

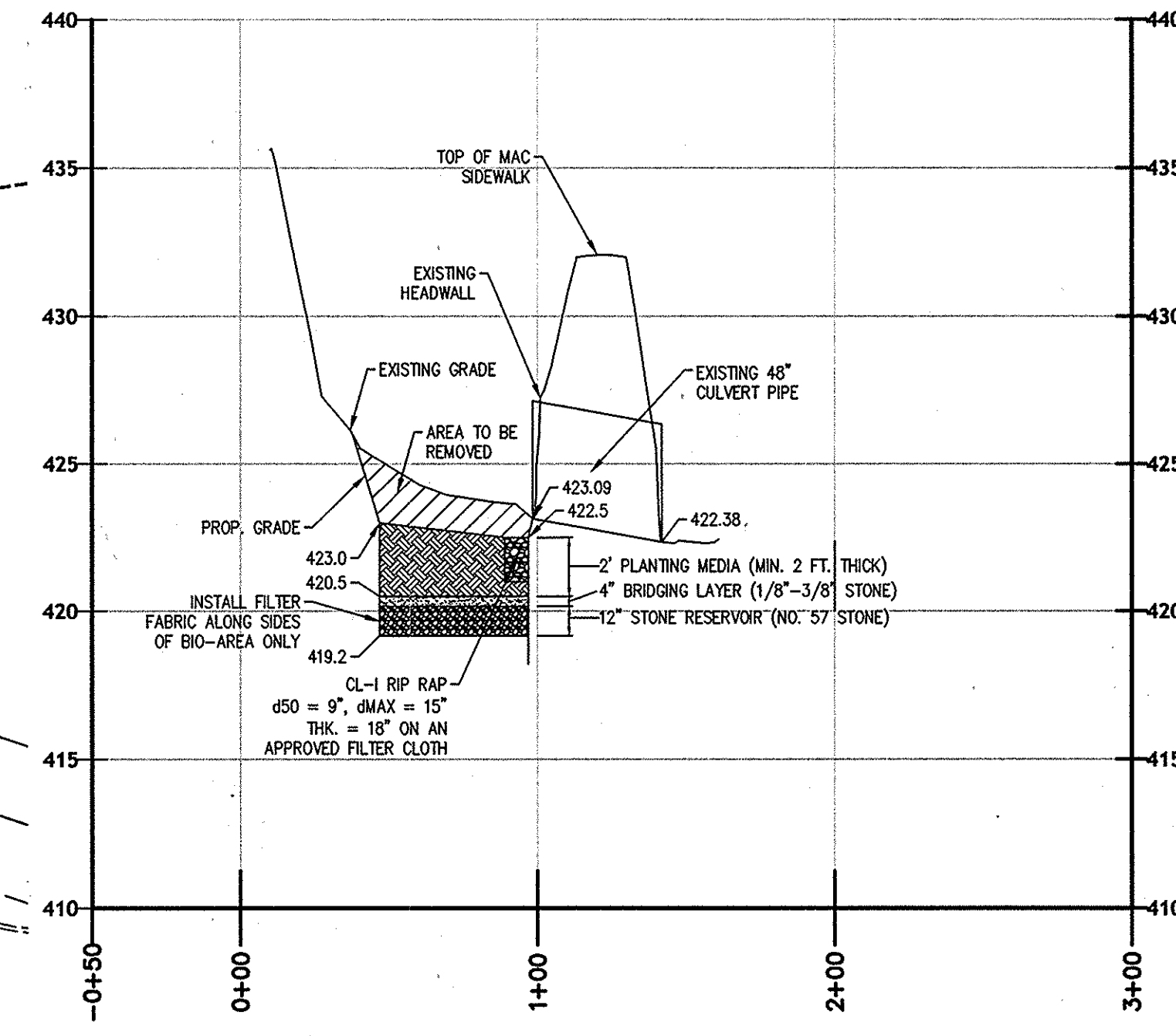




**SPECIFICATIONS FOR BIO-RETENTION AREAS**

- 1. MATERIAL SPECIFICATIONS**  
THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1. OF THE 2000 MARYLAND STORM WATER DESIGN MANUAL - APPENDIX B.
- 2. FILTERING MEDIA OR PLANTING SOIL**  
THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MOVED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMIUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.  
THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:
  - SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION)
  - ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (30%), AND COMPOST (40%).
  - CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.
  - PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED INTO THE SOIL TO INCREASE OR DECREASE PH.
 THERE SHALL BE AT LEAST ONE SOIL TEST PER PROJECT. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH AND ADDITIONAL TESTS OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.
- 3. COMPACTION**  
IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL IF PRACTICES ARE EXCAVATED USING A LOADER. THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TIRE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.  
COMPACTION CAN BE ALLEVATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.  
ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.  
WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.
- 4. PLANT MATERIAL**  
RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.
- 5. PLANT INSTALLATION**  
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. FINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDED MULCH MUST BE WELL-AGED (6 TO 12 MONTHS) FOR ACCEPTANCE. ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION.  
TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.  
GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.  
THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.
- 6. MISCELLANEOUS**  
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

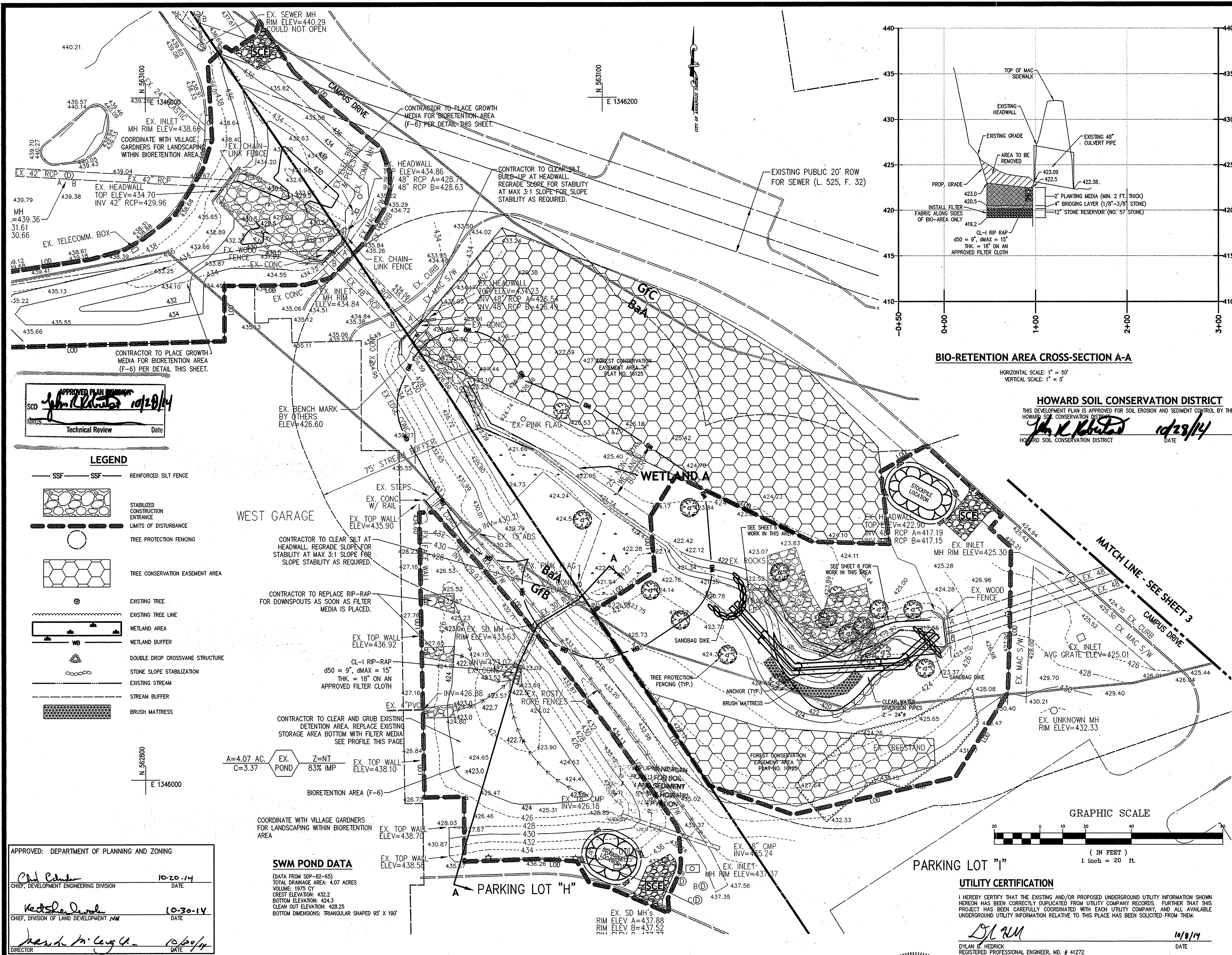
**NOTE**  
CLEAR WATER DIVERSION PIPE WILL BE RELOCATED DOWNSTREAM AS REQUIRED AS NECESSARY AS WORK PROGRESSES.



**BIO-RETENTION AREA CROSS-SECTION A-A**

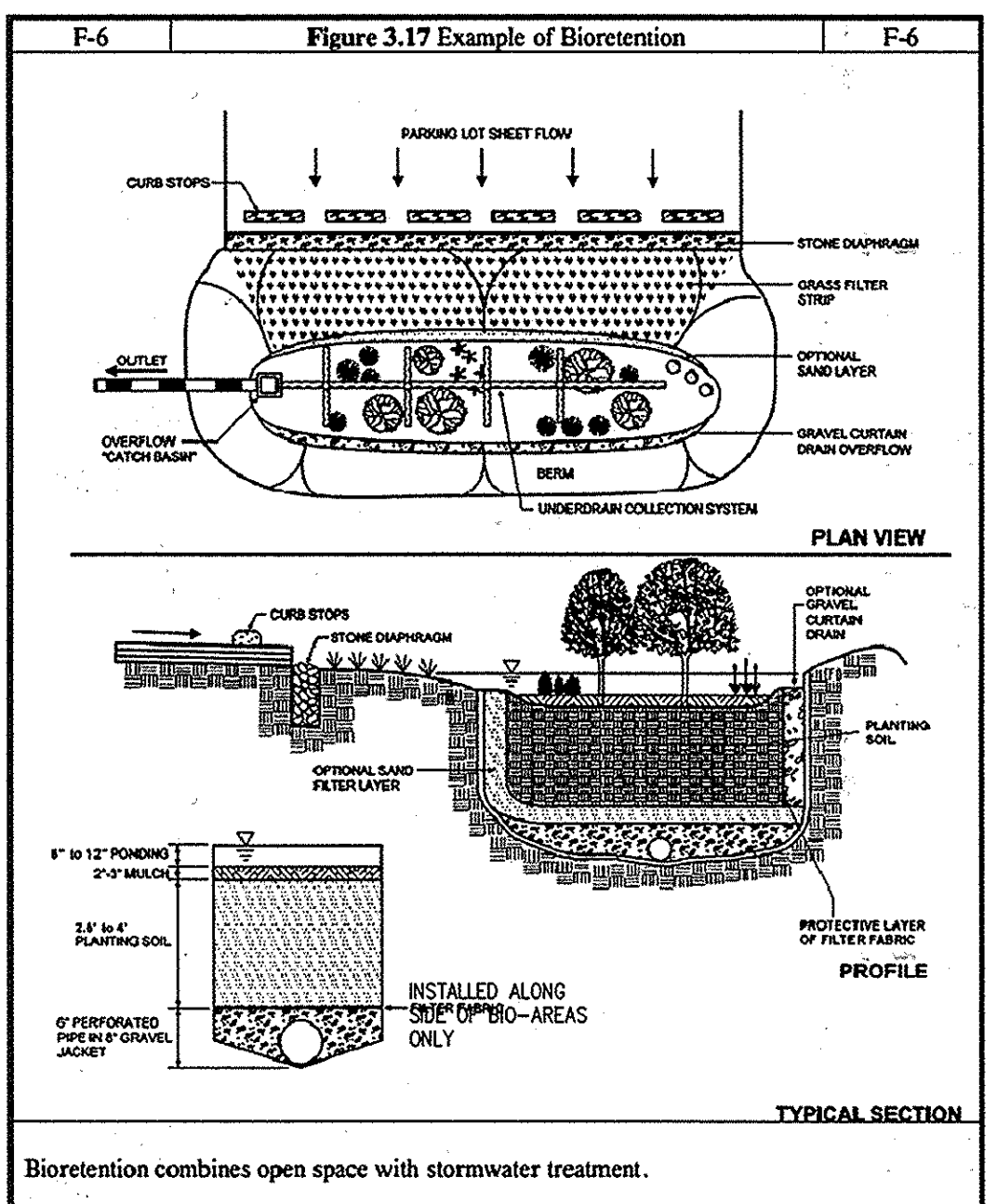
HORIZONTAL SCALE: 1" = 5'  
VERTICAL SCALE: 1" = 5'

**HOWARD SOIL CONSERVATION DISTRICT**  
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
*John K. Hedrick* 10/29/14  
HOWARD SOIL CONSERVATION DISTRICT DATE



**SWM POND DATA**  
(DATA FROM SDP-82-65)  
TOTAL DRAINAGE AREA: 4.07 ACRES  
VOLUME: 1975 CY  
CREST ELEVATION: 432.2  
BOTTOM ELEVATION: 424.3  
CLEAN OUT ELEVATION: 428.25  
BOTTOM DIMENSIONS: TRIANGULAR SHAPED 95' x 190'

**UTILITY CERTIFICATION**  
I HEREBY CERTIFY THAT THE EXISTING AND/OR PROPOSED UNDERGROUND UTILITY INFORMATION SHOWN HEREON HAS BEEN CORRECTLY DUPLICATED FROM UTILITY COMPANY RECORDS. FURTHER THAT THIS PROJECT HAS BEEN CAREFULLY COORDINATED WITH EACH UTILITY COMPANY, AND ALL AVAILABLE UNDERGROUND UTILITY INFORMATION RELATIVE TO THIS PLACE HAS BEEN SOLICITED FROM THEM.  
*Dylan B. Hedrick* 10/9/14  
DYLAN B. HEDRICK REGISTERED PROFESSIONAL ENGINEER, MD. # 41272 DATE



**CALL "MISS UTILITY"**  
TELEPHONE: 1-800-257-7777 FOR UTILITY LOCATIONS AT LEAST 48 HOURS BEFORE BEGINNING CONSTRUCTION.

APPROVED: DEPARTMENT OF PLANNING AND ZONING  
*Paul E. ...* 10-20-14  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*Ketola D...* 10-30-14  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE  
*Heather M. ...* 10/20/14  
DIRECTOR DATE

DESIGNED	DATE	DATE	BY	DESCRIPTIONS

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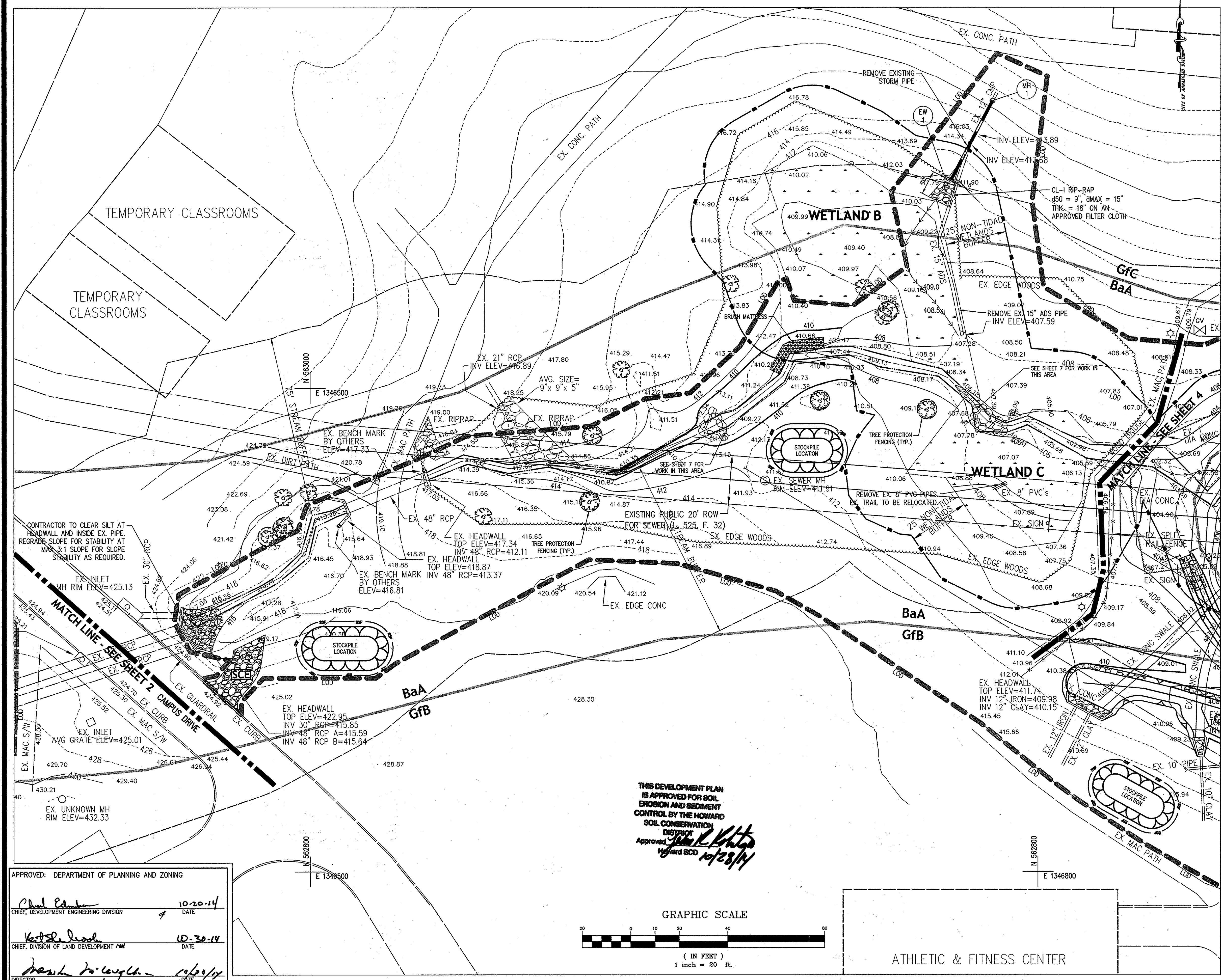
1120 Benfield Blvd.  
Suite C  
Millersville, MD 21108  
Ph. (410) 987-3450  
Fax (410) 987-3457

DYLAN HEDRICK  
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. 41272 EXP. DATE 01-13-2016

**OWNER / DEVELOPER**  
**HOWARD COMMUNITY COLLEGE**  
10901 LITTLE PATUXENT PKWY.  
COLUMBIA, MD 21044  
TEL: (443) 518-1000

**HOWARD COMMUNITY COLLEGE**  
**STREAM RESTORATION PLAN**  
**STREAM RESTORATION PLAN - AREA A**  
SUBDIVISION: HOWARD COMMUNITY COLLEGE  
PARCEL 47 ZONED POR & NT  
TAX MAP 35, 36 BLOCK 6 & 1  
ZONING: R-NT/POR ELECTION DISTRICT 5  
COLUMBIA, MARYLAND (HOWARD COUNTY)





**STORM DRAIN PIPE SCHEDULE**

FROM	TO	SIZE	MATERIAL	LENGTH
MH-1	EW-1	12"	HOPE	36'

**STORM DRAIN STRUCTURE SCHEDULE**

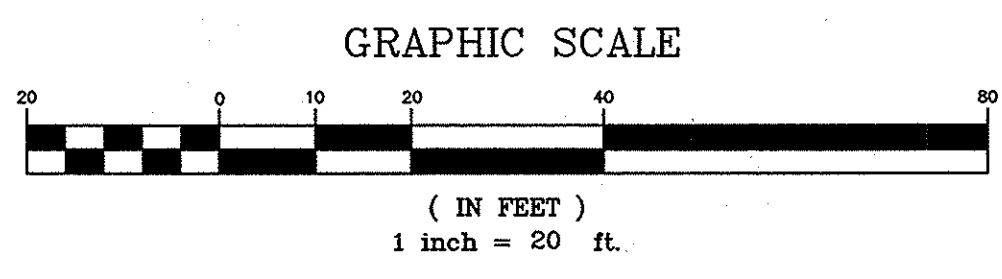
NO.	TYPE	LOCATION @ CL		INV. IN	INV. OUT	TOP ELEV.	HOWARD COUNTY STD. DETAIL
		NORTHING	EASTING				
MH-1	48" STD. PRECAST MH	563118.81	1346781.43	414.00	411.70	421.00	G-5.12
HW-1	TYPE 'C' ENDWALL	563085.84	1346784.26	411.50	413.25	413.25	D-5.21

**LEGEND**

- SSF — SSF — REINFORCED SILT FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- LIMITS OF DISTURBANCE
- TREE PROTECTION FENCING
- TREE CONSERVATION EASEMENT AREA
- EXISTING TREE
- EXISTING TREE LINE
- WETLAND AREA
- WETLAND BUFFER
- DOUBLE DROP CROSSVANE STRUCTURE
- STONE SLOPE STABILIZATION
- EXISTING STREAM
- STREAM BUFFER
- BRUSH MATTRESS

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

*John K. White*  
Approved 10/28/14  
Howard SCD



APPROVED: DEPARTMENT OF PLANNING AND ZONING

*Paul E. ...* 10-20-14  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

*Vestal ...* 10-30-14  
CHIEF, DIVISION OF LAND DEVELOPMENT

*Mark ...* 10/28/14  
DIRECTOR

**HOWARD SOIL CONSERVATION DISTRICT**

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*John K. White* 10/28/14  
DATE

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*Dylan Hedrick* 10/8/14  
DATE

DYLAN HEDRICK  
REGISTERED PROFESSIONAL ENGINEER, MD, # 41272

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DESIGNED		DATE		REVISIONS	
DATE	BY	DATE	BY	DESCRIPTIONS	

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Fax (410) 987-3457

DYLAN HEDRICK

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**OWNER / DEVELOPER**

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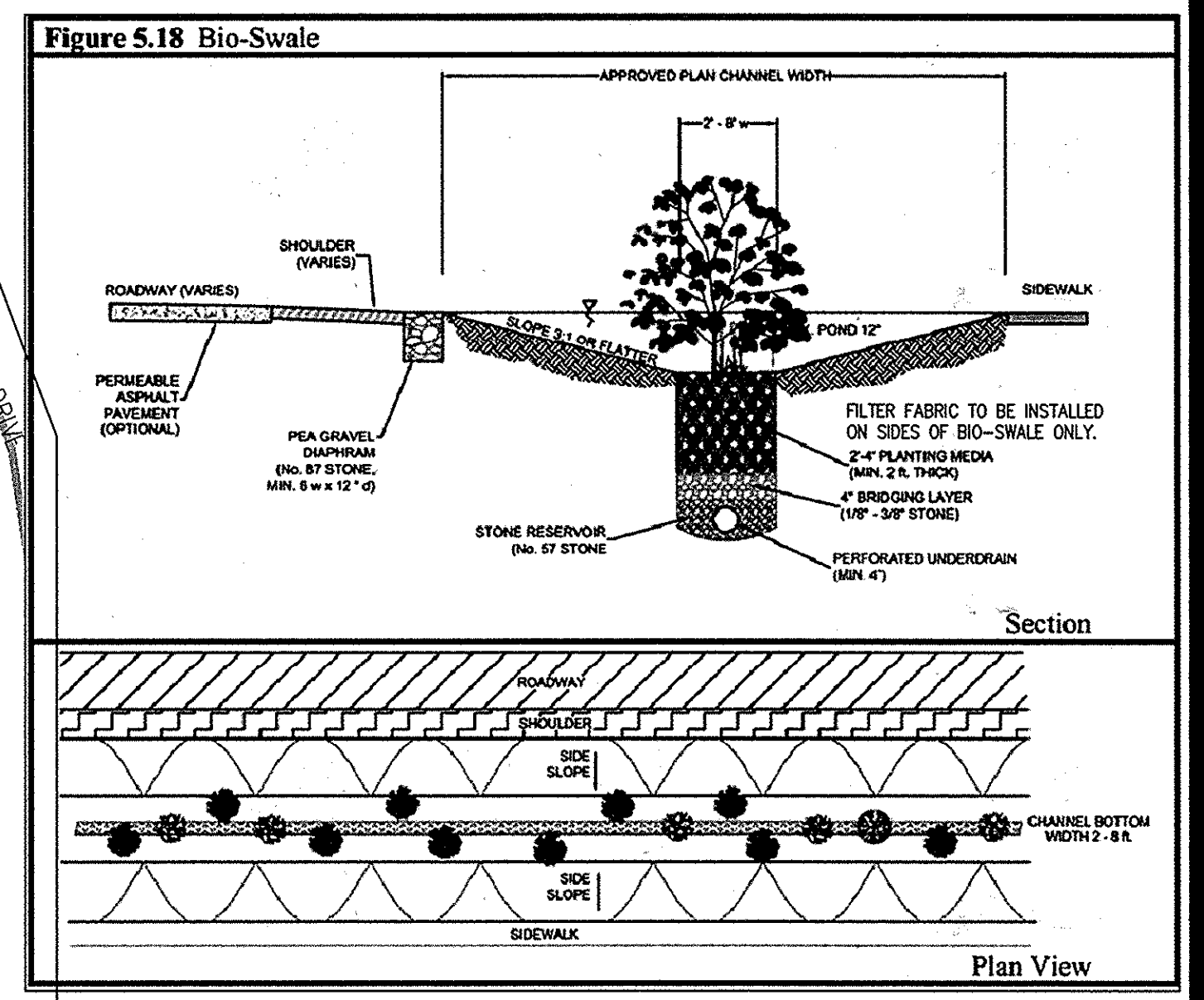
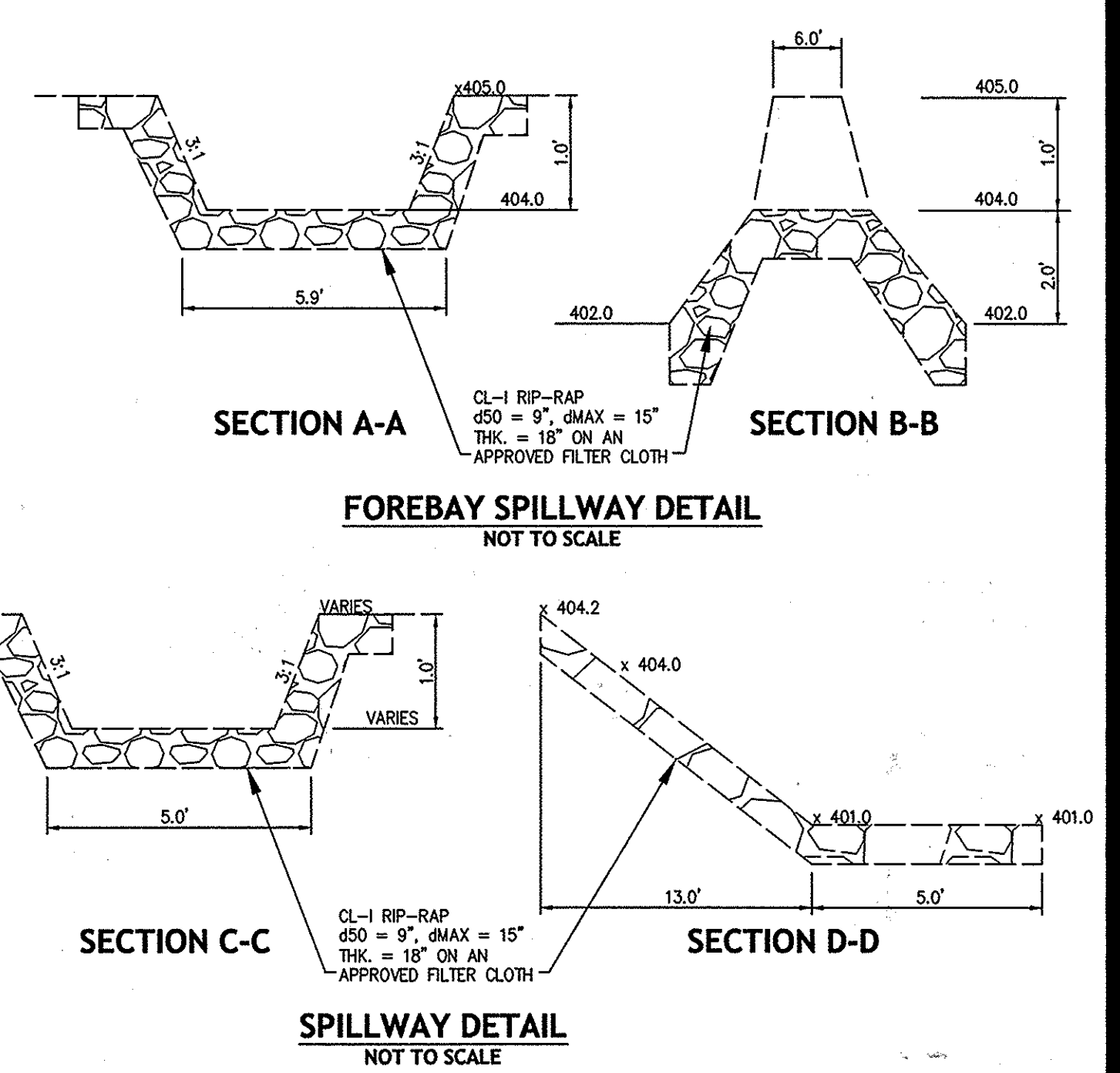
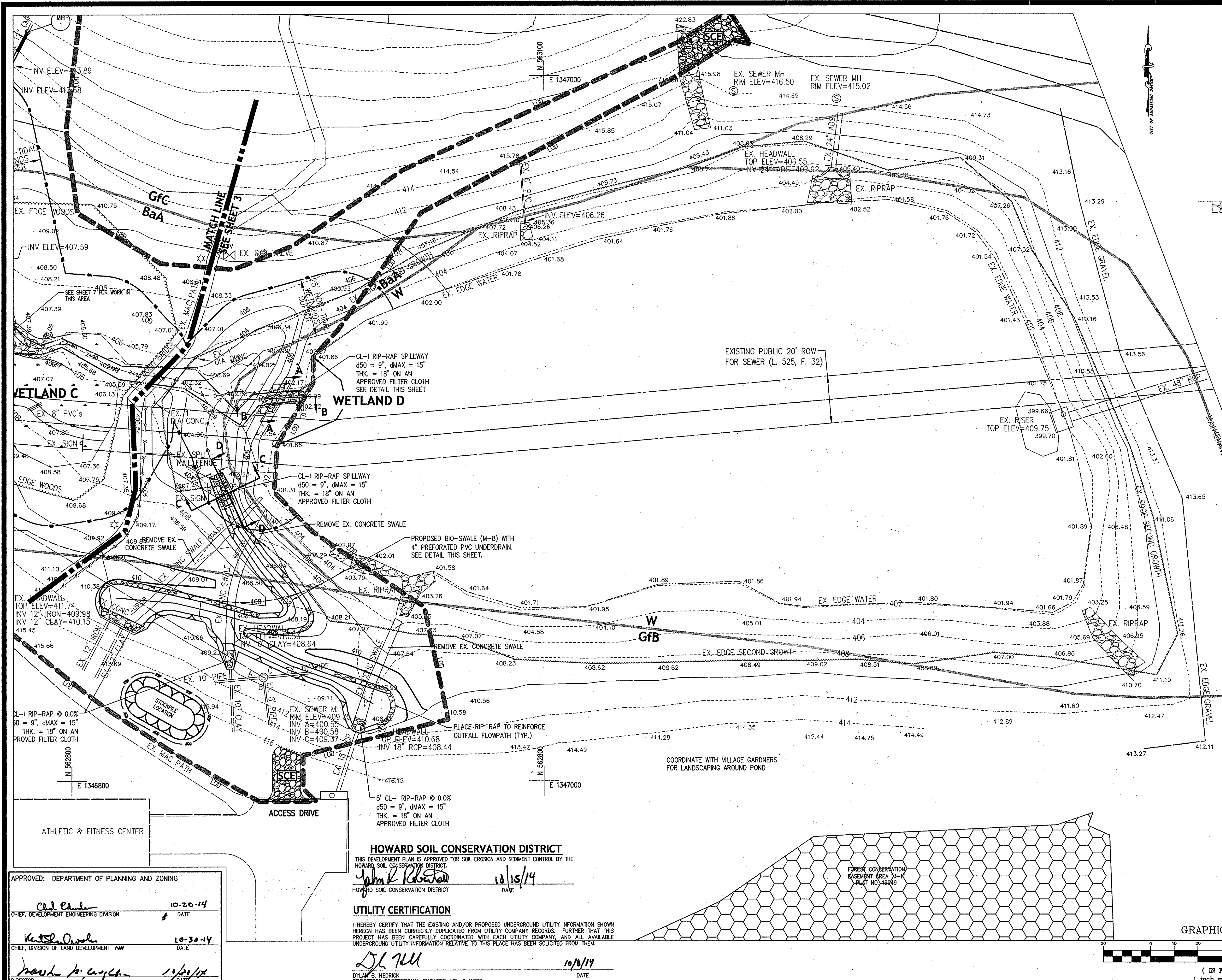
**HOWARD COMMUNITY COLLEGE**

**STREAM RESTORATION PLAN - AREA B**

STREAM RESTORATION PLAN - AREA B  
SUBDIVISION: HOWARD COMMUNITY COLLEGE  
PARCEL 47 ZONED POR & NT  
TAX MAP 35, 36 BLOCK 6 & 1  
ZONING: R-NT/POR ELECTION DISTRICT 5  
COLUMBIA, MARYLAND (HOWARD COUNTY)

SCALE: 1" = 20' DATE: AUGUST 2014 TTG PROJECT No. 513030 SHEET 3 OF 11





**BIO-SWALE DETAIL**

**LEGEND**

- SSF — SSF — REINFORCED SILT FENCE
- [Symbol] STABILIZED CONSTRUCTION ENTRANCE
- [Symbol] LIMITS OF DISTURBANCE
- [Symbol] TREE PROTECTION FENCING
- [Symbol] TREE CONSERVATION EASEMENT AREA
- [Symbol] EXISTING TREE
- [Symbol] EXISTING TREE LINE
- [Symbol] WETLAND AREA
- [Symbol] WETLAND BUFFER
- [Symbol] DOUBLE DROP CROSSWANE STRUCTURE
- [Symbol] STONE SLOPE STABILIZATION
- [Symbol] EXISTING STREAM
- [Symbol] STREAM BUFFER
- [Symbol] BRUSH MATTRESS

**GRAPHIC SCALE**  
 ( IN FEET )  
 1 inch = 20 ft.

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APPROVED: DEPARTMENT OF PLANNING AND ZONING

*Chad E. ...* 10-20-14  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

*Kristen ...* 10-30-14  
 CHIEF, DIVISION OF LAND DEVELOPMENT

*David ...* 10/20/14  
 DIRECTOR

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

*John R. ...* 10/15/14  
 HOWARD SOIL CONSERVATION DISTRICT

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*Dylan ...* 10/14/14  
 DYLAN G. HEDRICK  
 REGISTERED PROFESSIONAL ENGINEER, MD. # 41272

DESIGNED		DATE		REVISIONS	
DATE	BY	DATE	BY	DESCRIPTIONS	

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DYLAN HEDRICK

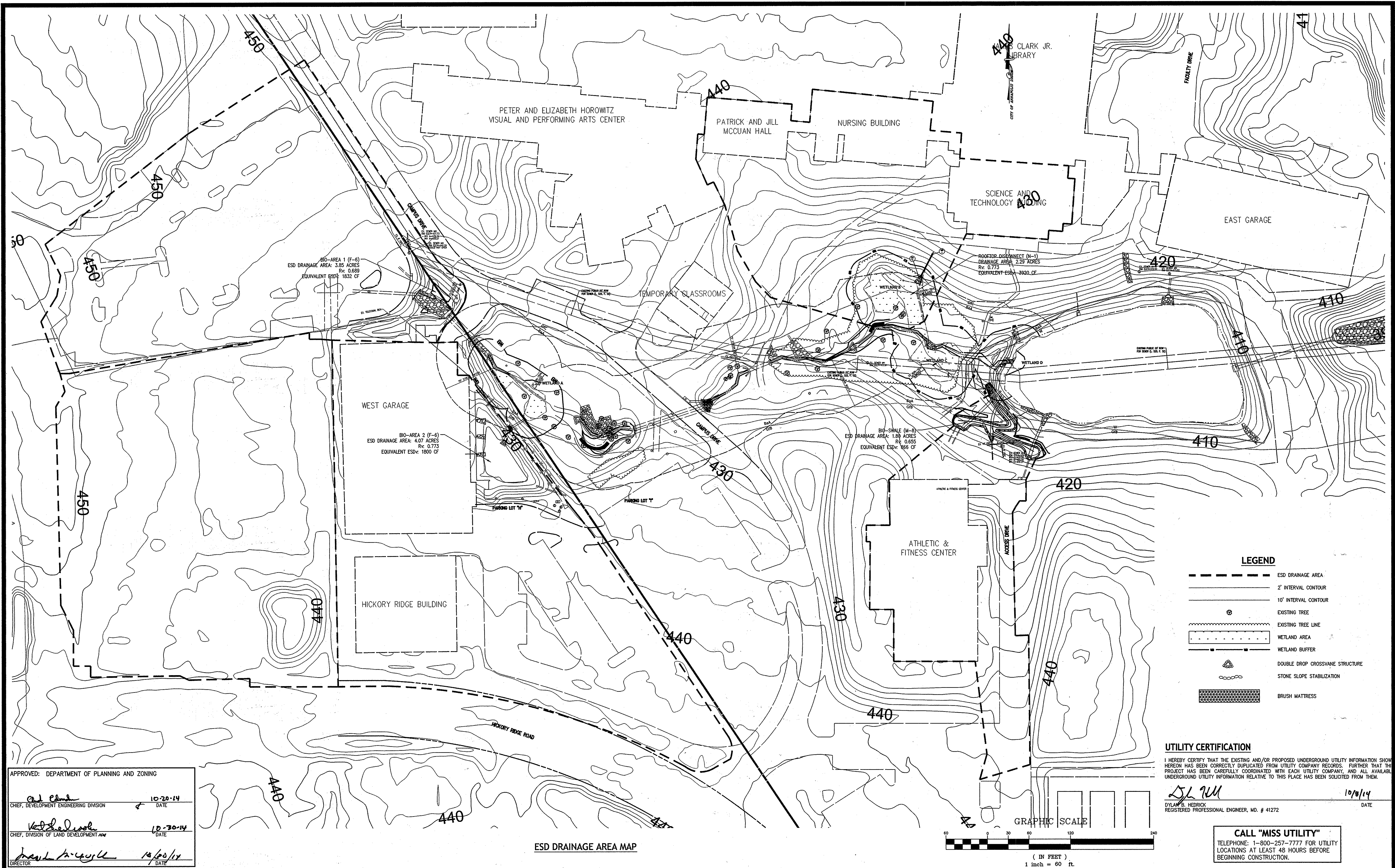
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**HOWARD COMMUNITY COLLEGE**  
**STREAM RESTORATION PLAN**  
**STREAM RESTORATION PLAN - AREA C**  
 SUBDIVISION: HOWARD COMMUNITY COLLEGE  
 PARCEL 47 ZONED PDR & NT  
 TAX MAP 35, 36 BLOCK 6 & 1  
 ZONING: R-N/PDR ELECTION DISTRICT 5  
 COLUMBIA, MARYLAND (HOWARD COUNTY)

SCALE: 1" = 20'  
 DATE: AUGUST 2014  
 TTG PROJECT No. 513030  
 SHEET 4 OF 11





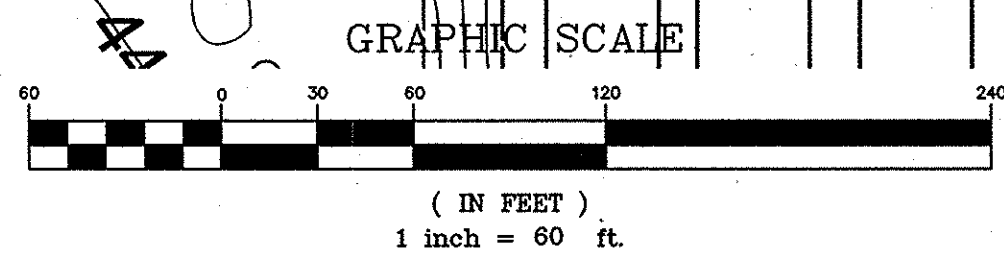
**LEGEND**

- ESD DRAINAGE AREA
- 2' INTERVAL CONTOUR
- 10' INTERVAL CONTOUR
- EXISTING TREE
- EXISTING TREE LINE
- WETLAND AREA
- WETLAND BUFFER
- DOUBLE DROP CROSSVALE STRUCTURE
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*Dylan Hedrick* 10/8/14  
 DYLAN HEDRICK  
 REGISTERED PROFESSIONAL ENGINEER, MD. # 41272 DATE



APPROVED: DEPARTMENT OF PLANNING AND ZONING

*Carl P. Smith* 10-20-14  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Victor DeLoach* 10-30-14  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*David P. Cuyler* 10/30/14  
 DIRECTOR DATE

ESD DRAINAGE AREA MAP

DESIGNED		DATE	
DRAWN		DATE	
CHECKED		DATE	
APPROVED		DATE	

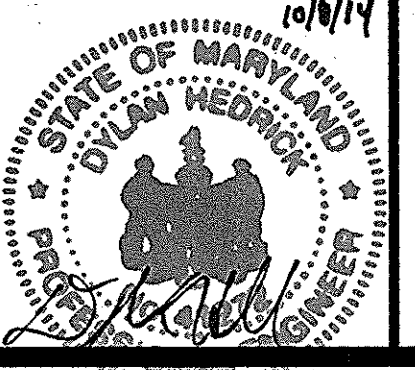
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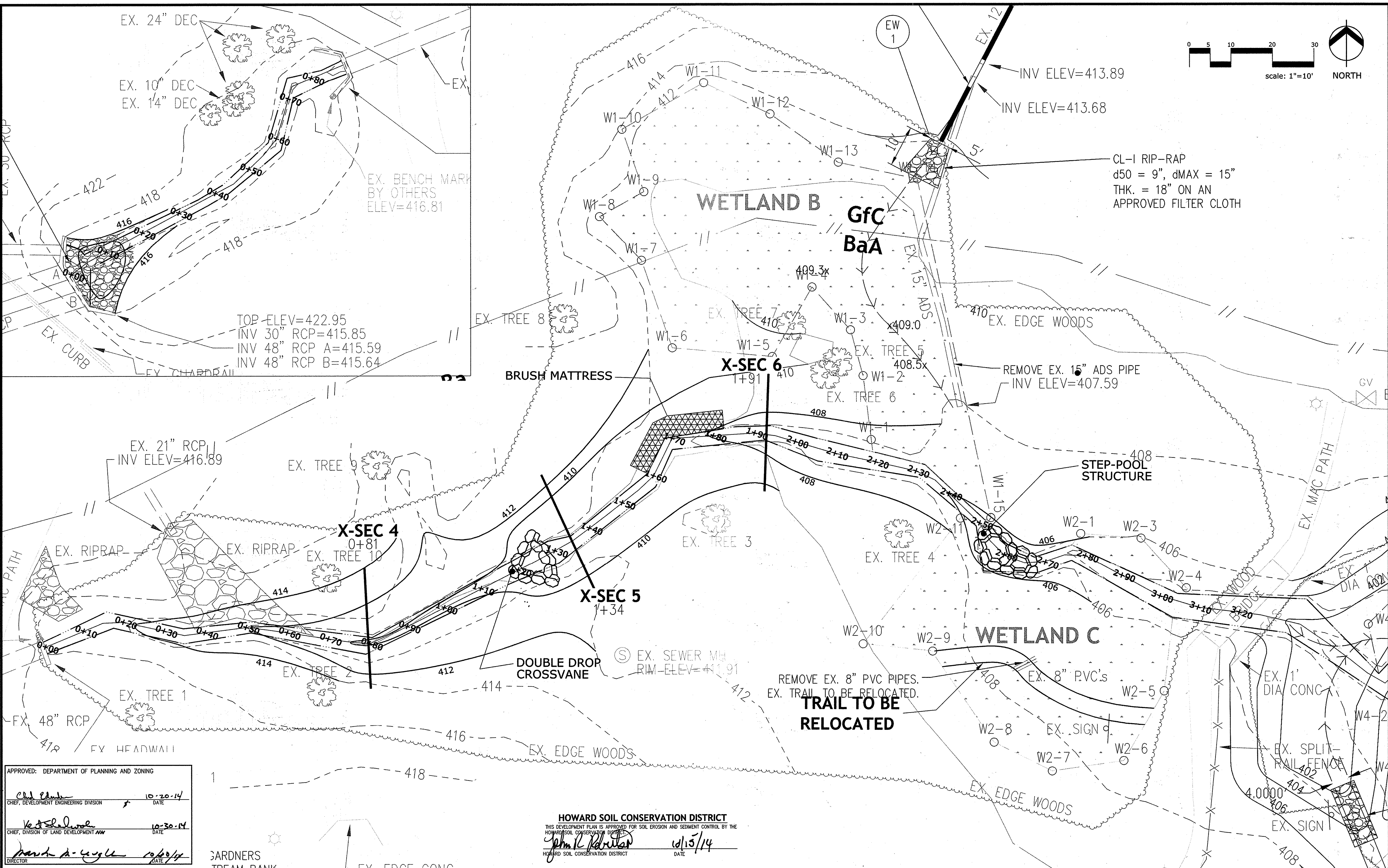
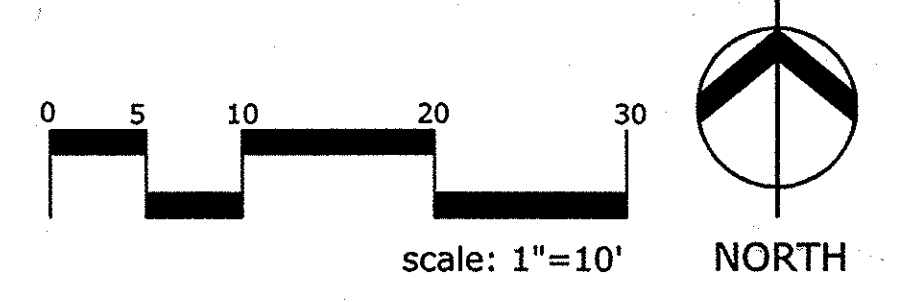
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**STREAM RESTORATION PLAN**  
**ESD DRAINAGE AREA MAP**  
 SUBDIVISION: HOWARD COMMUNITY COLLEGE  
 PARCEL 47 - ZONED PDR & NT  
 TAX MAP 35, 36 BLOCK 6 & 1  
 ZONING: R-N/PDR ELECTION DISTRICT 5  
 COLUMBIA, MARYLAND (HOWARD COUNTY)

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APPROVED: DEPARTMENT OF PLANNING AND ZONING

*Chad Plummer* 10-20-14  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Veit Scholze* 10-30-14  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*David A. Gagle* 10/28/14  
 DIRECTOR DATE

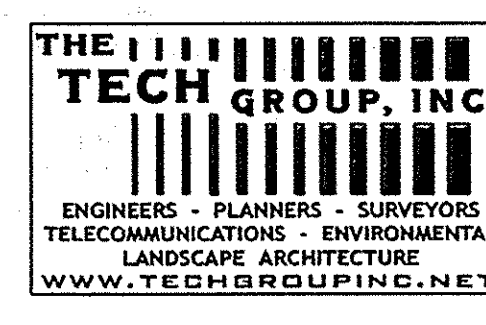
GARDNERS  
 STREAM BANK

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

*John L. Roberts* 10/15/14  
 HOWARD SOIL CONSERVATION DISTRICT DATE

DESIGNED	MTW	5.25.14
		DATE
DRAWN	MTW	5.25.14
		DATE
CHECKED	DH	5.25.14
		DATE
APPROVED	DH	5.25.14
		DATE

REVISIONS			
DATE	BY	DESCRIPTIONS	



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 COLUMBIA, MD 21044  
 TEL: (443) 518-1000

**HOWARD COMMUNITY COLLEGE**  
**STREAM RESTORATION PLAN**

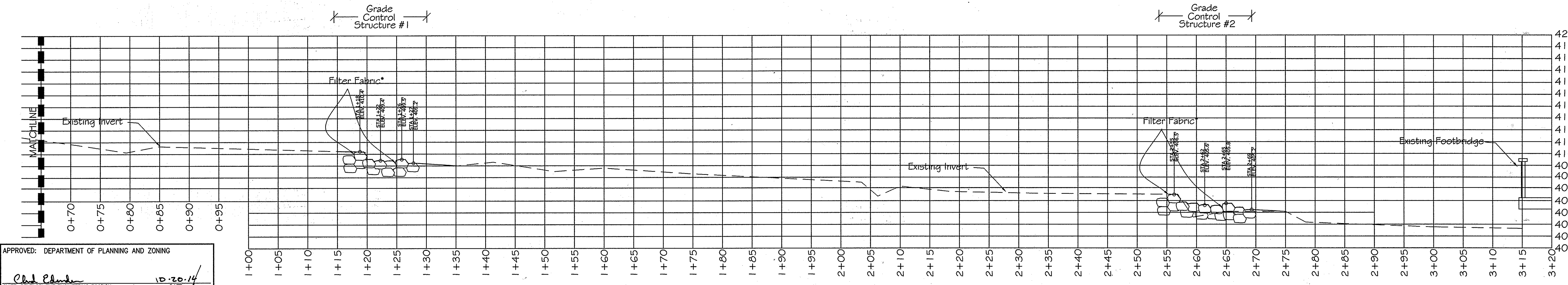
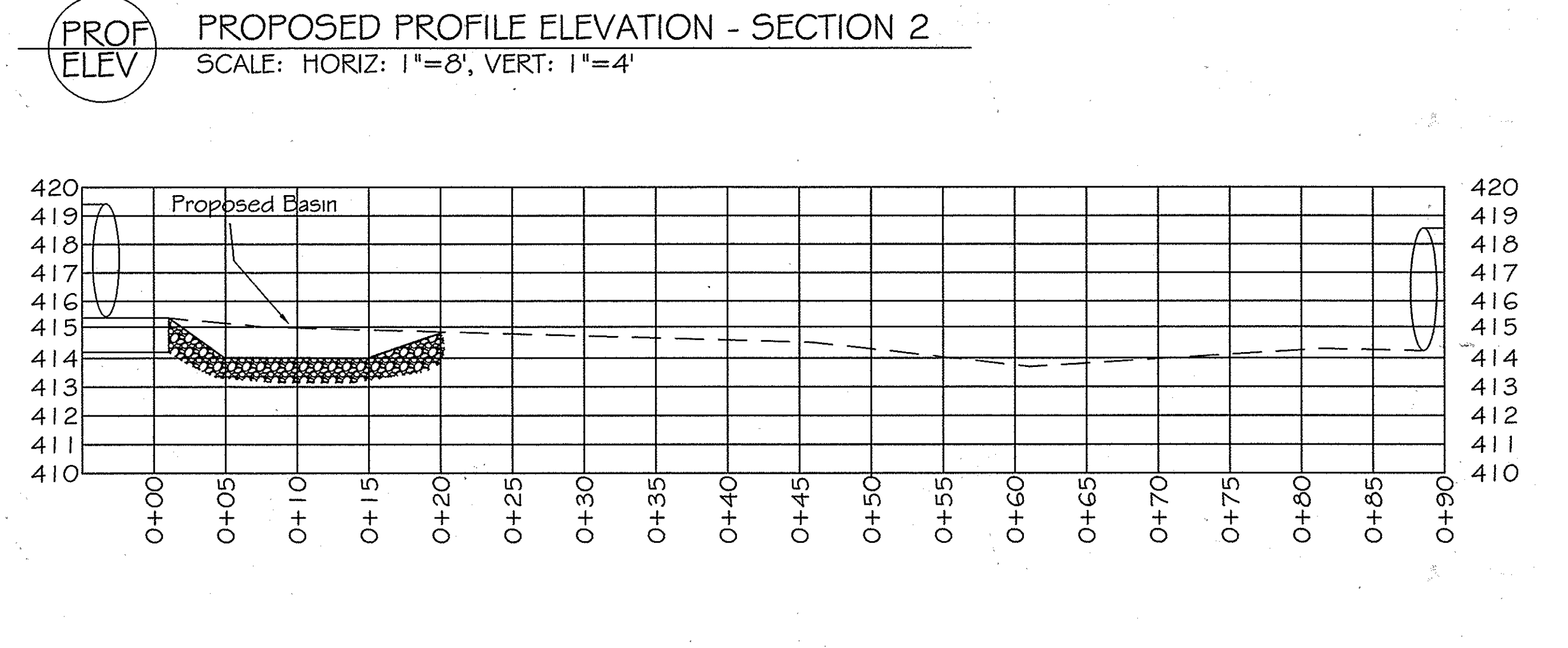
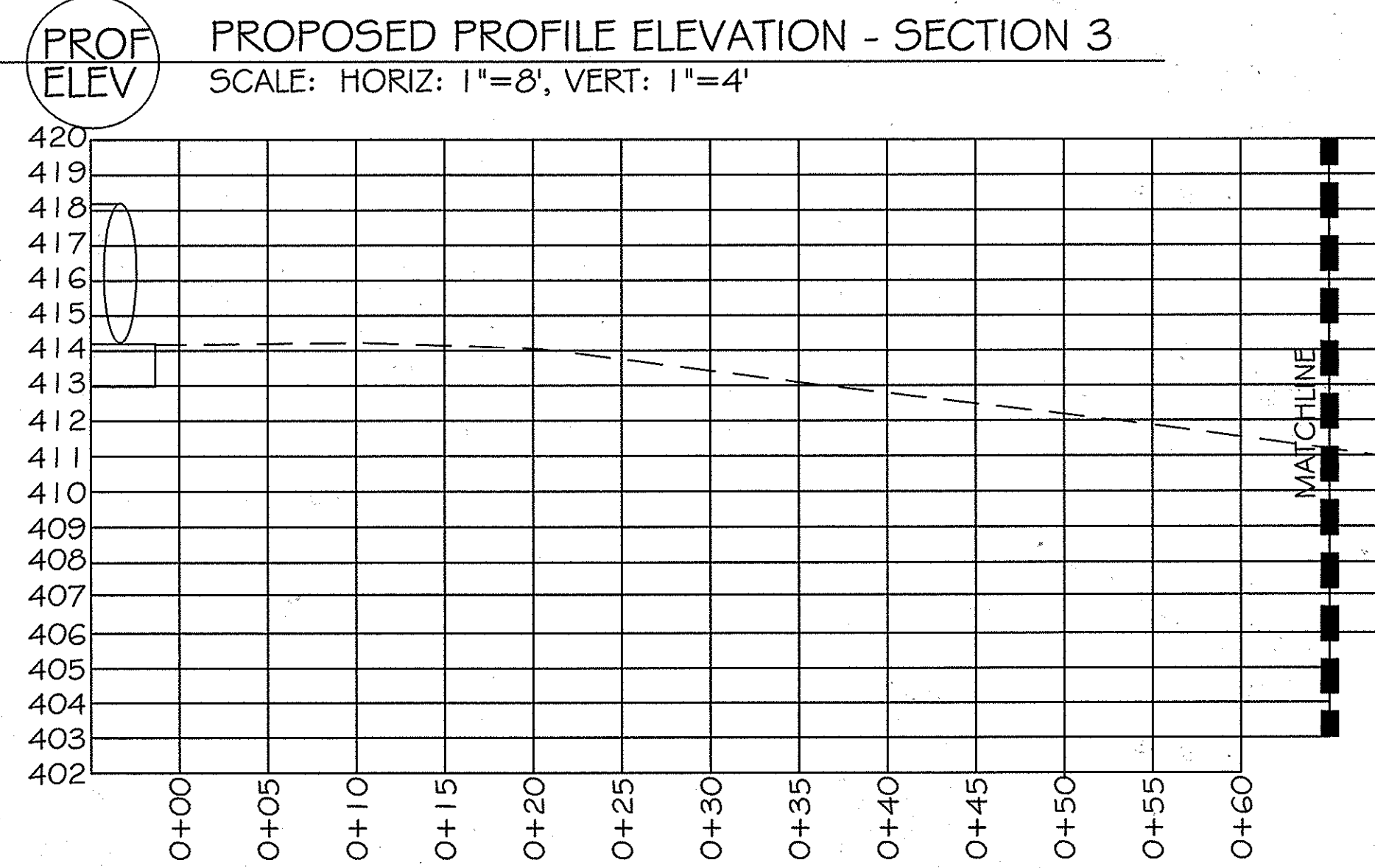
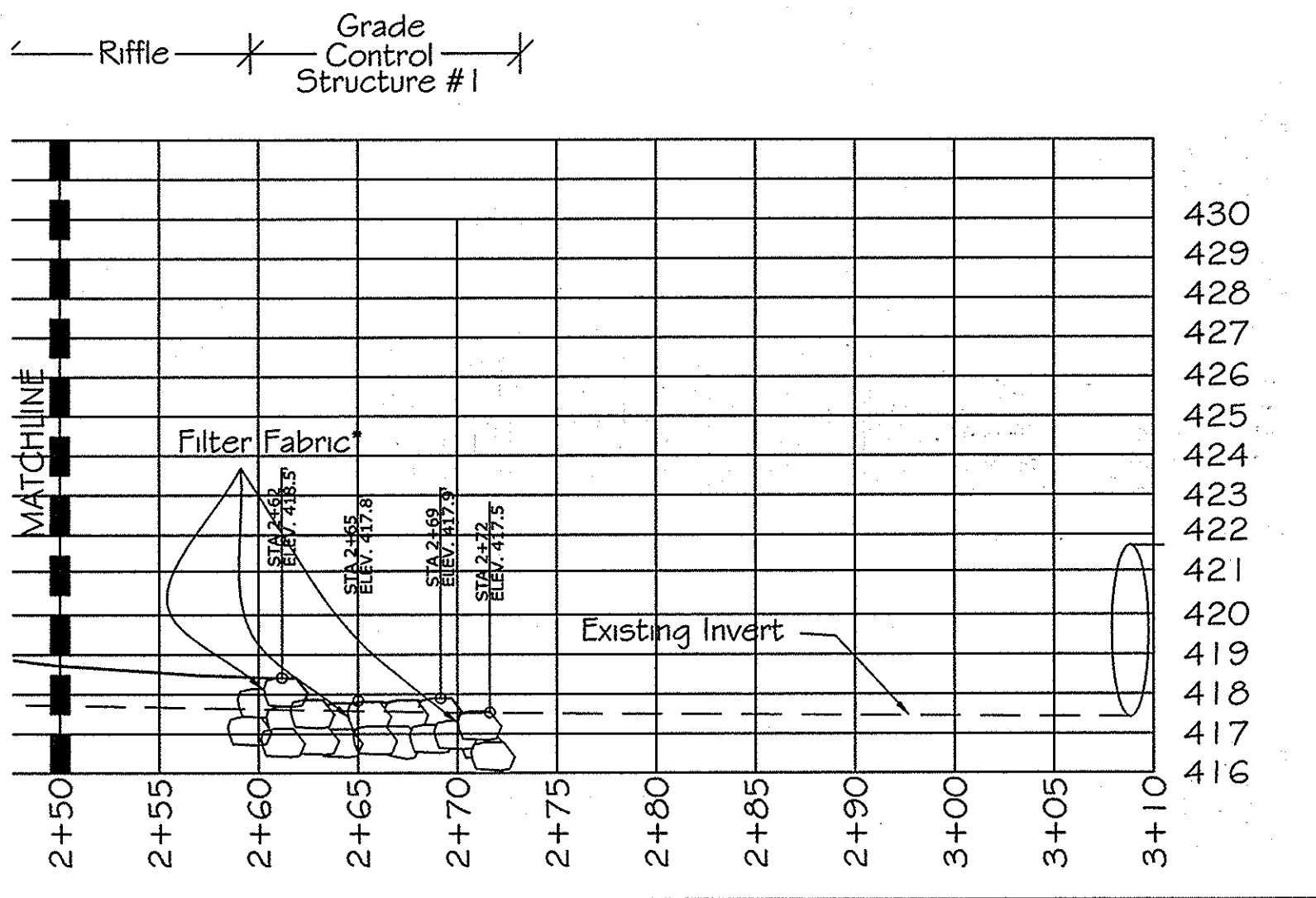
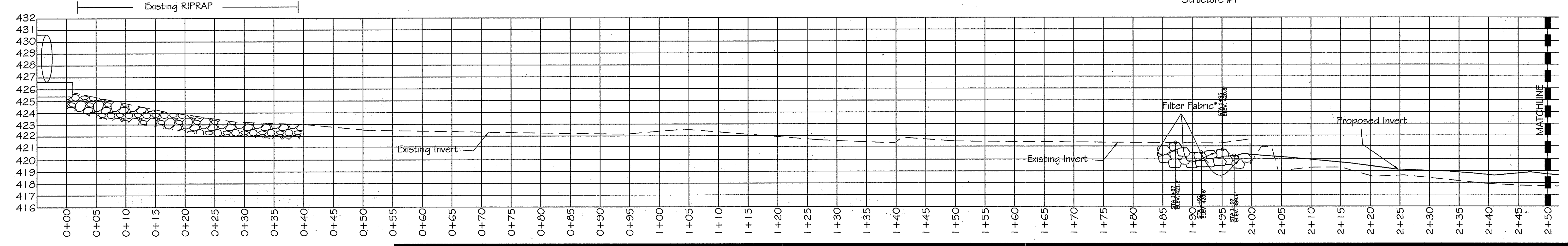
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PROF ELEV

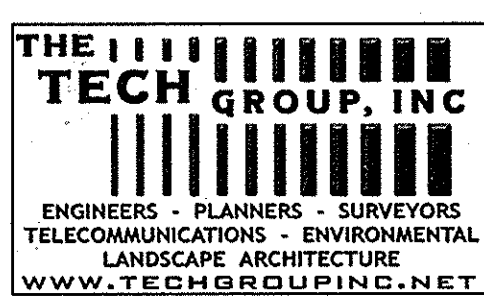
PROPOSED PROFILE ELEVATION - SECTION 1  
SCALE: HORIZ: 1"=8', VERT: 1"=4'

\* Filter Fabric will be placed on the upstream face of the drop structures. The cloth must be keyed in below scour protection.



APPROVED: DEPARTMENT OF PLANNING AND ZONING  
[Signatures and dates for approval]

Table with columns: DESIGNED, DRAWN, CHECKED, APPROVED, DATE, REVISIONS (DATE, BY, DESCRIPTIONS)

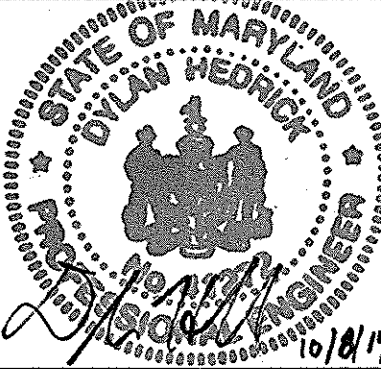


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D'YLAN HEDRICK  
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LICENSE No. 41272  
EXP. DATE 01-13-2016



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HOWARD COMMUNITY COLLEGE  
STREAM RESTORATION PLAN

SUBDIVISION: HOWARD COMMUNITY COLLEGE  
PARCEL 47 ZONED POR & NT  
TAX MAP 35, 36 BLOCK 6 & 1  
ZONING: R-N/FPOR ELECTION DISTRICT 5  
COLUMBIA, MARYLAND (HOWARD COUNTY)

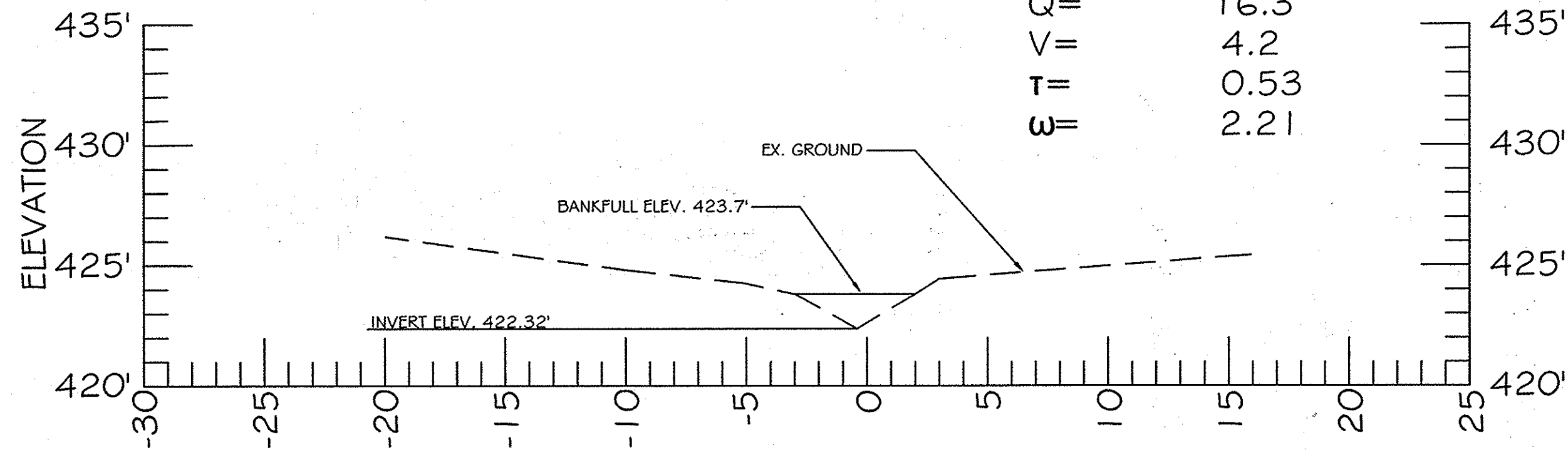
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STA 0+57 CROSS-SECTION ELEVATION - STREAM SECTION 1  
SCALE: HORIZ: 1"=5', VERT: 1"=5'

SECTION 1  
STA 0+57

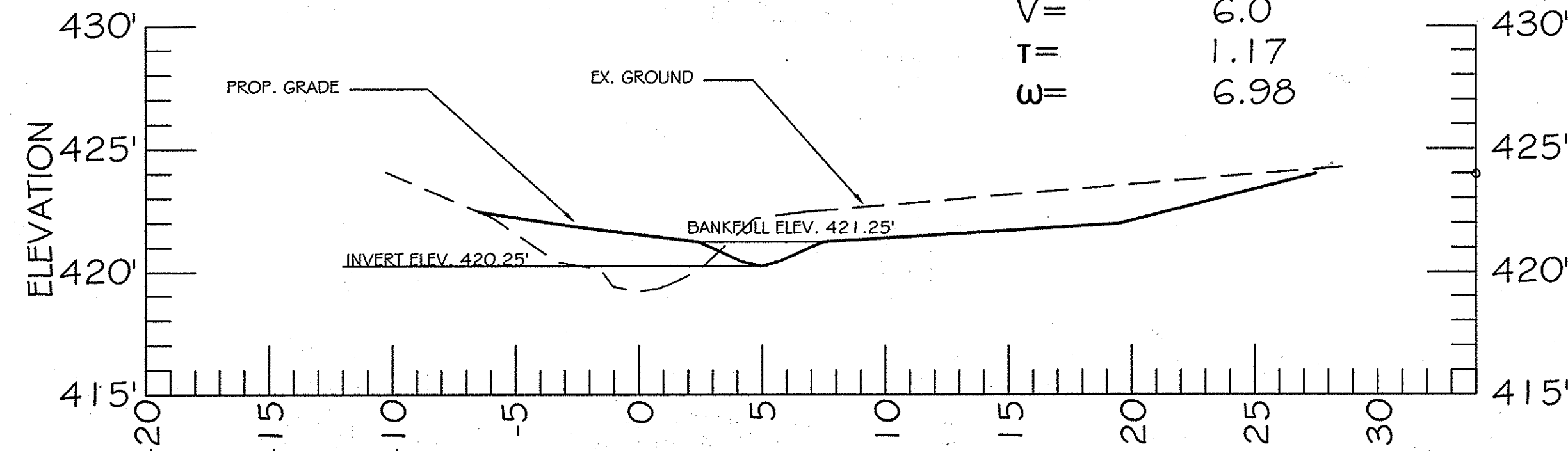
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Q= 16.3  
V= 4.2  
T= 0.53  
S= 2.21



STA 2+04 CROSS-SECTION ELEVATION - STREAM SECTION 2  
SCALE: HORIZ: 1"=5', VERT: 1"=5'

SECTION 2  
STA 2+04

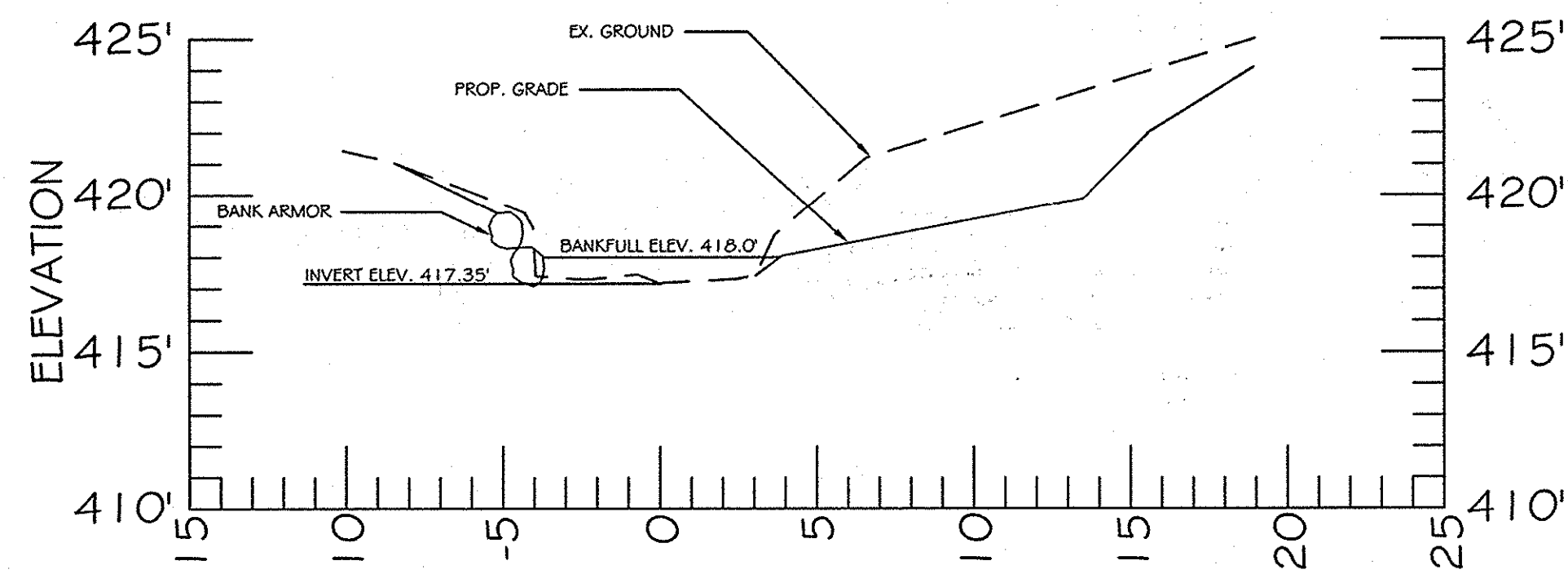
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T= 1.17  
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SCALE: HORIZ: 1"=5', VERT: 1"=5'

SECTION 3  
STA 2+79

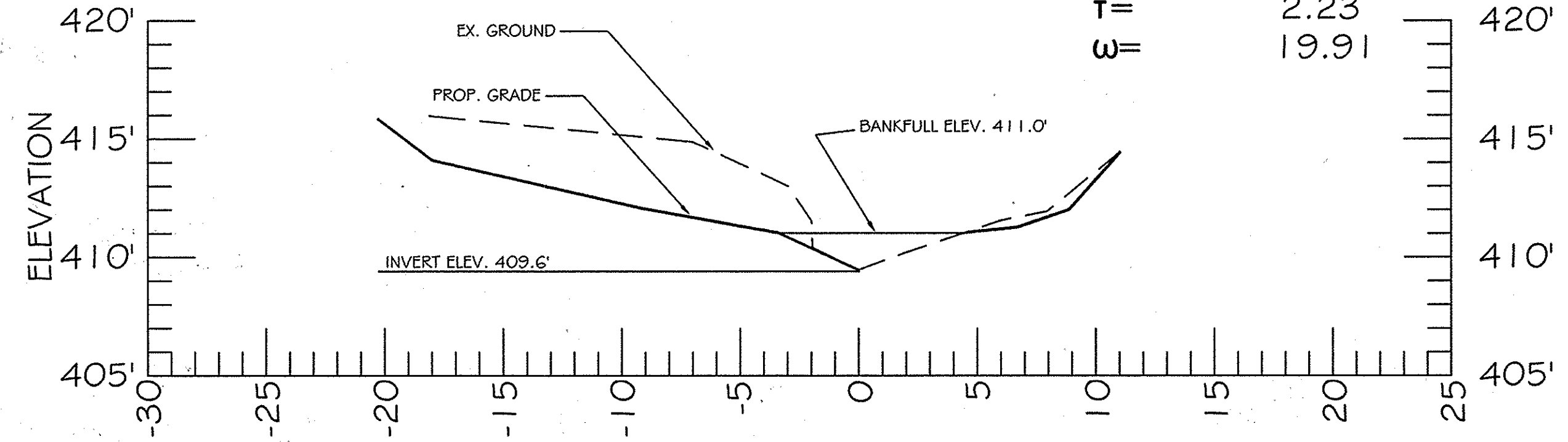
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STA 0+81 CROSS-SECTION ELEVATION - STREAM SECTION 4  
SCALE: HORIZ: 1"=5', VERT: 1"=5'

SECTION 4  
STA 0+81

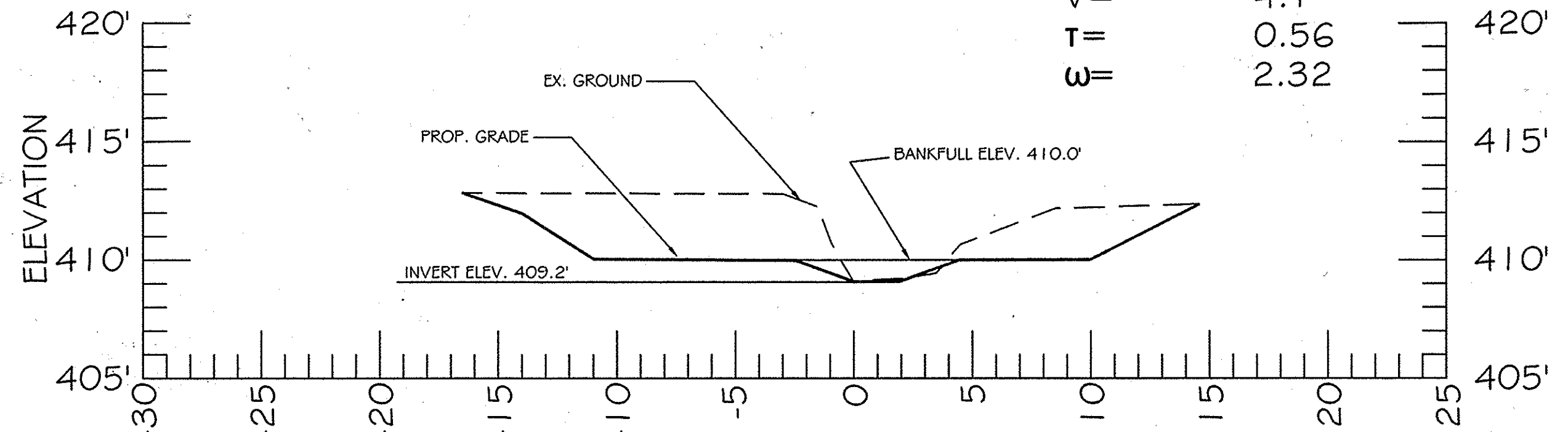
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STA 1+34 CROSS-SECTION ELEVATION - STREAM SECTION 5  
SCALE: HORIZ: 1"=5', VERT: 1"=5'

SECTION 5  
STA 1+34

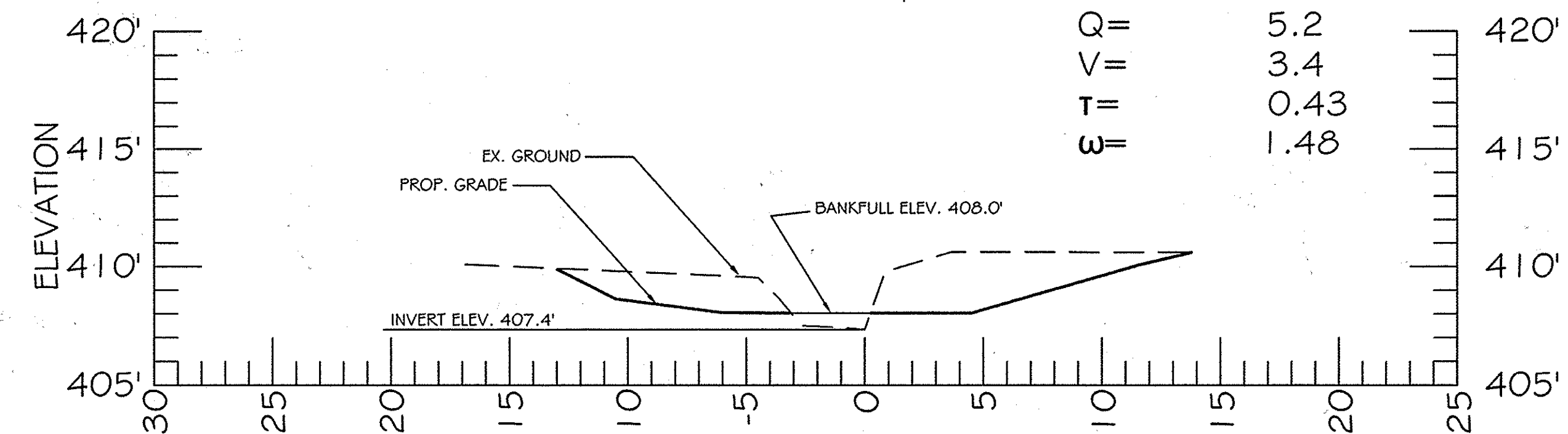
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ER= 3.5  
W/D= 12.4  
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V= 4.1  
T= 0.56  
S= 2.32



STA 1+97 CROSS-SECTION ELEVATION - STREAM SECTION 6  
SCALE: HORIZ: 1"=5', VERT: 1"=5'

SECTION 6  
STA 1+91

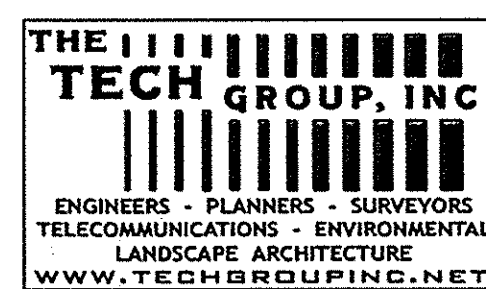
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S= 1.48



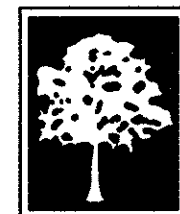
APPROVED: DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 10-20-14  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 10-30-14  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 10/30/14  
 DIRECTOR

DESIGNED		DATE	
MTW	5.25.14		
DRAWN		DATE	
MTW	5.25.14		
CHECKED		DATE	
DH	5.25.14		
APPROVED		DATE	
DH	5.25.14		

REVISIONS			
DATE	BY	DESCRIPTIONS	

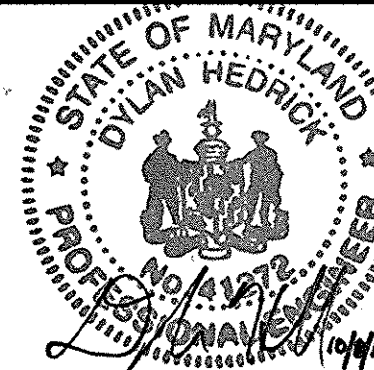


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HOWARD COMMUNITY COLLEGE  
STREAM RESTORATION PLAN

SUBDIVISION: HOWARD COMMUNITY COLLEGE  
PARCEL 47 ZONED POR & NT  
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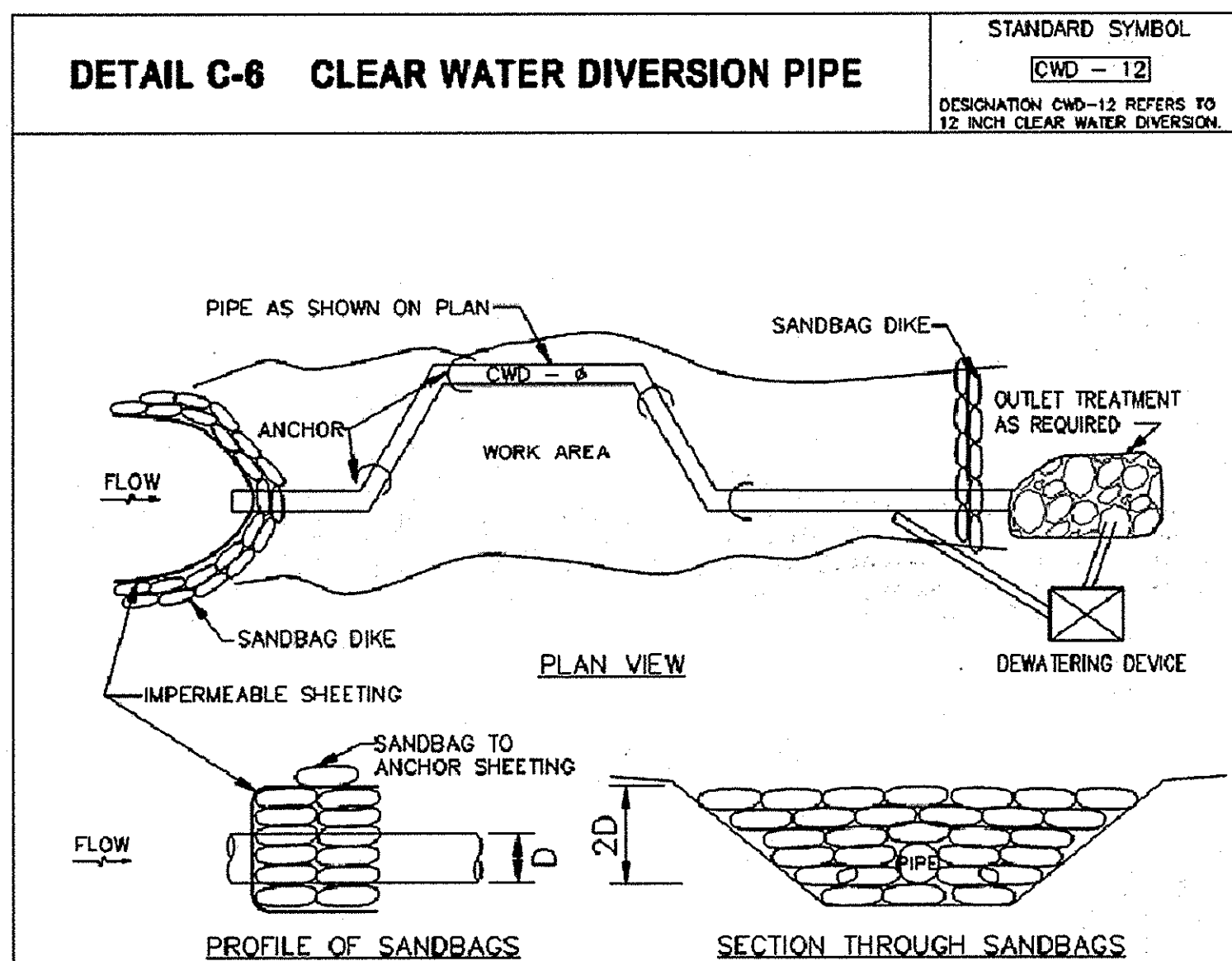


**CLEAR WATER DIVERSION PIPE DESIGN CALCULATIONS**

RATIONAL EQUATION FOR STORMWATER RUNOFF  
 $Q = CIA$   
 TWO YEAR STORM EVENT INTENSITY (I): 3.2" HOWARD COUNTY  
 DRAINAGE AREA (A): 17.95 ACRES  
 RATIONAL RUNOFF COEFFICIENT (C): 0.65  
 $Q = 43.08 \text{ CFS}$

MANNING'S EQUATION FOR CIRCULAR PIPE:  
 $Q = AV = A \cdot K \cdot R^{2/3} \cdot S^{1/2}$   
 $A = \pi R^2 = 3.14 \text{ SQ. FT. FOR } 24" \text{ PIPE}$   
 $K = 1.4859$   
 $N = 0.013$   
 $R_h = A/P$   
 $P = 2 \cdot \pi \cdot R = 6.28 \text{ FT}$   
 $R_h = 0.5 \text{ FT}$   
 $S = \text{SLOPE} = 1\% \text{ MINIMUM}$   
 $Q = 22.82 \text{ CFS FOR ONE } 24" \text{ PIPE}$

USE 2 - 24" PIPES (45.24 CFS CAPACITY)



- CONSTRUCTION SPECIFICATIONS**
- FLEXIBLE PIPE IS PREFERRED, HOWEVER, CORRUGATED METAL PIPE OR EQUIVALENT PVC PIPE CAN BE USED. MAKE ALL JOINTS WATERTIGHT.
  - FOR SANDBAGS USE MATERIALS THAT ARE RESISTANT TO ULTRA-VIOLENT RADIATION, TEARING, AND PUNCTURE AND WOVEN TIGHT ENOUGH TO PREVENT LEAKAGE OF FILL MATERIAL.
  - USE 10 MIL OR THICKER, UV RESISTANT, IMPERMEABLE SHEETING OR OTHER APPROVED MATERIAL THAT IS IMPERMEABLE AND RESISTANT TO PUNCTURING AND TEARING.
  - PLACE IMPERMEABLE SHEETING SUCH THAT UPGRADE PORTION OVERLAPS DOWNGRADE PORTION BY A MINIMUM OF 18 INCHES.
  - SET HEIGHT OF SANDBAG DIKE AT TWICE THE PIPE DIAMETER. MAINTAIN HEIGHT ALONG LENGTH OF SANDBAG DIKE. PLACE DOUBLE ROW OF SANDBAGS.
  - AT A MINIMUM, SECURELY ANCHOR DIVERSION PIPE AT EACH DOWNGRADE JOINT.
  - SET OUTLET END OF DIVERSION PIPE LOWER THAN INLET END.
  - PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
  - DEWATER WORK AREA USING AN APPROVED EROSION AND SEDIMENT CONTROL PRACTICE AS SPECIFIED ON APPROVED PLAN.
  - KEEP POINT OF DISCHARGE FREE OF EROSION. MAINTAIN WATER TIGHT CONNECTIONS AND POSITIVE DRAINAGE. REPLACE SANDBAGS AND IMPERMEABLE SHEETING IF TORN.

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  
 C.20

APPROVED: DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 10-20-14  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 10-30-14  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 [Signature] 10/30/14  
 DIRECTOR

DESIGNED	DATE	REVISIONS	
		DATE	DESCRIPTIONS
DRAWN	DATE		
CHECKED	DATE		
APPROVED	DATE		

**B-4-5 STANDARD AND SPECIFICATION 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.

1. GENERAL USE  
 a. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.3 FOR THE APPROPRIATE PLANT HARDNESS 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 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 1/2 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 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 PASTURE ESTABLISHMENT IS NECESSARY AND WHICH 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 35 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: 1 1/2 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 1 1/2 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 SEEDING WITH ADEQUATE WATER FOR PLANT GROWTH (1/2 TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TEXTURE) UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDING ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT SEASONS, OR ON ADVERSE SITES.

PERMANENT SEEDING SUMMARY

NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTHS	FERTILIZER RATE (10-20-20)			LIME RATE
					N	P205	K2O	
1	Deertongue	20	Mar 1 to May 15 Aug 1 to Oct 15	1/4 - 1/2 in	45 POUNDS PER ACRE (1.0 lb/1000 sf)	90 lb/ac (2.0 lb/1000 sf)	90 lb/ac (2.0 lb/1000 sf)	2 TONS/AC (90 lb/1000 sf)
2	Creeping Red Fescue	20	Mar 1 to May 15 Aug 1 to Oct 15	1/4 - 1/2 in				
3	Virginia Wild Rye	5	Mar 1 to May 15 Aug 1 to Oct 15	1/4 - 1/2 in				

- B. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER).

1. GENERAL SPECIFICATIONS  
 a. CLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.  
 b. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4 INCH, PLUS MINUS 1/4 INCH, AT THE TIME OF CUTTING. MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROWTH AND THATCH. BROKEN PADS AND TORN OR UNEVEN ENDS WILL NOT BE ACCEPTABLE.  
 c. STANDARD SIZE SECTIONS OF SOD MUST BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED VERTICALLY WITH A FIRM GRASP ON THE UPPER 10 PERCENT OF THE SECTION.  
 d. SOD MUST NOT BE HARVESTED OR TRANSPORTED WHEN MOISTURE CONTENT (EXCESSIVELY DRY OR WET) MAY ADVERSELY AFFECT ITS SURVIVAL.  
 e. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPORTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.  
 2. SOD INSTALLATION  
 a. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE THE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.  
 b. LAY THE FIRST ROW OF SOD IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT AND TIGHTLY WEIGHED AGAINST EACH OTHER. STAGGER LATERAL JOINTS TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS.  
 c. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP, PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOLID CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.  
 d. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD ARE THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATION FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.  
 3. SOD MAINTENANCE  
 a. IN THE ABSENCE OF ADEQUATE RAINFALL, WATER DAILY DURING THE FIRST WEEK OR AS OFTEN AND SUFFICIENTLY AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF 4 INCHES. WATER SOD DURING THE HEAT OF THE DAY TO PREVENT WILTING.  
 b. AFTER THE FIRST WEEK, SOD WATERING IS REQUIRED AS NECESSARY TO MAINTAIN ADEQUATE MOISTURE CONTENT.  
 c. DO NOT MOW UNTIL THE SOD IS FIRMLY ROOTED. NO MORE THAN 1/3 OF THE GRASS LEAF MUST BE REMOVED BY THE INITIAL CUTTING OR SUBSEQUENT CUTTINGS. MAINTAIN A GRASS HEIGHT OF AT LEAST 3 INCHES UNLESS OTHERWISE SPECIFIED.

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**B-4-4 STANDARD AND SPECIFICATION FOR TEMPORARY STABILIZATION**

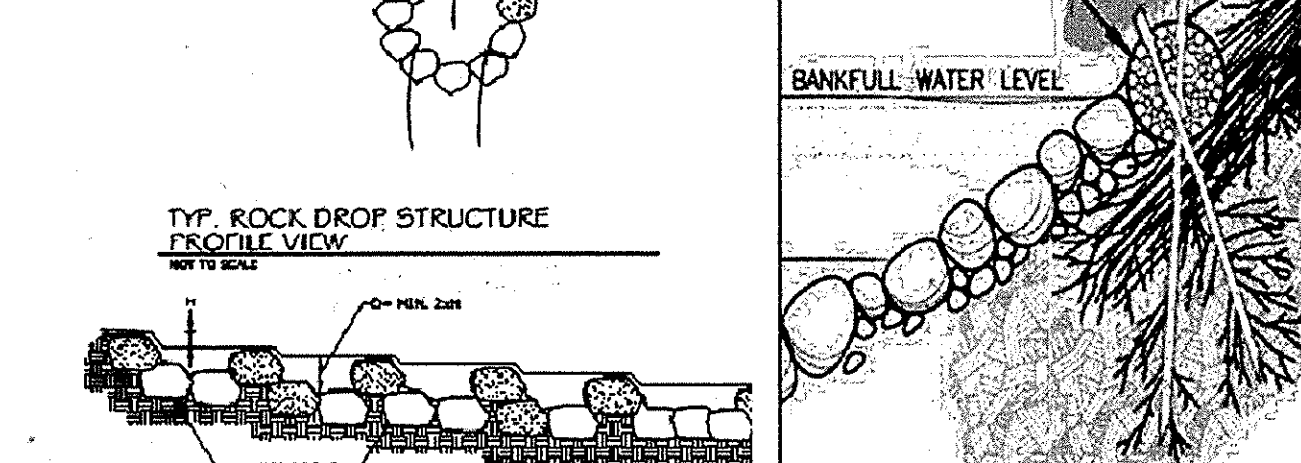
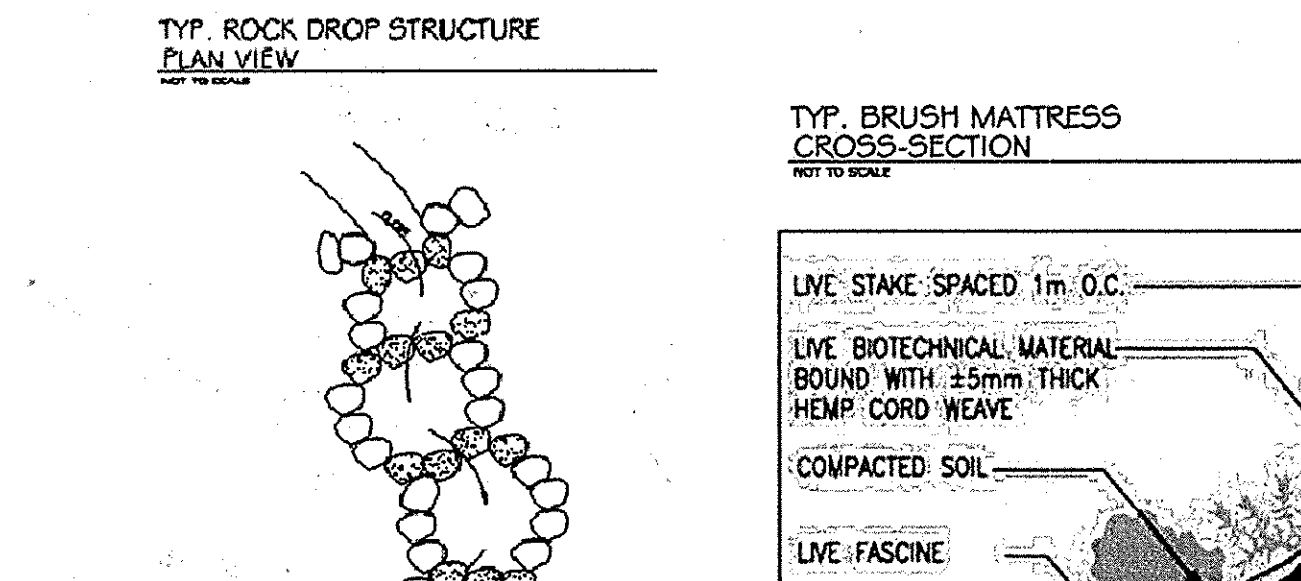
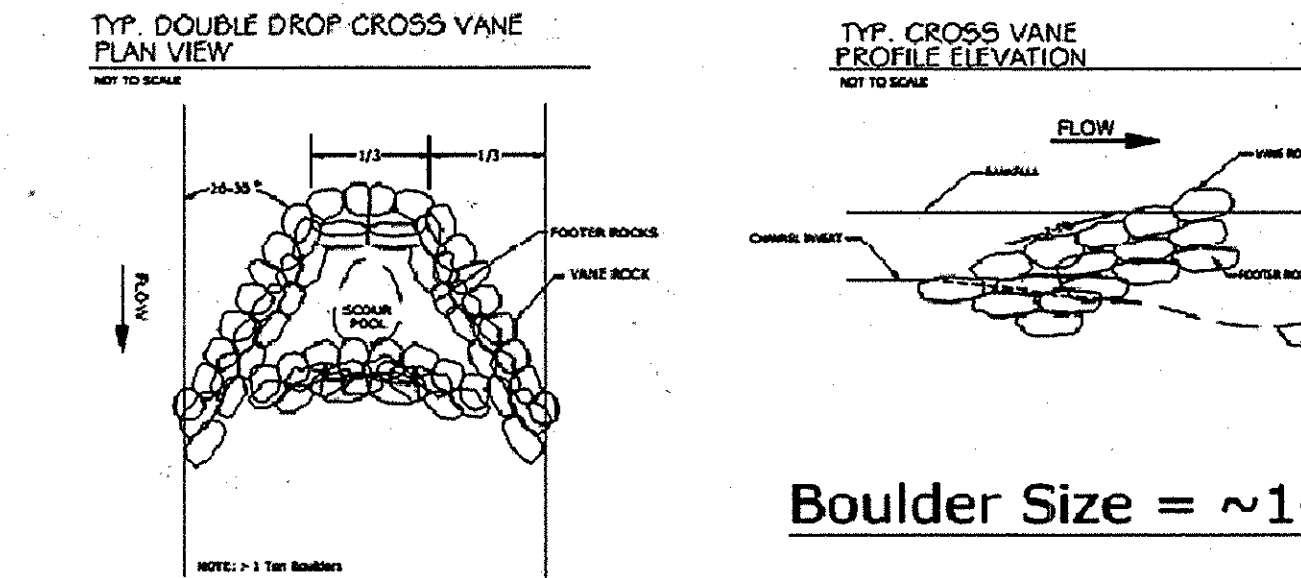
DEFINITION: TO STABILIZE DISTURBED SOILS WITH VEGETATION FOR UP TO 6 MONTHS.  
 PURPOSE: TO USE FAST GROWING VEGETATION THAT PROVIDES COVER ON DISTURBED SOILS.

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.

1. GENERAL USE  
 a. SELECT ONE OR MORE OF THE SPECIES OR SEED MIXTURES LISTED IN TABLE B.1 FOR THE APPROPRIATE PLANT HARDNESS 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, THE SUMMARY IS TO BE PLACED ON THE PLAN.

TEMPORARY SEEDING SUMMARY

NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTHS	FERTILIZER RATE (10-20-20)		LIME RATE
					N	P205	
	Deertongue	20	Mar 1 to May 15 Aug 1 to Oct 15	0.5			
	Creeping Red Fescue	20	Mar 1 to May 15 Aug 1 to Oct 15	0.5			
	Virginia Wild Rye	5	Mar 1 to May 15 Aug 1 to Oct 15	0.5			



Boulder Size = ~1-2 foot diameter

**STREAM RESTORATION PLAN TRIBUTARY TO LITTLE PATUXENT RIVER**

I. INTRODUCTION  
 THIS PLAN HAS BEEN DESIGNED TO RESTORE AND/OR STABILIZE APPROXIMATELY 500 LINEAR FEET OF PERENNIAL STREAM CHANNEL LOCATED ON THE CAMPUS OF HOWARD COMMUNITY COLLEGE IN HOWARD COUNTY, MARYLAND. THE PLAN IS PART OF GOVERNOR O'MALLEY'S STREAM RESTORATION CHALLENGE GRANT PROGRAM. PORTIONS OF THE EXISTING STREAM HAVE BECOME EXTREMELY DEGRADED OVER TIME DUE TO LAND USE CHANGES IN THE DRAINAGE AREA.

THIS PLAN WILL RESTORE ADEQUATE FLOODPLAIN ACCESS TO THE STREAM CHANNEL WHERE DEGRADATION HAS CAUSED THE STREAM CHANNEL TO BECOME ENTRENCHED, IN ORDER TO PROVIDE FLOODPLAIN ACCESS, STREAM-BANK GRADING AND INSTALLATION OF GRADE CONTROL STRUCTURES WILL BE REQUIRED. THESE STRUCTURES WILL BE BUILT OUT OF LARGE 1-2 TON BOULDERS THAT ARE AVAILABLE ON-SITE.

THE STREAM IS BROKEN INTO THREE SECTIONS BY CONCRETE CULVERTS. SECTION 1, LOCATED ADJACENT TO AN EXISTING PARKING GARAGE AND LOT WILL REQUIRE THE INSTALLATION OF TWO (2) DOUBLE DROP CROSS-VANE STRUCTURES IN ORDER TO DROP THE INVERT OF THE CHANNEL FROM THE EXISTING STABLE REACH OF THE STREAM TO AN EXISTING CULVERT. SECTION 2, IS A SHORT SECTION THAT WILL REQUIRE NO SIGNIFICANT STREAM-BANK GRADING. DEPOSITED FLUVIAL MATERIAL WILL BE REMOVED FROM THE BEGINNING OF THIS REACH AT THE CULVERT OUTFALL. A SMALL STILLING BASIN WILL BE INSTALLED IN THIS LOCATION TO PREVENT DOWNSTREAM DEGRADATION. SECTION 3, IS A LONG SECTION THAT WILL REQUIRE LITTLE-TO-NO STREAM INVERT GRADING. THE STREAM BANKS OF THIS SECTION WILL BE PULLED BACK TO PROVIDE AN ADEQUATE FLOODPLAIN AREA FOR THE STREAM. TWO ROCK STRUCTURES WILL BE INSTALLED IN THIS REACH TO REINFORCE EXISTING NATURAL NICK-POINTS.

THE SUBJECT CHANNEL IS CURRENTLY LOCATED WITHIN WOODED AREAS ON THE HOWARD COMMUNITY COLLEGE CAMPUS. ALL REASONABLE EFFORTS WILL BE MADE TO SAVE EXISTING TREES AND NATIVE VEGETATION. SUPPLEMENTAL RIPARIAN AND STREAM-BANK PLANTING WILL BE REQUIRED UNDER A SEPARATE PLANTING PLAN. WORK MUST BE PERFORMED AS CLOSE TO THE STREAM CHANNEL AS POSSIBLE. A PUMP AROUND DEWATERING DEVICE WILL BE UTILIZED TO DIVERT STREAM FLOW AND REMOVE WATER FROM THE WORK AREA. THIS PUMP AROUND MUST FOLLOW THE SPECIFICATIONS OUTLINED ON THE SEDIMENT AND EROSION CONTROL PLAN. THE PUMP AROUND WILL BE MOVED DOWNSTREAM AS WORK PROGRESSES.

**STREAM INFORMATION:**  
 UNNAMED TRIBUTARY TO LITTLE PATUXENT RIVER  
 HUC: 0206000602  
 USE IV-P: STREAM CLOSURE PERIOD - MARCH 1 THROUGH MAY 31, INCLUSIVE.  
 DRAINAGE AREA: ~45 ACRES (0.07 SQUARE MILES)

**CONDITIONS AND BEST MANAGEMENT PRACTICES FOR WORKING IN NON-TIDAL WETLANDS AND BUFFERS**

- ALL WORK PERFORMED IN NON-TIDAL WETLANDS AND BUFFERS WILL FOLLOW THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPs):
- MAINTAIN THE HYDROLOGIC REGIME OF THE WETLANDS ADJACENT TO THE AUTHORIZED ACTIVITY.
  - IF BACKFILL IS OBTAINED, USE ONLY CLEAN MATERIAL FREE OF WASTE, METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
  - REMOVE EXCESS FILL OR CONSTRUCTION MATERIAL OR DEBRIS TO AN UPLAND DISPOSAL AREA, OUTSIDE ANY FLOODPLAIN, WATERWAY, WETLAND, OR BUFFER.
  - RECTIFY ANY NON-TIDAL WETLANDS AND BUFFERS TEMPORARILY IMPACTED BY THE PROPOSED ACTIVITY. ALL STABILIZATION IN THE WETLAND AND BUFFER SHALL BE OF THE FOLLOWING RECOMMENDED SPECIES: ANNUAL RYEGRASS (Lolium multiflorum), MILLET (Setaria italica), OATS (Avena sp.), AND/OR RYE (Secale cereale). OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NON-TIDAL WETLANDS AND WATERWAYS DIVISION, KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN THE WETLANDS AND BUFFER. ALL TEMPORARY FILLS SHALL BE REMOVED IN THEIR ENTIRETY ON OR BEFORE THE COMPLETION OF CONSTRUCTION.
  - TO PROTECT IMPORTANT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM AS FOLLOWS: CLASS IV-P WATERS: IN-STREAM WORK MAY NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.
  - NO REMOVAL OF VEGETATION, GRADING, FILLING, DRAINING, OR OTHER ALTERATION OF THE NON-TIDAL WETLANDS OR BUFFER OUTSIDE THE LIMITS OF DISTURBANCE SHALL OCCUR WITHOUT WRITTEN AUTHORIZATION FROM THE WATER MANAGEMENT ADMINISTRATION.

**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
- THE STOCKPILE LOCATION AND ALL RELATED SEDIMENT CONTROL PRACTICES MUST BE CLEARLY INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN.
  - 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.
  - RUNOFF FROM THE STOCKPILE AREA MUST DRAIN TO A SUITABLE SEDIMENT CONTROL PRACTICE.
  - ACCESS THE STOCKPILE AREA FROM THE UPGRADE SIDE.
  - 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.
  - WHERE RUNOFF CONCENTRATES ALONG THE TOE OF THE STOCKPILE FILL, AN APPROPRIATE EROSION/SEDIMENT CONTROL PRACTICE MUST BE USED TO INTERCEPT THE DISCHARGE.
  - 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.
  - 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.

**HOWARD SOIL CONSERVATION DISTRICT**  
 THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT  
 [Signature] 10/15/14  
 HOWARD SOIL CONSERVATION DISTRICT DATE

**HOWARD COMMUNITY COLLEGE**  
 STREAM RESTORATION PLAN  
 SEDIMENT AND EROSION CONTROL DETAILS  
 SUBDIVISION: HOWARD COMMUNITY COLLEGE  
 PARCEL 47 ZONED PDR & NT  
 TAX MAP 35, 36 BLOCK 6 & 1  
 ZONING: R-NT-PDR ELECTION DISTRICT 5  
 COLUMBIA, MARYLAND (HOWARD COUNTY)  
 SCALE: NONE DATE: AUGUST 2014 TTG PROJECT No. 513030 SHEET 10 OF 11

**OWNER / DEVELOPER**  
**HOWARD COMMUNITY COLLEGE**  
 10901 LITTLE PATUXENT PKWY.  
 COLUMBIA, MD 21044  
 TEL: (443) 518-1000

DYLAN HEDRICK  
 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. 41272  
 EXP. DATE 01-13-2016



**B-4  
STANDARD AND SPECIFICATION FOR VEGETATIVE STABILIZATION**

**DEFINITION:**  
USING VEGETATION AS COVER TO PROTECT EXPOSED SOIL FROM EROSION.

**PURPOSE:**  
TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL.

**CONDITIONS WHERE PRACTICE APPLIES:**  
ON ALL DISTURBED AREAS NOT STABILIZED BY OTHER METHODS. THIS SPECIFICATION IS DIVIDED INTO SECTIONS ON INCREMENTAL STABILIZATION; SOIL PREPARATION, SOIL AMENDMENTS AND TOPSOILING; SEEDING AND MULCHING; TEMPORARY STABILIZATION; AND PERMANENT STABILIZATION.

**EFFECTS ON WATER QUALITY AND QUANTITY:**  
STABILIZATION PRACTICES ARE USED TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL. WHEN SOIL IS STABILIZED WITH VEGETATION, THE SOIL IS LESS LIKELY TO ERODE AND MORE LIKELY TO ALLOW INFILTRATION OF RAINFALL, THEREBY REDUCING SEDIMENT LOADS AND RUNOFF TO DOWNSTREAM AREAS.

**PLANTING VEGETATION IN DISTURBED AREAS WILL HAVE AN EFFECT ON THE WATER BUDGET, ESPECIALLY ON VOLUMES AND RATES OF RUNOFF. INFILTRATION, EVAPORATION, TRANSPIRATION, PERCOLATION, AND GROUNDWATER RECHARGE. OVER TIME, VEGETATION WILL INCREASE ORGANIC MATTER CONTENT AND IMPROVE THE WATER HOLDING CAPACITY OF THE SOIL AND SUBSEQUENT PLANT GROWTH.**

**VEGETATION WILL HELP REDUCE THE MOVEMENT OF SEDIMENT, NUTRIENTS, AND OTHER CHEMICALS CARRIED BY RUNOFF TO RECEIVING WATERS. PLANTS WILL ALSO HELP PROTECT GROUNDWATER SUPPLIES BY ASSIMILATING THOSE SUBSTANCES PRESENT WITHIN THE ROOT ZONE.**

**SEDIMENT CONTROL PRACTICES MUST REMAIN IN PLACE DURING GRADING, SEEDBED PREPARATION, SEEDING, MULCHING, AND VEGETATIVE ESTABLISHMENT.**

**ADEQUATE VEGETATIVE ESTABLISHMENT**

**INSPECT SEEDED AREAS FOR VEGETATIVE ESTABLISHMENT AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDINGS WITHIN THE PLANTING SEASON.**

1. ADEQUATE VEGETATIVE STABILIZATION REQUIRES 95 PERCENT GROUND COVER.
2. IF AN AREA HAS LESS THAN 40 PERCENT GROUND COVER, RESTABILIZE FOLLOWING THE ORIGINAL RECOMMENDATIONS FOR LIME, FERTILIZER, SEEDBED PREPARATION, AND SEEDING.
3. IF AN AREA HAS BETWEEN 40 AND 94 PERCENT GROUND COVER, OVER-SEED AND FERTILIZE USING HALF OF THE RATES ORIGINALLY SPECIFIED.
4. MAINTENANCE FERTILIZER RATES FOR PERMANENT SEEDING ARE SHOWN IN TABLE B.6 OF THE 2011 MARYLAND STD. AND SPECS FOR SOIL EROSION AND SEDIMENT CONTROL MANUAL.

**B-4-2 STANDARD AND SPECIFICATION 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.

**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 ROUNDED 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.
  - d. 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 LOWGRASS 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.
  - e. 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.
  - f. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLAN OR AS INDICATED BY THE RESULTS OF A SOIL TEST.
  - g. 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 IMPROVE THE SURFACE WHERE SITE CONDITIONS WITH 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 FRAGILE. SEEDING LOOSENING MAY BE UNNECESSARY ON HEAVILY DISTURBED AREAS.
2. TOPSOILING
  - a. 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.
  - b. 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 NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
    - 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 AGRICULTURAL ENGINEER. TOPSOIL MUST BE MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND MUST CONTAIN LESS THAN 5 PERCENT BY VOLUME OF ODORS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAN 1 1/2 INCHES IN DIAMETER.
    - b. TOPSOIL MUST BE FREE OF NOXIOUS PLANTS PARTS SUCH AS BERNIADA 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.

**B. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)**

1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATES 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 BURNED 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 90 PERCENT WILL PASS THROUGH A #100 MESH SIEVE AND 98 TO 100 PERCENT WILL PASS THROUGH A #200 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  
STANDARD AND SPECIFICATION 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.

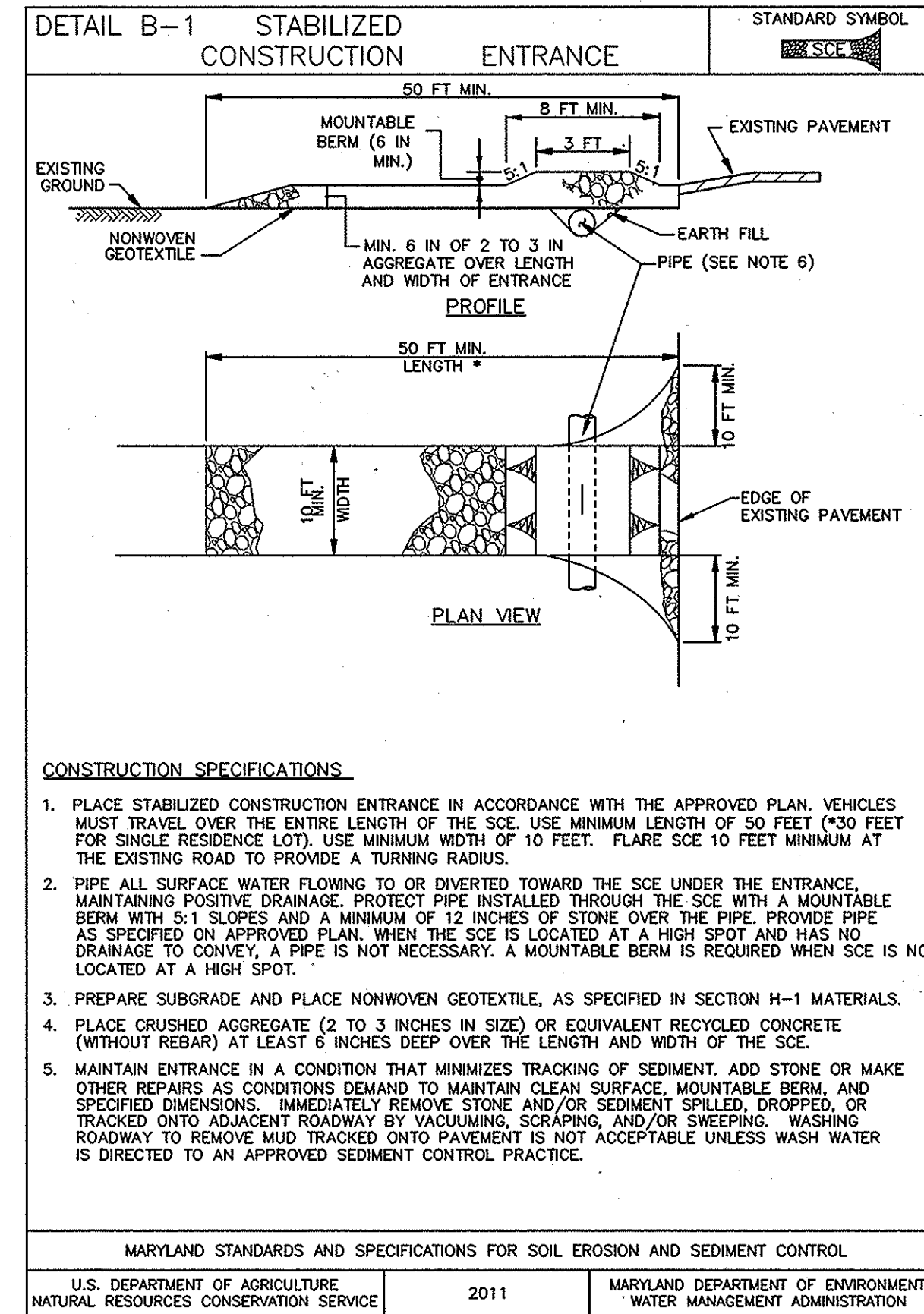
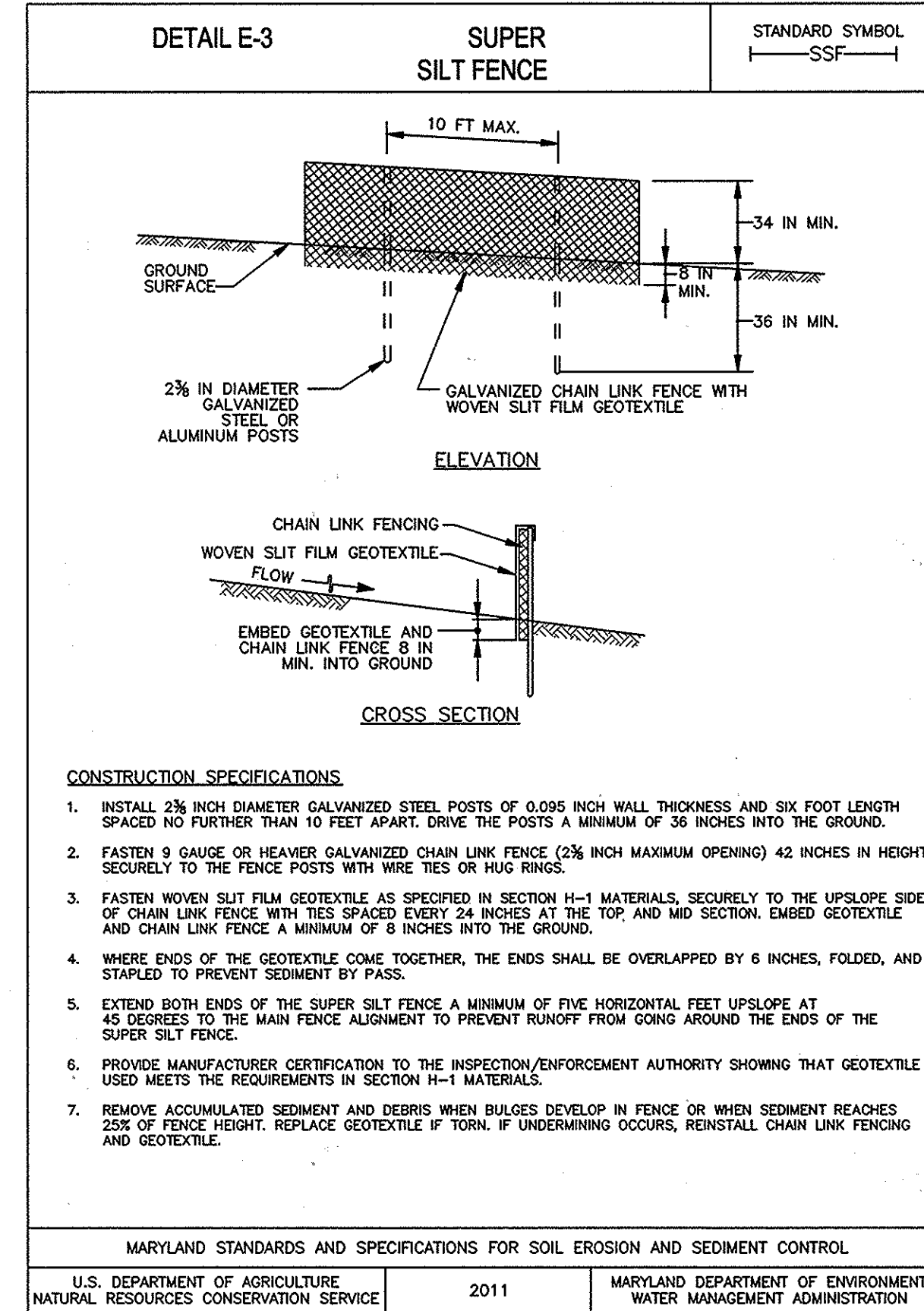
**CONDITIONS WHERE PRACTICE APPLIES:**  
TO THE SURFACE OF ALL PERIMETER CONTROLS, SLOPES, AND ANY DISTURBED AREA NOT UNDER ACTIVE GRADING.

**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 AND 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 MATERIAL.
2. APPLICATION
  - a. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DRIP 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.
    - iii. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
    - iv. 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.
  - b. 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; P205 (PHOSPHOROUS), 200 POUNDS PER ACRE; K2O (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 BURNED OR HYDRATED LIME WHEN HYDROSEEDING.
    - iii. MIX SEED AND FERTILIZER ON SITE AND SEED IMMEDIATELY AND WITH 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, MOULDY, CAVED, 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 UNIFORMITY SPREAD SLURRY.
    - ii. WCFM, INCLUDING DYE, MUST NOT INHIBIT 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 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 DRG (AGRO-TACK), DCA-70, PEROSET, TERRA TACK II, TERRA TACK AIR OR OTHER APPROVED EQUIVALENTS MAY BE USED. FOLLOW APPLICATION RATES AS SPECIFIED BY THE MANUFACTURER. APPLICATION OF LIQUID BINDERS NEED 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 MANUFACTURE RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 300 TO 3,000 FEET LONG.



**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED OPEN CHANNEL SYSTEMS (O-1 AND O-2)**

1. THE OPEN CHANNEL SYSTEM SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
2. THE OPEN CHANNEL SHALL BE MOVED A MINIMUM OF AS NEEDED DURING THE GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 6 INCHES.
3. DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE OPEN CHANNEL SYSTEM SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
5. REMOVE SILT IN THE OPEN CHANNEL SYSTEM WHEN IT EXCEEDS 25% OF THE ORIGINAL WVD.

**OPERATION AND MAINTENANCE SCHEDULE FOR BIO-RETENTION AREAS (F-6)**

1. ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING.
2. SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL. THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISEASED VEGETATION INDICATED BEYOND TREATMENT, TREATMENT OF ALL DISEASED TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.
3. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
4. SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

APPROVED: DEPARTMENT OF PLANNING AND ZONING

*Chad Clark* 10/20/14  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

*Kate Shen Duma* 10/30/14  
CHIEF, DIVISION OF LAND DEVELOPMENT

*Barbara M. Cagle* 10/29/14  
DIRECTOR

DESIGNED		DATE		REVISIONS	
DATE	BY	DATE	BY	DESCRIPTIONS	

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D'YLAN HEDRICK

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. 141272 EXP. DATE 01-13-2016

**OWNER / DEVELOPER**  
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**HOWARD SOIL CONSERVATION DISTRICT**

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

*John K. Roberts* 10/15/14  
HOWARD SOIL CONSERVATION DISTRICT

**HOWARD COMMUNITY COLLEGE**

**STREAM RESTORATION PLAN**  
SEDIMENT AND EROSION CONTROL DETAILS

SUBDIVISION: HOWARD COMMUNITY COLLEGE  
PARCEL 47 ZONED PDR & NT  
TAX MAP 35, 36 BLOCK 6 & 1  
ZONING: R-NT/POR ELECTION DISTRICT 5  
COLUMBIA, MARYLAND (HOWARD COUNTY)

SCALE: NONE DATE: AUGUST 2014 TTG PROJECT No. 513030 SHEET 11 OF 11