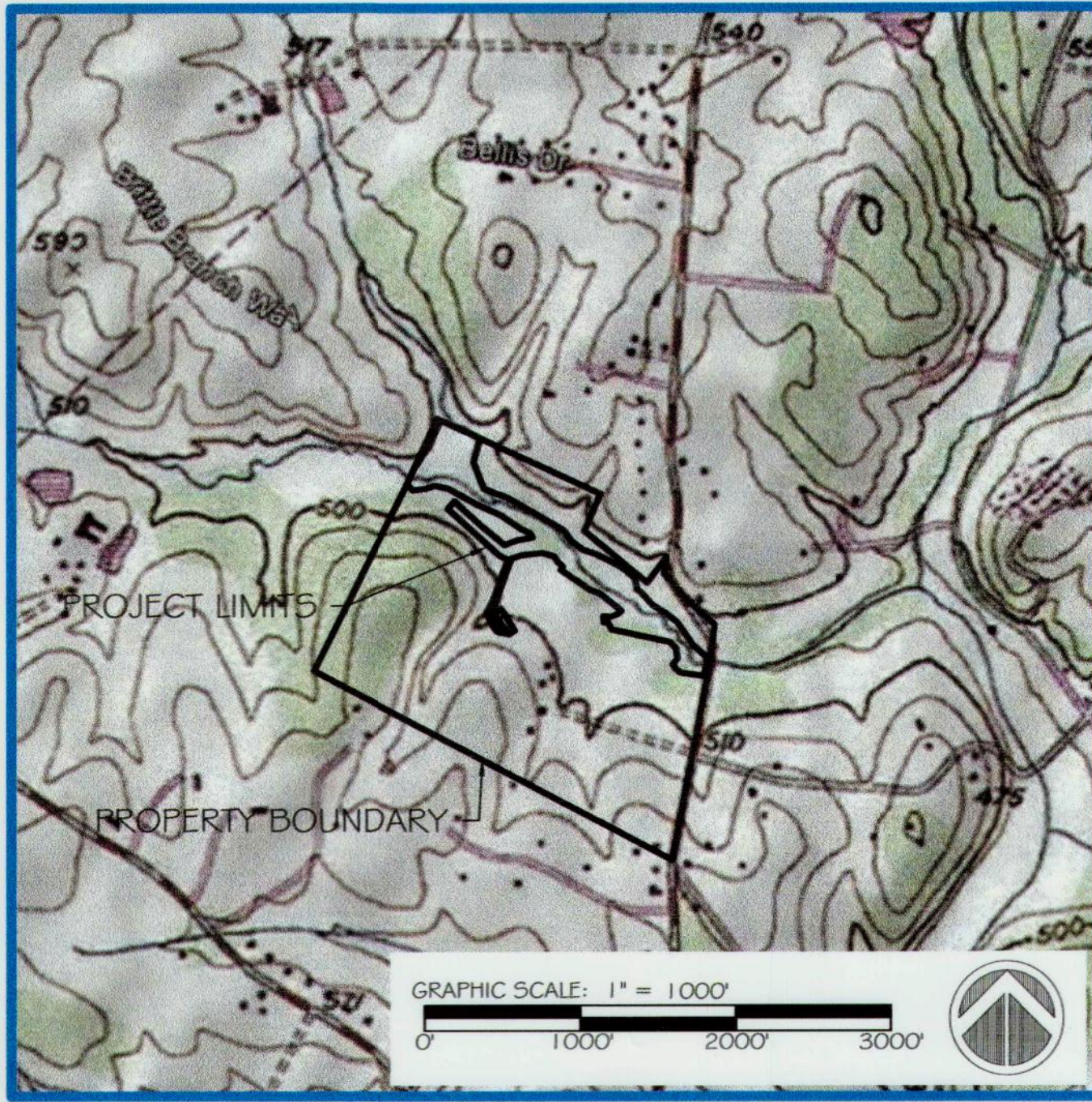


LOCATION MAP



LATITUDE: N 39° 18' 57.05"
LONGITUDE: W 77° 03' 40.20"

GENERAL NOTES:

- THE PURPOSE OF THIS PROJECT IS TO REMOVE CATTLE FROM THE STREAM, PROVIDE RESTRICTED & STABILIZED STREAM CROSSINGS & ACCESS, RESTORE THE STREAM, REFOREST THE RIPARIAN BUFFER, AND FENCE OFF THE RIPARIAN AREA FROM CATTLE. THE PROJECT MOTIVE IS TO ACHIEVE IMPERVIOUS ACREAGE CREDITS FOR HOWARD COUNTY.
- THE PROPERTY DELINEATED HEREON IS LOCATED ON MAP # 0007, GRID # 0024, AS PARCEL # 0141.
- THE PROPERTY SHOWN HEREON IS RECORDED IN THE NAME OF:
ACCT# OWNER ADDRESS MAP GRID PARCEL
1404325087 PATRICK, B DAVID III & DENNIS J 1960 DAISY RD WOODBINE, MD 21797 7 24 141
- ACCORDING TO HOWARD COUNTY ASSESSMENTS, THE SITE IS 91.6 ACRES.
- THIS PROPERTY IS CURRENTLY ZONED RURAL RESIDENTIAL. THE CURRENT LAND USE IS SINGLE FAMILY DETACHED (2 RESIDENTIAL UNITS).
- THE PROPOSED USE OF THE PROPERTY IS AGRICULTURAL WITH RESTRICTED AREAS FOR STREAM BUFFER PRESERVATION.
- THIS PROPERTY IS UNDER AN AGRICULTURAL EASEMENT BY THE MARYLAND AGRICULTURAL LAND PRESERVATION FOUNDATION (MALPF).
- THIS PROPERTY IS PARTIALLY COVERED BY A STREAM RESTORATION AREA EASEMENT, PURCHASED BY ENVIRONMENTAL BANC & EXCHANGE, LLC ON 11/30/2016 IN HOWARD COUNTY, MARYLAND AGREEMENT PA-050-2017. THE LIMITS OF THE EASEMENT ARE SHOWN IN THIS PLAN AND ARE APPROXIMATELY 14.93 ACRES.
- TOPOGRAPHIC INFORMATION SHOWN HEREON WAS ACQUIRED BY PRECISION SURVEY AND MAPPING LLC, DATED JUNE 21, 2016. CONTOUR INTERVAL IS 1 FOOT.
- SURVEYOR'S GENERAL NOTES:
9.1.1. COORDINATES AND BEARINGS SHOWN HEREON ARE BASED ON THE MARYLAND COORDINATE SYSTEM NAD83/NA2011 EPOCH 2010.
9.1.2. SUBJECT PROPERTY IS LOCATED AT 1960 DAISY ROAD IN WOODBINE, MARYLAND 21797.
9.1.3. THE LOCATION OF IMPROVEMENTS SHOWN HEREON ARE DERIVED FROM FIELD RUN SURVEY PERFORMED BY PRECISION SURVEYING AND MAPPING IN JUNE 2016. THE LIMITS FOR FIELD RUN SURVEY ARE SHOWN HEREON.
9.1.4. THE SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT.
9.1.5. CONTOUR LINES AND EDGE OF PAVEMENT SHOWN OUTSIDE OF THE SURVEY AREA WERE DERIVED FROM GIS DATA AT HOWARD COUNTY, MARYLAND.
- SOILS INFORMATION IS BASED ON THE USDA WEB SOIL SURVEY'S DATABASE CURRENT DATA FOR HOWARD COUNTY.
- THE PROPERTY SHOWN HEREON IS WITHIN A FEMA 100-YEAR FLOODPLAIN. FIRMS
- ALL CONSTRUCTION SHALL CONFORM TO CURRENT HOWARD COUNTY DESIGN MANUAL VOLUME IV STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION, HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES, AND 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, AND MARYLAND WATERWAYS CONSTRUCTION MANUAL, OR APPROVED MODIFICATIONS.
- STORMWATER MANAGEMENT FOR THE PROJECT IS NOT REQUIRED SINCE IT IS A STREAM RESTORATION PROJECT AND ADDING NO ADDITIONAL IMPERVIOUS SURFACES.
- SEDIMENT AND EROSION CONTROL WILL BE PROVIDED IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- A WETLAND DELINEATION WAS COMPLETED ON THE PROPERTY SHOWN HEREON. THE LIMITS OF WETLANDS AND STREAMS DEPICTED ON THIS MAP WERE DELINEATED BY ANGLER ENVIRONMENTAL AND GPS LOCATED BY ANGLER ENVIRONMENTAL. THE WETLAND DELINEATION WAS ONLY PERFORMED INSIDE THE PROJECT LIMITS AND DOES NOT DEPICT THE FULL EXTENT OF THESE FEATURES. WETLANDS WERE DELINEATED ON JANUARY 27 AND FEBRUARY 14, 2017 IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE U.S. ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL, AS WELL AS THE REGIONAL SUPPLEMENT TO THE U.S. ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL EASTERN MOUNTAINS AND PIEDMONT REGION (VERSION 2.0).
- ALL WETLAND DELINEATIONS AND PERMITS SHALL BE OBTAINED AND EVIDENCE OF SUCH BE PROVIDED TO THE COUNTY PRIOR TO LAND DISTURBANCE.
- LIBSONS LITTLE CREEK IS IN A TIER II WATERSHED, PATUXENT RIVER 1, BUT IS NOT A TIER II STREAM.
- LIBSONS LITTLE CREEK IS A III-P USE CLASS FOR BEING NONTIDAL COLD WATER AND PUBLIC WATER SUPPLY. STREAM CLOSURE DATES: OCTOBER 1 TO APRIL 30.
- LIBSONS LITTLE CREEK IS WITHIN THE BRIGHTON DAM BASIN, WHICH IS ON THE MARYLAND 303 IMPAIRED WATERS LIST FOR TEMPERATURE/WATER POLLUTION. THE RESERVOIR IS LISTED IMPAIRED DUE TO TOTAL PHOSPHORUS AND SEDIMENT, FOR WHICH IT HAS TMDLs.
- THE MDE PERMIT TRACKING NUMBER FOR THIS PROJECT IS 156216.

AS-BUILT NOTES:

- AS-BUILT FIELD WORK COMPLETED AS OF 1/21/18 BY CADED CONSULTING CORPORATION.
- HORIZONTAL AND VERTICAL DATUM BASED ON TRAVERSE INFORMATION RECEIVED FROM RES.
- BACKGROUND DESIGN DRAWINGS PREPARED BY RES.
- PERMISSION TO USE THE DESIGN DRAWING GRANTED BY RES.
- STRUCTURE AS-BUILT PATTERNS SHOWN HEREON IS FOR INFORMATIONAL PURPOSES ONLY. THEY DO NOT INDICATE THE ACTUAL SIZE, TYPE, OR ANY SUCH CHARACTERISTICS OF THE STRUCTURE.
- PLANTING AND LANDSCAPE WORK AND CERTIFICATION OF ANY KIND IS NOT PART OF THIS AS-BUILT SURVEY.
- THIS IS NOT A TOPOGRAPHIC SURVEY. IT IS MEANT TO DEPICT PERTINENT SITE IMPROVEMENTS RELATED TO THIS PROJECT ONLY.
- UNLESS OTHERWISE NOTED, ASBUILT SURVEY DOES NOT APPLY TO ANY ITEM THAT IS NOT CROSSED OUT OR REDLINED ON THESE AS-BUILT PLAN SHEETS.

NARRATIVE:

PROJECT DESCRIPTION:
THIS PROJECT IS FOR THE RESTORATION OF THE AFFECTED STREAM, LISBONS LITTLE CREEK. THE PROPOSED PROJECT INCLUDES TEMPORARY ACCESS TO THE STREAM, INSTALLATION OF E45 MEASURES, INSTALLATION OF STREAM CROSSINGS, INSTALLATION OF IN-STREAM STRUCTURES, AND REGRADING OF THE STREAM CHANNEL AND BANKS. THE PROJECT DOES NOT INCLUDE MODIFICATIONS TO EXISTING DRAINAGE PATTERNS, INSTALLATION OF STORMWATER MANAGEMENT PRACTICES OR STORM DRAINAGE STRUCTURES. AFTER CONSTRUCTION IS COMPLETE, ALL DISTURBED AREAS WILL BE RETURNED TO THEIR EXISTING CONDITIONS. TO COMPLETE THIS PROJECT 12.5 AC WILL BE DISTURBED.

THIS PROJECT WILL INCLUDE APPROXIMATELY 4,923 LINEAR FEET OF EXISTING STREAM AND BUFFER RESTORATION TO IMPROVE WATER QUALITY IN CATTAIL CREEK AND GAIN THE COUNTY AT LEAST 62 ACRES OF IMPERVIOUS SURFACE CREDIT TOWARD THE COUNTY'S NPDES MS4 PERMIT. THE PROPOSED STREAM AND BUFFER RESTORATION PROJECT WILL BE DEVELOPED IN THE EASEMENT AREA BY THE BUILDER IN COLLABORATION WITH THE GRANTEE AND THE HOWARD SOIL CONSERVATION DISTRICT. THE PROJECT WILL FENCE CATTLE OUT OF APPROXIMATELY 16.5 ACRES OF FLOODPLAIN. THREE STREAM CROSSINGS WILL BE IMPROVED AND FENCED OFF BY THE BUILDER TO PREVENT UPSTREAM AND DOWNSTREAM ACCESS ALONG THE STREAM. THE CROSSINGS AND FENCE WILL BE MAINTAINED BY THE BUILDER FOR THE FIRST YEAR AND BY THE GRANTEE THEREAFTER. HOWARD SOIL CONSERVATION DISTRICT WILL REGULARLY INSPECT THE FENCES AND CROSSINGS TO ENSURE THEY ARE FUNCTIONING AS INTENDED. THE COUNTY WILL UNDERTAKE REPAIRS TO THE FENCES AND CROSSINGS AS NECESSARY IF THE GRANTEE FAILS TO DO SO. ANY COSTS THE COUNTY INCURS IN SUCH REPAIRS ARE THE RESPONSIBILITY OF THE GRANTEE.

RESTORATION WILL BE DONE TO 4,191 LINEAR FEET OF STREAM WITH 732 LINEAR FEET OF THE EXISTING STREAM TO REMAIN AS OFFLINE OXBOWS. NATURAL STREAM CHANNEL RESTORATION AND RIPARIAN WETLAND WILL INCLUDE RIFFLE GRADE CONTROL AND BANK MODIFICATION. FIELD AREAS ADJACENT TO THE STREAM WILL TEMPORARILY HOLD, INFILTRATE STORMWATER FLOW, WHICH IS ANTICIPATED TO IMPROVE OR RESTORE THE GROUNDWATER TABLE AND RETURN THE HYDROLOGY CLOSE TO THE HISTORIC CONDITIONS. THE STREAM RESTORATION WILL BE MONITORED BY THE BUILDER FOR FIVE YEARS, OR AS REQUIRED BY THE STATE PERMITS, AND MAINTAINED BY THE BUILDER FOR THE FIRST YEAR. THE COUNTY WILL MONITOR THE STREAM CHANNEL THEREAFTER AND UNDERTAKE ANY MAINTENANCE ACTIVITIES IT DEEMS NECESSARY.

NATIVE PLANT COMMUNITIES WILL BE REESTABLISHED BY THE BUILDER IN THE EASEMENT AREA TO CREATE A STREAM BUFFER, REDUCE EROSION, FILTER NUTRIENTS, AND SLOW STORMWATER FLOWING TO THE STREAM. ANY RESTORED WETLAND AREAS WILL HAVE THE POTENTIAL TO SUPPORT SHALLOW VERNAL POOL HABITAT. THE BUILDER WILL BE RESPONSIBLE FOR ENSURING APPROPRIATE AND REQUIRED SURVIVAL RATES OF THE NATIVE PLANT COMMUNITIES ACCORDING TO THE HOWARD COUNTY FOREST CONSERVATION MANUAL (90% SURVIVAL OF ALL PLANTINGS FOR ONE YEAR). THE COUNTY WILL MONITOR PLANTINGS THEREAFTER AND UNDERTAKE ANY REPLANTING OR MAINTENANCE IT DEEMS NECESSARY.

REDUCTIONS IN NITROGEN, PHOSPHORUS, AND SEDIMENT ARE EXPECTED IN CATTAIL CREEK FROM BOTH THE STREAM AND FLOODPLAIN RESTORATION AND FROM THE REFORESTATION IN THE EASEMENT AREA. THESE REDUCTIONS WILL LIKELY IMPROVE THE WATER QUALITY DOWNSTREAM OF THE PROPERTY, AS WELL AS THE DRINKING WATER SUPPLY OF THE TRIADELPHIA RESERVOIR.

THE RESTORATION AND STORMWATER MANAGEMENT WORK ON THE PROPERTY WILL PROVIDE ADDITIONAL EDUCATIONAL OPPORTUNITIES FOR THE COMMUNITY. THE GRANTEE WILL PLACE SIGNAGE ALONG THE EASEMENT AREA TO BE VISIBLE BOTH FROM THE ROAD AND FOR SCHOOL GROUPS ON THE PROPERTY. EDUCATIONAL TOURS OF THE FARM RUN BY THE GRANTEE WILL INCLUDE AN OVERVIEW OF THE IMPORTANCE OF STORMWATER MANAGEMENT, HEALTHY STREAMS, REDUCING POLLUTION TO DRINKING WATER SOURCE, AND IMPROVING HABITAT.

DESIGNER'S SIGNATURE: JARROD HART
DATE: 5/25/18
MD REGISTRATION NO.: 37288
PRINTED NAME: JARROD HART
P.E., R.L.S., OR R.L.A. (CIRCLE ONE)

DESIGNER'S SIGNATURE: Bailey Wilford
DATE: 6/19/18
MD REGISTRATION NO.: 5885
PRINTED NAME: Bailey Wilford
P.E., R.L.S., OR R.L.A. (CIRCLE ONE)



OWNER'S/DEVELOPER'S CERTIFICATION:
"I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE."
OWNER'S/DEVELOPER'S SIGNATURE: James M. Jarvis
DATE: 6/1/18
PRINTED NAME & TITLE: JAMES M. JARVIS

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM DULY LICENSED PROFESSIONAL ENGINEERING UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: , **EXPIRATION DATE:** ,

MAPLE DELL FARM STREAM RESTORATION FINAL DESIGN PLANS HOWARD COUNTY, MD CAPITAL PROJECT # D-1158

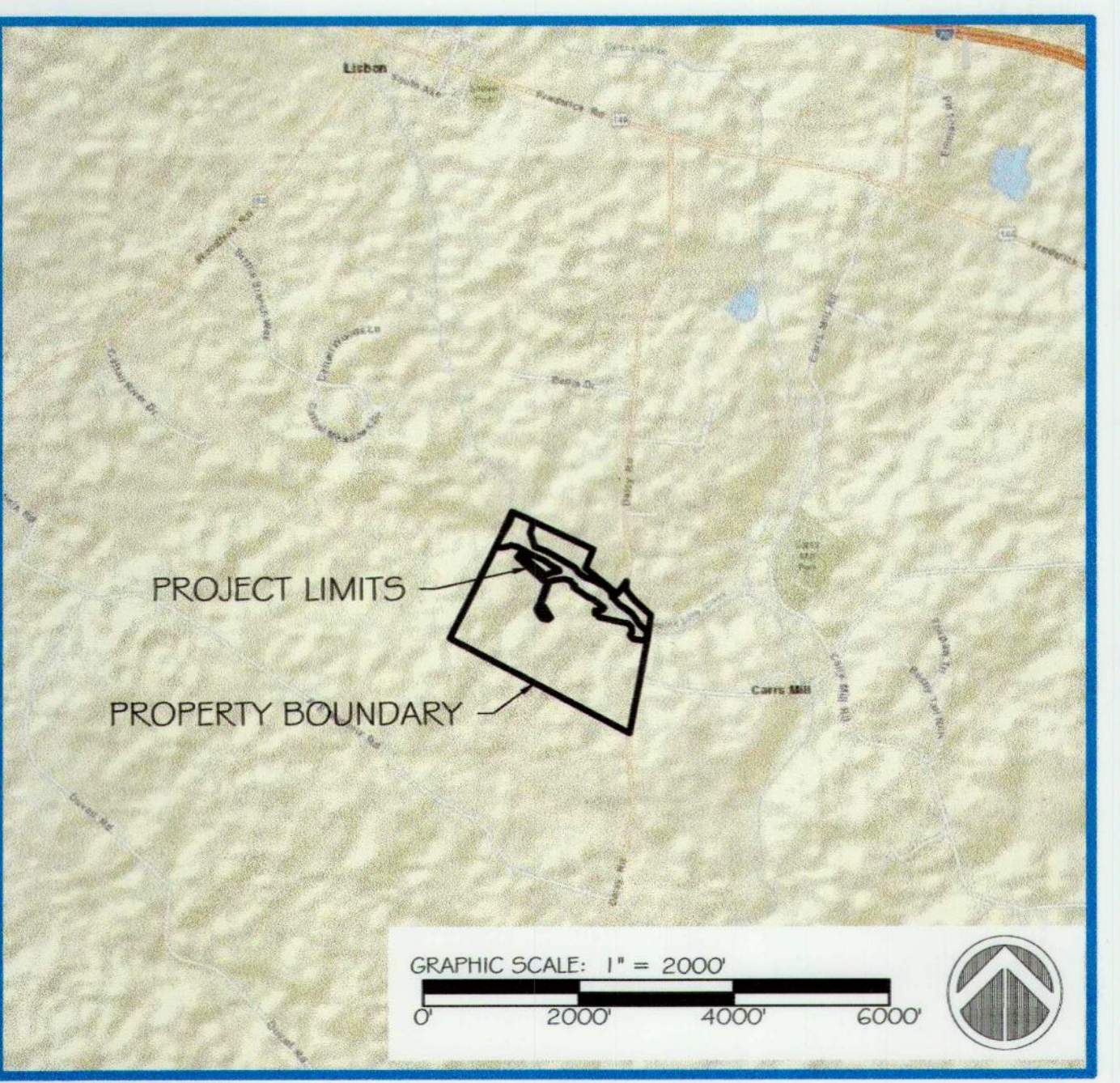
- SHEET INDEX:**
1 - COVERSHEET
2 - KEY SHEET
3-8 EXISTING CONDITIONS
9-14 PROPOSED CONDITIONS
15-23 PROPOSED PLAN AND PROFILE
24 - CROSS SECTIONS
25 - STREAM DESIGN TABLES
26-28 TYPICAL SECTIONS
29-33 STREAM DETAILS
34 - STREAM CROSSING DETAIL
35-40 EROSION AND SEDIMENT CONTROL PLAN
41 - ESC NOTES & NARRATIVE
42 - ESC DETAILS
43-48 PLANTING PLAN
49- PLANTING NOTES AND DETAILS
AB9-14 - AS-BUILT CONDITIONS
AB15-23 - AS-BUILT PLAN AND PROFILE

OWNER:
B. DAVID & DENNIS J. PATRICK
1960 DAISY RD WOODBINE, MD
21797-8428

PROPERTY INFO:
1960 DAISY RD WOODBINE, MD
1404325087
AGRICULTURAL
ACREAGE: 91.6 AC
ADC MAP: PAGE 16, GRID C1
ELECTION DISTRICT: 4-03

CLIENT/APPLICANT:
HOWARD COUNTY
3430 COURT HOUSE DR
ELLCOTT CITY, MD 21043

VICINITY MAP



ENGINEER:
JARROD HART
RES
5367 TELEPHONE RD WARRENTON, VA 20187
540-905-4223

DESIGNER:
DAVID BIDELESPACH
5 SMOOTH STONES RESTORATION, PLLC
LIVERMORE, CO 80536
919-218-0864

BUILDER:
MICHAEL PENY
RES
5367 TELEPHONE RD WARRENTON, VA 20187
540-905-4223

RELATED REQUIRED PERMITS					
TYPE OF PERMIT	REQD	NOT REQD	PENDING	APPROVED	NOTES
U.S. ARMY CORPS OF ENGINEERS	X			X	CENAD-OPR-MN-2017-61714-M37
MDE STATE PROGRAMMATIC GENERAL PERMIT	X			X	AUTH # 17-N-3288/201761714
HOWARD COUNTY ALTERNATIVE COMPLIANCE APPLICATION (ACA)	X			X	WP-18-065
HOWARD COUNTY GRADING PERMIT	X				
ZONING		X			
LAND DEVELOPMENT		X (ACA)			
FEMA (LOMR)	X				
BUILDING PERMIT		X			

PROJECT STATUS	
DATE	DESCRIPTION
7/7/2017	FIRST DRAFT 30% PLANS
7/11/2017	30% TO HOWARD COUNTY OCS
8/25/2017	30% PLANS SUBMITTED TO DPZ & HSCD
9/15/2017	30% PLANS APPROVED BY HSCD

PROJECT STATUS	
DATE	DESCRIPTION
12/14/2017	65% PLANS TO HOWARD CO. DPZ
12/28/2017	65% PLANS SUBMITTED TO HSCD
1/19/2018	65% PLANS APPROVED BY HSCD
4/3/2018	90% PLANS SUBMITTED TO DPZ & HSCD

PROJECT STATUS	
DATE	DESCRIPTION
4/27/2018	90% PLANS RESUBMITTED TO HSCD
5/21/2018	FINAL PLANS SUBMITTED TO HSCD
5/25/2018	FINAL SUBMITTED FOR SIGNATURES

DESIGNER'S SIGNATURE: Gallen Schuy
DATE: 6/4/18
HOWARD SCD

DEPARTMENT OF PUBLIC WORKS, HOWARD CO., MD
DESIGNED BY: 5 SMOOTH STONES RESTORATION, LLC (DBMG)
DRAWN BY: 555R (MG/UB) res (CP/DC)
DATE: 6/1/18
DATE: 5/31/18
DATE: 5/29/18

PROJECT STATUS:
DATE: 12/14/2017
DESCRIPTION: 65% PLANS SUBMITTED TO HSCD

**MAPLE DELL FARM STREAM RESTORATION
CAPITAL PROJECT # D-1158**

PROJECT MANAGER: res (RC) **JOB NUMBER:** 6172.00

DESIGNED BY: 5 SMOOTH STONES RESTORATION, LLC (DBMG) **DESIGN TYPE:** STREAM RESTORATION

DRAWN BY: 555R (MG/UB) res (CP/DC) **INITIAL PLAN DATE:** 12/14/2017

5 SMOOTH STONES RESTORATION PLLC

754 MOUNT MAHOGANY LIVERMORE, CO 80536 P: 919.218.0864 | WWW.FIVE5R.COM

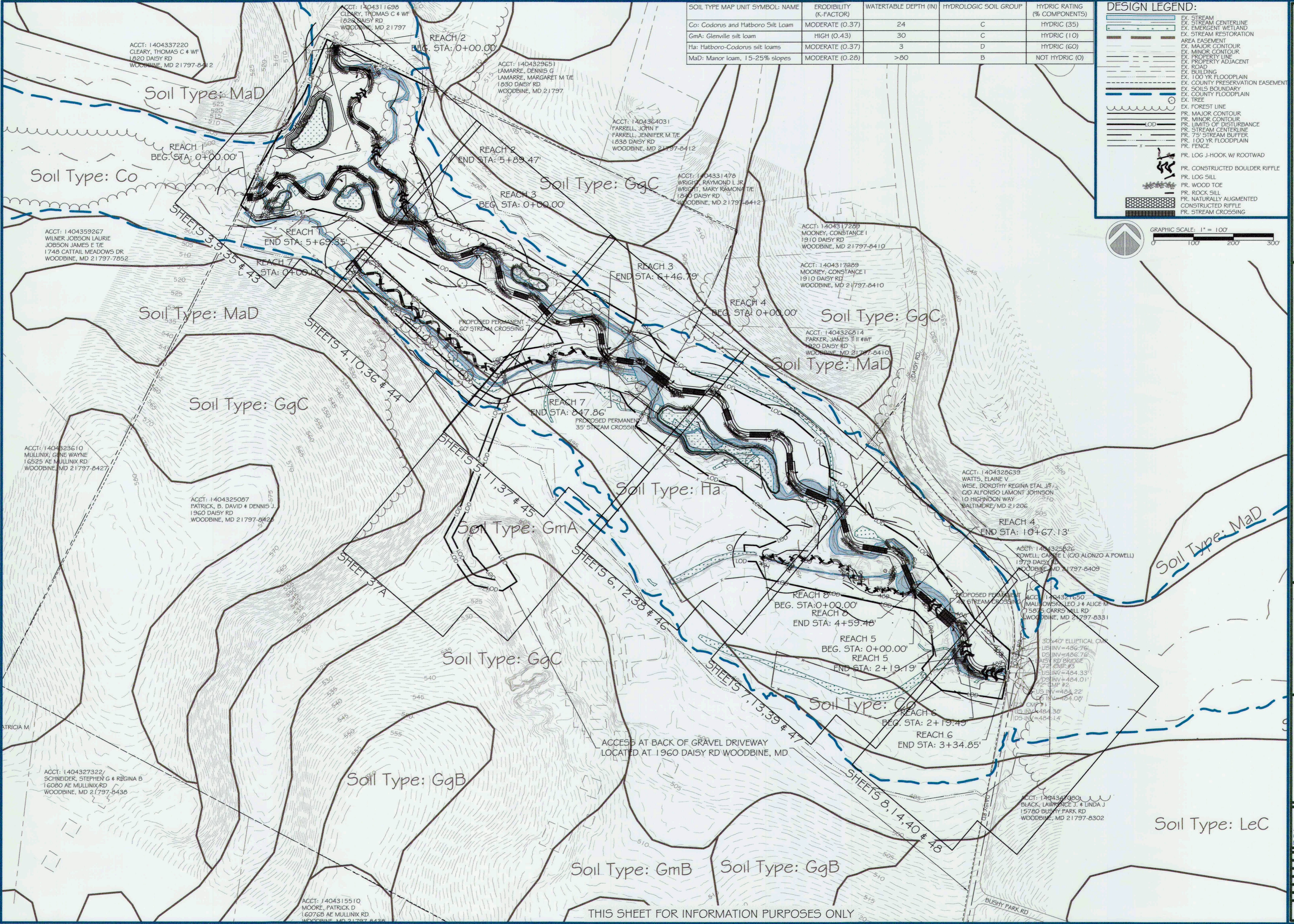
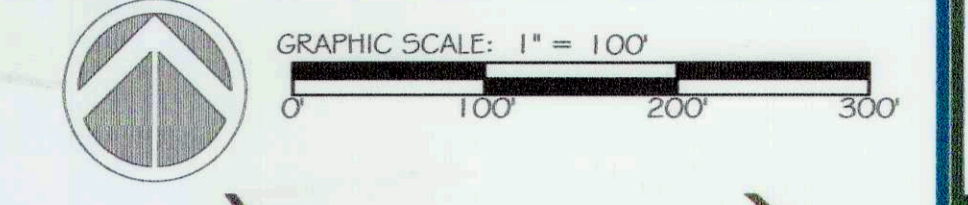
5367 TELEPHONE ROAD WARRENTON, VIRGINIA 20187 P: 703.393.4844 | WWW.RES.US

JOB NUMBER: 6172.00
MAPLE DELL STREAM RESTORATION

SOIL TYPE MAP UNIT SYMBOL: NAME	ERODIBILITY (K-FACTOR)	WATERTABLE DEPTH (IN)	HYDROLOGIC SOIL GROUP	HYDRIC RATING (% COMPONENTS)
Co: Codorus and Hatboro Silt Loam	MODERATE (0.37)	24	C	HYDRIC (35)
GmA: Glenville silt loam	HIGH (0.43)	30	C	HYDRIC (10)
Ha: Hatboro-Codorus silt loams	MODERATE (0.37)	3	D	HYDRIC (60)
MaD: Manor loam, 15-25% slopes	MODERATE (0.28)	>80	B	NOT HYDRIC (0)

DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING



ores
5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20197
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5 | SMOOTH STONES RESTORATION PLLC
754 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.215.0864 | WWW.FIVE59K.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

KEY SHEET

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEERS SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES


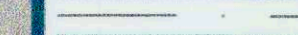
















PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGC/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 2 OF 49

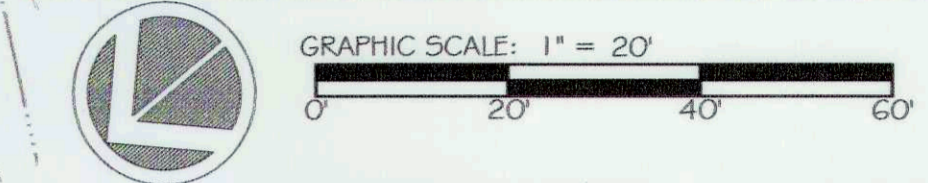
THIS SHEET FOR INFORMATION PURPOSES ONLY

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 4

LEGEND:

-  EX. STREAM
-  EX. STREAM CENTERLINE
-  EX. EMERGENT WETLAND
-  EX. STREAM RESTORATION AREA EASEMENT
-  EX. MAJOR CONTOUR
-  EX. MINOR CONTOUR
-  EX. PROPERTY LINE
-  EX. PROPERTY ADJACENT
-  EX. ROAD
-  EX. BUILDING
-  EX. 100 YR FLOODPLAIN
-  EX. 75' STREAM BUFFER
-  EX. COUNTY PRESERVATION EASEMENT
-  EX. STEEP SLOPE
-  EX. HIGHLY ERODIBLE SOILS
-  EX. COUNTY FLOODPLAIN
-  EX. TREE
-  EX. FOREST LINE



ores
5 | SMOOTH STONES
RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20167
P: 703.393.4044 | WWW.FRES.US

754 MOUNT MAHOOGANY
LIVERMORE, CO 80536
P: 919.216.0664 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EXISTING CONDITIONS

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
Mark J. West 5/25/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

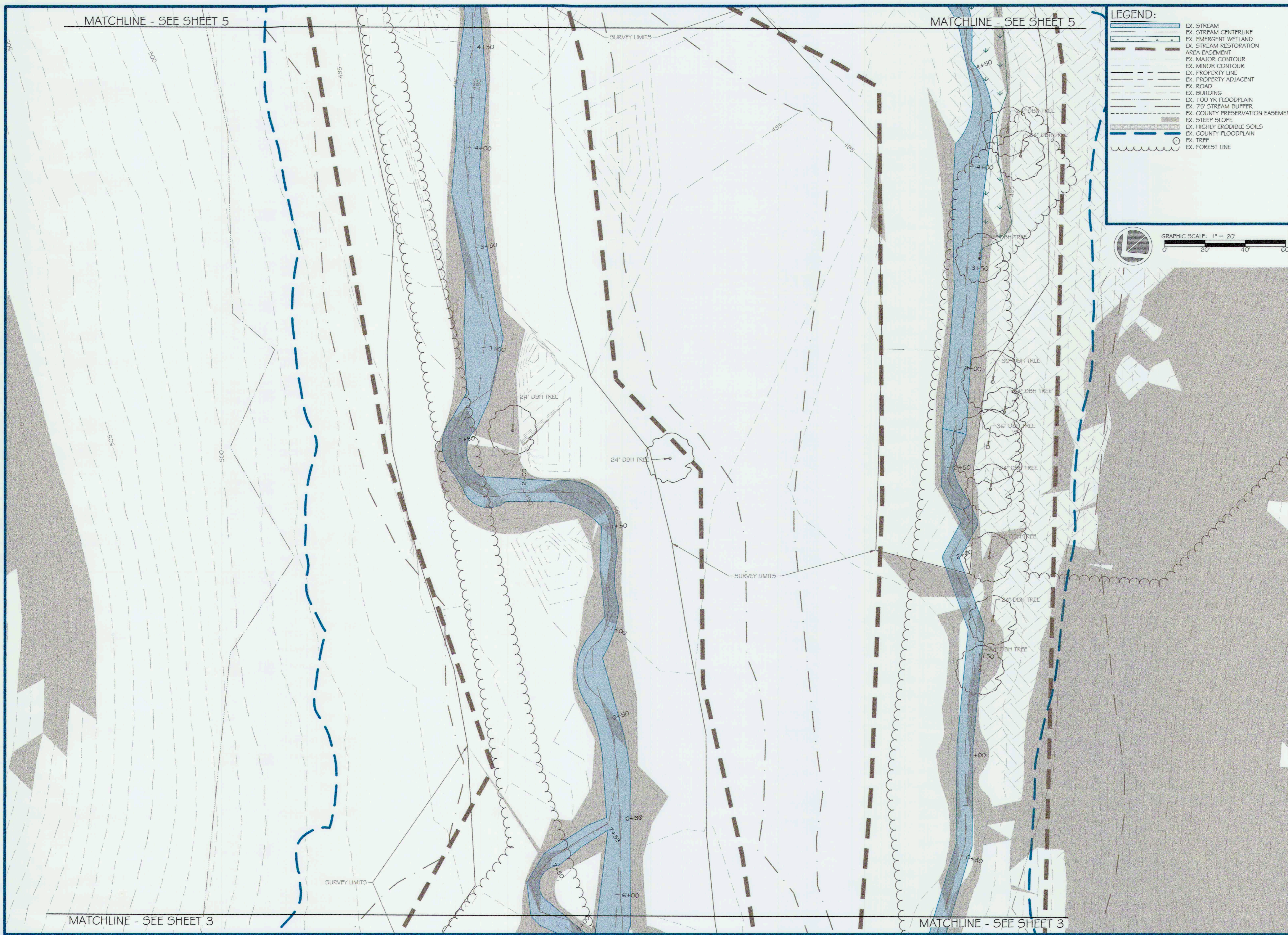
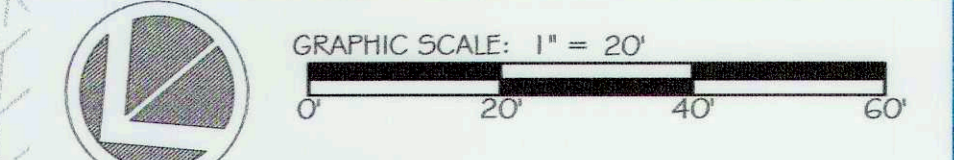
PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 3 OF 49

MATCHLINE - SEE SHEET 5

MATCHLINE - SEE SHEET 5

LEGEND:

	EX. STREAM
	EX. STREAM CENTERLINE
	EX. EMERGENT WETLAND
	EX. STREAM RESTORATION
	AREA EASEMENT
	EX. MAJOR CONTOUR
	EX. MINOR CONTOUR
	EX. PROPERTY LINE
	EX. PROPERTY ADJACENT
	EX. ROAD
	EX. BUILDING
	EX. 100 YR FLOODPLAIN
	EX. 75' STREAM BUFFER
	EX. COUNTY PRESERVATION EASEMENT
	EX. STEEP SLOPE
	EX. HIGHLY ERODIBLE SOILS
	EX. COUNTY FLOODPLAIN
	EX. TREE
	EX. FOREST LINE



ores
5 | SMOOTH STONES
RESTORATION PLLC

5837 TELEPHIC ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4844 | WWW.RES.US

764 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.218.0064 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EXISTING CONDITIONS

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A



APPROVED: DEPT. OF PUBLIC WORKS
Michael... 5/23/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGCPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:

MATCHLINE - SEE SHEET 3

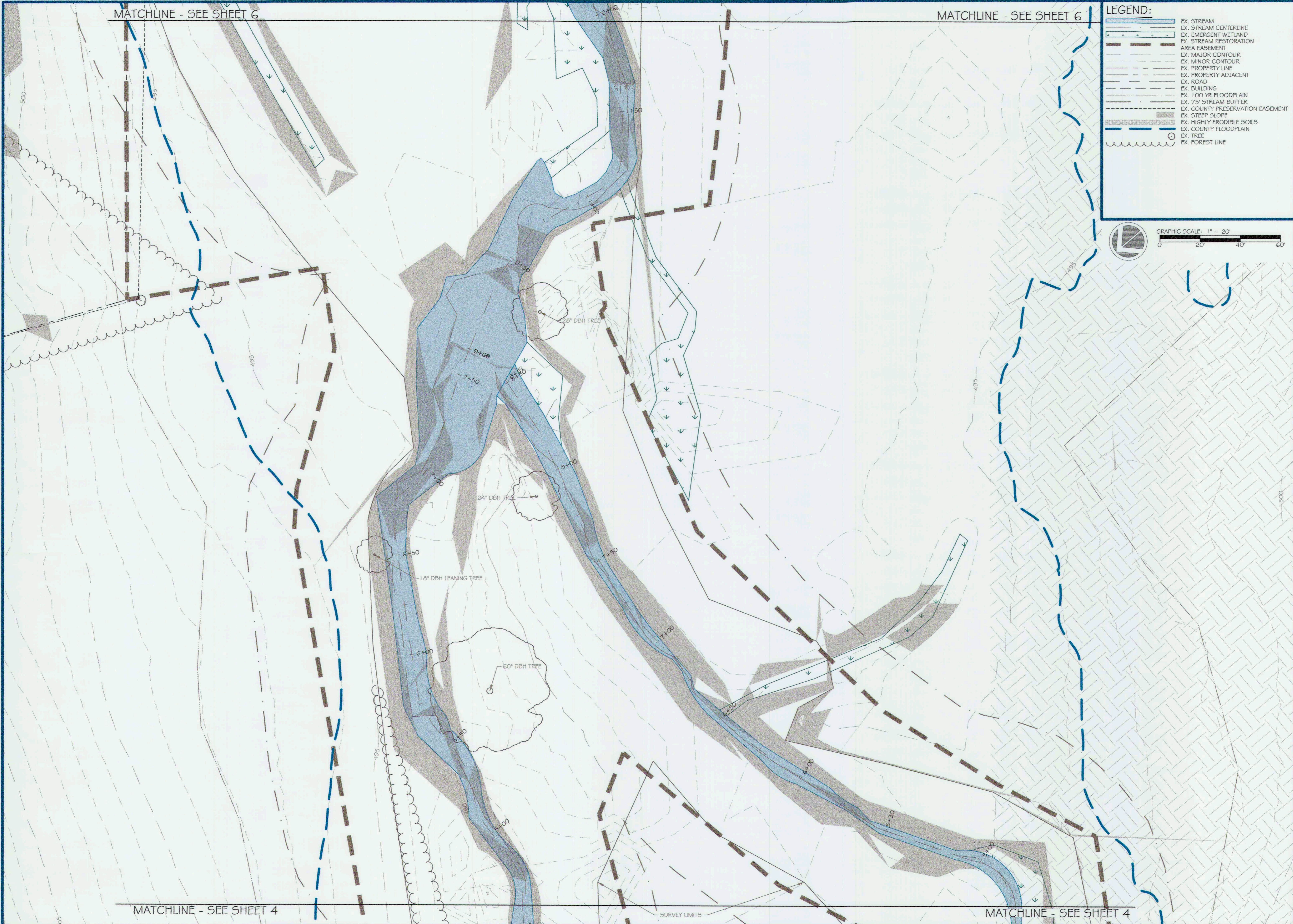
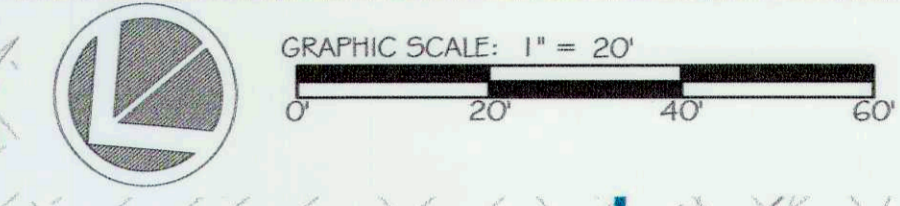
MATCHLINE - SEE SHEET 3

MATCHLINE - SEE SHEET 6

MATCHLINE - SEE SHEET 6

LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. ROAD ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. 75' STREAM BUFFER
- EX. COUNTY PRESERVATION EASEMENT
- EX. STEEP SLOPE
- EX. HIGHLY ERODIBLE SOILS
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE



res
5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
F: 703.393.4844 | WWW.RES.US

5 SMOOTH STONES RESTORATION PLLC
754 MOUNT MAHOGANY
LIVERMORE, CO 80536
F: 919.218.0864 | WWW.FIVE59R.COM

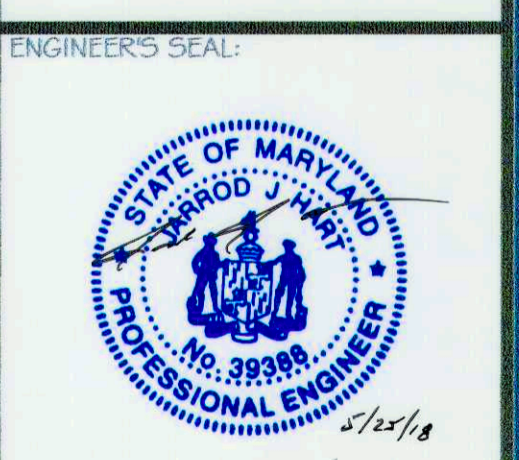
CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EXISTING CONDITIONS

(3 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A



APPROVED: DEPT. OF PUBLIC WORKS
Mark A. Luca
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
DATE: 12/14/2017

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CP/DC
JOB NUMBER: 6172.001
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 5 OF 49

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 4

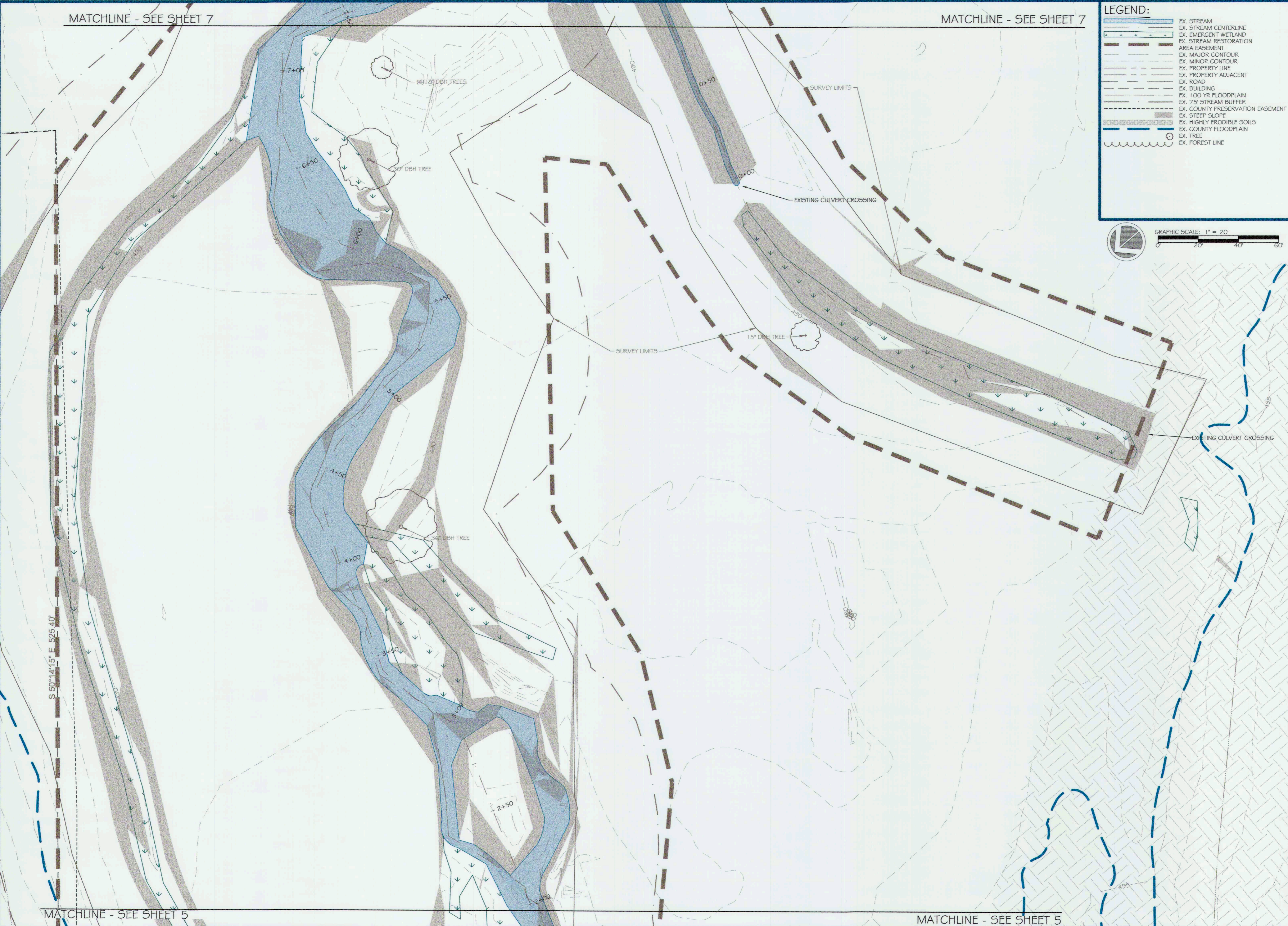
MATCHLINE - SEE SHEET 7

MATCHLINE - SEE SHEET 7

LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. 75' STREAM BUFFER
- EX. COUNTY PRESERVATION EASEMENT
- EX. STEEP SLOPE
- EX. HIGHLY ERODIBLE SOILS
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE

GRAPHIC SCALE: 1" = 20'



MATCHLINE - SEE SHEET 5

MATCHLINE - SEE SHEET 5

ores
5 | SMOOTH STONES
RESTORATION PLLC

5627 TELEPHONE ROAD
WABERSVILLE, OHIO 43087
P: 703.393.4644 | WWW.ORES.US

754 MOUNT MAROGANY
ROAD
WABERSVILLE, OHIO 43087
P: 919.218.0964 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EXISTING CONDITIONS
(4 OF 6)

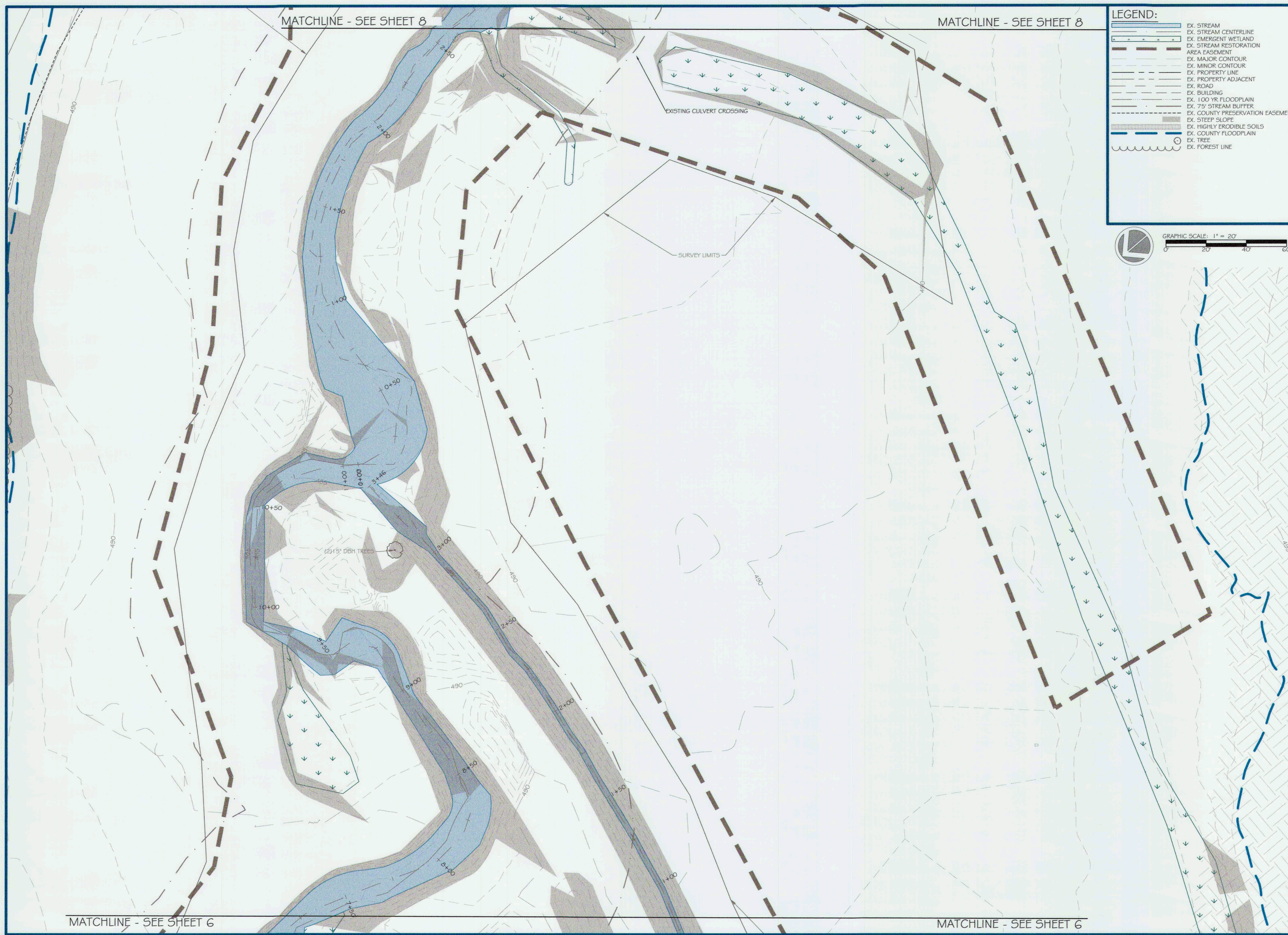
WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
Michael... 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGCP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:

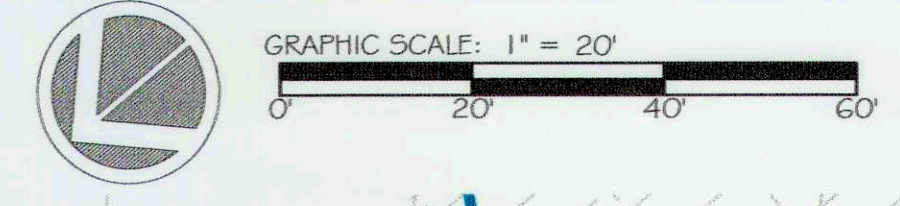


MATCHLINE - SEE SHEET 8

MATCHLINE - SEE SHEET 8

LEGEND:

- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. 75' STREAM BUFFER
- EX. COUNTY PRESERVATION EASEMENT
- EX. STEEP SLOPE
- EX. HIGHLY ERODIBLE SOILS
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE



ores
5 | SMOOTH STONES RESTORATION PLLC

5567 TELEPHONE ROAD
WOODBINE, MD 21797
P: 703.393.4644 | WWW.ORES.US

754 MOUNT MAHOGANY
LUMBER LANE
P: 919.218.0864 | WWW.FIFTEENR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EXISTING CONDITIONS
(5 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
Michael... 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGCP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 7 OF 49

MATCHLINE - SEE SHEET 6

MATCHLINE - SEE SHEET 6



LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR. FLOODPLAIN
- EX. 75' STREAM BUFFER
- EX. COUNTY PRESERVATION EASEMENT
- EX. STEEP SLOPE
- EX. HIGHLY ERODIBLE SOILS
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE

GRAPHIC SCALE: 1" = 20'

0 20 40 60

ores

5867 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4944 | WWW.RES.US

5 | SMOOTH STONES
RESTORATION PLLC

764 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.218.0564 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EXISTING CONDITIONS
(6 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

△

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Michael... 5/31/18
DATE

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MG/CPDC
JOB NUMBER:	6172.00
DESIGN TYPE:	STREAM RESTORATION
DATE:	12/14/2017
SHEET NO.:	8 OF 49

MATCHLINE - SEE SHEET 10

MATCHLINE - SEE SHEET 10

Soil Type: GgC

Soil Type: Co

Soil Type: Co

Soil Type: MaD

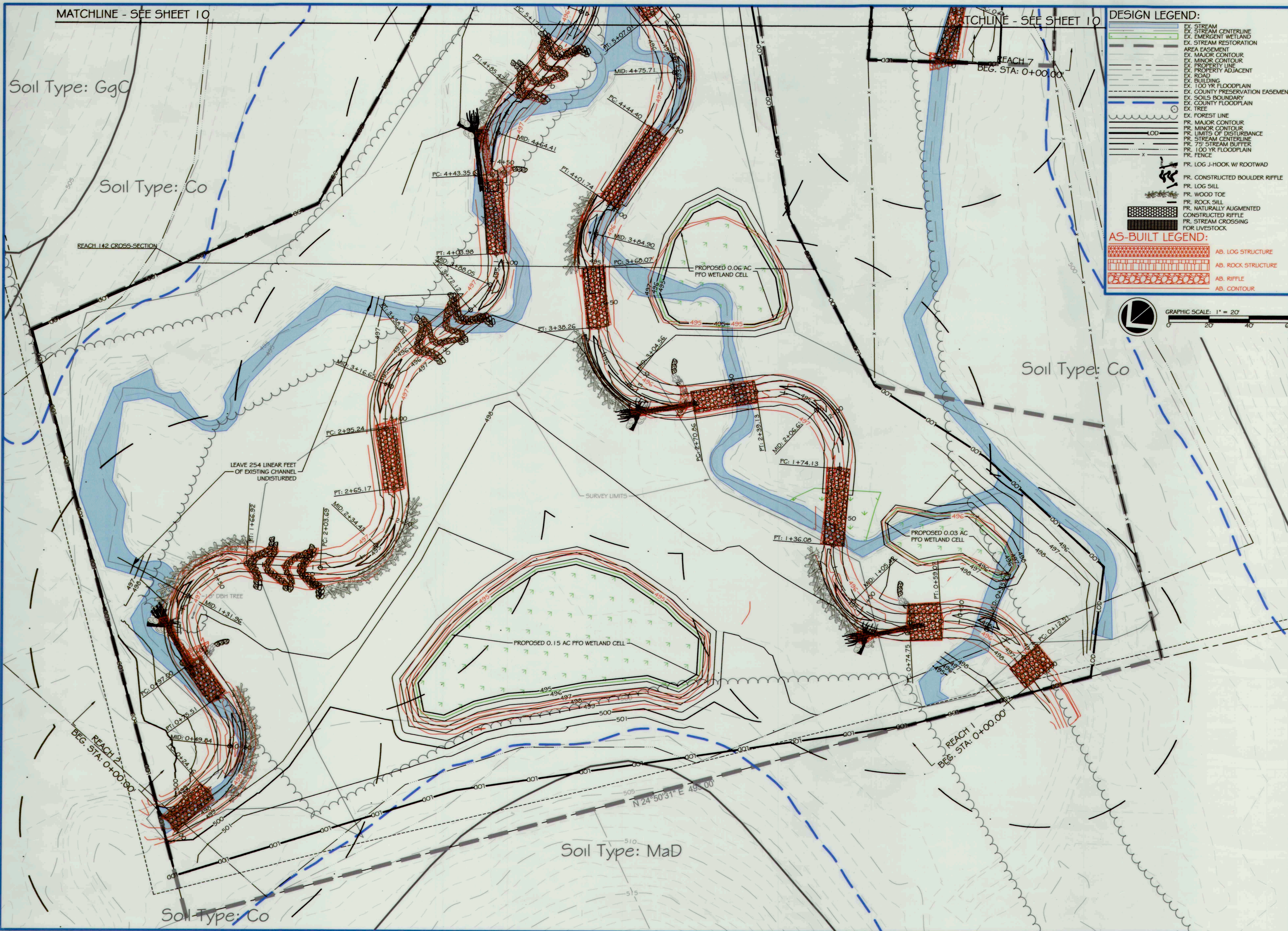
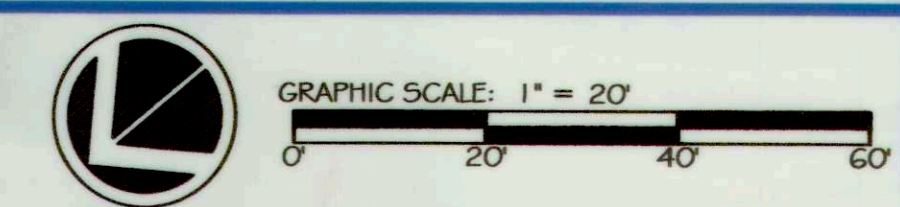
Soil Type: Co

DESIGN LEGEND:

	EX. STREAM CENTERLINE
	EX. EMERGENT WETLAND
	EX. STREAM RESTORATION
	EX. AREA EASEMENT
	EX. MAJOR CONTOUR
	EX. MINOR CONTOUR
	EX. PROPERTY LINE
	EX. PROPERTY ADJACENT
	EX. ROAD
	EX. BUILDING
	EX. 100 YR FLOODPLAIN
	EX. COUNTY PRESERVATION EASEMENT
	EX. SOILS BOUNDARY
	EX. COUNTY FLOODPLAIN
	EX. TREE
	EX. FOREST LINE
	PR. MAJOR CONTOUR
	PR. MINOR CONTOUR
	PR. LIMITS OF DISTURBANCE
	PR. STREAM CENTERLINE
	PR. 75 YR STREAM BUFFER
	PR. 100 YR FLOODPLAIN
	PR. FENCE
	PR. LOG J-HOOK W/ ROOTWAD
	PR. CONSTRUCTED BOULDER RIFFLE
	PR. LOG SILL
	PR. WOOD TOE
	PR. ROCK SILL
	PR. NATURALLY AUGMENTED RIFFLE
	PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

	AB. LOG STRUCTURE
	AB. ROCK STRUCTURE
	AB. RIFFLE
	AB. CONTOUR



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SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4644 | WWW.RES.US

754 MOUNT MARQUAM, LIVERMORE, CO 80536
P: 919.216.0664
WWW.FIVESSR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT CONDITIONS

(1 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
X

AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS 'AS-BUILT' PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Delaney 12/19/18
NAME DATE

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
Madison 5/1/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2018
SHEET NO: AB9 OF 49

MATCHLINE - SEE SHEET 10

MATCHLINE - SEE SHEET 10

Soil Type: GgC

Soil Type: Co

Soil Type: MaD

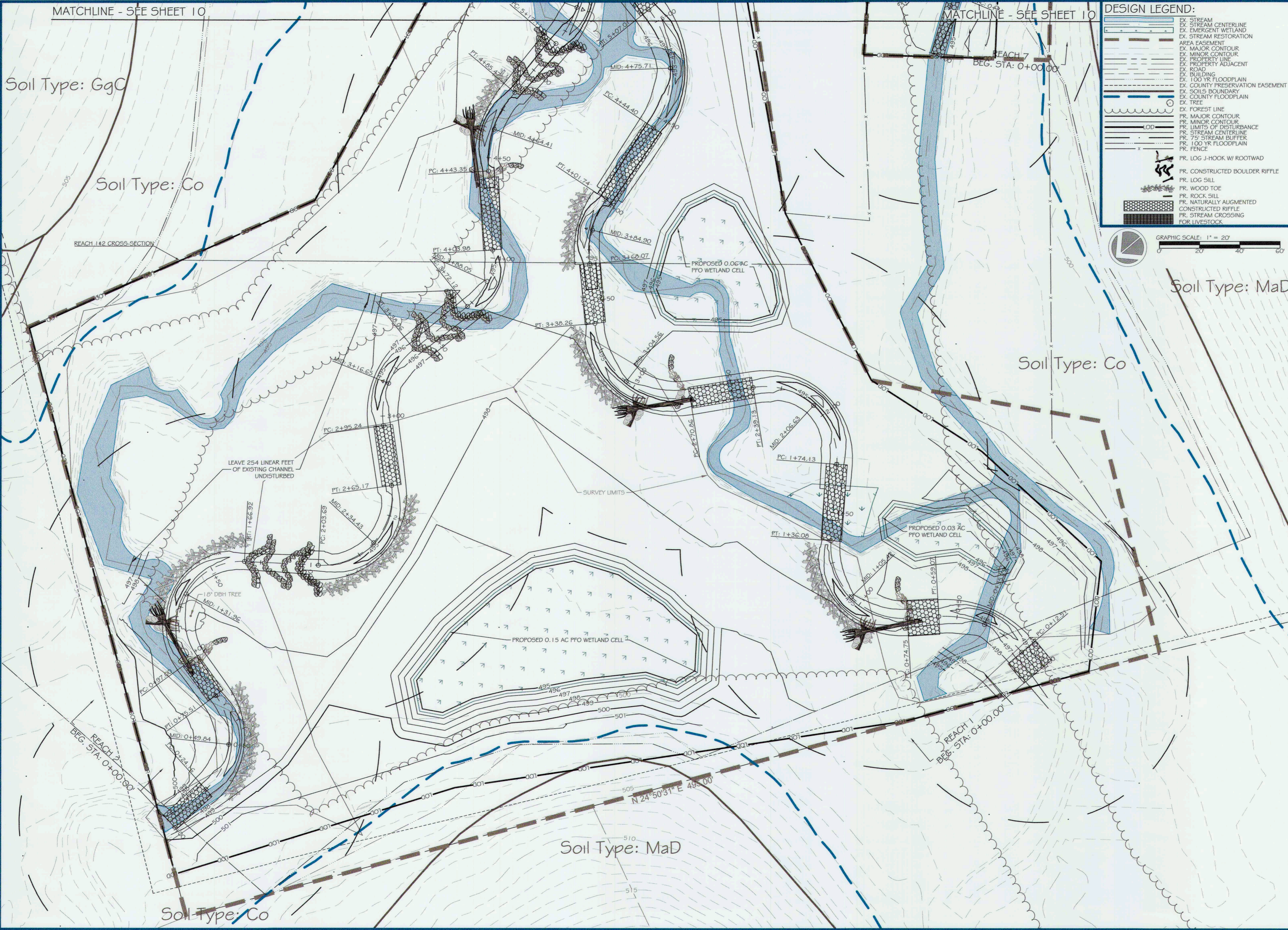
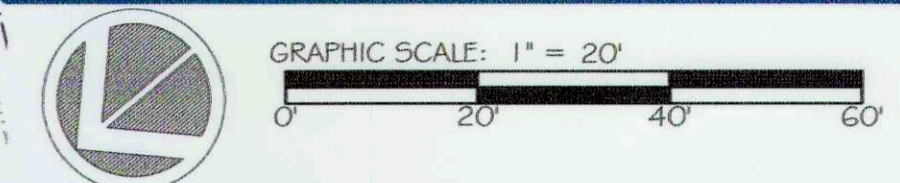
Soil Type: Co

Soil Type: MaD

Soil Type: Co

DESIGN LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION
[Symbol]	EX. EMERGENT WETLAND
[Symbol]	EX. AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. 100 YR FLOODPLAIN
[Symbol]	EX. COUNTY PRESERVATION EASEMENT
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. MAJOR CONTOUR
[Symbol]	PR. MINOR CONTOUR
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. STREAM CENTERLINE
[Symbol]	PR. 75' STREAM BUFFER
[Symbol]	PR. 100 YR FLOODPLAIN
[Symbol]	PR. FENCE
[Symbol]	PR. LOG J-HOOK W/ ROOTWAD
[Symbol]	PR. CONSTRUCTED BOULDER RIFFLE
[Symbol]	PR. LOG SILL
[Symbol]	PR. WOOD TOE
[Symbol]	PR. ROCK SILL
[Symbol]	PR. NATURALLY AUGMENTED
[Symbol]	CONSTRUCTED RIFFLE
[Symbol]	PR. STREAM CROSSING FOR LIVESTOCK



ores
5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4644 | WWW.ORES.US

5 | SMOOTH STONES RESTORATION PLLC
754 MOUNT MAHOOGANY
LIVERMORE, CO 80538
P: 919.216.0664 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED CONDITIONS

(1 OF 6)
WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Mark 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MG/PCD
JOB NUMBER:	6172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	9 OF 49

MATCHLINE - SEE SHEET 11

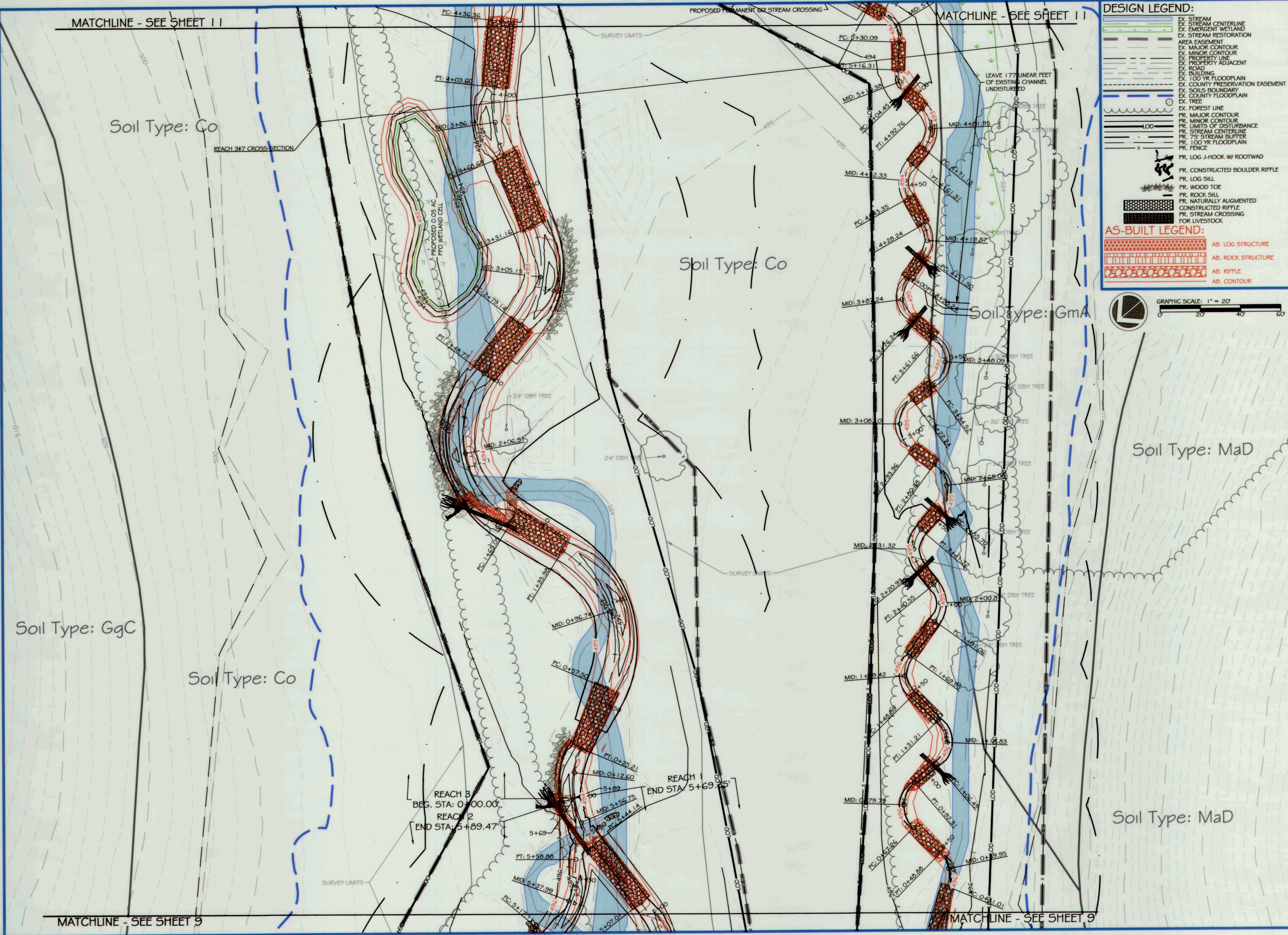
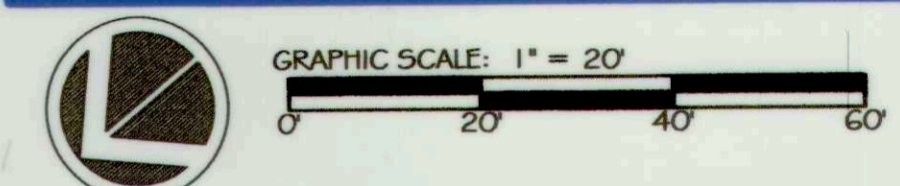
MATCHLINE - SEE SHEET 11

DESIGN LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR



ores
5 | SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4044 | WWW.RES.US

754 MOUNT MAHOGANY, LIVERMORE, CO 80536
P: 919.218.0964
WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT CONDITIONS
(2 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

AS-BUILT CERTIFICATION:
HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS 'AS-BUILT' PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Anthony Long 12/19/18
NAME DATE

ENGINEER'S SEAL:

APPROVED DEPT. OF PUBLIC WORKS

Matthew 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

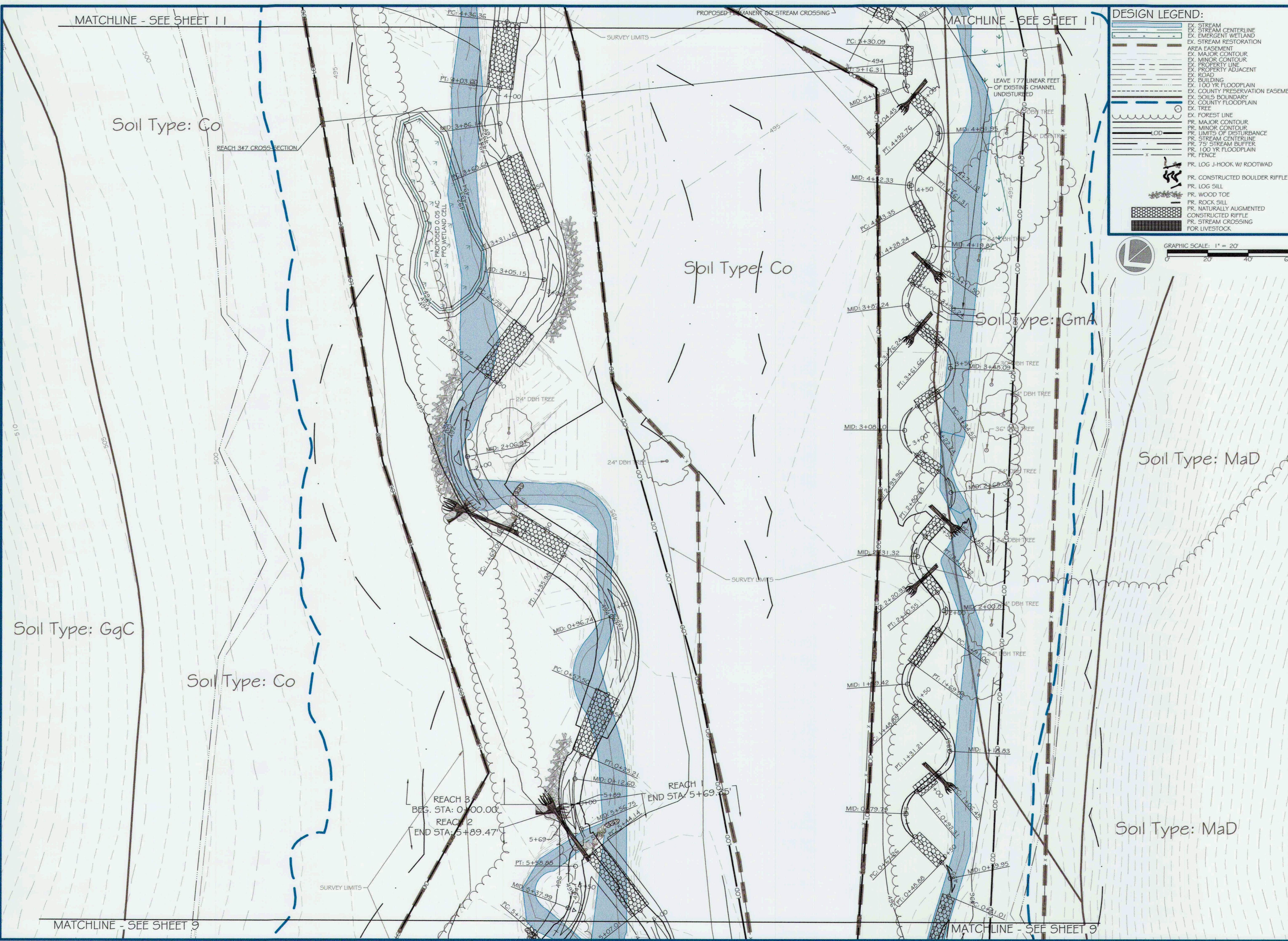
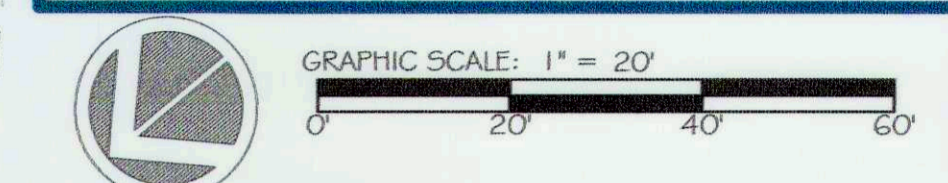
PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2018
SHEET NO: AB10 OF 49

MATCHLINE - SEE SHEET 11

MATCHLINE - SEE SHEET 11

DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. STREAM RESTORATION
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK



res

5567 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4044 | WWW.RES.US

5 SMOOTH STONES RESTORATION PLLC

754 MOUNT MAHOAGNY
LIVERMORE, CO 80536
P: 919.216.0864 | WWW.FIVE59R.COM

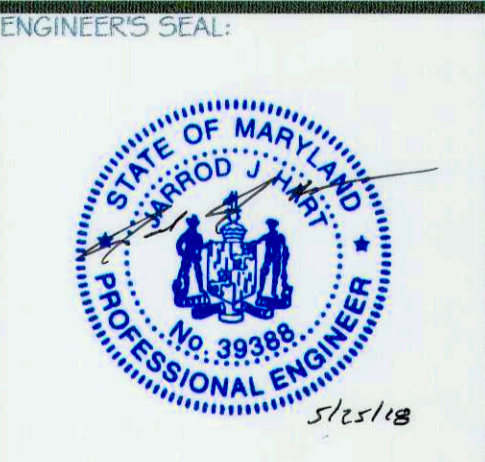
CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED CONDITIONS

(2 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:



APPROVED: DEPT. OF PUBLIC WORKS
Matthew Smith 5/31/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

PROJECT MANAGER: RC
 DESIGNER: DBMG
 DRAWN: MG/CPDC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 10 OF 49

MATCHLINE - SEE SHEET 12

MATCHLINE - SEE SHEET 12

DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. STREAM RESTORATION
- EX. STREAM RESTORATION
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR



GRAPHIC SCALE: 1" = 20'



Soil Type: Ha

Soil Type: Ha

Soil Type: GmA

MATCHLINE - SEE SHEET 10

MATCHLINE - SEE SHEET 10

ores
5837 TELEPHONE ROAD
WARRENTON, VIRGINIA 20147
P: 703.393.4644 | WWW.ORES.US

5 | SMOOTH STONES
RESTORATION PLLC
754 MOUNT MAHOGANY, LIVERMORE, CO 80536
P: 919.216.0624
WWW.FIVE5R.COM

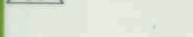
CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT CONDITIONS

(3 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:



AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS 'AS-BUILT' PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Dustin May 12/19/18
NAME DATE

ENGINEER'S SEAL:



APPROVED: DEPT. OF PUBLIC WORKS
M. ... 5/1/18 DATE
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DMVG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2018
SHEET NO: AB11 OF 49

MATCHLINE - SEE SHEET 12

MATCHLINE - SEE SHEET 12

DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK



GRAPHIC SCALE: 1" = 20'
0 20 40 60

Soil Type: Ha

Soil Type: Ha

Soil Type: GmA

Soil Type: Cp

ores
5 | SMOOTH STONES RESTORATION PLLC

5937 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4844 | WWW.ORES.US

764 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.218.0564 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED CONDITIONS

(3 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A



APPROVED: DEPT. OF PUBLIC WORKS
Matthew 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGC/PDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 11 OF 49

MATCHLINE - SEE SHEET 10

MATCHLINE - SEE SHEET 10

SURVEY LIMITS

MATCHLINE - SEE SHEET 13

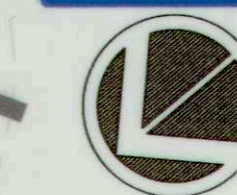
MATCHLINE - SEE SHEET 13

DESIGN LEGEND:

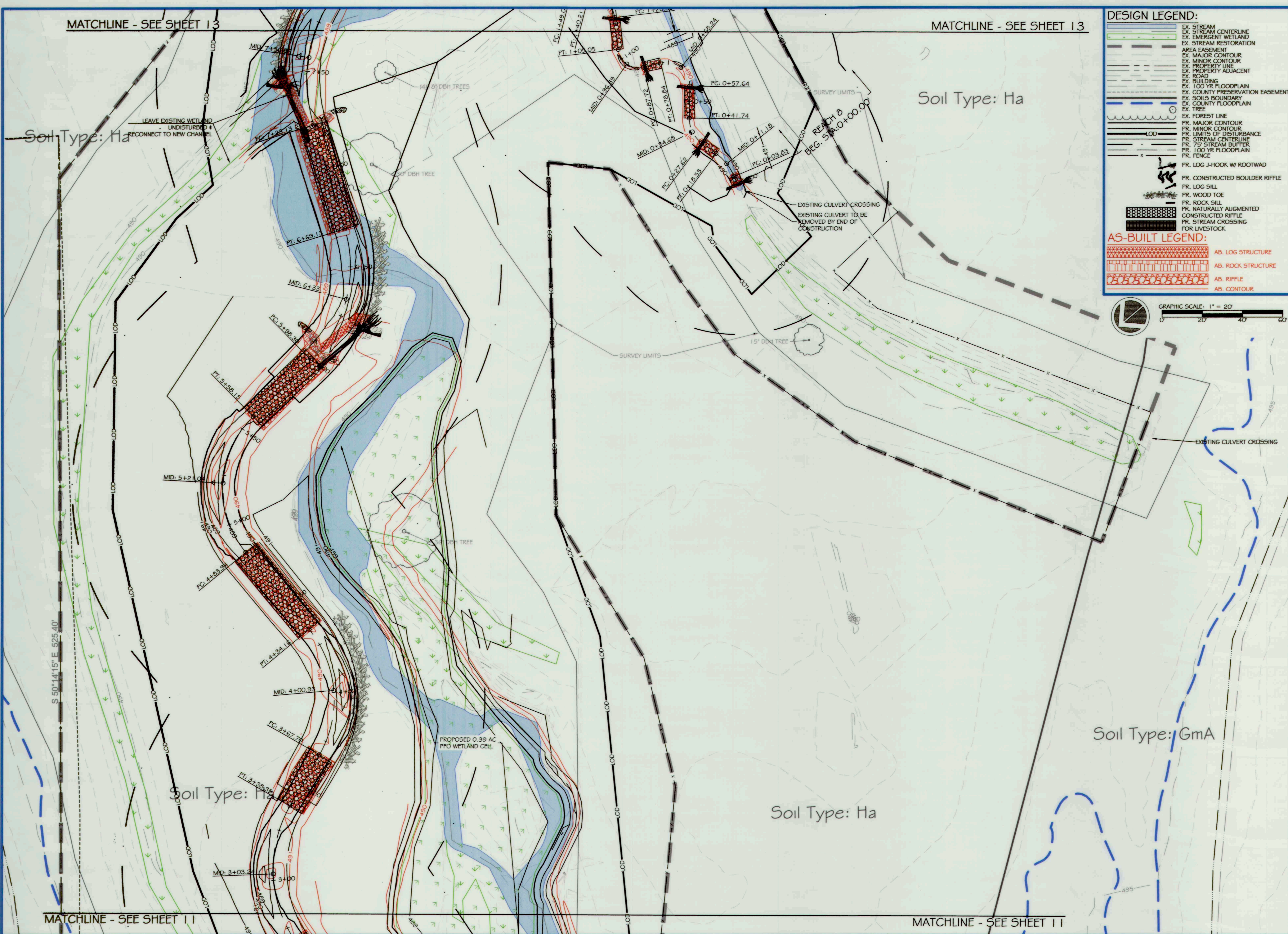
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR



GRAPHIC SCALE: 1" = 20'



ores
SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
F: 703.353.4644 | WWW.RES.US

754 MOUNT MAFOGAN, LIVERMORE, CO 80536
P: 970.216.0664
WWW.FRESHC.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT CONDITIONS (4 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
X

AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS 'AS-BUILT' PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Debra Ross 12/19/18
NAME DATE

ENGINEER'S SEAL:

Debra Ross 12/19/18

APPROVED, DEPT. OF PUBLIC WORKS
Michael Smith 5/1/18 DATE
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2018
SHEET NO: AB12 OF 49

MATCHLINE - SEE SHEET 11

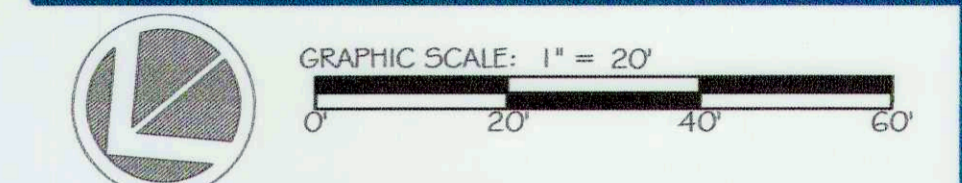
MATCHLINE - SEE SHEET 11

MATCHLINE - SEE SHEET 13

MATCHLINE - SEE SHEET 13

DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. STREAM RESTORATION
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK



Soil Type: Ha

Soil Type: Ha

Soil Type: GmA

Soil Type: Ha

Soil Type: Ha

MATCHLINE - SEE SHEET 11

MATCHLINE - SEE SHEET 11

ores
 5367 TELEPHONE ROAD
 WARRENTON, VIRGINIA 20167
 P: 703.593.4644 | WWW.ORES.US

5 SMOOTH STONES RESTORATION PLLC
 754 MOUNT MAHOGANY
 LIVERMORE, CO 80536
 P: 919.216.0864 | WWW.FIVE58R.COM

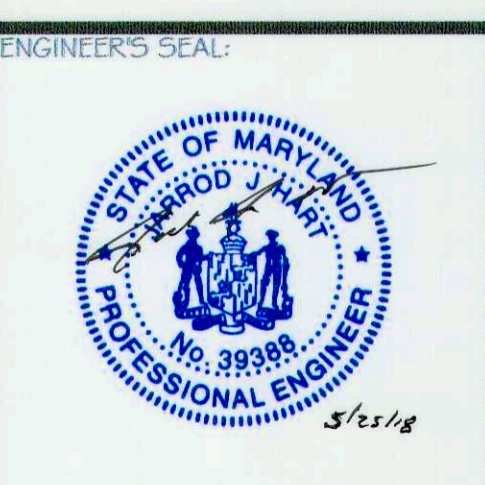
CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

PROPOSED CONDITIONS

(4 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:



APPROVED: DEPT. OF PUBLIC WORKS
[Signature] 3/31/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MG/CFDC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 12 OF 49

Soil Type: Ha

MATCHLINE - SEE SHEET 14

DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. STREAM RESTORATION
- EX. EMERGENT WETLAND
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TIE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

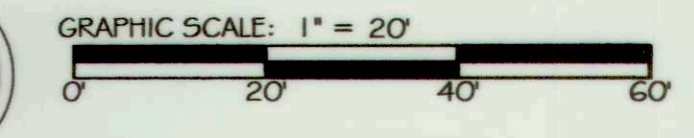
AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR

dres
SMOOTH STONES RESTORATION LLC
5367 TELEPHONE ROAD
WARRENTON, VIRGINIA, 20187
P. 703.393.4644 | WWW.RES.US

754 MOUNT MAHOGANY, LIVERMORE, CO 80536
P. 919.218.0664
WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS
AS-BUILT CONDITIONS
(5 OF 6)
WOODBINE, HOWARD COUNTY, MD



MATCHLINE - SEE SHEET 12

MATCHLINE - SEE SHEET 12

REVISIONS:

AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Douglas Wier 12/19/18
NAME DATE



APPROVED: DEPT. OF PUBLIC WORKS
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2018
SHEET NO: AB13 OF 49

Soil Type: Ha

Soil Type: Ha

Soil Type: Co

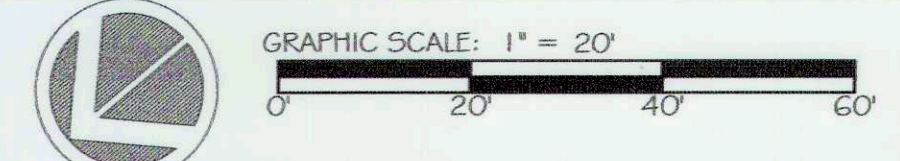
Soil Type: GmA

Soil Type: Ha

Soil Type: Co

DESIGN LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. EMERGENT WETLAND
[Symbol]	EX. STREAM RESTORATION
[Symbol]	AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. 100 YR FLOODPLAIN
[Symbol]	EX. COUNTY PRESERVATION EASEMENT
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. MAJOR CONTOUR
[Symbol]	PR. MINOR CONTOUR
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. STREAM CENTERLINE
[Symbol]	PR. 75' STREAM BUFFER
[Symbol]	PR. 100 YR FLOODPLAIN
[Symbol]	PR. FENCE
[Symbol]	PR. LOG J-HOOK W/ ROOTWAD
[Symbol]	PR. CONSTRUCTED BOULDER RIFFLE
[Symbol]	PR. LOG SILL
[Symbol]	PR. WOOD TOE
[Symbol]	PR. ROCK SILL
[Symbol]	PR. NATURALLY AUGMENTED
[Symbol]	CONSTRUCTED RIFFLE
[Symbol]	PR. STREAM CROSSING FOR LIVESTOCK



ores
5 | SMOOTH STONES
RESTORATION FILL

5667 TELEPHONE ROAD
WASHTON, MD 21797
P: 703.393.4944 | WWW.ORES.US

76.4 MOUNT MAHOGANY
115 BERRY STREET
P: 919.218.0964 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED CONDITIONS
(5 OF 6)

WOODBINE, HOWARD COUNTY, MD

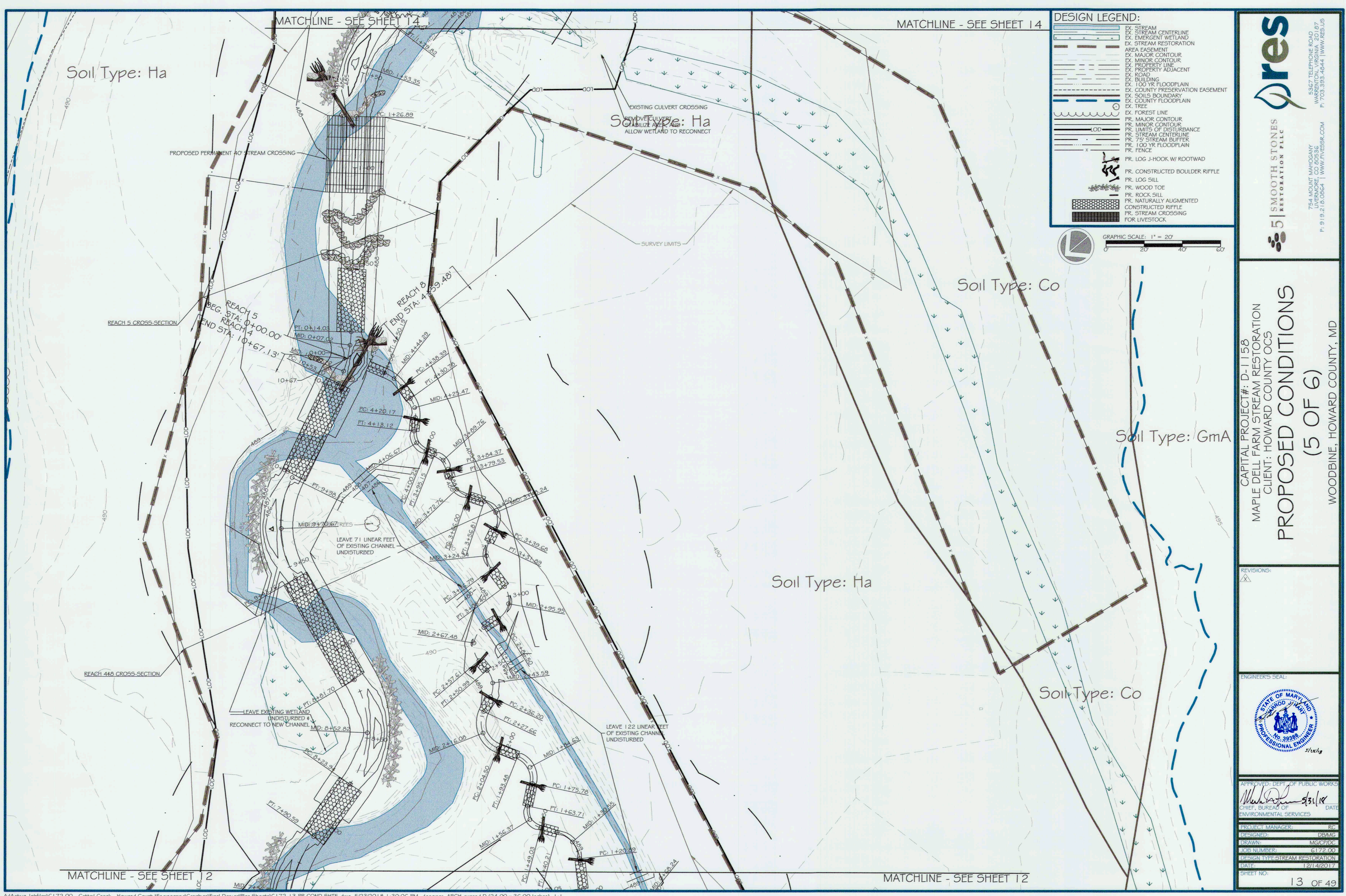
REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Michael J. ... 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MGCF/DC
JOB NUMBER:	G172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	13 OF 49



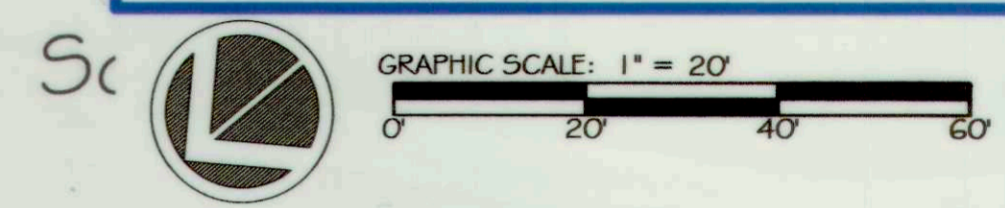


DESIGN LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. EMERGENT WETLAND
[Symbol]	EX. STREAM RESTORATION
[Symbol]	EX. AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. 100 YR FLOODPLAIN
[Symbol]	EX. COUNTY PRESERVATION EASEMENT
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. MAJOR CONTOUR
[Symbol]	PR. MINOR CONTOUR
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. STREAM CENTERLINE
[Symbol]	PR. 75' STREAM BUFFER
[Symbol]	PR. 100 YR FLOODPLAIN
[Symbol]	PR. FENCE
[Symbol]	PR. LOG J-HOOK W/ ROOTWAD
[Symbol]	PR. CONSTRUCTED BOULDER RIFFLE
[Symbol]	PR. LOG SILL
[Symbol]	PR. WOOD TOE
[Symbol]	PR. ROCK SILL
[Symbol]	PR. NATURALLY AUGMENTED CONSTRUCTED RIFFLE
[Symbol]	PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

[Symbol]	AB. LOG STRUCTURE
[Symbol]	AB. ROCK STRUCTURE
[Symbol]	AB. RIFFLE
[Symbol]	AB. CONTOUR



dres
5367 TELEPHONE ROAD
WASHTON, MO 63091
P: 703.393.4644 | WWW.DRES.US

5 | SMOOTH STONES RESTORATION PLLC
754 MOUNT MANOCANY LIVERMORE, CO 80536
P: 970.212.0564
WWW.FIVE55R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT CONDITIONS (6 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
[Symbol]

AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Debra W 10/17/18
NAME DATE
ENGINEERS SEAL

Debra W 10/19/18

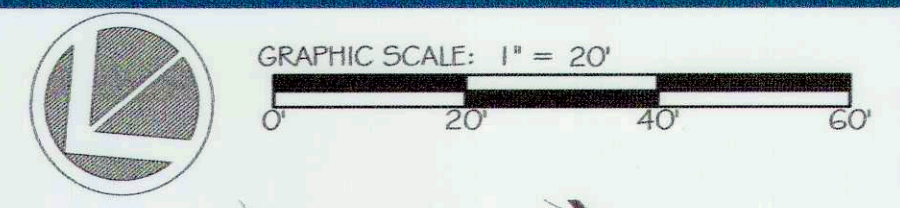
APPROVED: DEPT. OF PUBLIC WORKS
Madison 5/1/18 DATE
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2018
SHEET NO: AB14 OF 49



DESIGN LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION
[Symbol]	EX. EMERGENT WETLAND
[Symbol]	EX. STREAM RESTORATION
[Symbol]	AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. 100 YR FLOODPLAIN
[Symbol]	EX. COUNTY PRESERVATION EASEMENT
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. MAJOR CONTOUR
[Symbol]	PR. MINOR CONTOUR
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. STREAM CENTERLINE
[Symbol]	PR. 75' STREAM BUFFER
[Symbol]	PR. 100 YR FLOODPLAIN
[Symbol]	PR. FENCE
[Symbol]	PR. LOG J-HOOK W/ ROOTWAD
[Symbol]	PR. CONSTRUCTED BOULDER RIFFLE
[Symbol]	PR. LOG SILL
[Symbol]	PR. WOOD TOE
[Symbol]	PR. ROCK SILL
[Symbol]	PR. NATURALLY AUGMENTED
[Symbol]	CONSTRUCTED RIFFLE
[Symbol]	PR. STREAM CROSSING
[Symbol]	FOR LIVESTOCK



ores

5867 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4844 | WWW.RES.US

5 | SMOOTH STONES
RESTORATION PLLC

764 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.218.0364 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED CONDITIONS
(6 OF 6)

WOODBINE, HOWARD COUNTY, MD

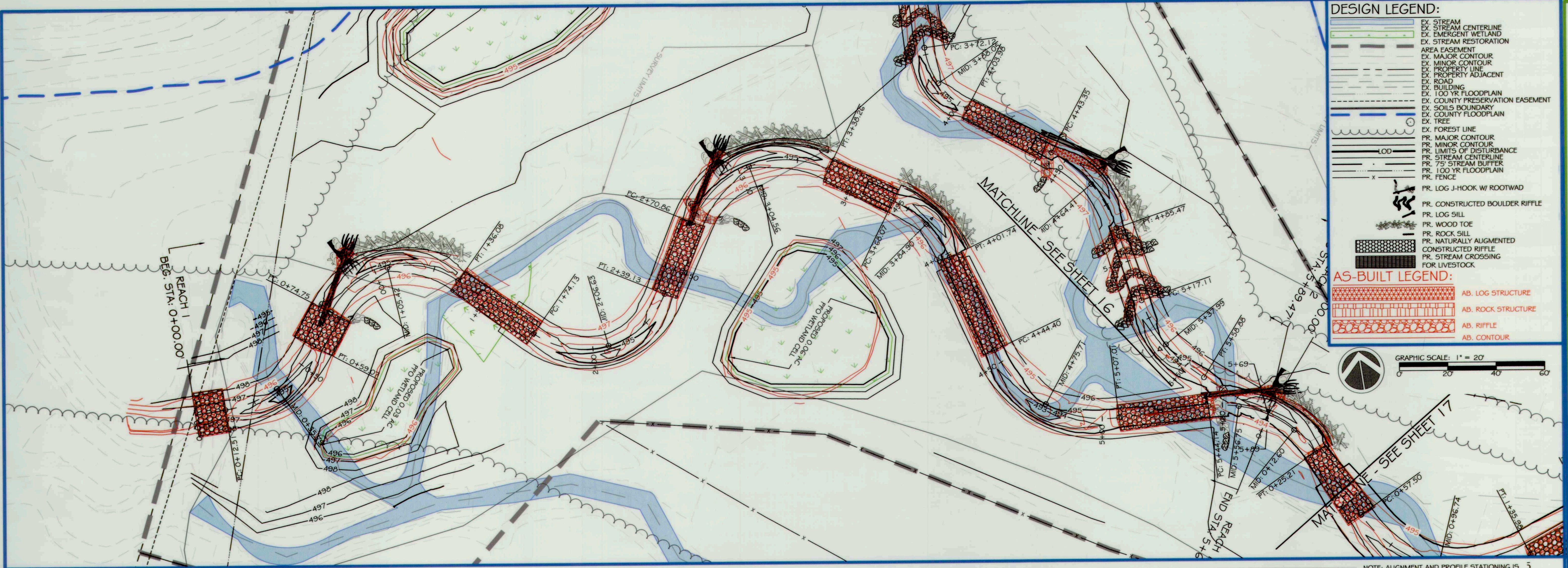
REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Michael J. ... 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MGCPDC
JOB NUMBER:	6172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	14 OF 49

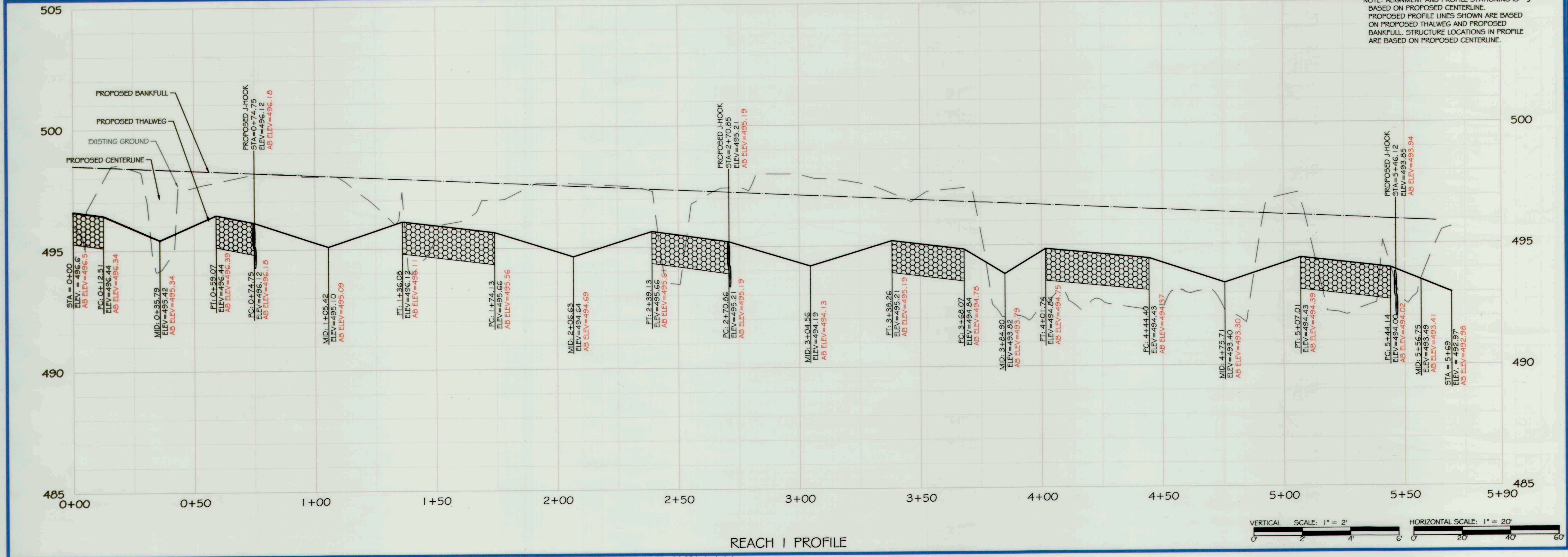
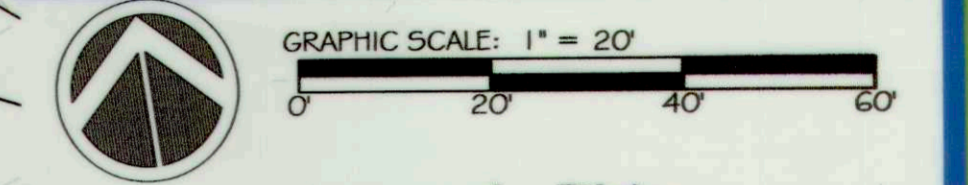


DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. STREAM RESTORATION
- EX. EMERGENT WETLAND
- EX. AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. CONTOUR



ores
5 | SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
MARTINSBURG, WV 26151
P. 703.393.4644 | WWW.RES.US

754 MOUNT MAHOGANY, LIVERMORE, CO 80536
P. 303.666.4100
WWW.PHYSISC.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

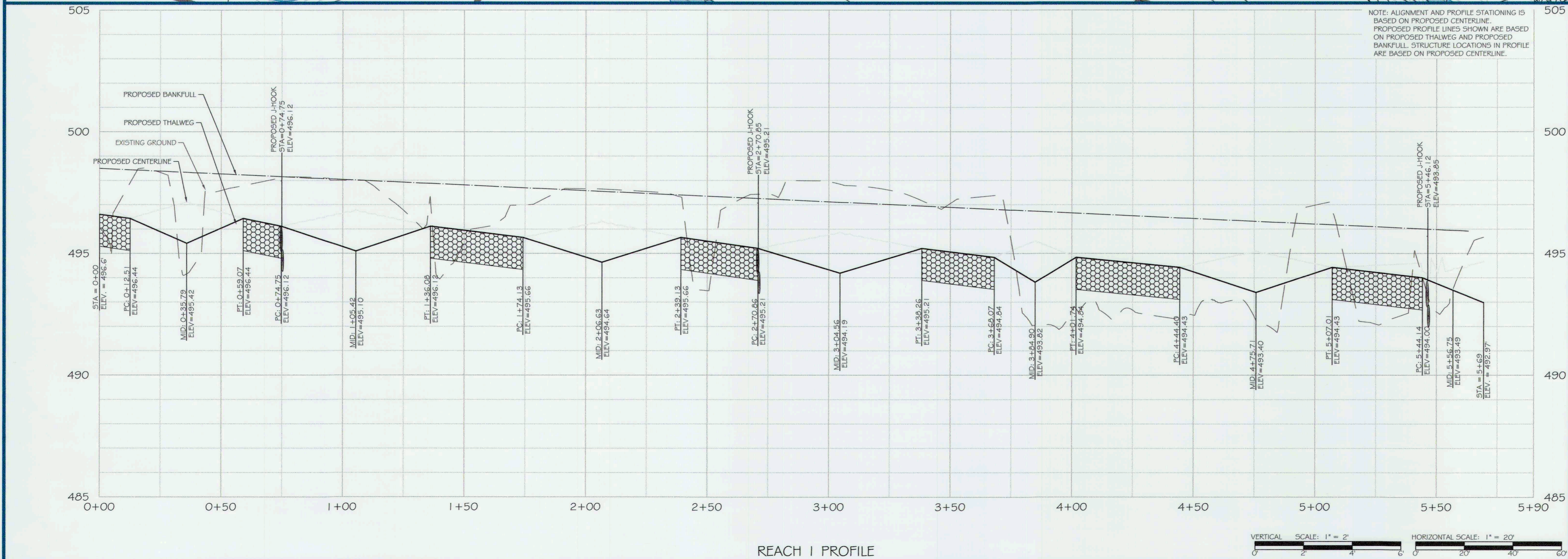
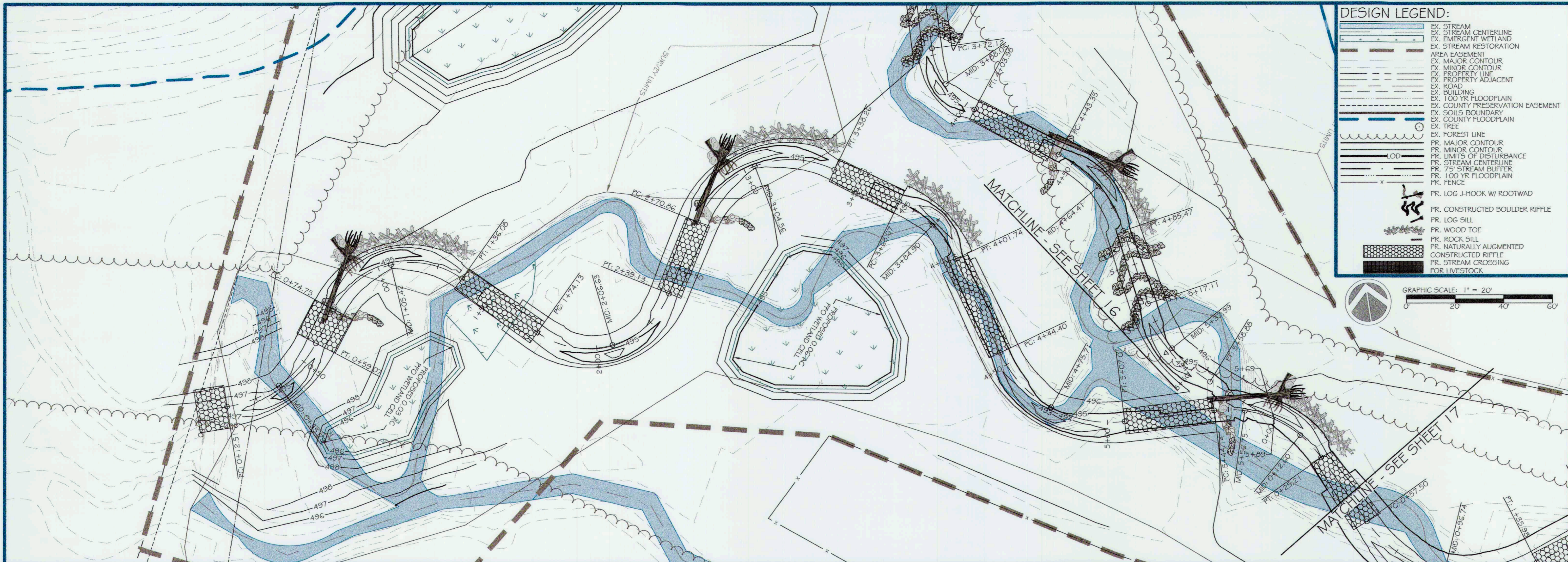
AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

NAME: *Daniel W. [Signature]* DATE: 12/19/18

ENGINEER'S SEAL:

APPROVED - DEPT. OF PUBLIC WORKS
[Signature] 5/1/18
DATE: 5/1/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2018
SHEET NO: **AB15 OF 49**



ores
SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WINDY HOLLOW, HOWARD COUNTY, MD
P. 703.393.4644 | WWW.ORES.US

754 MOUNT MAHOOGANY
WINDY HOLLOW, HOWARD COUNTY, MD
P. 919.218.0864 | WWW.FITESTR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
S. J. H. S. 5/21/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MG/CP/DC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 15 OF 49



DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
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- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR

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5 | SMOOTH STONES RESTORATION PLLC

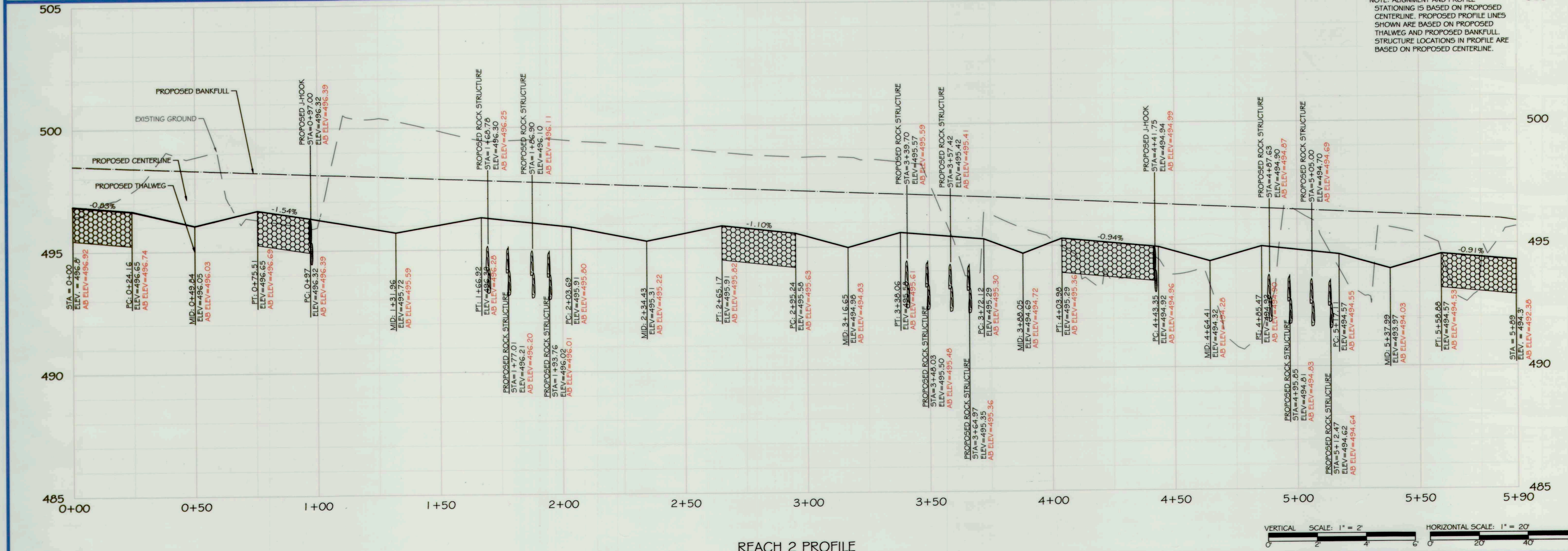
5367 TELEPHONE ROAD
WARRICK, IN 46786
P: 703.393.4644 | WWW.ORES.US

754 MOUNT MAHOGANY, LIVERMORE, CO 80536
919.396.6666
WWW.FRESH55.COM

CAPITAL PROJECT #: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD



REVISIONS:

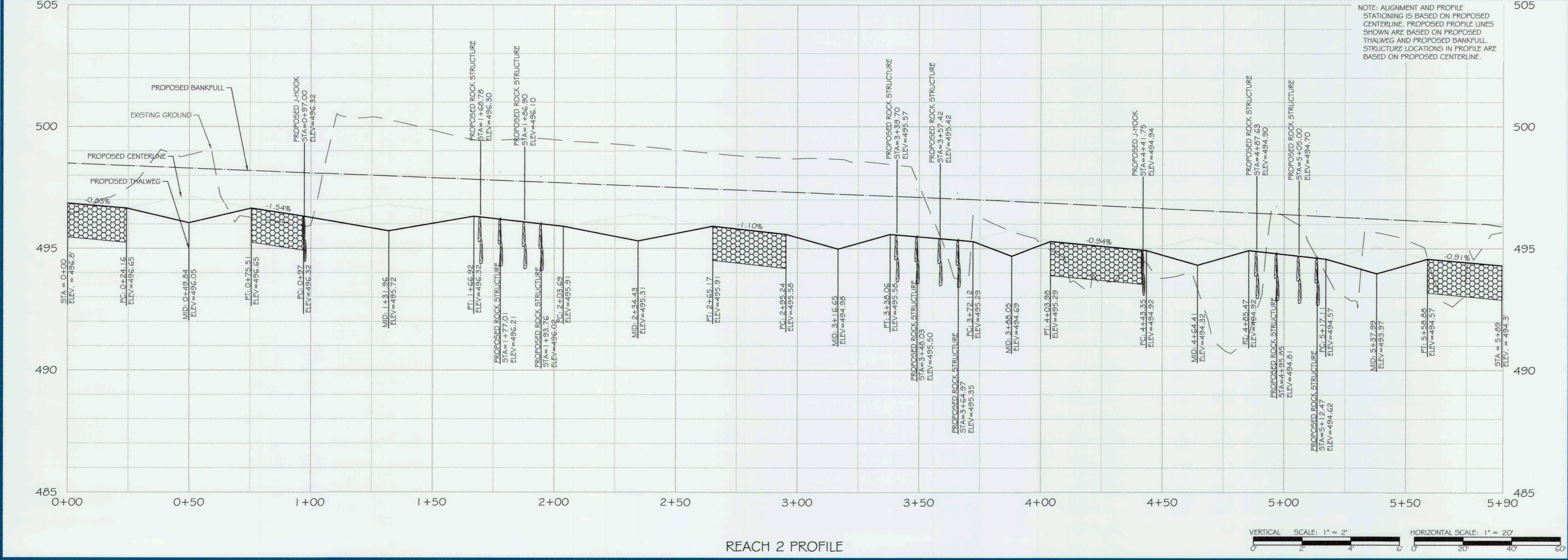
AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

DATE: 2/19/18



APPROVED: DEPT. OF PUBLIC WORKS
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2016
SHEET NO: AB16 OF 49



CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

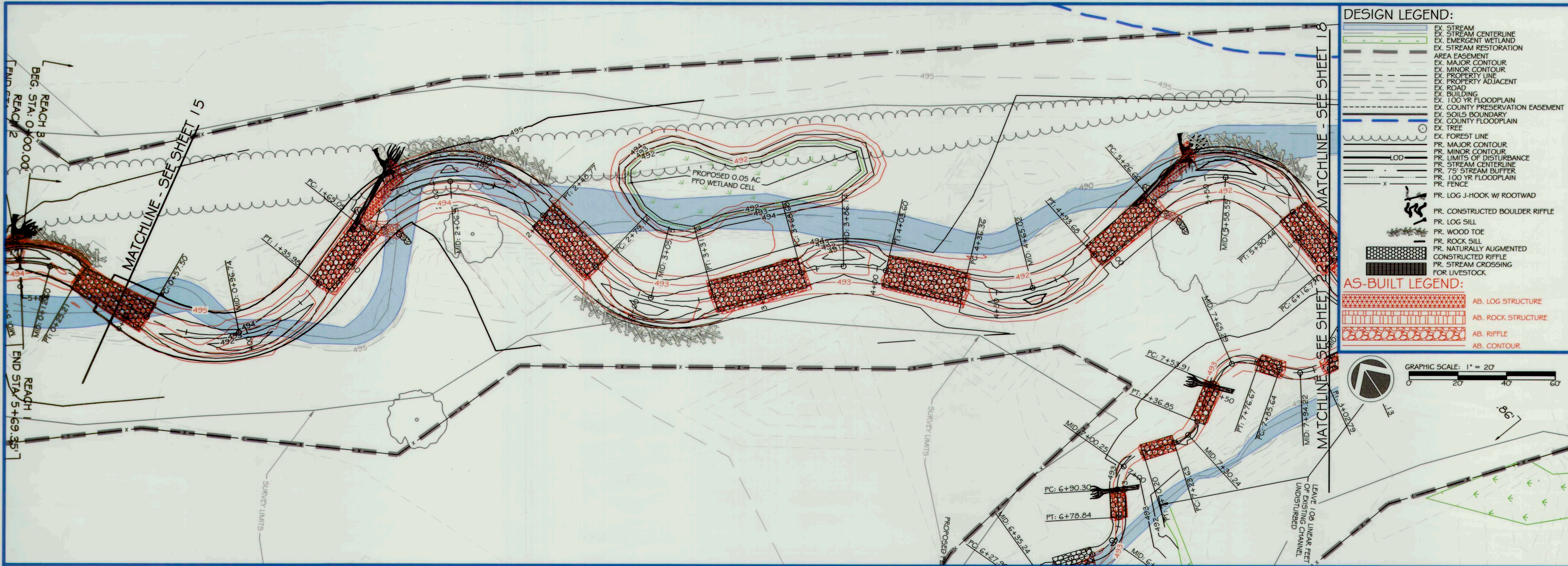
WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 16 OF 49

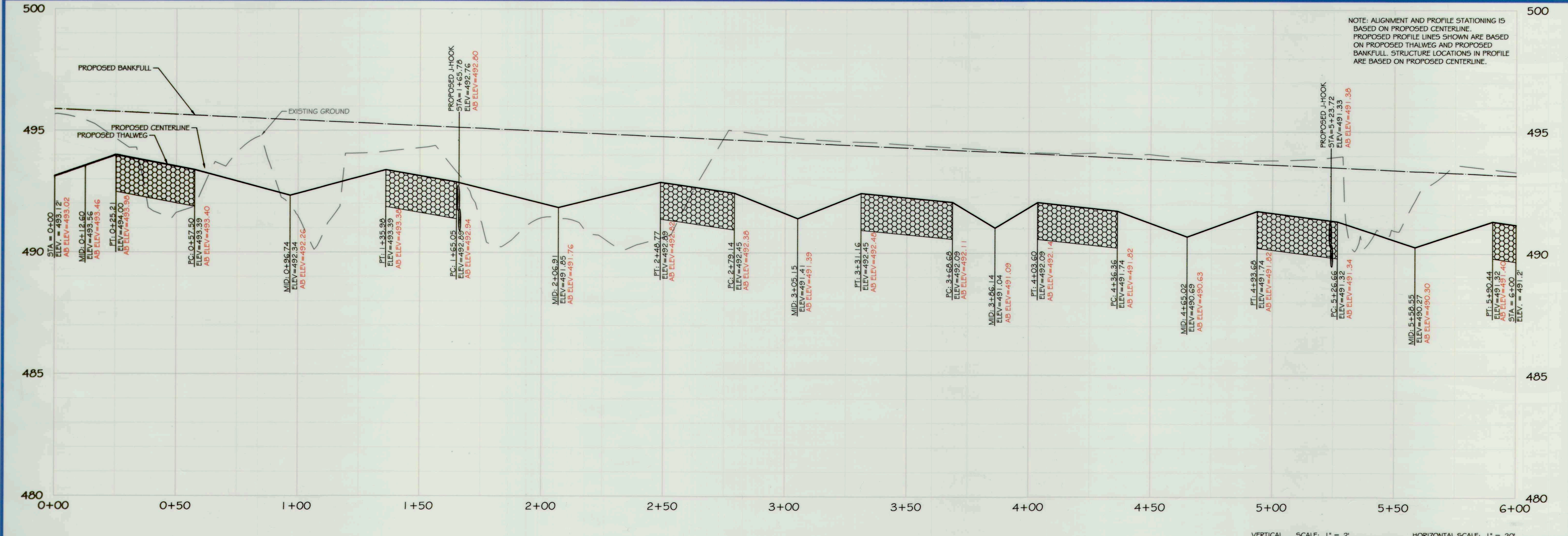
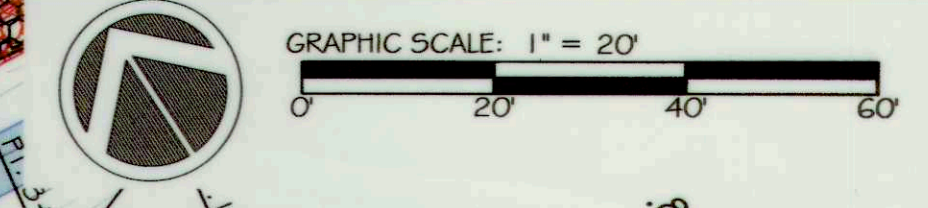


DESIGN LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- EX. AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR. FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR. FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR



NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.

ores
 5367 TELEPHONE ROAD
 WARRENTON, VIRGINIA, 20187
 P. 703.393.4644 | WWW.RES.US

5 | SMOOTH STONES RESTORATION PLLC
 754 MOUNT MAHOYAN, LIVERMORE, CO 80536
 P. 919.218.0564
 WWW.FIVE55K.COM

CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
 X

AS-BUILT CERTIFICATION:
 I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

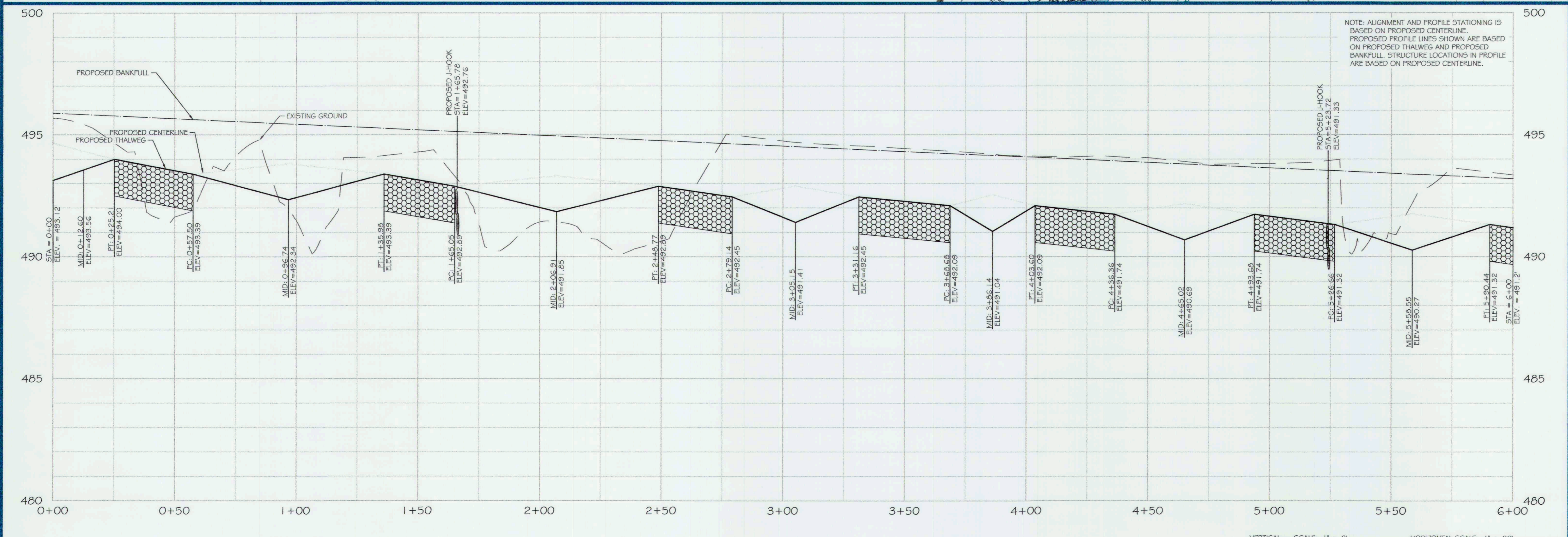
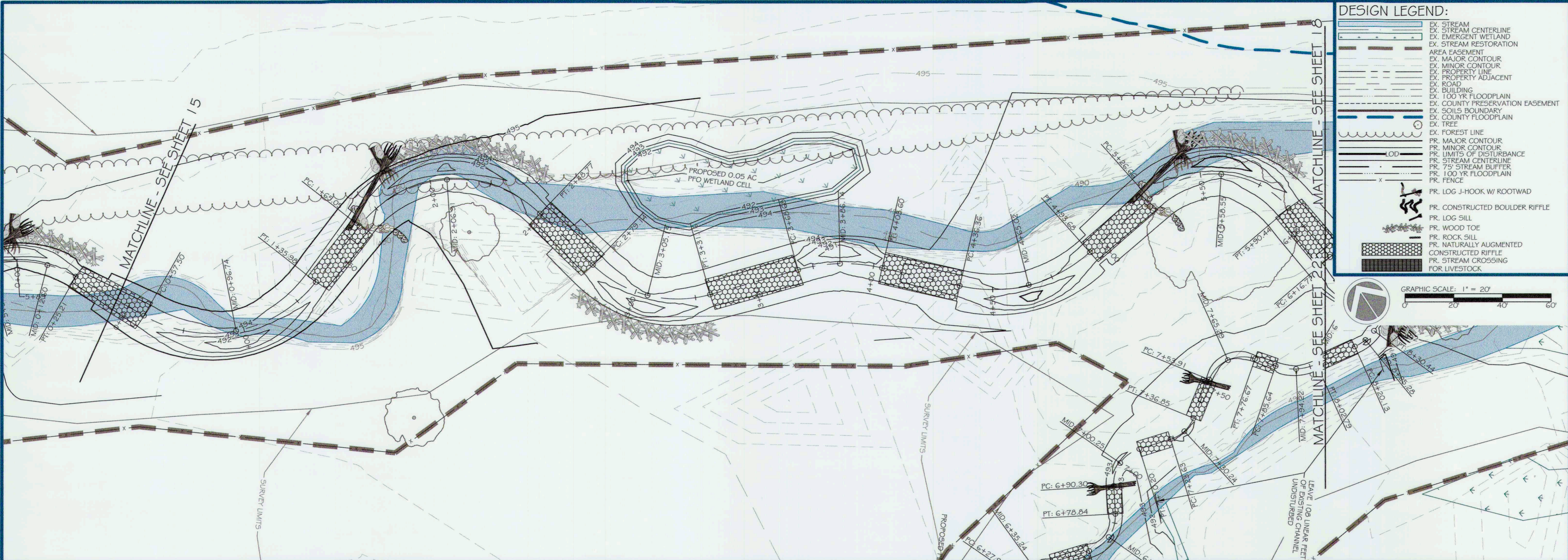
Daniel Aug 12/19/18
 NAME DATE

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE 12/19/18

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: DC
 JOB NUMBER: 6172
 DESIGN TYPE: STREAM RESTORATION
 DATE: 7/2/2018
 SHEET NO: AB17 OF 49



ores

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4644 | WWW.FRES.US

SMOOTH STONES RESTORATION PLLC

754 MOUNT MAHOGANY
LIVERTON, CO 80536
P: 919.216.0864 | WWW.FIVE5R.COM

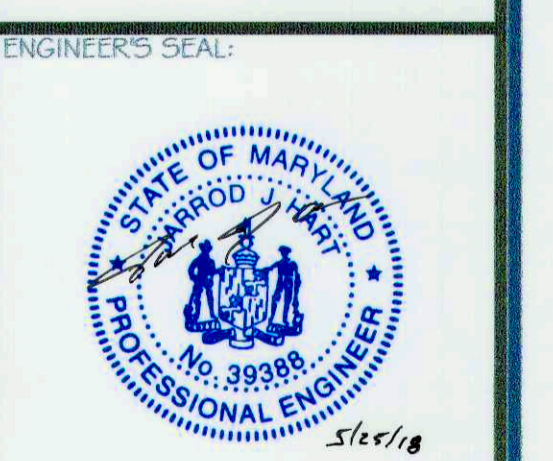
CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

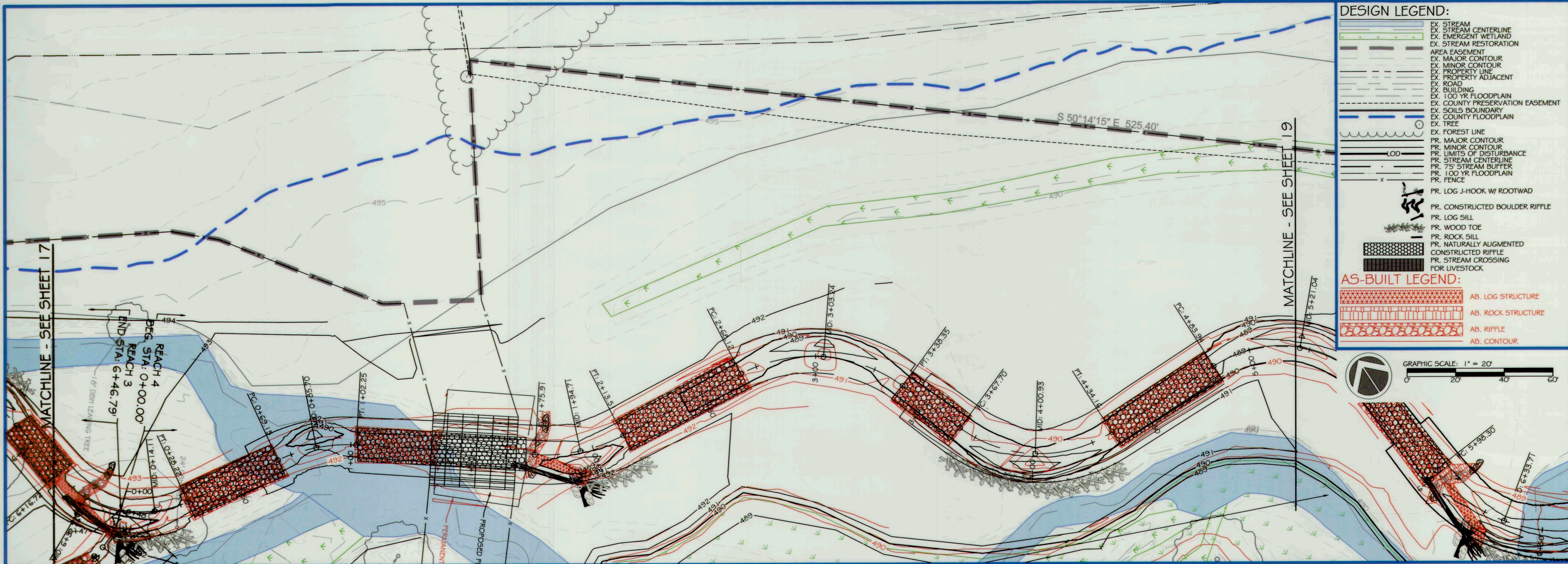
ENGINEER'S SEAL:



APPROVED: DEPT. OF PUBLIC WORKS

[Signature] 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 1/21/2017
SHEET NO: 17 OF 49



DESIGN LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR

ores

5 | SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P. 703.393.4644 | WWW.RES.US

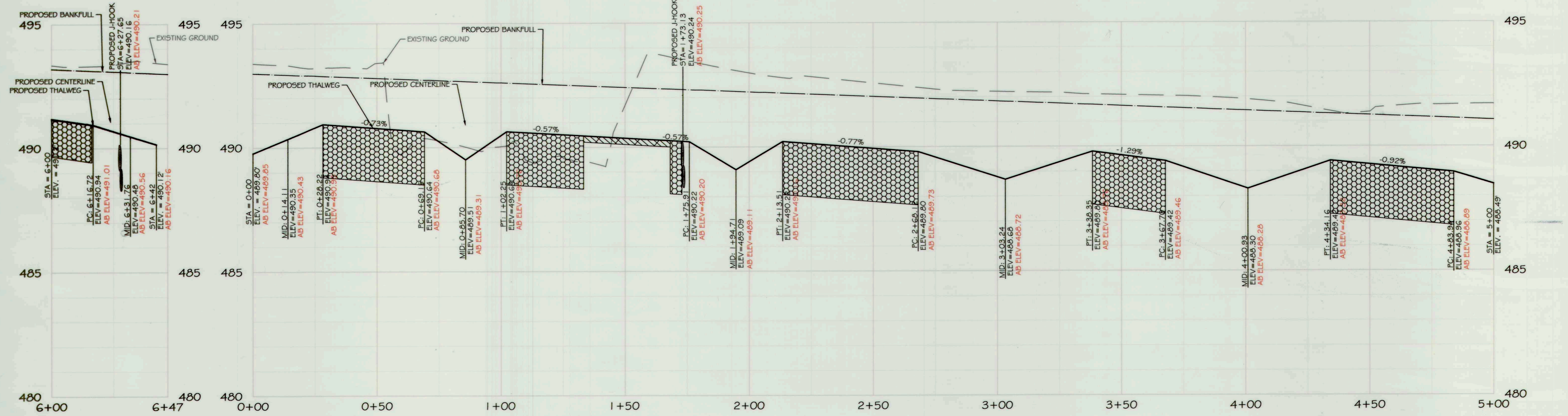
754 MOUNT MAHOGANY, LIVERMORE, CO 80536
P. 970.216.0664
WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.



REVISIONS:

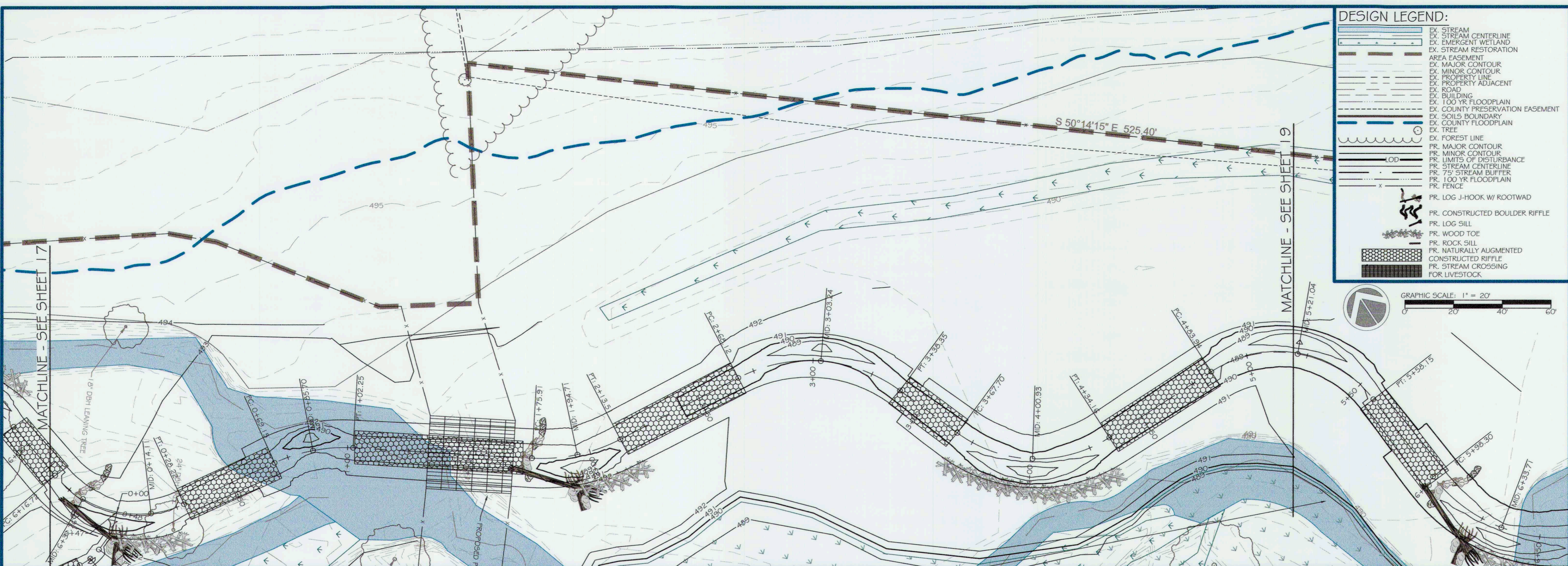
AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS 'AS-BUILT' PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Daniel W. [Signature] 12/19/18
NAME: [Signature] DATE: 12/19/18

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DATE: 7/20/18
SHEET NO: AB18 OF 49



ores
5 | SMOOTH STONES
RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4044 | WWW.RES.US

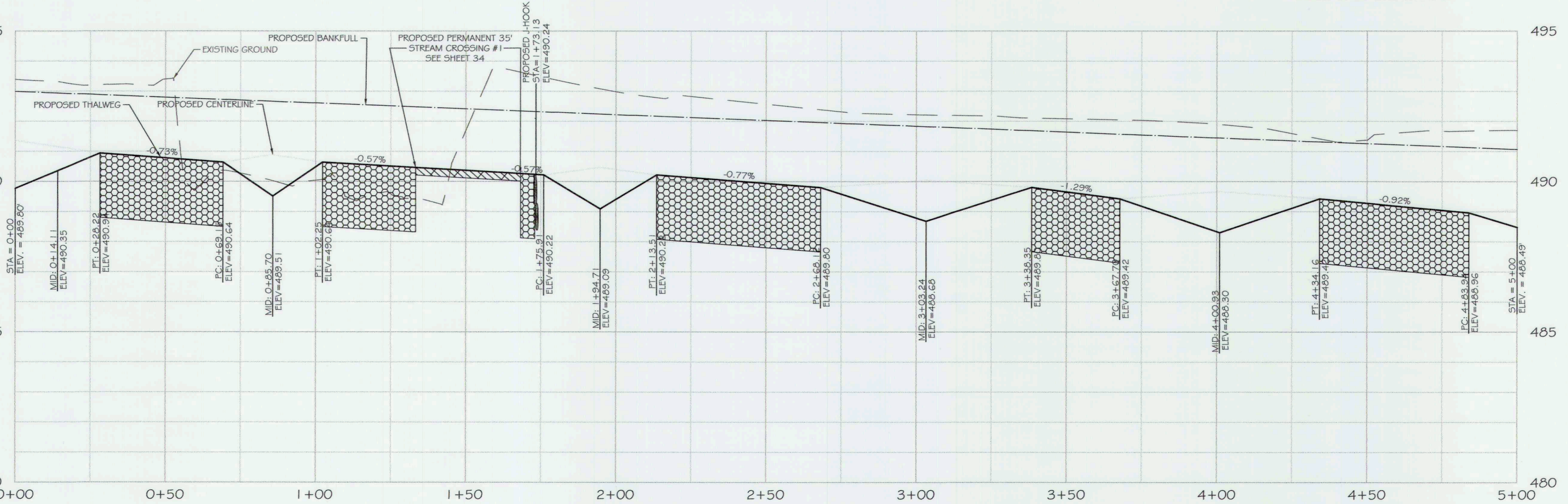
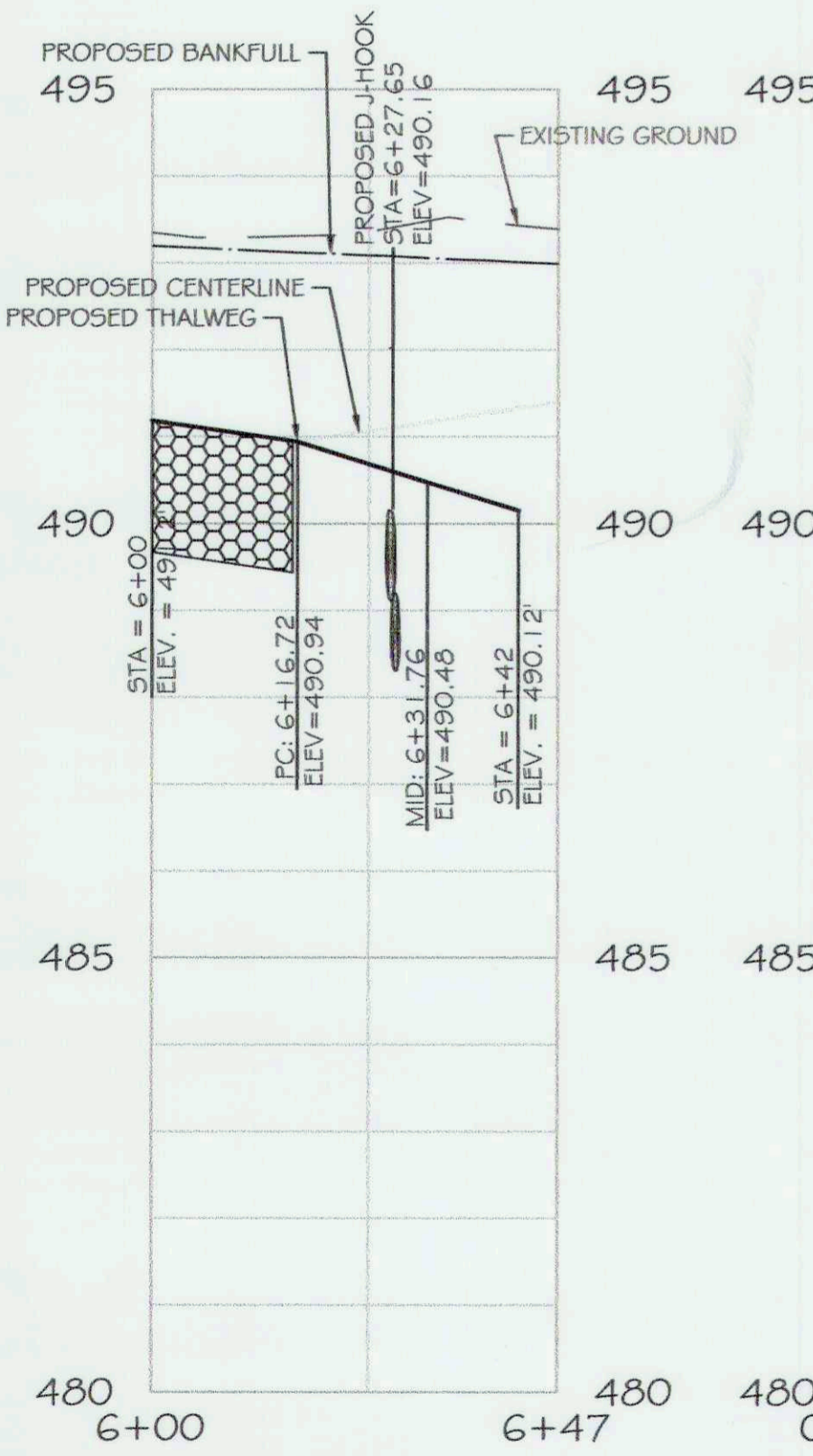
754 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.216.0864 | WWW.FIVE59K.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

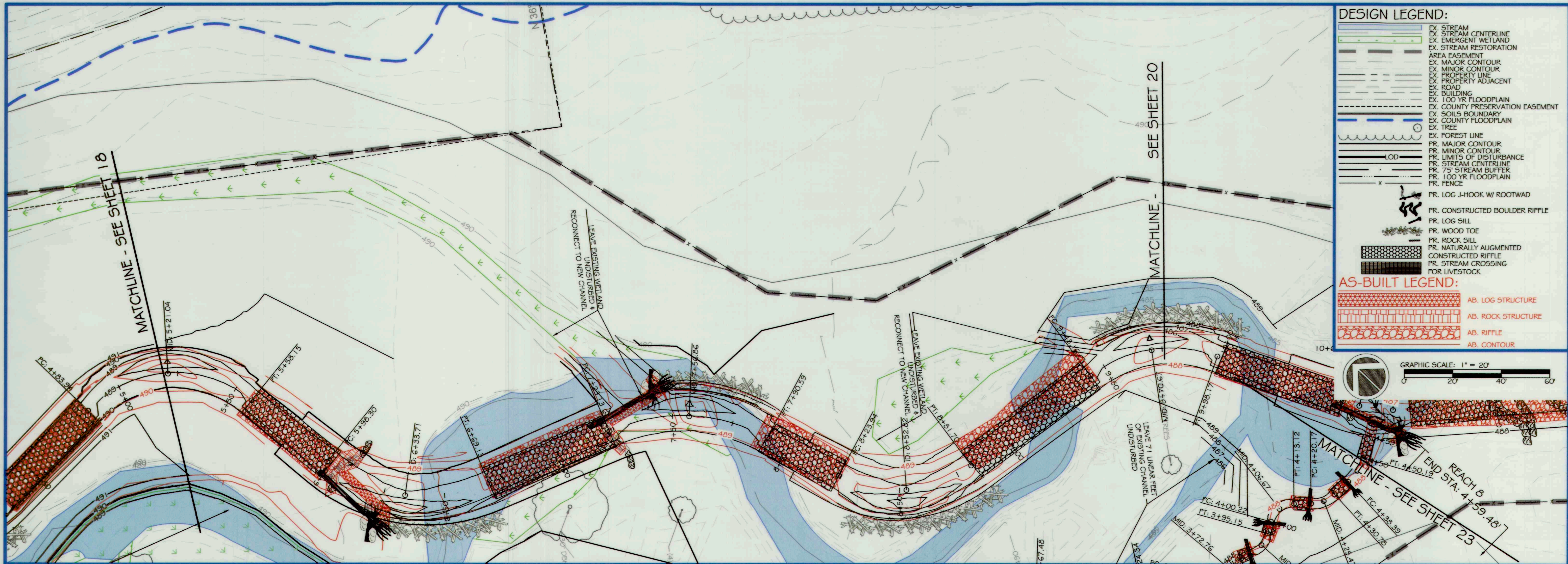
NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.



REVISIONS:



APPROVED: DEPT. OF PUBLIC WORKS
Michael... 5/21/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
 PROJECT MANAGER: RC
 DESIGNER: DBMG
 DRAWN: MG/CPDC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 18 OF 49

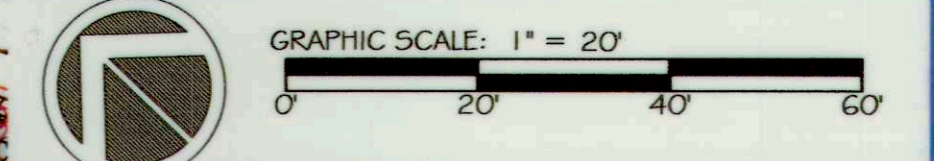


DESIGN LEGEND:

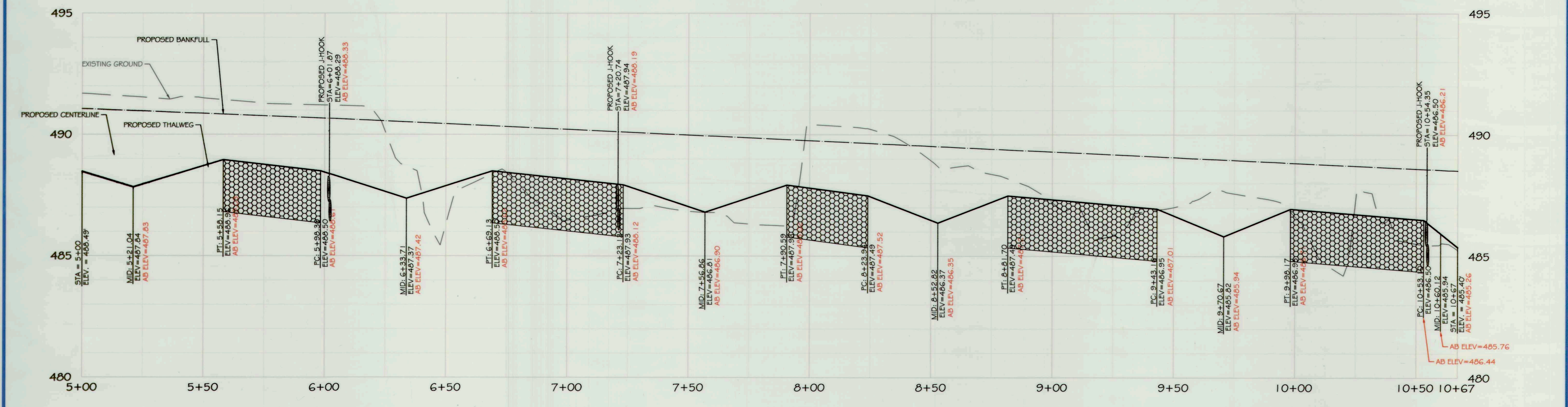
- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- EX. AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

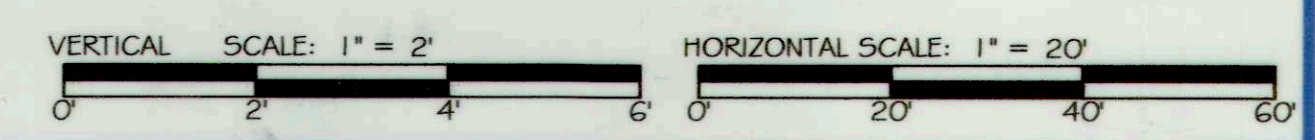
- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR



NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.



REACH 4 PROFILE (2 OF 2)



ores
SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, OREGON 97146
P. 503.862.2018
WWW.FIVE55K.COM

754 MOUNT MAHOGANY LIVERMORE, CO 80536
P. 970.218.0264
WWW.FIVE55K.COM

CAPITAL PROJECT#: D-11158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Daniel W. [Signature] 12/19/18
NAME: DATE

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
[Signature] 5/1/18
DATE

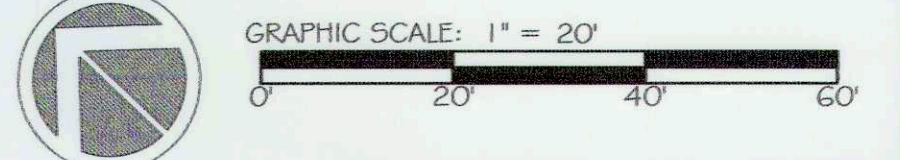
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: DC
JOB NUMBER: 6172
DESIGN TYPE: STREAM RESTORATION
DATE: 7/2/2018
SHEET NO: AB19 OF 49

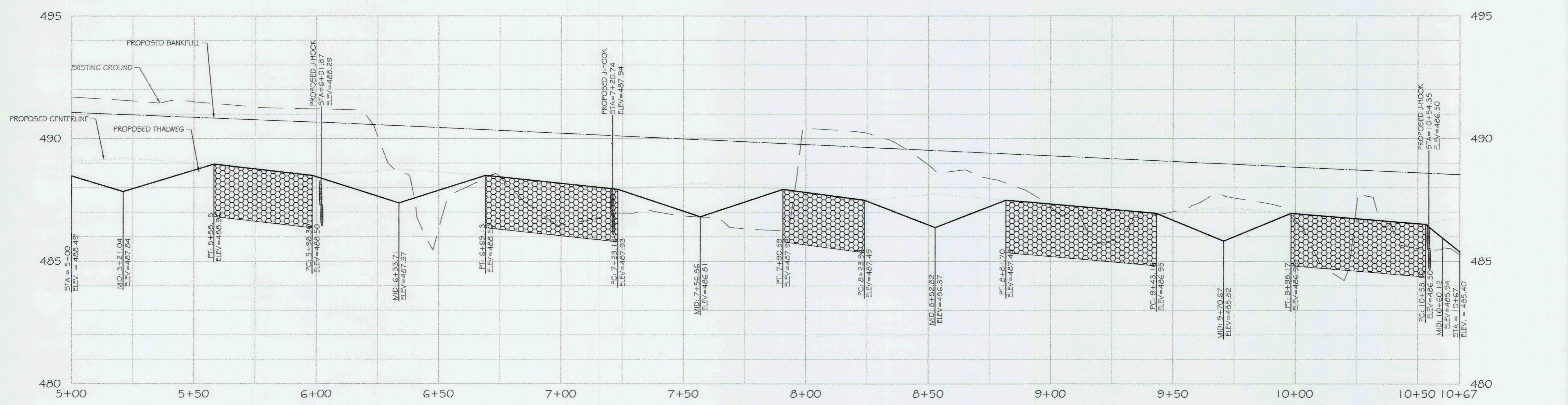


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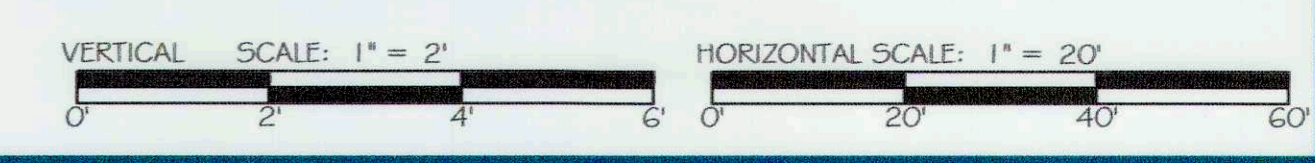
EX. STREAM CENTERLINE	PR. LOG J-HOOK W/ ROOTWAD
EX. STREAM RESTORATION	PR. CONSTRUCTED BOULDER RIFFLE
EX. EMERGENT WETLAND	PR. LOG SILL
EX. STREAM RESTORATION	PR. WOOD TOE
EX. MAJOR CONTOUR	PR. ROCK SILL
EX. MINOR CONTOUR	PR. NATURALLY AUGMENTED
EX. PROPERTY LINE	CONSTRUCTED RIFFLE
EX. PROPERTY ADJACENT	PR. STREAM CROSSING FOR LIVESTOCK
EX. ROAD	
EX. BUILDING	
EX. 100 YR FLOODPLAIN	
EX. COUNTY PRESERVATION EASEMENT	
EX. SOILS BOUNDARY	
EX. COUNTY FLOODPLAIN	
EX. TREE	
EX. FOREST LINE	
PR. MAJOR CONTOUR	
PR. MINOR CONTOUR	
PR. LIMITS OF DISTURBANCE	
PR. STREAM CENTERLINE	
PR. 75' STREAM BUFFER	
PR. 100 YR FLOODPLAIN	
PR. FENCE	



NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.



REACH 4 PROFILE (2 OF 2)



res
5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20167
P: 703.393.4644 | WWW.RES.US

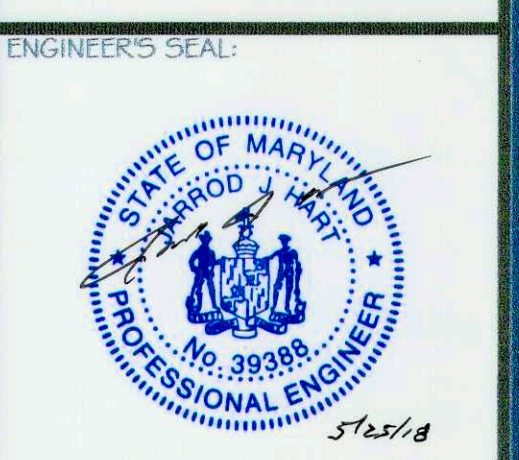
5 SMOOTH STONES RESTORATION PLLC
754 MOUNT MAHOCCANY
LIVERMORE, CO 80536
P: 919.215.0864 | WWW.FIVE5R.COM

CAPITAL PROJECT #: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

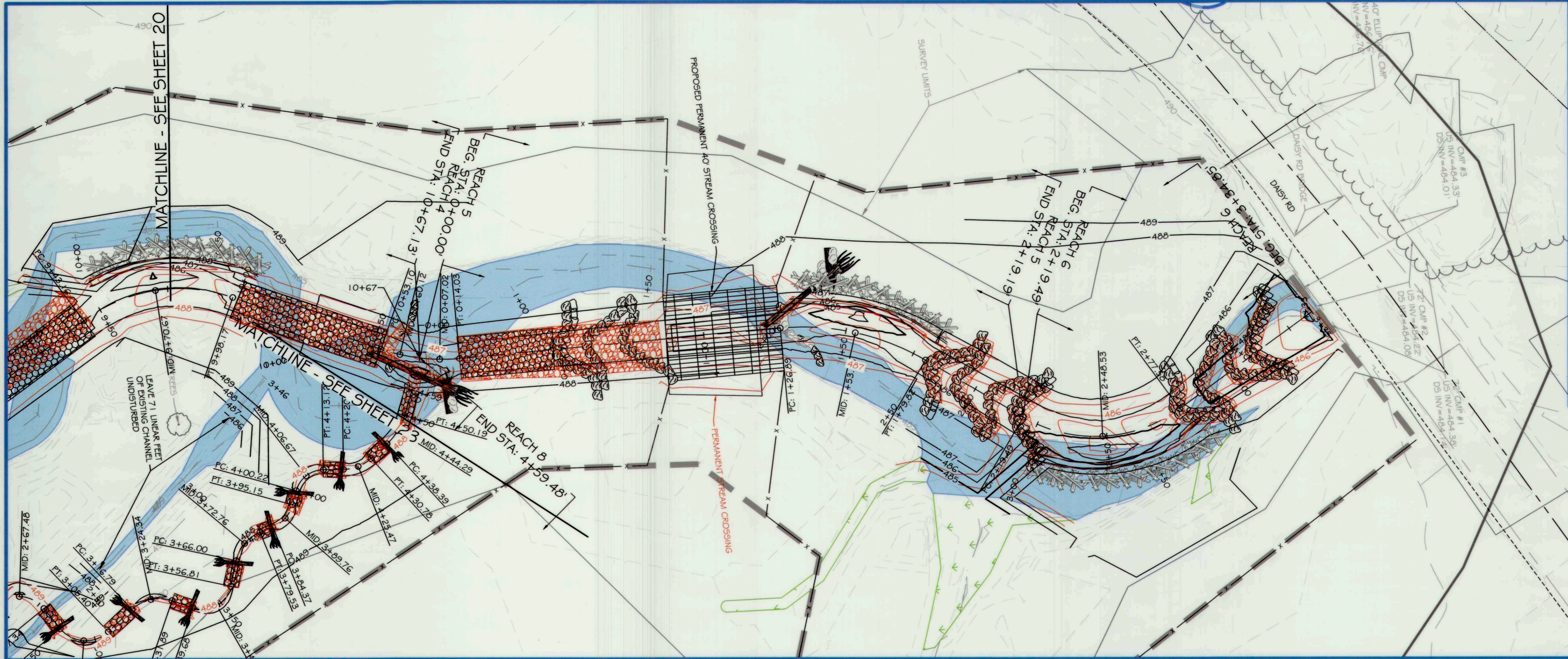
PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:



APPROVED: DEPT. OF PUBLIC WORKS
Michael... 5/21/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
 PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MG/CP/DC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 19 OF 49



DESIGN LEGEND:

- EX. STREAM
- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING
- FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR

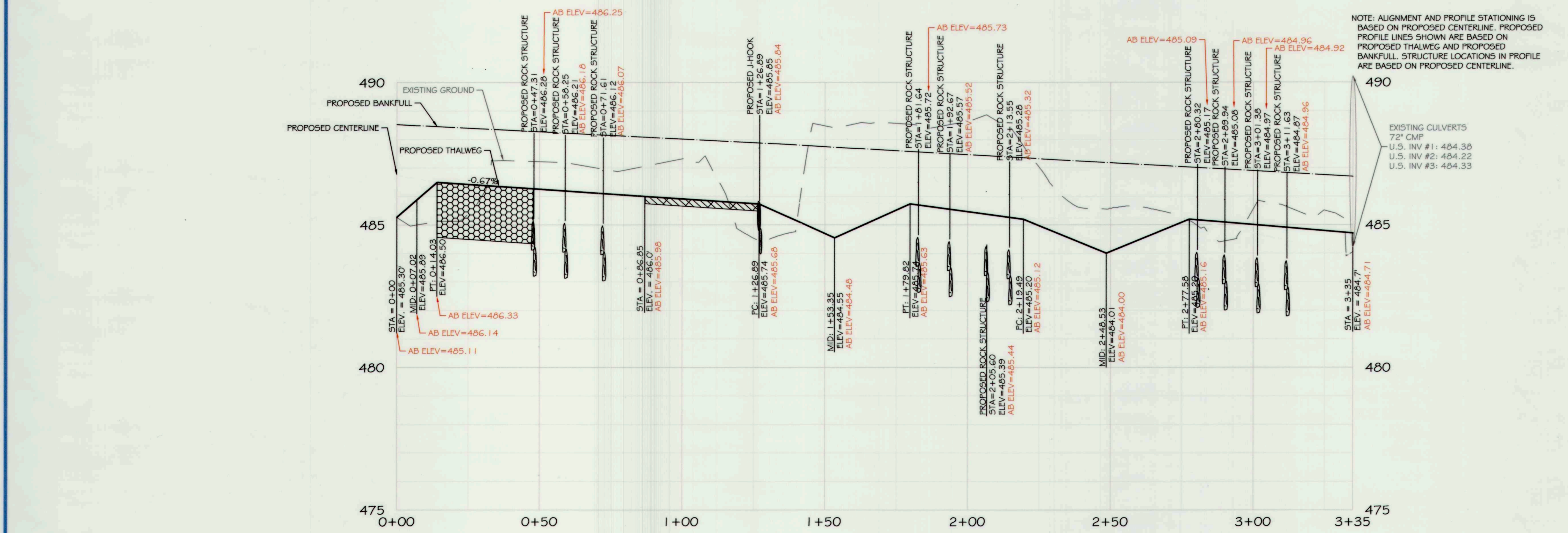
GRAPHIC SCALE: 1" = 20'

dres

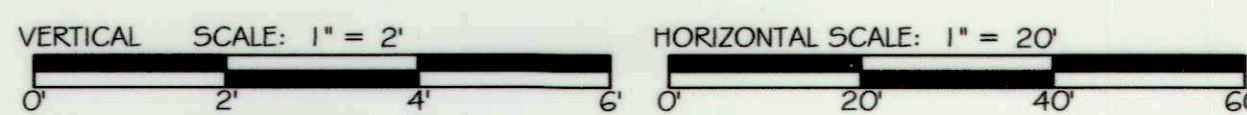
5 | SMOOTH STONES RESTORATION LLC

754 MOUNT MAHOGANY, LIVERMORE, CO 80536
 F: 919.218.0564
 WWW.FIVEDSR.COM

6327 TELEPHONE ROAD
 WASHINGTON, VIRGINIA, 20187
 P: 703.393.4844 | WWW.RE5.US



REACH 5-6 PROFILE



CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

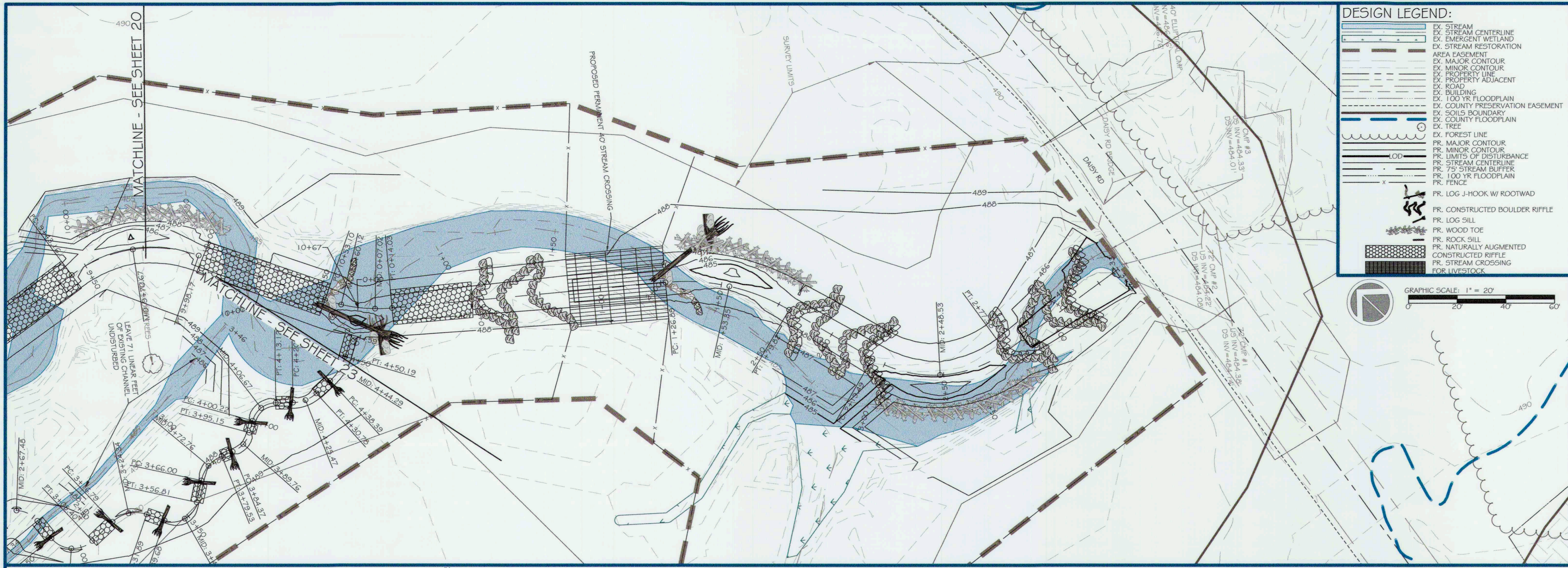
AS-BUILT CERTIFICATION:
 I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS AS-BUILT PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Dustin Cox 12/19/18
 NAME DATE



APPROVED: DEPT. OF PUBLIC WORKS
Michael... 5/31/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: DC
 JOB NUMBER: 6172
 DESIGN TYPE: STREAM RESTORATION
 DATE: 7/2/2018
 SHEET NO: AB20 OF 49



res
5 | SMOOTH STONES RESTORATION FILE

5307 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4544 | WWW.RES.US

754 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.218.0564 | WWW.FIVE59R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

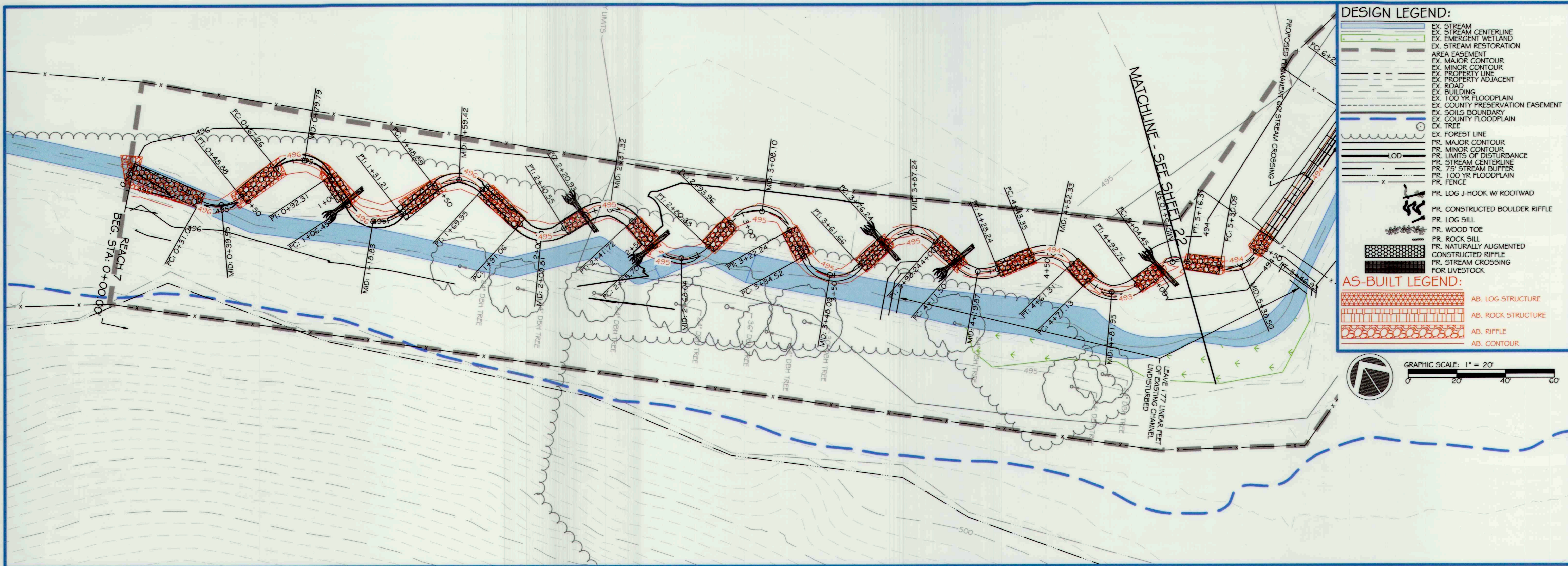
REVISIONS:

ENGINEER'S SEAL:

STATE OF MARYLAND
PROFESSIONAL ENGINEER
No. 39388
5/21/18

APPROVED: DEPT. OF PUBLIC WORKS
Chief, Bureau of Environmental Services
5/21/18

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGC/PDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 20 OF 49



DESIGN LEGEND:

- EX STREAM CENTERLINE
- EX EMERGENT WETLAND
- EX STREAM RESTORATION
- AREA EASEMENT
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- EX PROPERTY LINE
- EX ROAD
- EX BUILDING
- EX 100 YR FLOODPLAIN
- EX COUNTY PRESERVATION EASEMENT
- EX SOILS BOUNDARY
- EX COUNTY FLOODPLAIN
- EX TREE
- EX FOREST LINE
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR LIMITS OF DISTURBANCE
- PR STREAM CENTERLINE
- PR 75' STREAM BUFFER
- PR 100 YR FLOODPLAIN
- PR FENCE
- PR LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR LOG SILL
- PR WOOD TOE
- PR ROCK SILL
- PR NATURALLY AUGMENTED CONSTRUCTED RIFFLE
- PR STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB LOG STRUCTURE
- AB ROCK STRUCTURE
- AB RIFFLE
- AB CONTOUR

GRAPHIC SCALE: 1" = 20'

dres

5 | SMOOTH STONES RESTORATION PLLC

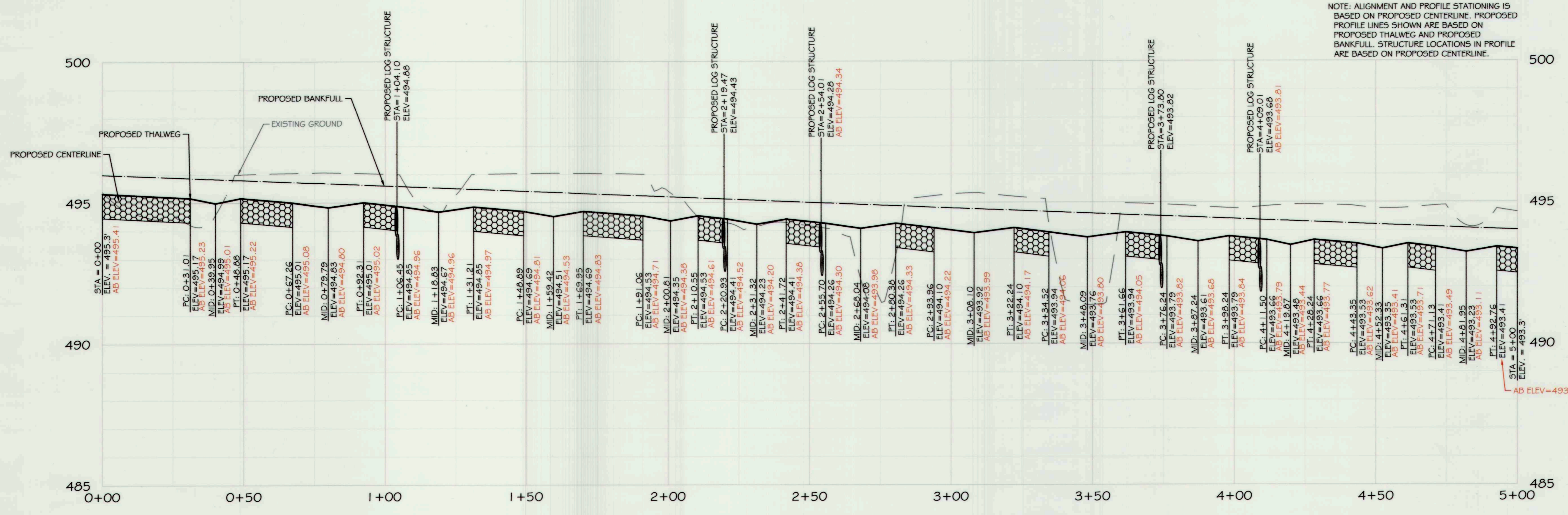
754 MOUNT MAHOAGAN, LIVERMORE, CO 80536
P: 919.218.0664
WWW.FIVE59R.COM

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.353.4644
WWW.RE5.US

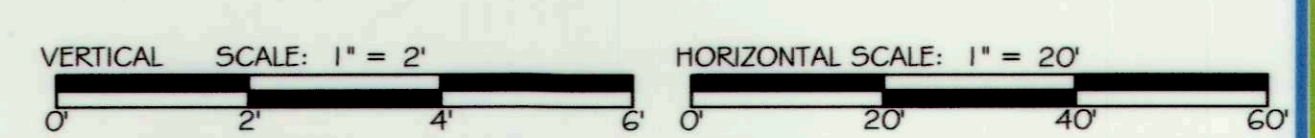
CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD



REACH 7 PROFILE (1 OF 2)



REVISIONS:

AS-BUILT CERTIFICATION:
I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS "AS-BUILT" PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

Biology 12/19/18
NAME DATE

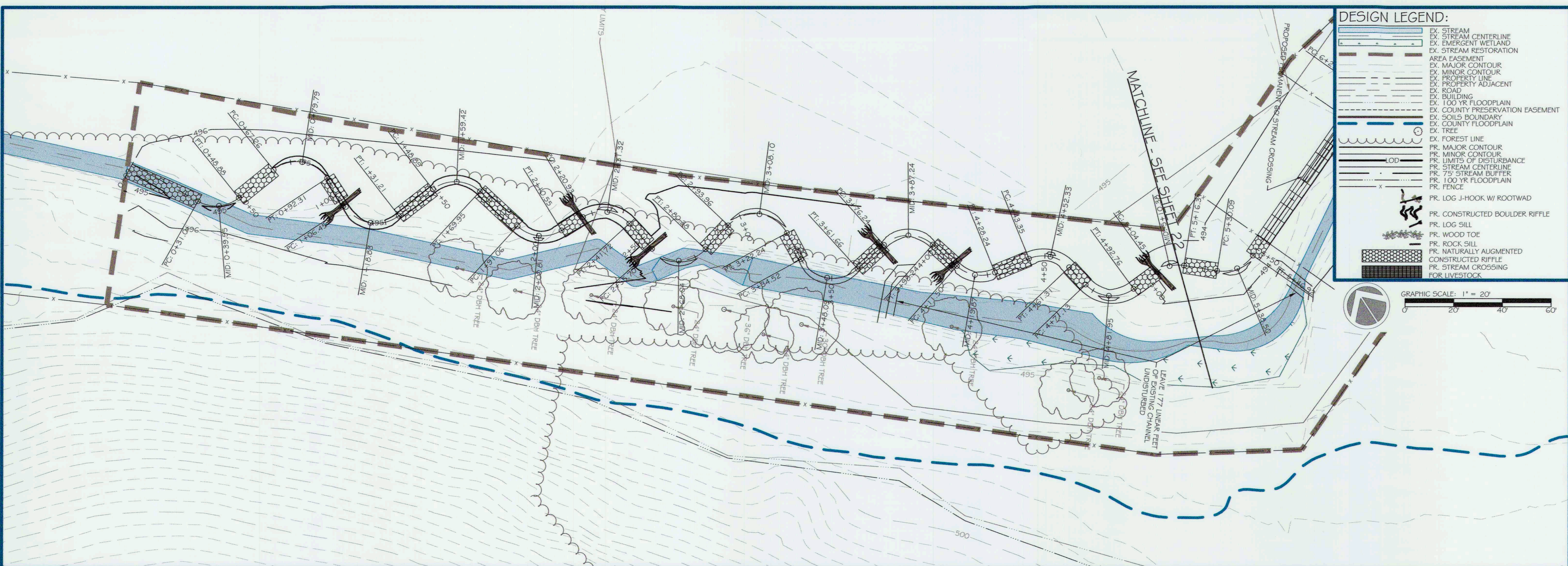
ENGINEER'S SEAL:

Daniel M. ... 12/19/18

APPROVED: DEPT. OF PUBLIC WORKS

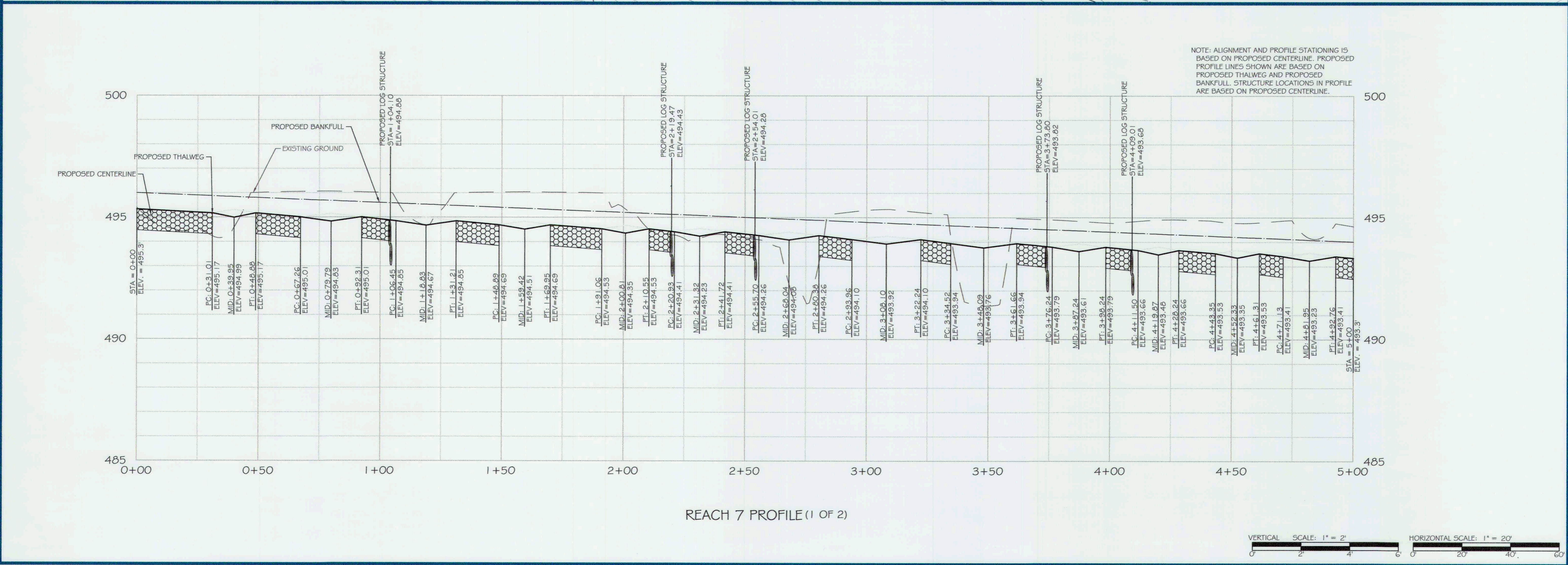
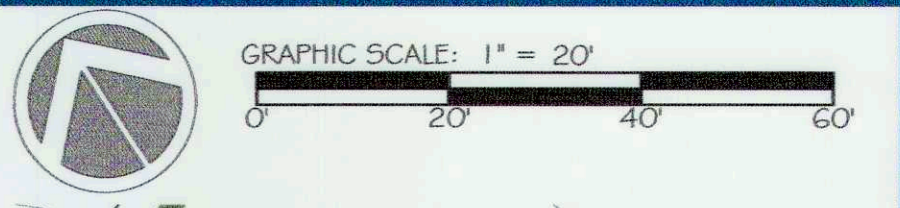
Michael ... 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	DC
JOB NUMBER:	6172
DESIGN TYPE:	STREAM RESTORATION
DATE:	7/2/2018
SHEET NO.:	AB21 OF 49



DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. STREAM RESTORATION
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. PROPERTY ADJACENT
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK



res
SMOOTH STONES RESTORATION PLLC

5567 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4044 | WWW.RES.US

754 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.216.0664 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

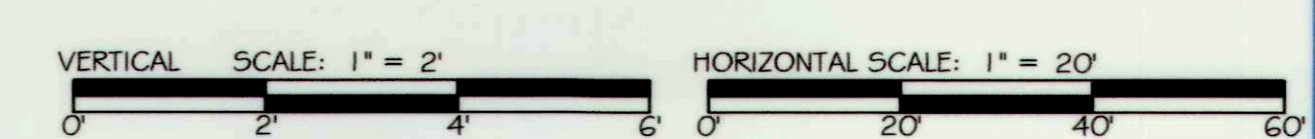
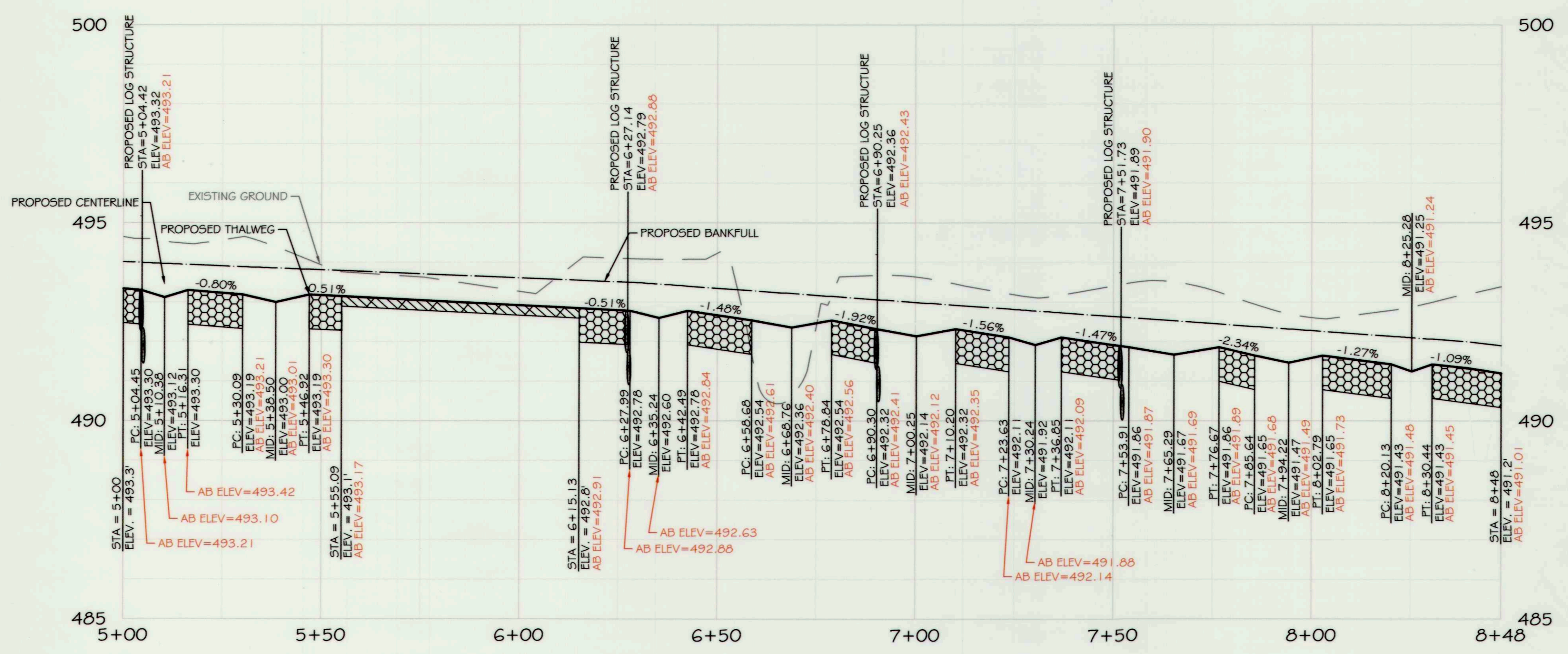
ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
5/21/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNER: DBMG
DRAWN: MG/CP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 21 OF 49



NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.



ores

SMOOTH STONES RESTORATION PLLC

5

CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

AS-BUILT CERTIFICATION:
 I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS AS-BUILT PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

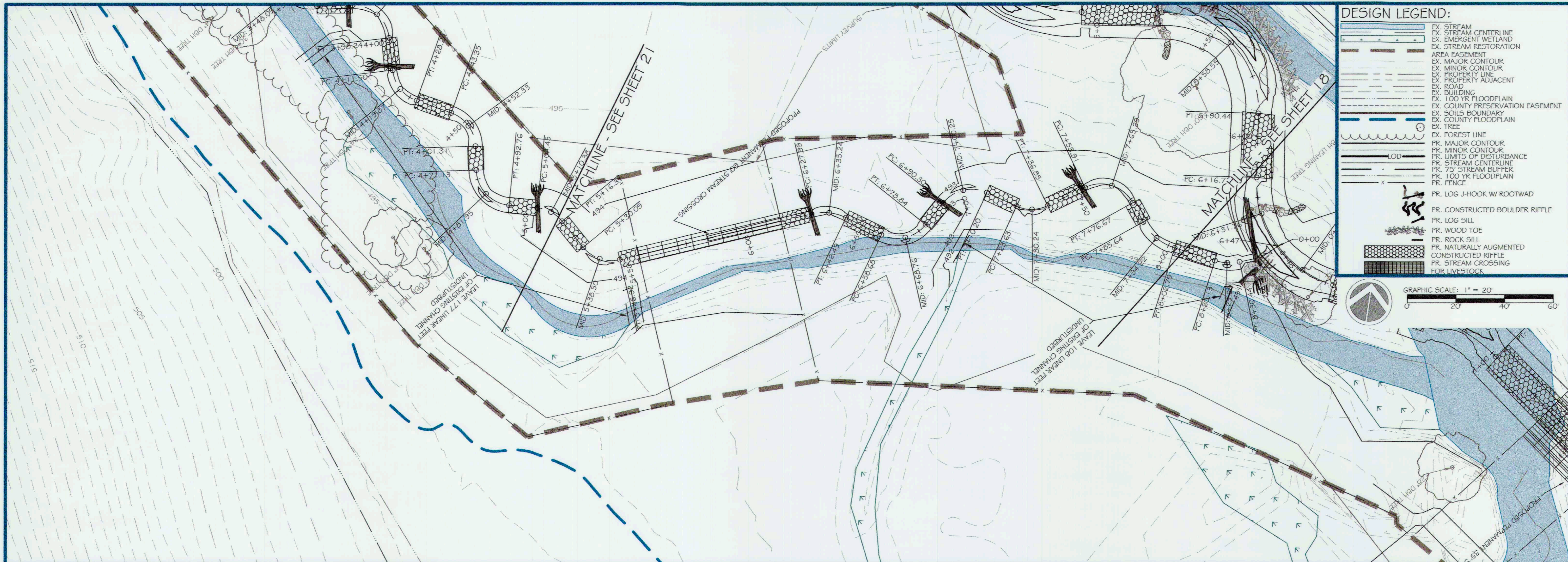
NAME: [Signature] DATE: 12/19/18

ENGINEER'S SEAL:

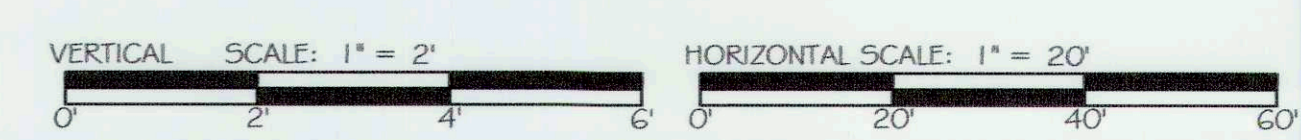
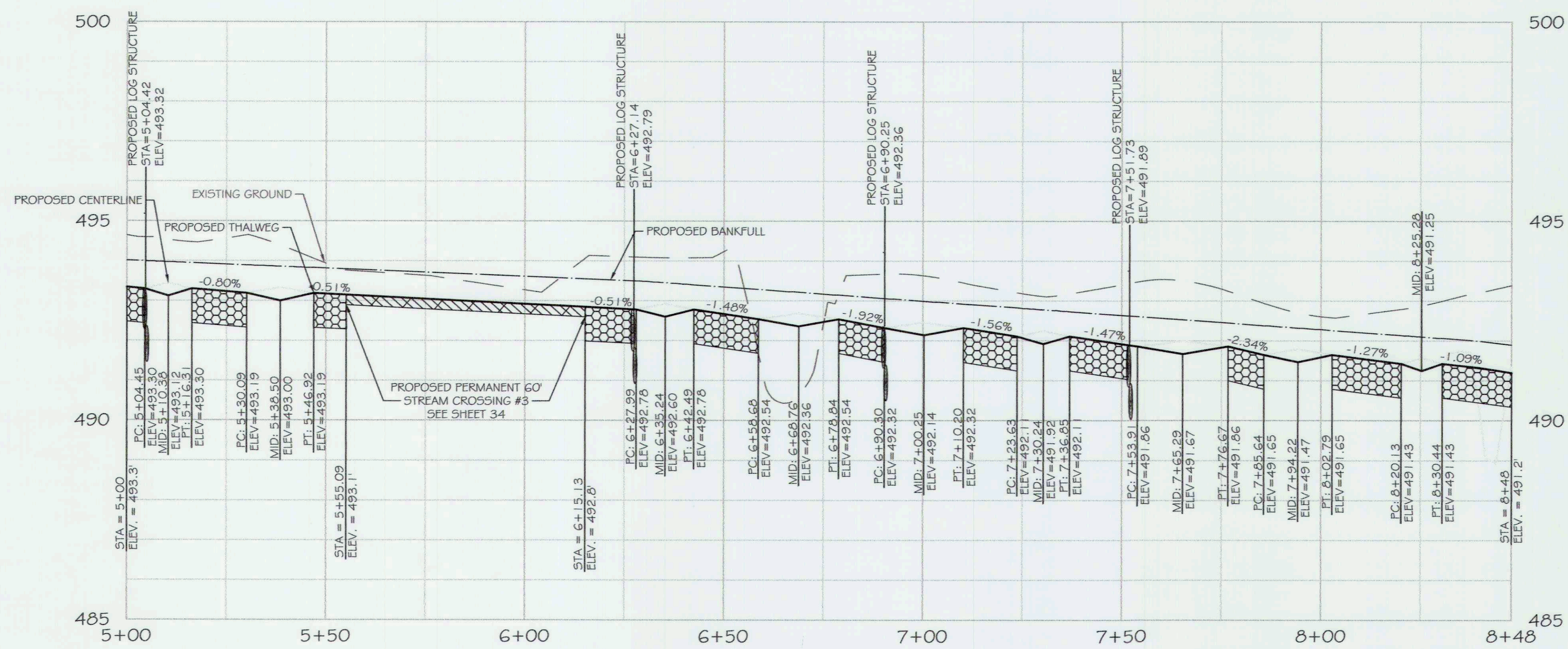
APPROVED: DEPT. OF PUBLIC WORKS
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
 DATE: 5/31/18

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: DC
 JOB NUMBER: 6172
 DESIGN TYPE: STREAM RESTORATION
 DATE: 7/20/18
 SHEET NO: AB22 OF 49

754 MOUNT MAPOGANY, LIVERMORE, CO 80536
 P: 703.393.4644 | WWW.FIVE58.COM



NOTE: ALIGNMENT AND PROFILE STATIONING IS BASED ON PROPOSED CENTERLINE. PROPOSED PROFILE LINES SHOWN ARE BASED ON PROPOSED THALWEG AND PROPOSED BANKFULL. STRUCTURE LOCATIONS IN PROFILE ARE BASED ON PROPOSED CENTERLINE.



ores
SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.395.4044 | WWW.ORES.US

754 MOUNT MAHOOGANY
LIVERMORE, CO 80536
P: 919.218.0864 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

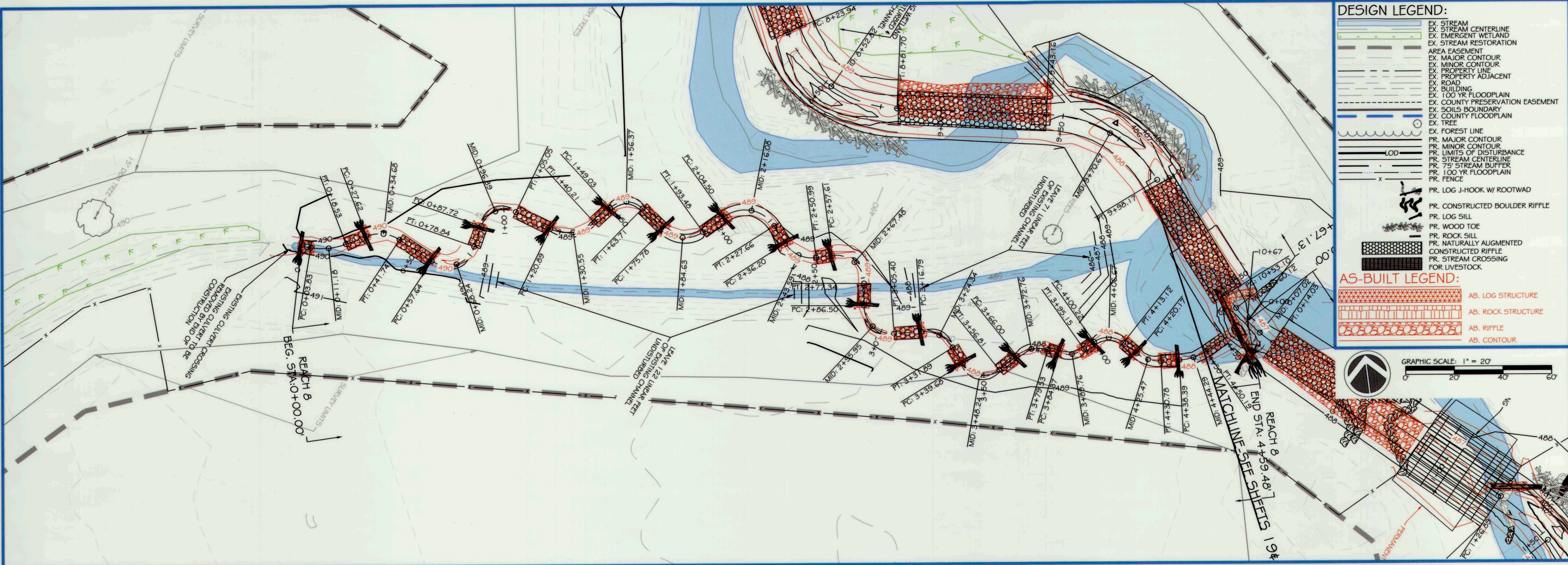
WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 22 OF 49



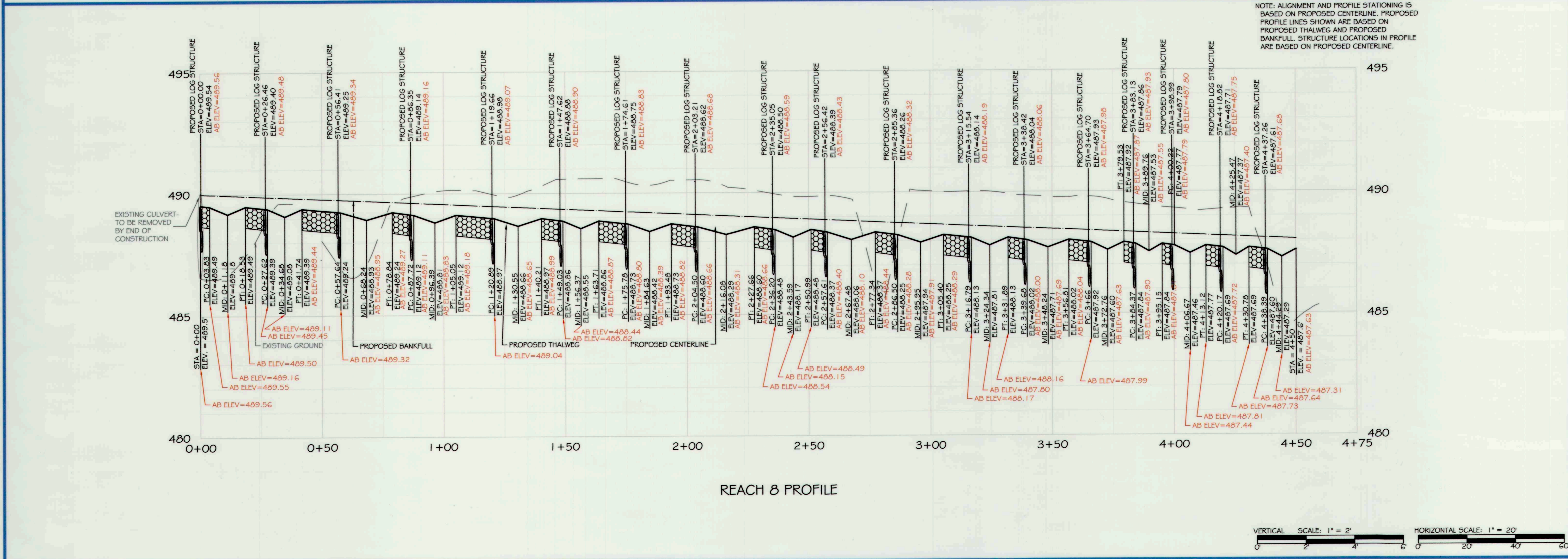
DESIGN LEGEND:

- EX. STREAM CENTERLINE
- EX. EMERGENT WETLAND
- EX. STREAM RESTORATION
- AREA EASEMENT
- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- EX. PROPERTY LINE
- EX. ROAD
- EX. BUILDING
- EX. 100 YR FLOODPLAIN
- EX. COUNTY PRESERVATION EASEMENT
- EX. SOILS BOUNDARY
- EX. COUNTY FLOODPLAIN
- EX. TREE
- EX. FOREST LINE
- PR. MAJOR CONTOUR
- PR. MINOR CONTOUR
- PR. LIMITS OF DISTURBANCE
- PR. STREAM CENTERLINE
- PR. 75' STREAM BUFFER
- PR. 100 YR FLOODPLAIN
- PR. FENCE
- PR. LOG J-HOOK W/ ROOTWAD
- PR. CONSTRUCTED BOULDER RIFFLE
- PR. LOG SILL
- PR. WOOD TOE
- PR. ROCK SILL
- PR. NATURALLY AUGMENTED
- CONSTRUCTED RIFFLE
- PR. STREAM CROSSING FOR LIVESTOCK

AS-BUILT LEGEND:

- AB. LOG STRUCTURE
- AB. ROCK STRUCTURE
- AB. RIFFLE
- AB. CONTOUR

GRAPHIC SCALE: 1" = 20'



res

5 | SMOOTH STONES RESTORATION PLLC

5827 TELEPHONE ROAD
WABESVILLE, VIRGINIA 22097
P. 703.393.4844 | WWW.RES.US

754 MOUNT MAHOGANY LIVERMORE, CO 80536
WWW.FIVE5R.COM

CAPITAL PROJECT #: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

AS-BUILT PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

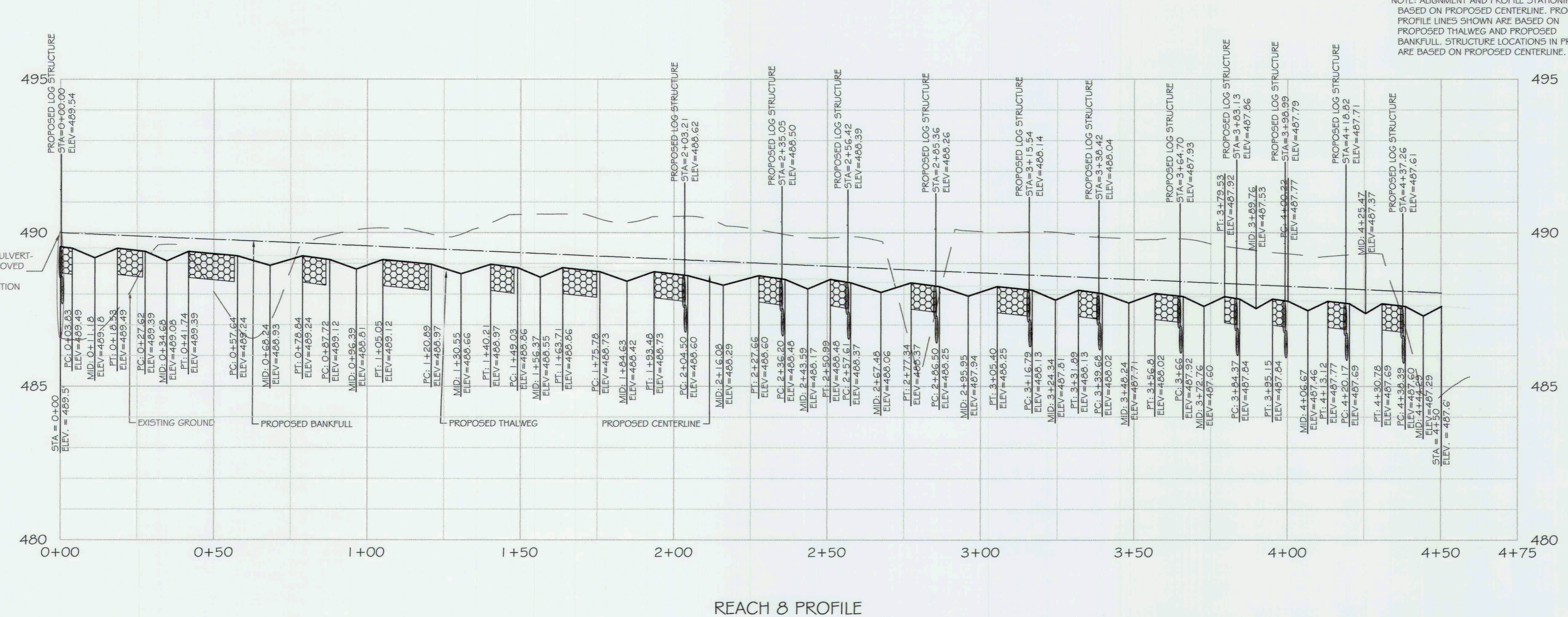
AS-BUILT CERTIFICATION: I HEREBY CERTIFY, BY MY SEAL, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE FACILITIES SHOWN ON THIS PLAN WERE CONSTRUCTED AS SHOWN ON THIS 'AS-BUILT' PLAN AND MEET THE APPROVED PLANS AND SPECIFICATIONS.

NAME: *Daniel M. [Signature]* DATE: 5/31/18

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
Michael [Signature] 5/31/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: DC
 JOB NUMBER: 6172
 DESIGN TYPE: STREAM RESTORATION
 DATE: 7/2/2018
 SHEET NO: AB23 OF 49



CAPITAL PROJECT#: D-11158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

PROPOSED PLAN AND PROFILE

WOODBINE, HOWARD COUNTY, MD

5 | SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
 WARRENTON, VIRGINIA 20187
 P: 703.395.4044 | WWW.RES.US

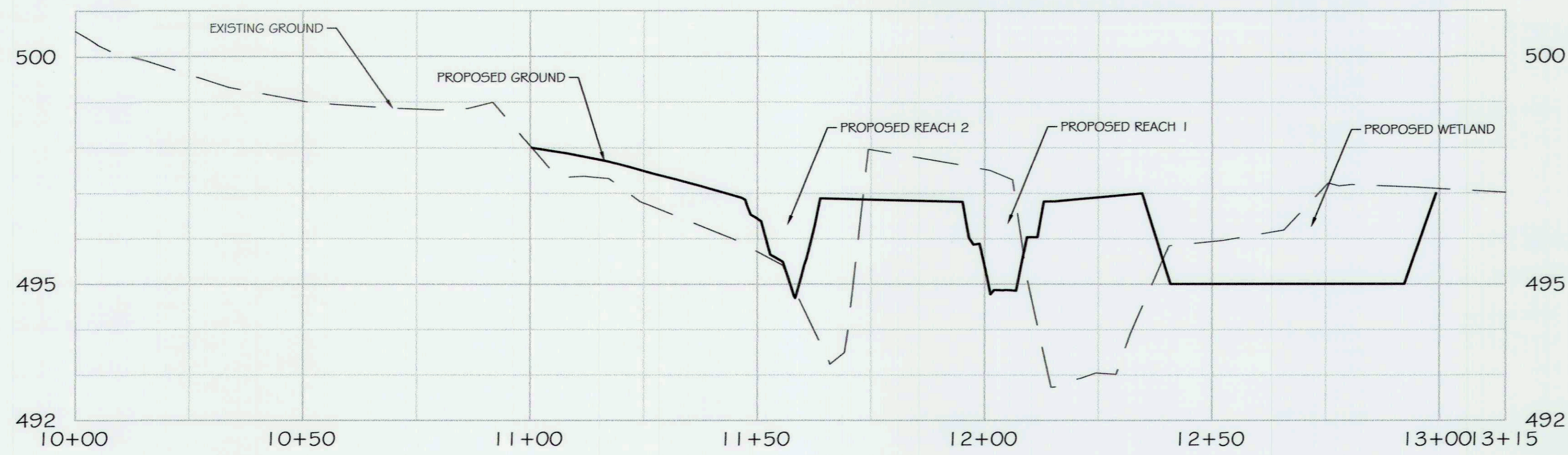
754 MOUNT MAHOGANY
 LIVERMORE, CO 80536
 P: 919.216.0664 | WWW.PINESTR.COM

REVISIONS:

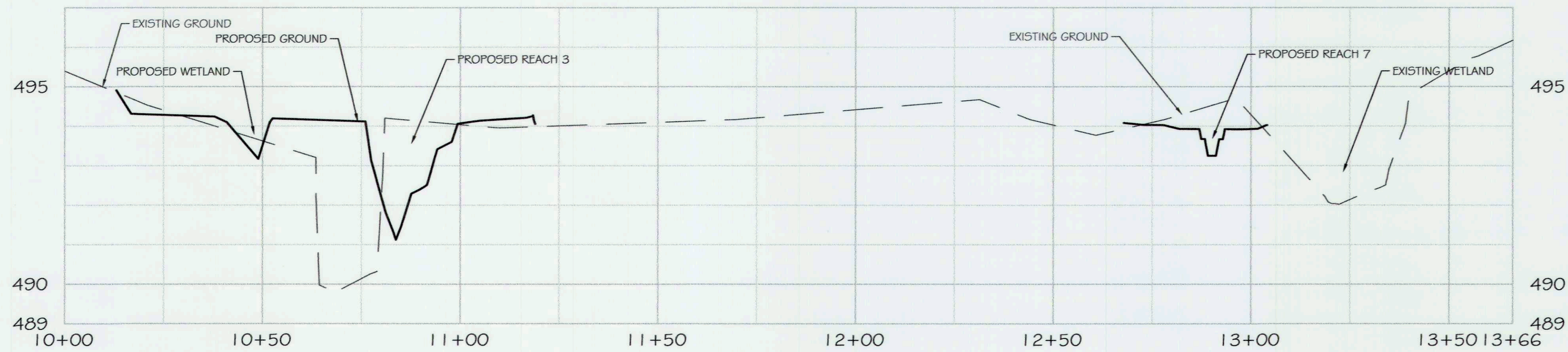
ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS
 Chief, Bureau of Environmental Services
 DATE: 5/21/18

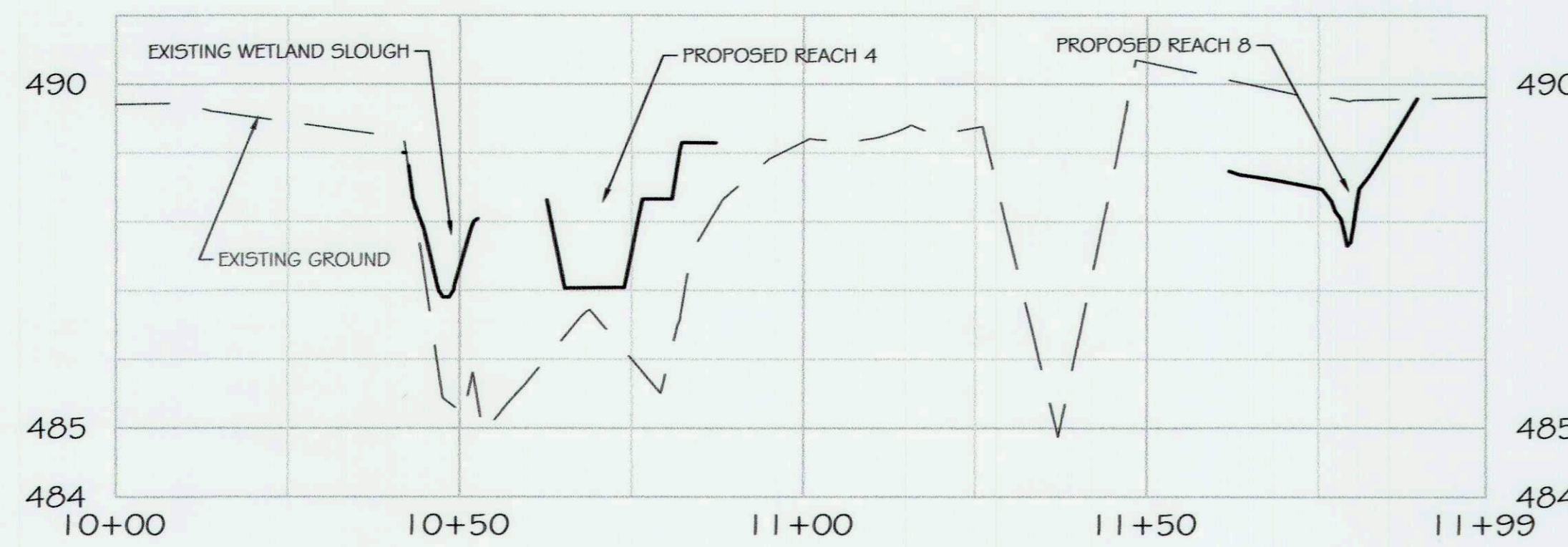
PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MG/CPC/D
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 23 OF 49



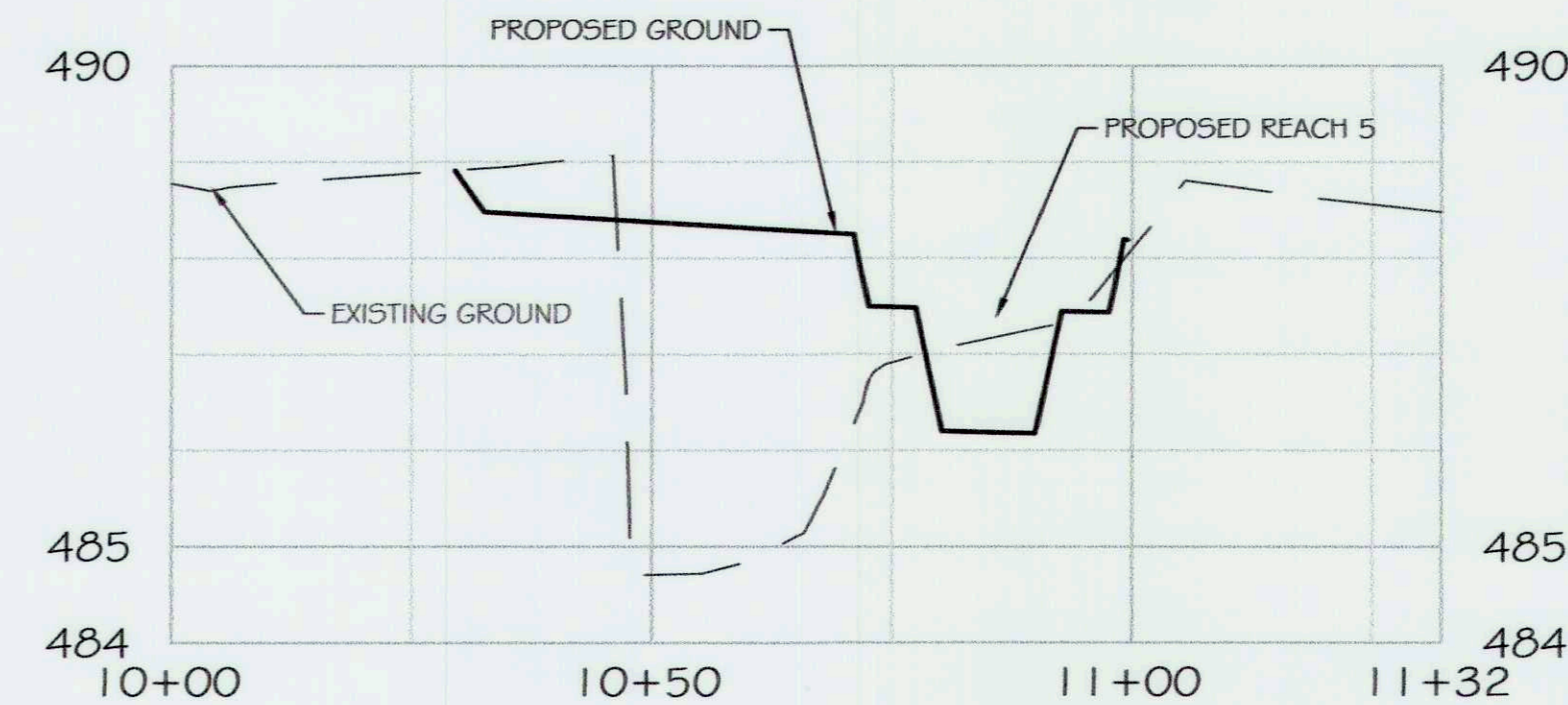
REACH 1 & 2 CROSS SECTION PROFILE



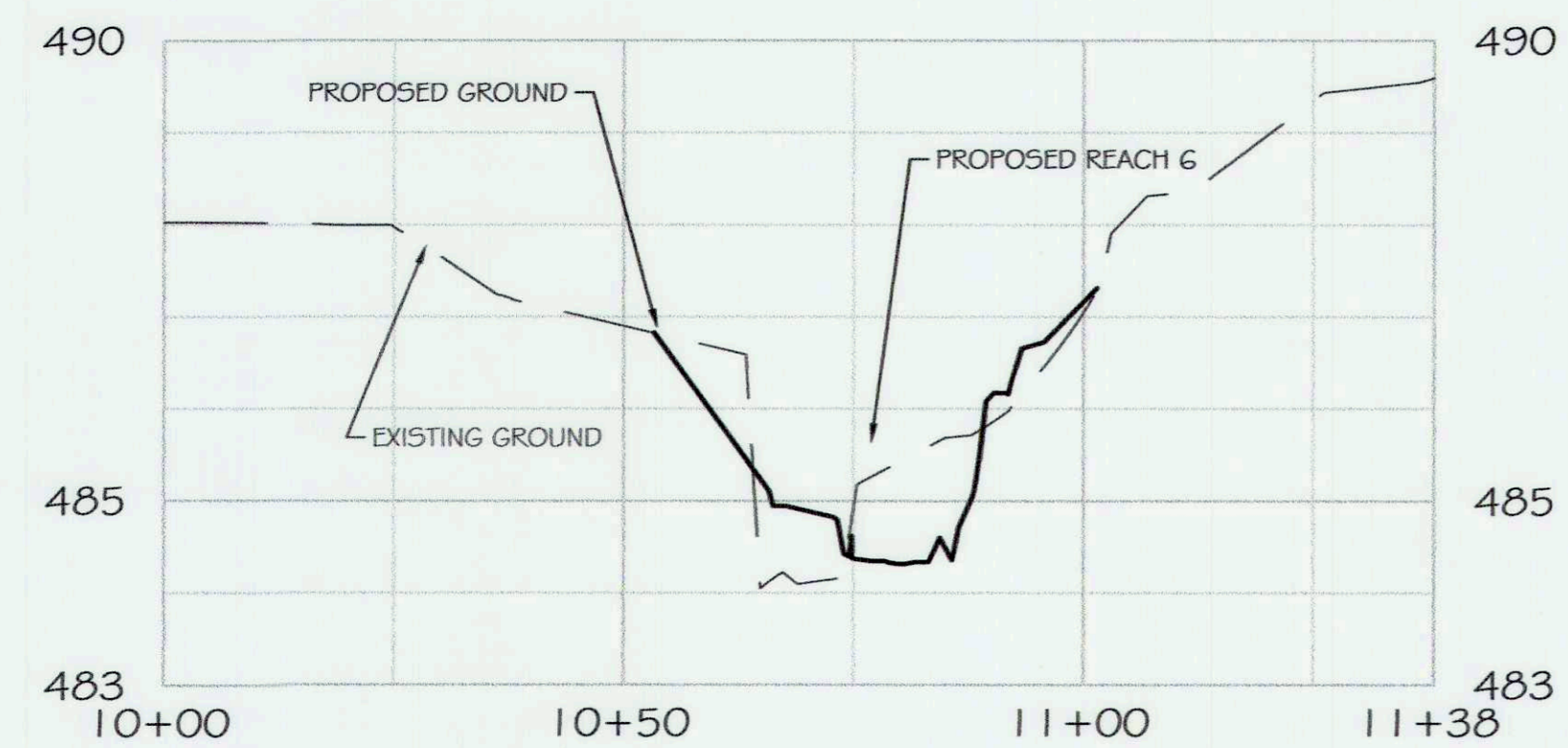
REACH 3 & 7 CROSS SECTION PROFILE



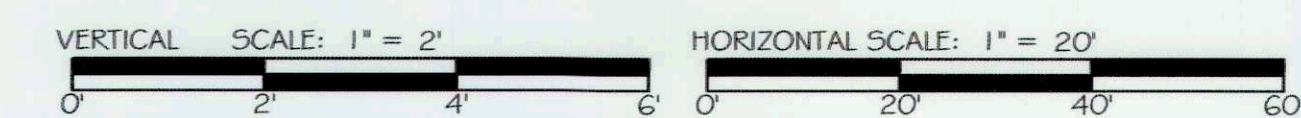
REACH 4 & 8 CROSS SECTION PROFILE



REACH 5 CROSS SECTION PROFILE



REACH 6 CROSS SECTION PROFILE



REVISIONS:

ENGINEER'S SEAL:



APPROVED: DEPT. OF PUBLIC WORKS
[Signature] 5/21/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNER: DBMG
DRAWN: MG/CP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:

STREAM MORPHOLOGY CATTAIL CREEK NTS

STREAM LAYOUT TYPICALS

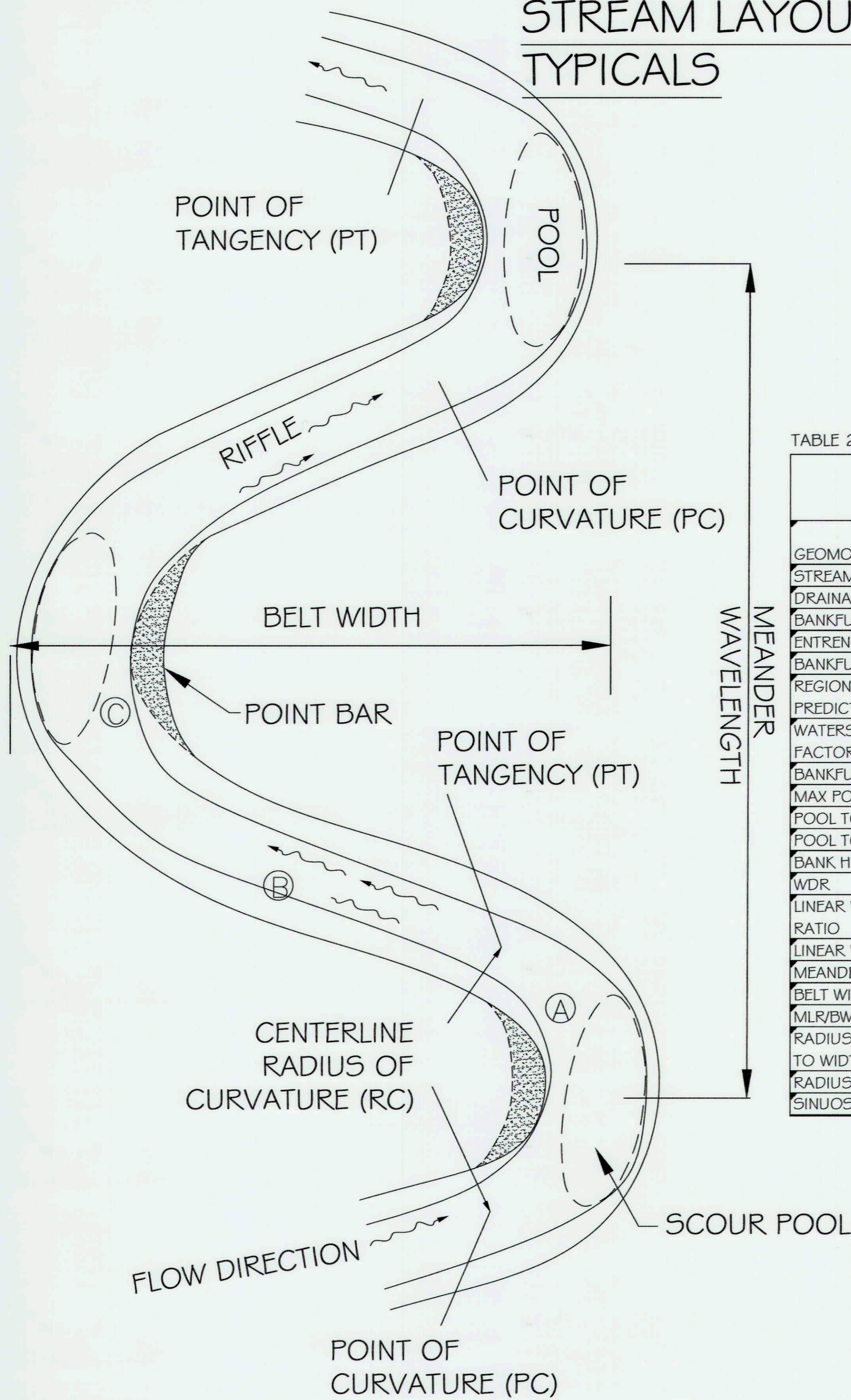
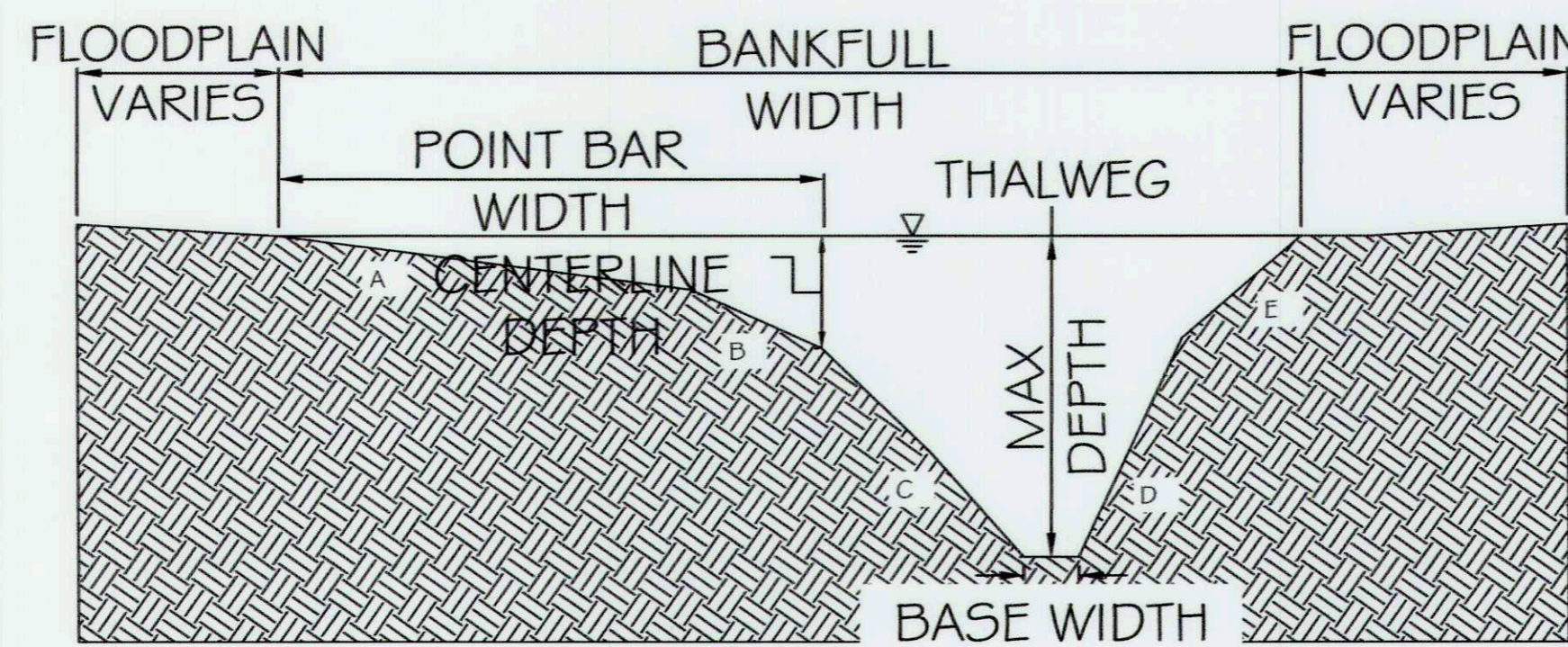


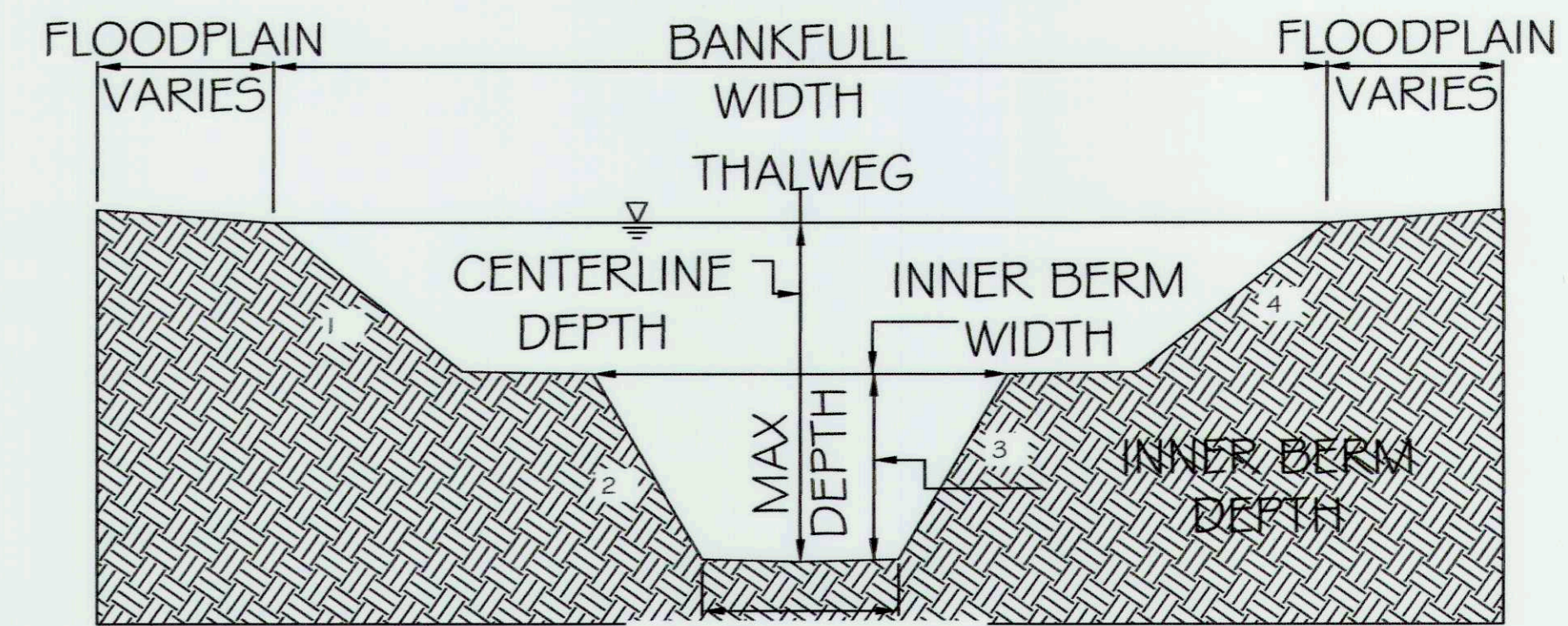
TABLE 1 - TYPICAL CROSS SECTION SIDE SLOPES BY REACH

SLOPE IDENTIFIER	REACH 1		REACH 2		REACH 3		REACH 4		REACH 5		REACH 6		REACH 7		REACH 8	
	RATIO	PERCENT	RATIO	PERCENT	RATIO	PERCENT	RATIO	PERCENT	RATIO	PERCENT	RATIO	PERCENT	RATIO	PERCENT	RATIO	PERCENT
A	18.0	5.6%	18.0	5.6%	18.0	5.6%	18.0	5.6%	18.0	5.6%	18.0	5.6%	18.0	5.6%	20.0	5.0%
B	7.2	13.9%	7.2	13.9%	7.2	13.9%	7.2	13.9%	7.2	13.9%	7.2	13.9%	7.2	13.9%	5.7	17.5%
C	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%
D	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%
E	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%
F	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%
G	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%
H	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%	2.0	50%

NOTE- MAXIMUM ALLOWABLE VELOCITY AND SHEAR STRESS FOR ALL TYPICAL CROSS SECTIONS:
 VELOCITY IN CHANNEL < 5.0 FPS
 SHEAR STRESS IN CHANNEL < 10-YEAR
 MAX SHEAR STRESS FROM TABLE 3
 VELOCITY FLOODPLAIN < 3.0 FPS
 SHEAR STRESS FLOODPLAIN < 2.0 PSF



TYPICAL SECTION-POOL RIGHT



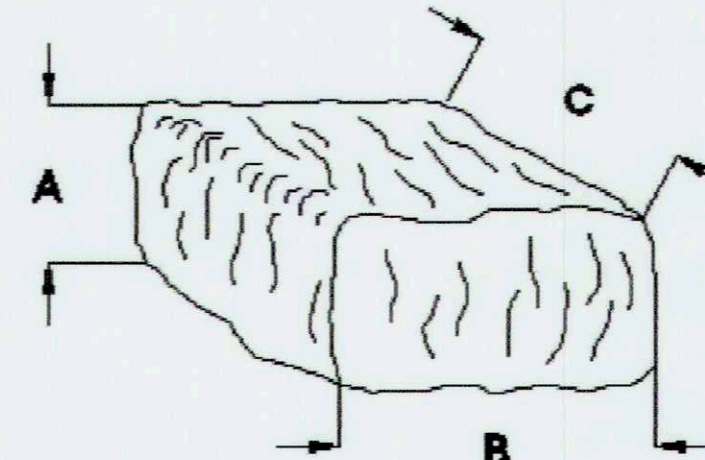
TYPICAL SECTION-RIFFLE

TABLE 2- STREAM MORPHOLOGY BY REACH

GEOMORPHIC PARAMETER	UPSTREAM REFERENCE REACH - MAPLE DELL FARM DESIGN		MAPLE DELL FARM PROJECT REACH 1		MAPLE DELL FARM PROJECT REACH 2		MAPLE DELL FARM PROJECT REACH 3		MAPLE DELL FARM PROJECT REACH 4		MAPLE DELL FARM PROJECT REACH 5		MAPLE DELL FARM PROJECT REACH 6		MAPLE DELL FARM PROJECT REACH 7		MAPLE DELL FARM PROJECT REACH 8	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STREAM SLOPE	0.40%	0.55%	0.35%	0.55%	0.35%	0.55%	0.35%	0.55%	0.35%	0.55%	0.35%	0.55%	0.35%	0.55%	0.35%	0.55%	0.35%	0.55%
DRAINAGE AREA	2.25	2.25	2.27	2.27	1.39	1.39	3.67	3.67	3.76	3.76	3.82	3.82	3.89	3.89	0.09	0.09	0.04	0.04
BANKFULL WIDTH	12	18	15.79	18.42	13.4	15.63	18.55	21.64	18.7	21.82	18.8	21.93	18.92	22.07	5.79	6.68	4.71	5.4
ENTRENCHMENT RATIO	5	10	5	10	5	10	5	10	5	10	5	10	5	10	5	10	5	10
BANKFULL AREA	16	24	20.78	24.25	14.96	17.46	28.68	33.45	29.14	34	29.46	34.36	29.82	34.79	2.39	2.79	1.39	1.62
REGIONAL CURVE PREDICTION EASTERN US WATERSHED RESPONSE FACTOR	33.57	33.57	33.77	33.77	24.31	24.31	46.6	46.6	47.36	47.36	47.86	47.86	48.45	48.45	3.88	3.88	2.26	2.26
BANKFULL DEPTH	1.33	1.33	1.32	1.32	1.12	1.12	1.55	1.55	1.56	1.56	1.57	1.57	1.58	1.58	0.41	0.42	0.29	0.3
MAX POOL DEPTH	2.8	3.2	3	3.4	3	3.4	3	3.4	3	3.4	3	3.4	3	3.4	3	3.4	3	3.4
POOL TO POOL SPACING	42	58	63.17	86.86	53.6	73.7	74.2	102	74.8	102.9	75.2	103.4	75.66	104	23.14	31.8	18.85	25.92
POOL TO POOL RATIO	3.5	4.83	4	5.5	4	5.5	4	5.5	4	5.5	4	5.5	4	5.5	4	5.5	4	5.5
BANK HEIGHT RATIO	1	1.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WDR	9	13.5	12	14	12	14	12	14	12	14	12	14	12	14	14	16	16	18
LINEAR WAVELENGTH RATIO	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11
LINEAR WAVELENGTH	96	144	126.34	202.7	107.2	171.96	148.4	238.1	149.61	240	150.41	241.3	151.32	242.8	46.28	73.5	37.71	59.4
MEANDER WIDTH RATIO	2.8	3.5	3	3.5	3	3.5	3	3.5	3	3.5	3	3.5	3	3.5	3	3.5	3	3.5
BELT WIDTH	33.6	63	47.38	64.49	40.2	54.71	55.65	75.75	56.1	76.36	56.4	76.77	56.75	77.24	17.36	23.4	14.14	18.9
MLR/BWR	2.29	3.93	2.29	3.67	2.29	3.67	2.29	3.67	2.29	3.67	2.29	3.67	2.29	3.67	2.29	3.67	2.29	3.67
RADIUS OF CURVATURE TO WIDTH RATIO	2.1	4	2.1	4	2.1	4	2.1	4	2.1	4	2.1	4	2.1	4	2.1	4	2.1	4
RADIUS OF CURVATURE	25.2	72	33.16	73.7	28.14	62.53	38.96	86.57	39.27	87.27	39.48	87.74	39.72	88.27	12.15	26.7	9.9	21.6
SINUOSITY	1.2	1.4	1.25	1.4	1.25	1.4	1.25	1.4	1.25	1.4	1.25	1.4	1.25	1.4	1.25	1.4	1.25	1.4

TABLE 3- STONE SUMMARY BY REACH

REACH	DESIGN PARAMETERS				BOULDER SIZE WITH FACTOR OF SAFETY					SELECT MATERIAL SIZING				2-YEAR MAX SHEAR IN CHANNEL (LBS/SQ.FT.)	2-YR MAXIMUM MOVABLE DIAMETER (IN)	10-YEAR MAX SHEAR IN CHANNEL (LBS/SQ.FT.)	10-YR MAXIMUM MOVABLE DIAMETER (IN)	
	DESIGN SLOPE FT/FT	2/10 YR MAX SHEAR LBS/FT^2	FACTOR OF SAFETY	DESIGN SHEAR LBS/FT^2	B	A	C	ROCK DENSITY TONS	BOULDER WEIGHT TONS	DIG	D50	D84	D100					MATERIAL DEPTH FT
REACH 1	0.005	1.47	1.5	2.21	3.4	2.3	4.6	165	2.9	2.2	4.6	7.9	11.5	1.3	1.25	7.1	1.47	7.9
REACH 2	0.0048	1.59	1.5	2.39	3.5	2.3	4.6	165	3.1	2.4	5.0	8.4	12.4	1.4	1.58	8.4	1.59	8.4
REACH 3	0.005	1.77	1.5	2.66	3.5	2.4	4.7	165	3.2	2.7	5.6	9.1	13.9	1.5	1.77	9.1	1.76	9.1
REACH 4	0.005	2.82	1.5	4.23	3.8	2.5	5.1	165	4.0	4.4	9.0	12.8	22.6	2.1	1.76	9.1	2.82	12.8
REACH 5	0.005	0.47	1.5	0.71	2.8	1.9	3.7	165	1.4	0.7	1.4	3.4	4.2	1.0	0.16	2.8	0.47	3.4
REACH 6	0.005	0.47	1.5	0.71	2.8	1.9	3.7	165	1.6	0.7	1.4	3.4	4.2	1.0	0.16	2.8	0.47	3.4
REACH 7	0.0055	0.31	1.5	0.47	NA	NA	NA	NA	NA	0.4	0.9	2.5	3.8	0.5	0.31	2.5	0.20	1.8
REACH 8	0.0045	0.01	1.5	0.02	NA	NA	NA	NA	NA	0.0	0.0	0.2	0.3	0.5	0.01	0.2	0.01	0.2



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 5367 TELEPHONE ROAD
 WARRENTON, VIRGINIA 20187
 P: 703.595.4644 | WWW.ORES.US

5 | SMOOTH STONES RESTORATION PLLC
 754 MOUNT MAHOGANY
 LIVERMORE, CO 80536
 P: 919.216.0664 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

STREAM DESIGN TABLES

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED, DEPT. OF PUBLIC WORKS:

 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

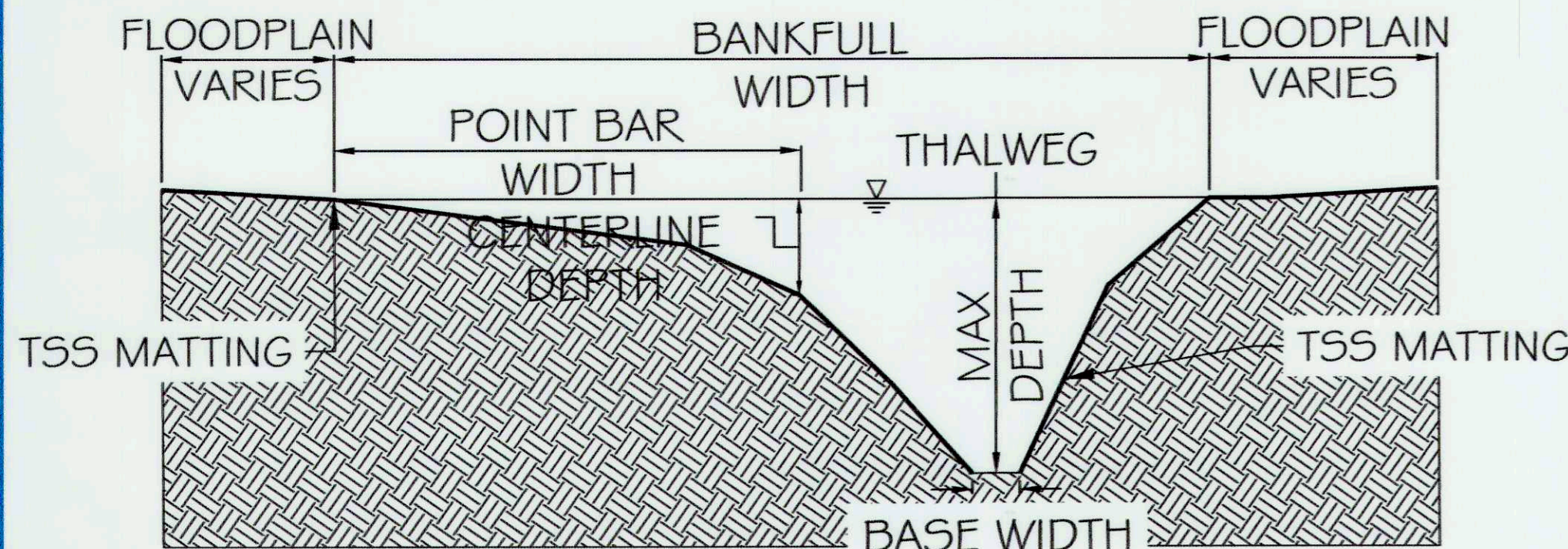
PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MGCPDC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 25 OF 49

REACH 1 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

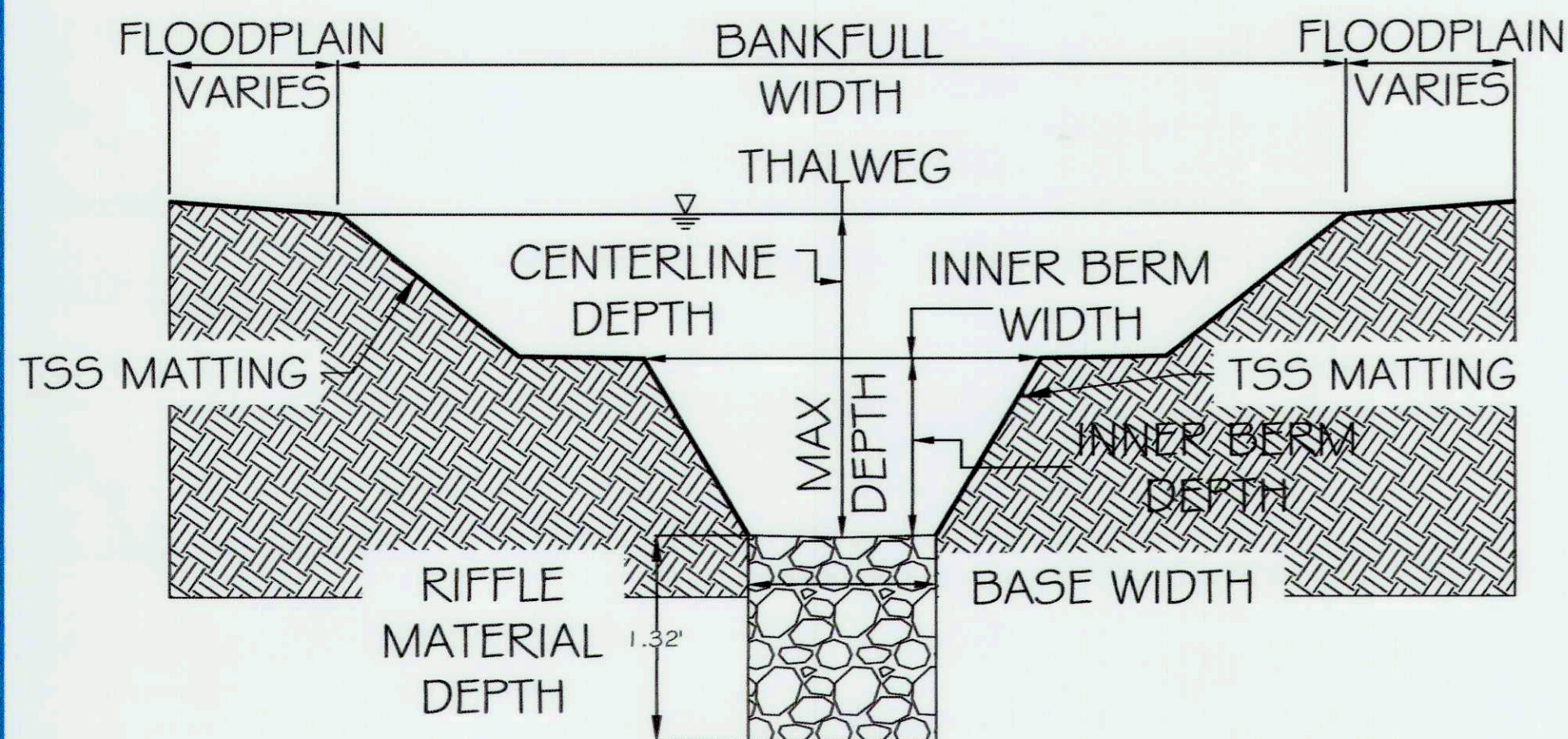
TYPICAL SECTION - POOL RIGHT (A)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		19.3 - 19.7
POINT BAR WIDTH		10.2 - 10.9
MAX DEPTH		2.36
BASE WIDTH		2.0 - 2.6
CENTERLINE DEPTH		1.1 - 1.3



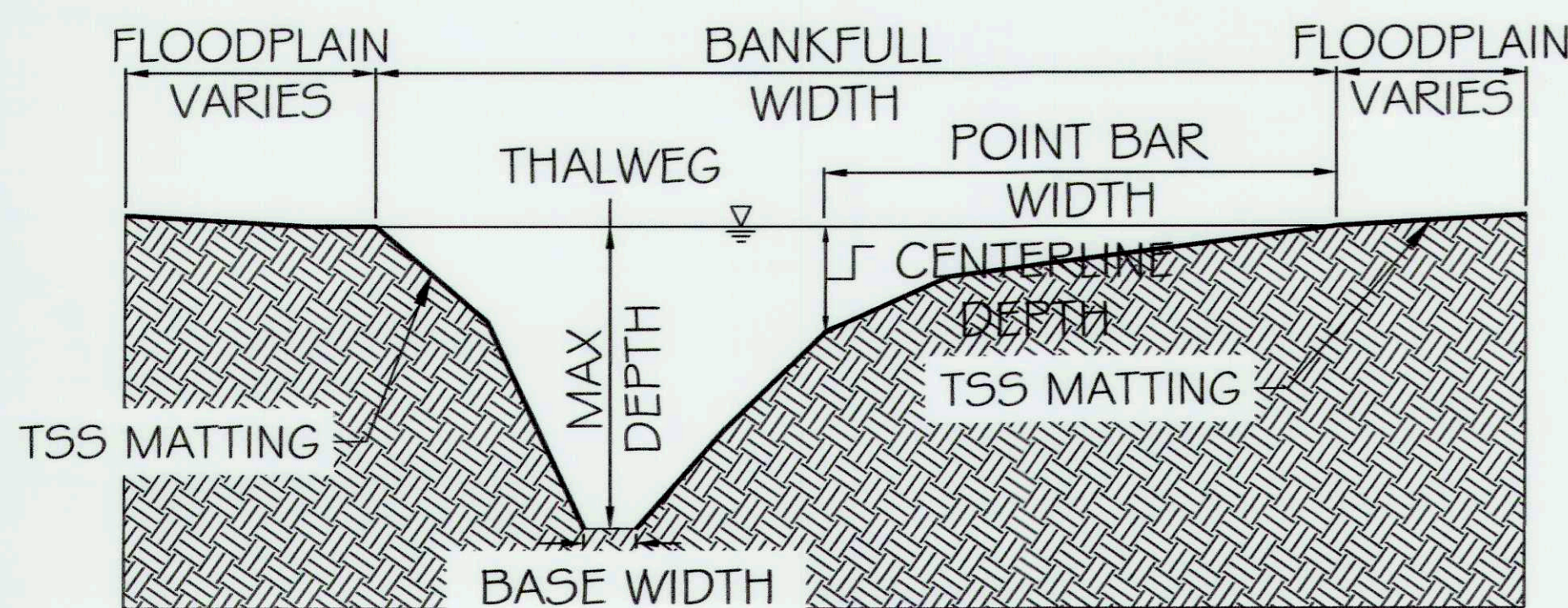
TYPICAL SECTION - RIFFLE (B)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		15.8 - 18.4
MAX/CENTERLINE DEPTH		1.7 - 2.0
BASE WIDTH		5.3 - 5.8
INNER BERM DEPTH		1.0 - 1.3
INNER BERM WIDTH		10.2 - 10.5



TYPICAL SECTION - POOL LEFT (C)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		19.3 - 19.7
POINT BAR WIDTH		10.2 - 10.9
MAX DEPTH		2.36
BASE WIDTH		2.0 - 2.6
CENTERLINE DEPTH		1.1 - 1.3

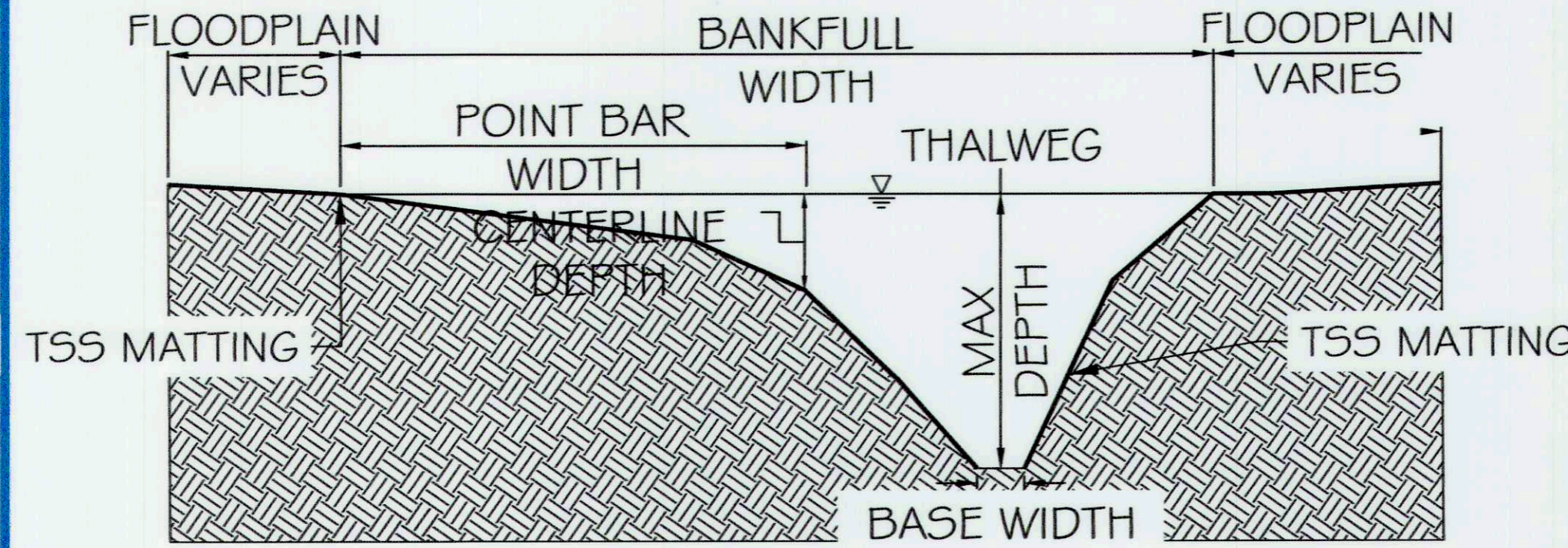


REACH 2 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

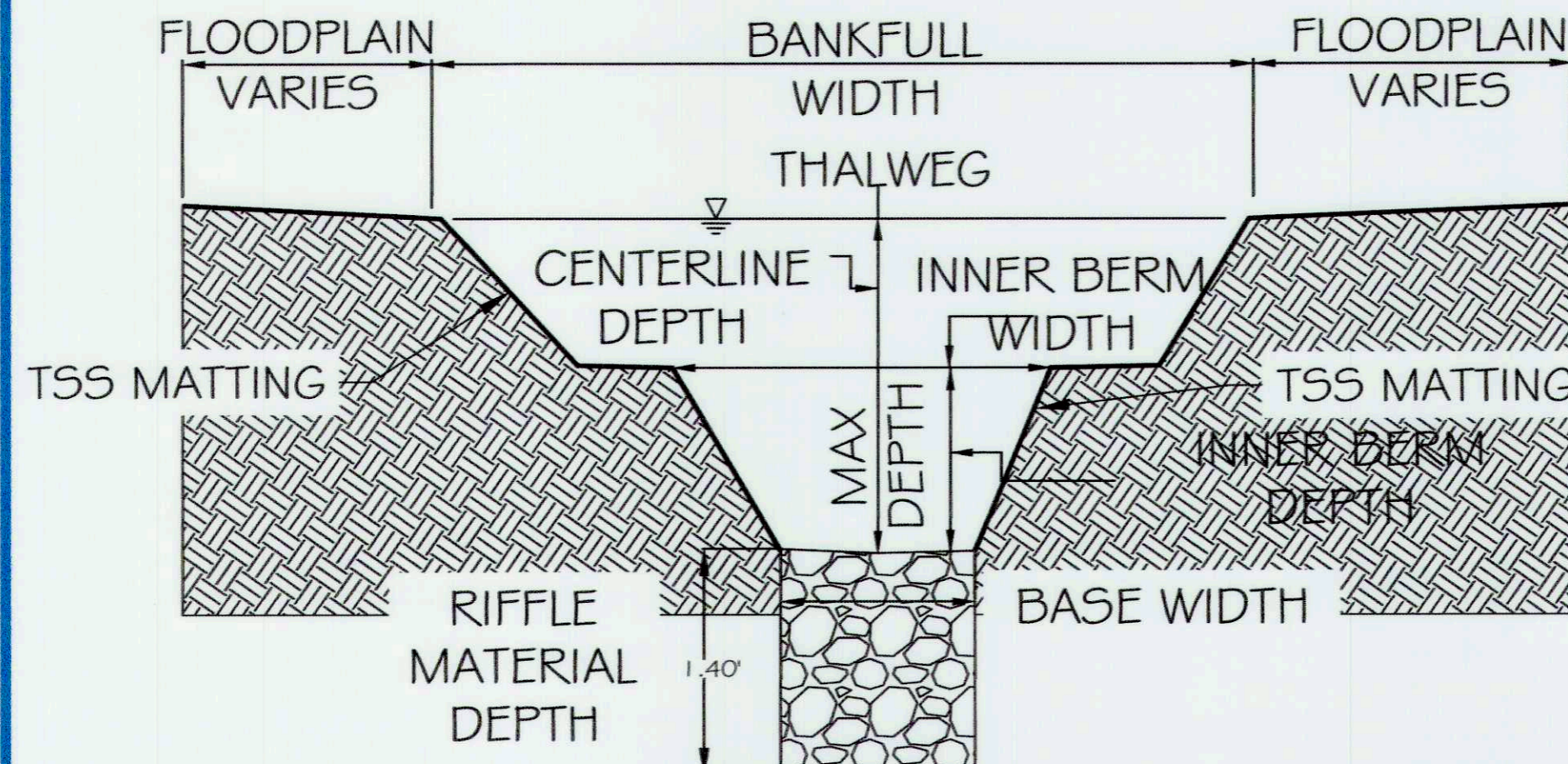
TYPICAL SECTION - POOL RIGHT (A)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		17.9 - 18.3
POINT BAR WIDTH		9.7 - 10.1
MAX DEPTH		2.15
BASE WIDTH		1.8 - 2.1
CENTERLINE DEPTH		1.0 - 1.3



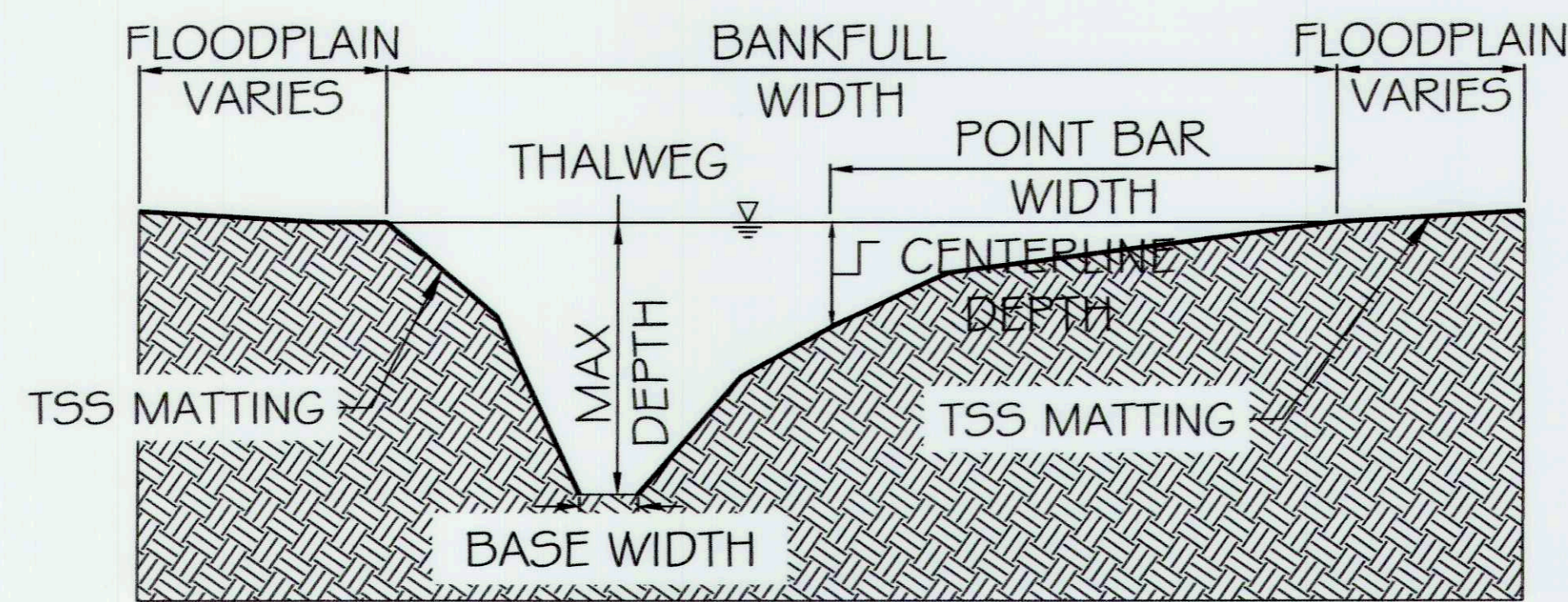
TYPICAL SECTION - RIFFLE (B)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		13.4 - 15.6
MAX/CENTERLINE DEPTH		1.5 - 1.8
BASE WIDTH		5.2 - 5.6
INNER BERM DEPTH		0.8 - 1.1
INNER BERM WIDTH		9.3 - 9.7



TYPICAL SECTION - POOL LEFT (C)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		17.9 - 18.3
POINT BAR WIDTH		9.7 - 10.1
MAX DEPTH		2.15
BASE WIDTH		1.8 - 2.1
CENTERLINE DEPTH		1.0 - 1.3

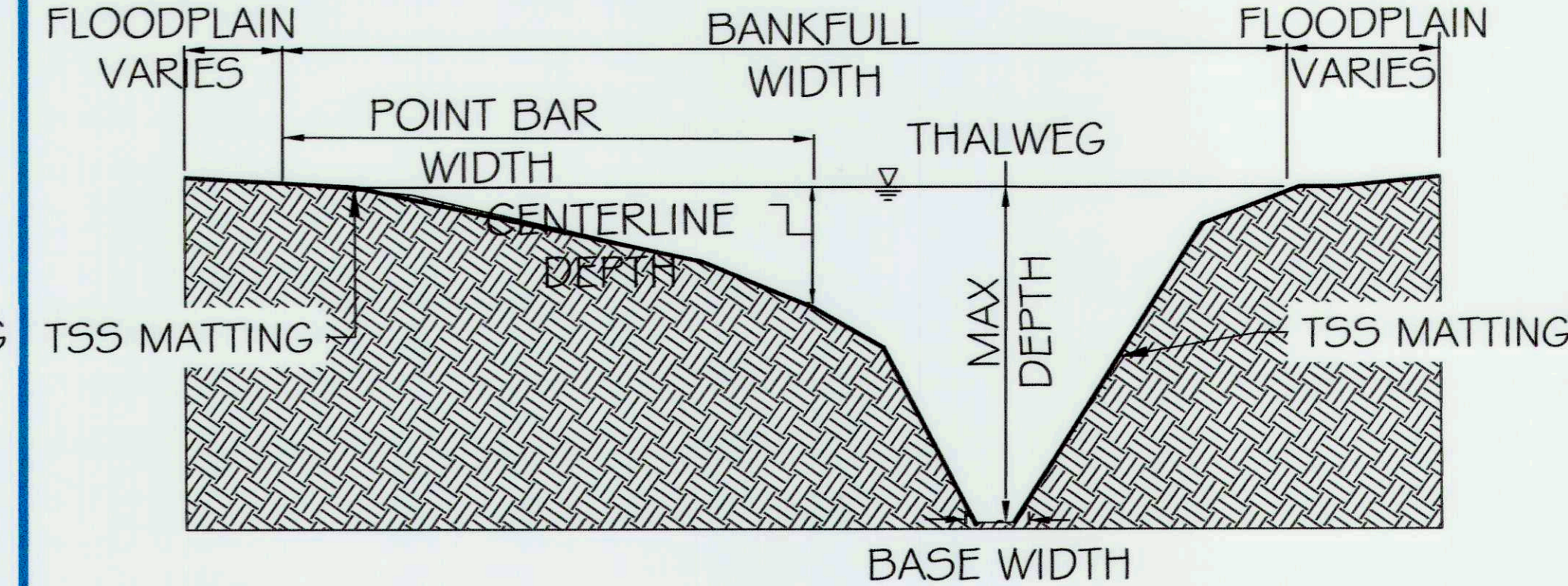


REACH 3 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

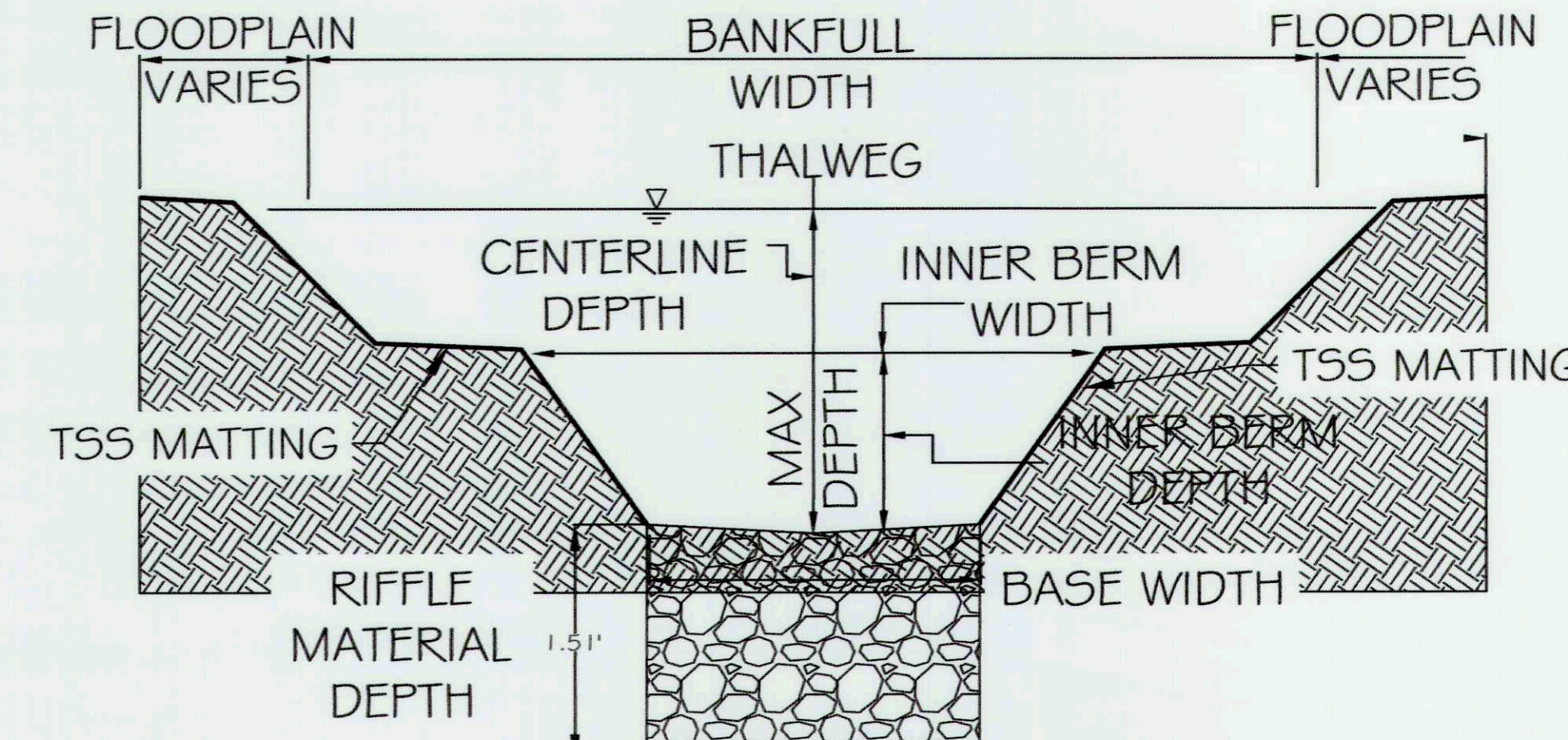
TYPICAL SECTION - POOL RIGHT (A)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.3 - 25.8
POINT BAR WIDTH		13.5 - 13.9
MAX DEPTH		3.11
BASE WIDTH		2.3 - 2.5
CENTERLINE DEPTH		1.4 - 1.7



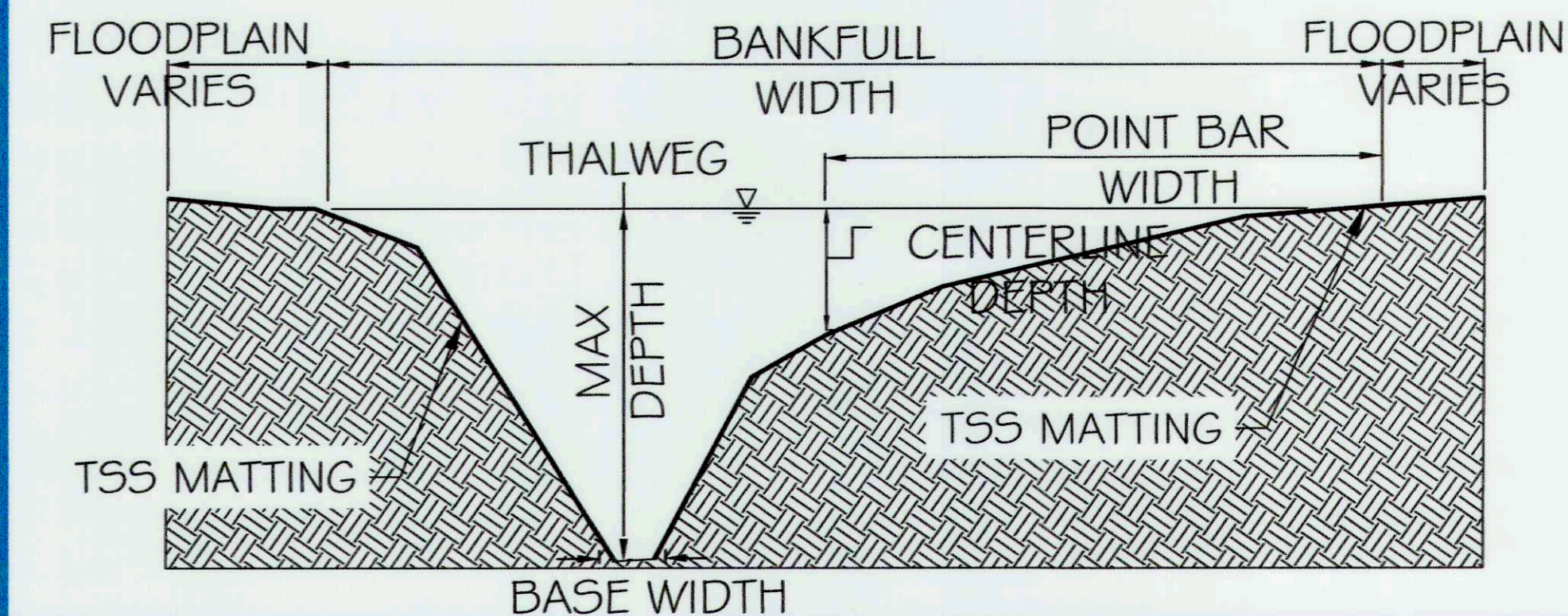
TYPICAL SECTION - RIFFLE (B)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		18.6 - 21.6
MAX/CENTERLINE DEPTH		1.9 - 2.2
BASE WIDTH		7.7 - 8.1
INNER BERM DEPTH		1.2 - 1.4
INNER BERM WIDTH		10.1 - 10.4



TYPICAL SECTION - POOL LEFT (C)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.3 - 25.8
POINT BAR WIDTH		13.5 - 13.9
MAX DEPTH		3.11
BASE WIDTH		2.3 - 2.5
CENTERLINE DEPTH		1.4 - 1.7



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5 | SMOOTH STONES RESTORATION PLLC
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LIVERMORE, CA 94536
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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

TYPICAL SECTIONS

WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A

ENGINEER'S SEAL:
STATE OF MARYLAND
PROFESSIONAL ENGINEER
No. 39388
star/ig

APPROVED BY: DEPT. OF PUBLIC WORKS
Chief, Bureau of Environmental Services
DATE: 5/30/18

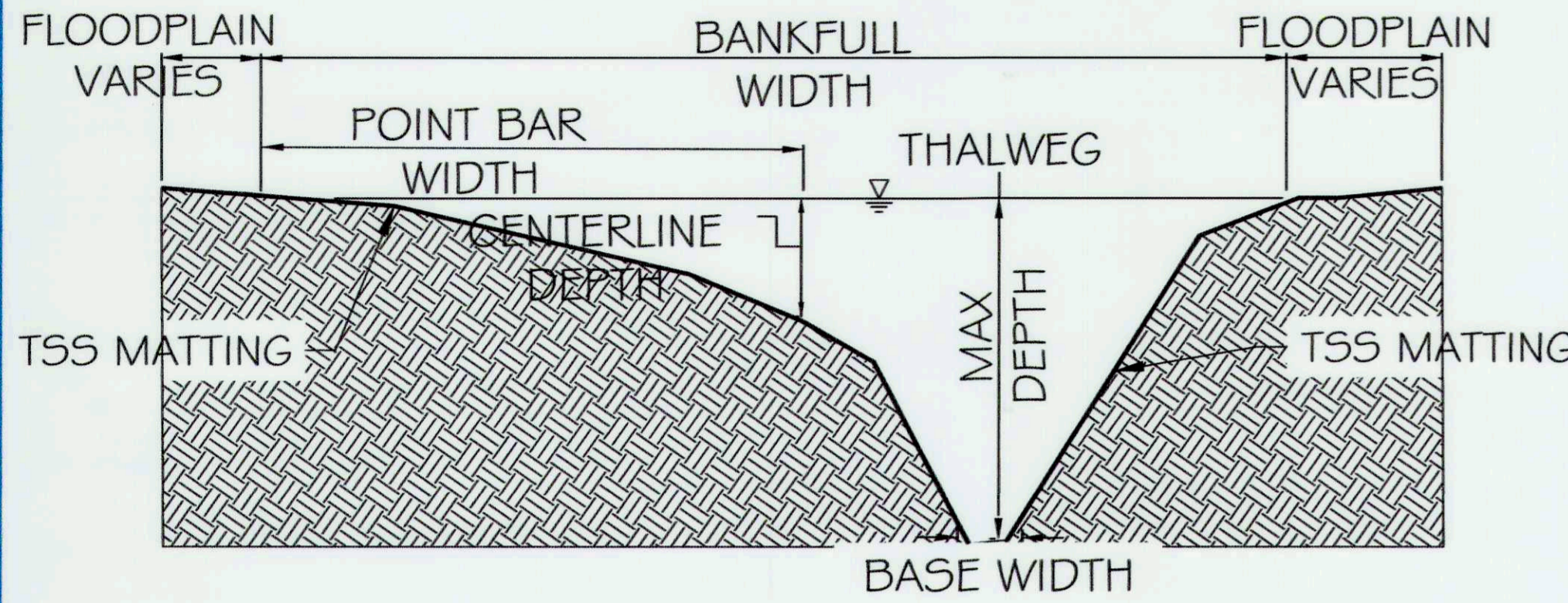
PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGC/PDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 26 OF 49

REACH 4 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

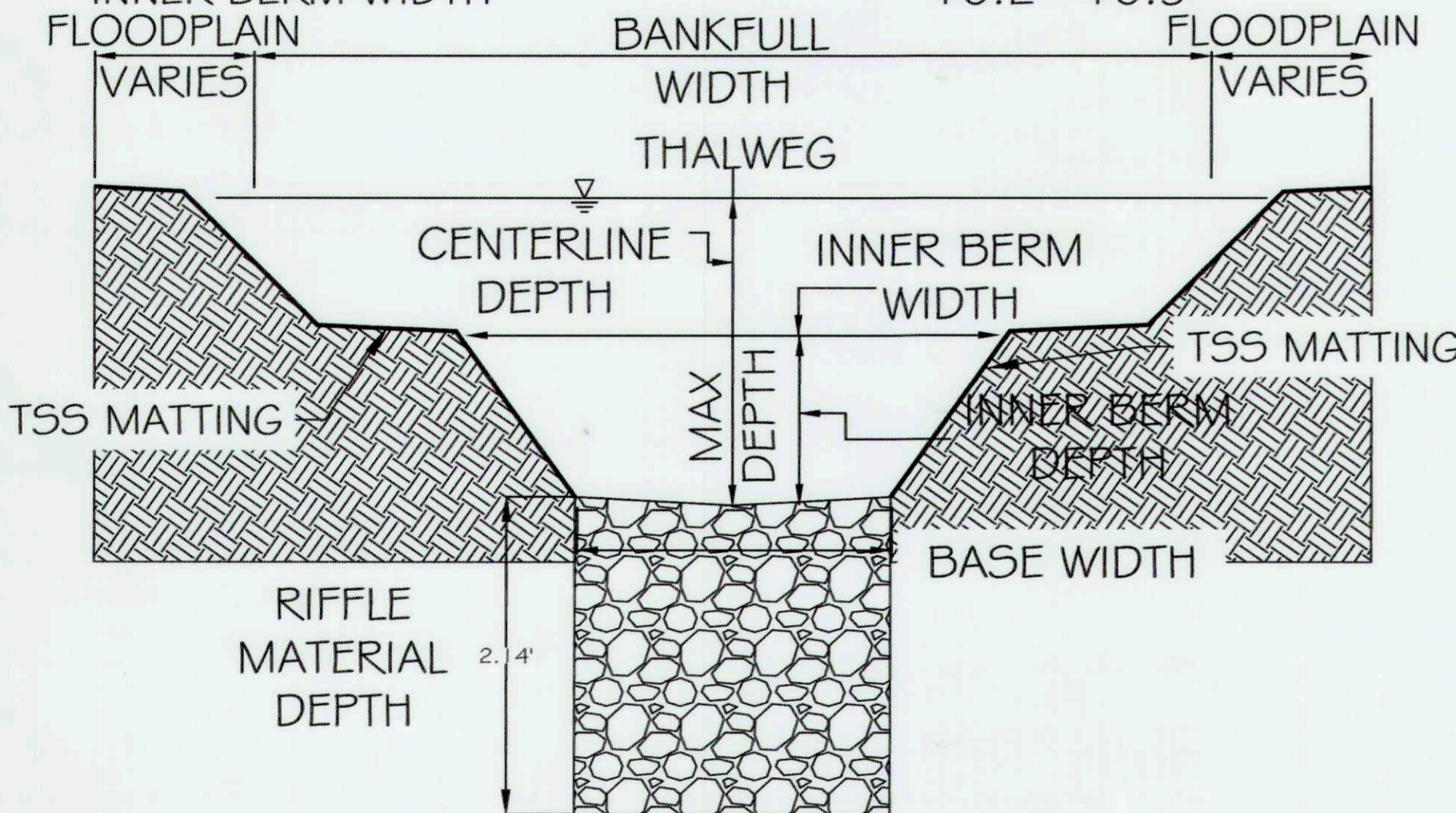
TYPICAL SECTION - POOL RIGHT (A)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.4 - 25.8
POINT BAR WIDTH		13.7 - 14.0
MAX DEPTH		3.14
BASE WIDTH		2.4 - 2.6
CENTERLINE DEPTH		1.5 - 1.8



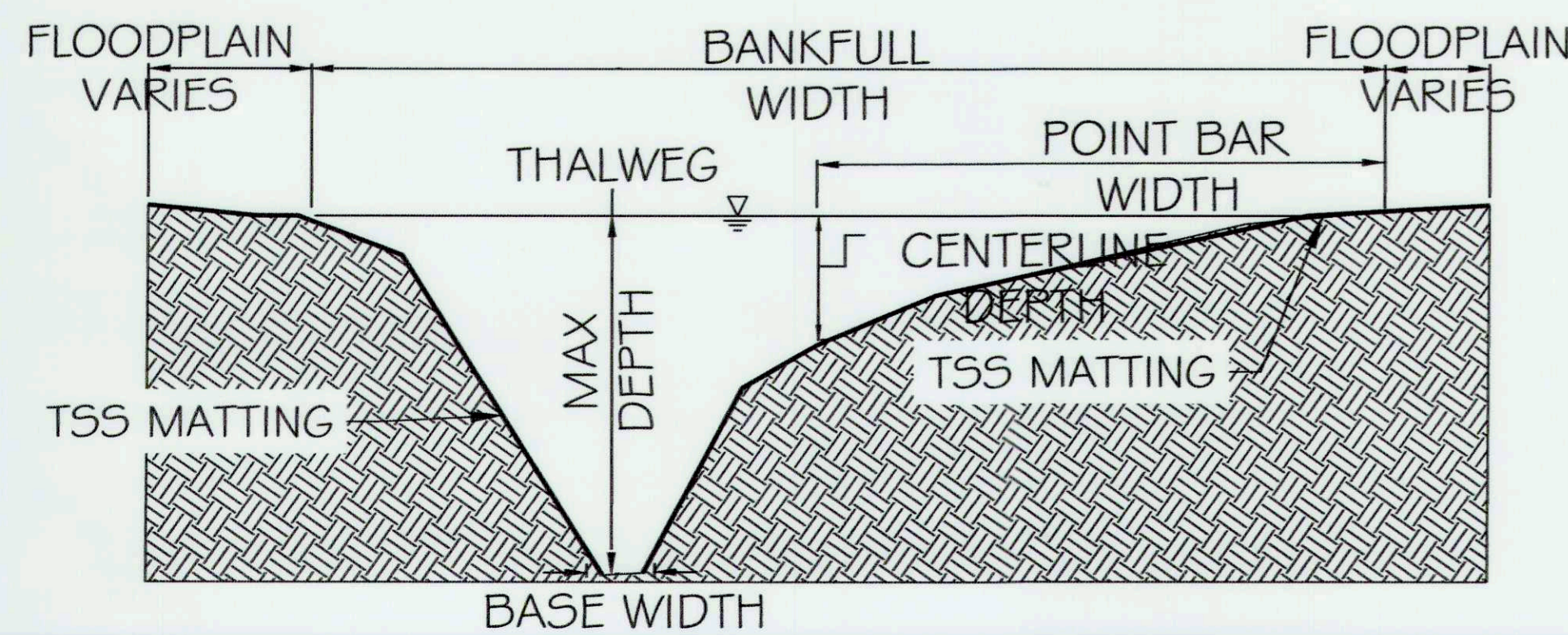
TYPICAL SECTION - RIFFLE (B)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		18.7 - 21.8
MAX/CENTERLINE DEPTH		1.9 - 2.2
BASE WIDTH		7.8 - 8.2
INNER BERM DEPTH		1.3 - 1.5
INNER BERM WIDTH		10.2 - 10.5



TYPICAL SECTION - POOL LEFT (C)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.4 - 25.8
POINT BAR WIDTH		13.7 - 14.0
MAX DEPTH		3.14
BASE WIDTH		2.4 - 2.6
CENTERLINE DEPTH		1.5 - 1.8

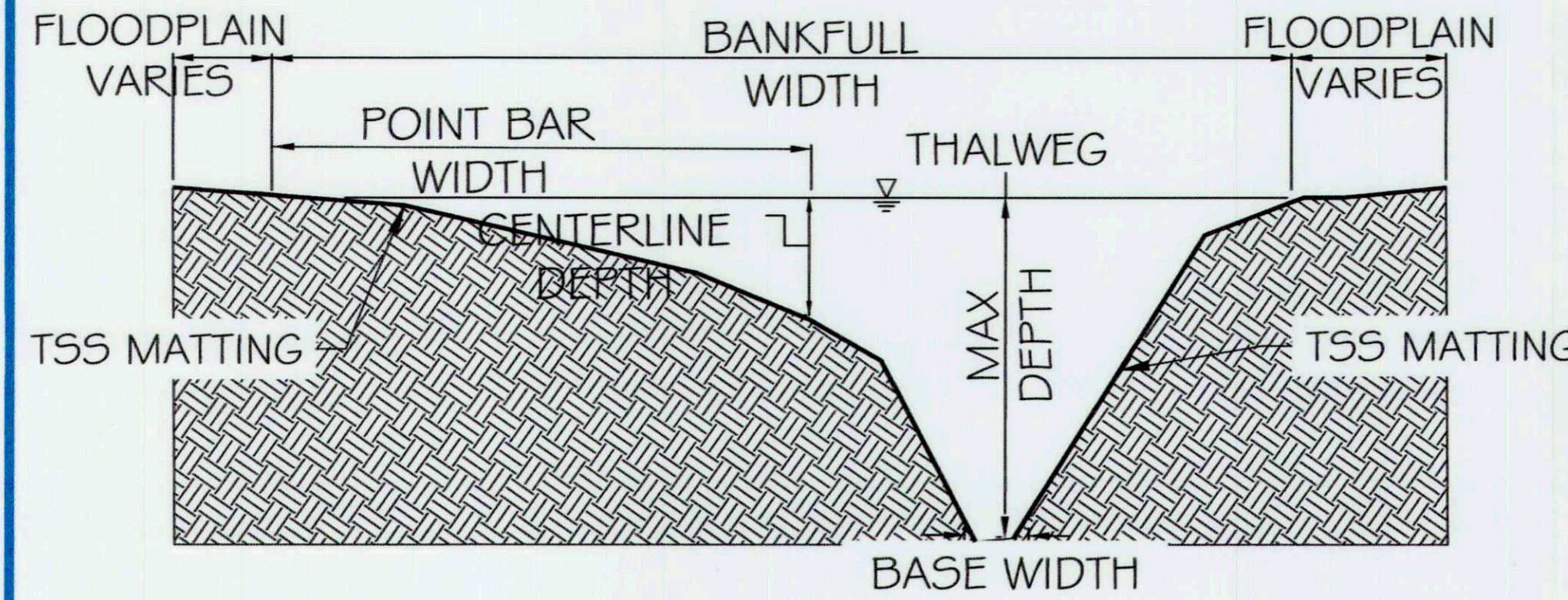


REACH 5 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

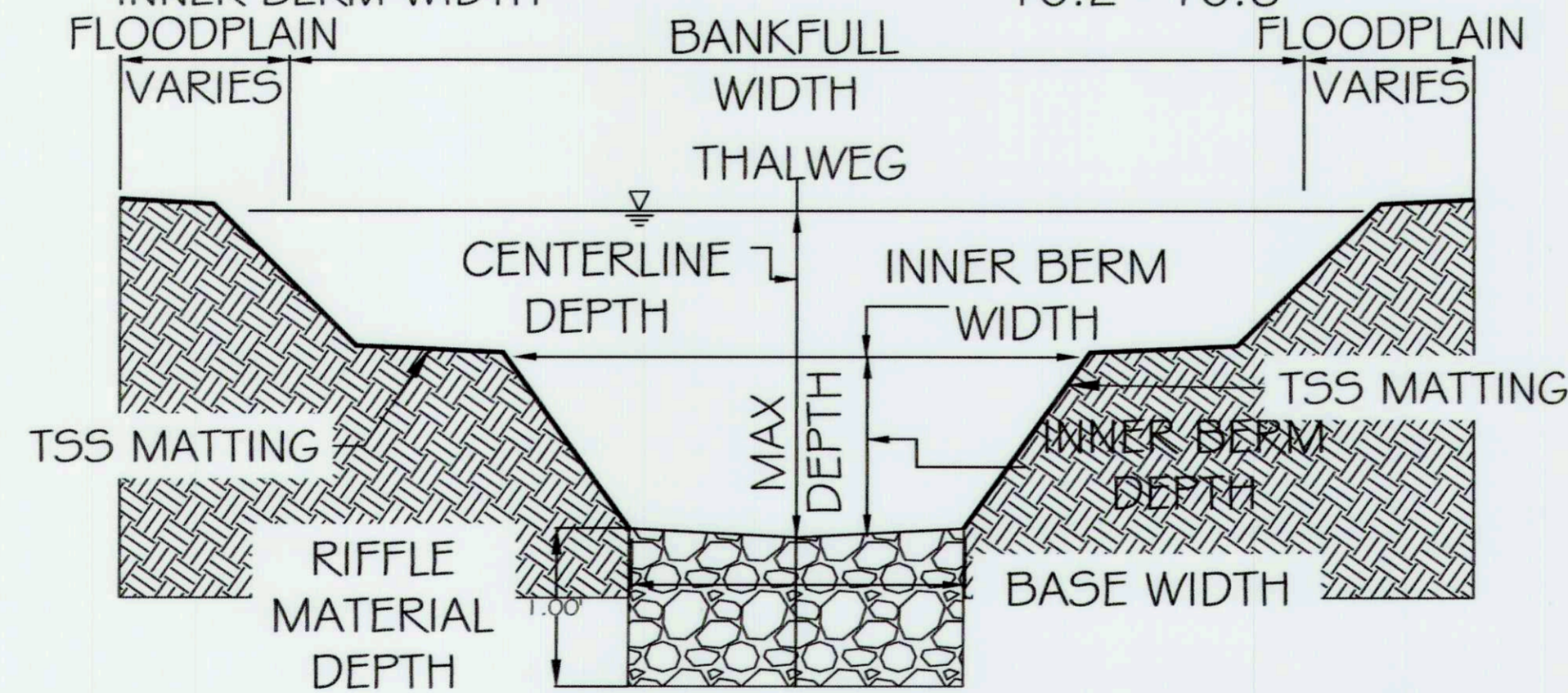
TYPICAL SECTION - POOL RIGHT (A)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.5 - 25.9
POINT BAR WIDTH		13.9 - 14.2
MAX DEPTH		3.18
BASE WIDTH		2.4 - 2.6
CENTERLINE DEPTH		1.6 - 1.9



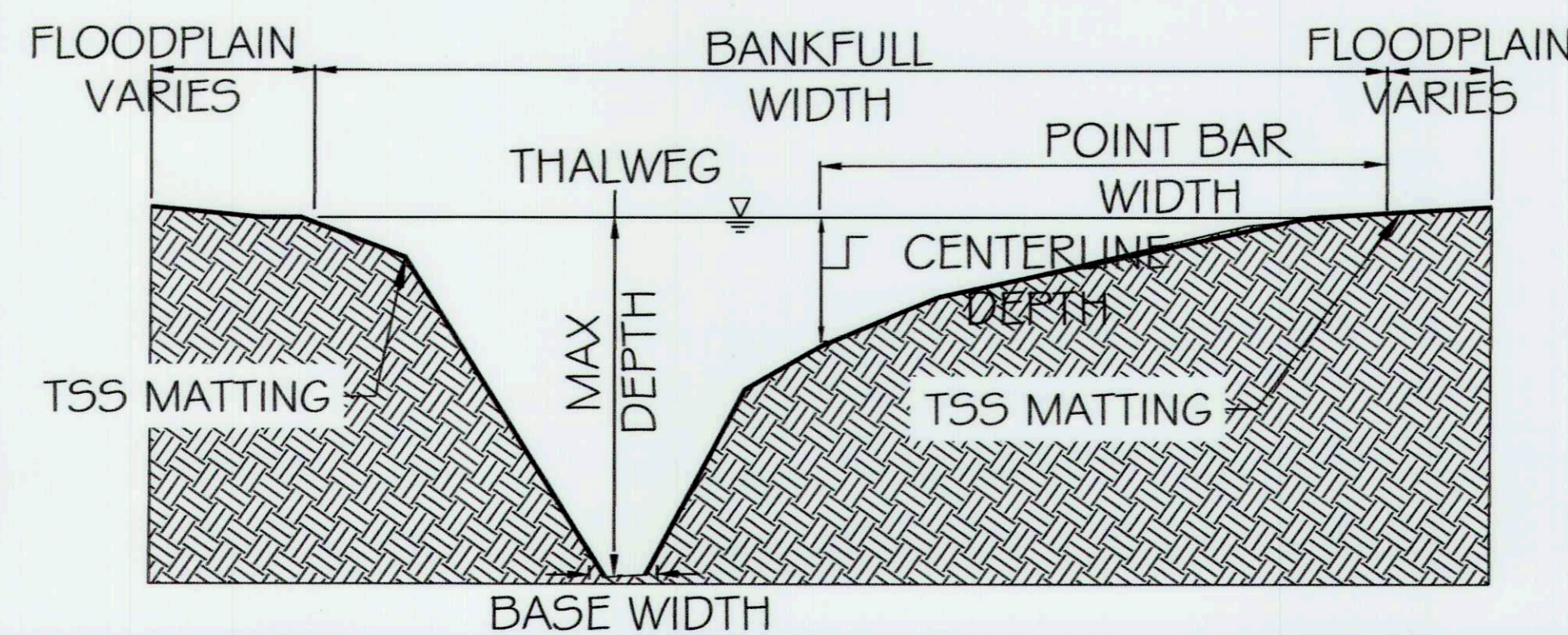
TYPICAL SECTION - RIFFLE (B)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		18.8 - 21.9
MAX/CENTERLINE DEPTH		1.95 - 2.25
BASE WIDTH		7.8 - 8.2
INNER BERM DEPTH		1.3 - 1.5
INNER BERM WIDTH		10.2 - 10.6



TYPICAL SECTION - POOL LEFT (C)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.5 - 25.9
POINT BAR WIDTH		13.9 - 14.2
MAX DEPTH		3.18
BASE WIDTH		2.4 - 2.6
CENTERLINE DEPTH		1.6 - 1.9

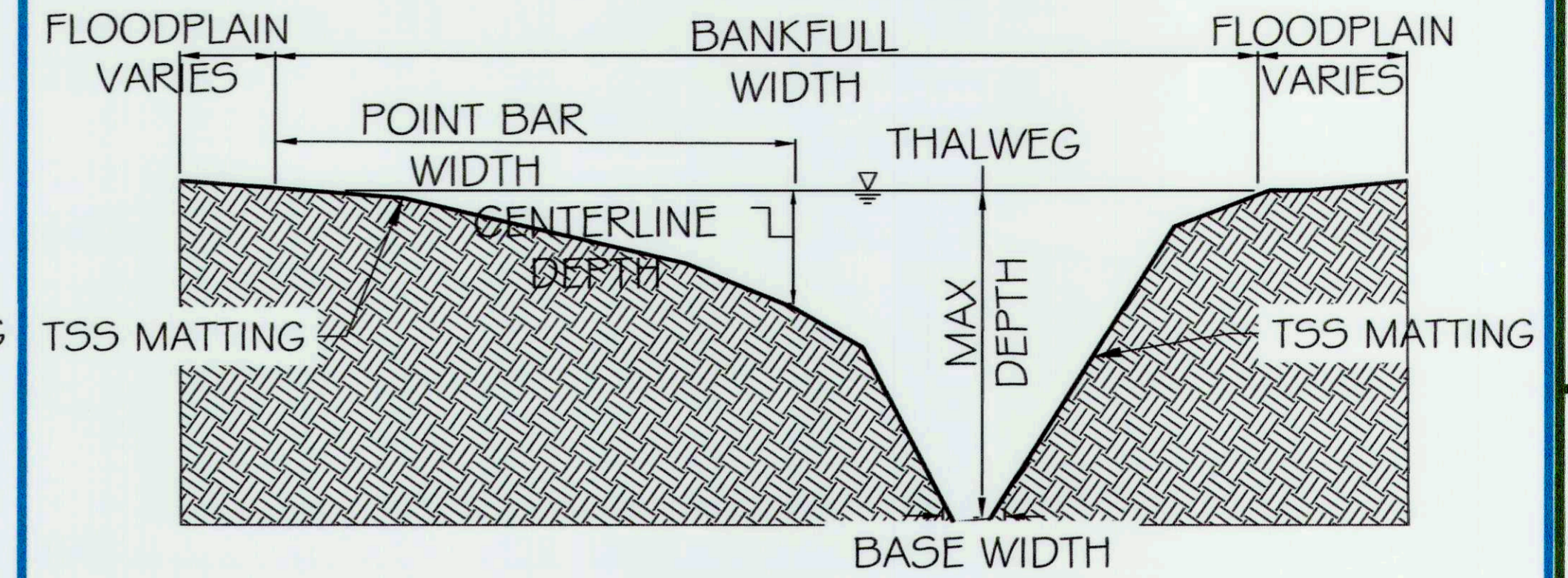


REACH 6 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

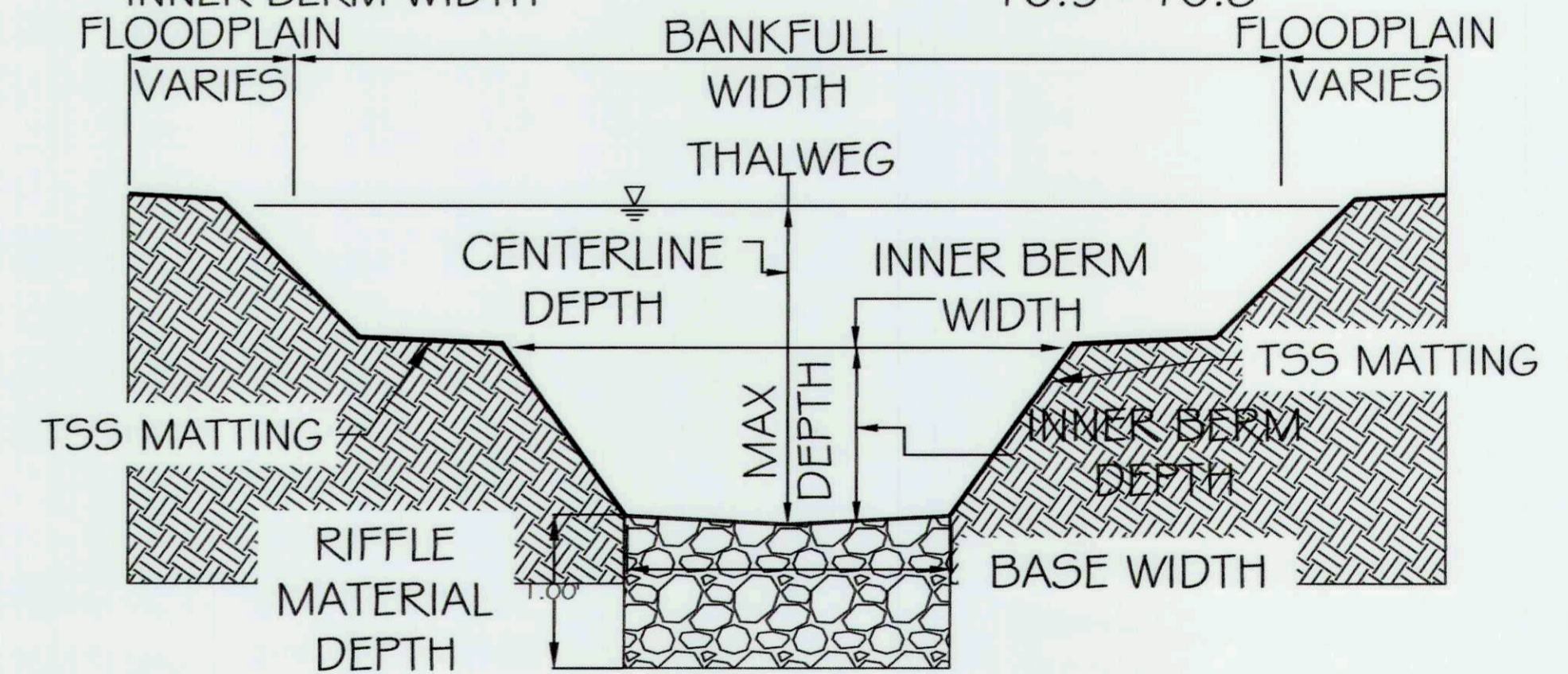
TYPICAL SECTION - POOL RIGHT (A)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.8 - 26.2
POINT BAR WIDTH		14.1 - 14.5
MAX DEPTH		3.18
BASE WIDTH		2.4 - 2.8
CENTERLINE DEPTH		1.7 - 2.0



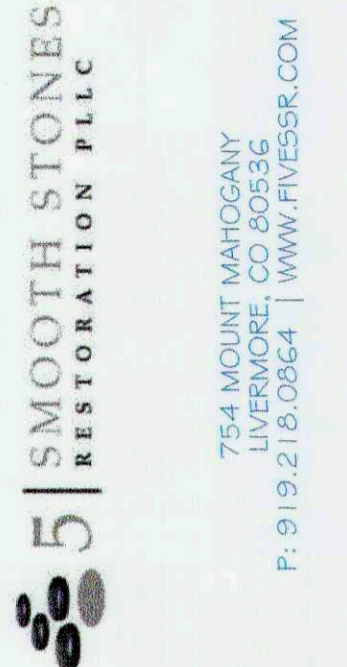
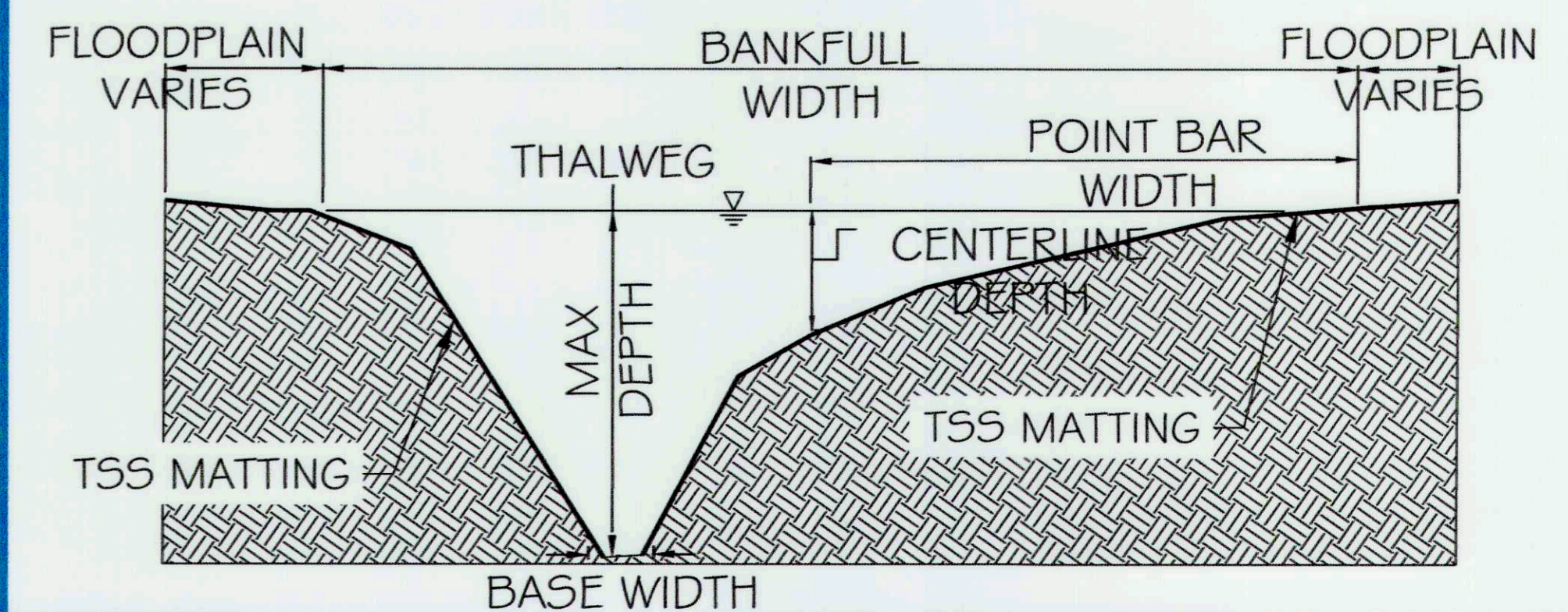
TYPICAL SECTION - RIFFLE (B)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		18.9 - 22.0
MAX/CENTERLINE DEPTH		2.1 - 2.4
BASE WIDTH		8.0 - 8.3
INNER BERM DEPTH		1.3 - 1.6
INNER BERM WIDTH		10.5 - 10.8



TYPICAL SECTION - POOL LEFT (C)

DESIGN PARAMETERS	NTS	SIZE (FT)
BANKFULL WIDTH		25.8 - 26.2
POINT BAR WIDTH		14.1 - 14.5
MAX DEPTH		3.18
BASE WIDTH		2.4 - 2.8
CENTERLINE DEPTH		1.7 - 2.0



CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS
TYPICAL SECTIONS
 WOODBINE, HOWARD COUNTY, MD

REVISIONS:
 (A)



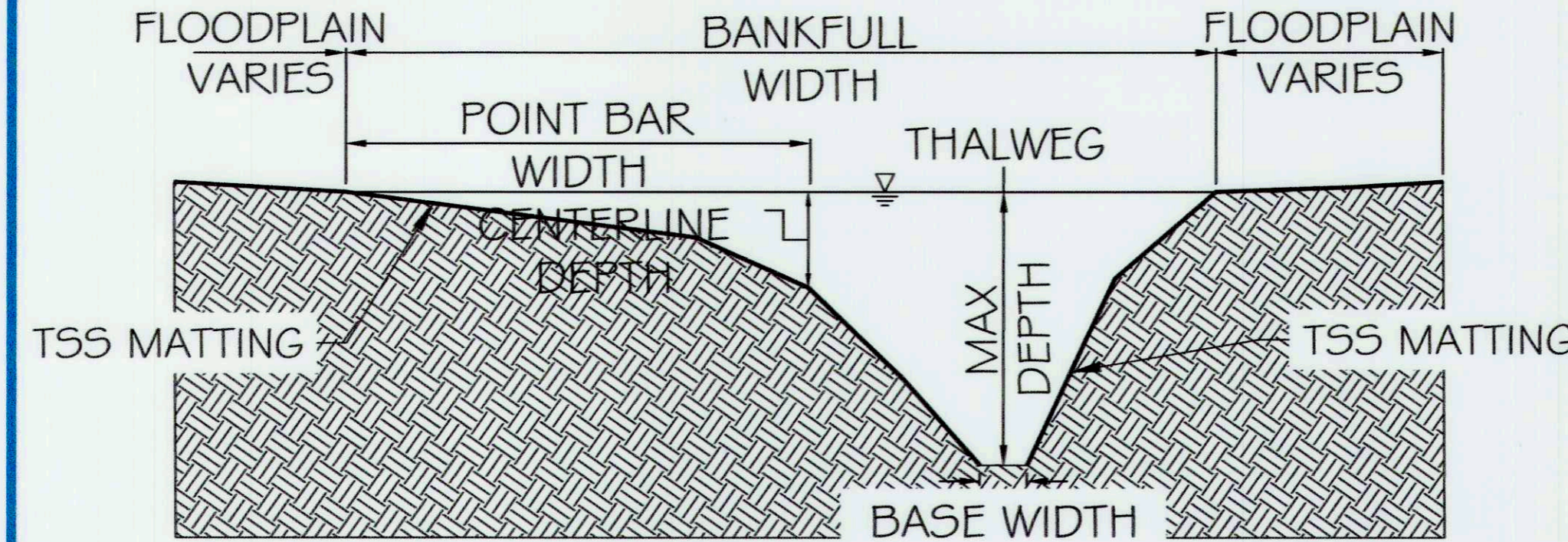
APPROVED: DEPT. OF PUBLIC WORKS
 Chief, Bureau of Environmental Services
 PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MGCPDC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 27 OF 49

REACH 7 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

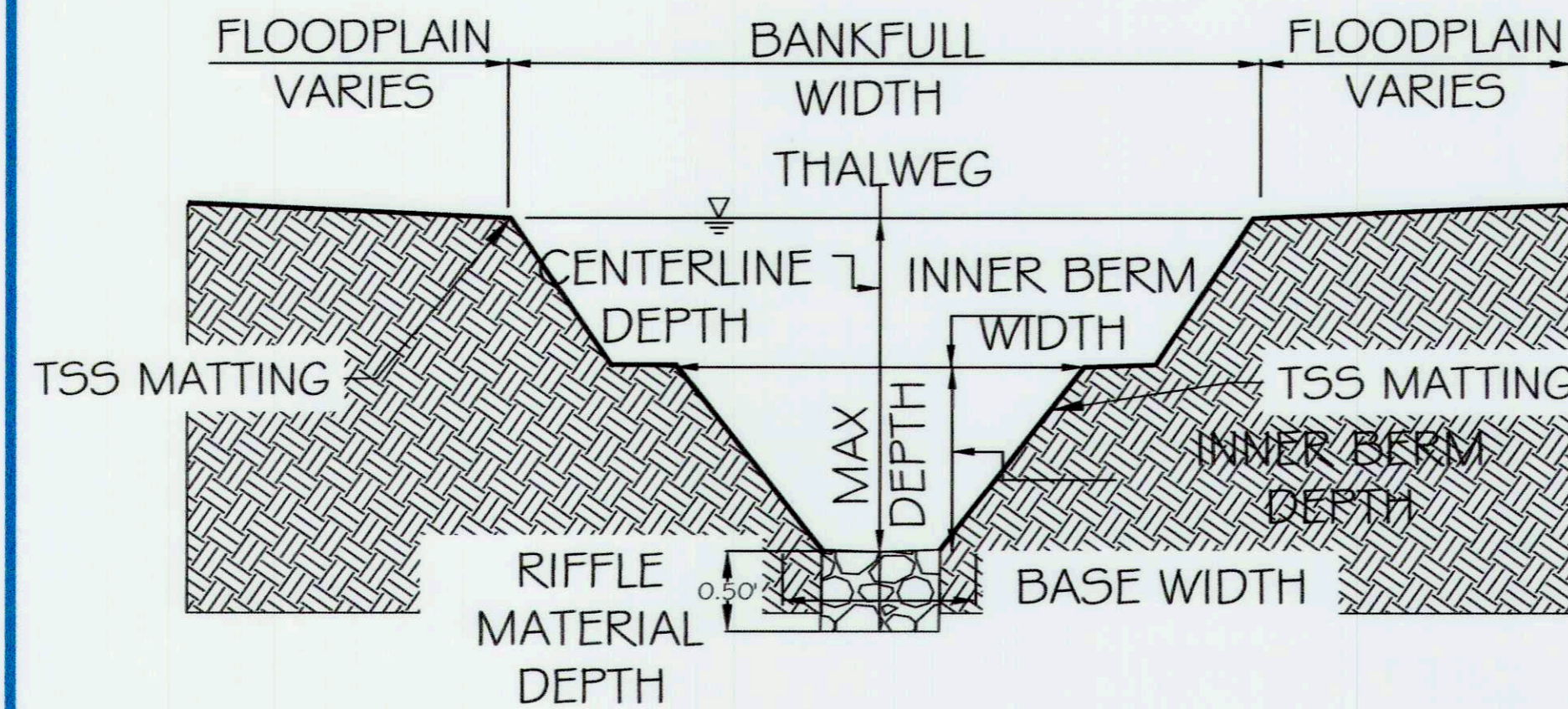
TYPICAL SECTION - POOL RIGHT (A)
NTS

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	6.6 - 7.2
POINT BAR WIDTH	3.7 - 4.0
MAX DEPTH	0.85
BASE WIDTH	0.4 - 0.6
CENTERLINE DEPTH	0.4 - 0.6



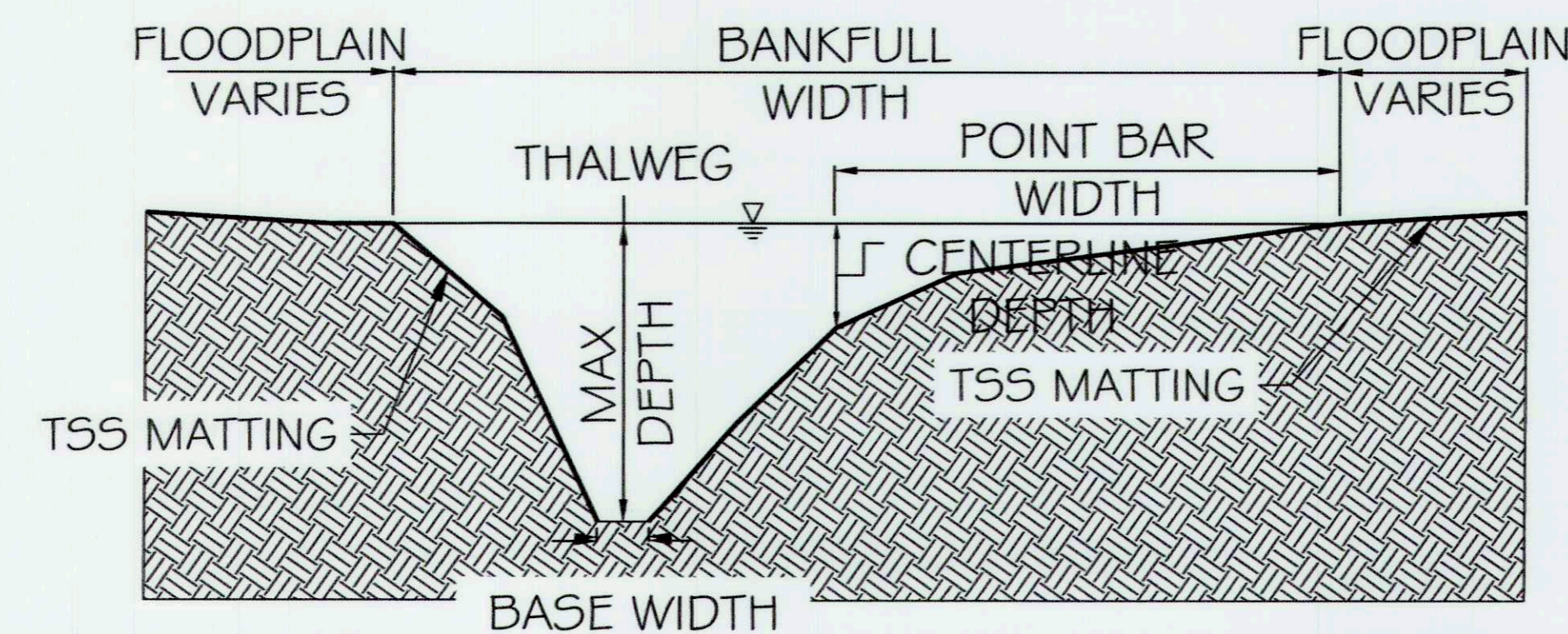
TYPICAL SECTION - RIFFLE (B)
NTS

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	5.8 - 6.8
MAX/CENTERLINE DEPTH	0.6 - 0.8
BASE WIDTH	1.9 - 2.1
INNER BERM DEPTH	0.4 - 0.5
INNER BERM WIDTH	2.5 - 2.8



TYPICAL SECTION - POOL LEFT (C)
NTS

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	6.6 - 7.2
POINT BAR WIDTH	3.7 - 4.0
MAX DEPTH	0.85
BASE WIDTH	0.4 - 0.6
CENTERLINE DEPTH	0.4 - 0.6

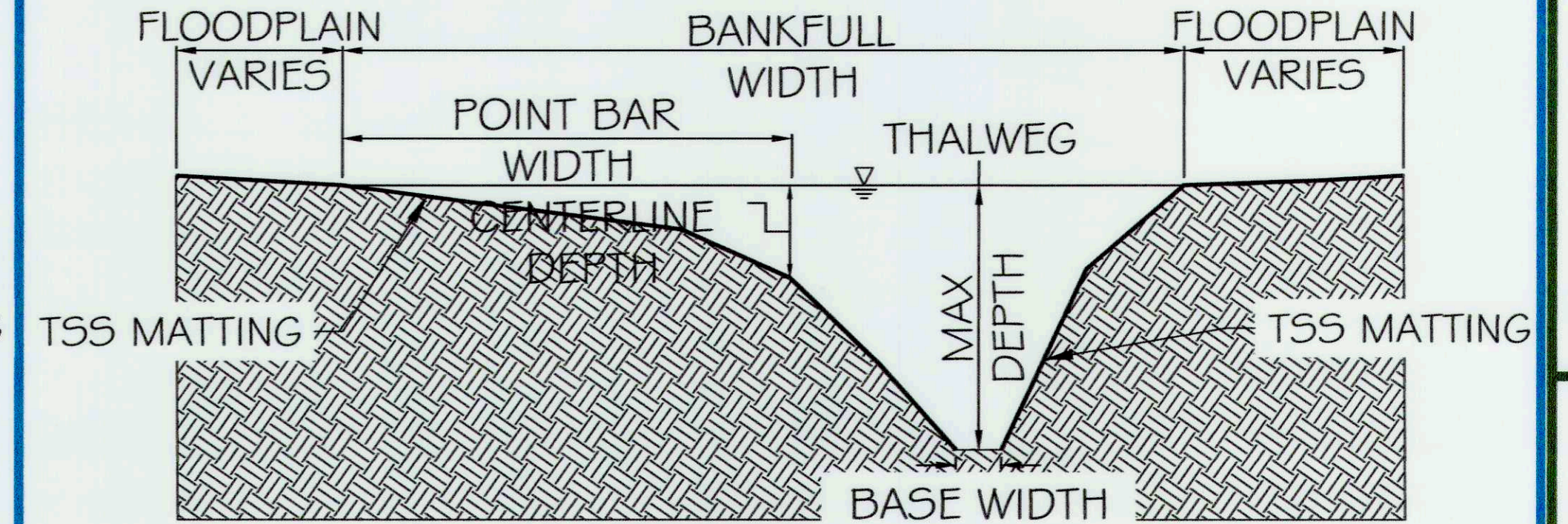


REACH 8 - TYPICAL SECTION

SEE SHEET 25 TABLE 1 FOR APPLICABLE SLOPES PER TYPICAL SECTION AND REACH

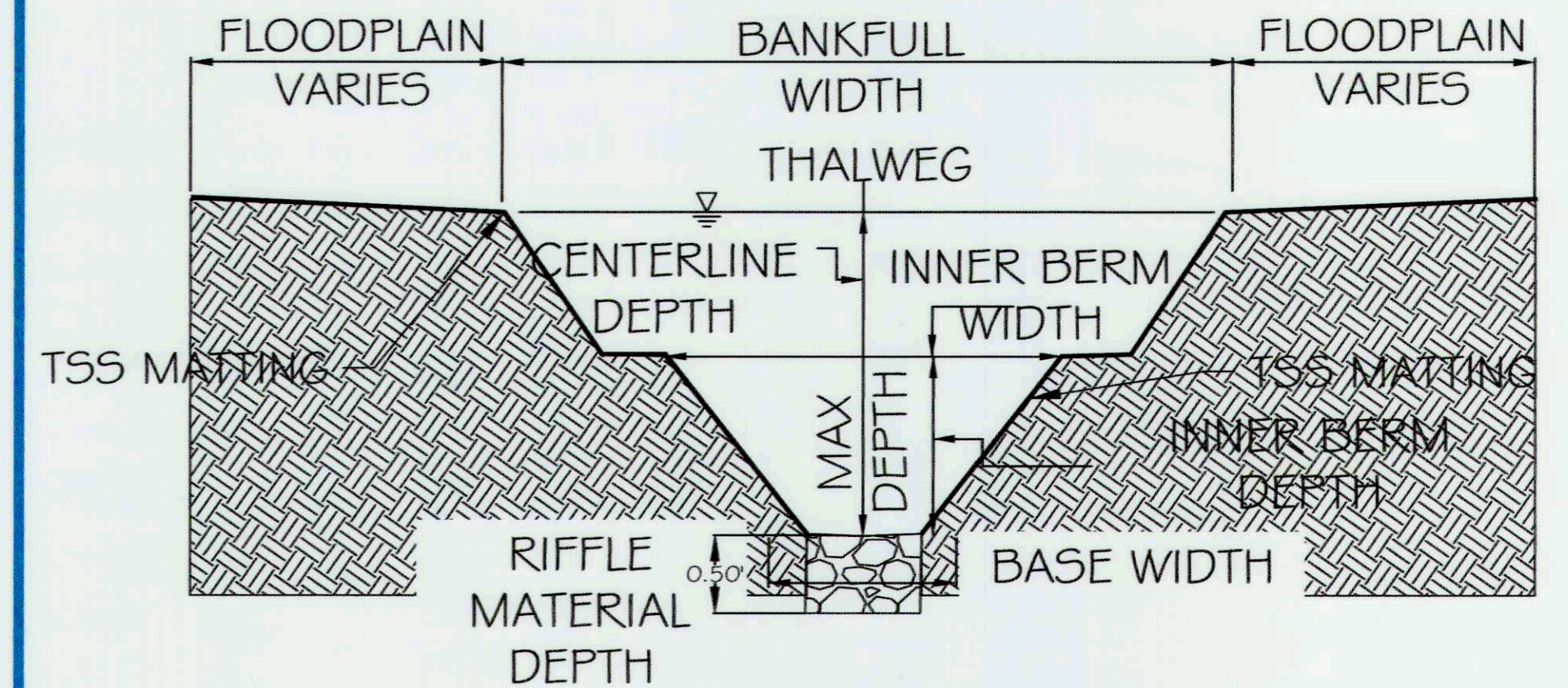
TYPICAL SECTION - POOL RIGHT (A)
NTS

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	5.5 - 5.9
POINT BAR WIDTH	3.0 - 3.2
MAX DEPTH	0.77
BASE WIDTH	0.4 - 0.6
CENTERLINE DEPTH	0.5 - 0.6



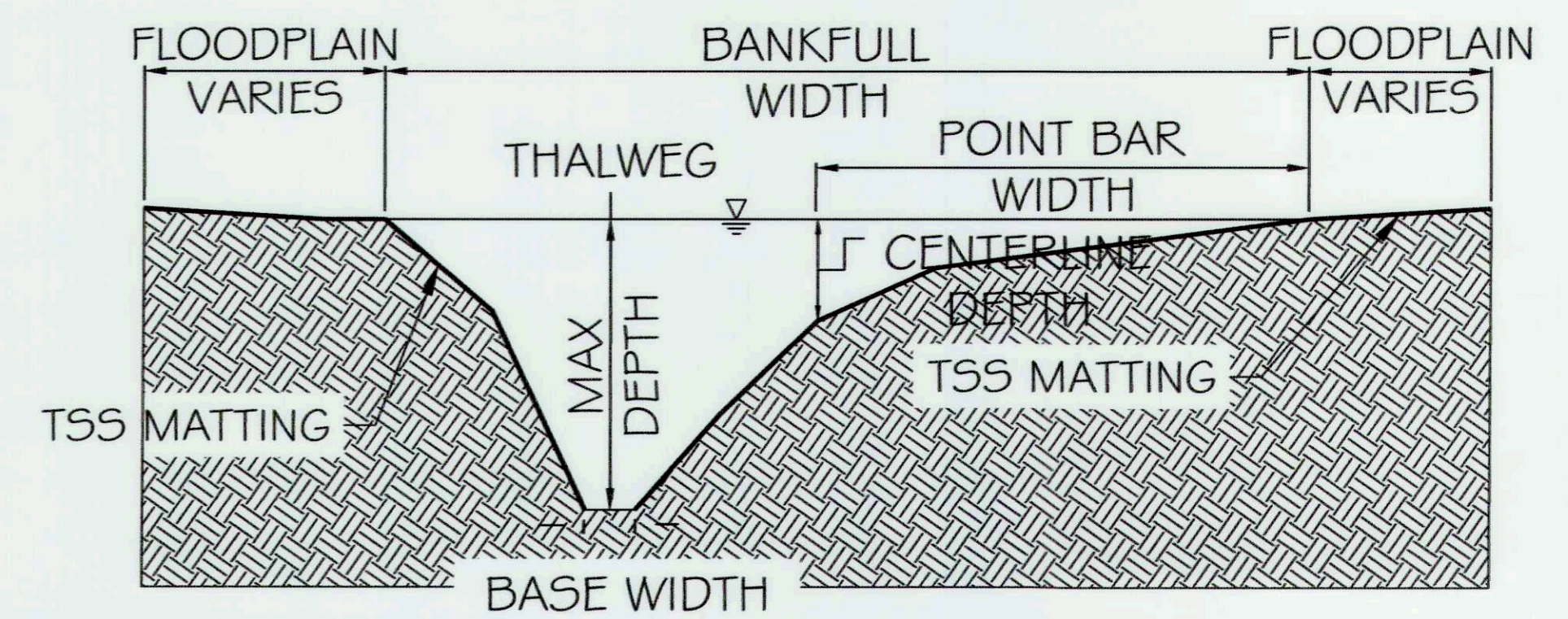
TYPICAL SECTION - RIFFLE (B)
NTS

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	4.7 - 6.8
MAX/CENTERLINE DEPTH	0.4 - 0.6
BASE WIDTH	1.8 - 2.1
INNER BERM DEPTH	0.6 - 0.8
INNER BERM WIDTH	2.6 - 2.9



TYPICAL SECTION - POOL LEFT (C)
NTS

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	5.5 - 5.9
POINT BAR WIDTH	3.0 - 3.2
MAX DEPTH	0.77
BASE WIDTH	0.4 - 0.6
CENTERLINE DEPTH	0.5 - 0.6



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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

TYPICAL SECTIONS

WOODBINE, HOWARD COUNTY, MD

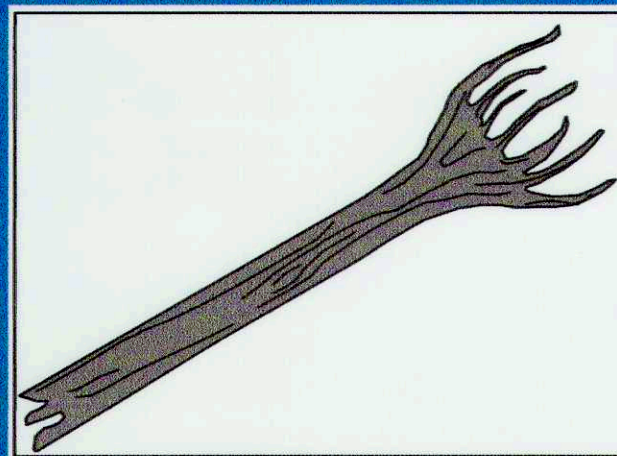
REVISIONS:

ENGINEER'S SEAL:

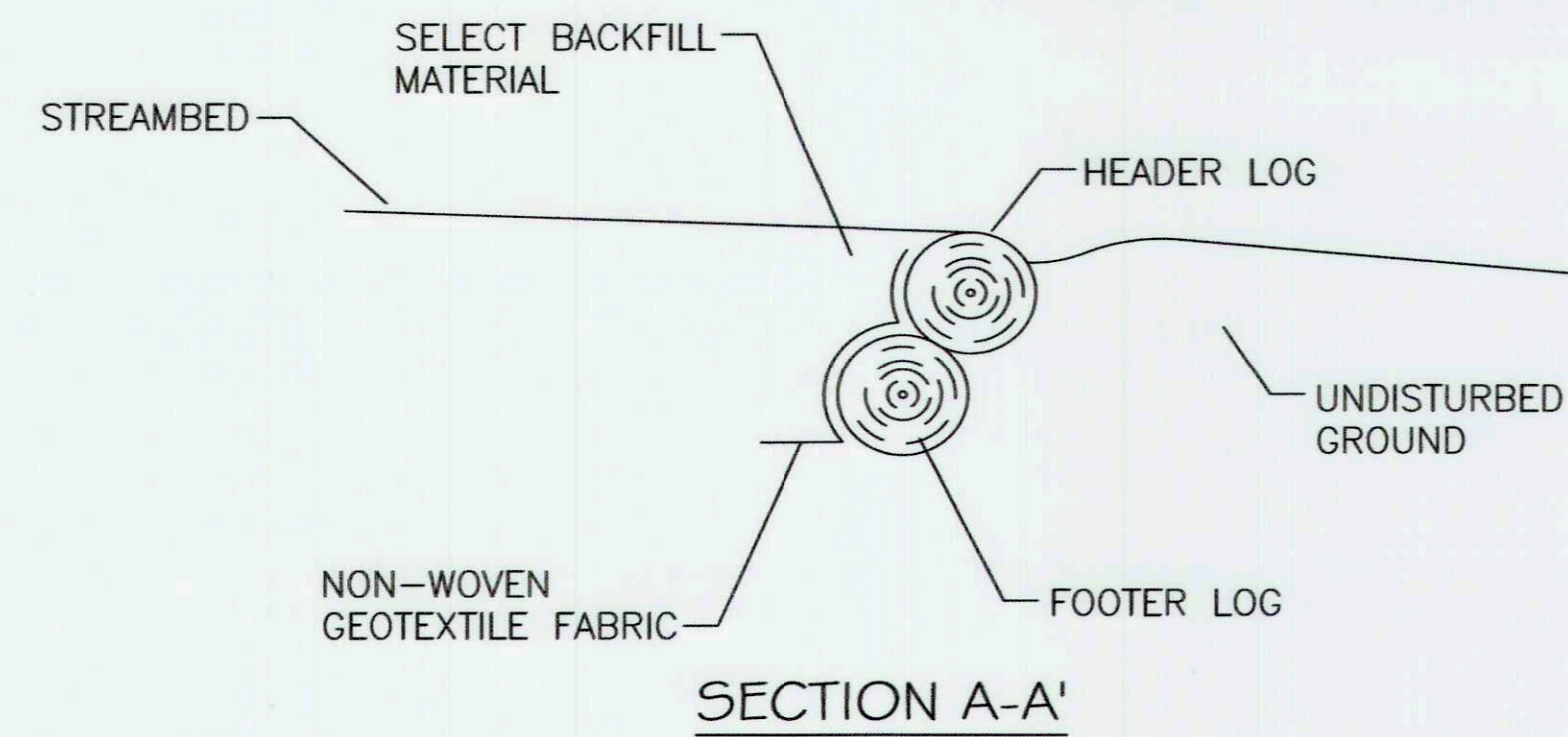


APPROVED: DEPT. OF PUBLIC WORKS
5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

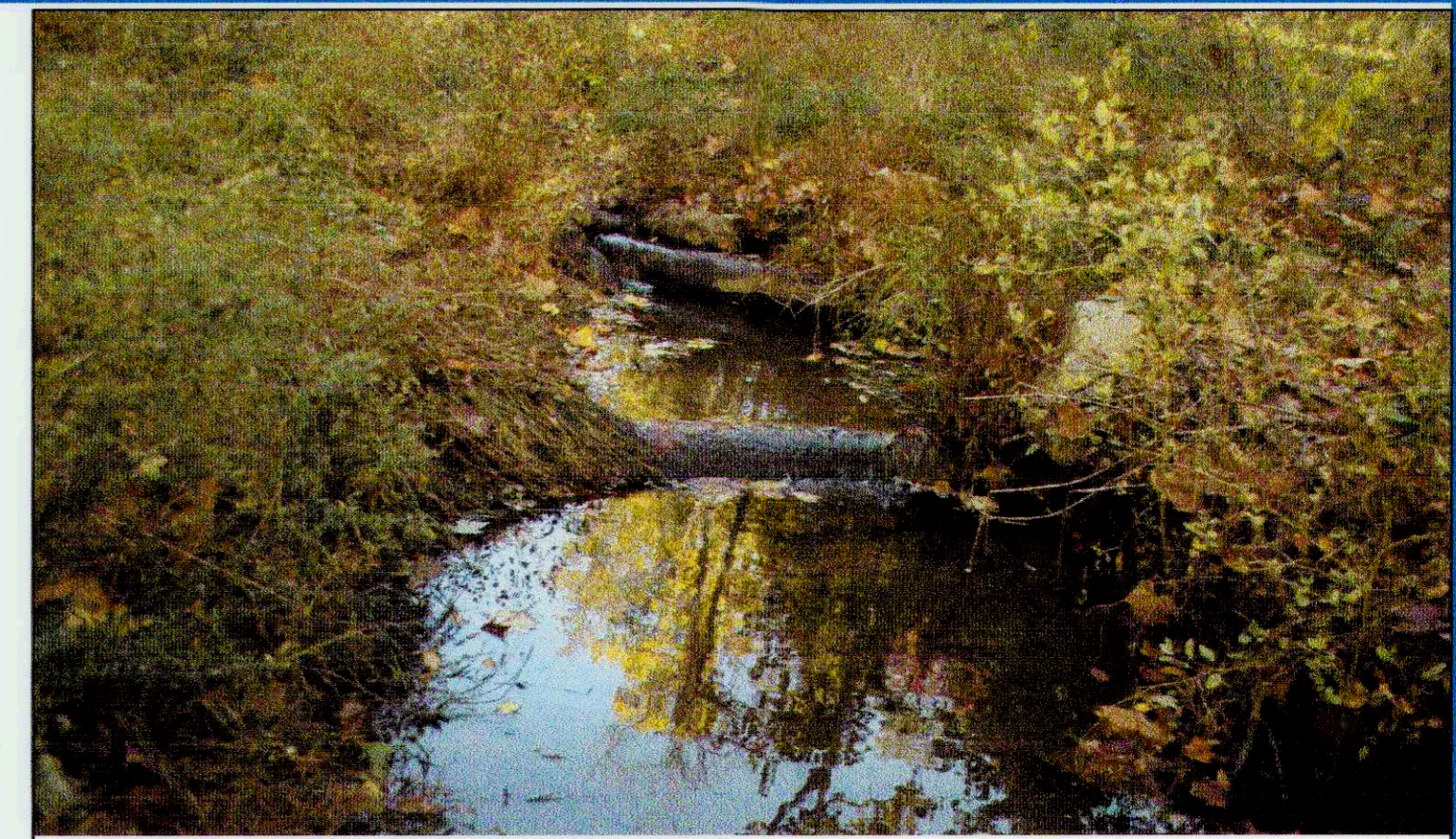
PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MGCP/DC
JOB NUMBER:	6172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO.:	



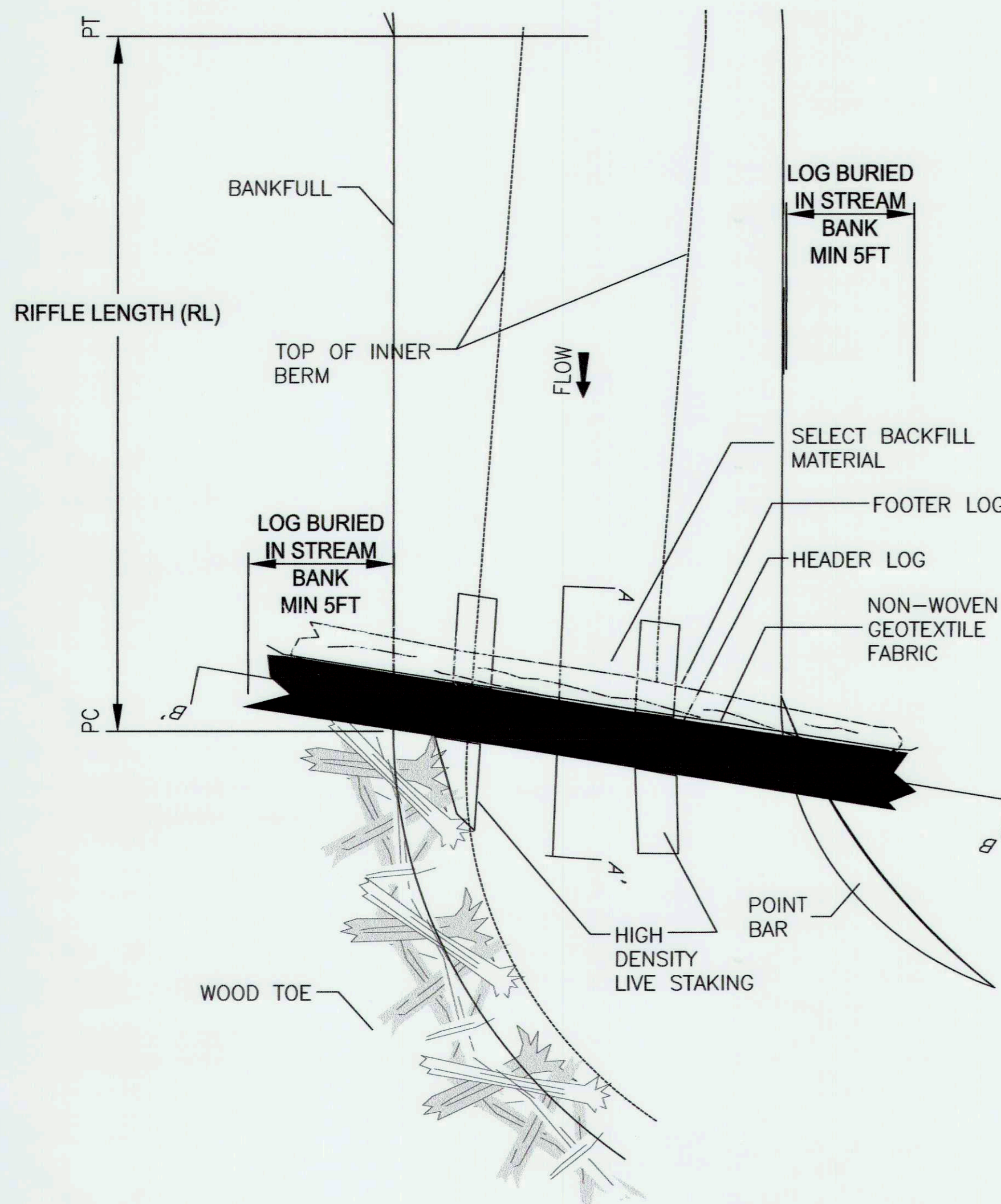
PLAN-SYMBOL



SECTION A-A'



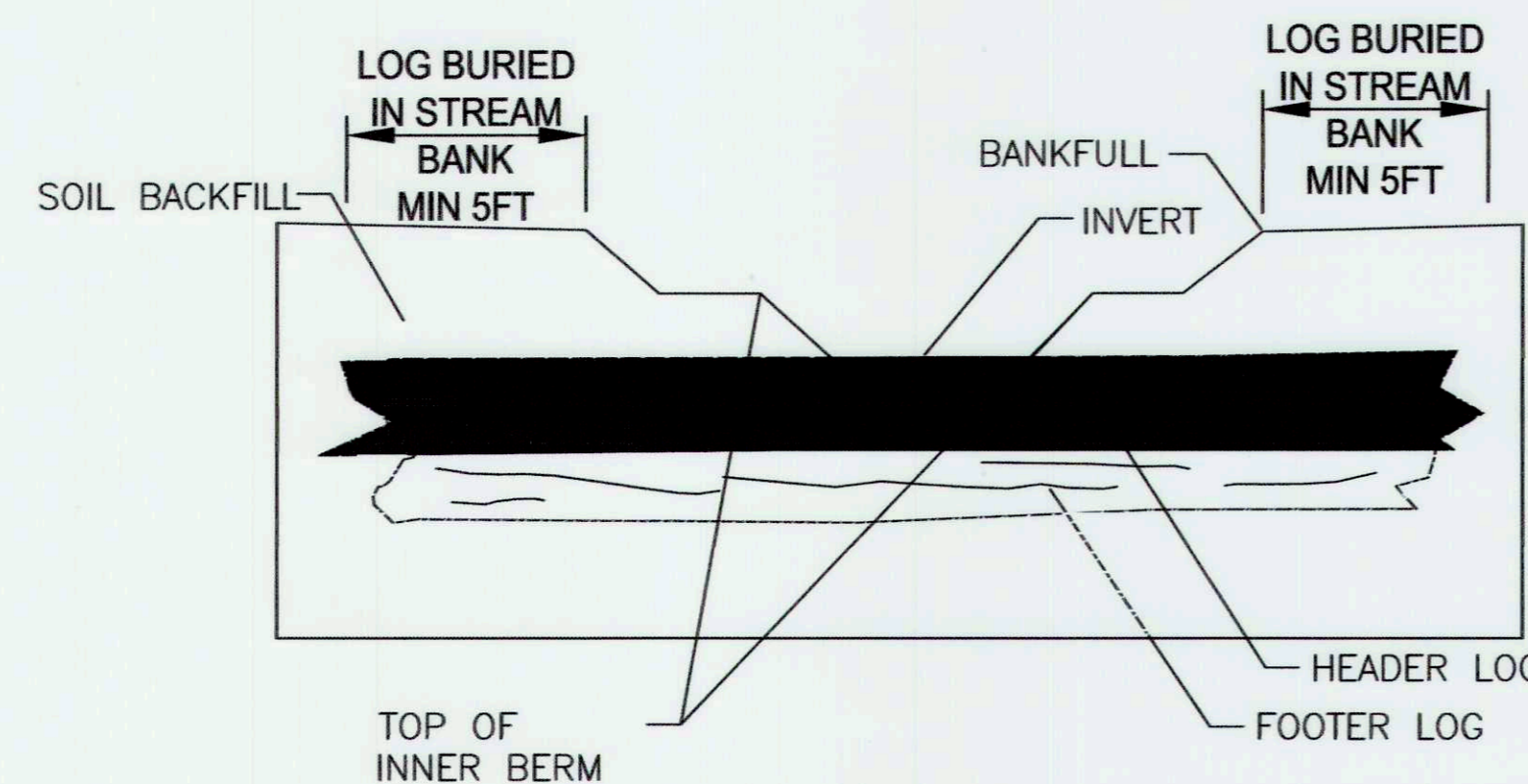
PURLEAR CREEK CONSTRUCTED 2007



PLANVIEW

NOTE:

- SOME LOG SILLS MAY BE INSTALLED AT THE PC IF INDICATED ON THE PLAN AND PROFILE SHEET. LOG SILLS LOCATED AT THE PC SHALL BE INSTALLED WITH SIMILAR PROCEDURE, EXCEPT THE LOGS SHALL HAVE A 1% VERTICAL SLOPE TOWARD THE INSIDE OF THE BEND. THE LOG SILL LOCATIONS SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2013 FORMAT DWG FILE.



SECTION B-B'

NOTES:

- LOGS SHALL HAVE MINIMUM DIAMETER OF 12"
- LOGS SHALL HAVE A MINIMUM LENGTH OF THE REACH BANKFULL WIDTH PLUS 10FT.
- IT IS PREFERRED THAT THE HEADER LOG USED FOR THIS STRUCTURE BE SLIGHTLY BOWED OR CURVED.
- IF A BOWED LOG IS USED FOR THE HEADER LOG, POSITION THE LOG SUCH THAT THE LOWEST POINT IS AT THE CENTERLINE OF THE CHANNEL AS SHOWN IN THE DETAIL.
- LIMBS OF ALL LOGS SHALL BE TRIMMED FLUSH.
- FOOTER LOGS ARE LOGS PLACED TO PROVIDE A FOUNDATION AND SCOUR PROTECTION FOR THE HEADER LOGS.
- THE HEADER LOG SHALL BE UNDERLAIN BY A FOOTER LOG UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- HEADER LOGS ARE THE UPPER MOST LOGS USED IN EACH STRUCTURE. THE HEADER LOG FOR THIS STRUCTURE IS ONLY VISIBLE BETWEEN THE INNER BERMS.
- HEADER LOG SHALL BE OFFSET SLIGHTLY DOWNSTREAM OF THE FOOTING LOG.
- SET INVERT TO MATCH STREAM BED ELEVATION AS PER THE DESIGN PROFILE.
- THE VERTICAL SLOPE OF EACH LOG SHALL BE 0% AND AT NOT EXCEED 1% UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ALL GAPS/VOIDS LARGER THAN 1 INCH BETWEEN THE HEADER AND FOOTER LOGS SHALL BE CHINKED WITH LIMBS AND/OR BRUSH ON THE UPSTREAM SIDE PRIOR TO PLACEMENT OF THE GEOTEXTILE.
- ON THE UPSTREAM SIDE OF THE LOGS NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED AS SHOWN IN THE GEOTEXTILE PLACEMENT DETAIL THE ENTIRE LENGTH OF THE LOG.
- BACKFILL STRUCTURE WITH SELECT BACKFILL MATERIAL AS SHOWN AND DEFINED IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL.
- NAIL NON-WOVEN GEOTEXTILE TO EDGE OF HEADER LOG AND BACKFILL AS SHOWN IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL.
- SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
- THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
- RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- SEE WOOD TOE DETAIL.

DETAIL - LOG SILL
NOT TO SCALE

*THE DETAIL BELOW IS AN EXAMPLE OF GEOTEC FABRIC TO BE USED ON ALL STRUCTURES THAT EXCEEDS THE 2-YR MAX SHEAR STRESSES FOR EACH REACH. AN EQUAL MAY BE USED AS APPROVED BY ENGINEER OF RECORD.



6 oz. Nonwoven Spec Sheet

Non Woven Specification Sheet
6 oz. Non Woven Geotextile Fabric

The Non Woven Geotextile is a non-biodegradable filter fabric designed to help with stabilization, separation and other erosion control, stabilization, and drainage applications. Offering a needle-punched fabric design, the 6 oz. nonwoven geotextile meets the following minimum average roll values:

Property	Test Method	Roll Value
Tensile Strength	ASTM-D-4632	160 lbs.
Elongation	ASTM-D-4632	50 %
Trapezoidal Tear	ASTM-D-4533	60 lbs.
CBR Puncture Strength	ASTM-D-6241	410 lbs.
AOS	ASTM-D-4751	70 US Sieve
Permittivity	ASTM-D-4491	1.5 Sec-1
Water Flow Rate	ASTM-D-4491	110 gpm/ft
UV Resistance	ASTM-D-4355	70%/ 500 hours

Unless otherwise noted, this certification is based on testing conducted at the time of manufacturing.



Product Solutions for a Cleaner World

P.O. Box 780928 Sebring, FL 32978 Toll Free: (1) 888.703.9889 Fax: (+1) 772.589.3343 Int: (+1) 772.646.0597 Info@GraniteEnvironmental.com www.GraniteEnvironmental.com

OPERATION & MAINTENANCE

LOG SILL SHOULD BE VISUALLY INSPECTED AFTER EACH MAJOR STORM EVENT OR AT MINIMUM YEARLY DURING THE FIRST FIVE YEARS FOLLOWING IMPLEMENTATION. VISUAL INSPECTION SHOULD INCLUDE INSPECTION OF THE LOG TO EVALUATE ITS INTEGRITY AND TO ENSURE MINIMAL OR NO PIPING IS OCCURRING THROUGH THE STRUCTURE. VERTICAL INTEGRITY OF THE STRUCTURE SHOULD BE EVALUATED BY LONGITUDINAL PROFILE FOLLOWING THE USACE PERMIT MONITORING REQUIREMENTS. REPAIRS TO THE STRUCTURE SHOULD BE COMPLETED AS NEEDED.

NOTE:

MAXIMUM ALLOWABLE SHEAR STRESS: 4 LBS/SQ.FT.
MAXIMUM ALLOWABLE VELOCITY: 1.0 FT/S



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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

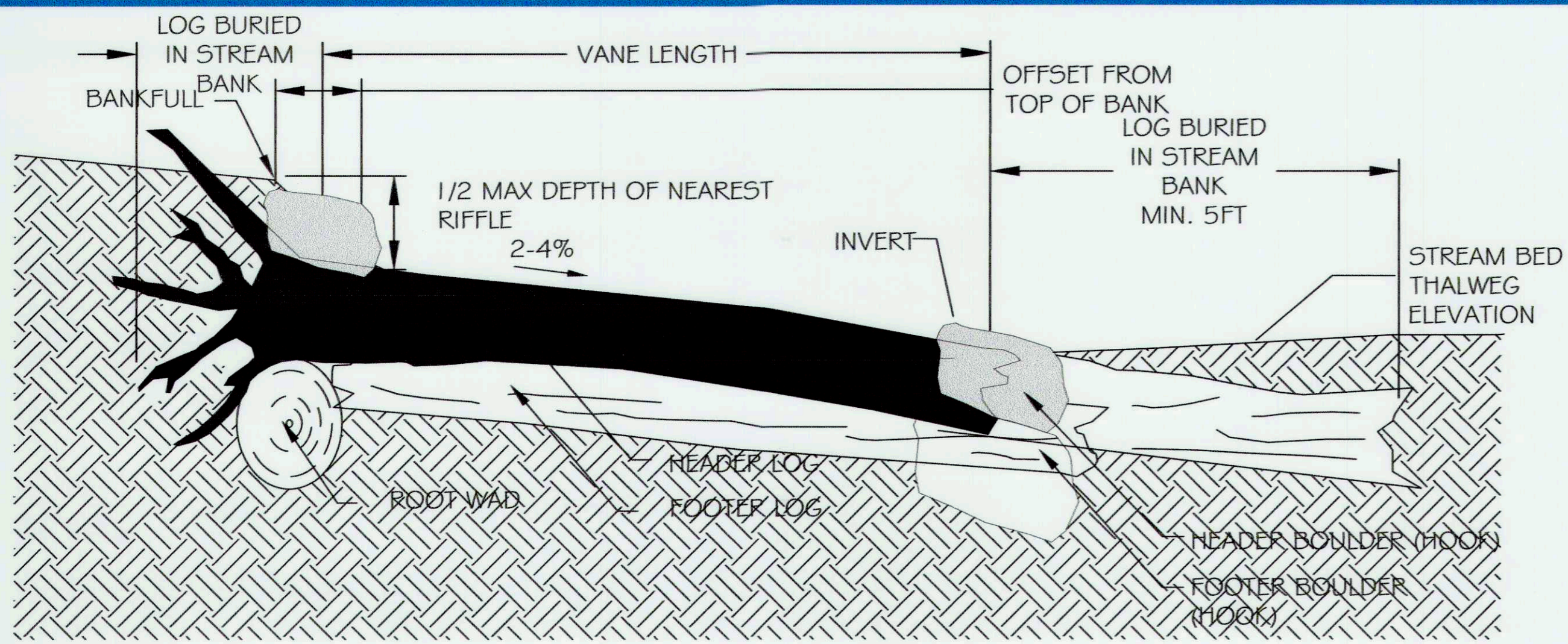
STREAM DETAILS
WOODBINE, HOWARD COUNTY, MD

REVISIONS:

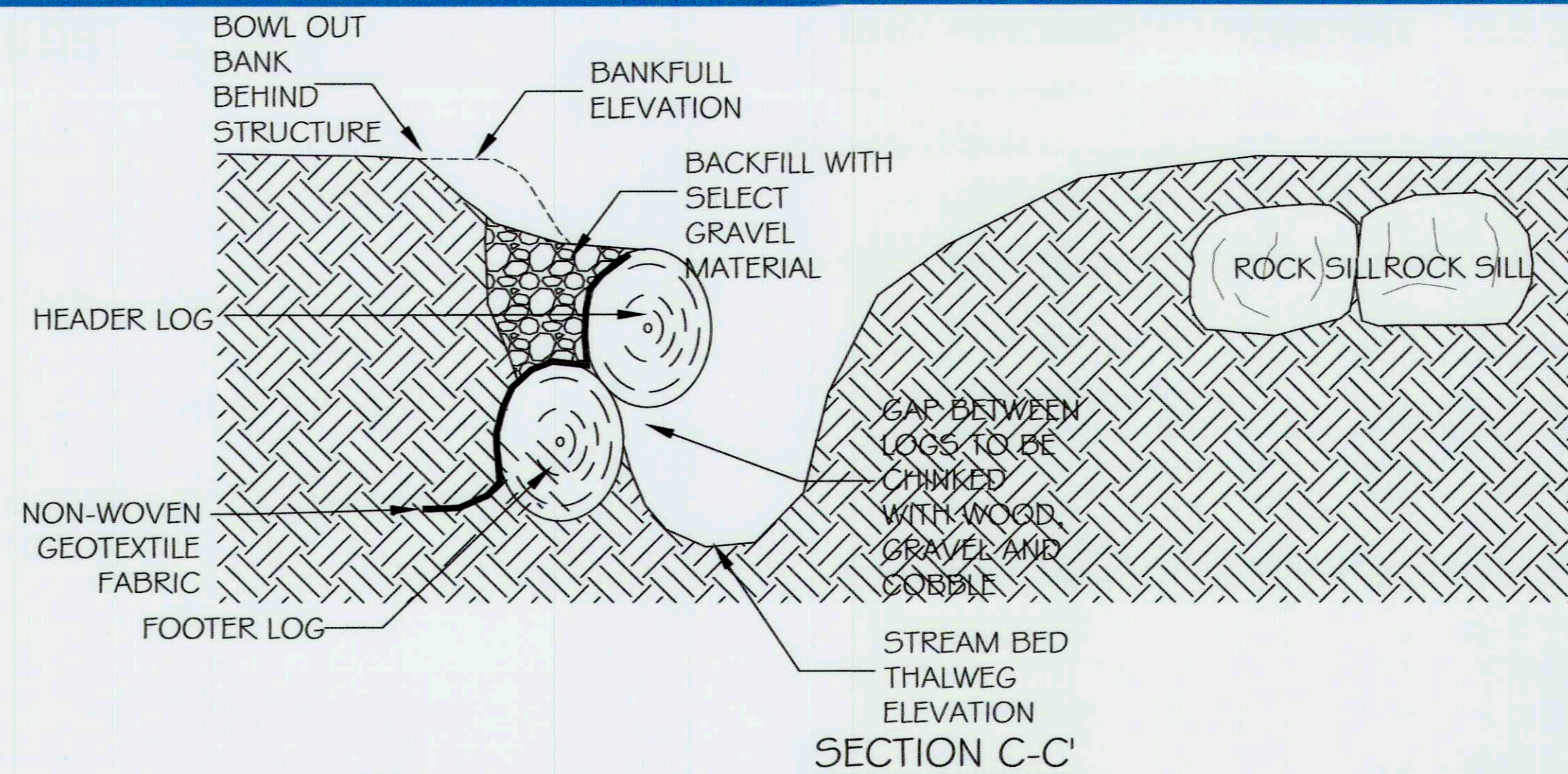
ENGINEER'S SEAL



DATE	5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES	
PROJECT MANAGER	RC
DESIGNED	DBMG
DRAWN	MG/CPDC
JOB NUMBER	6172.00
DESIGN TYPE	STREAM RESTORATION
DATE	12/14/2017
SHEET NO:	29 OF 49



SECTION A-A'



SECTION C-C'

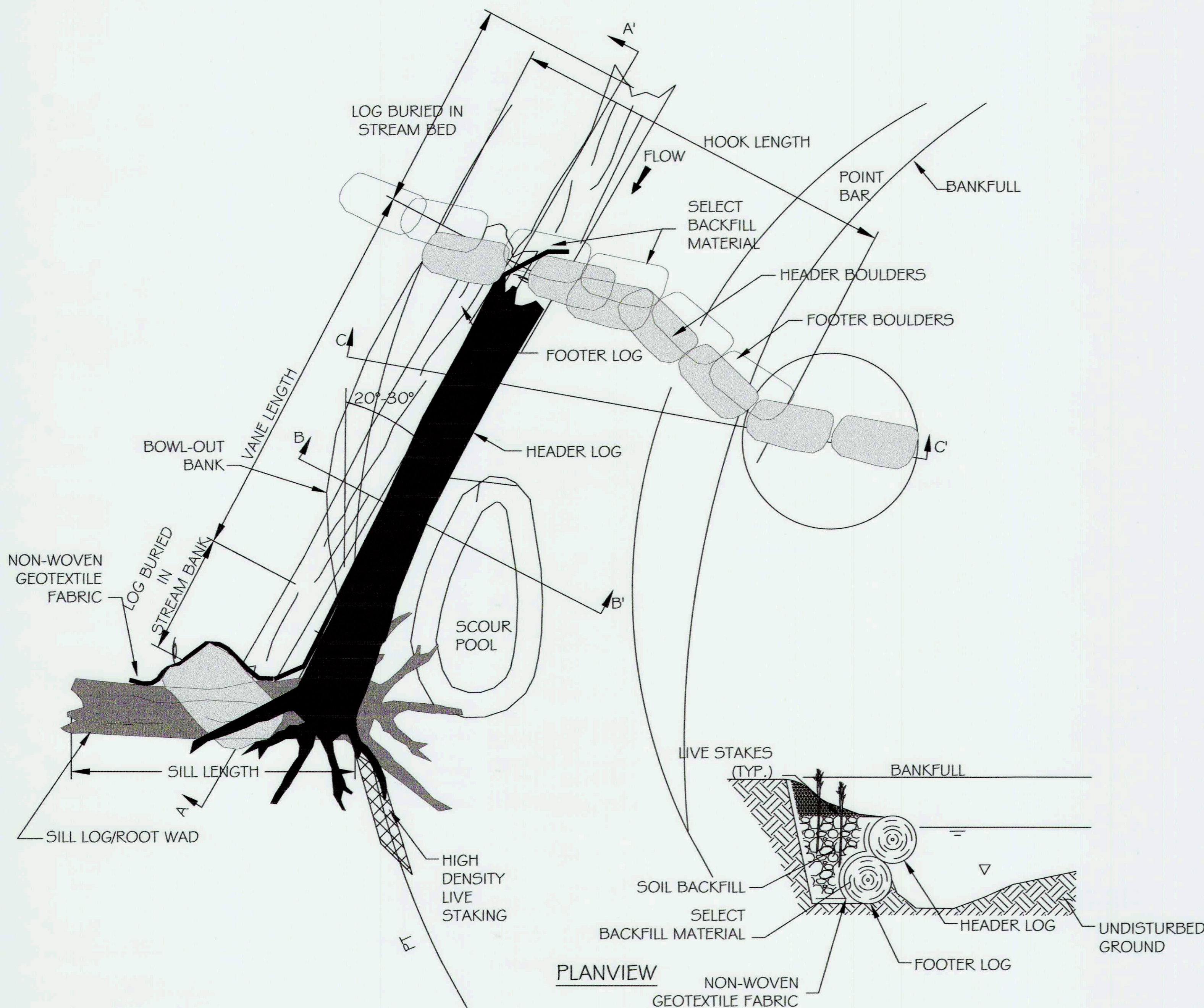
OPERATION & MAINTENANCE
 LOG J-HOOKS WITH ROOTWAD SHOULD BE VISUALLY INSPECTED AFTER EACH MAJOR STORM EVENT OR AT MINIMUM YEARLY DURING THE FIRST FIVE YEARS FOLLOWING IMPLEMENTATION. VISUAL INSPECTION SHOULD INCLUDE THE INTEGRITY AND TO ENSURE MINIMAL OR NO PIPING IS OCCURRING THROUGH THE STRUCTURE. VISUAL INSPECTION SHOULD ALSO INCLUDE BOULDER PLACEMENT, BACKFILL MATERIAL AND HORIZONTAL INTEGRITY OF THE STRUCTURE TO EVALUATE THE STABILITY OF INSTALLED BOULDERS. VERTICAL INTEGRITY OF THE STRUCTURE SHOULD BE EVALUATED BY LONGITUDINAL PROFILE FOLLOWING THE USACE PERMIT MONITORING REQUIREMENTS. REPAIRS TO THE STRUCTURE SHOULD BE COMPLETED AS NEEDED.

NOTES:

- LOGS SHALL HAVE MINIMUM DIAMETER OF 12" AND LENGTH AS SHOWN IN THE PLANS (~40' ON AVERAGE).
- ALL LOGS SHALL BE RELATIVELY STRAIGHT AND LIMBS SHALL BE TRIMMED FLUSH.
- FOOTER LOGS/BOULDERS ARE LOGS/BOULDERS PLACED TO PROVIDE A FOUNDATION AND SCOUR PROTECTION FOR THE HEADER LOGS/BOULDERS.
- HEADER LOGS/BOULDERS SHALL BE UNDERLAIN BY FOOTER LOGS/BOULDERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- HEADER LOGS ARE THE TOP MOST LOGS USED IN EACH LOG STRUCTURE. ALL HEADER LOGS CAN BE SEEN PROTRUDING FROM THE WATER SURFACE DURING EXTREMELY LOW FLOWS.
- HEADER LOGS SHALL BE OFFSET SLIGHTLY DOWNSTREAM OF THE FOOTING LOGS WHERE SCOUR POOLS ARE ANTICIPATED TO FORM AS SHOWN IN THE DETAIL.
- SILL LOGS SHALL BE PLACED PERPENDICULAR TO THE BANKFULL FLOW DIRECTION.
- THE FOOTER LOGS SHALL EXTEND FROM THE SILL LOG TO THE END OF THE HEADER LOG TOWARD THE BANK.
- HOOK BOULDERS SHALL EXTEND FROM THE HEADER LOG TO BEYOND BANKFULL WIDTH.
- SET INVERTS AT ELEVATION SHOWN ON THE PLAN AND PROFILE SHEETS. INVERTS AND ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE AND LN3 FILE. NO ELEVATIONS OF THE LOG DROPS STRUCTURE MAY VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTIONS FROM THE ENGINEER.
- HEADER LOG SHALL TIE INTO THE STREAM BANK AT A MAXIMUM ELEVATION OF 1/4 DMAX (MEASURED AT THE NEXT DOWNSTREAM RIFFLE) BELOW BANKFULL ELEVATION AND A MINIMUM ELEVATION OF 1/2 DMAX (MEASURED AT THE NEXT DOWNSTREAM RIFFLE) BELOW BANKFULL ELEVATION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- CUTTING OF THE SILL LOG ROOTWAD MAY BE REQUIRED TO PREVENT THE ROOTWAD FROM PROTRUDING ABOVE THE BANKFULL ELEVATION.
- ALL GAPS/VOIDS LARGER THAN 1 INCH BETWEEN THE HEADER AND FOOTING LOGS SHALL BE CHINKED WITH LIMBS AND/OR BRUSH ON THE UPSTREAM SIDE PRIOR TO PLACEMENT OF THE GEOTEXTILE.
- ALL GAPS/VOIDS LARGER THAN 1 INCH BETWEEN THE HEADER AND FOOTING BOULDERS SHALL BE CHINKED WITH GRAVEL AND COBBLES.
- ON THE UPSTREAM SIDE OF THE LOGS AND/OR BOULDERS NON-WOVEN GEOTEXTILE FABRIC (SEE SHEET 29 FOR SPECIFICATIONS) SHALL BE PLACED AS SHOWN IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL FOR THE ENTIRE LENGTH OF THE LOG AND BOULDER HOOK.
- BACKFILL STRUCTURE/STREAMBED WITH SELECT BACKFILL MATERIAL AS SHOWN AND DEFINED IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL.
- SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
- NAIL NON-WOVEN GEOTEXTILE TO EDGE OF HEADER LOG AND BACKFILL AS SHOWN IN THE GEOTEXTILE PLACEMENT AND SELECT BACKFILL DETAIL.
- THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
- RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- SEE THE PLANTING TABLE FOR DETAILS ON HIGH DENSITY LIVE STAKING.

NOTE:

MAXIMUM ALLOWABLE SHEAR STRESS: 4 LB5/SQ.FT.
 MAXIMUM ALLOWABLE VELOCITY: 1.0 FT/5



PLANVIEW

SECTION B-B'

○ DETAIL - LOG J-HOOK / WITH ROOTWAD
 NOT TO SCALE

NOTE:

THE DEPARTURE ANGLE SHOWN ABOVE IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE AND STRUCTURE LOCATION SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2013 FORMAT DWG FILE. REFER TO SHEET 25 TABLE 3 FOR APPROPRIATE ROCK AND BOULDER SIZES.

ores
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SMOOTH STONES RESTORATION PLLC
 754 MOUNT MAHOGANY
 WOODBINE, MD 21796
 P: 919.218.0864 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

STREAM DETAILS

WOODBINE, HOWARD COUNTY, MD

REVISIONS:



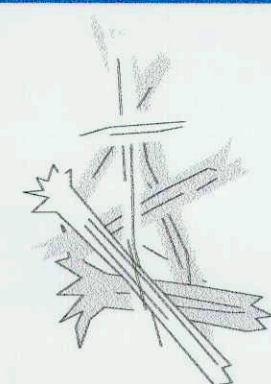
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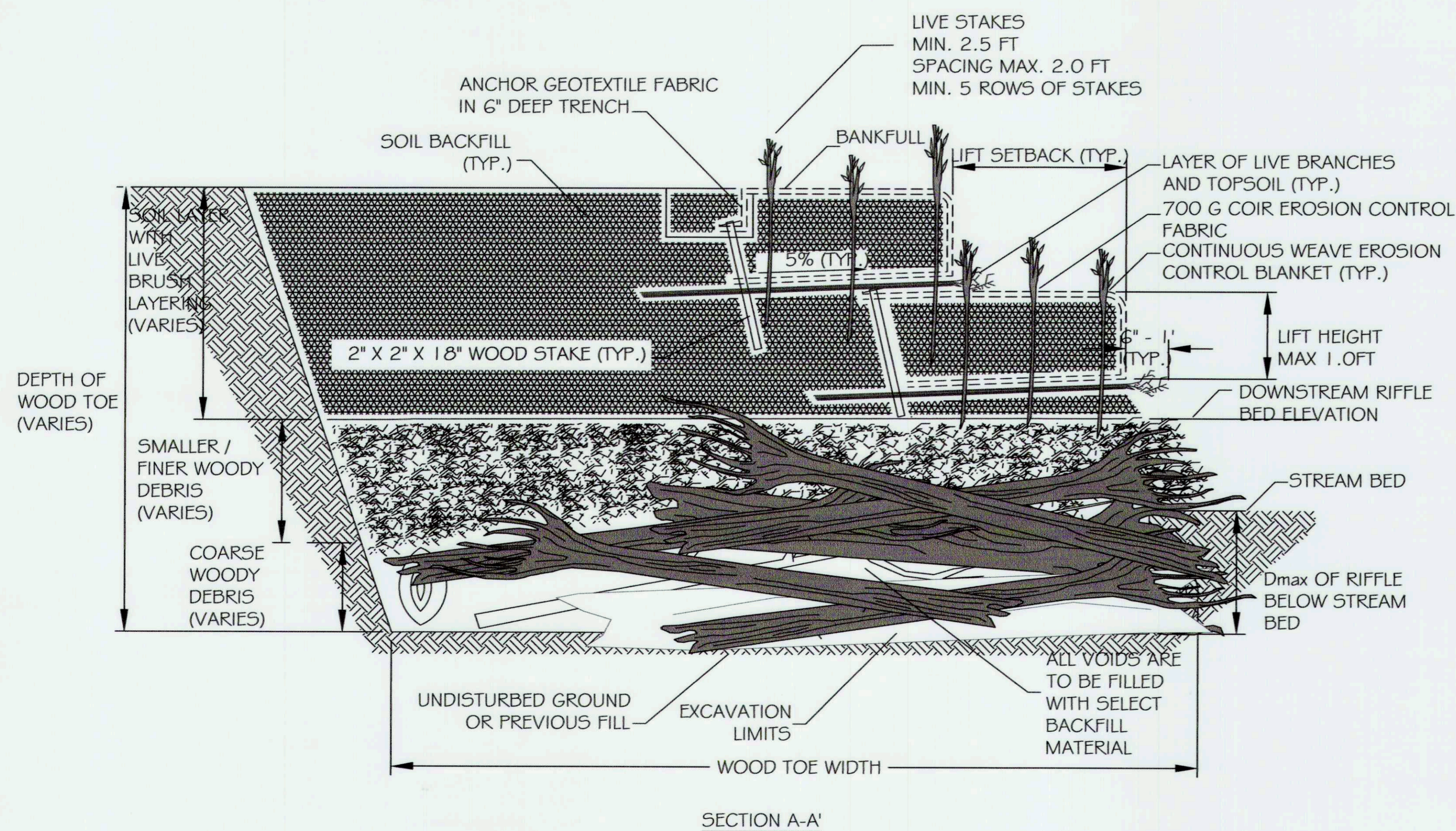
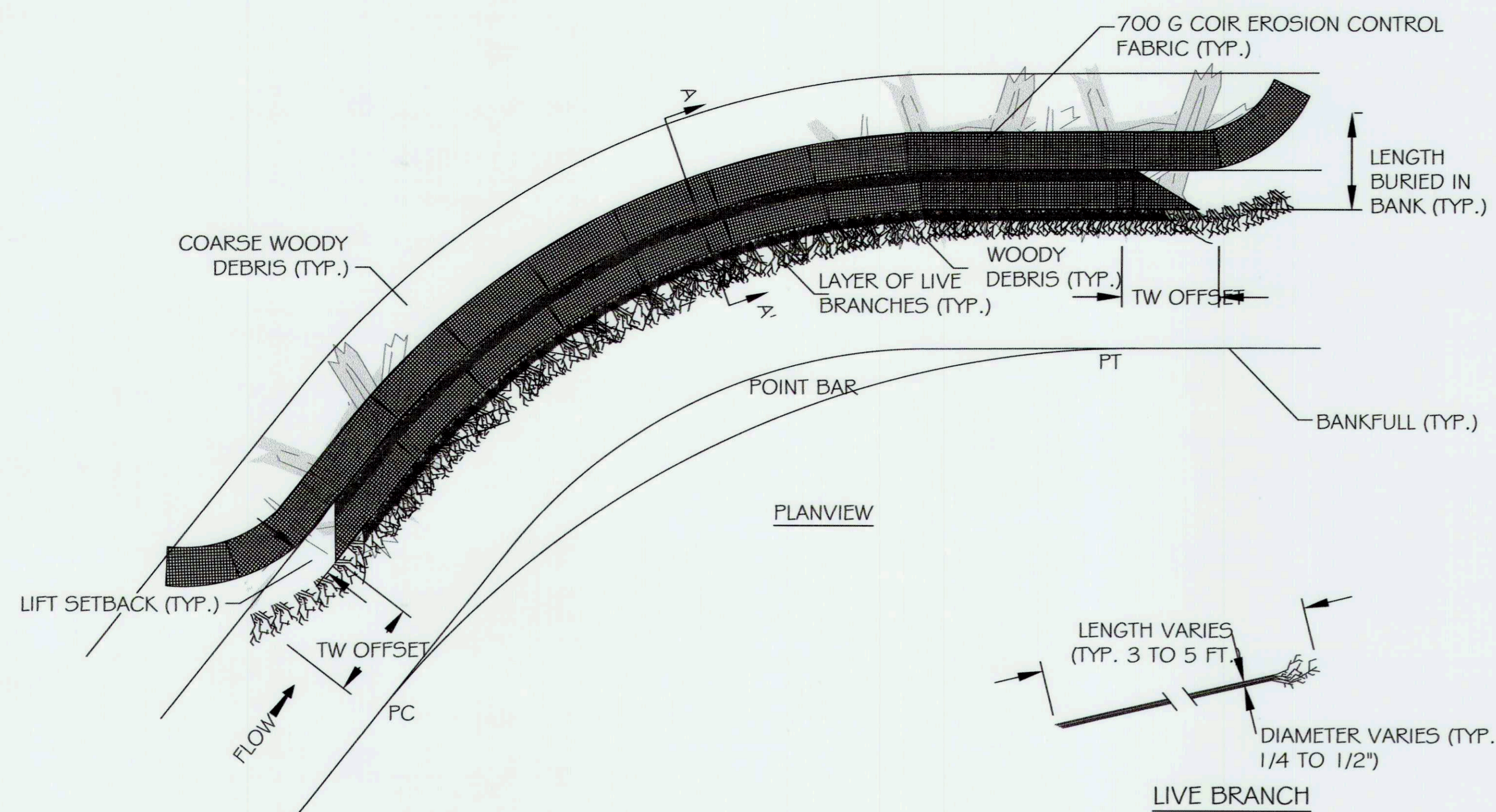
APPROVED: DEPT. OF PUBLIC WORKS

Mark Williams
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MC/CP/DC
JOB NUMBER:	6172.00
DESIGN TYPE:	STREAM RESTORATION
DATE:	12/14/2017
SHEET NO.:	



PLAN-SYMBOL



DETAIL - WOOD TOE
NOT TO SCALE

NOTES:

1. COARSE WOODY DEBRIS SHALL CONSIST OF LOGS, ROOTWADS, AND LARGE BRANCHES NOT SUITABLE FOR CONSTRUCTION OF LOG STRUCTURES. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER.
2. COARSE WOODY DEBRIS SHALL BE CONSTRUCTED WITH THE LARGEST MATERIAL PLACED FIRST. NO LOGS SHALL BE PLACED PARALLEL TO THE FLOW OF WATER, UNLESS DIRECTED BY THE ENGINEER. LOGS SHALL BE PLACED IN A CROSSING PATTERN OR WEAVE SUCH THAT EACH LOG IS ANCHORED BY ANOTHER LOG.
3. SMALL/FINE WOODY DEBRIS SHALL CONSIST OF MEDIUM TO SMALL LIMBS, BRANCHES, BUSHES, AND/OR LOGS. INVASIVE SPECIES SHALL NOT BE USED.
4. SMALL/FINE WOODY DEBRIS SHALL BE PLACED ABOVE THE COARSE WOODY DEBRIS WITH THE LARGEST MATERIAL BEING PLACED FIRST AND THE SMALLEST MATERIAL PLACED LAST.
5. ALL WOODY DEBRIS SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET IN ORDER TO REDUCE THE PRESENCE OF VOIDS IN THE SMALL/FINE WOODY DEBRIS LAYER.
6. THE HORIZONTAL LOCATIONS OF ALL WOODY DEBRIS ARE LOCATED ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE. NO LOCATIONS OF WOODY DEBRIS SHALL VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE ENGINEER.
7. GRAVEL LEVELING BASE SHALL BE INSTALLED ABOVE THE HIGHEST ELEVATION OF THE WOODY DEBRIS BEFORE THE SOIL LIFTS ARE INSTALLED.
8. THE SOIL BACKFILL USED FOR LIFTS AND TOPSOIL USED FOR LAYERING WITH THE LIVE BRANCHES SHALL BE FREE OF ANY LARGE ROOTS OR WOODY DEBRIS AND SHALL GENERALLY BE FREE FROM ANY GRAVEL OR COBBLE MATERIAL.
9. SOIL BACKFILL SHALL BE COMPACTED SUCH THAT FUTURE SETTLING WILL BE KEPT TO A MINIMUM; YET, NOT SUCH THAT THE UNDERLYING BRUSH IS DISPLACED OR DAMAGED.
10. THE TOP OF THE BACKFILL FOR THE FIRST LIFT SHALL BE SLOPED AT APPROXIMATELY 5% AWAY FROM THE STREAM.
11. PLACE A LAYER OF TOPSOIL AND LIVE BRANCHES ON TOP OF EACH SOIL LIFT SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE NEXT SOIL LIFT.
12. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER AND SHALL EXCLUDE INVASIVE SPECIES.
13. PLACE A LAYER OF 6.5 FEET WIDE GEOCOIR DEKOWE 700 EROSION CONTROL BLANKET, OR EQUIVALENT, ON TOP OF THE TOPSOIL AND LIVE BRANCHES SUCH THAT 2.5 FEET OF THE BLANKET WILL BE BURIED BELOW THE NEXT SOIL LIFT. ALLOW THE REMAINING 4.0 FEET OF BLANKET TO HANG OVER THE PRECEDING SOIL LIFT OR COIR FIBER LOGS.
14. PLACE A LAYER OF 6.5 FEET WIDE NON-WOVEN COIR MATTING OVER THE EROSION CONTROL BLANKET TO THE SAME LIMITS.
15. SOIL CAN BE COMPACTED BY STACKING A PIECE OF 2 X 6 SAWN LUMBER EDGWAYS UP TO THE LIFT HEIGHT SPECIFIED IN THE STRUCTURE TABLE AND SECURING WITH WOODEN STAKES TO PROVIDE A RIGID BACKSTOP FOR COMPACTING SOIL LIFT.
16. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.0 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
17. THE TOP OF THE SOIL BACKFILL SHALL BE FLAT WITHIN THE LIFT SETBACK DISTANCE SPECIFIED IN THE STRUCTURE TABLE. BEYOND THE LIFT SETBACK DISTANCE, THE SOIL BACKFILL SHALL BE SLOPED AT AN APPROXIMATE 5% SLOPE AWAY FROM THE STREAM.
18. TOP DRESS THE SOIL LIFT WITH TOPSOIL FROM THE FACE OF THE SOIL LIFT BACK INTO THE FLOODPLAIN AT LEAST 4FT.
19. REMOVE THE SAWN LUMBER AND WOODEN STAKES FROM THE FACE OF THE SOIL LIFT AND WRAP THE FACE AND TOP OF THE SOIL LIFT USING THE WOVEN AND NON-WOVEN COIR MATTING HANGING OVER THE PREVIOUS LIFT/COIR FIBER LOGS.
20. THE EROSION CONTROL FABRIC SHALL BE PULLED AS TIGHT AS POSSIBLE WITHOUT TEARING OR EXCESSIVELY DISTORTING THE FABRIC.
21. SECURE THE EROSION CONTROL AND NON-WOVEN MATTING IN PLACE BY STAKING THE END OF THE EROSION CONTROL FABRIC WITH WOODEN STAKES ON 1.5-FOOT CENTERS.
22. BEGIN CONSTRUCTION OF THE NEXT SOIL LIFT BY REPEATING THE PREVIOUS NOTES STARTING WITH NOTE 11.
23. THE OVERALL SLOPE CREATED BY THE LIVE BRUSH LAYERING SHALL MATCH THE PROPOSED CROSS SECTION SHAPE FOR THE OUTER BANK OF THE TYPICAL POOL CROSS-SECTION FOR EACH REACH.
24. THE COIR BLANKETS AND GEOTEXTILE FABRIC USED FOR THE UPPER MOST SOIL LIFT WILL BE SECURED WITHIN A 6 INCH DEEP TRENCH AS SHOWN IN DETAIL.
25. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
26. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
27. THE LOWER BANK STABILIZATION IS CRITICAL TO THE DESIGN INTENT OF THIS PROJECT. VARIANCE FROM WOOD TOE BANK STABILIZATION WILL ONLY BE CONSIDERED IF THE WOOD IS NOT AVAILABLE ONSITE.

OPERATION & MAINTENANCE

WOOD TOE SHOULD BE VISUALLY INSPECTED AFTER EACH MAJOR STORM EVENT OR AT MINIMUM YEARLY DURING THE FIRST FIVE YEARS FOLLOWING IMPLEMENTATION. VISUAL INSPECTION SHOULD INCLUDE INSPECTION OF THE SOILS LIFTS AND INTEGRITY OF THE OUTSIDE BENDS OF THE STREAM CHANNEL. MINIMAL TO NO RILL EROSION SHOULD BE PRESENT ON AND AROUND THE SOIL LIFT AND GEOTEXTILE. GRADING SHOULD BE VISUALLY INSPECTED TO ENSURE THE SOIL LIFTS KEEP THEIR INTEGRITY WHILE VEGETATION IS ESTABLISHING. REPAIRS TO THE STRUCTURE SHOULD BE COMPLETED AS NEEDED.

NOTE:

- MAXIMUM ALLOWABLE SHEAR STRESS: 4 LBS/SQ.FT.
- MAXIMUM ALLOWABLE VELOCITY: 1.0 FT/S

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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

STREAM DETAILS

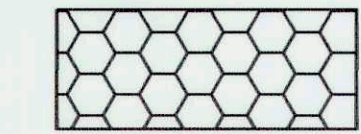
WOODBINE, HOWARD COUNTY, MD

REVISIONS:
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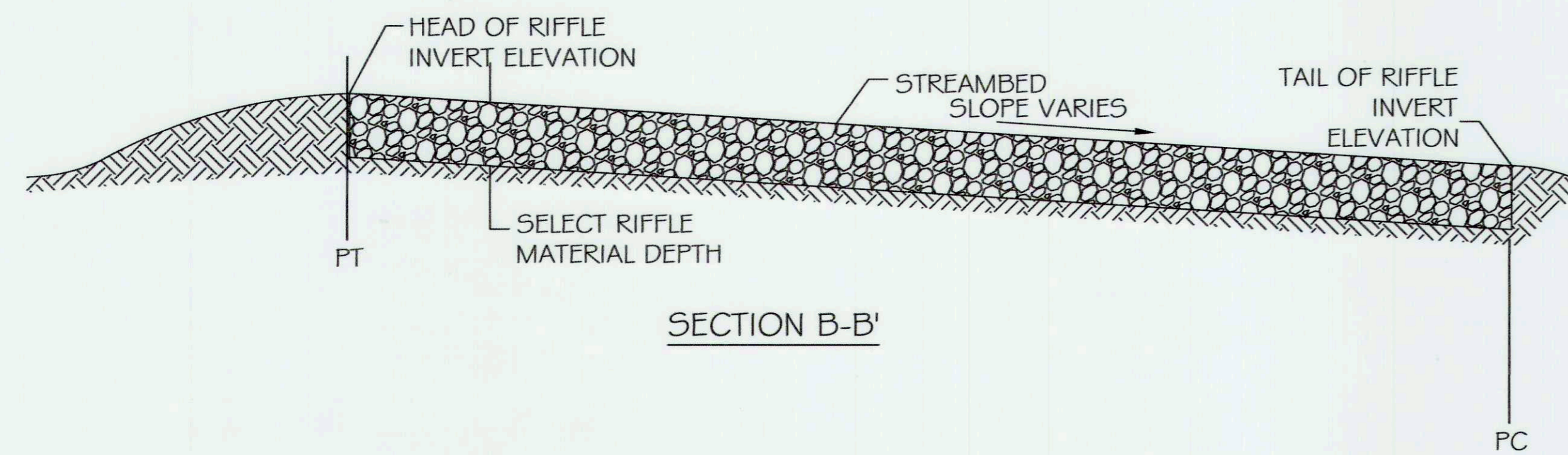


APPROVED: DEPT. OF PUBLIC WORKS
5/21/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

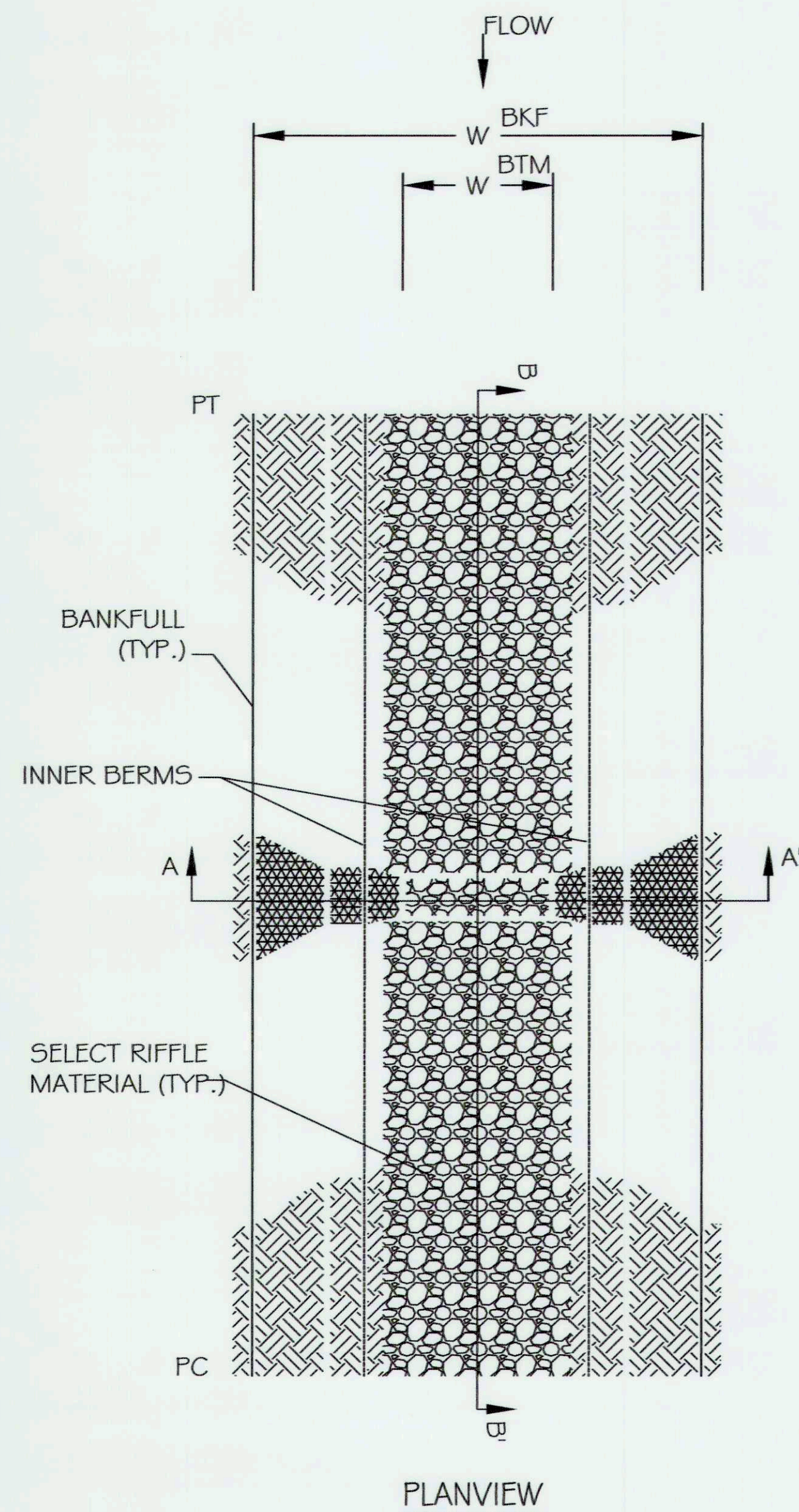
PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MGCP/DC
JOB NUMBER:	6172-00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	31 OF 49



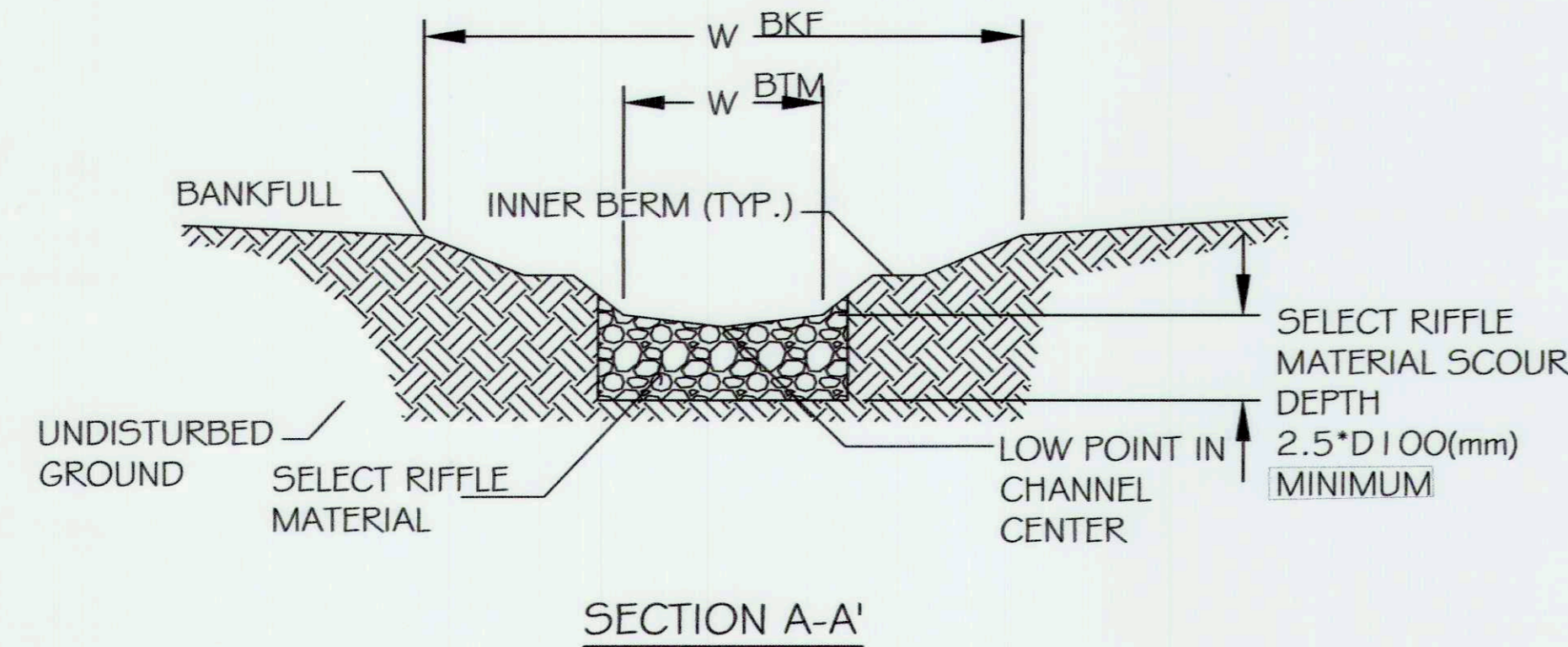
PLAN-SYMBOL



SECTION B-B'



PLANVIEW



SECTION A-A'

⊙ DETAIL - NATURALLY AUGMENTED CONSTRUCTED RIFFLES
NOT TO SCALE

NOTES:

1. THE GRAVEL AND COBBLE SUBSTRATE USED FOR THIS FEATURE SHOULD BE PREFERENTIALLY HARVESTED FROM THE ARMOR LAYER OF THE INCISED EXISTING CHANNEL.
2. SORTING AND SIEVING OF THE HARVESTED RIFFLE SUBSTRATE IS INCIDENTAL TO THE CONSTRUCTION OF THIS STRUCTURE
3. SELECT RIFFLE MATERIAL SHALL HAVE A GRADATION AS DEFINED IN THE REACH TABLE ON SHEET 25 OR AS APPROVED BY THE ENGINEER.
4. SELECT RIFFLE MATERIAL DEPTH SHALL BE AT LEAST 2.5 TIMES THE D 100 (MM) SPECIFIED IN THE TABLE (SHEET 25).
5. SELECT RIFFLE MATERIAL WILL BE PLACED AT A UNIFORM THICKNESS.
6. THE SELECT RIFFLE MATERIAL WILL BE PLACED SUCH THAT, IN CROSS-SECTION, ITS LOWEST ELEVATION OCCURS IN THE CENTER OF THE CHANNEL AS PER THE DETAIL.
7. SET INVERTS AT ELEVATIONS SHOWN IN REACH PROFILE.
8. SELECT RIFFLE MATERIAL SHALL BE COMPACTED USING TRACK EQUIPMENT SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
9. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
10. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
11. SEE TYPICAL RIFFLE CROSS SECTION FOR DIMENSIONS.
12. IF SITE CONDITIONS EXPOSE COARSER OR FINER SUBSTRATE THAN EXPECTED THE CONTRACTOR MAY SUGGEST AN ALTERNATIVE RIFFLE SUBSTRATE TO BE APPROVED AT THE DISCRETION OF THE ENGINEER.
13. THE ACCEPTABLE ALTERNATIVE TO SORTING AND HARVESTING IN SITU SUBSTRATE FOR THE STRUCTURE IS LISTED IN THE TABLE ON SHEET 25.

NOTE:

MAXIMUM ALLOWABLE SHEAR STRESS: 4 LBS/SQ.FT.

MAXIMUM ALLOWABLE VELOCITY: 8 FT/S

REFER TO SHEET 25 TABLE 3 FOR APPROPRIATE RIFFLE MATERIAL SIZES.

OPERATION & MAINTENANCE

NATURALLY AUGMENTED CONSTRUCTED RIFFLES SHOULD BE VISUALLY INSPECTED AFTER EACH MAJOR STORM EVENT OR AT MINIMUM YEARLY DURING THE FIRST FIVE YEARS FOLLOWING IMPLEMENTATION. VISUAL INSPECTION SHOULD INCLUDE INSPECTION OF SUBSTRATE TO INSURE MINIMAL TO NO DISPLACEMENT OCCURS DURING STORM FLOWS AND THE THALWEG REMAINS IN THE CENTER OF THE INNER BERM CHANNEL. VERTICAL INTEGRITY OF THE STRUCTURE SHOULD BE EVALUATED BY LONGITUDINAL PROFILE FOLLOWING THE USACE PERMIT MONITORING REQUIREMENTS. REPAIRS TO THE STRUCTURE SHOULD BE COMPLETED AS NEEDED.

GENERAL NOTES:

ANY NATIVE GRAVEL OR COBBLE MATERIAL EXCAVATED DURING CHANNEL CONSTRUCTION ELSEWHERE ON THIS PROJECT SHALL BE STOCKPILED FOR USE AS A SUBSTITUTE FOR THE SELECT RIFFLE MATERIAL UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE RIFFLE LOCATIONS SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2013 FORMAT DWG FILE.



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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

STREAM DETAILS
WOODBINE, HOWARD COUNTY, MD

REVISIONS:
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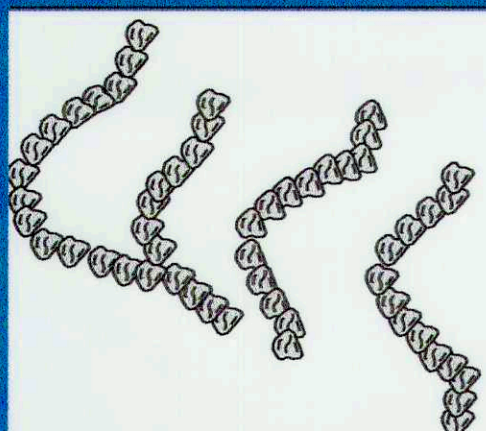
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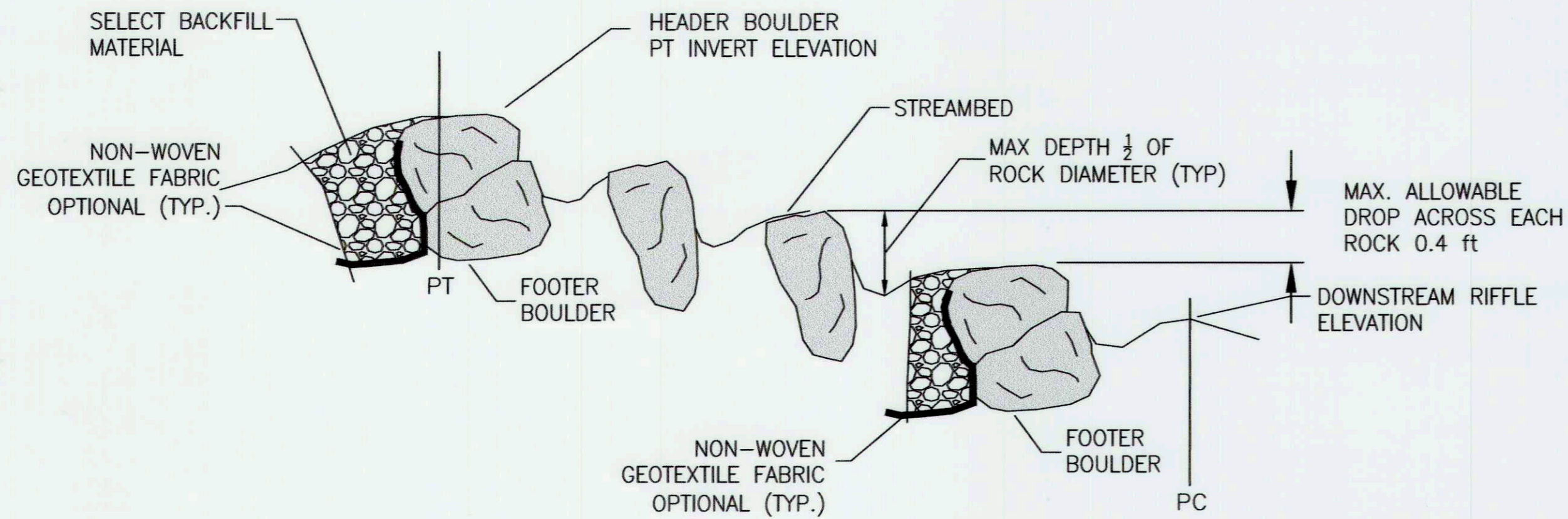
APPROVED: DEPT. OF PUBLIC WORKS

Chief, Bureau of Environmental Services
M. DeLeon 5/24/18
DATE

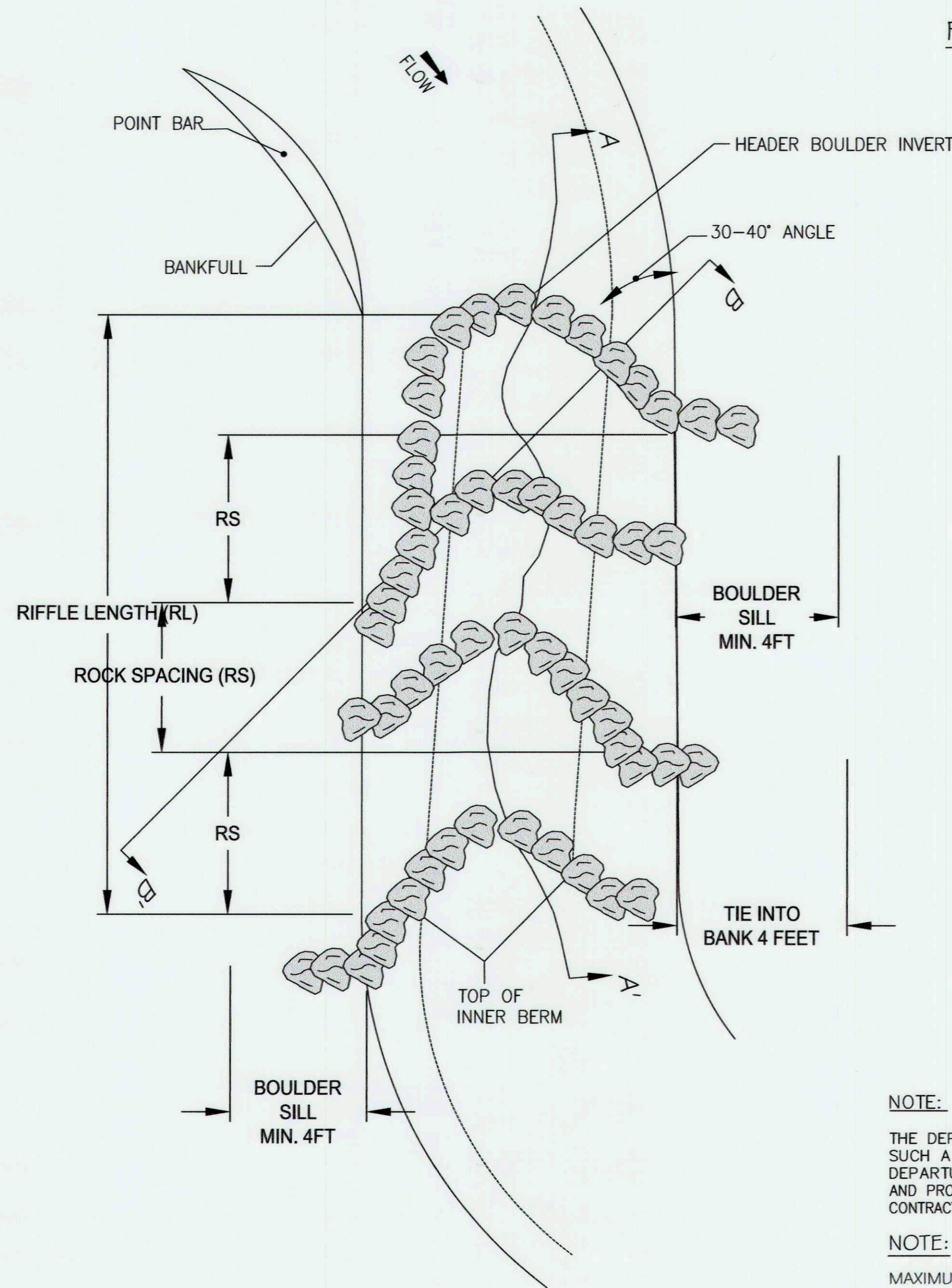
PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGCP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:



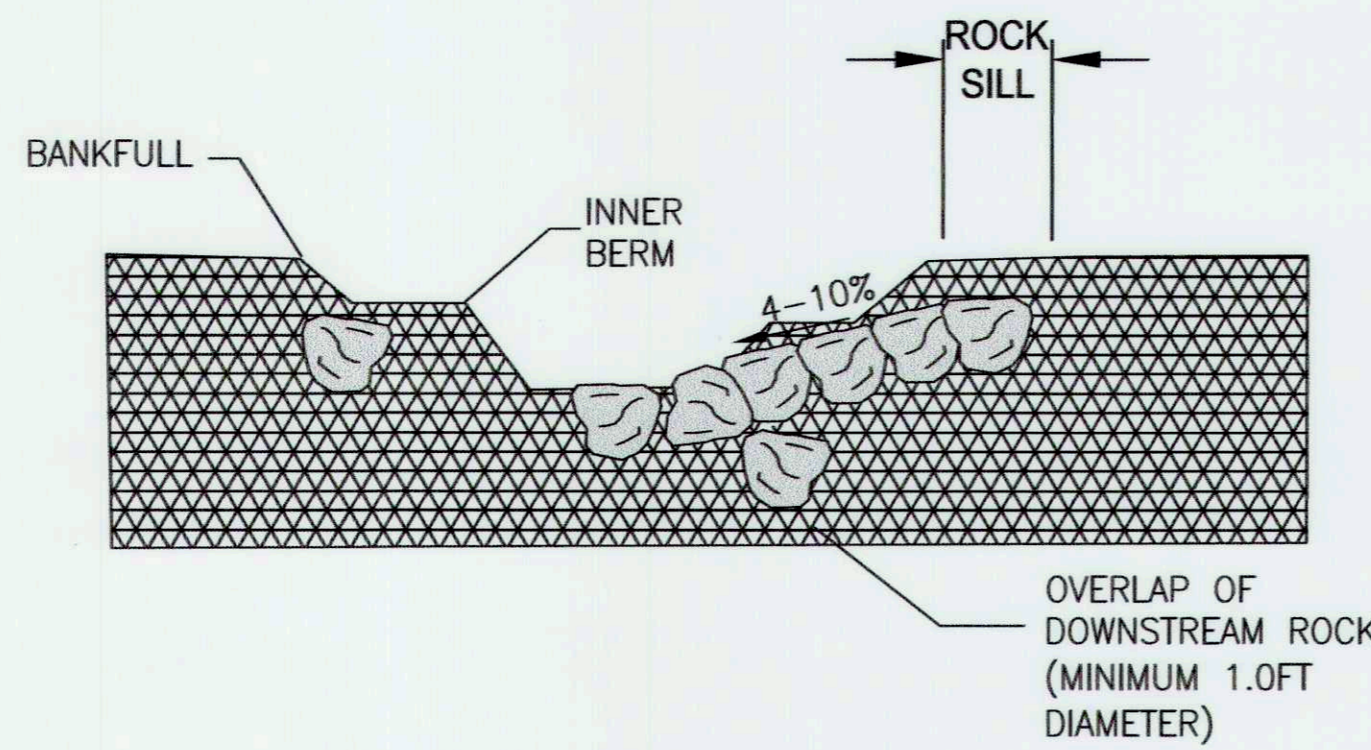
PLAN-SYMBOL



PROFILE A-A'
NOT TO SCALE



PLANVIEW



SECTION B-B'

NOTE:

THE DEPARTURE ANGLE SHOWN ABOVE IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2013 FORMAT DWG FILE.

NOTE:

MAXIMUM ALLOWABLE SHEAR STRESS: 4 LBS/SQ.FT.
MAXIMUM ALLOWABLE VELOCITY: 1.0 FT/S
REFER TO SHEET 25 TABLE 3 FOR APPROPRIATE ROCK AND BOULDER SIZES.

OPERATION & MAINTENANCE

CONSTRUCTED BOULDER RIFFLES SHOULD BE VISUALLY INSPECTED FOLLOWING MAJOR STORM EVENTS OR YEARLY DURING THE FIRST FIVE YEARS FOLLOWING IMPLEMENTATION. VISUAL INSPECTION SHOULD INCLUDE BOULDER PLACEMENT, BACKFILL MATERIAL AND HORIZONTAL INTEGRITY OF THE STRUCTURE TO EVALUATE THE STABILITY OF INSTALLED BOULDERS AND TO ENSURE MINIMAL OR NO PIPING IS OCCURRING THROUGH THE STRUCTURE. VERTICAL INTEGRITY OF THE STRUCTURE SHOULD BE EVALUATED BY A LONGITUDINAL PROFILE SURVEY FOLLOWING THE USACE PERMIT MONITORING REQUIREMENTS. REPAIRS TO THE STRUCTURE SHOULD BE COMPLETED AS NECESSARY.

DETAIL - CONSTRUCTED BOULDER RIFFLE
NOT TO SCALE



NC-EEP MORGAN CREEK - CONSTRUCTED 2010

NOTES:

- BOULDERS FOR THE CONSTRUCTED RIFFLE MUST BE A MINIMUM OF 1-2 TON BOULDER WITH A MIN. DIAMETER OF 2-3FT.
- THE UPSTREAM AND DOWNSTREAM HEADER BOULDERS SHALL BE UNDERLAIN BY FOOTER BOULDERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- HEADER BOULDERS ARE THE TOP MOST BOULDERS USED IN EACH STRUCTURE. HEADER BOULDERS FOR THIS STRUCTURE ARE ONLY VISIBLE BETWEEN THE INNER BERMS.
- HEADER BOULDERS SHALL BE OFFSET SLIGHTLY UPSTREAM OF THE FOOTER BOULDERS. FOOTER BOULDERS SHALL BE INSTALLED BEFORE THE HEADER BOULDERS.
- SET INVERTS AT ELEVATION SHOWN ON THE PLAN AND PROFILE SHEETS. INVERTS AND ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE. NO ELEVATIONS OF THE CONSTRUCTED RIFFLE ARMS MAY VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE ENGINEER.
- THE DROP IN ELEVATION ACROSS THE STRUCTURE SHALL NOT EXCEED 0.5 FT UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- MINI-VANES WILL BE SPACED IN THE RIFFLE AS A FUNCTION OF THE RIFFLE LENGTH.
- THE MOST UPSTREAM RIFFLE MINI-VANE ARM SHALL BE PLACED SUCH THAT THE BANK TIE IN IS ON THE SAME SIDE AS THE NEXT UPSTREAM OUTSIDE BEND IN ORDER TO SERVE AS A VANE AND HELP DIRECT STREAM FLOW AWAY FROM THE PREVIOUS OUTSIDE BEND. LOCATION OF ALL RIFFLE VANE ARMS ARE SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE AND LN3 FILE. NO ELEVATIONS OF THE CONSTRUCTED RIFFLE ARMS MAY VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE ENGINEER.
- THE MOST DOWNSTREAM MINI VANE ARM SHALL BE PLACED SUCH THAT THE HIGH POINT IS ON THE SAME SIDE AS THE NEXT DOWNSTREAM OUTSIDE BEND IN ORDER TO HELP DIRECT STREAM FLOW FROM THE NEXT OUTSIDE BEND.
- THE VERTICAL SLOPE OF EACH MINI VANE ARM SHALL NOT EXCEED 10% UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE SLOPES WILL BE DICTATED BY THE WIDTH TO DEPTH RATIO OF THE REACH, TYPICAL RIFFLE INNER BERM CHANNEL, VERTICAL DROP OVER THE LOG AND LOG DIAMETER.
- ALL GAPS/VOIDS LARGER THAN 2 INCHES BETWEEN THE HEADER AND FOOTER BOULDERS SHALL BE HANDED CHINKED WITH COBBLE AND GRAVEL ON THE UPSTREAM SIDE PRIOR TO PLACEMENT OF THE GEOTEXTILE. ALL CHINKING SHALL BE APPROVED BY THE ENGINEER BEFORE THE MINI-VANES ARE BACKFILLED.
- THE UPSTREAM SIDE OF THE FIRST AND LAST MINI-VANE ARM REQUIRE A LAYER OF NON-WOVEN GEOTEXTILE FABRIC (SEE SHEET 29 FOR SPECIFICATIONS) THAT SHALL BE PLACED AS SHOWN IN THE GEOTEXTILE PLACEMENT DETAIL THE ENTIRE LENGTH OF THE MINI-VANE.
- BACKFILL VANES WITH SELECT BACKFILL MATERIAL AS SHOWN AND DEFINED IN THE CONSTRUCTED RIFFLE DETAIL BY REACH.
- SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
- THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED, PROVIDED ANY HEIGHT DOES NOT EXCEED MAX. ALLOWABLE DROP OF 0.5 FT FOR THIS STRUCTURE.
- RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY DOWNSTREAM.

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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

STREAM DETAILS

WOODBINE, HOWARD COUNTY, MD

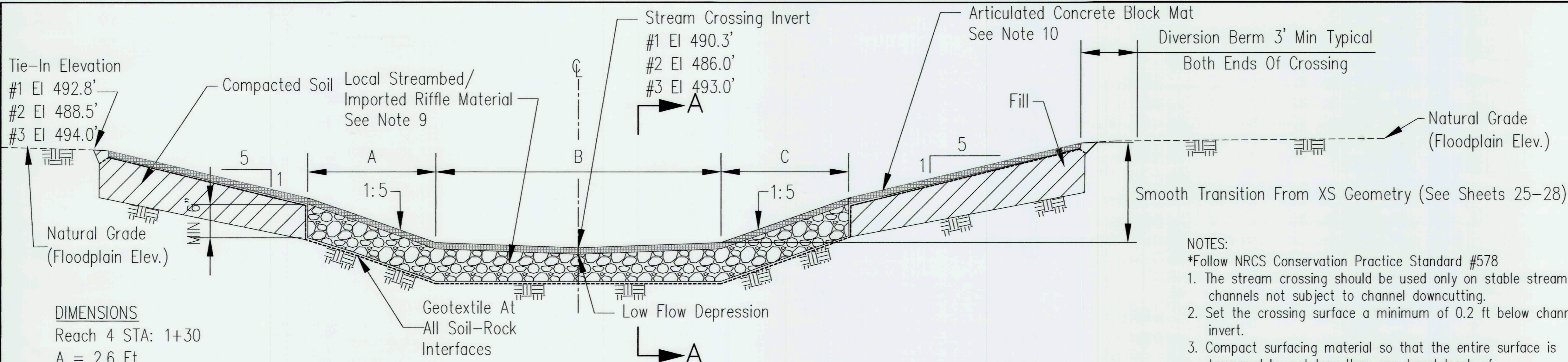
REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Michael J. ... 5/21/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:

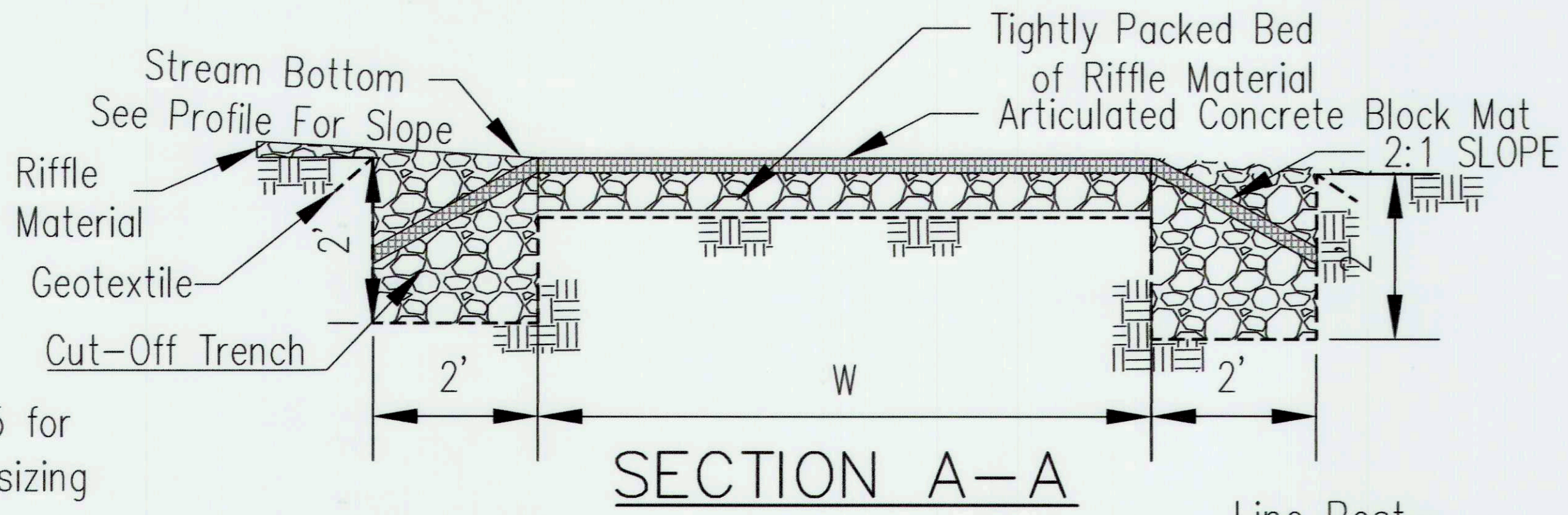


PROFILE ALONG CENTERLINE OF CROSSING

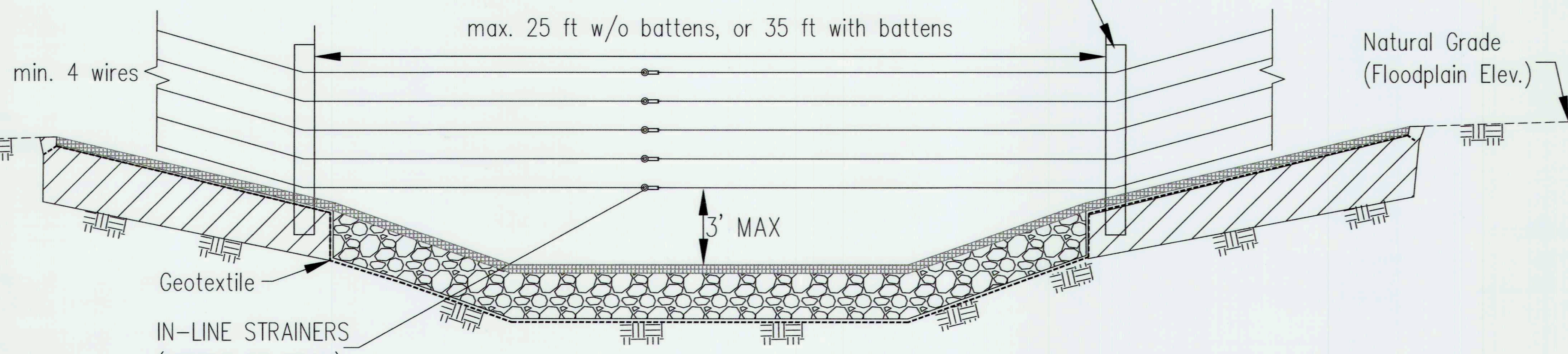
- #1 REACH 4 STATION 1+30
- #2 REACH 5 STATION 0+86
- #3 REACH 7 STATION 5+85

- DIMENSIONS**
- Reach 4 STA: 1+30
 A = 2.6 Ft
 B = 8.6 Ft
 C = 2.6 Ft
 W = 35 Ft
- Reach 5 STA: 0+86
 A = 2.5 Ft
 B = 9.4 Ft
 C = 2.5 Ft
 W = 40 Ft
- Reach 7 STA: 5+85
 A = 2.2 FT
 B = 2 FT
 C = 2.2 FT
 W = 60 FT

See table 3 on Sheet 25 for riffle substrate material sizing



OPERATION & MAINTENANCE
 STREAM CROSSINGS SHOULD BE VISUALLY INSPECTED AFTER EACH MAJOR STORM EVENT OR AT MINIMUM YEARLY DURING THE FIRST FIVE YEARS FOLLOWING IMPLEMENTATION. DEPENDING ON CROSSING USE, THE STRUCTURE MAY REQUIRE MORE FREQUENT INSPECTION. VISUAL INSPECTION SHOULD INCLUDE INSPECTION OF SUBSTRATE TO INSURE MINIMAL TO NO DISPLACEMENT OCCURS DURING STORM FLOWS, OR HIGH TRAFFIC TIMES AND THE THALWEG REMAINS IN THE CENTER OF THE INNER BERM CHANNEL. VERTICAL INTEGRITY OF THE STRUCTURE SHOULD BE EVALUATED BY LONGITUDINAL PROFILE FOLLOWING THE USACE PERMIT MONITORING REQUIREMENTS. REPAIRS TO THE STRUCTURE SHOULD BE COMPLETED AS NEEDED.



- NOTES:**
- *Follow NRCS Conservation Practice Standard #578
- The stream crossing should be used only on stable stream channels not subject to channel downcutting.
 - Set the crossing surface a minimum of 0.2 ft below channel invert.
 - Compact surfacing material so that the entire surface is traversed by not less than one tread track of the load hauling equipment.
 - Construct berms at each end of the crossing to direct surface flow away from excavated crossing, as directed by the engineer.
 - Seed all disturbed areas not covered by gravel in accordance with Critical Area Planting Standard (Practice Code 342).
 - Remove excavated material from site: place at least 12 feet from top edge of bank slope and spread so that the height does not exceed 1 foot, or to a stable soil stockpile. The spoil material must drain freely.
 - Geotextile (non-woven, needle punched) Minimum criteria:
 Grab tensile strength (lb) ASTM D 4632 ___ 98 lbs ___
 Elongation at failure (%) ASTM D 4632 ___ 50% ___
 Trapezoidal tear strength (lb) ASTM D 4533 ___ 43 lbs ___
 Puncture strength (lb) ASTM D 6241 ___ 300 lbs ___
 Ultraviolet light (% retained strength) ASTM D 4355 ___ 70%/500 hours ___
 Apparent opening size (AOS) ASTM D 4751 ___ 70 sieve ___
 max 0.22 mm (US sieve size 70)
 Permittivity sec⁻¹ ASTM D 4491 ___ 120 gpm/ft ___ min 0.70
 - Any geotextile splices must overlap a minimum of two feet, with upstream or upslope geotextile overlapping the abutting downslope geotextile. All edges of geotextile must be stapled down.
 - Use stream bed material in the base flow area up to bankfull elevation.
 - ACB mat should be Shoretec Shoreblock BD series or equivalent as approved by engineer of record. Minimum thickness of mat shall be 4 inches. Use closed cell block. Back fill openings with 3/4" gravel or crush-and-run above bankfull, and riffle material below bankfull.
- FENCING NOTES:**
- Wire should be ASTM Class 3 galvanized, 12.5 gauge (min.) high tensile with min. tensile strength of 180,000 psi
 - Wooden line posts shall be min 4 in. dia. or 4 in. square, metal line post shall be studded or punched t, u, or y shaped, with anchor plates and min. weight of 1.3 lbs/ft (excluding anchor plates)

Landowner	PATRICK, B. DAVID & DENNIS J.	Location	MAPLE DELL FARM, WOODBINE, MD
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ADAPTED FROM: USDA IL-ENG-864 STREAM CROSSING FOR LIVESTOCK, DRAWN BY M. QUINONES 2/1/17
 USDA MD-382-D1 HIGH TENSILE SMOOTH WIRE FENCE - NON-ELECTRIC 7/2003

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CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

STREAM CROSSING

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

APPROVED: DEPT. OF PUBLIC WORKS
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
 DATE: 7/31/18

PROJECT MANAGER: RC
 DESIGNER: DBMG
 DRAWN: MG/CP/DC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO:

34 OF 49

MATCHLINE - SEE SHEET 36

MATCHLINE - SEE SHEET 36

Soil Type: GgC

Soil Type: Co

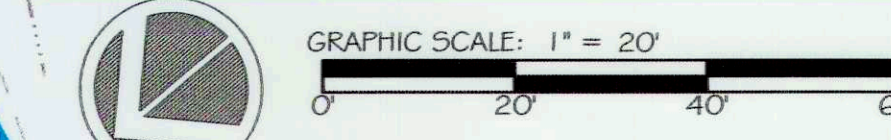
Soil Type:

Soil Type: MaD

Soil Type: Co

ESC LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. STEEP SLOPE
[Symbol]	EX. HIGHLY ERODIBLE SOILS
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. TREE PROTECTION
[Symbol]	PR. SAFETY FENCE
[Symbol]	PR. SILT FENCE
[Symbol]	PR. SUPER SILT FENCE
[Symbol]	PR. TEMPORARY SOIL STABILIZATION MATTING
[Symbol]	PR. STABILIZED CONSTRUCTION ENTRANCE
[Symbol]	PR. TEMP. ACCESS BRIDGE
[Symbol]	PR. CONSTRUCTION ACCESS ROAD
[Symbol]	PR. TIMBERMAT
[Symbol]	PR. TEMPORARY/PERMANENT SEEDING & MULCHING
[Symbol]	PR. STREAM DIVERSION/DEWATERING PUMP
[Symbol]	PR. VELOCITY DISSIPATOR
[Symbol]	PR. SANDBAG DIKE
[Symbol]	PR. FILTER BAG

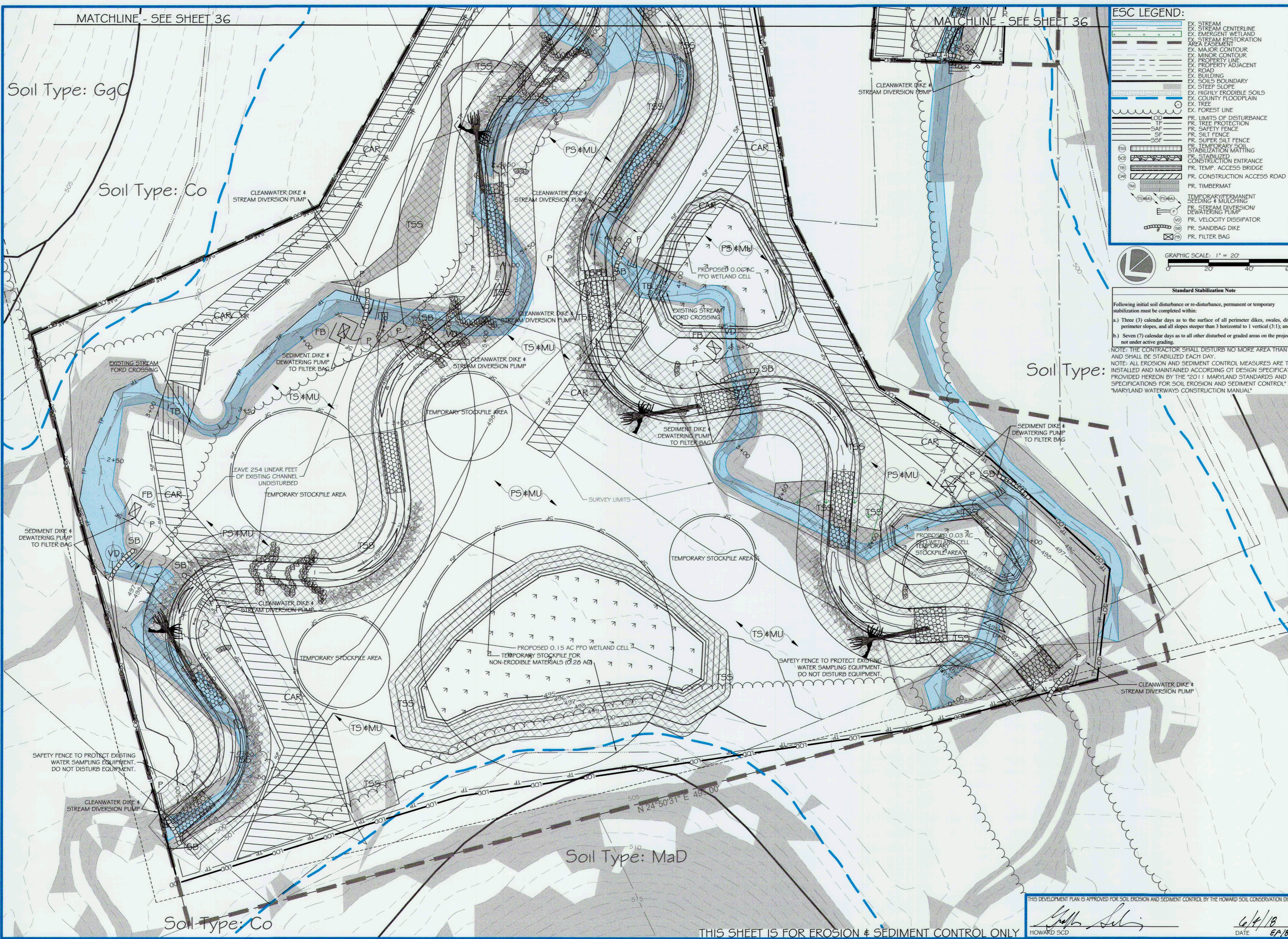


Standard Stabilization Note

Following initial soil disturbance or re-disturbance, permanent or temporary stabilization must be completed within:

- Three (3) calendar days as to the surface of all perimeter dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and
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NOTE: THE CONTRACTOR SHALL DISTURB NO MORE AREA THAN CAN AND SHALL BE STABILIZED EACH DAY.
NOTE: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED AND MAINTAINED ACCORDING TO DESIGN SPECIFICATIONS PROVIDED HEREON BY THE '2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL' AND 'MARYLAND WATERWAYS CONSTRUCTION MANUAL'



5 SMOOTH STONES RESTORATION PLLC

754 MOUNT MAHOOGANY
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P: 919.218.0864 | WWW.FIVE5R.COM

5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4644 | WWW.RES.US

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (1 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

1	
---	--

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Matthew Selig 5/11/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGCP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 35 OF 49

THIS SHEET IS FOR EROSION & SEDIMENT CONTROL ONLY

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

Matthew Selig
HOWARD SCD

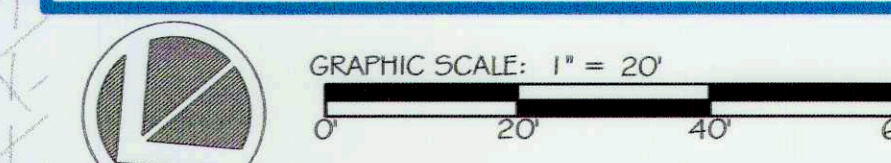
DATE: 6/14/18
6/18/2017

MATCHLINE - SEE SHEET 37

MATCHLINE - SEE SHEET 37

ESC LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. STEEP SLOPE
[Symbol]	EX. HIGHLY FLOODABLE SOILS
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. TREE PROTECTION
[Symbol]	PR. SAFETY FENCE
[Symbol]	PR. SILT FENCE
[Symbol]	PR. SUPER SILT FENCE
[Symbol]	PR. TEMPORARY SOIL STABILIZATION MATTING
[Symbol]	PR. STABILIZED CONSTRUCTION ENTRANCE
[Symbol]	PR. TEMP. ACCESS BRIDGE
[Symbol]	PR. CONSTRUCTION ACCESS ROAD
[Symbol]	PR. TIMBERMAT
[Symbol]	TEMPORARY/PERMANENT SEEDING & MULCHING
[Symbol]	PR. STREAM DIVERSION DEWATERING PUMP
[Symbol]	PR. VELOCITY DISSIPATOR
[Symbol]	PR. SANDBAG DIKE
[Symbol]	PR. FILTER BAG



Standard Stabilization Note

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res
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5 SMOOTH STONES RESTORATION PLLC
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LIVERMORE, CO 80536
F: 919.218.0864 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (2 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

Michael J. ... 5/21/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MG/CP/DC
JOB NUMBER:	6172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	36 OF 49

MATCHLINE - SEE SHEET 35

MATCHLINE - SEE SHEET 35

THIS SHEET IS FOR EROSION & SEDIMENT CONTROL ONLY

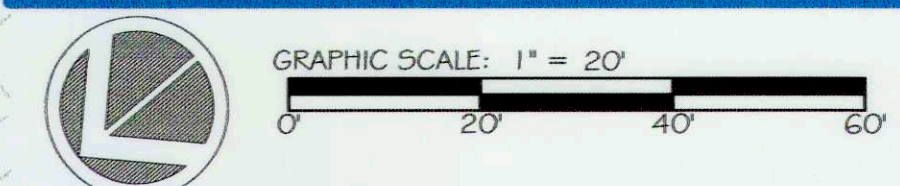
HOWARD SCD
[Signature]
DATE: 6/4/18
DATE: 6/18/07

MATCHLINE - SEE SHEET 38

MATCHLINE - SEE SHEET 38

ESC LEGEND:

[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION
[Symbol]	EX. EMERGENT WETLAND
[Symbol]	EX. AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. STEEP SLOPE
[Symbol]	EX. HIGHLY ERODIBLE SOILS
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. TREE PROTECTION
[Symbol]	PR. SAFETY FENCE
[Symbol]	PR. SILT FENCE
[Symbol]	PR. SUPER SILT FENCE
[Symbol]	PR. TEMPORARY SOIL STABILIZATION MATTING
[Symbol]	PR. STABILIZED CONSTRUCTION ENTRANCE
[Symbol]	PR. TEMP. ACCESS BRIDGE
[Symbol]	PR. CONSTRUCTION ACCESS ROAD
[Symbol]	PR. TIMBERMAT
[Symbol]	TEMPORARY/PERMANENT SEEDING & MULCHING
[Symbol]	PR. STREAM DIVERSION/DEWATERING PUMP
[Symbol]	PR. VELOCITY DISSIPATOR
[Symbol]	PR. SANDBAG DIKE
[Symbol]	PR. FILTER BAG



Standard Stabilization Note

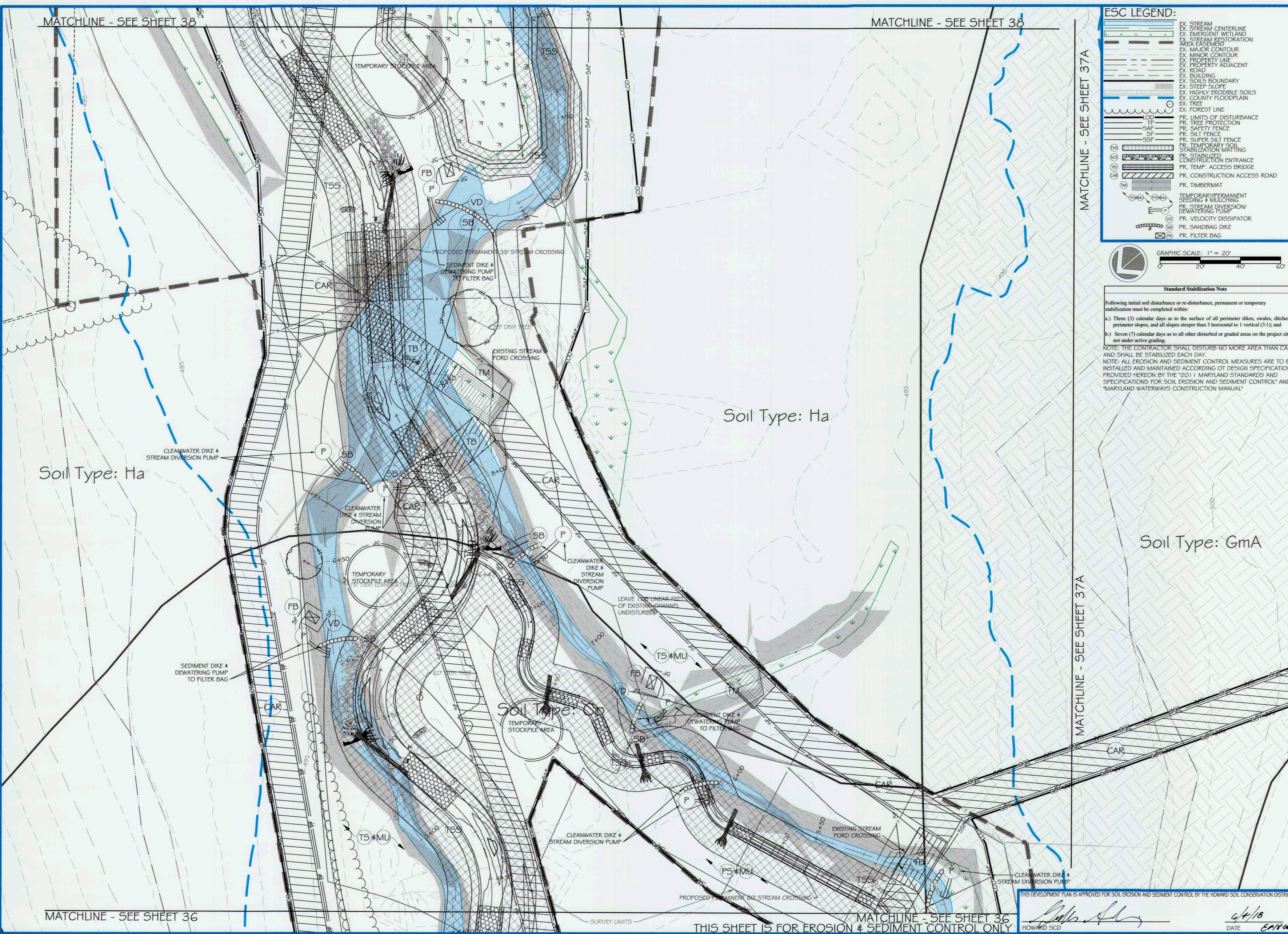
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MATCHLINE - SEE SHEET 37A

MATCHLINE - SEE SHEET 37A

MATCHLINE - SEE SHEET 36

MATCHLINE - SEE SHEET 36

THIS SHEET IS FOR EROSION & SEDIMENT CONTROL ONLY

APPROVED: DEPT. OF PUBLIC WORKS
 [Signature] 5/31/18 DATE
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
 PROJECT MANAGER: RC
 DESIGNER: DBMG
 DRAWN: MG/CPDC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO: 37 OF 49

res
 5367 TELEPHONE ROAD
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 P: 703.395.4044 | WWW.RES.US

SMOOTH STONES RESTORATION PLLC
 754 MOUNT MAHOOGANY
 LIVERMORE, CO 80536
 P: 919.216.0864 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (3 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

[Professional Engineer Seal: State of Maryland, No. 39388, Date 5/31/18]

MATCHLINE - SEE SHEET 38

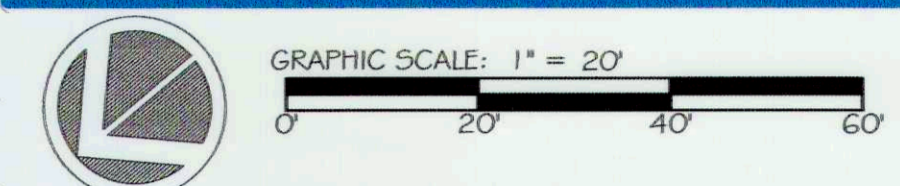
MATCHLINE - SEE SHEET 37

MATCHLINE - SEE SHEET 37

MATCHLINE - SEE SHEET 36

ESC LEGEND:

	EX. STREAM
	EX. STREAM CENTERLINE
	EX. STREAM RESTORATION AREA EASEMENT
	EX. MAJOR CONTOUR
	EX. MINOR CONTOUR
	EX. PROPERTY LINE
	EX. PROPERTY ADJACENT
	EX. ROAD
	EX. BUILDING
	EX. SOILS BOUNDARY
	EX. STEEP SLOPE
	EX. HIGHLY ERODIBLE SOILS
	EX. COUNTY FLOODPLAIN
	EX. TREE
	EX. FOREST LINE
	PR. LIMITS OF DISTURBANCE
	PR. TREE PROTECTION
	PR. SAFETY FENCE
	PR. SILT FENCE
	PR. SUPER SILT FENCE
	PR. TEMPORARY SOIL STABILIZATION MATTING
	PR. STABILIZED CONSTRUCTION ENTRANCE
	PR. TEMP. ACCESS BRIDGE
	PR. CONSTRUCTION ACCESS ROAD
	PR. TIMBERMAT
	TEMPORARY/PERMANENT SEEDING & MULCHING
	PR. STREAM DIVERSION/DEWATERING PUMP
	PR. VELOCITY DISSIPATOR
	PR. SANDBAG DIKE
	PR. FILTER BAG

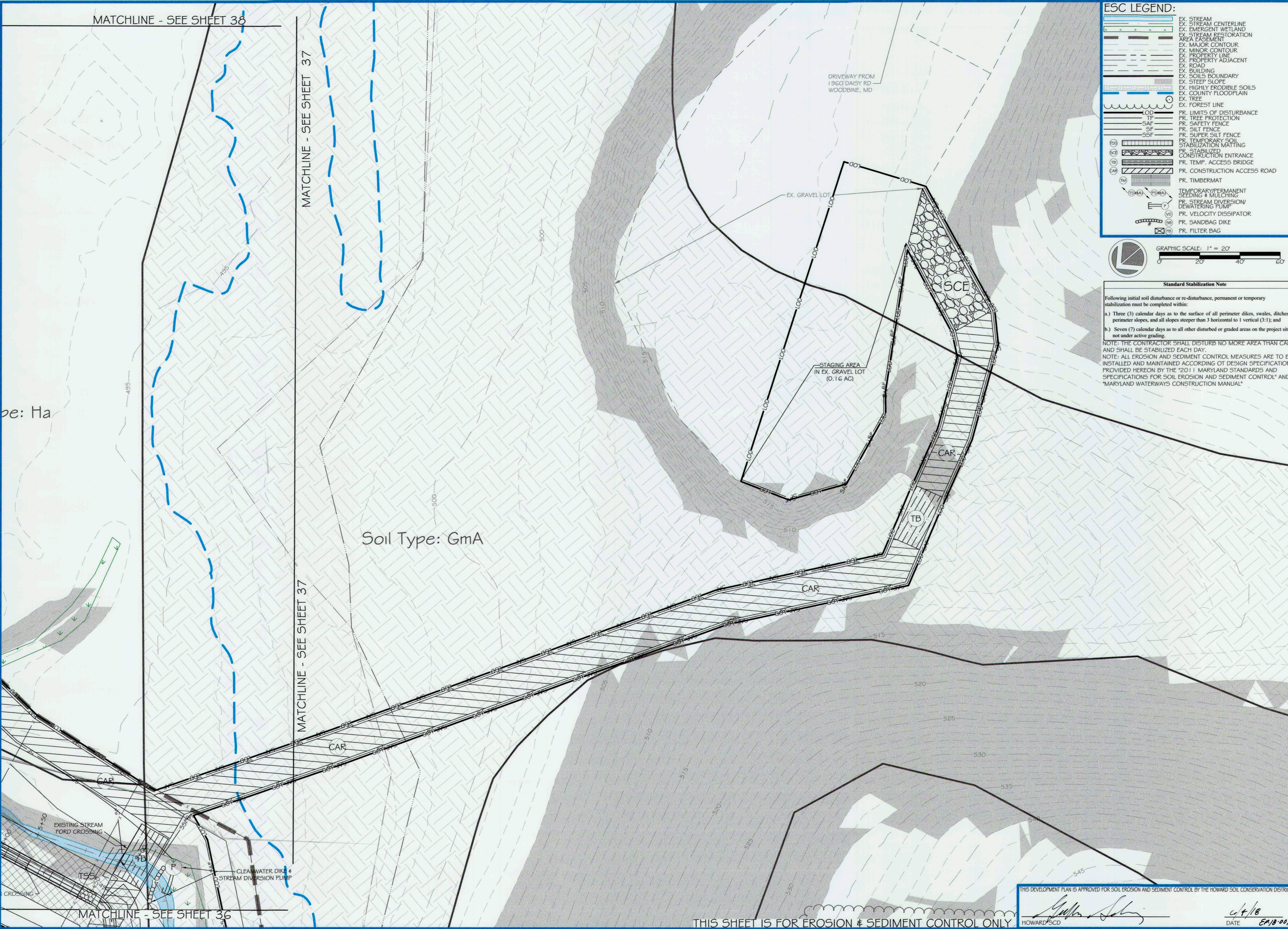


Standard Stabilization Note

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ores
5 | SMOOTH STONES RESTORATION PLLC

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WARRENTON, VIRGINIA 20187
P: 703.595.4644 | WWW.FRES.US

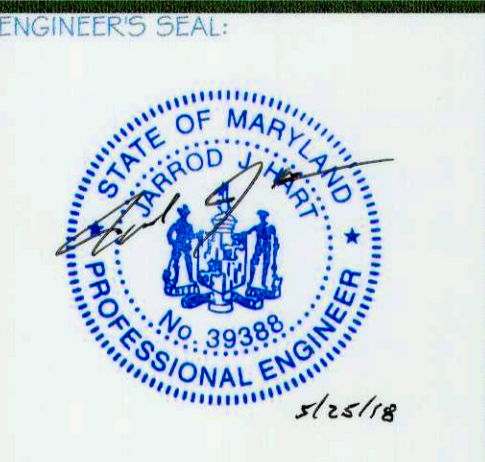
754 MOUNT MAHOOGAN
LIVERMORE, CO 80538
P: 919.216.0664 | WWW.FIVE55R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (3A OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:



APPROVED: DEPT. OF PUBLIC WORKS

[Signature]
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNER:	DBMG
DRAWN:	MGCP/DC
JOB NUMBER:	6172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	37A OF 49

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

[Signature]
HOWARD SCD

DATE: 4/4/18
EPA/18-007

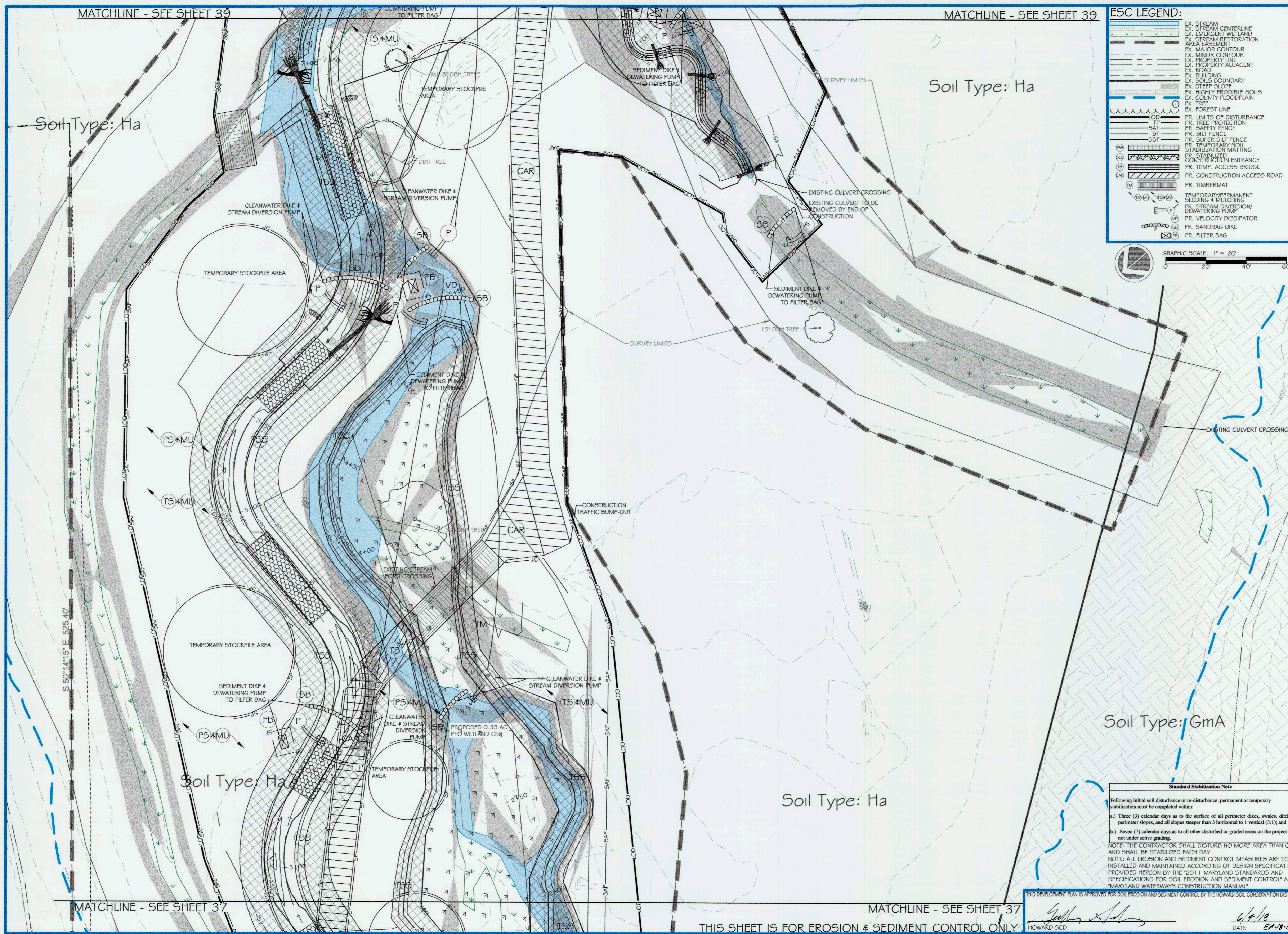
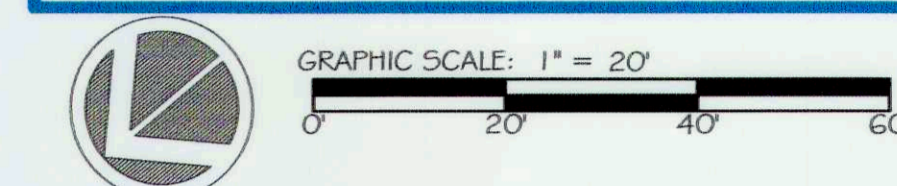
THIS SHEET IS FOR EROSION & SEDIMENT CONTROL ONLY

MATCHLINE - SEE SHEET 39

MATCHLINE - SEE SHEET 39

ESC LEGEND:

	EX. STREAM
	EX. STREAM CENTERLINE
	EX. EMERGENT WETLAND
	EX. STREAM RESTORATION AREA FACILITY
	EX. MAJOR CONTOUR
	EX. MINOR CONTOUR
	EX. PROPERTY LINE
	EX. PROPERTY ADJACENT
	EX. ROAD
	EX. BUILDING
	EX. SOILS BOUNDARY
	EX. STEEP SLOPE
	EX. HIGHLY ERODIBLE SOILS
	EX. COUNTY FLOODPLAIN
	EX. TREE
	EX. FOREST LINE
	PR. LIMITS OF DISTURBANCE
	PR. TREE PROTECTION
	PR. SAFETY FENCE
	PR. SILT FENCE
	PR. SUPER SILT FENCE
	PR. TEMPORARY SOIL STABILIZATION MATING
	PR. STABILIZED CONSTRUCTION ENTRANCE
	PR. TEMP. ACCESS BRIDGE
	PR. CONSTRUCTION ACCESS ROAD
	PR. TIMBERMAT
	TEMPORARY PERMANENT SEEDING & MULCHING
	PR. STREAM DIVERSION/DEWATERING PUMP
	PR. VELOCITY DISSIPATOR
	PR. SANDBAG DIKE
	PR. FILTER BAG



ores
5 | SMOOTH STONES RESTORATION FILLS

5627 TELEPHONE ROAD
WILMINGTON, DE 19807
P: 703.393.4844 | WWW.ORES.US

754 MOUNT MAHOGANY
WILMINGTON, DE 19804
P: 919.218.0364 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (4 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

Standard Stabilization Note

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THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

Geoffrey S. [Signature]
HOWARD SCD

DATE: 6/4/18
DATE: 01/18-007

APPROVED: DEPT. OF PUBLIC WORKS	DATE
<i>[Signature]</i>	5/24/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES	
PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MGCP/DC
JOB NUMBER:	6172.00
DESIGN TYPE: STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	38 OF 49

MATCHLINE - SEE SHEET 37

MATCHLINE - SEE SHEET 37

THIS SHEET IS FOR EROSION & SEDIMENT CONTROL ONLY

MATCHLINE - SEE SHEET 40

MATCHLINE - SEE SHEET 40

Soil Type: Ha

Soil Type: Ha

Soil Type: Co

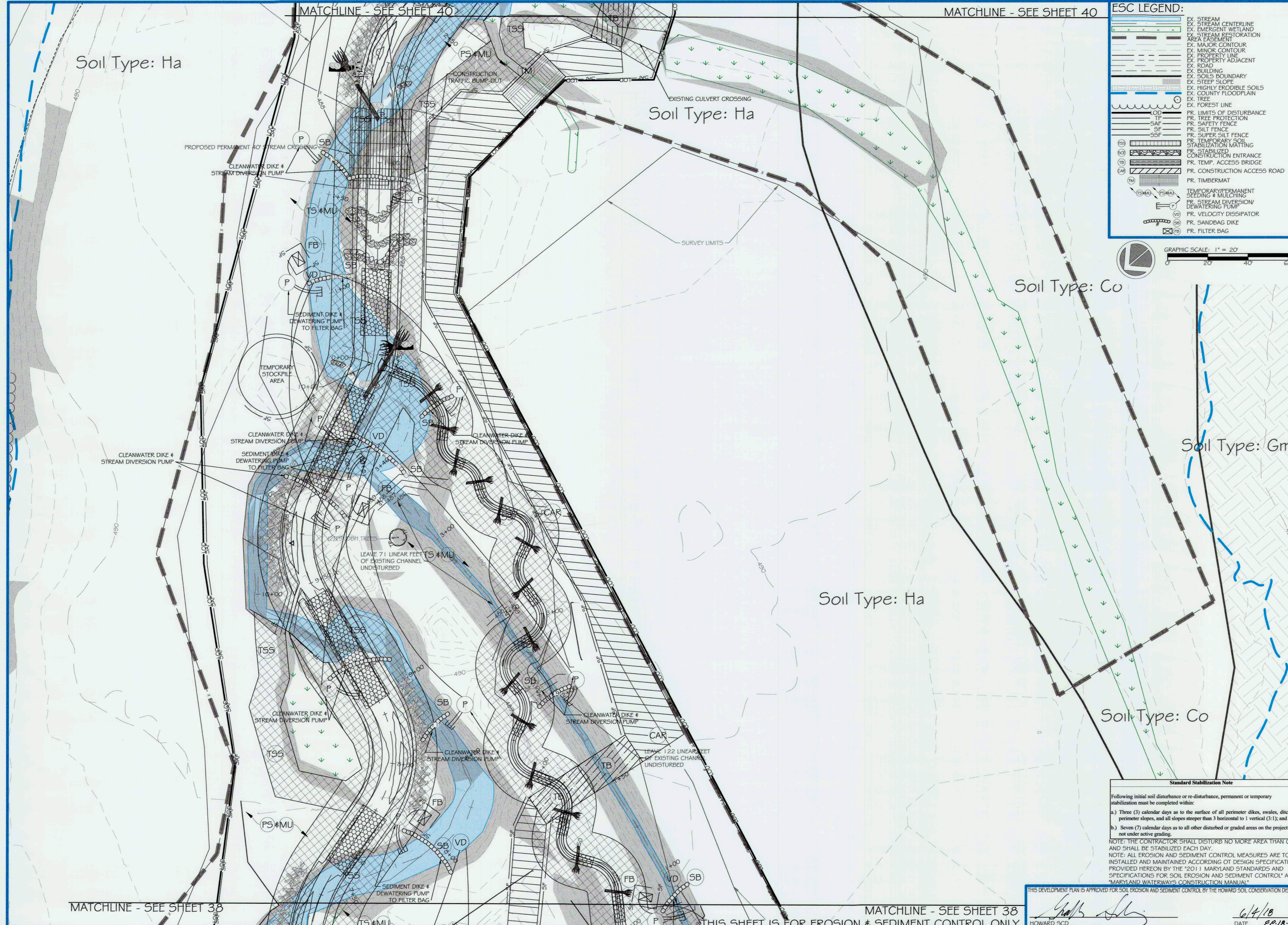
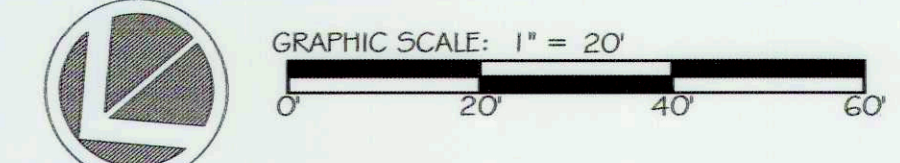
Soil Type: GmA

Soil Type: Ha

Soil Type: Co

ESC LEGEND:

[Symbol]	EX. STREAM
[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION AREA BASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. STEEP SLOPE
[Symbol]	EX. HIGHLY ERODIBLE SOILS
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. TREE PROTECTION
[Symbol]	PR. SAFETY FENCE
[Symbol]	PR. SILT FENCE
[Symbol]	PR. SUPER SILT FENCE
[Symbol]	PR. TEMPORARY SOIL STABILIZATION MATTING
[Symbol]	PR. STABILIZED CONSTRUCTION ENTRANCE
[Symbol]	PR. TEMP. ACCESS BRIDGE
[Symbol]	PR. CONSTRUCTION ACCESS ROAD
[Symbol]	PR. TIMBERMAT
[Symbol]	TEMPORARY/PERMANENT SEEDING + MULCHING
[Symbol]	PR. STREAM DIVERSION/DEWATERING PUMP
[Symbol]	PR. VELOCITY DISSIPATOR
[Symbol]	PR. SANDBAG DIKE
[Symbol]	PR. FILTER BAG



MATCHLINE - SEE SHEET 38

MATCHLINE - SEE SHEET 38

THIS SHEET IS FOR EROSION & SEDIMENT CONTROL ONLY

Standard Stabilization Note

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THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

[Signature]
HOWARD SCD

DATE: 6/4/18
EP.18-007

ores
5 | SMOOTH STONES RESTORATION PLLC

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P: 703.395.4044 | WWW.ORES.US

754 MOUNT MAHOGANY
LIVERMORE, CO 80536
P: 919.216.0864 | WWW.FIVE5R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (5 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

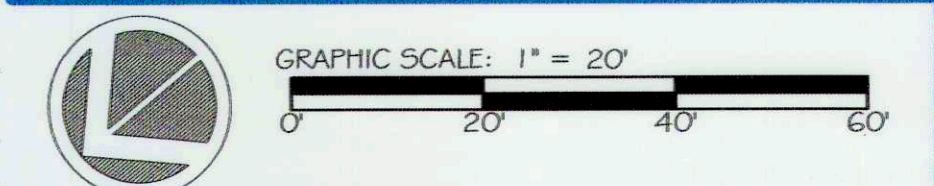
APPROVED: DEPT. OF PUBLIC WORKS
[Signature] 5/24/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 39 OF 49



ESC LEGEND:

[Symbol]	EX. STREAM
[Symbol]	EX. STREAM CENTERLINE
[Symbol]	EX. STREAM RESTORATION AREA EASEMENT
[Symbol]	EX. MAJOR CONTOUR
[Symbol]	EX. MINOR CONTOUR
[Symbol]	EX. PROPERTY LINE
[Symbol]	EX. PROPERTY ADJACENT
[Symbol]	EX. ROAD
[Symbol]	EX. BUILDING
[Symbol]	EX. SOILS BOUNDARY
[Symbol]	EX. STEEP SLOPE
[Symbol]	EX. HIGHLY ERODIBLE SOILS
[Symbol]	EX. COUNTY FLOODPLAIN
[Symbol]	EX. TREE
[Symbol]	EX. FOREST LINE
[Symbol]	PR. LIMITS OF DISTURBANCE
[Symbol]	PR. TREE PROTECTION
[Symbol]	PR. SAFETY FENCE
[Symbol]	PR. SILT FENCE
[Symbol]	PR. SUPER SILT FENCE
[Symbol]	PR. TEMPORARY SOIL STABILIZATION MATTING
[Symbol]	PR. STABILIZED CONSTRUCTION ENTRANCE
[Symbol]	PR. TEMP. ACCESS BRIDGE
[Symbol]	PR. CONSTRUCTION ACCESS ROAD
[Symbol]	PR. TIMBERMAT
[Symbol]	TEMPORARY/PERMANENT SEEDING & MULCHING
[Symbol]	PR. STREAM DIVERSION/DEWATERING PUMP
[Symbol]	PR. VELOCITY DISSIPATOR
[Symbol]	PR. SANDBAG DIKE
[Symbol]	PR. FILTER BAG



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ores

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SMOOTH STONES RESTORATION PLLC

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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

EROSION AND SEDIMENT CONTROL PLAN (6 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

APPROVED: DEPT. OF PUBLIC WORKS

[Signature] 5/30/18 DATE

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MGCPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 40 OF 49

EROSION AND SEDIMENT CONTROL NOTES AND NARRATIVE:

PROJECT DESCRIPTION:
THIS PROJECT IS FOR THE RESTORATION OF THE AFFECTED STREAM, USBONS LITTLE CREEK. THE PROPOSED PROJECT INCLUDES TEMPORARY ACCESS TO THE STREAM, INSTALLATION OF E45 MEASURES, INSTALLATION OF A STREAM CROSSING, INSTALLATION OF IN-STREAM STRUCTURES, AND REGRADING OF THE STREAM CHANNEL AND BANKS. THE PROJECT DOES NOT INCLUDE MODIFICATIONS TO EXISTING DRAINAGE PATTERNS, INSTALLATION OF STORMWATER MANAGEMENT PRACTICES OR STORM DRAINAGE STRUCTURES. AFTER CONSTRUCTION IS COMPLETE, ALL DISTURBED AREAS WILL BE RETURNED TO THEIR EXISTING CONDITIONS. THIS PROJECT WILL HAVE A LIMITS OF DISTURBANCE OF 12.5 AC.

EXISTING SITE CONDITIONS:
PER HOWARD COUNTY GIS, THE SITE IS ZONED SINGLE-FAMILY DETACHED AND IS SURROUNDED BY AGRICULTURAL LAND ON A PROPERTY OF APPROXIMATELY 9.16 ACRES IN SIZE. THE AGRICULTURAL LAND IS SPLIT INTO A MIXED-USE OF CROP AND PASTURE LAND. LOTS ARE PARTIALLY WOODED OR OPEN SPACE. SPARSE LARGE TREES LINE THE EXISTING CHANNEL. USBONS LITTLE CREEK DRAINS SOUTHEAST FROM THE SITE THOROUGH A COUNTY CULVERT UNDER DAISY RD AND IS A TRIBUTARY TO CATTAIL CREEK. THE STREAM HAS MANY TRIBUTARIES THAT ENTER IN THE PROJECT REACH, WITH SEVERAL ESTABLISHED CULVERT AND WET CROSSINGS. THE STREAM HAS HIGHLY ERODED BANKS AND A CHANNEL CLOGGED WITH SEDIMENT THAT MEANDERS ERRATICALLY. EXCESSIVE SEDIMENT HAS COVERED THE STREAMBED AND CATTLE HAVE HAD LIMITED ACCESS FOR SOME TIME.

SOILS:
THE SOIL TYPES AND SOIL CHARACTERISTICS WITHIN THE LIMITS OF DISTURBANCE ARE SUMMARIZED IN THE TABLE BELOW:

SOIL TYPE MAP UNIT SYMBOL: NAME	ERODIBILITY (K-FACTOR)	WATERTABLE DEPTH (IN)	HYDROLOGIC SOIL GROUP	HYDRIC RATING (% COMPONENTS)
CO: CODORIUS AND HATBORO SILT LOAM	MODERATE (0.37)	24	C	HYDRIC (35)
GMA: GLENVILLE SILT LOAM	HIGH (0.43)	30	C	HYDRIC (10)
HA: HATBORO-CODORIUS SILT LOAMS	MODERATE (0.37)	3	D	HYDRIC (60)
MAD: MANOR LOAM, 15-25% SLOPES	MODERATE (0.28)	>80	B	NOT HYDRIC (0)

OFF-SITE AREAS:
THE DISPOSAL OF ALL MATERIALS WILL BE IN ACCORDANCE WITH APPLICABLE REGULATIONS.

EROSION & SEDIMENT CONTROL MEASURES:
UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. THE MINIMUM STANDARDS SET FORTH SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED. THE E45 INSPECTOR HAS THE AUTHORITY TO ADD OR DELETE E45 CONTROLS AS NECESSARY IN THE FIELD AS SITE CONDITIONS CHANGE. ADDITIONALLY, NO E45 CONTROLS CAN BE REMOVED WITHOUT AUTHORIZATION FROM THE APPROPRIATE ENFORCEMENT AUTHORITY.

STABILIZED CONSTRUCTION ENTRANCE (B-1): SCE
A STABILIZED CONSTRUCTION ENTRANCE SHALL BE INSTALLED WHERE INDICATED ON THE PLANS. IT WILL BE NEEDED TO CLEAN THE TIRES OF VEHICLES AND EQUIPMENT DURING WET CONDITIONS IN ORDER TO PREVENT MUD/ROCKS/DEBRIS FROM BEING TRACKED OFF SITE OR INTO PUBLIC ROADWAYS.

STOCKPILE AREA (B-4-B):
A DESIGNATED LOCATION FOR TEMPORARY STORAGE OF SOIL THAT CONTROLS THE POTENTIAL FOR EROSION, SEDIMENTATION, AND CHANGES TO DRAINAGE PATTERNS. FOOTPRINT MUST BE SIZED TO ACCOMMODATE THE ANTICIPATED VOLUME OF MATERIAL AND BASED ON A SIDE SLOPE RATIO NO STEEPER THAN 2:1. ACCESS FROM UPHILL SIDE. USE SILT FENCE ON DOWNSHILL SIDE. FOLLOWS 3/7 DAY STABILIZATION REQUIREMENT. CONTRACTOR/BUILDER MAY FIELD ADJUST STOCKPILE AREAS AS NECESSARY.

PUMP AROUND / FILTER BAG (F-4) / SILT FENCE BARRIER (E-1) / FLUNGE POOL (D-4-2) VELOCITY DISSIPATER: P, FB, VD
A PUMP AROUND PER DETAIL F-4 SHALL BE UTILIZED. A FILTER BAG PER DETAIL F-4 WITH SILT FENCE PER E-1 SHALL BE UTILIZED TO STABILIZE THE OUTFALL OF THE DEWATERING PUMP. THE BYPASS PUMP SHOULD OUTFALL TO A STABILIZED VELOCITY DISSIPATER / FLUNGE POOL. THE TOTAL WORK AREA OF THE PUMP-AROUND SHOULD NOT EXCEED THE LENGTH OF AREA THAT CAN BE COMPLETED AND STABILIZED IN ONE (1) WORKING DAY. THE PUMP-AROUND LOCATIONS SHOWN ON THE PLAN ARE SCHEMATIC AND SHOULD BE PLACED IN THE FIELD BASED ON THE CONSTRUCTION SCHEDULE. THE PUMP-AROUND SHOULD BE COMPLETED AND REMOVED AT THE END OF EACH DAY. CONTRACTOR/BUILDER MAY FIELD ADJUST PUMP-AROUNDS AS NECESSARY FOR TIMING OR OTHER CONFLICTS THAT MAY ARISE.

VEGETATIVE STABILIZATION (B-4):
ALL DISTURBED AREAS OUTSIDE OF THE STREAM ARE TO BE PERMANENTLY SEEDED UPON THE REMOVAL OF TEMPORARY STABILIZATION PRACTICES. PERMANENT SEEDING PER B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING AND IN ACCORDANCE WITH B-4-5 PERMANENT SEEDING SHALL BE UTILIZED IN ALL DISTURBED AREAS. PLEASE SEE PLANTING PLAN AND NOTES (SHEETS 43-49) FOR AREA-SPECIFIC SEED MIXES PER THE TABLES PROVIDED.

TEMPORARY SOIL STABILIZATION MATTING (B-4-6-B): T55 - MINIMUM 2.02 LBS./SQ. FT.
TEMPORARY SOIL STABILIZATION MATTING SHALL BE INSTALLED WHERE INDICATED ON THE PLANS TO AID IN CONTROLLING EROSION IN CRITICAL AREAS AS WELL AS AIDING IN THE ESTABLISHMENT OF VEGETATION FOR PERMANENT STABILIZATION ON PREVIOUSLY DISTURBED SLOPES. BLANKETS/MATTING SHALL BE INSTALLED PER SPECIFICATION B-4-6-B. USE MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC), SUCH AS COIR 700 WOVEN MATTING.

SILT FENCE BARRIER (E-1) : SF
SILT FENCE SEDIMENT BARRIERS SHALL BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS WITH MINIMAL GRADES TO FILTER SEDIMENT-LADEN RUNOFF FROM SHEET FLOW AND ARE TO BE USED IF ADDITIONAL MEASURES ARE NEEDED TO PREVENT EROSION AS DIRECTED BY THE ESC INSPECTOR. CONTRACTOR/BUILDER MAY FIELD ADJUST SILT FENCE AS NECESSARY FOR ACCESS OR OTHER CONFLICTS THAT MAY ARISE.

FILTER BAG (F-4): FB
A GEOTEXTILE BAG THROUGH WHICH SEDIMENT-LADEN WATER IS PUMPED TO FILTER POND TO DISCHARGE TO BE PLACED IN A LOCATION ALLOWING FOR EASE OF DISPOSAL OF TRAPPED SEDIMENT WITH MINIMAL INTERFERENCE TO CONSTRUCTION ACTIVITIES OR PEDESTRIAN TRAFFIC. REPLACE WHEN CLOGGED, RIPPED, TORN, OR PUNCTURED. CONNECTION TO PUMP HOSE TO BE KEPT TIGHT. REPLACED BEDDING WHEN IT BECOMES DISPLACED. CONTRACTOR/BUILDER MAY FIELD ADJUST FILTER BAGS TO COINCIDE WITH ADJUSTMENTS TO PUMP-AROUNDS.

TREE PROTECTION FENCING: TP
A FENCE BARRIER IS TO BE PLACED AROUND EXISTING TREES/STANDS OF TREES (THOSE THAT WILL REMAIN) WITHIN 5 FEET OF THE CONSTRUCTION ACCESS ROAD OR ADJACENT GRADING ACTIVITIES.

TIMBER MAT: TM
TIMBER MATS WITH A SIX INCH LAYER OF MULCH BELOW THEM (WRAPPED IN FABRIC FOR CONTAINMENT) SHALL BE UTILIZED TO CREATE A STABILIZED CONSTRUCTION ACCESS ROAD, FROM THE EX. PARKING LOT TO THE WORK AREA, AND ACROSS ANY WETLAND AREAS AS DENOTED ON PLANS.

TEMPORARY STREAM CROSSING/TEMPORARY ACCESS BRIDGE: TB
A TEMPORARY STREAM CROSSINGS SHOULD BE INSTALLED IF IT IS NECESSARY FOR CONSTRUCTION TRAFFIC TO CROSS A FLOWING WATERCOURSE. A STRUCTURAL CROSSING IS NECESSARY TO PREVENT VEHICLES FROM DAMAGING STREAMBANKS AND CONTINUALLY TRACKING SEDIMENT AND OTHER POLLUTANTS INTO THE FLOW REGIME. HOWEVER, THESE STRUCTURES ARE CONSIDERED CHANNEL CONSTRUCTIONS AND SHOULD BE PLANNED TO BE IN SERVICE FOR THE SHORTEST PRACTICAL PERIOD OF TIME AND REMOVED AS SOON AS THEIR FUNCTION IS COMPLETED. IF POSSIBLE A TEMPORARY BRIDGE CROSSING SHALL BE INSTALLED, IT TYPICALLY CAUSES THE LEAST AMOUNT OF DISTURBANCE TO THE BED AND BANKS WHEN COMPARED TO OTHER CROSSINGS.

CONSTRUCTION SEQUENCE:

1. PRECONSTRUCTION MEETING (DAYS 0-5): PRIOR TO CLEARING OF TREES, INSTALLING SEDIMENT CONTROL MEASURES, OR GRADING, A PRECONSTRUCTION MEETING MUST BE CONDUCTED ON-SITE WITH THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS SEDIMENT CONTROL INSPECTOR (48 HOURS NOTICE), THE OWNERS REPRESENTATIVE, AND THE SITE ENGINEER.
MDE TRACKING NUMBER: 158216
NPDES PERMIT: TBD
2. LOD STAKEOUT (DAYS 0-5): THE LIMITS OF DISTURBANCE MUST BE FIELD MARKED PRIOR TO CLEARING OF TREES, INSTALLATION OF SEDIMENT CONTROL MEASURES, CONSTRUCTION, OR OTHER LAND DISTURBING ACTIVITIES.
3. CLEAR AND GRUB FOR PERIMETER CONTROLS (DAY 6-10): CLEAR AND GRUB AS NECESSARY FOR THE INSTALLATION OF PERIMETER CONTROLS.
4. PERIMETER CONTROLS (DAYS 6-10): CONSTRUCT AND STABILIZE PERIMETER CONTROLS WHICH INCLUDE TREE PROTECTION AND SAFETY FENCE.
5. CLEAR, GRUB, AND GRADE (DAYS 6-10): CLEAR, GRUB, AND GRADE FOR INSTALLATION OF SEDIMENT CONTROL DEVICES.
6. INSTALL REMAINING SEDIMENT CONTROL DEVICES (DAYS 6-10).
 - 6.1. INSTALL STREAM DIVERSION PUMP-AROUND ON A DAILY BASIS, DIVERT THE STREAM AS NECESSARY TO EXPOSE CONSTRUCTION AREA OF THE CHANNEL THAT CAN BE STABILIZED IN ONE DAY. DAILY PUMP-AROUNDS SHALL BE SET UP BEFORE WORK EACH DAY AND TAKEN OUT AFTER ALL WORK HAS BEEN COMPLETED FOR THAT DAY. THE PUMP INTAKE MUST BE FLOATED ABOVE THE STREAM BOTTOM AT ALL TIMES. PUMP CAPACITY SHOULD BE, AT MINIMUM, ABLE TO HANDLE 8 CF5 OR ABOUT 3600 GPM.
7. ONCE THE SEDIMENT CONTROL DEVICES ARE INSTALLED, THE PERMITTEE MUST OBTAIN WRITTEN APPROVAL FROM THE INSPECTOR BEFORE PROCEEDING WITH ANY ADDITIONAL CLEARING, GRUBBING, OR GRADING (DAY 10).
8. STAKE OUT (DAY 11): THE ALIGNMENT OF THE CHANNEL SHALL BE STAKED IN THE FIELD, AND REVIEWED WITH THE ENGINEER PRIOR TO GROUND DISTURBANCE. THE DOWNSTREAM TIE-IN TO THE EXISTING STREAM SHOULD BE REVIEWED TO DETERMINE IF MODIFICATIONS ARE REQUIRED TO ADJUST THE DESIGN TO CURRENT STREAM CONDITIONS
9. PERFORM REMAINING CLEARING/GRUBBING AS NECESSARY TO INSTALL REMAINING E45 MEASURES AND PERFORM CONSTRUCTION OPERATIONS (DAYS 11-15).
10. PERFORM STREAM RESTORATION OPERATION (DAYS 11-147). NOTE: TO KEEP PUMP-AROUNDS A DAILY OPERATION, EACH DAY COMPLETE THE FOLLOWING PUMP-AROUND SEQUENCE ON A LENGTH OF CHANNEL THAT CAN BE BUILT AND STABILIZED IN ONE DAY. THE CONSTRUCTION OF THE STREAM RESTORATION WILL BE CONSTRUCTED "IN THE DRY." PRIOR TO IMPACTS TO THE EXISTING STREAM CHANNEL. WHERE POSSIBLE, STREAM FLOW WILL BE MAINTAINED IN THE ORIGINAL STREAM CHANNEL WHILE THE OFFLINE SEGMENTS OF THE STREAM RESTORATION CHANNEL IS CONSTRUCTED. THE STREAM RESTORATION CHANNEL SHALL BE GRADED, SEEDED AND MATTED TO CONTROL EROSION PRIOR TO INTRODUCTION OF FLOW INTO THE CHANNEL. THE CONSTRUCTION OF THE STREAM RESTORATION CHANNEL SHALL GENERALLY FOLLOW THE SEQUENCE BELOW:
 - 10.1. SALVAGE TOP SOIL: STRIP TOP SOIL FROM AREA TO BE GRADED AND STOCKPILE FOR REUSE ACROSS THE WETLAND FLOODPLAIN AND RIPARIAN BUFFER.
 - 10.2. CHANNEL EXCAVATION: EXCAVATE THE CHANNEL PER THE PLANS. DURING EXCAVATION OF THE CHANNEL ANY ACCUMULATION OF GROUND WATER SHALL BE PUMPED OUT OF THE CHANNEL THROUGH AN APPROVED FILTERING DEVICE ONTO A STABILIZED AREA ENSURING NO EROSION OCCURS AROUND THE OUTFALL OF THE FILTERING DEVICE.
 - 10.3. INSTALLATION OF LOG STRUCTURES: USING LOGS SALVAGED FROM SITE CLEARING, INSTALL THE LOG STRUCTURES PER THE PLANS, ENSURING THAT THE TOP OF THE LOG EXPOSED IN THE CHANNEL IS EVEN WITH THE INVERT OF THE STREAM CHANNEL.
 - 10.4. INSTALLATION OF ROCK STRUCTURES: USING STRUCTURE STONE OF SIZE CALLED OUT ON PLANS, INSTALL THE ROCK STRUCTURES PER THE PLANS, ENSURING THAT THE TOP OF THE HEADER ROCK EXPOSED IN THE CHANNEL IS EVEN WITH THE INVERT OF THE STREAM CHANNEL.
 - 10.5. TRIBUTARIES: CONSTRUCTION SHOULD TAKE PLACE ON THE TRIBUTARIES (REACHES 748) BEFORE WORK ON THE MAIN STEM REACHES THE TRIBUTARY CONFLUENCE. CONSTRUCTION IN THE TRIBUTARY, INCLUDING PUMP AROUND PRACTICES, SHOULD FOLLOW THE SAME SEQUENCE AS FOR THE MAIN STEM OF THE STREAM. WHEN CONSTRUCTION ON THE TRIBUTARY IS COMPLETED, WORK ON THE MAIN STEM SHOULD RESUME. WATER FROM THE TRIBUTARY SHOULD CONTINUE TO BE PUMPED AROUND THE WORK AREA IN THE MAIN STEM.
 - 10.6. DOWNSTREAM TIE-IN: COMPLETE GRADING OF CHANNEL ON DOWNSTREAM END OF REACH 6, ENSURING A GRADUAL TRANSITION INTO THE DIMENSIONS OF THE EXISTING STREAM CHANNEL AND ENSURING THAT THE CULVERT OUTLET IS PROPERLY COUNTERSUNK. INSTALL TOP SOIL, WETLAND SEEDING AND COIR MATTING TO STABILIZE CHANNEL TIE-IN.
 - 10.7. UPSTREAM TIE-INS: AFTER THE COMPLETION ALL OTHER DOWNSTREAM GRADING, ON REACHES 1 AND 2, GRADE THE STREAM CHANNEL UPSTREAM TO THE EXISTING STREAM CHANNEL, ENSURING A GRADUAL TRANSITION FROM THE DIMENSIONS OF THE EXISTING STREAM CHANNEL. AFTER THE COMPLETION ALL OTHER DOWNSTREAM GRADING FOR REACH 3, GRADE THE STREAM CHANNEL UPSTREAM TO THE OUTLET OF THE EXISTING CULVERT, ENSURING THAT THE CULVERT OUTLET IS PROPERLY COUNTERSUNK. AT THE OUTLET OF THE CULVERT, TRANSITION THE CHANNEL DIMENSIONS TO MATCH THE WIDTH OF THE CULVERTS.
 - 10.8. CHANNEL STABILIZATION: INSTALL TOP SOIL, SEEDING, AND WOVEN COIR MATTING TO STABILIZE THE CHANNEL BANKS. SECURE THE MATTING PER THE PROVIDED DETAILS.
 - 10.9. BED MATERIAL: STABILIZE THE STREAM CHANNEL BED WITH STONE AS INDICATED IN THE PLANS, ENSURING THAT THE SURFACE OF THE STONE MATCHES THE PROFILE ELEVATION.
 - 10.10. TOP SOILING AND SEEDING WETLAND FLOODPLAIN: APPLY 2 INCHES OF SALVAGED TOP SOIL TO THE WETLAND FLOODPLAIN AND APPLY EROSION CONTROL SEED AND NATIVE SEED MIX AS REQUIRED BY THE PLANTING PLANS.
 - 10.11. MATTING: INSTALL WOVEN COIR MATTING ON THE SIDE SLOPES OF THE PROPOSED WETLAND CELLS AND THE FLOODPLAIN WETLAND. SECURE THE MATTING PER THE PROVIDED DETAILS.
11. RETURNING FLOW TO CHANNEL (DAY 148): AFTER THE ENTIRE STREAM CHANNEL HAS BEEN CONSTRUCTED AND STABILIZED, AND ALL TIE-INS COMPLETED, OPEN THE RELOCATED CHANNELS TO STREAM FLOW BY REMOVING SANDBAG DIKES AND STREAM DIVERSION PUMPS.
 - 11.1. PLANTING: IN THE APPROVED PLANTING SEASON, INSTALL THE WETLAND FLOODPLAIN AND RIPARIAN BUFFER PLANTINGS INCLUDED IN THE PLANTING PLAN.
12. DAILY INSPECTION AND MAINTENANCE OF E45 CONTROLS AS REQUIRED (DAYS 6-154).
13. OBTAIN WRITTEN APPROVAL OF HOWARD COUNTY SEDIMENT CONTROL INSPECTOR TO REMOVE E45 CONTROLS (DAYS 147-154).
14. PERMANENT SEED AND MULCH DISTURBED AREAS (DAYS 11-154).
15. DAILY INSPECTION AND MAINTENANCE OF PERMANENT SEEDING AND MULCHING IS REQUIRED UNTIL PERMANENT SEEDING IS ESTABLISHED AND A GOOD STAND IS MAINTAINED (DAYS 11-154). CONCURRENT WORK IN DIFFERING AREAS MAY TAKE PLACE AS LONG AS THE CONSTRUCTION SEQUENCE IS FOLLOWED PROPERLY FOR ALL WORK SITES AND THE NECESSARY PERMITS ARE OBTAINED AND ABIDED BY.

OPERATION & MAINTENANCE:
IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL. THE SILT FENCE BARRIERS WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF WAY TO THE TOP OF THE BARRIER. FILTERING DEVICES WILL BE INSPECTED FREQUENTLY AND REPAIRED/REPLACED ONCE THE SEDIMENT BUILD-UP PREVENTS THE STRUCTURE FROM FUNCTIONING AS DESIGNED. ALL SOIL STABILIZATION MATTING SHOULD BE INSPECTED PERIODICALLY FOLLOWING INSTALLATION, PARTICULARLY AFTER RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY DISLOCATION OR FAILURE SHOULD BE REPAIRED IMMEDIATELY. IF WASHOUTS OR BREAKAGE OCCURS, REINSTALL THE MATERIAL AFTER REPAIRING THE DAMAGE TO THE SLOPE OR DITCH. SEEDED AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEEDED AS NEEDED.

OWNER/DEVELOPER CERTIFICATION:
IT IS THE RESPONSIBILITY OF THE OWNER/DEVELOPER OR REPRESENTATIVE TO CONTACT THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS CONSTRUCTION INSPECTION DIVISION, LICENSES AND PERMITS OR ITS AGENT AT THE FOLLOWING STAGES OF THE PROJECT:

- 1) PRIOR TO THE START OF EARTH DISTURBANCE
- 2) UPON COMPLETION OF THE INSTALLATION OF PERIMETER EROSION & SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING.
- 3) PRIOR TO THE REMOVAL OF SEDIMENT CONTROL PRACTICES.
- 4) AFTER ADEQUATE STABILIZATION FOR FINAL SITE INSPECTION TO CLOSE SEDIMENT CONTROL PERMIT AND RELEASE BOND.

HOWARD SOIL CONSERVATION DISTRICT STANDARD EROSION AND SEDIMENT CONTROL NOTES:

1. A PRE-CONSTRUCTION MEETING MUST BE CONDUCTED WITH THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION INSPECTION DIVISION (C.I.D.) 410-315-1855 AFTER THE FUTURE LOD AND PROTECTED AREAS ARE MARKED CLEARLY IN THE FIELD. A MINIMUM OF 48 HOUR NOTICE TO C.I.D. MUST BE GIVEN AT THE FOLLOWING STAGES:
 - 1.1. PRIOR TO THE START OF EARTH DISTURBANCE
 - 1.2. UPON COMPLETION OF THE INSTALLATION OF PERIMETER SEDIMENT CONTROLS BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING.
 - 1.3. PRIOR TO THE START OF ANOTHER PHASE OF CONSTRUCTION OR OPENING OF ANOTHER GRADING UNIT.
 - 1.4. PRIOR TO THE REMOVAL OR MODIFICATION OF SEDIMENT CONTROL PRACTICES.

OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE. OTHER RELATED STATE AND FEDERAL PERMITS SHALL BE REFERENCED TO ENSURE COORDINATION AND TO AVOID CONFLICTS WITH THIS PLAN

2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL AND REVISIONS THERETO.
3. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION IS REQUIRED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3H:1V, AND SEVEN (7) DAYS AS TO ALL OTHER DISTURBED AREAS ON THE PROJECT SITE EXCEPT FOR THOSE AREAS UNDER ACTIVE GRADING.
4. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR TOPSOIL (SEC. B-4-2), PERMANENT SEEDING (SEC. B-4-5), TEMPORARY SEEDING (SEC. B-4-4), AND MULCHING (SEC. B-4-3). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES IF THE GROUND IS FROZEN. INCREMENTAL STABILIZATION (SEC. B-4-1) SPECIFICATIONS SHALL BE ENFORCED IN AREAS WITH >15' OF CUT AND/OR FILL. STOCKPILES (SEC. B-4-8) IN EXCESS OF 20 FT MUST BE BENCHED WITH STABLE OUTLET. ALL CONCENTRATED FLOW, STEEP SLOPE, AND HIGHLY ERODIBLE AREAS SHALL RECEIVE SOIL STABILIZATION MATTING (SEC. B-4-6-B).
5. ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE C.I.D.
6. SITE ANALYSIS:
 - 6.1. TOTAL AREA OF SITE: 14.9 AC
 - 6.2. AREA DISTURBED: 12.5 AC
 - 6.3. AREA TO BE ROOFED OR PAVED: 0.0 AC
 - 6.4. AREA TO BE VEGETATIVELY STABILIZED: 14.9 AC
 - 6.5. TOTAL CUT: 8490 CU. YDS.
 - 6.6. TOTAL FILL: 8220 CU. YDS.
 - 6.7. OFFSITE WASTE/BORROW AREA LOCATION: ALL ON-SITE
7. ANY SEDIMENT CONTROL PRACTICE THAT IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
8. ANY SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE C.I.D. THE SITE AND ALL CONTROLS SHALL BE INSPECTED BY THE CONTRACTOR WEEKLY AND THE NEXT DAY AFTER EACH RAIN EVENT. A WRITTEN REPORT BY THE CONTRACTOR, MADE AVAILABLE UPON REQUEST IS PART OF EVERY INSPECTION AND SHOULD INCLUDE:
 - 8.1. INSPECTION DATE
 - 8.2. INSPECTION TYPE (ROUTINE, PRE-STORM EVENT, DURING RAIN EVENT)
 - 8.3. NAME AND TITLE OF INSPECTOR
 - 8.4. WEATHER INFORMATION (CURRENT CONDITIONS AS WELL AS TIME AND AMOUNT OF LAST RECORDED PRECIPITATION)
 - 8.5. BRIEF DESCRIPTION OF PROJECT'S STATUS (E.G. PERCENT COMPLETE) AND/OR CURRENT ACTIVITIES
 - 8.6. EVIDENCE OF SEDIMENT DISCHARGES
 - 8.7. IDENTIFICATION OF PLAN DEFICIENCIES
 - 8.8. IDENTIFICATION OF SEDIMENT CONTROLS THAT REQUIRE MAINTENANCE
 - 8.9. IDENTIFICATION OF MISSING OR IMPROPERLY INSTALLED SEDIMENT CONTROLS
 - 8.10. COMPLIANCE STATUS REGARDING THE SEQUENCE OF CONSTRUCTION AND STABILIZATION REQUIREMENTS
 - 8.11. PHOTOGRAPHS
 - 8.12. MONITORING/SAMPLING
 - 8.13. MAINTENANCE AND/OR CORRECTIVE ACTION REQUIRED
 - 8.14. OTHER INSPECTION ITEMS AS REQUIRED BY THE GENERAL PERMIT FOR STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES (NPDES, MDE)
9. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK-FILLED AND STABILIZED BY THE END OF EACH WORKDAY, WHICHEVER IS SHORTER.
10. ANY MAJOR CHANGES OR REVISIONS TO THE PLAN OR SEQUENCE OF CONSTRUCTION MUST BE REVIEWED AND APPROVED BY THE HSCD PRIOR TO PROCEEDING WITH CONSTRUCTION. MINOR REVISIONS MAY BE ALLOWED BY THE C.I.D. PER THE LIST OF HSCD-APPROVED FIELD CHANGES
11. DISTURBANCE SHALL NOT OCCUR OUTSIDE THE L.O.D. A PROJECT IS TO BE SEQUENCED SO THAT GRADING ACTIVITIES BEGIN ON ONE GRADING UNIT (MAXIMUM ACREAGE OF 20 AC PER GRADING UNIT) AT A TIME. WORK MAY PROCEED TO A SUBSEQUENT GRADING UNIT WHEN AT LEAST 50 PERCENT OF THE DISTURBED AREA IN THE PRECEDING GRADING UNIT HAS BEEN STABILIZED AND APPROVED BY THE C.I.D. UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE C.I.D. NO MORE THAN 30 ACRES CUMULATIVELY MAY BE DISTURBED AT A GIVEN TIME.
12. WASH WATER FROM ANY EQUIPMENT, VEHICLES, WHEELS, PAVEMENT, AND OTHER SOURCES MUST BE TREATED IN A SEDIMENT BASIN OR OTHER APPROVED WASHOUT STRUCTURE.
13. TOPSOIL SHALL BE STOCKPILED AND PRESERVED ON-SITE FOR REDISTRIBUTION ONTO FINAL GRADE.
14. ALL SILT FENCE AND SUPER SILT FENCE SHALL BE PLACED ON-THE-CONTOUR AND BE IMBRICATED AT 25' MINIMUM INTERVALS WITH LOWER ENDS CURLED UP BY 2' IN ELEVATION.
15. STREAM CHANNELS MUST NOT BE DISTURBED DURING THE FOLLOWING RESTRICTED TIME PERIODS (INCLUSIVE):
 - 15.1. USE I AND I-P (MARCH 1 - JUNE 15)
 - 15.2. USE III AND III-P (OCTOBER 1 - MAY 31)
 - 15.3. USE IV (MARCH 1 - MAY 31)
16. A COPY OF THIS PLAN, THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE ASSOCIATED PERMITS SHALL BE ON-SITE AND AVAILABLE WHEN THE SITE IS ACTIVE.

ENVIRONMENTAL SITE DESIGN NARRATIVE / STORMWATER MANAGEMENT:

THIS PROJECT INCLUDES NO NEW PERMANENT IMPERVIOUS SURFACES, THEREFORE, NO PERMANENT STORMWATER MANAGEMENT PRACTICES ARE PROPOSED. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES ARE BEING IMPLEMENTED TO PREVENT EROSION AND SEDIMENT TRANSPORT DURING CONSTRUCTION OPERATIONS TO MINIMIZE THE IMPACT TO AND PROTECT THE SURROUNDING ENVIRONMENTAL FEATURES. THESE PRACTICES ARE DISCUSSED IN FURTHER DETAIL IN THE EROSION AND SEDIMENT CONTROL NARRATIVE. ONCE THE CONSTRUCTION OPERATIONS ARE COMPLETED EROSION AND SEDIMENT CONTROL MEASURES WILL BE REMOVED AND THE ENTIRE AREA WITHIN THE LIMITS OF DISTURBANCE WILL BE PERMANENTLY SEEDED.

NOTE: THE CONTRACTOR/BUILDER SHALL DISTURB NO MORE AREA THAN CAN AND SHALL BE STABILIZED EACH DAY.
NOTE: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED AND MAINTAINED ACCORDING TO DESIGN SPECIFICATIONS PROVIDED HEREON BY THE "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL" AND "MARYLAND WATERWAYS CONSTRUCTION MANUAL"

Standard Stabilization Note	
Following initial soil disturbance or re-disturbance, permanent or temporary stabilization must be completed within:	
a.) Three (3) calendar days as to the surface of all perimeter dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and	
b.) Seven (7) calendar days as to all other disturbed or graded areas on the project site not under active grading.	

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LIVERMORE, CO 80536
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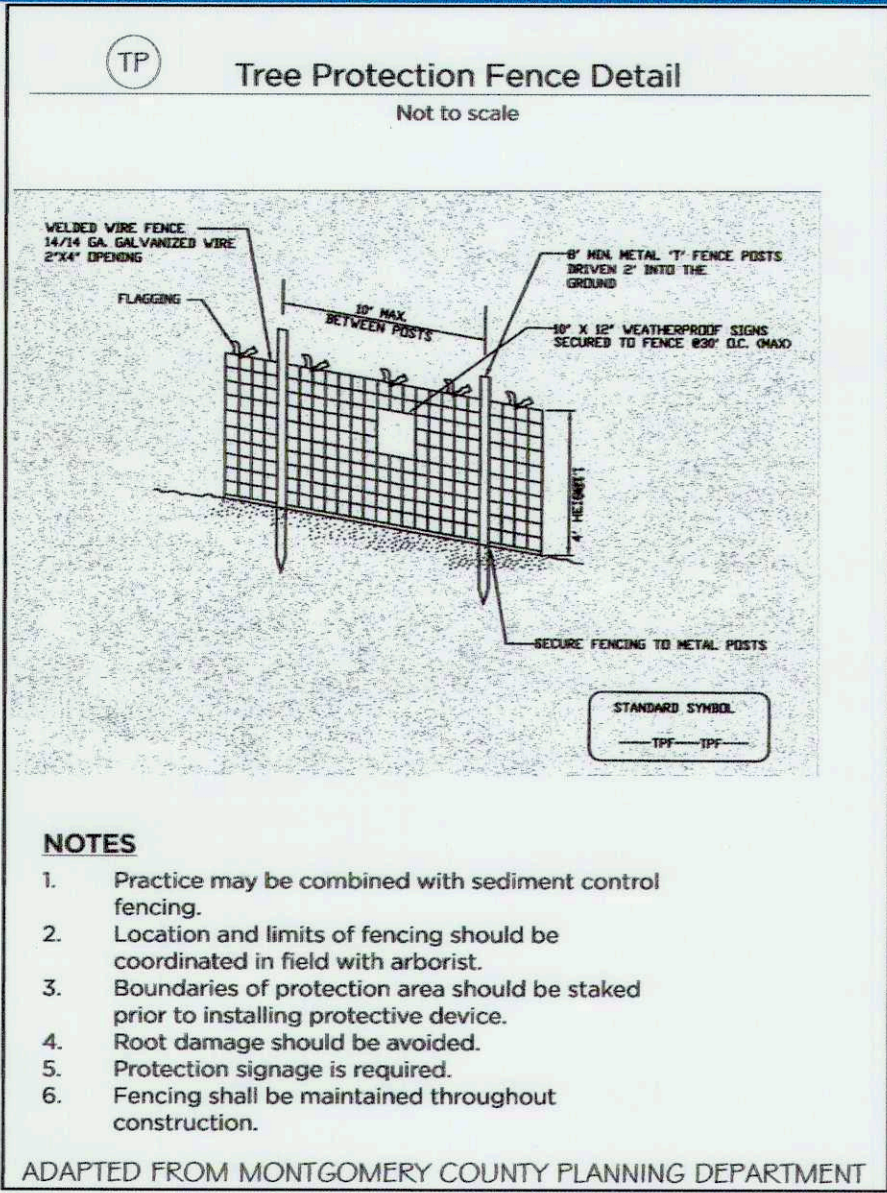
CAPITAL PROJECT#: D-11158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS
ESC NOTES &
NARRATIVE
WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A

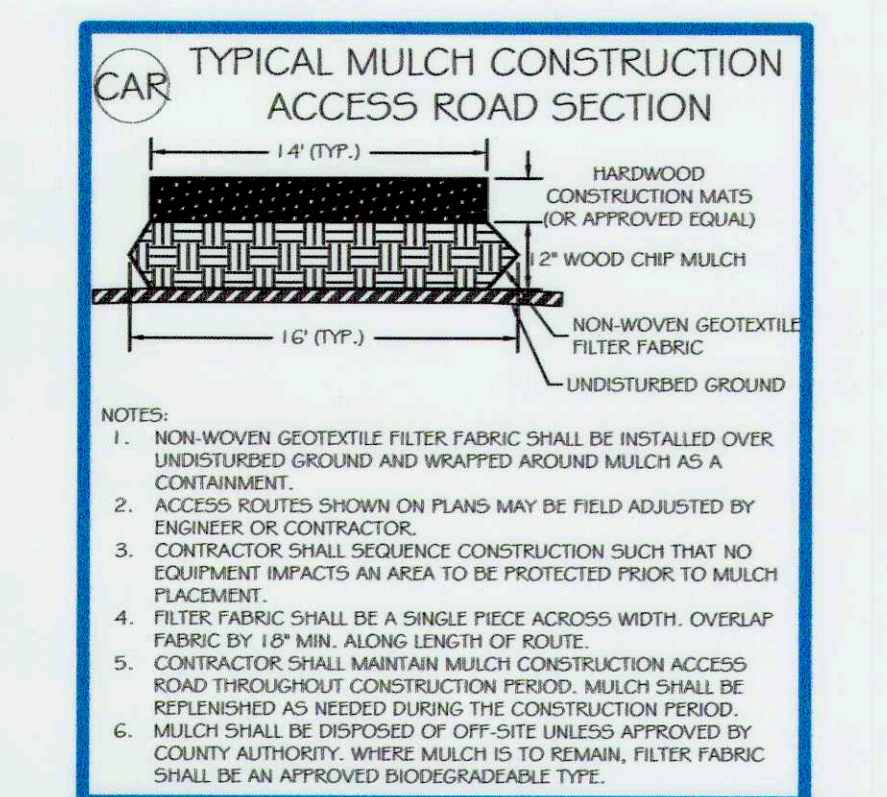


APPROVED: DEPT. OF PUBLIC WORKS
Michael 5/30/18
DATE: 5/30/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MGCP/DC
JOB NUMBER:	6172.00
DESIGN TYPE-STREAM RESTORATION	
DATE:	12/14/2017
SHEET NO:	41 OF 49



TP Tree Protection Fence Detail
Not to scale.
Notes:
1. Practice may be combined with sediment control fencing.
2. Location and limits of fencing should be coordinated in field with arborist.



TYPICAL MULCH CONSTRUCTION ACCESS ROAD SECTION
Notes:
1. NON-WOVEN GEOTEXTILE FILTER FABRIC SHALL BE INSTALLED OVER UNDISTURBED GROUND AND WRAPPED AROUND MULCH AS A CONTAINMENT.

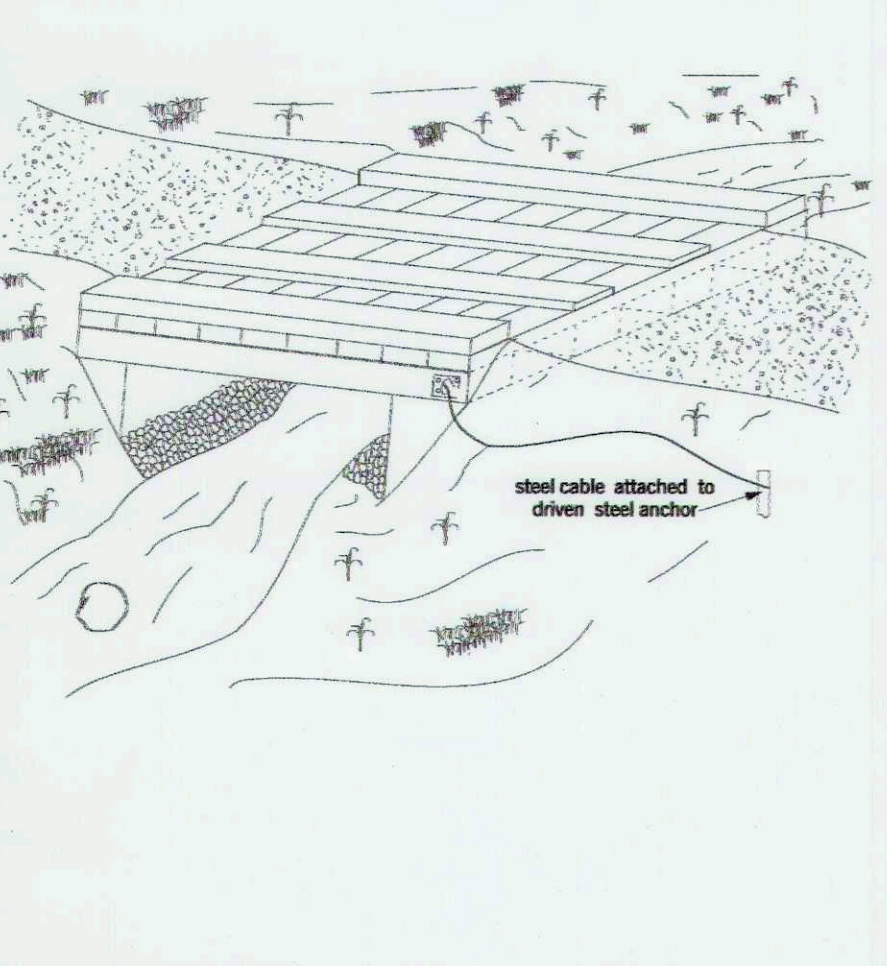
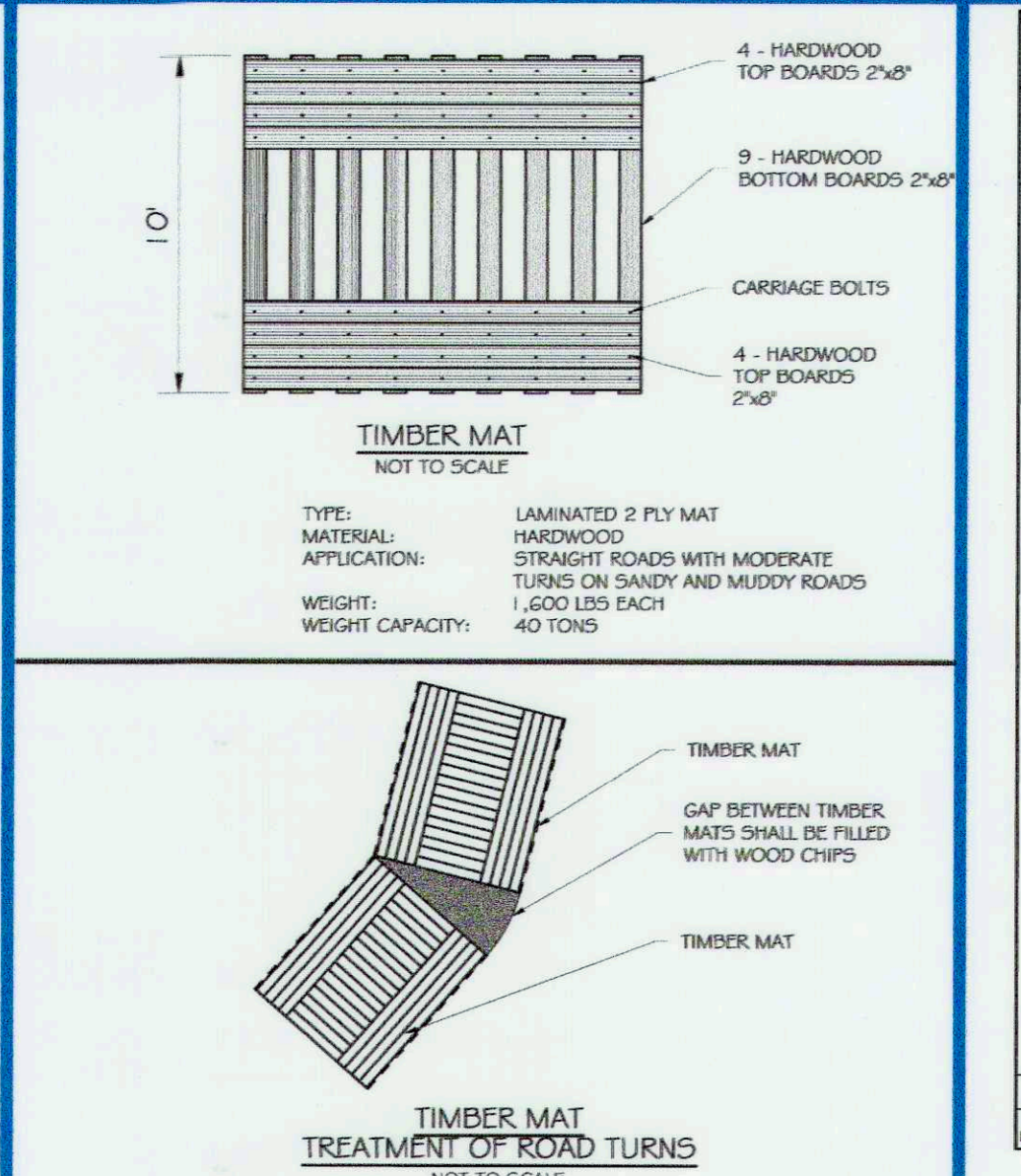
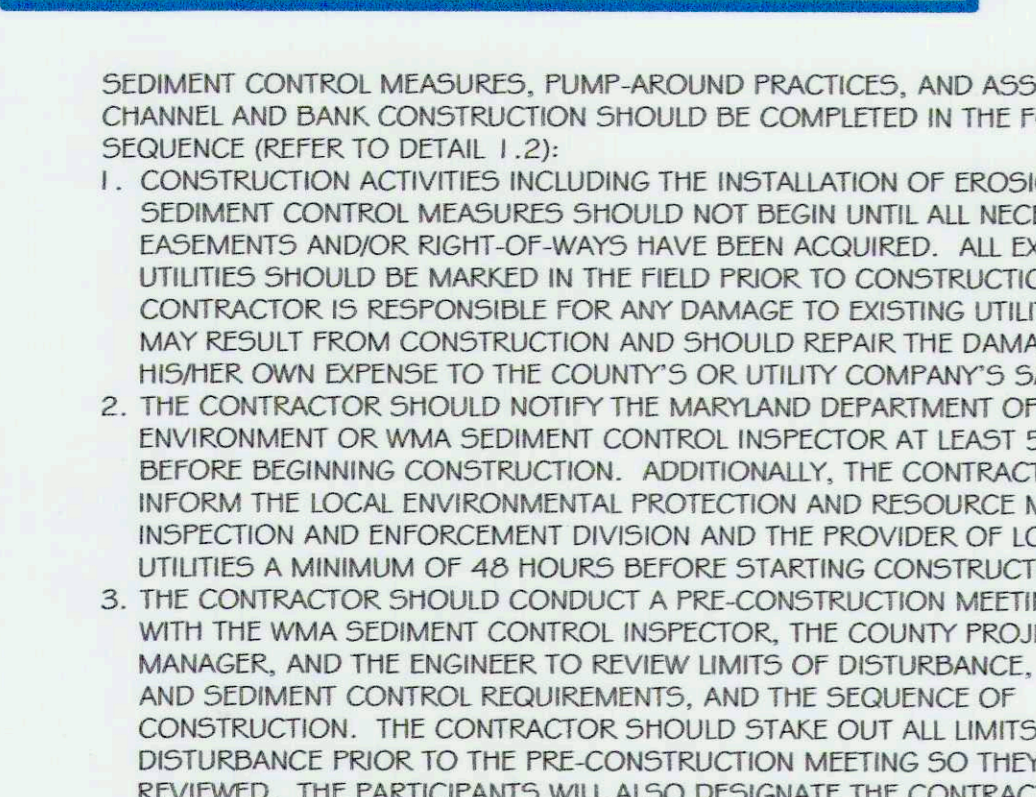


Table with 2 columns: PUMP-AROUND, BEGGING. Rows 1-19 showing reach, station, ending, drainage area, and duration for existing and proposed streams.

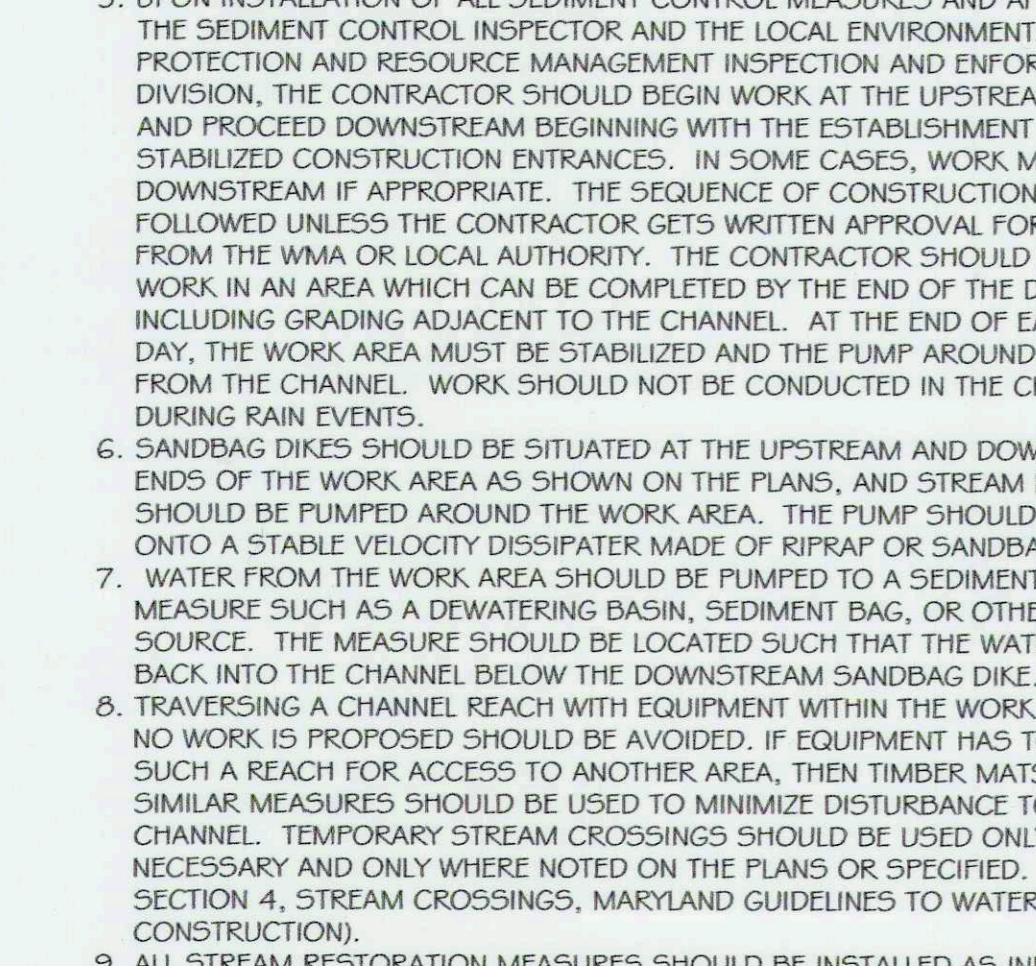
NOTE: PERMANENT PLANTING SEED MIXES ARE SHOWN ON SHEET 49 'PLANTING NOTES AND DETAILS'. THOSE SEED MIXES SHOULD NOT TAKE THE PLACE OF SEEDING FOR ESC PURPOSES.



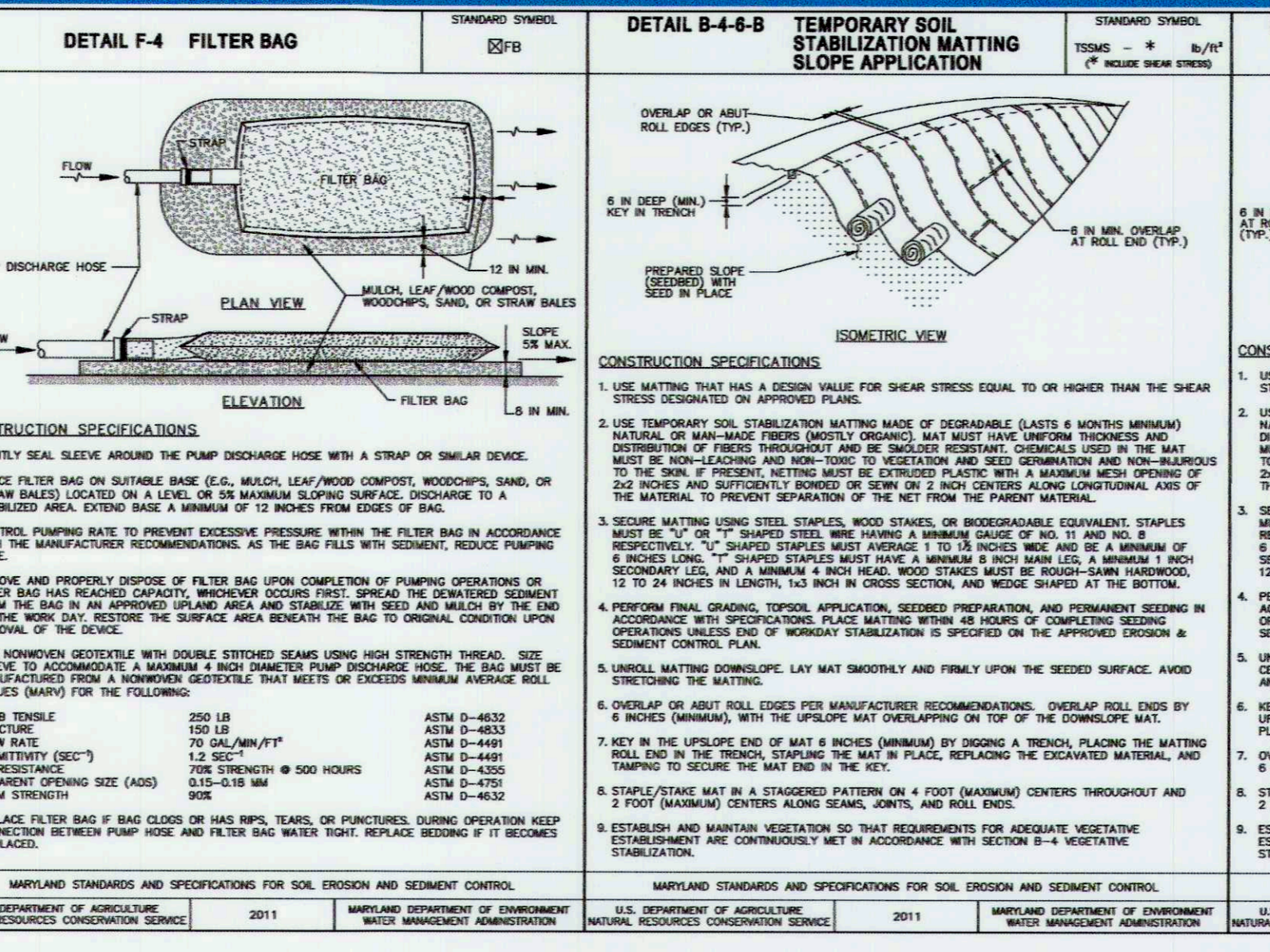
TM TIMBER MAT TREATMENT OF ROAD TURNS
NOT TO SCALE



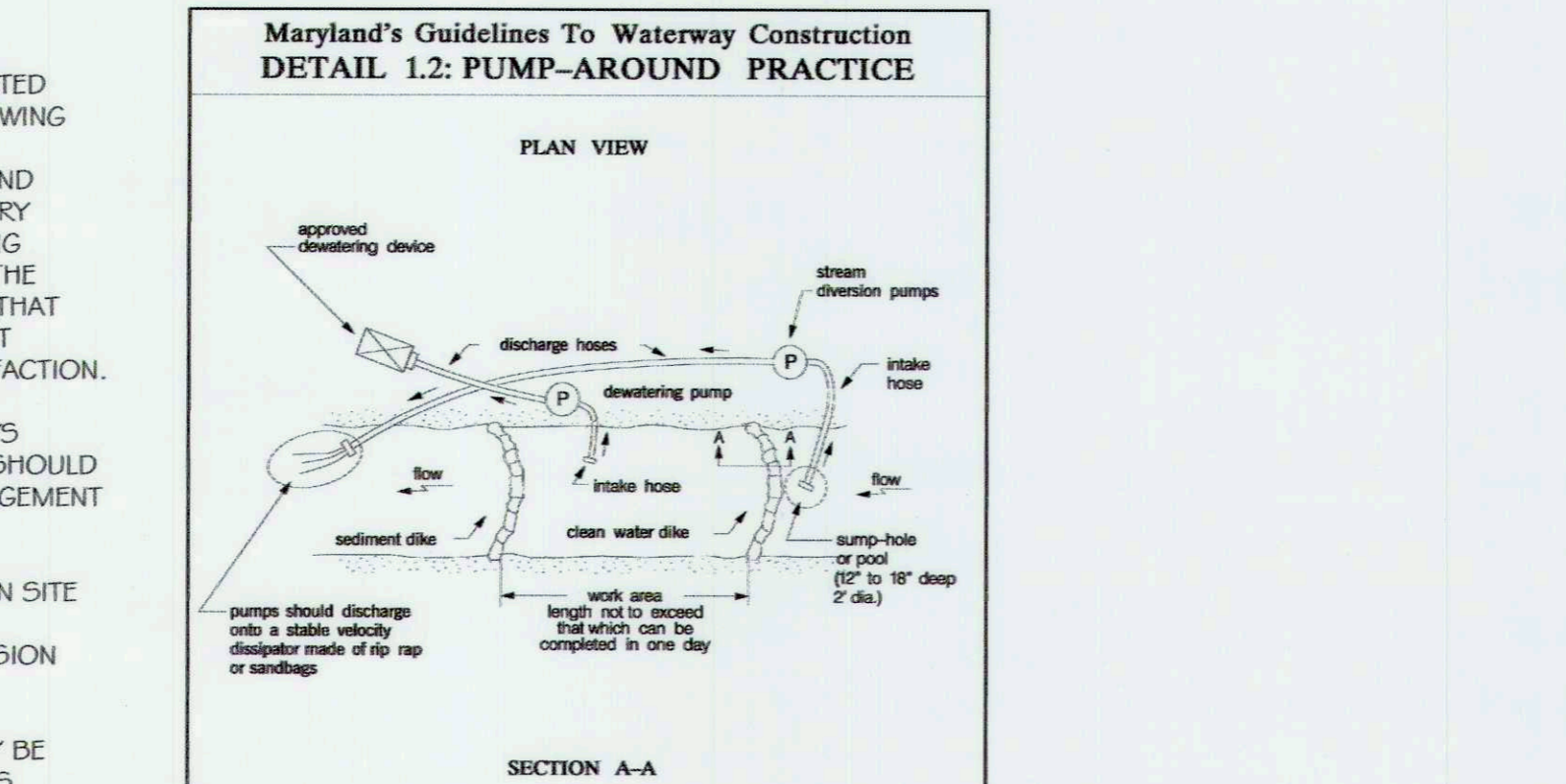
TM TIMBER MAT TEMPORARY ACCESS ROAD
NOT TO SCALE



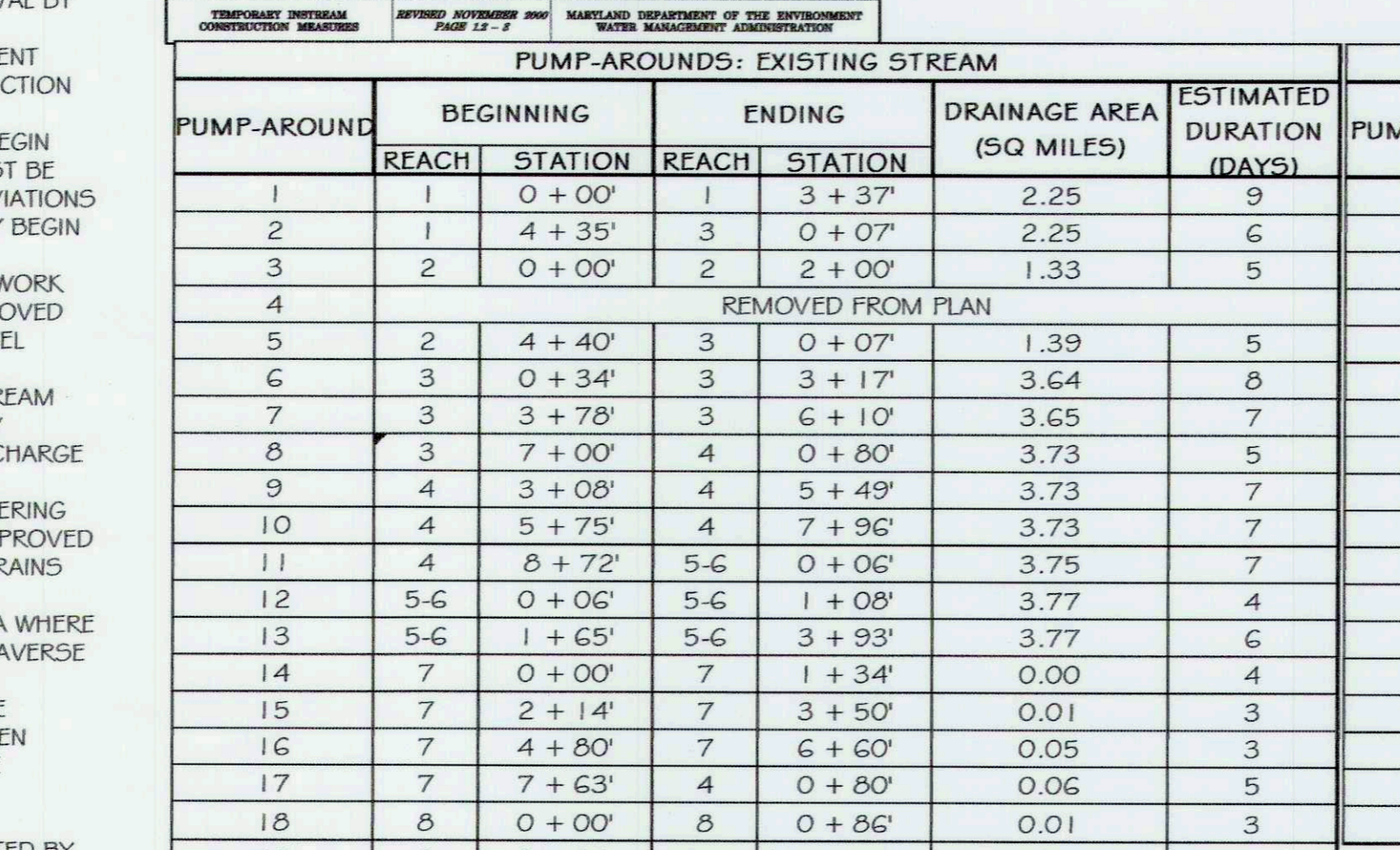
Maryland's Guidelines To Waterway Construction DETAIL 1.2: PUMP-AROUND PRACTICE
Notes:
1. CONSTRUCTION ACTIVITIES INCLUDING THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES SHOULD NOT BEGIN UNTIL ALL NECESSARY EASEMENTS AND/OR RIGHT-OF-WAYS HAVE BEEN ACQUIRED.



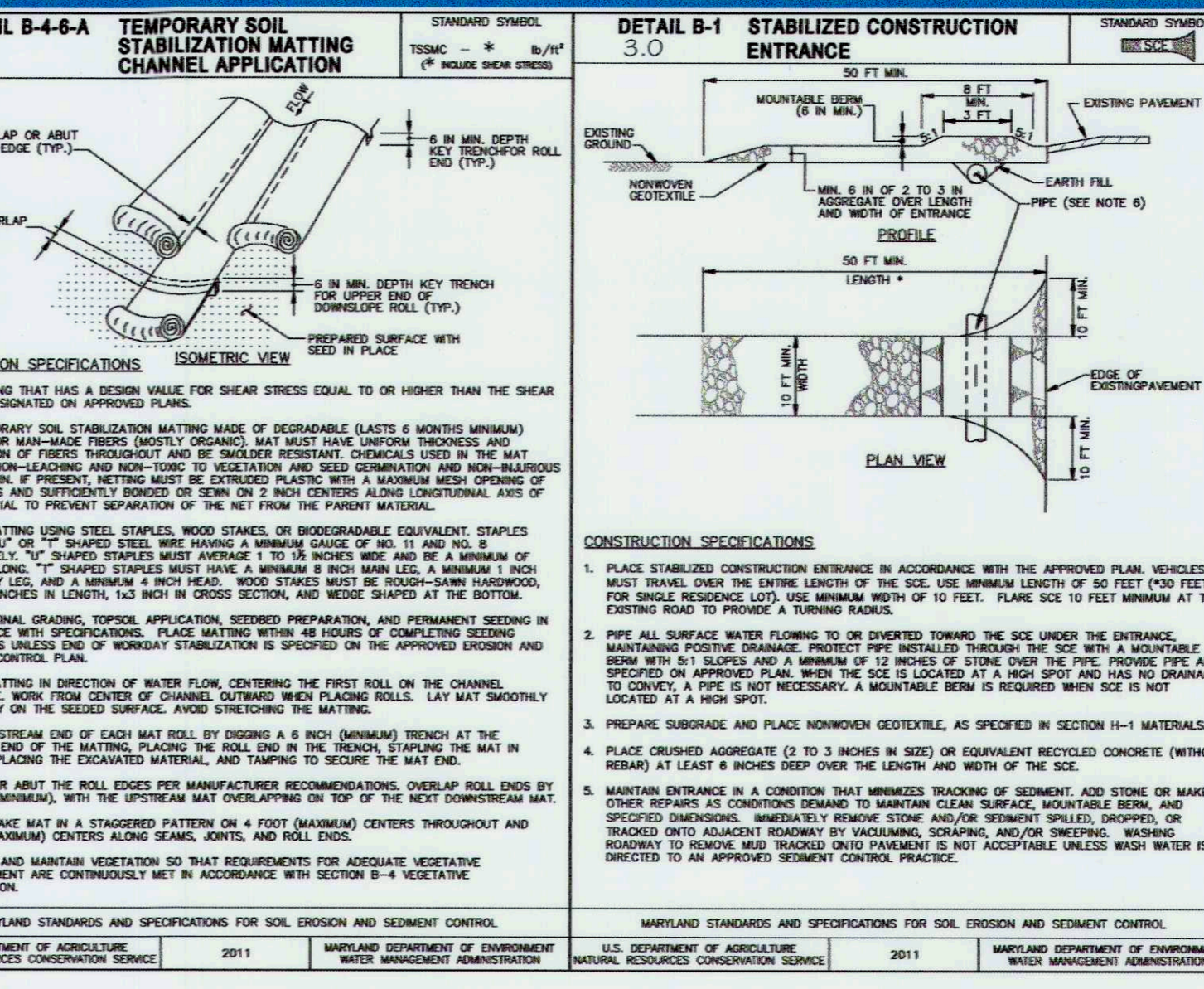
DETAIL F-4 FILTER BAG
CONSTRUCTION SPECIFICATIONS
1. APPLY SEAL SLAVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.



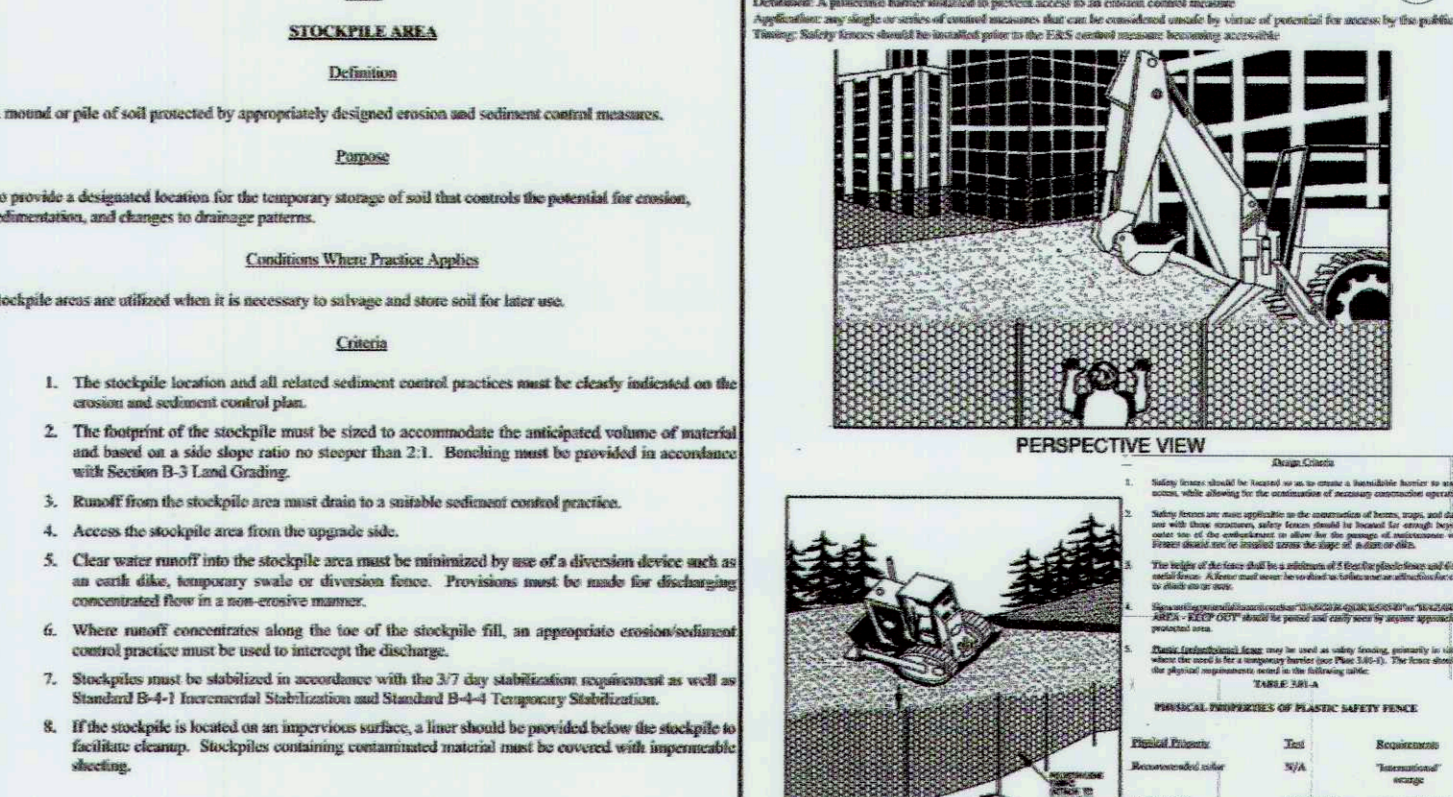
DETAIL B-4-B-8 TEMPORARY SOIL STABILIZATION MATTING SLOPE APPLICATION
CONSTRUCTION SPECIFICATIONS
1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.



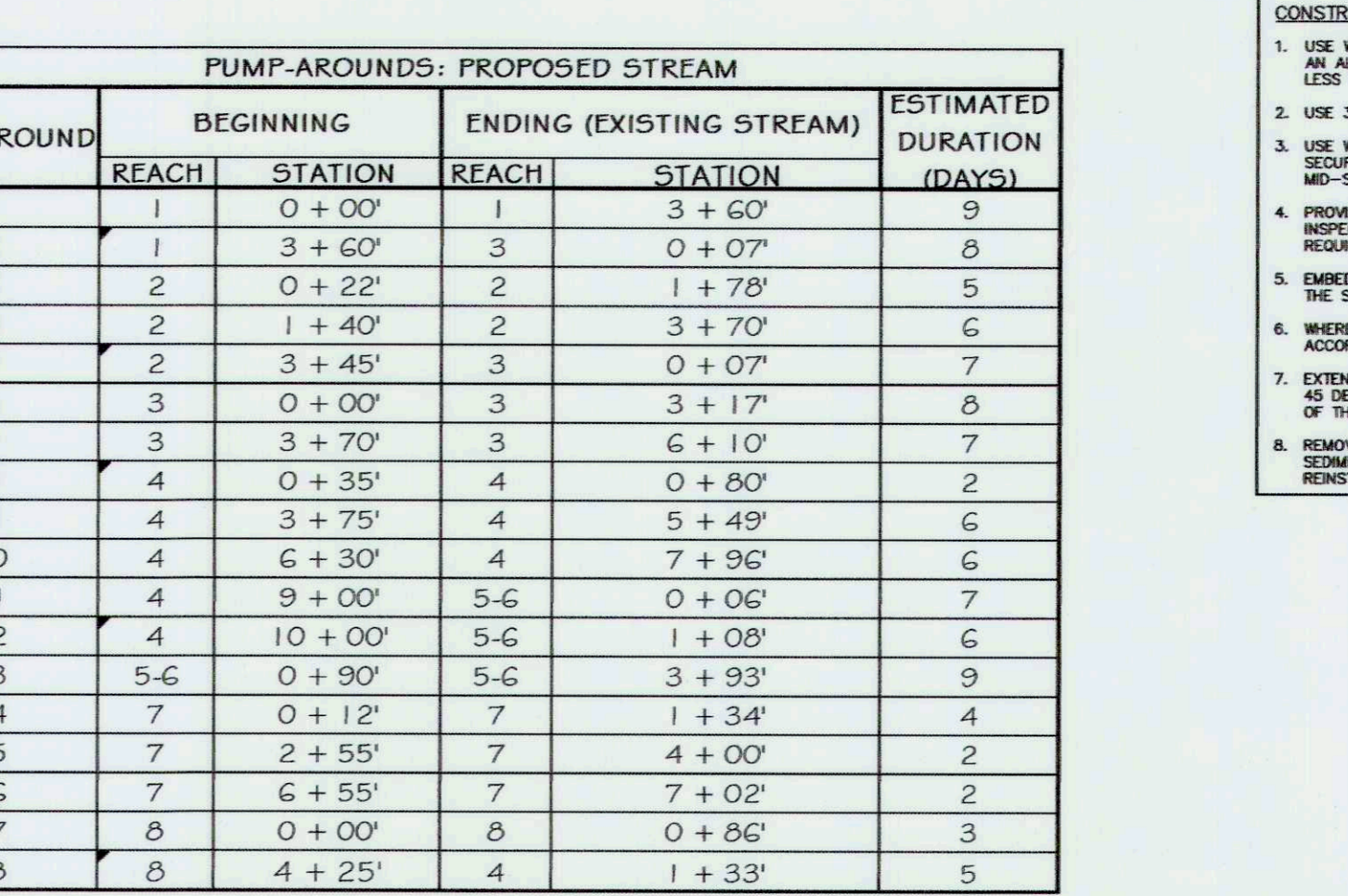
DETAIL B-4-B-6 TEMPORARY SOIL STABILIZATION MATTING CHANNEL APPLICATION
CONSTRUCTION SPECIFICATIONS
1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.



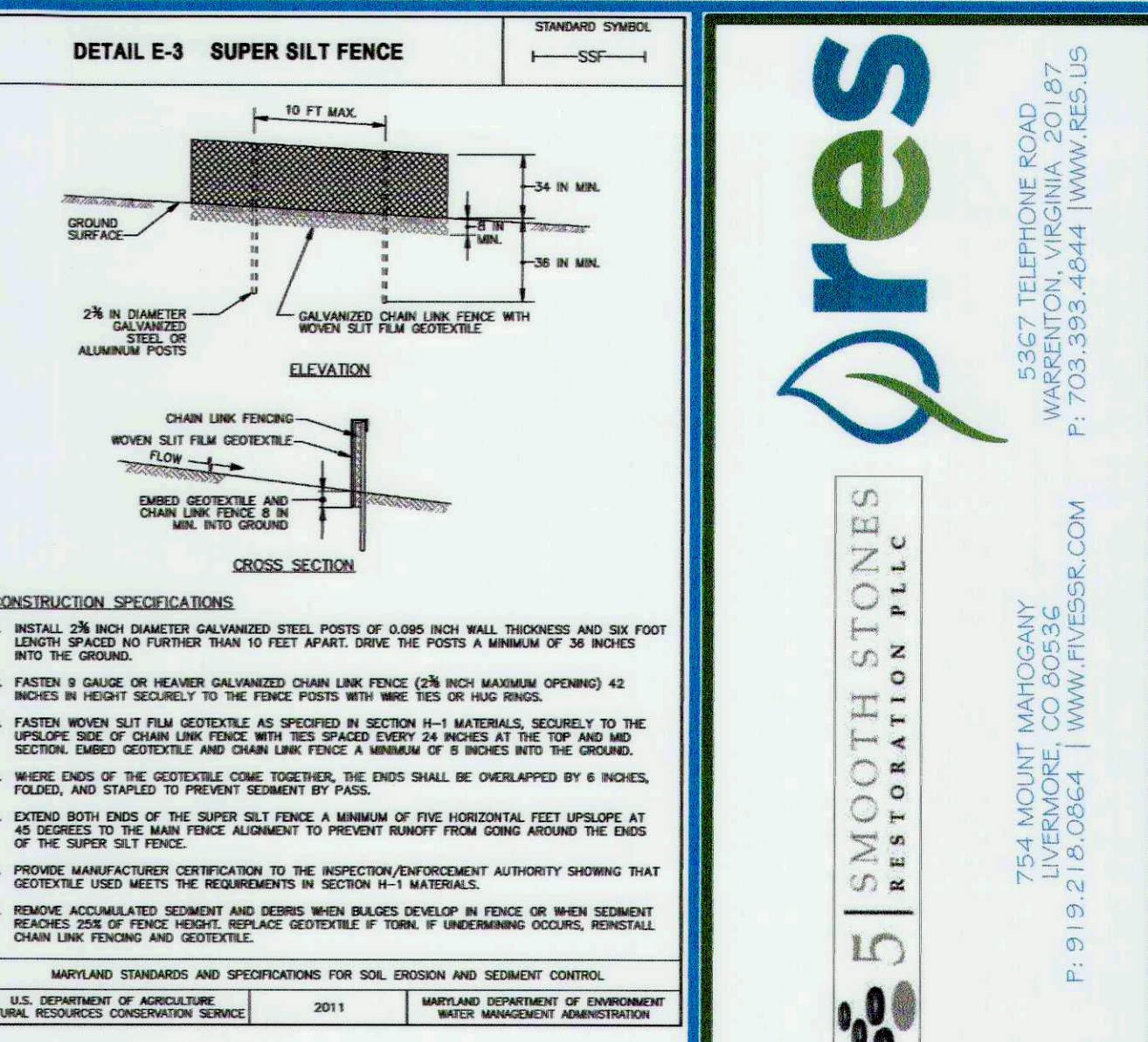
DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE
CONSTRUCTION SPECIFICATIONS
1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SIDE.



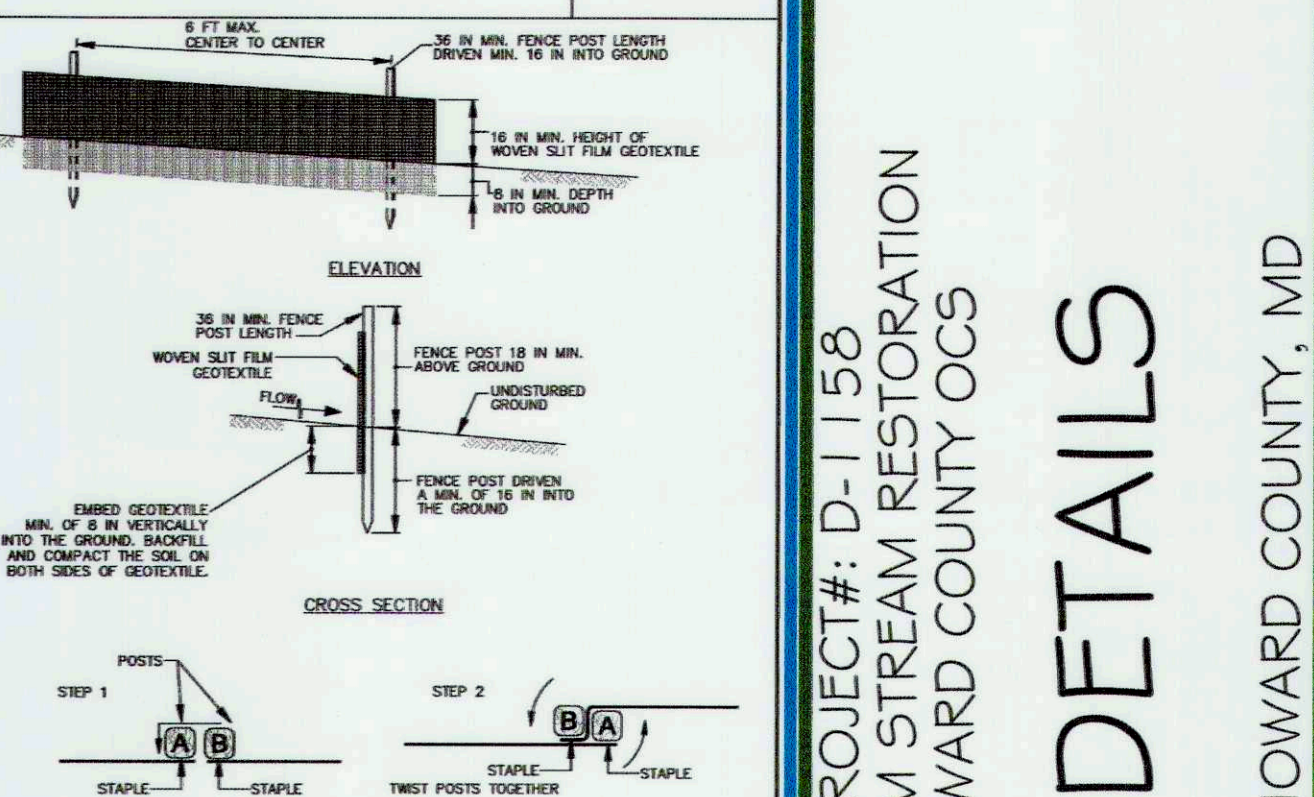
DETAIL E-3 SUPER SILT FENCE
CONSTRUCTION SPECIFICATIONS
1. INSTALL 2 1/2 INCH DIAMETER GALVANIZED STEEL POSTS OF 0.009 INCH WALL THICKNESS AND SIX FOOT LENGTHS SPACED 10 FEET APART.



DETAIL E-1 SILT FENCE
CONSTRUCTION SPECIFICATIONS
1. USE WOOD POSTS 1 1/2 X 1 1/2 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD.



SAFETY FENCE
A general purpose barrier fence that is used to restrict access to a restricted area.



DETAIL H-4-1 TEMPORARY ACCESS BRIDGE
CONSTRUCTION SPECIFICATIONS
1. CONSTRUCT TEMPORARY BRIDGE STRUCTURE AT OR ABOVE THE BANK ELEVATION TO PREVENT IMPACTS FROM FLOATING MATERIALS AND DEBRIS.

Table with 2 columns: PUMP-AROUND, BEGGING. Rows 1-19 showing reach, station, ending, drainage area, and duration for existing and proposed streams.

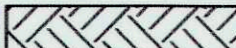
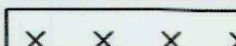
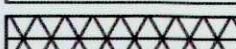

NOTE: MULCH ALONE MAY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN, THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED WHEN THE GROUND THAW.

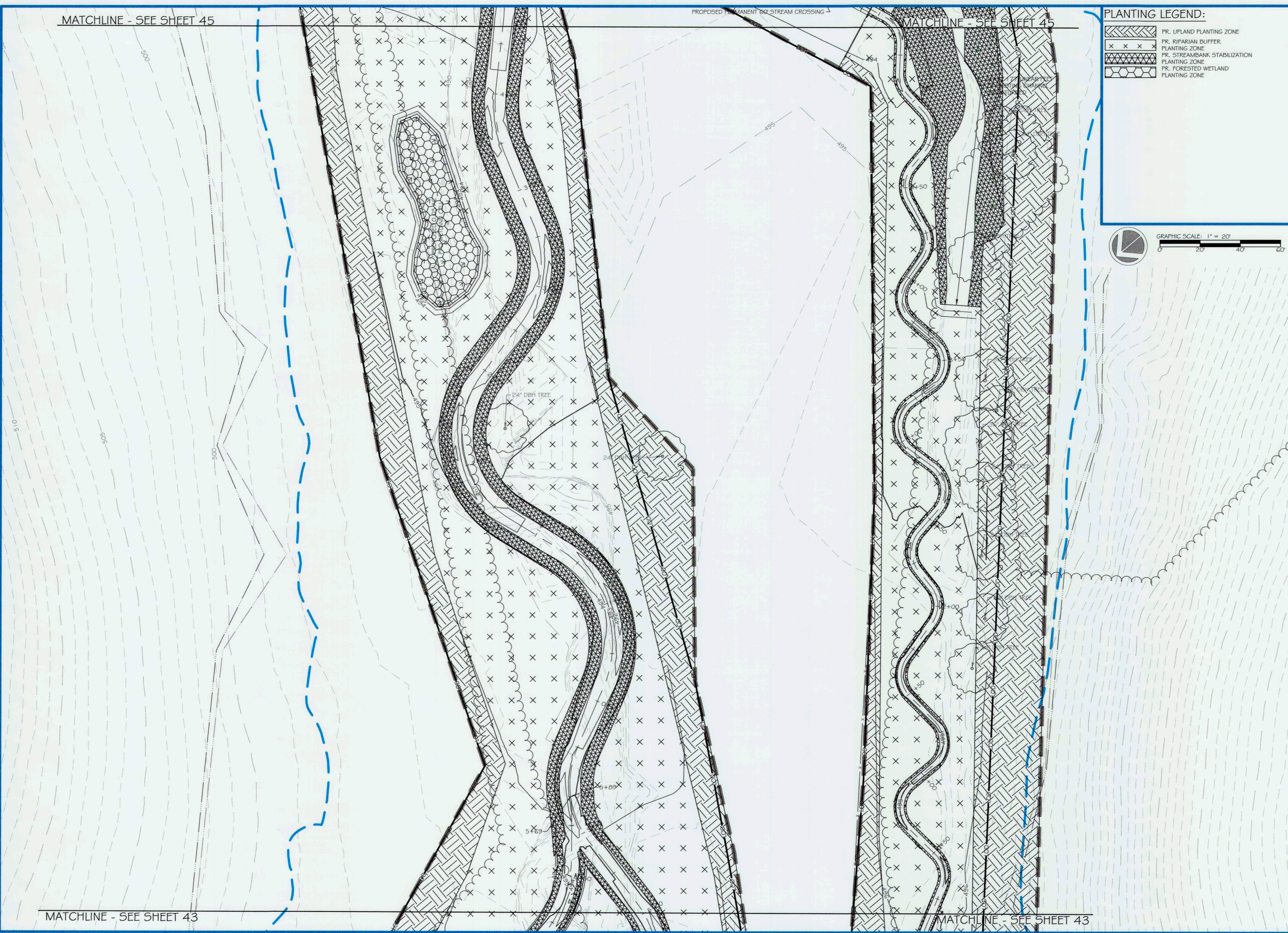
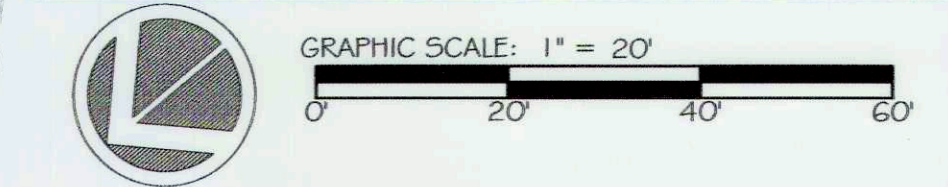
MATCHLINE - SEE SHEET 45

PROPOSED PERMANENT BOX STREAM CROSSING

MATCHLINE - SEE SHEET 45

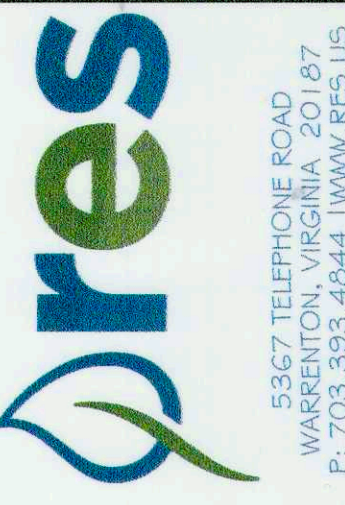
PLANTING LEGEND:

-  PR. UPLAND PLANTING ZONE
-  PR. RIPARIAN BUFFER PLANTING ZONE
-  PR. STREAMBANK STABILIZATION PLANTING ZONE
-  PR. FORESTED WETLAND PLANTING ZONE



MATCHLINE - SEE SHEET 43

MATCHLINE - SEE SHEET 43



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754 MOUNT MAHOAGNY
LIVERMORE, CO 80536
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CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS
PLANTING PLAN
(2 OF 6)
WOODBINE, HOWARD COUNTY, MD

REVISIONS:
A

ENGINEER'S SEAL:




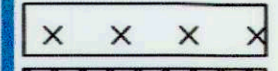


APPROVED: DEPT. OF PUBLIC WORKS
Mark [Signature] 5/25/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:

MATCHLINE - SEE SHEET 46

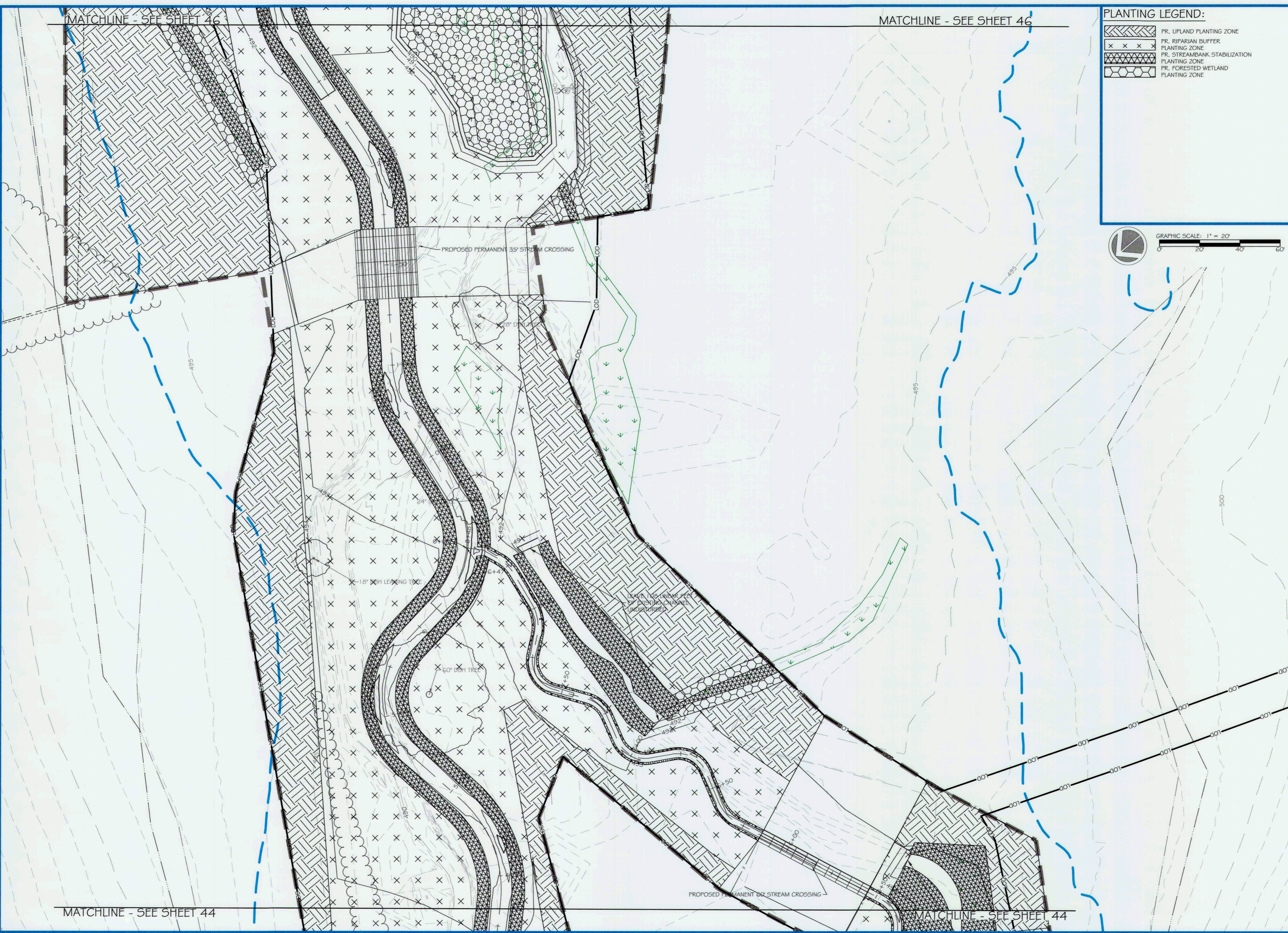
MATCHLINE - SEE SHEET 46

PLANTING LEGEND:

-  PR. UPLAND PLANTING ZONE
-  PR. RIPARIAN BUFFER PLANTING ZONE
-  PR. STREAMBANK STABILIZATION PLANTING ZONE
-  PR. FORESTED WETLAND PLANTING ZONE



GRAPHIC SCALE: 1" = 20'
0 20 40 60



MATCHLINE - SEE SHEET 44

MATCHLINE - SEE SHEET 44


ores
5367 TELEPHONE ROAD
WARRENTON, VIRGINIA 20147
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5 | SMOOTH STONES RESTORATION PLLC
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LIVERMORE, CO 80538
P: 919.216.0864 | WWW.FIVE59R.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS

PLANTING PLAN (3 OF 6)

WOODBINE, HOWARD COUNTY, MD

REVISIONS:


ENGINEER'S SEAL:



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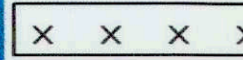


Michael J. ...
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE: 12/14/2017

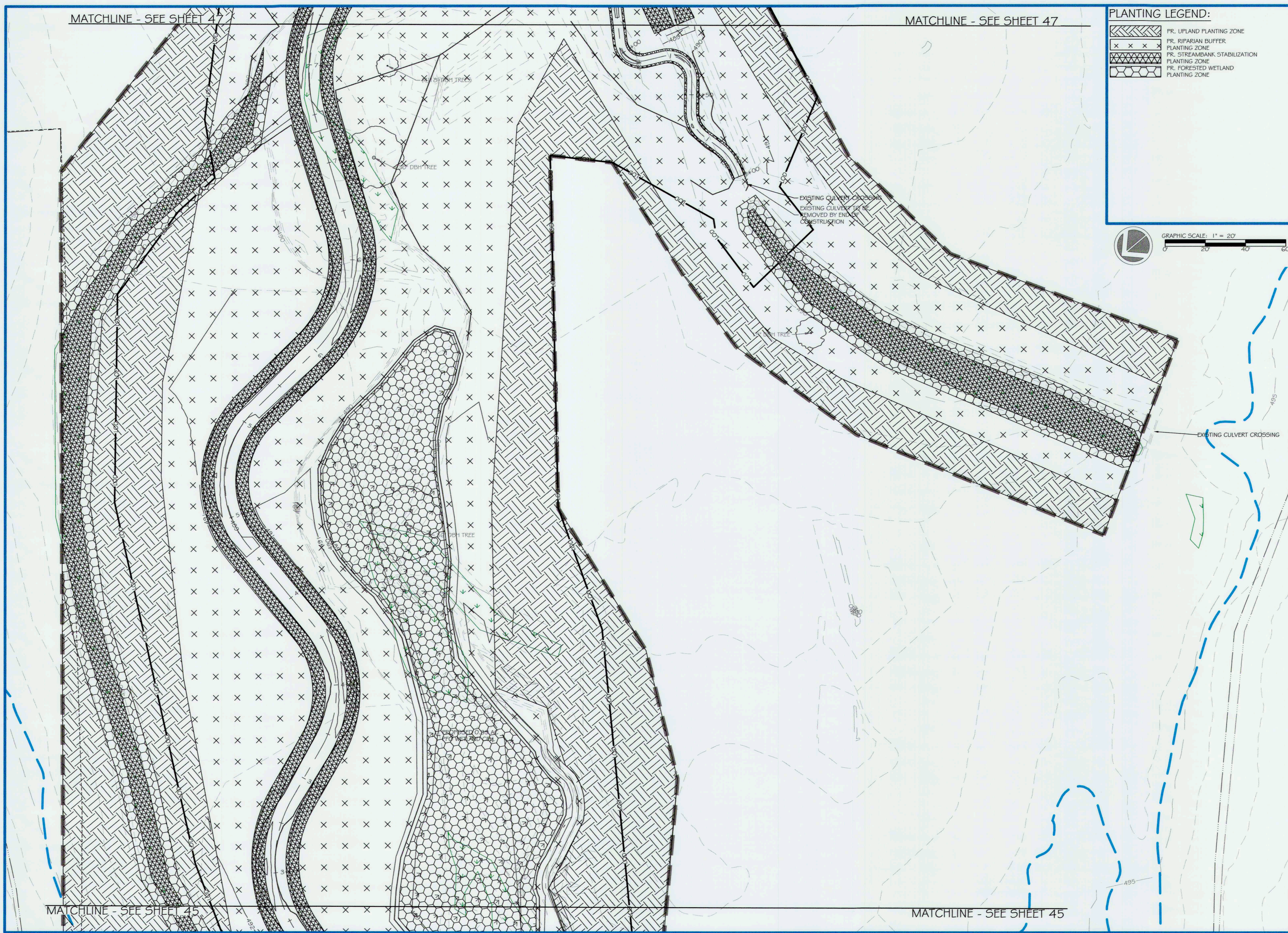
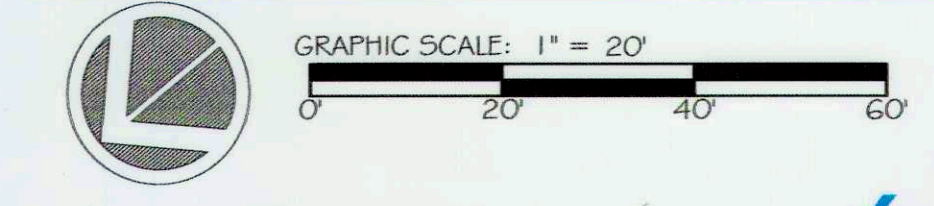
PROJECT MANAGER:	RC
DESIGNED:	DBMG
DRAWN:	MG/PCD
JOB NUMBER:	6172.00
DESIGN TYPE:	STREAM RESTORATION
DATE:	12/14/2017
SHEET NO.:	45 OF 49

MATCHLINE - SEE SHEET 47

MATCHLINE - SEE SHEET 47

PLANTING LEGEND:


-  PR. UPLAND PLANTING ZONE
-  PR. RIPARIAN BUFFER PLANTING ZONE
-  PR. STREAMBANK STABILIZATION PLANTING ZONE
-  PR. FORESTED WETLAND PLANTING ZONE




5 | SMOOTH STONES RESTORATION PLLC

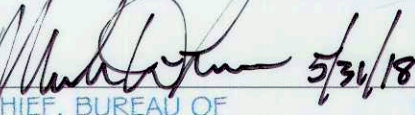
764 MOUNT MANSFIELD AVENUE
LIVERMORE, CO 80538
P: 919.218.0864 | WWW.FIVESR.COM

CAPITAL PROJECT#: D-1158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS
PLANTING PLAN
(4 OF 6)
 WOODBINE, HOWARD COUNTY, MD

REVISIONS:


ENGINEER'S SEAL:



APPROVED: DEPT. OF PUBLIC WORKS
 5/21/18
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
 DESIGNED: DBMG
 DRAWN: MGCP/DC
 JOB NUMBER: 6172.00
 DESIGN TYPE: STREAM RESTORATION
 DATE: 12/14/2017
 SHEET NO:

MATCHLINE - SEE SHEET 45

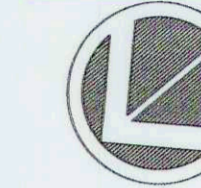
MATCHLINE - SEE SHEET 45

MATCHLINE - SEE SHEET 48

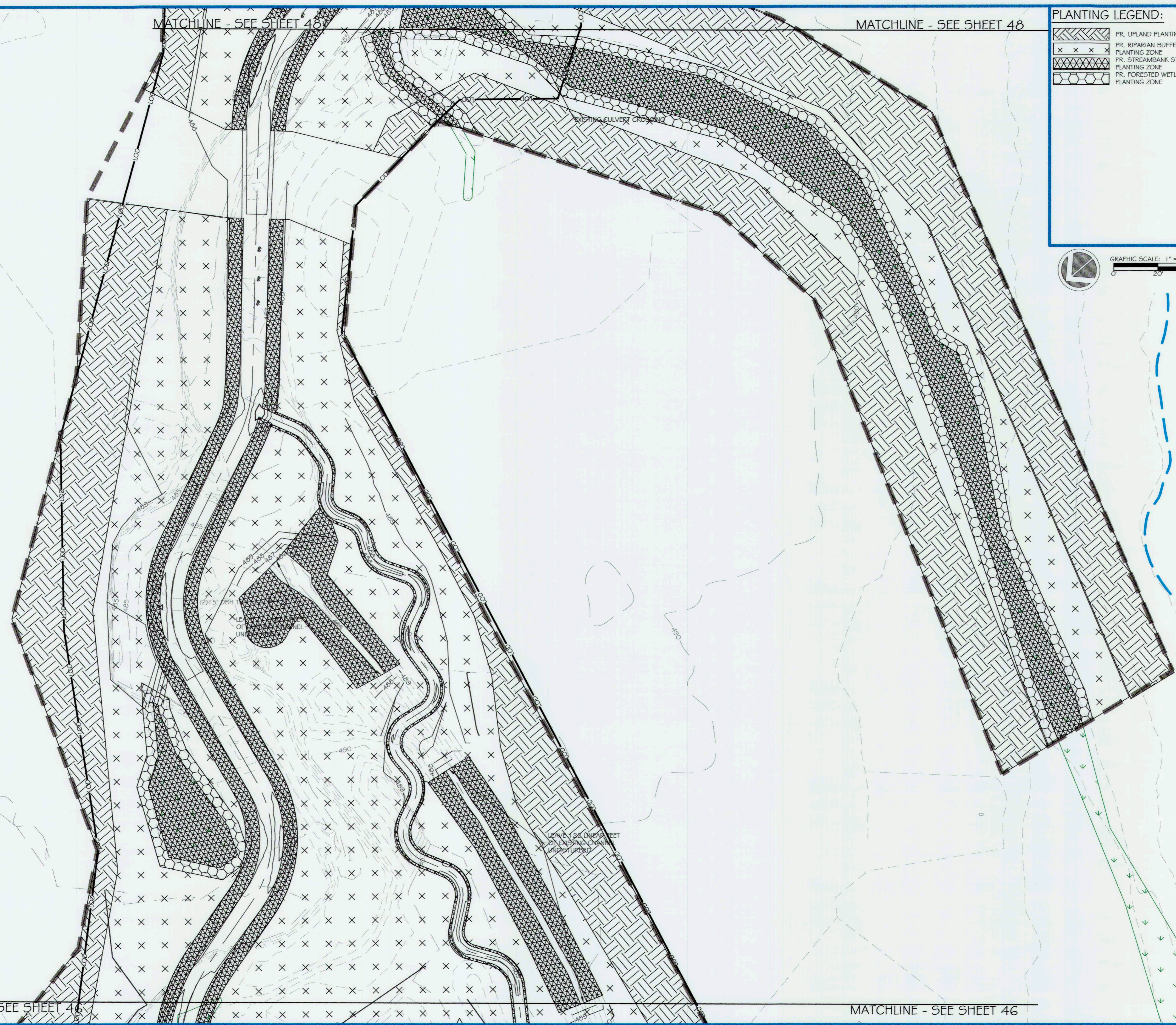
MATCHLINE - SEE SHEET 48

PLANTING LEGEND:

-  PR. UPLAND PLANTING ZONE
-  PR. RIPARIAN BUFFER PLANTING ZONE
-  PR. STREAMBANK STABILIZATION PLANTING ZONE
-  PR. FORESTED WETLAND PLANTING ZONE



GRAPHIC SCALE: 1" = 20'
0 20 40 60



MATCHLINE - SEE SHEET 46

MATCHLINE - SEE SHEET 46



5 | SMOOTH STONES RESTORATION PLLC

5367 TELEPHONE ROAD
WILMINGTON, MD 21807
P: 703.593.4644 | WWW.RES.US

754 MOUNT MAHOGANY
WILMINGTON, MD 21807
P: 919.216.0864 | WWW.FITESR.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS
PLANTING PLAN
(5 OF 6)
WOODBINE, HOWARD COUNTY, MD

REVISIONS:

ENGINEER'S SEAL:

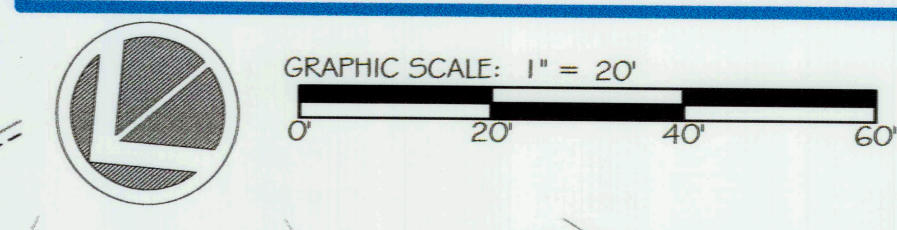


APPROVED: DEPT. OF PUBLIC WORKS
[Signature] 5/31/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

PROJECT MANAGER: RC
DESIGNED: DBMG
DRAWN: MG/CP/DC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO:

PLANTING LEGEND:

	PR. UPLAND PLANTING ZONE
	PR. RIPARIAN BUFFER PLANTING ZONE
	PR. STREAMBANK STABILIZATION PLANTING ZONE
	PR. FORESTED WETLAND PLANTING ZONE

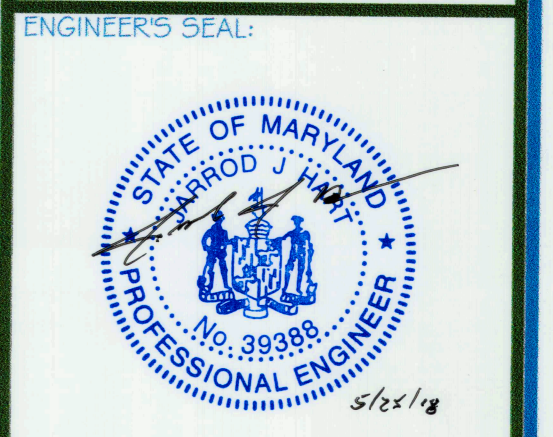


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5 SMOOTH STONES RESTORATION PLLC
5307 TELEPHONE ROAD
WARRENTON, VIRGINIA 20187
P: 703.393.4044 | WWW.RES.US

754 MOUNT MAHOOGANY
LIVERMORE, CO 80535
P: 919.218.0564 | WWW.FIVE59K.COM

CAPITAL PROJECT#: D-1158
MAPLE DELL FARM STREAM RESTORATION
CLIENT: HOWARD COUNTY OCS
PLANTING PLAN
(6 OF 6)
WOODBINE, HOWARD COUNTY, MD

REVISIONS:
△



APPROVED, DEPT. OF PUBLIC WORKS
Michael... 5/21/18
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
PROJECT MANAGER: RC
DESIGNED: DPMG
DRAWN: MCKPDC
JOB NUMBER: 6172.00
DESIGN TYPE: STREAM RESTORATION
DATE: 12/14/2017
SHEET NO: 48 OF 49

MATCHLINE - SEE SHEET 47

MATCHLINE - SEE SHEET 47

PLANTING SPECIFICATIONS

THE PLANTING SHOULD BE COMPLETED ACCORDING TO THE PLANTING PLAN & SPECIFICATIONS PROVIDED. PLANT SPECIES CAN BE MODIFIED AND/OR ADJUSTED DEPENDING ON SITE-SPECIFIC CONDITIONS AND/OR PLANT AVAILABILITY UPON APPROVAL FROM THE ENGINEER OF RECORD.

QUALITY:

PLANTS DELIVERED TO THE SITE SHOULD BE BASED ON THE PLANTING SCHEDULE FOUND ON THIS SHEET. SHRUBS SHOULD BE A MINIMUM 18-24" AT THE TIME OF PLANTING, OR 3-4' TALL. LARGER STOCK IS ACCEPTABLE AS LONG AS QUALITY AND VARIETY IS MAINTAINED AND DOES NOT PRESENT PROBLEMS WITH THE INSTALLATION PROCESS. TREES SHALL BE A MINIMUM 2" CALIPER AT 4.5' HEIGHT. PLANTS SHOULD BE OBTAINED FROM HARDINESS ZONES SIMILAR TO THOSE FOUND AT THE PROJECT SITE (ZONES 6 OR 7).

PRODUCT HANDLING, STORAGE, AND DELIVERY:

HANDLE PLANTS AT ALL TIMES SO THAT THE ROOTS OR BALLS ARE ADEQUATELY PROTECTED FROM BREAKAGE, DIRECT SUN, WARM AIR, AND DRYING WINDS. POTTED PLANTS SHOULD BE WATERED FREQUENTLY TO KEEP SOIL MOIST. PLANTS WITH DRIED OUT TOPS OR ROOTS SHALL BE REJECTED. ALL PLANT MATERIAL SHALL BE TRANSPORTED AND STORED TO PREVENT ANY PHYSICAL DAMAGE, AND AT THE NECESSARY INTERVALS MINIMIZE STORAGE AND TO MAINTAIN PROPER CULTIVATION PRACTICES.

PLANTING INSTRUCTIONS:

SHRUBS/TREES SHOULD BE PLANTED IN THE LOCATIONS SHOWN ON THE PLANTING PLAN. QUANTITY AND TYPES OF PLANTS SHALL BE PLANTED PER THE PLANTING SCHEDULE BELOW AND PLANTS SHOULD BE MIXED AND NOT CLUSTERED BY TYPE. ALL LIVE STAKES SHALL BE PLANTED PER DETAILS 243 BELOW. ALL CONTAINER PLANTS SHALL BE PLANTED PER DETAIL 1 BELOW. ALL BARE ROOT SEEDLINGS SHALL BE PLANTED PER DETAIL 4 BELOW. ALL PLANTS SHALL BE SET STRAIGHT OR PLUMB FOR AN UPRIGHT GROWTH PATTERN. THE PLANTING HOLES SHALL BE BACKFILLED WITH THE SAME SOIL THAT WAS EXCAVATED FROM THE HOLE AFTER REMOVING ALL STONES, ROOTS, AND OTHER DEBRIS GREATER THAN 1.5 INCHES IN DIAMETER. AFTER BACKFILLING THE HOLE, ALL PLANTED SPECIES SHOULD BE WATERED TO THE POINT OF SOIL SATURATION IF NOT PLANTED IN AN EXISTING WET CONDITION.

SCIENTIFIC NAME	COMMON NAME	INDICATOR STATUS	PERCENT (%)	APPLICATION RATE (LBS/ACRE)
<i>Agrostis gigantea</i>	Redtop	FACW	5%	2.5
<i>Bidens aristosa</i>	Showy Tickseed	FACW	10%	5.0
<i>Elymus submuticus</i>	Virginia Wild Rye	FACW	15%	7.5
<i>Panicum virgatum</i>	Switchgrass	FAC	10%	5.0
<i>Carex lurida</i>	Lund (Shallow) Sedge	OBL	15%	7.5
<i>Scirpus cyperinus</i>	Woodgrass	OBL	10%	5.0
<i>Dichanthium acuminatum</i>	Tapered Rosette Grass	FAC	5%	2.5
<i>Dichanthium clandestinum</i>	Deer Tongue	FACW	15%	7.5
<i>Polygonum pennsylvanicum</i>	PA Smartweed	FACW	5%	2.5
<i>Cyperus esculentus</i>	Yellow Nutsedge	FACU	5%	2.5
<i>Tridens flavus</i>	Purpletop Tidens	FACU	5%	2.5
*To be applied as needed in disturbed wetland/riparian areas			TOTAL LBS	100%
				50

SCIENTIFIC NAME	COMMON NAME	INDICATOR STATUS	PERCENT (%)	APPLICATION RATE (LBS/ACRE)
<i>Agrostis perennans</i>	Autumn Bentgrass	FACU	1.0%	0.5
<i>Andropogon virginicus</i>	Broomsedge	FACU	5.0%	2.5
<i>Chasmodon latifolium</i>	Indian Woodoats	FACU	15.0%	7.5
<i>Elymus virginicus</i>	Virginia Wildrye	FACW	15.0%	7.5
<i>Elymus riparius</i>	Riverside Wildrye	FACW	15.0%	7.5
<i>Schizachyrium scoparium</i>	Little Bluestem	FACU	25.0%	12.5
<i>Tridens flavus</i>	Purpletop	FACU	10.0%	5.0
<i>Rudbeckia hirta</i>	Black Eyed Susan	FACU	1.0%	0.5
<i>Helopsis helianthoides</i>	Smooth Oxeye Sunflower	FACU	3.0%	1.5
<i>Aster prenanthoides</i>	Zigzag Aster	FAC	1.0%	0.5
<i>Fuchsia graminifolia</i>	Flat-top Goldenrod	FAC	1.0%	0.5
<i>Carex lanceolata</i>	Lanceleaf Tickseed	FACU	1.0%	0.5
<i>Chamaecrista fasciculata</i>	Partridge Pea	FACU	2.0%	1.0
<i>Elymus hystrix</i>	Eastern Bottlebrush Grass	UPL	5.0%	2.5
*To be applied as needed in disturbed upland areas			TOTAL	100.0%
				50.0

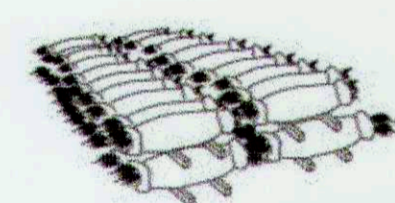
SCIENTIFIC NAME	COMMON NAME	INDICATOR	2 INCH CALIPER	BARE ROOT
TREES				
<i>Acer rubrum</i>	Red Maple	FAC	4G	11G
<i>Acer saccharinum</i>	Silver Maple	FAC	4G	11G
<i>Fagus grandifolia</i>	American Beech	FACU	4G	11G
<i>Platanus occidentalis</i>	American Sycamore	FACW	4G	11G
<i>Prunus serotina</i>	Black Cherry	FACU	23	50
<i>Quercus alba</i>	White Oak	FACU	23	50
SHRUBS/UNDERSTORY TREES				
<i>Amelanchier arborea</i>	Common Serviceberry	FACU	30	96
<i>Cercis canadensis</i>	Eastern Redbud	UPL	30	96
<i>Cornus florida</i>	Flowering Dogwood	FACU	30	96
<i>Viburnum prunifolium</i>	Blackhaw	FACU	30	96

SCIENTIFIC NAME	COMMON NAME	INDICATOR	2 INCH CALIPER	BARE ROOT
TREES				
<i>Acer rubrum</i>	Red Maple	FAC	0	18
<i>Betula nigra</i>	River Birch	FACW	0	18
<i>Platanus occidentalis</i>	American Sycamore	FACW	0	36
<i>Quercus palustris</i>	Pin Oak	FACW	0	9
<i>Quercus phellos</i>	Willow Oak	FAC+	0	9
SHRUBS/UNDERSTORY TREES				
<i>Alnus serrulata</i>	Hazel Alder	OBL	0	20
<i>Cephalanthus occidentalis</i>	Common Butterbush	OBL	0	20
<i>Cornus sericea</i>	Red Osier Dogwood	FACW	0	20
LIVESTAKES				
<i>Salix nigra</i>	Black Willow	FACW		1,000
<i>Cornus anomum</i>	Silky Dogwood	FACW		1,000

SCIENTIFIC NAME	COMMON NAME	INDICATOR	2 INCH CALIPER	BARE ROOT
TREES				
<i>Fagus grandifolia</i>	American Beech	FACU	33	84
<i>Liriodendron tulipifera</i>	Yellow Poplar	FACU	17	42
<i>Juglans nigra</i>	Black Walnut	FACU	33	84
<i>Robina pseudoacacia</i>	Black Locust	UPL	17	42
<i>Prunus serotina</i>	Black Cherry	FACU	17	42
<i>Quercus alba</i>	White Oak	FACU	33	84
SHRUBS/UNDERSTORY TREES				
<i>Amelanchier arborea</i>	Common Serviceberry	FACU	20	70
<i>Cercis canadensis</i>	Eastern Redbud	UPL	20	70
<i>Cornus florida</i>	Flowering Dogwood	FACU	20	70
<i>Viburnum dentatum</i>	Southern Arrowwood	FAC	20	70

SCIENTIFIC NAME	COMMON NAME	INDICATOR STATUS	PERCENT (%)	APPLICATION RATE (LBS/ACRE)
<i>Agrostis gigantea</i>	Redtop	FACW	2.0%	1.0
<i>Dichanthium clandestinum</i>	Deer Tongue	FAC	20.0%	10.0
<i>Elymus hystrix</i>	Eastern Bottlebrush Grass	NI	5.0%	2.5
<i>Elymus submuticus</i>	Virginia Wild Rye	FACW	25.0%	12.5
<i>Lolium perenne</i>	Perennial Ryegrass	FACU	2.0%	1.0
<i>Minutus riparius</i>	Monkey Flower	OBL	1.0%	0.5
<i>Panicum virgatum</i>	Switchgrass	FAC	15.0%	7.5
<i>Poa trivialis</i>	Rough Bluegrass	FACW	2.0%	1.0
<i>Rudbeckia hirta</i>	Blackeyed Susan	FACU	2.0%	1.0
<i>Schizachyrium scoparium</i>	Little Bluestem	FACU	15.0%	7.5
<i>Sorghastrum nutans</i>	Indian Grass	UPL	5.0%	2.5
<i>Symphoricarum encodes</i>	Heath Aster	FACU	2.0%	1.0
<i>Tripsacum dactyloides</i>	Eastern Gamagrass	FACW	4.0%	2.0
*To be applied as needed in disturbed streambank areas			TOTAL LBS	100%
				50
LIVESTAKES				
<i>Salix nigra</i>	Black Willow	FACW		11,967
<i>Cornus anomum</i>	Silky Dogwood	FACW		11,967

PLANTING BARE-ROOTED SEEDLINGS



CARE OF SEEDLINGS UNTIL PLANTED

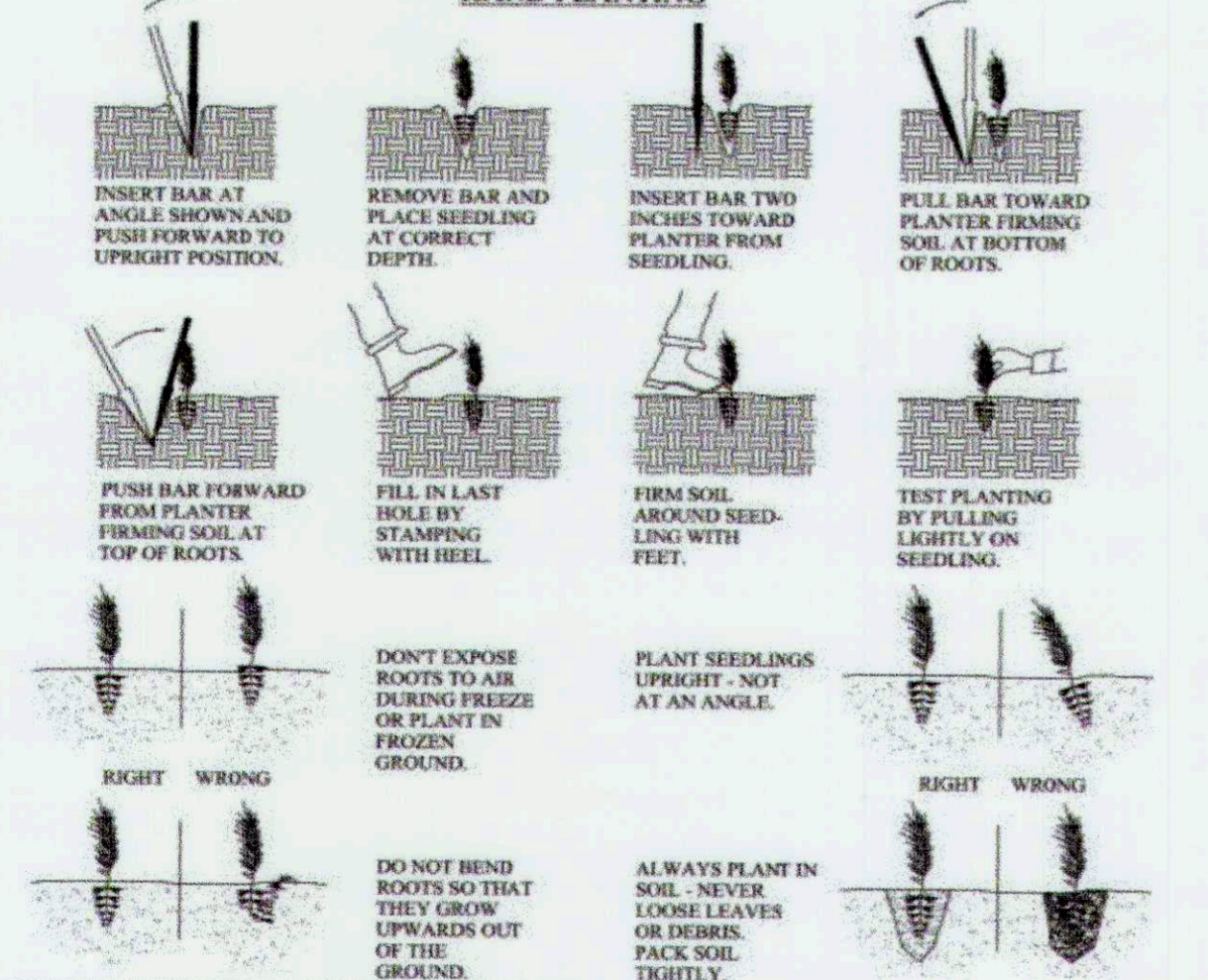
SEEDLINGS SHOULD BE PLANTED IMMEDIATELY. IF IT IS NECESSARY TO STORE MOSS PACKED SEEDLINGS FOR MORE THAN 2 WEEKS, ONE PINT OF WATER PER PKG. SHOULD BE ADDED IF CLAY-TREATED. DO NOT ADD WATER TO PKG. PACKAGES MUST BE SEPARATED TO PROVIDE VENTILATION. TO PREVENT "HEATING" SEPARATE PACKAGES WITH WOOD STRIPS AND STORE OUT OF THE WIND IN A SHADED, COOL, DRY FREEZING LOCATION.



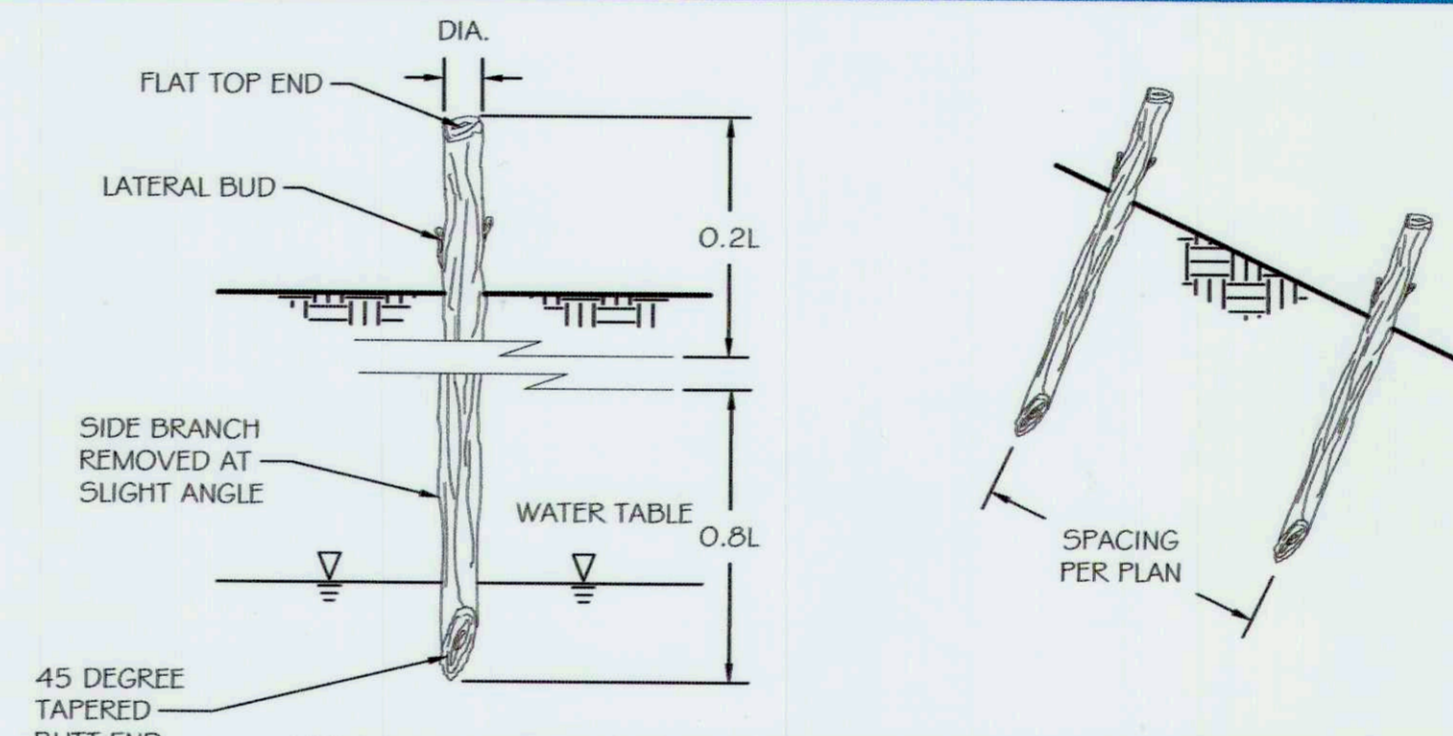
CARE OF SEEDLINGS DURING PLANTING

WHEN PLANTING, ROOTS MUST BE KEPT MOIST UNTIL TREES ARE IN THE GROUND. DO NOT CARRY SEEDLINGS IN YOUR HAND EXPOSED TO THE AIR AND SUN. KEEP MOSS-PACKED SEEDLINGS IN A CONTAINER PACKED WITH WET MOSS OR FILLED WITH THICK MUDDY WATER. COVER CLAY-TREATED SEEDLINGS WITH WET BURLAP ONLY.

HAND PLANTING

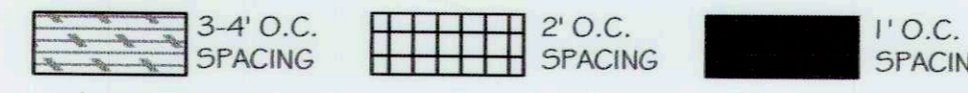
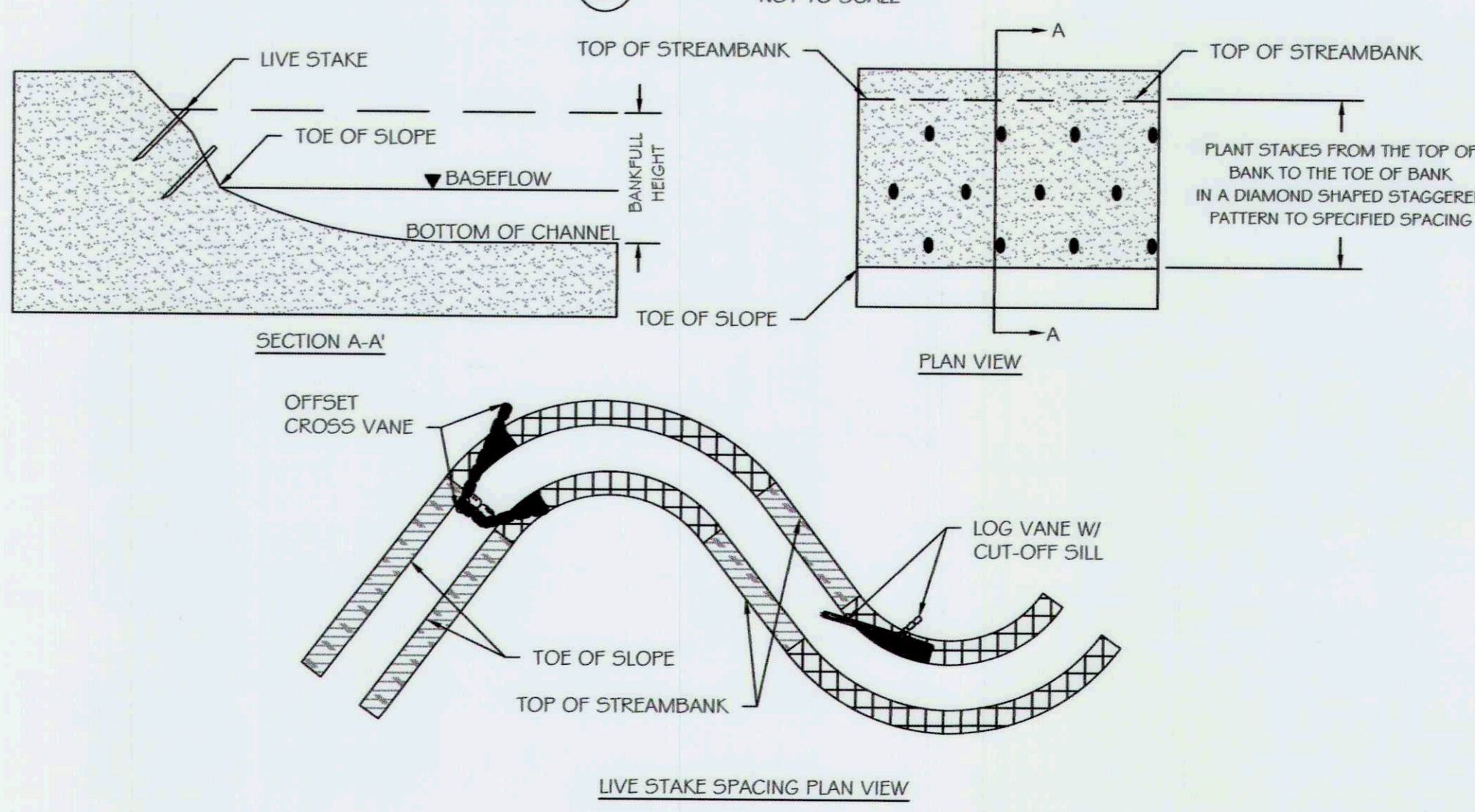


4 BARE ROOT NOT TO SCALE

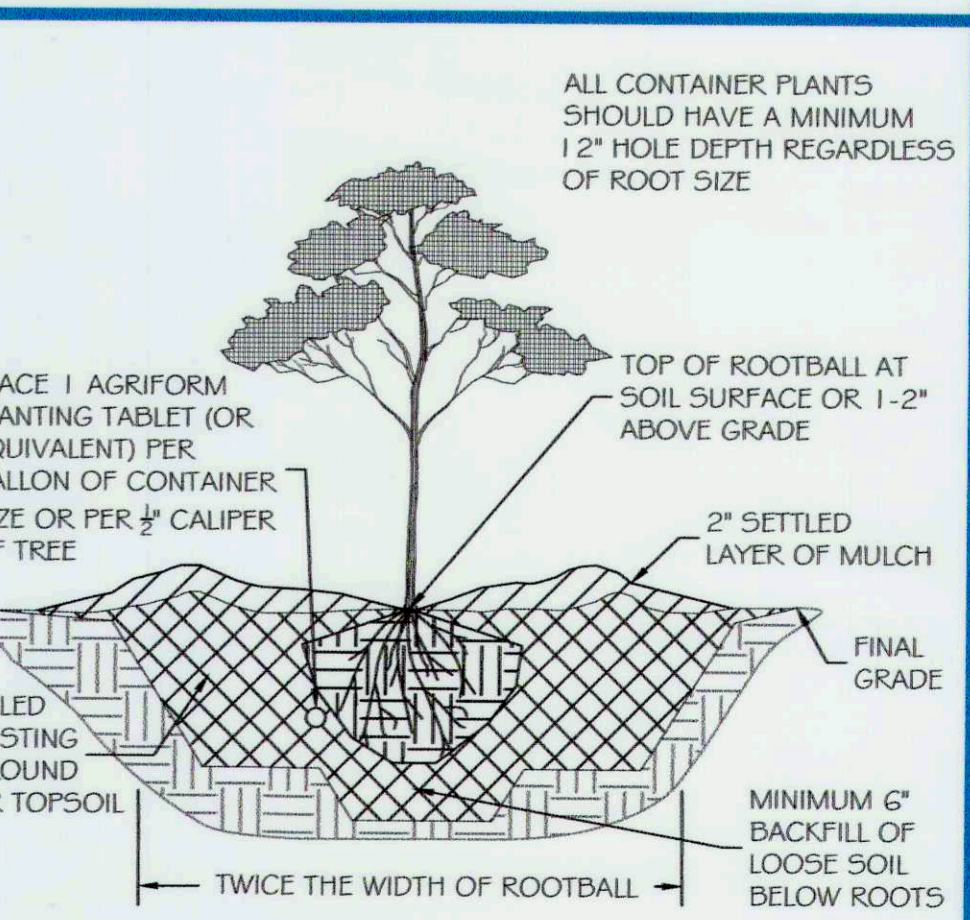


2 LIVE STAKES NOT TO SCALE

3 LIVE STAKE LAYOUT NOT TO SCALE



- NOTES:
- DO NOT INSTALL STAKES THAT HAVE BEEN SPLIT.
 - STAKES MUST BE INSTALLED WITH BUDS POINTING UPWARDS.
 - STAKES SHOULD BE 1/2 TO 2 INCHES IN DIAMETER AND 2 TO 3 FT. LONG.
 - STAKES SHOULD BE INSTALLED LEAVING 1/5 OF STAKE ABOVE GROUND.



1 CONTAINER TREE PLANTING NOT TO SCALE

CAPITAL PROJECT #: D-11158
 MAPLE DELL FARM STREAM RESTORATION
 CLIENT: HOWARD COUNTY OCS
PLANTING NOTES
AND DETAILS
 WOODBINE, HOWARD COUNTY, MD

REVISIONS:



APPROVED, DEPT. OF PUBLIC WORKS	
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES	DATE: 5/30/18
PROJECT MANAGER: RC	
DESIGNED: DBMG	
DRAWN: MG/CPDC	
JOB NUMBER: 6172.00	
DESIGN TYPE: STREAM RESTORATION	
DATE: 12/14/2017	
SHEET NO:	49 OF 49

