

- THE LOCATION OF EXISTING UTILITIES, INCLUDING UNDERGROUND UTILITIES, IS INDICATED ON THE DRAWINGS INsofar AS THEIR EXISTENCE AND LOCATION WERE KNOWN AT THE TIME OF PREPARATION OF THESE DRAWINGS. HOWEVER, NOTHING IN THESE CONTRACT DOCUMENTS SHALL BE CONSTRUED AS A GUARANTEE THAT SUCH UTILITIES ARE IN THE LOCATION INDICATED OR THAT THEY ACTUALLY EXIST, OR THAT OTHER UTILITIES ARE NOT WITHIN THE AREA OF OPERATIONS. THE CONTRACTOR SHALL MAKE ALL NECESSARY INVESTIGATIONS TO DETERMINE THE EXISTENCE AND LOCATIONS OF SUCH UTILITIES FAR ENOUGH IN ADVANCE TO ALLOW FOR ADJUSTMENTS DUE TO CONFLICTS IN THE HORIZONTAL AND VERTICAL LOCATION OF THE PIPE. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR MAINTENANCE AND PROTECTION OF EXISTING UTILITIES AND STRUCTURES.
2. THE CONTRACTOR SHALL OBTAIN FIELD UTILITY LOCATIONS BY CALLING "MISS UTILITY" (1-800-552-7001) AT LEAST 3 WORKING DAYS PRIOR TO ANY EXCAVATION ON THE SITE.
3. WATERLINES SHALL BE LAID TO LINES AND GRADES SHOWN ON THE DRAWINGS TO AVOID LOCAL HIGH POINTS AND LOW POINTS EXCEPT WHERE INDICATED.
4. HORIZONTAL AND VERTICAL DATUM IS VIRGINIA STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD 83.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THESE DRAWINGS AND THE TECHNICAL SPECIFICATIONS. THE CONTRACTOR SHALL MAINTAIN A COPY OF BOTH THE DRAWINGS AND TECHNICAL SPECIFICATIONS AT THE SITE AT ALL TIMES.
6. SITE IS LOCATED IN A RESIDENTIAL AREA AND EXISTING RESIDENCES ARE LOCATED IMMEDIATELY ADJACENT TO SITE. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO MINIMIZE DISTURBANCE TO ADJACENT PROPERTIES, INCLUDING PREVENTION OF DUST/DEBRIS INTRUSION ONTO PROPERTIES.
7. CONTRACTOR SHALL PROTECT EXISTING TREES FROM DAMAGE, UNLESS OTHERWISE ALLOWED BY OWNER IN WRITING. NO TREES SHALL BE REMOVED WITHOUT PRIOR WRITTEN APPROVAL OF THE OWNER.
8. CONTRACTOR SHALL PROVIDE THE CITY WITH A PLAN TO MAINTAIN WATER SERVICE TO ALL CUSTOMERS WITH MINIMUM DISRUPTION PRIOR TO START OF CONSTRUCTION. NOTIFICATION TO AFFECTED CUSTOMERS SHALL BE COORDINATED WITH CITY AND GIVEN 24 HOURS PRIOR TO DISRUPTION WHEN POSSIBLE.
9. THE USE OF TEMPORARY ABOVE GROUND LINES WILL BE ALLOWED TO FACILITATE INSTALLATION OF THE NEW LINES. THESE LINES SHALL BE PROTECTED DURING USE AND REMOVED WHEN NO LONGER NEEDED. COST OF ANY TEMPORARY LINES SHALL BE INCLUDED IN THE UNIT COST OF THE WATERLINE.
10. NEW SERVICE LINES SHALL BE INSTALLED FROM THE NEW WATERLINE TO THE EXISTING METER BOXES. SERVICE LINES SHALL BE TESTED WITH THE WATERLINE AND CONNECTED TO METERS AFTER PASSING REQUIRED TESTS.
11. LOCATION OF EXISTING UTILITIES IS APPROXIMATE AND FIELD ADJUSTMENTS TO PROPOSED WATERLINE SHALL BE MADE TO MAINTAIN PROPER CLEARANCES AND PROTECT OTHER UTILITIES. CONTRACTOR SHALL NOTIFY CITY OF ANY CONFLICTS PRIOR TO MAKING FIELD ADJUSTMENTS. ALL WORK SHALL BE MAINTAINED WITHIN EXISTING STREET RIGHT OF WAY.
12. ALL WORK IN MASON'S CREEK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF VMRC PERMIT NO. 08-0621 WHICH IS INCLUDED IN THE APPENDIX OF THE PROJECT MANUAL.

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

ES-2: ALL EROSION & SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

ES-3: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION & SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

ES-4: ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES & DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

ES-5: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUN-OFF PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

1. SEEDING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
2. WHEN PERMANENT SEEDING CANNOT OCCUR AT THE PROPER TIME, TEMPORARY SEEDING WILL BE PERFORMED TO BE FOLLOWED BY PERMANENT SEEDING.

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 AREA THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

MS-2 DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES 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.

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 IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.

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 LAND-RESTORING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

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

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.
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 SEDIMENT BASINS. 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.

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.

A. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITE SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE NATURAL OR MAN-MADE RECEIVING CHANNEL, PIPE OR PIPE 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 BED OR BANKS; OR
- (2) IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE TEN-YEAR STORM IS CONTAINED WITHIN THE APPURTENANCES; OR
- (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 PLAN-APPROVING AUTHORITY TO PREVENT DOWNSTREAM EROSION.

PER D. THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS.

ED TO E. ALL HYDROLOGIC ANALYSES SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT OF THE SUBJECT PROJECT.

ANY F. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION, HE SHALL OBTAIN APPROVAL FROM THE LOCALITY 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.

PER 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.

Y A 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.

UM, 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.

A. PROJECT DESCRIPTION

The project consists of two waterline extensions from Kesslers Mill Road to Sheraton Drive and along Kesslers Mill Road from I-81 to Route 311. The project consists of installation of approximately 4850 L.F. of 12" water line with appurtenances and retrofitting existing master meter vault with a magnetic flow meter.

B. EXISTING SITE CONDITIONS

The site is located in Roanoke County west of Interstate 81 and East of Thompson Memorial Drive. The Existing site is a grassy area between Kessler Mill Road and a multi-use trail. Currently stormwater drains through a series of pipes and ditches to Mason's Creek on the other side of Kessler Mill road.

C. ADJACENT PROPERTY

The project is bound by Kessler Mill Road on one side, and by a multi-use trail and Roanoke County Local Government buildings on the other side.

D. PLANNED EARTHWORK ACTIVITIES / OFF-SITE AREAS

The project will include approximately 4850 L.F. of trench to lay the 12" pipe. At this time it is not anticipated that any off-site areas will be affected. If off-site fill or borrow is required then the location of all off-site fill or borrow areas associated with the construction project will be provided to Roanoke County Department of Community Development. An Erosion Control Plan or measures may be required for this area.

According to the SCS soils information posted on-line, there are approximately two main soil groups in the project site. These are the Sindion Loom, 0 to 2 percent slopes, occasionally flooded, and Udorthents--Urban land complex. Map unit descriptions for these soils are as follows:

- 42A-- Sindion loam, 0 to 2 percent slopes, occasionally flooded
This Sindion series consists of very deep, moderately well drained soils formed in alluvium derived from limestone, sandstone, phyllite, siltstone, shale, granite, gneiss, schist, and basalt on flood plains. Permeability is moderate. Slopes range from 0 to 3 percent. Mean annual precipitation is about 42 inches, and mean annual air temperature is about 55 degrees F.
- 52 -- Udorthents--Urban land complex
This complex consists of moderately well drained to excessively drained soils that have been disturbed by cuffing or filling, and areas that are covered by buildings and pavement. The complex is about 70 percent Udorthents, 20 percent Udorthents, and 10 percent other soils. Udorthents are in areas that have been cut to a depth of 2 feet or more or are on areas with more than 2 feet of fill. Udorthents consist primarily of moderately coarse textured soil material and a few small areas of medium textured material.

F. CRITICAL AREAS

Critical areas include culvert and storm drain inlets. The proposed erosion and sediment control measures are intended to prevent sediment transport and promote stabilization.

All structural and vegetative erosion and sediment control practices will be constructed and maintained in accordance with the minimum standards and specifications of the "Virginia Erosion and Sediment Control Handbook" (VESCH), latest edition.

MINIMUM STANDARDS: All applicable Minimum Standards must be addressed. Specifically:

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 thirty (30) days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
2. Perimeter dikes and ditches, 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 land disturbance takes place.
3. Stabilization measures shall be applied to earthen structures such as dams, ditches, and diversions immediately after installation.
4. 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 each end of each day and all sediment shall be removed from the road by sweeping or washing 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.
5. All temporary erosion and sediment control measures shall be removed within thirty (30) days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the local program 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.

1. Silt Fence – Std & Spec 3.05

Silt fence shall be installed as shown on the Plan to detain sediment from disturbed areas during construction operations preventing sediment from leaving the site, as well as to decrease the velocity of low-to-moderate level channel flows.

2. STORM DRAIN Inlet Protection ~ Std & Spec 3.07

Storm drain inlet protection shall be placed at the existing grate inlet to prevent sediment from entering the storm drainage system. In areas where separate temporary sediment trap construction is not feasible, excavated storm inlet sediment traps have been specified.

3. CULVERT INLET PROTECTION - STD & SPEC 3.08

All culverts shall be protected during construction. Sediment laden runoff shall be filtered before entering storm drain inlets and piping systems.

4. MS-16: UTILITY INSTALLATION

No more than 500 linear feet of utility trench may be opened at one time. Excavated material shall be placed on the uphill side of trenches. Effluent from dewatering operations shall be filtered or passed through approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property. Backfill material shall be properly compacted to minimize erosion and promote stabilization.

GENERAL: A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized by pavement. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform and mature enough to survive and will inhibit erosion. New vegetation shall be maintained at a minimum of 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 VESCH Standard and Specification and the Erosion and Sediment Control Plan.

Permanent or temporary 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 dormant (undisturbed) for longer than 30 days. Permanent seeding shall 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.

1. TEMPORARY SEEDING – std & Spec 3.31

Temporary seeding shall be applied over cleared areas that will not be brought to final grade within 30 days. Temporary seeding mixes shall be as described on the detail sheets of the Erosion and Sediment Control Plan.

2. PERMANENT SEEDING – STD. & SPEC 3.32

Permanent seeding is proposed over all cleared areas. Permanent seeding mixes shall be as described on the Erosion and Sediment Control Plan or as shown on the detail drawings.

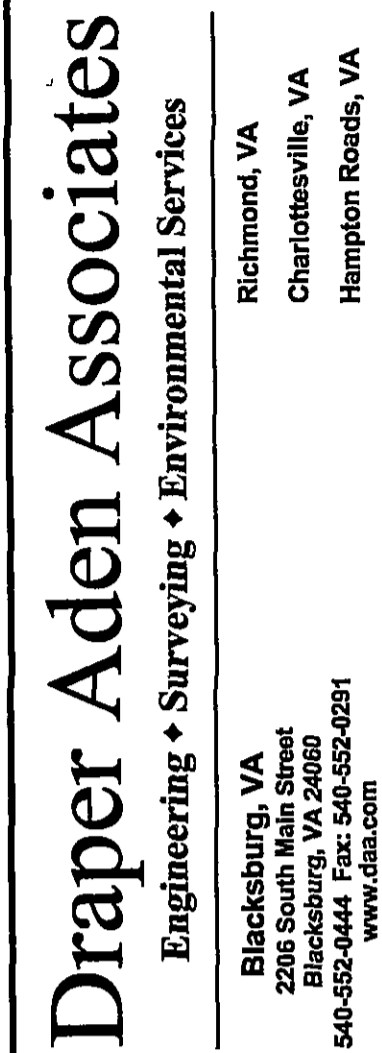
3. Mulching — std. & Spec 3.35

Mulch shall be applied in conjunction with temporary and permanent seeding as specified in TEMPORARY and PERMANENT SEEDING - Std. & Spec. 3.31 & 3.32.

J. STORMWATER CONSIDERATIONS

Since there are no proposed changes to the existing land use, there are not going to be any changes in drainage patterns or volumes.

EXISTING		PROPOSED	
---1000---	CONTOURS	---1000---	CONTOURS
	GROUND ELEVATION		GROUND ELEVATION
	TREE LINE	N/A	TREE LINE
---	STREAM	N/A	STREAM
	LIMITS OF CLEARING		LIMITS OF CLEARING
	DECIDUOUS TREE	N/A	DECIDUOUS TREE
	CONIFEROUS TREE	N/A	CONIFEROUS TREE
	SHRUB	N/A	SHRUB
---X---X---	FENCE	---X---X---	FENCE
---	PROPERTY LINE/ROW	---	PROPERTY LINE/ROW
○	IRON ROD FOUND	○	IRON ROD FOUND
●	IRON ROD SET	●	IRON ROD SET
□	MONUMENT FOUND	□	MONUMENT FOUND
■	MONUMENT SET	■	MONUMENT SET
---	EASEMENT	---	EASEMENT
.....	100 YEAR FLOOD ZONE	N/A	100 YEAR FLOOD ZONE
---	LIMITS OF CONSTRUCTION		LIMITS OF CONSTRUCTION
	BENCHMARK		BENCHMARK
	BUILDING		BUILDING
---	HEAVY DUTY PAVEMENT		HEAVY DUTY PAVEMENT
---	STANDARD DUTY PAVEMENT		STANDARD DUTY PAVEMENT
---	CONCRETE		CONCRETE
---	DEMOLITION		DEMOLITION
DEMOLITION KEY			
	SIGN		SIGN
	BOLLARD		BOLLARD
	BOREHOLE		BOREHOLE
	METAL POST		METAL POST
	WOOD POST		WOOD POST
	TEST PIT		TEST PIT
==	STORM SEWER	==	STORM SEWER
○	STORM CLEANOUT	●	STORM CLEANOUT
○	STORM MANHOLE	●	STORM MANHOLE
□	STORM DRAINAGE INLET	□	STORM DRAINAGE INLET
1	STORM STRUCTURE KEY	1	STORM STRUCTURE KEY
ss	SANITARY SEWER	ss	SANITARY SEWER
fm	FORCE MAIN	fm	FORCE MAIN
○	SANITARY CLEANOUT	●	SANITARY CLEANOUT
○	SANITARY MANHOLE	●	SANITARY MANHOLE
1	SANITARY STRUCTURE KEY	1	SANITARY STRUCTURE KEY
uge	UNDERGROUND ELECTRIC	uge	UNDERGROUND ELECTRIC
ohp	OVERHEAD POWER	ohp	OVERHEAD POWER
○	LIGHT POLE	○	LIGHT POLE
○	ELECTRIC POLE	○	ELECTRIC POLE
ⓔ	ELECTRIC MANHOLE	ⓔ	ELECTRIC MANHOLE
w	WATER	w	WATER
⊗	WATER VALVE	⊗	WATER VALVE
⊗	POST INDICATOR VALVE	⊗	POST INDICATOR VALVE
⊗	AIR RELEASE VALVE	⊗	AIR RELEASE VALVE
○	BLOW OFF VALVE	●	BLOW OFF VALVE
⊗	GATE VALVE	⊗	GATE VALVE
⋈	BUTTERFLY VALVE	⋈	BUTTERFLY VALVE
⋈	B.F. VALVE w/OPERATOR	⋈	B.F. VALVE w/OPERATOR
⋈	SIAMESE CONNECTION	⋈	SIAMESE CONNECTION
○	FIRE HYDRANT	○	FIRE HYDRANT
○	HOSE BIB	○	HOSE BIB
⊗	WATER METER	⊗	WATER METER
⊗	WATER MANHOLE	⊗	WATER MANHOLE
⊗	WELL	⊗	WELL
com	GENERIC COMMUNICATION	com	GENERIC COMMUNICATION
ugc	UNDERGROUND COMMUNICATION	ugc	UNDERGROUND COMMUNICATION
ohc	OVERHEAD COMMUNICATIONS	ohc	OVERHEAD COMMUNICATIONS
fo	FIBER OPTICS	fo	FIBER OPTICS
ⓔ	FIBER OPTICS MANHOLE	ⓔ	FIBER OPTICS MANHOLE
ⓔ	FIBER OPTICS PEDESTAL	ⓔ	FIBER OPTICS PEDESTAL
catv	CABLE TV	catv	CABLE TV
ⓔ	CABLE TV MANHOLE	ⓔ	CABLE TV MANHOLE
ⓔ	CABLE TV PEDESTAL	ⓔ	CABLE TV PEDESTAL
t	TELEPHONE LINE	t	TELEPHONE LINE
oht	OVERHEAD TELEPHONE	oht	OVERHEAD TELEPHONE
ugt	UNDERGROUND TELEPHONE	ugt	UNDERGROUND TELEPHONE
ⓔ	TELEPHONE BOX	ⓔ	TELEPHONE BOX
ⓔ	TELEPHONE MANHOLE	ⓔ	TELEPHONE MANHOLE
○	TELEPHONE PEDESTAL	○	TELEPHONE PEDESTAL
○	TELEPHONE POLE	○	TELEPHONE POLE
g	GAS LINE	g	GAS LINE
ⓔ	GAS DRIP	ⓔ	GAS DRIP
ⓔ	GAS METER	ⓔ	GAS METER
ⓔ	GAS MANHOLE	ⓔ	GAS MANHOLE
○	GAS VALVE	○	GAS VALVE



07/31/08
PER ROANOKE COUNTY DCI

11. *Journal of the American Medical Association*, 273:1225-1226, 1995

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