  |                |               |   |   |  |  |
|                                      | c Matter Cont      | ent            |               | - 100% (dry weigl                         | ,   |  |  |
| Org                                  | ganic Portion      |                | F             | ibrous and elong                          | ated  |  |  |
|                                      | pH                 |                |               | 5.5 - 8.0                                 |   |  |  |
|                                      | sture Conten       | t              |               | 35% - 55%                                 |   |  |  |
|                                      | article Size       |                |               | 5 pass through 1"                         |   |  |  |
| Soluble S                            | Salt Concentr      | ation          | 5.0 dS,       | /m (mmhos/cm)                             | viaximum  |  |  |
| DATE                                 |                    |                | •             | ENVIR                                     | ONMENTAL  |  |  |
| DATE                                 | MPN                | ount           | ain           |   |   |  |  |
| DATE 08/11/17                        |                    |                |               | COI                                       | POST FILTER   |  |  |
| N.T.S. SHEET 1 OF 1                  |                    | V              |               |   | TABLES  |  |  |
|                                      |                    | F              | PIPELINE      |   |   |  |  |
| k l                                  | DEGLO              |                | EERING        | DRAWING NO.                               |   |  |  |

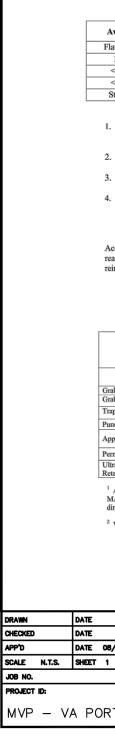
| Slope Percent |  |
|---------------|--|
|               |  |
| 2 (or less)   |  |
| 5             |  |
| 10            |  |
| 15            |  |
| 20            |  |
| 25            |  |
| 30            |  |
| 35            |  |
| 40            |  |
| 45            |  |
| 50            |  |
|               |  |

| DRAWN DATE                |                    | ENVIRONMENTAL DETA  |            |
|---------------------------|--------------------|---------------------|------------|
| CHECKED DATE              | Mountain           |                     |            |
| APP'D DATE 08/11/17       |                    | COMPOST FILTER SOCK |            |
| SCALE N.T.S. SHEET 1 OF 1 | <b>Valley</b>      | TABLES              |            |
| JOB NO.                   | PIPELINE           | TABLES              |            |
| PROJECT ID:               |                    | DRAWING NO.         | 854        |
| MVP - VA PORTION          | DESIGN ENGINEERING | MVP-ES3.2           | reev.<br>O |



MVP-ES9.1





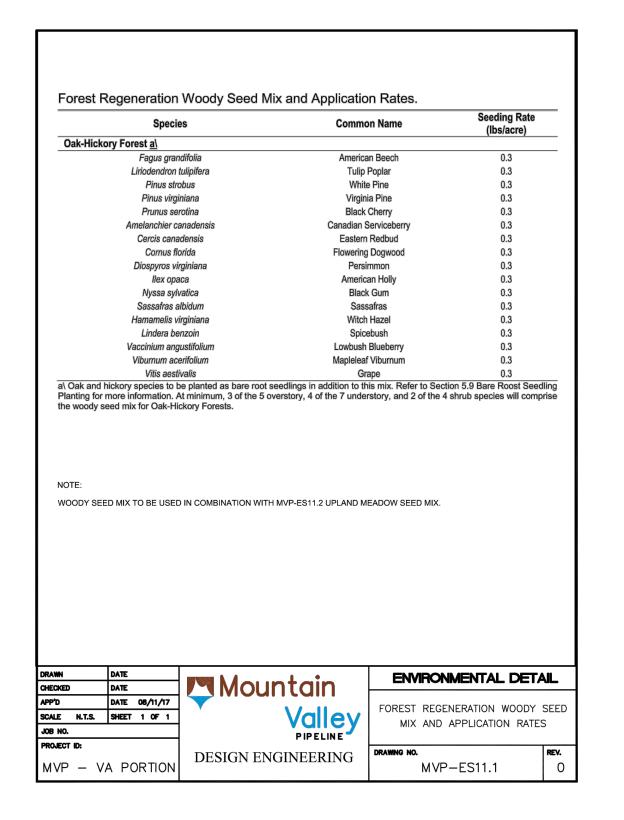
|       | Maxim um Slope Length for Compost Filter Sock in Feet  |       |   |
|-------|--|-------|---|
| Note: | Table developed from Filtrexx Sediment Control product cut sheet by Filtrexx International, LL | C. As | a |

| general refere | 2     | cturers specifications | for brand of compost filt |       |
|----------------|-------|------------------------|---------------------------|-------|
| 8 in           | 12 in | 18 in                  | 24 in                     | 32 in |
| 600            | 750   | 1000                   | 1300                      | 1650  |
| 400            | 500   | 550                    | 650                       | 750   |
| 200            | 250   | 300                    | 400                       | 500   |
| 140            | 170   | 200                    | 325                       | 450   |
| 100            | 125   | 140                    | 260                       | 400   |
| 80             | 100   | 1 <mark>1</mark> 0     | 200                       | 275   |
| 60             | 75    | 90                     | 130                       | 200   |
| 60             | 75    | 80                     | 115                       | 150   |
| 60             | 75    | 80                     | 100                       | 125   |
| 40             | 50    | 60                     | 80                        | 100   |
| 40             | 50    | 55                     | 65                        | 75    |

MAXIMUM SLOPE LENGTH ABOVE COMPOST FILTER SOCK AND RECOMMENDED DIAMETER

|   | Table E.3: Suj       | per Silt Fence Desi              | gn Constrai                    | nts              |                      |                  |       |              |
|---|----------------------|----------------------------------|--------------------------------|------------------|----------------------|------------------|-------|--------------|
| Average Slope Steepn  | 255                  | Maximum<br>Slope Length          |                                | Supe             | Maxim<br>er Silt Fer | um<br>ice Lengtl | 1     |              |
| Flatter than 10:1 (0 - <10  |                      | Unlimited                        |                                |                  | Unlimi               |                  |       |              |
| 10:1 to 5:1 (10 - 20%   |                      | 200 feet                         |                                |                  | 1,500 1              |                  |       |              |
| <5:1 to 3:1 (>20 - 33%<br><3:1 to 2:1 (>33 - 50%                                  | -                    | 150 feet<br>100 feet             |                                |                  | 1,000 i<br>500 fa    |                  |       |              |
| Steeper than 2:1 (>50%  |                      | 50 feet                          |                                |                  | 250 ft               |                  |       |              |
| Deeper unit 211 (* 553  | ·/                   | 00 1001                          |                                |                  | 200 1                |                  |       |              |
| <ol> <li>Super silt fence sho<br/>5% for a distance of</li> </ol>                 | more than 50 feet.   |                                  | *                              |                  |                      |                  |       |              |
| <ol><li>Super silt fence sl</li></ol>   | ould be used with    | 1 caution in areas               | where rocky                    | 7 soils m        | ay prever            | nt trenchii      | ıg.   |              |
| <ol><li>The use of super s</li></ol>  | ilt fence must cor   | form to the desig                | n constraint                   | s listed i       | n Table F            | .3 above.        |       |              |
| <ol> <li>Extend both ends of<br/>fence alignment to p</li> </ol>                  |                      |                                  |                                |                  | e at 45 deg          | rees to the      | main  |              |
|   |                      | Maintenance                      |                                |                  |                      |                  |       |              |
| Accumulated sediment a<br>reaches 25 percent of the<br>reinstall chain link fenci | e fence height. The  |                                  |                                |                  |                      |                  | t     |              |
|   | Table I              | H.1: Geotextile Fabr             | ies                            | 1987             | 1                    |                  |       |              |
|   |                      | WOVEN<br>SLIT FILM<br>GEOTEXTILE | MONOFIL<br>GEOTEX<br>JM AVERAG | AMENT<br>TILE    | NONW<br>GEOTE        |                  |       |              |
| PROPERTY  | TEST METHOD          | MD CD                            | MD                             | CD CD            | MD                   | CD               |       |              |
| Grab Tensile Strength   | ASTM D-4632          | 200 lb 200 lb                    | 370 lb                         | 250 lb           | 200 lb               | 200 lb           |       |              |
| Grab Tensile Elongation   | ASTM D-4632          | 15% 10%                          | 15%                            | 15%              | 50%                  | 50%              |       |              |
| Trapezoidal Tear Strength   | ASTM D-4533          | 75 lb 75 lb                      | 100 lb                         | 60 lb            | 80 lb                | 80 lb            |       |              |
| uncture Strength  | ASTM D-6241          | 450 lb                           | 9001                           | -                | 450                  |                  |       |              |
| Apparent Opening Size <sup>2</sup>  | ASTM D-4751          | U.S. Sieve 30<br>(0.59 mm)       | U.S. Sie<br>(0.21 n            |                  | U.S. S<br>(0.21      |                  |       |              |
| ermittivity   | ASTM D-4491          | 0.05 sec <sup>-1</sup>           | 0.28 st                        | ec <sup>-1</sup> | 1.1 :                |                  |       |              |
| Jltraviolet Resistance<br>Retained at 500 hours                                   | ASTM D-4355          | 70% strength                     | 70% stre                       | ength            | 70% s                | rength           |       |              |
| <sup>1</sup> All numeric values exce<br>MARV is calculated as the<br>direction.   |                      |                                  |                                |                  |                      |                  |       |              |
| <sup>2</sup> Values for AOS represe   | nt the average maxim | um opening.                      |                                |                  |                      |                  |       |              |
|   |                      |                                  |                                |                  |                      |                  |       |              |
|   | Mour                 | tain                             |                                | EN               | <b>/IRON</b>         | IMEN             | TAL C | <b>ETAIL</b> |
| 08/11/17<br>1 OF 1  |                      |                                  | y                              |                  | SUP                  | ER SIL           | FENC  | E            |
|   | SIGN ENG             | DIEEDDI                          |                                | WING NO          |                      |                  |       | REV.         |

| ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS       | ADDRESS VADEQ COMMENTS  | ADDRESS VADEQ COMMENTS | PLAN SUBMISSION      | DESCRIPTION:   | REVISIONS:           |                      |
|--|------------------------------|-------------------------|------------------------|----------------------|--|----------------------|----------------------|
| 6 03/23/18 KAL RE DW 5 03/16/18 KAL RE DW        | 4 02/21/18 KAL RE DW         | 3 02/05/18 KAL RE DW    | 2 01/12/18 KAL RE DW   | 1 09/21/17 KAL RE DW | NO.: DATE: DWN.: CHKD.: APPD.:   | A J A                |                      |
| ≥<br>€<br>com                                    | <b>ک</b><br>۱۹۹۳<br>661<br>F | TE<br>worl<br>AN<br>OST |                        | SEN<br>PLA           | I DF<br>ZA   | H<br>LUTION:<br>RIVE | canonSBURG, PA 15317 |
|  |                              |                         | CONSTRUCTION           | PLANS                |  |                      |                      |
|  |                              |                         | EAL                    | oooq<br>THC          | and the second sec |                      |                      |
| DRAW   |                              | Lic.                    | D J.<br>No. 04         | 40205<br>2h          |  | INIA dy the          | KAL                  |



| Elymus virginicus<br>Schizachyrium scoparium<br>Sorghastrum nutans<br>Asclepias syriaca<br>Asclepias tuberosa<br>Chamaecrista fasciculata<br>Chamaecrista nictitans<br>Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br>Species<br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis<br>Tradescantia ohiensis | Virginia Wildrye<br>Little Bluestem<br>Indiangrass<br>Common Milkweed<br>Butterfly Milkweed<br>Partridge Pea<br>Sensitive Partridge Pea<br>Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br><b>Common Name</b><br>Wild Senna<br>Early Goldenrod | 4.00<br>11.68<br>1.00<br>0.10<br>0.10<br>0.60<br>0.44<br>0.04<br>0.40<br>0.10<br>0.10<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.04<br>Seeding Rate<br>(lbs/acre)<br>0.60 | 5.0 - 7.4<br>5.0 - 8.4<br>5.0 - 7.8<br>4.8 - 6.8<br>5.5 - 7.5<br>6.0 - 7.0<br>5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8<br>\$ | June to October<br>July to October<br>August to October<br>June to August<br>July to September<br>June to October<br>April to July<br>July to October<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period<br>(if applicable) |
|---|---|---|--|---|
| Sorghastrum nutans<br>Asclepias syriaca<br>Asclepias syriaca<br>Chamaecrista fasciculata<br>Chamaecrista fasciculata<br>Chamaecrista nictitans<br>Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Indiangrass<br>Common Milkweed<br>Butterfly Milkweed<br>Partridge Pea<br>Sensitive Partridge Pea<br>Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br><b>Common Name</b><br>Wild Senna   | 1.00<br>0.10<br>0.60<br>0.06<br>0.44<br>0.04<br>0.40<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)                                  | 5.0 - 7.8<br>4.8 - 6.8<br>5.5 - 7.5<br>6.0 - 7.0<br>5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8                                 | August to October<br>June to August<br>June to August<br>July to September<br>June to October<br>April to July<br>July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October                                      |
| Asclepias syriaca<br>Asclepias tuberosa<br>Chamaecrista fasciculata<br>Chamaecrista fasciculata<br>Chamaecrista nictitans<br>Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis   | Common Milkweed<br>Butterfly Milkweed<br>Partridge Pea<br>Sensitive Partridge Pea<br>Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br><b>Common Name</b><br>Wild Senna  | 0.10<br>0.10<br>0.60<br>0.44<br>0.44<br>0.40<br>0.10<br>0.10<br>0.10<br>0.10<br>0.1   | 4.8 - 6.8<br>5.5 - 7.5<br>6.0 - 7.0<br>5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8  | June to August<br>June to August<br>July to September<br>June to October<br>April to July<br>July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October   |
| Asclepias tuberosa<br>Chamaecrista fasciculata<br>Chamaecrista fasciculata<br>Chamaecrista nictitans<br>Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Butterfly Milkweed<br>Partridge Pea<br>Sensitive Partridge Pea<br>Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br><b>Common Name</b><br>Wild Senna   | 0.10<br>0.60<br>0.44<br>0.04<br>0.40<br>0.10<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 5.5 - 7.5<br>6.0 - 7.0<br>5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8   | June to August<br>July to September<br>June to October<br>April to July<br>July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October   |
| Chamaecrista fasciculata<br>Chamaecrista nictitans<br>Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Partridge Pea<br>Sensitive Partridge Pea<br>Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna  | 0.60<br>0.06<br>0.44<br>0.04<br>0.10<br>0.10<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.02  | 5.5 - 7.5<br>6.0 - 7.0<br>5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8   | July to September<br>June to October<br>April to July<br>July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period   |
| Chamaecrista nictitans<br>Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Sensitive Partridge Pea<br>Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna   | 0.06<br>0.44<br>0.04<br>0.10<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 6.0 - 7.0<br>5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8  | June to October<br>April to July<br>July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period  |
| Coreopsis lanceolata<br>Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Lanceleaf Coreopsis<br>Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna  | 0.44<br>0.04<br>0.10<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8   | April to July<br>July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period   |
| Eupatorium coelestinum<br>Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Mistflower<br>Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna   | 0.04<br>0.40<br>0.10<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.02<br>0.0   | 5.5 - 7.5<br>5.8 - 6.8<br>6.0 - 8.0<br>< 6.8   | July to October<br>July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period  |
| Heliopsis helianthoides<br>Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Oxeye Sunflower<br>Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna   | 0.40<br>0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 5.8 - 6.8<br>6.0 - 8.0<br>< 6.8  | July to August<br>July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period   |
| Lespedeza virginica<br>Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis   | Slender Bushclover<br>Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna  | 0.10<br>0.10<br>0.10<br>0.20<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 6.0 - 8.0<br>< 6.8   | July to September<br>August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period   |
| Liatris graminifolia<br>Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br><b>Species</b><br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Grassleaf Blazing Star<br>Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna  | 0.10<br>0.10<br>0.20<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 6.0 - 8.0<br>< 6.8   | August to October<br>June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period  |
| Monarda fistulosa<br>Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br>Species<br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis   | Wild Bergamot<br>Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna  | 0.10<br>0.10<br>0.20<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | 6.0 - 8.0<br>< 6.8   | June to September<br>late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period   |
| Penstemon laevigatus<br>Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br>Species<br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Appalachian Beardtongue<br>Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna   | 0.10<br>0.20<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  | < 6.8  | late May to late<br>August<br>May to June<br>summer<br>July to October<br>Bloom Period  |
| Pycnanthemum incanum<br>Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br>Species<br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Hoary Mountainmint,<br>Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna  | 0.20<br>0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  |  | August<br>May to June<br>summer<br>July to October<br>Bloom Period  |
| Rudbeckia fulgida var. fulgida<br>Rudbeckia hirta<br>Species<br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Orange Coneflower<br>Blackeyed Susan<br>Common Name<br>Wild Senna   | 0.02<br>0.04<br>Seeding Rate<br>(Ibs/acre)  |  | summer<br>July to October<br>Bloom Period   |
| Rudbeckia hirta Species Senna hebecarpa Solidago juncea Solidago nemoralis  | Blackeyed Susan Common Name Wild Senna  | 0.04<br>Seeding Rate<br>(Ibs/acre)  |  | July to October<br>Bloom Period   |
| Species<br>Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis   | Common Name<br>Wild Senna   | Seeding Rate<br>(lbs/acre)  | рН   | Bloom Period  |
| Senna hebecarpa<br>Solidago juncea<br>Solidago nemoralis  | Wild Senna  | (lbs/acre)  | pН   |   |
| Solidago juncea<br>Solidago nemoralis   |   | 0.60  |  |   |
| Solidago nemoralis  | Early Goldenrod   | 0.00  | 6.0 - 7.0  | May to July   |
| 5   |   | 0.10  |  | July to August  |
| Tradescantia ohiensis   | Gray Goldenrod  | 0.04  |  | June to July  |
|   | Ohio Spiderwort   | 0.04  | 6.5 - 7.5  | August to September   |
| Tradescantia virginiana   | Virginia Spiderwort   | 0.10<br><b>20.00</b>  |  | late April to mid-July  |
| TEMPORARY SEED MIX:<br>9/1 - 2/15: 50/50 MIX ANNUAL RYEGRASS<br>2/16 - 4/30: ANNUAL RYEGRASS (LOLIUM<br>5/1 - 8/31: GERMAN MILLET (SETARIA ITA  | 1 MULTI-FLORUM) (60-100 LBS/  |   | CALE CEREA   | LE) (50-100 LBS/AC)   |
| AWN DATE  | Mountain  | EN  | VIRONM   | ENTAL DETAIL  |
| ECKED DATE  | WOULTUIL  |   |  |   |
|   |   | UF  | PLAND ME   | ADOW SEED MIX   |
| NLE N.T.S. SHEET 1 OF 1   | Valle   |   | AND APPL   | ICATION RATES   |
| B NO.   | PIPELIN   | E   |  |   |

| Species         Common Name         Get Mig Nate         pH         Online Parkal           Agrostis perennans         Auturm Bentgrass         0.04         5.0 - 7.0         Midsummer           Andropogon gerardii         Big Bluestem         0.10         May to June         May to June           Elymus wirginicus         Virginia Wirk         1.00         6.2 - 7.0         June to Clober           Juncus effusus         Soft Rush         3.00         4.9 - 6.8         June to July           Juncus effusus         Soft Rush         1.00         4.6 - 6.9         July to August           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           Charmaecrista fasciculata         Partridge Pea         0.60         5.5 - 7.0         May to June           Repatorium celestinum         Mistlower         0.20         4.8 - 7.2         July to October           Eupatorium fistulosum         Joe Pye Weed         0.20         4.8 - 7.2         July to August           Geum canadense         White Avens         0.40         5.0 - 8.0         June to October           Helapisis helianthoides         Oxayey   |   |   | Common Name   | Seeding Rate | pН  | Bloom Period            |
|--|---|---|---|--------------|---|-------------------------|
| Andropogon gerardii       Big Bluestem       0.10       May to June to October         Juncus effusus       Soft Rush       3.00       4.9 - 6.8       June to October         Juncus effusus       Soft Rush       3.00       4.6 - 6.9       June to July         Panicum clandestinum       Deerongue       6.90       6.8 - 8.9       June to August         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         Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Etupatorium coelestinum       Mistlower       0.20       June to October       June to October         Eupatorium perfoliatum       Boneset       0.20       June to October       July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Heliopisis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to October         Pycnanthenum tenulfolum       Slender Mountainmint       0.10       5.0 - 7.5       July to October         Pycnanthenum tenulfolum       Blackeyed Susan       0.40       July to August to September <td< th=""><th></th><th>-</th><th></th><th></th><th>-</th><th></th></td<> |   | -   |   |              | -   |                         |
| Elymis 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       June to August         Panicum clandestinum       Deertongue       6.90       6.8 - 8.9       June to August         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         Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium coelestinum       MistRower       0.20       4.8 - 7.2       July to September         Eupatorium perfoilatum       Boneset       0.20       June to July       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.0 - 8.0       June to July       July to October         Monarda fistulosa       Wild Bergamot       0.20       July to October       July to October         Pyranthemum tenuifolium       Slender Mountainmint       0.10       July to September       July to October         Pyrantheecarpa       Wild Senna       0.10       J  |   |   | -   |              | 5.0 - 7.0                                   |                         |
| 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         Panicum clandestinum       Deertongue       6.90       6.8 - 8.9       June to August         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         Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium coelestinum       Mistflower       0.20       June to October       June to October         Eupatorium perfoliatum       Boneset       0.20       June to October       July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to October         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       June to October       July to August         Senna hebecarpa       Wild Senna       0.10       August to September     <  | 4   |   | *   |              |   |                         |
| Juncus tenuis       Path Rush       1.00       4.6 - 6.9       July to August         Panicum clandestinum       Deertongue       6.90       6.8 - 8.9       June to August         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         Chamaeorista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium coelestinum       Mistflower       0.20       June to October       June to October         Eupatorium fistulosum       Joe Pye Wleed       0.20       4.8 - 7.2       July to September         Geum canadense       White Avens       0.40       5.0 - 7.5       July to October         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Monarda fistulosa       Oxeye Sunflower       0.14       4.5 - 7.0       July to October         Pycnanthemum tenuifolium       Stender Mountainmint       0.10       4.0 - 7.5       August to September         Monarda fistulosa       Wild Berna       0.10       June to September       July to August to September         Veronaia noveboracensis       New York Ironweed       0.72   |   |   |   |              |   |                         |
| Panicum clandestinum       Deertongue       6.90       6.8 - 8.9       June to August         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         Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium colestinum       Mistflower       0.20       4.8 - 7.2       July to October         Eupatorium perfoliatum       Boneset       0.20       June to July       Mune to July         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Monarda fistulosa       Wild Bergamot       0.20       July to October       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Rudbeckia hirla       Blackeyed Susan       0.40       -7.5       August to September         Verbena hastata       Blue Vervain       0.10       June to October       June to September         Verbena hastata       Blue Vervain       0.10       June to October <th></th> <td></td> <td></td> <td></td> <td></td> <td></td>             |   |   |   |              |   |                         |
| 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         Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium coelestinum       Mistflower       0.20       -4.8 - 7.2       July to October         Eupatorium perfoilatum       Boneset       0.20       -4.8 - 7.2       July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Heliopsis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to October         Monarda fistulosa       Wild Bergamot       0.20       July to Cotober       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       June to October       June to October         Verbena hastata       Blue Vervain       0.10       June to October <th>_</th> <td></td> <td></td> <td></td> <td></td> <td></td>  | _   |   |   |              |   |                         |
| Asolepias incarnata       Swamp Millkweed       4.00       5.0 - 7.4       June to October         Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium coelestinum       Mistflower       0.20       June to October         Eupatorium fistulosum       Joe Pye Weed       0.20       4.8 - 7.2       July to September         Eupatorium perfoilatum       Boneset       0.20       June to July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July to August         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       June to October         Verbena hastata       Blue Vervain       0.10       August to September         Verbena hastata       Blue Vervain       0.10       June to October         Vernonia noveboracensis       New York Ironweed       0.72       June to October         9/1 - 2/15:       50/50       MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WI   |   |   | -   |              |   | •                       |
| Chamaecrista fasciculata       Partridge Pea       0.60       5.5 - 7.0       May to June         Eupatorium coelestinum       Mistflower       0.20       4.8 - 7.2       July to September         Eupatorium perfoliatum       Boneset       0.20       4.8 - 7.2       July to September         Eupatorium perfoliatum       Boneset       0.20       4.8 - 7.2       July to September         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to Cober         Heliopsis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to Cober         Pycnanthemum tenuifolium       Slender Mountainminit       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       July to August       Senna hebecarpa         Verbena hastata       Blue Vervain       0.10       June to September         Verbena in aoveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00       20.00   |   | -   | •   |              |   | • •                     |
| Eupatorium coelestinum       Mistflower       0.20       June to October         Eupatorium fistulosum       Joe Pye Weed       0.20       4.8 - 7.2       July to September         Eupatorium perfoliatum       Boneset       0.20       July to August       July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Honarda fistulosa       Wild Bergamot       0.20       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainminit       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       July to August       September         Verbena hastata       Blue Vervain       0.10       August to September         Verbena hastata       Blue Vervain       0.10       June to October         20.00       20       20.00       20.00       20.00   |   |   | -   |              |   |                         |
| Eupatorium fistuliosum       Jee Pye Weed       0.20       4.8 - 7.2       July to September         Eupatorium perfoliatum       Boneset       0.20       July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to September         Rudbeckia hirta       Blackeyed Susan       0.40       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 October         Verbena hastata       Blue Vervain       0.10       June to October         Vernonia noveboracensis       New York Ironweed       0.72       June to October         9/1 - 2/15:       50/50       MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC)       2/16 - 4/30:       ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)  |   |   | -   |              | 5.5 - 7.0                                   | ,                       |
| Eupatorium perfoliatum       Boneset       0.20       July to August         Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Heliopsis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       July to August       September         Verbena hastata       Blue Vervain       0.10       August to September         Vernonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00       20.00  |   | ,   |   |              | 10  |                         |
| Geum canadense       White Avens       0.40       5.0 - 8.0       June to July         Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Heliopsis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       0.10       4.0 - 7.5       August to September         Rudbeckia hirta       Blackeyed Susan       0.40       July to August       July to August         Senna hebecarpa       Wild Senna       0.10       August to September         Verbena hastata       Blue Vervain       0.10       June to September         Vermonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00       20.00  |   |   |   |              | 4.8 - 7.2                                   |                         |
| Helenium autumnale       Common Sneezeweed       0.10       5.5 - 7.5       July to October         Heliopsis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       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         Vermonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00       20.00  | El  |   |   |              | E0.00                                       |                         |
| Heliopsis helianthoides       Oxeye Sunflower       0.14       4.5 - 7.0       July to September         Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       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         Vermonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00       20.00  | ,   |   |   |              |   |                         |
| Monarda fistulosa       Wild Bergamot       0.20       July to October         Pycnanthemum tenuifolium       Slender Mountainmint       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         Vermonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00       20.00   |   |   |   |              |   |                         |
| Pycnanthemum tenuifolium       Slender Mountainmint       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         Vernonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00  |   |   | ,   |              | 4.5 - 7.0                                   | • •                     |
| 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         Vernonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00   | Duro  |   | •   |              | 40 75                                       |                         |
| Senna hebecarpa       Wild Senna       0.10       August to September         Verbena hastata       Blue Vervain       0.10       June to September         Vermonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00   | Fyci  |   |   |              | 4.0 - 7.0                                   |                         |
| Verbena hastata       Blue Vervain       0.10       June to September         Vernonia noveboracensis       New York Ironweed       0.72       June to October         20.00       20.00       20.00       20.00   |   |   | ,   |              |   |                         |
| Vernonia noveboracensis       New York Ironweed       0.72<br>20.00       June to October         TEMPORARY SEED MIX:       9/1 - 2/15: 50/50 MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC)       2/16 - 4/30: ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)   |   |   |   |              |   |                         |
| 20.00<br>TEMPORARY SEED MIX:<br>9/1 - 2/15: 50/50 MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC)<br>2/16 - 4/30: ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)  | Ve  |   |   |              |   |                         |
| TEMPORARY SEED MIX:<br>9/1 - 2/15: 50/50 MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC)<br>2/16 - 4/30: ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)   | ver   | nonia noveboracensis  | INCAN LOLV I OHMOCO   |              |   |                         |
|  |   |   |   |              |   |                         |
| Revised 1/24/18  | 9/1 - 2/15<br>2/16 - 4/3  | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA  | SS (LOLIUM MULTI-FLORUM) (60-100 LBS/                                 | ,            | ECALE CERE                                  | ALE) (50-100 LBS/AC)    |
|  | 9/1 - 2/15<br>2/16 - 4/3<br>5/1 - 8/31  | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA<br>: GERMAN MILLET (S  | SS (LOLIUM MULTI-FLORUM) (60-100 LBS/<br>SETARIA ITALICA) (50 LBS/AC) | AC)          | Revised                                     | 1/24/18                 |
|  | 9/1 - 2/15<br>2/16 - 4/3<br>5/1 - 8/31  | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA<br>: GERMAN MILLET (S<br>DATE                                  | SS (LOLIUM MULTI-FLORUM) (60-100 LBS/<br>SETARIA ITALICA) (50 LBS/AC) | AC)          | Revised                                     | 1/24/18                 |
|  | 9/1 - 2/15<br>2/16 - 4/3<br>5/1 - 8/31  | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA<br>: GERMAN MILLET (S<br>DATE<br>DATE                          | ss (lolium multi-florum) (60-100 lbs/<br>setaria italica) (50 lbs/ac) | AC)          | Revised<br>VIRONME                          | 1/24/18<br>ENTAL DETAIL |
|  | 9/1 - 2/15<br>2/16 - 4/3<br>5/1 - 8/31  | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA<br>: GERMAN MILLET (S<br>DATE<br>DATE                          | ss (lolium multi-florum) (60-100 lbs/<br>setaria italica) (50 lbs/ac) | AC)          | Revised<br>VIRONME<br>RIPARIAN              | 1/24/18<br>ENTAL DETAIL |
| NO. PIPELINE AND APPLICATION RATES   | 9/1 - 2/15<br>2/16 - 4/3<br>5/1 - 8/31<br>5/1 - 8/1<br>5/1 | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA<br>: GERMAN MILLET (S<br>DATE<br>DATE<br>DATE<br>DATE 08/11/17 | SS (LOLIUM MULTI-FLORUM) (60-100 LBS/<br>SETARIA ITALICA) (50 LBS/AC) | AC)          | Revised<br>VIRONME<br>RIPARIAN              | 1/24/18<br>ENTAL DETAIL |
|  | 9/1 - 2/15<br>2/16 - 4/3<br>5/1 - 8/31<br>5/1 - 8/1<br>5/1 | : 50/50 MIX ANNUAL<br>0: ANNUAL RYEGRA<br>: GERMAN MILLET (S<br>DATE<br>DATE<br>DATE<br>DATE 08/11/17 | SS (LOLIUM MULTI-FLORUM) (60-100 LBS/<br>SETARIA ITALICA) (50 LBS/AC) | AC)          | Revised<br>VIRONME<br>RIPARIAN<br>AND APPLI | 1/24/18<br>ENTAL DETAIL |

| Acer rub<br>Acer saccha<br>Betula ni<br>Carpinus car | arinum   | Native<br>Red Maple |                  | Planting <sup>1</sup>             | Planting <sup>2</sup>                        |
|--|----------|---------------------|------------------|-----------------------------------|--|
| Acer saccha<br>Betula ni<br>Carpinus car             | arinum   | Red Maple           | e Trees          |                                   |  |
| Betula ni<br>Carpinus car                            |          |                     | FAC              | Х                                 | Х  |
| Carpinus car   | iara     | Silver Maple        | FACW             | Х                                 | Х  |
|  | -        | River Birch         | FACW             | <u>X</u>                          | <u>X</u>                                     |
|  |          | American Hornbeam   | FAC              | <u>X</u>                          | Х  |
| Carya gla  |          | Pignut Hickory      | FACU             | <u>X</u>                          |  |
| Carya ov   |          | Shagbark Hickory    | FACU             | <u>X</u>                          |  |
| Chionanthus v  |          | White Fringe Tree   | FAC+             | <u> </u>                          |  |
| Diospyros vii  | giniana  | Common Persimmon    | FAC-             | Х                                 |  |
| Specie   | es       | Common Name         | Indicator Status | Riparian<br>Planting <sup>1</sup> | Forested<br>Wetland<br>Planting <sup>2</sup> |
| Fraxinus penn  |          | Green Ash           | FACW             | Х                                 | Х  |
| Juniperus vir  | <u> </u> | Eastern Red Cedar   | FACU             | Х                                 | Х  |
| Liquidambar s  |          | Sweet Gum           | FAC              | Х                                 | Х  |
| Liriodendron   | •        | Tuliptree           | FACU             | Х                                 | Х  |
| Nyssa sylvatica                                      |          | Black Gum           | FAC              | Х                                 |  |
| Platanus occ   |          | American Sycamore   | FACW-            | X                                 | Х  |
| Populus de   |          | Eastern Cottonwood  | FAC              | X                                 |  |
| Quercus b  |          | Swamp White Oak     | FACW+            | X                                 | <u>X</u>                                     |
| Quercus fa   |          | Cherrybark Red Oak  | FACW             | X                                 | <u>X</u>                                     |
| Quercus pi   |          | Willow Oak          | FAC+             | <u>X</u>                          | Х  |
| Quercus I  | -        | Water Oak           | FAC              | <u> </u>                          | ×7   |
| Quercus pa   |          | Pin Oak             | FACW             | <u> </u>                          | X  |
| Salix nig  |          | Black Willow        | FACW             | <u> </u>                          | X  |
| Ulmus ame  | ricana   | American Elm        | FACW-            | Х                                 | Х  |

|                               | Species                                       | Common Name            | Seeding Rate<br>(Ibs/acre) | рН                    | Bloom Period<br>(if applicable)                   |
|-------------------------------|---|------------------------|----------------------------|-----------------------|---|
| A                             | grostis perennans                             | Autumn Bentgrass       | 3.15                       | 5.5 - 7.5             | Midsummer   |
| I                             | Elymus virginicus                             | Virginia Wildrye       | 9.05                       | 5.0 - 7.4             | June to October                                   |
| Pai                           | nicum clandestinum                            | Deertongue             | 4.50                       | 4.0 - 7.5             | May to September                                  |
| Schi.                         | zachyrium scoparium                           | Little Bluestem        | 11.25                      | 5.0 - 7.4             | July to October                                   |
| Se                            | orghastrum nutans                             | Indiangrass            | 14.40                      | 5.0 - 7.8             | August to October                                 |
| 1                             | Asclepias syriaca                             | Common Milkweed        | 0.09                       |                       | June to August                                    |
|                               | Aster pilosus                                 | Heath Aster            | 0.05                       | 5.4 - 7.0             | After fall frost                                  |
| Cha                           | maecrista fasciculata                         | Partridge Pea          | 0.45                       | 5.5 - 7.5             | July to September                                 |
| Co                            | reopsis lanceolata                            | Lanceleaf Coreopsis    | 0.45                       | 6.0 - 7.0             | April to July                                     |
| Eup                           | atorium coelestinum                           | Mistflower             | 0.05                       | 5.5 - 7.5             | July to October                                   |
| Hel                           | iopsis helianthoides                          | Oxeye Sunflower        | 0.45                       |                       | July to August                                    |
| L                             | iatris graminifolia                           | Grassleaf Blazing Star | 0.09                       | 5.8 - 6.8             | August to October                                 |
| 1                             | /lonarda fistulosa                            | Wild Bergamot          | 0.23                       | 6.0 - 8.0             | June to Septembe                                  |
| Pyci                          | nanthemum incanum                             | Hoary Mountainmint     | 0.05                       | < 6.8                 | summer  |
|                               | Rudbeckia hirta                               | Blackeyed Susan        | 0.45                       | 6.0 - 7.0             | May to July                                       |
| 5                             | Senna hebecarpa                               | Wild Senna             | 0.23                       |                       | July to August                                    |
| S                             | olidago nemoralis                             | Gray Goldenrod         | 0.05                       | 6.5 - 7.5             | August to Septembe                                |
| Tra                           | descantia ohiensis                            | Ohio Spiderwort        | 0.05                       |                       | late April to mid-Jul                             |
|                               |   |                        |                            |                       |   |
|                               |   |                        |                            |                       |   |
| WN<br>CKED<br>TO<br>LE N.T.S. | DATE<br>DATE<br>DATE 08/11/17<br>SHEET 1 0F 1 | Mountain               |                            | AND STEEF             | P SLOPE SEED                                      |
| cked<br>'d                    | DATE<br>DATE 08/11/17                         | Mountain               |                            | AND STEEF             |   |
| CKED<br>D<br>LE N.T.S.        | DATE<br>DATE 08/11/17                         |                        | y UPL                      | AND STEEF<br>AND APPL | <b>ENTAL DET</b><br>P SLOPE SEED<br>JCATION RATES |
|                               |   |                        |                            |                       |   |

| CHECKED<br>APP'D           | DATE O                     |
|----------------------------|----------------------------|
|                            | DATE                       |
| DRAWN                      | DATE                       |
|                            |                            |
| PERMANEN                   | TLY STAE                   |
| 2. FOLLOWING<br>PRESENT IN | RESTOR                     |
| 1. ANNUAL RY               | EGRASS                     |
| NOTE:                      |                            |
|                            |                            |
|                            |                            |
|                            | onia nove                  |
|                            | Verbena h                  |
|                            | Mimulus n                  |
|                            | iopsis heli<br>udwigia alt |
|                            | elenium au                 |
|                            | patorium p                 |
|                            | atorium co<br>patorium f   |
|                            | sclepias ir                |
|                            | cirpus pol                 |
|                            | Speci                      |
|                            |                            |
|                            | Scirpus cy                 |
| (                          | Juncus e<br>Dnoclea se     |
|                            | Elymus vir                 |
|                            | Sinna arun                 |
|                            | Carex vulp                 |
|                            | Carex IL                   |
|                            | Carex lup<br>Carex lu      |
|                            | Carex gyr                  |
| Ai                         | isma subc                  |
|                            | Speci                      |
| Wetland                    | s Seed                     |
| Watland                    |                            |
|                            |                            |
|                            |                            |
|                            |                            |

| RAWN        | DATE          |                    | ENVIRONMENTAL DETA    | 1    |
|-------------|---------------|--------------------|-----------------------|------|
| HECKED      | DATE          | Mountain           |                       |      |
| PP'D        | DATE 08/11/17 |                    | WETLAND SEED MIX      |      |
| CALE N.T.S. | SHEET 1 OF 1  | ' Valley           | AND APPLICATION RATES |      |
| OB NO.      |               | PIPELINE           | AND APPLICATION RATES |      |
| ROJECT ID:  |               |                    | DRAWING NO.           | REV. |
| MVP - VA    | A PORTION     | DESIGN ENGINEERING | MVP-ES11.4            | 0    |

|                                |   | Native S            | hrubs |  |  |
|--------------------------------|---|---------------------|-------|--|--|
| Alı                            | nus serrulata   | Brook-side Alder    | OBL   |  | Х  |
|                                | chier canadensis                                      | Canada Serviceberry | FAC   | Х  |  |
| Aro                            | nia arbutifolia                                       | Red Chokecherry     | FACW  | Х  | Х  |
| Bacc                           | haris halimifolia                                     | Groundsel Bush      | FACW- | Х  | Х  |
| Cephala                        | nthus occidentalis                                    | Buttonbush          | OBL   |  | Х  |
| ,                              | nus amomum  | Silky Dogwood       | FACW  | Х  | Х  |
|                                | 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+ | Х  | X  |
|                                | othoe racemosa  | Fetter-bush         | FACW  | X  | X  |
|                                | dera benzoin  | Spicebush           | FACW- | X  | X  |
|                                | onia ligustrina                                       | Maleberry           | FACW  | X X  | X  |
|                                | nolia virginiana                                      | Sweetbay Magnolia   | FACW+ | X X  | x x  |
|                                | carpus opulifolius                                    | Eastern Ninebark    | FACW- | X X  | X X  |
|                                |   |                     |       |  |  |
|                                | ucus canadensis                                       | American Elder      | FACW- | X  | X  |
|                                | ium corymbosum  | Highbush Blueberry  | FACW- | X  | Х  |
|                                | rnum dentatum   | Arrow-wood          | FAC   | X  |  |
| viburi                         | num prunifolium                                       | Black-haw           | FACU  | X  |  |
|                                |   |                     |       |  |  |
|                                |   |                     |       |  |  |
| 4<br>ED<br>                    | DATE<br>DATE<br>DATE<br>DATE 08/11/17<br>SHEET 1 OF 1 | Mounta              |       | ENVIRONMEN<br>NATIVE TREE AND SH<br>BARE ROOT PLANTING<br>AREAS AND FORE | HRUB SPECIES F<br>GS WITHIN RIPAF                  |
| ed<br>N.T.S.                   | DATE<br>DATE 08/11/17                                 |                     |       | NATIVE TREE AND SH<br>BARE ROOT PLANTING                                 | HRUB SPECIES F<br>GS WITHIN RIPAF                  |
| ED<br>N.T.S.<br>10.<br>ICT ID: | DATE<br>DATE 08/11/17                                 |                     |       | NATIVE TREE AND SH<br>BARE ROOT PLANTING<br>AREAS AND FORE               | HRUB SPECIES F<br>GS WITHIN RIPAF<br>STED WETLANDS |

| erbody Name<br>erbody Name<br>tony Creek<br>stony Creek<br>stony Creek<br>craig Creek<br>raig Creek<br>raig Creek | 199.1, 199.4<br>MP<br>200.4<br>204.4<br>211.2<br>219.2<br>219.3  | Giles<br>County<br>Giles<br>Giles<br>Giles<br>Montgomery   | VA<br>State<br>VA<br>VA<br>VA   | headwaters of wild trout stream,<br>coldwater stream<br>Valuable Resource<br>candy darter, green floater, coldwater<br>stream, wild trout stream<br>coldwater stream, wild trout stream<br>candy darter, green floater, coldwater  |
|---|--|--|---|--|
| tony Creek<br>Stony Creek<br>Stony Creek<br>Craig Creek<br>Craig Creek<br>raig Creek                              | 200.4<br>204.4<br>211.2<br>219.2   | Giles<br>Giles<br>Giles  | VA<br>VA  | candy darter, green floater, coldwater<br>stream, wild trout stream<br>coldwater stream, wild trout stream   |
| e Stony Creek<br>nking Creek<br><sup>-</sup> Craig Creek<br><sup>-</sup> Craig Creek<br>raig Creek                | 204.4<br>211.2<br>219.2  | Giles  | VA  | stream, wild trout stream<br>coldwater stream, wild trout stream   |
| rking Creek<br>Craig Creek<br>Craig Creek<br>raig Creek   | 211.2<br>219.2   | Giles  |   |  |
| <sup>-</sup> Craig Creek<br><sup>-</sup> Craig Creek<br>raig Creek  | 219.2  |  | VA  | candy darter, green floater, coldwater   |
| Craig Creek   |  | Montgomery   |   | stream, wild trout stream, non-listed mussels  |
| raig Creek  | 219.3  |  | VA  | Headwaters of James spinymussel<br>occurrences, USFS lands area  |
| -   |  | Montgomery   | VA  | Headwaters of James spinymussel<br>occurrences, USFS lands area  |
| raio Creek  | 219.7  | Montgomery   | VA  | Headwaters of James spinymussel<br>occurrences, USFS lands area  |
| ang oroon   | 219.7  | Montgomery   | VA  | Headwaters of James spinymussel<br>occurrences, USFS lands area  |
| Craig Creek   | 219.8  | Montgomery   | VA  | Headwaters of James spinymussel<br>occurrences, USFS lands area  |
| Craig Creek   | 220.0  | Montgomery   | VA  | Headwaters of James spinymussel<br>occurrences, USFS lands area<br>upstream of Roanoke logperch suitable   |
| Mill Creek  |  | Montgomery   | VA  | habitat, orangefin madtom, coldwater<br>stream, wild trout   |
| rk]Roanoke River  | 227.2  | Montgomery   | VA  | Roanoke logperch present, non-listed<br>mussels present, orangefin madtom,<br>coldwater stream, wild trout   |
| rk Roanoke River  | 227.4  | Montgomery   | VA  | Roanoke logperch present, non-listed<br>mussels present, orangefin madtom,<br>coldwater stream, wild trout   |
| dshaw Creek   | 230.7  | Montgomery   | VA  | Roanoke logperch suitable habitat,<br>orangefin madtom, coldwater stream,<br>wild trout  |
| dshaw Creek   | 231.5  | Montgomery   | VA  | Roanoke logperch suitable habitat,<br>orangefin madtom, coldwater stream,<br>wild trout  |
| anoke River   | 235.4  | Montgomery   | VA  | Roanoke logperch present, orangefin<br>madtom, non-listed mussels present  |
| ttom Creek  | 241.1  | Roanoke  | VA  | upstream of Bottom Creek Gorge,<br>orangefin madtom, coldwater stream,<br>wild trout   |
| ttom Creek  | 242.5  | Roanoke  | VA  | upstream of Bottom Creek Gorge,<br>orangefin madtom, coldwater stream,<br>wild trout   |
| DATE  |  |  |   |  |
| DATE  | Mo   | untain   |   | ENVIRONMENTAL DET/   |
| DATE 08/11/17   |  |  |   |  |
|   |  | Valle  | <u> </u>  | STREAM CROSSINGS PROPOSED  |
|   | Mill Creek Mill Creek rk Roanoke River ork Roanoke River dshaw Creek dshaw Creek anoke River ottom Creek bttom Creek bttom Creek | Mill Creek     222.2       rk     Roanoke River     227.2       rk Roanoke River     227.4       dshaw Creek     230.7       dshaw Creek     231.5       anoke River     235.4       ottom Creek     241.1 | Mill Creek       222.2       Montgomery         mill Creek       227.2       Montgomery         rk Roanoke River       227.4       Montgomery         ork Roanoke River       227.4       Montgomery         dshaw Creek       230.7       Montgomery         dshaw Creek       231.5       Montgomery         anoke River       235.4       Montgomery         ottom Creek       241.1       Roanoke | Mill Creek       222.2       Montgomery       VA         rrk       Roanoke River       227.2       Montgomery       VA         rrk Roanoke River       227.4       Montgomery       VA         dshaw Creek       230.7       Montgomery       VA         dshaw Creek       231.5       Montgomery       VA         anoke River       235.4       Montgomery       VA         attom Creek       241.1       Roanoke       VA         attom Creek       242.5       Roanoke       VA |

| ecies          | Common Name                    | Seeding Rate<br>(Ibs/acre) | pН        | Bloom Period<br>(if applicable) |
|----------------|--------------------------------|----------------------------|-----------|---------------------------------|
| ubcordatum     | Mud Plantain                   | 0.04                       |           |                                 |
| gynandra       | Fringed Sedge                  | 0.10                       | 5.0 - 7.0 | Midsummer                       |
| ( lupulina     | Hop Sedge                      | 1.00                       |           | May to June                     |
| ex lurida      | Shallow Sedge                  | 3.00                       | 6.2 - 7.0 | June to October                 |
| scoparia       | Blunt Broom Sedge              | 1.00                       | 4.9 - 6.8 | June to July                    |
| /ulpinoidea    | Fox Sedge                      | 6.90                       | 4.6 - 6.9 | July to August                  |
| rundinacea     | Wood Reedgrass                 | 0.40                       | 6.8 - 8.9 | June to August                  |
| s virginicus   | Virginia Wildrye               | 4.00                       | 4.0 - 8.5 | August to September             |
| is effusus     | Soft Rush                      | 0.60                       | 5.0 - 7.4 | June to October                 |
| a sensibilis   | Sensitive Fern                 | 0.20                       | 5.5 - 7.0 | May to June                     |
| s cyperinus    | Woolgrass                      | 0.20                       |           | June to October                 |
| ecies          | Common Name                    | Seeding Rate<br>(Ibs/acre) | pН        | Bloom Period<br>(if applicable) |
| polyphyllus    | Many Leaved Bulrush            | 0.20                       | 4.8 - 7.2 | July to September               |
| incarnata      | Swamp Milkweed                 | 0.40                       |           | July to August                  |
| n coelestinum  | Mistflower                     | 0.10                       | 5.0 - 8.0 | June to July                    |
| m fistulosum   | Joe Pye Weed                   | 0.14                       | 5.5 - 7.5 | July to October                 |
| m perfoliatum  | Boneset                        | 0.20                       | 4.5 - 7.0 | July to September               |
| n autumnale    | Common Sneezeweed              | 0.10                       |           | July to October                 |
| helianthoides  | Oxeye Sunflower                | 0.40                       | 4.0 - 7.5 | August to September             |
| a alternifolia | Seedbox                        | 0.10                       |           | July to August                  |
| us ringens     | Square Stemmed<br>Monkeyflower | 0.10                       |           | August to September             |
| na hastata     | Blue Vervain                   | 0.72                       |           | June to September               |
|                | New York Ironweed              | 0.10                       |           | June to October                 |

# ASS WILL BE USED AT A RATE OF 40 LBS/AC FOR STABILIZATION OF WETLANDS DISTURBED BY THE PROJECT. ITORATION AND TEMPORARY STABILIZATION WITH ANNUAL RYEGRASS, SHOULD THE NATIVE SEEDBANK TOPSOIL NOT REESTABLISH THE WETLAND, MVP WILL APPLY THIS SEED MIX TO SUPPLEMENT AND ITABILIZE THE WETLAND.

| ADDRESS VADEQ COMMENTS   | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS              | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS                       | PLAN SUBMISSION        | DESCRIPTION: |                                      |                      |
|--|------------------------|-------------------------------------|------------------------|--|------------------------|--------------|--------------------------------------|----------------------|
| ADDF   | ADDF                   | ADDF                                | ADDF                   | ADDF   |                        | ·:           | REVISIONS:                           |                      |
| Μ  | DW                     | DW                                  | DW                     | DW   | DW                     | .: APPD.:    | Ŕ                                    |                      |
| RE   | RE                     | RE                                  | RE                     | RE   | RE                     | : CHKD.:     |                                      |                      |
| 3 KAL  | 3 KAL                  | 3 KAL                               | 3 KAL                  | 3 KAL  | 7 KAL                  | DWN.:        |                                      |                      |
| 03/23/18   | 03/16/18               | 02/21/18                            | 02/05/18               | 01/12/18                                     | 09/21/17               | DATE:        |                                      |                      |
| 6 (  | 5 (                    | 4 (                                 | 3 (                    | 2 (  | 1                      | NO.:         |                                      |                      |
|  |                        | EDOCION AND CEDIMENT CONTROL DI ANC |                        | MUUNIAIN VALLET PIPELINE PROJECT - ROUU LINE | GILES COUNTY, VIRGINIA |              | 555 SOUTHPOINTE BOULEVARD, SUITE 200 | CANONSBURG, PA 15317 |
| Complex world CLEAR SOLUTIONS"<br>661 ANDERSEN DRIVE<br>FOSTER PLAZA 7<br>PITTSBURGH, PA 15220 |                        |                                     |                        |  |                        |              |                                      |                      |
| CONSTRUCTION<br>PLANS  |                        |                                     |                        |  |                        |              |                                      |                      |
|  |                        | CONTRACTOR                          |                        | D J.<br>No. 04                               | 40205<br>2h            |              | CINIA AVE                            |                      |
|  | AWN                    |                                     |                        |  |                        |              |                                      | KAL<br>RE            |
| AP<br>DA   | PRO'<br>TE·            | VED                                 | BY:                    | 03   | /23,                   | /19          |                                      | DW                   |

03/23/18

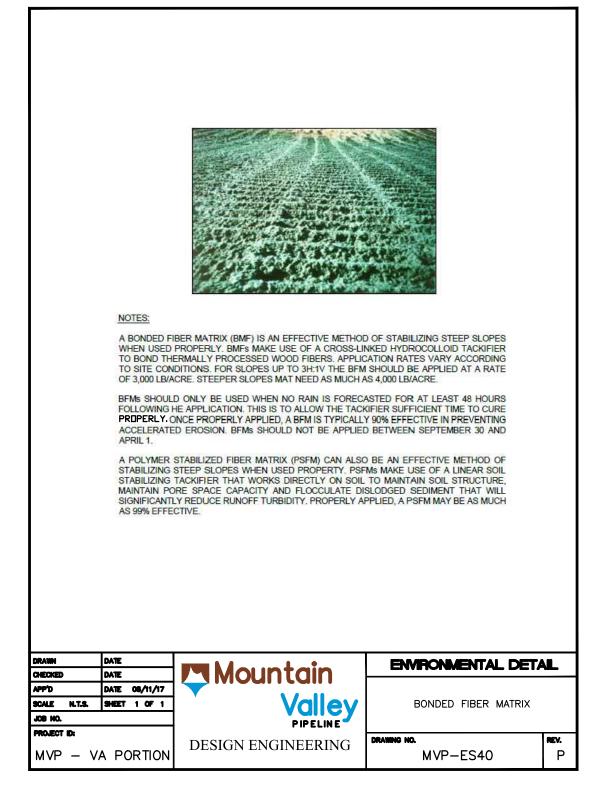
REVISION

AS SHOWN

SHT. NO. LY-026-4 OF 11

DATE: SCALE:

|              | Mill Creek          | 245.1  | Roanoke      | VA     | upstream of Bottom Creek Gorge,<br>orangefin madtom, coldwater stream,<br>wild trout   |
|--------------|---------------------|--------|--------------|--------|--|
| G            | Green Creek         | 247.1  | Franklin     | VA     | upstream of Bottom Creek Gorge,<br>orangefin madtom, coldwater stream,<br>wild trout   |
| G            | Green Creek         | 247.4  | Franklin     | VA     | upstream of Bottom Creek Gorge,<br>orangefin madtom, coldwater stream,<br>wild trout   |
| North Fo     | rk Blackwater River | 249.7  | Franklin     | VA     | Roanoke logperch suitable habitat,<br>coldwater stream wild trout stream   |
| Wat          | erbody Name         | MP     | County       | State  | Valuable Resource  |
| T            | Feels Creek         | 258.2  | Franklin     | VA     | upstream of Roanoke logperch suitable<br>habitat, one of numerous project<br>crossings of Teels Creek                              |
| Т            | Feels Creek         | 260.3  | Franklin     | VA     | upstream of Roanoke logperch suitable<br>habitat, one of numerous project<br>crossings of Teels Creek                              |
| T            | Feels Creek         | 261.0  | Franklin     | VA     | upstream of Roanoke logperch suitable<br>habitat, one of numerous project<br>crossings of Teels Creek                              |
| 1            | Feels Creek         | 261.8  | Franklin     | VA     | upstream of Roanoke logperch suitable<br>habitat, one of numerous project<br>crossings of Teels Creek                              |
| T            | Feels Creek         | 262.3  | Franklin     | VA     | Roanoke logperch suitable habitat, one<br>of numerous project crossings of Teels<br>Creek contributing sediment impacts            |
|              | Little Creek        | 262.6  | Franklin     | VA     | Roanoke logperch suitable habitat,<br>numerous crossings upstream<br>contributing sediment impacts                                 |
| I            | Little Creek        | 263.3  | Franklin     | VA     | Roanoke logperch suitable habitat, non-<br>listed mussels present, numerous<br>crossings upstream contributing<br>sediment impacts |
| Ма           | ggodee Creek        | 269.4  | Franklin     | VA     | Roanoke logperch suitable habitat  |
| Bla          | ckwater River       | 269.7  | Franklin     | VA     | Roanoke logperch present, non-listed<br>mussels present  |
| UNT          | to Jacks Creek      | 278.8  | Franklin     | VA     | orangefin madtom   |
| Т            | urkey Creek         | 280.5  | Franklin     | VA     | orangefin madtom   |
| Str          | awfield Creek       | 282.3  | Franklin     | VA     | orangefin madtom   |
| Pi           | arrot Branch        | 282.9  | Franklin     | VA     | orangefin madtom   |
| Jo           | nnikin Creek        | 284.4  | Pittsylvania | VA     | orangefin madtom   |
| UNT          | to Rocky Creek      | 287.1  | Pittsylvania | VA     | orangefin madtom   |
|              | Pigg River          | 289.1  | Pittsylvania | VA     | Roanoke logperch present, orangefin<br>madtom, mussels present including<br>yellow lampmussel (VA threatened)                      |
| H            | arpen Creek         | 289.9  | Pittsylvania | VA     | Roanoke logperch suitable habitat,<br>orangefin madtom   |
| H            | arpen Creek         | 292.0  | Pittsylvania | VA     | orangefin madtom   |
| DRAWN        | DATE                |        |              |        |  |
| CHECKED      | DATE                | Mo     | untain       |        | ENVIRONMENTAL DETAIL   |
| APP'D        | DATE 08/11/17       |        |              |        | TREAM CROSSINGS BROROSED FOR   |
| SCALE N.T.S. | SHEET 1 OF 1        | Ť      | Vall         | ⊇V   S | TREAM CROSSINGS PROPOSED FOR   |
| JOB NO.      |                     |        |              |        | BARE ROOT SEEDING PLANTINGS  |
| PROJECT ID:  |                     |        |              |        | WING NO. REV.  |
| MVP – V      | A PORTION           | DESIGN | ENGINEERI    | NG     | MVP-ES11.9 0   |
|              |                     |        |              |        |  |



|            |                                       |  | zers or soil binders should not be used alone for<br>s together to prevent displacement.   | mulch. These materials are useful to  |                  |
|------------|---------------------------------------|--|--|---|------------------|
|            | 3.3<br>mu                             | <ol><li>have been deve</li></ol>   | tured SOIL STABILIZATION BLANKETS A<br>loped for erosion control in recent years. Some<br>in critical areas such as waterways. They also r   | of these products can be used as  |                  |
|            | sea                                   | son and economic   | als for mulching will be based on the type of so<br>s. It is especially important to mulch liberally in<br>d southern slope exposures.   |   |                  |
|            | Org                                   | ganic Mulches  |  |   |                  |
|            | or                                    | oats (free of troub  | nost commonly used in conjunction with seeding<br>lesome weed seeds) and may be spread by hand<br>d down by an acceptable method.  |   |                  |
|            | Ha                                    | y−Hay shall not l  | be used as mulch for Project activities.   |   |                  |
|            |                                       | <u>m Stalks</u> - These s<br>istant to displacen   | should be shredded into 4- to 6-inch lengths. Sta<br>nent.   | lks decompose slowly and are  |                  |
|            | dec<br>pre                            | compose slowly as  | le for areas that will not be closely mowed, and<br>ad do not require tacking. They must be treated<br>ciency in plants; however, can be a very inexper<br>a the site.   | with 12 pounds of nitrogen per ton to   |                  |
|            | pla<br>app                            | ntings. Bark is als  | <u>d Bark</u> - These are by-products of timber process<br>to a suitable mulch for areas planted to grasses a<br>nechanically and is not usually toxic to grasses of<br>red.   | nd not closely mowed. It may be   |                  |
|            | soi<br>req<br>app<br>soi<br>mo<br>use | l contact when app<br>uire tacking, althous<br>plication of fiber n<br>ls. Additionally, fi<br>nths or when used | In hydroseeding operations and applied as part of<br>plied over top of (as a separate operation) newly<br>yugh tacking agents or binders are sometimes us<br>nulch. This form of mulch does not provide suff<br>iber mulch will not be considered adequate mul-<br>d for late fall mulch cover. Use straw mulch dur<br>o straw mulch. This treatment is well suited for s<br>cement. | v seeded areas. These fibers do not<br>ed in conjunction with the<br>ficient protection to highly erodible<br>ch when used during the dry summer<br>ing these periods. Fiber mulch may be |                  |
|            |                                       |  | nic materials which make excellent mulches but<br>use of these materials can reduce costs.   | are only available locally or   |                  |
|            | Ch                                    | emical Mulches a   | nd Soil Binders  |   |                  |
|            | are<br>and                            | emulsions or disp  | hetic, spray-on materials are marketed to stabili<br>bersions of vinyl compounds, rubber or other sul<br>il. They may be used alone in some cases as ten<br>r straw.   | bstances which are mixed with water   |                  |
|            |                                       |  |  |   |                  |
| RAWN       |                                       | DATE   |  | ENVIRONMENTAL DET   |                  |
| ECKED      |                                       | DATE   | Mountain 🎦   |   |                  |
| PD         |                                       | DATE   |  |   |                  |
| LE N.1     | .s.                                   | SHEET 1 OF 1   | Valley   | MULCHING  |                  |
| B NO.      |                                       |  | PIPELINE   |   |                  |
| Roject id: | РХХ                                   | xx   | DESIGN ENGINEERING   | drawing no.<br>MVP-ES45.1   | <b>rev.</b><br>P |
|            |                                       |  |  |   |                  |

Blankets and Matting

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 on steep slopes and in channel flow situations.

STABILIZATION BLANKETS & MATTING.

MVP-ES40.1.

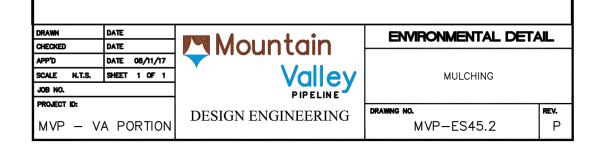
Organic Mulches

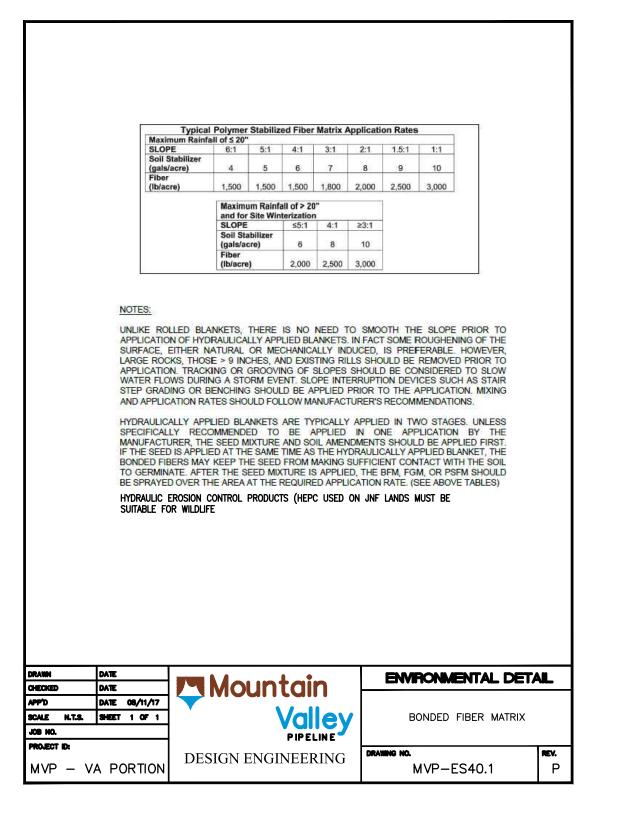
Table 3.35-A.

Prior to mulching: Complete the required grading and install needed sediment control practices.

be applied prior to mulching except in the following cases:

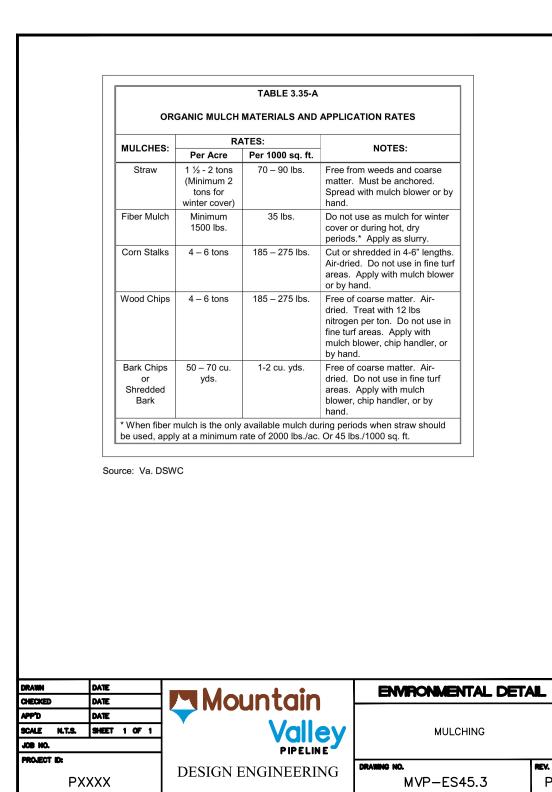
b. Where seed is to be applied following a straw mulch spread during winter months.





| gani<br>st ef | c mul<br>ffectiv   |
|---------------|--|
| ani<br>st ej  | c mul<br>ffectiv   |
|               |  |
| stin          | es can<br>g and<br>ermina                                |
|               | es are<br>mulc   |
| 4.            | Mul<br>TEM   |
| 3.            | Mul<br>not p   |
|               | weat<br>this j<br>achie                                  |
| 2.            | Area   |
| 1.            | Area<br>MVI  |
| 2.            | To f<br>again  |
| 1.            | To p<br>of ov  |
| -             | ation  |
| 12.           |  |
|               |  |
|               | 1.<br>2.<br>1.<br>2.<br>3.<br>4.<br>lcho<br>face<br>lcho |

PXXXX



|         | ID:    |          |  |
|---------|--------|----------|--|
| JOB NO. |        |          |  |
| SCALE   | N.T.S. | _        | EET 1 (                                |
| CHECKED |        | DA<br>DA |  |
|         |        |          |  |
| DRAWN   |        | DA       | more ti                                |
|         |        | 5.       | Peg and<br>other m<br>surface<br>mulch |
|         |        | 4.       | <u>Mulch</u><br>accord                 |
|         |        |          |  |
|         |        |          |  |
|         |        |          | υ.                                     |
|         |        |          | a.<br>b.                               |
|         |        |          | The fol                                |
|         |        |          | edges o<br>area sh<br>be spra          |
|         |        | 3.       | providi<br>Liquid                      |
|         |        | 2.       | Fiber M<br>of a hy                     |
|         |        | 1.       | Mulch<br>implen<br>control<br>safely.  |
|         | O      | ther of  | Anchor<br>organic i<br>ing strav       |
|         | se     | ction    | spreadin<br>is and pl                  |
|         |        |          | ation: M                               |

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

# **Specifications**

- 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.
- Lime and fertilizer should be incorporated and surface roughening accomplished as needed. Seed should
- a. Where seed is to be applied as part of a hydroseeder slurry containing fiber mulch.

#### MULCHING

#### **Definition**

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

**Purposes** 

prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity overland flow.

foster the growth of vegetation by increasing available moisture and providing insulation inst extreme heat and cold.

Conditions Where Practice Applies

eas which have been permanently seeded (see Appendix B – Typical Construction Details VP-ES11.1 through ES12.3) should be mulched immediately following seeding.

eas which cannot be seeded because of the season should be mulched to provide some tection to the soil surface. An organic mulch should be used, and the area then seeded as soon ather or seasonal conditions permit. It is not recommended that fiber mulch be used alone for s practice; at normal application rates it just simply does not provide the protection that is

nieved using other types of mulch. Ich may be used together with plantings of trees, shrubs, or certain ground covers which do provide adequate soil stabilization by themselves.

ulch shall be used in conjunction with temporary seeding operations as specified in EMPORARY SEEDING, Std. & Spec. 3.31

#### Planning Considerations

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

n increase the infiltration rate of the soil, reduce soil moisture loss by evaporation, prevent d sealing of the soil surface, modify soil temperatures, and provide a suitable microclimate for nation.

alch materials, such as straw, wood chips, bark, and fiber mulch have been found to be the

|        | Mountain           | ENVIRONMENTAL DETAIL    |                  |  |
|--------|--------------------|-------------------------|------------------|--|
| 1 OF 1 |                    | MULCHING                |                  |  |
|        | DESIGN ENGINEERING | drawing no.<br>MVP-ES45 | <b>rev.</b><br>P |  |

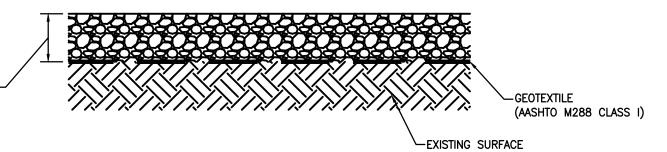
|                         | 4   | - 11   |
|-------------------------|---|--|
|                         | ch materials shall be spread uniformly, by hand or m  |  |
| ~                       | straw mulch by hand, divide the area to be mulched i<br>e 70-90 lbs. (n to 2 bales) of straw in each section to   | 11 2 7 1   |
| c mu                    | <u>s:</u> Straw mulch must be anchored immediately after s<br>lches listed in Table 3.35-A do not require anchoring<br>may be used:   |  |
| emei<br>rol w           | achoring tool (often referred to as a Krimper or Krim<br>at designed to punch mulch into the soil surface. Thi<br><i>i</i> th straw. It is limited to use on slopes no steeper that<br>lachinery shall be operated on the contour.  | s method provides good erosion   |
| hydr                    | Ilch: A very common practice with widespread use to<br>oseeder at a rate of 500-750 lbs/acre over top of stray<br>g additional mulch to the newly seeded area.  |  |
| s of shou               | ulch binders: Application of liquid mulch binders an<br>areas and at crests of ridges and banks, to prevent dis<br>ild have binder applied uniformly. Binders may be a<br>ed into the mulch as it is being blown onto the soil.   | splacement. The remainder of the   |
| follo                   | wing types of binders may be used:  |  |
| _                       | synthetic binders - Formulated binders or organically<br>s recommended by the manufacturer to anchor mulc   |  |
| s<br>c                  | Asphalt - Any type of asphalt thin enough to be blow<br>atisfactory. Recommended for use are rapid curing (<br>euring (MC-250, MC-800) and emulsified asphalt (SS<br>RS-2, CRS-1, and CRS-2).   | RC-70, RC-250, RC-800), medium   |
| u                       | Apply asphalt at 0.10 gallon per square yard (10 gal./<br>ise heavier applications as it may cause the straw to '<br>lesignations are from the Asphalt Institute Specificat   | 'perch" over rills. All asphalt  |
| T<br>s<br>e             | <u>Note</u> : This particular method is not used as common<br>The development of hydraulic seeding equipment pro<br>ynthetic or organically based binders and tackifiers.<br>invironmental concerns should be addressed to ensur<br>tot enter valuable water supplies. Avoid applications | moted the industry to turn to<br>When this method is used,<br>e that petroleum-based products do |
|                         | ttings: Lightweight plastic, cotton, or paper nets mag<br>g to manufacturer's recommendations.  | <i>y</i> be stapled over the mulch   |
| r met<br>ice, e<br>h by | wine: Because it is labor-intensive, this method is fe<br>thods cannot be used. Drive 8- to 10-inch wooden pe<br>every 4 feet in all directions. Stakes may be driven be<br>y stretching twine between pegs in a criss-cross-withing<br>es around each peg.                               | gs to within 3 inches of the soil<br>efore or after straw is spread. Secure                      |
|                         | Mountain  | ENVIRONMENTAL DETAIL   |
|                         |   |  |
|                         |   |  |
| I OF                    |   | MULCHING   |

| CH<br>AP<br>DA  |  |              | с<br>а             |   | cz/cn a    | ZJ/ 18 KAL | КE     | M          | AUDRESS VADEQ COMMENIS |
|-----------------|--|--------------|--------------------|---|------------|------------|--------|------------|------------------------|
| IECK            |  |              |                    |   | 5 03/16,   | 16/18 KAL  | RE     | DW         | ADDRESS VADEQ COMMENTS |
| ED<br>VED       | Transformation COLUMN                    |              | 661<br>F           | ANCILLARY SILE<br>FDOSION AND SEDIMENT CONTROL DI ANC | 4 02/21/18 | /18 KAL    | RE     | DW         | ADDRESS VADEQ COMMENTS |
| BY:             |  |              | worl<br>AN<br>OST  | TO INTAIN VALLEY DIDELINE DO LET LEON INF             | 3 02/05,   | 05/18 KAL  | RE     | DW         | ADDRESS VADEQ COMMENTS |
| 03              |  | CONSTRUCTION | ⊣∣c<br>DEF<br>ER   | MUUNIAIN VALLET PIPELINE PRUJEUI - HOUU LINE          | 2 01/12,   | 12/18 KAL  | RE     | DW         | ADDRESS VADEQ COMMENTS |
| /23,            |  | PI ANS       | LEAI<br>SEN<br>PLA | GILES COUNTY, VIRGINIA                                | 1 09/21,   | 21/17 KAL  | RE     | DW         | PLAN SUBMISSION        |
| /18             | LNER<br>57593                            |              | N DF<br>ZA         |   | NO.: DATE: | : DWN.:    | CHKD.: | APPD.:     | DESCRIPTION:           |
|                 | AN AND AND AND AND AND AND AND AND AND A |              | LUTION             | 555 SOUTHPOINTE BOULEVARD, SUITE 200                  |            |            |        | REVISIONS: | :SZO                   |
| KAL<br>RE<br>DW |  |              | S™                 | CANONSBURG, PA 15317                                  |            |            |        |            |                        |

| C                       | hemical Mulches  |   |   |
|-------------------------|--|---|---|
|                         |  | may be used alone only in the following situatio  | ns:   |
|                         |  | o other mulching material is available.   |   |
|                         |  | nction with temporary seeding during the times  | when mulch is not required for that   |
|                         | areas wi<br>SURFA  | arch 15 to May 1 and August 15 to September 3<br>th slopes no steeper than 4:1, which have been r<br>CE ROUGHENING, Std. & Spec. 3.29. If rill er<br>applied immediately.   | oughened in accordance with   |
|                         | hydrosed   | Chemical mulches may be used to bind other mu<br>eded slurry at any time. Manufacturer's recomme<br>shall be followed.  |   |
|                         |  | Maintenance   |   |
| ma<br>in:<br>pla<br>pla | ats should be inspe<br>stall netting or mat<br>ace up until grasse | rosion is observed in mulched areas, additional n<br>cted after rainstorms for dislocation or failure. I<br>ting as necessary after repairing damage to the s<br>s are firmly established. Where mulch is used in<br>riodically throughout the year to determine if mu<br>s needed. | f washouts or breakage occur, re-<br>slope or ditch. Inspections should take<br>conjunction with ornamental |
|                         |  |   |   |
| RAWN<br>HECKED          | DATE<br>DATE   | Mountain  | ENVIRONMENTAL DETAIL  |
|                         |  | Mountain<br>Valley  | ENVIRONMENTAL DETAIL  |

6" (MIN) VDOT #1 COARSE AGGREGATE ——

# 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/FT<sup>2</sup>.

> TYPICAL GRAVEL SURFACE DETAIL N.T.S.

| -                      |                        |                                     |                        |                        |                        |              |   |                      |
|------------------------|------------------------|-------------------------------------|------------------------|------------------------|------------------------|--------------|---|----------------------|
| ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS              | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | PLAN SUBMISSION        | DESCRIPTION: | REVISIONS:  |                      |
| MQ                     | DW                     | DW                                  | DW                     | DW                     | DW                     | APPD.:       | Ч<br>И  |                      |
| RED                    | RE D                   | RE D                                | RE D                   | RE D                   | RE D                   | CHKD.: API   | ш.  |                      |
| KAL                    | KAL F                  | KAL F                               | KAL F                  | KAL F                  | KAL F                  | DWN.: CH     |   |                      |
|                        |                        |                                     |                        |                        |                        |              |   |                      |
| 03/23/18               | 03/16/18               | 02/21/18                            | 02/05/18               | 01/12/18               | 09/21/17               | DATE:        |   |                      |
| 9                      | 5                      | 4                                   | 3                      | 2                      | -                      | NO.:         |   |                      |
|                        |                        | EDOSION AND SEDIMENT CONTROL DI ANS |                        |                        | GILES COUNTY, VIRGINIA |              | Impounding value i fifeline, LLC       555 Southpointe Boulevard, Suite 200 | CANONSBURG, PA 15317 |
| c                      |                        | 661<br>F                            | AN<br>OST              | DER<br>ER              | SEN<br>PLA             | I DF<br>ZA   |   | S <sup>™</sup>       |
|                        |                        |                                     |                        | CONSTRUCTION           | PLANS                  |              |   |                      |
|                        |                        | Transformeration                    |                        | D J.<br>Vo. 02         |                        |              | A STANDARD AND A STANDARD   |                      |
|                        | AWN                    |                                     | -                      |                        |                        |              |   | KAL<br>RE            |
| AP                     | PRO<br>TE:             |                                     | BY:                    | 03                     | /23,                   | /18          |   | DW                   |
| sc                     | ALE:                   |                                     | 1 .                    |                        | SHC                    |              |   |                      |
|                        |                        |                                     | -1-                    | 521                    |                        | 0            |   |                      |

#### **EROSION AND SEDIMENT CONTROL NARRATIVE**

#### PROJECT DESCRIPTION

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 TO 2.0 MILLION DEKATHERMS PER DAY OF NATURAL GAS.

THE MVP-LY-026 PIPEYARD CONSISTS OF APPROXIMATELY 11.79 ACRES OF AREA TO BE DISTURBED, CONSTRUCTED WITHIN GILES COUNTY. THE SITE IS LOCATED NEXT TO AND SOUTH OF THE INTERSECTION BETWEEN US-460 AND GRILL ROAD (STATE ROUTE 757). ACCESS TO THE SITE WILL BE PROVIDED BY DRIVING FROM GRILL ROAD ACROSS US-460 TO AN EXISTING ACCESS ROAD FOR TEMPORARY ACCESS. THE SITE WILL BE USED FOR OFFICE TRAILERS, WAREHOUSE TRAILERS AND MATERIALS, EMPLOYEE PARKING, AND FUEL CONTAINMENT. NO GRUBBING OR OTHER SOIL DISTURBING ACTIVITIES WILL BE CONDUCTED, TOPSOIL STRIPPING WILL NOT OCCUR, AND NO GRAVEL WILL REMAIN ON THE SITE AFTER THE SITE IS UTILIZED.

#### EXISTING SITE CONDITIONS

EXISTING GROUND COVER INCLUDES PASTURE, TREES, SHRUBS AND EXISTING PAVED ACCESS ROADS. THERE ARE TWO DRAINAGE AREAS FOR THE PROJECT. SLOPES ON THE SITE ARE GENERALLY BETWEEN 5 AND 20 PERCENT. THERE ARE NO STREAMS OR WETLANDS LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD) AT THIS SITE. THE SITE HAS TWO DISTINCT AREAS: AN UPPER AND LOWER PORTION DIVIDED BY A STEEP FILL-SLOPE HILLSIDE. THE UPPER PORTION OF THE SITE IS RELATIVELY FLAT WHILE THE LOWER PORTION IS ROLLING.

ADJACENT AREAS: ADJACENT AREAS INCLUDE: COMMERCIAL BUSINESSES, THE NEW RIVER, FORESTED AREAS, SINGLE-FAMILY HOMES, PASTURE AND ROADS.

#### OFF-SITE AREAS

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

5. <u>SOILS:</u> THE SOILS LOCATED WITHIN THE LOD INCLUDE:

GILES COUNTY: BRADDOCK SANDY LOAM (4B), BRADDOCK SANDY LOAM (4C), BRADDOCK SANDY LOAM (4D), BRADDOCK SANDY LOAM (4E), FREDERICK-ROCK OUTCROP COMPLEX (16F).

BRADDOCK SERIES SOILS CONSIST OF DEEP, WELL-DRAINED, AND MODERATELY PERMEABLE SOILS. RUNOFF CLASS IS LOW TO MODERATE ON NEARLY LEVEL SLOPES BUT VERY HIGH ON STEEP SLOPES. THICKNESS RANGES FROM 40 TO 60 INCHES OR MORE. DEPTH TO HARD BEDROCK IS MORE THAN 60 INCHES. TEXTURE IS SANDY LOAM.

FREDERICK SERIES SOILS CONSIST OF VERY DEEP, WELL-DRAINED SOILS SOILS WITH MODERATE PERMEABILITY. POTENTIAL FOR SURFACE RUNOFF IS LOW TO VERY HIGH. THICKNESS IS MORE THAN 60 INCHES. DEPTH TO BEDROCK IS MORE THAN 72 INCHES. TEXTURE RANGES BY HORIZON, INCLUDING SILT LOAM, LOAM, SILTY CLAY, AND CLAY. FREDERICK-ROCK OUTCROP COMPLEX SOILS HAVE 30 TO 60 PERCENT SLOPES.

#### 6. CRITICAL AREAS:

THERE ARE NO STREAMS AND WETLANDS WITHIN THE LOD. PRIOR TO GRADING ACTIVITIES, SEDIMENT BARRIERS WILL BE INSTALLED DOWNGRADIENT OF THE CONSTRUCTION WORK AREA AS NEEDED TO PREVENT THE FLOW OF SPOIL 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.

THE PROJECT IS LOCATED IN AN AREA THAT IS SUSCEPTIBLE TO POTENTIAL EROSION HAZARDS. THESE AREAS PRIMARILY OCCUR ON STEEP SLOPES. E&S CONTROLS ON THE SITE WILL MITIGATE EROSION HAZARDS. EROSION CONTROL BLANKET WILL BE PLACED IF A SLOPE AT THE SITE BECOMES UNSTABILIZED.

KARST FEATURES (SINKHOLES) ARE LOCATED ALONG THE SOUTHERN EDGE OF THE SITE LOD. NO EARTH DISTURBANCE ACTIVITIES ARE PROPOSED PER THE CURRENT PLAN, BUT STACKED COMPOST FILTER SOCK WILL BE INSTALLED ALONG THE SOUTHERN EDGE OF THE SITE AS A PRECAUTIONARY MEASURE. IT SHOULD ALSO BE NOTED THAT THE PROPOSED FUEL STORAGE AREA IS LOCATED BEYOND THE MINIMUM 100-FOOT SET BACK FROM KARST FEATURES AS RECOMMENDED IN THE KARST MITIGATION PLAN. THEREFORE, THE SITE DESIGN IS ADEQUATE FOR MEETING THE INTENDED PROTECTIVE MEASURES OUTLINED IN THE "VIRGINIA DCR TECHNICAL BULLETING NO. 2 - HYDROLOGIC MODELING AND DESIGN IN KARST."

#### 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.

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

VEGETATIVE PRACTICES

- 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
- 8. 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 TEMPORARY MATERIAL STORAGE, EMPLOYEE PARKING, TRAILER STAGING, AND FUEL STORAGE 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:

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.

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.

11. CALCULATIONS:

STACKED COMPOST FILTER SOCK - MVP-ES9.3

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. LIME AND FERTILIZER WILL BE ADDED IN ACCORDANCE WITH THE PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS.

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-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:

1. SEDIMENT TRAPS:

2

**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.

BE PROVIDED.

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.

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. 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-ES3.2

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

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.

1.1.ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES

1.2.MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA.

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 AREA.

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 DURATION.

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

MS-10 STORM SEWER INLET PROTECTION. ALL STC PROTECTED SO THAT SEDIMENT-LADEN WATER CA FILTERED/ TREATED TO REMOVE SEDIMENT.

**MS-11 STORMWATER CONVEYANCE PROTECTION.** ARE MADE OPERATIONAL, ADEQUATE OUTLET PRO SHALL BE INSTALLED IN BOTH THE CONVEYANCE C

**MS-12 WORK IN LIVE WATERCOURSE. WHEN WORK** MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TI DURING CONSTRUCTION. NONERODIBLE MATERIAL EARTHEN FILL MAY BE USED FOR THESE STRUCTU

MS-13 CROSSING LIVE WATERCOURSE. WHEN A LIV TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY V BE PROVIDED.

**MS-14 REGULATION OF WATERCOURSE CROSSING** WORKING IN OR CROSSING LIVE WATERCOURSES

MS-15 STABILIZING OF WATERCOURSE. THE BED A IN THE WATERCOURSE IS COMPLETED.

| ORM SEWER INLETS MADE OPERABLE DURING CONSTRUCTION SHALL BE<br>ANNOT ENTER THE STORMWATER CONVEYANCE SYSTEM WITHOUT FIRST BEING<br>BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES<br>DECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING<br>CHANNEL AND RECEIVING CHANNEL.<br>(IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO<br>RANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE<br>SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS.<br>IRES IF ARMORED BY NONERODIBLE COVER MATERIALS. | COMMENTS | COMMENTS | COMMENTS       | COMMENTS | ИTS              |           |                |                   |                     |   |
|---|----------|----------|----------------|----------|------------------|-----------|----------------|-------------------|---------------------|---|
| OTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING<br>CHANNEL AND RECEIVING CHANNEL.<br>(IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO<br>RANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE<br>SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS.<br>IRES IF ARMORED BY NONERODIBLE COVER MATERIALS.   | COMMENTS | MMENTS   | MENTS          | ENTS     | UTS              |           |                |                   |                     |   |
| RANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE<br>SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS.<br>IRES IF ARMORED BY NONERODIBLE COVER MATERIALS.  |          | 2        |                | Ξ        | ME               | z         |                |                   |                     |   |
|   | S VADEQ  | VADEQ    | VADEQ          | VADEQ    |                  | N SUBMI   |                | DESCRIPTION:      |                     |   |
|   | ADDRESS  | ADDRESS  | ADDRESS        | ADDRES   | ADDRESS          | PL        |                |                   | :.<br>()<br>Z       |   |
| 6. ALL APPLICABLE FEDERAL STATE AND LOCAL REGULATIONS PERTAINING TO SHALL BE MET.   |          |          |                |          |                  |           |                |                   | EVISIO              |   |
| AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK   | MQ       | DW       | DW             | DW       | DW               | MQ        |                | APPU.:            | Ц                   |   |
|   | RE       | RE       | ┢              | ┝        |                  | RE        | 1              | : CHKD.:          |                     |   |
|   | 18 KAL   | /18 KAL  | _              | -        |                  | ┢         | ╈              | DWN.              |                     |   |
|   | 03/23/18 | 03/16/   | /21/           |          | 01/12/18         | 09/21/17  | -              |                   |                     |   |
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|   |          | comp     | ANCILLARY SITE |          |                  | RSE<br>PL | TE<br>N<br>AZA | sol<br>DRI<br>A 7 | -I<br>UTION         | EanonSBURG, PA 15317 CANONSBURG, PA 15317 |
|   |          |          |                |          | CONSTRUCTION     |           |                |                   |                     |   |
|   |          |          | N BY           | Lic.     | (ID J.<br>No. (C | 14020     | 0575           | ER 393            | A A MAR ARABARA ANT | KAL<br>RE                                 |
|   |          | PRO      | OVED           | BY       |                  | 3/2       | <del>,</del> , | ~                 | -                   | DW<br>A                                   |

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.
- b. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE 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 BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.

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.

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: 1. 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 2. (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.
- 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
- PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT (C) 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: 1. 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 PROJECT.
- 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 STATE.
- 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 PROMULGATED PURSUANT TO § 62.1-44.15:54 OR 62.1-44.15:65 OF THE ACT.
- 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.
- n. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 9VAC25-870-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) REGULATION SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF THIS SUBDIVISION 19.

#### **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 <u>9VAC25-870-66.</u> 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 VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (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.

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.

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>

WHERE:

= 0.098 FT

0.0078 FT:

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

REARRANGING,

V = Q/A

= 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).

DEPTH OF 0.10 FT:

# B. RUNOFF FROM PROJECT SITE

# 1. SHEETFLOW DISCHARGES

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

# 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

# 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

- DEPTH 5/3 = 0.000305
- DEPTH = 0.0078 FT
- THIS FLOW DEPTH CAN THEN BE USED TO COMPUTE THE VELOCITY IN ACCORDANCE WITH:

# = 0.00134 / 0.0078

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

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 COM

- V = Q/A
- = 0.095/0.10
- = 0.95 FPS

THUS, THE CFS WILL ALSO PRODUCE SHEETFL PROPERTIES. AS A RESULT. SHEETFLOW DOWN CONSTRUCTION IS ALSO IN FULL COMPLIANCE

# c) FLOODING

BECAUSE SHEETFLOW HAS BEEN DEMONSTRAT COMPLIANCE WITH THE FLOODING PROVISION HOWEVER, THE SHEETFLOW PROVISION CITED PROPERTIES OR RESOURCES" DOES NOT OCCU

"FLOODING" MEANS A VOLUME OF WATER WATER BODY, OR CONVEYANCE SYSTEM A THREATENING DAMAGE."

IN THIS INSTANCE. THERE ARE NO CONVEYANC RELATED TO OVERLAND FLOW THAT CAUSES C SHEETFLOW FROM EITHER THE SILT FENCE OR DOWN GRADIENT FLOW RATES THAT MAY OCCU ACTUALLY BE REDUCED AS A RESULT OF POND THEREFORE COMPLIES WITH THE REQUIREMENT

2. DISCHARGE TO A CONVEYANCE SYSTEM

SEDIMENT TRAPS/BASINS WILL BE DESIGNED IN ENSURE THAT THERE IS NO INCREASE IN THE P

# C. SUMMARY

SINCE IT HAS BEEN DEMONSTRATED THAT UNDER THE PERIMETER CONTROLS WILL NOT "CAUSE OF PROPERTIES" DURING AND IMMEDIATELY FOLLOW COMPLIANCE WITH MS-19.

# 14. BEST MANAGEMENT PRACTICES INST

TEMPORARY AND PERMANENT BMPS WILL BE USE ENVIRONMENTAL EFFECTS OF CONSTRUCTION AG

THE FOLLOWING ARE GENERAL BMP INSTALLATIC

- A STONE CONSTRUCTION ENTRANCE, SHOWN TRAFFIC WILL BE ACCESSING A PAVED ROAD
- VEGETATION WILL BE REMOVED BY BRUSH H FELLING/CUTTING OF STUMPS AT THE GROUN INSTALLED AFTER ALL VEGETATION/TREES AI
- WETLANDS (IF PRESENT) WILL BE PROTECTED ORANGE CONSTRUCTION SAFETY FENCE WIL (IF PRESENT) WILL EITHER UTILIZE EXISTING
- DEWATERING, IF NEEDED, WILL BE CONDUCT WILL BE LOCATED IN A WELL-VEGETATED UPI
- ALL DISTURBED AREAS WILL BE GRADED IN F STABILIZED AS SOON AS POSSIBLE AFTER CC DAYS AFTER REACHING FINAL GRADE. REFER SPECIFICATIONS.
- TEMPORARY SEDIMENT BARRIERS WILL BE M THAT IS UNIFORM, MATURE ENOUGH TO SURY APPROPRIATE CONTROLS WILL BE REMOVED EROSION CONTROLS WILL BE STABILIZED IMM
- ALL WASTE MATERIAL WILL BE TRANSPORTED THE MATERIAL.
- IN NON-AGRICULTURAL AREAS THE VISUAL SU UNDISTURBED LANDS. IN AGRICULTURAL ARE PORTIONS OF THE SAME FIELD, UNLESS THE

| MPUTE THE VELOCITY IN ACCORDANCE WITH:  |                        |                                   |                        |                        |                        |            |                    |           |                                |        |
|---|------------------------|-----------------------------------|------------------------|------------------------|------------------------|------------|--------------------|-----------|--------------------------------|--------|
| LOW IN A NON-EROSIVE MANNER THAT WILL NOT IMPACT DOWN GRADIENT<br>VNGRADIENT FROM THE CFS PERIMETER CONTROL IMMEDIATELY FOLLOWING<br>E WITH M.S. 19.  | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS            | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | ADDRESS VADEQ COMMENTS | N SUBMI    | DESCRIPTION:       |           | .0                             |        |
| ATED FOR DOWNGRADIENT FLOWS DURING THE CONSTRUCTION PROCESS,<br>I OF THE REGULATIONS (9VAC25-870-66 C. FLOOD PROTECTION) IS NOT REQUIRED.<br>D IN THIS NARRATIVE DOES REQUIRE THAT "FLOODING" OF DOWNGRADIENT<br>CUR. THE DEFINITION OF "FLOODING" PROVIDED IN THE REGULATIONS IS:  | 4                      | 4                                 | 4                      | 4                      | 4                      |            |                    |           |                                |        |
| THAT IS TOO GREAT TO BE CONFINED WITHIN THE BANKS OR WALLS OF A STREAM,<br>AND THAT OVERFLOWS ONTO ADJACENT LANDS, THEREBY CAUSING OR   | DW                     | DW                                | DW                     | M                      | M                      | Z          | APPD.:             |           | Ц<br>К                         |        |
| CES (I.E. SHEETFLOW), THEREFORE THE APPLICABLE PORTION OF THE DEFINITION IS<br>OR THREATENS TO CAUSE DAMAGE. THIS ANALYSIS HAS DEMONSTRATED THAT THE<br>R CFS IS NON-EROSIVE. THEREFORE, THE TEMPORARY, NOMINAL INCREASES IN<br>CUR IN SOME SITUATIONS (NOTE - IN MANY INSTANCES THE FLOW RATES WILL<br>IDING BEHIND THE SILT FENCE AND/OR CFS) WILL NOT RESULT IN DAMAGE AND<br>ENTS OF MS-19. | /18 KAL RE             | /18 KAL RE                        | /18 KAL RE             |                        | KAL                    | KAL        |                    | 1         |                                |        |
|   | 03/23/                 | 03/16/18                          | 02/21/                 | 02/05/                 | 01/12/                 | 09/21/     | DATE:              |           |                                |        |
| IN ACCORDANCE WITH THE VESCH AND TO CONTROL THE 2-YEAR STORM EVENT TO<br>PEAK RATE OF RUNOFF AT THE DOWNSTREAM POINT OF DISCHARGE.  | 9                      | 5                                 | 4                      | 3                      |                        |            | NO.:               |           |                                |        |
| ER THE MOST CONSERVATIVE ASSUMPTIONS THAT SHEETFLOW DOWN GRADIENT OF<br>OR CONTRIBUTE TO EROSION, SEDIMENTATION, OR FLOODING OF DOWN GRADIENT<br>OWING CONSTRUCTION, THE CONSTRUCTION PHASE OF THE PROJECT WILL BE IN FULL<br>TALLATION AND REMOVAL NOTES:  |                        |                                   |                        |                        | - HOUU LINE            |            | (                  | LLC       | 200                            |        |
| SED DURING CONSTRUCTION ACTIVITIES TO AVOID AND/OR MINIMIZE ADVERSE   |                        |                                   |                        |                        |                        | ∡          |                    | ~         | SUITE                          |        |
| ACTIVITIES.<br>ON NOTES FOR PIPEYARD AND LAYDOWN AREA CONSTRUCTION ACTIVITIES.  |                        |                                   |                        |                        | <b>PRUJECI</b>         | VIRGINIA   |                    | _         |                                | -      |
| /N ON DETAIL SHEET, SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION<br>D DIRECTLY FROM A DISTURBED AREA.  |                        |                                   | NENT<br>VENT           | ਡ                      |                        | COUNTY, 1  | Ι.                 |           | BOULEVARD,<br>IRG PA 15.3      |        |
| HOGGING THE AREA; ANY TREES TO BE REMOVED WILL BE CONDUCTED BY HAND<br>IND SURFACE. TEMPORARY GRAVEL OVER GEOTEXTILE (SEE DETAIL) WILL BE<br>ARE REMOVED.   |                        |                                   | AND SEDI               | 븳、                     |                        | CILES COI  |                    | VALL      | Southpointe Bou<br>Canonsrurg  |        |
| ED WITH SILT FENCE OR BELTED SILT RETENTION FENCE (BSRF). IN ADDITIONAL,<br>ILL BE INSTALLED TO PROTECT WETLANDS FROM DISTURBANCE. STREAM CROSSINGS<br>CULVERTS OR BE SPANNED USING TIMBER MAT BRIDGES.   |                        |                                   |                        |                        | VALL                   |            |                    | ~         | 555 SO                         |        |
| TED USING A PUMP AND HOSE. WATER WILL BE RELEASED INTO A FILTER BAG THAT<br>PLAND AREA.   |                        |                                   | L                      |                        | MUUNIAIN               |            |                    |           |                                |        |
| PREPARATION FOR SEEDING AND MULCHING. THE CONSTRUCTION SITE SHOULD BE<br>COMPLETION. ESTABLISHMENT OF FINAL COVER MUST BE INITIATED NO LATER THAN 7<br>ER TO TABLES ON THIS SHEET FOR TEMPORARY AND PERMANENT SEEDING   |                        |                                   | רב                     |                        |                        |            | TEC                | н         |                                |        |
| MAINTAINED UNTIL VEGETATION HAS BECOME ESTABLISHED WITH A GROUND COVER<br>RVIVE AND WILL INHIBIT EROSION. ONCE THIS COVERAGE HAS BEEN OBTAINED,<br>D FROM THE WORK AREA. AREAS DISTURBED DURING THE REMOVAL OF THE<br>IMEDIATELY.   | c                      |                                   | 661<br>F               | AN<br>OST              | idei<br>Er             | rse<br>Pl⁄ | N D<br>NZA         | RIVE<br>7 |                                |        |
| ED OFFSITE FOR RECYCLING AND/OR DISPOSAL AT A FACILITY APPROVED TO RECEIVE  |                        | P                                 | PITTS                  | SBUI                   | RGF                    | I, P       | A 1                | 522       | 0                              |        |
| SURVEY SHALL BE COMPARED TO THE DENSITY AND COVER OF ADJACENT<br>REAS, THE VISUAL SURVEY SHALL BE COMPARED TO THE ADJACENT UNDISTURBED<br>E EASEMENT AGREEMENT SPECIFIES OTHERWISE.   |                        |                                   |                        |                        | CONSTRUCTION           |            |                    |           |                                |        |
|   |                        |                                   | COLUMN COLUMN          |                        | No. C                  | 4020       | LLNEI<br>5759      |           |                                |        |
|   | C⊢<br>AP<br>DA<br>SC   | AWN<br>IECK<br>PRO<br>TE:<br>ALE: | ED  <br>VED            | BY:<br>BY:             | 03<br>AS               | SH         | 5/18<br>OWN<br>8 ( |           | KA<br>R<br>DV<br>REVISIO<br>11 | E<br>N |

# 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**

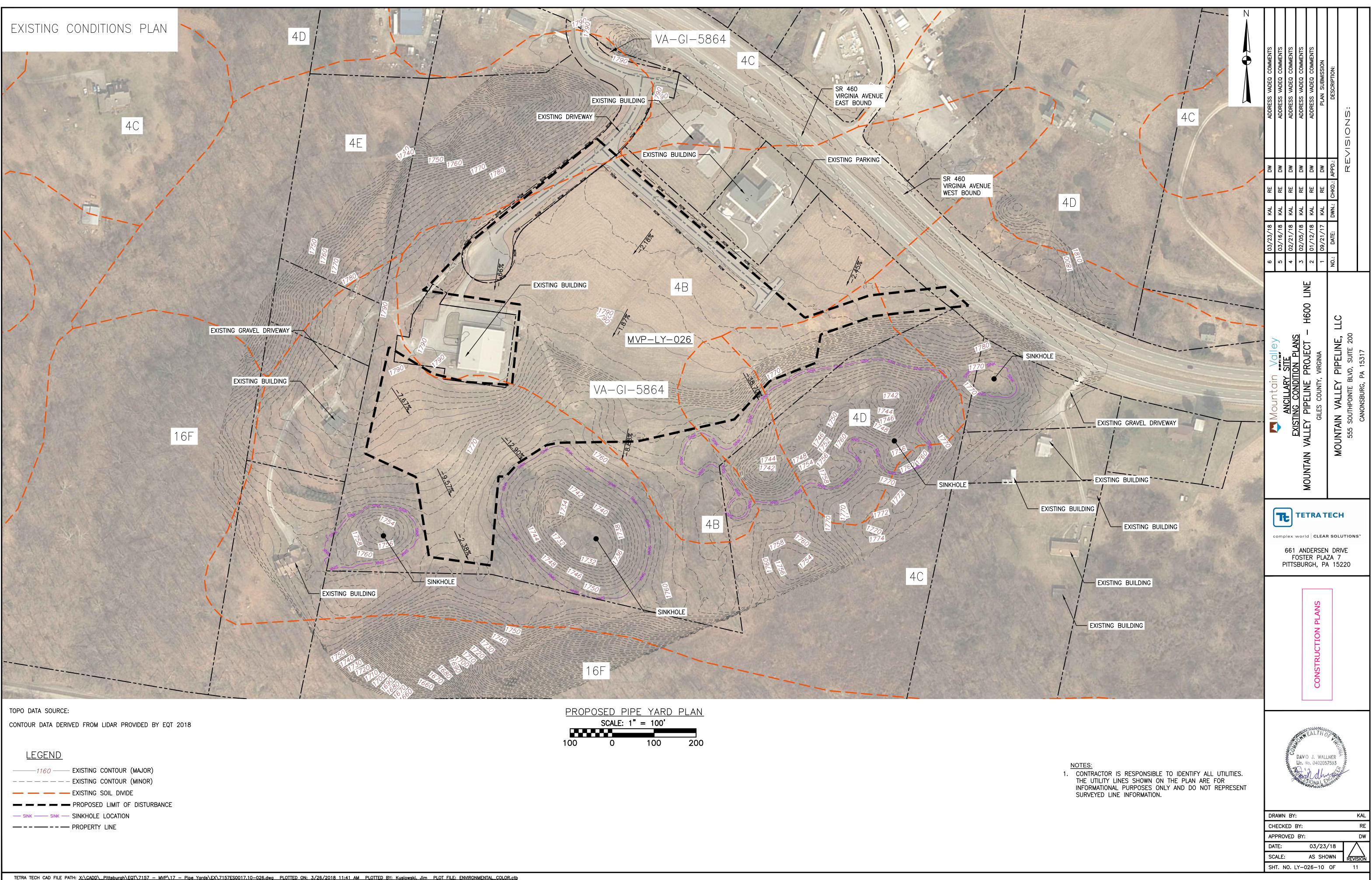
- TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. MAINTENANCE AND REPAIR SHALL BE CONDUCTED IN ACCORDANCE WITH THE APPROVED STANDARDS AND SPECIFICATIONS.
- IN NON-AGRICULTURAL AREAS THE VISUAL 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:

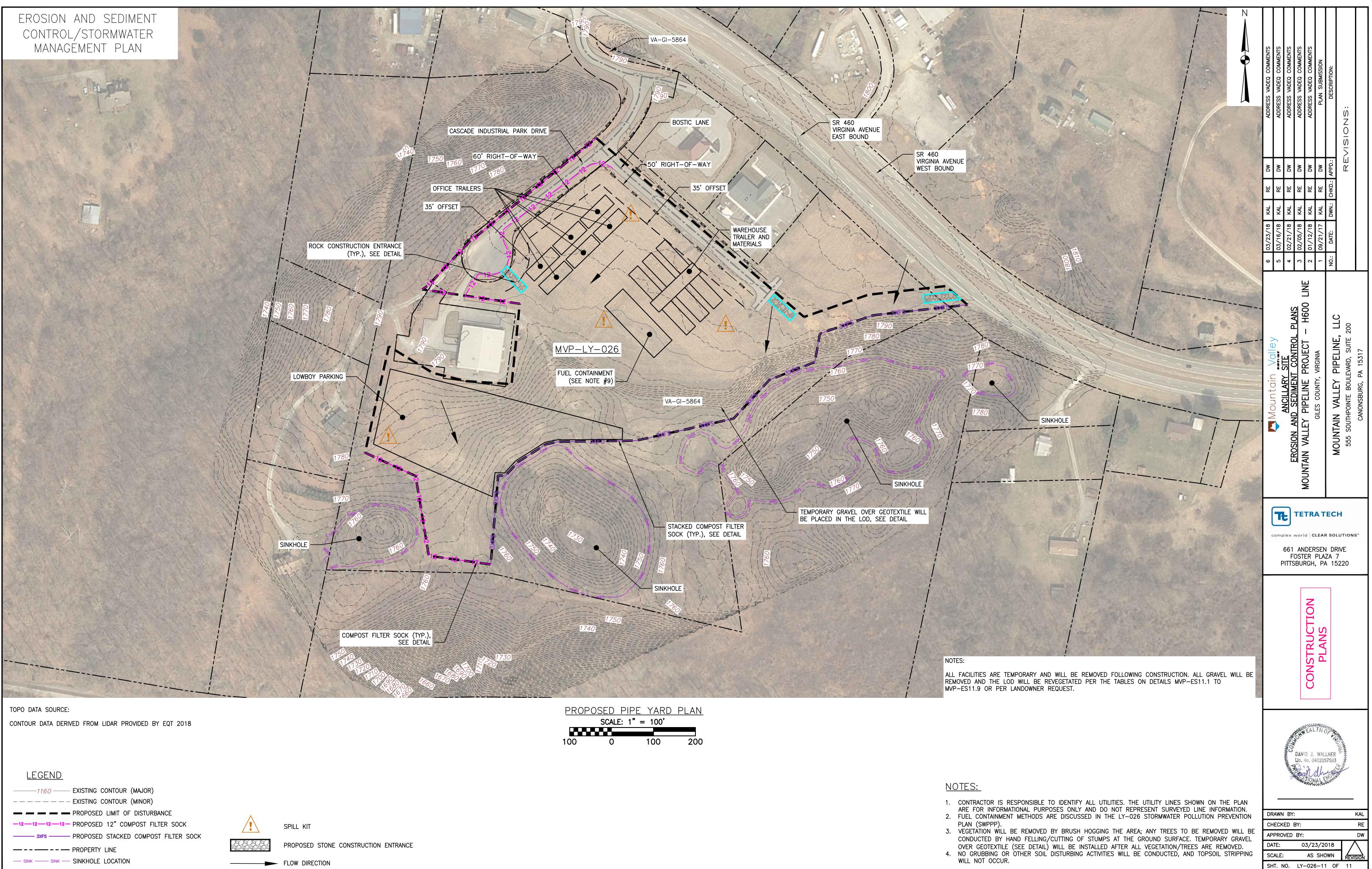
- 1. REMOVE TEMPORARY GRAVEL AND UNDERLYING GEOTEXTILE.
- 2. DISC/AERATE SOILS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION.
- 3. APPLY SPECIALTY SEEDS AS REQUIRED THAT WILL NOT BE HANDLED IN THE MULCH PHASE (STEP 4), SEED THE AREA USING THE SEED MIXES AND RATES SPECIFIED IN MVP-ES11.1 TO MVP-ES11.9 OR PER LANDOWNER REQUEST.
- 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.

| ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>ADDRESS VADEQ COMMENTS<br>PLAN SUBMISSION<br>DESCRIPTION: | REVISIONS:   |
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| ο Ω 4 ω 0 – <sup>N</sup>  |  |
| MOUNTAIN VALLEY PIPELINE PROJECT - H600 LINE<br>CILES COUNTY, VIRGINIA  | 555 SOUTHPOINTE BOULEVARD, SUITE 200<br>CANONSBURG, PA 15317 |
| 661 ANDERSEN DR<br>FOSTER PLAZA 7<br>PITTSBURGH, PA 15  | RIVE<br>7  |
| CONSTRUCTION<br>PLANS   |  |
| DAVID J. WALLINER<br>Lic. No. 0402057593  | A CIVIA  |
| DRAWN BY:<br>CHECKED BY:  | KAL<br>RE  |
| APPROVED BY:<br>DATE: 03/23/18  | DW   |
|   |  |
| SCALE: AS SHOWN<br>SHT. NO. LY-026-9 OF   | REVISION   |



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| PROP | <u>osed</u> | <u>PIPE</u> | <u>Yard</u> | <u>Plan</u> |
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