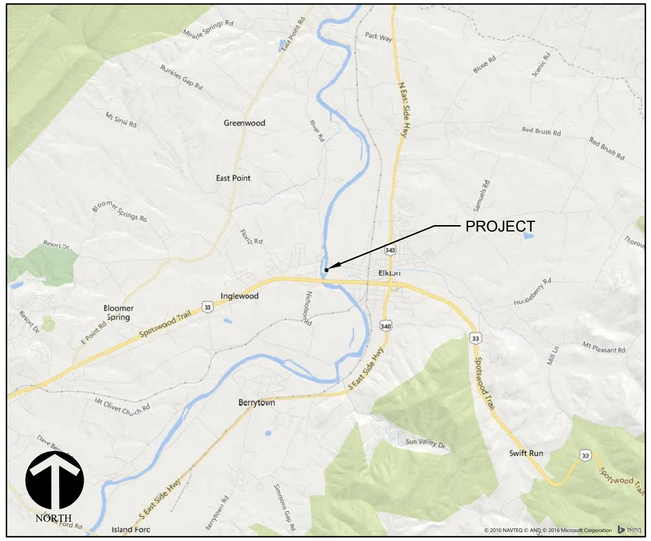
SOUTH FORK SHENANDOAH RIVER BANK STABILIZATION

TOWN OF ELKTON, VIRGINIA



VICINITY MAP

SCALE: 1" = 1 MI.

PROJECT INFORMATION

1. CLIENT:
   TOWN OF ELKTON
   173 WEST SPOTSWOOD AVENUE
   ELKTON, VA 22827
   CONTACT: TROY SHIFFLETT
   PHONE: 540.820.3265
   EMAIL: TSHIFFLETT@TOWNOFELKTON.COM

2. PROJECT AGENT:
   PROJECT MANAGER/MANAGER
   ECOSYSTEM SERVICES, LLC
   1739-A ALLIED STREET
   CHARLOTTESVILLE, VA 22903
   CONTACT: KIP MUMAW, PE
   540.239.1428
   KIP@ECOSYSTEMSERVICES.US

1. PROPERTY OWNER: TOWN OF ELKTON
2. TOTAL ACREAGE OF DISTURBANCE: +/- 3.89 ACRES
3. PROJECT WATERSHED: SOUTH FORK SHENANDOAH RIVER
4. HYDROLOGIC UNIT CODE (8-DIGIT): 02070005

LEGEND

- PROPERTY LINE
- EXISTING 1' CONTOUR LINE
- EXISTING 5' CONTOUR LINE
- SS EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- OHE EXISTING OVERHEAD ELECTRIC
- UGTEL EXISTING UNDERGROUND TELEPHONE
- EXISTING STREAM TOP OF BANK
- EXISTING STREAM TOE OF SLOPE
- EXISTING STREAM THALWEG
- EXISTING FEMA FLOODLINES
- S EXISTING SEWER MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING POWER POLE
- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING SURVEY MONUMENT
- EXISTING TREE
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED ROCK VANE
- PROPOSED STREAMBANK PLANTING
- PROPOSED BUFFER PLANTING

APPROVAL:

REGULATORY AUTHORITY SIGNATURE | TITLE | DATE

REGULATORY AUTHORITY SIGNATURE | TITLE | DATE

ESC LEGEND

SYMBOL	MEASURE	STD & SPEC
LOD	LIMITS OF DISTURBANCE	NA
SF	SILT FENCE	3.05
CE	CONSTRUCTION ENTRANCE	3.02
SP	STOCKPILE/STAGING	NA
	TREE TO BE REMOVED	NA

SHEET INDEX

PROJECT NARRATIVE

LOCATED IN THE TOWN OF ELKTON, VIRGINIA, THE PROPOSED PROJECT CONSISTS OF BANK STABILIZATION ON APPROXIMATELY 530 LINEAR FEET OF THE SOUTH FORK TO THE SHENANDOAH RIVER. THE PRIMARY GOAL IS RE-ESTABLISH A STABLE BANK SLOPE AND PROFILE THAT WILL PROTECT THE CURRENT LANDFILL.

PROPOSED RESTORATION APPROACH WILL INVOLVE CHANNEL GRADING, EXCAVATION, AND SELECT STRUCTURE PLACEMENT TO PROVIDE LONG TERM BANK STABILITY. STRUCTURES AND BIOENGINEERING MEASURES INCLUDING ROCK VANE AND SOIL LIFTS WILL BE UTILIZED. STREAM BANKS AND RIPARIAN BUFFERS WILL BE PLANTED WITH NATIVE TREES, SHRUBS, AND GRASSES.

GENERAL NOTES

1. THIS IS A WATER QUALITY PROJECT. CHANNEL AND FLOOD PROTECTION REGULATIONS HAVE BEEN MET THROUGH NO CONCENTRATED STORMWATER FLOW BEING RELEASED FROM THE PROJECT AREA. THERE IS NO INCREASE IN IMPERVIOUS AREA. NUTRIENT DISCHARGE FOR THIS PROJECT IS UNDER 0.41 LBS PER ACRE PER YEAR.
2. ALL BASEMAPPING AND TOPOGRAPHIC SURVEY INFORMATION IS PROVIDED BY KEE MAPPING AND SURVEYING, INC.
3. ADDITIONAL FIELD SURVEYS WERE CONDUCTED BY ECOSYSTEM SERVICES, LLC.
4. ADDITIONAL BASE MAPPING OBTAINED FROM ROCKINGHAM COUNTY GIS AND VGIN.
5. HORIZONTAL DATUM: NAD83 VIRGINIA STATE PLANE, NORTH ZONE, US FOOT
6. VERTICAL DATUM: NAVD 88, US FOOT
7. THE CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 811 OR 1-800-552-7001 PRIOR TO ANY LAND DISTURBING ACTIVITIES.
8. ALL WORK SHALL BE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL STANDARDS.
9. ANY WORK THAT IS REQUIRED FOR THE SUCCESSFUL COMPLETION OF THE PROJECT AS SPECIFIED IN THIS SET OF PLANS BUT NOT SPECIFICALLY ADDRESSED IN THE PLAN SET SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO COMPLETE SUCH WORK.
10. THE PROJECT DOES NOT INCLUDE THE ADDITION OF ANY IMPERVIOUS COVER. NO INCREASE IN RUNOFF WILL RESULT FROM THIS PROJECT.
11. NO WORK SHALL BEGIN WITHOUT ACQUISITION OF ALL LOCAL, STATE, AND FEDERAL PERMITS AND APPROVALS.
12. THE CONTRACTOR SHALL CONTACT THE DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ) FOR A PRE-CONSTRUCTION MEETING PRIOR TO ANY LAND DISTURBING ACTIVITIES.
13. SHOULD A DISCREPANCY BE FOUND IN THE PLAN SET, THE CONTRACTOR SHALL CONSULT WITH DESIGN ENGINEER PRIOR TO COMPLETION OF SPECIFIC WORK.
14. ALL GRADING ACTIVITIES SHALL INCLUDE REMOVAL AND TEMPORARY STOCKPILING OF TOP SOIL, EXECUTION OF GRADING , AND REPLACEMENT OF TOPSOIL TO ACHIEVE FINAL GRADES.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS AS A RESULT OF ITS WORK PERFORMED DURING THE CONTRACT PERIOD. THIS RESPONSIBILITY SHALL INCLUDE RE-SEEDING DISTURBED AREAS AND TEMPORARY ACCESS ROADS.
16. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND STAGING MATERIAL INSIDE THE LIMITS OF DISTURBANCE UNLESS PRIOR APPROVAL BY THE PROJECT ENGINEER IS PROVIDED.
17. CLEARING & GRUBBING SHALL BE CONFINED TO THOSE AREAS NEEDED FOR CONSTRUCTION ACCESS AND GRADING.
18. UNDER NO CIRCUMSTANCES ARE TREES OVER 6" DBH TO BE REMOVED WITHOUT PRIOR APPROVAL FROM THE PROJECT ENGINEER UNLESS OTHERWISE SPECIFIED WITHIN THIS PLAN SET.
19. THE CONTRACTOR IS RESPONSIBLE FOR ALL TAKE-OFF QUANTITIES INCLUDING BUT NOT LIMITED TO FILL, STONE, AND VEGETATIVE MATERIALS.
20. PLAN VIEW LOCATION OF STRUCTURES IS APPROXIMATE. STRUCTURE PLACEMENT SHOULD FOLLOW THE PROFILE VIEW AND STRUCTURE DETAILS.
21. IF SITE OR CONSTRUCTION CONSTRAINTS PREVENT POOL OR STRUCTURE ELEVATIONS FROM BEING CONSISTENT WITH THE PLAN SET, THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER TO FIELD MODIFY THE ELEVATIONS.
22. ALL SECTION VIEWS ARE ORIENTED LOOKING DOWNSTREAM UNLESS OTHERWISE SPECIFIED.

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/18

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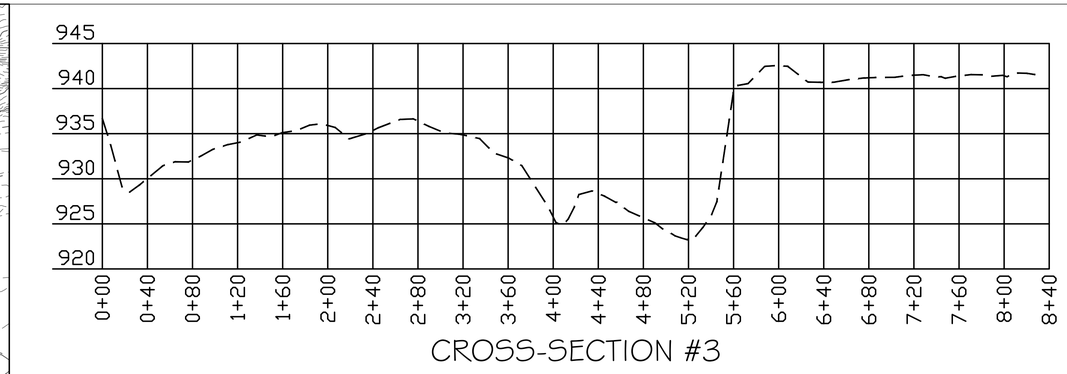
COMMONWEALTH OF VIRGINIA
WILLIAM KIPLING MUMAW
Lic. No. 049293
PROFESSIONAL ENGINEER

REVISION:

ECOSYSTEM SERVICES



FEMA ZONE AE FLOODWAY BOUNDARY
*NOTE: PROJECT LIMITS ARE LOCATED WITHIN FEMA ZONE AE FLOODWAY

CROSS SECTION #3

PARCEL ID: 130-A-L118
KENNETH E. & JUNE S. MONGER

EXISTING BRIDGE PIER (TYP.)

ROUTE 33 BUS. BRIDGE

FLOW

EXISTING TOP OF BANK

SUBMERGED LOG

EXISTING TREE (TYP.)

LANDFILL BORING (SEE GEOTECHNICAL REPORT)

SURVEY BENCHMARKS (TYP.)

EXISTING WIRE FENCE

EXISTING GRAVEL PARKING LOT

EXISTING BOAT RAMP

CROSS SECTION #3

PARCEL ID: 130-A-L120
TOWN OF ELKTON

PARCEL ID: 130-A-L120
TOWN OF ELKTON

40 20 0 40 80
1"= 40 Feet

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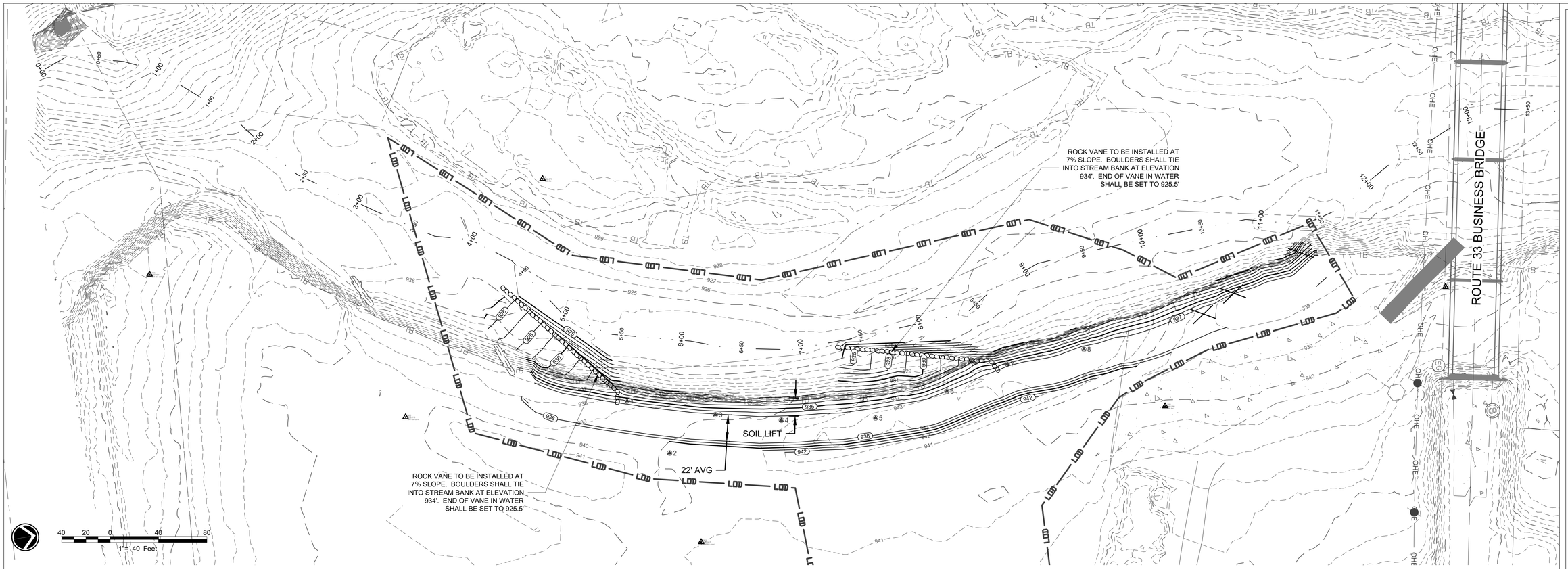
SOUTH FORK SHENANDOAH RIVER

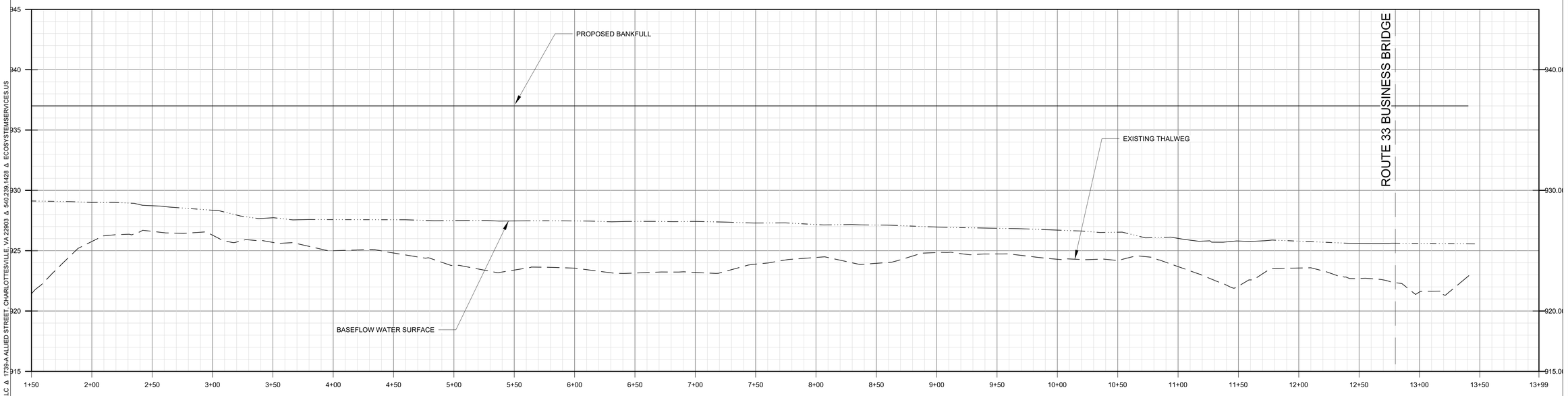
BANK STABILIZATION

EXISTING CONDITIONS

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/2018
SHEET:	2





PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE SCALE: 1" = 4'

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SOUTH FORK SHENANDOAH RIVER

BANK STABILIZATION

GRADING PLAN

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/2018
SHEET:	3

SEQUENCE OF CONSTRUCTION

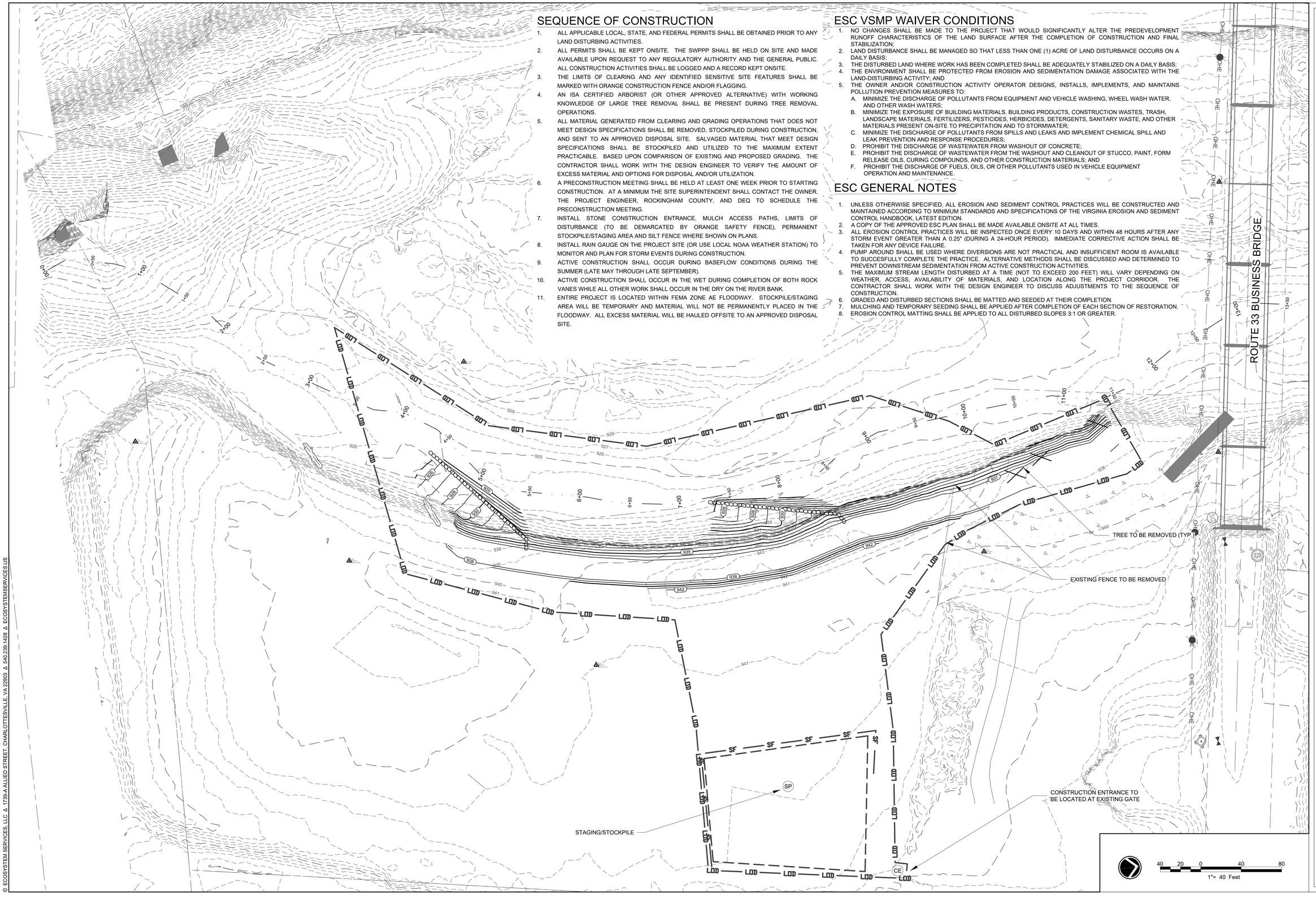
1. ALL APPLICABLE LOCAL, STATE, AND FEDERAL PERMITS SHALL BE OBTAINED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
2. ALL PERMITS SHALL BE KEPT ONSITE. THE SWPPP SHALL BE HELD ON SITE AND MADE AVAILABLE UPON REQUEST TO ANY REGULATORY AUTHORITY AND THE GENERAL PUBLIC. ALL CONSTRUCTION ACTIVITIES SHALL BE LOGGED AND A RECORD KEPT ONSITE.
3. THE LIMITS OF CLEARING AND ANY IDENTIFIED SENSITIVE SITE FEATURES SHALL BE MARKED WITH ORANGE CONSTRUCTION FENCE AND/OR FLAGGING.
4. AN ISA CERTIFIED ARBORIST (OR OTHER APPROVED ALTERNATIVE) WITH WORKING KNOWLEDGE OF LARGE TREE REMOVAL SHALL BE PRESENT DURING TREE REMOVAL OPERATIONS.
5. ALL MATERIAL GENERATED FROM CLEARING AND GRADING OPERATIONS THAT DOES NOT MEET DESIGN SPECIFICATIONS SHALL BE REMOVED, STOCKPILED DURING CONSTRUCTION, AND SENT TO AN APPROVED DISPOSAL SITE. SALVAGED MATERIAL THAT MEET DESIGN SPECIFICATIONS SHALL BE STOCKPILED AND UTILIZED TO THE MAXIMUM EXTENT PRACTICABLE. BASED UPON COMPARISON OF EXISTING AND PROPOSED GRADING. THE CONTRACTOR SHALL WORK WITH THE DESIGN ENGINEER TO VERIFY THE AMOUNT OF EXCESS MATERIAL AND OPTIONS FOR DISPOSAL AND/OR UTILIZATION.
6. A PRECONSTRUCTION MEETING SHALL BE HELD AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION. AT A MINIMUM THE SITE SUPERINTENDENT SHALL CONTACT THE OWNER, THE PROJECT ENGINEER, ROCKINGHAM COUNTY, AND DEQ TO SCHEDULE THE PRECONSTRUCTION MEETING.
7. INSTALL STONE CONSTRUCTION ENTRANCE, MULCH ACCESS PATHS, LIMITS OF DISTURBANCE (TO BE DEMARCATED BY ORANGE SAFETY FENCE), PERMANENT STOCKPILE/STAGING AREA AND SILT FENCE WHERE SHOWN ON PLANS.
8. INSTALL RAIN GAUGE ON THE PROJECT SITE (OR USE LOCAL NOAA WEATHER STATION) TO MONITOR AND PLAN FOR STORM EVENTS DURING CONSTRUCTION.
9. ACTIVE CONSTRUCTION SHALL OCCUR DURING BASEFLOW CONDITIONS DURING THE SUMMER (LATE MAY THROUGH LATE SEPTEMBER).
10. ACTIVE CONSTRUCTION SHALL OCCUR IN THE WET DURING COMPLETION OF BOTH ROCK VANES WHILE ALL OTHER WORK SHALL OCCUR IN THE DRY ON THE RIVER BANK.
11. ENTIRE PROJECT IS LOCATED WITHIN FEMA ZONE AE FLOODWAY. STOCKPILE/STAGING AREA WILL BE TEMPORARY AND MATERIAL WILL NOT BE PERMANENTLY PLACED IN THE FLOODWAY. ALL EXCESS MATERIAL WILL BE HAULED OFFSITE TO AN APPROVED DISPOSAL SITE.

ESC VSMP WAIVER CONDITIONS

1. NO CHANGES SHALL BE MADE TO THE PROJECT THAT WOULD SIGNIFICANTLY ALTER THE PREDEVELOPMENT RUNOFF CHARACTERISTICS OF THE LAND SURFACE AFTER THE COMPLETION OF CONSTRUCTION AND FINAL STABILIZATION;
2. LAND DISTURBANCE SHALL BE MANAGED SO THAT LESS THAN ONE (1) ACRE OF LAND DISTURBANCE OCCURS ON A DAILY BASIS;
3. THE DISTURBED LAND WHERE WORK HAS BEEN COMPLETED SHALL BE ADEQUATELY STABILIZED ON A DAILY BASIS;
4. THE ENVIRONMENT SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION DAMAGE ASSOCIATED WITH THE LAND-DISTURBING ACTIVITY; AND
5. THE OWNER AND/OR CONSTRUCTION ACTIVITY OPERATOR DESIGNS, INSTALLS, IMPLEMENTS, AND MAINTAINS POLLUTION PREVENTION MEASURES TO:
   - A. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER, AND OTHER WASH WATERS;
   - B. MINIMIZE THE EXPOSURE OF BUILDING MATERIALS, BUILDING PRODUCTS, CONSTRUCTION WASTES, TRASH, LANDSCAPE MATERIALS, FERTILIZERS, PESTICIDES, HERBICIDES, DETERGENTS, SANITARY WASTE, AND OTHER MATERIALS PRESENT ON-SITE TO PRECIPITATION AND TO STORMWATER;
   - C. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM SPILLS AND LEAKS AND IMPLEMENT CHEMICAL SPILL AND LEAK PREVENTION AND RESPONSE PROCEDURES;
   - D. PROHIBIT THE DISCHARGE OF WASTEWATER FROM WASHOUT OF CONCRETE;
   - E. PROHIBIT THE DISCHARGE OF WASTEWATER FROM THE WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS, AND OTHER CONSTRUCTION MATERIALS; AND
   - F. PROHIBIT THE DISCHARGE OF FUELS, OILS, OR OTHER POLLUTANTS USED IN VEHICLE EQUIPMENT OPERATION AND MAINTENANCE.

ESC GENERAL NOTES

1. UNLESS OTHERWISE SPECIFIED, ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
2. A COPY OF THE APPROVED ESC PLAN SHALL BE MADE AVAILABLE ONSITE AT ALL TIMES.
3. ALL EROSION CONTROL PRACTICES WILL BE INSPECTED ONCE EVERY 10 DAYS AND WITHIN 48 HOURS AFTER ANY STORM EVENT GREATER THAN A 0.25" (DURING A 24-HOUR PERIOD). IMMEDIATE CORRECTIVE ACTION SHALL BE TAKEN FOR ANY DEVICE FAILURE.
4. PUMP AROUND SHALL BE USED WHERE DIVERSIONS ARE NOT PRACTICAL AND INSUFFICIENT ROOM IS AVAILABLE TO SUCCESFULLY COMPLETE THE PRACTICE. ALTERNATIVE METHODS SHALL BE DISCUSSED AND DETERMINED TO PREVENT DOWNSTREAM SEDIMENTATION FROM ACTIVE CONSTRUCTION ACTIVITIES.
5. THE MAXIMUM STREAM LENGTH DISTURBED AT A TIME (NOT TO EXCEED 200 FEET) WILL VARY DEPENDING ON WEATHER, ACCESS, AVAILABILITY OF MATERIALS, AND LOCATION ALONG THE PROJECT CORRIDOR. THE CONTRACTOR SHALL WORK WITH THE DESIGN ENGINEER TO DISCUSS ADJUSTMENTS TO THE SEQUENCE OF CONSTRUCTION.
6. GRADED AND DISTURBED SECTIONS SHALL BE MATTED AND SEEDED AT THEIR COMPLETION.
7. MULCHING AND TEMPORARY SEEDING SHALL BE APPLIED AFTER COMPLETION OF EACH SECTION OF RESTORATION.
8. EROSION CONTROL MATTING SHALL BE APPLIED TO ALL DISTURBED SLOPES 3:1 OR GREATER.



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PROFESSIONAL ENGINEER

SOUTH FORK SHENANDOAH RIVER

BANK STABILIZATION

EROSION & SEDIMENT CONTROL PLAN

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/2018
SHEET:	4

EROSION & SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION

THE PROJECT CONSISTS OF STABILIZING THE RIGHT BANK OF THE SOUTH FORK - SHENANDOAH RIVER IN CONJUNCTION WITH SELECT GRADING AND EXCAVATION. THE PROPOSED WORK WILL HELP REDUCE NUTRIENTS AND SEDIMENTS FROM BEING TRANSPORTED DOWNSTREAM, INCREASE NATIVE RIPARIAN VEGETATIVE DIVERSITY AND HABITAT, AND IMPROVE PHYSICAL AQUATIC HABITAT. THE TOTAL PROJECT AREA DISTURBANCE IS 4.40 ACRES.

SITE DESCRIPTION

THE PROJECT LIMITS CONSIST OF THE SOUTH FORK SHENANDOAH RIVER, FOREST, FALLOW FIELDS, AND THE BOAT RAMP PARKING LOT.

ADJACENT PROPERTY

THE LAND USES IN THE VICINITY INCLUDE AGRICULTURAL, RESIDENTIAL, AND COMMERICAL DEVELOPMENT. PROJECT IS ADJACENT TO THE ROCKINGHAM COUNTY REFUSE TRANSFER STATION AND RECYCLING COLLECTION CENTER AND A DGIF BOAT LAUNCH. THE PROPOSED CONSTRUCTION ACTIVITY IS CONTAINED WITHIN PARCELS OWNED BY THE PROPERTY OWNER NOTED IN THE PLANS.

OFFSITE AREAS

NO OFFSITE AREAS ARE ASSOCIATED WITH THIS PROJECT. IF ADDITIONAL MATERIAL IS REQUIRED TO BE TAKEN OFFSITE, A PROPER DISPOSAL LOCATION WITH AN APPROVED SWPPP AND ESC PLAN WILL BE PROVIDED.

SOILS

THE SOILS IN THE VICINITY OF THE PROPOSED PROJECT INCLUDE THE FOLLOWING:

1) FREDERICK AND LODI SILT LOAMS (33C2), ROCKY, 7-15% SLOPES
2) FREDERICK AND LODI SILT LOAMS (33D2), ROCKY, 15-25% SLOPES, ERODED
3) MILLROCK LOAMY SAND (46A), 0-4% SLOPES, FREQUENTLY FLOODED
4) TIOGA FINE SANDY LOAM (69A), 0-3% SLOPES, RARELY FLOODED
5) TYPIC UDORTHENTS (70A), NEARLY LEVEL

*ALL SOIL TYPES ARE LISTED WITHIN THE HYDROLOGIC SOIL GROUP "A".

CRITICAL EROSION AREAS:

THE EXISTING STREAM BANK TO BE STABILIZED IS CONSIDERED THE CRITICAL EROSION AREA AS IT IS EXPOSED TO EROSIVE FLOWS..

EROSION AND SEDIMENT CONTROL MEASURES:

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. NO EROSION AND SEDIMENT CONTROL STRUCTURE SHALL BE REMOVED WITHOUT THE APPROVAL OF THE ESC INSPECTOR.

ALL MEASURES TO BE UTILIZED FOR THIS PROJECT ARE LISTED BELOW:

TEMPORARY STONE CONSTRUCTION ENTRANCE- STD. & SPEC. 3.02

A TEMPORARY STONE CONSTRUCTION ENTRANCE WILL BE PROVIDED AS SHOWN ON THESE PLANS.

SILT FENCE- STD. & SPEC. 3.05

SILT FENCE WILL BE INSTALLED AT LOCATIONS SHOWN ON THESE PLANS IN ORDER TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT FROM THE DISTURBED AREAS DURING CONSTRUCTION OPERATIONS IN ORDER TO PREVENT SEDIMENT FROM LEAVING THE SITE.

TEMPORARY SEEDING & MULCHING -STD. 3.31 & SPEC & 3.35

TEMPORARY SEEDING AND MULCHING WILL BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 14 DAYS. FOR TEMPORARY SEEDING USE 50% OF THE RECOMMENDED RATES OF FERTILIZER, LIME AND FULL AMOUNT OF SEED AND MULCH REQUIRED FOR REGULAR SEEDING. MULCHING SHALL CONSIST OF HARDWOOD MULCH.

PERMANENT SEEDING-STD. & SPEC 3.32

PERMANENT SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRAD BUT WILL REMAIN UNDISTURBED FOR LONGER THAN FOURTEEN (14) DAYS.

TEMPORARY SEEDING MIXTURE:

THE FOLLOWING TEMPORARY SEEDS SPECIES SHALL BE USED FOR TEMPORARY SOIL STABILIZATION. WHERE SEASONS TRANSITION IT IS RECOMMENDED TO COMBINE BOTH HEAT AND COLD TOLERANT SPECIES. ANNUAL RYE GRASS SHALL NOT BE USED.

Common Name	Botanical Name	Application Rate (lbs/ac)	Planting Period
Rye Grain	*Secale cerale*	25	Nov. 1st - April 30th
Wheat	*Triticum aestivum*	30	Nov. 1st - April 30th
German Millet	*Setaria italic*	10	May 1st - Sept. 30th
Browntop Millet	*Urochloa ramosa*	10	May 1st - Sept. 30th

STABILIZATION NOTES

1. GENERAL SEEDING SHALL OCCUR WITHIN SEVEN DAYS OF REACHING FINAL GRADE.
2. PLANTING AT OTHER TIMES THAN SPECIFIED MAY BE DONE ONLY UNDER SPECIFIC CONDITIONS AND WITH THE CONSENT OF THE ENGINEER.
3. ALL OPERATIONS SHALL BE PERFORMED ONLY WHEN THE SOIL IS IN PROPER CONDITION TO PERMIT SATISFACTORY WORK.
4. SURFACE SHALL BE CLEARED OF ALL GRADE STAKES, SURFACE TRASH OR OTHER OBJECTS, WHICH WOULD HINDER INSTALLATION OF SEED.
5. SEED SHALL BE APPLIED WITH AN APPROPRIATE METHOD EITHER BY HYDROSEEDING/HYDROMULCHING OR BROADCAST SPREAD.
6. HYDROSEED OR HYDRO MULCH SHALL BE DYED GREEN TO AID IN VISUAL METERING DURING APPLICATION AND SHALL BE APPLIED AT A RATE OF 1200 POUNDS PER ACRE.
7. UNLESS HYDROSEEDING/HYDROMULCHING METHODS ARE USED, SEED SHALL BE RAKED AND LIGHTLY ROLLED. SEED SHALL BE COVERED WITH STRAW MULCH AT A RATE OF 1.5 TONS PER ACRE AND SHALL BE OF STANDARD QUALITY AND FREE OF WEEDS.

STORMWATER RUNOFF CONSIDERATIONS

STORMWATER RUNOFF WILL NOT BE INCREASED AS A RESULT OF THIS PROJECT. RUNOFF IS EXPECTED TO BE REDUCED.

MAINTENANCE SCHEDULE

IN GENERAL, THE CONTRACTOR SHALL CHECK ALL EROSION AND SEDIMENT CONTROL MEASURES EVERY TEN DAYS AND WITHIN 48-HOURS OF THE END OF A STORM EVENT THAT IS 0.25 INCHES OR GREATER. IF SITE INSPECTIONS IDENTIFY BMPS THAT ARE NOT OPERATING EFFECTIVELY, MAINTENANCE SHALL BE PERFORMED BEFORE THE NEXT ANTICIPATED STORM EVENT, OR AS NECESSARY TO MAINTAIN THE CONTINUED EFFECTIVENESS OF STORMWATER CONTROLS. IF MAINTENANCE PRIOR TO THE NEXT ANTICIPATED STORM EVENT IS IMPRACTICABLE, MAINTENANCE MUST BE SCHEDULED AND ACCOMPLISHED AS SOON AS PRACTICABLE. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:

1. TEMPORARY STONE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHT-OF-WAYS. PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE WASHING AND REWORKING OF EXISTING STONE SHALL BE EXECUTED AS CONDITIONS DEMAND. ALL MATERIALS SPILLED, DROPPED, WASHED OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.

2. SILT FENCE SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT AND WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, REPAIRED, AND SEEDED.

3. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM.

4. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATERS. WHERE DISCHARGE LOCATIONS ARE INACCESSIBLE, NEARBY DOWNSTREAM LOCATIONS SHALL BE INSPECTED TO THE EXTENT THAT SUCH INSPECTIONS ARE PRACTICABLE.

5. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED DAILY FOR EVIDENCE OF OFFSITE SEDIMENT TRACKING.

6. TREE PROTECTION SHALL BE CHECKED REGULARLY FOR DAMAGE AND REPAIRED AS NECESSARY. SITE INSPECTION FOR ADDITIONAL AREAS THAT WARRANT TREE PROTECTION SHOULD BE CONDUCTED DAILY.

EROSION AND SEDIMENT CONTROL NOTES

1. THE OWNER/DEVELOPER MUST NOTIFY AT LEAST 24 HOUR PRIOR TO THE START OF CONSTRUCTIONS IN ACCORDANCE WITH APPLICABLE COUNTY ORDINANCES AND POLICIES.
2. THE OWNER/DEVELOPER GRANTS THE RIGHT-OF-ENTRY ON THIS PROPERTY TO THE DESIGNATED DEPARTMENT OF ENVIRONMENTAL QUALITY PERSONNEL FOR THE PURPOSE OF INSPECTING AND MONITORING FOR COMPLIANCE WITH TITLE 10.01, CHAPTER 5, ARTICLE 4 OF THE CODE OF VIRGINIA, EROSION AND SEDIMENT CONTROL LAW AND THE DESIGN AND CONSTRUCTION STANDARDS MANUAL SECTION 750.04 (C).
3. ALL EROSION CONTROL MEASURES SHOWN ON THE APPROVED PLAN MUST BE IN PLACE AND INSPECTED AND APPROVED BY THE DESIGNATED AUTHORITY PRIOR TO CLEARING, STRIPPING OF TOPSOIL OR GRADING.
4. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND PERMIT SHALL BE KEPT ON THE SITE AT ALL TIMES.
5. THE DEVELOPER/DEVELOPER'S REPRESENTATIVE IS RESPONSIBLE FOR THE INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE DESIGNATED AUTHORITY.
6. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL COMPLETE AND ADEQUATE STABILIZATIONS IS ACHIEVED.
7. WATER MUST BE PUMPED INTO AN APPROVED FILTERING DEVICE DURING DEWATERING OPERATIONS.
8. ALL EROSION AND SEDIMENT CONTROL PRACTICES MUST BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND THE VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS. THE DEVELOPER/DEVELOPER'S REPRESENTATIVE SHALL INSPECT ALL EROSION AND SEDIMENT CONTROL MEASURES AT A MINIMUM EVERY 10 DAYS AND AFTER EACH SIGNIFICANT RAINFALL. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR: 1) SILT FENCE BARRIERS WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. 2) SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER 3) SEEDED AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEEDED AS NEEDED 4) STREAM DIVERSIONS SHALL BE INSPECTED DAILY AND AFTER EACH RAIN TO ENSURE THEY'RE FUNCTIONING PROPERLY AND THAT THE INTEGRITY OF THE LINING ARE NOT IMPAIRED. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES MUST BE MADE IMMEDIATELY AFTER THE INSPECTION.
9. PERMANENT SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN UNDISTURBED FOR LONGER THAN FOURTEEN (14) DAYS. SEEDING AND SELECTION OF THE SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK 3.32. ROADS AND PARKING AREAS SHALL BE STABILIZED WITHIN SEVEN (7) DAYS AFTER FINAL GRADE IS REACHED.
10. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES WILL BE REMOVED WITHIN 30 DAYS AFTER ADEQUATE SITE STABILIZATION AND AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, AS AUTHORIZED BY THE DESIGNATED VESCP INSPECTORS. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES WILL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
11. WHEN THE SEDIMENT IS TRANSPORTED ONTO A PAVED ROAD SURFACE, THE ROAD WILL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT WILL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING WILL BE ALLOWED ONLY AFTER SEDIMENT IS DISPOSED IN THIS MANNER.
12. AREAS WHICH ARE NOT TO BE DISTURBED WILL BE CLEARLY MARKED BY FLAGS, SIGNS, ETC.
13. TREE SAVE AREAS SHALL BE CLEARLY MARKED IN THE FIELD BY ORANGE SAFETY FENCE.
14. ORANGE SAFETY FENCE MUST BE INSTALLED AROUND ALL SILT TRAPS AND SEDIMENT BASINS.

ESC MINIMUM STANDARDS

A VIRGINIA EROSION AND SEDIMENT CONTROL PLAN (VESCP) MUST BE CONSISTENT WITH THE FOLLOWING CRITERIA, TECHNIQUES AND METHODS:

1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

2. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCK PILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

3. A 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.

4. SEDIMENT BASINS AND 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.

5. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

6. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN.

A. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT TRAP SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE TRAP SHALL ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES.

B. SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A 25-YEAR STORM OF 24-HOUR DURATION. RUNOFF COEFFICIENTS USED IN RUNOFF CALCULATIONS SHALL CORRESPOND TO A BARE EARTH CONDITION OR THOSE CONDITIONS EXPECTED TO EXIST WHILE THE SEDIMENT BASIN IS UTILIZED.

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

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

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

10. ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.

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

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

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

14. ALL APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.

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

16. 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 THIS CHAPTER.

F. APPLICABLE SAFETY REQUIREMENTS SHALL BE COMPLIED WITH.

17. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. 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. THIS PROVISION SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.

18. 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 VESCP 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.

19. 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.

(B) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A TWO-YEAR STORM TO DEMONSTRATE THAT STORMWATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND

(C) PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE PIPE OR SYSTEM.

C. IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL:

(1) IMPROVE THE CHANNELS TO A CONDITION WHERE A TEN-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 TEN-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 TEN-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/SHE 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.

L. 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) REGULATIONS.

N. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 9VAC25-870-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) REGULATIONS SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF SUBDIVISION 19 OF THIS SUBSECTION.

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SOUTH FORK SHENANDOAH RIVER

BANK STABILIZATION

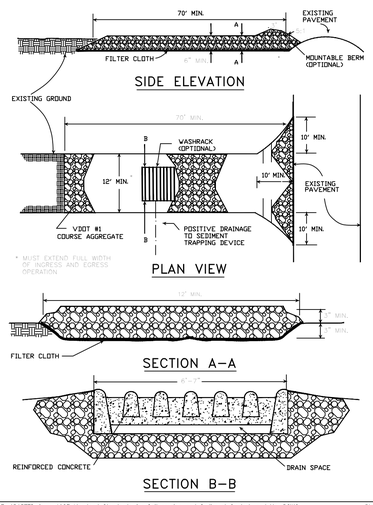
ESC DETAILS

REVISION:

PROJECT MANAGER: WKM
DESIGNED: WKM/CKA
DRAWN: CKA
PROJECT #: 16-0055
DATE: 8/8/2018
SHEET:

5

STONE CONSTRUCTION ENTRANCE

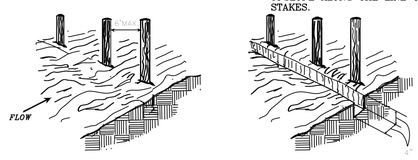


SOURCE: ADAPTED from 1983 Maryland Standards for Soil erosion and Sediment Control, and Va. DSWC — Plate 3.02-1

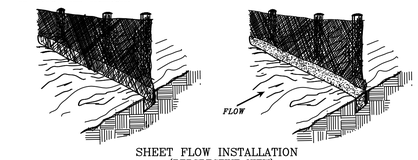
STONE CONSTRUCTION ENTRANCE
STD. & SPEC. 3.02 (CE)

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

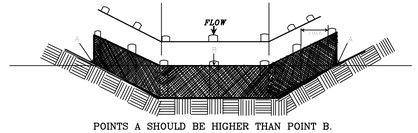
1. SET THE STAKES.
2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.



3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)

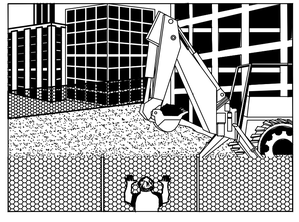


POINTS A SHOULD BE HIGHER THAN POINT B.
DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

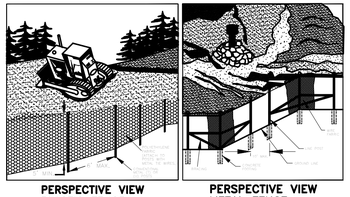
SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control,VA. DSWC Sherwood and Wyant — PLATE. 3.05-2

SILT FENCE -
STD. & SPEC. 3.05

SAFETY FENCE



PERSPECTIVE VIEW



PERSPECTIVE VIEW
PLASTIC FENCE

PERSPECTIVE VIEW
METAL FENCE

SOURCE: CONWED PLASTICS
VDOT ROAD AND BRIDGE STANDARDS — PLATE. 3.01

ORANGE SAFETY FENCE - STD. & SPEC. 3.01

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BANK STABILIZATION

ESC DETAILS

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
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DATE:	8/8/2018
SHEET:	6

STREAMBANK PLANTING ZONE
(GEOLIFT W/ BRANCH PLANTINGS
LIVE STAKES, AND PLUGS, NO
BOULDER FOUNDATION)

STREAMBANK PLANTING ZONE
(GEOLIFT W/ BRANCH PLANTINGS
,LIVE STAKES, AND PLUGS)

RIPARIAN BUFFER ZONE PLANTING (BALL
AND BURLAP VEGETATION, TEMPORARY
AND PERMANENT SEEDING)

FLOODPLAIN BENCH ZONE PLANTING
(COIR FIBER MATTING, BARE ROOTS,
TEMPORARY AND PERMANENT SEEDING)

40 20 0 40 80
1"= 40 Feet

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BANK STABILIZATION

PLANTING

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/2018
SHEET:	7

LANDSCAPE SPECIFICATIONS

1. PLANT MATERIAL NAMES ARE IN COMPLIANCE WITH HORTUS THIRD. SIZES AND GRADING ARE TO COMPLY WITH THE LATEST EDITION OF AMERICAN STANDARDS FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.

2. ALL WORK SHALL BE COORDINATED WITH TRADES.

3. USE EXISTING TOPSOIL AND/OR PROVIDE NEW TOPSOIL, WHICH IS FERTILE, PRIABLE, NATURAL LOAM, SURFACE SOIL, REASONABLY FREE OF SUBSOIL, FOREIGN MATTER, ROOTS, STUMPS AND STONES LARGER THAN 2" IN DIMENSION.

4. CONTRACTOR SHALL ASCERTAIN LOCATION OF ALL UTILITIES PRIOR TO EXCAVATION.

5. CONTRACTOR SHALL MAINTAIN PLANT MATERIAL DURING INSTALLATION. MAINTENANCE SHALL BECOME RESPONSIBILITY OF OWNER UPON ACCEPTANCE OF WORK.

6. WHEN THE LANDSCAPE WORK IS COMPLETED, THE OWNERS REPRESENTATIVE WILL, UPON WRITTEN REQUEST, MAKE AN INSPECTION TO DETERMINE ACCEPTABILITY. IF WORK IS NOT ACCEPTABLE, REPLACE REJECTED WORK AND CONTINUE MAINTENANCE UNTIL REINSPECTION AND APPROVAL.

7. GUARANTEE ALL MATERIALS AND LABOR FOR 12 CALENDAR MONTHS AFTER ACCEPTANCE.

A. MAKE REPLACEMENTS OF ALL DEAD PLANTS IN IMPAIRED CONDITIONS IN EARLY FALL FOLLOWING PLANTING.
B. AND ADDITIONALLY IN THE EARLY SPRING FOR THE SAME OR OTHER MATERIALS WHICH ARE DEAD OR IMPAIRED FROM THE WINTER CONDITIONS.

8. WITHIN 10 DAYS AFTER ACCEPTANCE, THE CONTRACTOR SHALL DELIVER AN OUTLINE OF MAINTENANCE PROCEDURES RECOMMENDED FOR THIS PLANTING TO THE OWNER.

9. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY DURING THE GUARANTEE PERIOD TO PROVIDE WRITTEN NOTICE TO THE OWNER OF ANY MAINTENANCE PRACTICE WHICH IN THEIR OPINION WILL AFFECT THE GUARANTEE IF NOT REMEDIED PROMPTLY.

10. DO NOT MAKE SUBSTITUTIONS. BID MATERIALS SHOWN ON PLANS. CONTRACTOR IS ENCOURAGED TO PROVIDE WRITTEN ALTERNATE LIST OF MATERIALS, SIZES AND NUMBERS. SUBSTITUTION FOR COST EFFECTIVE MAINTENANCE OF DESIGN INTEGRITY.

11. THE PROJECT ENGINEER RESERVES THE RIGHT TO ACCEPT OR REJECT ANY MATERIAL THAT HE/SHE DEEMS UNACCEPTABLE. REJECTED MATERIAL SHALL BE REMOVED PROMPTLY FROM THE SITE.

12. ALL PLANT MATERIAL SHALL BE NURSERY GROWN UNLESS OTHERWISE SPECIFIED. PRUNING SHALL BE DONE BEFORE PLANTING OR DURING THE PLANTING OPERATION.

13. ALL PLANT MATERIAL SHALL BE COVERED AND PROTECTED FROM EXCESSIVE DRYING DURING TRANSIT.

14. ANTI-DESICCANTS SHALL BE APPLIED ON ALL MATERIAL DUG WHILE IN FOLIAGE.

15. MULCH MATERIAL SHALL BE EITHER SHREDDED HARDWOOD MULCH OR APPROVED EQUAL. MATERIAL SHALL BE MULCHING GRADE, UNIFORM IN SIZE, AND FREE OF FOREIGN MATTER.

16. TOPSOIL MIXTURE SHALL BE 2 PARTS EXISTING SOIL MIXED EVENLY WITH 1 PART SPHAGNUM PEAT MOSS OR PEAT HUMUS. EXISTING SOIL SHALL BE FREE OF STONES, LUMPS, PLANTS, ROOTS, AND OTHER DEBRIS OVER 1 1/2 INCHES. IT SHALL NOT CONTAIN TOXIC SUBSTANCES HARMFUL TO PLANT GROWTH. TOPSOIL SHALL HAVE A pH RANGE OF 5.0 TO 7.0.

17. PLANTING PROCEDURES FOR TREES AND SHRUBS

A. PLANTING SHALL OCCUR IN ACCORDANCE WITH ALL DETAILS.
B. TREES AND SHRUBS SHALL BE PLACED IN THE PLANTING PIT BY LIFTING FROM THE BALL (NEVER FROM THE BRANCHES OF TRUNK). ALL PLANT MATERIAL SHALL BE PLACED IN A STRAIGHT POSITION WITHIN THE PLANTING PIT WITH THE MOST DESIRABLE SIDE PLACED TOWARDS THE PROMINENT VIEW (SIDEWALK, STREET, ETC.)
C. THE TREE PIT SHALL BE BACK FILLED WITH A SOIL MIXTURE AS PER SPECIFICATIONS. THE PIT SHALL BE FILLED HALFWAY INITIALLY AND TAMPED FIRMLY. ALL ROPES, WIRES, ETC. ON THE ROOTBALL SHALL BE CUT AND THE BURLAP OR BALL WRAP PULLED BACK TO THE EDGE OF THE ROOTBALL. COMPLETE BACKFILLING PLANT PIT AND TAMP FIRMLY. BACKFILL SOIL SHALL NOT COVER TOP OF ROOTBALL. MULCH ROOTBALL AND SAUCER WITH MINIMUM 3 INCHES SHREDDED OR CHIPPED HARDWOOD OR PINE MULCH. WATER THOROUGHLY OR UNTIL PLANT PIT IS FILLED.

FLOODPLAIN BENCH ZONE (+/- 0.42 AC)					
Common Name	**Botanical Name**	**Stock Type**	**Spacing**	**% of Total**	**Quantity**
TREES					
River Birch	*Betula nigra*	Bare Root	8' O.C.	15%	43
Red Mulberry	*Morus rubra*	Bare Root	8' O.C.	5%	14
Tulip poplar	*Liriodendron tulipifera*	Bare Root	8' O.C.	10%	29
Sycamore	*Platanus occidentalis*	Bare Root	8' O.C.	25%	71
American elm	*Ulmus americana*	Bare Root	8' O.C.	5%	14
SHRUBS					
Silky dogwood	*Cornus amomum*	Bare Root	8' O.C.	10%	29
Ironwood	*Carpinus caroliniana*	Bare Root	8' O.C.	5%	14
Redbud	*Cercis canadensis*	Bare Root	8' O.C.	9%	26
Hazelnut	*Corylus americana*	Bare Root	8' O.C.	6%	17
Blackhaw virbunum	*Viburnum pruniofolium*	Bare Root	8' O.C.	10%	29
				Total (Trees)	171
				Total (Shrubs)	114

RIPARIAN BUFFER ZONE (+/- 0.37 AC)					
Common Name	**Botanical Name**	**Stock Type**	**Spacing**	**% of Total**	**Quantity**
TREES					
River Birch	*Betula nigra*	5' min. height / B&B	10' O.C.	15%	24
Red Mulberry	*Morus rubra*	5' min. height / B&B	10' O.C.	5%	8
Tulip poplar	*Liriodendron tulipifera*	5' min. height / B&B	10' O.C.	10%	16
Sycamore	*Platanus occidentalis*	5' min. height / B&B	10' O.C.	25%	40
American elm	*Ulmus americana*	5' min. height / B&B	10' O.C.	5%	8
SHRUBS					
Silky dogwood	*Cornus amomum*	5' min. height / B&B	10' O.C.	10%	16
Ironwood	*Carpinus caroliniana*	5' min. height / B&B	10' O.C.	5%	8
Redbud	*Cercis canadensis*	5' min. height / B&B	10' O.C.	9%	15
Hazelnut	*Corylus americana*	5' min. height / B&B	10' O.C.	6%	10
Blackhaw virbunum	*Viburnum pruniofolium*	5' min. height / B&B	10' O.C.	10%	16
				Total (Trees)	97
				Total (Shrubs)	65

STREAM BANK ZONE (+/- 0.25 AC)					
Common Name	**Botanical Name**	**Stock Type**	**Spacing**	**% of Total**	**Quantity**
Switchgrass	*Panicum virgatum*	Plug	2' O.C.	40%	1098
Deertongue	*Panicum clandestinum*	Plug	2' O.C.	20%	549
Indiangrass	*Sorghastrum nutans*	Plug	2' O.C.	20%	549
Big bluestem	*Andropogon gerardii*	Plug	2' O.C.	10%	275
Little bluestem	*Schizachyrium scoparium*	Plug	2' O.C.	10%	275
				Total	2745

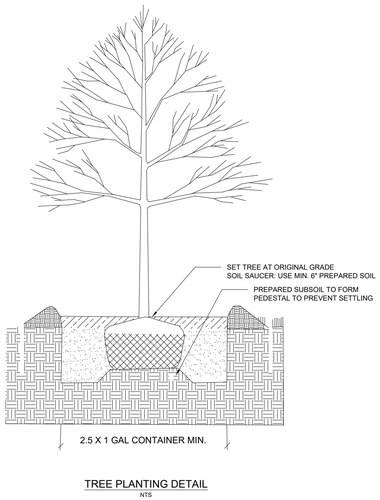
PERMANENT SEEDING MIXTURE:

THE FOLLOWING PERMANENT SEEDING SHOULD BE PLANTED ON ALL DISTURBED AREAS IMMEDIATELY AFTER FINAL GRADING AT A RATE OF 25 LBS/ACRE:

Common Name	Botanical Name	% of Seed Mix
Virginia Wild Rye	*Elymus virginicus*	15
Switchgrass	*Panicum virgatum*	15
Creeping Bentgrass	*Agrostis stolonifera*	15
Black-eyed Susan	*Rudbeckia hirta*	15
Coreopsis	*Coreopsis lanceolata*	10
Deer Tongue	*Panicum clandestinum*	10
Big Bluestem	*Andropogon gerardii*	5
Little Bluestem	*Schizachyrium scoparium*	5
Indian Grass	*Sorghastrum nutans*	5
Indian Wood Oats	*Chasmanthium latifolium*	5

LIVE STAKE PLANTING (0.25 AC @ 2 FT O.C. SPACING)			
Botanical Name	**Common Name**	**% of Total**	**Quantity**
Cornus amomum	*Silky dogwood*	35%	961
Salix Sericea	*Silky willow*	25%	686
Physocarpus opulifolius	*Ninebark*	15%	412
Sambucus canadensis	*Elderberry*	15%	412
Salix nigra	*Black willow*	10%	275
		Total	2745

BRANCH LAYER PLANTING (0.25 AC @ 2" O.C. SPACING)			
Botanical Name	**Common Name**	**% of Total**	**Quantity**
Cornus amomum	*Silky dogwood*	35%	961
Salix Sericea	*Silky willow*	25%	686
Physocarpus opulifolius	*Ninebark*	15%	412
Sambucus canadensis	*Elderberry*	15%	412
Salix nigra	*Black willow*	10%	275
		Total	2745



TREE PLANTING DETAIL
NTS

PLANTING DETAILS

SEEDLING / LINER BAREROOT PLANTING DETAIL
SCALE: N.T.S.

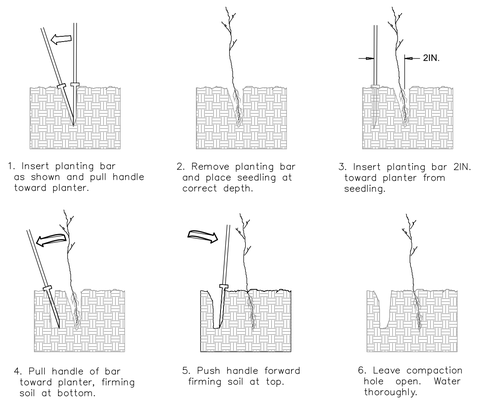
PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12IN. long, 4IN. wide and 1IN. thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches (10IN.) below the root collar.

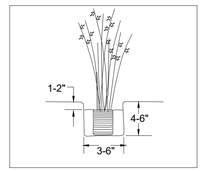
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR
(FOR FLOODPLAIN BUFFER PLANTING AND UPLAND BUFFER PLANTING)



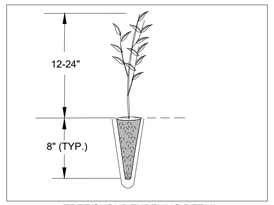
1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2IN. toward planter from seedling.
4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

NOTES:

1. OTHER PLANTING METHOD CAN BE USED WITH THE PERMISSION OF THE PLANTING SUPERVISOR.



HERBACEOUS PLUG DETAIL
NOT TO SCALE



TREE/SHRUB TUBELING DETAIL
NOT TO SCALE.

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COMMONWEALTH OF VIRGINIA
WILLIAM KIPLING MUMAW
Lic. No. 049293
PROFESSIONAL ENGINEER

SOUTH FORK SHENANDOAH RIVER

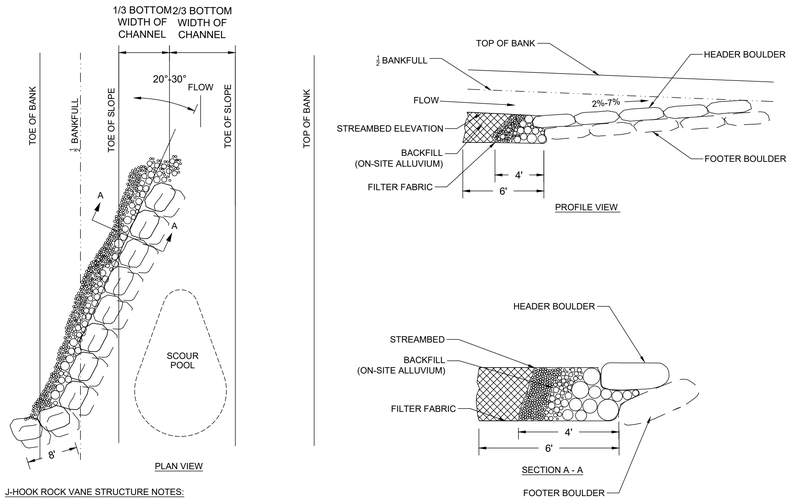
BANK STABILIZATION

PLANTING DETAILS

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/2018
SHEET:	8

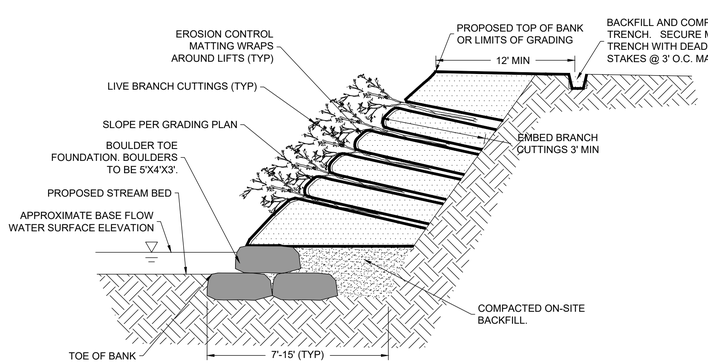
ROCK VANE
SCALE: NTS

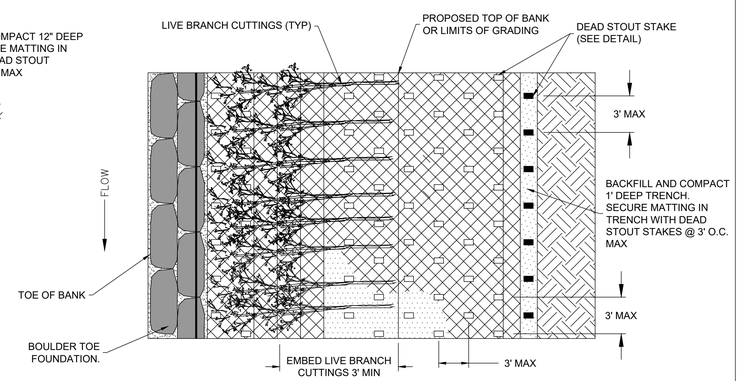


J-HOOK ROCK VANE STRUCTURE NOTES:

1. BOULDERS MUST BE AT LEAST 5'x4'x3'.
2. USE FILTER FABRIC TO SEAL GAPS BETWEEN BOULDERS.
3. DIG A TRENCH BELOW THE BED FOR FOOTER BOULDERS. START AT BANK AND PLACE FOOTER BOULDERS FIRST AND THEN HEADER BOULDERS. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
4. INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER BOULDERS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER BOULDERS, AND THEN UPSTREAM FOR A MINIMUM OF SIX FEET.
5. USE WELL GRADED MIX OF INDOT REVETMENT RIP RAP AND CLASS 1 STONE OR ON-SITE ALLUVIUM ON UPSTREAM SIDE OF STRUCTURE.
6. AFTER ALL STONE HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER BOULDER.
7. FILTER FABRIC SHALL BE TRIMMED ALONG THE TRANSITION BETWEEN THE STONE BACKFILL AND THE HEADER BOULDERS SO THAT THE FILTER FABRIC DOES NOT OVERLAP THE HEADER BOULDERS.

VEGETATED GEOLIFT
SCALE: NTS





PLAN VIEW

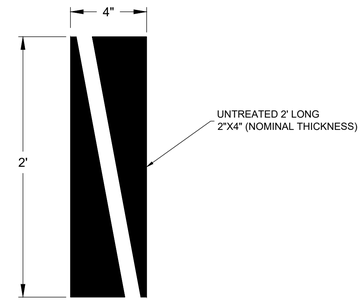
NOTES:

1. VEGETATED GEOLIFT SHALL CONSIST OF LIVE CUTTINGS PLACED BETWEEN SOIL LIFTS WRAPPED WITH EROSION CONTROL MATTING.
2. VEGETATED GEOLIFT MAY BE INSTALLED OVER A STREAM BANK BOULDER TOE FOUNDATION. COARSE BACKFILL WILL BE COMPRISED CLASS A RIP RAP OR ON-SITE ALLUVIUM IF AVAILABLE.
3. THE LIVE CUTTINGS USED IN THE VEGETATED GEOLIFT SPECIES INCLUDED ARE REFERENCED ON PLANTING PLAN SHEET.
4. EROSION CONTROL MATTING SHALL BE OF A TYPE SPECIFIED IN THE DETAILS AND SPECIFICATIONS. IT SHALL BE USED TO WRAP THE SOIL LIFTS AND ALSO BE PLACED FLAT AND STAKED AGAINST ALL OTHER PREPARED (GRADED, TILLED, SMOOTHED; ETC.) AND SEEDED AND MULCHED SLOPES.
5. THE SOIL PLACED BELOW, WITHIN, AND ABOVE THE LIFTS SHALL ON-SITE SOIL. IF ON-SITE SOIL IS DETERMINED TO BE UNSUITABLE, EXISTING ON-SITE SOILD SHALL BE AMENDED WITH A MIXTURE OF 70% ON-SITE MATERIAL AND 25% TOPSOIL AND 5% COMPOST.

INSTALLATION OF VEGETATED GEOGRID SHALL PROGRESS GENERALLY AS FOLLOWS:

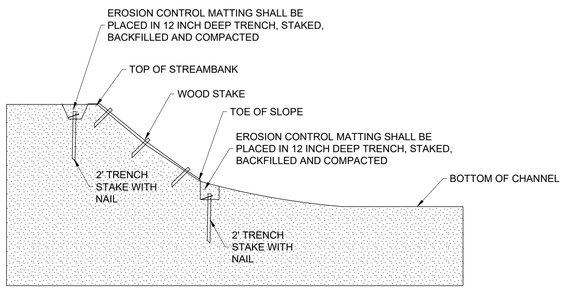
A. BOULDER TOE FOUNDATION SHALL BE INSTALLED AS SPECIFIED IN THE DETAIL OR PER DIRECTION OF THE ENGINEER.
B. PLACE LAYER OF EROSION CONTROL MATTING OVER BOULDER TOE FOUNDATION. MATTING SHALL EXTEND OVER THE TOE PROTECTION TO THE FACE OF THE EXISTING SLOPE. A SUFFICIENT AMOUNT OF MATTING SHOULD REMAIN TO WRAP THE FACE OF THE SOIL LIFT AND EXTEND BACK ON TOP OF THE LIFT A MINIMUM DISTANCE SPECIFIED BY THE DETAIL OR ENGINEER.
C. PLACE FIRST LIFT OF SOIL OVER THE MATTING. THIS LIFT SHALL BE THE SPECIFIED LIFT HEIGHT AT THE "BACK" OF THE LIFT (WHERE IT MEETS THE EXISTING SLOPE FACE). THE LIFT SHALL SLOPE UPWARD TOWARD THE PROPOSED SLOPE FACE TO ACHIEVE THE SPECIFIED SLOPE OF THE PROPOSED STREAM BANK FACE.
D. SOIL SHALL BE COMPACTED WITH TRACKHOE BUCKET OR OTHER EQUIPMENT THAT IS BEING UTILIZED FOR LIFT CONSTRUCTION.
E. WRAP COMPACTED SOIL LIFT WITH THE REMAINING EROSION CONTROL MATTING.
F. PLACE LAYER OF LIVE CUTTINGS ON TOP OF THE LIFT AT 2" ON CENTER. THE BASAL ENDS OF THE LIVE CUTTINGS SHALL CONTACT THE FACE OF THE EXISTING SLOPE AND SHALL PROJECT NO MORE THAN 6 INCHES FROM THE PROPOSED SLOPE FACE.
G. CONSTRUCT REMAINING LIFTS IN SIMILAR FASHION AT THE SPECIFIED HEIGHT UNTIL LIFT IS 1' FROM THE TOP OF THE BANK
H. THE FACE OF THE COMPLETED VEGETATED GEOLIFT SHALL MATCH THE PROPOSED BANK SLOPE.

6. THE PLAN VIEW ILLUSTRATES A PERPENDICULAR PERSPECTIVE OF EACH SURFACE DEPICTED IN THE CROSS SECTION. THERE IS NO FORESHORTENING OF THE STREAM BANK (OR ANY OTHER SLOPED SURFACE) IN THE PLAN VIEW.
7. THE CHANNEL BASEFLOW ELEVATION WILL VARY SEASONALLY AND MAY BE VERY LOW DURING TIMES OF DROUGHT. FOR CONSTRUCTION PURPOSES, THE BASEFLOW ELEVATION WILL BE CONSIDERED TO BE EQUAL TO THE DOWNSTREAM THALWEG ELEVATION THAT BACKS UP WATER.
8. CONSTRUCT VEGETATED GEOLIFT AT A SLOPE PER THE GRADING PLAN.
9. BOULDERS SHALL BE 5'X4'X3'. IF BEDROCK IS ENCOUNTERED OR OTHER MATERIAL DETERMINED BY THE ENGINEER TO BE SUITABLE FOR THE GEOLIFT FOUNDATION, BOULDER MAY NOT BE REQUIRED.

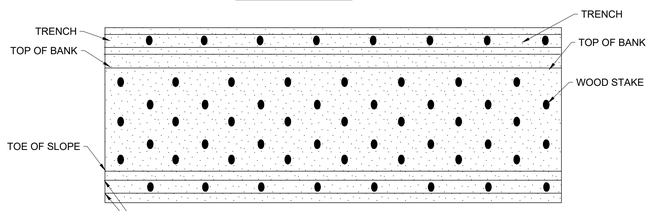


DEAD STOUT STAKE DETAIL

COIR FIBER EROSION CONTROL MATTING



CROSS-SECTION

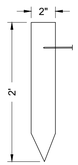


PLAN VIEW

TYPICAL TRENCH STAKE

THE WOOD STAKE SHALL BE THE NORTH AMERICAN GREEN ECO-STAKE OR APPROVED EQUAL WITH THE FOLLOWING DIMENSIONS:

LEG LENGTH	11.00 IN (27.94 CM)
HEAD WIDTH	1.25 IN (3.18 CM)
HEAD THICKNESS	0.40 IN (1.02 CM)
LEG WIDTH	0.60 IN (1.52 CM) (TAPERED TO POINT)
LEG THICKNESS	0.40 IN (1.02 CM)
TOTAL LENGTH	12.00 IN (30.48 CM)



EROSION CONTROL MATTING NOTES

1. BANKS SHALL BE SEEDED (PERMANENT & TEMPORARY) PRIOR TO PLACEMENT OF MATTING.
2. WOODEN STAKES SHALL BE PLACED IN A DIAMOND SHAPE PATTERN PER THE PLAN VIEW.
3. TRENCH STAKES AND WOOD STAKES SHALL BE PLACED A MAXIMUM DISTANCE APART OF 3'.
4. EROSION CONTROL MATTING (ECM) SHOULD BE USED TO AID PERMANENT VEGETATED STABILIZATION OF SLOPES 2:1 OR GREATER AND WITH MORE THAN 10 FEET OF VERTICAL RELIEF.
5. ECM SHOULD BE USED WHEN MULCH CANNOT BE ADEQUATELY TACKED AND WHERE IMMEDIATE GROUND COVER IS REQUIRED TO PREVENT EROSION DAMAGE.
6. 6" MINIMUM OVERLAP IN THE HORIZONTAL

EROSION CONTROL MATTING MAINTENANCE NOTES

1. INSPECT ECM AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (1/2 INCH OR GREATER) RAINFALL EVENT. REPAIR IMMEDIATELY.
2. GOOD CONTACT WITH THE GROUND MUST BE MAINTAINED, AND EROSION MUST NOT OCCUR BENEATH THE ECM.
3. ANY AREAS OF THE ECM THAT ARE DAMAGED OR NOT IN CLOSE CONTACT WITH THE GROUND SHALL BE REPAIRED AND STAPLED.
4. IF EROSION OCCURS DUE TO POORLY CONTROLLED DRAINAGE, THE PROBLEM SHALL BE FIXED AND THE ERODED AREA PROTECTED.
5. MONITOR AND REPAIR THE ECM AS NECESSARY UNTIL GROUND COVER IS ESTABLISHED.

MATTING SPECIFICATIONS

GRADED SLOPES

1. MATTING SHALL BE WOVEN MACHINE SPUN BRISTLE COIR TWINE MADE OF COIR FIBER OBTAINED FROM FRESH WATER CURED COCONUT HUSKS.
2. MATTING SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   WEIGHT: 29 OZ/SY (ASTM D 3776)
   THICKNESS: 0.35 IN. (ASTM D 1777)
   DRY TENSILE STRENGTH:
   MACHINE DIRECTION - 2024 LBS/SF
   CROSS DIRECTION - 1160 LBS/SF
   (ASTM D 4595)
   WET TENSILE STRENGTH:
   MACHINE DIRECTION - 1776 LBS/SF
   CROSS DIRECTION - 936 LBS/SF
   (ASTM D 4595)
   OPEN AREA: 38%

GEOLIFTS

1. MATTING SHALL BE A DOUBLE LAYERED BIODEGRADABLE EROSION CONTROL FABRIC MADE UP OF AN OUTER LAYER OF HIGH STRENGTH COIR FABRIC AND AN INNER LAYER OF LIGHTWEIGHT JUTE FABRIC TIED TOGETHER. KOIR WRAP 1000 OR AN APPROVED EQUIVALENT SHALL BE UTILIZED.

2. MATTING SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
   WEIGHT: 33.3 OZ/SY (ASTM D 5261)
   THICKNESS: 0.35 IN. (ASTM D 5199)
   WIDE WIDTH TENSILE STRENGTH (OUTER LAYER):
   1008 X 936 LBS/FT (ASTM D 4595)
   WIDE WIDTH TENSILE STRENGTH (INNER LAYER):
   612 X 468 LBS/FT (ASTM D 4595)
   SHEAR STRESS: 4.5 PSF

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COMMONWEALTH OF VIRGINIA
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Lic. No. 049293
PROFESSIONAL ENGINEER

SOUTH FORK SHENANDOAH RIVER

BANK STABILIZATION

STRUCTURES

REVISION:

PROJECT MANAGER:	WKM
DESIGNED:	WKM/CKA
DRAWN:	CKA
PROJECT #:	16-0055
DATE:	8/8/2018
SHEET:	9