HEATHERLAND STREAM RESTORATION PROJECT

HOWARD COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT D-1158

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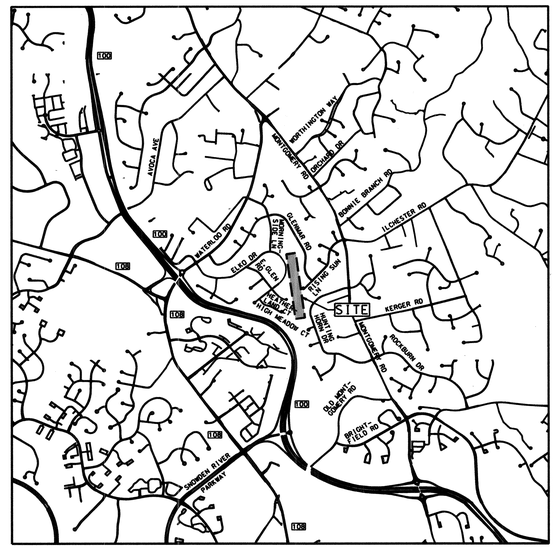
LEGEND

- 430 — EX. CONTOUR
- SD — EX. STORM DRAIN
- S — EX. SANITARY SEWER
- X — EX. METAL FENCE
- OH — EX. OVERHEAD ELECTRIC
- EX. WOODS LINE
- EX. TREE
- SS, SD — EX. MANHOLE
- EX. UTILITY POLE
- EX. EASEMENT
- PROPERTY LINE
- WUS — WATERS OF THE U.S.
- EX. NON-TIDAL WETLAND
- SP-11 — SPECIMEN TREE
- FP — EXISTING 100 YR. FLOODPLAIN
- FP — PROPOSED 100 YR. FLOODPLAIN
- TS — TREE SAVE
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- FL-15 — FILTER LOG
- ALTERNATING ROUGHNESS
- COIR FIBER ROLL
- WOODY TOE
- EMBEDDED LOG
- RIFFLE GRADE CONTROL
- STEEP RIFFLE
- PUMP AND HOSE
- FB — FILTER BAG
- OCF — ORANGE CONSTRUCTION/ SAFETY FENCE
- SAND BAG DAM
- STABILIZED CONSTRUCTION ENTRANCE



VICINITY MAP
SCALE: 1" = 2000'

ADC MAP COORD. 16/G5

VERTICAL AND HORIZONTAL SURVEY CONTROL WAS ESTABLISHED THROUGH RTK GPS OBSERVATIONS AND VRS NETWORK SERVICE. NO COUNTY SURVEY CONTROLS WERE USED.

GENERAL INFORMATION

1. THE SUBJECT PROPERTIES ARE ZONED R-20 IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING REGULATIONS.
2. THE DEPARTMENT OF PLANNING AND ZONING AND THE HOWARD SOIL CONSERVATION DISTRICT HAVE DETERMINED THAT THE DISTURBANCES WITHIN THE 100-YEAR FLOODPLAIN, WETLANDS, STREAM AND REQUIRED BUFFERS FOR THE PROPOSED STREAM RESTORATION PROJECT ARE CONSIDERED ESSENTIAL OR NECESSARY IN ACCORDANCE WITH SECTIONS 16.115(C) AND 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.
3. NO STRUCTURES OR SUBDIVISIONS ARE PROPOSED: THEREFORE THIS PLAN IS NOT REQUIRED TO MEET THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.
4. THERE ARE NO BURIAL GROUNDS OR CEMETERY SITES LOCATED ON THE PROJECT SITE.
5. THIS PLAN MEETS THE REQUIREMENTS OF THE FOREST CONSERVATION REGULATIONS.
6. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY CONTAINED HEREIN PLUS MSHA STANDARDS AND SPECIFICATIONS, IF APPLICABLE.
7. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS, BUREAU OF ENGINEERING/ CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 24 HOURS IN ADVANCE OF ANY WORK BEING DONE.
8. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
9. THE COORDINATES SHOWN HEREON ARE BASED ON GPS CONTROL.
10. WATER IS PUBLIC.
11. SEWER IS PUBLIC.
12. EXISTING UTILITIES ARE BASED ON FIELD SURVEYS AND AVAILABLE RECORD DRAWINGS.
13. THE WETLANDS DELINEATION FOR THIS PROJECT WAS PERFORMED BY KCI TECHNOLOGIES INC. ON FEBRUARY 17, 2016 AND FEBRUARY 18, 2016.
14. THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH ONE FOOT CONTOUR INTERVALS PREPARED BY AB CONSULTANTS, INC., ON MAY 24, 2016.
15. ALL WORK SHALL CONFORM TO THE MDE BEST MANAGEMENT PRACTICES FOR WETLANDS AND WATERWAYS AS LISTED IN THE REQUIREMENTS OF THE NONTIDAL WETLANDS AND WATERWAYS PERMIT APPROVED ON (MDE TRACKING #201662060/16-NT-3367).
16. NO TRAFFIC STUDY IS REQUIRED FOR THIS PROJECT.
17. OBSTRUCTIONS SHOWN ON THIS DRAWING ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND KCI TECHNOLOGIES, INC. DOES NOT WARRANT OR GUARANTEE THE CORRECTNESS OR COMPLETENESS OF THE INFORMATION GIVEN. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE PLANS AND THE FIELD CONDITIONS, THE CONTRACTOR MUST VERIFY SUCH INFORMATION TO HIS OWN SATISFACTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY TO RESOLVE THE SITUATION. SHOULD THE CONTRACTOR MAKE FIELD CORRECTIONS OR ADJUSTMENTS WITHOUT NOTIFYING THE ENGINEER, THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR THOSE CHANGES.
18. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO THE CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
19. AN ALTERNATIVE COMPLIANCE (WP-17-095) WAS APPROVED ON 04/06/2017 FROM SECTION 16.155(a)(1)(ii), MAKING THE PROJECT EXEMPT FROM AN SDP SUBMITTAL AND SECTION 16.1201(n), THAT ALLOWS THE USE OF THE AREA INSIDE THE LIMIT OF DISTURBANCE AS THE NET TRACT AREA IN THE FOREST CONSERVATION CALCULATIONS. APPROVAL OF THE ALTERNATIVE COMPLIANCE IS SUBJECT TO THE FOLLOWING CONDITIONS:
    a. THE ALTERNATIVE COMPLIANCE PLAN EXHIBIT SHALL SERVE AS THE SUBSTITUTE FOR A SITE DEVELOPMENT PLAN FOR DEVELOPMENT. NO DISTURBANCE IS PERMITTED BEYOND THE 3.34 ACRE LIMIT OF DISTURBANCE AS SHOWN ON THE ALTERNATIVE COMPLIANCE EXHIBIT UNLESS IT CAN BE SUFFICIENTLY DEMONSTRATED BY THE APPLICANT TO BE JUSTIFIED.
    b. THE PROPOSED DISTURBANCE (3,730 SF / 0.09 AC) TO THE EXISTING FOREST CONSERVATION EASEMENT ON PARCEL 801 LOT 318 SHALL BE REPLANTED ON-SITE WITHIN THE EXISTING EASEMENT PER HOWARD COUNTY RECREATION AND PARKS STANDARDS.
    c. THE REMOVAL OF STATE CHAMPION TREES, TREES 75% OF THE DIAMETER OF STATE CHAMPION TREES OR TREES 30" IN DIAMETER OR LARGER IS NOT PERMITTED UNDER THIS ALTERNATIVE COMPLIANCE REQUEST. ANY REMOVAL OF THESE SPECIMEN TREES WILL REQUIRE ALTERNATIVE COMPLIANCE TO SECTION 16.1205(a)(7) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. ALL EFFORTS SHALL BE MADE TO REDUCE IMPACTS TO SPECIMEN TREES DURING CONSTRUCTION. TREE PROTECTION FENCING AS DETAILED ON THE PLAN EXHIBIT SHALL BE UTILIZED AS NECESSARY.
    d. THE APPLICANT SHALL OBTAIN ALL REQUIRED AUTHORIZATIONS AND PERMITS FROM THE MARYLAND DEPARTMENT OF THE ENVIRONMENT AND U.S. ARMY CORPS OF ENGINEERS FOR DISTURBANCES WITHIN THE FLOODPLAIN, WETLANDS, STREAMS AND THEIR BUFFERS. REFERENCE THE APPLICABLE MDE OR USACOE PERMITS OR TRACKING NUMBERS ON THE ALTERNATIVE COMPLIANCE PLAN EXHIBIT AND ANY BUILDING OR GRADING PERMITS.
    e. ONCE CAPITAL PROJECT D-1158 IS COMPLETE, THE LIMIT OF DISTURBANCE SHALL BE RESTORED TO ITS PREVIOUS CONDITION THROUGH STABILIZATION AND REPLANTING OF FOREST RESOURCES.
    f. COMPLIANCE WITH THE PROVIDED COMMENTS FROM DPZ- DIVISION OF LAND DEVELOPMENT. SUBMIT A REVISED EXHIBIT PLAN FOR FILE RETENTION RECORDS.
20. THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS (DPW) HAS SATISFIED THE FOREST CONSERVATION OBLIGATION OF 0.32 ACRES OF REFORESTATION FOR THIS PLAN WITH A FEE-IN-LIEU PAYMENT OF $10,455.00 MADE TO THE HOWARD COUNTY FOREST CONSERVATION FUND.
21. DEEP RUN IS CLASSIFIED AS STREAM USE CLASS I AND 303D IMPAIRMENT STATUS 4A FOR SEDIMENT AND TSS.

SPECIAL CONTRACTOR NOTES

1. 100-YEAR FLOODPLAIN ELEVATION IS SHOWN ON THE PLANS.
2. NO STOCKPILE OF ANY MATERIAL IS ALLOWED IN THE 100-YEAR FLOODPLAIN.
3. IN-STREAM WORK IS PROHIBITED FROM MARCH 1 TO JUNE 15, INCLUSIVE. STREAM CLASSIFICATIONS: USE I
4. CONTRACTOR SHALL CONTINUALLY MONITOR WEATHER FORECASTS DURING WORK ACTIVITIES AND SCHEDULE WORK DURING FAVORABLE CONDITIONS.
5. THE CONTRACTOR SHALL EXERCISE CARE IN ACTIVITIES INVOLVING EITHER CUT AND FILL OR GRADING IN THE VICINITY OF TREES THAT ARE TO REMAIN AT THE CONSTRUCTION SITE. ALL EARTH CUTS AND ACTIVITIES IN THE VICINITY OF TREES TO REMAIN SHALL BE MADE IN A MANNER THAT DOES NOT DISTURB THE CRITICAL ROOT ZONE WITHIN THE DRIPLINE OF THE TREE. PROTECTIVE ORANGE FENCING SHALL BE INSTALLED AROUND THE PERIMETER OF THE CRITICAL ROOT ZONE PRIOR TO CONSTRUCTION. THE LOCATION OF THE PROTECTIVE ORANGE FENCING SHALL BE APPROVED BY HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS PRIOR TO CONSTRUCTION.
6. CONTRACTOR SHALL NOT STORE EQUIPMENT, MATERIALS AND/OR SUPPLIES BEYOND THE ORANGE FENCING SHOWN ON THE PLANS.
7. UPON COMPLETION OF THE WORK, BUT PRIOR TO DE-MOBILIZATION, THE CONTRACTOR SHALL REMOVE ALL REMNANTS OF CONSTRUCTION MATERIALS FROM THE SITE. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE PRE-CONSTRUCTION CONDITIONS.
8. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES, PHOTOGRAPHS OF THE PROPOSED WORK AREA AND ACCESS SHALL BE TAKEN.
9. ALL TREES TO BE REMOVED SHALL BE CUT AT THE BASE WITH A SAW AND NOT PUSHED OVER. TREE STUMPS MAY BE LEFT IN PLACE, UNLESS OTHERWISE DIRECTED ON THE PLANS.
10. ALL MATERIAL SHALL BE REMOVED AND DISPOSED OF OFFSITE.
11. THE CONTRACTOR SHALL PAY CLOSE ATTENTION TO PEDESTRIANS WALKING NEAR THE WORK SITE.
12. WORKING HOURS ARE 7AM TO 7PM MONDAY THROUGH FRIDAY.
13. THE CONTRACTOR SHALL AVOID TRACKING HEAVY EQUIPMENT OVER THE CRITICAL ROOT ZONE OF SPECIMEN TREES. IF UNAVOIDABLE, LOAD MATTS SHOULD BE USED WHEN TRACKING OVER THE CRITICAL ROOT ZONES.
14. WORK AREAS SHALL BE PERMENENTLY STABILIZED DAILY BEFORE LEAVING THE WORK SITE.
15. PROVIDE TEMPORARY WOOD MATS FOR CONSTRUCTION TRAFFIC THROUGH WETLAND AREAS. WOOD MATS SHALL BE REVIEWED AND APPROVED BY THE INSPECTOR AS APPLIED DURING CONSTRUCTION. ALL MATERIAL SHALL BE REMOVED UPON CONSTRUCTION COMPLETION.
16. SOIL STABILIZATION MATTING IS TO BE PLACED THROUGHOUT THE MAJORITY OF THE SITE DUE TO THE ABUNDANCE OF STEEP SLOPES AND HIGHLY ERODIBLE SOILS FOUND ON SITE. NATURAL FIBER MATTING SHALL BE PLACED THROUGHOUT THE PROJECT SITE WHERE ANY GRADING IS PERFORMED WITH THE EXCEPTION OF AREAS USING REINFORCED NATURAL FIBER MATTING AS SHOWN IN THE DETAILS. AREAS WHERE CLEARING AND GRADING ARE NOT PERFORMED (E.G., LOCATIONS OF HOSE FOR PUMP AROUND, CONSTRUCTION ACCESS, OR AREAS NOT GRADED) DO NOT REQUIRE THE APPLICATION OF SOILSTABILIZATION MATTING.

ENGINEER'S CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY SOIL CONSERVATION DISTRICT"

P.E. # 38311 — 9/20/17
SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE) — DATE
KATHY L. HOVERMAN, PE

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE THE BEGINNING OF THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT"

9/29/17
SIGNATURE OF DEVELOPER (PRINT NAME BELOW SIGNATURE) — DATE
JAMES M. IRVINE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

9/27/17 — DIRECTOR, OF PUBLIC WORKS — DATE
9/25/17 — CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE
9/26/17 — CHIEF, STORMWATER MANAGEMENT DIVISION — DATE

DEPARTMENT OF RECREATION AND PARKS, HOWARD COUNTY, MD

9-27-17 — DIRECTOR OF RECREATION AND PARKS — DATE

PERMIT INFORMATION CHART

SUBDIVISION NAME		SECTION/AREA		PARCEL#
MONTGOMERY MEADOWS		01/06		801, 423
PLAT# or L/F	GRID #	ZONING	TAX MAP NO.	ELECT. DISTR.	CENSUS TRACT
	0020	R20	31	01	601105
WATER CODE		SEWER CODE		
PUBLIC		PUBLIC		

PLAT#: 9003, 9083, 9375, 9565, 9721, 9727, 9728

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

HOWARD SCD — 10/2/17 — DATE

OWNER:
HOWARD COUNTY
DEPARTMENT OF PUBLIC WORKS
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
410-313-6444

STATE OF MARYLAND — KATHY LYNN HOVERMAN — No. 38311 — PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311. EXPIRATION DATE: JANUARY 6, 2018

NO.	REVISIONS DESCRIPTION	DATE

KCI FILE: M:\ 2013 \ 17133314.88\

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HEATHERLAND STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

TITLE SHEET

SCALE:	NOT TO SCALE
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

TI-01

SHEET NO.: 1 OF 38

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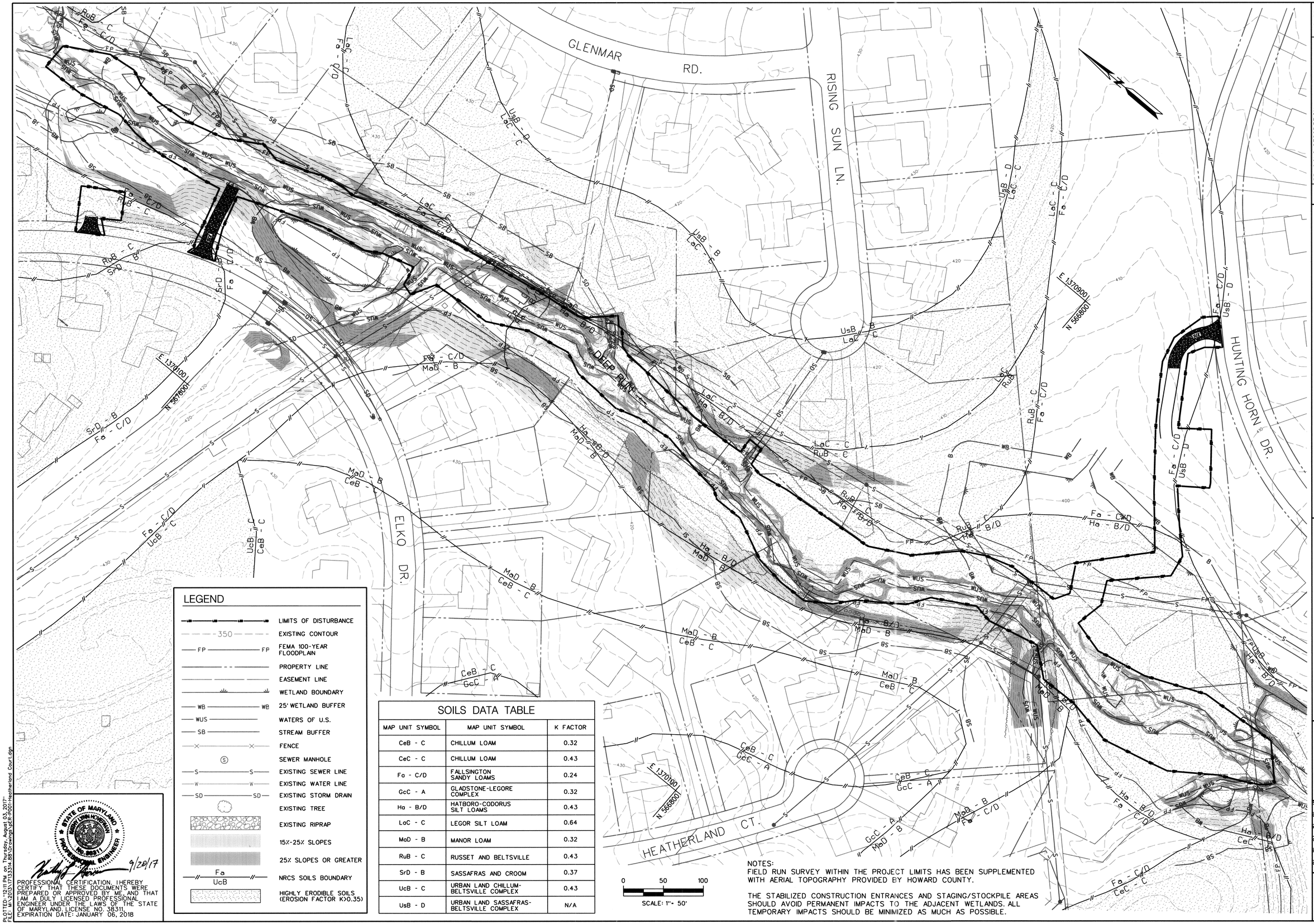

LEGEND

	LIMITS OF DISTURBANCE
350	EXISTING CONTOUR
FP FP	FEMA 100-YEAR FLOODPLAIN
	PROPERTY LINE
	EASEMENT LINE
	WETLAND BOUNDARY
WB WB	25' WETLAND BUFFER
WUS	WATERS OF U.S.
SB	STREAM BUFFER
	FENCE
S	SEWER MANHOLE
S S	EXISTING SEWER LINE
W W	EXISTING WATER LINE
SD SD	EXISTING STORM DRAIN
	EXISTING TREE
	EXISTING RIPRAP
	15%-25% SLOPES
	25% SLOPES OR GREATER
Fa / UcB	NRCS SOILS BOUNDARY
	HIGHLY ERODIBLE SOILS (EROSION FACTOR K>0.35)

SOILS DATA TABLE

MAP UNIT SYMBOL	MAP UNIT SYMBOL	K FACTOR
CeB - C	CHILLUM LOAM	0.32
CeC - C	CHILLUM LOAM	0.43
Fa - C/D	FALLSINGTON SANDY LOAMS	0.24
GcC - A	GLADSTONE-LEGORE COMPLEX	0.32
Ha - B/D	HATBORO-CODORUS SILT LOAMS	0.43
LaC - C	LEGOR SILT LOAM	0.64
MaD - B	MANOR LOAM	0.32
RuB - C	RUSSET AND BELTSVILLE	0.43
SrD - B	SASSAFRAS AND CROOM	0.37
UcB - C	URBAN LAND CHILLUM-BELTSVILLE COMPLEX	0.43
UsB - D	URBAN LAND SASSAFRAS-BELTSVILLE COMPLEX	N/A

NOTES:
FIELD RUN SURVEY WITHIN THE PROJECT LIMITS HAS BEEN SUPPLEMENTED WITH AERIAL TOPOGRAPHY PROVIDED BY HOWARD COUNTY.

THE STABILIZED CONSTRUCTION ENTRANCES AND STAGING/STOCKPILE AREAS SHOULD AVOID PERMANENT IMPACTS TO THE ADJACENT WETLANDS. ALL TEMPORARY IMPACTS SHOULD BE MINIMIZED AS MUCH AS POSSIBLE.

STATE OF MARYLAND
MICHAEL LYNN HOFFMAN
No. 38311
PROFESSIONAL ENGINEER

9/28/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

PLOTTED: "12:11 PM on Thursday, August 03, 2017"
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NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND COURT STREAM RESTORATION PROJECT

CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

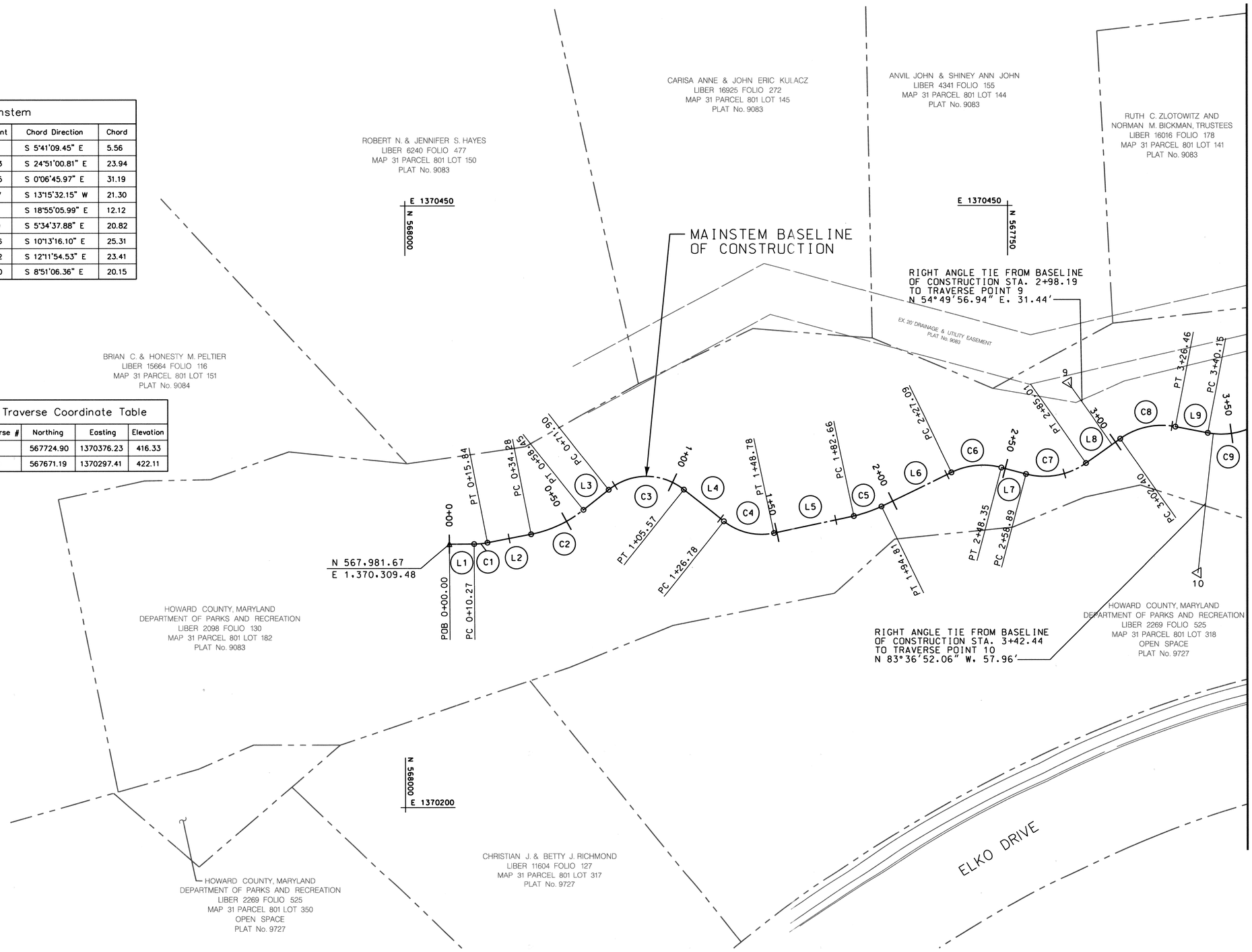
ENVIRONMENTAL RESOURCES MAP

SCALE:	1"= 50'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

Curve Table – Mainstem						
Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C1	30.00	10°37'41.11"	5.56	2.79	S 5°41'09.45" E	5.56
C2	50.00	27°42'01.62"	24.17	12.33	S 24°51'00.81" E	23.94
C3	25.00	77°10'31.29"	33.67	19.95	S 0°06'45.97" E	31.19
C4	25.00	50°25'55.05"	22.01	11.77	S 13°15'32.15" W	21.30
C5	50.00	13°55'21.23"	12.15	6.10	S 18°55'05.99" E	12.12
C6	30.00	40°36'17.45"	21.26	11.10	S 5°34'37.88" E	20.82
C7	30.00	49°53'33.90"	26.12	13.96	S 10°13'16.10" E	25.31
C8	30.00	45°56'17.06"	24.05	12.72	S 12°11'54.53" E	23.41
C9	30.00	39°14'40.73"	20.55	10.70	S 8°51'06.36" E	20.15

Line Table–Mainstem		
Line #	Length	Direction
L1	10.27	S 0°22'18.89" E
L2	18.44	S 11°00'00.00" E
L3	13.44	S 38°42'01.62" E
L4	21.20	S 38°28'29.68" W
L5	33.88	S 11°57'25.38" E
L6	32.28	S 25°52'46.61" E
L7	10.54	S 14°43'30.85" W
L8	17.39	S 35°10'03.06" E
L9	13.69	S 10°46'14.01" W

Traverse Coordinate Table			
Traverse #	Northing	Easting	Elevation
9	567724.90	1370376.23	416.33
10	567671.19	1370297.41	422.11



MATCH LINE - SEE SHEET GS-02

NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID&BLOCK 0020

GEOMETRY SHEET

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

GS-01

SHEET NO.: 3 OF 38

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
KATHY LYNN HOVERMAN
No. 38311
PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

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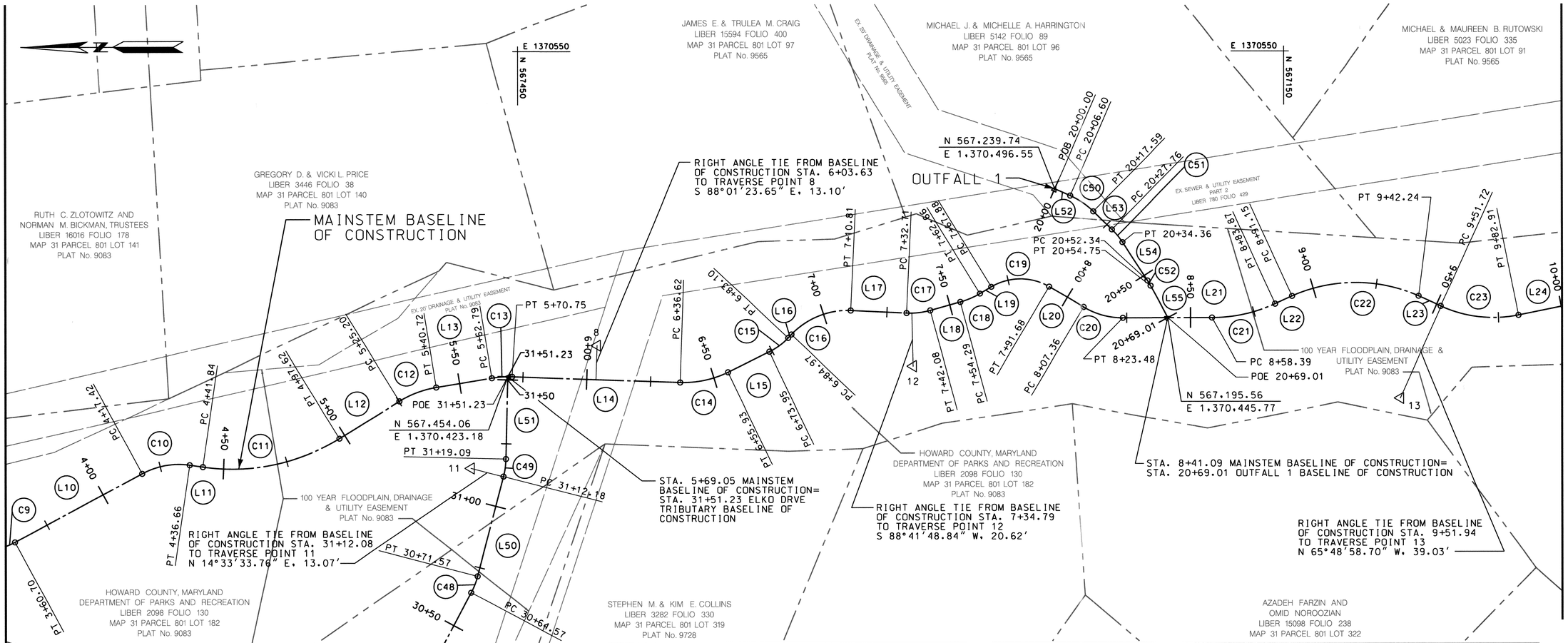

Curve Table – Mainstem

Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C9	30.00	39°14'40.73"	20.55	10.70	S 8°51'06.36" E	20.15
C10	30.00	36°45'20.03"	19.25	9.97	S 10°05'46.71" E	18.92
C11	80.00	39°56'56.34"	55.78	29.08	S 11°41'34.86" E	54.66
C12	40.00	22°14'16.56"	15.53	7.86	S 20°32'54.75" E	15.43
C13	40.00	11°24'22.82"	7.96	3.99	S 3°43'35.06" E	7.95
C14	40.00	27°40'00.54"	19.32	9.85	S 11°51'23.92" E	19.13
C15	25.00	20°58'35.35"	9.15	4.63	S 36°10'41.87" E	9.10
C16	30.00	49°20'37.64"	25.84	13.78	S 21°59'40.72" E	25.05
C17	30.00	17°53'22.39"	9.37	4.72	S 6°16'03.10" E	9.33
C18	30.00	15°58'50.57"	8.37	4.21	S 23°12'09.57" E	8.34
C19	22.00	61°58'22.50"	23.80	13.21	S 0°12'23.60" E	22.65
C20	30.00	30°47'52.58"	16.13	8.26	S 15°22'51.36" W	15.93
C21	60.00	24°20'15.85"	25.49	12.94	S 12°11'12.85" E	25.30
C22	60.00	48°47'04.85"	51.09	27.21	S 0°02'11.65" W	49.56
C23	50.00	35°44'13.77"	31.19	16.12	S 6°33'37.19" W	30.68

Curve Table – Elko Drive Tributary

Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C48	30.00	13°22'34.11"	7.00	3.52	S 68°45'09.19" E	6.99
C49	30.00	13°11'55.61"	6.91	3.47	S 82°02'24.05" E	6.90

Line Table–Mainstem

Line #	Length	Direction
L10	56.72	S 28°28'26.72" E
L11	5.18	S 8°16'53.31" W
L12	27.58	S 31°40'03.03" E
L13	22.06	S 9°25'46.47" E
L14	65.87	S 1°58'36.35" W
L15	18.02	S 25°41'24.19" E
L16	1.87	S 46°39'59.54" E
L17	21.90	S 2°40'38.10" W
L18	12.21	S 15°12'44.29" E
L19	5.23	S 31°11'34.86" E
L20	15.68	S 30°46'47.65" W
L21	34.90	S 0°01'04.93" E
L22	7.28	S 24°21'20.78" E
L23	9.49	S 24°25'44.07" W
L24	20.71	S 11°18'29.70" E

Line Table–Elko Drive Tributary

Line #	Length	Direction
L49	64.57	S 62°03'52.14" E
L50	40.61	S 75°26'26.24" E
L51	32.14	S 88°38'21.85" E

Curve Table – Outfall 1

Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C50	30.00	20°59'14.37"	10.99	5.56	S 34°06'49.27" W	10.93
C51	30.00	12°35'42.09"	6.59	3.31	S 50°54'17.50" W	6.58
C52	30.00	4°36'33.69"	2.41	1.21	S 59°30'25.39" W	2.41

Line Table–Outfall 1

Line #	Length	Direction
L52	6.60	S 23°37'12.09" W
L53	10.17	S 44°36'26.46" W
L54	17.98	S 57°12'08.55" W
L55	14.25	S 61°48'42.24" W

Traverse Coordinate Table

Traverse #	Northing	Easting	Elevation
8	567419.05	1370435.12	409.16
11	567468.45	1370387.41	411.73
12	567295.29	1370427.07	407.12
13	567104.50	1370414.47	406.15

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
KIRSTY LYNN HOVEMAN
No. 38311
PROFESSIONAL ENGINEER
9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

PLOTTED: "12:18 PM on Thursday, August 03, 2017"
FILE: M:\2013\17133314.88\Drawings\GS-P002_Heatherland.dgn

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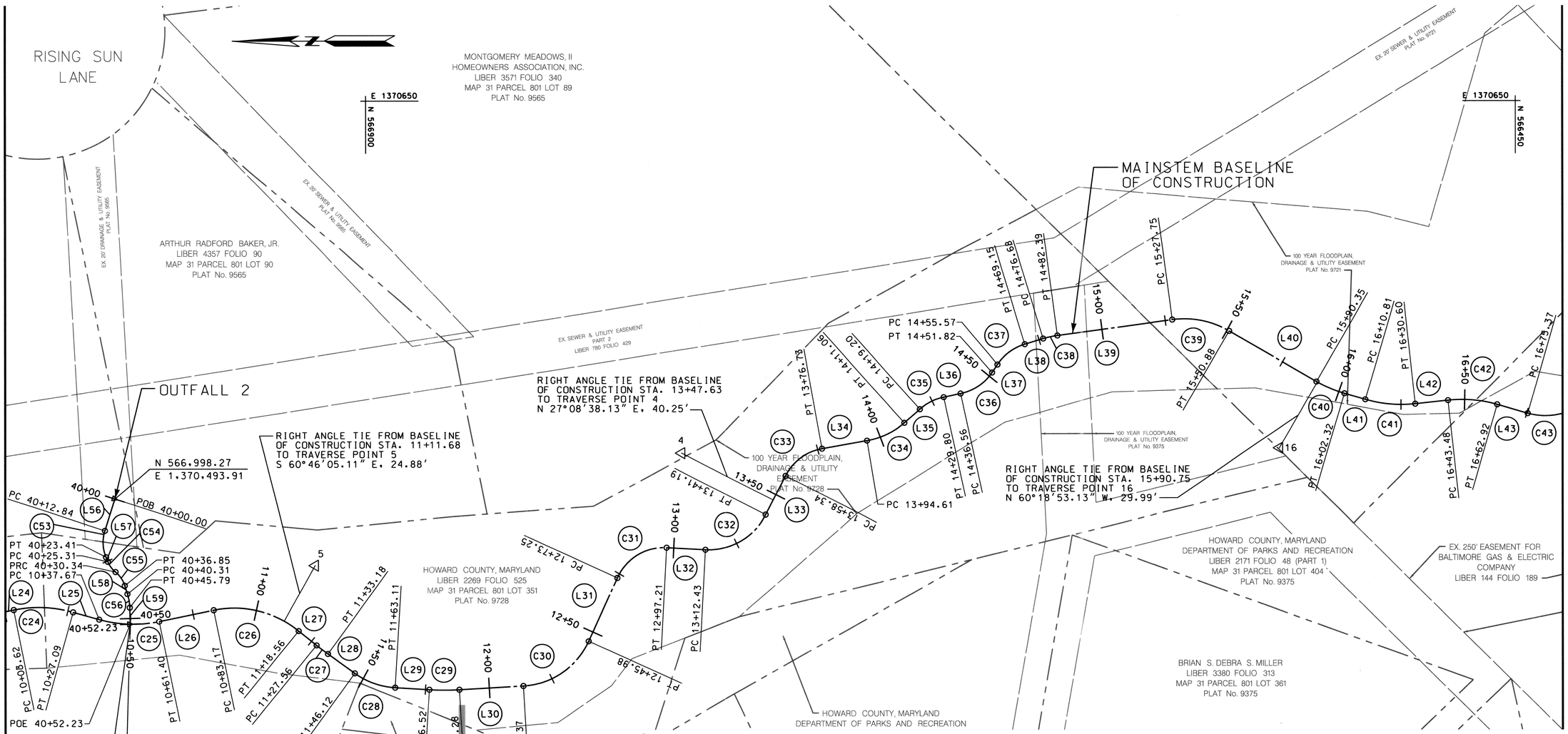
HEATHERLAND
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

GEOMETRY SHEET

SCALE: 1" = 20'
DATE: AUGUST 2017
KCI JOB NO.: 17133314.88
CAPITAL PROJECT NO.: D-1158
PERMIT ISSUE:
CONSTRUCTION ISSUE:

GS-02



Curve Table – Mainstem

Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C24	50.00	26°53'20.18"	23.47	11.95	S 2°08'10.39" W	23.25
C25	50.00	27°11'37.94"	23.73	12.09	S 1°59'01.51" W	23.51
C26	40.00	50°41'36.18"	35.39	18.95	S 13°44'00.63" W	34.25
C27	100.00	3°13'03.16"	5.62	2.81	S 37°28'17.14" W	5.61
C28	30.00	32°26'27.81"	16.99	8.73	S 19°38'31.65" W	16.76
C29	100.00	6°44'23.49"	11.76	5.89	S 0°03'06.00" W	11.76
C30	30.00	62°16'57.04"	32.61	18.13	S 34°27'34.27" E	31.03
C31	20.00	68°38'40.88"	23.96	13.65	S 31°16'42.35" E	22.55
C32	25.00	65°53'59.97"	28.75	16.20	S 29°54'21.89" E	27.20
C33	20.00	52°41'06.41"	18.39	9.90	S 36°30'48.67" E	17.75
C34	30.00	31°24'53.33"	16.45	8.44	S 25°52'42.12" E	16.24
C35	20.70	29°20'29.23"	10.60	5.42	S 26°54'54.17" E	10.48
C36	20.00	43°43'03.18"	15.26	8.02	S 34°06'11.15" E	14.89
C37	20.00	38°53'18.23"	13.57	7.06	S 36°31'03.62" E	13.32
C38	35.00	9°20'47.19"	5.71	2.86	S 12°24'00.91" E	5.70
C39	35.00	37°52'03.51"	23.13	12.01	S 11°12'24.44" W	22.71
C40	50.00	13°42'45.99"	11.97	6.01	S 23°17'03.20" W	11.94
C41	50.00	22°40'08.89"	19.78	10.02	S 5°05'35.75" W	19.65
C42	50.00	22°16'46.54"	19.44	9.85	S 4°53'54.58" W	19.32
C43	25.00	46°58'31.57"	20.50	10.86	S 7°26'57.94" E	19.93

Line Table–Mainstem

Line #	Length	Direction
L24	20.71	S 11°18'29.70" E
L25	10.58	S 15°34'50.48" W
L26	21.77	S 11°36'47.46" E
L27	9.00	S 39°04'48.72" W
L28	12.95	S 35°51'45.56" W
L29	13.41	S 3°25'17.74" W
L30	25.08	S 3°19'05.75" E
L31	27.27	S 65°36'02.79" E
L32	15.22	S 3°02'38.09" W
L33	17.15	S 62°51'21.87" E
L34	17.88	S 10°10'15.46" E
L35	8.14	S 41°35'08.79" E
L36	6.77	S 12°14'39.56" E
L37	3.75	S 55°57'42.74" E
L38	7.53	S 17°04'24.51" E
L39	45.37	S 7°43'37.31" E
L40	39.47	S 30°08'26.19" W
L41	8.49	S 16°25'40.20" W
L42	12.88	S 6°14'28.69" E
L43	12.45	S 16°02'17.85" W

Curve Table – Outfall 2

Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C53	15.00	40°22'51.20"	10.57	5.52	S 87°39'39.26" W	10.35
C54	10.00	28°47'31.27"	5.03	2.57	S 53°04'28.03" W	4.97
C55	11.00	33°56'55.43"	6.52	3.36	S 55°39'10.11" W	6.42
C56	20.00	15°41'55.21"	5.48	2.76	S 80°28'35.43" W	5.46

Line Table–Outfall 2

Line #	Length	Direction
L56	12.84	N 72°08'55.14" W
L57	1.90	S 67°28'13.66" W
L58	3.45	S 72°37'37.83" W
L59	6.44	S 88°19'33.04" W

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

Traverse Coordinate Table

Traverse #	Northing	Easting	Elevation
4	566776.47	1370511.72	399.84
5	566919.94	1370468.01	402.07
16	566542.49	1370513.72	399.39

STATE OF MARYLAND
MARK LYNN HOVEMAN
No. 38311
PROFESSIONAL ENGINEER
9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — 9/25/17 DATE

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HEATHERLAND STREAM RESTORATION PROJECT

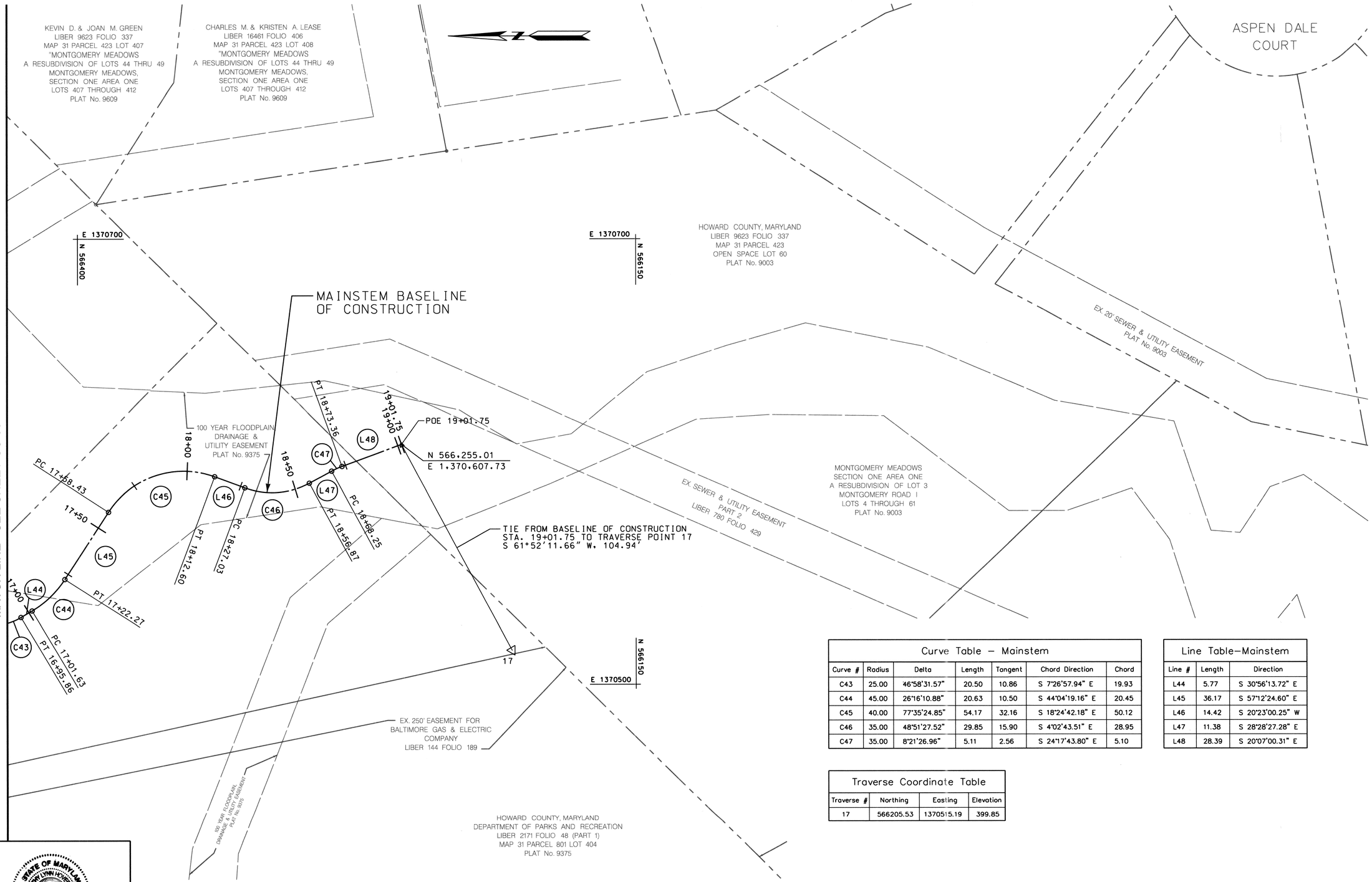
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

GEOMETRY SHEET

SCALE: 1" = 20'
DATE: AUGUST 2017
KCI JOB NO.: 17133314.88
CAPITAL PROJECT NO.: D-1158
PERMIT ISSUE:
CONSTRUCTION ISSUE:

GS-03

SHEET NO.: 5 OF 38



Curve Table – Mainstem						
Curve #	Radius	Delta	Length	Tangent	Chord Direction	Chord
C43	25.00	46°58'31.57"	20.50	10.86	S 7°26'57.94" E	19.93
C44	45.00	26°16'10.88"	20.63	10.50	S 44°04'19.16" E	20.45
C45	40.00	77°35'24.85"	54.17	32.16	S 18°24'42.18" E	50.12
C46	35.00	48°51'27.52"	29.85	15.90	S 4°02'43.51" E	28.95
C47	35.00	8°21'26.96"	5.11	2.56	S 24°17'43.80" E	5.10

Line Table–Mainstem		
Line #	Length	Direction
L44	5.77	S 30°56'13.72" E
L45	36.17	S 57°12'24.60" E
L46	14.42	S 20°23'00.25" W
L47	11.38	S 28°28'27.28" E
L48	28.39	S 20°07'00.31" E

Traverse Coordinate Table			
Traverse #	Northing	Easting	Elevation
17	566205.53	1370515.19	399.85

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
KEITH LYNN HOFFMAN
No. 38311
PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

9/25/17

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE

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COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

GEOMETRY SHEET

SCALE: 1" = 20'
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KCI JOB NO.: 17133314.88
CAPITAL PROJECT NO.: D-1158
PERMIT ISSUE:
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GS-04

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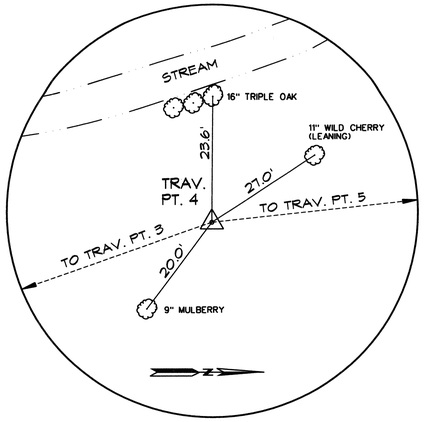
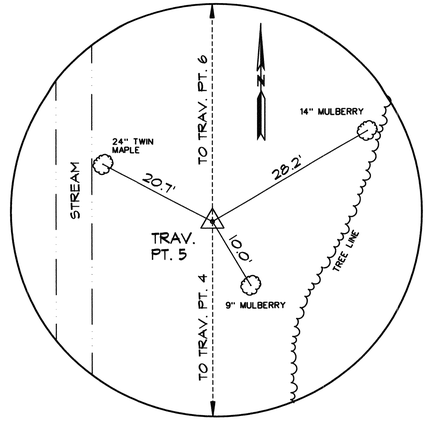


TRAVERSE POINT 4
PIN AND CAP
NOT TO SCALE



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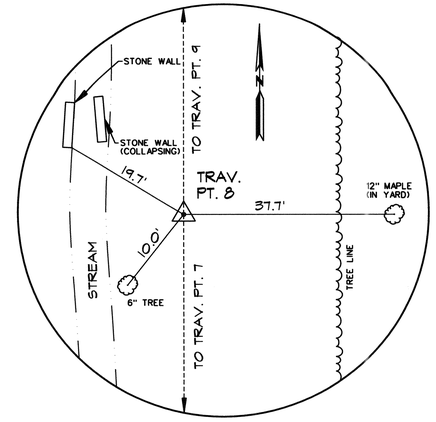

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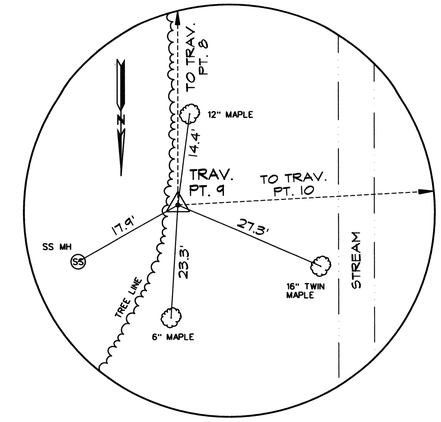

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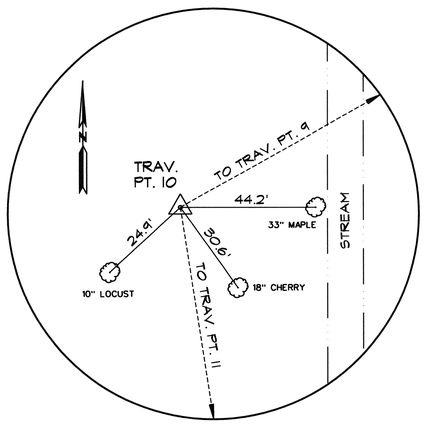

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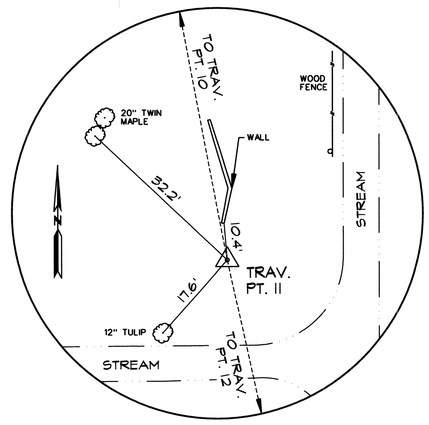

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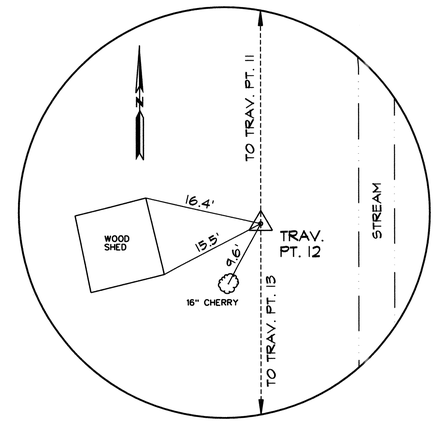

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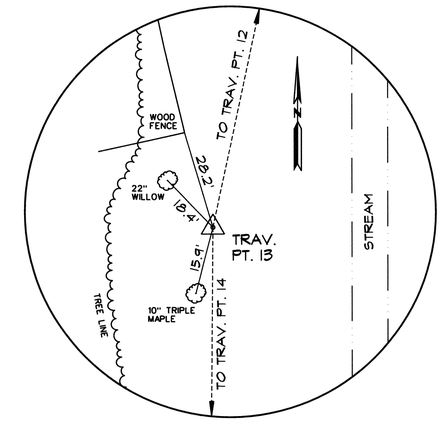

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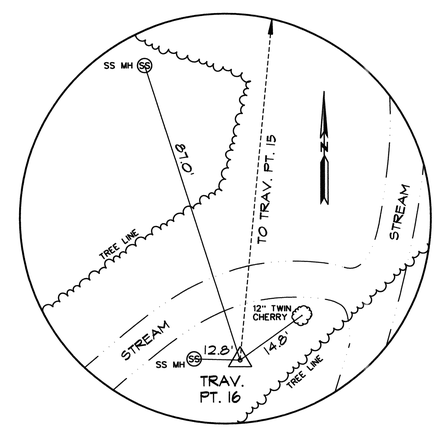

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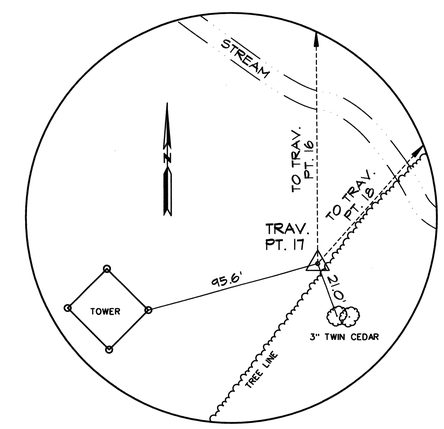

TRAVERSE POINT 17
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STATE OF MARYLAND
MARY LYNN HOFFMANN
No. 38311
PROFESSIONAL ENGINEER
9/26/17

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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 3/25/17

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PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

GEOMETRY SHEET

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

GS-05

SHEET NO.: 7 OF 38

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ALTERNATING ROUGHNESS SCHEDULE

FROM STATION	TO STATION	OFFSET*
0+75	1+30	L
1+30	1+55	R
2+25	2+55	L
2+55	2+90	R
3+30	3+40	L

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

STEEP RIFFLE SCHEDULE

FROM STATION	TO STATION
0+10	0+25
1+15	1+30
1+55	1+90
2+55	2+65
2+90	3+10
3+30	3+40

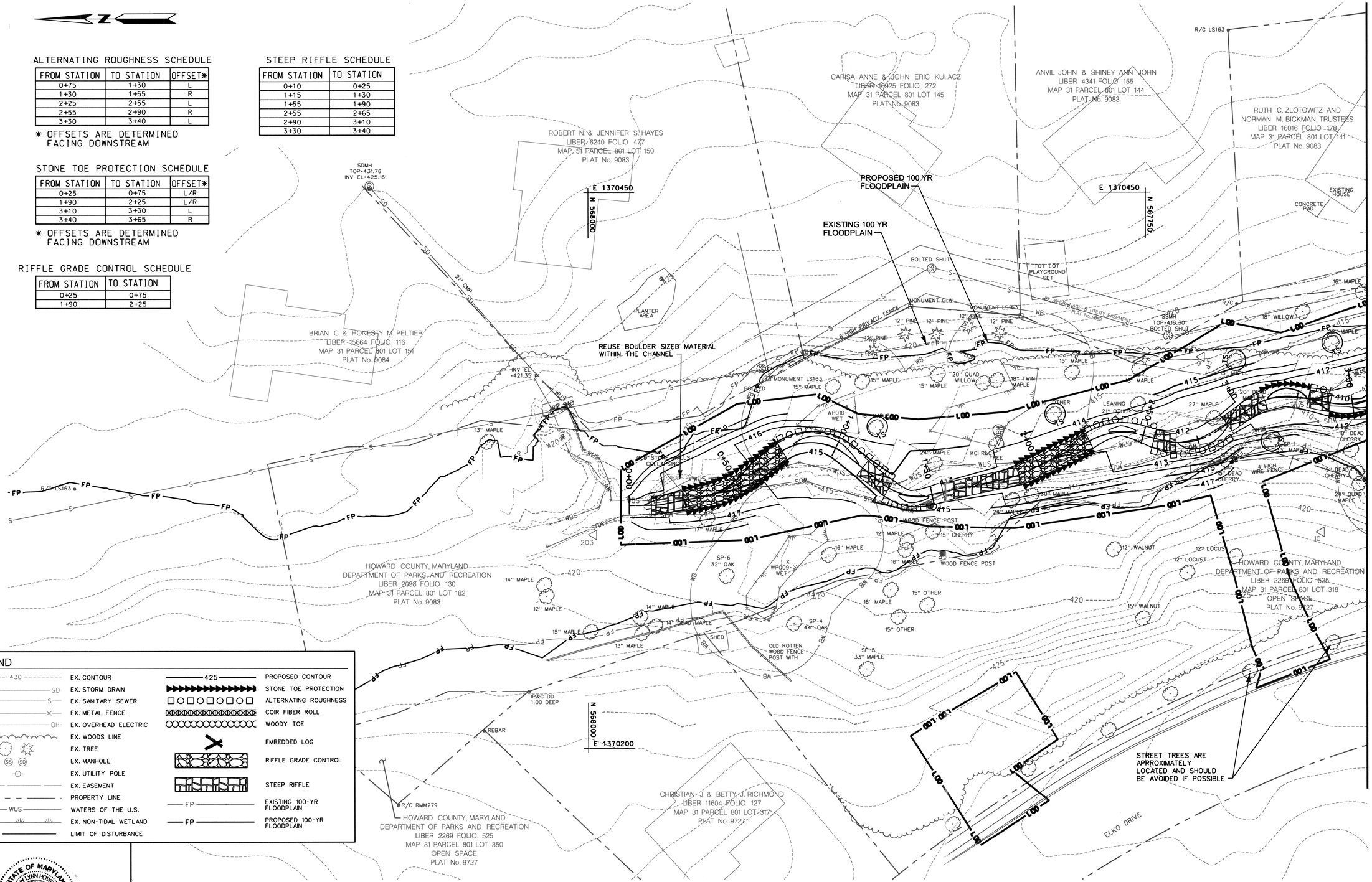
STONE TOE PROTECTION SCHEDULE

FROM STATION	TO STATION	OFFSET*
0+25	0+75	L/R
1+90	2+25	L/R
3+10	3+30	L
3+40	3+65	R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

RIFFLE GRADE CONTROL SCHEDULE

FROM STATION	TO STATION
0+25	0+75
1+90	2+25



MATCH LINE - SEE SHEET GR-02

LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		STONE TOE PROTECTION
S	EX. SANITARY SEWER		ALTERNATING ROUGHNESS
X	EX. METAL FENCE		COIR FIBER ROLL
OH	EX. OVERHEAD ELECTRIC		WOODY TOE
	EX. WOODS LINE		EMBEDDED LOG
	EX. TREE		RIFFLE GRADE CONTROL
SS SD	EX. MANHOLE		STEEP RIFFLE
	EX. UTILITY POLE	FP	EXISTING 100-YR FLOODPLAIN
	EX. EASEMENT	FP	PROPOSED 100-YR FLOODPLAIN
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		
	EX. NON-TIDAL WETLAND		
LOD	LIMIT OF DISTURBANCE		

STATE OF MARYLAND
KEVIN LYNN HENEMAN
No. 38311
PROFESSIONAL ENGINEER

9/24/17

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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

GRADING PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

GR-01

SHEET NO.: 8 OF 38

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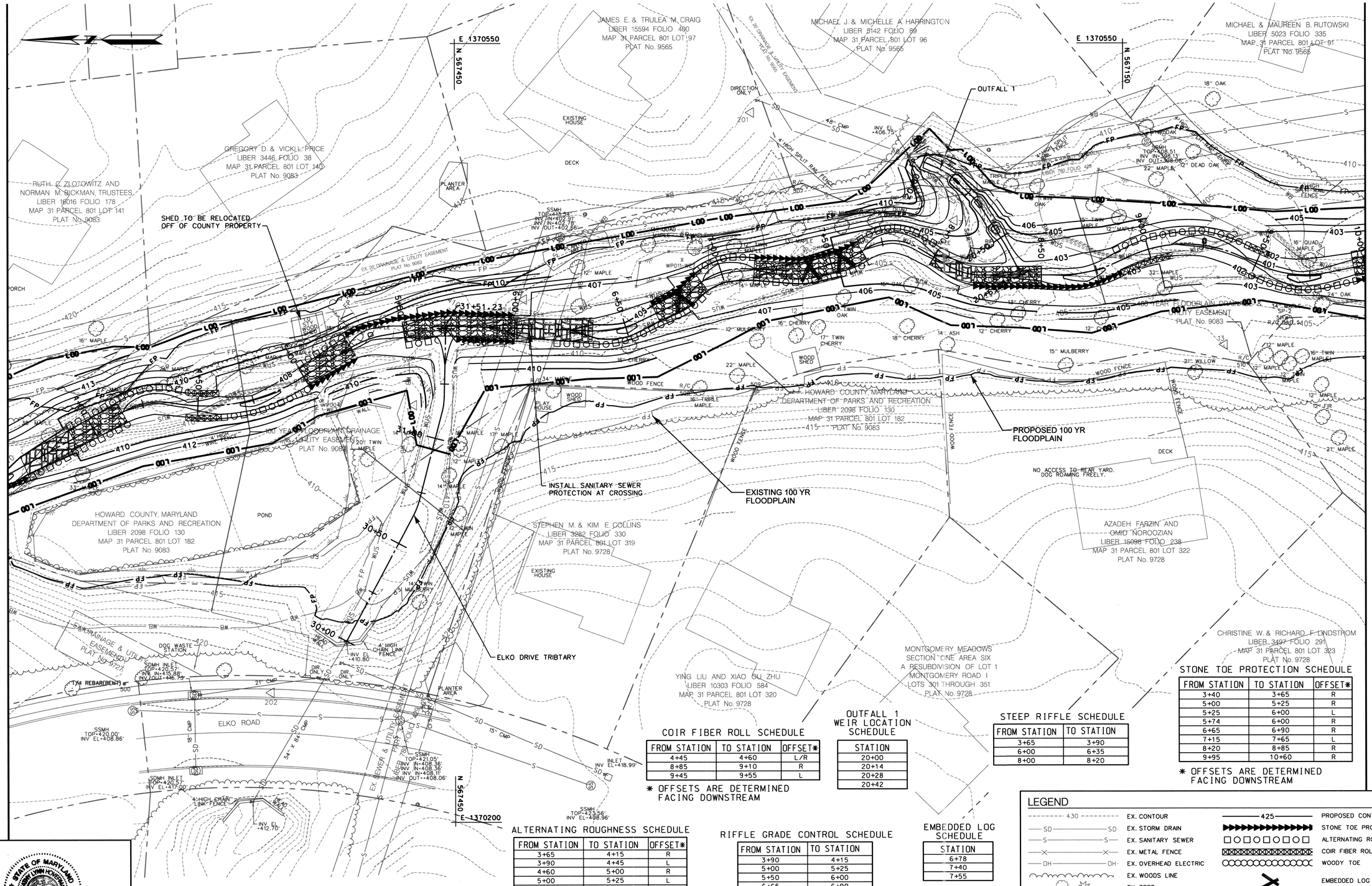

COIR FIBER ROLL SCHEDULE

FROM STATION	TO STATION	OFFSET*
4+45	4+60	L/R
8+85	9+10	R
9+45	9+55	L

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

OUTFALL 1 WEIR LOCATION SCHEDULE

STATION
20+00
20+14
20+28
20+42

STEEP RIFFLE SCHEDULE

FROM STATION	TO STATION
3+65	3+90
6+00	6+35
8+00	8+20

STONE TOE PROTECTION SCHEDULE

FROM STATION	TO STATION	OFFSET*
3+40	3+65	R
5+00	5+25	R
5+25	6+00	L
5+74	6+00	R
6+65	6+90	R
7+15	7+65	L
8+20	8+85	R
9+95	10+60	R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

ALTERNATING ROUGHNESS SCHEDULE

FROM STATION	TO STATION	OFFSET*
3+65	4+15	R
3+90	4+45	L
4+60	5+00	R
5+00	5+25	L
5+50	5+65	R
6+17	6+90	R
6+90	7+15	L
7+15	7+65	R
7+65	8+00	L
8+85	9+45	L
9+45	9+95	R
9+95	10+85	L

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

RIFFLE GRADE CONTROL SCHEDULE

FROM STATION	TO STATION
3+90	4+15
5+00	5+25
5+50	6+00
6+65	6+90
7+15	7+65
8+20	8+50
9+95	10+60

EMBEDDED LOG SCHEDULE

STATION
6+78
7+40
7+55

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
X	EX. METAL FENCE
OH	EX. OVERHEAD ELECTRIC
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
WUS	WATERS OF THE U.S.
	EX. NON-TIDAL WETLAND
LOD	LIMIT OF DISTURBANCE
425	PROPOSED CONTOUR
	STONE TOE PROTECTION
	ALTERNATING ROUGHNESS
	COIR FIBER ROLL
	WOODY TOE
	EMBEDDED LOG
	RIFFLE GRADE CONTROL
	STEEP RIFFLE
FP	EXISTING 100-YR FLOODPLAIN
FP	PROPOSED 100-YR FLOODPLAIN

STATE OF MARYLAND
KATHY WHITMAN
No. 38311
PROFESSIONAL ENGINEER
9/26/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

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HEATHERLAND STREAM RESTORATION PROJECT

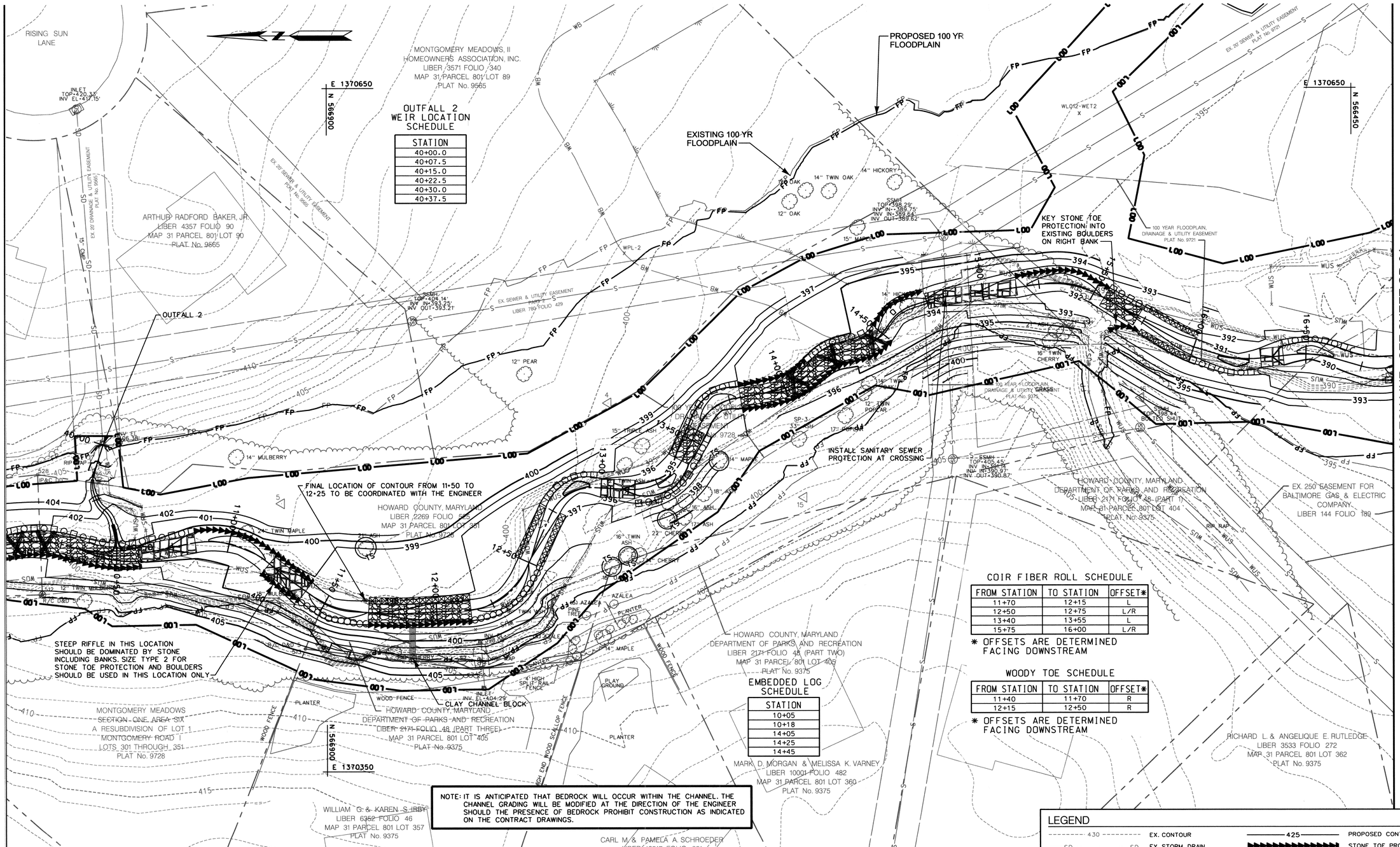
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

GRADING PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

GR-02

SHEET NO.: 9 OF 38



OUTFALL 2 WEIR LOCATION SCHEDULE

STATION
40+00.0
40+07.5
40+15.0
40+22.5
40+30.0
40+37.5

EMBEDDED LOG SCHEDULE

STATION
10+05
10+18
14+05
14+25
14+45

COIR FIBER ROLL SCHEDULE

FROM STATION	TO STATION	OFFSET*
11+70	12+15	L
12+50	12+75	L/R
13+40	13+55	L
15+75	16+00	L/R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

WOODY TOE SCHEDULE

FROM STATION	TO STATION	OFFSET*
11+40	11+70	R
12+15	12+50	R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

NOTE: IT IS ANTICIPATED THAT BEDROCK WILL OCCUR WITHIN THE CHANNEL. THE CHANNEL GRADING WILL BE MODIFIED AT THE DIRECTION OF THE ENGINEER SHOULD THE PRESENCE OF BEDROCK PROHIBIT CONSTRUCTION AS INDICATED ON THE CONTRACT DRAWINGS.

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

RIFFLE GRADE CONTROL SCHEDULE

FROM STATION	TO STATION
9+95	10+60
11+70	12+15
13+40	13+55
13+80	14+45
15+55	15+72

STEEP RIFFLE SCHEDULE

FROM STATION	TO STATION
10+60	10+85
11+20	11+40
13+00	13+15
14+75	15+15
16+30	16+40

STONE TOE PROTECTION SCHEDULE

FROM STATION	TO STATION	OFFSET*
9+95	10+60	R
10+85	11+40	L
11+20	11+40	R
11+70	12+15	R
13+80	14+15	L
13+80	14+50	R
14+50	14+75	L
15+15	15+55	L
15+63	15+75	R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

ALTERNATING ROUGHNESS SCHEDULE

FROM STATION	TO STATION	OFFSET*
9+95	10+85	L
12+75	13+00	L
13+15	13+55	R
13+55	13+80	L
14+15	14+50	L
15+55	15+75	L
16+00	16+30	R
16+40	16+70	L
16+85	17+15	R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
X	EX. METAL FENCE
OH	EX. OVERHEAD ELECTRIC
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
WUS	WATERS OF THE U.S.
	EX. NON-TIDAL WETLAND
LOD	LIMIT OF DISTURBANCE
425	PROPOSED CONTOUR
	STONE TOE PROTECTION
	ALTERNATING ROUGHNESS
	COIR FIBER ROLL
	WOODY TOE
	EMBEDDED LOG
	RIFFLE GRADE CONTROL
	STEEP RIFFLE
FP	EXISTING 100-YR FLOODPLAIN
FP	PROPOSED 100-YR FLOODPLAIN

STATE OF MARYLAND
MARK LYNN HOWDYSHELL
No. 38311
PROFESSIONAL ENGINEER
7/26/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 7/27/17

NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND STREAM RESTORATION PROJECT

CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

GRADING PLAN

SCALE: 1" = 20'
DATE: AUGUST 2017
KCI JOB NO.: 17133314.88
CAPITAL PROJECT NO.: D-1158
PERMIT ISSUE:
CONSTRUCTION ISSUE:

GR-03

PLOTTED: "12:30 PM on Thursday, August 03, 2017"
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LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		STONE TOE PROTECTION
S	EX. SANITARY SEWER		ALTERNATING ROUGHNESS
X	EX. METAL FENCE		COIR FIBER ROLL
OH	EX. OVERHEAD ELECTRIC		WOODY TOE
	EX. WOODS LINE		EMBEDDED LOG
	EX. TREE		RIFFLE GRADE CONTROL
SS	EX. MANHOLE		STEEP RIFFLE
	EX. UTILITY POLE	FP	EXISTING 100-YR FLOODPLAIN
	EX. EASEMENT	FP	PROPOSED 100-YR FLOODPLAIN
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		
	EX. NON-TIDAL WETLAND		
LOD	LIMIT OF DISTURBANCE		

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STONE TOE PROTECTION SCHEDULE

FROM STATION	TO STATION	OFFSET*
18+20	18+60	R
18+20	18+30	L

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

RIFFLE GRADE CONTROL SCHEDULE

FROM STATION	TO STATION
18+60	18+72

COIR FIBER ROLL SCHEDULE

FROM STATION	TO STATION	OFFSET*
17+15	17+70	L/R

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

ALTERNATING ROUGHNESS SCHEDULE

FROM STATION	TO STATION	OFFSET*
16+85	17+15	R
17+70	18+20	L

* OFFSETS ARE DETERMINED FACING DOWNSTREAM

STATE OF MARYLAND
KATHY LYNN HOVEMAN
No. 38311
PROFESSIONAL ENGINEER
9/26/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

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HEATHERLAND STREAM RESTORATION PROJECT

CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

GRADING PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
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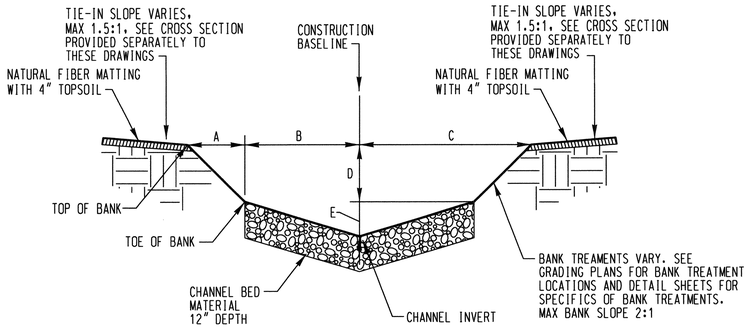
CONSTRUCTION ISSUE:	

GR-04

SHEET NO.: 11 OF 38

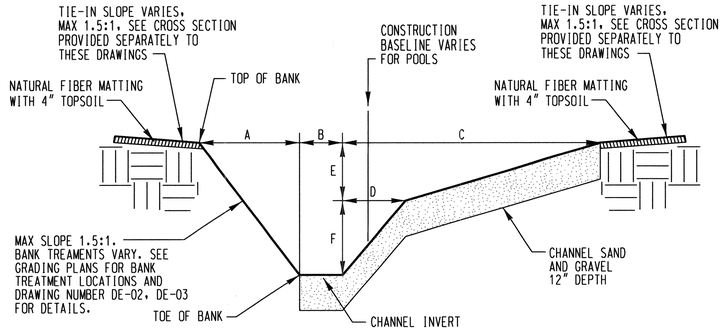


NOTE: MATERIALS VARY. CHANNEL BED MATERIAL TO BE USED IN ALL RIFFLES NOT IDENTIFIED AS A STEEP RIFFLE OR RIFFLE GRADE CONTROL LOCATION. SEE PROFILE SHEETS 17 THROUGH 19 FOR SPECIFIC LOCATIONS.

TYPICAL SECTION RIFFLE

NOT TO SCALE

TYPICAL RIFFLE TYPE 1					
FEATURE (REACH)	A	B	C	D	E
RIFFLE 1-1 (1)	2.0'	4.0'	6.0'	1.0'	0.4'
RIFFLE 2-1 (2)	2.8'	3.7'	6.5'	1.3'	0.4'
RIFFLE 4-1 (3)	3.5'	4.0'	7.5'	1.3'	0.5'
RIFFLE 4-2 (4)	4.0'	4.0'	8.0'	1.4'	0.4'

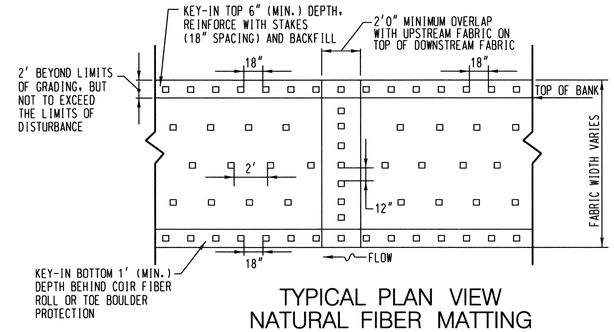


NOTE: POOL RIGHT IS A MIRROR IMAGE OF POOL LEFT. SEE PROFILE FOR SPECIFIC LOCATIONS. POOL MATERIAL SHOULD BE PLACED AT THE POINT OF THE POOL IDENTIFIED ON THE PROFILE THROUGH THE NEXT DOWNSTREAM RIFFLE LOCATION IDENTIFIED ON THE PROFILE. SEE SHEETS 17 THROUGH 19.

TYPICAL SECTION POOL LEFT

NOT TO SCALE

TYPICAL POOL TYPE 1						
FEATURE (REACH)	A	B	C	D	E	F
POOL 1-1 (1)	3.5'	1.5'	9.0'	2.2'	1.0'	1.3'
POOL 2-1 (2)	4.0'	2.0'	9.5'	2.5'	1.2'	1.4'
POOL 4-1 (3)	4.5'	2.0'	10.5'	2.5'	1.3'	1.5'
POOL 4-2 (4)	5.0'	2.0'	11.0'	2.5'	1.4'	1.4'



TYPICAL PLAN VIEW NATURAL FIBER MATTING AND REINFORCED NATURAL FIBER MATTING

NOT TO SCALE

NOTES FOR NATURAL AND REINFORCED NATURAL FIBER MATTING:

1. NATURAL FIBER MATTING TO BE ROLLED LENGTHWISE ALONG STREAMBANK EXTENDING TO THE BOTTOM OF TOE PROTECTION AND A MINIMUM OF TWO FEET PAST THE LIMITS OF GRADING. IF MORE THAN ONE ROLL IS REQUIRED, MID-BANK OVERLAP SHOULD BE A MINIMUM OF ONE FOOT AND SECURELY FASTENED WITH STAKES. AT TRANSITION BETWEEN NATURAL FIBER MATTING AND REINFORCED NATURAL FIBER MATTING, MATTING SHOULD BE OVERLAPPED TWO FEET AND SECURELY FASTENED WITH STAKES.

2. NATURAL FIBER MATTING IS TO BE INSTALLED ON ALL GRADED SLOPES, HIGHLY ERODIBLE SOILS (SEE SHEET 21), AND WETLAND AREAS.

3. NATURAL FIBER MATTING. MATTING FOR THE BANK TREATMENT AREAS SHALL CONSIST OF A MACHINE PRODUCED MAT OF DEGRADABLE NATURAL FIBERS AND SHALL MEET THE FOLLOWING MINIMUM SPECIFICATIONS:

   MATERIAL: WOVEN COIR FIBER YARN OR TWINE
   THICKNESS: 0.25 IN.
   ELONGATION (DRY/WET): 29%/35%
   WEIGHT: 20 OZ/SY
   OPEN AREA: 50%
   SIZE: 6 FT. WIDE X 150 FT IN LENGTH (100 SY PER ROLL)
   SHEAR STRESS: 2.0 LBS/SQ FT
   FLOW VELOCITY: 8 FT./SEC.
   LIFE EXPECTANCY: 3 YEARS

4. REINFORCED NATURAL FIBER MATTING. MATTING FOR ALTERNATING ROUGHNESS AND WOODY TOE SHALL CONSIST OF A DOUBLE-LAYERED BIODEGRADABLE FABRIC: A BOTTOM LAYER OF JUTE FABRIC AND A TOP LAYER OF HIGH STRENGTH COIR MATTING, CONNECTED TOGETHER. REINFORCED NATURAL FIBER MATTING SHALL MEET THE FOLLOWING MINIMUM SPECIFICATIONS:

   MATERIALS: WOVEN COIR FIBER (TOP LAYER) AND JUTE FABRIC (BOTTOM LAYER)
   THICKNESS: 0.35 IN.
   ELONGATION (DRY/WET): 30%/26% (TOP LAYER) AND 8%/9% (BOTTOM LAYER)
   WEIGHT: 33.3 OZ/SY
   PERMEABILITY: 1.03 IN/SEC
   SHEAR STRESS: 3.5 LBS/SQ FT
   FLOW VELOCITY: 10 FT/SEC

5. REINFORCED NATURAL FIBER MATTING SHOULD BE PLACED AS INDICATED ABOVE IN #1.

6. MATTING STAKES. STAKES FOR SECURING THE MATTING ALONG OTHER PORTIONS OF THE MATTING MATERIAL ABOVE THE TOE TRENCH AND FOR THE KEY-IN TRENCH AT THE TOP OF THE SLOPE SHALL CONSIST OF 1-1/2" X 1-1/2" HARDWOOD STAKES, 18-INCHES IN LENGTH, TAPERED AT THE BOTTOM END FOR EASY INSERTION INTO THE SOIL AND FLAT AT THE TOP END FOR HAMMERING.

   SHEAR STRESS: 4.5 LBS/SQ FT
   FLOW VELOCITY: 12 FT./SEC.
   LIFE EXPECTANCY: 3 YEARS IN REINFORCED NATURAL FIBER MATTING

7. SEE DETAIL B-4-6-D ON SHEET 25 FOR ADDITIONAL INFORMATION ON INSTALLATION.

GRANULAR FILTER AND CHANNEL SAND & GRAVEL	
% LESS THAN	US STD SIEVE
100	2.5 in
85-100	1.0 in
60-100	0.5 in
35-70	No. 10
20-50	No. 40
3-20	No. 200

NOTE: SALVAGED MATERIAL IS LARGELY AVAILABLE AND SHOULD BE USED FOR CHANNEL SAND AND GRAVEL WHILE FURNISHED MATERIAL SHOULD BE USED AS GRANULAR FILTER IF FURNISHING MATERIAL BECOMES NECESSARY.

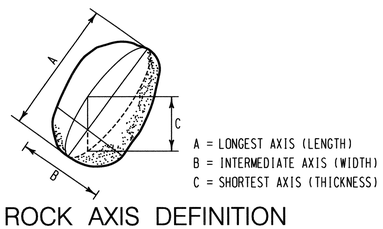
CHANNEL BED MATERIAL	
% LESS THAN	MIN SIZE
100	12.5 in
84	10.0 in
60	7.0 in
50	4.0 in
30	3.0 in
10	0.5 in

NOTE: CHANNEL BED MATERIAL SHALL BE SALVAGED WHEN POSSIBLE. ONLY FURNISH CHANNEL BED MATERIAL WHEN SALVAGED MATERIAL IS NOT AVAILABLE. MATERIAL SHALL NOT BE COMPRISED OF RIPRAP BUT OF A NATURAL STREAM MATERIAL. ANGULAR MATERIAL IS PREFERRED OVER ROUNDED MATERIAL FOR ANY FURNISHED CHANNEL BED MATERIAL.

RIFFLE GRADE CONTROL MATERIAL	
% LESS THAN	MIN SIZE
100	20.0 in
84	16.7 in
60	14.0 in
50	10.0 in
30	8.0 in
10	3.0 in

SIZES FOR STONE TYPES			
AXIS	A (LONGEST)	B (INTERMEDIATE)	C (SHORTEST)
STONE TYPE	MAX.	RANGE	MIN.
ALTERNATING ROUGHNESS STONES, TYPE 1 STONE TOE PROTECTION, AND TYPE 1 BOULDER STONES [1]	CLASS II RIPRAP		
TYPE 2 STONE TOE PROTECTION AND TYPE 2 BOULDER STONE	CLASS III RIPRAP		
OUTFALL 1 AND 2 WEIR STONES [2]	2.5'	1.2' - 1.8'	1.0'

NOTES
1. SALVAGEABLE STONE MATERIAL IS TO BE USED PRIOR TO ANY FURNISHED STOME MATERIAL. MATERIAL IS ANTICIPATED TO BE AVAILABLE IN REACH 1 WITH POSSIBLE MATERIAL SALVAGED THROUGHOUT.
2. OUTFALL 1 AND 2 WEIR STONES SHOULD BE BLOCKY IN SHAPE FOR STACKING.



ROCK AXIS DEFINITION

NOT TO SCALE

STATE OF MARYLAND
KATHLYNN HEINEMAN
No. 38311
PROFESSIONAL ENGINEER

9/26/17

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PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

STREAM DETAILS

SCALE:	NOT TO SCALE
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
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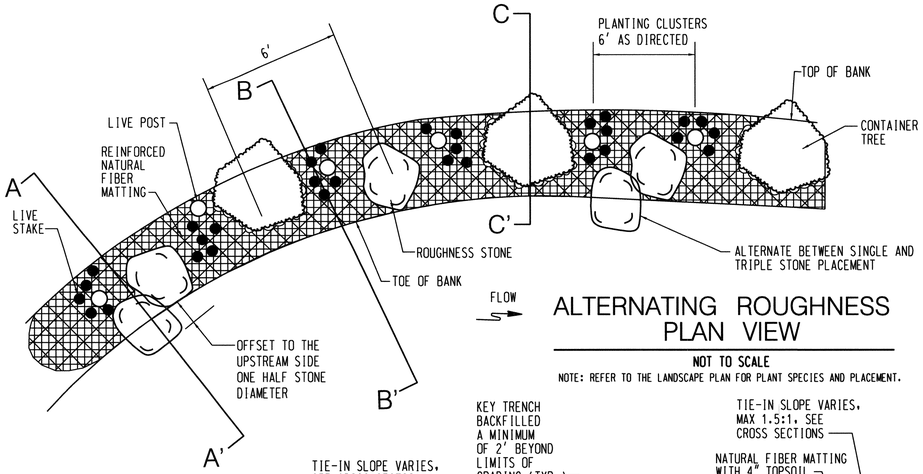
CONSTRUCTION ISSUE:	

DE-01

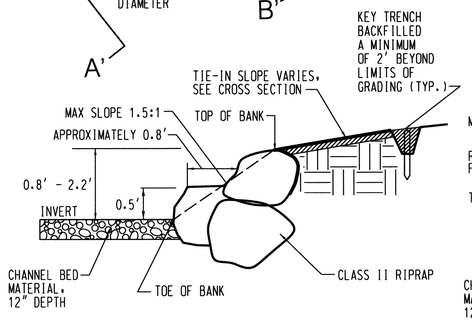
ALTERNATING ROUGHNESS DETAILS



ALTERNATING ROUGHNESS PLAN VIEW

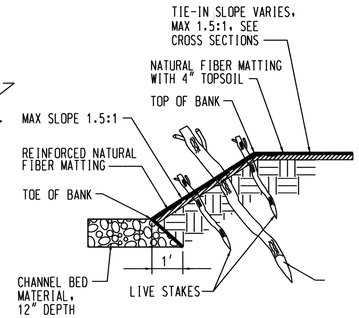
NOT TO SCALE

NOTE: REFER TO THE LANDSCAPE PLAN FOR PLANT SPECIES AND PLACEMENT.



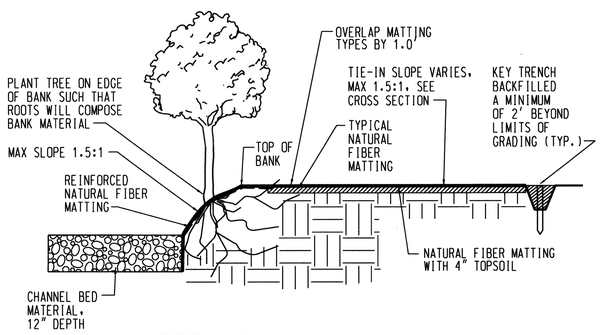
ALTERNATING ROUGHNESS SECTION A'-A

NOT TO SCALE



ALTERNATING ROUGHNESS SECTION B'-B

NOT TO SCALE

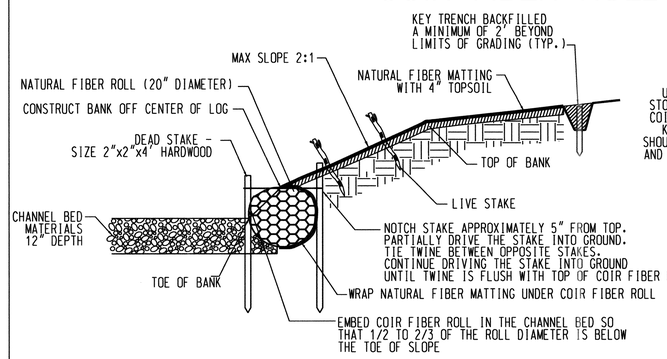


ALTERNATING ROUGHNESS SECTION C'-C

NOT TO SCALE

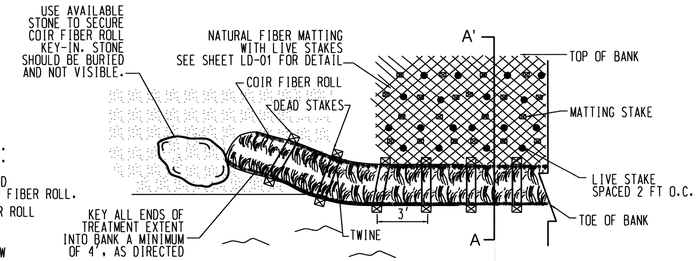
NOTE: RIFFLE BANKS ARE STEEPER AND LOWER THAN POOL BANKS. THEREFORE ALTERNATING ROUGHNESS TREES AT RIFFLES SHOULD BE PLANTED AT THE VERY TOP EDGE OF THE BANK. TREES AT POOLS SHOULD BE PLANTED NO GREATER THAN HALF THE BANK HEIGHT ALONG THE SLOPE, NOT AT TOP OF BANK.

COIR FIBER ROLL DETAILS



COIR FIBER ROLL WITH MATTING - SECTION A-A'

NOT TO SCALE



COIR FIBER ROLL WITH MATTING - PLAN VIEW DETAIL

NOT TO SCALE

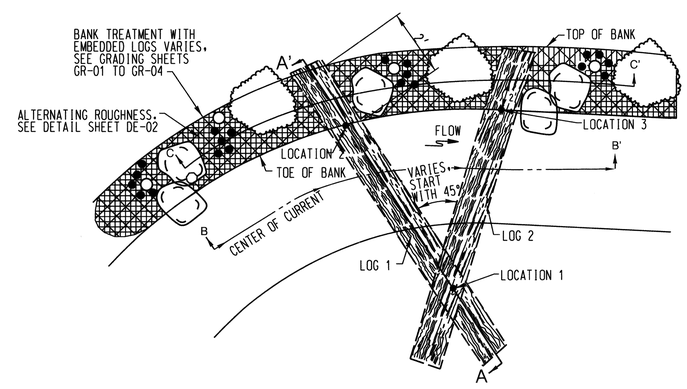
NOTES FOR COIR FIBER ROLL:

1. DEAD STAKES SHOULD BE USED TO ANCHOR THE COIR FIBER ROLLS IN PLACE. STAKES SHOULD BE NOTCHED APPROXIMATELY 5 INCHES (13 CENTIMETERS) FROM THEIR TOPS AND POUNDED PARTIALLY INTO THE GROUND ON EITHER SIDE OF THE BUNDLE AT A SPACING OF 3 TO 4 FEET (0.9 TO 1.2 METERS). TWINE SHOULD BE TIED FROM THE NOTCH IN ONE STAKE TO THE NOTCH IN THE STAKE DIRECTLY OPPOSITE. THE STAKES SHOULD THEN BE DRIVEN SO THAT THE TWINE IS SECURED AGAINST THE TOP OF THE ROLL. IDEALLY, THE TOP OF THE STAKE SHOULD BE FLUSH WITH THE TOP OF THE ROLL.

2. THE ENDS OF ADJACENT LOGS SHOULD BE LACED TOGETHER WITH TWINE BY MAKING A NUMBER OF PASSES IN THE END NETTING BETWEEN THE LOGS AND PULLING THE TWINE TAUT. WHERE A FIBER ROLL DOES NOT ABUT ANOTHER FIBER ROLL, THE END SHOULD BE BENT INWARD AND BURIED IN THE BANK TO PREVENT WATER FROM INTRUDING BEHIND THE ROLL AND DISLODGING IT.

3. SUCCESSIVE ROWS OF FIBER ROLLS SHOULD BE OFFSET 3 TO 8 INCHES (8 TO 20 CENTIMETERS). ADDITIONALLY, TO ENSURE THAT ROOTS EXTEND INTO THE SOIL, PLANTS SHOULD BE PLUGGED INTO THE SIDES OF THE FIBER LOG NEAR THE SOIL. THE NEED TO BACKFILL/CONTOUR THE SOIL BEHIND THE FIBER LOGS AND BETWEEN SUCCESSIVE LIFTS WILL DEPEND ON THE SPECIFIC AESTHETIC AND PHYSICAL REQUIREMENTS OF THE PROJECT. THE RE-CONTOURED SOIL SHOULD BE SEEDED AND/OR PLUGGED WITH APPROPRIATE VEGETATIVE SPECIES AND COVERED WITH AN EROSION CONTROL BLANKET TO PREVENT SLOPE EROSION.

EMBEDDED LOG DETAILS

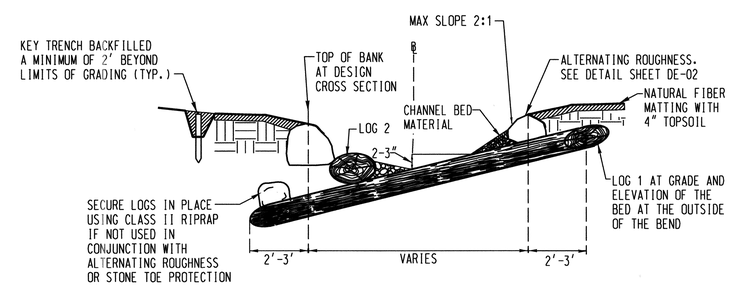


NOTE: LOG LOCATIONS MAY BE ALTERED DURING CONSTRUCTION, AT THE DISCRETION OF THE ENGINEER. THE CONTRACTOR SHALL WORK WITH THE ENGINEER FOR EXACT PLACEMENT.

EMBEDDED LOGS PLAN VIEW

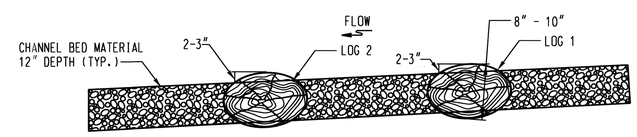
NOT TO SCALE

NOTE:
LOGS SHALL BE SALVAGED FROM CLEARING OPERATIONS.
WILLOW SPECIES SHOULD NOT BE USED AS EMBEDDED LOGS.
LOGS SHALL BE 8" - 10" IN DIAMETER.



CROSS SECTION VIEW A-A'

NOT TO SCALE



PROFILE VIEW B-B'

NOT TO SCALE

STATE OF MARYLAND
NANCY LYNN HOWARD
No. 38311
PROFESSIONAL ENGINEER
9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 8/23/17

NO.	REVISIONS DESCRIPTION	DATE

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PARCELS 801, 423 TAX MAP 31
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DETAILS

SCALE:	NOT TO SCALE
DATE:	AUGUST 2017
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DE-02

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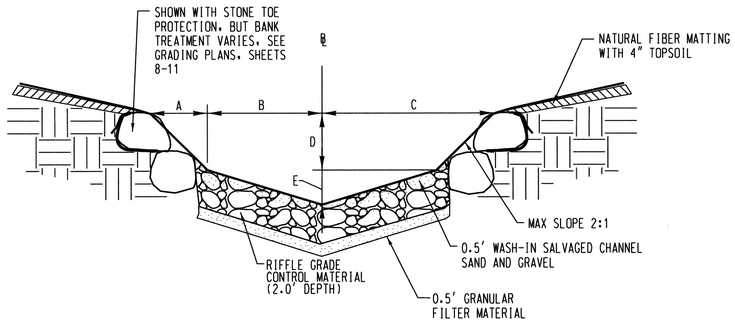

RIFFLE GRADE CONTROL CROSS SECTION

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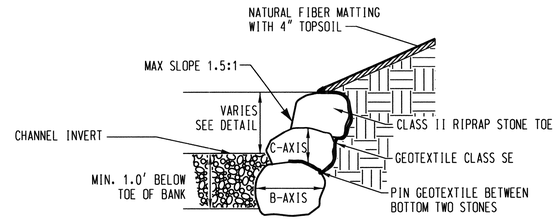
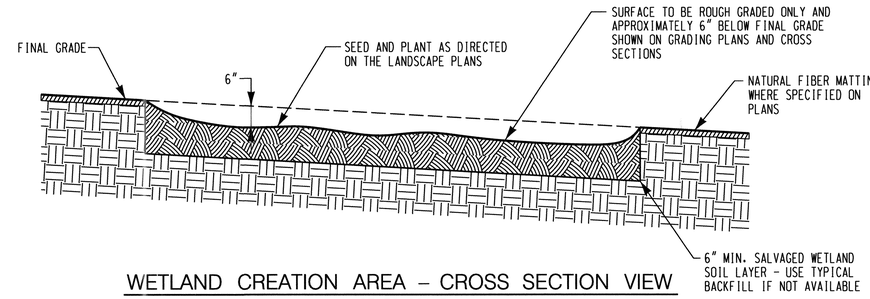


TYPICAL STONE TOE PROTECTION DETAIL*

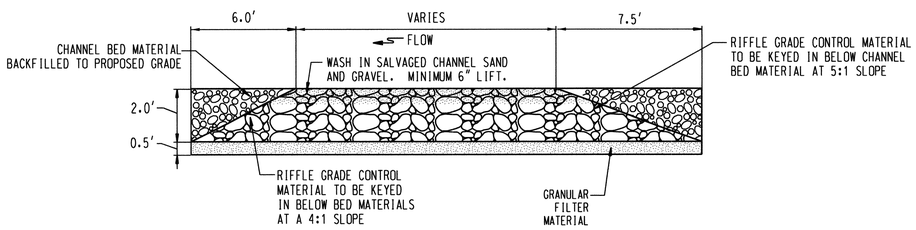
NOT TO SCALE

TYPE 2 STONE TOE PROTECTION*	
FROM STA.	TO STA.
11+25	11+40



WETLAND CREATION AREA – CROSS SECTION VIEW

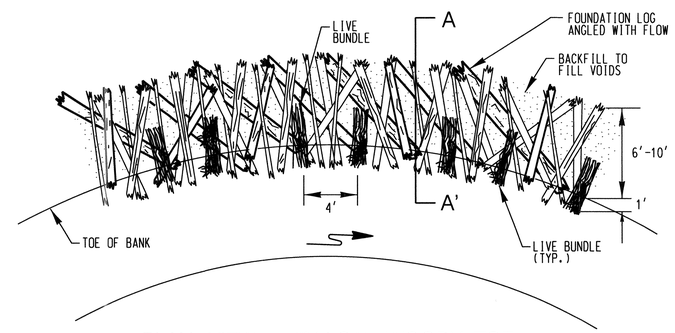
NOT TO SCALE



NOTES: 1. ALL RIFFLE GRADE CONTROL STRUCTURES SHALL BE CONSTRUCTED FROM DOWNSTREAM TO UPSTREAM
2. THE RIFFLE GRADE CONTROL MATERIAL SHALL BE PLACED TO ITS FULL DEPTH MOVING FROM ONE BANK TO THE OPPOSING BANK.

TYPICAL RIFFLE GRADE CONTROL PROFILE

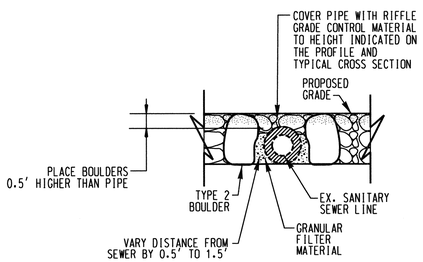
NOT TO SCALE



PLAN VIEW – TYPICAL WOODY TOE

NOT TO SCALE

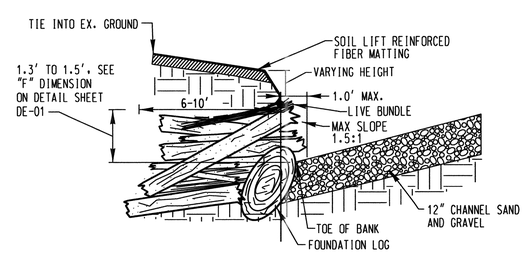
NOTE: FOUNDATION LOG PLACEMENT MUST BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF ADDITIONAL MATERIAL.



SANITARY SEWER PROTECTION

NOT TO SCALE

NOTE:
BOULDERS SHOULD NOT BE PLACED IN A STRAIGHT LINE LIKE A SILL, BUT VARIED TO HELP INTERLOCK OTHER MATERIALS. PLACE BOULDERS WITH DIRECTION FROM THE ENGINEER.



CROSS SECTION A–A' TYPICAL WOODY TOE

NOT TO SCALE

NOTES:

1. SUITABLE TREE MATERIALS INCLUDING TRUNKS, TOPS, AND LIMBS, SHALL BE SALVAGED FOR USE IN WOODY TOE APPLICATIONS AS APPROVED BY THE ENGINEER.
2. FOUNDATION LOGS SHALL BE ANGLED WITH THE FLOW AND EXTEND THE FULL WIDTH OF THE FILL SECTION.
3. WOODY MATERIAL SHALL BE PLACED RANDOMLY ON FOUNDATION LOGS AND PRESSED FLAT WITH THE BUCKET UNTIL THE FINAL DEPTH OF MATERIAL IS REACHED (SEE TABLE).
4. FILL VOIDS WITH SUITABLE BACKFILL MATERIAL.
5. INSTALL LIVE BUNDLES FLAT ON TOP OF WOODY MATERIAL. LIVE BUNDLES SHALL CONSIST OF 3 LIVE STAKES AND SHALL OCCUR EVERY 4 FEET.
6. INSTALL SOIL LIFT WITH REINFORCED NATURAL FIBER MATTING.

SUITABLE SALVAGED TREE MATERIALS

MATERIAL	SIZE
FOUNDATION LOGS	16" TO 24" DIAMETER
TRUNKS, TOPS, LIMBS	2" - 8" DIAMETER

STATE OF MARYLAND — KATHY LYNN HOVERMAN — No. 38311 — PROFESSIONAL ENGINEER — 9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

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DETAILS

SCALE:	NOT TO SCALE
DATE:	AUGUST 2017
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CONSTRUCTION ISSUE:	

DE-03

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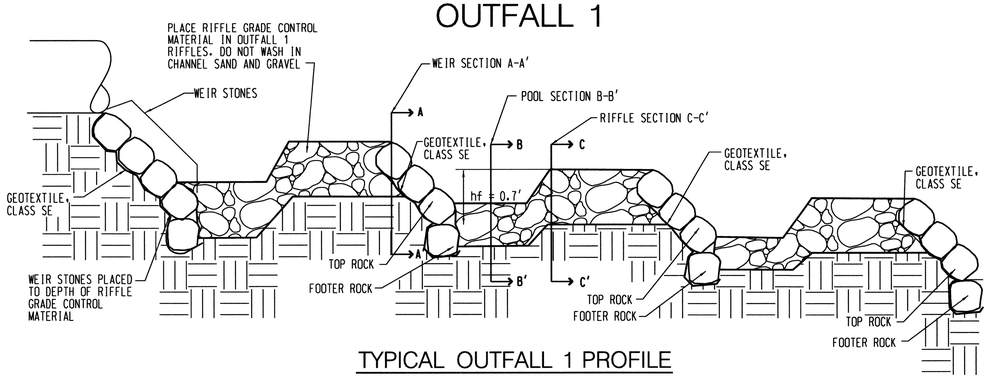
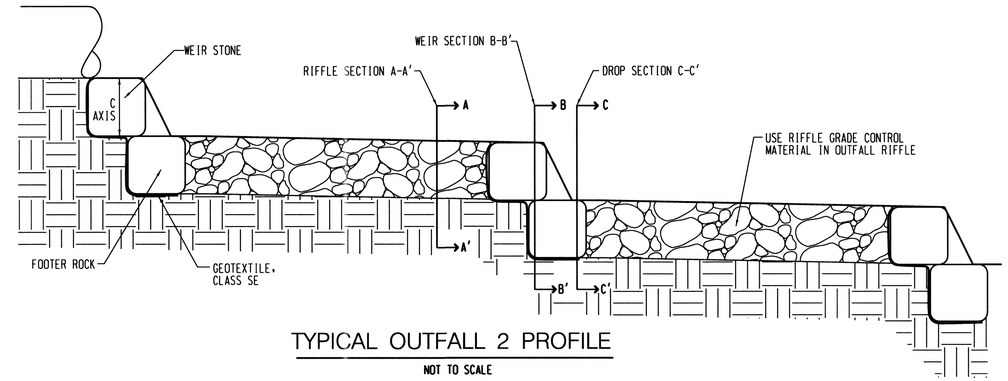
STEP POOL SYSTEM – OUTFALL 1



TYPICAL OUTFALL 1 PROFILE

NOT TO SCALE

CASCADE OUTFALL SYSTEM – OUTFALL 2



TYPICAL OUTFALL 2 PROFILE

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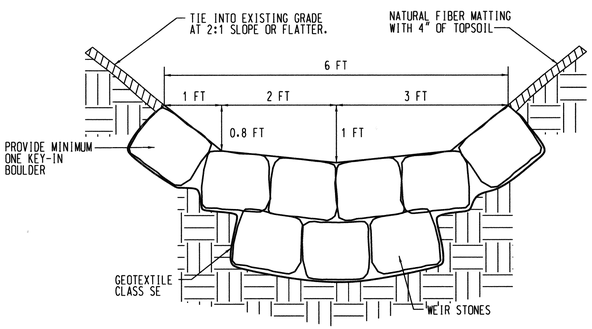
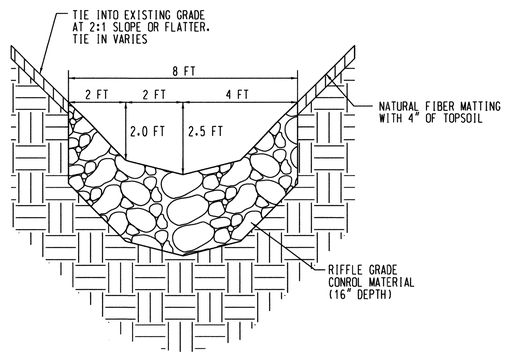


TYPICAL SECTION – WEIR STONE A–A'

NOT TO SCALE



TYPICAL SECTION – POOL B–B'

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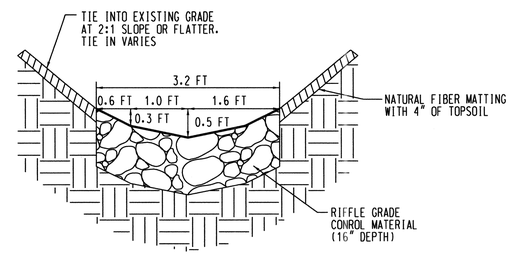

TYPICAL SECTION – RIFFLE A–A'

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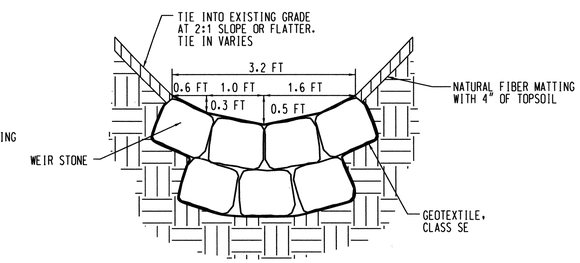

TYPICAL SECTION – WEIR STONE B–B'

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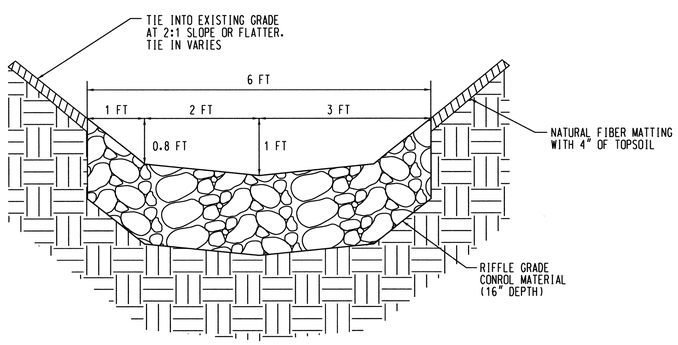
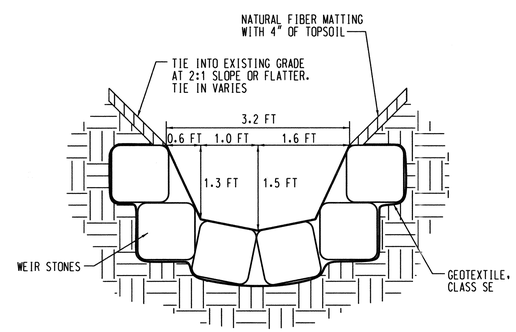


TYPICAL SECTION – RIFFLE C–C'

NOT TO SCALE



TYPICAL SECTION – DROP STRUCTURE C–C'

NOT TO SCALE

STATE OF MARYLAND
KWAN LYNN HEWEHAN
No. 38311
PROFESSIONAL ENGINEER

9/20/17

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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

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DETAILS

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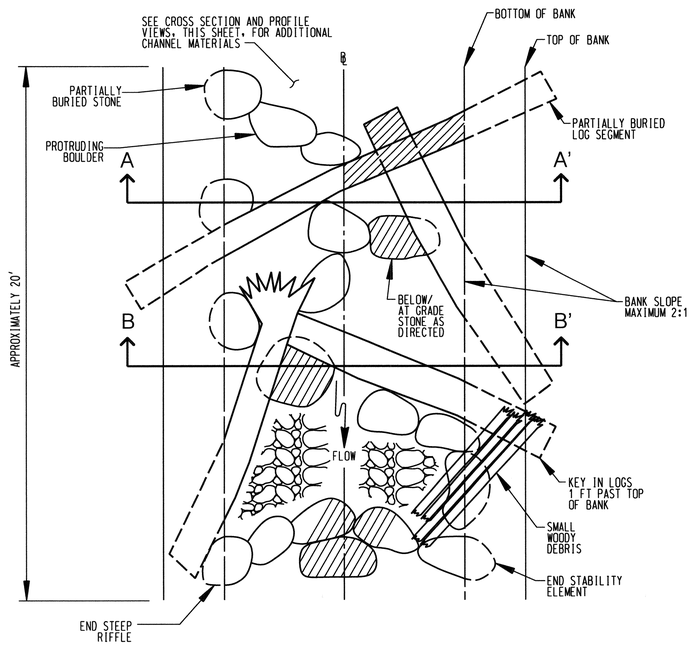
CONSTRUCTION ISSUE:	

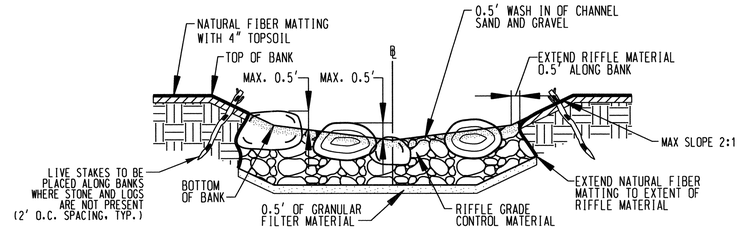
DE-04



STEEP RIFFLE* – PLAN

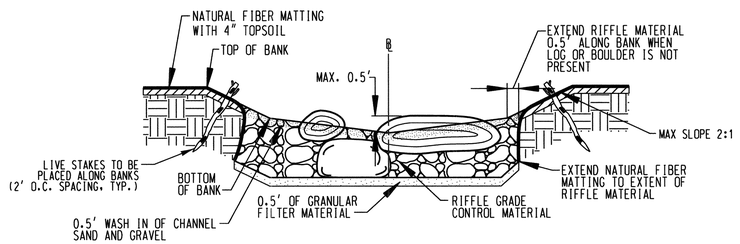
NOT TO SCALE

TYPE 2 BOULDER STONE FOR STEEP RIFFLE*	
FROM STA.	TO STA.
11+25	11+40



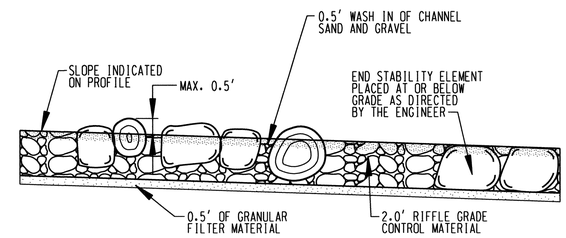
STEEP RIFFLE – SECTION A–A'

NOT TO SCALE



STEEP RIFFLE – SECTION B–B'

NOT TO SCALE



STEEP RIFFLE – PROFILE

NOT TO SCALE

NOTES:

1. MAXIMUM HEIGHT IS RELATIVE TO PROPOSED CROSS SECTION ELEVATION AT EDGE OF EXPOSED LOG OR STONE.
2. EXACT LOCATION OF LOGS AND STONES WILL VARY BASED ON MATERIAL AND STRUCTURE LENGTH.
3. THIS GRAPHIC IS A REPRESENTATION OF HOW THE STEPP RIFFLE WILL BE INTEGRATED WITH BOULDERS, LOGS, AND RIFFLE GRADE CONTROL MATERIAL. STEEP RIFFLES OF SHORTER OR LONGER LENGTHS SHOULD BE REDUCED OR ADDED AS DIRECTED BY THE ENGINEER.
4. END STABILITY ELEMENT IS REQUIRED BUT CAN BE MADE OF STONE OR LOGS.
5. STONES AND LOGS SHALL VARY IN THE HEIGHT ABOVE GRADE.
6. STONES SHALL BE SALVAGED OR OF APPROVED SIZE OF CLASS II AND CLASS III RIPRAP MATERIAL.
7. LOGS SHALL BE SALVAGED FROM ON-SITE CLEARING ACTIVITIES AND OF A DIAMETER OF 6" TO 18" AS APPROVED BY THE ENGINEER.
8. THE MAXIMUM PROTRUSION HEIGHT WITHIN THE CHANNEL IS 0.5'. PROTRUSION CAN INCREASE BEYOND 0.5' BETWEEN THE BOTTOM AND TOP OF BANK EXTENTS.

STATE OF MARYLAND
KIMBERLY LYNN HOVERMAN
No. 38311
PROFESSIONAL ENGINEER

7/26/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 8/25/17

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ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

DETAILS

SCALE:	NOT TO SCALE
DATE:	AUGUST 2017
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CAPITAL PROJECT NO.:	D-1158
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DE-05

SHEET NO.: 16 OF 38

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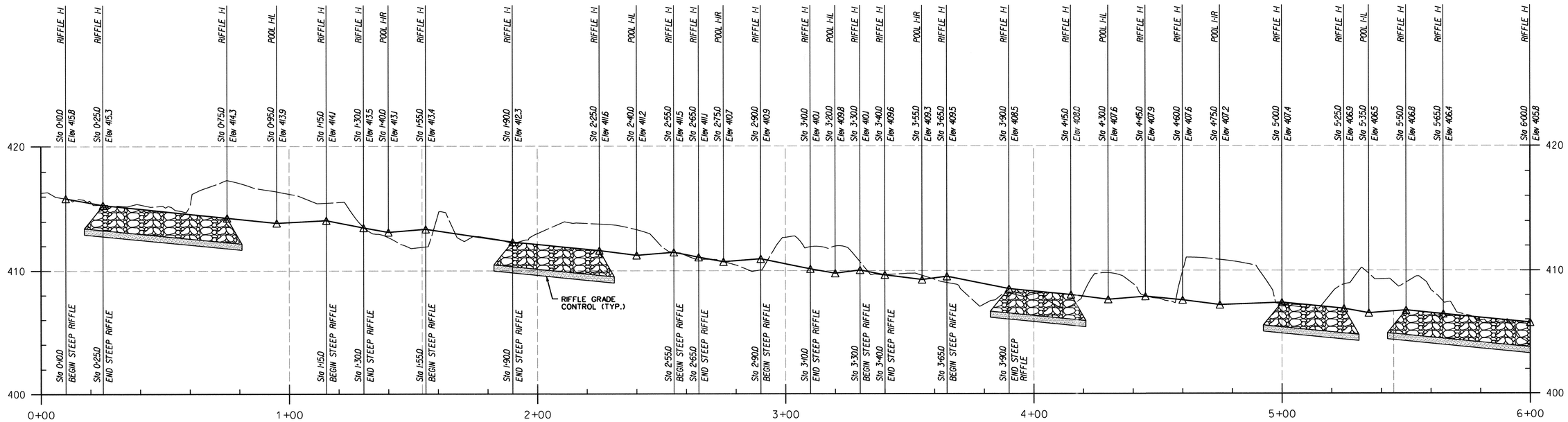
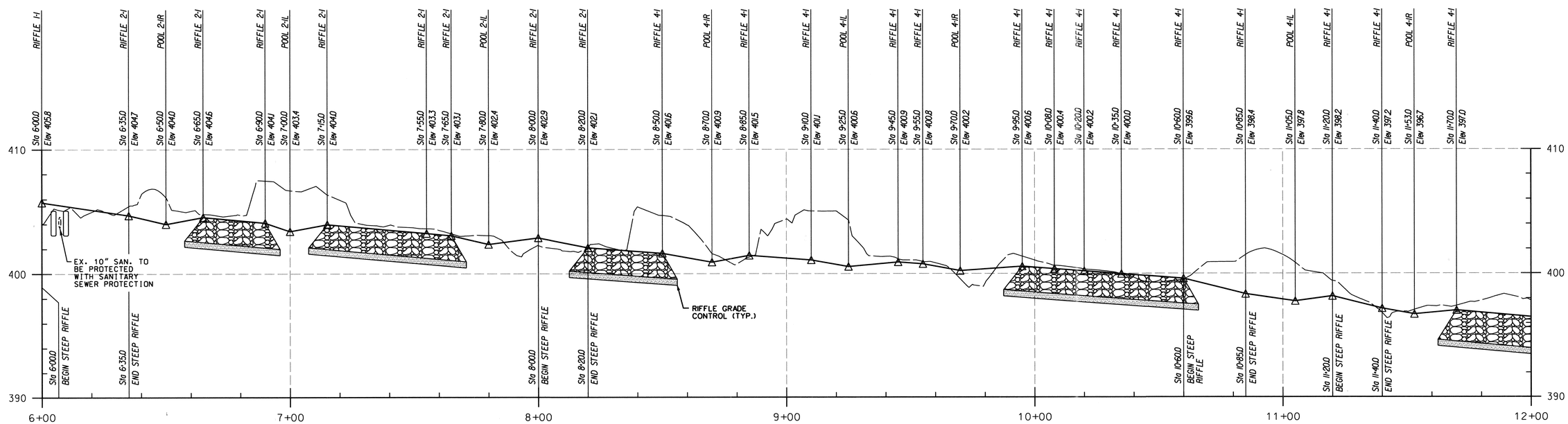


MAINSTEM



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NO.	REVISIONS DESCRIPTION	DATE

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ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

PROFILES

SCALE:	HOR. 1" = 20' VERT. 1" = 4'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

PR-01

SHEET NO.: 17 OF 38

STATE OF MARYLAND
KIRSTY LYNN HOVERMAN
No. 38311
PROFESSIONAL ENGINEER
7/20/17

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LEGEND

EXISTING GROUND
PROPOSED GRADE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

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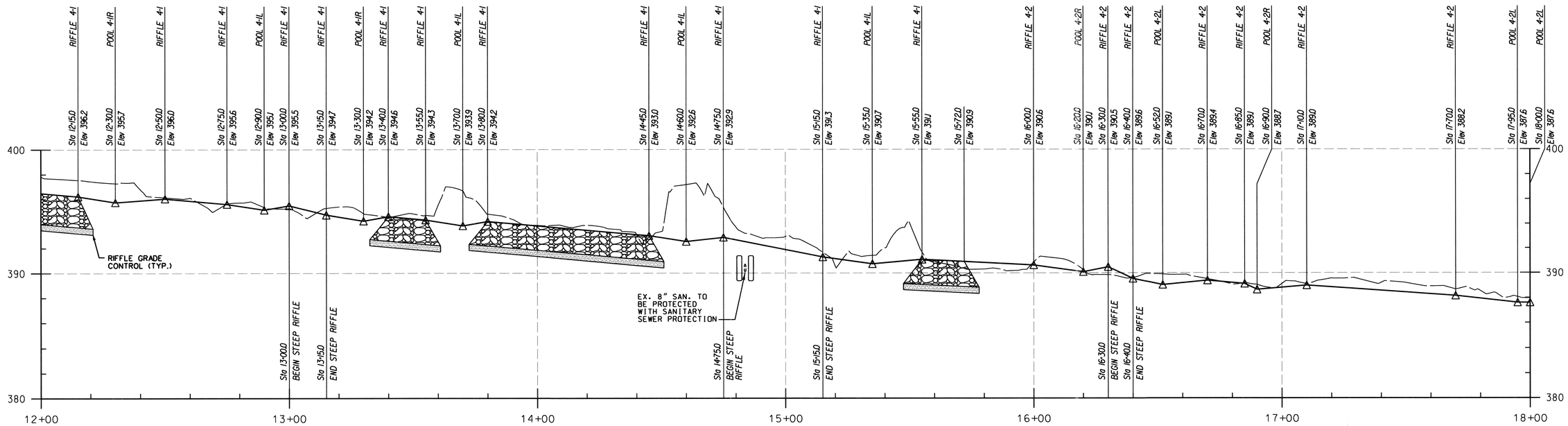
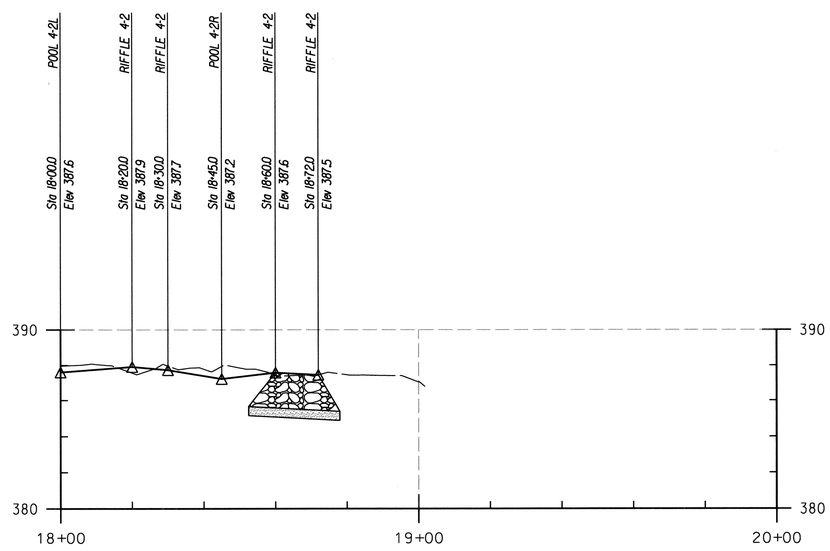


MAINSTEM



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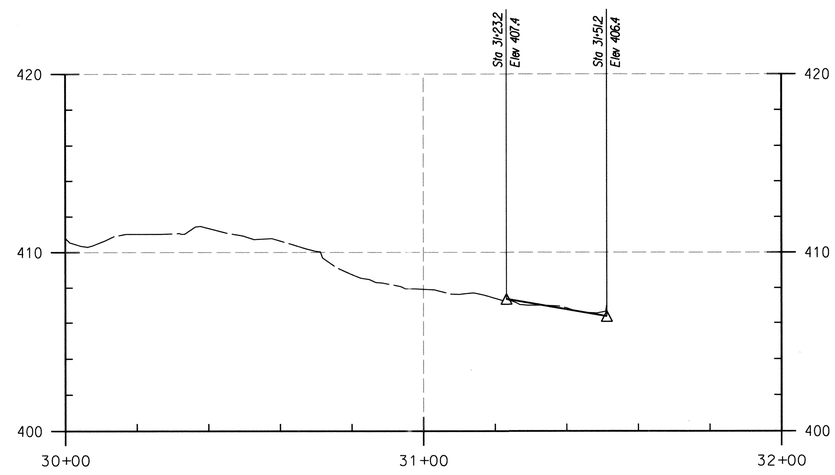

GRADING WITHIN THE BED MAY BE ELIMINATED AT THE TIME OF CONSTRUCTION DUE TO THE SIMILARITY OF PROFILE TO EXISTING CONDITIONS. ADJUSTMENT TO THE ELKO DRIVE TRIBUTARY SHALL ONLY BE CONDUCTED IF DIRECTED TO DO SO BY THE ENGINEER.

ELKO DRIVE TRIBUTARY

STATE OF MARYLAND
MARY LYNN HOVERMAN
No. 38311
PROFESSIONAL ENGINEER

8/29/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311. EXPIRATION DATE: JANUARY 06, 2018

LEGEND

EXISTING GROUND

PROPOSED GRADE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

8/25/17
DATE

NO.	REVISIONS DESCRIPTION	DATE

KCI FILE: M:\ 2013 \ 17133314.88\

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FAX: (410) 316-7818
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HEATHERLAND
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

PROFILES

SCALE:	HOR. 1" = 20' VERT. 1" = 4'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

PR-02

SHEET NO.: 18 OF 38

PLOTTED: 11:12:45 PM on Thursday, August 03, 2017
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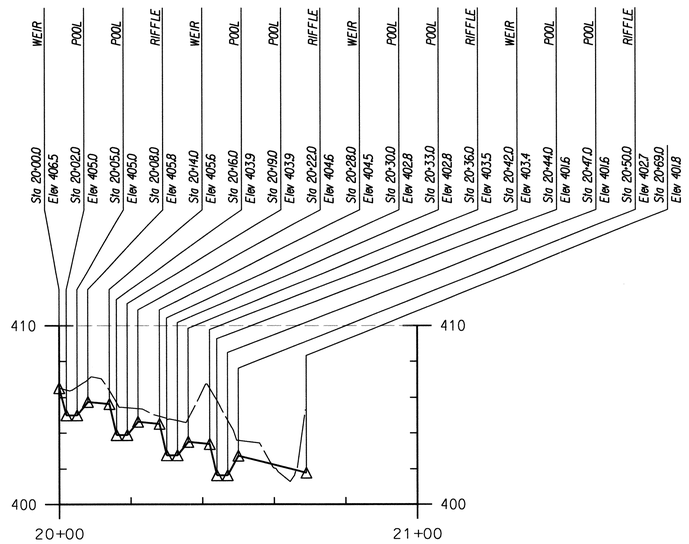
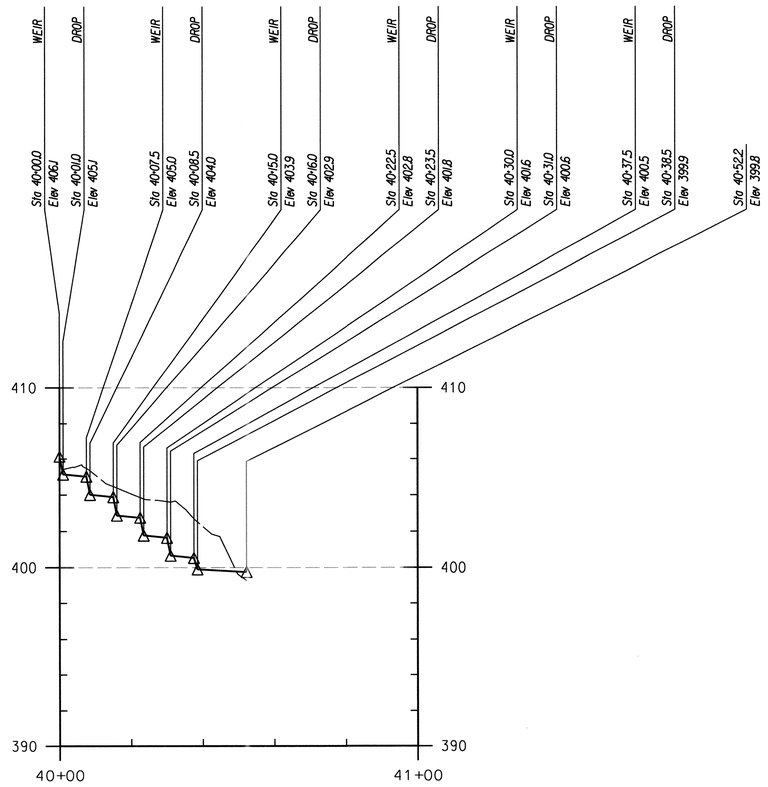


OUTFALL 1



OUTFALL 2

STATE OF MARYLAND
KATHLEEN MARIE SCHERMERHORN
No. 38311
PROFESSIONAL ENGINEER

9/29/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

LEGEND

EXISTING GROUND

PROPOSED GRADE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

PROFILES

SCALE:	HOR. 1" = 20' VERT. 1" = 4'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

PR-03

SHEET NO.: 19 OF 38

PLOTTED: "12:46 PM on Thursday, August 03, 2017"
FILE: M:\2013\17133314.88\Drawings\pPR-P003_Heatherland.dgn

LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		SANDBAG DAM
S	EX. SANITARY SEWER	FB	FILTER BAG
X	EX. METAL FENCE	FL-15	FILTER LOG
OH	EX. OVERHEAD ELECTRIC	SF	SILT FENCE
	EX. WOODS LINE	SSF	SUPER SILT FENCE
	EX. TREE	SCE	STABILIZED CONSTRUCTION ENTRANCE
SS SD	EX. MANHOLE		
	EX. UTILITY POLE		
	EX. EASEMENT		SOIL STABILIZATION MATTING
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		HIGHLY ERODIBLE SOILS
	EX. NON-TIDAL WETLAND	Fo / UcB	SOILS BOUNDARY
LOD	LIMIT OF DISTURBANCE		ACCESS ROAD
	CLEAN WATER DIVERSION PIPE		
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE		STONE TOE PROTECTION
	PUMP		ALTERNATING ROUGHNESS
FP	EXISTING 100-YR FLOODPLAIN		COIR FIBER ROLL
FP	PROPOSED 100-YR FLOODPLAIN		WOODY TOE
	15%-25% SLOPES		EMBEDDED LOG
	25% SLOPES OR GREATER		RIFFLE GRADE CONTROL
TS	TREE SAVE		STEEP RIFFLE

EXISTING BGE TOWERS

N 566800 / E 1370950

97'±

PROPOSED ACCESS

225'±

AVOID TREES BY ROAD

HUNTING HORN DRIVE

E 1370950 / N 566350

PROPOSED STAGING AREA
STAGING EQUIPMENT AND MATERIALS WITHIN STAGING AREA AND BGE EASEMENT NOT TO EXCEED 14 FEET IN HEIGHT.

FL-15

35 LF FILTER LOG

MATCH LINE - ES-02
MATCH LINE - ES-03

MATCH LINE - ES-03

SUPER SILT FENCE
L = 91 FT
CONTRIBUTING SLOPE = 1,500 FT @ 6%

SUPER SILT FENCE
L = 58 FT
CONTRIBUTING SLOPE = 500 FT @ 6%

MATCH LINE - ES-03
MATCH LINE - ES-04

N 566800 / E 1370250

HEATHERLAND CT.

EXISTING BGE TOWER

EXISTING BGE EASEMENT

NOTE:
MAXIMUM HEIGHT OF MATERIALS STORED IN STAGING AREA OFF OF HUNTING HORN DRIVE NOT TO EXCEED 14 FEET.

STATE OF MARYLAND
KATHY LYNN HOWERTON
No. 38311
PROFESSIONAL ENGINEER

9/12/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

PLOTTED: "10:27 PM on Friday, August 04, 2017"
FILE: M:\2013\17133314.88\Drawings\ES-P000-Heatherland Court_BGE Access.dgn

NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND COURT STREAM RESTORATION PROJECT

CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

BGE EASEMENT ACCESS LOCATION PLAN

SCALE:	1" = 40'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

BGE-01

SHEET NO.: 20 OF 38

GENERAL NOTES:

1. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777, HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/ CONSTRUCTION INSPECTION DIVISION (410) 313-1880 AT LEAST SEVEN (7) DAYS PRIOR TO BEGINNING WORK.THE CONTRACTOR SHALL NOTIFY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) NON-TIDAL WETLANDS AND WATERWAYS INSPECTIONS, WATER MANAGEMENT ADMINISTRATION (410) 537-3510 AT LEAST FIVE (5) DAYS PRIOR TO BEGINNING OF ANY WORK. IN-STREAM WORK IS PROHIBITED FROM MARCH 1 TO JUNE 15, INCLUSIVE, STREAM CLASSIFICATION: USE I.

2. OBTAIN GRADING PERMIT AND OTHER NECESSARY PERMITS FOR CONSTRUCTION FROM THE COUNTY AT THE PRE-CONSTRUCTION MEETING. MDE PERMIT TRACKING NO. AI 151612.

3. ALL NECESSARY EASEMENTS OR RIGHTS-OF-ENTRY SHALL BE SECURED PRIOR TO THE START OF THE PROJECT.

4. THE CONTRACTOR SHALL COORDINATE AN ON-SITE PRE-CONSTRUCTION MEETING PER THE HOWARD SOIL CONSERVATION DISTRICT (HSCD) STANDARD SEDIMENT CONTROL NOTES. THE LOD SHALL BE STAKED OUT PRIOR TO THIS MEETING. ALL TREE SAVES WITHIN THE LOD SHALL BE IDENTIFIED DURING THE MEETING.

5. THE CONTRACTOR AND ITS DRIVERS SHALL TAKE EXTRA PRECAUTION WHEN DRIVING AND HAULING MATERIALS ON THE ACCESS ROAD, SITE AREAS AND CHANNEL TO MINIMIZE IMPACT TO EXISITNG FEATURES, SUCH AS TREES, WETLANDS, U.S. WATERS, THE STREAM BED AND CHANNEL SLOPES AND NEWLY CONSTRUCTED FEATURES.

6. THE CONTRACTOR IS ONLY TO TRAVERSE THE STREAM CHANNEL WITHIN THE CURRENT WORKING PHASE.

SEQUENCE OF CONSTRUCTION:

1. INSTALL ORANGE CONSTRUCTION FENCE (OCF) AS SHOWN ON THE PLANS. HOWARD COUNTY DPW SHALL APPROVE THE LOCATION PRIOR TO ANY REMOVAL OR ANY CLEARING ACTIVITIES. (2 DAYS)

2. AT EACH PHASE, THE CONTRACTOR SHALL:

A. CONSTRUCT AND/OR MAINTAIN THE STABILIZED ENTRANCE, MAINTAIN THE LOD, AND CONSTRUCT AND/OR MAINTAIN THE TREE SAVE PROTECTIONS. (1 DAY)

B. CLEAR AND GRUB ONLY AS NECESSARY FOR INSTALLATION OF EROSION AND SEDIMENT CONTROL DEVICES AND INSTALL SILT FENCE AND PERIMETER CONTROLS. (5 DAYS)

C. WORKING FROM UPSTREAM TO DOWNSTREAM FOR PHASES 1-4 AND DOWNSTREAM TO UPSTREAM FOR PHASES 5-8, INSTALL SAND BAG DIVERSIONS IN THE STREAM CHANNEL AND UTILIZE PUMP AROUND SYSTEMS WITH 3 AND 4 INCH DIVERSION PIPES AS NECESSARY TO DEWATER UPSTREAM OF THE SANDBAGS. ALL WATER FROM DISTURBED AREAS SHALL BE PUMPED TO A FILTER BAG ON RIPRAP PAD AS SHOWN ON THE PLANS.

D. ONCE SAND BAG DAMS ARE INSTALLED AND PUMP AROUND PRACTICES FUNCTIONING, AND WITH APPROVAL FROM THE INSPECTOR, CONSTRUCT AND GRADE STREAM CHANNEL AND IN STREAM STRUCTURES AS SHOWN ON THE PLANS.

E. ONCE EACH PHASE IS COMPLETE AND UPON ESC INSPECTOR APPROVAL, ADJUST THE SANDBAG DIVERSIONS AND CONTINUE WITH THE NEXT PHASE. (1 DAY)

3. CONSTRUCTION SHALL BE PERFORMED FOR THE FOLLOWING STREAM SEGMENTS:

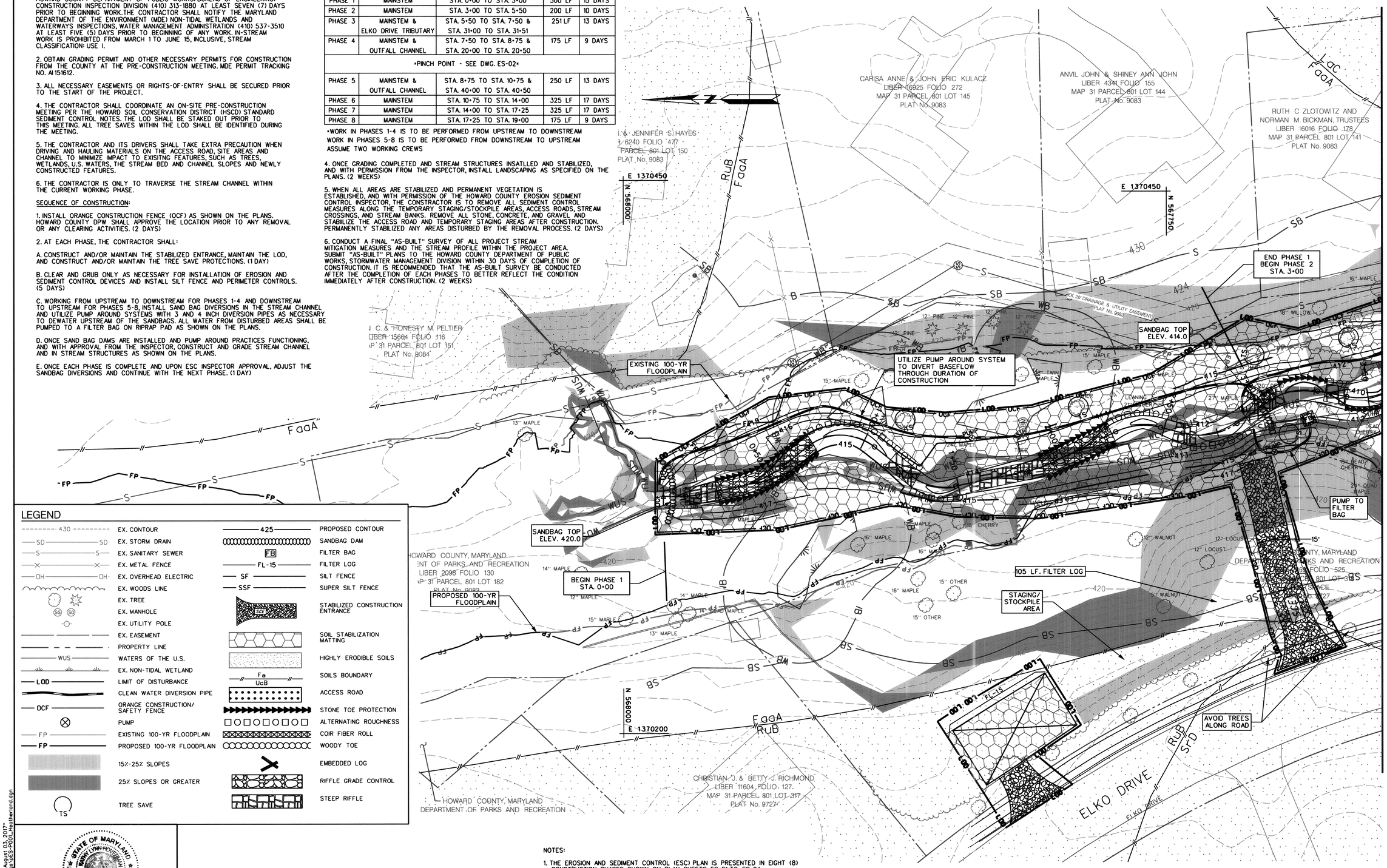
PHASE	LOCATION	STATIONS	LENGTH	DURATION
PHASE 1	MAINSTEM	STA. 0+00 TO STA. 3+00	300 LF	15 DAYS
PHASE 2	MAINSTEM	STA. 3+00 TO STA. 5+50	200 LF	10 DAYS
PHASE 3	MAINSTEM & ELKO DRIVE TRIBUTARY	STA. 5+50 TO STA. 7+50 & STA. 31+00 TO STA. 31+51	251 LF	13 DAYS
PHASE 4	MAINSTEM & OUTFALL CHANNEL	STA. 7+50 TO STA. 8+75 & STA. 20+00 TO STA. 20+50	175 LF	9 DAYS
PINCH POINT - SEE DWG. ES-02				
PHASE 5	MAINSTEM & OUTFALL CHANNEL	STA. 8+75 TO STA. 10+75 & STA. 40+00 TO STA. 40+50	250 LF	13 DAYS
PHASE 6	MAINSTEM	STA. 10+75 TO STA. 14+00	325 LF	17 DAYS
PHASE 7	MAINSTEM	STA. 14+00 TO STA. 17+25	325 LF	17 DAYS
PHASE 8	MAINSTEM	STA. 17+25 TO STA. 19+00	175 LF	9 DAYS

*WORK IN PHASES 1-4 IS TO BE PERFORMED FROM UPSTREAM TO DOWNSTREAM
WORK IN PHASES 5-8 IS TO BE PERFORMED FROM DOWNSTREAM TO UPSTREAM
ASSUME TWO WORKING CREWS

4. ONCE GRADING COMPLETED AND STREAM STRUCTURES INSATLLED AND STABILIZED, AND WITH PERMISSION FROM THE INSPECTOR, INSTALL LANDSCAPING AS SPECIFIED ON THE PLANS. (2 WEEKS)

5. WHEN ALL AREAS ARE STABILIZED AND PERMANENT VEGETATION IS ESTABLISHED, AND WITH PERMISSION OF THE HOWARD COUNTY EROSION SEDIMENT CONTROL INSPECTOR, THE CONSTRACTOR IS TO REMOVE ALL SEDIMENT CONTROL MEASURES ALONG THE TEMPORARY STAGING/STOCKPILE AREAS, ACCESS ROADS, STREAM CROSSINGS, AND STREAM BANKS. REMOVE ALL STONE, CONCRETE, AND GRAVEL AND STABILIZE THE ACCESS ROAD AND TEMPORARY STAGING AREAS AFTER CONSTRUCTION. PERMANENTLY STABILIZED ANY AREAS DISTURBED BY THE REMOVAL PROCESS. (2 DAYS)

6. CONDUCT A FINAL "AS-BUILT" SURVEY OF ALL PROJECT STREAM MITIGATION MEASURES AND THE STREAM PROFILE WITHIN THE PROJECT AREA. SUBMIT "AS-BUILT" PLANS TO THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS, STORMWATER MANAGEMENT DIVISION WITHIN 30 DAYS OF COMPLETION OF CONSTRUCTION. IT IS RECOMMENDED THAT THE AS-BUILT SURVEY BE CONDUCTED AFTER THE COMPLETION OF EACH PHASES TO BETTER REFLECT THE CONDITION IMMEDIATELY AFTER CONSTRUCTION. (2 WEEKS)



LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		SANDBAG DAM
S	EX. SANITARY SEWER	FB	FILTER BAG
X	EX. METAL FENCE	FL-15	FILTER LOG
OH	EX. OVERHEAD ELECTRIC	SF	SILT FENCE
	EX. WOODS LINE	SSF	SUPER SILT FENCE
	EX. TREE		STABILIZED CONSTRUCTION ENTRANCE
SS SD	EX. MANHOLE		
	EX. UTILITY POLE		
	EX. EASEMENT		SOIL STABILIZATION MATTING
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		HIGHLY ERODIBLE SOILS
	EX. NON-TIDAL WETLAND	Fa / UcB	SOILS BOUNDARY
LOD	LIMIT OF DISTURBANCE		ACCESS ROAD
	CLEAN WATER DIVERSION PIPE		
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE		STONE TOE PROTECTION
	PUMP		ALTERNATING ROUGHNESS
FP	EXISTING 100-YR FLOODPLAIN		COIR FIBER ROLL
FP	PROPOSED 100-YR FLOODPLAIN		WOODY TOE
	15%-25% SLOPES		EMBEDDED LOG
	25% SLOPES OR GREATER		RIFFLE GRADE CONTROL
TS	TREE SAVE		STEEP RIFFLE

NOTES:

1. THE EROSION AND SEDIMENT CONTROL (ESC) PLAN IS PRESENTED IN EIGHT (8) CONSTRUCTION PHASES SHOWN ON PLAN SHEETS ES-01 TO ES-04.
2. THE CONTRACTOR SHALL NOT UNLOAD OR DUMP MATERIALS SUCH AS RIPRAP OR BOULDERS ON TOP OF ANY EXISTING UTILITY LINES.
3. ESC NOTES AND DETAILS ARE PROVIDED ON SHEET ES-05 AND SHEET ES-06.
4. CONTRACTOR SHALL RELOCATE STREAM DIVERSIONS AS NEEDED TO TRAVERSE THE WORK AREA.
5. SEE SHEET GS-01 TO SHEET GS-04 FOR PROPOSED STREAM GEOMETRY

STATE OF MARYLAND
NATHAN W. HOBBS
No. 38311
PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

PLOTTED: "0103 PM, on Thursday, August 03, 2017"
FILE: M:\2013\17\33314.88\Drawings\ES-P001_Heatherland.dgn

NO.	REVISIONS DESCRIPTION	DATE

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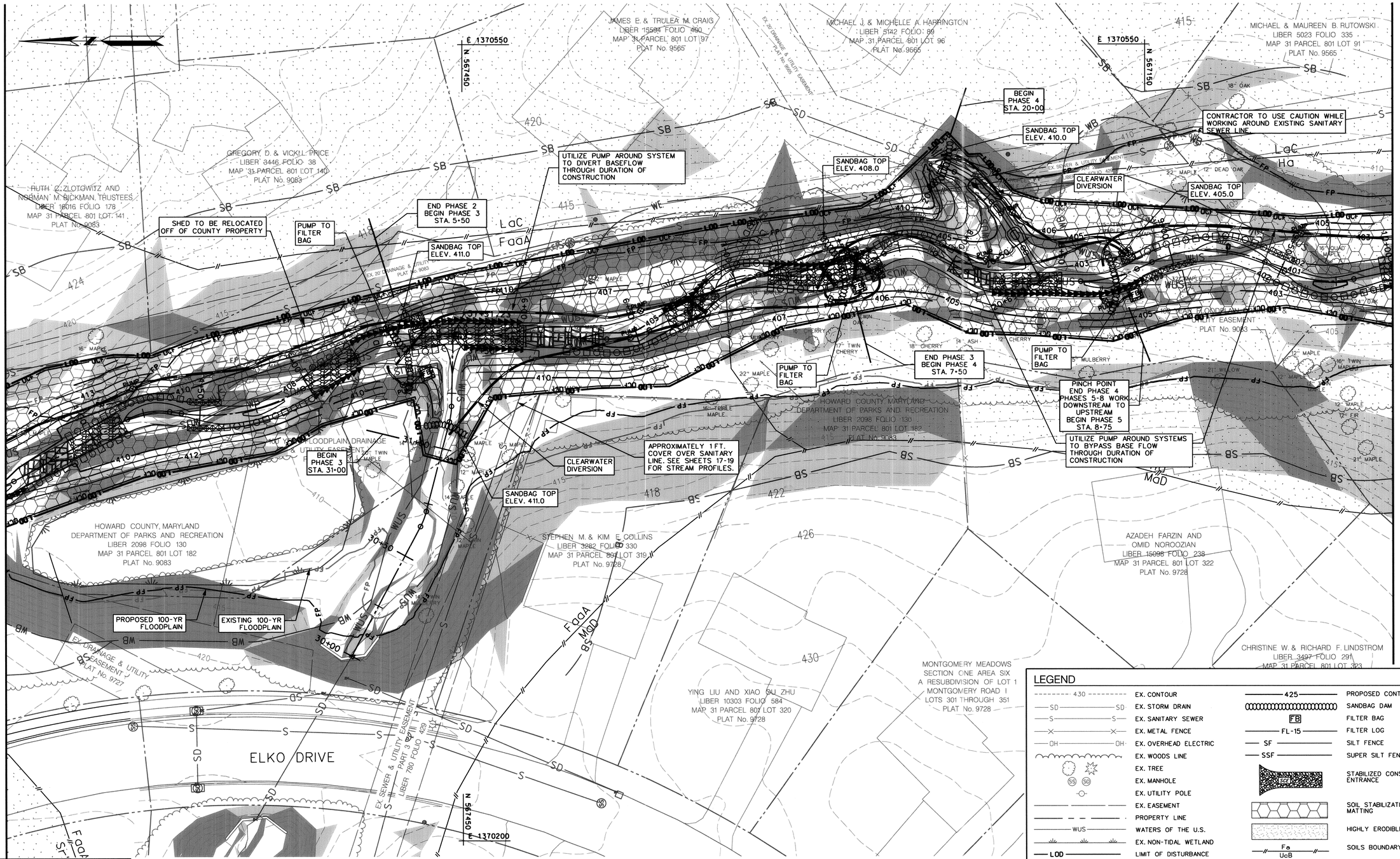
HEATHERLAND COURT
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL PLAN

SCALE:	1"=20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

ES-01



NOTES:

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5. SEE SHEET GS-01 TO SHEET GS-04 FOR PROPOSED STREAM GEOMETRY

LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		SANDBAG DAM
S	EX. SANITARY SEWER	FB	FILTER BAG
X	EX. METAL FENCE	FL-15	FILTER LOG
OH	EX. OVERHEAD ELECTRIC	SF	SILT FENCE
	EX. WOODS LINE	SSF	SUPER SILT FENCE
	EX. TREE	SCE	STABILIZED CONSTRUCTION ENTRANCE
SS SD	EX. MANHOLE		
	EX. UTILITY POLE		
	EX. EASEMENT		SOIL STABILIZATION MATTING
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		HIGHLY ERODIBLE SOILS
	EX. NON-TIDAL WETLAND	Fa UcB	SOILS BOUNDARY
LOD	LIMIT OF DISTURBANCE		
	CLEAN WATER DIVERSION PIPE		ACCESS ROAD
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE		STONE TOE PROTECTION
	PUMP		ALTERNATING ROUGHNESS
FP	EXISTING 100-YR FLOODPLAIN		COIR FIBER ROLL
FP	PROPOSED 100-YR FLOODPLAIN		WOODY TOE
	15%-25% SLOPES		EMBEDDED LOG
	25% SLOPES OR GREATER		RIFFLE GRADE CONTROL
TS	TREE SAVE		STEEP RIFFLE

STATE OF MARYLAND
BRIAN LYNN HOWARD
No. 38311
PROFESSIONAL ENGINEER

9/29/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 8/25/17

NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND COURT
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STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL PLAN

SCALE:	1"=20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

ES-02

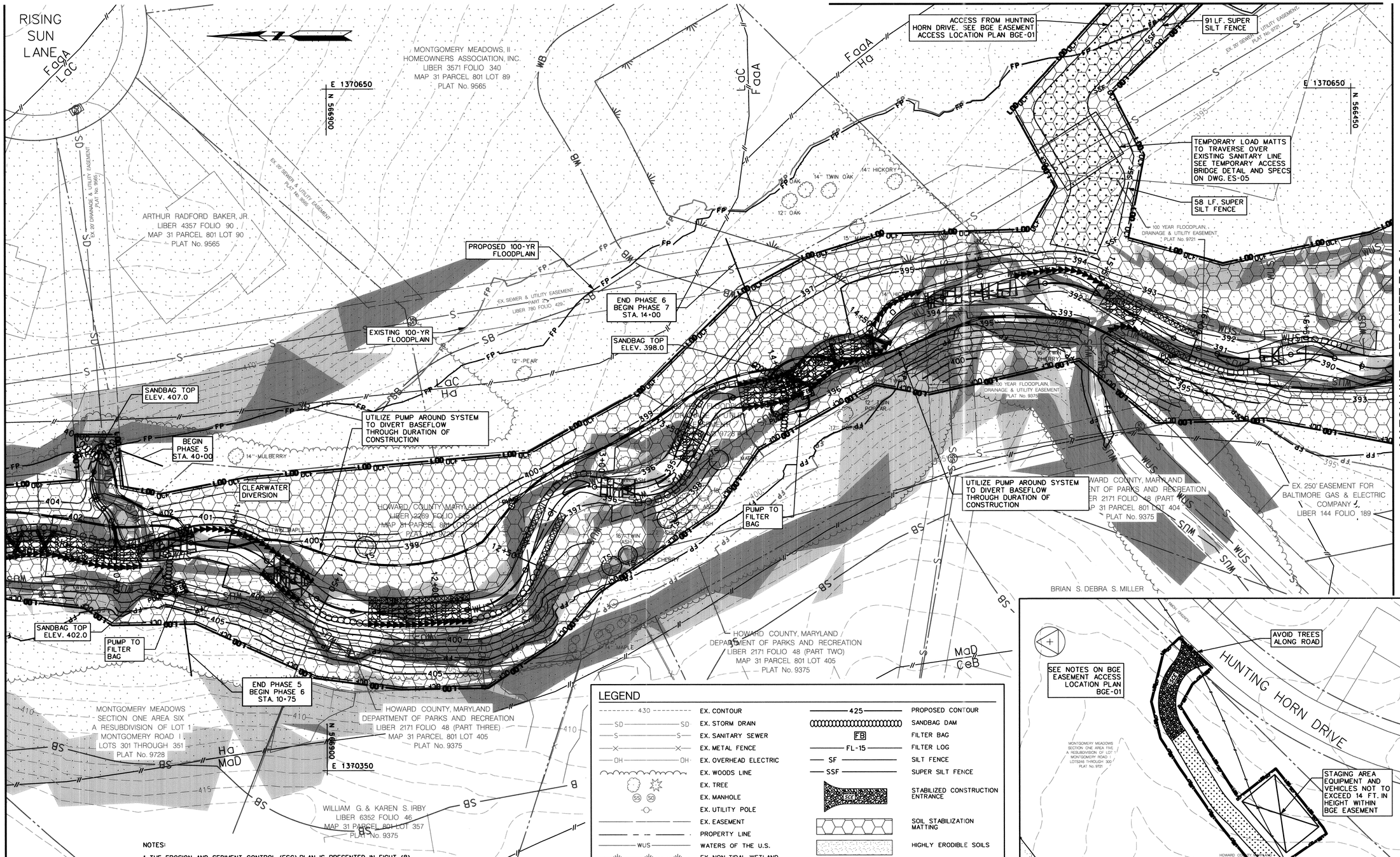
SHEET NO.: 22 OF 38

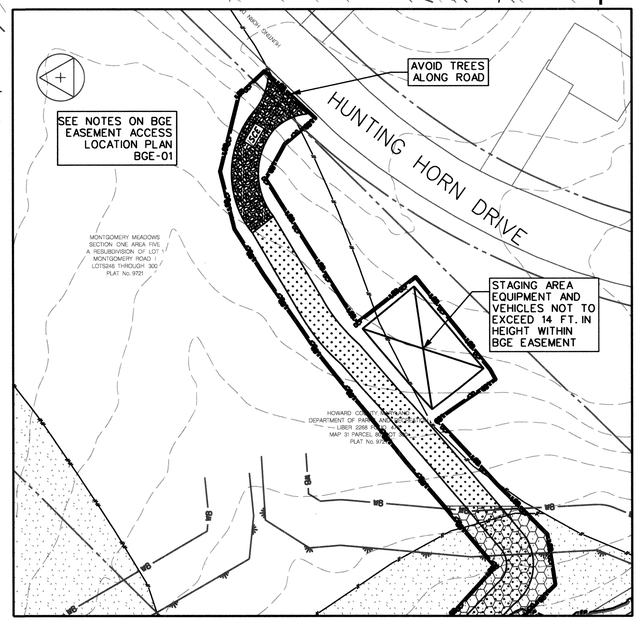
PLOTTED: 10:05 PM on Thursday, August 03, 2017
FILE: M:\2013\17133314.88\Drawings\ES-P002_Heatherland.dgn

MATCH LINE - SEE THIS SHEET

MATCH LINE - SEE SHEET ES-02

MATCH LINE - SEE SHEET ES-04





MATCH LINE - SEE THIS SHEET
SCALE: 1"=40'

LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		SANDBAG DAM
S	EX. SANITARY SEWER	FB	FILTER BAG
	EX. METAL FENCE	FL-15	FILTER LOG
OH	EX. OVERHEAD ELECTRIC	SF	SILT FENCE
	EX. WOODS LINE	SSF	SUPER SILT FENCE
SS SD	EX. TREE		STABILIZED CONSTRUCTION ENTRANCE
	EX. MANHOLE		
	EX. UTILITY POLE		
	EX. EASEMENT		SOIL STABILIZATION MATTING
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		HIGHLY ERODIBLE SOILS
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	CLEAN WATER DIVERSION PIPE		
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NOTES:

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3. ESC NOTES AND DETAILS ARE PROVIDED ON SHEET ES-05 AND SHEET ES-06.
4. CONTRACTOR SHALL RELOCATE STREAM DIVERSIONS AS NEEDED TO TRAVERSE THE WORK AREA.
5. SEE SHEET GS-01 TO SHEET GS-04 FOR PROPOSED STREAM GEOMETRY
6. TEMPORARY MULCH SHALL BE USED FOR THE ACCESS ROAD IN NON WETLAND AREAS. TEMPORARY LOAD MATS, AS SPECIFIED IN THE TEMPORARY ACCESS BRIDGE DETAIL ON DWG. ES-05, SHALL BE USED FOR THE ACCESS ROAD IN WETLAND AREAS.

STATE OF MARYLAND — KATHY LYNN HOWSMAN — No. 38311 — PROFESSIONAL ENGINEER

9/26/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

PLOTTED: "01:07 PM on Thursday, August 03, 2017"
FILE: M:\2013\17133314.88\Drawings\ES-P003_Heatherland.dgn

NO.	REVISIONS DESCRIPTION	DATE

KCI FILE: M:\ 2013 \ 17133314.88 \

936 RIDGEBROOK ROAD
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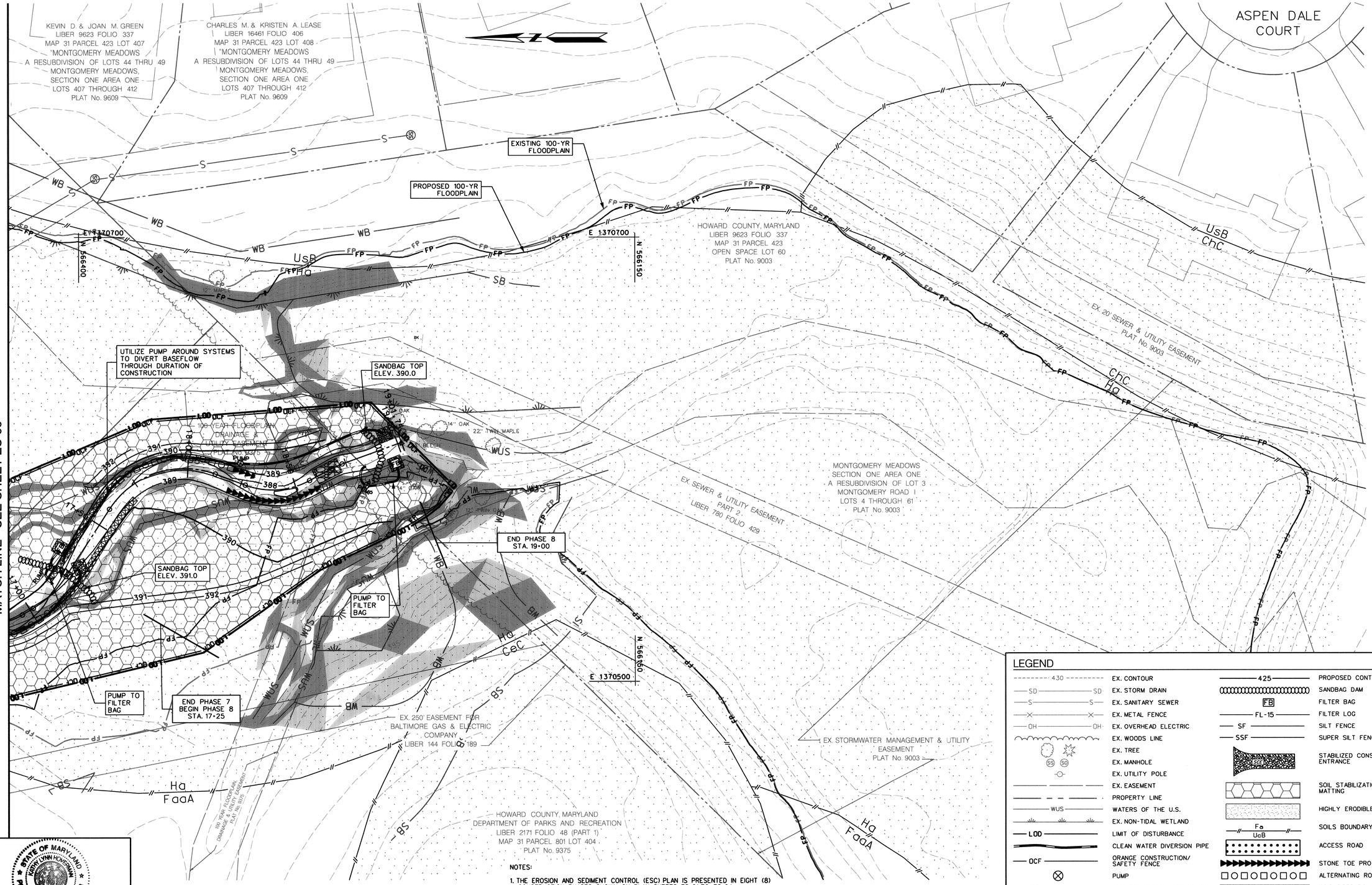
HEATHERLAND COURT
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL PLAN

SCALE:	1"=20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

ES-03

SHEET NO.: 23 OF 38



NOTES:

1. THE EROSION AND SEDIMENT CONTROL (ESC) PLAN IS PRESENTED IN EIGHT (8) CONSTRUCTION PHASES SHOWN ON PLAN SHEETS ES-01 TO ES-04.
2. THE CONTRACTOR SHALL NOT UNLOAD OR DUMP MATERIALS SUCH AS RIPRAP OR BOULDERS ON TOP OF ANY EXISTING UTILITY LINES.
3. ESC NOTES AND DETAILS ARE PROVIDED ON SHEET ES-05 AND SHEET ES-06.
4. CONTRACTOR SHALL RELOCATE STREAM DIVERSIONS AS NEEDED TO TRAVERSE THE WORK AREA.
5. SEE SHEET GS-01 TO SHEET GS-04 FOR PROPOSED STREAM GEOMETRY

LEGEND

430	EX. CONTOUR	425	PROPOSED CONTOUR
SD	EX. STORM DRAIN		SANDBAG DAM
S	EX. SANITARY SEWER	FB	FILTER BAG
X	EX. METAL FENCE	FL-15	FILTER LOG
OH	EX. OVERHEAD ELECTRIC	SF	SILT FENCE
	EX. WOODS LINE	SSF	SUPER SILT FENCE
SS SG	EX. TREE / EX. MANHOLE	SCE	STABILIZED CONSTRUCTION ENTRANCE
	EX. UTILITY POLE		
	EX. EASEMENT		SOIL STABILIZATION MATTING
	PROPERTY LINE		
WUS	WATERS OF THE U.S.		HIGHLY ERODIBLE SOILS
	EX. NON-TIDAL WETLAND	Fa / UcB	SOILS BOUNDARY
LOD	LIMIT OF DISTURBANCE		ACCESS ROAD
	CLEAN WATER DIVERSION PIPE		
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE		STONE TOE PROTECTION
	PUMP		ALTERNATING ROUGHNESS
FP	EXISTING 100-YR FLOODPLAIN		COIR FIBER ROLL
FP	PROPOSED 100-YR FLOODPLAIN		WOODY TOE
	15%-25% SLOPES		EMBEDDED LOG
	25% SLOPES OR GREATER		RIFFLE GRADE CONTROL
TS	TREE SAVE		STEEP RIFFLE

STATE OF MARYLAND
KATHRYN WW HOFFMAN
No. 38311
PROFESSIONAL ENGINEER

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9/20/17

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 2/25/17

NO.	REVISIONS DESCRIPTION	DATE

KCI FILE: M:\ 2013 \ 17133314.88 \

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HEATHERLAND COURT STREAM RESTORATION PROJECT

CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL PLAN

SCALE:	1"=20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

ES-04

SHEET NO.: 24 OF 38

PLOTTED: "01:09 PM on Thursday, August 03, 2017"
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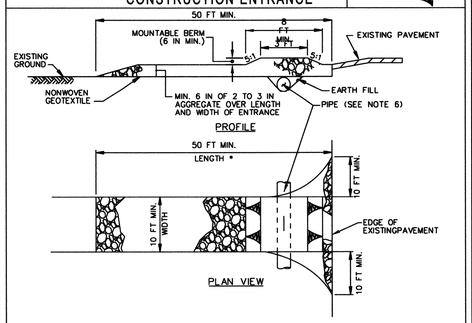
DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL SCE



CONSTRUCTION SPECIFICATIONS

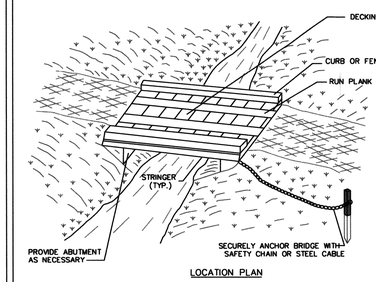
1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	201 1	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL H-4-1 TEMPORARY ACCESS BRIDGE

STANDARD SYMBOL TB



NOTE:
TIME OF YEAR RESTRICTIONS DO NOT APPLY TO THE CONSTRUCTION OR REMOVAL OF A TEMPORARY ACESS BRIDGE UNLESS THERE IS DISTURBANCE TO THE STREAM CHANNEL.

1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL H-4-1 TEMPORARY ACCESS BRIDGE

STANDARD SYMBOL TB

CONSTRUCTION SPECIFICATIONS

1. CONSTRUCT TEMPORARY BRIDGE STRUCTURE AT OR ABOVE THE BANK ELEVATION TO PREVENT IMPACTS FROM FLOATING MATERIALS AND DEBRIS.
2. PLACE ABUTMENTS PARALLEL TO, AND ON, STABLE BANKS.
3. CONSTRUCT BRIDGE TO SPAN ENTIRE CHANNEL UNLESS OTHERWISE INDICATED ON APPROVED PLAN.
4. USE STRINGERS CONSISTING OF LOGS, SAWN TIMBER, PRESTRESSED CONCRETE BEAMS, METAL BEAMS, OR OTHER APPROVED MATERIALS.
5. SELECT DECKING MATERIALS TO PROVIDE SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOAD. PLACE ALL DECKING MEMBERS PERPENDICULAR TO THE STRINGERS, BUTT TIGHTLY, AND SECURELY FASTEN. DECKING MATERIALS MUST BE BUTTED TIGHTLY TO PREVENT ANY SOIL MATERIAL TRACKED ONTO THE BRIDGE FROM FALLING INTO THE WATERWAY BELOW.
6. SECURELY FASTEN OPTIONAL RUN PLANKING FOR THE LENGTH OF THE SPAN. PROVIDE A RUN PLANK FOR EACH TRACK OF THE EQUIPMENT WHEELS. ALTHOUGH RUN PLANKS ARE OPTIONAL, THEY MAY BE NECESSARY TO PROPERLY DISTRIBUTE LOADS.
7. INSTALL CURBS THE ENTIRE LENGTH OF THE OUTER SIDES OF THE DECK TO PREVENT SEDIMENT FROM ENTERING THE STREAM CHANNEL.
8. ANCHOR BRIDGE SECURELY AT ONLY ONE END USING STEEL CABLE OR CHAIN. ANCHORING AT ONLY ONE END WILL PREVENT CHANNEL OBSTRUCTION IN THE EVENT THAT FLOODWATERS FLOAT THE BRIDGE. ACCEPTABLE ANCHORS ARE LARGE TREES, LARGE BOULDERS, OR DRIVEN STEEL POSTS. ANCHOR MUST BE SUFFICIENT TO PREVENT THE BRIDGE FROM FLOATING DOWNSTREAM.
9. AREAS DISTURBED DURING BRIDGE INSTALLATION AND/OR REMOVAL MUST NOT BE LEFT UNSTABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN APPROVED SEDIMENT CONTROL DEVICE.
10. STABILIZE APPROACH TO BRIDGE AND KEEP FREE OF EROSION. CLEAN SEDIMENT FROM DECKING AND CURBS DAILY BY SCRAPING, SWEEPING, AND/OR VACUUMING. ENSURE THAT DECKING AND CURBS REMAIN TIGHTLY BUTTED WITHOUT GAPS. REMOVE DEBRIS TRAPPED BY BRIDGE. MAINTAIN AREAS ADJACENT TO CROSSING TO CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
11. AFTER THE TEMPORARY CROSSING IS NO LONGER NEEDED, REMOVE IT WITHIN 14 CALENDAR DAYS. IF SUBJECT TO THE USE DESIGNATION CLOSURE, REMOVE AT THE END OF CLOSURE PERIOD. PROTECT STREAM BANKS DURING BRIDGE REMOVAL AND STABILIZE ALL DISTURBED AREAS WITH EROSION CONTROL MATTING. ACCOMPLISH REMOVAL OF THE BRIDGE AND CLEAN UP OF THE AREA WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE WATERWAY CHANNEL. STORE ALL REMOVED MATERIALS IN AN APPROVED STAGING AREA.

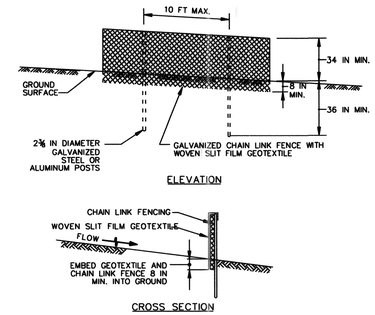
2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL —SSF—



CONSTRUCTION SPECIFICATIONS

1. INSTALL 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2⅜ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

SPECIFICATIONS FOR LOGGING MATS

Definition

A *logging mat* is a portable fabrication, usually constructed of boards or timbers and held together by bolts or cable, to provide temporary protection of a forest harvest entrance or haul road.

Purpose

This practice protects the surface soil structure from excessive compaction and rutting.

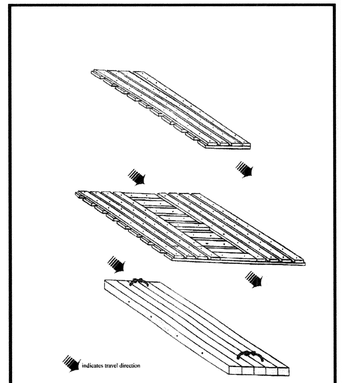
Conditions Where Practice Applies

This practice applies to any part of the forest harvest access system where rutting could become an erosion or water handling problem. It is often used as a substitute for stone or other stabilizing materials at the entrance of a forest harvest site and isolated wet areas on haul roads or skid trails.

Specifications

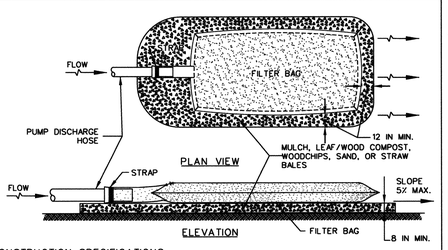
1. Mats shall be placed end-to-end to form a continuous span for the entire length of the area to be protected.
2. Mats can be used as a substitute for or in conjunction with stone, gravel, wood chips, culverts, or other stabilizing material at the entrance to the harvest site.
3. Mats shall be inspected frequently and maintained or replaced as necessary to ensure their proper function.

Diagram 13.0
Logging Mats



DETAIL F-4 FILTER BAG

STANDARD SYMBOL ⊠FB



CONSTRUCTION SPECIFICATIONS

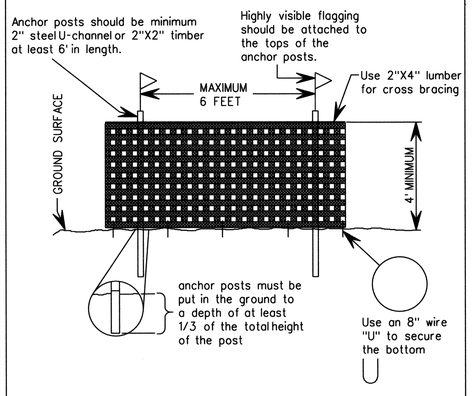
1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) FOR THE FOLLOWING:

GRAB TENSILE	250 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT²	ASTM D-4491
PERMITTIVITY (SEC^{-1})	1.2 SEC^{-1}	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	90%	ASTM D-4632

6. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

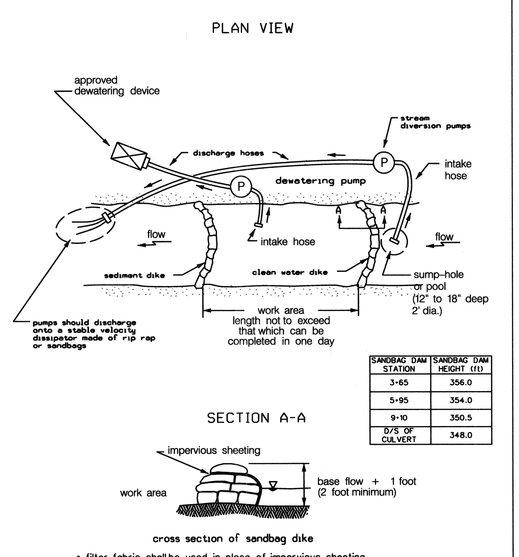
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



DETAIL FOR BLAZE ORANGE PLASTIC MESH SAFETY FENCE
NOT TO SCALE

DETAIL 1.2: PUMP-AROUND PRACTICE



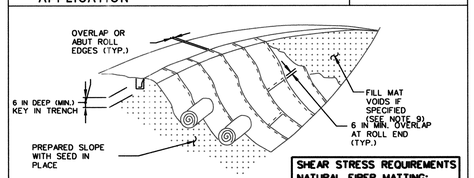
SANDBAG DAM STATION	SANDBAG DAM HEIGHT (ft)
3+65	356.0
5+95	354.0
9+10	350.5
D/S OF CULVERT	348.0

* filter fabric shall be used in place of impervious sheeting at the downstream sand bag for each stage of work.

TEMPORARY INSTREAM CONSTRUCTION MEASURES — REVISED NOVEMBER 2000 PAGE 1.2 - 3 — MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-4-6-D PERMANENT SOIL STABILIZATION MATTING SLOPE APPLICATION

STANDARD SYMBOL
PSSMS – 2.0 LB/FT² FOR NFM
PSSMS – 3.5 LB/FT² FOR RNFM



SHEAR STRESS REQUIREMENTS
NATURAL FIBER MATTING: 2.0 LBS/SF
REINFORCED NATURAL FIBER MATTING: 3.5 LBS/SF

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.
2. USE PERMANENT SOIL STABILIZATION MATTING MADE OF OPEN WEAVE SYNTHETIC, NON-DEGRADABLE FIBERS OR ELEMENTS OF UNIFORM THICKNESS AND DISTRIBUTION THROUGHOUT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES OR WOOD STAKES. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPE AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS, UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWN SLOPE. LAY MATTING SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT EDGES OF MATTING ROLLS PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSTREAM MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE TOP OF SLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. IF SPECIFIED BY THE DESIGNER OR MANUFACTURER AND DEPENDING ON THE TYPE OF MAT BEING INSTALLED, ONCE THE MATTING IS KEYED AND STAPLED IN PLACE, FILL THE MAT VOIDS WITH TOP SOIL OR GRANULAR MATERIAL AND LIGHTLY COMPACT OR ROLL TO MAXIMIZE SOIL/MAT CONTACT WITHOUT CRUSHING MAT.
10. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

*SEE DE-01 FOR STRENGTH AND MATERIAL SPECIFICATIONS

MGWC 1.2: PUMP-AROUND PRACTICE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing a temporary pump around and supporting measures to divert flow around in-stream construction sites.

IMPLEMENTATION SEQUENCE

Sediment control measures, pump-around practices, and associated channel and bank construction should be completed in the following sequence (refer to Detail 1.2):

1. Construction activities including the installation of erosion and sediment control measures should not begin until all necessary easements, permits and/or right-of-ways have been acquired. All existing utilities should be located prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and should repair the damage at his/her own expense to the county's or utility company's satisfaction.
2. The contractor should notify the Maryland Department of the Environment or WMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor should inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.
3. The contractor should conduct a pre-construction meeting on site with the WMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. The contractor should stake out all limits of disturbance prior to the pre-construction meeting so they may be reviewed. The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance, which will be removed for construction access. Trees should not be removed within the limit of disturbance without approval from the WMA or local authority.
4. Construction should not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor should stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible.
5. Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor should begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. In some cases, work may begin downstream if appropriate. The sequence of construction must be followed unless the contractor gets written approval for deviations from the WMA or local authority. The contractor should only begin work in an area which can be completed by the end of the day including grading adjacent to the channel. At the end of each workday, the work area must be stabilized and the pump around removed from the channel. Work should not be conducted in the channel during rain events.
6. Sandbag dikes should be situated at the upstream and downstream ends of the work area as shown on the plans, and stream flow should be pumped around the work area. The pump should discharge onto a stable velocity dissipater made of riprap or sandbags.
7. Water from the work area should be pumped to a sediment filtering measure such as a dewatering basin, sediment bag, or other approved source. The measure should be located such that the water drains back into the channel below the downstream sandbag dike.
8. Traversing a channel reach with equipment within the work area where no work is proposed should be avoided. If equipment has to traverse such a reach for access to another area, then timber mats or similar measures should be used to minimize disturbance to the channel. Temporary stream crossings should be used only when necessary and only where noted on the plans or specified. (See Section 4, Stream Crossings, Maryland Guidelines to Waterway Construction).
9. All stream restoration measures should be installed as indicated by the plans and all banks graded in accordance with the grading plans and typical cross-sections. All grading must be stabilized at the end of each day with seed and mulch or seed and matting as specified on the plans.
10. After an area is completed and stabilized, the clean water dike should be removed. After the first sediment flush, a new clean water dike should be established upstream from the old sediment dike. Finally, upon establishment of a new sediment dike below the old one, the old sediment dike should be removed.
11. A pump around must be installed on any tributary or storm drain outfall, which contributes baseflow to the work area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. This water should discharge onto the same velocity dissipater used for the main stem pump around.
12. If a tributary is to be restored, construction should take place on the tributary before work on the main stream reaches the tributary confluence. Construction in the tributary, including pump around practices, should follow the same sequence as for the main stem of the river or 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.
13. The contractor is responsible for providing access to and maintaining all erosion and sediment control devices until the sediment control inspector approves their removal.
14. After construction, all disturbed areas should be regraded and revegetated as per the planting plan.

STATE OF MARYLAND — MICHAEL LYNN HOVERMAN — No. 38311 — PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

PLOTTED: "01:37 PM on Friday, August 04, 2017"
FILE: M:\2013\17133314.88\Drawings\DES-0001_Heatherland.dgn

NO.	REVISIONS DESCRIPTION	DATE

KCI FILE: M:\ 2013 \ 17133314.88 \

936 RIDGEBROOK ROAD
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KCI TECHNOLOGIES

HEATHERLAND COURT
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL DETAILS

SCALE:	N/A
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

ES-05

SHEET NO.: 25 OF 38

HOWARD SOIL CONSERVATION DISTRICT (HSCD)
STANDARD SEDIMENT CONTROL NOTES

1. A pre-construction meeting must occur with the Howard County Department of Public Works, Construction Inspection Division (CID), 410-313-1855 after the future LOD and protected areas are marked clearly in the field. A minimum of 48 hour notice to CID must be given at the following stages:

   a. Prior to the start of earth disturbance,
   b. Upon completion of the installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading,
   c. Prior to the start of another phase of construction or opening of another grading unit,
   d. 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 steeper than 3 horizontal to 1 vertical (3:1); and seven (7) calendar 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).

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 CID.

6. Site Analysis:

Total Area of Site:	3.27	Acres
Area Disturbed:	3.27	Acres
Area to be roofed or paved:	0	Acres
Area to be vegetatively stabilized:	3.27	Acres
Total Cut:	2,713	Cu. Yds.
Total Fill:	987	Cu. Yds.
Offsite waste/borrow area location:		

7. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.

8. Additional sediment control must be provided, if deemed necessary by the CID. 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:

   - Inspection date
   - Inspection type (routine, pre-storm event, during rain event)
   - Name and title of inspector
   - Weather information (current conditions as well as time and amount of last recorded precipitation)
   - Brief description of project's status (e.g., percent complete) and/or current activities
   - Evidence of sediment discharges
   - Identification of plan deficiencies
   - Identification of sediment controls that require maintenance
   - Identification of missing or improperly installed sediment controls
   - Compliance status regarding the sequence of construction and stabilization requirements
   - Photographs
   - Monitoring/sampling
   - Maintenance and/or corrective action performed
   - 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 and shall 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 allowed by the CID 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 CID. Unless otherwise specified and approved by the CID, 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 uphill by 2' in elevation.

15. Stream channels must not be disturbed during the following restricted time periods (inclusive):
    - Use I and IP March 1 - June 15
    - Use III and IIIP October 1 - April 30
    - Use IV March 1 - May 31

16. A copy of this plan, the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, and associated permits shall be on-site and available when the site is active.

Rev. 8 2015

STATE OF MARYLAND
KATHY LYNN HOVERMAN
No. 38311
PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

9/25/17

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE

PLOTTED: 10:16 PM on Thursday, August 03, 2017
FILE: M:\2013\17133314.88\Drawings\ES-N001-Heatherland.dgn

B-4-1 STANDARDS AND SPECIFICATIONS
FOR
INCREMENTAL STABILIZATION

Definition

Establishment of vegetative cover on cut and fill slopes.

Purpose

To provide timely vegetative cover on cut and fill slopes as work progresses.

Conditions Where Practice Applies

Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

Criteria

A. Incremental Stabilization - Cut Slopes

1. Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.
2. Construction sequence example (Refer to Figure B.1):
   a. Construct and stabilize all temporary swales or dikes that will be used to convey runoff around the excavation.
   b. Perform Phase 1 excavation, prepare seedbed, and stabilize.
   c. Perform Phase 2 excavation, prepare seedbed, and stabilize. Overseed Phase 1 areas as necessary.
   d. Perform final phase excavation, prepare seedbed, and stabilize. Overseed previously seeded areas as necessary.

Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

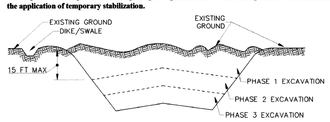

Figure B.1: Incremental Stabilization – Cut

B-4-2 STANDARDS AND SPECIFICATIONS
FOR
SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

Definition

The process of preparing the soils to sustain adequate vegetative stabilization.

Purpose

To provide a suitable soil medium for vegetative growth.

Conditions Where Practice Applies

Where vegetative stabilization is to be established.

Criteria

A. Soil Preparation

1. Temporary Stabilization
   a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
   b. Apply fertilizer and lime as prescribed on the plans.
   c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.
2. Permanent Stabilization
   a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
      i. Soil pH between 6.0 and 7.0.
      ii. Soluble salts less than 500 parts per million (ppm).
      iii. Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be acceptable.
      iv. Soil contains 1.5 percent minimum organic matter by weight.
      v. Soil contains sufficient pore space to permit adequate root penetration.
   b. Application of amendments or topsoil is required if on-site soils do not meet the above conditions.
   c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
   d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
   e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

B. Topsoiling

1. Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
2. Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS.
3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
   a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
   b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
   c. The original soil to be vegetated contains material toxic to plant growth.
   d. The soil is so acidic that treatment with limestone is not feasible.
4. Areas having slopes steeper than 2:1 require special consideration and design.
5. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:
   a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter.
   b. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified.
   c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

6. Topsoil Application
   a. Erosion and sediment control practices must be maintained when applying topsoil.
   b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
   c. Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

C. Soil Amendments (Fertilizer and Lime Specifications)

1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.
2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-3 STANDARDS AND SPECIFICATIONS
FOR
SEEDING AND MULCHING

Definition

The application of seed and mulch to establish vegetative cover.

Purpose

To protect disturbed soils from erosion during and at the end of construction.

Conditions Where Practice Applies

To the surface of all perimeter controls, slopes, and any disturbed area not under active grading.

Criteria

A. Seeding

1. Specifications
   a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
   b. 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 thaws.
   c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculant less effective.
   d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.
2. Application
   a. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
      i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site-specific seeding summaries.
      ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
   b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.
      i. Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
      ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
   c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
      i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P_2O_5 (phosphorous), 200 pounds per acre; K_2O (potassium), 200 pounds per acre.
      ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
      iii. Mix seed and fertilizer on site and seed immediately and without interruption.
      iv. When hydroseeding do not incorporate seed into the soil.

B. Mulching

1. Mulch Materials (in order of preference)
   a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. **Note: Use only sterile straw mulch in areas where one species of grass is desired.**
   b. Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
      i. WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
      ii. WCFM, including dye, must contain no germination or growth inhibiting factors.
      iii. WCFM materials are to be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
      iv. WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.
      v. WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.

2. Application
   a. Apply mulch to all seeded areas immediately after seeding.
   b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre.
   c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
3. Anchoring
   a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
      i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should follow the contour.
      ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
      iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. **Use of asphalt binders is strictly prohibited.**
      iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long.

B-4-4 STANDARDS AND SPECIFICATIONS
FOR
TEMPORARY STABILIZATION

Definition

To stabilize disturbed soils with vegetation for up to 6 months.

Purpose

To use fast growing vegetation that provides cover on disturbed soils.

Conditions Where Practice Applies

Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

Criteria

1. Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.
2. For sites having soil tests performed, use and show the recommended rates by the testing agency. Soil tests are not required for Temporary Seeding.
3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season.

Table B.1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate 1/		Seeding Depth 2/ (inches)	Recommended Seeding Dates by Plant Hardiness Zone 3/		
	lb/ac	lb/1000 ft²		5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass (*Lolium perenne ssp. multiflorum*)	40	1.0	0.5	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Barley (*Hordeum vulgare*)	96	2.2	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Oats (*Avena sativa*)	72	1.7	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Wheat (*Triticum aestivum*)	120	2.8	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Cereal Rye (*Secale cereale*)	112	2.8	1.0	Mar 15 to May 31; Aug 1 to Oct 31	Mar 1 to May 15; Aug 1 to Nov 15	Feb 15 to Apr 30; Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet (*Setaria italica*)	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet (*Pennisetum glaucum*)	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

NOTES:
1/ Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. *Adjustments are usually not needed for the cool-season grasses.*

Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.

Oats are the recommended nurse crop for warm-season grasses.

2/ For sandy soils, plant seeds at twice the depth listed above.
3/ The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

FOR
PERMANENT STABILIZATION

Definition

To stabilize disturbed soils with permanent vegetation.

Purpose

To use long-lived perennial grasses and legumes to establish permanent ground cover on disturbed soils.

Conditions Where Practice Applies

Exposed soils where ground cover is needed for 6 months or more.

Criteria

A. Seed Mixtures

1. General Use
   a. Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table B.2. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The Summary is to be placed on the plan.
   b. Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guide, Section 342 - Critical Area Planting.
   c. For sites having disturbed area over 5 acres, use and show the rates recommended by the soil testing agency.
   d. For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3 ½ pounds per 1000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.
2. Turfgrass Mixtures
   a. Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium to high level of maintenance.
   b. Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.
      i. Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive management. Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
      ii. Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid establishment is necessary and when turf will receive medium to intensive management. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds mixture per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
      iii. Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade. Recommended mixture includes; Certified Tall Fescue Cultivars 95 to 100 percent, Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per 1000 square feet. One or more cultivars may be blended.
      iv. Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass lawns. For establishment in high quality, intensively managed turf area. Mixture includes; Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1½ to 3 pounds per 1000 square feet.

      Notes:
      Select turfgrass varieties from those listed in the most current University of Maryland Publication, Agronomy Memo #77, "Turfgrass Cultivar Recommendations for Maryland"

      Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed Section, provides a reliable means of consumer protection and assures a pure genetic line

   c. Ideal Times of Seeding for Turf Grass Mixtures

      Western MD: March 15 to June 1, August 1 to October 1 (Hardiness Zones: 5b, 6a)

      Central MD: March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)

      Southern MD, Eastern Shore: March 1 to May 15, August 15 to October 15 (Hardiness Zones: 7a, 7b)

   d. Till areas to receive seed by disking or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 1½ inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will pose no difficulty.
   e. If soil moisture is deficient, supply new seedings with adequate water for plant growth (½ to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedings are made late in the planting season, in abnormally dry or hot seasons, or on adverse sites.

Permanent Seeding For Site Stabilization

Seeding Area Description	Seed Mix	Application Rate (lb./ac.)	Seeding Dates
Existing Wetland and Wetland Buffers	Ernst Seed Mix ERNMX-713 MD Upper Midland FACW Mix	15	Feb. 15 – October 31
Forested Areas	Ernst Seed Mix ERNMX-712 MD Upper Midland Riparian Mix	15	Feb. 15 – October 31
Existing Grass Slopes (See Other Permanent Seeding Table – This Sheet)			

Permanent Seeding for Site Stabilization – Existing Grass Slopes Only (See other table for other areas, this sheet)

Hardiness Zone (from Figure B.3): 7A; Seed Mixture (from Table B.3):					Fertilizer Rate (10-20-20)			Lime Rate
No.	Species	Application Rate (lb/ac)	*Seeding Dates	Seeding Depths	N	P_2O_5	K_2O	
Mix #3	Deertongue	20	Feb 15–May 31	1/4-1/2 in	45 pounds per acre (1.0 lb/ 1000 sf)	90 lb/ac (2 lb/ 1000 sf)	90 lb/ac (2 lb/ 1000 sf)	2 tons/ac (90 lb/ 1000 sf)
	Canada Wild Rye	3						
	Redtop	1						
	Common Lespedeza	10						
Mix #10	Orchard Grass	25	Feb 15–April 30 Aug 15–Oct 31	1/4-1/2 in				
	Creeping Red Fescue	10						
	Redtop	1						
	Alsike Clover	3						
	White Clover	3						
Mix #12	Creeping Red Fescue	25	Feb 15–April 30 Aug 15–Oct 31	1/4-1/2 in				
	Hard Fescue	25						
	Sheep Fescue	25						
	White Clover	3						
	Red Clover	3						

*For the period May 1–August 14, add either Pearl Millet or Foxtail Millet to the permanent mix
- 2 lbs/acre to mix #10
- 4 lbs/acre to mix #12

NOTE: ALSIKE CLOVER CAN BE TOXIC TO HORSES. OMIT ALSIKE CLOVER IF USING MIX #10 FOR PASTURES.

B-4-8 STANDARDS AND SPECIFICATIONS
FOR
STOCKPILE AREA

Definition

A mound or pile of soil protected by appropriately designed erosion and sediment control measures.

Purpose

To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.

Conditions Where Practice Applies

Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

Criteria

1. The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan.
2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.
3. Runoff from the stockpile area must drain to a suitable sediment control practice.
4. Access the stockpile area from the upgrade side.
5. Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.
6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.
7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.
8. If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

Maintenance

The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

NO.	REVISIONS DESCRIPTION	DATE

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STORMWATER MANAGEMENT DIVISION
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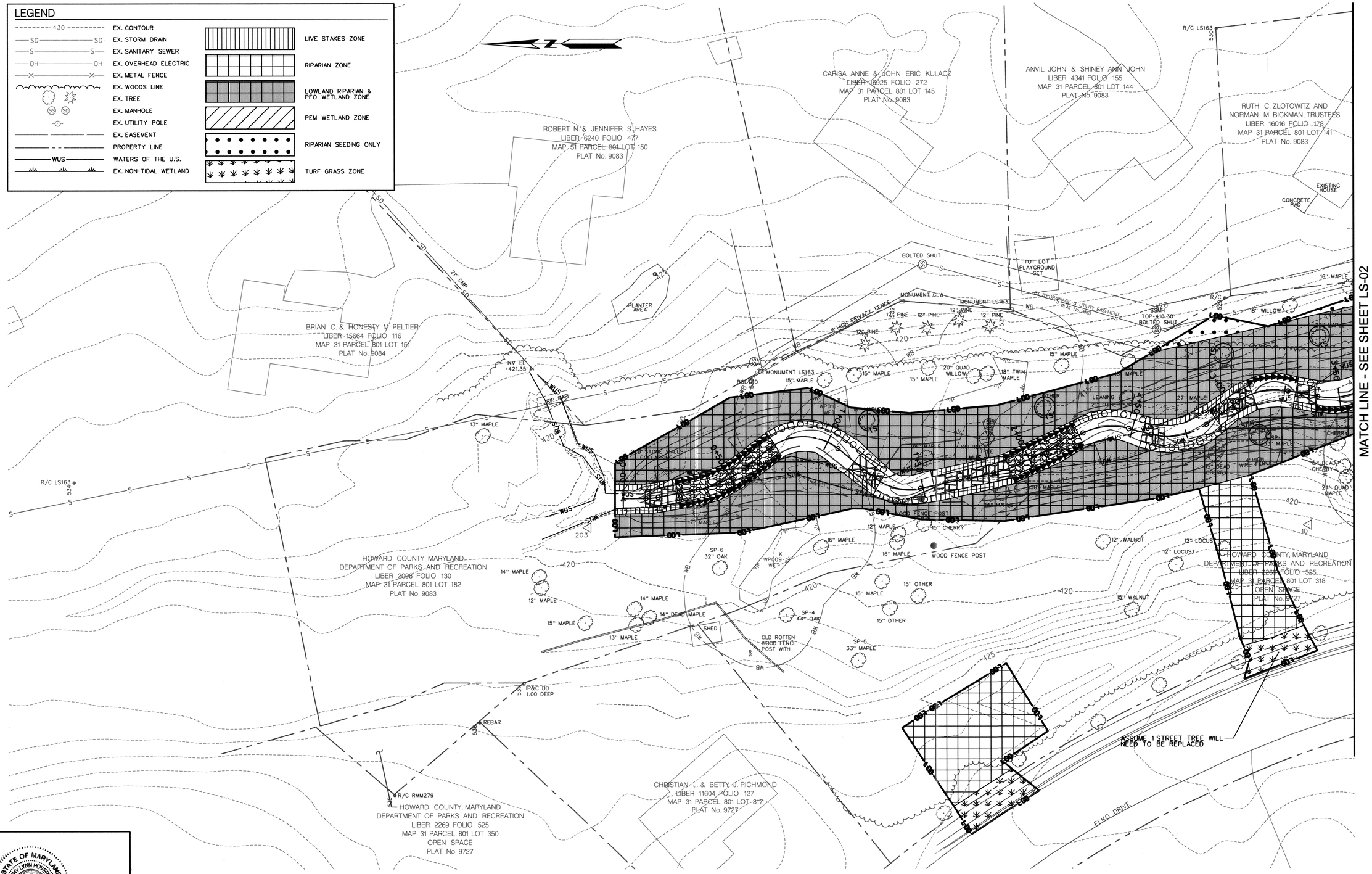
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL NOTES

SCALE:	N/A
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

ES-06



MATCH LINE - SEE SHEET LS-02

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STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

LANDSCAPE PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

LS-01

SHEET NO.: 27 OF 38

STATE OF MARYLAND
KATHY LYNN HOWSMAN
No. 38311
PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

7/20/17

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

9/25/17
DATE

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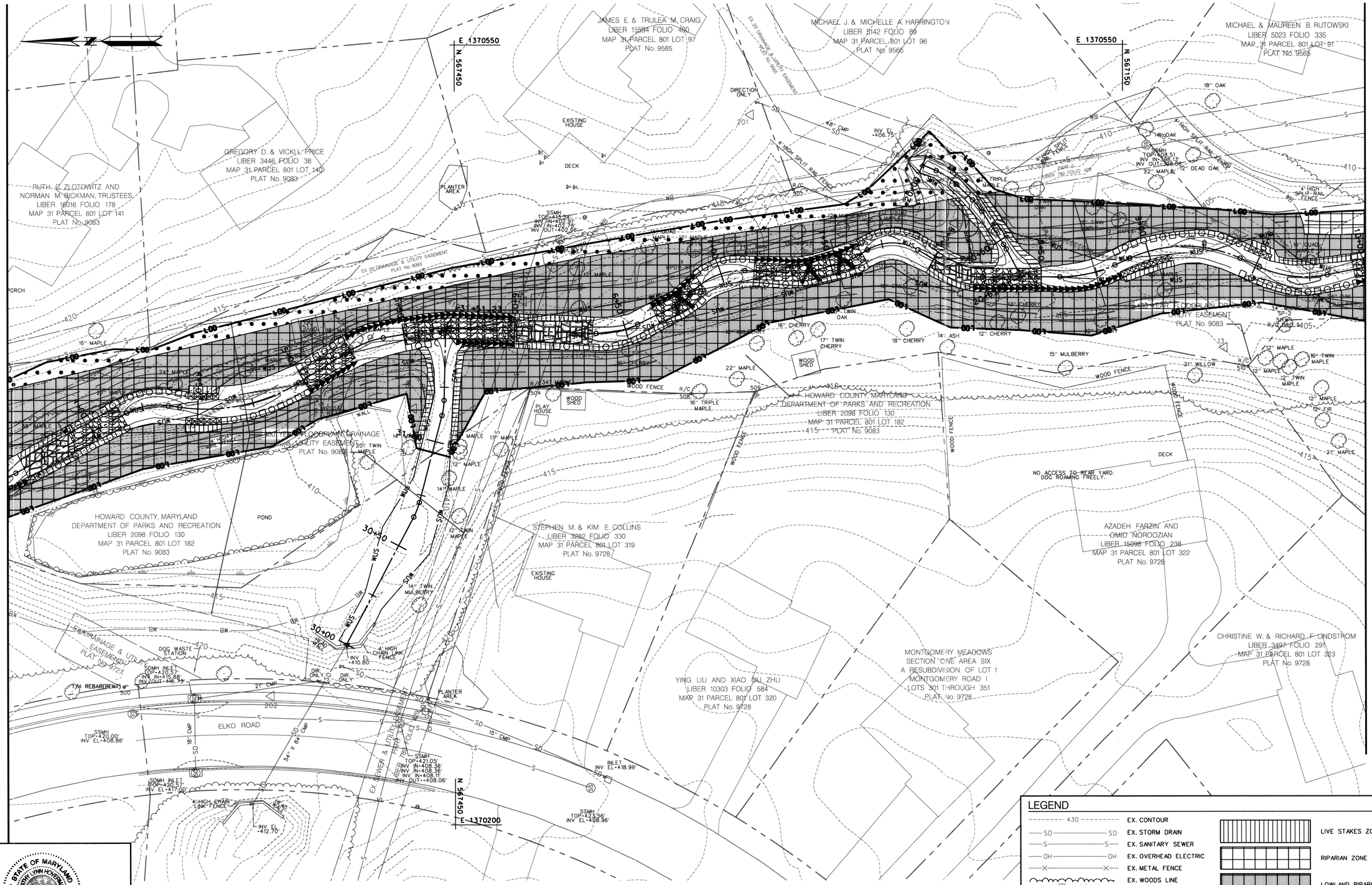

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
OH	EX. OVERHEAD ELECTRIC
X	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
WUS	WATERS OF THE U.S.
	EX. NON-TIDAL WETLAND
	LIVE STAKES ZONE
	RIPARIAN ZONE
	LOWLAND RIPARIAN & PFO WETLAND ZONE
	PEM WETLAND ZONE
	RIPARIAN SEEDING ONLY
	TURF GRASS ZONE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
MARY LYNN HOVEMAN
No. 38311
PROFESSIONAL ENGINEER

9/20/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38311, EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

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STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

LANDSCAPE PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

LS-02

SHEET NO.: 28 OF 38

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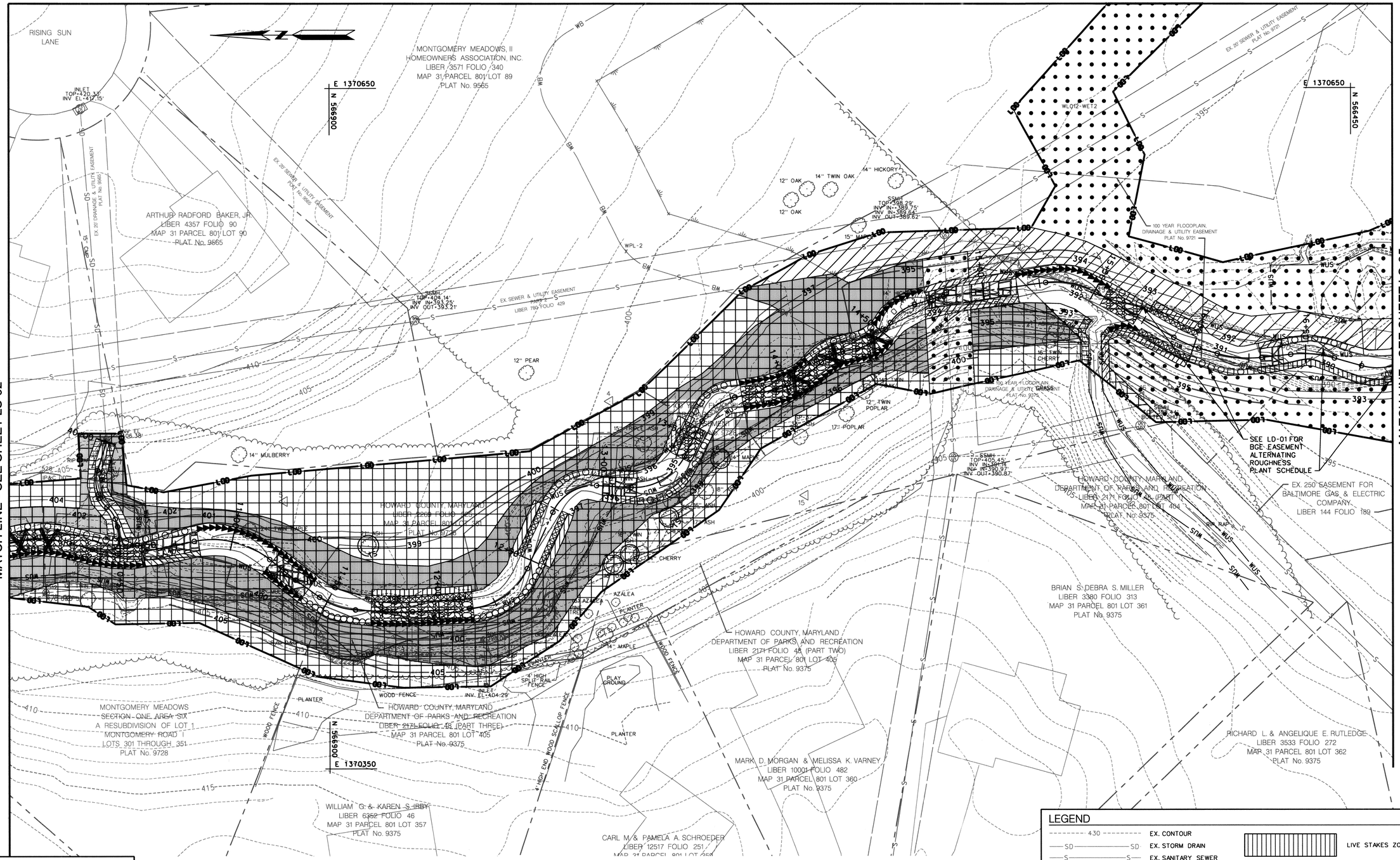
MATCH LINE - SEE SHEET LS-05

MATCH LINE - SEE SHEET LS-02



LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
OH	EX. OVERHEAD ELECTRIC
X	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
WUS	WATERS OF THE U.S.
	EX. NON-TIDAL WETLAND
	LIVE STAKES ZONE
	RIPARIAN ZONE
	LOWLAND RIPARIAN & PFO WETLAND ZONE
	PEM WETLAND ZONE
	RIPARIAN SEEDING ONLY
	TURF GRASS ZONE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
WORTHWINN HOWERWAN
No. 38311
PROFESSIONAL ENGINEER

9/20/17

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COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

LANDSCAPE PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
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CONSTRUCTION ISSUE:	

LS-03

SHEET NO.: 29 OF 38

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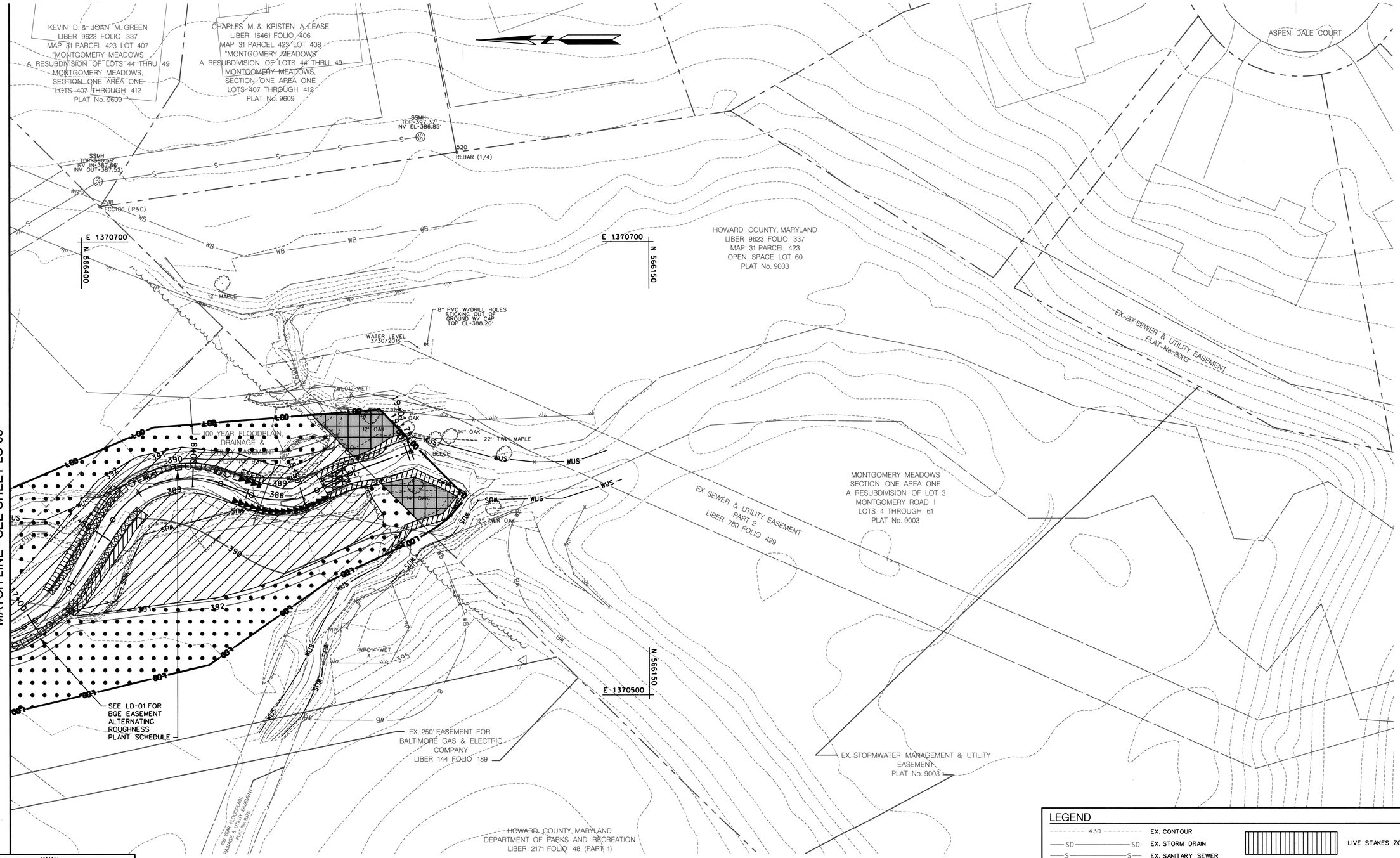

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
OH	EX. OVERHEAD ELECTRIC
X	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
WUS	WATERS OF THE U.S.
	EX. NON-TIDAL WETLAND

	LIVE STAKES ZONE
	RIPARIAN ZONE
	LOWLAND RIPARIAN & PFO WETLAND ZONE
	PEM WETLAND ZONE
	RIPARIAN SEEDING ONLY
	TURF GRASS ZONE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
KATHY LYNN HOWERTON
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PROFESSIONAL ENGINEER
9/20/17

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COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

LANDSCAPE PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

LS-04

SHEET NO.: 30 OF 38

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
OH	EX. OVERHEAD ELECTRIC
	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
WUS	WATERS OF THE U.S.
	EX. NON-TIDAL WETLAND
	LIVE STAKES ZONE
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	PEM WETLAND ZONE
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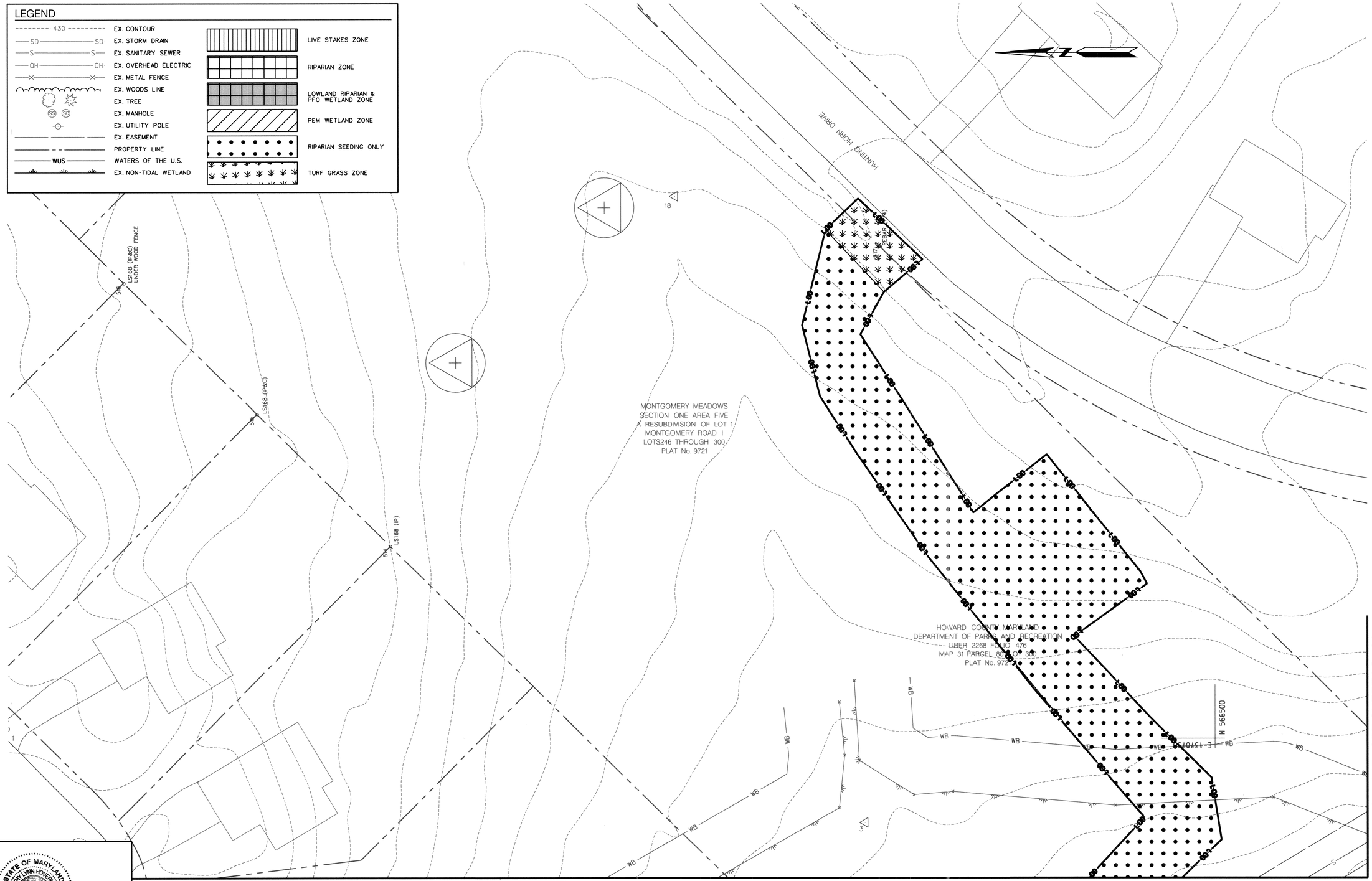
	TURF GRASS ZONE



MATCH LINE - SEE SHEET LS - 03

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

STATE OF MARYLAND
KATHY LYNN HOVERMAN
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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

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PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRID/BLOCK 0020

LANDSCAPE PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

LS-05

SHEET NO.: 31 OF 38

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MASTER PLANT SCHEDULE +

RIPARIAN ZONE (SHEETS 27 – 31)

(15,908 SQ FT/0.37 AC)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate
TREES					
22	Quercus rubra	Northern Red Oak	5' Height	Container	11' O.C.
22	Quercus palustris	Pin Oak	5' Height	Container	11' O.C.
22	Prunus serotina	Black cherry	5' Height	Container	11' O.C.
22	Quercus alba	White Oak	5' Height	Container	11' O.C.
22	Betula nigra	River Birch	5' Height	Container	11' O.C.
SHRUBS					
17	Cercis canadensis	Eastern redbud	3' Height	Container	6'-8' O.C.
17	Ilex verticillata	Winterberry	3' Height	Container	6'-8' O.C.
17	Viburnum dentatum	Arrowwood viburnum	3' Height	Container	6'-8' O.C.
17	Amelanchier canadensis	Serviceberry	3' Height	Container	6'-8' O.C.

LOWLAND RIPARIAN & PFO WETLAND ZONE (SHEETS 27 – 31)

(48,283 SQ FT/1.11 AC)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate
TREES					
64	Platanus occidentalis	American Sycamore	5' Height	Container	11' O.C.
64	Quercus palustris	Pin Oak	5' Height	Container	11' O.C.
64	Acer negundo	Boxelder	5' Height	Container	11' O.C.
64	Acer rubrum	Red maple	5' Height	Container	11' O.C.
64	Nyssa sylvatica	Black gum	5' Height	Container	11' O.C.
SHRUBS					
50	Cornus florida	Flowering dogwood	3' Height	Container	6'-8' O.C.
50	Carpinus caroliniana	Musclewood	3' Height	Container	6'-8' O.C.
50	Viburnum dentatum	Arrowwood viburnum	3' Height	Container	6'-8' O.C.
50	Lindera benzion	Spicebush	3' Height	Container	6'-8' O.C.

ALTERNATING ROUGHNESS PLANTINGS (SHEETS 27 – 28)

(943 LF)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate
TREES					
20	Celtis occidentalis	Hackberry	2" Caliper	Container	12' O.C.
20	Quercus bicolor	Swamp White Oak	2" Caliper	Container	12' O.C.
20	Platanus occidentalis	Sycamore	2" Caliper	Container	12' O.C.
20	Acer saccharinum	Silver Maple	2" Caliper	Container	12' O.C.
LIVE STAKES					
197	Cornus racemosa	Gray Dogwood	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
197	Cornus amomum	Silky Dogwood	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
197	Salix sericea	Silky Willow	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
197	Alnus incana	Speckled Alder	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
LIVE POSTS					
79	Alnus incana ssp rugosa	Speckled alder	6' Length 2" min. dia.	Dormant stems	1/cluster/6 LF
79	Salix sericea	Silky Willow	6' Length 2" min. dia.	Dormant stems	1/cluster/6 LF

Note: Alternate Roughness Planting locations shall be staked for approval by the engineer, prior to installation.
Dormant stem quantites represent the total number of individual stems.

BGE EASEMENT ALTERNATING ROUGHNESS PLANTINGS (SHEETS 29 & 30)

(179 LF)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate
SHRUBS					
4	Viburnum dentatum	Arrowwood viburnum	3' Height	Container	12' O.C.
4	Vaccinium corymbosum	Highbush Blueberry	3' Height	Container	12' O.C.
4	Lindera benzion	Spicebush	3' Height	Container	12' O.C.
4	Cephalanthus occidentalis	Button Bush	3' Height	Container	12' O.C.
LIVE STAKES					
38	Cornus racemosa	Gray Dogwood	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
38	Cornus amomum	Silky Dogwood	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
38	Salix sericea	Silky Willow	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
38	Viburnum dentatum	Arrowwood viburnum	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF
LIVE POSTS					
15	Viburnum dentatum	Arrowwood viburnum	6' Length 2" min. dia.	Dormant stems	1/cluster/6 LF
15	Salix sericea	Silky Willow	6' Length 2" min. dia.	Dormant stems	1/cluster/6 LF

Note: Alternate Roughness Planting locations shall be staked for approval by the engineer, prior to installation.
Dormant stem quantites represent the total number of individual stems.

WOODY TOE (SHEETS 27 – 31)

(72 LF)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate
LIVE BUNDLES					
14	Cornus racemosa	Gray Dogwood	3' Length 0.5"-1.0" dia.	Dormant stems	Bundles of three, every 4'
14	Cornus amomum	Silky Dogwood	3' Length 0.5"-1.0" dia.	Dormant stems	Bundles of three, every 4'
14	Salix sericea	Silky Willow	3' Length 0.5"-1.0" dia.	Dormant stems	Bundles of three, every 4'
14	Alnus incana	Speckled Alder	3' Length 0.5"-1.0" dia.	Dormant stems	Bundles of three, every 4'

Notes: Dormant stem quantites represent the total number of individual stems.
Live bundles are made of 3' lives stakes per bundle.

+NOTE: 4 INCHES OF TOPSOIL SHALL BE PLACED THROUGHOUT THE SITE EXCEPT IN WETLANDS OR FORESTED WETLAND ZONE TO INCREASE SOIL FERTILITY.

STATE OF MARYLAND
KATHY LYNN HOVERMAN
No. 38311
PROFESSIONAL ENGINEER
9/12/17

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311. EXPIRATION DATE: JANUARY 06, 2018

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES — DATE 9/25/17

PLOTTED:"09:53 PM on Thursday, August 03, 2017"
FILE: M:\2013\17133314.88\Drawings\LD-PD01-Heatherland.dgn

PEM WETLAND ZONE (SHEETS 27 – 31)

(9,203 SQ FT/0.21 AC)

Quantity	Botanical Name	Common Name	Size	Form	Spacing/Rate
PLUGS					
1,151	Carex lurida	Lurid sedge	2" Soil diameter	Plug	12" O.C.
1,151	Juncus effusus	Soft rush	2" Soil diameter	Plug	12" O.C.
1,151	Scirpus atrovirens	Green bulrush	2" Soil diameter	Plug	12" O.C.
1,151	Eutrochium purpureum	Joe Pye Weed	2" Soil diameter	Plug	12" O.C.
1,151	Verbena hastata	Blue vervain	2" Soil diameter	Plug	12" O.C.
1,151	Asclepias incarnata	Swamp milkweed	2" Soil diameter	Plug	12" O.C.
1,151	Lobelia cardinalis	Cardinal flower	2" Soil diameter	Plug	12" O.C.
1,151	Iris versicolor	Blueflag iris	2" Soil diameter	Plug	12" O.C.

LIVE STAKES ZONE (SHEETS 27 – 31)

(4,122 SQ FT/0.1 AC)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate
172	Cornus sericea	Red Osier Dogwood	3' Length 0.5"-1.5" dia.	Dormant Stems	2' O.C.
172	Cornus amomum	Silky Dogwood	3' Length 0.5"-1.5" dia.	Dormant Stems	2' O.C.
172	Viburnum dentatum	Arrowwood Viburnum	3' Length 0.5"-1.5" dia.	Dormant Stems	2' O.C.
172	Cephalanthus occidentalis	Buttonbush	3' Length 0.5"-1.5" dia.	Dormant Stems	2' O.C.
172	Alnus incana	Speckled Alder	3' Length 0.5"-1.5" dia.	Dormant Stems	2' O.C.
172	Salix sericea	Silky willow	3' Length 0.5"-1.5" dia.	Dormant Stems	2' O.C.

PERMANENT SEEDING FOR LIVE STAKES, WOODY TOE, ALTERNATING ROUGHNESS, PEM WETLAND, LOWLAND RIPARIAN & PFO WETLAND ZONES (SHEETS 27 – 31)

(66,411 SQ FT/1.52 AC)

Qty(lbs)*	Botanical Name
22.8	ERNMX-723 OR EQUIVALENT

*Seeding shall be applied at a 15 lbs/AC seeding rate.

LIME AND FERTILIZER SHOULD NOT BE USED UNLESS DETERMINED NECESSARY BASED ON THE ON-SITE TOPSOIL CONDITION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL ENSURE A LOOSE SURFACE OF TOPSOIL PRIOR TO SEEDING AND INSTALLATION OF NATURAL FIBER MATTING TO ENSURE CONTACT BETWEEN SEED AND SOIL.

PERMANENT SEEDING FOR RIPARIAN ZONE (SHEETS 27 – 31)

(50,978 SQ FT/1.17 AC)

Qty(lbs)*	Botanical Name
17.6	ERNMX-722 OR EQUIVALENT

*Seeding shall be applied at a 15 lbs/AC seeding rate.

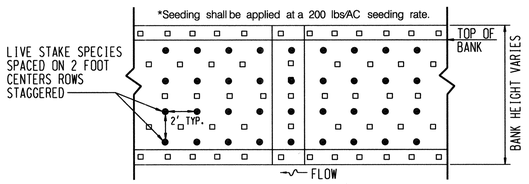
LIME AND FERTILIZER SHOULD NOT BE USED UNLESS DETERMINED NECESSARY BASED ON THE ON-SITE TOPSOIL CONDITION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL ENSURE A LOOSE SURFACE OF TOPSOIL PRIOR TO SEEDING AND INSTALLATION OF NATURAL FIBER MATTING TO ENSURE CONTACT BETWEEN SEED AND SOIL.

TURF GRASS ZONE (SHEETS 27 – 31)

(1,751 SQ FT/0.04 AC)

Qty(lbs)*	Botanical Name
8.0	SHA Seed mix No. 1 (920.06.07 a)

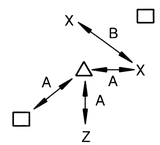
*Seeding shall be applied at a 200 lbs/AC seeding rate.



NOTE - SEE DE-01 FOR INFORMATION REGARDING INSTALLATION OF NATURAL FIBER MATTING.

LIVE STAKE PLANTING PLAN VIEW

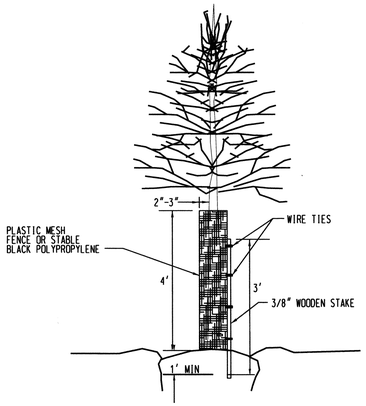
NOT TO SCALE



△, □ TREE SPECIES A: MINIMUM SPACING PER SCHEDULE
X, Z SHRUB SPECIES B: DUPLICATE SPECIES SPACING MINIMUM 2 TIMES MINIMUM SPACING

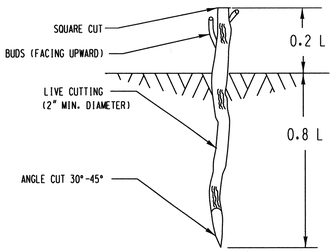
TREE AND SHRUB RANDOM SPACING

NOT TO SCALE



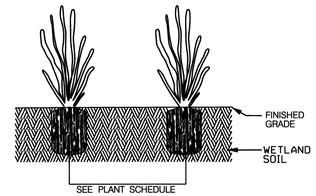
TREE SHELTER DETAIL

NOT TO SCALE



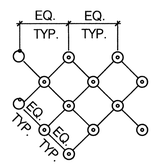
LIVE POST PLANTING DETAIL

NOT TO SCALE



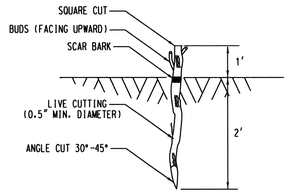
PLUG PLANTING DETAIL

WITHIN WETLAND ZONE
NOT TO SCALE



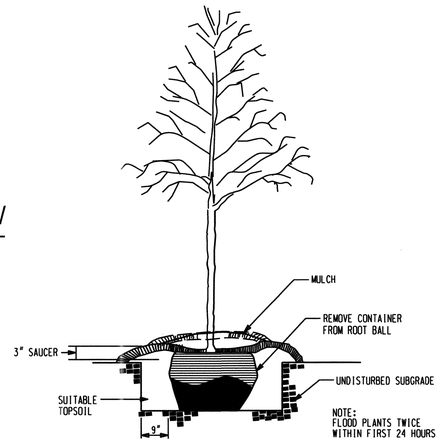
PLUG TYPICAL SPACING PLAN

NOT TO SCALE



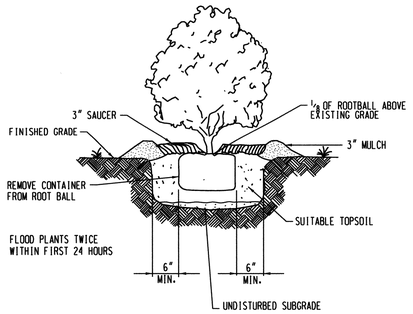
LIVE STAKE DETAIL

NOT TO SCALE



TREE PLANTING DETAIL

NOT TO SCALE



SHRUB PLANTING DETAIL

NOT TO SCALE

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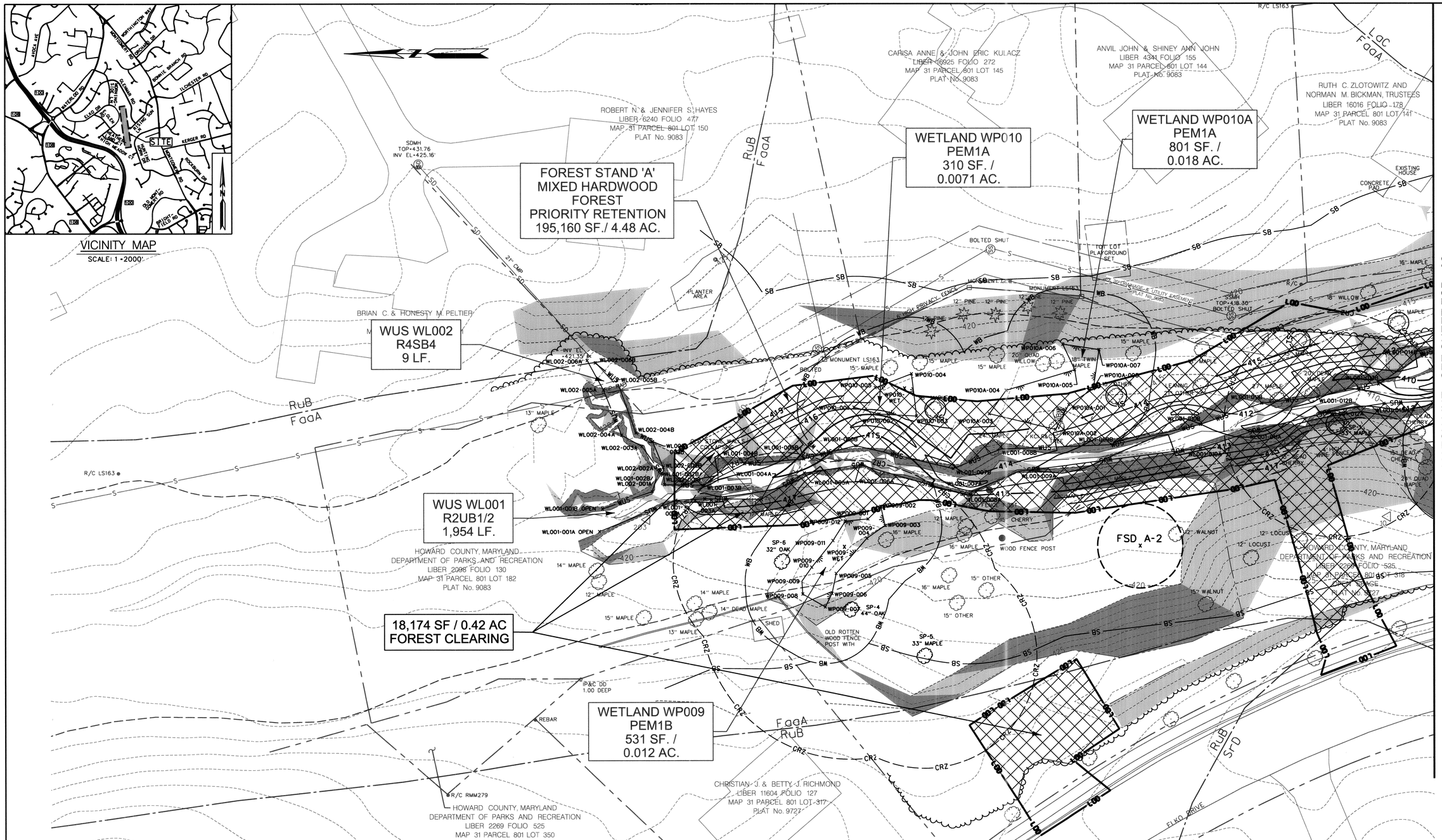
HEATHERLAND
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 801, 423 TAX MAP 31
ZONING R20 ELECTION DISTRICT 01 GRIDBLOCK 0020

LANDSCAPE DETAILS

SCALE:	NOT TO SCALE
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

LD-01

SHEET NO.: 32 OF 38



LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
X	EX. OVERHEAD ELECTRIC
OH	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
GuB / GhB	SOILS LINE
WUS	WATERS OF THE U.S.
	WATERWAY (EPHEMERAL)
	EX. NON-TIDAL WETLAND
WB	25' WETLAND BUFFER
SB	EX. 75' STREAM BUFFER
	EX. H & H 100-YEAR FLOODPLAIN
LOD	LIMIT OF DISTURBANCE
425	PROP. CONTOUR
	SLOPES 15-25%
	SLOPES 25% OR GREATER
	EX. FOREST TO BE REMOVED
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE
	PROP. WOODS LINE
	STONE TOE PROTECTION
	WOODY TOE
	ALTERNATING ROUGHNESS
	COIR LOGS
	EMBEDDED LOG
	RIFFLE GRADE CONTROL
	STEEP RIFFLE
SF	SILT FENCE
SSF	SUPER SILT FENCE
UPL-1	WETLAND/UPLAND SAMPLE PLOT
A-2	FOREST STAND SAMPLE PLOT
SP-1	SPECIMEN TREE / CRITICAL ROOT ZONE
15	EX. TREE TO BE SAVED
	EX. TREE TO BE REMOVED

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20ft.

THIS PLAN WAS PREPARED BY:
JENNIFER BIRD
KCI TECHNOLOGIES
MDNR QUALIFIED PROFESSIONAL
STATUS
(SEPTEMBER 2011)

SIGNATURE

AUGUST 2017
DATE

NO.	REVISIONS DESCRIPTION	DATE

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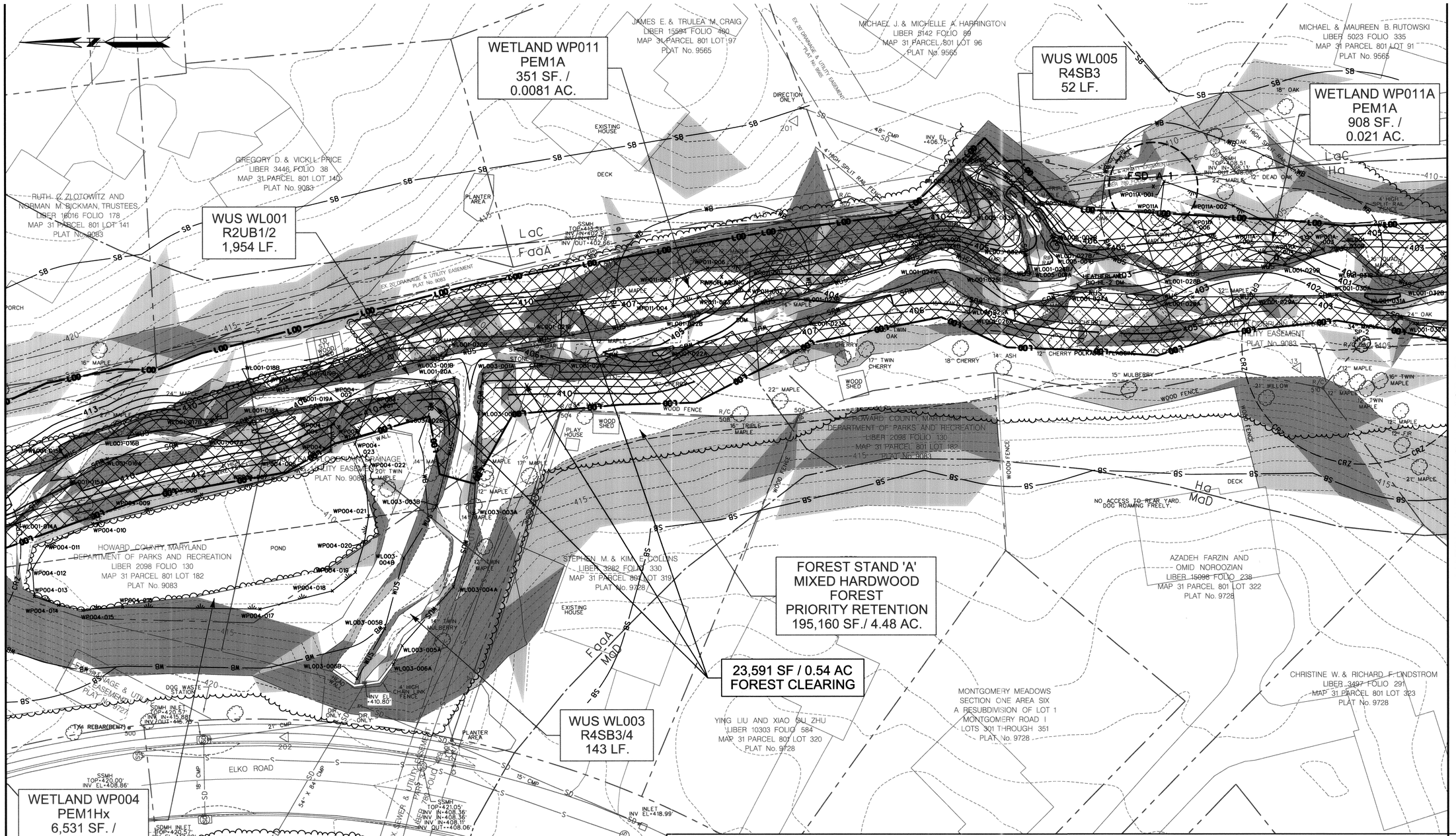
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 399, 489, 562, 211, 386, 495, 530 TAX MAP 17
ZONING R20 ELECTION DISTRICT 02 GRID/BLOCK 0022

FOREST CONSERVATION PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

FCP-01

SHEET NO.: 33 OF 38



LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
	EX. OVERHEAD ELECTRIC
OH	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
GuB GhB	SOILS LINE
WUS	WATERS OF THE U.S.
	WATERWAY (EPHEMERAL)
	EX. NON-TIDAL WETLAND
WB	25' WETLAND BUFFER
SB	EX. 75' STREAM BUFFER
	EX. H & H 100-YEAR FLOODPLAIN
LOD	LIMIT OF DISTURBANCE
425	PROP. CONTOUR
	SLOPES 15-25%
	SLOPES 25% OR GREATER
	EX. FOREST TO BE REMOVED
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE
	PROP. WOODS LINE
	STONE TOE PROTECTION
	WOODY TOE
	ALTERNATING ROUGHNESS
	COIR LOGS
	EMBEDDED LOG
	RIFFLE GRADE CONTROL
	STEEP RIFFLE
SF	SILT FENCE
SSF	SUPER SILT FENCE
UPL-1	WETLAND/UPLAND SAMPLE PLOT
A-2	FOREST STAND SAMPLE PLOT
CRZ SP-1	SPECIMEN TREE / CRITICAL ROOT ZONE
15	EX. TREE TO BE SAVED
X	EX. TREE TO BE REMOVED

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20ft.

THIS PLAN WAS PREPARED BY:
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MDNR QUALIFIED PROFESSIONAL
STATUS
(SEPTEMBER 2011)

SIGNATURE

AUGUST 2017
DATE

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6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 399, 489, 562, 211, 386, 435, 530 TAX MAP 17
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

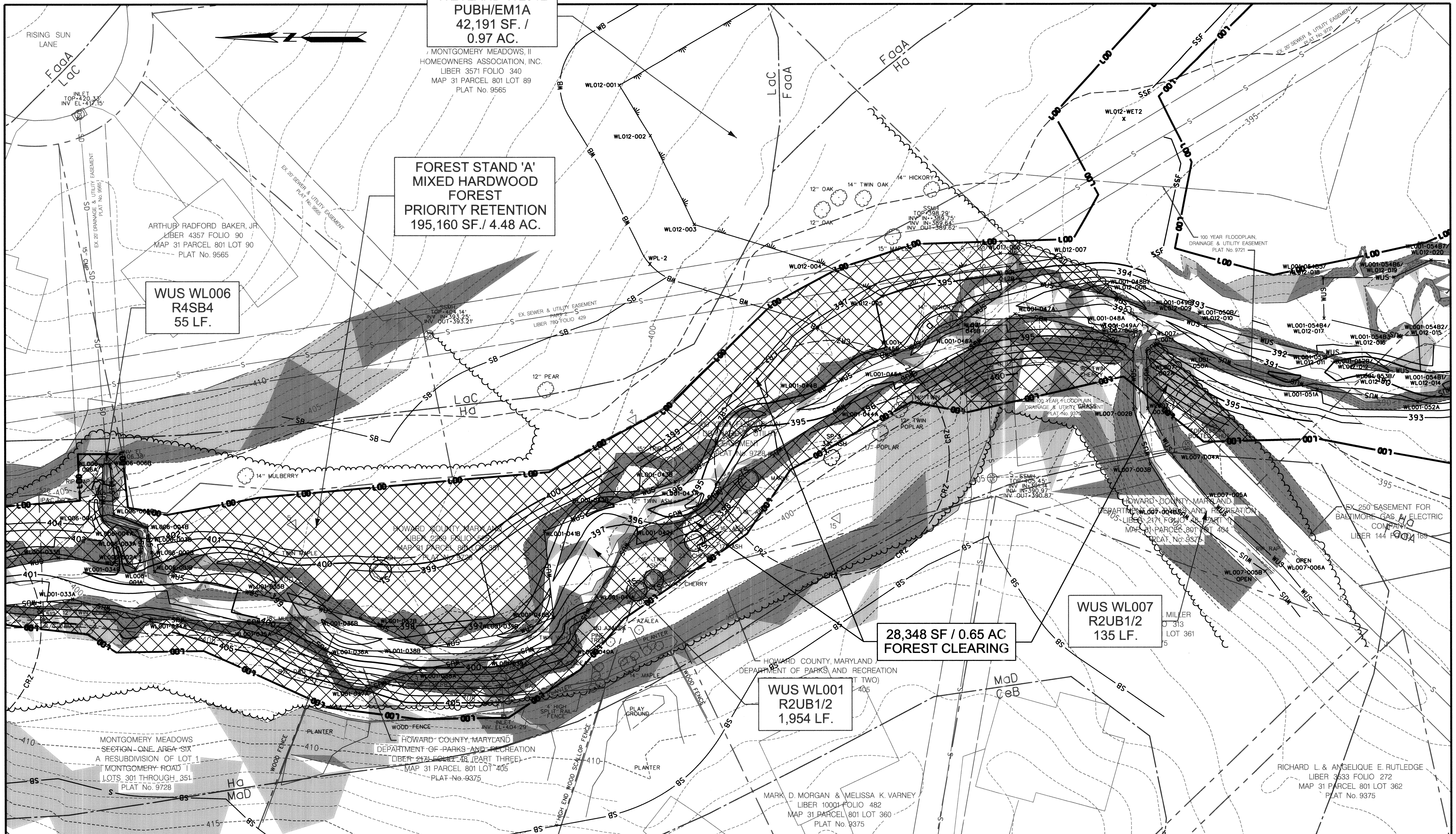
FOREST CONSERVATION PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

FCP-02

SHEET NO.: 34 OF 38

BY: amanda.wagoner
FILE: M:\2013\17133314.88\Drawings\FCP-02_Heatherland.dgn



LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
X	EX. OVERHEAD ELECTRIC
OH	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
GuB / GhB	SOILS LINE
WUS	WATERS OF THE U.S.
	WATERWAY (EPHEMERAL)
	EX. NON-TIDAL WETLAND
WB	25' WETLAND BUFFER
SB	EX. 75' STREAM BUFFER
	EX. H & H 100-YEAR FLOODPLAIN
LOD	LIMIT OF DISTURBANCE
425	PROP. CONTOUR
	SLOPES 15-25%
	SLOPES 25% OR GREATER
	EX. FOREST TO BE REMOVED
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE
	PROP. WOODS LINE
	STONE TOE PROTECTION
	WOODY TOE
	ALTERNATING ROUGHNESS
	COIR LOGS
	EMBEDDED LOG
	RIFFLE GRADE CONTROL
	STEEP RIFFLE
SF	SILT FENCE
SSF	SUPER SILT FENCE
UPL-1	WETLAND/UPLAND SAMPLE PLOT
A-2	FOREST STAND SAMPLE PLOT
SP-1 / CRZ	SPECIMEN TREE / CRITICAL ROOT ZONE
TS	EX. TREE TO BE SAVED
	EX. TREE TO BE REMOVED

THIS PLAN WAS PREPARED BY:
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(SEPTEMBER 2011)

SIGNATURE

AUGUST 2017
DATE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20ft.

BY: amanda.wagoner
FILE: M:\2013\17133314.88\Drawings\FCP-03_Heatherland.dgn

NO.	REVISIONS DESCRIPTION	DATE

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HEATHERLAND STREAM RESTORATION PROJECT

CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 399, 489, 562, 211, 386, 495, 530 TAX MAP 17
ZONING R20 ELECTION DISTRICT 02 GRID/BLOCK 0022

FOREST CONSERVATION PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

FCP-03

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
	EX. OVERHEAD ELECTRIC
OH	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
	PROPERTY LINE
GuB / GhB	SOILS LINE
WUS	WATERS OF THE U.S.
	WATERWAY (EPHEMERAL)
	EX. NON-TIDAL WETLAND
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	SLOPES 15-25%
	SLOPES 25% OR GREATER
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OCF	ORANGE CONSTRUCTION/ SAFETY FENCE
	PROP. WOODS LINE
	STONE TOE PROTECTION
	WOODY TOE
	ALTERNATING ROUGHNESS
	COIR LOGS
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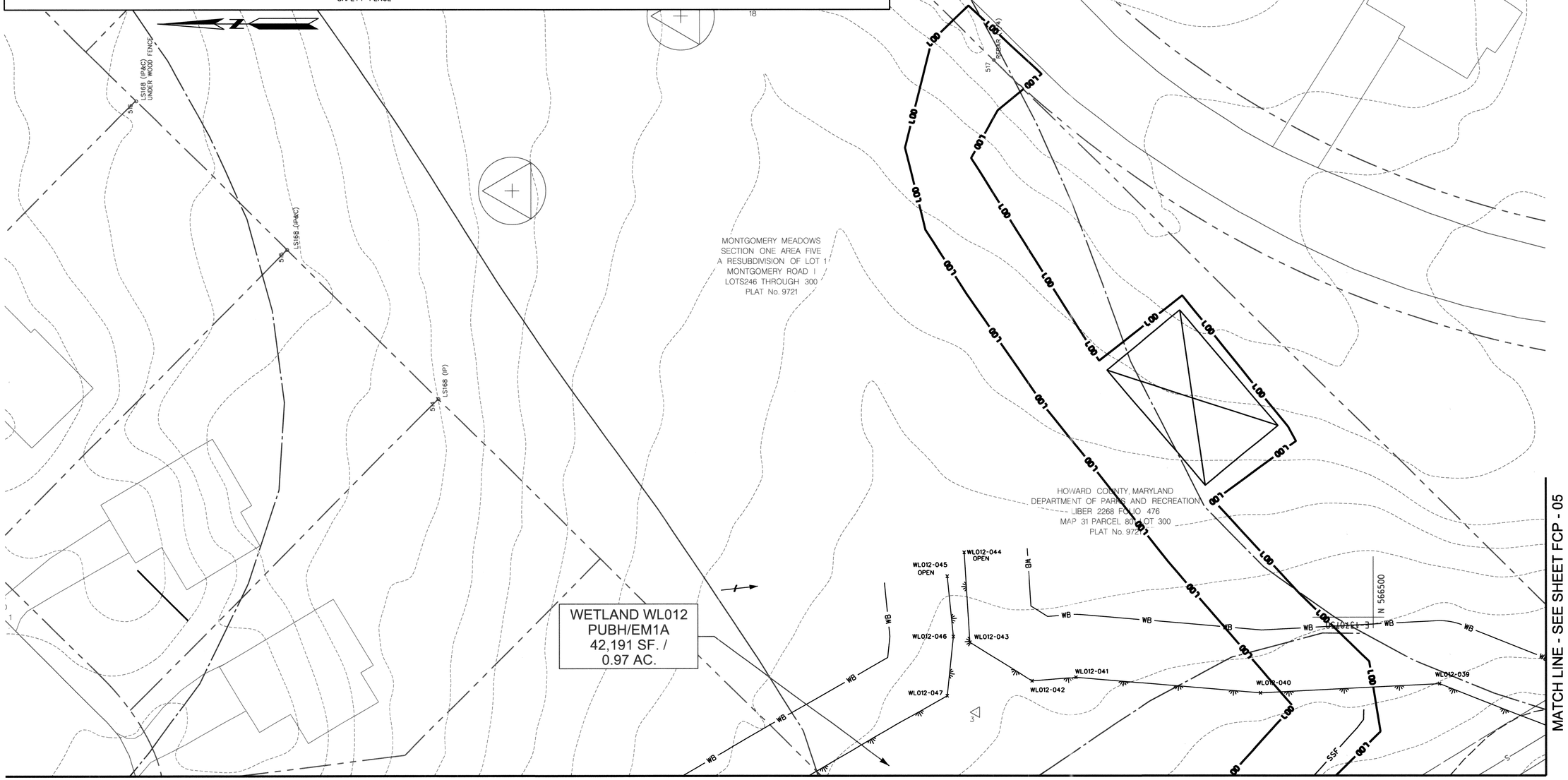
A-2	FOREST STAND SAMPLE PLOT
CRZ SP-1 CRZ	SPECIMEN TREE / CRITICAL ROOT ZONE
TS	EX. TREE TO BE SAVED
	EX. TREE TO BE REMOVED



MATCH LINE - SEE SHEET FCP - 03

*NO FOREST CLEARING ON THIS SHEET

THIS PLAN WAS PREPARED BY:
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KCI TECHNOLOGIES
MDNR QUALIFIED PROFESSIONAL
STATUS
(SEPTEMBER 2011)

SIGNATURE

AUGUST 2017
DATE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20ft.

NO.	REVISIONS DESCRIPTION	DATE

KCIFILE: M:\ 2013 \ 17133314.88\

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HEATHERLAND
STREAM RESTORATION PROJECT
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6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 399, 489, 562, 211, 386, 495, 530 TAX MAP 17
ZONING R20 ELECTION DISTRICT 02 GRID/BLOCK 0022

FOREST CONSERVATION PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

FCP-04

BY: amando.wagner
FILE: M:\2013\17133314.88\Drawings\FCP-04_Heatherland.dgn

MATCH LINE - SEE SHEET FCP - 04

MATCH LINE - SEE SHEET FCP - 03

KEVIN D. & JOAN M. GREEN
LIBER 9623 FOLIO 337
MAP 31 PARCEL 423 LOT 407
"MONTGOMERY MEADOWS
A RESUBDIVISION OF LOTS 44 THRU 49
MONTGOMERY MEADOWS,
SECTION ONE AREA ONE
LOTS 407 THROUGH 412
PLAT No. 9609

CHARLES M. & KRISTEN A. LEASE
LIBER 16461 FOLIO 406
MAP 31 PARCEL 423 LOT 408
"MONTGOMERY MEADOWS
A RESUBDIVISION OF LOTS 44 THRU 49
MONTGOMERY MEADOWS,
SECTION ONE AREA ONE
LOTS 407 THROUGH 412
PLAT No. 9609

ASPEN DALE COURT

HOWARD COUNTY, MARYLAND
LIBER 9623 FOLIO 337
MAP 31 PARCEL 423
OPEN SPACE LOT 60
PLAT No. 9003

FOREST STAND 'A'
MIXED HARDWOOD
FOREST
PRIORITY RETENTION
195,160 SF./ 4.48 AC.

WETLAND WL012
PUBH/EM1A
42,191 SF. /
0.97 AC.

1,268 SF / 0.03 AC
FOREST CLEARING

WETLAND WP013
PUBHx
42 SF. /
0.0010 AC.

WUS WL008
R2UB2/3
139 LF.

WUS WL001
R2UB1/2
1,954 LF.

WETLAND WP014
PEM1B
843 SF. /
0.019 AC.

100 YEAR FLOODPLAIN
DRAINAGE &
UTILITY EASEMENT
PLAT No. 9375

EX. 50' SEWER & UTILITY EASEMENT
PLAT No. 9003

EX. SEWER & UTILITY EASEMENT
PART 2
LIBER 780 FOLIO 429

MONTGOMERY MEADOWS
SECTION ONE AREA ONE
A RESUBDIVISION OF LOT 3
MONTGOMERY ROAD I
LOTS 4 THROUGH 61
PLAT No. 9003

EX. 250' EASEMENT FOR
BALTIMORE GAS & ELECTRIC
COMPANY
LIBER 144 FOLIO 189

EX. STORMWATER MANAGEMENT & UTILITY
EASEMENT
PLAT No. 9003

HOWARD COUNTY, MARYLAND
DEPARTMENT OF PARKS AND RECREATION
LIBER 2171 FOLIO 48 (PART 1)
MAP 31 PARCEL 801 LOT 404
PLAT No. 9375

LEGEND

430	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
	EX. OVERHEAD ELECTRIC
OH	EX. METAL FENCE
	EX. WOODS LINE
	EX. TREE
SS SD	EX. MANHOLE
	EX. UTILITY POLE
	EX. EASEMENT
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GuB / GhB	SOILS LINE
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	WATERWAY (EPHEMERAL)
	EX. NON-TIDAL WETLAND
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LOD	LIMIT OF DISTURBANCE
425	PROP. CONTOUR
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	EX. FOREST TO BE REMOVED
OCF	ORANGE CONSTRUCTION/ SAFETY FENCE
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	STONE TOE PROTECTION
	WOODY TOE
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	COIR LOGS
	EMBEDDED LOG
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A-2	FOREST STAND SAMPLE PLOT
SP-1 CRZ	SPECIMEN TREE / CRITICAL ROOT ZONE
15	EX. TREE TO BE SAVED
	EX. TREE TO BE REMOVED

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20ft.

THIS PLAN WAS PREPARED BY:
JENNIFER BIRD
KCI TECHNOLOGIES
MDNR QUALIFIED PROFESSIONAL
STATUS
(SEPTEMBER 2011)

SIGNATURE

AUGUST 2017
DATE

NO.	REVISIONS DESCRIPTION	DATE

KCIFILE: M:\ 2013 \ 17133314.88\

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HEATHERLAND
STREAM RESTORATION PROJECT
CAPITAL PROJECT D-1158
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046
PARCELS 399, 489, 562, 211, 386, 495, 530 TAX MAP 17
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

FOREST CONSERVATION PLAN

SCALE:	1" = 20'
DATE:	AUGUST 2017
KCI JOB NO.:	17133314.88
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

FCP-05

BY: amondo.wagoner
FILE: M:\2013\17133314.88\Drawings\FCP-05_Heatherland.dgn

WATER RESOURCES NOTES

1. WATERS OF THE UNITED STATES (WUS) AND WETLANDS WERE DELINEATED BY KCI TECNOLOGIES, INC. IN FEBRUARY 2016.
2. SEVEN NONTIDAL WETLAND AND SEVEN WUS WERE IDENTIFIED WITHIN THE STUDY AREA. FOUR WUS SYSTEMS AND TWO NONTIDAL WETLAND SYSTEMS EXTEND BEYOND THE STUDY AREA BOUNDARIES.
3. WETLANDS SHOWN REPRESENT THE UNVERIFIED USACE BOUNDARIES.

FOREST RESOURCES NOTES

1. THE STUDY AREA BOUNDARY VARIES ALONG THE STREAM CORRIDOR FROM 100-FOOT WIDE TO 200-FOOT WIDE.
2. FOREST STANDS EXTEND BEYOND THE STUDY AREA BOUNDARY.
3. ONE FOREST STANDS WAS IDENTIFIED DURING FIELD INVESTIGATIONS AND IS CLASSIFIED AS PRIORITY RETENTION.
4. SIX SPECIMEN TREES WERE LOCATED DURING FIELD INVESTIGATIONS (SEE TABLE 1, THIS SHEET).

FOREST CONSERVATION NOTES

1. THE LOD (LIMIT OF DISTURBANCE) WAS USED AS THE TOTAL TRACT FOR FOREST CONSERVATION CALCULATIONS AS APPROVED UNDER ALTERNATIVE COMPLIANCE WP-17-095.
2. 1.44 ACRES OF CLEARING WILL BE WITHIN THE 100-YEAR FLOODPLAIN. THESE AREAS WILL BE REPLANTED AS SEEN ON THE LANDSCAPE PLANS, SHEETS 27 THROUGH 31 AND THE LANDSCAPE DETAILS ON SHEET 32.
3. ALL EFFORTS TO MINIMIZE THE AREA OF DISTURBANCE WILL BE MADE.
4. THE 0.27 ACRES OF FOREST MITIGATION WILL BE SATISFIED THROUGH FEE-IN-LIEU. FEE-IN-LIEU WILL BE PAID AT $0.75/SF. (11,762 SF. X $0.75 = $8,821.50).
5. CURRENT ACREAGE OF FOREST WITHIN THE LOD IS 1.64 ACRES. THE ENTIRE LOD WILL BE REPLANTED.

GENERAL NOTES

1. TOPOGRAPHICAL SURVEY DATA PROVIDED BY AB CONSULTANTS, INC. WAS COMPLETED IN MAY 2016.
2. THE EXISTING LAND USE IS FORESTED WITH A HOWARD COUNTY DRAINAGE RESERVATION EASEMENT. SURROUNDING LAND USE IS DESIGNATED AS MEDIUM DENSITY RESIDENTIAL.
3. EXISTING ZONING IS RESIDENTIAL SINGLE (R-20).
4. CRITICAL HABITATS CONSIST OF NONTIDAL WETLANDS, THEIR BUFFERS, STEEP SLOPES, AND THE PERENNIAL UNNAMED TRIBUTARIES TO DEEP RUN.
5. NO RARE, THREATENED OR ENDANGERED SPECIES WERE ENCOUNTERED DURING THE FIELD INVESTIGATIONS. CORRESPONDENCE WITH THE THE MARYLAND HISTORICAL TRUST INDICATE NO HISTORIC RESOURCES WITHIN THE STUDY AREA. IN ADDITION, CORRESPONDENCE WITH THE U.S. FISH & WILDLIFE SERVICE AND THE MARYLAND DEPARTMENT OF NATURAL RESOURCES INDICATE NO RARE, THREATENED OR ENDANGERED SPECIES WITHIN THE STUDY AREA.
6. THE PROJECT AREA IS LOCATED ON PROPERTIES OWNED BY HOWARD COUNTY PARKS AND RECREATION AND SEVERAL PRIVATE PROPERTIES (MAP 31 PARCEL 423 AND 801).
7. TOTAL AREA OF NONTIDAL WETLANDS WITHIN THE PROJECT AREA: 52,508 SF / 1.2 AC
8. TOTAL LINEAR FEET OF PERENNIAL AND INTERMITTENT STREAMS: 2,487 LF
9. TOTAL FORESTED AREA WITHIN LIMITS OF DISTURBANCE BUT OUTSIDE THE 100 YEAR FLOODPLAIN IS: 0.24 AC
10. NO SPECIMEN TREES WILL BE REMOVED.
11. TREE SAVES ARE SHOWN WITHIN THE LOD BECAUSE AN ATTEMPT WILL BE MADE TO SAVE THESE TREES. TREES WILL ONLY BE REMOVED IF NECESSARY FOR GRADING OR ACCESS.

SPECIMEN TREES

Number	Species	Common Name	Size, DBH (in)	Condition
SP-1	*Acer rubrum*	Red maple	33.0	Fair
SP-2	*Acer rubrum*	Red maple	34.0	Fair
SP-3	*Fraxinus pennsylvanica*	Green ash	33.0	Fair
SP-4	*Quercus alba*	White oak	44.0	Fair
SP-5	*Acer rubrum*	Red maple	33.0	Good
SP-6	*Quercus alba*	White oak	32.0	Fair

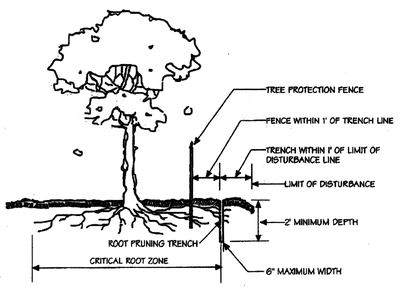
SOILS TABLE

Soil Symbol	Soil Unit Name	Percent Slope	K_f value	Hydric (Y/N)
FaaA	Fallsington sandy loams	0-2	N/A	Yes
Ha	Hatboro-Codorus silt loams	0-3	0.37	Yes
LaC	Legore silt loam	8-15	N/A	No
MaD	Manor loam	15-25	0.28	No
RuB	Russett and Beltsville soils	2-5	0.28	No
SrD	Sassafras and Croom soils	10-15	0.32	No
UsB	Urban land-Sassafras-Beltsville complex	0-5	N/A	No

Forest Conservation Worksheet 2.2

Net Tract Area			
A.	Total Tract Area	A =	3.24
B.	Deductions	B =	2.62
C.	Net Tract Area	C =	0.62
Land Use Category			
	Input the number "1" under the appropriate land use zoning, and limit to only one entry		
	ARA 0 / MDR 0 / IDA 0 / HDR 1 / MPD 0 / CIA 0		
D.	Afforestation Threshold (Net Tract Area x 15%)	D =	0.09
E.	Conservation Threshold (Net Tract Area x 20%)	E =	0.12
Existing Forest Cover			
F.	Existing Forest Cover within the Net Tract Area	F =	0.20
G.	Area of Forest Above Conservation Threshold	G =	0.08
Break Even Point			
H.	Break Even Point	H =	0.14
I.	Forest Clearing Permitted Without Mitigation	I =	0.06
Proposed Forest Clearing			
J.	Total Area of Forest to be Cleared	J =	0.20
K.	Total Area of Forest to be Retained	K =	0.00
Planting Requirements			
L.	Reforestation for Clearing Above the Conservation Threshold	L =	0.02
M.	Reforestation for Clearing Below the Conservation Threshold	M =	0.25
N.	Credit for Retention above the Conservation Threshold	N =	0.00
P.	Total Reforestation Required	P =	0.27
Q.	Total Afforestation Required	Q =	0.00
R.	Total Planting Requirement	R =	0.27

NOTE:
TOTAL FOREST CLEARING WITHIN THE LOD = 1.64 AC.
CLEARING OUTSIDE THE FLOODPLAIN BUT WITHIN THE LOD = 0.20 AC.



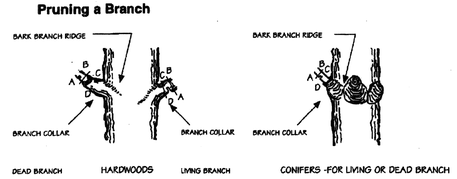
Notes:
1. Retention Areas to be established as part of the forest conservation plan review process.
2. Boundaries of Retention Areas to be staked, flagged and/or fenced prior to trenching.
3. Exact location of trench should be identified.
4. Trench should be immediately backfilled with soil removed or organic soil.
5. Roots should be cleanly cut using vibratory knife or other acceptable equipment.

Source: Adapted from Steve Clark & Associates/ACRT, Inc. and Forest Conservation Manual, 1991

Root Pruning — **Figure D-1**

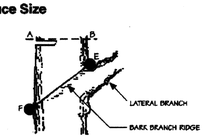
ROOT PRUNING
NOT TO SCALE

Pruning a Branch



Notes:
1. Remove branch weight by undercutting at A and remove limb by cutting through at AB.
2. Remove stub at CD (line between branch bark ridge and outer edge of branch collar).
3. If D is difficult to find on hardwoods, angle of CD to trunk should be the reflective angle of the bark branch ridge to the trunk.
4. Only prune at specified times.
5. Remove no more than 30% of crown at one time.

Pruning a Leader to Reduce Size

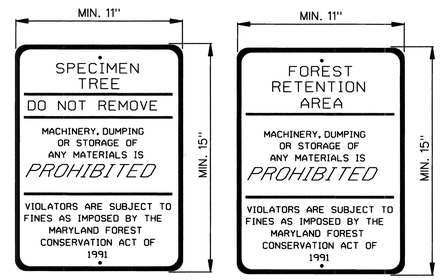


Notes:
1. Remove top weight by undercutting at A and remove limb by cutting through AB.
2. Remove stub at EF parallel to the bark branch ridge.
3. Only prune at specified times.
4. No more than 30% of crown to be removed at one time.
5. Diameter of lateral branch should be no less than 30% of the diameter of the leader.

Source: Fairfax County, Virginia:Vegetation Preservation & Planting, January 1986

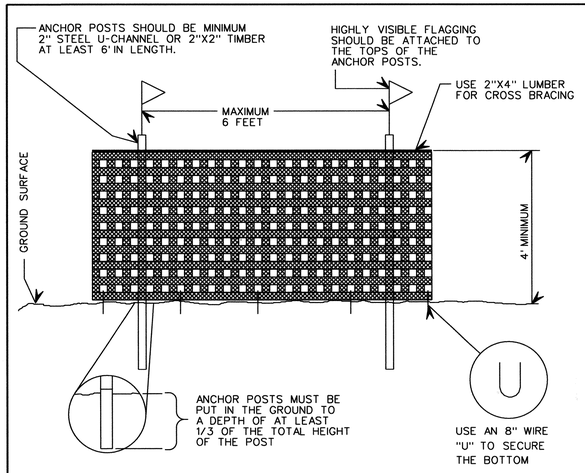
Tree Pruning — **Figure D-2**

TREE PRUNING
NOT TO SCALE



NOTES:
1. BOTTOM OF SIGN TO BE HIGHER THAN TREE PROTECTION FENCE.
2. SIGNS TO BE PLACED 50 TO 100' APART. CONDITIONS ON SITE AFFECTING VISIBILITY MAY WARRANT PLACING SIGNS CLOSER OR FARTHER APART WITHIN THE ACCEPTABLE NOTED RANGE.
3. ATTACHMENT OF SIGNS TO TREES IS PROHIBITED.
4. SIGNS MAY BE REMOVED FROM RESIDENTIAL LOTS UPON ISSUANCE OF USE AND OCCUPANCY RETENTION FOREST ONLY.
5. ALL SIGNAGE MUST REMAIN DURING THE MAINTENANCE PERIOD.
6. THE SIGNS NOTIFY CONSTRUCTION WORKERS AND FUTURE RESIDENTS OF THE NEWLY PLANTED MATERIAL, IMPROVING THE TREES' SURVIVAL RATES.
7. SIGNS MAY BE ADAPTED BY RESIDENTS FOR IDENTIFICATION OF FOREST RETENTION AREAS.

FOREST CONSERVATION SIGNAGE
NOT TO SCALE



BLAZE ORANGE PLASTIC
MESH SAFETY FENCE/TREE PROTECTION DETAIL
NOT TO SCALE

PLACEMENT OF ORANGE HIGH VISIBILITY FENCE:
1. ORANGE HIGH VISIBILITY FENCE SHALL BE MANUALLY INSTALLED ALONG THE LIMITS OF DISTURBANCE, WHERE THAT LIMIT IS WITHIN 50' OF THE FOREST CONSERVATION/ FOREST BUFFER EASEMENTS AND SHALL FUNCTION AS A FOREST PROTECTION DEVICE.
2. RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS.
3. BOUNDARIES OF THE RETENTION AREA SHALL BE STAKES AND FLAGGED PRIOR TO INSTALLING THE DEVICE.
4. ROOT DAMAGE SHALL BE AVOIDED.
5. PROTECTIVE SIGNAGE MAY ALSO BE USED.
6. DEVICE SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

STANDARD SYMBOL
OSF

THIS PLAN WAS PREPARED BY:
JENNIFER BIRD
KCI TECHNOLOGIES
MDNR QUALIFIED PROFESSIONAL STATUS
(SEPTEMBER 2011)

SIGNATURE

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ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

FOREST CONSERVATION PLAN NOTES

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FCP-06

BY: amando.wagner
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