

This document, together with the concepts and designs presented herein, are an instrument of service. It is intended only for the specific purpose and client for which it was prepared. Reuse of this document without authorization and adaptation by Engineering Concepts, Inc. shall be without liability to Engineering Concepts, Inc.

9VAC25-830, MINIMUM STANDARDS.  
A 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. TOPSOIL MAY BE USED AS PERMANENT STABILIZATION PER THE VESCH AND MUST BE COMPACTED TO A MINIMUM DEPTH OF 2 TO 4 INCHES. CONTRACTOR TO ADHERE TO THESE STANDARDS WHILE DEVELOPING THIS SITE.

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. CONTRACTOR TO TEMPORARY SEED STOCKPILE IF STOCKPILE IS NOT USED WITHIN (14) FOURTEEN DAYS.

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. CONTRACTOR TO ADHERE TO THIS STANDARD FOR DEVELOPING THIS SITE.

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. CONTRACTOR TO INSTALL A TEMPORARY SEDIMENT TRAP AND TEMPORARY SEDIMENT BASINS FOR THE INITIAL F&S INSTALLATION. AFTER SITE HAS STABILIZED AND DEVELOPMENT IS NEARLY FINISHED, CONTRACTOR TO OBTAIN APPROVAL FROM BOTETOURT COUNTY SITE INSPECTOR TO FILL AND STABILIZE TRAPS AND BASINS.

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.

ALL CUT AND FILL SITES FOR THIS SITE WILL BE AT 2:1 MIN. OR FLATTER

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. THERE WILL BE NO CONCENTRATED RUNOFF FLOWING DOWN CUT OR FILL SLOPE.

9. WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED. CONTRACTOR TO ADHERE TO THIS CRITERIA FOR DEVELOPMENT OF THIS SITE

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.

ALL INLETS AND OUTLETS CULVERTS SHALL HAVE EITHER INLET OR OUTLET PROTECTION. CHANNELS SLOPES ARE TO BE PROTECTED ACCORDING TO THE DITCH DETAILS SPECIFICATIONS SHOWN ON THE GRADING PLANS (I.E. JUTE MESH, GEOGRID, ETC.)

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. NOT APPLICABLE FOR THIS SITE

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. NOT APPLICABLE FOR THIS SITE

14. ALL APPLICABLE FEDERAL, STATE AND LOCAL CHAPTERS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET. NOT APPLICABLE FOR THIS SITE

15. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED. NOT APPLICABLE FOR THIS SITE

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. RE-STABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THIS CHAPTER.

F. APPLICABLE SAFETY CHAPTERS SHALL BE COMPLIED WITH.

CONTRACTOR TO ADHERE TO THIS CRITERIA FOR DEVELOPMENT OF THIS SITE.

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. CONTRACTOR TO ADHERE TO THIS CRITERIA FOR DEVELOPMENT OF THIS SITE. A CONSTRUCTION ENTRANCE WILL BE IMPLEMENTED FOR THIS SITE. ANY MUD/DIRT/DEBRIS FROM CONSTRUCTION SITE ONTO SETTLER'S ROAD AND PIONEER ROAD SHALL BE IMMEDIATELY CLEANED.

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. CONTRACTOR TO ADHERE TO THIS CRITERIA FOR DEVELOPMENT BY PERMANENT SEEDING.

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.

(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 CHANNEL THE BED OR 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. (VDOT APPROVAL)

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. THIS SITE WAS DESIGNED TO COMPLY WITH THE ABOVE CRITERIA

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. THIS SITE WAS DESIGNED TO COMPLY WITH THE ABOVE CRITERIA BY CALLING FOR INLET/OUTLET PROTECTION, SEDIMENT TRAPS, SEDIMENT BASINS, DIVERSION BERMS, SILT FENCE, ETC.

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 § 10.1-562 OR 10.1-570 OF THE ACT.

THE PROJECT MEETS MS-19.

M. FOR PLANS APPROVED ON AND AFTER JULY 1, 2014, THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF § 10.1-561 A OF THE ACT AND THIS SUBSECTION SHALL BE SATISFIED BY COMPLIANCE WITH WATER QUANTITY REQUIREMENTS IN THE STORMWATER MANAGEMENT ACT (§ 10.1-603.2 ET SEQ. OF THE CODE OF VIRGINIA) AND ATTENDANT REGULATIONS, UNLESS SUCH LAND-DISTURBING ACTIVITIES ARE IN ACCORDANCE WITH 4VAC50-60-48 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSWMP) PERMIT REGULATIONS.

N. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 4VAC50-60-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSWMP) PERMIT REGULATIONS SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF MINIMUM STANDARD 19. THIS PROJECT ADHERES AND SATISFIES THE MINIMUM STANDARDS

#### EROSION CONSTRUCTION NOTES

ES-1 UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.

ES-2 THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRECONSTRUCTION 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.

#### PERMANENT STABILIZATION

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING WITHIN 7 DAYS FOLLOWING FINAL GRADING. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO STD. AND SPEC. 3.32, PERMANENT SEEDING, OF THE 1992 VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. MULCH (STRAW OR FIBER) WILL BE USED ON ALL SEEDED AREAS. IN ALL SEEDING OPERATIONS, SEED, FERTILIZER AND LIME WILL BE APPLIED PRIOR TO MULCHING. EROSION CONTROL BLANKETS MAY BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDDED TO PROTECT THE SLOPES PROPERLY.

#### EROSION AND SEDIMENT CONTROL NARRATIVE

##### PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF DEVELOPING 16.67 ACRES OF VACANT LAND IN ASHLEY PLANTATION OFF OF GREENFIELD STREET. THE DEVELOPMENT WILL CONSIST OF 48 PROPOSED SINGLE-FAMILY HOME LOTS SERVED BY EXISTING GREENFIELD STREET AND A PROPOSED 3,236 LINEAR FEET PUBLIC ROAD. THE 2-WAY ROAD WILL FEATURE 12-FOOT TRAVEL LANES WITH CURB AND GUTTER, WATERLINE, SANITARY SEWER, AND STORM SEWER ARE PROPOSED WITH THIS PROJECT.

##### EXISTING SITE CONDITIONS

THE SITE IS LOCATED ON THE SOUTH SIDE OF GREENFIELD STREET BETWEEN ISLAND GREEN ROAD AND TRINITY ROAD. THE EXISTING SITE IS PRIMARILY ROLLING HILLS WITH MODERATE SLOPES AND CONSISTS OF FIELD GRASS, SPARSE VEGETATION, AND TREES. THERE ARE NO EXISTING WATERWAYS TO BE IMPACTED BY THIS PROJECT.

##### OFFSITE AREAS

NO OFF-SITE AREAS WILL BE IMPACTED OR USED AS HOST FOR STOCKPILES, ETC., BY THE CONSTRUCTION OF THIS PROJECT.

##### ADJACENT PROPERTY

IT IS BORDERED ON THE NORTH BY GREENFIELD STREET. IT IS BORDERED ON THE EAST AND SOUTH BY MULTIPLE RESIDENTIAL AND AGRICULTURAL PROPERTIES ZONED A1 AGRICULTURAL. IT IS BORDERED ON THE WEST PRIMARILY BY SINGLE-FAMILY RESIDENTIAL HOME LOTS ZONED R1 RESIDENTIAL.

##### CRITICAL EROSION AREAS

CRITICAL EROSION AREAS ARE AREAS WHERE SLOPES ARE 2:1 OR STEEPER AND AREAS OF PROPOSED DITCHES. ALL SLOPES AT THIS SITE ARE PLANNED AT 3:1 WHERE FEASIBLE WITH SOME 2:1 SLOPES. THERE ARE NO EXISTING SLOPES ON SITE GREATER THAN 3:1.

##### SOILS

SOURCE OF SOILS INFORMATION WAS TAKEN FROM USDA NATURAL RESOURCES CONSERVATION SERVICES - WEB SOIL SURVEY. A COMPLETE REPORT IS INCLUDED IN SECTION IV.

SEE DATA ATTACHED.

#### EROSION AND SEDIMENT CONTROL MEASURES

(CONSTRUCTION SEQUENCE AND PHASING)

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 1992 VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, OR LATEST EDITION. THE MINIMUM STANDARDS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE. THE FOLLOWING ORDER OF EROSION CONTROL PRACTICES SHALL BE ADHERED TO IN PREPARING THIS SITE FOR CONSTRUCTION:

1. AS A FIRST STEP IN LAND DISTURBANCE ALL PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED INCLUDING SILT FENCE, DIVERSION DIKES, DIVERSION DITCHES, TEMPORARY SEDIMENT TRAP, TEMPORARY SEDIMENT BASINS AND INLET PROTECTION.
2. INSTALLATION OF THE GRAVEL CONSTRUCTION ENTRANCE SHALL IMMEDIATELY FOLLOW.
3. GRADING TO FOLLOW UPON COMPLETION OF INITIAL EROSION CONTROL MEASURES.
4. ALL DENUDED AREAS ARE TO BE TEMPORARY SEEDDED IF NO CONSTRUCTION WORK IS TO BE COMPLETED WITHIN 7 DAYS.
5. REMOVAL OF TEMPORARY SEDIMENT CONTROL MEASURES FOLLOWING STABILIZATION OF SITE IS DIRECTED BY BOTETOURT COUNTY EROSION AND SEDIMENT CONTROL INSPECTOR.

##### STRUCTURAL PRACTICES

1. CE - TEMPORARY STONE CONSTRUCTION ENTRANCE - 3.02  
A STABILIZED STONE PAD WITH A FILTER FABRIC UNDER LINER LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS ON A CONSTRUCTION SITE. THIS PAD REDUCES THE AMOUNT OF MUD TRANSPORTED ONTO PAVED PUBLIC ROADS BY MOTOR VEHICLES OR RUNOFF.

2. CRS - CONSTRUCTION ROAD STABILIZATION - 3.03  
THE TEMPORARY STABILIZATION OF ACCESS ROADS, SUBDIVISION ROADS, PARKING AREAS, AND OTHER ON-SITE VEHICLE TRANSPORTATION ROUTES WITH STONE IMMEDIATELY AFTER GRADING. THIS REDUCES THE EROSION OF TEMPORARY ROADBEDS BY CONSTRUCTION TRAFFIC DURING WET WEATHER AND THE EROSION AND SUBSEQUENT REGARDING OF PERMANENT ROADBEDS BETWEEN THE TIME OF INITIAL GRADING AND FINAL STABILIZATION.

3. SF - SILT FENCE BARRIER - 3.05  
SILT FENCE BARRIERS WILL BE INSTALLED DOWN SLOPE OF AREAS WITH MINIMAL GRADE TO FILTER SEDIMENT LADEN RUNOFF FROM SHEET FLOW.

4. IP- STORM DRAIN INLET PROTECTION - 3.07  
A SEDIMENT FILTER OR AN EXCAVATED IMPOUNDED AREA AROUND A STORM DRAIN DROP INLET OR CURB INLET. THIS FILTER PREVENTS SEDIMENT FROM ENTERING STORM DRAINAGE SYSTEMS PRIOR TO PERMANENT STABILIZATION OF THE DISTURBED AREA.

5. CIP - CULVERT INLET PROTECTION - 3.08  
A SEDIMENT FILTER LOCATED AT THE INLET TO STORM SEWER CULVERTS. THIS FILTER WILL PREVENT SEDIMENT FROM ENTERING, ACCUMULATING IN AND BEING TRANSFERRED BY A CULVERT AND ASSOCIATED DRAINAGE SYSTEM PRIOR TO PERMANENT STABILIZATION OF A DISTURBED PROJECT AREA. THE FILTER WILL ALSO PROVIDE EROSION CONTROL AT CULVERT INLETS DURING THE PHASE OF A PROJECT WHERE ELEVATION AND DRAINAGE PATTERNS CHANGE, CAUSING ORIGINAL CONTROL MEASURES TO BE INEFFECTIVE OR IN NEED OF REMOVAL.

6. DD - TEMPORARY DIVERSION DIKE - 3.09  
A TEMPORARY RIDGE OF COMPACTED SOIL CONSTRUCTED AT THE TOP OR BASE OF A SLOPING DISTURBED AREA. THIS RIDGE WILL DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED DISTURBED AREAS AND SLOPES TO A STABILIZED OUTLET. FURTHERMORE, THIS WILL ALSO DIVERT SEDIMENT-LADEN RUNOFF FROM A DISTURBED AREA TO A SEDIMENT-TRAPPING FACILITY SUCH AS A SEDIMENT TRAP OR SEDIMENT BASIN.

7. DV - DIVERSION - 3.12  
A DIVERSION IS A CHANNEL CONSTRUCTED ACROSS A SLOPE WITH A SUPPORTING EARTHEN RIDGE ON THE LOWER SIDE. THIS CHANNEL REDUCES SLOPE LENGTH IN ORDER TO INTERCEPT AND DIVERT STORMWATER RUNOFF TO STABILIZED OUTLETS AT NON-EROSIVE VELOCITIES.

8. ST - TEMPORARY SEDIMENT TRAP - 3.13  
A TEMPORARY PONDING AREAS FORMED BY CONSTRUCTING AN EARTHEN EMBANKMENT WITH A STONE OUTLET TO DETAIN SEDIMENT-LADEN RUNOFF FROM SMALL-DISTURBED AREAS LONG ENOUGH TO ALLOW THE MAJORITY OF THE SEDIMENT TO SETTLE OUT.

9. SB - TEMPORARY SEDIMENT BASIN - 3.14  
A TEMPORARY SEDIMENT BASIN IS A TEMPORARY BARRIER OR DAM WITH A CONTROLLED STORMWATER RELEASE STRUCTURE FORMED BY CONSTRUCTING AN EMBANKMENT OF COMPACTED SOIL ACROSS A DRAINAGEWAY. THIS BARRIER WILL DETAIN SEDIMENT-LADEN RUNOFF FROM DISTURBED AREAS IN "WET" AND "DRY" STORAGE LONG ENOUGH FOR THE MAJORITY OF THE SEDIMENT TO SETTLE OUT.

10. OP - OUTLET PREVENTION - 3.18  
STRUCTURALLY LINED APRONS OR OTHER ACCEPTABLE ENERGY DISSIPATING DEVICES PLACED AT THE OUTLETS OF PIPES OR PAVED CHANNEL SECTIONS. THESE DEVICES WILL PREVENT SCOUR AT STORMWATER OUTLETS, TO PROTECT THE OUTLET STRUCTURE, AND TO MINIMIZE THE POTENTIAL FOR DOWNSTREAM EROSION BY REDUCING THE VELOCITY AND ENERGY OF CONCENTRATED STORMWATER FLOWS.

11. CD - ROCK CHECK DAMS - 3.20  
ROCK CHECK DAMS ARE SMALL TEMPORARY STONE DAMS CONSTRUCTED ACROSS A SWALE OR DRAINAGE DITCH. THEY ARE DESIGNED TO REDUCE THE VELOCITY OF CONCENTRATED STORMWATER FLOWS, THEREBY REDUCING EROSION OF THE SWALE OR DITCH. THIS PRACTICE ALSO TRAPS SEDIMENT GENERATED FROM ADJACENT AREAS OR THE DITCH ITSELF, MAINLY BY PONDING OF THE STORMWATER RUNOFF. FIELD EXPERIENCE HAS SHOWN IT TO PERFORM MORE EFFECTIVELY THAN SILT FENCES OR STRAW BALES IN THE EFFORT TO STABILIZE "WET-WEATHER" DITCHES.

12. B/M - BLANKETS & MATTING - 3.36  
BLANKETS AND MATTING IS DEFINED AS THE INSTALLATION OF A PROTECTIVE COVERING (BLANKET) OR A SOIL STABILIZATION MAT ON A PREPARED PLANTING AREA OF A STEEP SLOPE, CHANNEL OR SHORELINE. THIS AIDS IN CONTROLLING EROSION ON CRITICAL AREAS BY PROVIDING A MICROCLIMATE, WHICH PROTECTS YOUNG VEGETATION AND PROMOTES ITS ESTABLISHMENT. IN ADDITION, SOME TYPES OF SOIL STABILIZATION MAPS ARE ALSO USED TO RAISE THE MAXIMUM PERMISSIBLE VELOCITY OF TURF GRASS IN CHANNELIZED AREAS BY "REINFORCING THE TURF" TO RESIST THE FORCES DURING STORM EVENTS.

##### VEGETATIVE PRACTICES

1. TS - TEMPORARY SEEDING - 3.31  
ALL DENUDED AREAS, WHICH WILL BE LEFT DORMANT FOR MORE THAN 7 DAYS, SHALL BE SEEDDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING.
2. PS - PERMANENT SEEDING - 3.32  
ALL FINAL-GRADED AREAS WHERE PERMANENT COVER IS DESIRED OR ROUGH-GRADED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A YEAR OR MORE SHALL BE SEEDDED WITH PERENNIAL VEGETATION WITHIN 7 DAYS OF REACHING FINAL GRADE.
3. MU - MULCHING - 3.35  
APPLICATION OF PLANT RESIDUES OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION BY PROTECTING THE SOIL SURFACE FROM RAINDROP IMPACT AND REDUCING THE VELOCITY OF OVERLAND FLOW. MULCHING ALSO FOSTERS THE GROWTH OF VEGETATION BY INCREASING AVAILABLE MOISTURE AND PROVIDING INSULATION AGAINST EXTREME HEAT AND COLD.

EROSION - SILTATION CONTROL COST ESTIMATE				
ALL COSTS GIVEN ARE COMPLETE IN PLACE				
DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL COST
3.02- CONSTRUCTION ENTRANCE	EA	1	\$ 1,500.00	\$ 1,500.00
3.03- CONST. RD. STABILIZATION	SY	6,091	\$ 5.00	\$ 30,455.00
3.05- SILT FENCE	LF	668	\$ 7.50	\$ 5,010.00
3.07- SD INLET PROTECTION	EA	18	\$ 625.00	\$ 11,250.00
3.08- CULVERT INLET PROTECTION	EA	2	\$ 625.00	\$ 1,250.00
3.09- TEMPORARY DIVERSION DIKE	LF	0	\$ 6.00	\$ -
3.13- TEMPORARY SEDIMENT TRAP	CY	0	\$ 3.50	\$ -
3.14- TEMPORARY SEDIMENT BASIN	CY	0	\$ 10.03	\$ -
3.15- TEMPORARY SLOPE DRAIN	LF	0	\$ 12.00	\$ -
3.16- PAVED FLUME	SY	0	\$ 55.00	\$ -
3.18- OUTLET PROTECTION	EA	4	\$ 625.00	\$ 2,500.00
3.19- RIP-RAP	SY	0	\$ 57.00	\$ -
3.20- ROCK CHECK DAM	EA	0	\$ 250.76	\$ -
3.31- TEMPORARY SEEDING	AC	15	\$ 600.00	\$ 9,180.00
3.32- PERMANENT SEEDING	AC	15	\$ 600.00	\$ 9,180.00
3.35- MULCHING	AC	15	\$ 600.00	\$ 9,180.00
3.36- SOIL STABILIZATION BLANKETS & MATTING	SY	0	\$ 6.00	\$ -
SUB-TOTAL				\$ 79,505.00
10% CONTINGENCY				\$ 7,950.50
TOTAL PROJECT COST				\$ 87,455.50
TOTAL DISTURBED AREA		739,867 SF	16.55 AC	
AVERAGE EROSION CONTROL PER ACRE:		\$5,284		

##### PERMANENT STABILIZATION

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING WITHIN 7 DAYS OF REACHING FINAL GRADES. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO STD. AND SPEC. 3.32, PERMANENT SEEDING, OF THE 1992 VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. MULCH (STRAW OR FIBER) WILL BE USED ON ALL SEEDDED AREAS. IN ALL SEEDING OPERATIONS, SEED, FERTILIZER AND LIME WILL BE APPLIED PRIOR TO MULCHING. EROSION CONTROL BLANKETS MAY BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDDED TO PROTECT THE SLOPES PROPERLY.

##### MAINTENANCE

IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:

1. CONSTRUCTION ENTRANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE WASHING AND REWORKING OF EXISTING STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY STRUCTURES USED TO TRAP SEDIMENT. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY. THE USE OF WATER TRUCKS TO REMOVE MATERIALS DROPPED, WASHED, OR TRACKED ONTO ROADWAYS WILL NOT BE PERMITTED UNDER ANY CIRCUMSTANCES.
2. SEDIMENT BARRIERS - THE SEDIMENT TR