

EROSION AND SEDIMENT CONTROL NARRATIVE

- A. INTRODUCTION
- THE PROJECT AREA IS LOCATED ALONG LAUREL RIDGE ROAD AND LEWISTON STREET IN THE CITY OF ROANOKE, VIRGINIA. THE PURPOSE OF THIS PROJECT IS TO ALLEVIATE FLOODING, PARTICULARLY FOR PROPERTIES ALONG THE NORTH SIDE OF LEWISTON STREET. ADDITIONALLY, WATER QUALITY BMPs HAVE BEEN ADDED WHERE POSSIBLE THROUGHOUT THE PROJECT TO HELP WITH THE CITY'S WATER QUALITY INITIATIVES. THE TOTAL DISTURBED AREA IS 0.70 ACRES, OF THAT AREA, 0.33 ACRES IS LOCATED WITHIN THE EXISTING PAVEMENT OF LAUREL RIDGE ROAD AND LEWISTON STREET, AND THE REMAINING 0.37 ACRES IS ADJACENT TO THE ROADWAY.
- B. EXISTING SITE CONDITIONS
- THE PROJECT IS LOCATED WITHIN THE RIGHT-OF-WAY OF LAUREL RIDGE ROAD AND LEWISTON STREET. REFER TO FIGURE 1 FOR A DRAINAGE AREA MAP OF THE PROJECT AREA.
- C. ADJACENT PROPERTY
- THE PROJECT AREA IS SURROUNDED BY RESIDENTIAL DEVELOPMENT ZONED R-7 (SINGLE FAMILY RESIDENTIAL) AND ROS (RECREATIONAL AND OPEN SPACE), WITH PROPER SEDIMENT CONTROL IN PLACE TO CONTAIN SEDIMENT PRIOR TO ENTERING THE NEW AND EXISTING STORM DRAINAGE SYSTEM, NO ADVERSE EFFECT RESULTING FROM SEDIMENT DEPOSITION IS ANTICIPATED FOR THE ADJACENT PROPERTIES.
- D. PLANNED EARTHWORK ACTIVITIES
- TO MITIGATE EXISTING FLOODING AND IMPROVE WATER QUALITY OF THE DOWNSTREAM WATERSHED, WATER QUALITY SWALES (DRY SWALES) WILL BE BUILT ALONG THE SOUTHWESTERN SIDE OF LEWISTON STREET AND STORM SEWER WILL BE CONSTRUCTED UNDER LAUREL RIDGE ROAD AND LEWISTON STREET.
- ANY EXCESS OR UNSUITABLE MATERIAL WILL BE TRANSPORTED TO OFF-SITE DISPOSAL AREAS WITH SEPARATE EROSION AND SEDIMENT CONTROL PLANS APPROVED BY THE CITY OF ROANOKE. THE NAMES OF ANY OFFSITE AREAS MUST BE PROVIDED TO THE CITY OF ROANOKE BEFORE ANY SOIL IS TRANSPORTED OFFSITE. THE DEPTH OF TOPSOIL/SURFICIAL SOIL IN EXISTING VEGETATED AREAS IS APPROXIMATELY 2-3 INCHES.
- ANY IMPORTED MATERIAL REQUIRED FOR BACKFILLING, STONE BASES, ETC., IS PLANNED TO BE OBTAINED FROM COMMERCIAL REGIONAL QUARRIES. ALL OFF-SITE LAND DISTURBING AREAS FROM WHICH MATERIAL IS TO BE OBTAINED SHALL HAVE AN APPROVED EROSION AND SEDIMENT CONTROL PLAN.
- E. SOILS

ACCORDING TO THE CUSTOM SOIL RESOURCE REPORT FOR ROANOKE COUNTY AND CITIES OF ROANOKE AND SALEM, VIRGINIA, THE SOILS IN THE DRAINAGE AREA OF THE PROPOSED PROJECT ARE COMPRISED OF MAINLY FREDERICK URBAN LAND COMPLEX, WITH SMALL POCKETS OF COMBS LOAM AND FREDERICK SILT LOAM. SOILS WITHIN THE DISTURBED AREA OF THE PROJECT ARE PRIMARILY COMPOSED OF FREDERICK URBAN LAND COMPLEX. A SOIL MAP IS PROVIDED IN APPENDIX A. THE SITE AND SURROUNDING AREAS ARE PRIMARILY COMPOSED OF HYDROLOGIC SOIL GROUP 'B' SOILS.

- F. CRITICAL EROSION AREAS
- CRITICAL EROSION AREAS MAY BE ENCOUNTERED DURING GRADING OPERATIONS AS FOLLOWS:
- PROPOSED SLOPES NEAR 2:1 OR GREATER.
  - DRAINAGE SWALES WHERE SURFACE RUNOFF WILL BE CONCENTRATED.
- THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES ARE INTENDED TO MINIMIZE ANY POTENTIAL PROBLEMS AND PROMOTE STABILIZATION.

G. EROSION AND SEDIMENT CONTROL MEASURES

ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE 2013 VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESC), LATEST EDITION, AS PROVIDED IN APPENDIX E AND IN CONFORMANCE WITH THE CONDITIONS OF APPLICABLE ENVIRONMENTAL PERMITS.

- H. STRUCTURAL PRACTICES
1. STORM DRAIN INLET PROTECTION – STD. & SPEC. 3.07
- STORM DRAIN INLET PROTECTION SHALL BE PLACED AT EXISTING AND PROPOSED GRATE INLETS TO PREVENT SEDIMENT FROM ENTERING THE STORM PIPING.
2. CULVERT INLET PROTECTION – STD. & SPEC. 3.08
- CULVERT INLET PROTECTION SHALL BE INSTALLED AND CONSIST OF A SEDIMENT FILTER LOCATED AT THE INLET TO STORM SEWER CULVERTS, WHICH PREVENTS SEDIMENT FROM ENTERING, ACCUMULATING IN AND BEING TRANSFERRED BY THE CULVERT. IT PROVIDES EROSION CONTROL AT CULVERTS DURING THE PHASE OF THE PROJECT WHERE ELEVATIONS AND DRAINAGE PATTERNS ARE CHANGING, CAUSING ORIGINAL CONTROL MEASURES TO BE INEFFECTIVE.
3. RIPRAP – STD. & SPEC. 3.19
- LARGE, LOOSE, ANGULAR STONE WITH FILTER FABRIC INSTALLED TO PROTECT SOIL FROM THE EROSION FORCES OF CONCENTRATED RUNOFF OR STABILIZE SLOPES.

- I. VEGETATIVE PRACTICES
- GENERAL: A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED BY CONCRETE OR ASPHALT PAVEMENT. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE, AND WILL INHIBIT EROSION. NEW VEGETATION SHALL BE MAINTAINED FOR ONE FULL YEAR AFTER PLANTING. NEW SEEDING SHALL BE SUPPLIED WITH ADEQUATE MOISTURE, ESPECIALLY LATE IN THE SEASON, AND IN ABNORMALLY HOT OR DRY WEATHER, STABILIZATION PRACTICES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE APPROPRIATE VESC STD. & SPEC. AS PROVIDED IN THE APPENDIX, AND THE EROSION AND SEDIMENT CONTROL PLAN. SELECTION OF THE APPROPRIATE SEED MIXTURE FOR TEMPORARY SEEDING WILL DEPEND UPON THE TIME OF YEAR IT IS APPLIED.
1. TOPSOILING – STD. & SPEC. 3.30
- IN ORDER TO STABILIZE FINAL SITE GRADES, SUITABLE, ORGANIC GROWTH MEDIUM SHALL BE USED. THIS CAN BE ACCOMPLISHED THROUGH ON-SITE PRESERVATION OF EXISTING TOPSOIL OR IMPORTED TOPSOIL.
2. PERMANENT SEEDING – STD. & SPEC. 3.32
- PERMANENT SEEDING SHALL ALSO BE USED ON ALL AREAS THAT ARE NOT AT FINAL GRADE AND THAT WILL BE LEFT DORMANT FOR A PERIOD OF MORE THAN 1 YEAR. UPON COMPLETION OF FINAL GRADING, PERMANENT SEEDING SHALL ALSO BE USED ON ALL AREAS NOT STABILIZED BY HARDSCAPE OR SODDING. IF CONFLICTS EXIST BETWEEN THE PROJECT SPECIFICATIONS AND THE VESC STD. & SPEC. 3.32, THE MORE STRINGENT REQUIREMENT SHALL APPLY AS DIRECTED BY THE ENGINEER. PERMANENT SEEDING MIXES AND RATES ARE FOUND ON SHEET C401.
3. MULCHING – STD. & SPEC. 3.35
- APPLICATION OF PLANT RESIDUES OR OTHER SUITABLE MATERIAL SHALL BE INSTALLED TO PREVENT EROSION AND FOSTER GROWTH OF VEGETATION TO AREAS WHICH HAVE BEEN SEEDDED OR IN AREAS WHICH CANNOT BE SEEDDED BECAUSE OF SEASON TO PROVIDE SOME PROTECTION TO THE SOIL SURFACE.
4. SOIL STABILIZATION BLANKETS AND MATTING – STD. & SPEC. 3.36
- BLANKETS AND MATTING SHALL BE USED TO AID 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 MATS ARE ALSO USED TO RAISE THE MAXIMUM PERMISSIBLE VELOCITY OF TURF GRASS STANDS IN CHANNELIZED AREAS BY 25% TO RESIST THE FORCES OF EROSION DURING STORM EVENTS.
5. TREE PRESERVATION AND PROTECTION – STD. & SPEC. 3.38
- DESIRABLE TREES SHALL BE PROTECTED FROM MECHANICAL AND OTHER INJURY DURING LAND DISTURBING ACTIVITY TO ENSURE THEIR SURVIVAL.
6. DUST CONTROL – STD. & SPEC. 3.39
- DURING LAND DISTURBANCE, REDUCE SURFACE AND AIR MOVEMENT OF DUST IN AREAS SUBJECT TO DUST PROBLEMS IN ORDER TO PREVENT SOIL LOSS AND REDUCE THE PRESENCE OF POTENTIALLY HARMFUL AIRBORNE SUBSTANCES.

- J. MANAGEMENT STRATEGIES
1. THE CONTRACTOR WILL DESIGNATE AN EMPLOYEE CERTIFIED AS THE "RESPONSIBLE LAND DISTURBER" (RLD), BY THE COMMONWEALTH OF VIRGINIA, DEPARTMENT OF ENVIRONMENTAL QUALITY (VADEQ), WHO IS IN CHARGE OF AND IS RESPONSIBLE FOR CARRYING OUT THE LAND-DISTURBING ACTIVITIES ON THIS PROJECT. THIS EMPLOYEE SHALL ALSO INSPECT FOR DEFICIENCIES IMMEDIATELY

- AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND AT LEAST WEEKLY WHEN NO RAINFALL OCCURS, THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO THE CITY OF ROANOKE THAT THEY MEET THIS REQUIREMENT PRIOR TO CONSTRUCTION, AND THE CITY OF ROANOKE SHALL PROVIDE THE NAME OF THE RLD TO VADEQ PRIOR TO LAND DISTURBANCE. IN THE INTERIM UNTIL THE WORK STARTS, MATTHEW B. JAMES, P.E., DRAPER ADEN ASSOCIATES, IS THE RLD.
2. AS A FIRST STEP MEASURE, INLET PROTECTION AND TREE PROTECTION SHALL BE INSTALLED AS INDICATED PRIOR TO UPSLOPE LAND DISTURBANCE.
3. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
4. INLET PROTECTION AS INDICATED ON THE PLAN SHALL BE INSTALLED FOR NEW INLETS AS THEY BECOME OPERATIONAL.
5. ON-SITE STOCKPILING OF SOIL IS NOT ANTICIPATED AT THIS TIME.
6. PERMANENT SEEDING WILL BE USED ON ALL DISTURBED AREAS THAT ARE NOT SCHEDULED TO RECEIVE HARDSCAPE, OR LANDSCAPING (HARDWOOD MULCH, ETC.).
7. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER 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. REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROLS SHALL BE COORDINATED AND AUTHORIZED BY THE CITY OF ROANOKE.
- K. CONSTRUCTION SCHEDULE
1. INSTALLATION OF SEDIMENT CONTROLS: SILT FENCE AND INLET/CULVERT PROTECTION SHALL BE CONSTRUCTED AS FIRST STEPS IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.
2. CONSTRUCTION IS EXPECTED TO BEGIN IN THE SUMMER OF 2015 AND BE COMPLETED IN THE FALL OF 2015.
3. AFTER THE STABILIZATION OF THE SITE IS COMPLETE, EROSION AND SEDIMENT CONTROL DEVICES WILL BE REMOVED. EROSION AND SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED UNLESS AUTHORIZED BY THE CITY OF ROANOKE.
- L. PERMANENT STABILIZATION
- ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING, STABILIZATION MEASURES SHOWN ON THE PLANS, AND LANDSCAPING FOLLOWING THE FINAL GRADING.
- M. MAINTENANCE

THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY (AT LEAST DAILY) 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. IN ADDITION, THE RECEIVING STREAM IS A TMDL DESIGNATED STREAM. INSPECTIONS ARE TO OCCUR EVERY FOUR TO FIVE DAYS WITH AN ADDITIONAL INSPECTION WITHIN 24 HOURS OF A QUALIFYING RAIN EVENT (0.25" OF RAINFALL WITHIN 24 HOURS).

5. ALL DEVICES USED AT ENTRANCES TO THE STORM DRAIN SYSTEM SHALL BE CHECKED FOR THEIR PERFORMANCE. IF REPAIRS NEED TO BE MADE, THEY SHALL BE DONE IN A RESPONSIBLE MANNER.

6. SEDIMENT SHALL BE REMOVED FROM TRAPPING DEVICES WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE BARRIER. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

7. ALL VEGETATED AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHALL BE FERTILIZED AND REPAIRED BY RESEEDING AS NECESSARY.

8. ROANOKE CITY PERSONNEL WILL BE RESPONSIBLE FOR MAINTENANCE AFTER THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR IS RELEASED FROM THE PROJECT, AND WARRANTIES FULFILLED.

STATE MINIMUM STANDARDS FOR EROSION CONTROL

- AN EROSION AND SEDIMENT CONTROL PROGRAM ADOPTED BY A DISTRICT OR LOCALITY MUST BE CONSISTENT WITH THE FOLLOWING CRITERIA, TECHNIQUES AND METHODS:
- MS-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 (UNDISTURBED) FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
- STABILIZATION MEASURES ARE SHOWN ON THE SITE & GRADING PLAN SHEETS**
- MS-2 DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.
- SOIL STOCKPILING IS NOT ANTICIPATED ON THIS PROJECT; HOWEVER, ANY SOIL STOCKPILES SHALL BE SURROUNDED BY SILT FENCE.**
- MS-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, IN THE OPINION OF THE DIVISION OF SOIL AND WATER CONSERVATION OF THE DEPARTMENT OF CONSERVATION AND RECREATION, IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.
- PERMANENT VEGETATIVE COVER IS SPECIFIED IN UNPAVED AREAS.**
- MS-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.
- SEDIMENT TRAPPING MEASURES ARE SHOWN ON THE SITE & GRADING PLAN SHEETS**
- MS-5 STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
- NOT APPLICABLE**
- MS-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.
- NOT APPLICABLE**
- 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. THE 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 TWENTY-FIVE 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.
- MS-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.
- SLOPE STABILIZATION MEASURES ARE SHOWN ON THE SITE & GRADING PLAN SHEETS, AS WELL AS THE DETAIL SHEETS.**
- MS-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.
- CONCENTRATED RUNOFF IS NOT EXPECTED ON CUT/FILL SLOPES OTHER THAN WITHIN THE PROPOSED OR MODIFIED CHANNELS.**
- MS-9 WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.
- NOT ANTICIPATED. IF WATER IS OBSERVED SEEPING FROM A SLOPE FACE, THE CONTRACTOR SHOULD CONTACT THE OWNER BEFORE PROCEEDING.**
- MS-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.
- INLET PROTECTION IS SHOWN ON PROPOSED STORM SEWER INLETS.**
- MS-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.
- SEE DETAIL SHEETS FOR LINING INFORMATION.**
- MS-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.**
- MS-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.**
- MS-14 ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.
- NOT APPLICABLE.**
- MS-15 THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.
- NOT APPLICABLE**
- MS-16 UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:
- THE FOLLOWING CRITERIA MUST BE MET BY THE CONTRACTOR DURING CONSTRUCTION RELATED TO INSTALLATION OF STORM SEWER PIPE ALONG LEWISTON STREET AND LAUREL RIDGE ROAD.**
- 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. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.
- MS-17 WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED 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 PUBLIC ROAD SURFACE, THE ROAD 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 SUBDIVISION LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.
- ALL WORK IS ANTICIPATED TO BE ACCESSED FROM THE RIGHT-OF-WAY, AND THEREFORE NO CONSTRUCTION ENTRANCE IS REQUIRED**
- MS-18 ALL TEMPORARY EROSION 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 ADMINISTRATOR. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
- ALL TEMPORARY MEASURES TO BE REMOVED PER THIS MINIMUM STANDARD.**
- MS-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.
- THE PROJECT DISCHARGES INTO A MANMADE STORMWATER CONVEYANCE CHANNEL AT STRUCTURE 4A, WHICH HAS A TOTAL CONTRIBUTING DRAINAGE AREA OF 48.5 ACRES. THE PROJECT AREA (EXCLUDING UNDERGROUND PUBLIC UTILITY WORK IN THE ROADWAY) IS 0.37 ACRES, WHICH SATISFIES THE LIMITS OF ANALYSIS FOR CHANNEL PROTECTION AND FLOOD PROTECTION AND FLOOD PROTECTION. PEAK FLOWS FOR THE 10-YEAR STORM ARE SLIGHTLY LOWER IN THE POST-DEVELOPMENT CONDITION DUE TO THE RUNOFF REDUCTION ACHIEVED BY INSTALLATION OF DRY SWALES, WHICH SATISFIES THE FLOOD PROTECTION CRITERIA OF 94VC25-670-66.**

- 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.
- 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.
- 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 COVERED BY 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 § 10.1-562 OR 10.1-570 OF THE ACT.
- 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 (VSMP) PERMIT REGULATIONS.
- N. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 4VAC50-60-65 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) PERMIT REGULATIONS SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF MINIMUM STANDARD 19.

COMMONWEALTH OF VIRGINIA

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9/24/2015

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ROANOKE, VIRGINIA

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NO SCALE

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