

CONSTRUCTION PLANS STREAM RESTORATION AND BMP RETROFITS DARE ELEMENTARY YORK COUNTY, VIRGINIA

APPLICANT/OWNER

YORK COUNTY, VIRGINIA
ENVIRONMENTAL AND DEVELOPMENT SERVICES
120 ALEXANDER HAMILTON BOULEVARD
P.O. BOX 532
YORKTOWN, VIRGINIA 23690
ATTN: MRS. CONNIE BENNETT, P.E.

BASE INFORMATION

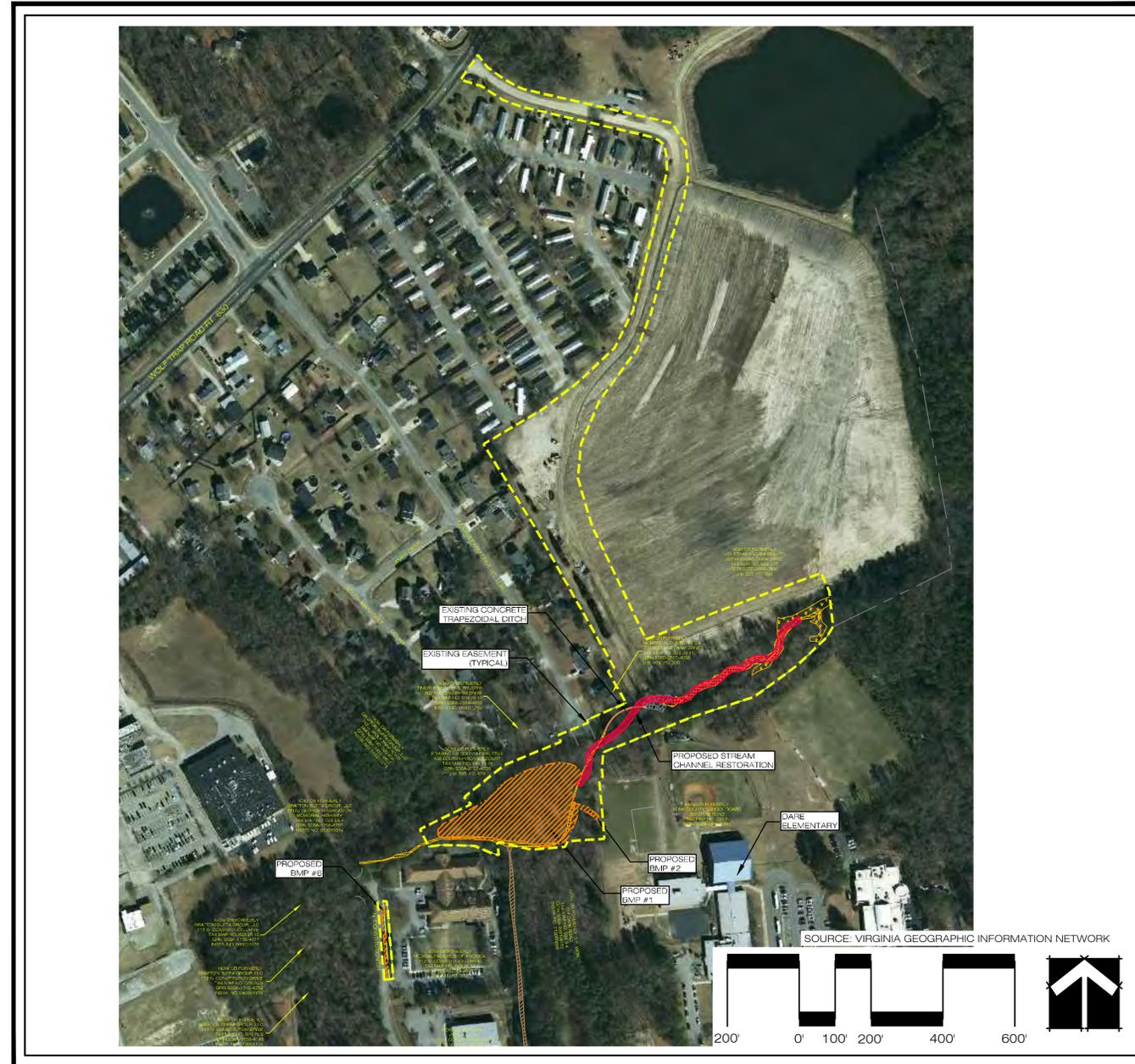
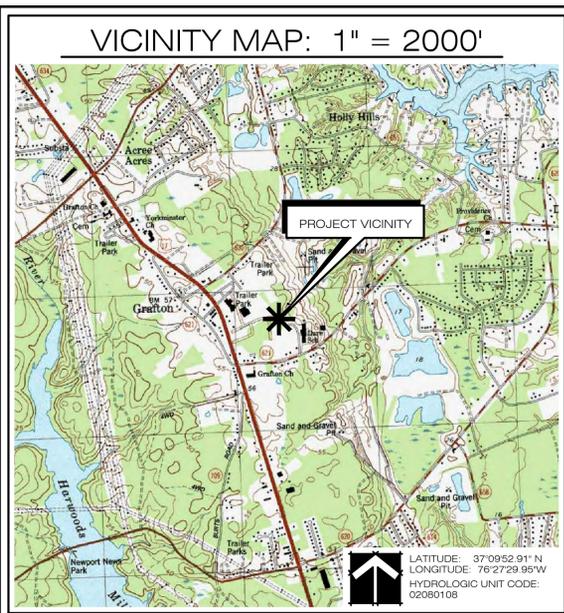
YORK COUNTY, VIRGINIA	AES CONSULTING ENGINEERS
OFFICE OF GEOGRAPHIC INFORMATION	5248 OLDE TOWNE ROAD SUITE 1
120 ALEXANDER HAMILTON BOULEVARD	WILLIAMSBURG, VIRGINIA 23188
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YORKTOWN, VIRGINIA 23690	FAX: (757) 220-8994
ATTN: MS. STEPHANIE PETERS	ATTN: GRAHAM CORSON, P.E.
	SURVEY WORK DATED: 03/19/2012
	DATUM INFORMATION:
	HORIZONTAL - NAD83 SOUTH
	VERTICAL - NAVD29

ENGINEER

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
5209 CENTER STREET
WILLIAMSBURG, VIRGINIA 23188
(757) 220-6869
ATTN: J. GLENN MUCKLEY, P.E.

STATISTICAL DATA

PROJECT LIMITS (APPROXIMATE):	10.69 ACRES ±
LIMITS OF DISTURBANCE (APPROXIMATE):	4.71 ACRES ±
EXISTING WETLANDS:	0.16 ACRES ±
EXISTING STREAM CHANNEL: (EXCLUDING WETLANDS):	0.24 ACRES ± (1,462 L.F. ±)
JURISDICTIONAL DITCH	0.21 ACRES ± (1,462 L.F. ±)
PROPOSED LIMITS OF GRADING:	2.79 ACRES ±
PROPOSED STREAM CHANNEL RESTORATION:	860 L.F. ±



PROJECT NARRATIVE:

THE DARE ELEMENTARY SCHOOL STREAM RESTORATION PROJECT FOR YORK COUNTY, VIRGINIA INVOLVES THE STABILIZATION OF A HIGHLY DEGRADED STREAM CHANNEL THROUGH THE IMPLEMENTATION OF STREAM RESTORATION PRACTICES AND STRUCTURAL BEST MANAGEMENT PRACTICES (BMP). THE COUNTY PROPOSES RESTORATION OF 860 LINEAR FEET (LF) OF AN UNNAMED TRIBUTARY OF CHISMAN CREEK WITHIN THE LYNNHAVEN-POQUOSON DRAINAGE BASIN (HUC: 02080108). THE PROJECT CHANNEL RECEIVES MULTIPLE SOURCES OF UNCONTROLLED STORMWATER DRAINAGE INPUTS FROM DEVELOPMENT AND GEORGE WASHINGTON MEMORIAL HIGHWAY (U.S. ROUTE 17). AS SUCH, SEVERAL ADDITIONAL STRUCTURAL WATER QUALITY BMPs ARE PROPOSED UPSTREAM OF THE RESTORATION REACH. THESE BMPs INCLUDE A CONSTRUCTED WETLAND, WATER QUALITY SWALES, AND AMENDED SUBSTRATE IN DRY SWALES. ALL BMPs ARE INTENDED TO PROVIDE WATER QUALITY RETROFIT ENHANCEMENTS, WHILE THE CONSTRUCTED WETLAND (BMP1), WILL AID IN CONTROLLING WATER QUALITY VOLUMES.

THE EXISTING CHARACTERISTICS AND CONDITION OF THE DEGRADED PROJECT REACH CAN BE BRIEFLY SUMMARIZED BY THE FOLLOWING:

- HIGH STORMWATER VELOCITIES AND SHEARS ALONG STRAIGHTENED CONVEYANCE CHANNELS HAVE LED TO MULTIPLE AREAS OF LATERAL AND VERTICAL INSTABILITIES;
- DOWNCUTTING AND HEADCUT MIGRATION HAS RESULTED IN SEVERE CHANNEL INCISION (BANK HEIGHT RATIOS > 2), BEGINNING AT AN UNDERSIZED CULVERT AT THE UPPER EXTENT OF THE REACH;
- A SEVERE HEADCUT HAS DEVELOPED DOWNSTREAM OF A CONCRETE TRAPEZOIDAL DITCH. STORMWATER VELOCITIES OVER THE HEADCUT HAS LED TO SEVERE CHANNEL INSTABILITIES DOWNSTREAM, RESULTING IN MASS WASTING, TREE LOSS, AND DANGEROUS SLOPE CONDITIONS WITHIN CLOSE PROXIMITY TO DARE ELEMENTARY SCHOOL AND HIKING TRAILS;
- THE CHANNEL DOWNSTREAM OF THE HEADCUT IS LATERALLY EXPANDING DUE TO A RESISTANT CALCAREOUS LAYER CALLED THE YORKTOWN FORMATION. THIS LATERAL EXPANSION CONTINUES TO DESTABILIZE TOE SLOPES CAUSING SEVERE BANK EROSION, TREE LOSS, AND DANGEROUS LOCALIZED SLOPE CONDITIONS.

THE PROPOSED STREAM RESTORATION AND BMP IMPLEMENTATION PLAN HEREIN INCORPORATES SEVERAL GOALS:

- IMPROVE CHANNEL STABILITY AND BANK FORM AND FUNCTION;
- ALLEVIATE PROFILE INSTABILITIES AND CORRECT SEVERE HEADCUTS THROUGH A MORE COMPREHENSIVE STREAM RESTORATION PLAN IN LIEU OF LOCALIZED HEADCUT STABILIZATION;
- INCREASE FLOODPLAIN CONNECTIVITY AND STORMWATER ATTENUATION;
- INSTALL STABLE GRADE CONTROLS AND ENHANCE HABITAT AVAILABILITY WITHIN THE CHANNEL, UTILIZING LOCALLY AVAILABLE AND NATIVE MATERIALS WHERE PRACTICABLE;
- PROVIDE HABITAT AND GRADE CONTROL THROUGH CONSTRUCTED RIFFLE AND POOL SEQUENCES, ROCK CASCADES, AND SUBSTRATE ENHANCEMENT;
- SAFEGUARD THE LANDFILL AND SCHOOL PROPERTY FROM STORMWATER EVENT DAMAGE AND ENCROACHMENT;
- PREVENT FURTHER COSTS AND MAINTENANCE OF THE HEADCUT AREAS AND AREAS OF ACTIVE BANK EROSION BY CONSTRUCTING A STABLE, CONTIGUOUS STREAM CORRIDOR;
- PROVIDE EDUCATIONAL AND OUTREACH OPPORTUNITY SHOWCASING ECOLOGICAL AND BIOLOGICAL BENEFITS OF THE STREAM RESTORATION PLAN.

THE PROJECT WILL NECESSITATE THE PARTIAL CLEARING OF THE EXISTING STREAM BUFFER TO ACCOMPLISH THESE OVERALL GOALS. A SUBSTANTIAL AMOUNT OF EARTHWORK WILL TAKE PLACE DUE TO EXCAVATION OF THE CONSTRUCTED WETLAND AREA. THIS MATERIAL WILL BE REUSED ONSITE IN THE CONSTRUCTION OF THE STREAM RESTORATION REACH. SENSITIVE AREAS DOWNSTREAM WILL BE PROTECTED THROUGH DAILY MANAGEMENT OF CONSTRUCTION OPERATIONS IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN PROVIDED WITHIN THESE PLANS. DISTURBANCE WITHIN THE CORRIDOR WILL BE STABILIZED THROUGH A VARIETY OF NATURAL VEGETATIVE PLANTING PRACTICES AND STONE ARMORING.

SHEET INDEX:

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2. EXISTING CONDITIONS - NORTH
3. EXISTING CONDITIONS - SOUTH
4. MASTER PLAN
5. CONSTRUCTED WETLAND DESIGN - BMP #1
6. CONSTRUCTED WETLAND SECTIONS AND DETAILS - BMP #1
7. GRASSSED CHANNEL DESIGN AND DETAILS - BMP #2
8. GRASSSED CHANNEL DESIGN AND DETAILS - BMP #6
9. BMP CONSTRUCTION NOTES AND DETAILS
10. STREAM - PLAN AND PROFILE
11. STREAM - PLAN AND PROFILE CONTINUED
12. STREAM CROSS-SECTIONS (1)
13. STREAM CROSS-SECTIONS (2)
14. STREAM RESTORATION NOTES AND DETAILS (1)
15. STREAM RESTORATION NOTES AND DETAILS (2)
16. STREAM RESTORATION NOTES AND DETAILS (3)
17. EROSION AND SEDIMENT CONTROL PLAN - PHASE 1
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19. EROSION AND SEDIMENT CONTROL PLAN - PHASE 3
20. EROSION AND SEDIMENT CONTROL PLAN - NOTES AND DETAILS
21. PLANTING PLAN - BMP #1 & BMP #2
22. PLANTING PLAN - STREAM RESTORATION
23. HYDROLOGY AND HYDRAULIC SUMMARY
24. GEOTECHNICAL BORING LOGS

REVISIONS:	
DATE	DATE

JANUARY 6, 2014

APPROVED FOR CONSTRUCTION
COUNTY OF YORK, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL &
DEVELOPMENT SERVICES

REVIEWED	DATE



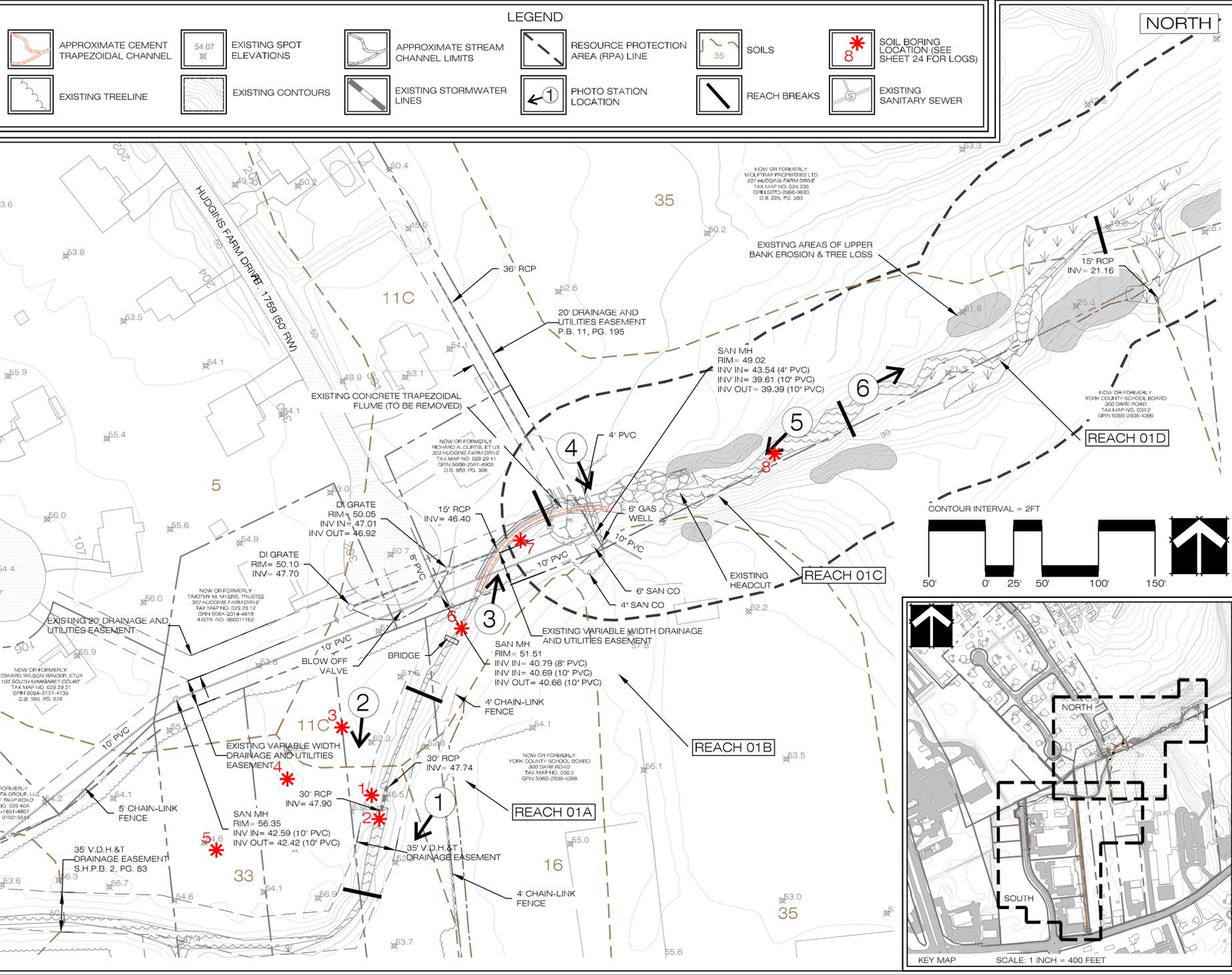
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Environmental Consultants

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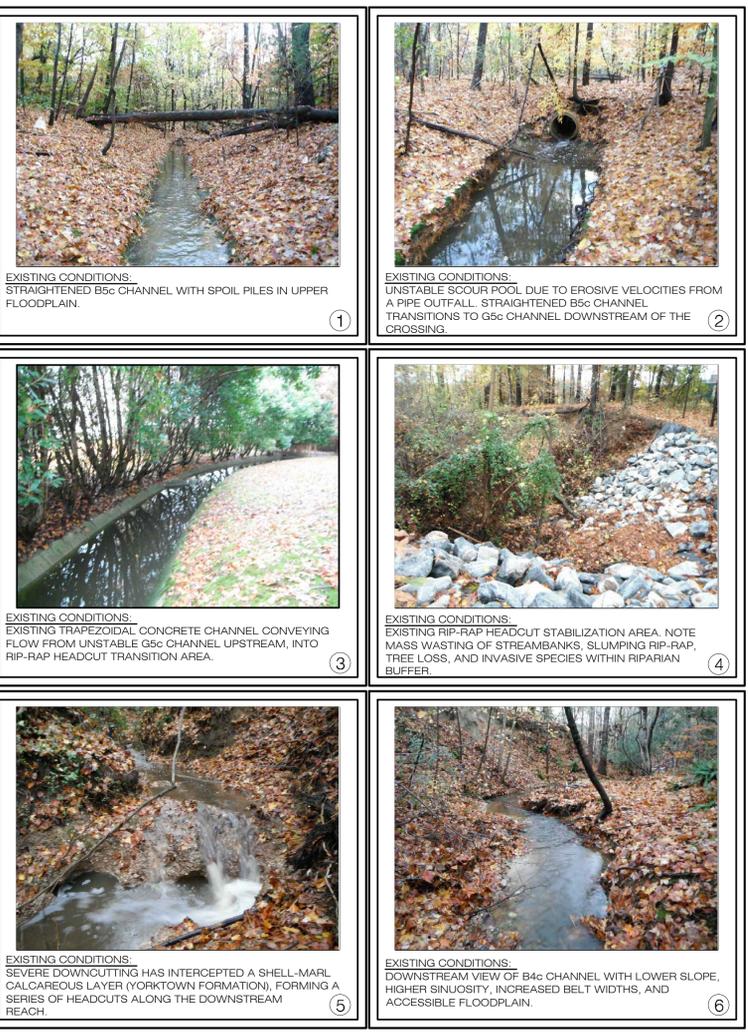


EXISTING CONDITIONS SUMMARY

CHANNEL IMPROVEMENTS ARE PROPOSED FOR AN UNNAMED TRIBUTARY TO CHISMAN CREEK IN YORK COUNTY, VIRGINIA. THE STREAM STUDY REACH ORIGINATES ON THE EASTERN SIDE OF GEORGE WASHINGTON MEMORIAL HIGHWAY (U.S. ROUTE 17) AND FLOWS THROUGH A MIXED LAND USE WATERSHED, WITH DARE ELEMENTARY SCHOOL ON ITS RIGHT BANK AND A CONSTRUCTION LANDFILL FACILITY ALONG ITS LEFT BANK. THE EXISTING RIPARIAN BUFFER CONSISTS OF MATURE MIXED HARDWOODS AND LOBLOLLY PINE, WITH RIPARIAN BUFFER WIDTHS VARYING BETWEEN 25 AND OVER 100 FEET.

THE PROPOSED RESTORATION AREA BEGINS JUST ABOVE A FALLING REINFORCED CONCRETE PIPE AND EARTHEN CROSSING. THE UPPER-MOST REACH (01A) IS LARGELY CHARACTERIZED AS A ROSSGEN B5c STREAM TYPE, WHICH IS A RELATIVELY STABLE, MODERATELY ENTRENCHED SYSTEM. EVIDENCE OF HISTORIC SPOIL PILES AT THE TOP OF BANK, ARE LOCATED DOWNSTREAM OF THE CROSSING. A DEEPLY INCISED SCOUR POOL MARKS THE BEGINNING OF REACH 01B. REACH 01B IS CLASSIFIED AS AN UNSTABLE G5c, WHICH IS A CHARACTERIZED BY ENTRENCHMENT WITH VERTICAL ERODING BANKS AND LOW WIDTH/DEPTH RATIO. REACH 01B INCLUDES AN APPROXIMATELY 150-FOOT TRAPEZOIDAL CONCRETE DITCH THAT BISECTS A MAINTAINED RESIDENTIAL LAWN. REACH 01C ORIGINATES DOWNSTREAM OF THE CONCRETE DITCH. WITHIN THIS REACH, A HISTORIC SEVERE HEADCUT HAS UNDERGONE A NUMBER OF FAILED STABILIZATION TREATMENTS. CURRENTLY THE HEADCUT HAS BEEN STABILIZED BY APPROXIMATELY 185-TONS OF CLASS I RIP-RAP, AN UNKNOWN AMOUNT OF CLASS II RIP-RAP, AND GABION BASKETS ALONG THE RIGHT BANK WALL. THE LARGE VOLUME OF RIP-RAP CURRENTLY SERVES TO DISSIPATE THE ENERGY OF THE FALLING WATER. REACH 01C DROPS STEEPLY IN ELEVATION, APPROACHING SLOPES OF 23% BEFORE INTERCEPTING A RESISTANT, SHELL-RICH CALCAREOUS LAYER CALLED THE YORKTOWN FORMATION. REACH 01C IS CHARACTERIZED AS A G5a AND G5 STREAM TYPE (DEPENDANT ON LOCALIZED SLOPES). THIS HEAVILY ENTRENCHED REACH HAS BEEN VERTICALLY CONSTRAINED BY THE RESISTANT SHELL LAYER, RESULTING IN WIDESPREAD LATERAL INSTABILITIES. DUE TO MASS WASTING OF STEEP SIDE SLOPES AND RESULTANT TREE LOSS, TOP OF BANK AREAS HAVE BECOME DANGEROUS WITH NEAR VERTICAL DROPS OF 20+ FEET IN CLOSE PROXIMITY TO WALKING TRAILS AND DARE ELEMENTARY SCHOOL. REACH 01D BEGINS WHERE THE VALLEY BROADENS, ALLOWING LATERAL FLOODPRONE RELIEF, WIDER BELT WIDTHS, AND MORE STABLE STREAM CONDITIONS. REACH 01D IS CLASSIFIED AS A STABLE B4c, WITH LOCALIZED AREAS OF EROSION AT THE TOE OF SLOPE. SIDE SLOPES REMAIN STEEP ALONG THE UPPER LEFT BANK, WITH A NARROW RIPARIAN BUFFER ADJACENT TO THE CONSTRUCTION LANDFILL PROPERTY.

THE SUBJECT CHANNEL, A TRIBUTARY TO CHISMAN CREEK DRAINING APPROXIMATELY 0.15 SQ. MI. (98-ACRES) AT THE DOWNSTREAM TERMINUS, WAS ANALYZED WITH PRELIMINARY HYDROLOGIC ANALYSIS (TR-55 METHODOLOGY) IN ORDER TO EVALUATE PEAK DISCHARGES ASSOCIATED WITH VARIOUS STORM EVENTS. THESE STORM EVENTS INCLUDE THE 1-YEAR, 2-YEAR, AND 10-YEAR DISCHARGE, TO BE USED IN SUPPORT OF NATURAL CHANNEL DESIGN AND FLOODPLAIN ANALYSES. BY COMPARING RESULTS OF THE TR-55 METHODOLOGY TO THE REGIONAL CURVE DATA FOR VA, MD NEW COASTAL PLAIN (USGS REPORT 2007-5162), THE TR-55 METHODOLOGY FLOWS WERE FOUND TO BE SIGNIFICANTLY HIGHER AS A RESULT OF LIMITED STORMWATER MANAGEMENT CONTROLS IN THE WATERSHED, AND CONTRIBUTING TO THE CURRENT DEGRADED CONDITION.



SOIL SERIES SUMMARY

MAP SYMBOL	SOIL NAME	SLOPE (%)	DRAINAGE	SOIL PROFILE DEPTHS	WATER TABLE / FLOODING FREQUENCY	HYDRIC	PERMEABILITY (Ksat)	HYDROLOGIC SOIL GROUP	DEPTH TO BEDROCK
1	ALTAVISTA FINE SANDY LOAM	0-3	MODERATELY WELL	DEEP	1.5-2.5 FEET/ NONE	N	MODERATELY	C	>5 FEET
5	BERTHERA SILT LOAM	0-2	POORLY	DEEP	0 FEET/ NONE	Y	SLOW	D	>5 FEET
11C	GRAVEN-UCHEEC COMPLEX	6-10	MODERATELY WELL - WELL	DEEP	2-3 FEET/ NONE	N	SLOW - MODERATELY	C	>5 FEET
16	IZAGORA LOAM	0-3	MODERATELY WELL	DEEP	1.5-3 FEET/ NONE	N	MODERATELY - SLOW	C	>5 FEET
33	TOMOTLEY FINE SANDY LOAM	0-2	POORLY	DEEP	0-1 FOOT/ NONE	Y	MODERATELY - MODERATELY SLOW	B/D	>5 FEET
35	UDORTHENTS, LOAMY	0-70	WELL - MODERATELY WELL	DEEP	>5 FEET/ NONE	N	MODERATELY RAPID - SLOW	--	>5 FEET

SOURCE: U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR FAUQUIER COUNTY, VIRGINIA

EXISTING HYDROLOGY & HYDRAULICS

APPROXIMATE DRAINAGE AREA IS 98-ACRES AT DOWNSTREAM TERMINUS OF REACH 01D

STORM FREQUENCY	DISCHARGE (CFS)	VELOCITY (FT/S)	SHEAR (LB/FT ²)
1 YEAR	80.49	4.22	0.62
2 YEAR	110.49	4.51	0.68
10 YEAR	208.24	5.36	0.89

UTILIZING TR-55 METHODOLOGY

REGIONAL CURVE INFORMATION

CALCULATED WITH A DRAINAGE AREA OF 98-ACRES AT THE TERMINUS OF REACH 01D

REGIONAL CURVE	AREA (A)	WIDTH (W)	DEPTH (D)	DISCHARGE (CFS)
VA, MD NEW COASTAL PLAIN (USGS REPORT 2007-5162)	3.6 SF	5.3 FT	0.7 FT	9.2 CFS

NOTE: "REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES" FOR PROPOSED DARE ELEMENTARY SCHOOL DRAINAGE IMPROVEMENTS, AS PREPARED BY G E T SOLUTIONS, INC. ON DECEMBER 19, 2012. SEE SHEETS 13 - 18 OF THIS PLAN SET FOR DETAILED GEOTECHNICAL BORING LOGS.

GEOMORPHOLOGIC SUMMARY DATA

STREAM REACH	STREAM TYPE	BANKFULL X-SECT AREA	BANKFULL WIDTH	BANKFULL MEAN DEPTH	W/D RATIO	FLOODPRONE WIDTH	ER	SINUOSITY	CHANNEL SLOPE	VALLEY SLOPE
REACH 01A	B5c	2.26 FT ²	4.53 FT	0.5 FT	9.06	8.97	1.98	1.01	0.003 FT/FT	0.003 FT/FT
REACH 01B	G5c*	3.04 FT ²	4.1 FT	0.74 FT	5.54	5.61	1.37	1.01	0.004 FT/FT	0.004 FT/FT
REACH 01C	G5/G5a*	3.04 FT ²	4.1 FT	0.74 FT	5.54	5.61	1.37	1.11	0.009 FT/FT	0.10 FT/FT
REACH 01D	B4c	3.86 FT ²	7.21 FT	0.54 FT	13.4	10.8	1.49	1.25	0.008 FT/FT	0.010 FT/FT

* DENOTES UNSTABLE STREAM REACH

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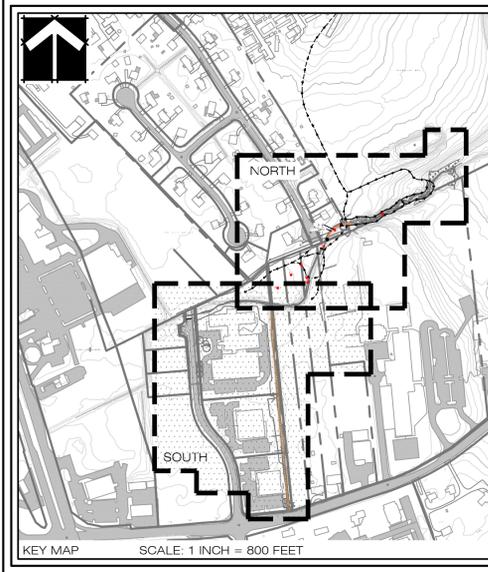
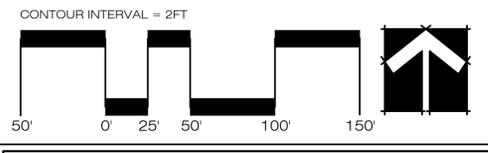
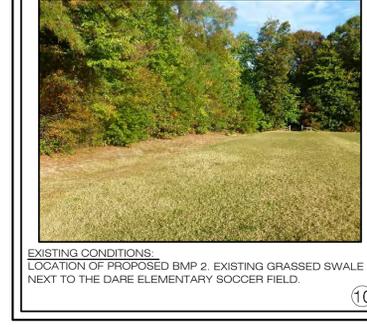
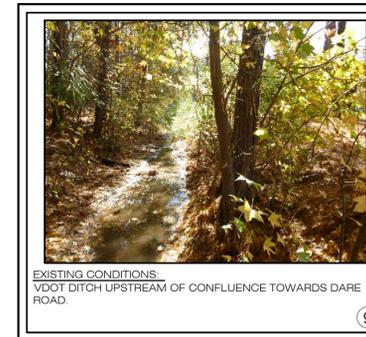
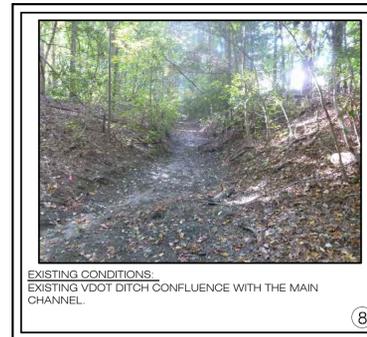
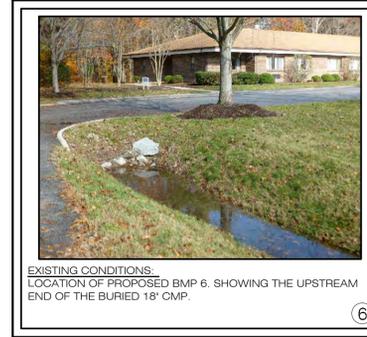
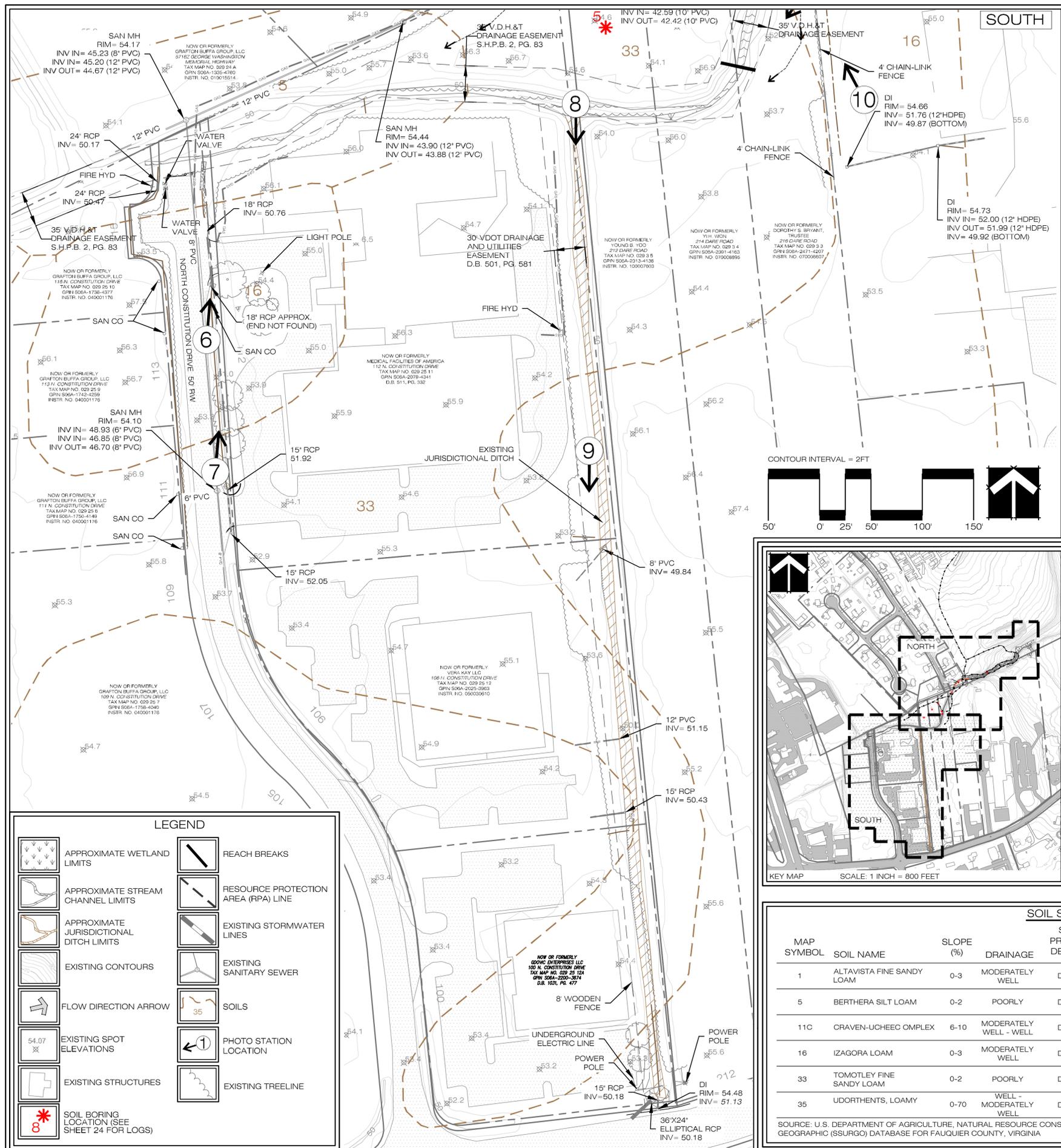
WEG
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Environmental Consultants

EXISTING CONDITIONS - NORTH
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
J. GLENN MUCKLEY
Lic. No. 038970
1-6-14
PROFESSIONAL ENGINEER

REVISIONS:
DATE: _____

DRAWN BY: JWR
DESIGNED BY: JWR
DATE: 01/06/14
CHECKED BY: JWR/BGM
SCALE: AS NOTED
SHEET: 2
JOB#: 4656



LEGEND

	APPROXIMATE WETLAND LIMITS		REACH BREAKS
	APPROXIMATE STREAM CHANNEL LIMITS		RESOURCE PROTECTION AREA (RPA) LINE
	APPROXIMATE JURISDICTIONAL DITCH LIMITS		EXISTING STORMWATER LINES
	EXISTING CONTOURS		EXISTING SANITARY SEWER
	FLOW DIRECTION ARROW		SOILS
	EXISTING SPOT ELEVATIONS		PHOTO STATION LOCATION
	EXISTING STRUCTURES		EXISTING TREELINE
	SOIL BORING LOCATION (SEE SHEET 24 FOR LOGS)		

SOIL SERIES SUMMARY

MAP SYMBOL	SOIL NAME	SLOPE (%)	DRAINAGE	SOIL PROFILE DEPTHS	WATER TABLE / FLOODING FREQUENCY	HYDRIC	PERMEABILITY (Ksat)	HYDROLOGIC SOIL GROUP	DEPTH TO BEDROCK
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33	TOMOTLEY FINE SANDY LOAM	0-2	POORLY	DEEP	0-1 FOOT/ NONE	Y	MODERATELY - MODERATELY SLOW	B/D	>5 FEET
35	UDORTHERTS, LOAMY	0-70	WELL - MODERATELY WELL	DEEP	>5 FEET/ NONE	N	MODERATELY RAPID - SLOW	--	>5 FEET

SOURCE: U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE FOR FAUQUIER COUNTY, VIRGINIA

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GROUP, INC.

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EXISTING CONDITIONS - SOUTH
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA

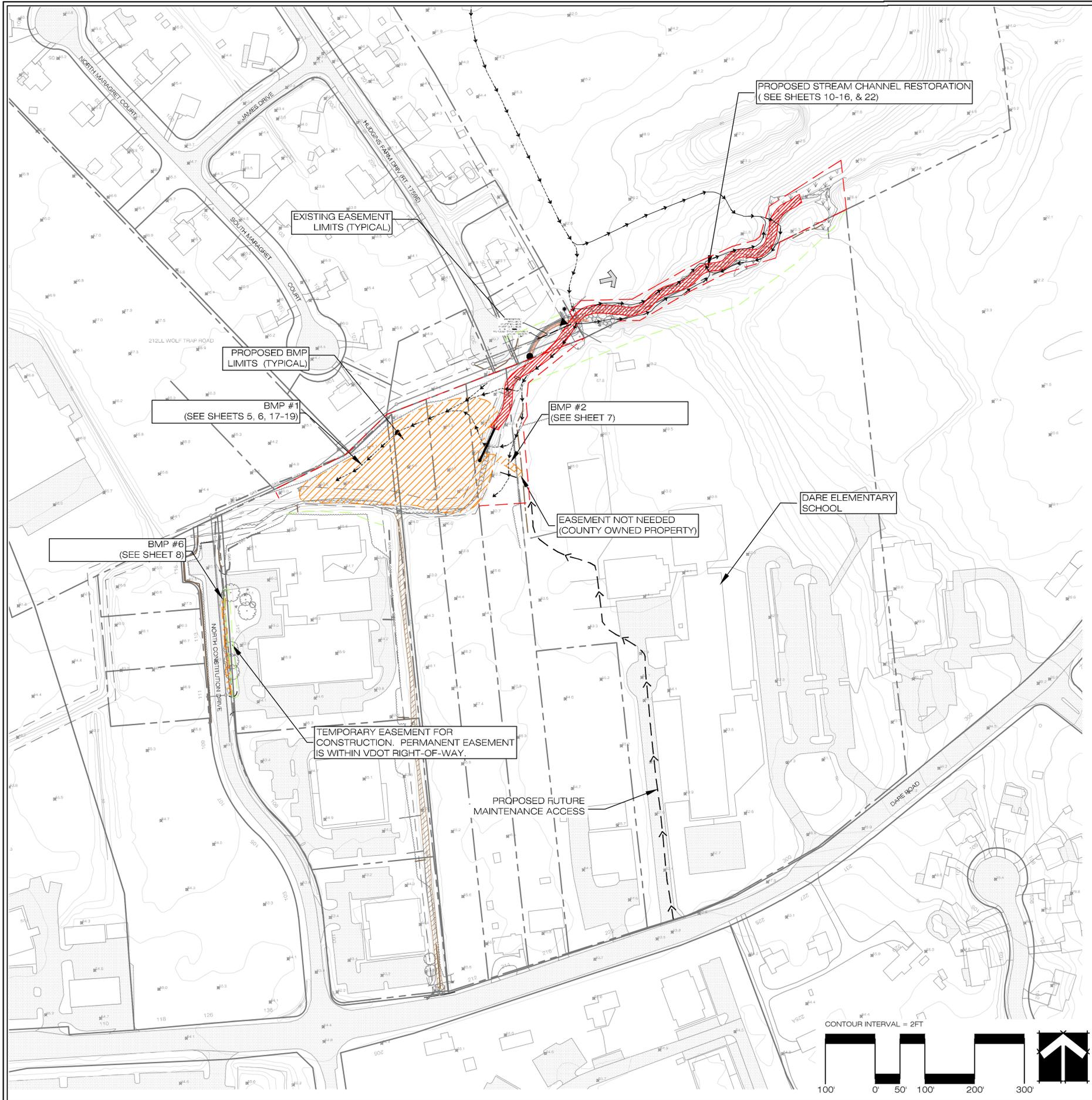
COMMONWEALTH OF VIRGINIA
GLENN MUCKLEY
Lic. No. 038970
1-6-14
PROFESSIONAL ENGINEER

REVISIONS:

DATE	DESCRIPTION

DRAWN BY: JWS
DESIGNED BY: JWS
DATE: 01/06/14
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SCALE: AS NOTED
SHEET: **3**
JOB#: 4656

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LEGEND:

	APPROXIMATE WETLAND LIMITS		AREA BENCHMARKS		PROPOSED BMP LIMITS
	APPROXIMATE STREAM CHANNEL LIMITS		EXISTING RIPRAP (BY OTHERS)		PROPOSED STREAM PATTERN (860 L.F. ±)
	APPROXIMATE JURISDICTIONAL DITCH LIMITS		FLOW DIRECTION ARROW		TEMPORARY EASEMENT LIMITS
	SURVEYED SPECIMEN TREES		ESTIMATED LIMITS OF GRADING		PROPOSED CONSTRUCTION ACCESS ROUTE
	EXISTING TOPOGRAPHY		PROPOSED FUTURE MAINTENANCE ACCESS		EXISTING SANITARY SEWER
	EXISTING EASEMENT LIMITS		PROPOSED EASEMENT LIMITS		

**MASTER PLAN
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**



REVISIONS:

NO.	DATE	DESCRIPTION

DRAWN BY: TSB
DESIGNED BY: JWR
DATE: 01/06/14
CHECKED BY: JWR/BGM
SCALE: AS NOTED
SHEET: 4
JOB#: 4656

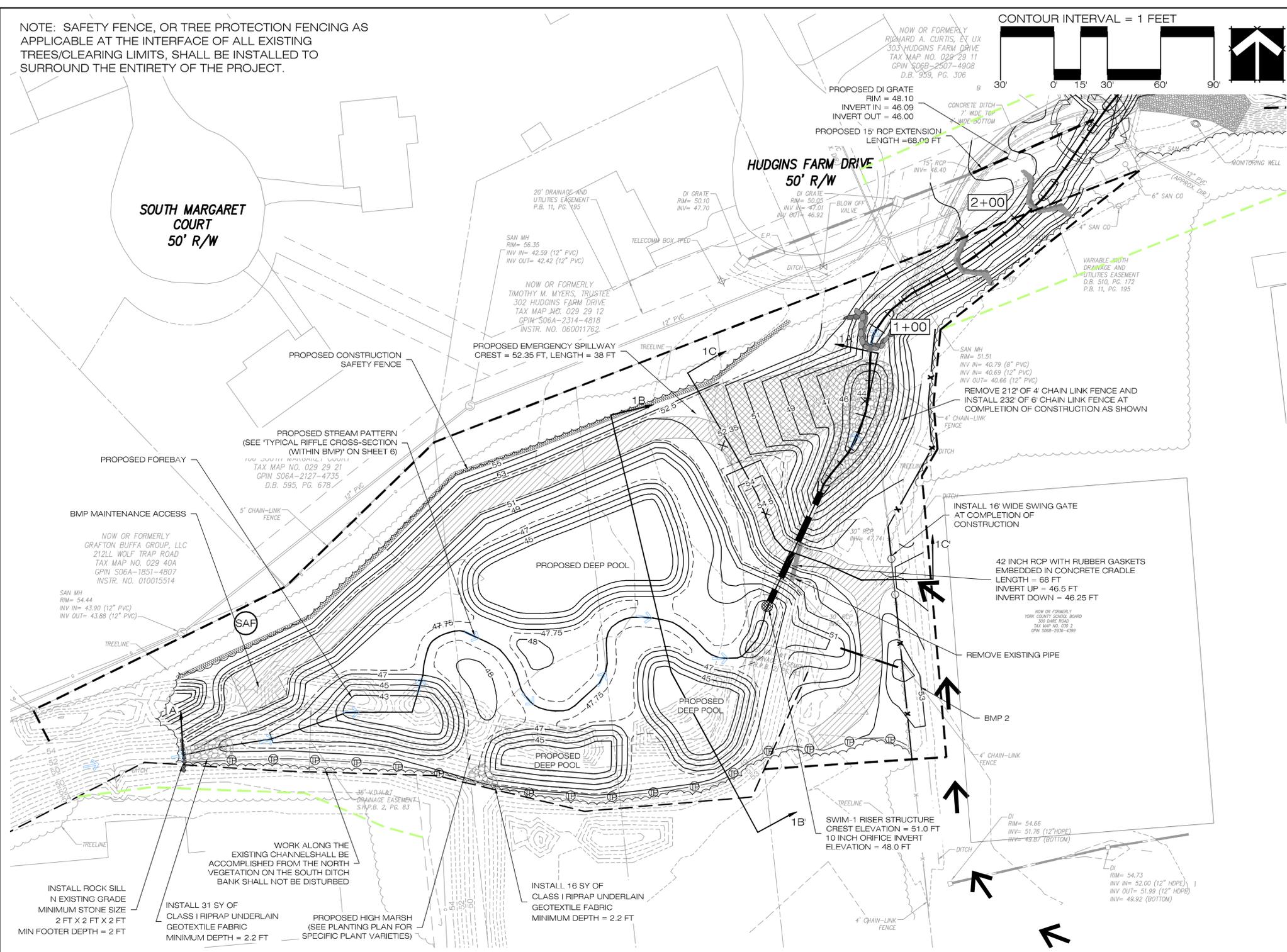
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ENVIRONMENTAL
GROUP, INC.

Environmental Consultants

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NOTE: SAFETY FENCE, OR TREE PROTECTION FENCING AS APPLICABLE AT THE INTERFACE OF ALL EXISTING TREES/CLEARING LIMITS, SHALL BE INSTALLED TO SURROUND THE ENTIRETY OF THE PROJECT.



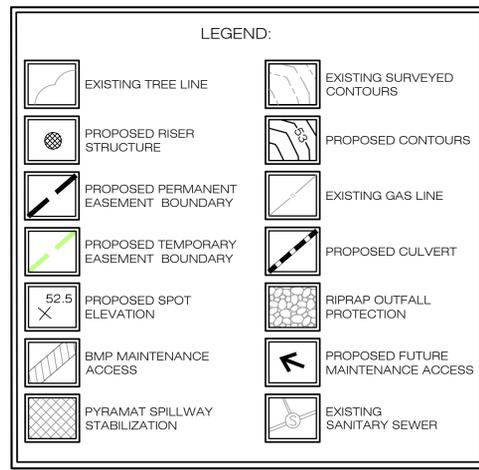
WATER QUALITY DESIGN SUMMARY

NOTE: NO WATER QUALITY TREATMENT REQUIREMENTS ARE ASSOCIATED WITH THIS PROJECT; BUT RATHER, THE PROPOSED BMP IS A VOLUNTARY STORMWATER RETROFIT FOR EXISTING UNTREATED AREAS. SEE BMP RETROFIT WATER QUALITY TREATMENT ASSESSMENT MEMORANDUM FOR GREATER DETAIL FOR POLLUTANT REDUCTIONS.

SITE DATA:
 TOTAL DRAINAGE AREA = 67.39
 IMPERVIOUS AREA = 27.51 ACRES
 MANAGED TURF AREA = 21.95 ACRES

PROPOSED BMP TYPE:
 CONSTRUCTED WETLAND

TOTAL TREATMENT VOLUME:
 PROVIDED VOLUME = 108004 CF



BASIN CHARACTERISTICS

DESIGN ELEVATIONS

TOP OF DAM ELEVATION	54.50 FT (MSL)
NORMAL POOL ELEVATION	48.00 FT (MSL)
1 YEAR ED ORIFICE ELEVATION	48.00 FT (MSL)
PRINCIPAL RISER CREST ELEVATION	51.00 FT (MSL)
OUTLET BARREL INVERT UP ELEVATION	46.50 FT (MSL)
OUTLET BARREL INVERT DOWN ELEVATION	46.25 FT (MSL)
AUXILIARY SPILLWAY ELEVATION	52.35 FT (MSL)

HYDROLOGIC SUMMARY

	1-YEAR CFS	2-YEAR CFS	10-YEAR CFS	100-YEAR CFS
EXISTING	35.86	43.45	104.14	239.38
POST-DEVELOPMENT (ROUTED)	20.74	42.07	103.61	243.30

ROUTED PEAK ELEVATIONS

	1-YEAR FT	2-YEAR FT	10-YEAR FT	100-YEAR FT
EXISTING	51.32	52.02	52.94	53.61
POST-DEVELOPMENT (ROUTED)	51.50	51.85	52.61	53.44

FLOTATION CALCULATIONS - BMP 1

VOL. OF WATER DISPLACED = 233.3 CF

WEIGHT OF WATER DISPLACED = 233.3 CUBIC FEET X 62.4 LBS/CF = 14557.9 LBS WATER

VOL. OF RISER = ((OUTER AREA - INNER AREA) X HEIGHT ABOVE INVERT) - HOLES = 38.88 CF - 5.08 CF = 33.80 CF

WEIGHT OF CONCRETE RISER = (33.80 CUBIC FT X 150 LBS/CF) = 5070 LBS CONCRETE

VOL. OF BASE = (OUTER AREA X DEPTH BELOW INVERT) = 28.27 SF * 3.75 FT = 106.01 CF

WEIGHT OF BASE = (106.01 CF X 150 LBS/CF) = 15901.9 LBS CONCRETE

TOTAL COUNTERWEIGHT = WEIGHT OF RISER + WEIGHT OF BASE = 5070 LBS + 15901.9 = 20971.9 LBS

CHECK IF COUNTERWEIGHT > WEIGHT OF WATER DISPLACED X (SAFETY FACTOR):
 20971.9 LBS > 14557.9 LBS X (1.25)
 20971.9 LBS > 18197.4 LBS

DESIGN SUMMARY:

BMP #1 IS A PROPOSED CONSTRUCTED WETLAND LOCATED TO THE NORTH WEST OF DARE ELEMENTARY SCHOOL. THIS BMP WILL INVOLVE A CHANNEL RELOCATION ALONG WITH THE IMPLEMENTATION OF SEVERAL WETLAND BENCHES AND DEEP POOL AREAS. THE EXISTING CULVERT CROSSING WILL BE REMOVED AND UPGRADED TO A RISER AND BARREL CONFIGURATION THAT WILL PROVIDE WATER QUALITY TREATMENT AND QUANTITY CONTROL. AN EMERGENCY SPILLWAY WILL BE INCLUDED IN THE DESIGN. EXISTING STANDS OF TREES WILL REMAIN TO ACT AS A BUFFER, SEPARATING THE HOUSES TO THE NORTH WEST AND THE BMP IN ADDITION TO THE MEDICAL FACILITY TO THE SOUTH. ADDITIONAL PLANTINGS WILL BE INSTALLED WITHIN THE FLOOR OF THE BMP TO PROVIDE ENHANCED WATER QUALITY TREATMENT, IMPROVED AESTHETICS, AND ADDITIONAL BUFFERING.

OUTLET STRUCTURE DESIGN SUMMARY:

DRAW DOWN ORIFICE: 14" ORIFICE CUT OUT OF RISER STRUCTURE, INVERT (UP/DOWN) = 48.00 FT

RISER STRUCTURE: VDOT STANDARD 60" CONCRETE STAND PIPE, CREST = 51.00 FT (H=5.50 FT PLUS 2-FT CONCRETE BASE)

OUTLET BARREL #1: PROPOSED 42" CLASS III RCP, PROPOSED LENGTH = 68 FT, INVERT (UP) = 46.50 FT, INVERT (DOWN) = 46.25 FT

END-SECTION: VDOT STANDARD FLARED END SECTION FOR 42" CONCRETE PIPE CULVERT

AUXILIARY SPILLWAY: 38-FT WIDE GRASSED SPILLWAY, STABILIZE WITH PYRAMAT OR EQUIVALENT, ELEVATION = 52.35 FT

PIPE OUTFALL PROTECTION - RIPRAP APRON

USED MINIMUM TAILWATER CONDITION

APRON LENGTH:
 DIAMETER D = 42"
 DISCHARGE Q = 96.87 CFS (10-yr)
 LENGTH La = 27 FT (MIN.)

APRON MATERIAL:
 OUTLET VELOCITY = 4.54 FT/S
 APRON MATERIAL = CLASS A1 RIPRAP (PER VDOT SPECS)

APRON WIDTH:
 UPSTREAM: 3 X D = 10.5 FT (MIN.)
 DOWNSTREAM: CONFORM TO WELL-DEFINED CHANNEL

APRON DEPTH:
 dmin = 2.0 X D50 = 2.0 X 0.90 FT = 1.8 FT

NOTE: RIPRAP USED FOR OUTFALL PROTECTION MUST CONFORM WITH THE HRFD CONSTRUCTION STANDARDS, SECTION 414.

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CONSTRUCTED WETLAND DESIGN - BMP #1
DARE ELEMENTARY SCHOOL
 YORK COUNTY, VIRGINIA

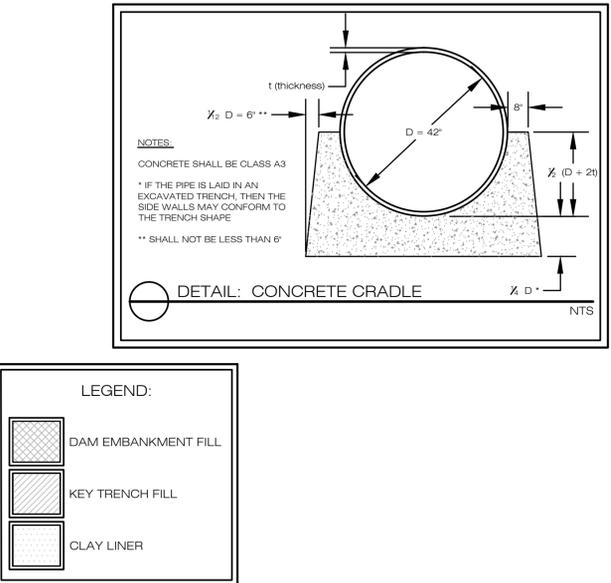
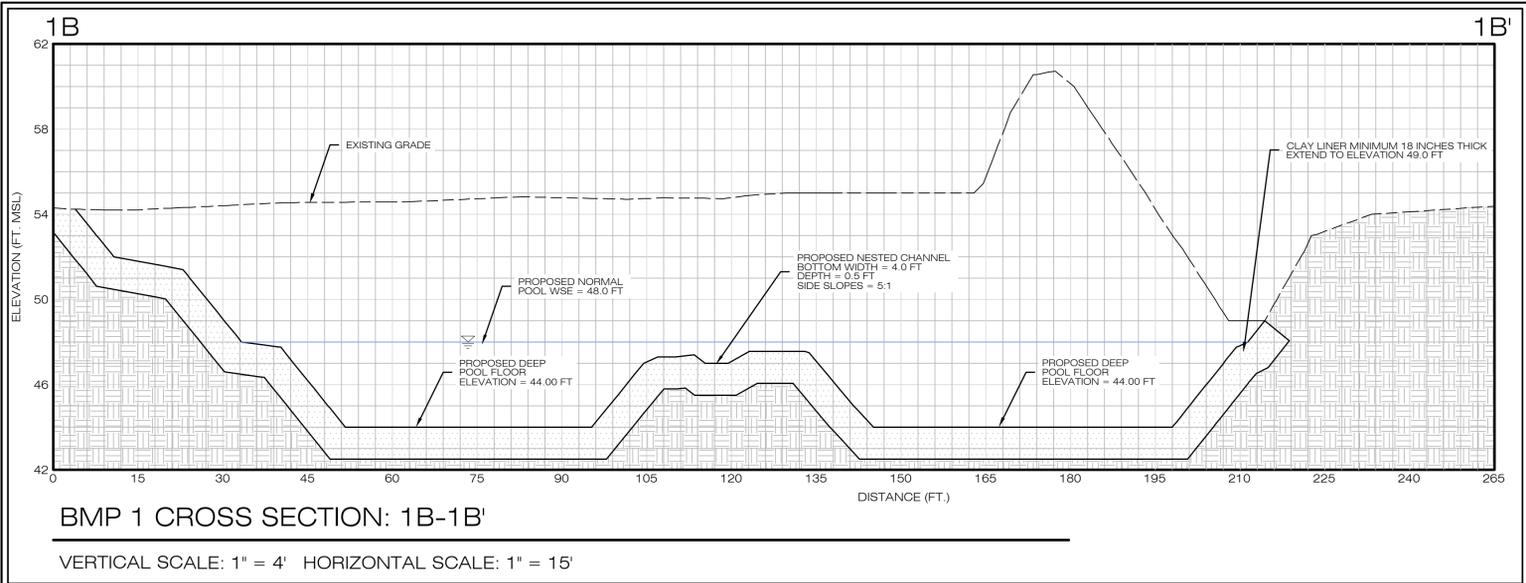
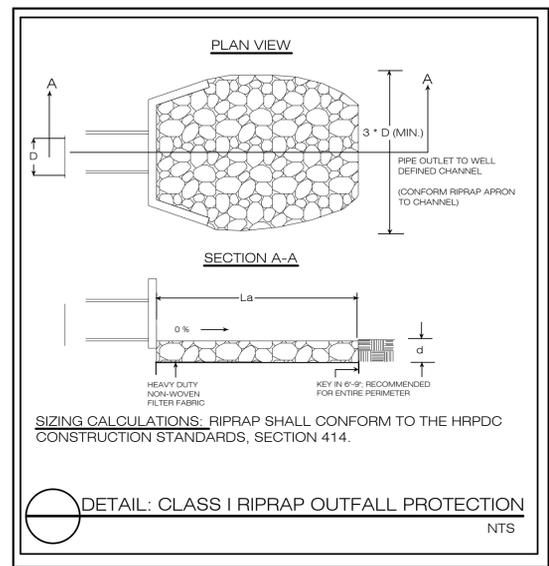
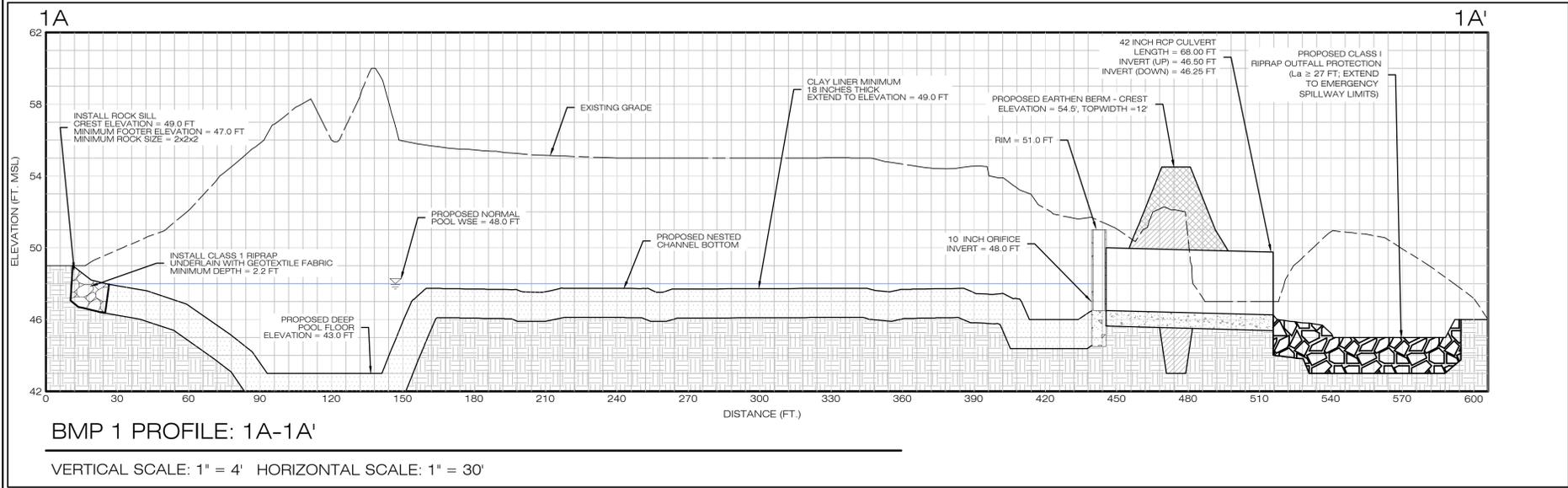
COMMONWEALTH OF VIRGINIA
 I. GLENN MUCKLEY
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 1-6-14
 PROFESSIONAL ENGINEER

REVISIONS:

DATE	DESCRIPTION

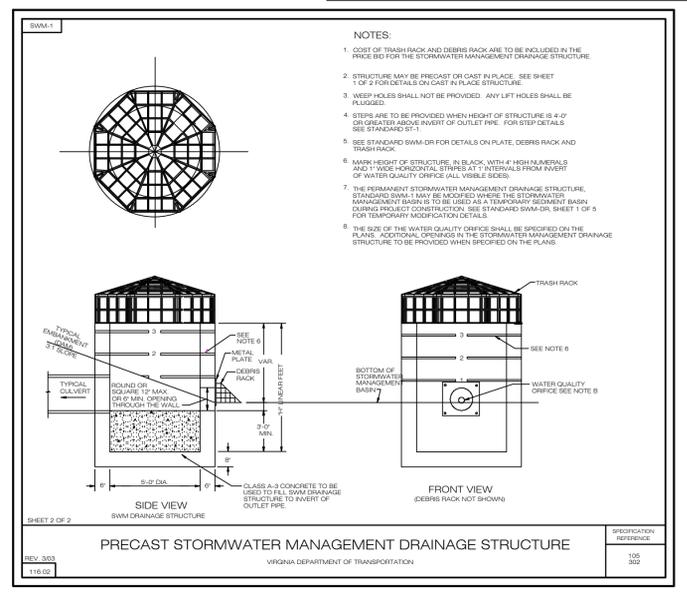
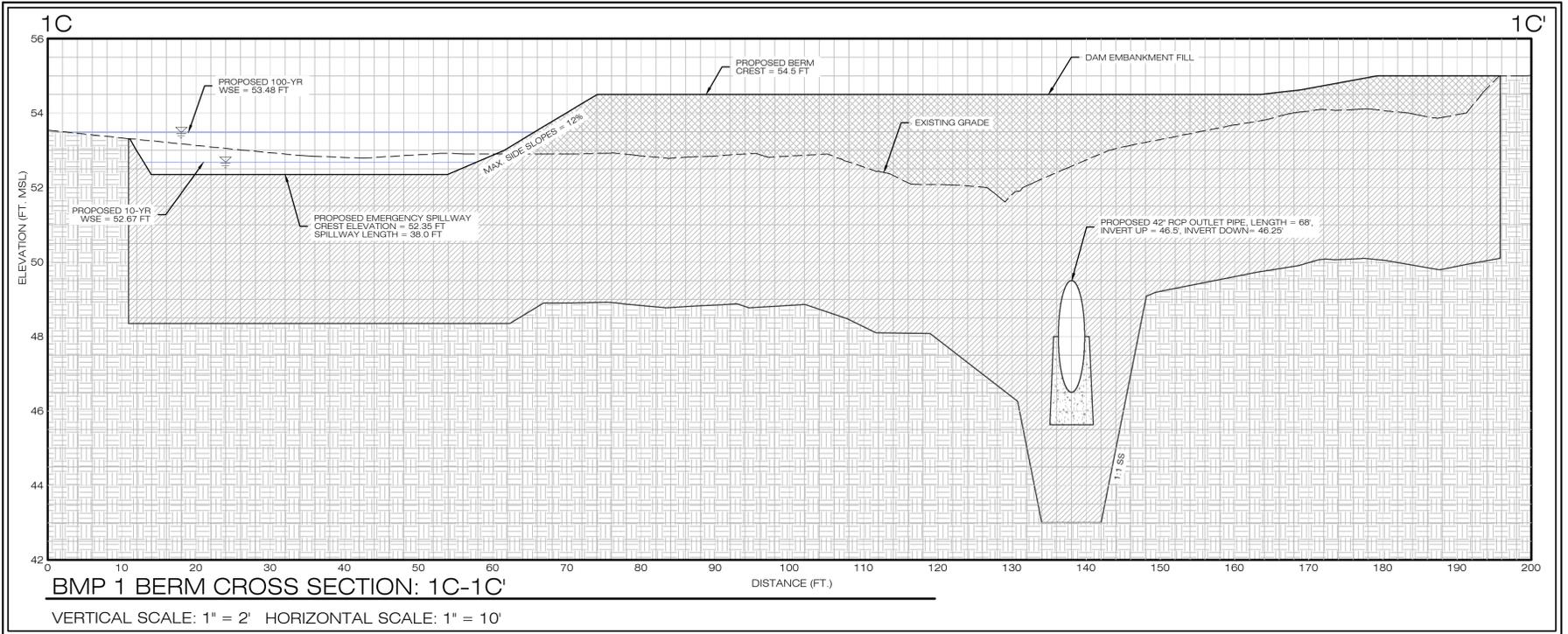
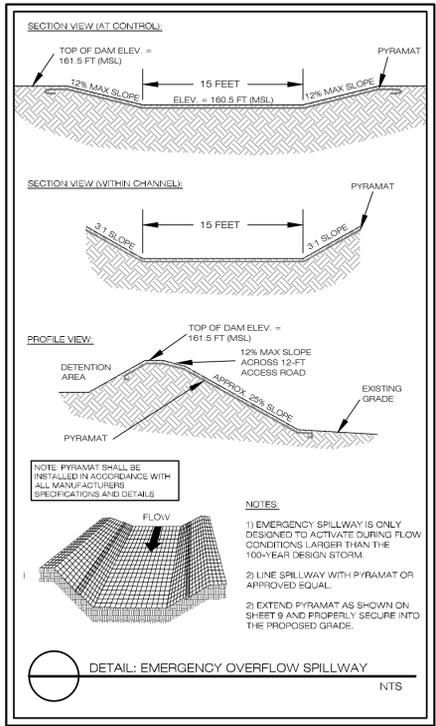
DRAWN BY: J.T.J.
 DESIGNED BY: J.T.J.
 DATE: 01/06/14
 CHECKED BY: J.M.
 SCALE: AS NOTED
SHEET: 5
 JOB#: 4656

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LEGEND:

- DAM EMBANKMENT FILL
- KEY TRENCH FILL
- CLAY LINER



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CONSTRUCTED WETLAND SECTIONS AND DETAILS - BMP #1
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA

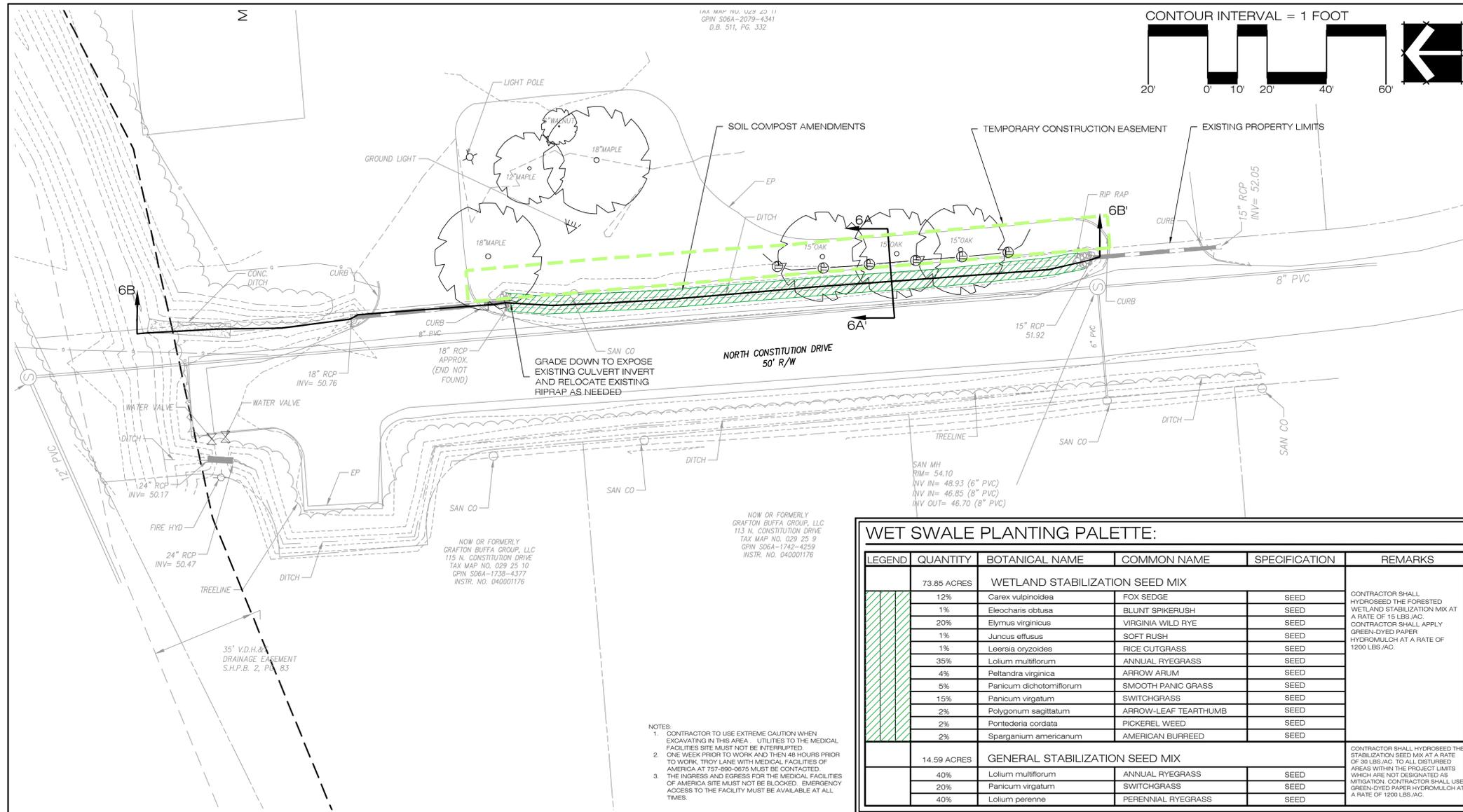
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REVISIONS:

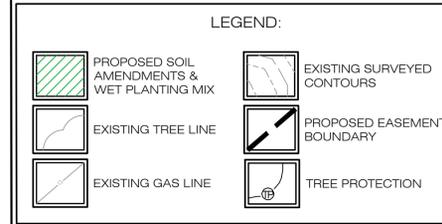
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DATE: 01/06/14 **CHECKED BY:** JGM
SCALE: AS NOTED

SHEET: 6
JOB#: 4656



DESIGN SUMMARY:
 BMP 6 IS A PROPOSED GRASSED CHANNEL WITH SOIL COMPOST AMENDMENTS. THE DOWNSTREAM EXTENT OF THE AMENDED SOILS WILL INCORPORATE A SMALL SECTION OF GRADING IN ORDER TO EXPOSE THE EXISTING CULVERT INVERT.



CALCULATION SUMMARY:

NOTE: NO WATER QUALITY TREATMENT REQUIREMENTS ARE ASSOCIATED WITH THIS PROJECT, BUT RATHER, THE PROPOSED SWALE IS A VOLUNTARY STORMWATER RETROFIT FOR EXISTING UNTREATED AREAS.

SITE DATA:
 TOTAL DRAINAGE AREA = 1.19 ACRES
 IMPERVIOUS AREA = 0.85 ACRES
 MANAGED TURF AREA = 0.34 ACRES

PROPOSED BMP TYPE:
 GRASSED CHANNEL* (NEW DCR SPECIFICATIONS)

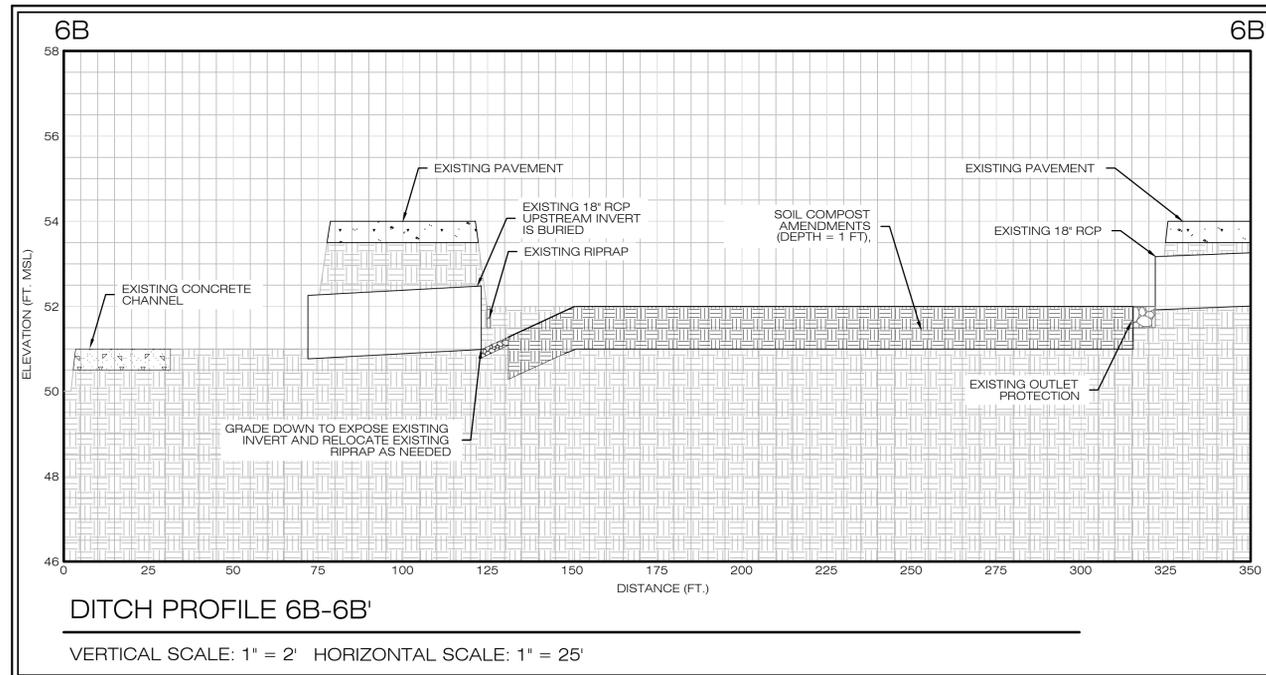
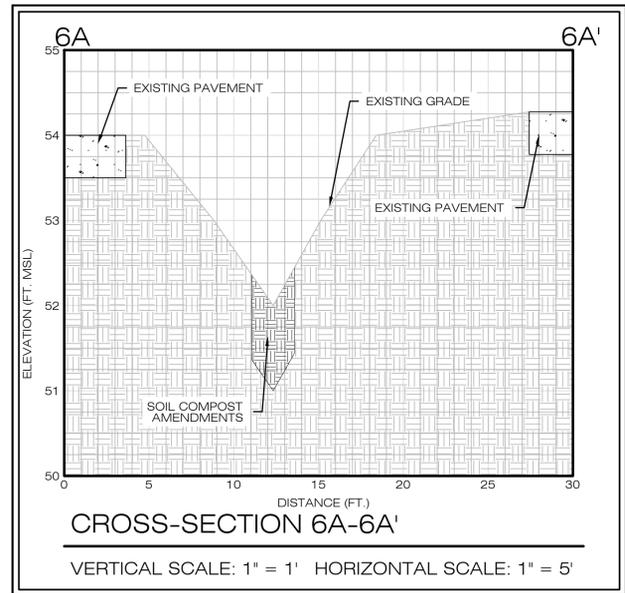
GRASSED CHANNEL:
 LENGTH = 194 FT
 BOTTOM WIDTH = 6.00 FT
 AVERAGE SLOPE = <math>< 4\%</math>
 DEPTH OF COMPOST AMENDMENTS = 1.0 FT

WATER QUALITY TREATMENT:
 POST DEVELOPMENT POLLUTANT LOAD = 2.03 (LBS-TP/YR)
 RUNOFF REDUCTION = 20%
 POLLUTANT REMOVAL EFFICIENCY = 41%
 TOTAL ESTIMATED POLLUTANT REMOVAL = 0.83 (LBS-TP/YR)

WET SWALE PLANTING PALETTE:

LEGEND	QUANTITY	BOTANICAL NAME	COMMON NAME	SPECIFICATION	REMARKS	
	73.85 ACRES	WETLAND STABILIZATION SEED MIX				CONTRACTOR SHALL HYDROSEED THE FORESTED WETLAND STABILIZATION MIX AT A RATE OF 15 LBS./AC. CONTRACTOR SHALL APPLY GREEN-DYED PAPER HYDROMULCH AT A RATE OF 1200 LBS./AC.
	12%	Carex vulpinoidea	FOX SEDGE	SEED		
	1%	Eleocharis obtusa	BLUNT SPIKERUSH	SEED		
	20%	Elymus virginicus	VIRGINIA WILD RYE	SEED		
	1%	Juncus effusus	SOFT RUSH	SEED		
	1%	Leersia oryzoides	RICE CUTGRASS	SEED		
	35%	Lolium multiflorum	ANNUAL RYEGRASS	SEED		
	4%	Peltandra virginica	ARROW ARUM	SEED		
	5%	Panicum dichotomiflorum	SMOOTH PANIC GRASS	SEED		
	15%	Panicum virgatum	SWITCHGRASS	SEED		
	2%	Polygonum sagittatum	ARROW-LEAF TEARTHUMB	SEED		
	2%	Pontederia cordata	PICKEREL WEED	SEED		
2%	Sparganium americanum	AMERICAN BURREED	SEED			
	14.59 ACRES	GENERAL STABILIZATION SEED MIX				CONTRACTOR SHALL HYDROSEED THE STABILIZATION SEED MIX AT A RATE OF 30 LBS./AC. TO ALL DISTURBED AREAS WITHIN THE PROJECT LIMITS WHICH ARE NOT DESIGNATED AS MITIGATION. CONTRACTOR SHALL USE GREEN-DYED PAPER HYDROMULCH AT A RATE OF 1200 LBS./AC.
	40%	Lolium multiflorum	ANNUAL RYEGRASS	SEED		
	20%	Panicum virgatum	SWITCHGRASS	SEED		
	40%	Lolium perenne	PERENNIAL RYEGRASS	SEED		

- NOTES:**
- CONTRACTOR TO USE EXTREME CAUTION WHEN EXCAVATING IN THIS AREA - UTILITIES TO THE MEDICAL FACILITIES SITE MUST NOT BE INTERRUPTED.
 - ONE WEEK PRIOR TO WORK AND THEN 48 HOURS PRIOR TO WORK, TROY LANE WITH MEDICAL FACILITIES OF AMERICA AT 707-890-9875 MUST BE CONTACTED.
 - THE INGRESS AND EGRESS FOR THE MEDICAL FACILITIES OF AMERICA SITE MUST NOT BE BLOCKED. EMERGENCY ACCESS TO THE FACILITY MUST BE AVAILABLE AT ALL TIMES.



GRASSED CHANNEL CONSTRUCTION SEQUENCE:

THE FOLLOWING IS A GENERAL CONSTRUCTION SEQUENCE TO PROPERLY INSTALL THE PROPOSED GRASS CHANNEL AMENDMENTS, ALTHOUGH STEPS MAY BE SLIGHTLY MODIFIED BASED ON FIELD CONDITIONS UPON APPROVAL BY YORK COUNTY.

- AS THE EXISTING CHANNEL IS SUBJECT TO FLOW, THE AMENDMENTS SHALL BE INCORPORATED IN DRY WEATHER. A PERIOD OF DRY WEATHER FORECAST SHALL BE IDENTIFIED, AND THE WORK SHALL BE ACCOMPLISHED WITHIN ONE DAY, TO THE EXTENT PRACTICABLE. THE CONTRACTOR SHALL COORDINATE THE CONSTRUCTION WINDOW WITH THE ENGINEER TO ENSURE AVAILABILITY OF DESIGN APPROVALS.
- THE CONTRACTOR SHALL CLEAN THE DOWNSTREAM INLET PRIOR TO ANY CHANNEL DISTURBANCE, REMOVING THE EXISTING SOIL AND RIPRAP, EXPOSING THE CHANNEL INVERT.
- CLEAN RIPRAP SHALL BE INSTALLED, UNDERLAIN BY GEOTEXTILE FABRIC, AS SHOWN ON THE PLAN.
- THE LIMITS OF INSTALLATION OF THE SOIL COMPOST AMENDMENTS SHALL BE TILLED PER SPECIFICATIONS.
- SOIL COMPOST AMENDMENTS SHALL BE SPREAD IN A MANNER AND A DEPTH AS SPECIFIED.
- SOIL COMPOST AMENDMENTS SHALL BE TILLED TO A DEPTH OF ONE FOOT, AS SHOWN.
- FINAL GRADES SHALL BE ESTABLISHED, AND ADDITIONAL AMENDMENTS SHALL BE ADDED PER SOIL TESTS.
- FOLLOWING FINAL FLOAT, ALL DISTURBED AREAS SHALL BE SEEDDED WITH THE SPECIFIED MIX AND STABILIZED WITH BLANKETING AND MATTING. AFTER INITIAL PLANTING, A BIODEGRADABLE EROSION CONTROL FABRIC SHOULD BE USED, CONFORMING TO STANDARD AND SPECIFICATION 3.36 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. THE ENGINEER, OR REPRESENTATIVE, SHALL PERFORM A CONSTRUCTION INSPECTION. A PUNCHLIST WILL BE PROVIDED AT THIS TIME FOR ANY CORRECTIVE ACTION REQUIRED PRIOR TO FINAL FACILITY ACCEPTANCE.

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WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
 Environmental Consultants

GRASSED CHANNEL DESIGN AND DETAILS - BMP #6
DARE ELEMENTARY SCHOOL
 YORK COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
 J. GLENN MUCKLEY
 Lic. No. 038970
 1-6-14
 PROFESSIONAL ENGINEER

REVISIONS:

NO.	DATE	DESCRIPTION

DRAWN BY: J.T.J.
 DESIGNED BY: J.T.J.
 DATE: 01/06/14
 CHECKED BY: J.G.M.
 SCALE: AS NOTED
SHEET: 8
 JOB#: 4656

SECTION 9: CONSTRUCTED WETLAND MAINTENANCE

9.1. MAINTENANCE AGREEMENTS

SECTION 4 VAC 50-60-124 OF THE REGULATIONS SPECIFIES THE CIRCUMSTANCES UNDER WHICH A MAINTENANCE AGREEMENT MUST BE EXECUTED BETWEEN THE OWNER AND THE LOCAL PROGRAM. THIS SECTION SETS FORTH INSPECTION REQUIREMENTS, COMPLIANCE PROCEDURES IF MAINTENANCE IS NEGLECTED, NOTIFICATION OF THE LOCAL PROGRAM UPON TRANSFER OF OWNERSHIP, AND RIGHT-OF-ENTRY FOR LOCAL PROGRAM PERSONNEL.

IT IS ALSO RECOMMENDED THAT THE MAINTENANCE AGREEMENT INCLUDE A LIST OF QUALIFIED CONTRACTORS THAT CAN PERFORM INSPECTION OR MAINTENANCE SERVICES, AS WELL AS CONTACT INFORMATION FOR OWNERS TO GET LOCAL OR STATE ASSISTANCE TO SOLVE COMMON NUISANCE PROBLEMS, SUCH AS MOSQUITO CONTROL, GEESE, INVASIVE PLANTS, VEGETATIVE MANAGEMENT, AND BEAVER REMOVAL. THE CWP POND AND WETLAND MAINTENANCE GUIDEBOOK (2004) PROVIDES SOME EXCELLENT TEMPLATES OF HOW TO RESPOND TO THESE PROBLEMS.

9.2. FIRST YEAR MAINTENANCE OPERATIONS

SUCCESSFUL ESTABLISHMENT OF CONSTRUCTED WETLAND AREAS REQUIRES THAT THE FOLLOWING TASKS BE UNDERTAKEN IN THE FIRST TWO YEARS:

INITIAL INSPECTIONS. DURING THE FIRST 6 MONTHS FOLLOWING CONSTRUCTION, THE SITE SHOULD BE INSPECTED AT LEAST TWICE AFTER STORM EVENTS THAT EXCEED 1/2 INCH OF RAINFALL.

SPOT RESEEDING. INSPECTORS SHOULD LOOK FOR BARE OR ERODING AREAS IN THE CONTRIBUTING DRAINAGE AREA OR AROUND THE WETLAND BUFFER, AND MAKE SURE THEY ARE IMMEDIATELY STABILIZED WITH GRASS COVER.

WATERING. TREES PLANTED IN THE BUFFER AND ON WETLAND ISLANDS AND PENINSULAS NEED WATERING DURING THE FIRST GROWING SEASON. IN GENERAL, CONSIDER WATERING EVERY THREE DAYS FOR FIRST MONTH, AND THEN WEEKLY DURING THE FIRST GROWING SEASON (APRIL - OCTOBER), DEPENDING ON RAINFALL.

REINFORCEMENT PLANTINGS. REGARDLESS OF THE CARE TAKEN DURING THE INITIAL PLANTING OF THE WETLAND AND BUFFER, IT IS PROBABLE THAT SOME AREAS WILL REMAIN UNVEGETATED AND SOME SPECIES WILL NOT SURVIVE. POOR SURVIVAL CAN RESULT FROM MANY UNFORESEEN FACTORS, SUCH AS PREDATION, POOR QUALITY PLANT STOCK, WATER LEVEL CHANGES, DROUGHT, THUS, IT IS ADVISABLE TO BUDGET FOR AN ADDITIONAL ROUND OF REINFORCEMENT PLANTING AFTER ONE OR TWO GROWING SEASONS. CONSTRUCTION CONTRACTS SHOULD INCLUDE A CARE AND REPLACEMENT WARRANTY EXTENDING AT LEAST TWO GROWING SEASONS AFTER INITIAL PLANTING, TO SELECTIVELY REPLANT PORTIONS OF THE WETLAND THAT FAIL TO FILL IN OR SURVIVE.

9.3. INSPECTIONS AND ONGOING MAINTENANCE

IDEALLY, MAINTENANCE OF CONSTRUCTED WETLANDS SHOULD BE DRIVEN BY ANNUAL INSPECTIONS THAT EVALUATE THE CONDITION AND PERFORMANCE OF THE WETLAND, INCLUDING THE FOLLOWING:

- MEASURE SEDIMENT ACCUMULATION LEVELS IN FOREBAYS AND MICROPOLS.
- MONITOR THE GROWTH AND SURVIVAL OF EMERGENT WETLANDS AND TREE/SHRUB SPECIES. RECORD THE SPECIES AND APPROXIMATE COVERAGE, AND NOTE THE PRESENCE OF ANY INVASIVE PLANT SPECIES.
- INSPECT THE CONDITION OF STORMWATER INLETS TO THE WETLAND FOR MATERIAL DAMAGE, EROSION OR UNDERCUTTING.
- INSPECT UPSTREAM AND DOWNSTREAM BANKS FOR EVIDENCE OF SLOUGHING, ANIMAL BURROWS, BOGGA AREAS, WOODY GROWTH OR GULLY EROSION THAT MAY UNDERMINE EMBANKMENT INTEGRITY.
- INSPECT THE WETLAND OUTFALL CHANNEL FOR EROSION, UNDERCUTTING, RIP-RAP DISPLACEMENT, WOODY GROWTH, ETC.
- INSPECT THE CONDITION OF THE PRINCIPAL SPILLWAY AND RISER FOR EVIDENCE OF SPALLING, JOINT FAILURE, LEAKAGE, CORROSION, ETC.
- INSPECT THE CONDITION OF ALL TRASH RACKS, REVERSE-SLOPED PIPES, AND FLASHBOARD RISERS FOR EVIDENCE OF CLOGGING, LEAKAGE, DEBRIS ACCUMULATION, ETC.
- INSPECT MAINTENANCE ACCESS TO ENSURE IT IS FREE OF WOODY VEGETATION, AND CHECK TO SEE WHETHER VALVES, MANHOLES AND LOCKS CAN BE OPENED OR OPERATED.
- INSPECT INTERNAL AND EXTERNAL SIDE SLOPES OF THE WETLAND FOR EVIDENCE OF SPARSE VEGETATIVE COVER, EROSION, OR SLUMPING, AND MAKE NEEDED REPAIRS IMMEDIATELY.
- CLEANUPS SHOULD BE SCHEDULED AT LEAST ONCE A YEAR TO REMOVE TRASH, DEBRIS AND FLOATABLES.

BASED ON INSPECTION RESULTS, SPECIFIC MAINTENANCE TASKS WILL BE TRIGGERED. EXAMPLE MAINTENANCE INSPECTION CHECKLISTS FOR CONSTRUCTED WETLANDS CAN BE ACCESSED IN APPENDIX C OF CHAPTER 9 OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK (2010) OR AT THE CWP WEBSITE AT:

[HTTP://WWW.CWP.ORG/RESOURCE_LIBRARY/CONTROLLING_RUNOFF_AND_DISCHARGES/SM.HTM](http://www.cwp.org/resource_library/controlling_runoff_and_discharges/sm.htm)

(SCROLL TO TOOL: PLAN REVIEW, BMP CONSTRUCTION, AND MAINTENANCE CHECKLISTS)

A MORE DETAILED MAINTENANCE INSPECTION FORM IS ALSO AVAILABLE FROM APPENDIX B OF CWP'S STORMWATER POND AND WETLAND MAINTENANCE GUIDEBOOK (2004).

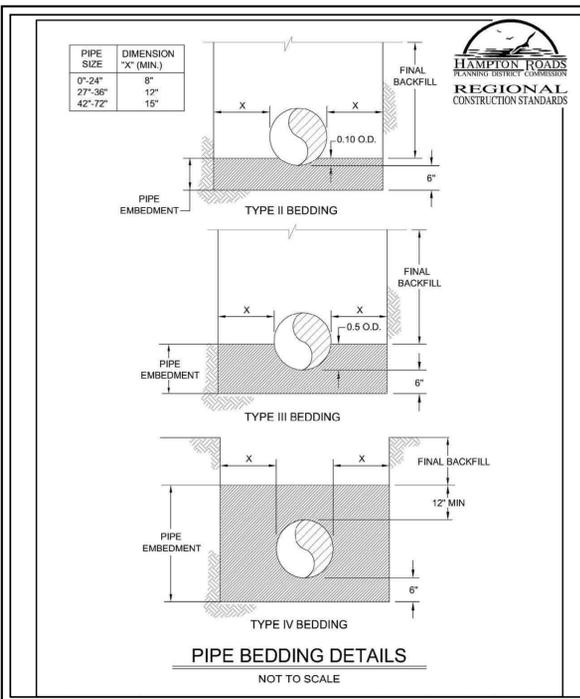
MANAGING VEGETATION IS AN IMPORTANT ONGOING MAINTENANCE TASK AT EVERY CONSTRUCTED WETLAND AND FOR EACH INUNDATION ZONE. FOLLOWING THE DESIGN CRITERIA ABOVE SHOULD RESULT IN A REDUCED NEED FOR REGULAR MOWING OF THE EMBANKMENT AND ACCESS ROADS. VEGETATION WITHIN THE WETLAND, HOWEVER, WILL REQUIRE SOME ANNUAL MAINTENANCE.

9.4. NON-ROUTINE MAINTENANCE

SEDIMENT REMOVAL. FREQUENT SEDIMENT REMOVAL FROM THE FOREBAY IS ESSENTIAL TO MAINTAIN THE FUNCTION AND PERFORMANCE OF A CONSTRUCTED WETLAND. MAINTENANCE PLANS SHOULD SCHEDULE CLEANOUTS APPROXIMATELY EVERY 5 YEARS, OR WHEN INSPECTIONS INDICATE THAT 50% OF THE FOREBAY SEDIMENT STORAGE CAPACITY HAS BEEN FILLED. THE DESIGNER SHOULD ALSO CHECK TO SEE WHETHER REMOVED SEDIMENTS CAN BE SPOILED ON-SITE OR MUST BE HAULED AWAY. SEDIMENTS EXCAVATED FROM CONSTRUCTED WETLANDS ARE NOT USUALLY CONSIDERED TOXIC OR HAZARDOUS. THEY CAN BE SAFELY DISPOSED OF BY EITHER LAND APPLICATION OR LAND FILLING.

CONTROL INVASIVE SPECIES. DESIGNERS SHOULD EXPECT SIGNIFICANT CHANGES IN WETLAND SPECIES COMPOSITION TO OCCUR OVER TIME. INSPECTIONS SHOULD CAREFULLY TRACK CHANGES IN WETLAND PLANT SPECIES DISTRIBUTION OVER TIME. INVASIVE PLANTS SHOULD BE DEALT WITH AS SOON AS THEY BEGIN TO COLONIZE THE WETLAND. AS A GENERAL RULE, CONTROL OF UNDESIRABLE INVASIVE SPECIES (E.G., CATTAILS AND PHRAGMITES) SHOULD COMMENCE WHEN THEIR COVERAGE EXCEEDS MORE THAN 15% OF A WETLAND CELL AREA. ALTHOUGH THE APPLICATION OF HERBICIDES IS NOT RECOMMENDED, SOME TYPES (E.G., GLYPHOSATE) HAVE BEEN USED TO CONTROL CATTAILS WITH SOME SUCCESS. EXTENDED PERIODS OF DEWATERING MAY ALSO WORK, SINCE EARLY MANUAL REMOVAL PROVIDES ONLY SHORT-TERM RELIEF FROM INVASIVE SPECIES. WHILE IT IS DIFFICULT TO EXCLUDE INVASIVE SPECIES COMPLETELY FROM STORMWATER WETLANDS, THEIR ABILITY TO TAKE OVER THE ENTIRE WETLAND CAN BE REDUCED IF THE DESIGNER CREATES A WIDE RANGE OF DEPTH ZONES AND A COMPLEX INTERNAL STRUCTURE WITHIN THE WETLAND.

THINNING AND HARVESTING OF WOODY GROWTH. THINNING OR HARVESTING OF EXCESS FOREST GROWTH MAY BE PERIODICALLY NEEDED TO GUIDE THE FORESTED WETLAND INTO A MORE MATURE STATE. VEGETATION MAY NEED TO BE HARVESTED PERIODICALLY IF THE CONSTRUCTED WETLAND BECOMES OVERGROWN. THINNING OR HARVESTING OPERATIONS SHOULD BE SCHEDULED TO OCCUR APPROXIMATELY 5 AND 10 YEARS AFTER THE INITIAL WETLAND CONSTRUCTION. REMOVAL OF WOODY SPECIES ON OR NEAR THE EMBANKMENT AND MAINTENANCE ACCESS AREAS SHOULD BE CONDUCTED EVERY 2 YEARS.



GENERAL NOTES:

1. WORK IN THIS PROJECT SHALL CONFORM TO THE LATEST EDITIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE SPECIFICATIONS, THE VDOT ROAD AND BRIDGE STANDARDS, THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, AND THE HAMPTON ROADS PLANNING DISTRICT CONSTRUCTION STANDARDS. IN THE EVENT OF CONFLICT BETWEEN ANY OF THESE STANDARDS, SPECIFICATIONS, OR PLANS, THE MOST STRINGENT SHALL GOVERN.

2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED CONTINUOUSLY, RELOCATED WHEN AND AS NECESSARY, AND SHALL BE CHECKED AFTER EVERY SIGNIFICANT RAINFALL. SEEDED AREAS SHALL BE CHECKED REGULARLY AND SHALL BE WATERED, FERTILIZED, RESEDED, AND MULCHED AS NECESSARY TO OBTAIN A DENSE STAND OF GRASS.

3. WHEN THE CONSTRUCTION ROAD STABILIZATION STONE HAS BEEN COVERED WITH SOIL OR HAS BEEN PUSHED INTO THE SOIL BY CONSTRUCTION TRAFFIC, IT SHALL BE REPLACED WITH A DEPTH OF STONE EQUAL TO THAT OF ORIGINAL APPLICATION.

4. ALL UTILITIES, INCLUDING ALL POLES AND STRUCTURES, SHALL BE RELOCATED AS NECESSARY AT EITHER THE DEVELOPERS OR UTILITY OWNERS EXPENSE PRIOR TO CONSTRUCTION.

5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS AND UTILITIES WHICH OCCUR AS A RESULT OF PROJECT CONSTRUCTION WITHIN OR CONTIGUOUS TO EXISTING RIGHT OF WAY.

6. ADDITIONAL DITCH LININGS SHALL BE PROVIDED, AT THE CONTRACTORS EXPENSE, AS DETERMINED NECESSARY BY THE INSPECTOR DURING FIELD REVIEW.

7. THE TOPOGRAPHIC CONTOUR INTERVAL IS ONE (1) FOOT FOR EXISTING CONTOURS AND ONE (1) FOOT FOR PROPOSED.

8. UNLESS OTHERWISE NOTED, ALL PROPOSED ELEVATIONS AS SHOWN HEREIN ARE FINISHED GRADE.

9. MAINTAIN A MINIMUM VERTICAL CLEARANCE OF ONE (1) FOOT SIX (6) INCHES BETWEEN CROSSING OF ALL UTILITIES LINES UNLESS OTHERWISE NOTED.

10. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO CURRENT YORK COUNTY, HAMPTON ROADS PLANNING DISTRICT, AND VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS. MATERIALS SUPPLIED BY THE CONTRACTOR MUST CONFORM TO THE HRPDC CONSTRUCTION STANDARDS, SECTION 200.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE OWNER AND THE ENGINEER OF ANY CHANGES OR CONDITIONS ATTACHED TO PERMITS OBTAINED FROM THE STATE, OR ANY OTHER AUTHORITY ISSUING PERMITS.

12. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING TRUCKS AND/OR EQUIPMENT OF MUD, PRIOR TO ENTERING THE VDOT RIGHT-OF-WAY. IT IS THE CONTRACTORS RESPONSIBILITY TO CLEAN STREETS OF MUD AND/OR ALLAY DUST, OR TAKE WHATEVER MEASURES NECESSARY TO ENSURE THAT THE STREETS ARE KEPT IN A CLEAN AND DUST FREE CONDITION AT ALL TIMES.

13. APPROVAL OF THIS PLAN SHALL IN NO WAY GRANT PERMISSION BY THE COUNTY OR STATE FOR THE CONTRACTOR TO TRESPASS ON OFF-SITE PROPERTIES.

14. THE CONTRACTOR SHALL VISIT THE SITE AND SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.

15. THE CONTRACTOR SHALL CLEAR THE SITE OF ALL TREES, BUILDINGS, FOUNDATIONS, ETC. WITHIN THE LIMITS OF CONSTRUCTION, AND SHALL BE RESPONSIBLE FOR COORDINATING ANY DISCONNECTION OF EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND ABANDONING ALL EXISTING WELLS AND/OR SEPTIC DRAIN FIELDS AND COORDINATING THEIR ABANDONMENT WITH THE CITY OR COUNTY HEALTH DEPARTMENT. ALL CLEARING AND GRUBBING ACTIVITIES SHALL CONFORM TO THE HRPDC CONSTRUCTION STANDARDS, SECTION 301.

16. ALL LAND ON OR OFF-SITE WHICH IS DISTURBED BY CONSTRUCTION AND WHICH IS NOT BUILT UPON OR SURFACED, SHALL BE ADEQUATELY STABILIZED TO CONTROL EROSION AND SEDIMENTATION.

17. WILLIAMSBURG ENVIRONMENTAL GROUP, INC. DOES NOT CERTIFY TO THE LOCATION OF OR THE EXISTENCE OF ANY EXISTING UNDERGROUND UTILITIES. THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE RECORDS. THIS DOES NOT CONSTITUTE A GUARANTEE OF THEIR ACTUAL LOCATIONS OR THAT THEY HAVE ALL BEEN SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DIGGING OF TEST HOLES PRIOR TO BEGINNING ANY CONSTRUCTION. THESE TEST HOLES WILL BE MADE TO VERIFY ALL CROSSINGS BETWEEN NEW AND EXISTING FACILITIES AND AT CRITICAL GRADE CHANGES IF CONDITIONS ARE FOUND IN THE FIELD WHICH ARE MATERIALLY DIFFERENT FROM THE PLANS. THE CONTRACTOR SHALL NOTIFY WILLIAMSBURG ENVIRONMENTAL GROUP, INC. SO THAT APPROPRIATE REVISIONS CAN BE MADE TO THE PLANS.

18. CONTRACTOR SHALL NOTIFY OPERATORS WHO MAINTAIN EXISTING UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATION OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NO MORE THAN TEN (10) WORKING DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION. CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 1-800-552-7001 PRIOR TO COMMENCEMENT OF ANY EXCAVATION. OTHER PERTINENT CONTACT INFORMATION IS SHOWN BELOW:

DOMINION VIRGINIA POWER	1-866-366-4357
YORK COUNTY POLICE DEPARTMENT	1-757-890-3630
YORK COUNTY UTILITIES	1-757-890-3752
PENINSULA HEALTH DISTRICT	1-757-594-7305
VIRGINIA NATURAL GAS	1-877-572-3342
MISS UTILITY	1-800-552-7001
MEDICAL FACILITIES OF AMERICA	1-757-890-0675
WOLFTRAP PROPERTIES	1-757-898-4232

19. ALL TESTS, STUDIES, ETC., WILL BE CARRIED OUT AT THE EXPENSE OF THE CONTRACTOR.

20. THE APPROVAL OF THESE PLANS SHALL IN NO WAY RELIEVE THE OWNER OF COMPLYING WITH OTHER APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS.

CONSTRUCTION INSPECTIONS:

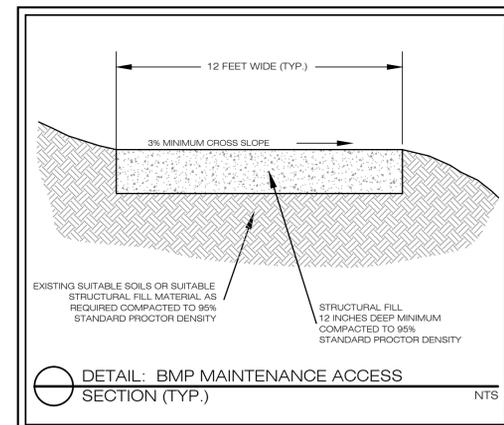
CONTRACTOR SHALL COORDINATE WITH THE OWNER OR DESIGNEE FOR INSPECTIONS OF ALL MEASURES DURING :

- STAKEOUT
- CLEARING AND GRUBBING
- TEMPORARY ACCESS INSTALLATION
- FINAL STABILIZATION AND PLANTING

CONTRACTOR IS RESPONSIBLE FOR GIVING SUFFICIENT NOTICE TO OWNER OR DESIGNEE PRIOR TO INSPECTION AND FOR PROVIDING DOCUMENTATION INCLUDING:

- PHOTOS
- MATERIALS TICKETS
- SHOP DRAWINGS
- AS BUILT DRAWINGS

DOCUMENTATION SHALL DEMONSTRATE PROPER WORKMANSHIP CONSISTENT WITH PLANS, SPECIFICATIONS, AND REFERENCE STANDARDS, TO THE SATISFACTION OF THE OWNER AND DESIGNEE.

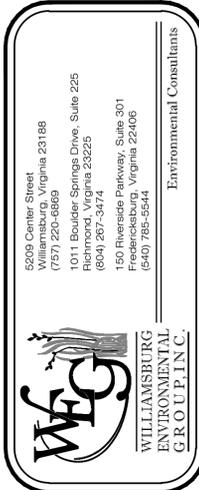


**BMP CONSTRUCTION NOTES AND DETAILS
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**



REVISIONS:	DATE:

DRAWN BY: JTG
DESIGNED BY: JTG
DATE: 01/06/14
CHECKED BY: JGM
SCALE: AS NOTED
SHEET: 9
JOB#: 4656



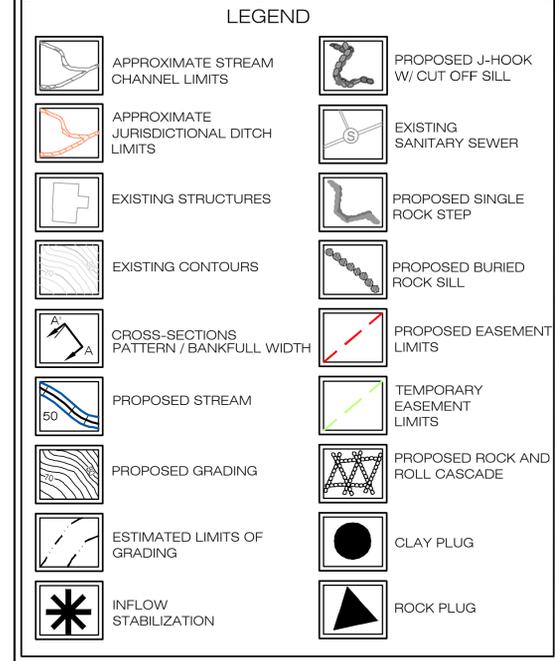
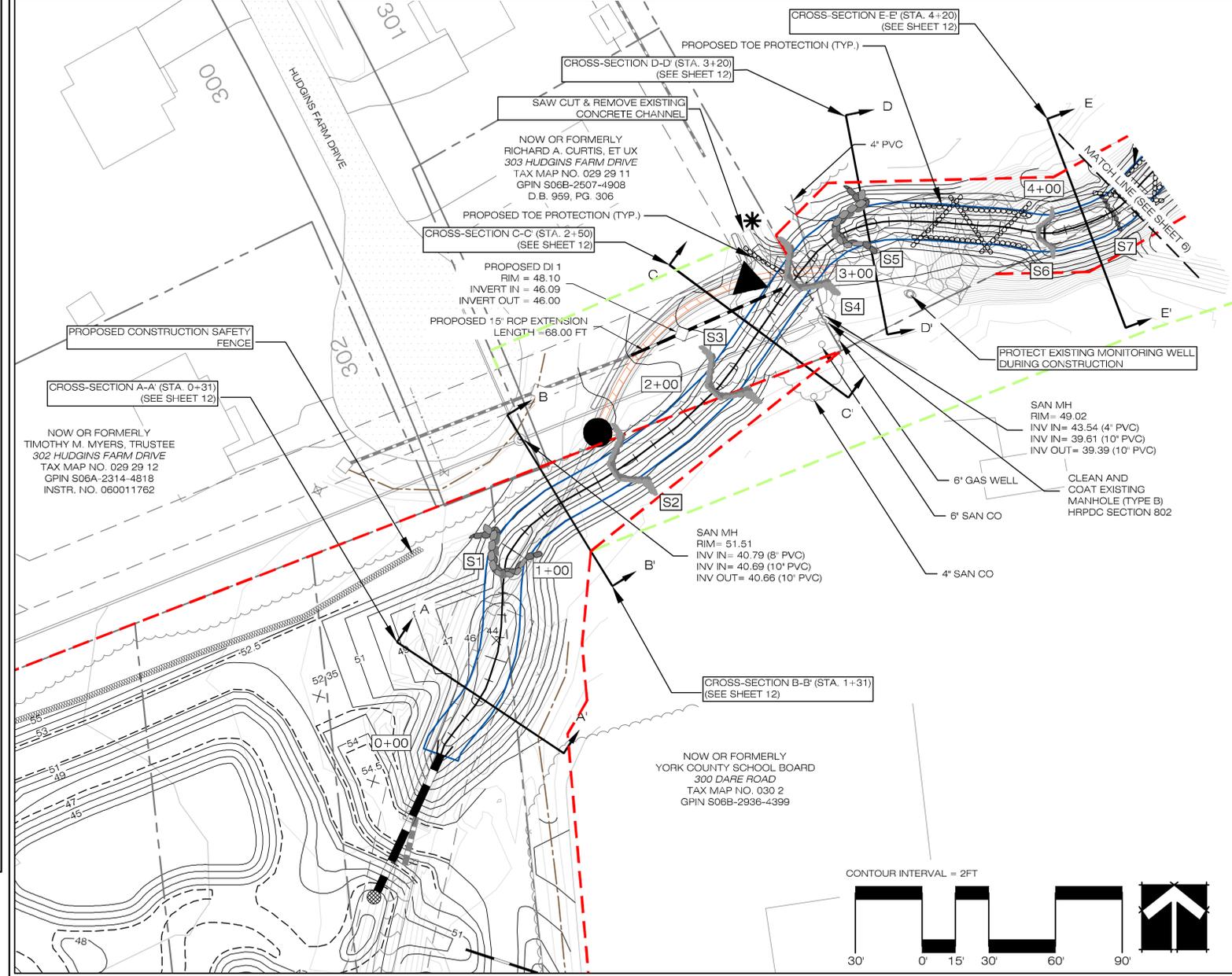
PROPOSED RESTORATION SUMMARY

THE PROPOSED STREAM RESTORATION PLAN WILL ALLEVIATE EXISTING BANK AND CHANNEL INSTABILITIES THROUGH A RANGE OF STABILIZATION MEASURES. THESE ACTIVITIES WILL ENHANCE EXISTING HABITAT WHILE PROVIDING NEW HABITAT AVAILABILITY. THIS WILL BE ACCOMPLISHED THROUGH SELECTION OF APPROPRIATE SUBSTRATE MATERIALS, POOL VARIABILITY AND CHANNEL SINUOSITY. THE STREAM RESTORATION DESIGN INCLUDES RE-ESTABLISHING ACCESS TO ALL FLOODPLAIN, WITH A PROPOSED GEOMETRY THAT UTILIZES THE EXISTING CHANNEL PATTERN, AS WELL AS, BED LIFTING TO BE CONSISTENT WITH REFERENCE DIMENSIONAL ENTRENCHMENT RATIOS. ADDITIONALLY, A LOW FLOW INNER BERM WILL PROVIDE INCREASED DEPOSITIONAL AREA AND STORAGE FOR FINE SEDIMENTS. ENHANCEMENT ACTIVITIES, INCLUDING BANK GRADING, BANKFULL BENCH CREATION, AND INSTALLATION OF ADEQUATE FLOODPRONE WIDTHS WILL BE PERFORMED WITHIN THE EXISTING PLANFORM. THE DESIGN CROSS-SECTIONAL GEOMETRY WILL BE MAINTAINED FROM THE EXISTING PLANFORM THROUGHOUT THE PATTERN ADJUSTMENT ZONES IN ORDER TO PROVIDE APPROPRIATE DIMENSION THROUGHOUT THE RESTORATION REACH.

THE PROPOSED CHANNEL GRADIENTS WILL BE ACHIEVED AND MAINTAINED THROUGH INCORPORATION OF ROCK DROP AND CASCADE STRUCTURES (PROVIDING GRADE CONTROL) AND APPROPRIATELY SIZED POOLS FOR ENERGY DISSIPATION AND HABITAT AVAILABILITY. THE PROJECT AREA INCLUDES A LARGE HEADCUT ASSOCIATED WITH AN ESCARPMENT. THE BANKS ARE NEAR-VERTICAL AND ARE UNDERGOING RETREAT CAUSING SLOPE FAILURE AND MASS WASTING. SPECIAL CONSIDERATION HAS BEEN GIVEN TO THE NATURE OF THE VALLEY HEAD, WITH A DESIGN SOLUTION ENGINEERED FOR THE SPECIFIC LOCAL CONDITIONS. BY ATTAINING APPROPRIATE ENTRENCHMENT RATIOS UPSTREAM OF THE HEADCUT, THE DESIGN WILL ACHIEVE A BALANCED CUT-FILL RATIO IN ORDER TO ALLEVIATE THE SEVERE VALLEY SLOPES AND WILL PROVIDE RIPARIAN PLANTING ZONES. CONSTRUCTED RIFFLES WILL BE INSTALLED TO PROVIDE STABLE CHANNEL BED HABITAT AND GRADE CONTROL. STEEPER SLOPED CHANNEL AREAS WILL INCLUDE A SERIES OF ROCK AND ROLL CASCADE ZONES WHICH PROVIDE ENERGY DISSIPATION AND MICRO-POOL HABITAT. EXISTING CLASS I AND II RIPRAP WILL BE UTILIZED FOR PROPOSED STRUCTURES TO THE GREATEST EXTENT PRACTICABLE. RIPRAP USED WILL CONFORM WITH THE HRPDC CONSTRUCTION STANDARDS, SECTION 414. THE OVERLYING STREAM CHANNEL IS DESIGNED TO PASS THE 10-YEAR FLOW EVENT, WITH HIGHER MAGNITUDE FLOWS ACCESSING THE BIOSLOPE MEDIA THROUGH OVERBANK EXPANSION.

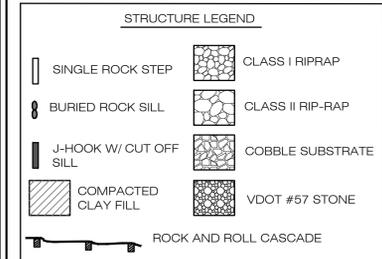
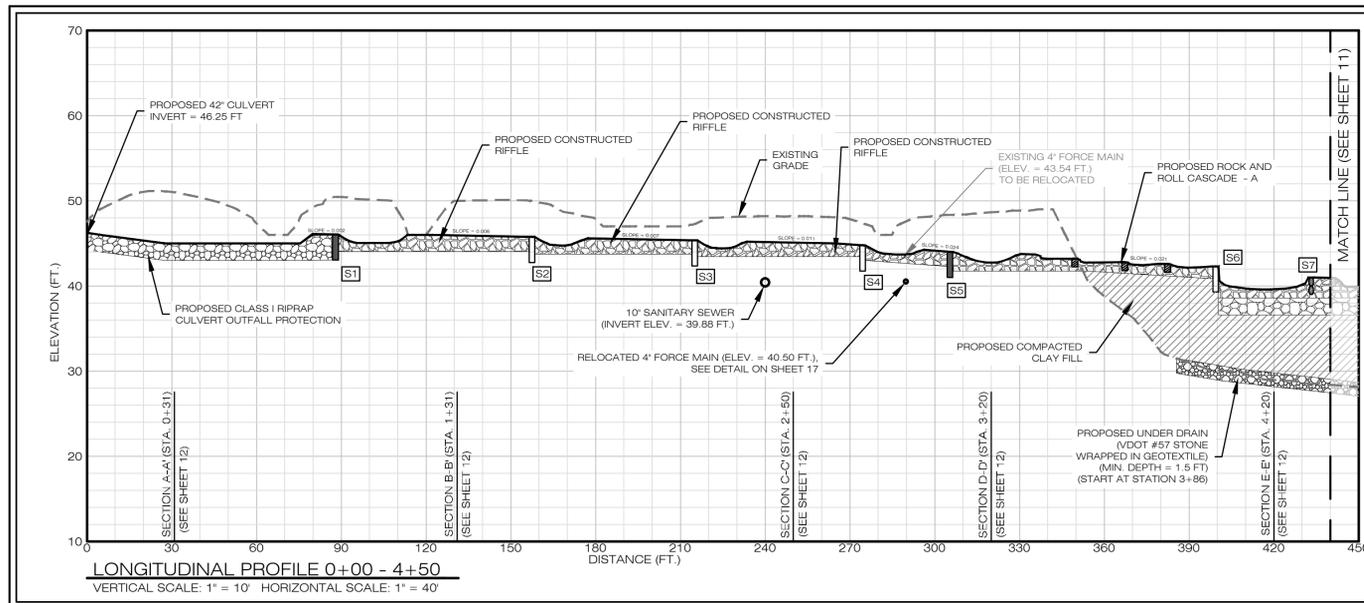
FARTHER DOWNSTREAM THE EXISTING STREAMBANK SLOPES HAVE STABILIZED INTO STAGE IV (AGGRADATION AND PLAN FORM ADJUSTMENT) OF THE CHANNEL EVOLUTION MODEL, BUT UPPER VALLEY WALL EROSION PERSISTS. THE CHANNEL ALIGNMENT WILL BE ADJUSTED TO ENSURE STABILITY OF THE LEFT BANK SIDE SLOPE ADJACENT TO PART OF THE CONSTRUCTION LANDFILL PROPERTY. THE CROSS-SECTIONAL DIMENSION WILL BE ENLARGED (AND MODIFIED IN SHAPE) IN ORDER TO ACCOMMODATE THE INCREASED HYDROLOGIC INPUT FROM THE SURROUNDING WATERSHED. UNSTABLE UPPER BANK AREAS WILL BE SHAPED TO ACHIEVE SAFER SLOPE GRADIENTS AND TO ALLOW PLANTING OF RIPARIAN HABITAT ZONES.

ADDITIONAL ACTIVITIES INCLUDE THE REMOVAL OF FALLEN TREES AND EXISTING ANTHROPOGENIC DEBRIS FROM SELECT LOCATIONS, AND PROVIDING EROSION CONTROL MATTING AND STABILIZATION SEED MIX FOR DISTURBED AREAS.



GEOMORPHOLOGICAL DESIGN SUMMARY

TARGET METRICS	
CROSS-SECTIONAL AREA	24.85 - 37.78 FT ²
WIDTH/DEPTH RATIO	10.93
BANKFULL WIDTH	16.5 FT
BANKFULL MEAN DEPTH	1.51 FT
BANKFULL MAX DEPTH	2.50 FT
RADIUS OF CURVATURE	30 - 47 FT
MEANDER LENGTH	80 - 217 FT
BELT WIDTH	24 - 43 FT
SINUOSITY	1.10



NOTE:
1) SEE STREAM CROSS SECTIONS ON SHEET 12 AND 13.
2) SEE SPECIFIC STRUCTURE DESIGN INFORMATION ON SHEET 14 AND 15.
3) INSPECTION REQUIRED ON ALL SEWER CROSSINGS UPON COMPLETION OF CONSTRUCTION.

**STREAM- PLAN AND PROFILE
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**



REVISIONS:

DATE	DESCRIPTION

DRAWN BY: JWR
DESIGNED BY: JWR
DATE: 01/06/14
CHECKED BY: JWR/DBGM
SCALE: AS NOTED
SHEET: 10
JOB#: 4656

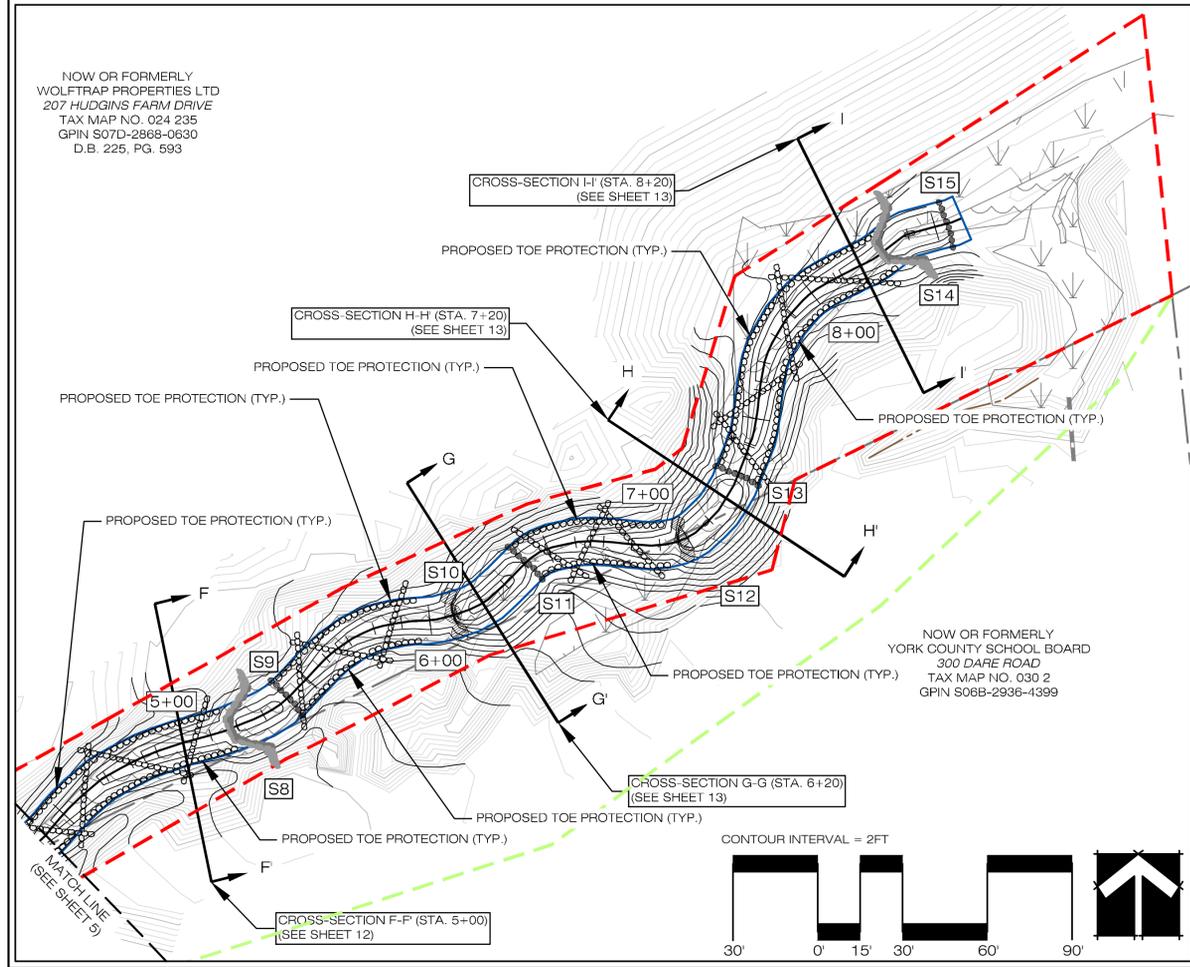
WEG
WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

5209 Center Street
Williamsburg, Virginia 23188
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1011 Boulder Springs Drive, Suite 225
Richmond, Virginia 23225
(804) 287-5474
150 Riverside Parkway, Suite 301
Virginia Beach, Virginia 23466
(540) 785-5554

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NOW OR FORMERLY
WOLFTRAP PROPERTIES LTD
207 HUDGINS FARM DRIVE
TAX MAP NO. 024 235
GPIN S07D-2868-0630
D.B. 225, PG. 693

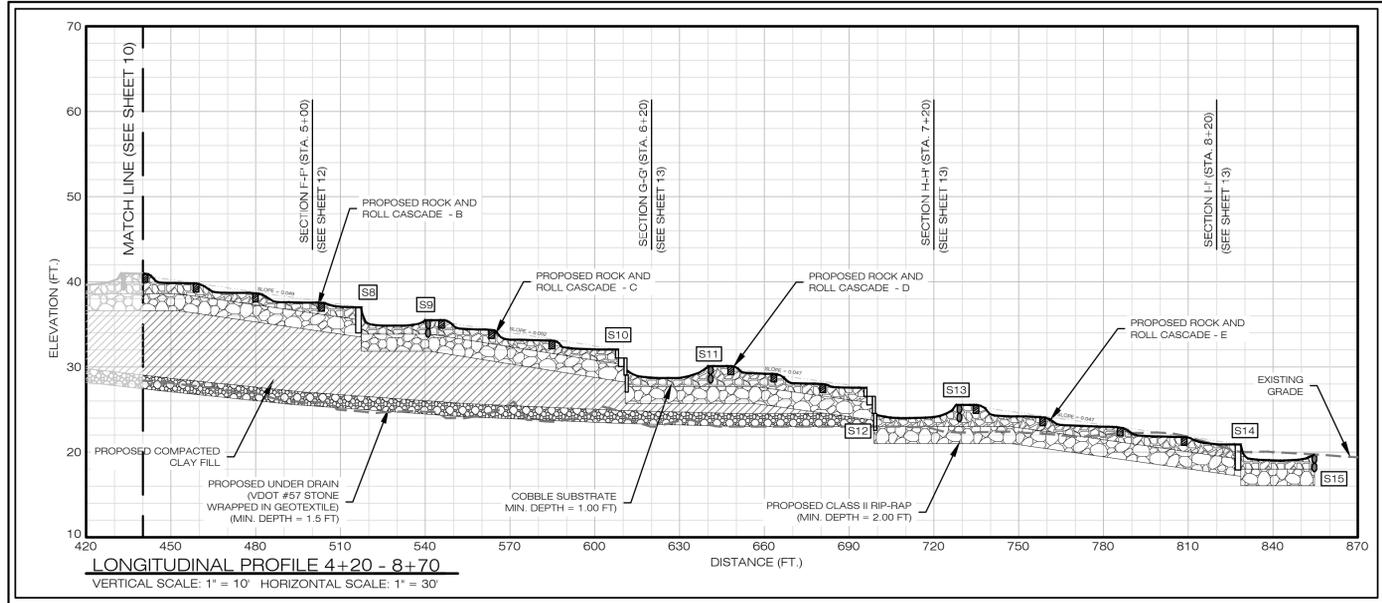
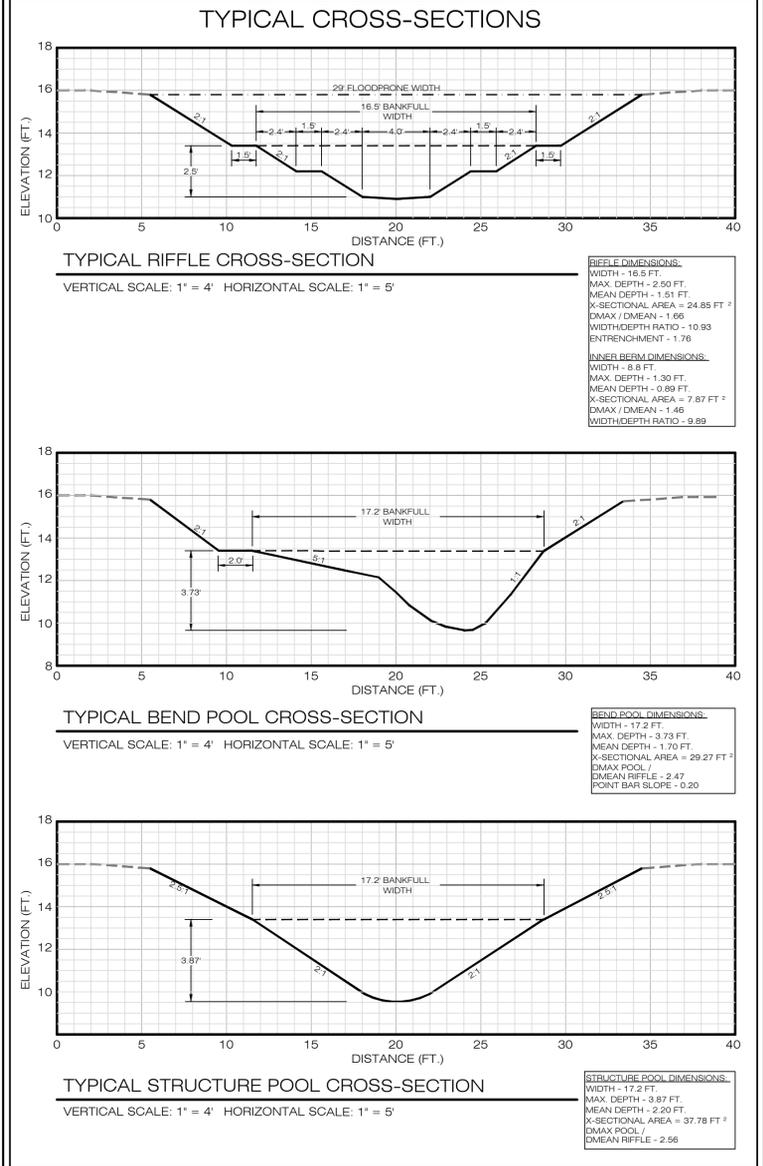


LEGEND

	APPROXIMATE STREAM CHANNEL LIMITS		PROPOSED J-HOOK W/ CUT OFF SILL
	APPROXIMATE JURISDICTIONAL DITCH LIMITS		EXISTING SANITARY SEWER
	EXISTING STRUCTURES		PROPOSED SINGLE ROCK STEP
	EXISTING CONTOURS		PROPOSED DOUBLE ROCK STEP
	CROSS-SECTIONS		PROPOSED BURIED ROCK SILL
	PROPOSED STREAM PATTERN / BANKFULL WIDTH		PROPOSED EASEMENT LIMITS
	PROPOSED GRADING		TEMPORARY EASEMENT LIMITS
	ESTIMATED LIMITS OF GRADING		PROPOSED ROCK AND ROLL CASCADE

GEOMORPHOLOGICAL DESIGN SUMMARY

TARGET METRICS	RESTORATION
CROSS-SECTIONAL AREA	24.85 - 37.78 FT ²
WIDTH/DEPTH RATIO	10.93
BANKFULL WIDTH	16.5 FT
BANKFULL MEAN DEPTH	1.51 FT
BANKFULL MAX DEPTH	2.50 FT
RADIUS OF CURVATURE	30 - 47 FT
MEANDER LENGTH	80 - 217 FT
BELT WIDTH	24 - 43 FT
SINUOSITY	1.10



STRUCTURE LEGEND

	SINGLE ROCK STEP		CLASS II RIP-RAP
	DOUBLE ROCK STEP		COBBLE SUBSTRATE
	ROCK SILL		VDOT #57 STONE
	ROCK AND ROLL CASCADE		COMPACTED CLAY FILL

NOTE:
(1) SEE STREAM CROSS SECTIONS ON SHEETS 12 AND 13.
(2) SEE SPECIFIC STRUCTURE DESIGN INFORMATION ON SHEET 14 AND 15.

STREAM- PLAN AND PROFILE CONTINUED

DARE ELEMENTARY SCHOOL

YORK COUNTY, VIRGINIA



REVISIONS:

NO.	DATE	DESCRIPTION

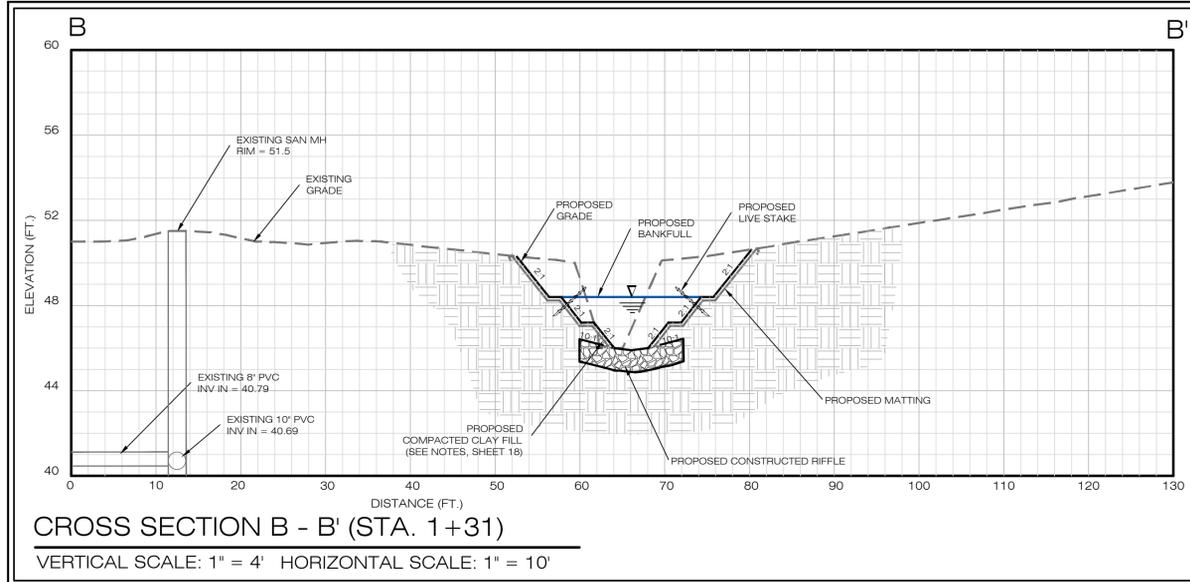
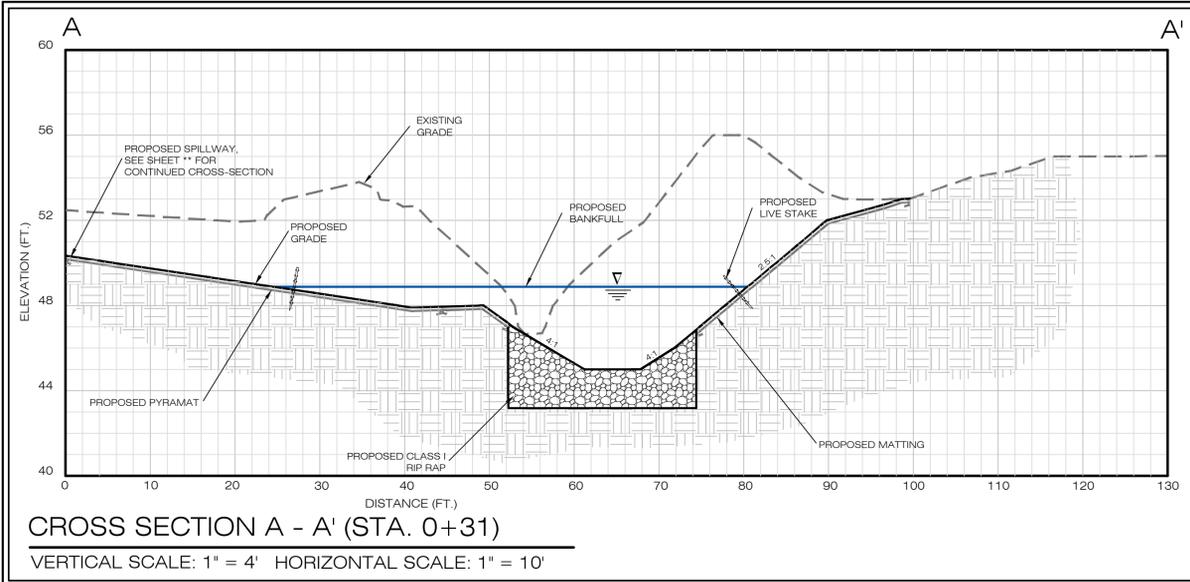
DRAWN BY: TSJ
DESIGNED BY: JWR
DATE: 01/06/14
CHECKED BY: JWR/DBGM
SCALE: AS NOTED
SHEET: 11
JOB#: 4656

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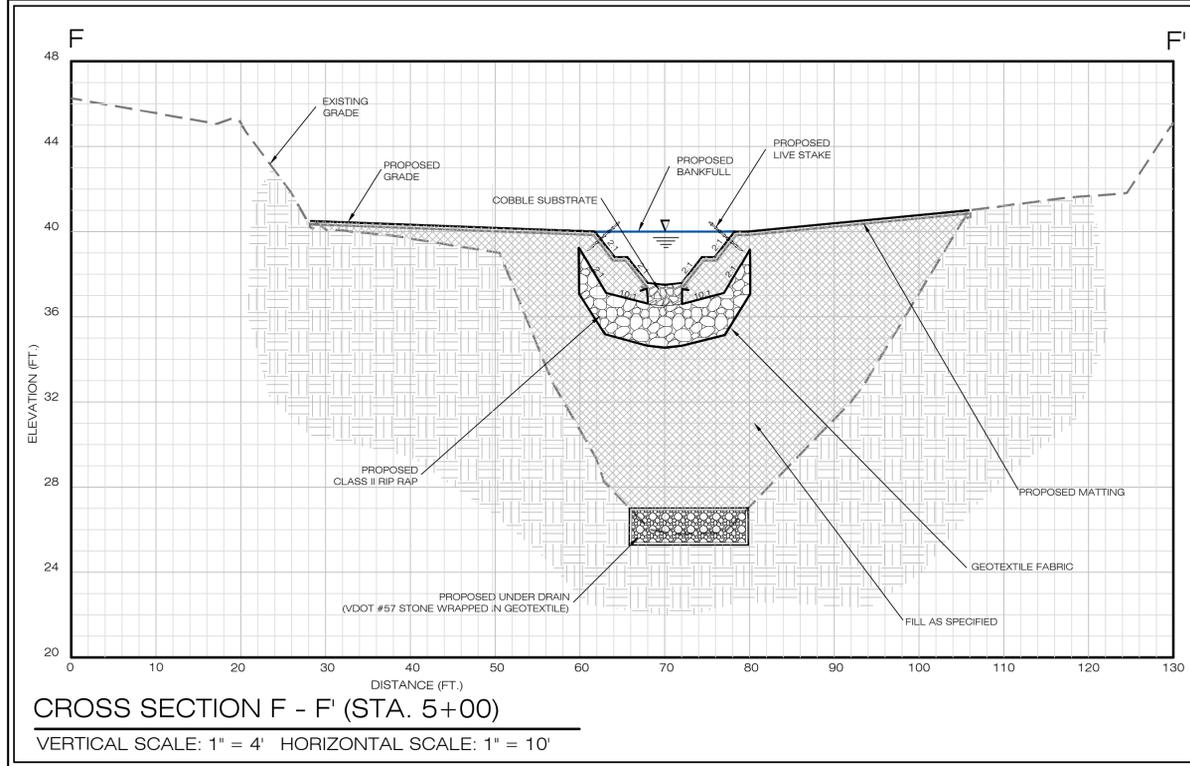
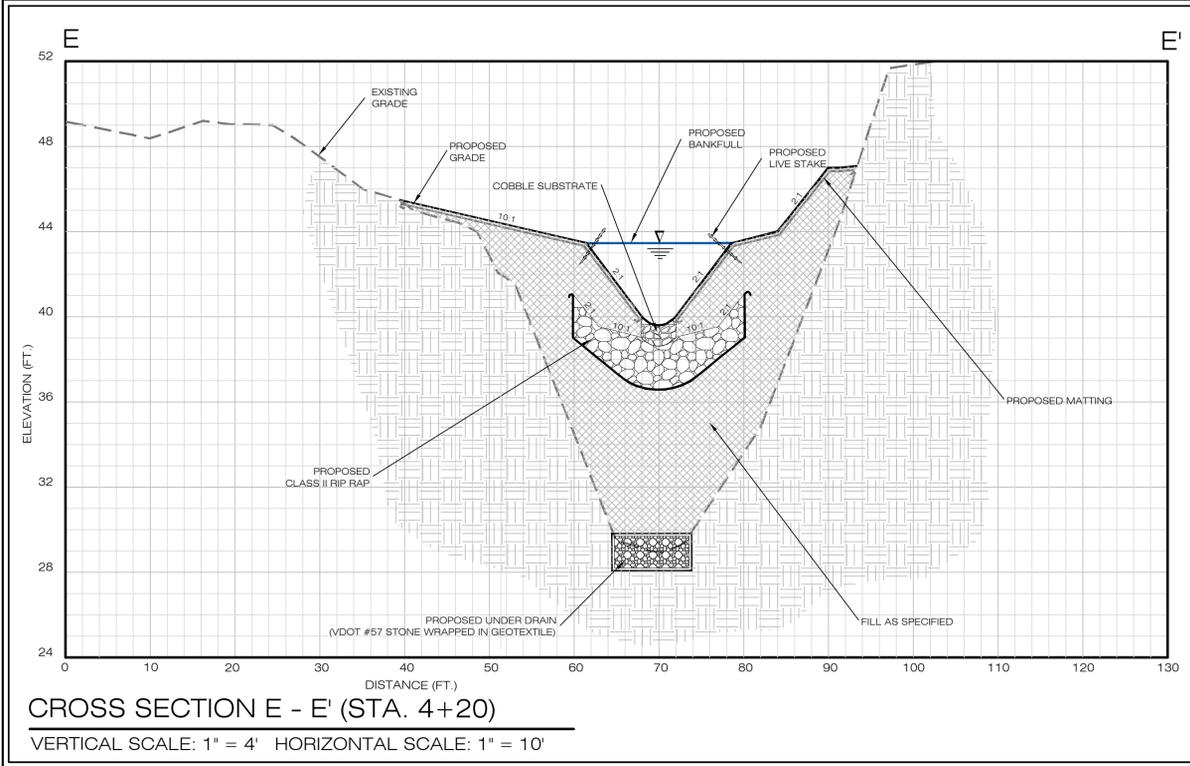
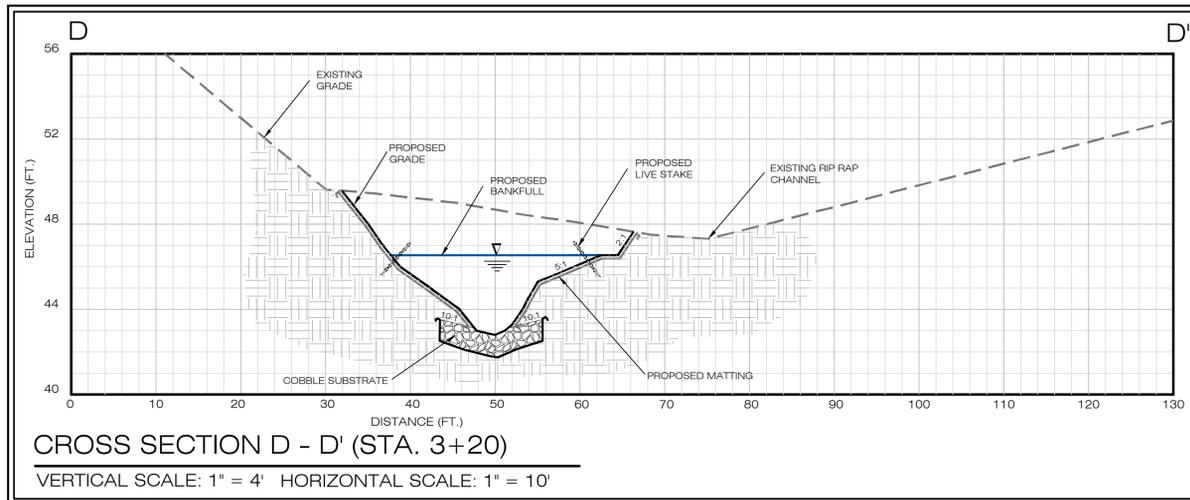
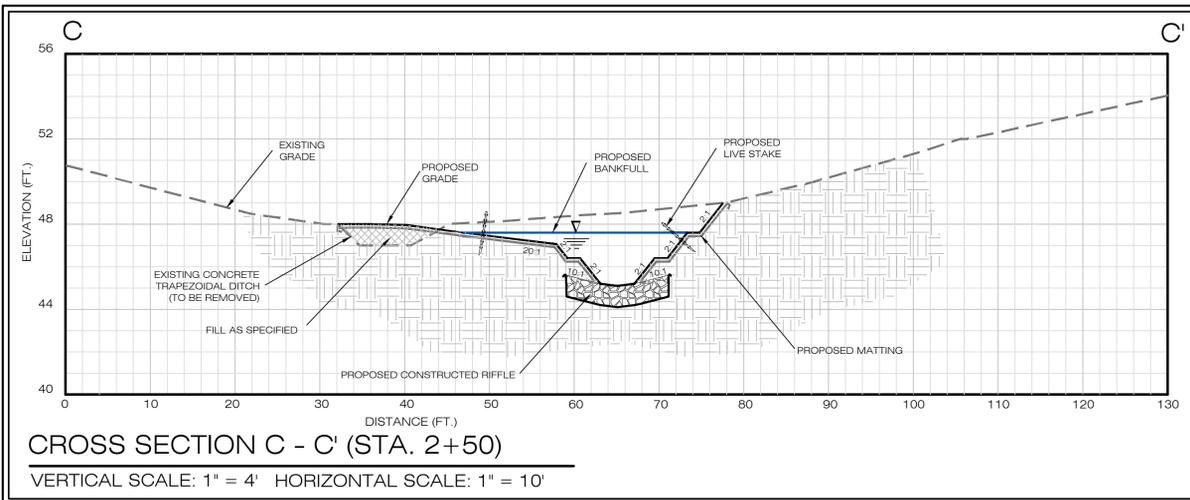
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LEGEND:

- DAM EMBANKMENT FILL
- KEY TRENCH FILL
- CLAY LINER



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STREAM CROSS-SECTIONS (1)
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA

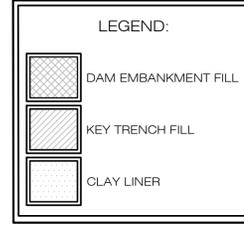
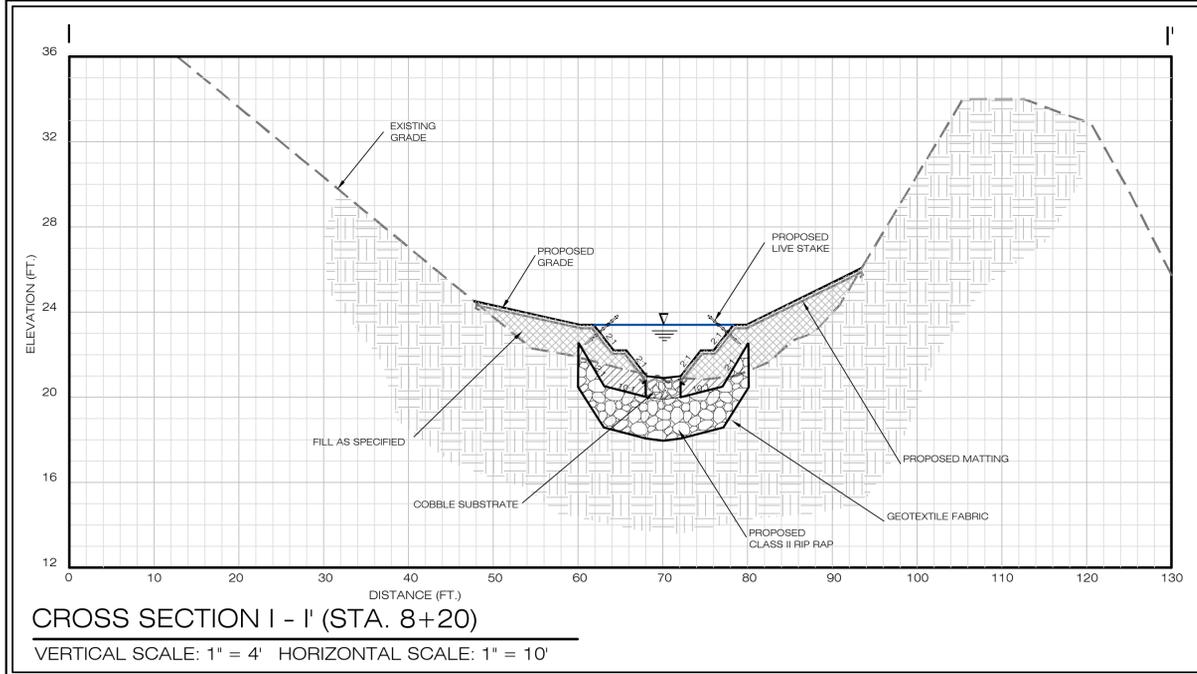
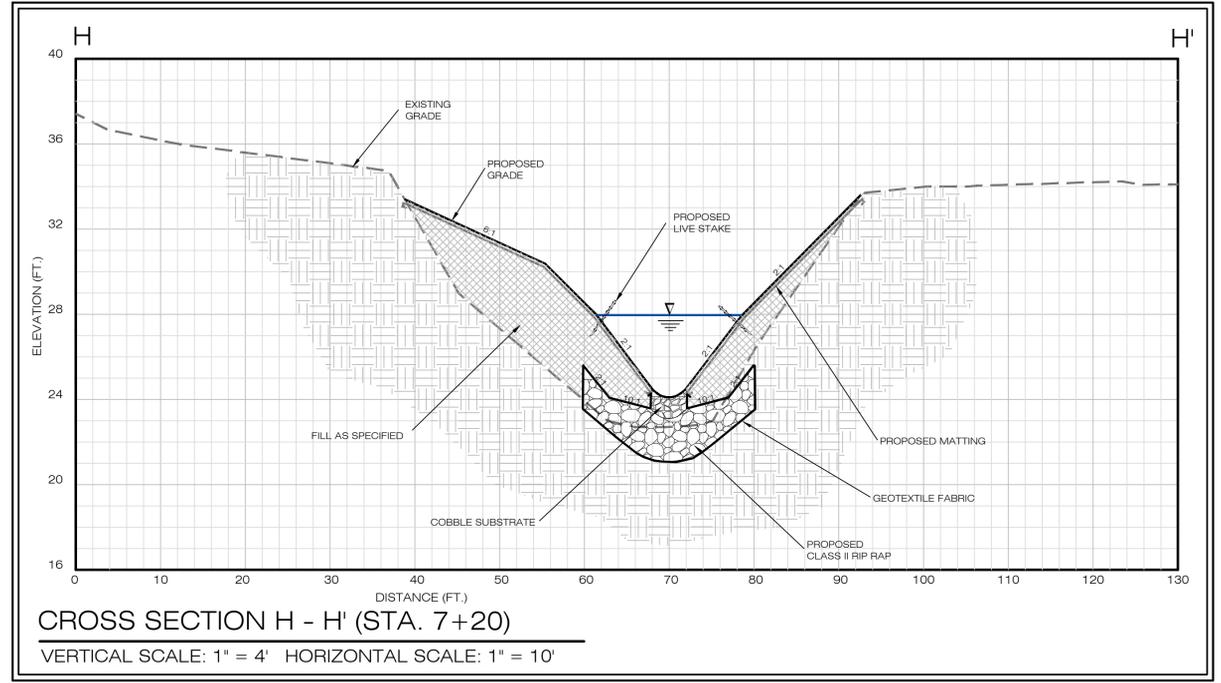
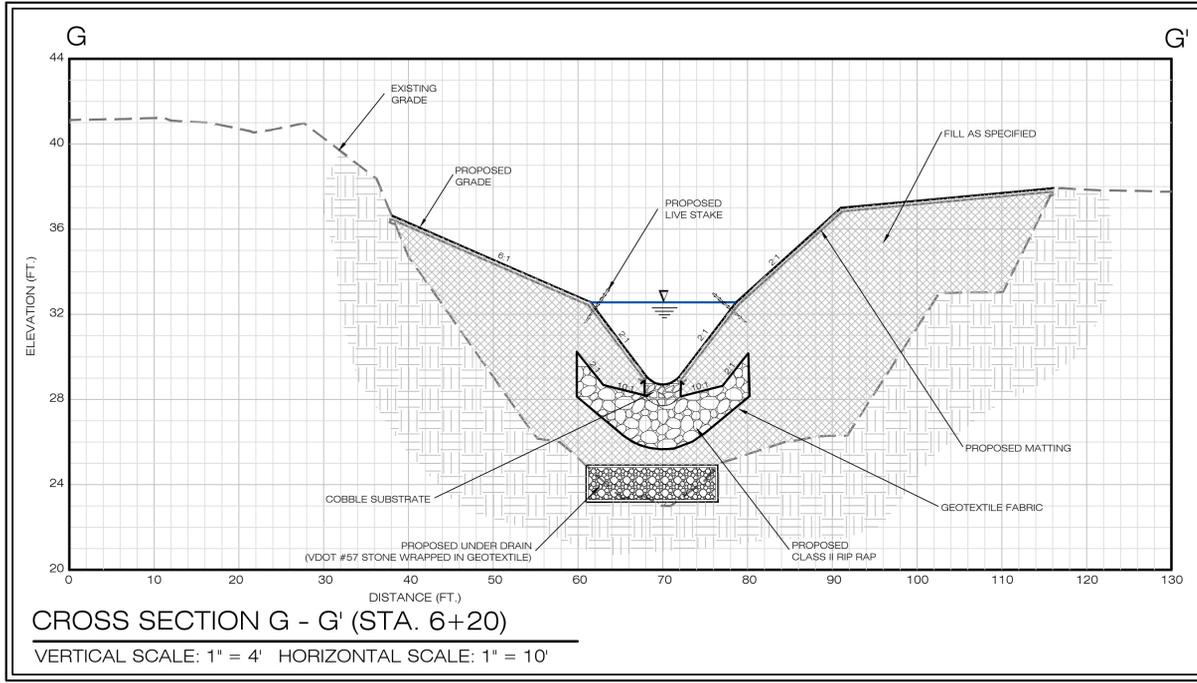
COMMONWEALTH OF VIRGINIA
 J. GLENN MUCKLEY
 Lic. No. 038970
 1-6-14
 PROFESSIONAL ENGINEER

REVISIONS:

NO.	DATE	DESCRIPTION

DRAWN BY: JS
 DESIGNED BY: JWR
 DATE: 01/06/14
 CHECKED BY: JWR/BGM
 SCALE: AS NOTED
 SHEET: 12
 JOB#: 4656

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 (540) 785-5544
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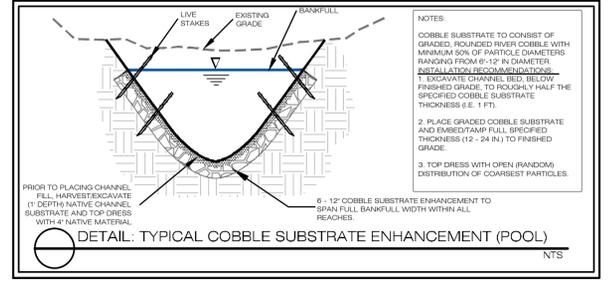
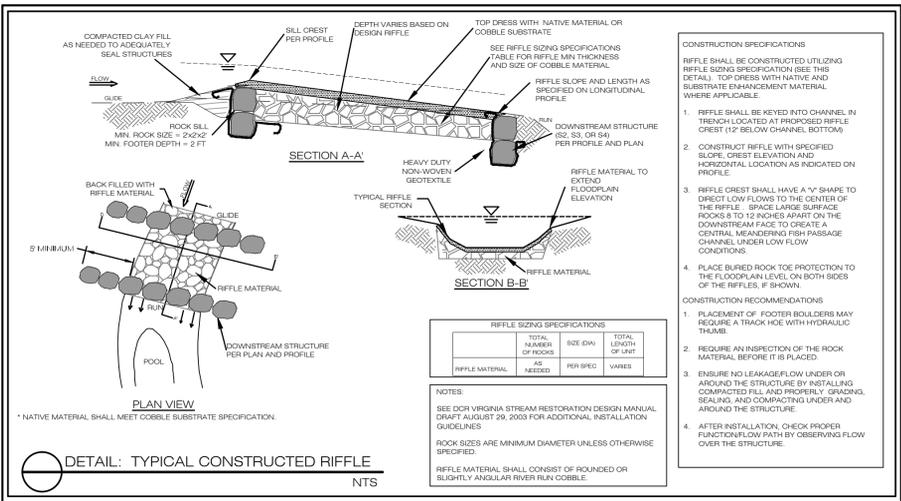
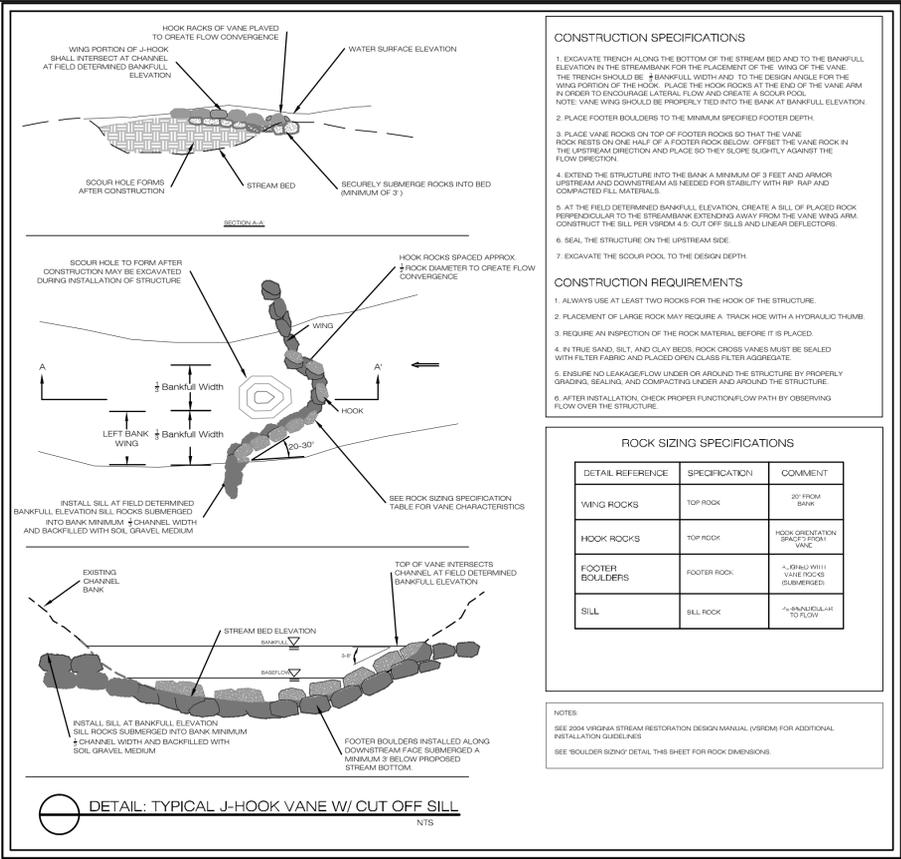
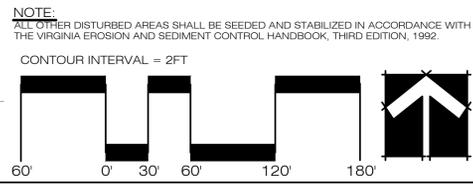
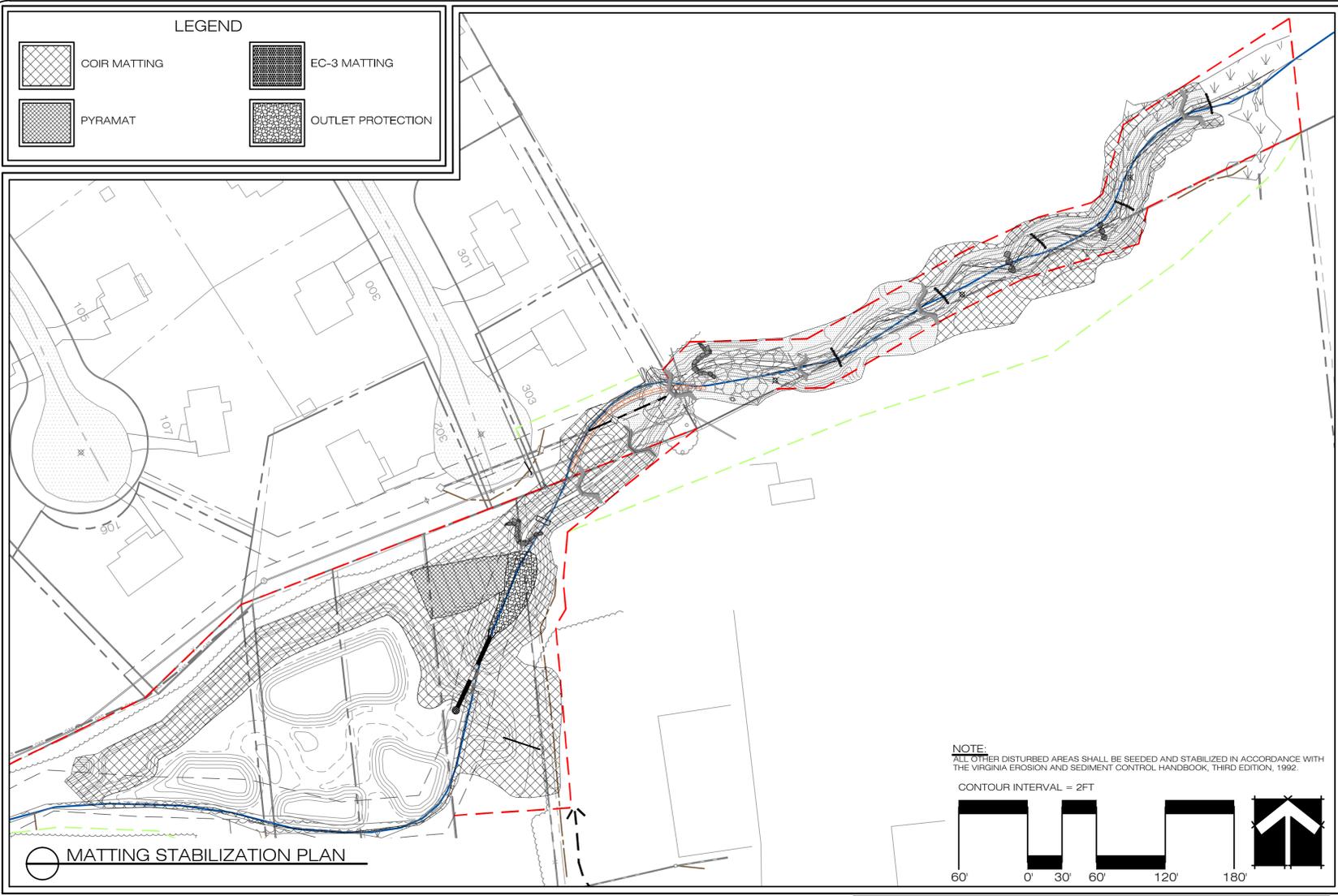
STREAM CROSS-SECTIONS (2)
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
 J. GLENN MUCKLEY
 Lic. No. 038970
 1-6-14
 PROFESSIONAL ENGINEER

REVISIONS:

NO.	DATE	DESCRIPTION

DRAWN BY: TSL
 DESIGNED BY: JWR
 DATE: 01/06/14
 CHECKED BY: JWR/DBGM
 SCALE: AS NOTED
SHEET: 13
 JOB#: 4656



PROPOSED STREAMBANK RESTORATION PLAN:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING CONSTRUCTION SEQUENCE. ALL MATERIALS SUPPLIED BY THE CONTRACTOR SHALL CONFORM TO SECTION 200 OF THE HRPDC CONSTRUCTION STANDARDS:

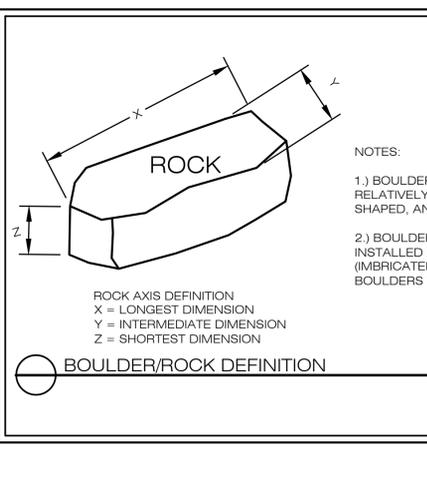
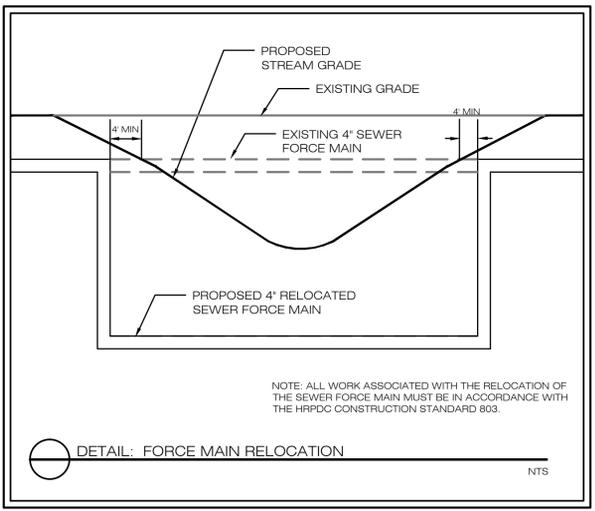
- ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND THE PROCEDURE OUTLINED IN THESE PLANS.
- THE CONTRACTOR SHOULD INSTALL SITE IMPROVEMENTS IN PHASES TO MINIMIZE DISTURBED AREAS.
- THE CONTRACTOR SHALL INSTALL BIO-ENGINEERING AND STRUCTURAL DEVICES FOR STREAM RESTORATION AFTER EARTHWORK OPERATIONS HAVE BEEN COMPLETED.
- THE CONTRACTOR SHALL PERMANENTLY STABILIZE THE DISTURBED AREAS WITH THE STREAM RESTORATION MIX IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS SHOWN IN THESE PLANS. EROSION CONTROL MATTING AND SEEDING SHALL BE APPLIED IN SENSITIVE AREAS AS IDENTIFIED HEREIN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF SEEDED AREAS UNTIL A FINAL REVIEW HAS BEEN COMPLETED BY THE ENGINEER.
- THE ENGINEER SHALL PERFORM A FINAL SITE INSPECTION. ALL COMMENTS RECEIVED BY THE CONTRACTOR SHALL BE ADDRESSED PRIOR TO THE COMMENCEMENT OF CLEAN-UP ACTIVITIES.
- CONTRACTOR SHALL COMMENCE WITH THE FINAL CLEAN-UP OF THE PROJECT SITE, AND DEMOBILIZATION TASKS.

GENERAL NOTES:

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS OF ALL EXISTING UTILITIES WITHIN THE PROJECT AREA PRIOR TO COMMENCEMENT OF CONSTRUCTION OPERATIONS, AND MUST CONTACT MISS UTILITY PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.
- ALL DOWNSTREAM EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND CONSTRUCTED PRIOR TO THE COMMENCEMENT OF ANY UPSTREAM EARTHWORK ACTIVITIES. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR IN ACCORDANCE WITH THESE PLANS AND THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992.
- THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN A CONSTRUCTION STAGING/ STOCKPILE AREA AS APPROVED BY THE ENGINEER. LOCATION OF THIS AREA SHALL BE COORDINATED BETWEEN THE CONTRACTOR AND OWNER (OR REPRESENTATIVE).
- THE CONTRACTOR IS RESPONSIBLE FOR LAYOUT AND STAKE-OUT OF ALL WORK COVERED UNDER THESE PLANS.
- ALL CONSTRUCTION AND DEMOLITION ACTIVITIES ASSOCIATED WITH THIS PROJECT SHALL BE ACCOMPLISHED IN SUCH A MANNER THAT CONSTRUCTION AND/OR WASTE MATERIALS DO NOT ENTER STATE WATERS.

MAINTENANCE OF THE PROJECT SITE

- THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS AND DISPOSE OF OFF-SITE IN ACCORDANCE WITH ALL LOCAL AND STATE LAWS AND REGULATIONS.
- ALL EQUIPMENT AND SUPPLIES SHALL BE STORED WITHIN THE CONSTRUCTION STAGING AREA WHILE CONSTRUCTION ACTIVITIES HAVE CEASED FOR THE DAY.
- THE CONTRACTOR SHALL PROVIDE ALL PROTECTION MEASURES AND DEVICES NECESSARY TO PROTECT THE PROPERTY, ADJACENT PROPERTY, THE PUBLIC, EMPLOYEES, AND THE GENERAL PROJECT DURING THE DURATION OF THE PROJECT AND COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
- ALL EXISTING SITE IMPROVEMENTS TO REMAIN SHALL BE PROTECTED FROM DAMAGE. ANY DAMAGE CAUSED BY THE CONTRACTOR DURING CONSTRUCTION OPERATIONS UNDER THIS CONTRACT SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE.



STRUCTURE INFORMATION

STRUCTURE #	STRUCTURE TYPE	PROFILE STATION	CREST HEIGHT (ELEVATION)	MINIMUM ROCK SIZE (FT X FT X FT)	MIN. FOOTER DEPTH (ELEVATION)
S1	J-HOOK VANE	0+89	46.0	2x2x2	2
S2	SINGLE ROCK STEP	1+59	45.7	2x2x2	2
S3	SINGLE ROCK STEP	2+16	45.3	2x2x2	2
S4	SINGLE ROCK STEP	2+76	44.7	2x2x2	4
S5	J-HOOK VANE	3+06	44.0	2x2x2	4
S6	SINGLE ROCK STEP	4+00	42.3	2x2x2	6
S7	ROCK SILL	4+33	41.0	2x2x2	2
S8	SINGLE ROCK STEP	5+17	37.0	2.5x2.5x2.5	5
S9	ROCK SILL	5+41	35.5	2x2x2	2
S10	DOUBLE ROCK STEP	6+08	32.0	2.5x2.5x2.5	7.5
S11	ROCK SILL	6+41	30.1	2x2x2	2
S12	DOUBLE ROCK STEP	6+96	27.6	2.5x2.5x2.5	7.5
S13	ROCK SILL	7+29	25.6	2x2x2	2
S14	SINGLE ROCK STEP	8+29	20.9	2.5x2.5x2.5	5
S15	ROCK SILL	8+55	19.7	2x2x2	2

NOTE: FINAL STRUCTURE ANGLES AND SLOPES MAY BE ADJUSTED IN FIELD BY ENGINEER.

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ENVIRONMENTAL
GROUP, INC.

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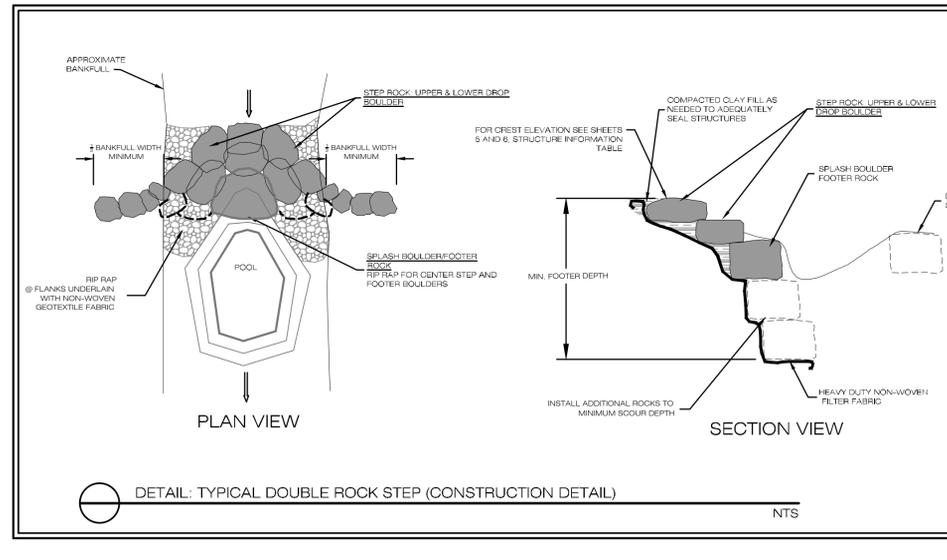
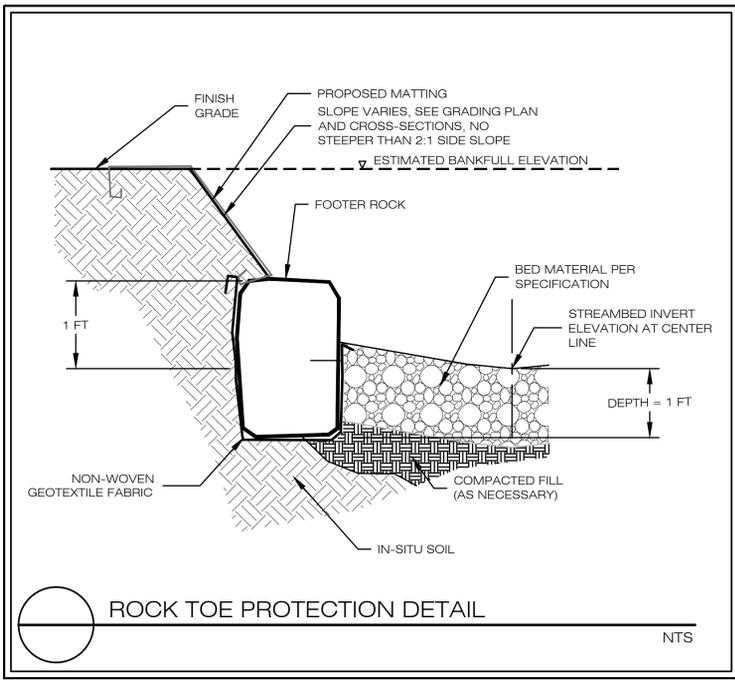
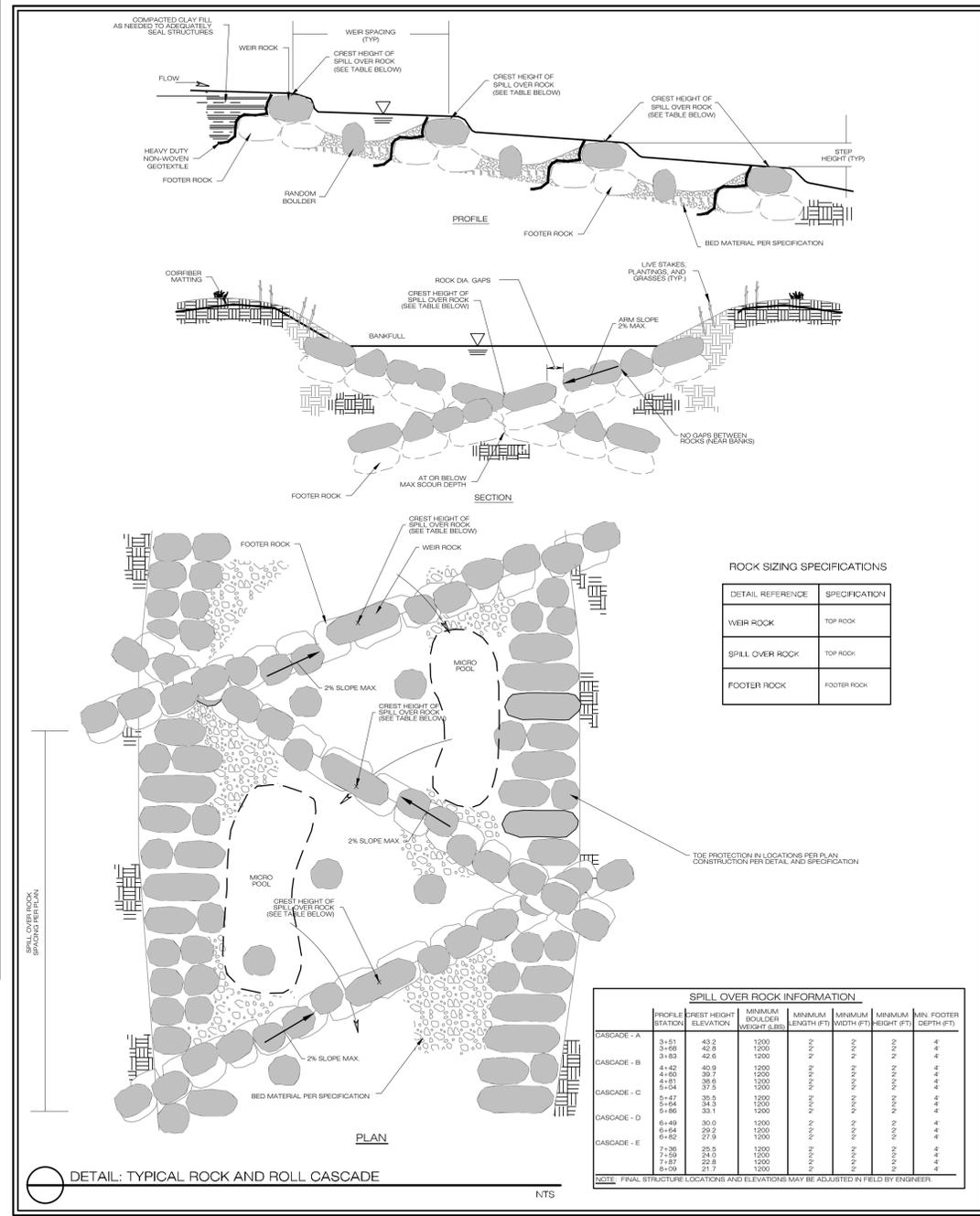
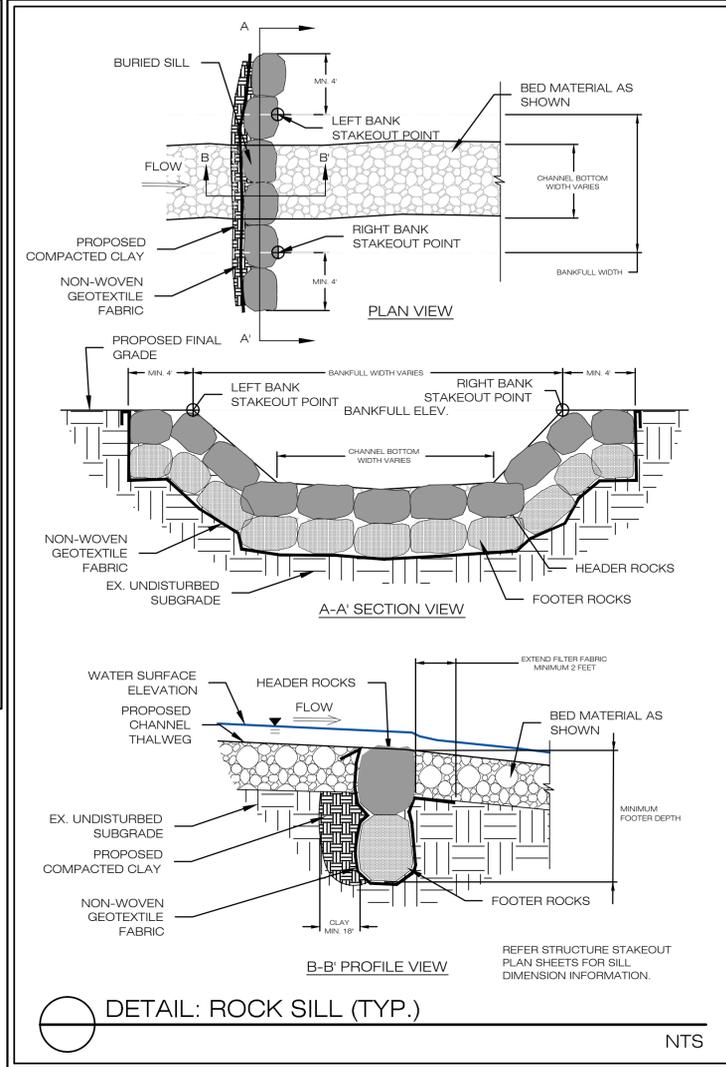
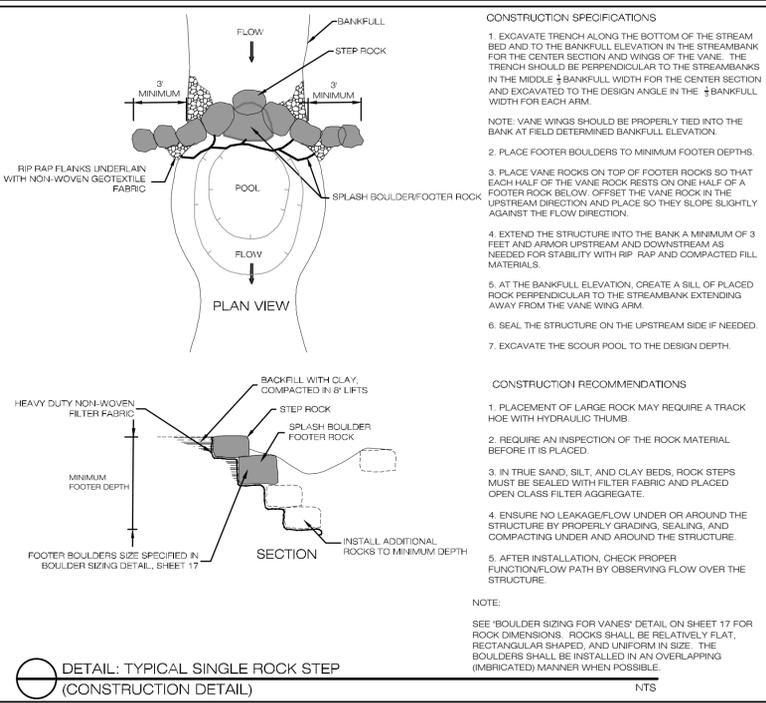
**STREAM RESTORATION
NOTES AND DETAILS (1)
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**

COMMONWEALTH OF VIRGINIA
1. GLENN MUCKLEY
Lic. No. 038970
1-6-14
PROFESSIONAL ENGINEER

REVISIONS:

NO.	DATE	DESCRIPTION

DRAWN BY: JWR
DESIGNED BY: JWR
DATE: 01/06/14
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SCALE: AS NOTED
SHEET: 14
JOB#: 4656



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**STREAM RESTORATION
NOTES AND DETAILS (2)
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**

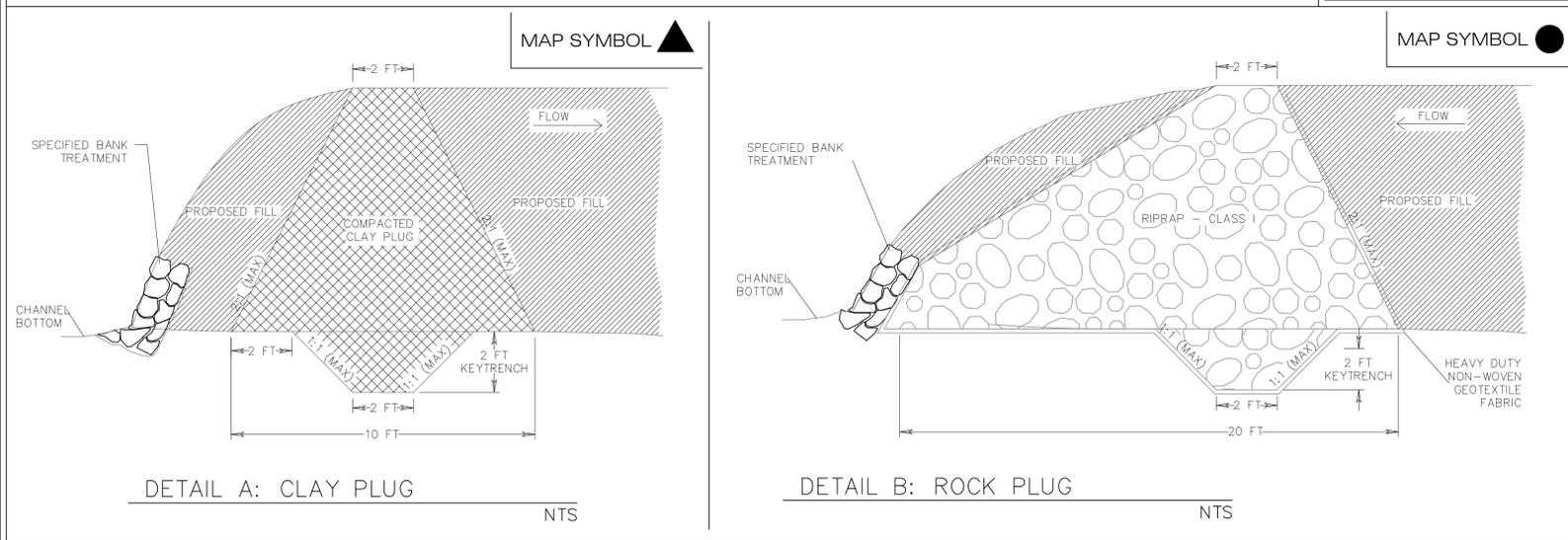
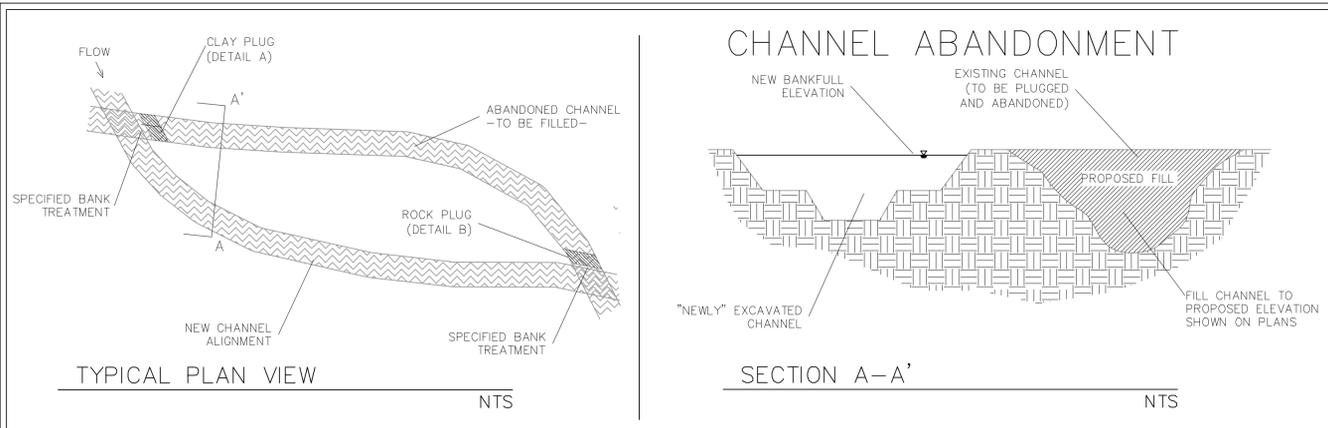
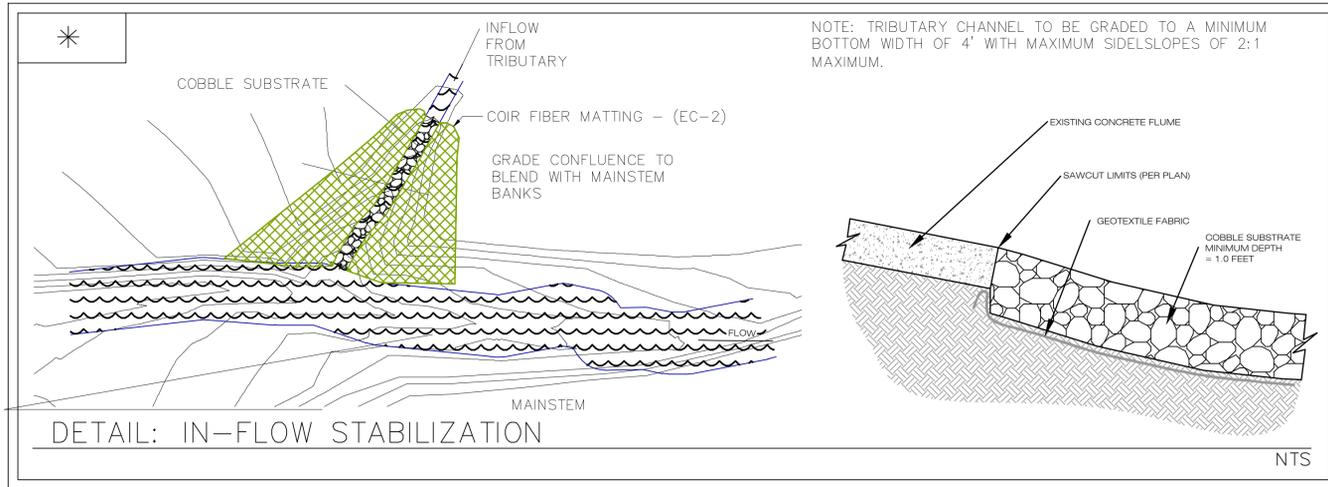
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JOB#: 4656

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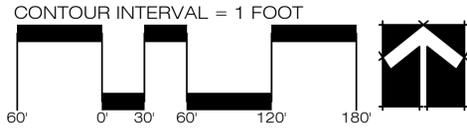


**STREAM RESTORATION
NOTES AND DETAILS (3)
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**

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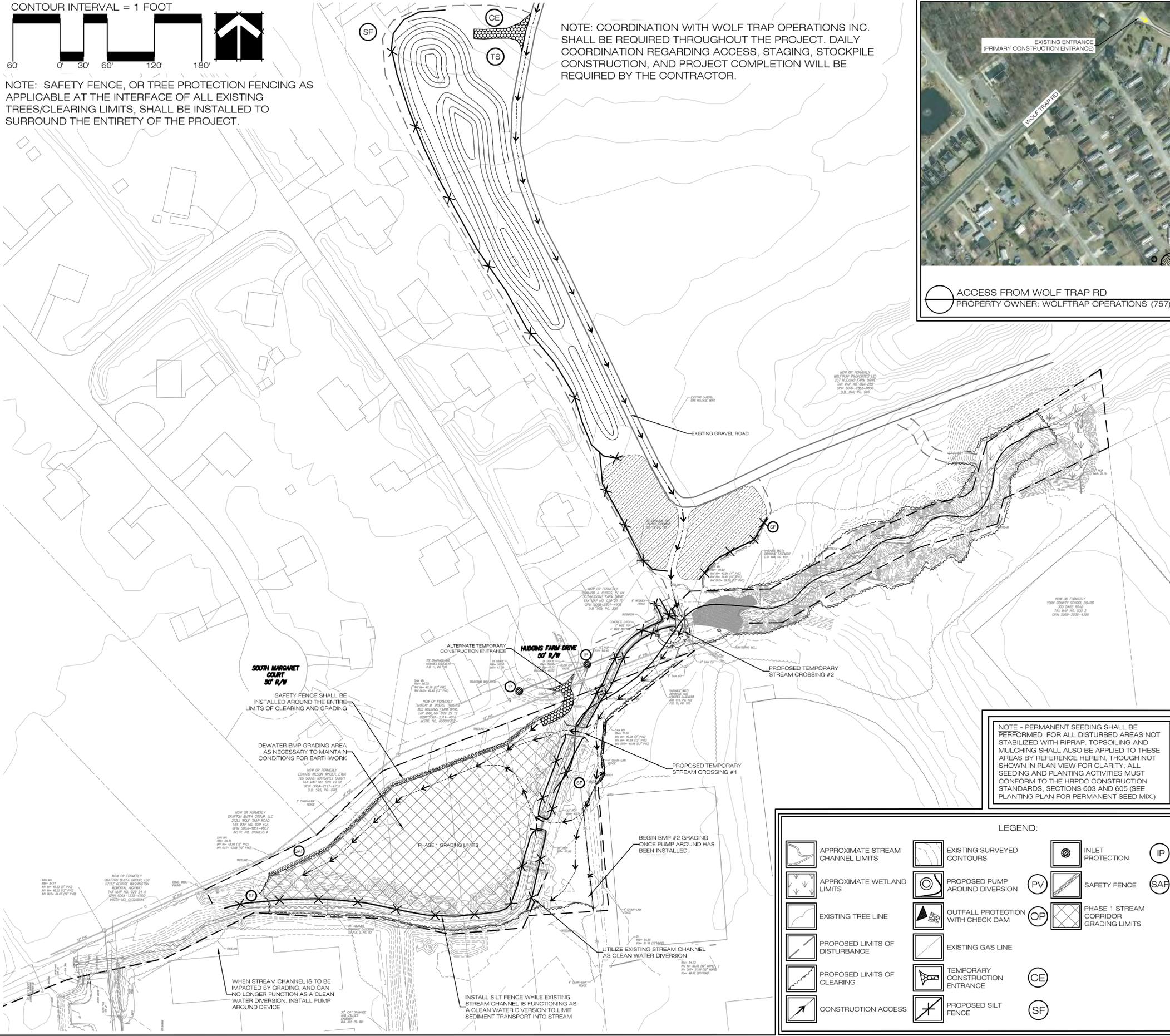
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JOB#: 4656



NOTE: SAFETY FENCE, OR TREE PROTECTION FENCING AS APPLICABLE AT THE INTERFACE OF ALL EXISTING TREES/CLEARING LIMITS, SHALL BE INSTALLED TO SURROUND THE ENTIRETY OF THE PROJECT.

NOTE: COORDINATION WITH WOLF TRAP OPERATIONS INC. SHALL BE REQUIRED THROUGHOUT THE PROJECT. DAILY COORDINATION REGARDING ACCESS, STAGING, STOCKPILE CONSTRUCTION, AND PROJECT COMPLETION WILL BE REQUIRED BY THE CONTRACTOR.



CONSTRUCTION SEQUENCE:

THE PROJECT IS ENVISIONED WITH A ROLLING, PHASED IMPLEMENTATION FROM THE UPSTREAM BOUNDARY AT THE PROPOSED BMP #1 & #2 TO THE DOWNSTREAM CHANNEL RESTORATION TERMINUS. AS SUCH, ALL CONSTRUCTION SHALL COMMENCE GENERALLY UPSTREAM TO DOWNSTREAM. BMP #6 CONSTRUCTION MAY BE PERFORMED INDEPENDENTLY AND CONCURRENTLY WITH OTHER PARTS OF THE PROJECT WITHIN A LIMITED TIME WINDOW AND IS NOT ADDRESSED IN THE SEQUENCE BELOW. SEE THE GRASSED CHANNEL DESIGN FOR THE BMP #6 SEQUENCE OF CONSTRUCTION. EXCESS EXCAVATED MATERIAL WILL BE GENERATED FROM THE CONSTRUCTION OF BMP #1 EVEN WITH A SUBSTANTIAL AMOUNT OF FILL MATERIAL FROM THIS LOCATION NEEDED FOR THE COMPLETION OF DOWNSTREAM CHANNEL IMPROVEMENTS. TO ACCOMMODATE OVERBURDENED MATERIAL PERMANENT STOCKPILES HAVE BEEN PROPOSED ON THE WOLFTRAP OPERATIONS, INC. PROPERTY. WHILE INTERMEDIATE PHASING OPERATIONS AND DAILY MAINTENANCE PRACTICES WILL BE REQUIRED TO LIMIT SEDIMENT TRANSPORT OFF-SITE, THE PROJECT HAS BEEN BROKEN INTO THREE PRIMARY PHASES. PHASE 1 DEALS WITH THE INITIAL ACCESS, STAGING, AND BULK EXCAVATION OF BMP ONE MATERIAL (WITH A CLEAN WATER DIVERSION INTACT) AND PLACEMENT OF FILL WITHIN PERMANENT STOCK PILE AREAS. PHASE 2 COVERS THE REMAINING EXCAVATION OF BMP ONE, THE TRANSITION TO ON-LINE (IN CHANNEL) CONSTRUCTION ACTIVITIES, AND THE INITIAL FILL PLACEMENT WITHIN THE UPPER REACHES OF THE STREAM CONSTRUCTION. FINALLY, THE THIRD PHASE (3) DEPOSITS THE REMAINING DOWNSTREAM CONSTRUCTION ACTIVITIES ONCE BMP ONE HAS BEEN COMPLETED, WHILE MORE THOROUGHLY DEFINING THE LIMITS OF STABILIZATION EFFORTS. THE FOLLOWING REPRESENTS THE PHASED SEQUENCE OF CONSTRUCTION:

- PHASE I
- SCHEDULE AN ON-SITE PRE-CONSTRUCTION MEETING WITH THE YORK COUNTY ENVIRONMENTAL AND DEVELOPMENT SERVICES, THE ENGINEER, AND A REPRESENTATIVE OF WOLFTRAP OPERATIONS, INC. PRIOR TO THE MEETING, THE CONTRACTOR, COORDINATING WITH WOLFTRAP OPERATIONS, INC., SHALL FLAG THE LIMITS OF CLEARING AND THE LIMITS OF INTENDED PERMANENT/TEMPORARY STOCKPILING AND STAGING PER PLAN. THE COUNTY AND ENGINEER SHALL APPROVE THE LIMITS OF CLEARING PRIOR TO CONSTRUCTION ACTIVITIES. DURING THIS PRE-CONSTRUCTION MEETING, THE ENGINEER OR COUNTY MAY CHOOSE TO ALTER THE LIMITS OF CONSTRUCTION TO AVOID LARGE WOODY VEGETATION.
 - ACCESS SHALL BE ESTABLISHED THROUGH THE EXISTING LANDFILL ROAD AS SHOWN. COORDINATE WITH WOLFTRAP OPERATIONS, INC. REGARDING ACCESS, STAGING, AND STOCKPILING ON A DAILY BASIS. ALTERNATE ACCESS, AS NECESSARY, WILL BE PROVIDED OFF OF HUDDINS FARM DRIVE. INSTALL ALL CONSTRUCTION ENTRANCES IN ACCORDANCE WITH STD. & SPEC. 3.02.
 - INSTALL ALL PHASE I EROSION AND SEDIMENT CONTROL MEASURES ACCORDING TO STANDARDS SET FORTH IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION 1992 PRIOR TO THE COMMENCEMENT OF ANY EARTHWORK ACTIVITIES ON-SITE. INSTALL TEMPORARY STREAM CROSSINGS AND SILT FENCE AS NEEDED FOR PHASE I EXCAVATION. REMOVE EXISTING FENCE SEGMENT AS SHOWN. INSTALL SILT FENCE AND TREE PROTECTION AS SHOWN ON THE PLANS. INSTALL ORANGE SAFETY FENCE AROUND THE PERIMETER OF THE ENTIRE LIMITS OF CLEARING AND GRADING.
 - PROTECT ALL SANITARY PIPES AND OTHER UNDERGROUND UTILITIES WITHIN OR ADJACENT TO THE PROJECT AREA.
 - AS CONSTRUCTION BORDERS ADJACENT RESIDENCES AND A SCHOOL, TAKE PARTICULAR CARE TO ENSURE THAT THE WORK AREA IS INACCESSIBLE AND ALL SAFETY FENCE AND BARRIERS ARE INTACT AT THE CLOSE OF EACH WORK DAY. SAFETY FENCE SHALL ENCOMPASS THE WORK AREA. NO GAPS SHALL BE ACCEPTABLE IN SAFETY FENCE UNLESS OTHERWISE APPROVED BY THE COUNTY.
 - THE CLEARING AND GRUBBING OF PHASE I AREAS SHALL COMMENCE.
 - NO STREAM BANKS SHALL BE LEFT EXPOSED (I.E. BARE) AT THE END OF THE WORK DAY. ALL STREAM BANKS SHALL BE COVERED WITH MATTING BEFORE THE CONTRACTOR STOPS WORK FOR THE DAY. THE CONTRACTOR SHALL TEMPORARILY COVER ANY DISTURBED AREAS WITH MATTING AT THE END OF EACH WORK DAY IF FINAL STABILIZATION IS NOT COMPLETED BY THE END OF THE DAY. IN ADDITION, ANY REMAINING DISTURBED AREAS IN THE OVERBANK ZONES SHALL BE PROTECTED FROM SHEET FLOW UNTIL WORK CONTINUES THE FOLLOWING DAY.
 - EXCAVATE BMP 1 AREA. ENSURE THAT THE EXISTING CHANNEL REMAINS A CLEAN WATER DIVERSION THROUGH THE PHASE I EXCAVATION AREAS. THE EXISTING CHANNEL SHALL REMAIN INTACT AND FREE OF SEDIMENT THROUGHOUT PHASE I CONSTRUCTION EFFORTS.
 - HAUL EXCAVATED MATERIAL TO THE STOCKPILE LOCATION AS SHOWN ON THE ADJACENT LANDFILL PROPERTY. TOPSOIL MATERIAL TO BE USED FOR REPLACEMENT PRIOR TO STABILIZATION SHALL BE KEPT SEPARATED FROM BULK EXCAVATION MATERIALS FOR USE IN BMP AND STREAM COMPLETION.
 - ENSURE THAT ALL EXCAVATIONS REMAIN ISOLATED FROM EXISTING STREAM FLOWS, AND THESE EXCAVATED AREAS SHALL BE DEWATERED AS NEEDED VIA APPROVED METHODS IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION 1992.
 - BMP 1 EMBANKMENT CONSTRUCTION MAY COMMENCE FROM BOTH SIDES OF THE CHANNEL IF NECESSARY; HOWEVER, THE CLEAN WATER DIVERSION REMAINS INTACT UNTIL PHASE II CONTROLS ARE IN PLACE.
 - ONCE IT IS DETERMINED THAT NO ADDITIONAL BMP 1 CONSTRUCTION CAN TAKE PLACE WITHOUT DISRUPTION OF THE CLEAN WATER DIVERSION CHANNEL, PHASE II PROTOCOLS SHALL COMMENCE.

NOTE - PERMANENT SEEDING SHALL BE PERFORMED FOR ALL DISTURBED AREAS NOT STABILIZED WITH RIPRAP, TOPSOILING AND MULCHING SHALL ALSO BE APPLIED TO THESE AREAS BY REFERENCE HEREIN, THOUGH NOT SHOWN IN PLAN VIEW FOR CLARITY. ALL SEEDING AND PLANTING ACTIVITIES MUST CONFORM TO THE HRPDC CONSTRUCTION STANDARDS, SECTIONS 603 AND 605 (SEE PLANTING PLAN FOR PERMANENT SEED MIX.)

LEGEND:

**EROSION AND SEDIMENT CONTROL
PLAN - PHASE 1
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**



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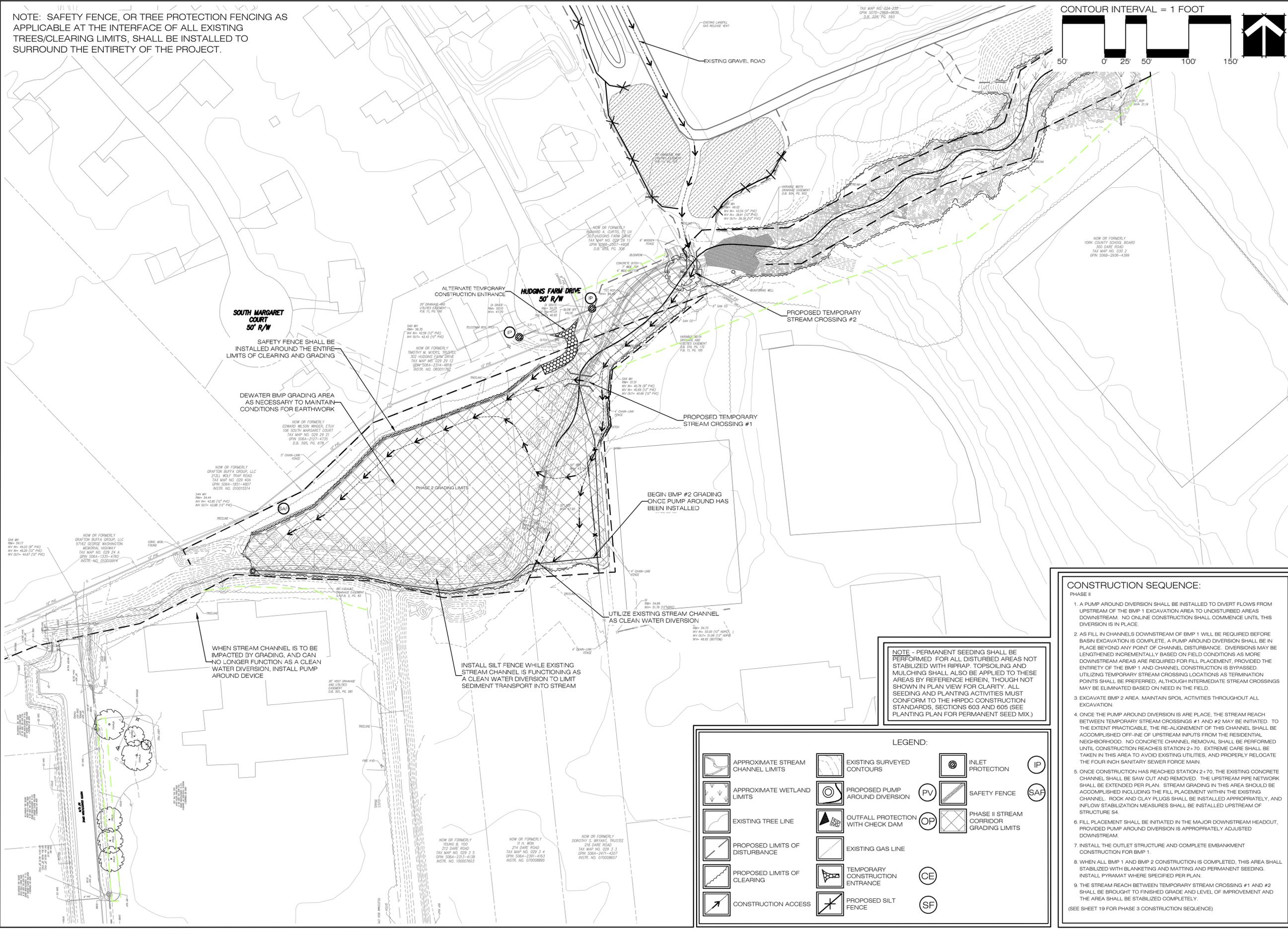
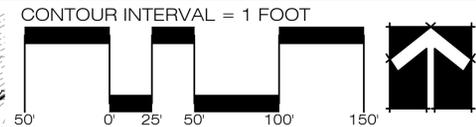
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NOTE: SAFETY FENCE, OR TREE PROTECTION FENCING AS APPLICABLE AT THE INTERFACE OF ALL EXISTING TREES/CLEARING LIMITS, SHALL BE INSTALLED TO SURROUND THE ENTIRETY OF THE PROJECT.



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LEGEND:	
	APPROXIMATE STREAM CHANNEL LIMITS
	EXISTING SURVEYED CONTOURS
	PROPOSED PUMP AROUND DIVERSION
	OUTFALL PROTECTION WITH CHECK DAM
	EXISTING GAS LINE
	TEMPORARY CONSTRUCTION ENTRANCE
	PROPOSED SILT FENCE
	INLET PROTECTION (IP)
	SAFETY FENCE (SAF)
	PHASE II STREAM CORRIDOR GRADING LIMITS
	CONSTRUCTION ACCESS

- CONSTRUCTION SEQUENCE:**
- PHASE II
- A PUMP AROUND DIVERSION SHALL BE INSTALLED TO DIVERT FLOWS FROM UPSTREAM OF THE BMP 1 EXCAVATION AREA TO UNDISTURBED AREAS DOWNSTREAM. NO ONLINE CONSTRUCTION SHALL COMMENCE UNTIL THIS DIVERSION IS IN PLACE.
 - AS FILL IN CHANNELS DOWNSTREAM OF BMP 1 WILL BE REQUIRED BEFORE BASIN EXCAVATION IS COMPLETE, A PUMP AROUND DIVERSION SHALL BE IN PLACE BEFORE ANY POINT OF CHANNEL DISTURBANCE. DIVERSIONS MAY BE LENGTHENED INCREMENTALLY BASED ON FIELD CONDITIONS AS MORE DOWNSTREAM AREAS ARE REQUIRED FOR FILL PLACEMENT. PROVIDED THE ENTIRETY OF THE BMP 1 AND CHANNEL CONSTRUCTION IS BYPASSED, UTILIZING TEMPORARY STREAM CROSSING LOCATIONS AS TERMINATION POINTS SHALL BE PREFERRED, ALTHOUGH INTERMEDIATE STREAM CROSSINGS MAY BE ELIMINATED BASED ON NEED IN THE FIELD.
 - EXCAVATE BMP 2 AREA. MAINTAIN SPOIL ACTIVITIES THROUGHOUT ALL EXCAVATION.
 - ONCE THE PUMP AROUND DIVERSION IS IN PLACE, THE STREAM REACH BETWEEN TEMPORARY STREAM CROSSINGS #1 AND #2 MAY BE INITIATED. TO THE EXTENT PRACTICABLE, THE RE-ALIGNMENT OF THIS CHANNEL SHALL BE ACCOMPLISHED OFF-LINE OF UPSTREAM INPUTS FROM THE RESIDENTIAL NEIGHBORHOOD. NO CONCRETE CHANNEL REMOVAL SHALL BE PERFORMED UNTIL CONSTRUCTION REACHES STATION 2+70. EXTREME CARE SHALL BE TAKEN IN THIS AREA TO AVOID EXISTING UTILITIES, AND PROPERLY RELOCATE THE FOUR INCH SANITARY SEWER FORCE MAIN.
 - ONCE CONSTRUCTION HAS REACHED STATION 2+70, THE EXISTING CONCRETE CHANNEL SHALL BE SAW CUT AND REMOVED. THE UPSTREAM PIPE NETWORK SHALL BE EXTENDED PER PLAN. STREAM GRADING IN THIS AREA SHOULD BE ACCOMPLISHED INCLUDING THE FILL PLACEMENT WITHIN THE EXISTING CHANNEL. ROCK AND CLAY PILES SHALL BE INSTALLED APPROPRIATELY, AND INFLOW STABILIZATION MEASURES SHALL BE INSTALLED UPSTREAM OF STRUCTURE S4.
 - FILL PLACEMENT SHALL BE INITIATED IN THE MAJOR DOWNSTREAM HEADCUT, PROVIDED PUMP AROUND DIVERSION IS APPROPRIATELY ADJUSTED DOWNSTREAM.
 - INSTALL THE OUTLET STRUCTURE AND COMPLETE EMBANKMENT CONSTRUCTION FOR BMP 1.
 - WHEN ALL BMP 1 AND BMP 2 CONSTRUCTION IS COMPLETED, THIS AREA SHALL BE STABILIZED WITH BLANKETING AND MATTING AND PERMANENT SEEDING. INSTALL PYRAMAT WHERE SPECIFIED PER PLAN.
 - THE STREAM REACH BETWEEN TEMPORARY STREAM CROSSING #1 AND #2 SHALL BE BROUGHT TO FINISHED GRADE AND LEVEL OF IMPROVEMENT AND THE AREA SHALL BE STABILIZED COMPLETELY.
- (SEE SHEET 19 FOR PHASE 3 CONSTRUCTION SEQUENCE)

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**EROSION AND SEDIMENT CONTROL
PLAN - PHASE 2
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**

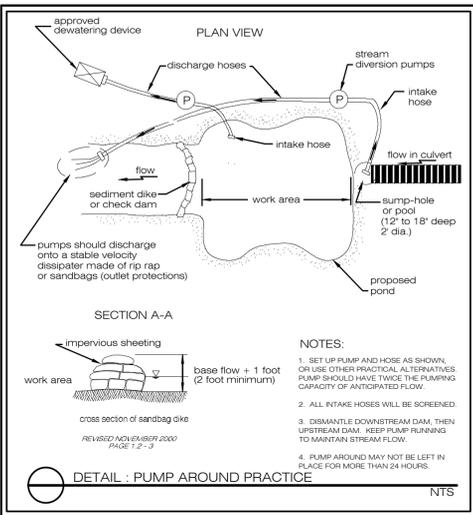
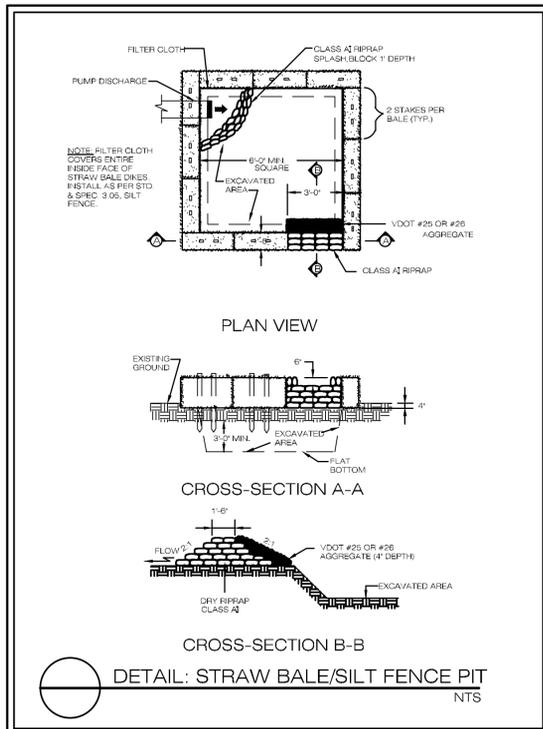
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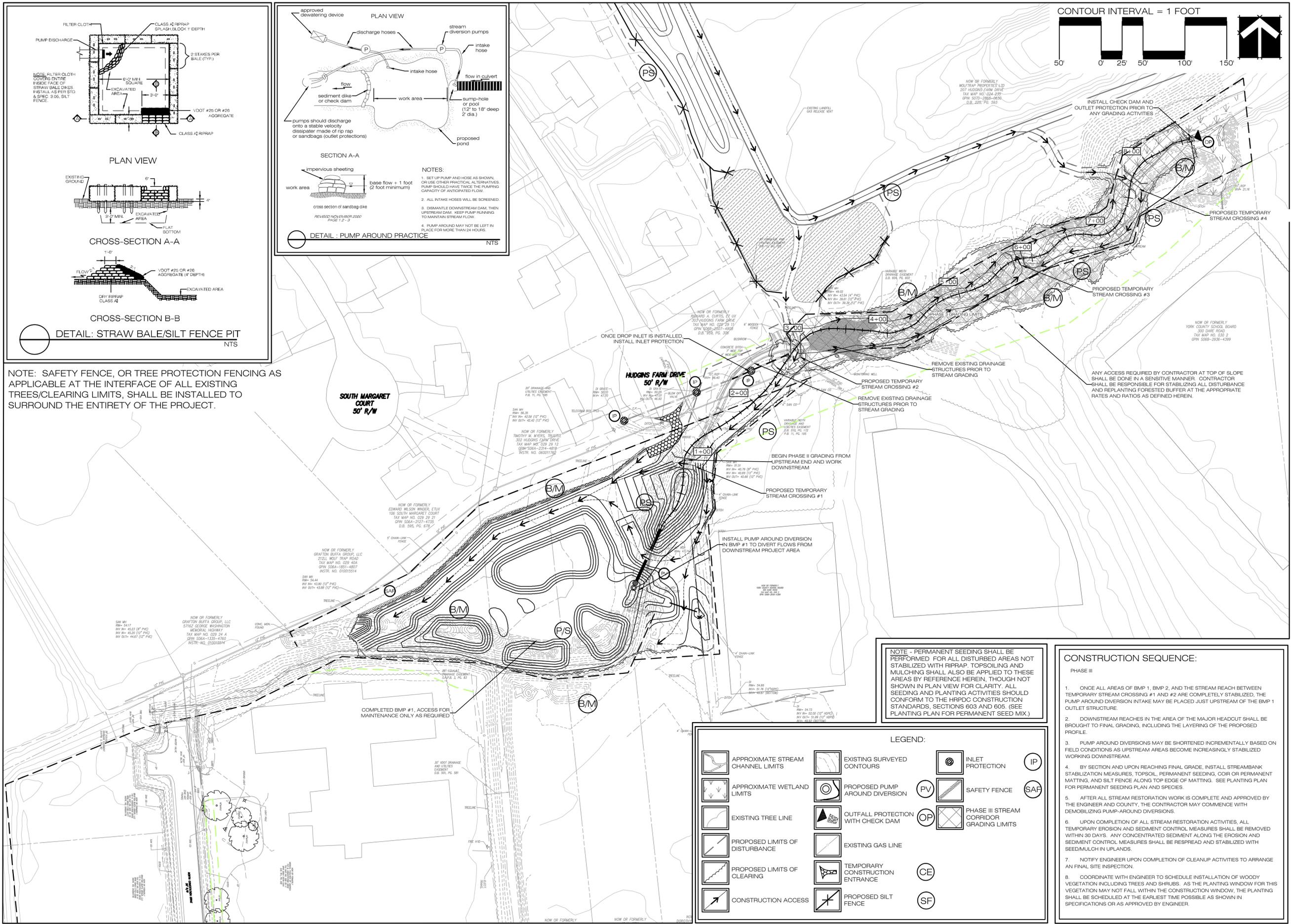
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NOTE - PERMANENT SEEDING SHALL BE PERFORMED FOR ALL DISTURBED AREAS NOT STABILIZED WITH RIPRAP, TOPSOILING AND MULCHING SHALL ALSO BE APPLIED TO THESE AREAS BY REFERENCE HEREIN, THOUGH NOT SHOWN IN PLAN VIEW FOR CLARITY. ALL SEEDING AND PLANTING ACTIVITIES SHOULD CONFORM TO THE HRPC CONSTRUCTION STANDARDS, SECTIONS 603 AND 605. (SEE PLANTING PLAN FOR PERMANENT SEED MIX.)

CONSTRUCTION SEQUENCE:

- PHASE III**
1. ONCE ALL AREAS OF BMP 1, BMP 2, AND THE STREAM REACH BETWEEN TEMPORARY STREAM CROSSING #1 AND #2 ARE COMPLETELY STABILIZED, THE PUMP AROUND DIVERSION INTAKE MAY BE PLACED JUST UPSTREAM OF THE BMP 1 OUTLET STRUCTURE.
 2. DOWNSTREAM REACHES IN THE AREA OF THE MAJOR HEADCUT SHALL BE BROUGHT TO FINAL GRADING, INCLUDING THE LAYERING OF THE PROPOSED PROFILE.
 3. PUMP AROUND DIVERSIONS MAY BE SHORTENED INCREMENTALLY BASED ON FIELD CONDITIONS AS UPSTREAM AREAS BECOME INCREASINGLY STABILIZED WORKING DOWNSTREAM.
 4. BY SECTION AND UPON REACHING FINAL GRADE, INSTALL STREAMBANK STABILIZATION MEASURES, TOPSOIL, PERMANENT SEEDING, COIR OR PERMANENT MATTING, AND SILT FENCE ALONG TOP EDGE OF MATTING. SEE PLANTING PLAN FOR PERMANENT SEEDING PLAN AND SPECIES.
 5. AFTER ALL STREAM RESTORATION WORK IS COMPLETE AND APPROVED BY THE ENGINEER AND COUNTY, THE CONTRACTOR MAY COMMENCE WITH DEMOBILIZING PUMP-AROUND DIVERSIONS.
 6. UPON COMPLETION OF ALL STREAM RESTORATION ACTIVITIES, ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. ANY CONCENTRATED SEDIMENT ALONG THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE RESPREAD AND STABILIZED WITH SEED/MULCH IN UPLANDS.
 7. NOTIFY ENGINEER UPON COMPLETION OF CLEANUP ACTIVITIES TO ARRANGE AN FINAL SITE INSPECTION.
 8. COORDINATE WITH ENGINEER TO SCHEDULE INSTALLATION OF WOODY VEGETATION INCLUDING TREES AND SHRUBS. AS THE PLANTING WINDOW FOR THIS VEGETATION MAY NOT FALL WITHIN THE CONSTRUCTION WINDOW, THE PLANTING SHALL BE SCHEDULED AT THE EARLIEST TIME POSSIBLE AS SHOWN IN SPECIFICATIONS OR AS APPROVED BY ENGINEER.

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**EROSION AND SEDIMENT CONTROL
PLAN - PHASE 3
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**

COMMONWEALTH OF VIRGINIA
1. GLENN MUCKLEY
Lic. No. 038970
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PROFESSIONAL ENGINEER

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EROSION AND SEDIMENT CONTROL NARRATIVE

EROSION AND SEDIMENT CONTROL NOTES

1. THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR INTO STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS SHALL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATION SHALL APPLY TO THIS PROJECT.
2. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY 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 DISPOSAL AREA.
3. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.
4. ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING A LIVE WATERCOURSE SHALL BE MET.
5. PERIODIC INSPECTIONS OF ALL EROSION CONTROL MEASURES SHALL BE MADE BY THE CONTRACTOR TO ASSESS THEIR CONDITION. INSPECTIONS SHALL BE CONDUCTED AT LEAST EVERY 14 CALENDAR DAYS AND WITHIN 48 HOURS FOLLOWING ANY RUNOFF PRODUCING STORM EVENT. THIS INCLUDES INSPECTION AFTER EVERY ERODIBLE RAINFALL EVENT AND THE REPAIR OF MEASURES DAMAGED BY SUB-CONTRACTORS. ANY NECESSARY REPAIRS OR CLEAN UP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT THE TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. APPROVAL BY THE ENGINEER WILL BE REQUIRED FOR ANY DEVIATIONS FROM THE APPROVED PLANS.
7. ADDITIONAL EROSION CONTROL DEVICES MAY BE REQUIRED BY THE STATE INSPECTOR, ENGINEER, OWNER, OR HIS DESIGNATED AGENT IF DEEMED NECESSARY.
8. ALL EROSION CONTROL DEVICES SHALL BE IN PLACE AND FUNCTIONAL AT ALL TIMES AND IF REMOVED FOR CONSTRUCTION PROGRESS, SHALL BE REPLACED BY THE CLOSE OF EACH WORKDAY.
9. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION.
10. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
11. ALL SLOPES SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.36 (B)M AND MANUAL BEST PRACTICES. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.
12. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. OUTFALL CHANNELS FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE OR PAVED DITCHES WHERE REQUIRED.
13. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGETATIVE ESTABLISHMENT OR MULCHING.
14. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.
15. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED AND FERTILIZER IN ACCORDANCE WITH THE SEEDING SCHEDULE LOCATED ON SHEET 5.
16. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEED.

PROJECT DESCRIPTION

THE PURPOSE OF THE PROJECT IS TO RESTORE 660 LINEAR FEET (L.F.) OF EXTREMELY DEGRADED STREAM CHANNEL, TO PROVIDE STABILITY WITHIN THE LOCAL WATERSHED WITH IMPROVED WATER QUALITY CHARACTERISTICS. IN ADDITION, SEVERAL STRUCTURAL MEASURES ARE PROPOSED THAT WILL PROVIDE SUBSTANTIAL WATER QUALITY IMPROVEMENTS WHILE ENHANCING WATER QUANTITY CONTROL FOR THE RESTORED STREAM REACH. THE PRINCIPAL BMP # 1 IS PROPOSED AS A CONSTRUCTED WETLAND. BMP # 2 AND # 3 SHOWN ARE PROPOSED AS SOIL COMPOST AMENDED SWALE. APPROXIMATELY 4.71 ACRES OF DISTURBANCE ARE REQUIRED FOR THE PROJECT.

EXISTING CONDITIONS

THE EXISTING SITE FOR THE PROPOSED STREAM AND BMP 1, 2, AND 3 IMPROVEMENTS IS A PREDOMINATELY WOODED CORRIDOR IN SOUTHERN YORK COUNTY'S GRAFTON AREA. THE STREAM RUNS AMONGST AN EXISTING RESIDENTIAL COMMUNITY AND IS BORDERED BY DARE ELEMENTARY SCHOOL, AN EXISTING LANDFILL, AND A HEALTH CARE CENTER. THE STREAM REACH HAS EXHIBITED SEVERE HEADCUTTING DUE TO LARGE FLOW STORM EVENTS. PAST STABILIZATION EFFORTS HAVE BEEN UNSUCCESSFUL, REQUIRING THE MORE COMPREHENSIVE APPROACH SHOWN. BMP # 6 IS AN EXISTING ROAD SIDE DRAINAGE DITCH.

ADJACENT AREAS

ADJACENT ROADWAYS WILL BE PROTECTED THROUGH THE USE OF TEMPORARY STONE CONSTRUCTION ENTRANCES. THE PLAN HAS BEEN DEVELOPED TO LIMIT DISTURBANCE AND ANY INDIRECT IMPACTS TO THE SURROUNDING PROPERTY OWNERS TO THE EXTENT PRACTICABLE. DOWNSTREAM AREAS WILL BE OF PARTICULAR CONCERN DURING CONSTRUCTION. THE EROSION AND SEDIMENT CONTROL PLAN HAS BEEN DEVELOPED TO LIMIT SEDIMENT LOSS OFF-SITE.

CRITICAL EROSION AREAS

WITH THE SEVERITY OF THE EXISTING HEADCUTS THE STREAM CORRIDOR SIDE SLOPES REPRESENT THE MOST CRITICAL OPPORTUNITY FOR EROSION. THESE AREAS ARE ADDRESSED THROUGH THE GRADING, EROSION AND SEDIMENT CONTROL MEASURES AND STABILIZATION PRACTICES AS SHOWN. IT WILL BE CRITICAL THAT THE CONTRACTOR ACTIVELY MANAGE THE DELICATE CONSTRUCTION OF THESE AREAS DAILY THROUGHOUT THE DURATION OF THE PROJECT. THE CRITICAL JURISDICTIONAL AREAS DOWNSTREAM SHALL BE PROTECTED THROUGH THIS DAILY MANAGEMENT IN CONJUNCTION WITH THE EROSION AND SEDIMENT CONTROL MEASURES AS DEFINED.

SEEPAGE ALONG SLOPES

PROPOSED SLOPE STABILIZATION CONSISTS OF BLANKETTING AND MATTING IMMEDIATELY FOLLOWING GRADING OPERATIONS. NO OTHER CONCERNS, SUCH AS SEEPAGE, ARE ANTICIPATED AT THIS TIME. HOWEVER, IF EXCESSIVE GROUNDWATER SEEPAGE IS IDENTIFIED WITHIN A PARTICULAR AREA DURING CONSTRUCTION, PREVENTING ADEQUATE STABILIZATION, THE CONTRACTOR SHALL EMPLOY SEEPAGE CONTROL MEASURES SUCH AS A SUBSURFACE DRAIN PER VESCH 3.28 AS NEEDED.

STRUCTURAL PRACTICES

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, THIRD EDITION, 1992. THE MINIMUM STANDARDS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, LATEST EDITION SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE, IN WRITING.

1. SAFETY FENCE - STD. & SPEC. 3.01

SAFETY FENCE WILL BE PROVIDED TO SEPARATE THE ADJACENT NEIGHBORHOOD FROM THE LAND DISTURBING AND CONSTRUCTION ACTIVITIES.

2. TEMPORARY STONE CONSTRUCTION ENTRANCE - STD. & SPEC. 3.02

A CONSTRUCTION ENTRANCE SHALL BE EMPLOYED TO REDUCE THE AMOUNT OF MATERIAL TRANSPORTED OFF-SITE BY CONSTRUCTION VEHICLES. THE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED AT THE LOCATION SHOWN ON SHEET 6 FOR THE DURATION OF THE CONSTRUCTION AND STABILIZATION.

3. SILT FENCE - STD. & SPEC. 3.05

SILT FENCE SHALL BE INSTALLED AROUND THE STOCKPILE AREA AND DOWNSTREAM AREA OF THE EARTHEN DAM, AS SHOWN ON SHEET 6, IN ORDER TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT FROM THE DISTURBED AREAS DURING CONSTRUCTION OPERATIONS.

4. OUTLET PROTECTION - STD. & SPEC. 3.18

OUTLET PROTECTION SHALL BE INSTALLED DOWNSTREAM OF THE PROPOSED CULVERT OUTFALL LOCATIONS AND AT THE DOWNSTREAM MOST POINT OF THE PROJECT.

5. STORM DRAIN INLET PROTECTION - STD. & SPEC. 3.07

INLET PROTECTION SHALL BE PROVIDED ON THE DRAIN INLETS ADJACENT TO THE PROJECT AREA AND ACCESS TO PREVENT SEDIMENT FROM ENTERING STORMWATER SYSTEM.

6. DEWATERING STRUCTURE - STD AND SPEC 3.26

DURING EXCAVATION/CONSTRUCTION OF THE STORMWATER BASIN, DEWATERING OPERATIONS SHALL BE EMPLOYED AS NEEDED TO ADDRESS GROUNDWATER CONCERNS AND ENSURE ADEQUATELY COMPACTED FILL. FILTERING OF DISCHARGE FROM DEWATERING PUMP SHALL BE PROVIDED IN ACCORDANCE WITH VESCH 3.26 AND WILL BE DETERMINED BY THE CONTRACTOR.

7. SOIL STABILIZATION BLANKETS AND MATTING - STD. & SPEC. 3.36

STABILIZATION MATTING SHALL BE IMMEDIATELY APPLIED TO ALL DISTURBED AREAS UPON REACHING FINAL GRADE.

8. ROCK CHECK DAM - STD. & SPEC. 3.20

A ROCK CHECK DAM IS PLACED WITHIN THE OUTLET PROTECTION LEAVING THE FACILITY, AS WELL AS THE EMERGENCY SPILLWAY CHANNEL IN ORDER TO DETER WATERFLOW, DECREASE FLOW RATES, AND CAPTURE SEDIMENT DURING CONSTRUCTION.

9. TEMPORARY VEHICULAR STREAM CROSSING - STD. & SPEC. 3.24

TEMPORARY STREAM CROSSINGS WILL BE IMPLEMENTED AS NEEDED TO ACCOMMODATE ACCESS FOR GRADING ACTIVITIES. THE TEMPORARY BRIDGE CROSSINGS WILL BE IN ACCORDANCE WITH STANDARD AND SPECIFICATION 3.24.1.

10. TREE PROTECTION - STD. & SPEC. 3.38

TREE PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR IN THE LOCATIONS SHOWN ON THE PLAN, AND ENCODING THE PROJECT IN AREAS THAT INTERFACE THE CLEARING LIMITS AS DEFINED.

NON-STRUCTURAL PRACTICES

1. TEMPORARY SEEDING - STD. & SPEC. 3.31

ALL EXPOSED SOIL SURFACES THAT ARE NOT TO BE FINE-GRADED FOR PERIODS LONGER THAN 30 DAYS SHALL RECEIVE TEMPORARY SEEDING. SELECTION OF THE TEMPORARY SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992, AND APPROVED BY THE ENGINEER.

2. PERMANENT SEEDING - STD. & SPEC. 3.32

PERMANENT SEEDING SHALL BE USED TO STABILIZE DISTURBED AREAS BROUGHT TO FINAL GRADE BY ESTABLISHING PERENNIAL VEGETATIVE COVER. SELECTION OF THE PERMANENT SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE SEEDING SCHEDULE LOCATED ON SHEET 5.

3. TOPSOILING - STD. & SPEC. 3.30

TOPSOIL WILL BE STRIPPED FROM AREAS TO BE GRADED AND STOCKPILED SEPARATELY FOR LATER USE WHERE APPLICABLE. IN A SIMILAR MANNER, SUITABLE CLAY MATERIAL SHALL ALSO BE STOCKPILED SEPARATELY.

4. MULCHING - STD. & SPEC. 3.35

AREAS WHICH HAVE BEEN PERMANENTLY OR TEMPORARILY SEEDING SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING. MULCHING SHALL BE USED IN FALL FOR WINTER COVER AND DURING HOT AND DRY SUMMER MONTHS.

MAINTENANCE PRACTICES

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

3.01 - SAFETY FENCE SHALL BE CHECKED REGULARLY FOR WETHER AND OTHER DAMAGE. ANY NECESSARY REPAIRS MUST BE MADE IMMEDIATELY. CARE SHOULD BE TAKEN TO SECURE ALL ACCESS POINTS AT THE END OF EACH WORKING DAY. LOCKING DEVICES SHOULD BE REPAIRED OR REPLACED AS NECESSARY.

3.02 - TEMPORARY STONE 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 PERIODICALLY TOPPING THE ENTRANCE WITH ADDITIONAL STONE OR WASHING THE EXISTING STONE.

3.05 - SILT FENCE - SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. SEDIMENT DEPOSITS SHOULD 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, PREPARED AND SEEDED. CLOSE ATTENTION SHALL BE PAID TO REPAIR DAMAGED SILT FENCE RESULTING FROM END RUNS AND UNDERCUTTING. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE, THE FABRIC SHALL BE REPLACED PROMPTLY.

3.07 - STORM DRAIN INLET PROTECTION SHALL BE CHECKED AFTER EACH RAIN EVENT AND REPAIRS WILL BE MADE AS NEEDED. ACCUMULATED SEDIMENT SHOULD BE REMOVED WHEN ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT WILL BE PLACED SO IT DOES NOT ERODE FURTHER. STRUCTURES WILL BE REMOVED ONCE DRAINAGE AREA TO INLET IS STABILIZED.

3.20 - ROCK CHECK DAMS SHOULD BE CHECKED FOR SEDIMENT ACCUMULATION AFTER EACH RUNOFF PRODUCING STORM EVENT. SEDIMENT SHOULD BE REMOVED WHEN IT REACHED ONE HALF OF THE ORIGINAL HEIGHT OF THE MEASURE. REGULAR INSPECTIONS SHOULD BE MADE TO ENSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES.

3.24 - TEMPORARY STREAM (BRIDGE) CROSSING SHOULD BE CHECKED AT A MINIMUM OF ONCE A WEEK. ANY DAMAGE SHOULD BE FIXED IMMEDIATELY.

3.26 - DEWATERING STRUCTURE - THE FILTERING DEVICE MUST BE INSPECTED FREQUENTLY. THE ACCUMULATED SEDIMENT WHICH IS REMOVED FROM THE DEVICE MUST BE SPREAD ON-SITE AND STABILIZED OR PROPERLY DISPOSED OF.

EROSION AND SEDIMENT CONTROL MINIMUM STANDARDS

THE INTENT OF THIS SECTION IS TO SUMMARIZE HOW THE EROSION AND SEDIMENT CONTROL MEASURES PROPOSED IN THE EROSION AND SEDIMENT CONTROL PLAN SATISFY THE 19 MINIMUM STANDARDS SET FORTH IN THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS (4VAC50-30-40). THE FOLLOWING IS A BRIEF SYNOPSIS OF THE MINIMUM STANDARDS (MS) AND HOW THEY ARE ADDRESSED IN THE PLAN.

MS-1 STABILIZATION OF DENUDED AREAS - WITHIN SEVEN DAYS, PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS THAT MAY REMAIN DORMANT FOR LONGER THAN 30 DAYS. TEMPORARY AND PERMANENT SEEDING, MULCHING, BLANKETS AND MATTING, AND RIPRAP ARE SPECIFIED IN THE PLAN FOR STABILIZATION OF DENUDED AREAS.

MS-2 STABILIZATION OF SOIL STOCKPILES - DURING CONSTRUCTION, SOIL STOCKPILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES (I.E. SILT FENCE).

MS-3 ESTABLISHMENT OF PERMANENT VEGETATION - 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 TIMING AND STABILIZATION OF SEDIMENT TRAPPING MEASURES - ALL SEDIMENT TRAPPING MEASURES (INCLUDING SEDIMENT BASINS) SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

MS-5 STABILIZATION OF EARTHEN STRUCTURES - STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES IMMEDIATELY AFTER INSTALLATION AS SPECIFIED IN THE PLAN.

MS-6 SEDIMENT TRAP AND BASINS - SEDIMENT TRAPS ARE NOT USED IN THIS PLAN. SEDIMENT BASINS SHALL CONTROL DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES. THE MINIMUM STORAGE CAPACITY 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.

MS-7 DESIGN, CONSTRUCTION, AND STABILIZATION OF CUT AND FILL SLOPES - CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. MOST SLOPES ARE PROPOSED TO BE STABILIZED WITH BLANKETING AND MATTING AS SHOWN ON THE E&S PLAN. SLOPES FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL, SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

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

MS-9 ADEQUATE DRAINAGE PROTECTION FROM WATER SEEPS - IF THE CONTRACTOR IDENTIFIES WATER SEEPAGE FROM A SLOPE FACE, ADEQUATE DRAINAGE PER VESCH 3.28 OR OTHER APPROPRIATE PROTECTION SHALL BE PROVIDED.

MS-10 STORM SEWER INLET PROTECTION - NOT APPLICABLE FOR THIS PLAN SINCE THERE ARE NO STORM SEWER INLETS AFFECTED BY THE PROPOSED CONSTRUCTION.

MS-11 STORMWATER CONVEYANCE PROTECTION - 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.

MS-12 WORK IN LIVE WATERCOURSE - THE WATERCOURSE ON-SITE SHALL BE IMPACTED AND PROPER PERMITS OBTAINED PRIOR TO CONSTRUCTION. UPSTREAM BASEFLOWS SHALL BE DIVERTED AROUND THE WORK AREA AND ALL DISTURBANCE CONTAINED WITHIN THE PERMITTED IMPACTS.

MS-13 CROSSING LIVE WATERCOURSE - THE WATERCOURSE ON-SITE SHALL BE IMPACTED AND PROPER PERMITS OBTAINED PRIOR TO CONSTRUCTION. UPSTREAM BASEFLOWS SHALL BE DIVERTED AROUND THE WORK AREA AND ALL DISTURBANCE CONTAINED WITHIN THE PERMITTED IMPACTS.

MS-14 REGULATION OF WATERCOURSE CROSSING - THE WATERCOURSE ON-SITE SHALL BE IMPACTED AND PROPER PERMITS OBTAINED PRIOR TO CONSTRUCTION. UPSTREAM BASEFLOWS SHALL BE DIVERTED AROUND THE WORK AREA AND ALL DISTURBANCE CONTAINED WITHIN THE PERMITTED IMPACTS.

MS-15 STABILIZATION OF WATERCOURSE - NOT APPLICABLE.

MS-16 UNDERGROUND UTILITY LINE INSTALLATION - NO UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN THIS PLAN.

MS-17 VEHICULAR SEDIMENT TRACKING - 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 ROADWAY. 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.

MS-18 REMOVAL OF TEMPORARY MEASURES - ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER THE FINAL SITE STABILIZATION OR WHEN TEMPORARY MEASURES ARE NO LONGER NEEDED.

MS-19 STORMWATER MANAGEMENT - PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION, AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY, AND PEAK FLOW RUNOFF. CONCENTRATED STORMWATER RUNOFF LEAVING THE PROJECT SHALL BE CONTROLLED BY THE PROPOSED STORMWATER BASIN AND DISCHARGED TO AN ADEQUATE RECEIVING CHANNEL. A CHANNEL ADEQUACY EVALUATION HAS BEEN PERFORMED.

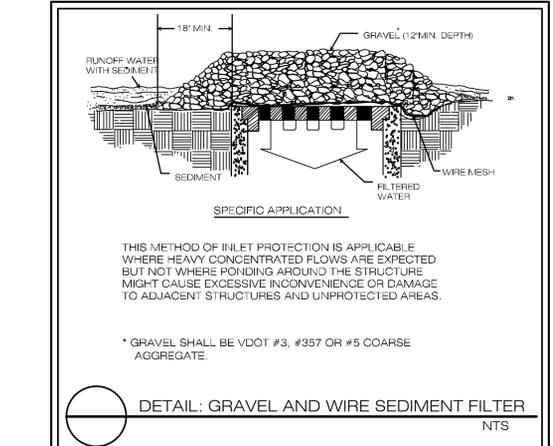
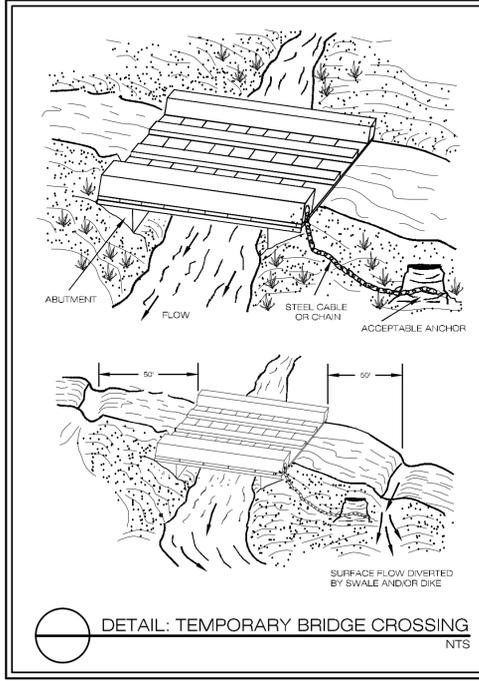
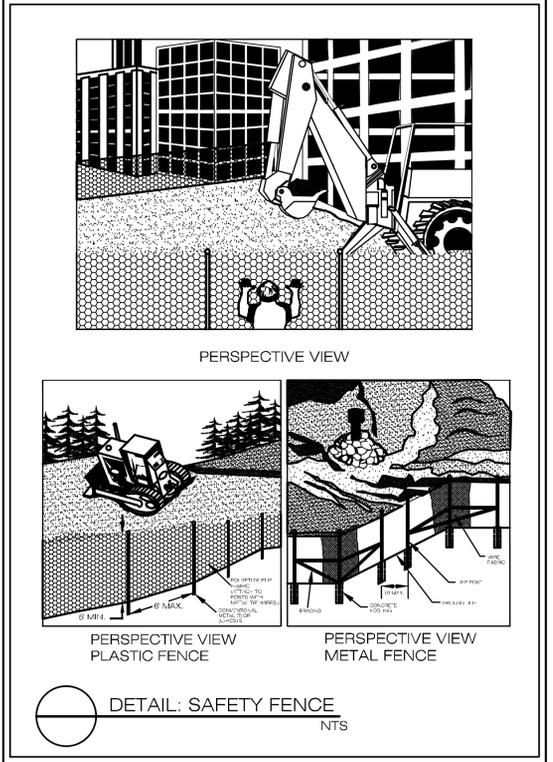
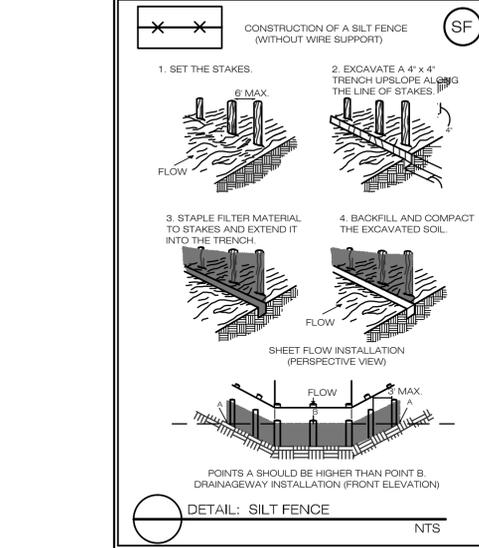
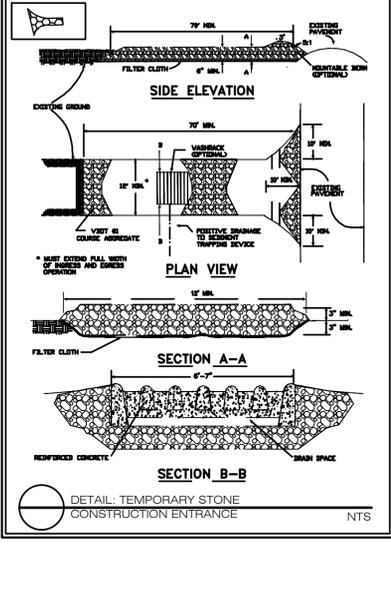
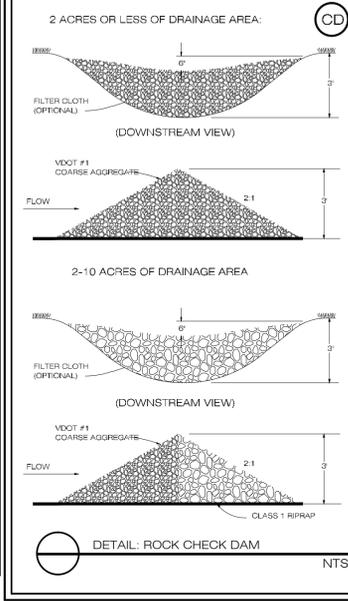
GENERAL EROSION AND SEDIMENT CONTROL NOTES
COUNTY OF YORK, VIRGINIA

NOTES:
ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IN ACCORDANCE WITH THE CURRENT COUNTY OF YORK EROSION AND SEDIMENT CONTROL ORDINANCE, THE 1992 VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATION 4VAC50-30-40. EROSION AND SEDIMENT CONTROL REGULATIONS, THE PERMITTEE OR HIS AGENT AND/OR CONTRACTOR SHALL SECURE A COPY OF EACH PUBLICATION AND THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL APPLICABLE PRACTICES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.

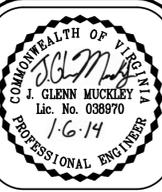
THE PURPOSE OF SUCH PRACTICES INCLUDING, BUT NOT LIMITED TO, THOSE SHOWN ON THESE PLAN SHEETS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE OR AIRBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR INTO STATE WATERS. ALL SEDIMENTS MUST BE CONFINED TO THE PROJECT SITE AT THE LOCATIONS SHOWN ON THE PLANS. PROTECTION OF EXISTING NATURAL VEGETATION FROM NECESSARY DISTURBANCE IS ESSENTIAL. ALL CONSTRUCTION PERSONNEL SHALL BE CAUTIONED TO AVOID DAMAGE TO EXISTING TREES AND VEGETATION DURING CONSTRUCTION ACTIVITIES.

THE FOLLOWING SHALL BE INCLUDED IN THE SEQUENCE OF CONSTRUCTION OR NARRATIVE TO ADDRESS EROSION CONTROL PRACTICES:

1. 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. OUTFALLS ARE TO BE KEPT CLEAR OF DEBRIS AND SEDIMENTS SHALL BE CLEANED OUT PERIODICALLY DURING AND AFTER CONSTRUCTION ACTIVITIES.
2. ALL TEMPORARY OR PERMANENT EROSION AND SEDIMENT CONTROL PRACTICES NECESSARY FOR RETAINING SEDIMENTS ON THE CONSTRUCTION SITE SHALL BE INSTALLED AND TREE PROTECTION FENCING SHALL BE ERECTED AT THE LOCATIONS AS SPECIFIED ON THE APPROVED PLANS PRIOR TO ANY LAND CLEARING, GRUBBING, GRADING OR EARTH MOVING ACTIVITIES.
3. CONSTRUCTION ENTRANCE (CE) SHALL BE INSTALLED CONCURRENTLY WITH THE INITIATION OF CLEARING AND GRUBBING OPERATIONS.
4. CLEARING AND GRUBBING DEBRIS SHALL BE PROPERLY DISPOSED OF.
5. THE INSTALLATION OF EROSION CONTROL AND DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL OTHER CONSTRUCTION ACTIVITIES. SITE DRAINAGE FACILITIES SHALL BE SCHEDULED TO BE COMPLETED WITHIN 30 DAYS FOLLOWING COMPLETION OF THE ROUGH GRADING OPERATIONS AT ANY POINT ON THE PROJECT.
6. OUTFALL DITCHES SHALL BE CONSTRUCTED AND STABILIZED PRIOR TO THE INITIATION OF ANY UTILITY CONSTRUCTION OR BUILDING CONSTRUCTION ACTIVITY. OUTLET PROTECTION (OP) SHALL ALSO BE INSTALLED WHERE CALLED FOR IMMEDIATELY AFTER CONSTRUCTION OF THE OUTFALL DITCHES.
7. ALL TEMPORARY OR PERMANENT EARTHEN STRUCTURES SUCH AS DAMS, AND DIVERSION DIKES SHALL BE STABILIZED (SEEDED) IMMEDIATELY AFTER THEIR CONSTRUCTION. STONE OUTLETS(S) SHALL BE PROVIDED WHERE SHOWN ON THE PLANS.
8. TOPSOIL STOCKPILES SHALL BE PLACED IN THE LOCATION(S) SHOWN ON THESE PLANS. SILT FENCE OR STRAW BALE BARRIERS SHALL BE ERECTED AT THE TOE OF THE STOCKPILES. SILT FENCE OR STRAW BALE BARRIERS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. STOCKPILES SHALL BE SEEDED AND STABILIZED WITH A FIRM STAND OF GRASS.
9. CONSTRUCTION ROAD STABILIZATION SHALL BE APPLIED TO ACCESS ROADS, SUBDIVISION ROADS, PARKING AREAS AND/OR OTHER VEHICLE TRANSPORTATION ROUTES IMMEDIATELY AFTER GRADING.
10. ALL AREAS DESIGNATED FOR UNDERGROUND UTILITIES SHALL BE STABILIZED AS SOON AS PRACTICAL, BUT NOT EXCEEDING 15 DAYS FOLLOWING THEIR INSTALLATION AND BACKFILLING. TRENCH LENGTHS TO BE OPENED AT ANY ONE TIME IS NOT TO EXCEED 100 FEET. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPWIND 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.
11. 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 TO DENUDED AREAS THAT MAY NOT BE A FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR. TEMPORARY VEGETATIVE COVER MAY BE ELIMINATED IN FAVOR OF THE PERMANENT VEGETATIVE COVER IF SITE CONDITIONS PERMIT AND THE OWNER AND/OR ENGINEER SO DIRECTS. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION. PERMANENT VEGETATIVE COVER (STABILIZATION) SHALL CONSIST OF TOPSOILING, LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS.
12. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE SCHEDULED ON A WEEKLY BASIS AND AFTER EACH RUNOFF PRODUCING RAINFALL EVENT PER THE VA E & S HANDBOOK. ANY SEDIMENT THAT HAS BEEN TRANSPORTED BEYOND THE PROJECT LIMITS SHALL BE REMOVED.
13. SEDIMENT TRAPS, BASINS AND OTHER TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED ONLY WHEN STABILIZATION HAS BEEN ESTABLISHED. 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 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 DIRECTED BY THE COUNTY.
14. ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO THIS PROJECT SHALL BE MET.
15. THE PERMITTEE SHALL BE HELD RESPONSIBLE FOR THE ACTIONS AND PERFORMANCE OF ANY OTHER PARTIES PERFORMING WORK ON THIS PROJECT.



**EROSION AND SEDIMENT CONTROL
PLAN - NOTES AND DETAILS
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA**

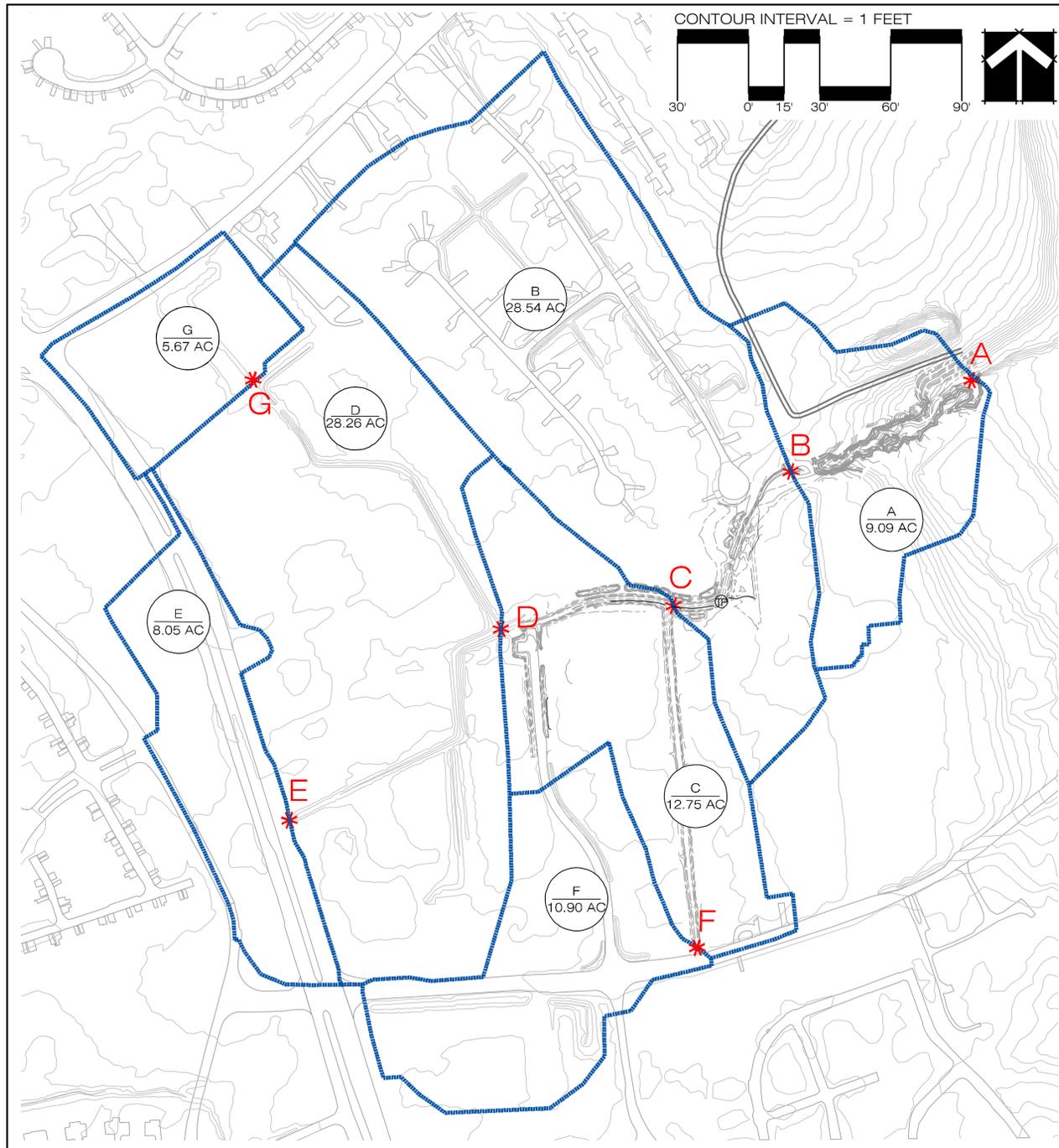


REVISIONS:
DATE:

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LEGEND:

	EXISTING TREE LINE		EXISTING SURVEYED CONTOURS
	PROPOSED RISER STRUCTURE		PROPOSED CONTOURS
	PROPOSED EASEMENT BOUNDARY		EXISTING GAS LINE
	PROPOSED SPOT ELEVATION		PROPOSED CULVERT
	BMP MAINTENANCE ACCESS		RIPRAP OUTFALL PROTECTION
	PYRAMID SPILLWAY STABILIZATION		PROPOSED FUTURE MAINTENANCE ACCESS

PROPOSED HYDROLOGY

NODE	DA	CN	TC	1-YEAR	2-YEAR	10-YEAR	100-YEAR
G	5.67	92.45	22.68	11.77	15.33	24.91	43.77
F	10.90	85.57	41.64	11.27	16.79	29.80	47.00
E	8.05	90.06	47.36	14.27	18.62	110.31	54.07
D	28.26	85.73	62.96	47.76	64.04	110.31	205.34
C	12.75	80.63	50.30	52.86	71.99	125.53	235.55
B	28.54	81.15	67.10	36.62	70.80	178.59	393.55
A	9.09	77.20	25.90	38.88	74.84	189.79	427.04

NOTE: PROPOSED IMPROVEMENTS ARE INTENDED AS WATER QUALITY AND QUANTITY RETROFITS. NO OTHER CHANGE IN LAND USE IS PROPOSED IN THE CONTRIBUTING DRAINAGE AREAS

PROPOSED HYDRAULICS

X-SECTION	EVENT	SLOPE	FLOW	NORMAL DEPTH	SHEAR	VELOCITY
A	1	0.002	23.67	1.88	0.16	0.99
	2		46.97	2.64	0.21	1.19
	10		123.55	5.60	0.39	1.83
	100		278.04	5.93	0.74	1.89
B	1	0.006	36.62	1.55	0.30	3.34
	2		70.80	2.01	0.42	4.11
	100		393.55	4.04	0.84	6.57
C	1	0.011	36.62	1.39	0.48	4.10
	2		70.80	1.78	0.66	5.07
	100		393.55	3.60	1.31	7.99
D	1	0.024	36.62	1.70	1.14	6.41
	2		70.80	2.18	1.47	7.56
	100		393.55	4.17	2.76	11.52
E	1	0.021	36.62	1.74	1.02	6.09
	2		70.80	2.23	1.31	7.19
	100		393.55	4.28	2.46	10.93
F	1	0.049	38.88	0.92	1.93	8.05
	2		74.84	1.37	2.11	8.55
	100		427.04	2.81	4.25	13.65
G	1	0.052	38.88	1.50	2.17	8.69
	2		74.84	1.92	2.79	10.24
	100		427.04	3.71	5.39	15.84
H	1	0.047	38.88	1.53	2.02	8.36
	2		74.84	1.96	2.58	9.86
	100		427.04	3.78	4.96	15.25
I	1	0.047	38.88	0.93	1.85	7.93
	2		74.84	1.38	2.05	8.44
	100		427.04	2.83	4.11	13.46

SEE SHEETS 12 & 13 FOR CROSS SECTION GEOMETRY AND SHEETS 10 & 11 FOR LOCATION

HYDROLOGY & HYDRAULIC SUMMARY
DARE ELEMENTARY SCHOOL
YORK COUNTY, VIRGINIA



REVISIONS:

NO.	DATE	DESCRIPTION

DRAWN BY: JTG
 DESIGNED BY: JTG/M
 DATE: 01/06/14
 CHECKED BY: JGM
 SCALE: AS NOTED
SHEET: 23
 JOB#: 4656

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NOTE: SEE SHEET 2 (EXISTING CONDITIONS) FOR BORING LOCATIONS

