

# PHASE II OFF-SITE STREAM MITIGATION PLAN

## PRINCIPIO BUSINESS PARK - BUILDING SITE 'C'

### CECIL COUNTY, MARYLAND

#### GENERAL NOTES

1. APPLICANT: STEWART PROPERTIES  
1723 PRINCIPIO FURNACE ROAD  
PERRYVILLE, MARYLAND 21903  
CONTACT: RYAN WOERNER
2. PLAN PREPARER: GEO-TECHNOLOGY ASSOCIATES, INC. (GTA)  
3445 BOX HILL CORPORATE CENTER DRIVE, SUITE A  
ABINGDON, MARYLAND 21009  
CONTACT: TRACIE BOYER  
PHONE: (410) 515-9446  
EMAIL: TBOYER@GTAENG.COM
3. LOCATION: THE PROPOSED STREAM MITIGATION AREA IS LOCATED ALONG AN UNNAMED, PERENNIAL TRIBUTARY TO PLUM CREEK AND IS LOCATED WEST OF OLD ELK NECK ROAD IN THE ELKTON AREA OF CECIL COUNTY, MARYLAND.
4. NOTE THAT NO IN-STREAM WORK IS TO BE PERFORMED FROM MARCH 1 THROUGH JUNE 15, INCLUSIVE, OF ANY GIVEN YEAR.
5. EARTHMOVING CONTRACTOR MUST CONTACT MISS UTILITY (CALL BEFORE YOU DIG) AT 1-800-257-7777 TO GET UNDERGROUND UTILITIES MARKED PRIOR TO BEGINNING CONSTRUCTION.
6. STEWART PROPERTIES (THE PERMITTEE) AND THE SELECTED CONTRACTOR(S) ARE THE RESPONSIBLE PARTIES FOR THIS PROJECT.
7. A QUALIFIED STREAM RESTORATION SPECIALIST SHOULD PROVIDE CONSTRUCTION OVERSIGHT FOR THIS STREAM MITIGATION PROJECT.
8. MAJOR PLAN REVISIONS DUE TO UNFORESEEN SITE CONDITIONS MUST BE APPROVED BY THE U.S. ARMY CORPS OF ENGINEERS AND THE CECIL COUNTY SOIL CONSERVATION DISTRICT PRIOR TO THOSE CHANGES BEING CONSTRUCTED. HOWEVER, CORRECTIVE ACTION NECESSARY TO AVOID IMMEDIATELY POSED SEDIMENTATION AND/OR OTHER ENVIRONMENTAL THREATS MUST BE TAKEN.
9. A COPY OF THE APPROVED PLANS AND PERMIT(S) MUST BE ON-SITE DURING CONSTRUCTION.
10. ALL EXCESS SOIL AND ROCK MATERIAL MUST BE DISPOSED OF IN APPROVED UPLANDS LIMIT OF DISTURBANCE (LOD) OUTSIDE THE STREAM CHANNEL AND FLOODPLAIN. NO WETLANDS ARE PROPOSED TO BE PERMANENTLY IMPACTED BY THIS PROJECT AND TEMPORARY WETLAND IMPACTS THAT ARE ASSOCIATED WITH PROTECTIVE TIMBER MATTING AND MINOR GRADING DURING CONSTRUCTION WILL BE RESTORED TO PRE-EXISTING CONDITIONS.
11. THIS PHASE II STREAM MITIGATION PLAN WAS PREPARED ON AN EXISTING TOPOGRAPHIC BASE PLAN PROVIDED BY MORRIS AND RITCHIE ASSOCIATES, INC. (MRA).
12. ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FEDERAL INSURANCE RATE MAP (FIRM) NUMBER 24015C0160E, EFFECTIVE MAY 4, 2015, THERE IS NO PREVIOUSLY MAPPED 100-YEAR FLOODPLAIN WITHIN THE PROPOSED MITIGATION AREA.
13. THIS STREAM MITIGATION PROJECT PROPOSES THE RESTORATION OF AN UNNAMED, PERENNIAL TRIBUTARY TO PLUM CREEK; PLUM CREEK DRAINS TO THE ELK RIVER. WITHIN THE VICINITY OF THE PROJECT, TRIBUTARIES TO THE ELK RIVER ARE LISTED IN THE CODE OF MARYLAND REGULATIONS (COMAR) 26.08.02.08 AS DESIGNATED USE "CLASS I: WATER CONTACT RECREATION, AND PROTECTION OF NONTIDAL WARMWATER AQUATIC LIFE."
14. THIS PLAN WAS PREPARED BY GTA FOR THE SOLE AND EXCLUSIVE USE OF STEWART PROPERTIES, ANY REPRODUCTION OF THIS PLAN BY ANY OTHER PERSON WITHOUT THE EXPRESSED WRITTEN PERMISSION OF GTA AND STEWART PROPERTIES IS UNAUTHORIZED, AND SUCH USE IS AT THE SOLE RISK OF THE USER.

#### STANDARD NOTES FOR UTILITY NOTIFICATION

1. CALL "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF WORK.
2. NOTICE OF INTENT TO EXCAVATE NUMBERS 22384820 & 22385050.
3. CONTACT MADE BY GTA ON MAY 23, 2022.



#### CONSTRUCTION SEQUENCE PROVISIONS

1. CONSTRUCTION TO TAKE PLACE WHEN NO SNOW IS ON THE GROUND WHEN DRIER CONDITIONS ARE FAVORABLE.
2. PLANTING OF CONTAINERIZED TREES, SHRUBS IN THE MITIGATION AREAS SHOULD BE COMPLETED DURING THE SPRING OR FALL FOLLOWING CONSTRUCTION. INSTALLATION OF THE LIVE STAKES SHOULD BE COMPLETED IN MARCH OR EARLY APRIL FOLLOWING CONSTRUCTION.

#### NOTIFICATIONS PRIOR TO CONSTRUCTION

1. CONTACT THE PROPERTY OWNERS REPRESENTATIVE - RYAN WOERNER TEN (10) DAYS PRIOR TO CONSTRUCTION.
2. CONTACT CECIL COUNTY SOIL CONSERVATION DISTRICT AT (410)-398-4411 TEN (10) DAYS PRIOR TO BEGINNING CONSTRUCTION.
3. CONTACT MATT HYNSON OF THE U.S. ARMY CORPS OF ENGINEERS AT (410)-962-4503 TEN (10) DAYS PRIOR TO BEGINNING CONSTRUCTION.
4. CONTACT THE MARYLAND DEPARTMENT OF THE ENVIRONMENT'S WATER AND SCIENCE ADMINISTRATION COMPLIANCE PROGRAM AT (410) 537-3510 TEN (10) DAYS PRIOR TO BEGINNING CONSTRUCTION FOR START OF WORK NOTIFICATION.
5. CONTACT MRS. TRACIE BOYER OF GTA AT (410) 515-9446 TEN (10) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

#### CONSTRUCTION SEQUENCE

##### PHASE I - CULVERT CROSSING AREA STA. 100+00 TO 102+35

1. ESTABLISH TRAFFIC SAFETY PROTOCOLS FOR PROPOSED CONSTRUCTION WORK THROUGH PROPER WORK AHEAD SIGNAGE AND PROPER TRAFFIC FLAGGING PERSONNEL ALONG OLD ELK NECK ROAD WHEN LARGE TRUCKS AND CONSTRUCTION EQUIPMENT ARE ENTERING AND LEAVING THE SUBJECT PROPERTIES WHERE STREAM MITIGATION WORK IS PROPOSED TO OCCUR. COORDINATE WITH THE CECIL COUNTY DEPARTMENT OF PUBLIC WORKS FOR APPLICABLE LOCAL REQUIREMENTS.
2. ENTER PROJECT SITE FROM THE EXISTING DRIVEWAY LOCATED AT 2287 OLD ELK NECK ROAD VIA LANDS OWNED BY THE STATE OF MARYLAND AND DOMINIC AND MARY SCOLARO. THE EXISING DRIVEWAY TO BE UTILIZED FOR CONSTRUCTION IS THE SOLE ENTRANCE TO THE SCOLARO PROPERTY AND IS USED BY THE RESIDENTS ON A DAILY BASIS.
3. ESTABLISH THE PRIMARY CONSTRUCTION STAGING AREA SOUTHEAST OF THE CULVERT CROSSING AND INSTALL THE SILT FENCE AS SHOWN.
4. INSTALL FILTER LOGS OR SILT FENCE ALONG THE BOUNDARIES OF THE EXISTING WETLANDS.
5. AVOID REMOVAL OF ANY TREES LARGER THAN 18-INCHES OR GREATER IN DIAMETER WHENEVER POSSIBLE. CAREFULLY REMOVE SELECT TREES THAT CAN'T BE AVOIDED FROM STREAM MITIGATION WORK AND THOSE THAT MAY BE IN LINE OF THE TEMPORARY CONSTRUCTION ACCESS PATHWAY. SAVE AND STOCKPILE ALL 12 TO 18-INCH DIAMETER LOGS FOR POTENTIAL USE IN CONSTRUCTION OF WOODY IN-STREAM STRUCTURES. ANY LARGER TREES THAT MAY BE OF SAW TIMBER VALUE SHOULD FIRST BE OFFERED TO THE LANDOWNER. THE CONTRACTOR IS RESPONSIBLE FOR PROPER DISPOSAL OF EXCESS BRUSH AND TREE MATERIAL.
6. STOCKPILE AND HAVE READY ALL MATERIALS NECESSARY FOR CONSTRUCTING PUMP AROUND UPSTREAM COFFER DAMS AND THE DOWNSTREAM SEDIMENT FILTERS FOR WORK AREAS.
7. STARTING UPSTREAM, PROGRESSIVELY INSTALL AND REMOVE COFFER DAMS TO PUMP AROUND EACH WORK AREA (USING PRACTICES SHOWN IN E&S PLAN DETAILS AND COMPLETE WORK IN THE DRY. UTILIZE PROPER SIZED PUMPS TO BEGIN DEWATERING AND PUMPING AROUND EACH WORK AREA.
8. AT THE DRIVEWAY'S CURRENT CROSSING OF THE UNNAMED TRIBUTARY TO PLUM CREEK DOWNSTREAM CLOSEST TO OLD ELK NECK ROAD, CONSTRUCT THE ALIGNED CHANNEL WITH A PROPOSED BANKFULL WIDTH OF APPROXIMATELY 17 TO 17.5 FEET. THE NEW BOX CULVERT CROSSING TO BE INSTALLED AT THIS LOCATION SHOULD BE CONSTRUCTED IN THE ALIGNED CHANNEL IN THE DRY AND A TEMPORARY BRIDGE CROSSING WILL BE NEEDED ALONG THE DRIVEWAY FOR RESIDENT PASSAGE AS WORK ENDS EACH DAY.
9. WORKING IN ONE 200-FOOT SECTION AREA AT A TIME, CUT, FILL AND INSTALL CROSS VANES, J-HOOK, TOE WOOD, AND IMBRICATED TOE ROCK IN THE STREAM MITIGATION AREA ACCORDING TO GRADING PLANS AND STRUCTURE DETAILS. FOR EACH STRUCTURE TYPE, FOLLOW INSTALLATION INSTRUCTIONS PROVIDED ON THE IN-STREAM STRUCTURES DETAIL SHEET. FOR CROSS VANE AND J-HOOK STRUCTURES, STAKEOUT THE EDGES OF PROPOSED BANKFULL WIDTH (16.1 FEET), INSTALL CROSS VANES AND J-HOOK STRUCTURES, MAKING SURE NOT TO EXCEED 5.0 TO 7.0 PERCENT SLOPES ON THE VANE ARMS TO THE PROPOSED BANKFULL WIDTH ON THE STREAM. OUTSIDE VANE ARMS SHOULD BE INSTALLED AT 25° ANGLES AS SHOWN ON GRADING PLANS. UTILIZE GEOTEXTILE BEHIND THE CROSS VANES AND J-HOOKS AND CHINK ANY GAPS.
10. WHERE A CHANNEL RELOCATION IS PROPOSED, CONSTRUCT THE REALIGNED CHANNEL AND ANY PROPOSED IN-STREAM GRADE CONTROL STRUCTURES IN THE DRY. STABILIZING FRESHLY GRADED AREAS WITH SEED, ADD AT LEAST 1-FOOT OF FERTILE TOP SOIL, AND EROSION CONTROL MATTING. EXCAVATED SOILS SHALL BE TRANSPORTED TO THE STOCKPILES UNTIL THE REALIGNED CHANNEL IS STABLE AND ABLE TO CONVEY STREAM FLOW. USE PUMP AROUND PRACTICES TO MANAGE STREAM FLOW. CONSTRUCT CHANNEL BLOCKS AT THE ENTRANCE AND EXIT OF EACH EXISTING CHANNEL CUTOFF, AND COMPLETE GRADING AS SHOWN. REDIRECT STREAM FLOW THROUGH THE RELOCATED CHANNEL SECTION ONCE COMPLETED. SEED, MULCH AND/OR INSTALL EROSION CONTROL MATTING OVER THE OLD CHANNEL.
11. BE CERTAIN TO UTILIZE GEOTEXTILE UNDER FOOTER ROCKS AND BEHIND IMBRICATED TOE ROCK COURSES AND BACK FILL WITH SUITABLE SOILS. NEWLY GRADED STABILIZED BANKS SHOULD CONTAIN AT LEAST 1-FOOT OF FERTILE TOP SOIL ON THEIR SURFACES FOR PROPOSED RIPARIAN PLANTINGS. SOIL FILL BEHIND TOE ROCK AND STREAM STRUCTURES SHOULD BE PROPERLY COMPACTED PRIOR TO INSTALLING EROSION CONTROL MATTING.
12. PROGRESSIVELY SEED AND MULCH ALL FRESHLY GRADED AREAS WITHIN THE LIMIT OF DISTURBANCE (LOD) AS STREAM MITIGATION PROCEEDS DOWNSTREAM. INSTALL SOIL STABILIZATION MATTING (TENSAR NAG C125BN OR EQUIVALENT) WITH A SHEAR STRESS VALUE OF 2.35 LBS/FT<sup>2</sup> ON ALL GRADED SECTIONS OF STREAM BANK ABOVE THE NORMAL FLOW CHANNEL. SOIL STABILIZATION MATTING SHOULD ALSO BE ON ALL SLOPES THAT ARE 3:1 OR STEEPER. RESEED DISTURBED AREAS AND STAGING AREAS AND REMOVE ANY CONSTRUCTION EQUIPMENT AND DEBRIS AFTER COMPLETING EACH MITIGATION AREA. PROCEED WITH WORK IN CONSECUTIVE 200 - FOOT SECTIONS TO THE DOWNSTREAM MOST END OF THE PROJECT AREA.

##### PHASE II - STREAM MITIGATION STA. 0+00 TO 15+64

13. REPEAT STEPS 1 AND 2.
14. THE DISTANCE OF THE UNIMPROVED STONE/DIRT DRIVEWAY IS APPROXIMATELY 1,400 FEET FROM ITS ENTRANCE TO THE STAGING AREA THAT WILL BE LOCATED IN AN EXISTING ELEVATED FIELD WEST OF OLD ELK NECK ROAD AND THE EXISTING CULVERT CROSSING. A STABILIZED ROCK CONSTRUCTION ENTRANCE SHOULD BE CONSTRUCTED AT THE ENTRANCE TO THE FIELD AND THE STAGING AREA AS SHOWN ON THE EROSION AND SEDIMENT (E&S) CONTROL PLAN SHEETS.
15. ESTABLISH THE PRIMARY CONSTRUCTION STAGING AREA APPROXIMATELY 200 FEET SOUTHWEST OF THE STABILIZED CONSTRUCTION ENTRANCE AND INSTALL THE SILT FENCE AS SHOWN.
16. ESTABLISH THE WESTERN TEMPORARY CONSTRUCTION ACCESS PATHWAY FROM THE PRIMARY CONSTRUCTION STAGING AREA AT AN ABANDONED ACCESS ROAD THAT DESCENDS DOWN THE SLOPE TO THE FLOODPLAIN AREA. CLEAR AND GRUB ANY SMALL TREES ALONG THE PROPOSED TEMPORARY CONSTRUCTION ACCESS PATHWAY AND CONSTRUCT THE TWO MOUNTABLE BERMS AT THE LOCATIONS SHOWN.
17. INSTALL TEMPORARY BRIDGES OVER THE UNNAMED TRIBUTARY TO PLUM CREEK AND THE ABANDONED OFFSHOOT CHANNEL WHEN NEEDED AS SHOWN ON E&S CONTROL PLANS TO ACCESS THE MOST UPSTREAM SECTION OF THE STREAM MITIGATION AREA.
18. REPEAT STEPS 4 THROUGH 12.
19. RESTORE ALL STAGING AREAS AND THE TEMPORARY CONSTRUCTION ACCESS PATHWAY ALONG THE NORTHERN BANK OF THE STREAM MITIGATION AREA TO ORIGINAL GRADES AND SEED AND MULCH WITH THE SEED MIX INDICATED IN THE PLANTING PLAN.
20. REMOVE THE TEMPORARY BRIDGE CROSSINGS AND RESTORE THE TEMPORARY CONSTRUCTION ACCESS PATHWAY AND SOUTHERNMOST STAGING AREA TO ORIGINAL GRADES AND SEED AND MULCH WITH THE SEED MIX INDICATED IN THE PLANTING PLAN.
21. REMOVE THE SILT SOCK ADJACENT TO ALL WETLANDS AND RESTORE ALL TEMPORARY CONSTRUCTION ACCESS PATHWAYS AND THE STAGING & MATERIAL STOCKPILE AREAS TO ORIGINAL GRADES AND SEED AND MULCH WITH THE SEED MIXES INDICATED IN THE PLANTING PLAN.

##### PHASE III - STREAM MITIGATION STA. 18+40 TO 21+60

22. REPEAT STEPS 1 AND 2.
23. ESTABLISH THE EASTERN TEMPORARY CONSTRUCTION ACCESS PATHWAY FROM THE SCOLARO PROPERTY'S UNIMPROVED STONE/DIRT DRIVEWAY TO COMPLETE CONSTRUCTION IN THE EASTERN SECTION OF THE STREAM MITIGATION AREA.
24. REPEAT STEPS 4 THROUGH 21.
25. AS PER THE LOCATIONS AND SPECIFICATIONS ON THE PLANTING PLAN, PLANT TREES AND SHRUBS IN RIPARIAN BUFFER, REGRADED SLOPES AND FLOODPLAIN AREAS (OUTSIDE THE BANK FULL CHANNEL) IN THE SPRING FOLLOWING CONSTRUCTION.
26. INSTALL LIVE STAKES AS SHOWN ON THE PLANTING PLAN IN EARLY SPRING FOLLOWING CONSTRUCTION.
27. ONCE ALL CONSTRUCTION IS COMPLETED, REMOVE THE STABILIZED CONSTRUCTION ENTRANCES. RESTORE ALL EQUIPMENT TRACK OR TIRE RUTS TO ORIGINAL GRADES AND SEED AND MULCH ANY DISTURBED SOILS ACCORDING TO THE E&S PLAN.

#### INDEX OF SHEETS

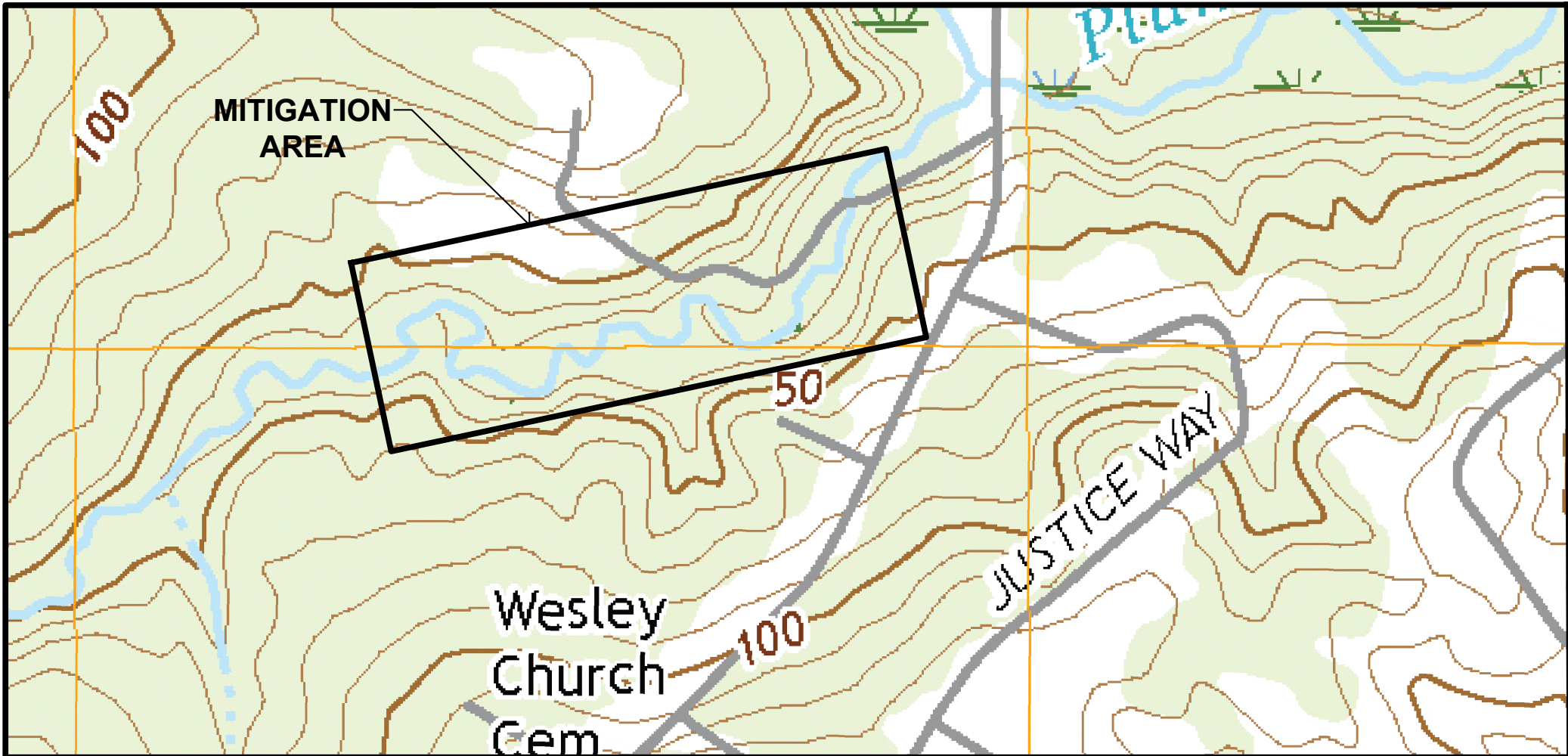
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#### MITIGATION NARRATIVE

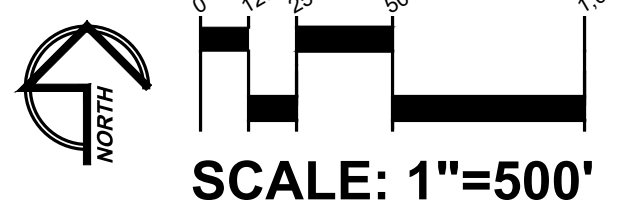
TO COMPENSATE FOR PERMANENT IMPACTS TO APPROXIMATELY 1,723± LINEAR FEET OF INTERMITTENT AND PERENNIAL STREAM FROM THE CONSTRUCTION OF THE PRINCIPIO SITE 'C' WAREHOUSE PROPERTY, STEWART PROPERTIES PROPOSES TO RESTORE A CONTIGUOUS 2,100 ± LINEAR FOOT SEGMENT OF A PERENNIAL UNNAMED TRIBUTARY TO PLUM CREEK FOR COMPENSATORY MITIGATION ON AN OFFSITE PROPERTY OWNED BY DOMINIC AND MARY SCOLARO IN CECIL COUNTY MARYLAND. IN ADDITION, ANOTHER 230 FEET OF STREAM WILL BE RELOCATED AND RESTORED AS PART OF A CULVERT REPLACEMENT AND STREAM IMPROVEMENT EFFORTS. THE PROPOSED STREAM MITIGATION CHANNEL HAS A DRAINAGE AREA OF APPROXIMATELY 2.2 SQUARE MILES. THE PROPOSED RESTORATION CHANNEL EXHIBITS ACTIVE STREAM BANK EROSION, CHANNEL HEAD-CUTTING AND SEDIMENTATION, AND IN SOME AREAS, LATERAL MIGRATION.

TO IMPROVE THE STREAM'S HABITAT AND FUNCTIONAL VALUES, THIS PHASE II STREAM MITIGATION PLAN INCLUDES THE RELOCATION OF KEY ERODED SECTIONS OF OXBOW CHANNELS, REGRAIDING ERODED STREAM BANKS TO MORE STABLE SLOPES, INSTALLING IN-STREAM FLOW AND HABITAT STRUCTURES, AND IMPROVING RIPARIAN BUFFER HABITAT THROUGH THE PLANTING OF ADDITIONAL NATIVE RIPARIAN TREES, SHRUBS AND LIVE STAKES ALONG THE RESTORED STREAM BANKS. AT LEAST TWO OXBOW CUTOFF CHANNELS WILL BE CONVERTED TO VERNAL POOLS WHILE OTHERS WILL BE RECLAIMED AND PLANTED WITH TREES. TO IMPROVE INSTREAM FLOW AND HABITAT, THE MITIGATION INCLUDES THE INCORPORATION OF CROSS VANES, J-HOOKS, TOE WOOD AND AN IMPROVED RIFLE-POOL COMPLEX. IN AREAS WHERE WETLANDS OR MATURE FOREST AND STEEP SLOPE AREAS LIMIT GRADING AND FURTHER ENCROACHMENT INTO THE FLOODPLAIN, IMBRICATED TOE ROCK WILL BE INSTALLED ALONG THE OUTER STREAM BENDS TO REDUCE EROSION AND PROVIDE BANK PROTECTION. PROPOSED GRADING AND INSTREAM STRUCTURES WILL ALSO HELP IMPROVE STABLE BANKFULL CHANNEL DIMENSIONS AND RECONNECT THE FLOODPLAIN THROUGH RESTORED FLOODPLAIN BENCHES ALONG THE MITIGATION AREA. EXISTING WETLANDS AND RIPARIAN BUFFERS ALONG THE STREAM RESTORATION CORRIDOR WILL BE PROTECTED DURING PROPOSED STREAM RESTORATION CONSTRUCTION ACTIVITIES AND TEMPORARY WETLAND IMPACTS WILL BE RESTORED.

CONTINGENT UPON MDE AND USAGE APPROVALS OF THE PHASE II STREAM MITIGATION PLAN, STREAM MITIGATION CONSTRUCTION ACTIVITIES SHOULD BE COMPLETED DURING THE TYPICALLY DRIER PERIODS OF LATE FALL INTO LATE WINTER, WITH RIPARIAN TREE, SHRUB AND LIVE STAKE PLANTING OCCURRING IN SPRING OF THE YEAR. STREAM MITIGATION CONSTRUCTION ACTIVITIES WILL BE COMPLETED FROM UPSTREAM TO DOWNSTREAM AND WILL BE SCHEDULED TO OCCUR CONCURRENTLY WITH PROPOSED PROJECT RELATED ON-SITE STREAM IMPACTS. STREAM MITIGATION CONSTRUCTION ACTIVITIES ARE ESTIMATED TO TAKE A TOTAL OF EIGHT TO TEN WEEKS, WITH SUBSEQUENT PLANTINGS REQUIRING APPROXIMATELY TWO (2) WEEKS.



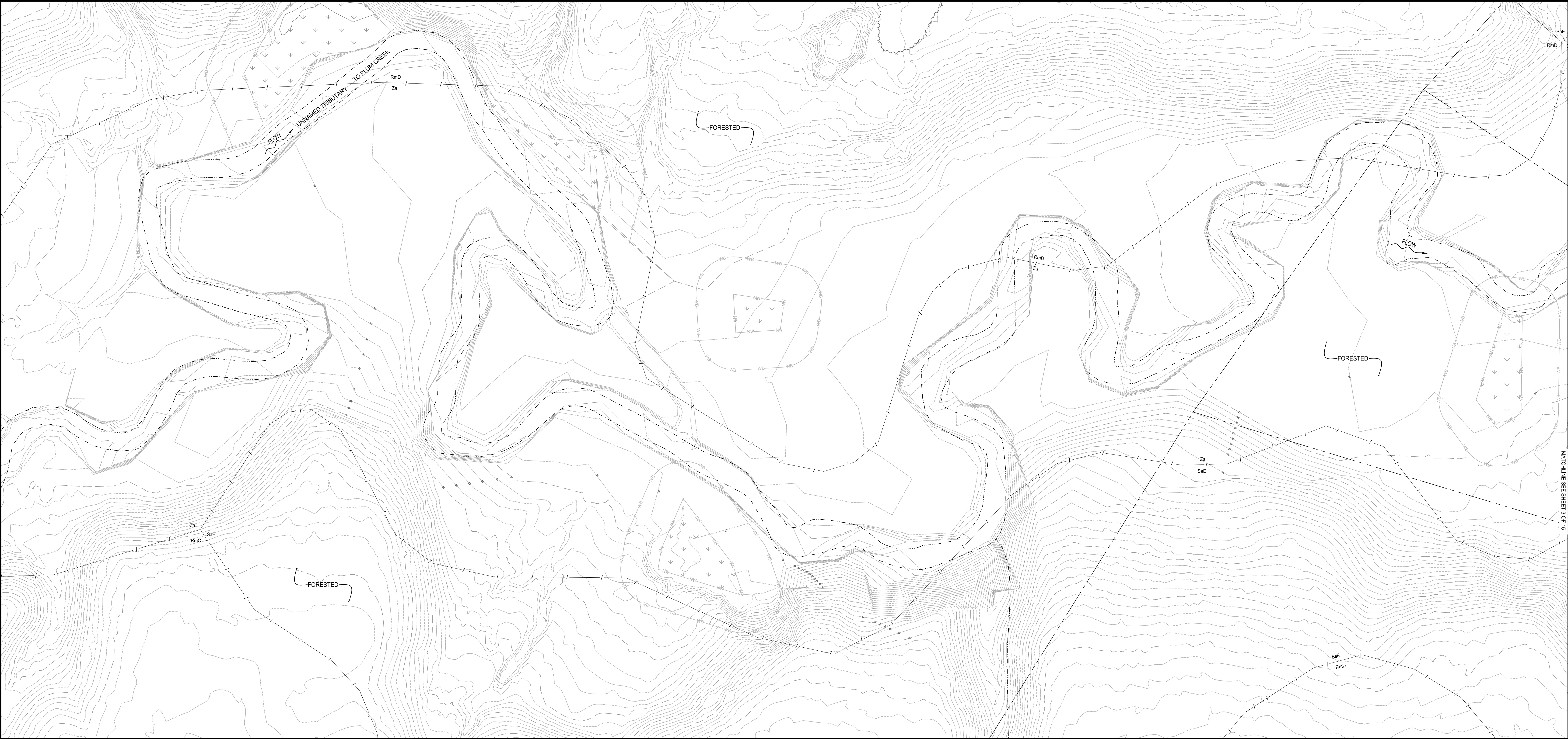
#### PLAN VIEW KEY



SCALE: 1"=500'

	<b>GEO-TECHNOLOGY ASSOCIATES, INC.</b> GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3445-A BOX HILL CORPORATE CENTER DRIVE ABINGDON, MARYLAND 21009 410-515-9446 FAX: 410-515-4895 WWW.GTAENG.COM © GEO-TECHNOLOGY ASSOCIATES, INC.
	COVER SHEET <b>PRINCIPIO BUSINESS PARK - BUILDING SITE 'C'</b> <b>PHASE II STREAM MITIGATION PLAN</b>
CECIL COUNTY, MARYLAND	
REVISIONS: 6/24/2022 – GRADING AND E&S	JOB NO: 31200335X2 SCALE: N/A DATE: JUNE 1, 2022 DRAWN BY: TAB DESIGN BY: DPS/TAB REVIEW BY: DPS/TAS SHEET: 1 OF 15






LEGEND

- EX. PROPERTY BOUNDARY
- EX. 1-FOOT CONTOUR
- EX. 5-FOOT CONTOUR
- EX. TREELINE
- EX. STREAM
- EX. WETLAND BUFFER
- EX. NONTIDAL WETLAND
- EX. SOIL BOUNDARY

SOIL TABLE

SYMBOL <sup>1</sup>	NAME/DESCRIPTION <sup>1</sup>	HYDRIC SOIL <sup>2</sup>	HYDRIC COMPONENT <sup>2</sup>	PERCENTAGE OF MAPPING UNIT <sup>2</sup>	LANDSCAPE POSITION <sup>2</sup>
RmC	RUSSETT-CHRISTIANA-HAMBROOK COMPLEX, 5 TO 10 PERCENT SLOPES	NO	-	-	-
RmD	RUSSETT-CHRISTIANA-HAMBROOK COMPLEX, 10 TO 15 PERCENT SLOPES	NO	-	-	-
SaE	SASSAFRAS SANDY LOAM, 15 TO 25 PERCENT SLOPES	YES	ZEKIAH	5	FLOODPLAINS
Za	ZEKIAH SANDY LOAM, FREQUENTLY FLOODED	YES	ZEKIAH	75	FLOODPLAINS
			LONGMARSH	10	FLOODPLAINS
			ASKECKSY, UNDRAINED	5	FLATS, DRAINAGEWAYS, DEPRESSIONS, SWALES
			FALLSINGTON, UNDRAINED	5	SWALES, DRAINAGEWAYS, FLATS, DEPRESSIONS

1. U. S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, CECIL COUNTY, MD. SOIL SURVEY DATA, VERSION 11, DATED SEPTEMBER 13, 2019.  
2. HYDRIC SOILS INFORMATION AVAILABLE FROM THE STATE SOIL DATA ACCESS HYDRIC SOILS LIST, AT <HTTPS://WWW.NRCS.USDA.GOV/INTERNET/FSE\_DOCUMENTS/NRCSSEPRD1316619.HTML#REPORTREF>, ACCESSED FEBRUARY 7, 2022.



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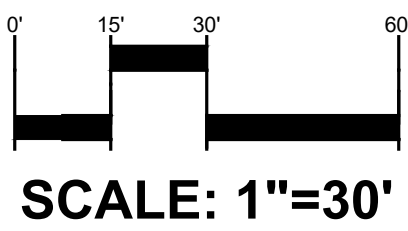
EXISTING CONDITIONS

**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

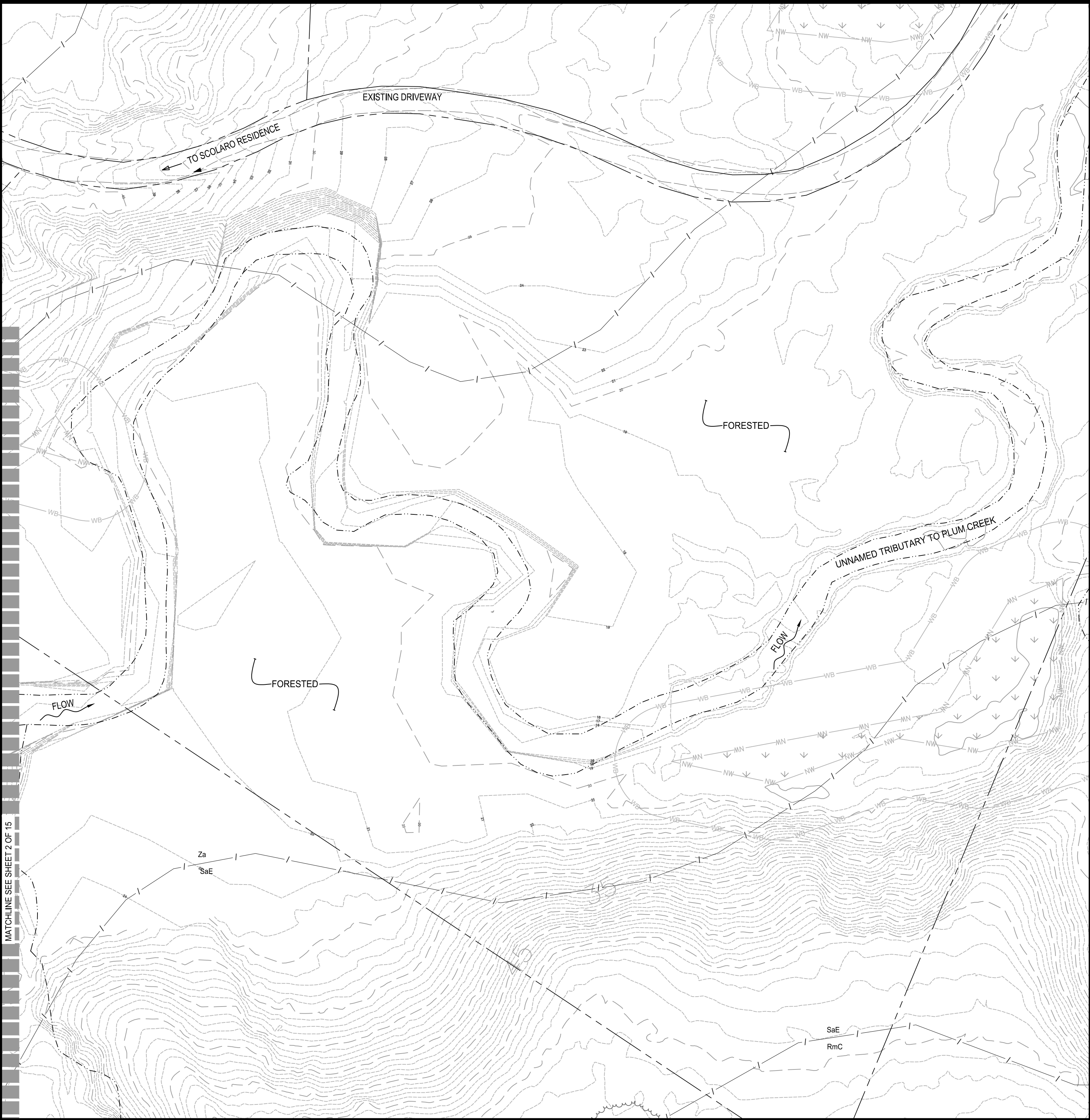
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SCALE: 1"=30'





LEGEND

- EX. PROPERTY BOUNDARY
- EX. 1-FOOT CONTOUR
- EX. 5-FOOT CONTOUR
- EX. ROAD
- EX. TREELINE
- EX. STREAM
- EX. WETLAND BUFFER
- EX. NONTIDAL WETLAND
- EX. SOIL BOUNDARY



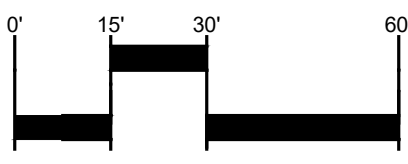
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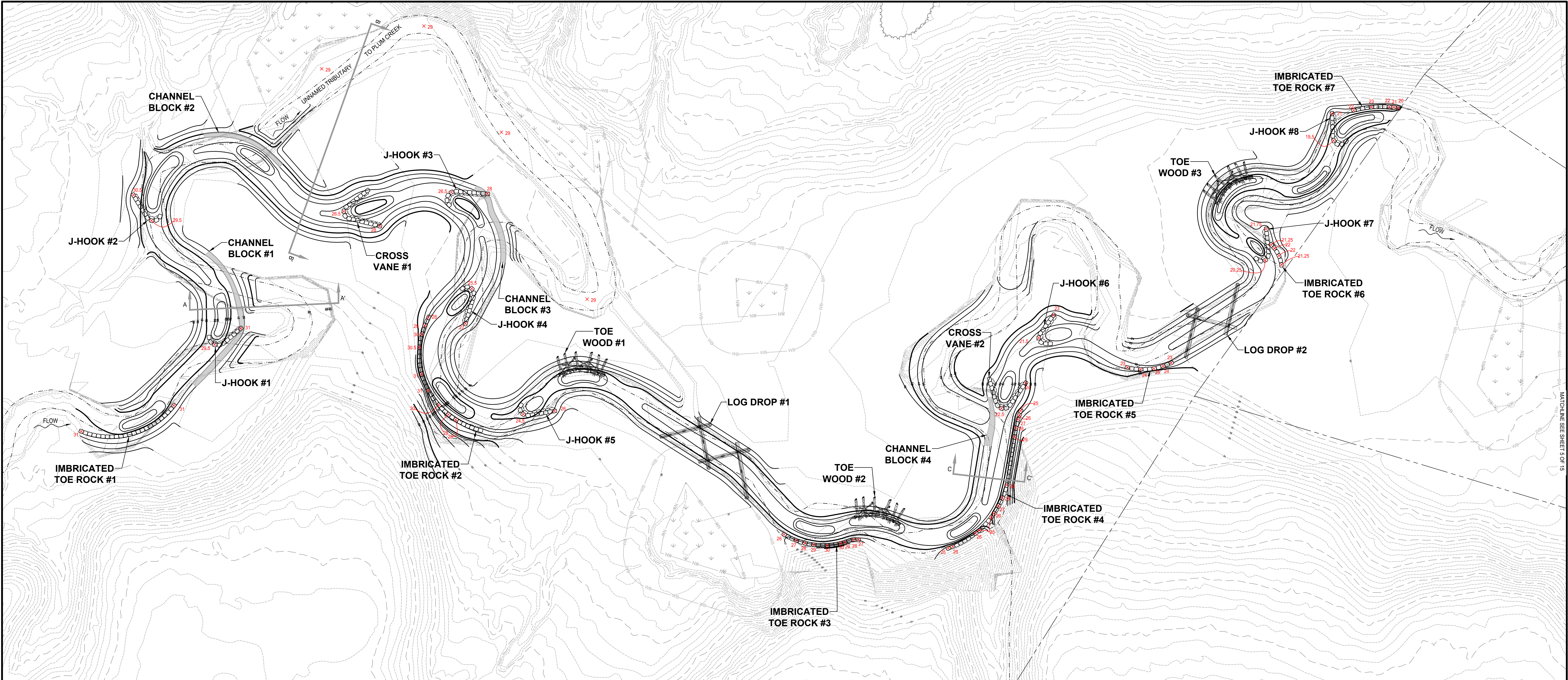
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SCALE: 1"=30'





STREAM MITIGATION AREA STA 0+00 - 15+64

LEGEND

	EX. PROPERTY BOUNDARY		PR. IMBRICATED TOE ROCK
	EX. 1-FOOT CONTOUR		PR. SPOT ELEVATION
	EX. 5-FOOT CONTOUR		PR. CROSS VANE
	EX. TREELINE		PR. J-HOOK
	EX. STREAM		PR. TOE WOOD
	EX. WETLAND BUFFER		PR. LOG DROP
	EX. NONTIDAL WETLAND		
	PR. 1-FOOT CONTOUR		
	PR. 5-FOOT CONTOUR		
	CROSS SECTION (SEE SHEET 7)		



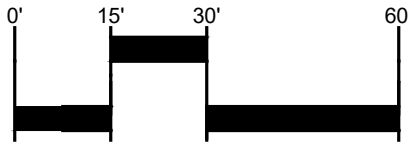
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CECIL COUNTY, MARYLAND

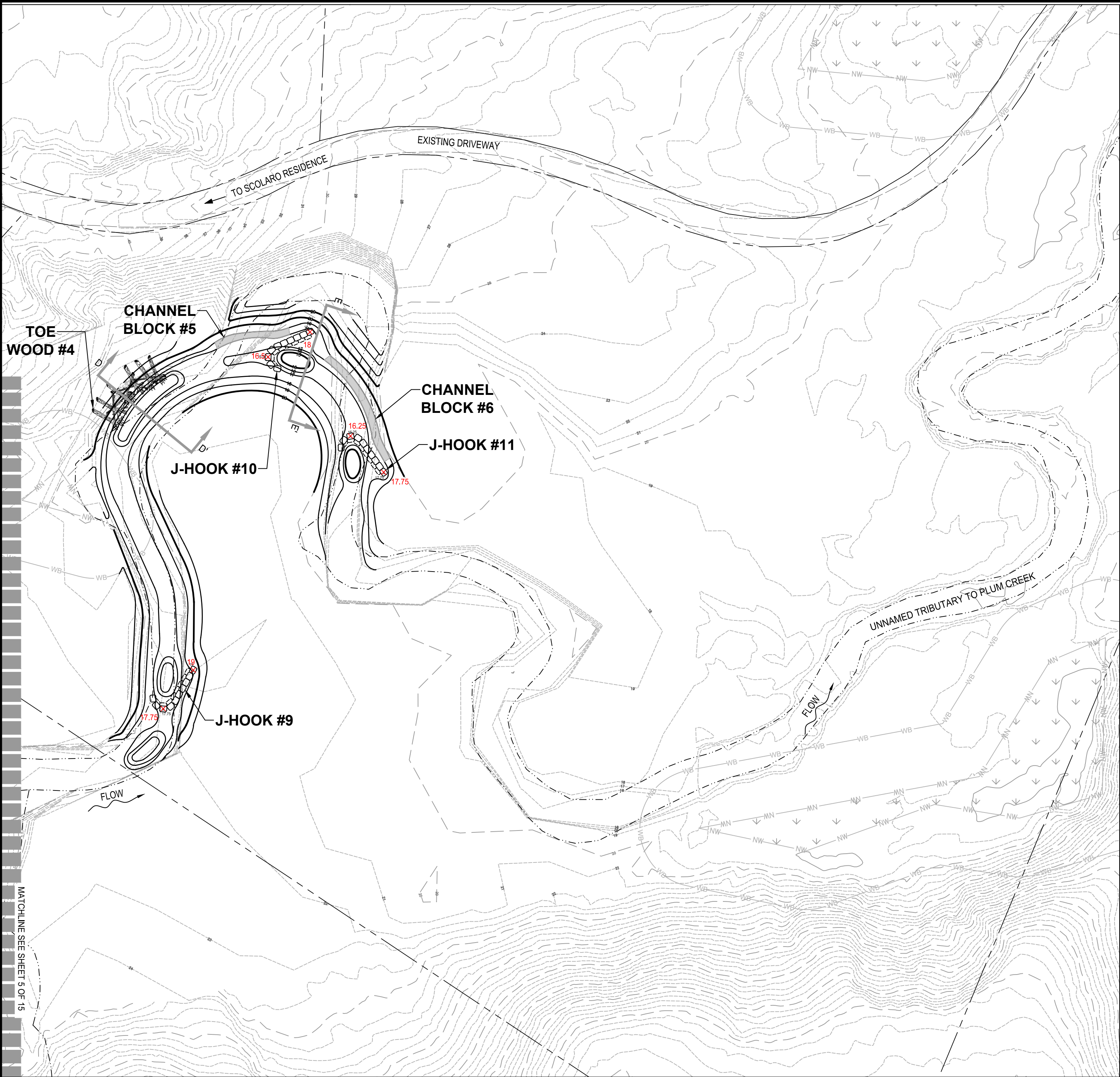
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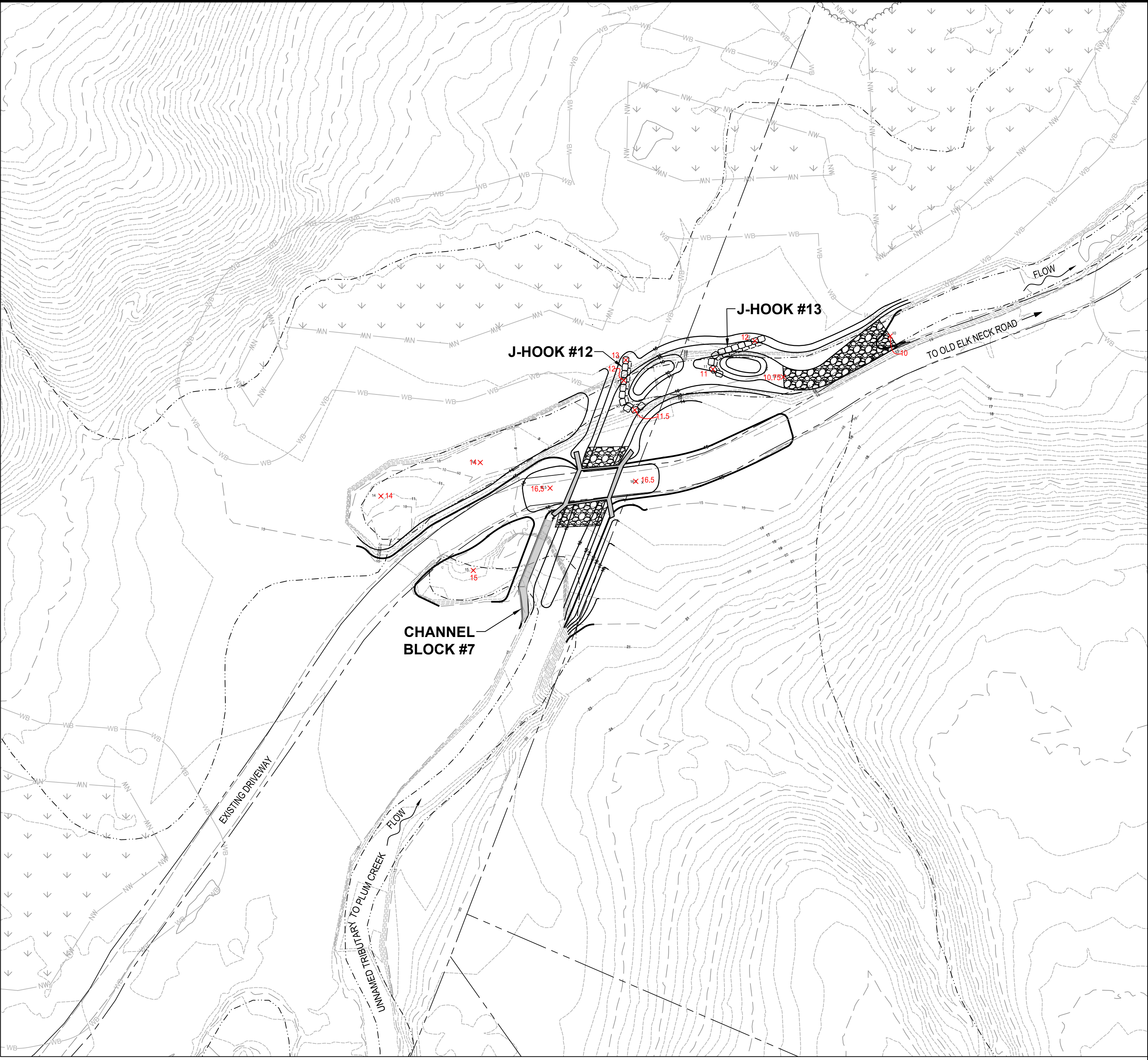


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STREAM MITIGATION AREA STA 18+40 - 21+60



CULVERT CROSSING AREA (STA. 100+00 TO 102+35)

LEGEND

	EX. PROPERTY BOUNDARY		PR. IMBRICATED TOE ROCK
	EX. 1-FOOT CONTOUR		PR. SPOT ELEVATION
	EX. 5-FOOT CONTOUR		PR. CROSS VANE
	EX. ROAD		PR. J-HOOK
	EX. TREELINE		PR. TOE WOOD
	EX. STREAM		PR. CONSTRUCTED RIFFLE
	EX. WETLAND BUFFER		
	EX. NONTIDAL WETLAND		
	PR. 1-FOOT CONTOUR		
	PR. 5-FOOT CONTOUR		
	CROSS SECTION (SEE SHEET 7)		



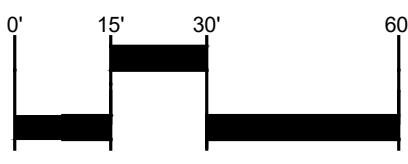
**GEO-TECHNOLOGY ASSOCIATES, INC.**  
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PROPOSED CONDITIONS  
**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

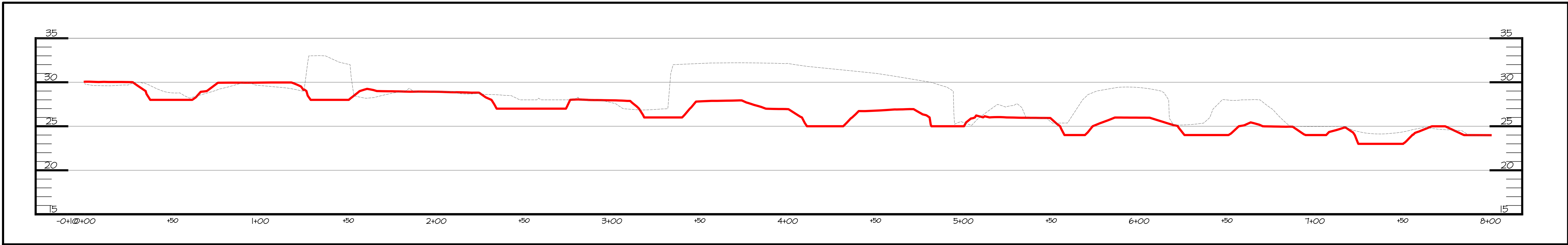
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SHEET:	5 OF 15



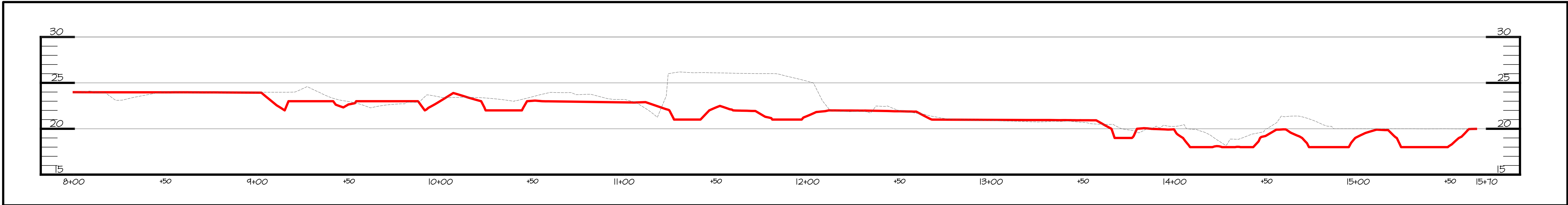
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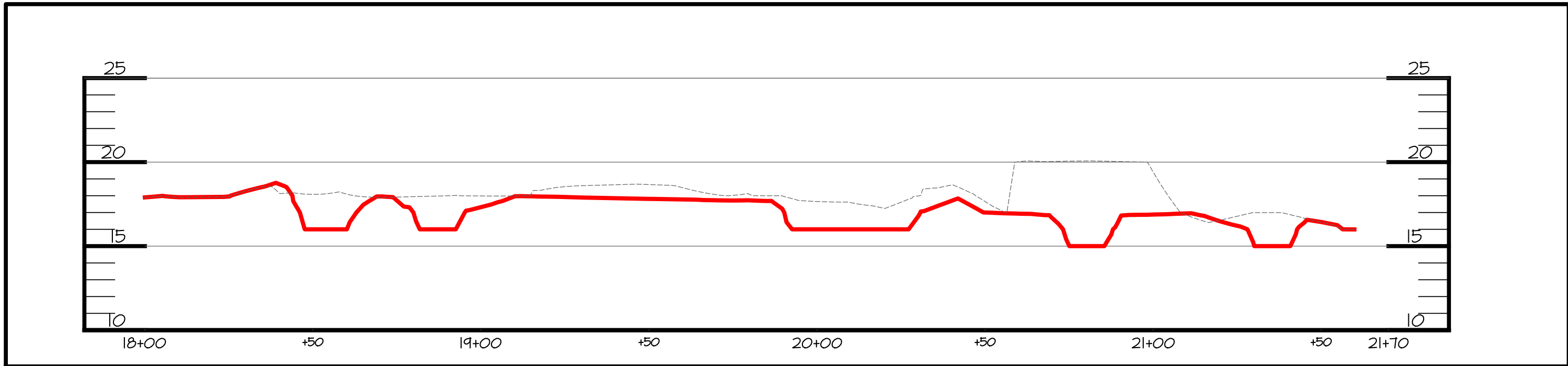
LONGITUDINAL PROFILE STA. 0+00 TO 8+00

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V: 1"=6'



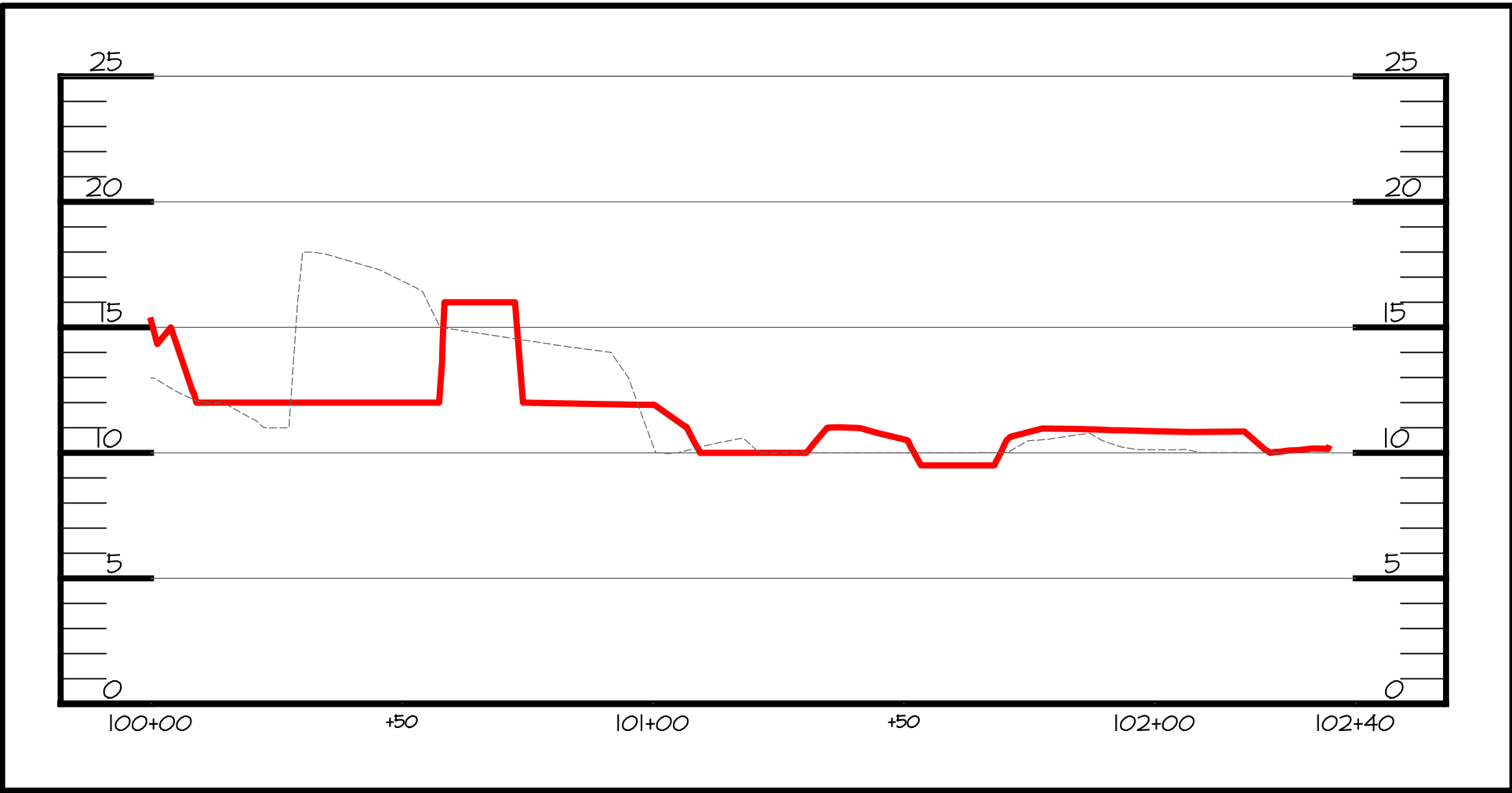
LONGITUDINAL PROFILE STA. 8+00 TO 15+70

SCALE: H: 1"=30'  
V: 1"=6'



LONGITUDINAL PROFILE STA. 18+00 TO 21+70

SCALE: H: 1"=30'  
V: 1"=6'



LONGITUDINAL PROFILE STA. 100+00 TO 102+40

SCALE: H: 1"=30'  
V: 1"=6'

LEGEND

———— PROPOSED GRADE  
----- EXISTING GRADE



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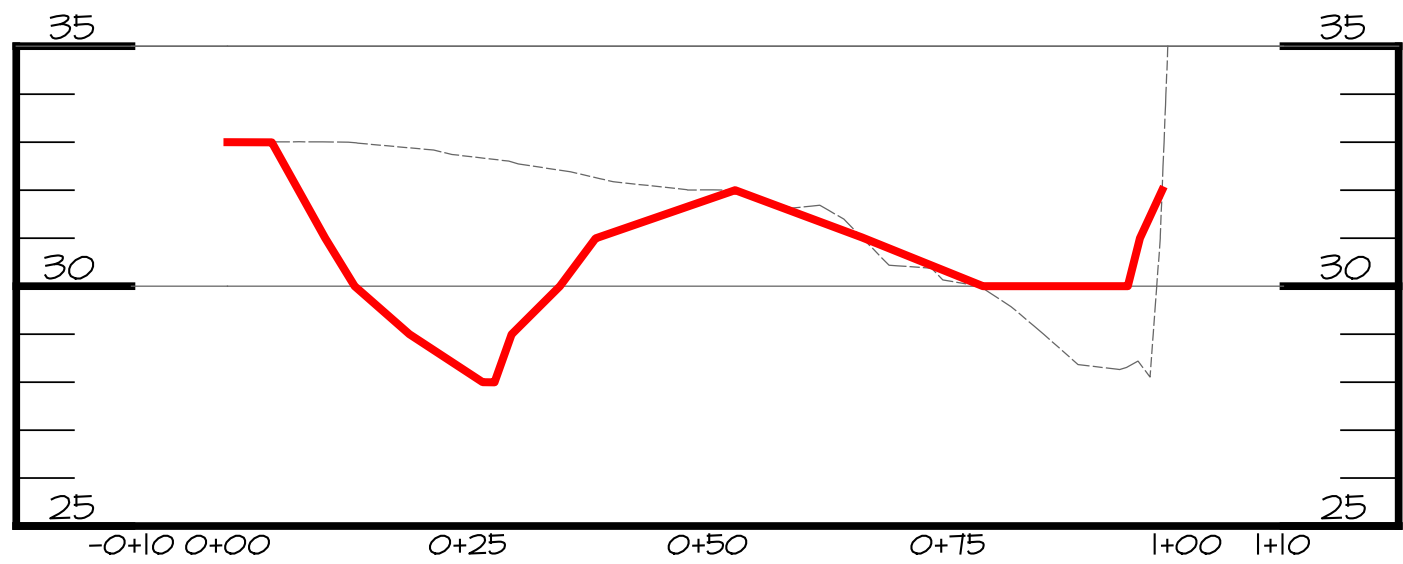
CROSS SECTIONS  
**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

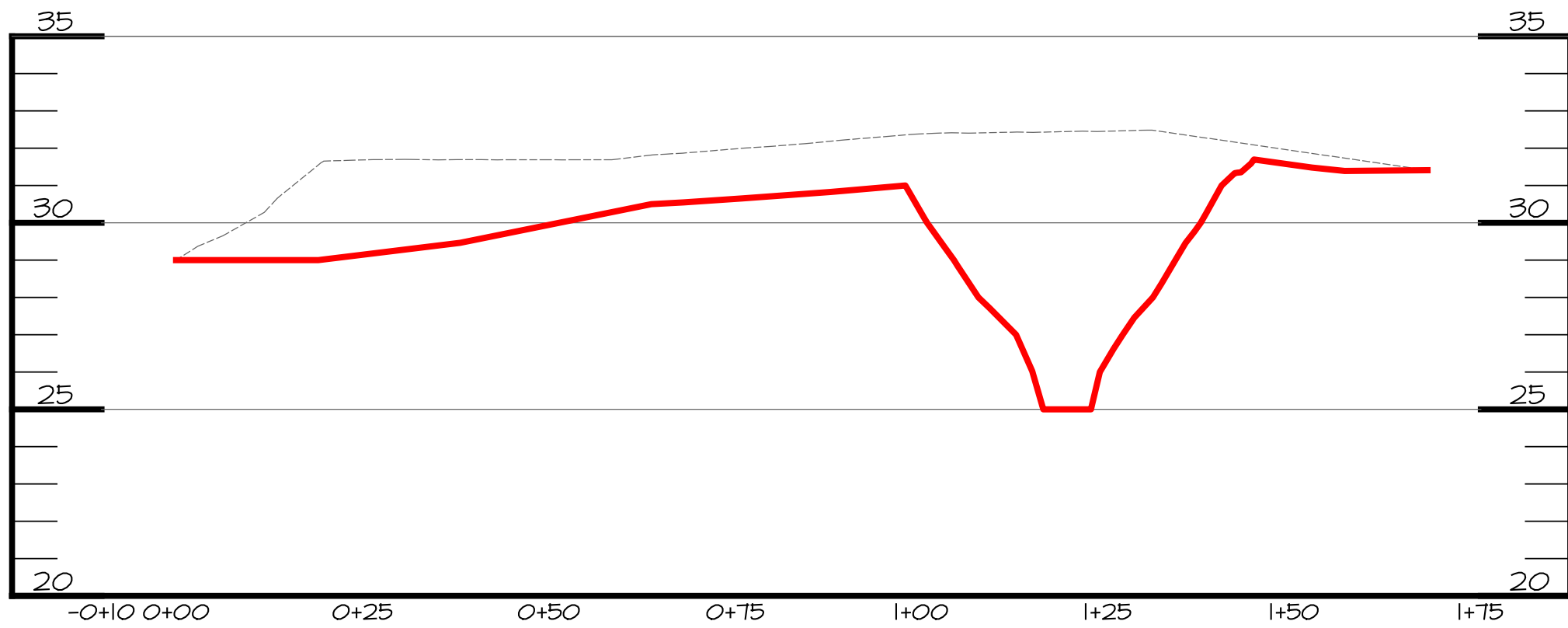
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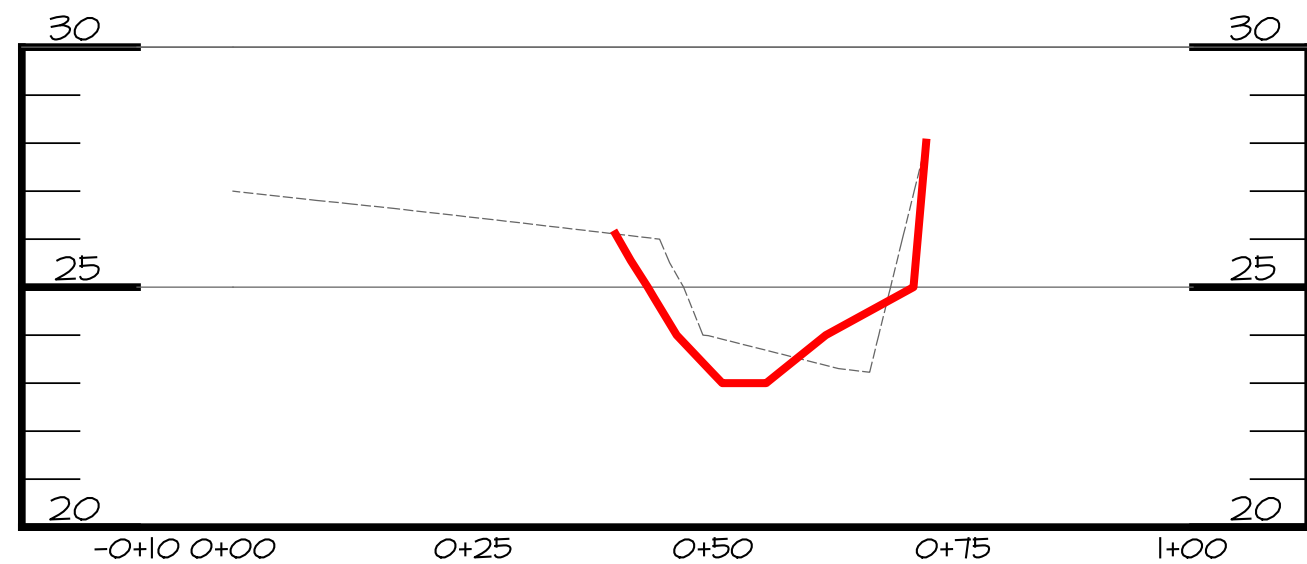




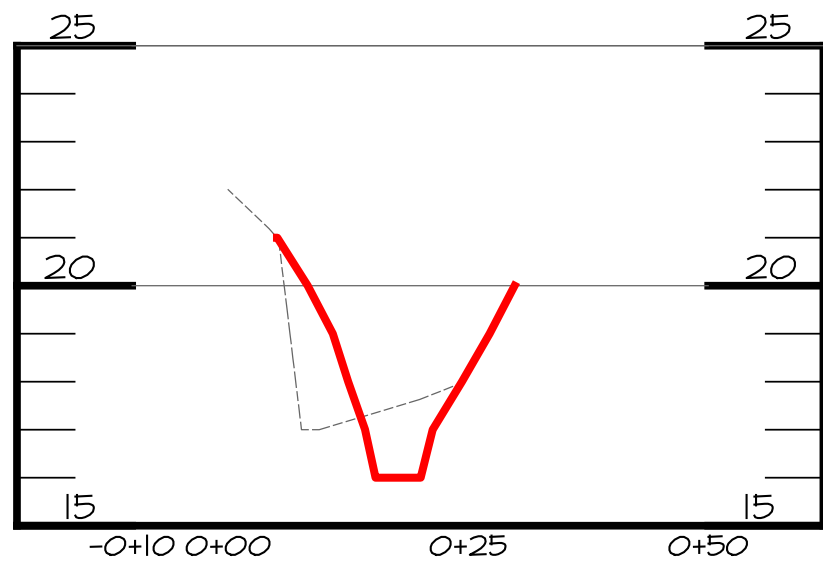
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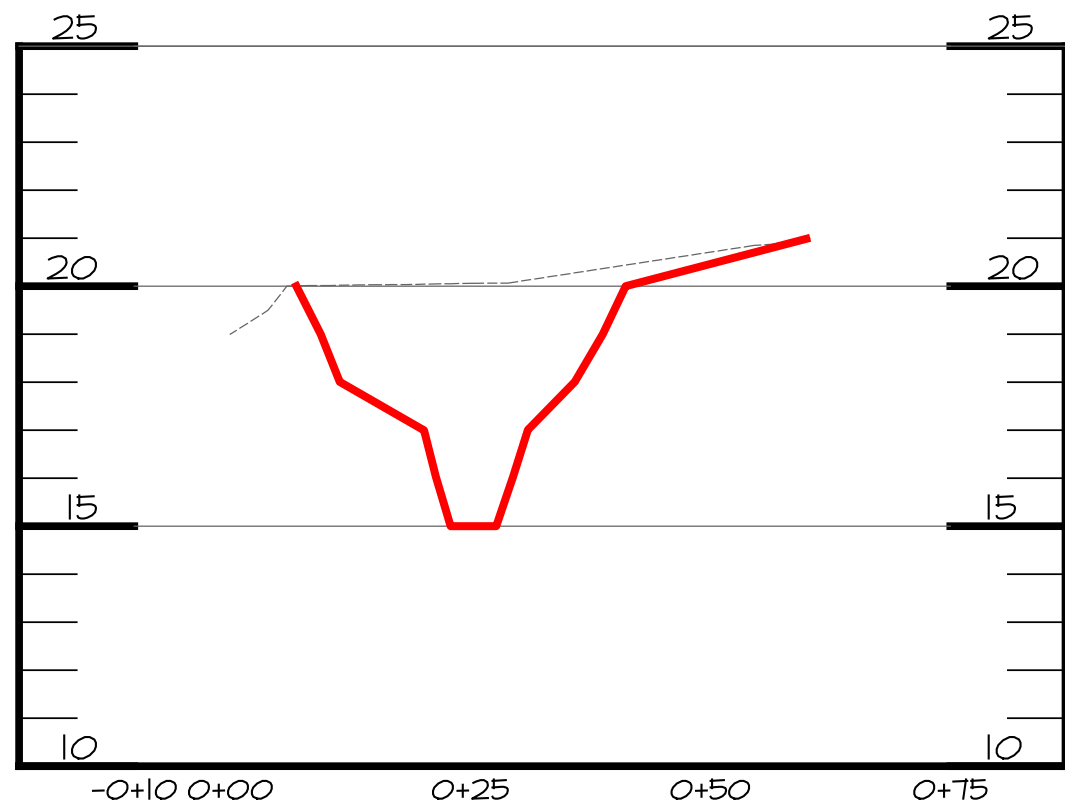
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**C-C' PROFILE**  
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**D-D' PROFILE**  
SCALE: H: 1"=20'  
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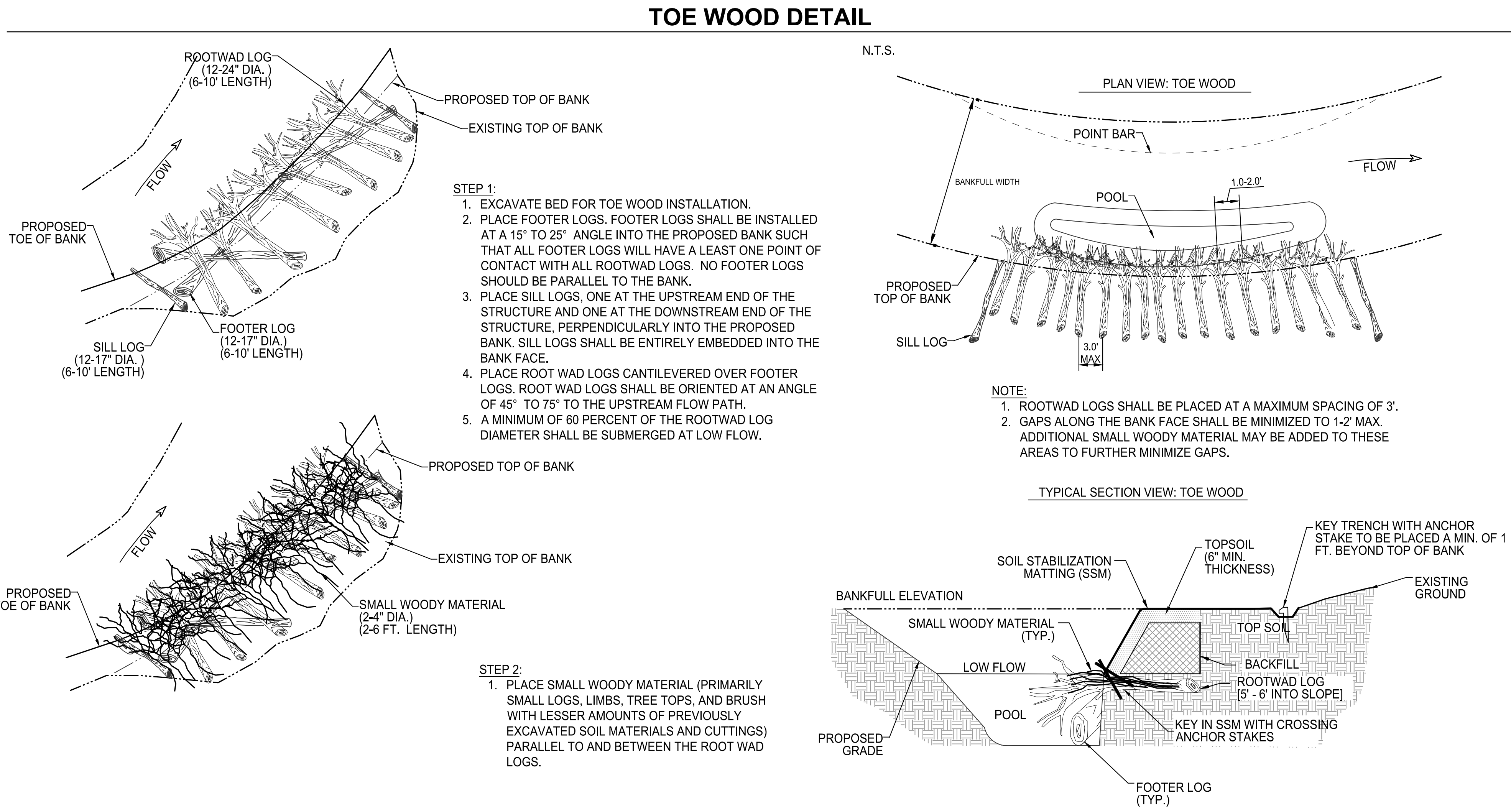
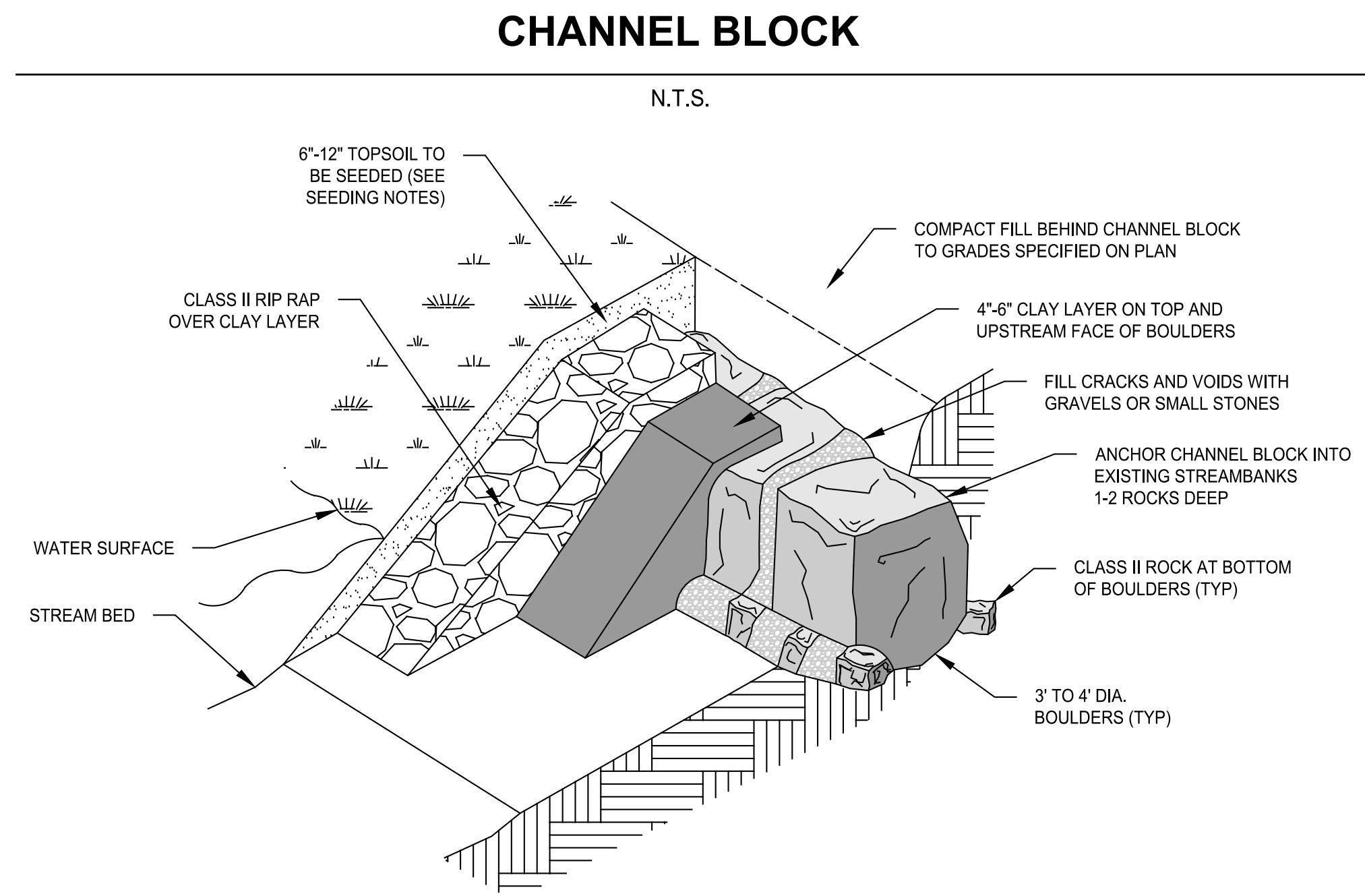
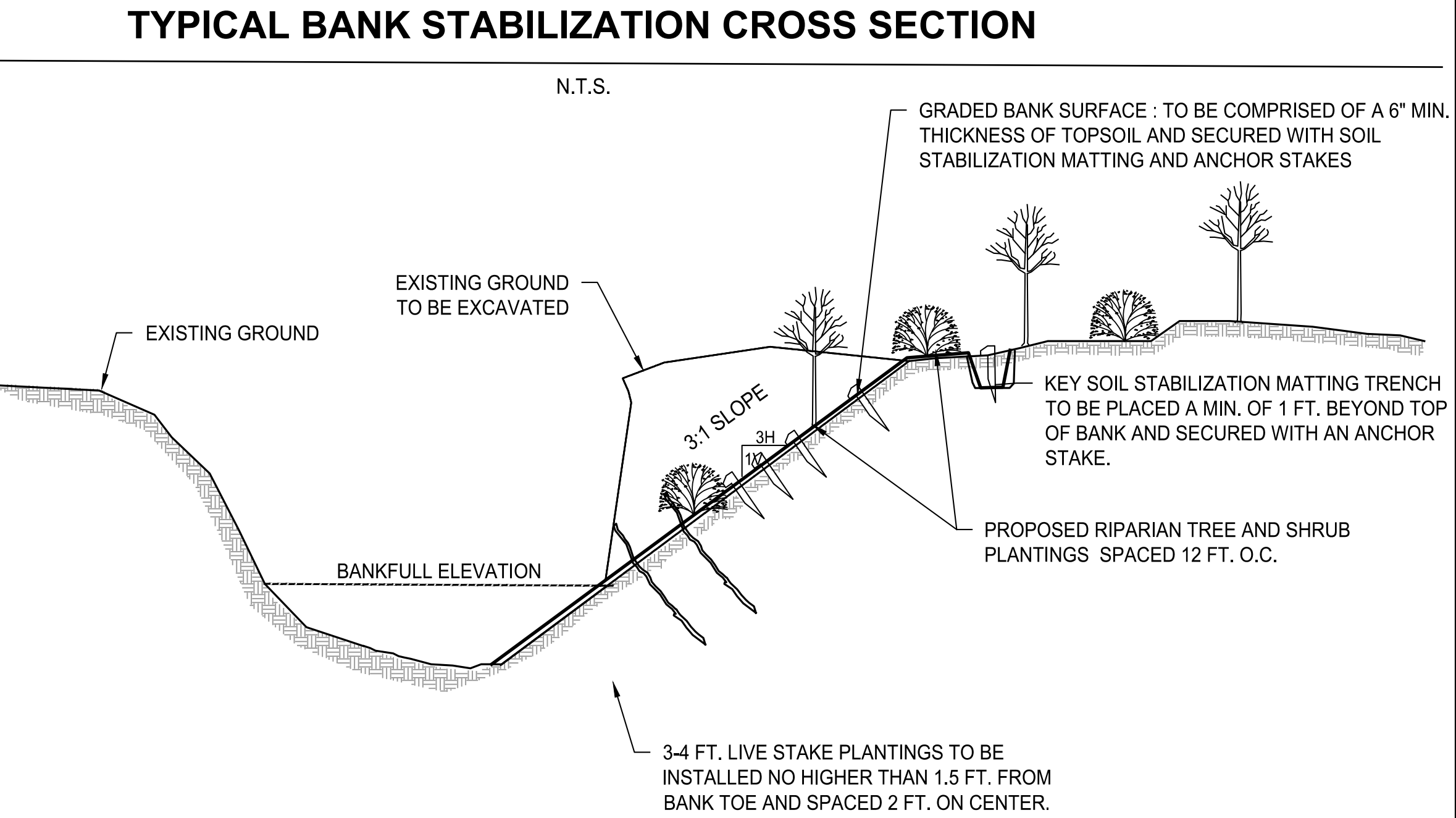
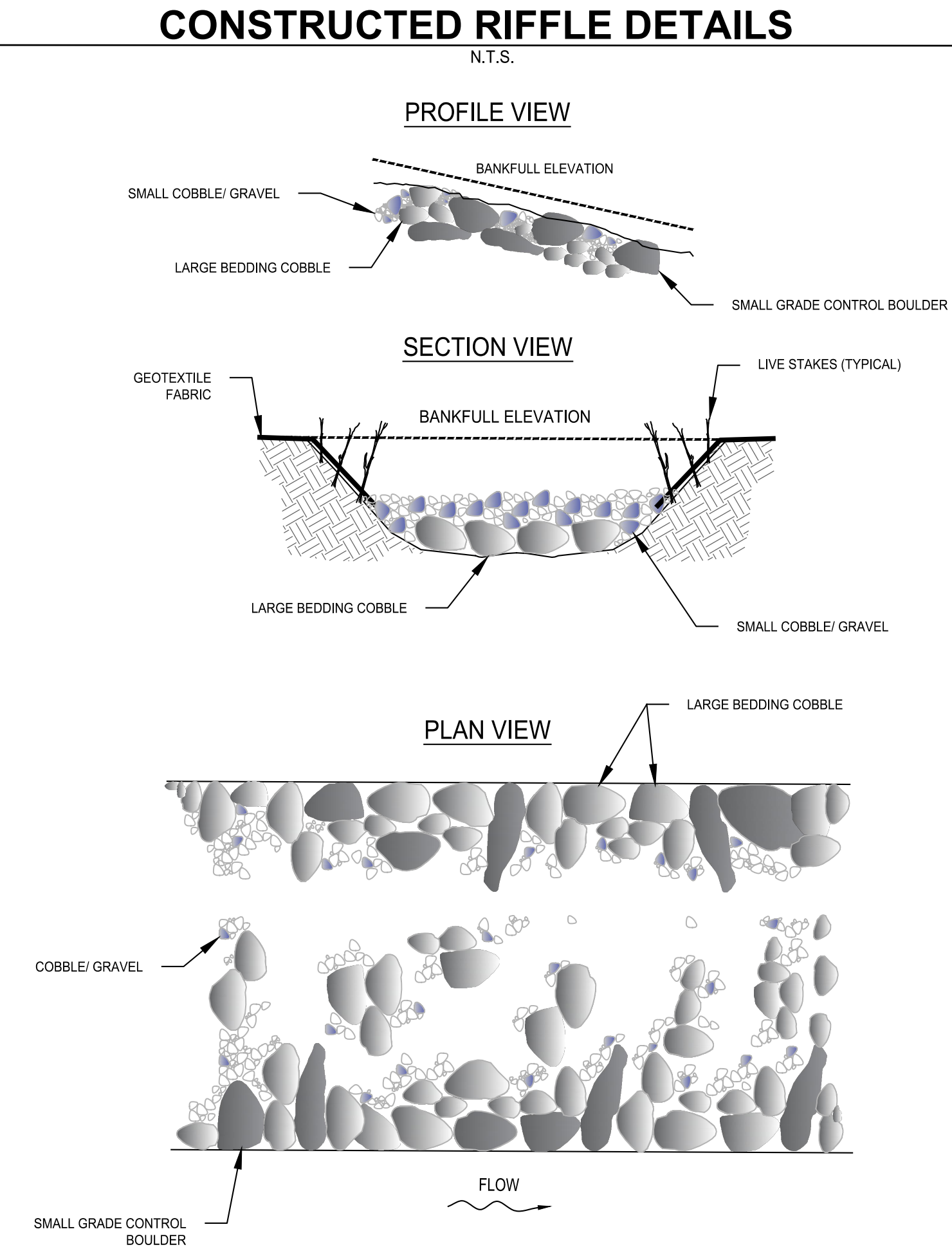
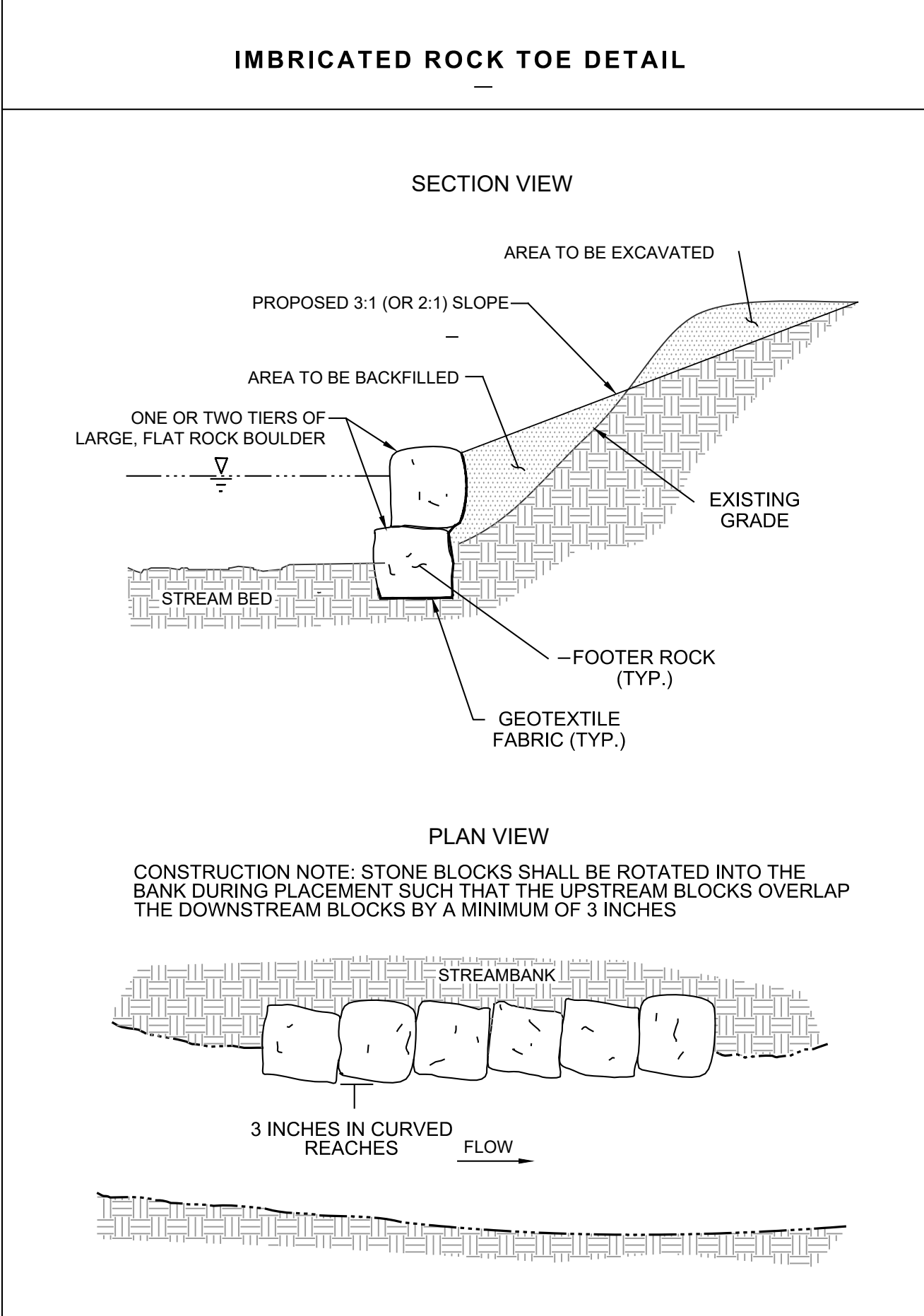
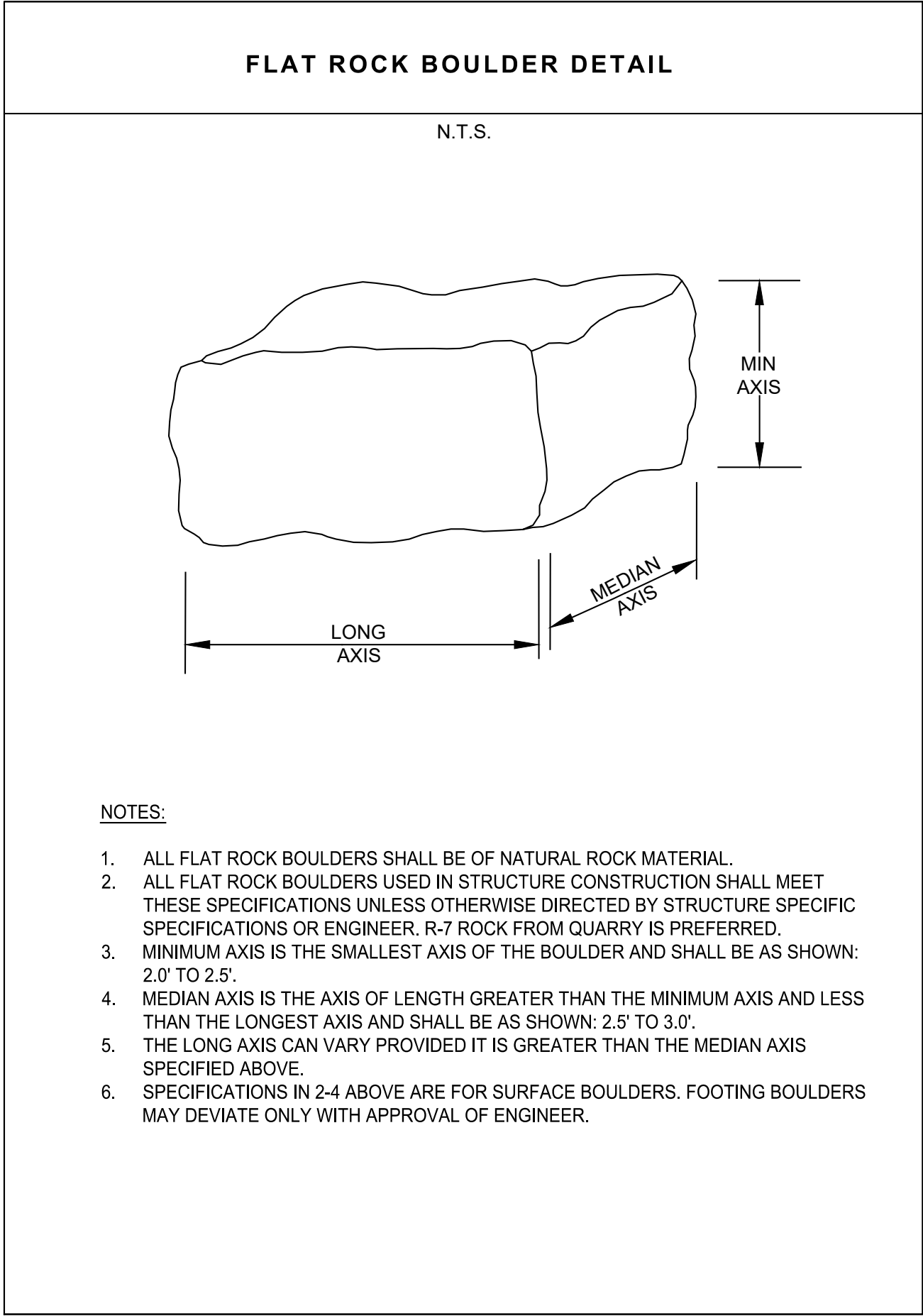
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**LEGEND**

	PROPOSED GRADE
	EXISTING GRADE

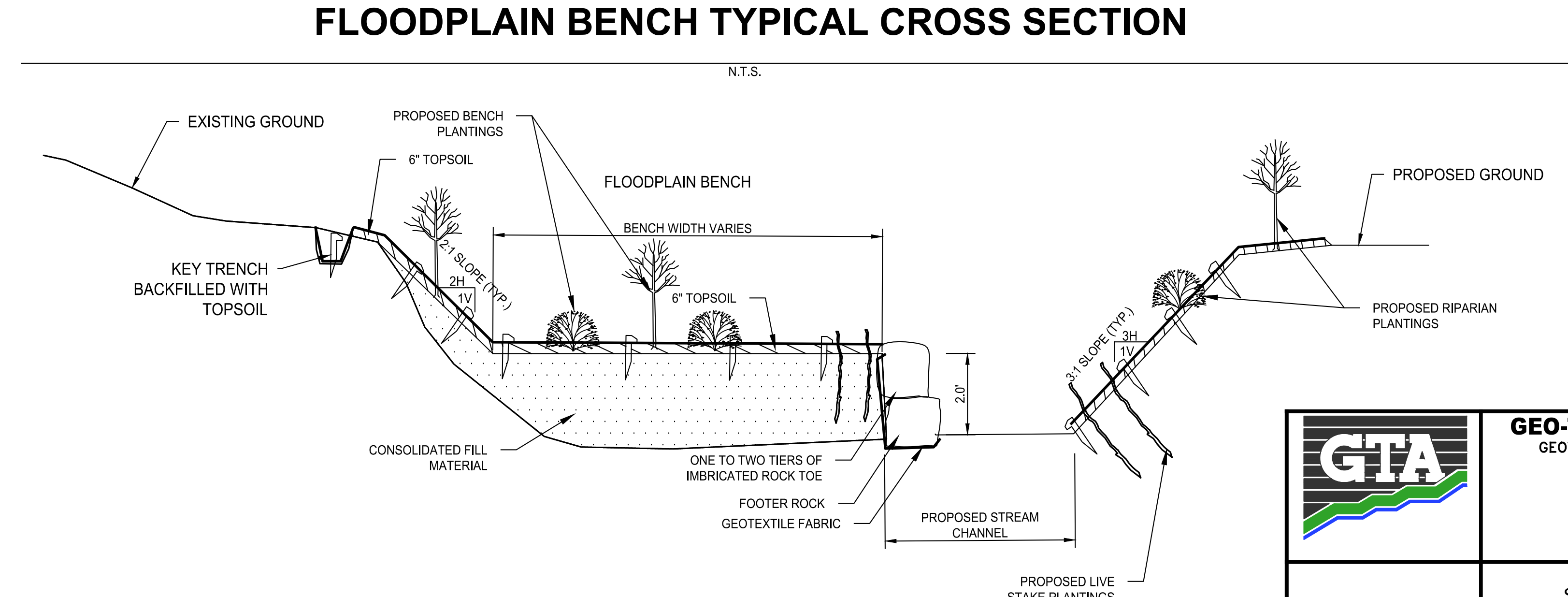
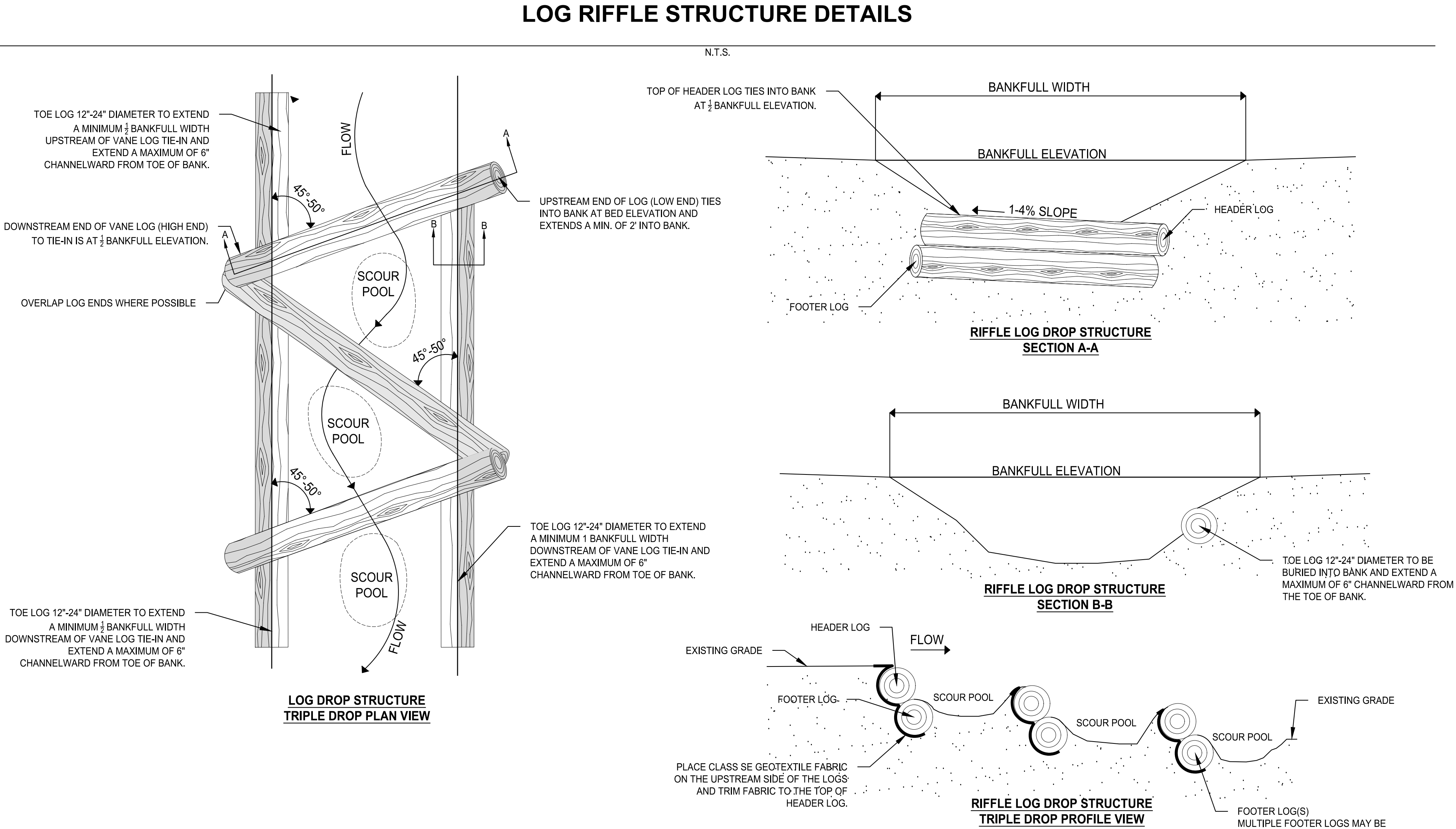
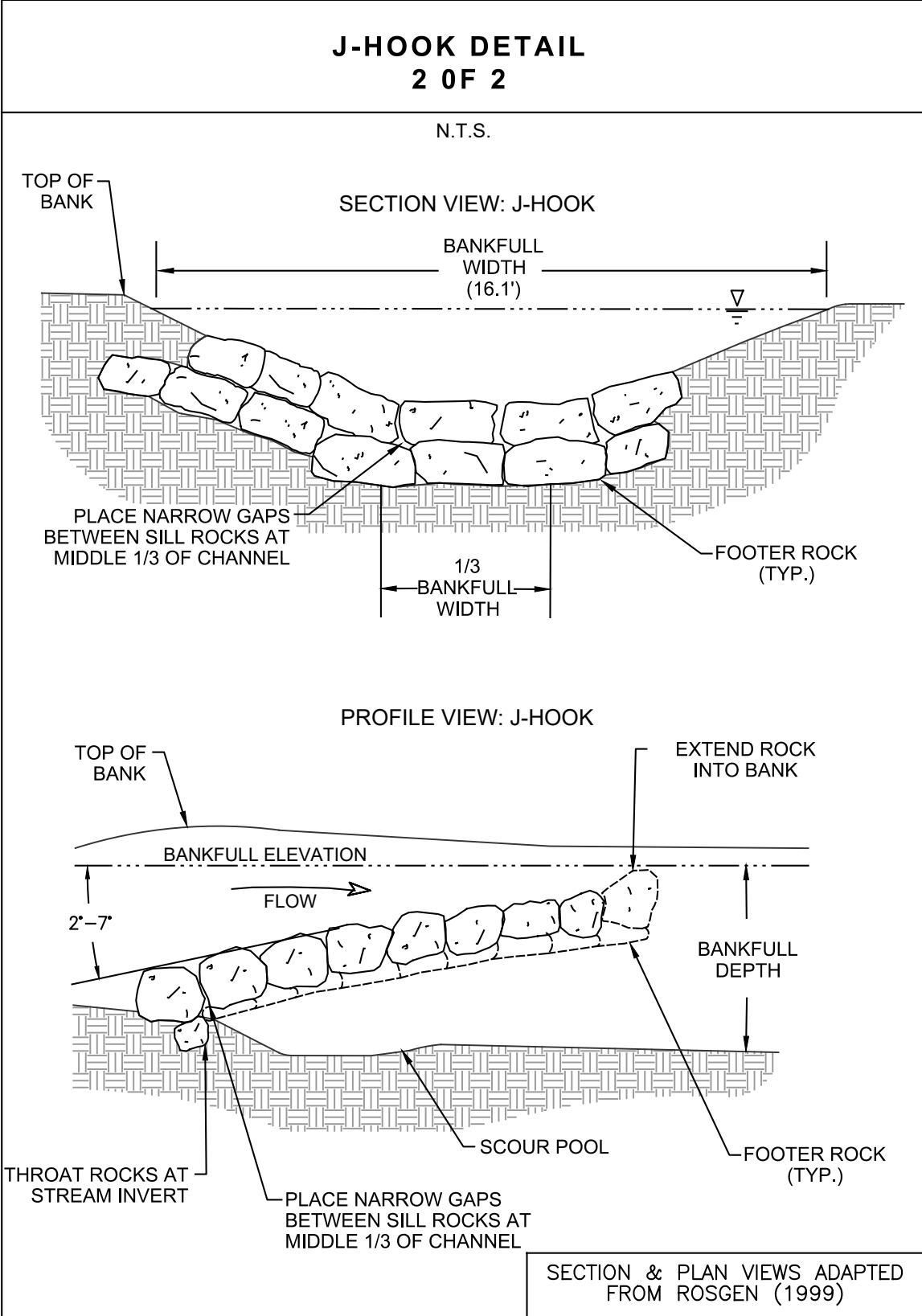
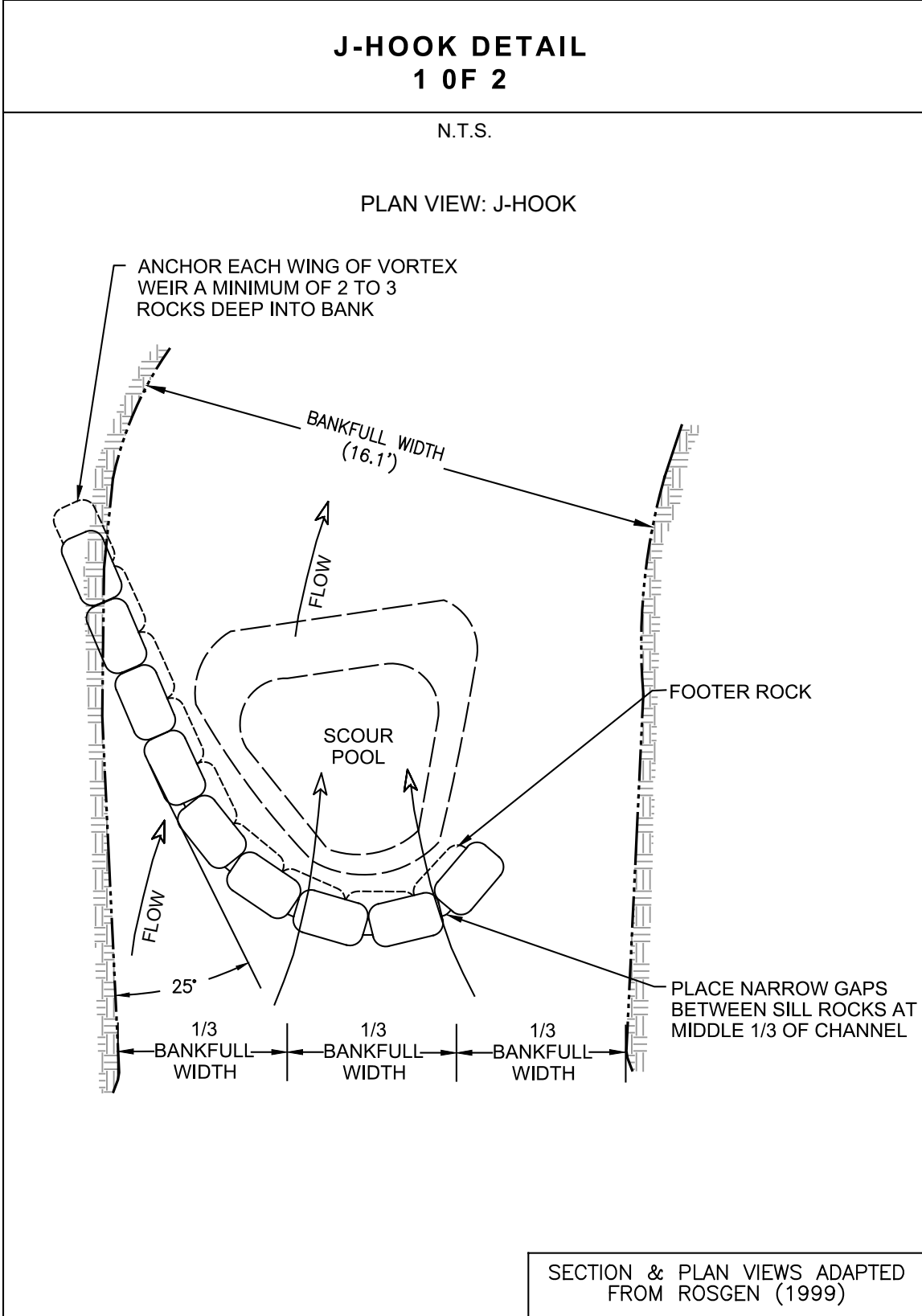
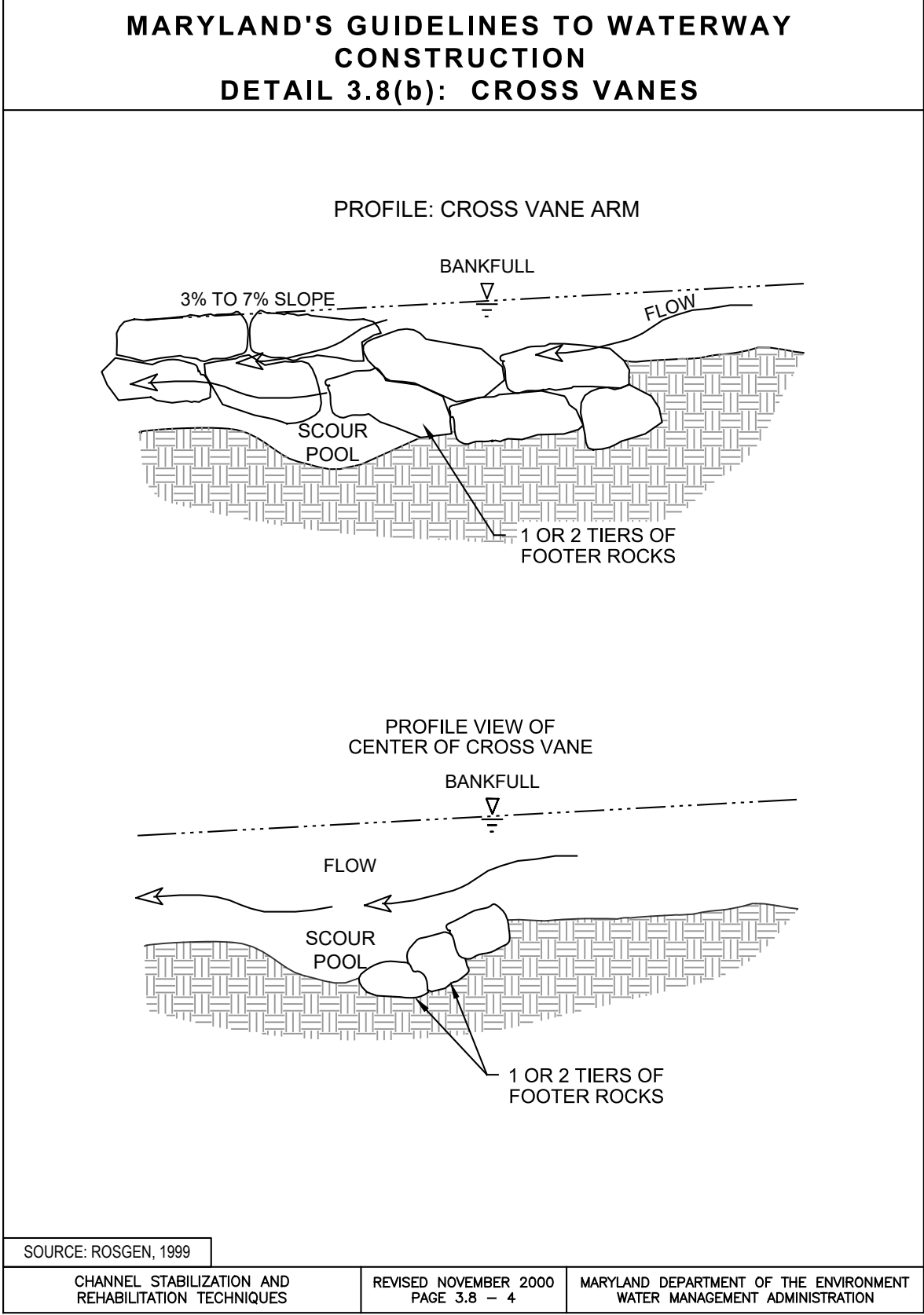
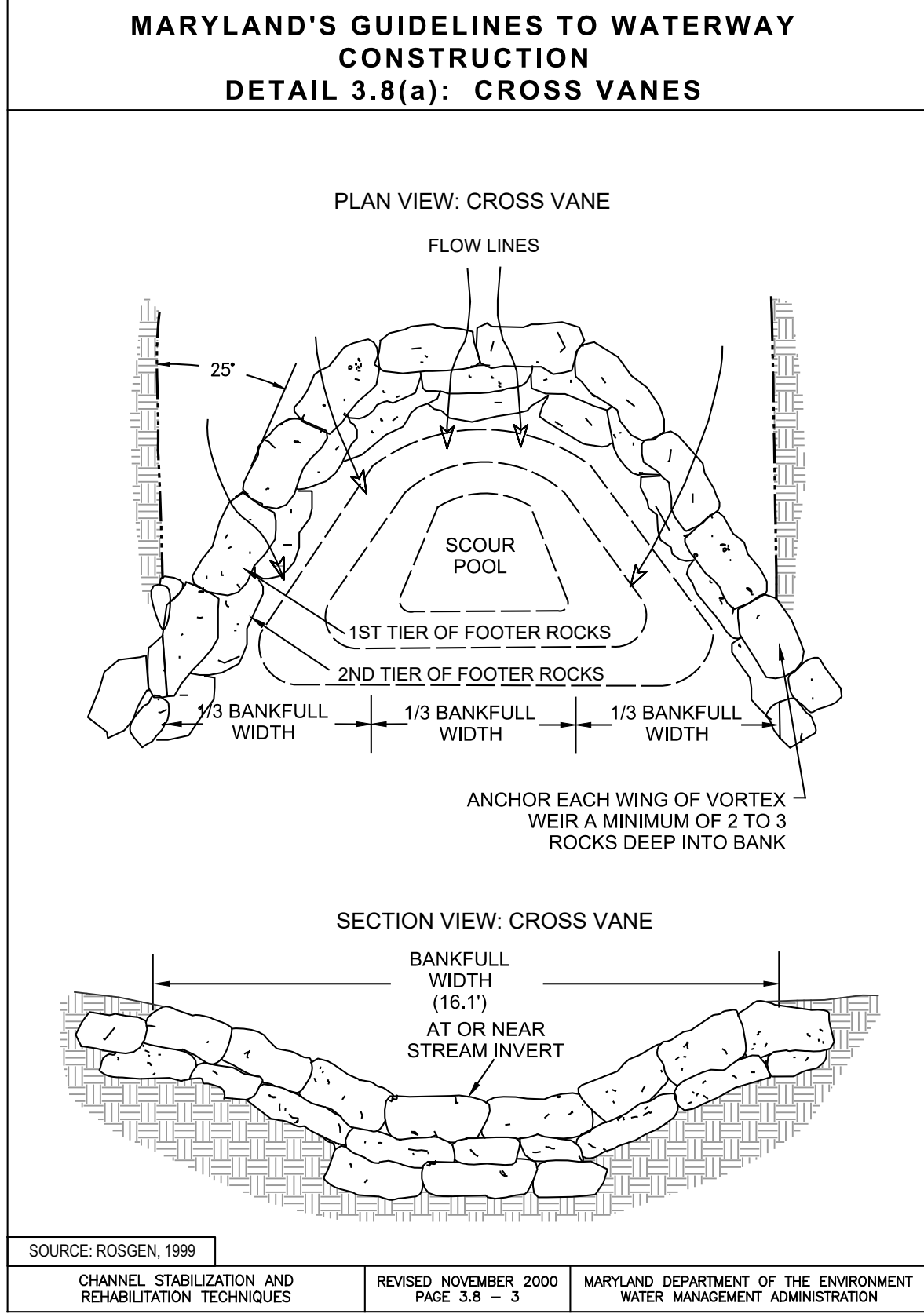
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	<b>LONGITUDINAL PROFILE</b> <b>PRINCIPIO BUSINESS PARK -</b> <b>BUILDING SITE 'C'</b> <b>PHASE II STREAM MITIGATION PLAN</b>  CECIL COUNTY, MARYLAND														
REVISIONS: 6/24/2022 – GRADING AND E&S	<table><tr><td>JOB NO:</td><td>31200335X2</td></tr><tr><td>SCALE:</td><td>N/A</td></tr><tr><td>DATE:</td><td>JUNE 1, 2022</td></tr><tr><td>DRAWN BY:</td><td>TAB</td></tr><tr><td>DESIGN BY:</td><td>DPS/TAB</td></tr><tr><td>REVIEW BY:</td><td>DPS/TAS</td></tr><tr><td>SHEET:</td><td>7 OF 15</td></tr></table>	JOB NO:	31200335X2	SCALE:	N/A	DATE:	JUNE 1, 2022	DRAWN BY:	TAB	DESIGN BY:	DPS/TAB	REVIEW BY:	DPS/TAS	SHEET:	7 OF 15
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	<b>STREAM RESTORATION DETAILS</b> <b>PRINCIPIO BUSINESS PARK - BUILDING SITE 'C'</b> <b>PHASE II STREAM MITIGATION PLAN</b> CECIL COUNTY, MARYLAND
REVISIONS: 6/24/2022 – GRADING AND E&S	JOB NO: 31200335X2 SCALE: N/A DATE: JUNE 1, 2022 DRAWN BY: TAB DESIGN BY: DPS/TAB REVIEW BY: DPS/TAS SHEET: 8 OF 15





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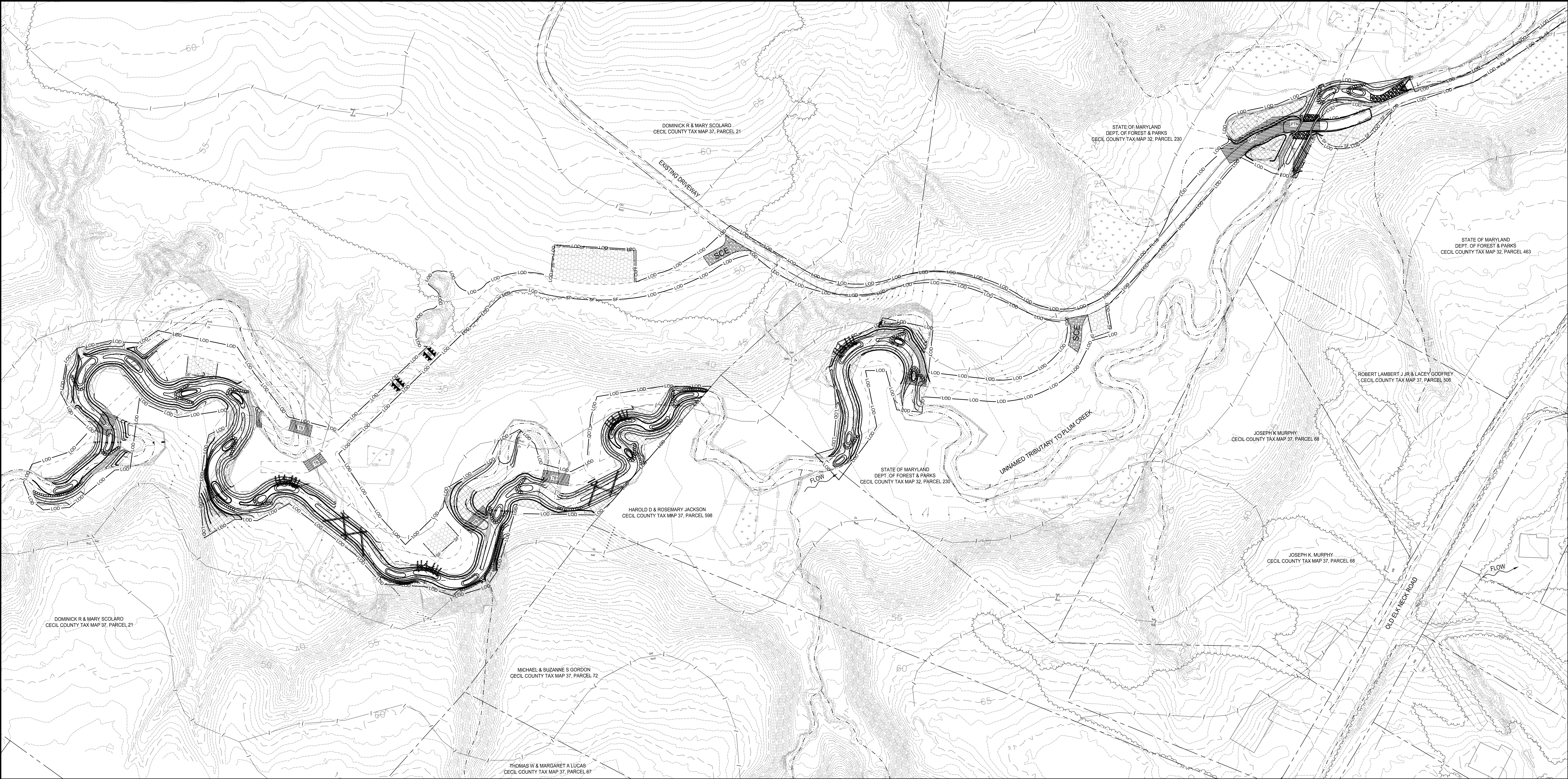
**STREAM RESTORATION DETAILS**  
**PRINCIPIO BUSINESS PARK -**  
**BUILDING SITE 'C'**  
**PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

REVISIONS:  
6/24/2022 - GRADING AND E&S

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LEGEND

	EX. PROPERTY BOUNDARY		PR. LIMIT OF DISTURBANCE AND 18" FILTER LOG
	EX. 1-FOOT CONTOUR		PR. 18" FILTER LOG
	EX. 5-FOOT CONTOUR		PR. TEMPORARY ACCESS ROAD
	EX. ROAD		STABILIZED CONSTRUCTION ENTRANCE
	EX. TREELINE		PR. TEMPORARY STAGING AND STOCKPILE AREA
	EX. STREAM		PR. EROSION CONTROL MATTING
	EX. WETLAND BUFFER		PR. MOUNTABLE BERM
	EX. NONTIDAL WETLAND		PR. TEMPORARY BRIDGE
	EX. SOIL BOUNDARY		PR. PROTECTIVE TIMBER MATTING
	PR. 1-FOOT CONTOUR		
	PR. 5-FOOT CONTOUR		

SOIL TABLE

SYMBOL <sup>1</sup>	NAME/DESCRIPTION <sup>1</sup>	HYDRIC SOIL <sup>2</sup>	HYDRIC COMPONENT <sup>2</sup>	PERCENTAGE OF MAPPING UNIT <sup>2</sup>	LANDSCAPE POSITION <sup>2</sup>
RmC	RUSSETT-CHRISTIANA-HAMBROOK COMPLEX, 5 TO 10 PERCENT SLOPES	NO	-	-	-
RmD	RUSSETT-CHRISTIANA-HAMBROOK COMPLEX, 10 TO 15 PERCENT SLOPES	NO	-	-	-
SaE	SASSAFRAS SANDY LOAM, 15 TO 25 PERCENT SLOPES	YES	ZEKIAH	5	FLOODPLAINS
Za	ZEKIAH SANDY LOAM, FREQUENTLY FLOODED	YES	ZEKIAH	75	FLOODPLAINS
			LONGMARSH	10	FLOODPLAINS
			ASKECKSY, UNDRAINED	5	FLATS, DRAINAGEWAYS, DEPRESSIONS, SWALES
			FALLSINGTON, UNDRAINED	5	SWALES, DRAINAGEWAYS, FLATS, DEPRESSIONS

1. U. S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, CECIL COUNTY, MD. SOIL SURVEY DATA, VERSION 11, DATED SEPTEMBER 13, 2019.  
2. HYDRIC SOILS INFORMATION AVAILABLE FROM THE STATE SOIL DATA ACCESS HYDRIC SOILS LIST, AT <[HTTPS://WWW.NRCS.USDA.GOV/INTERIM/FSE\\_DOCUMENTS/NRCSERPD1316619.HTML#REPORTREF](https://www.nrcs.usda.gov/interim/fse_documents/NRCSERPD1316619.HTML#REPORTREF)>. ACCESSED FEBRUARY 7, 2022.



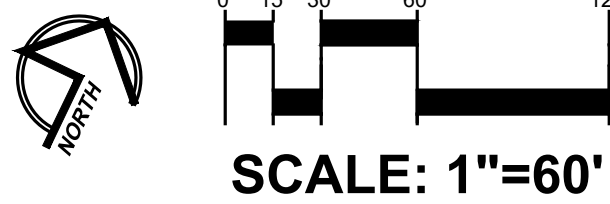
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EROSION AND SEDIMENT CONTROL  
OVERLAY PLAN  
**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

REVISIONS:  
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GENERAL EROSION AND SEDIMENTATION CONTROL NOTES

A. GENERAL EROSION AND SEDIMENT CONTROL GUIDELINES:

- LEFTOVER SOIL MATERIAL (SPOIL), GENERATED FROM AND NOT UTILIZED DURING THE STREAM MITIGATION, MUST BE DISPOSED OF OUTSIDE OF EXISTING WETLANDS AND ANY ASSOCIATED FLOODPLAIN. SPOIL MATERIALS ARE NOT TO BE DISPOSED OF IN REGULATED WATERS OF THE STATE OF MARYLAND AND THE UNITED STATES INCLUDING RIVERS, LAKES AND WETLANDS.
- EARTHWORK ASSOCIATED WITH THE GRADING NEAR THE EXISTING TOP OF STREAM BANKS SHOULD TAKE PLACE DURING DRY CONDITIONS.
- ALL DISTURBED SOILS SHOULD BE SEEDED AND/OR PLANTED WITH VEGETATION IMMEDIATELY AFTER ACHIEVING FINAL GRADE.
- UPON PROJECT COMMENCEMENT, ALL EARTHWORK ASSOCIATED WITH THIS PROJECT (WITH THE EXCEPTION OF ADDITIONAL TREE AND SHRUB PLANTING) SHOULD BE COMPLETED IMMEDIATELY.
- THE ISSUED JOINT MARYLAND DEPARTMENT OF THE ENVIRONMENT AND UNITED STATES ARMY CORPS OF ENGINEERS PERMITS MUST BE KEPT ON-SITE DURING CONSTRUCTION.
- A COPY OF THIS STREAM MITIGATION PLAN AND THE COUNTY APPROVED EROSION AND SEDIMENT (E&S) CONTROL PLAN SHALL BE KEPT ON-SITE AND AVAILABLE FOR INSPECTION ON THE CONSTRUCTION SITE AT ALL TIMES THROUGH THE TERMS OF THE PROJECT.
- THE INTENT OF THIS PLAN/NARRATIVE IS TO INDICATE THE GENERAL MEANS OF COMPLIANCE WITH RULES AND REGULATIONS OF THE CODE OF MARYLAND TITLE 26, SOIL EROSION AND SEDIMENT CONTROL REGULATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IMPLEMENT THESE METHODS, PLUS ADDITIONAL METHODS AS MAY BE NECESSARY BECAUSE OF THE CONDITIONS CREATED BY LOCAL SITE CONDITIONS, AND/OR CONSTRUCTION PROCEDURES IN ORDER TO ASSURE COMPLIANCE WITH APPLICABLE LAW. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL E&S CONTROL BEST MANAGEMENT PRACTICES (BMPS) AND FACILITIES SO THAT THEY PERFORM AS REQUIRED BY LAW.

B. GENERAL EROSION AND SEDIMENT CONTROL METHODS/PROCEDURES:

- IN ALL CASES, THE SMALLEST PRACTICAL AREA OF STABLE LAND SURFACE SHALL BE DISTURBED.
- ALL RELATED SEDIMENT AND EROSION CONTROL FACILITIES SHALL BE IN PLACE AND CAPABLE OF FUNCTIONING AS INTENDED PRIOR TO EARTHMOVING ACTIVITY.
- BACKFILLED EXCAVATIONS SHALL BE RESTORED TO THE ORIGINAL TYPE OF COVER AND GRADE AS PER SPECIFICATIONS. SEEDING SHALL BE DONE ACCORDING TO SCHEDULE FOR PERMANENT SEEDING. TEMPORARY STABILIZATION IS REQUIRED OF ANY AND ALL ERODIBLE/SOLUBLE AREAS AND MATERIALS IMMEDIATELY.
- CONSTRUCTION INTO UNPAVED AREAS FROM PAVED AREAS OR STREETS (PRIVATE OR PUBLIC) SHALL BE VIA THE TEMPORARY ACCESS ROAD.
- SEDIMENT SPILLED, DROPPED OR TRACKED ONTO PAVED SURFACES SHALL BE REMOVED IMMEDIATELY.
- ALL SLOPES 3:1 OR STEEPER WILL UTILIZE EROSION CONTROL MATTING AS SPECIFIED.
- ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE CONSTRUCTION SEQUENCE. EACH STAGE SHALL BE COMPLETED BEFORE THE FOLLOWING STAGE IS INITIATED. CLEARING AND GRUBBING SHALL BE LIMITED ONLY TO THOSE AREAS DESCRIBED IN EACH STAGE.
- AT LEAST 10 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, INCLUDING, BUT NOT LIMITED TO, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, AND A REPRESENTATIVE FROM THE CECIL COUNTY SOIL CONSERVATION DISTRICT FOR AN ON-SITE PRE-CONSTRUCTION MEETING.
- UNTIL THE SITE IS STABILIZED, ALL E&S CONTROL BMPS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL E&S BMPS AFTER EACH RUNOFF EVENT AND ON A LOG KEPT FOR THIS PURPOSE. THE COMPLIANCE ACTIONS AND THE DATE, TIME AND NAME OF THE PERSON CONDUCTING THE INSPECTION MUST BE DOCUMENTED. THE INSPECTION LOG WILL BE KEPT ON SITE AT ALL TIMES AND MADE AVAILABLE TO THE DISTRICT UPON REQUEST. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND REMATTING, MUST BE PERFORMED IMMEDIATELY. IF E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS OR MODIFICATIONS OF THOSE INSTALLED WILL BE NEEDED, AND MUST BE APPROVED BY THE DESIGN CONSULTANT AND LOCAL, STATE, AND FEDERAL JURISDICTIONS. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY E&S BMPS MUST BE STABILIZED IMMEDIATELY.
- BEFORE INITIATING ANY REVISION TO THE APPROVED E&S CONTROL PLAN OR REVISION WHICH MAY AFFECT THE EFFECTIVENESS OF THE COUNTY APPROVED E&S CONTROL PLAN, THE OPERATOR MUST RECEIVE APPROVAL OF THE REVISIONS FROM THE DESIGN CONSULTANT AND LOCAL, STATE, AND FEDERAL JURISDICTIONS. THE OPERATOR SHALL ASSURE THAT THE APPROVED E&S CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION, AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BMPS TO ELIMINATE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION.
- WHERE PUMPING AROUND MAY BE NECESSARY, ALL PUMPING OF SEDIMENT LADEN WATER OR POTENTIALLY SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP SUCH AS A FILTER BAG DISCHARGING OVER NON-DISTURBED AREAS.
- THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE RULES AND REGULATIONS OF THE CODE OF MARYLAND TITLE 26, SOIL EROSION AND SEDIMENT CONTROL REGULATIONS.
- THE OPERATOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS OR SITE WASTE IN ACCORDANCE WITH LOCAL AND STATE SOLID WASTE MANAGEMENT REGULATIONS. THE CONTRACTOR SHALL NOT ILLEGALLY BURY, DUMP, OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.
- STOCKPILE HEIGHTS MUST NOT EXCEED 15 FEET. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.
- UPON COMPLETION OR TEMPORARY CESSATION OF THE EARTH DISTURBANCE ACTIVITY, OR ANY STAGE THEREOF, THE PROJECT SITE SHALL BE IMMEDIATELY STABILIZED WITH THE APPROPRIATE TEMPORARY OR PERMANENT STABILIZATION.
- AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 85% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE ANY AREAS DISTURBED BY THE ACTIVITIES. DURING NON-GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE SPECIFIED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY VEGETATIVE STABILIZATION SPECIFICATIONS. DISTURBED AREAS WHICH ARE AT FINISHED GRADE OR WHICH WILL NOT BE REDISTURBED WITHIN 1 YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE PERMANENT VEGETATIVE STABILIZATION SPECIFICATIONS.

C. SEQUENCE OF CONSTRUCTION:

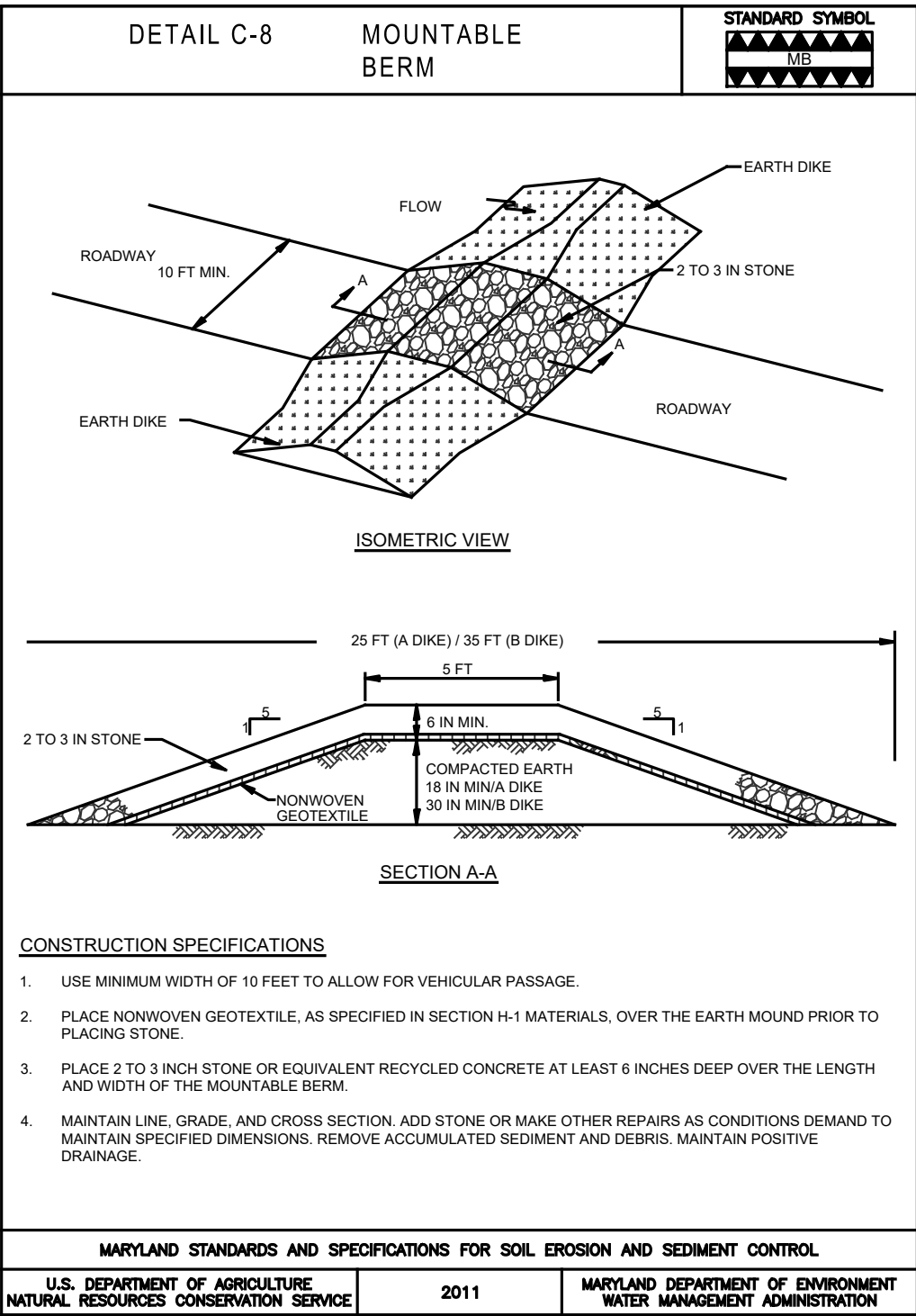
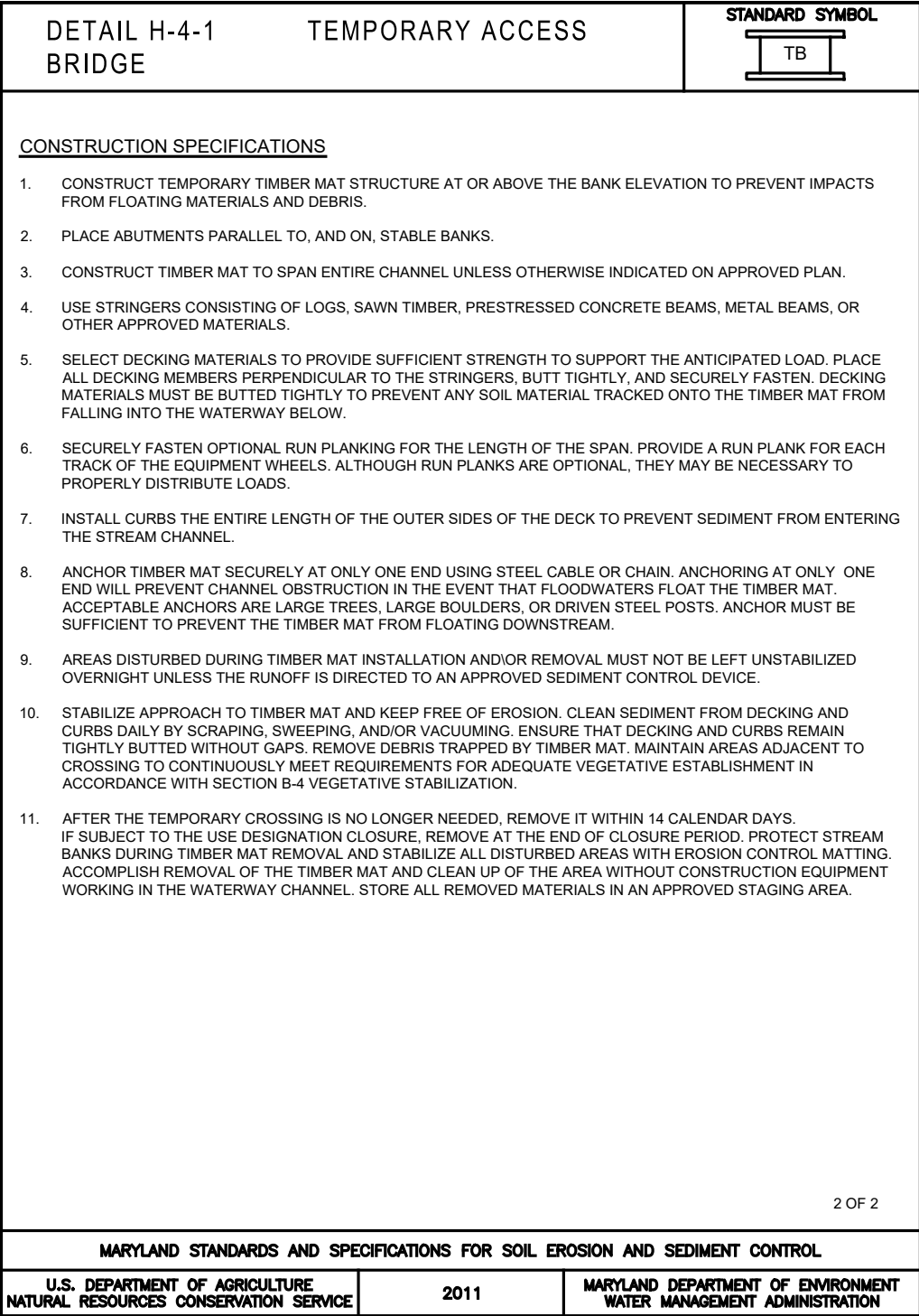
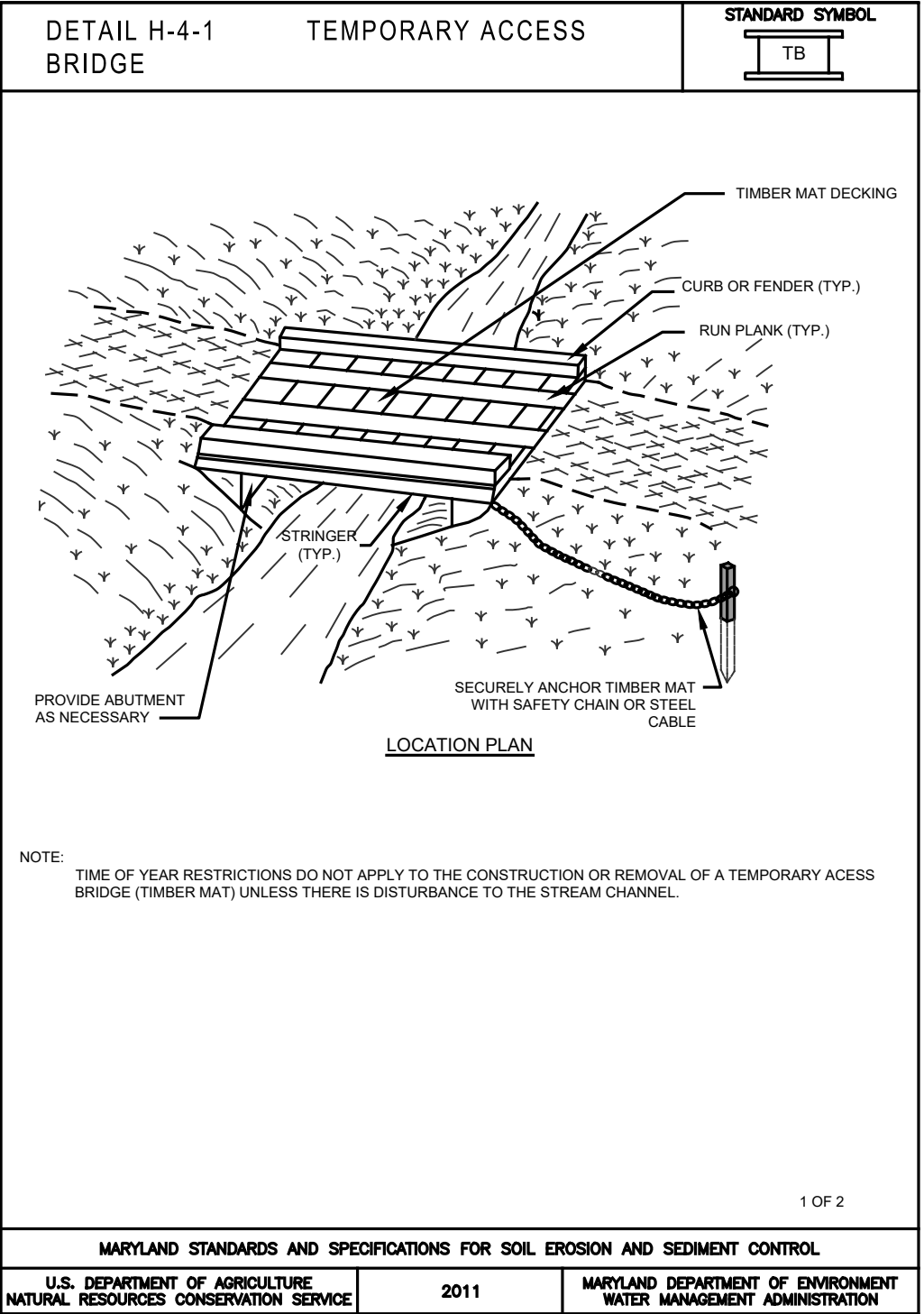
- REFER TO SHEET 1.

D. SEEDING AND MULCHING SPECIFICATIONS:

- REFER TO SHEET 16.

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

- NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIALS, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIALS, OR ANY OTHER DELETERIOUS SUBSTANCE.
- PLACE HEAVY EQUIPMENT ON MATS OR SUITABLE OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
- RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
- ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETERIA ITALICA), BARLEY (HORDEUM SP.), OATS (UNIOLA SP.), AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS. THE AREA SHALL BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
- AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
- TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:
  - USE I WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE, DURING ANY YEAR.
  - USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THROUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
  - USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.
- STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
- CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACES SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.



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**EROSION & SEDIMENT CONTROL  
GENERAL NOTES & DETAILS  
PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

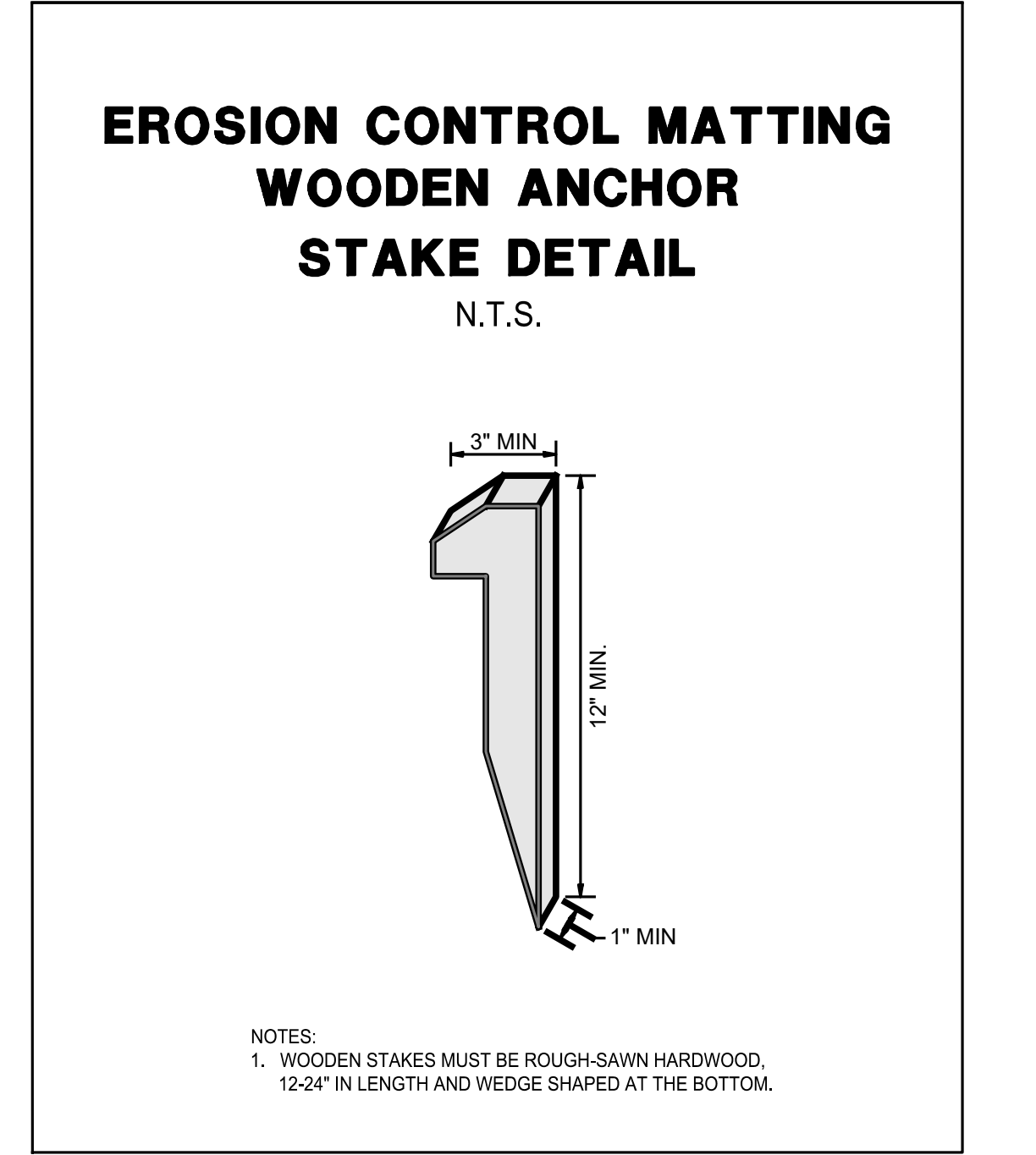
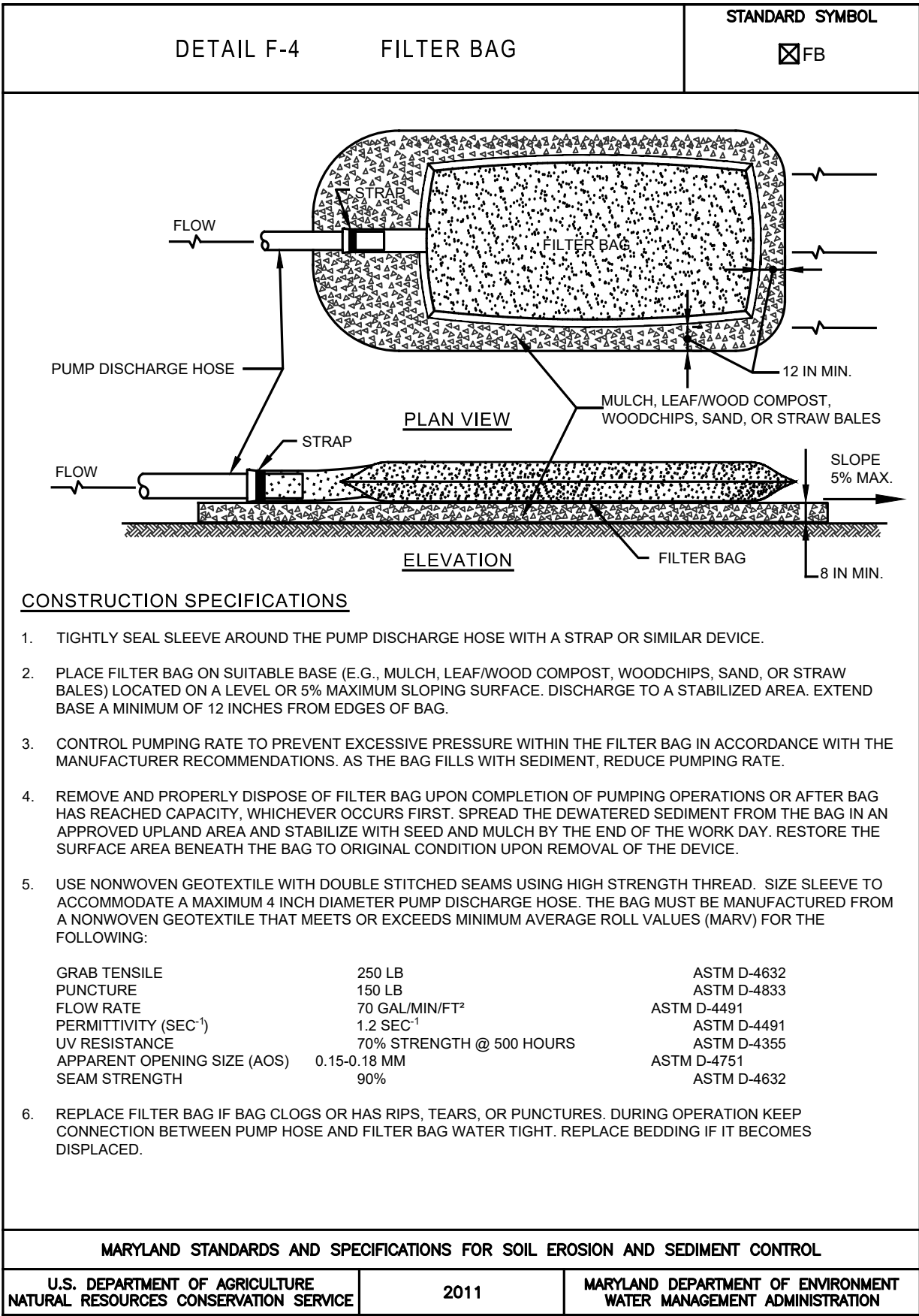
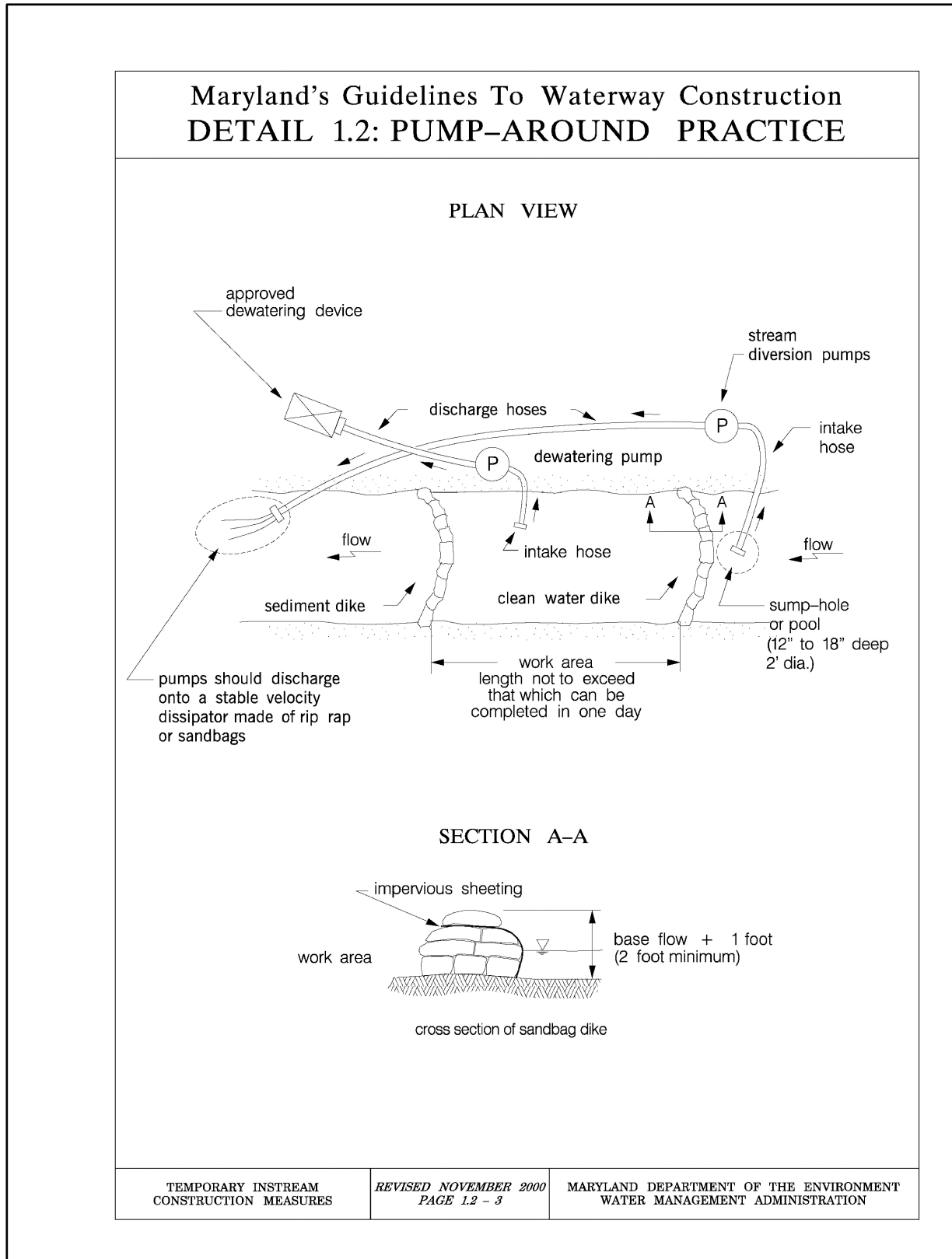
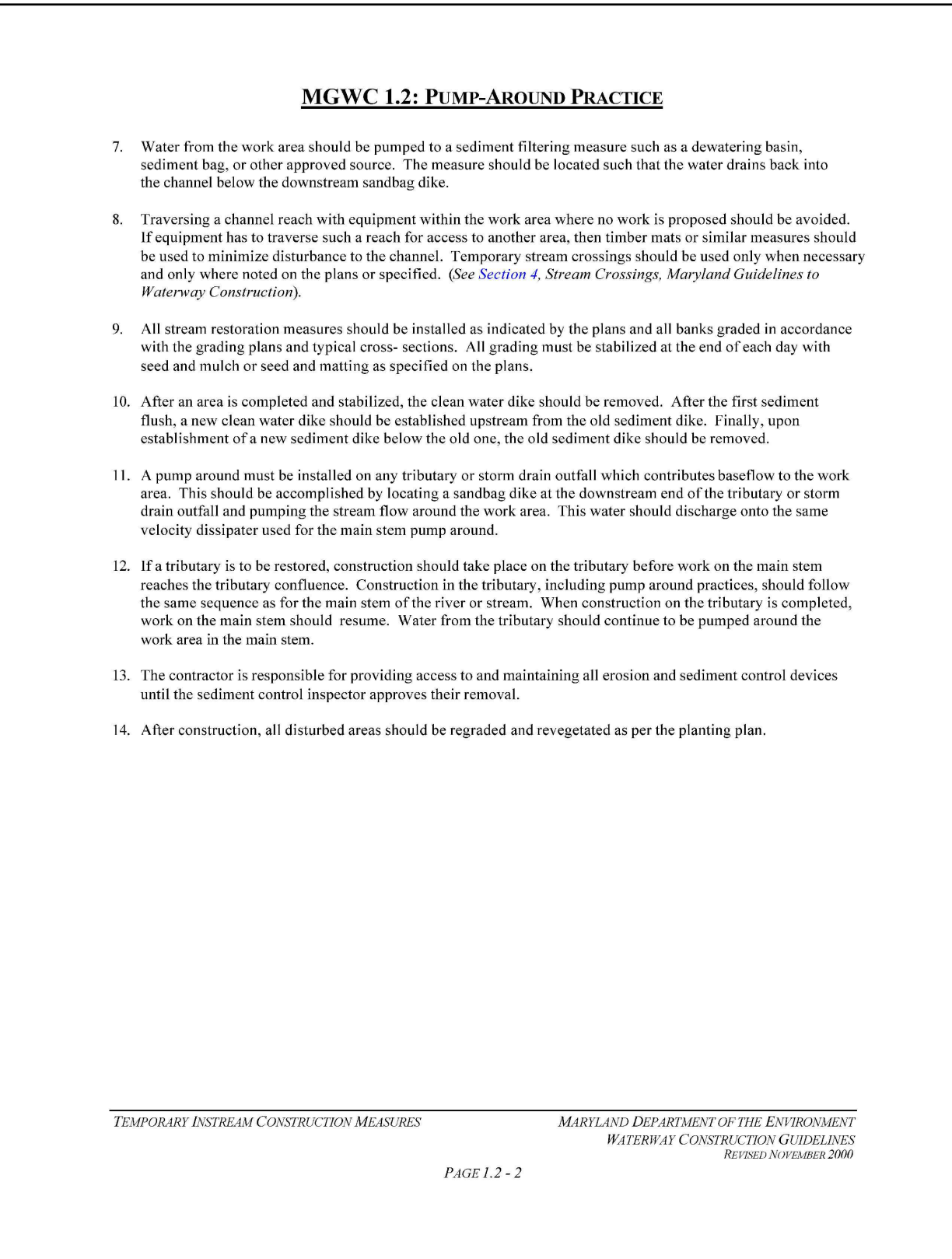
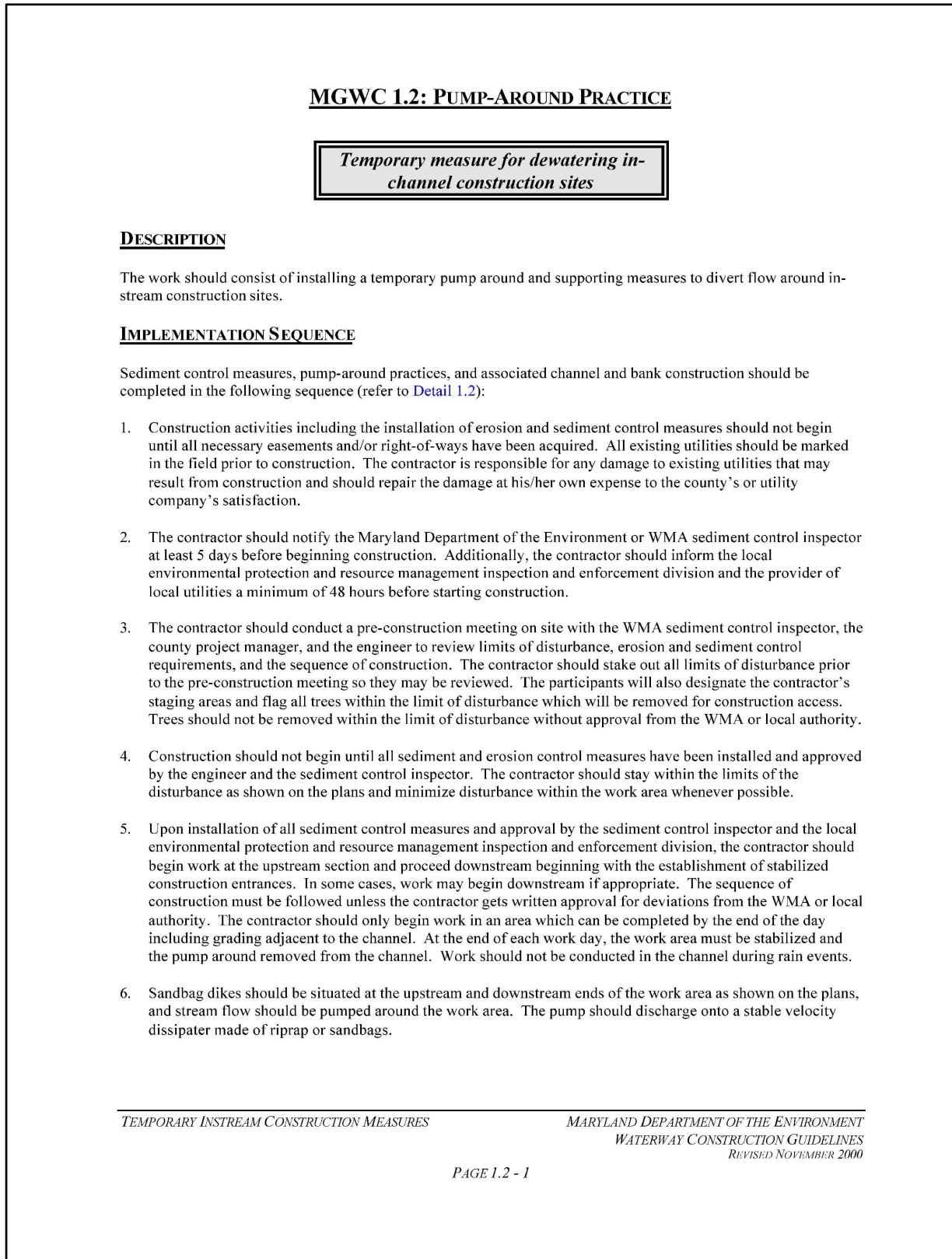
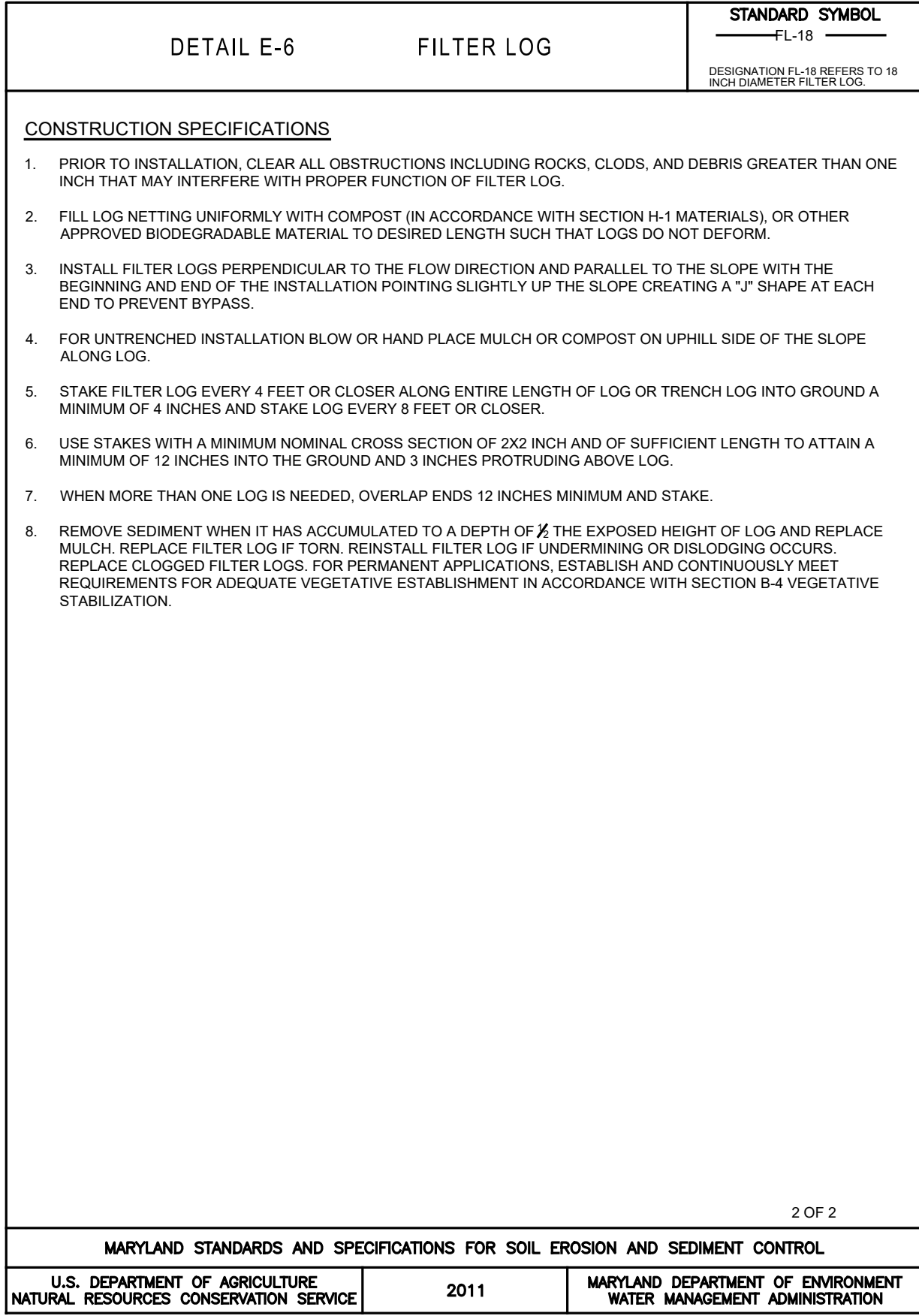
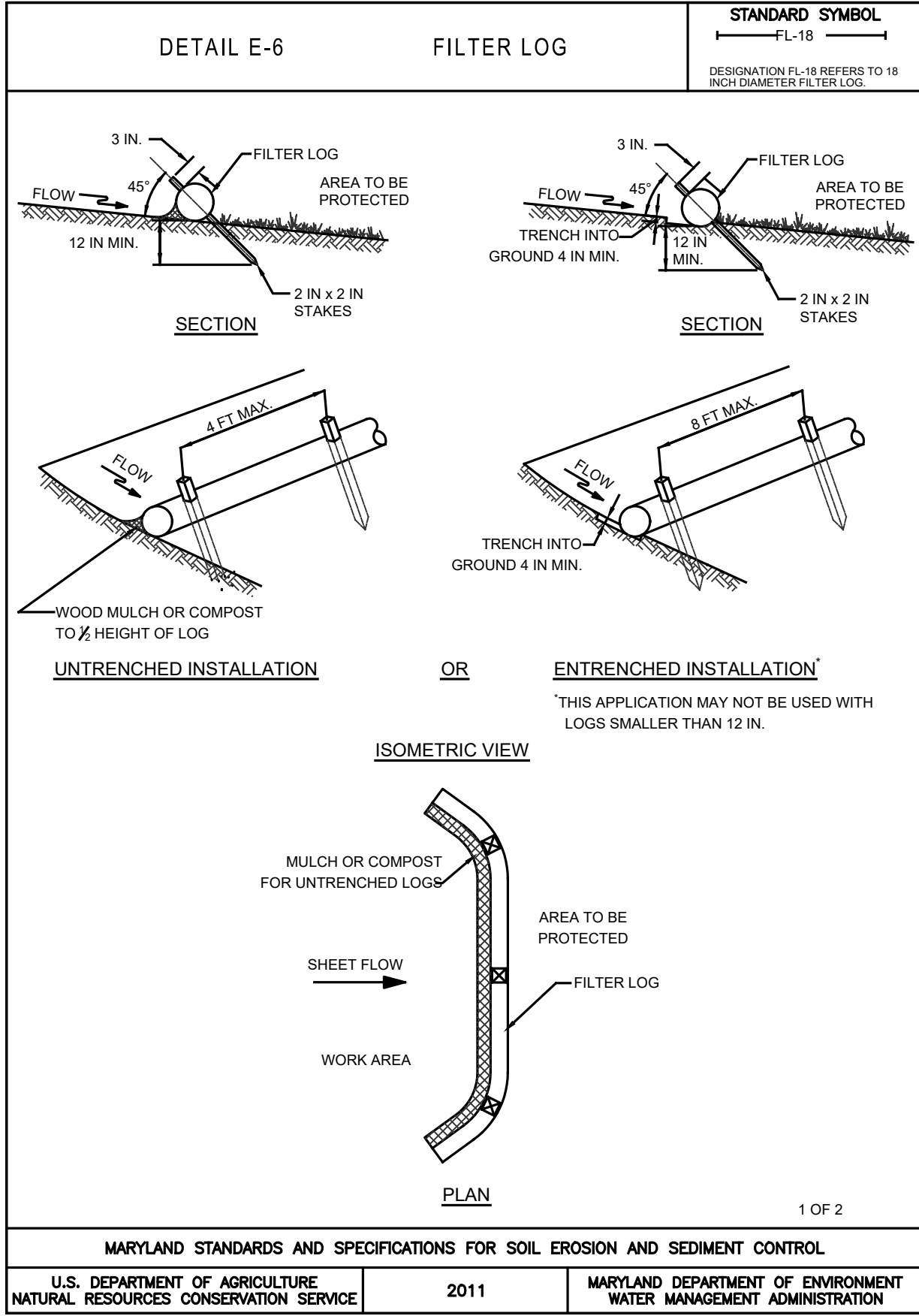
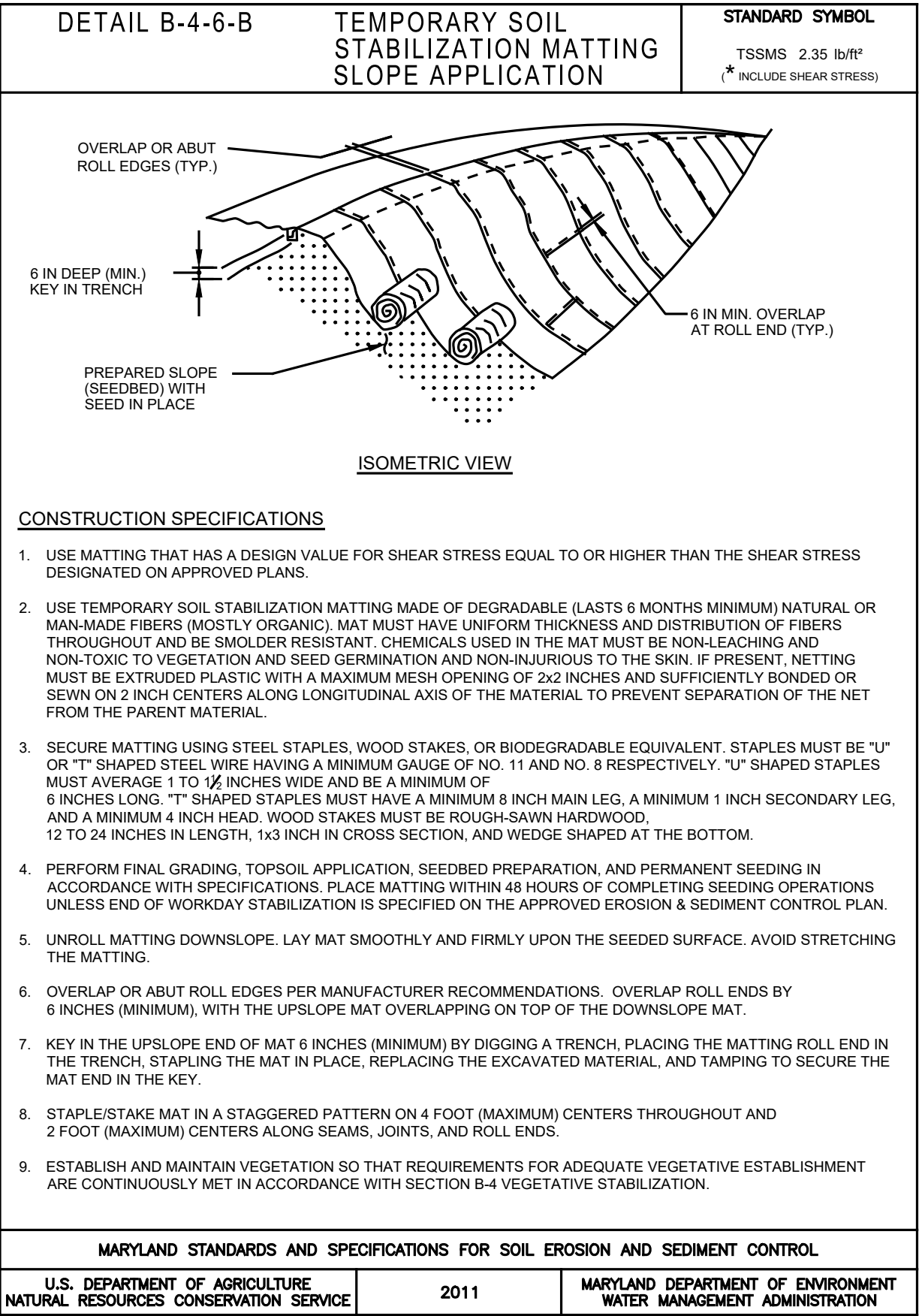
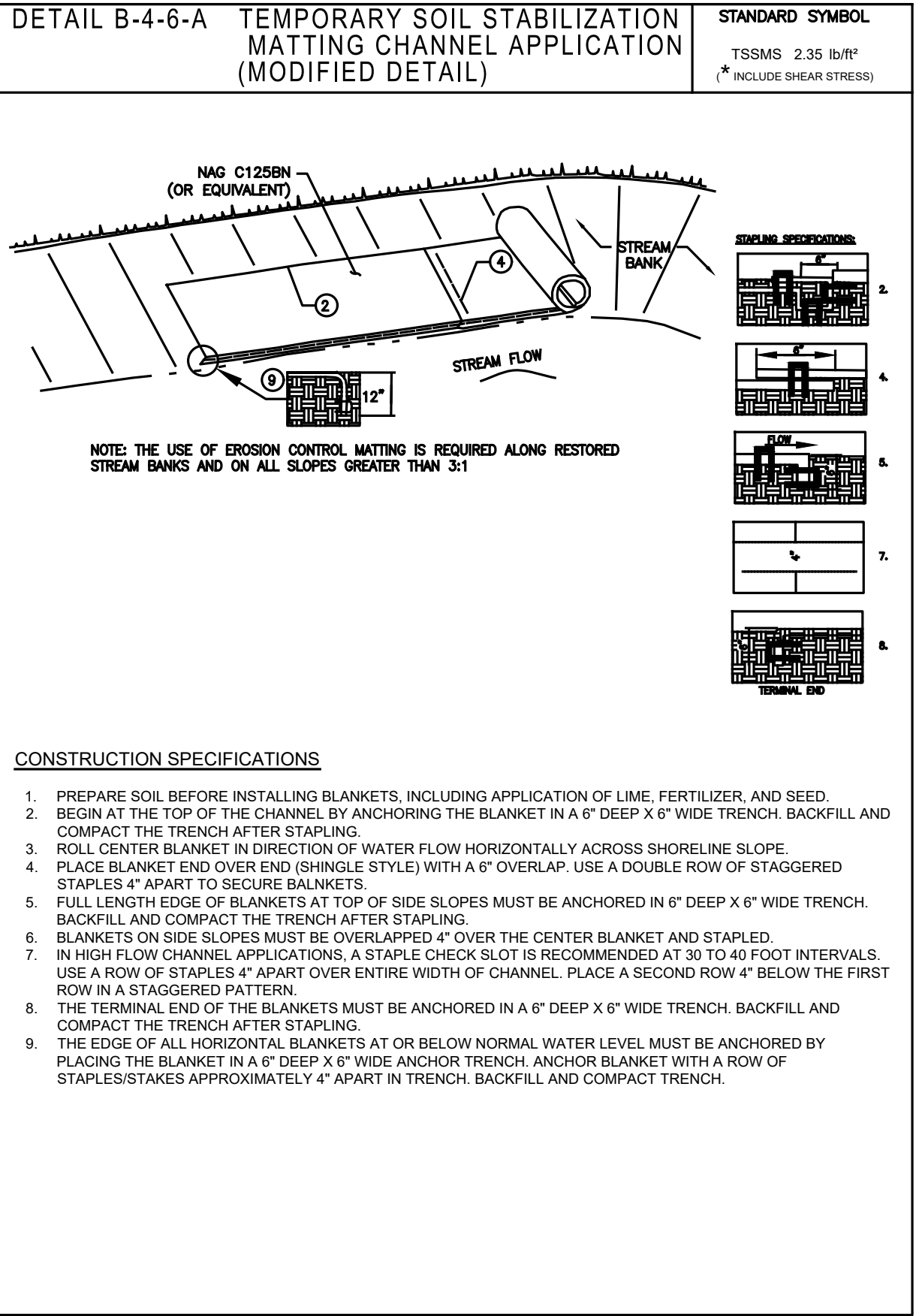
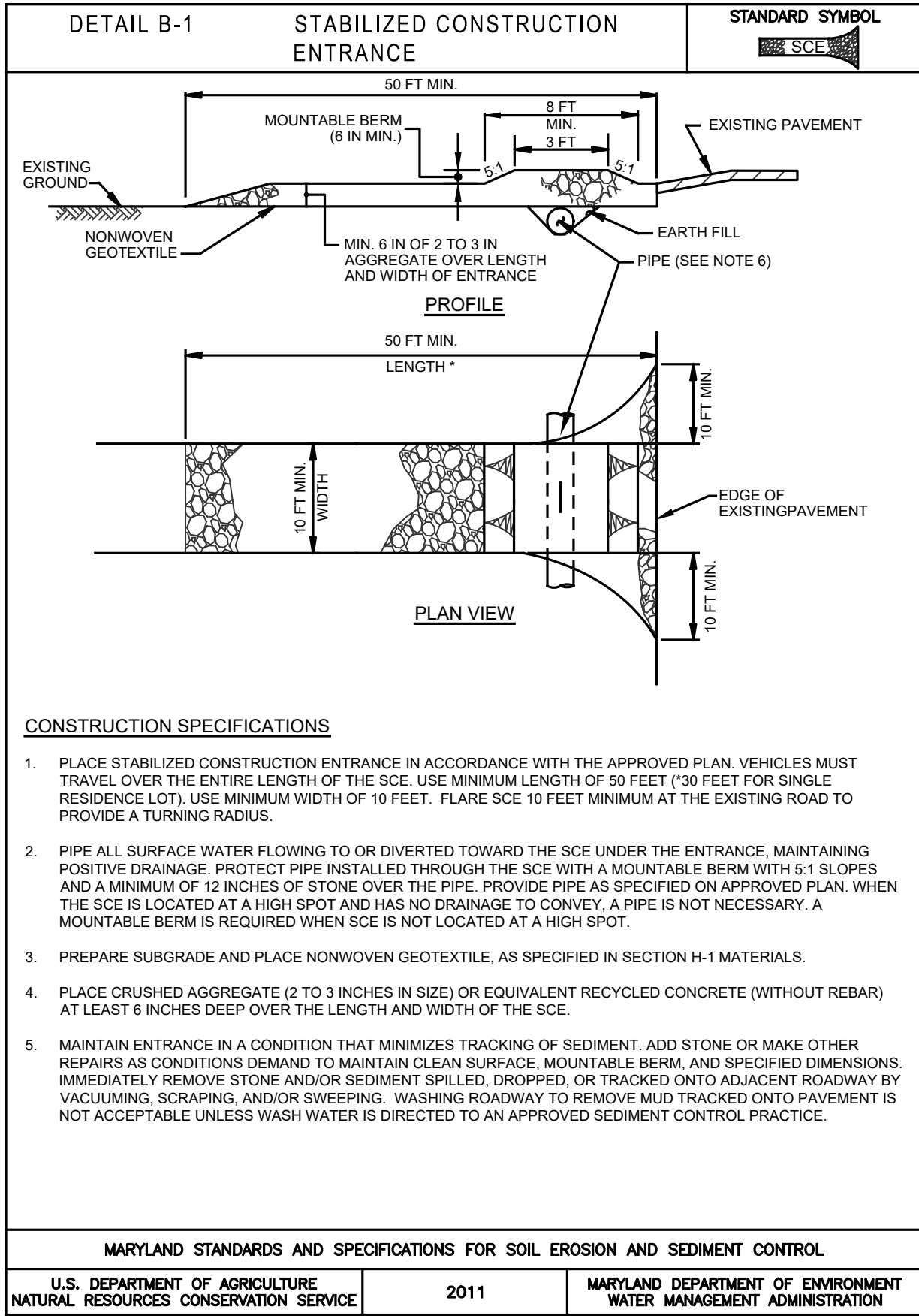
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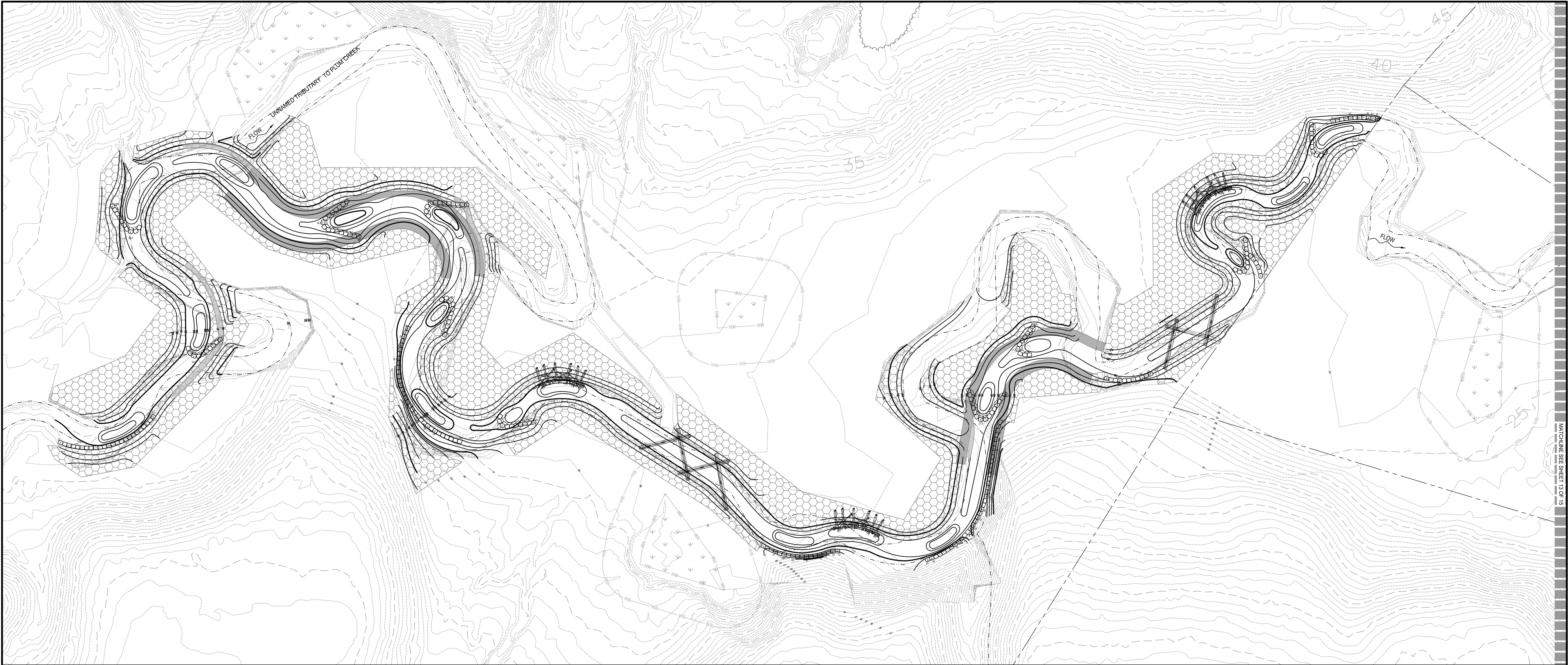
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**EROSION AND SEDIMENT CONTROL DETAILS**  
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MATCHLINE SEE SHEET 13 OF 15

# LEGEND

	EX. PROPERTY BOUNDARY		PR. 1-FOOT CONTOUR
	EX. 1-FOOT CONTOUR		PR. 5-FOOT CONTOUR
	EX. 5-FOOT CONTOUR		PR. TREE AND SHRUB PLANTING AREA
	EX. TREELINE		PR. LIVESTAKE PLANTING AREA
	EX. STREAM		
	EX. WETLAND BUFFER		
	EX. NONTIDAL WETLAND		



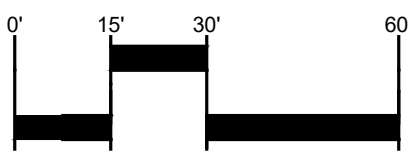
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PLANTING PLAN  
**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

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SCALE: 1"=30'





## LEGEND

- EX. PROPERTY BOUNDARY
- EX. 1-FOOT CONTOUR
- EX. 5-FOOT CONTOUR
- EX. TREELINE
- EX. STREAM
- EX. WETLAND BUFFER
- EX. NONTIDAL WETLAND
- PR. 1-FOOT CONTOUR
- PR. 5-FOOT CONTOUR
- PR. TREE AND SHRUB PLANTING AREA
- PR. LIVESTAKE PLANTING AREA

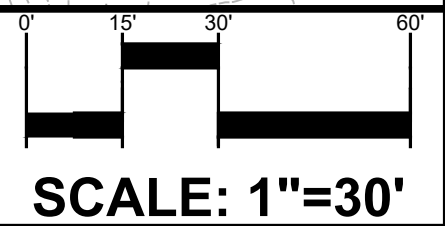
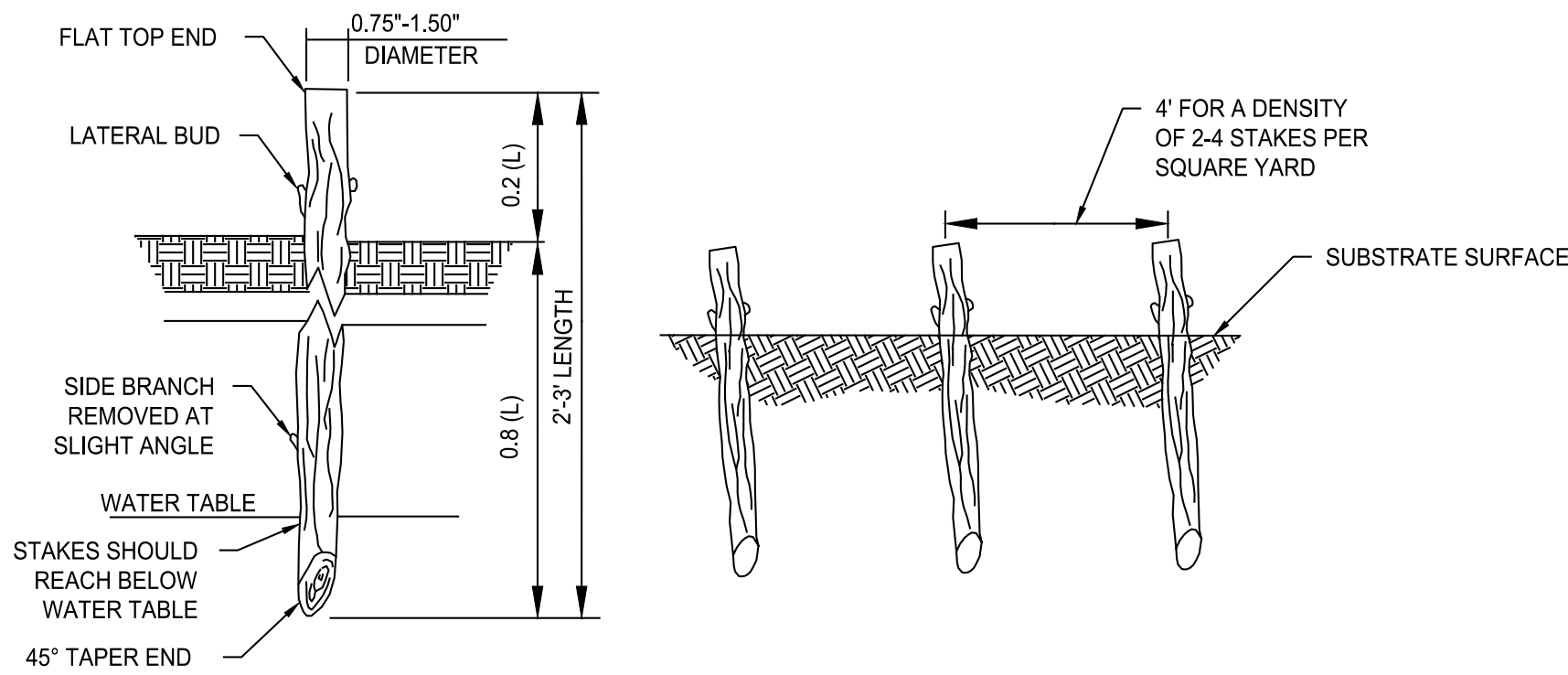
## LIVE STAKE SPECIFICATIONS AND DETAIL

TO BE PLANTED ALONG EDGE OF EXISTING STREAM CHANNEL; N.T.S.

### INSTALLATION NOTES:

- LIVE STAKES SHOULD HAVE A DIAMETER BETWEEN 0.75"-1.50" AND SHOULD BE LONG ENOUGH TO REACH BELOW THE GROUNDWATER TABLE SO THAT A STRONG ROOT SYSTEM CAN QUICKLY DEVELOP. AT LEAST 1' SHOULD BE EXPOSED TO SUNLIGHT.
- LIVE STAKE ROOTING AREAS SHOULD BE SOAKED IN BARRELS OF WATER FOR 24-48 HOURS JUST PRIOR TO INSTALLATION.
- WHILE KEEPING THE BARK OF THE LIVE STAKES INTACT, THE SIDE BRANCHES SHOULD BE CLEANLY REMOVED, THE BASAL ENDS ANGLED FOR EASY INSERTION, AND THE TOPS CUT SQUARE.
- THE CUTTINGS SHOULD BE IMPLANTED WITH THE ANGLED BASAL END DOWN AND BUDS ORIENTED UP AT THE MINIMUM ANGLE OF 10 DEGREES TO THE HORIZONTAL SO THAT ROOTING WILL NOT BE RESTRICTED. ALL STAKES SHOULD BE POSITIONED ABOVE THE NORMAL BASE FLOW LEVEL. PROJECT PLANNERS MAY NEED TO STUDY AN APTLY CHOSEN VEGETATED REFERENCE REACH FOR FUTURE GUIDANCE WHEN INSTALLING LIVE STAKES.
  - IN SOFT SOILS, THE STAKES CAN BE INSERTED PERPENDICULARLY INTO THE SLOPE USING A DEAD BLOW HAMMER; IN HARD SOILS, HOWEVER, A STEEL ROD SHOULD BE EMPLOYED TO CREATE A PILOT HOLE BEFORE THE STAKES ARE PLANTED.
  - 20% OF THE LIVE STAKE, AND A MINIMUM OF TWO LATERAL BUDS, SHOULD BE EXPOSED ABOVE THE SLOPE SO THAT GREEN, LEAFY SHOOTS WILL READILY GROW.
  - SPLIT OR OTHERWISE DAMAGED STAKES SHOULD BE DISCARDED.
- AFTER THE STAKES HAVE BEEN INSERTED INTO THE GROUND, SOIL SHOULD BE TAMPED FIRMLY AROUND THEIR BASES TO ENCOURAGE ROOT GROWTH.
- SUCCESSIVE STAKES SHOULD BE ARRANGED IN A TRIANGULAR CONFIGURATION AND SPACED A DISTANCE OF 4' APART.
- LIVE STAKES SHOULD BE KEPT COVERED AND MOIST AT ALL TIMES AND SHOULD BE PLACED IN COLD STORAGE IF MORE THAN A FEW HOURS ELAPSE BETWEEN THE CUTTING AND REPLANTING TIMES.
- LIVE STAKES MUST BE INSTALLED DURING THE DORMANT SEASON (NOVEMBER 15 THROUGH MARCH 15).

COMMON NAME	SCIENTIFIC NAME	AVAILABILITY	HABITAT VALUE	SIZE/FORM	ROOT TYPE	ROOTING ABILITY FROM CUTTING	QUANTITY
SILKY DOGWOOD	CORNUS AMOMUM	VERY COMMON	VERY GOOD	SMALL SHURB	SHALLOW-FIBROUS	VERY GOOD	134
RED-OSIER DOGWOOD	CORNUS SERICEA	VERY COMMON	VERY GOOD	MEDIUM-SMALL SHURB	SHALLOW	VERY GOOD	134
BLACK WILLOW	SALIX NIGRA	VERY COMMON	GOOD	LARGE-SHRUB/SMALL-TREE	SHALLOW TO DEEP	VERY GOOD	134



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EXISTING CONDITIONS

**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

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TREE PLANTINGS - STANDARDS AND SPECIFICATIONS

1. PLANT MATERIAL SELECTION

A. ALL PLANT MATERIALS GREATER THAN 1" CALIPER SHALL MEET OR EXCEED THE REQUIREMENTS OF THE AMERICAN NURSERYMEN'S ASSOCIATION STANDARDS. ALL PLANTS SHALL BE TYPICAL OF THE SPECIES AND VARIETY, SHALL HAVE A NORMAL HABIT OF GROWTH, AND SHALL BE FIRST QUALITY, SOUND, VIGOROUS, WELL-BRANCHED, AND WITH HEALTHY, WELL-FURNISHED ROOT SYSTEMS. THEY SHALL BE FREE OF DISEASE, INSECT PESTS, AND MECHANICAL INJURIES.

B. PLANTING STOCK LESS THAN 1" CALIPER SHALL MEET THE FOLLOWING MINIMUM STANDARDS. SEEDLINGS/WHIPS:

HARDWOODS - 1/4" TO 1/2" CALIPER WITH ROOTS NOT LESS THAN 8" LONG

CONIFERS - 3/8" TO 1/2" CALIPER WITH ROOTS NOT LESS THAN 8" LONG AND TOP HEIGHT OF 6" OR MORE

SHRUBS - 3/8" OR LARGER CALIPER WITH A ROOT SYSTEM

C. THE COUNTY HAS THE RIGHT TO REQUIRE ALTERNATIVE SPECIES OR SIZE OF REPLACEMENT TREE STOCK.
2. PLANTING SITE PREPARATION

A. UNDISTURBED SITES:

DISTURBANCE OF SOILS SHOULD BE LIMITED TO THE PLANTING FIELD FOR EACH PLANT. FOR PLANTINGS WHERE LARGE STOCK (BALLED AND BURLAPPED STOCK GREATER THAN 2" CALIPER) IS CHOSEN, THE PLANTING FIELD OF RADIUS OF 5 TIMES THE DIAMETER OF THE ROOT BALL IS RECOMMENDED.

IN AREAS OF STEEP SLOPES OR ERODIBLE SOILS, SOIL DISTURBANCE SHALL BE LIMITED TO THE PLANTING FIELD WHOSE RADIUS IS EQUAL TO 2.5 X DIAMETER OF THE ROOT BALL.

B. DISTURBED AREAS:

SOILS SHOULD BE TREATED BY INCORPORATING NATURAL MULCH WITHIN THE TOP 12 INCHES, OR AMENDMENTS AS DETERMINED BY A SOILS ANALYSIS. NATURAL AMENDMENTS, SUCH AS ORGANIC MULCH OR LEAF MOLD COMPOST, ARE PREFERRED.

IF FILL MATERIAL IS USED AT THE PLANTING SITE, IT SHALL BE CLEAN FILL MIX WITH 12 INCHES OF NATIVE SOIL. STOCKPILING OF NATIVE TOPSOILS MUST BE DONE IN SUCH A WAY THAT THE HEIGHT OF THE PILE DOES NOT DAMAGE THE SEED BANK.
3. PLANTING PERIOD

DEPENDING ON THE SIZE STOCK BEING USED, THE RECOMMENDED PLANTING WINDOWS DIFFER (SEE PLANTING AND MAINTENANCE CALENDAR ON THIS SHEET).
4. PLANT MATERIAL STORAGE

IT IS RECOMMENDED THAT PLANTING OCCUR WITHIN 24 HOURS OF DELIVERY TO THE SITE. PLANT MATERIALS WHICH ARE LEFT UNPLANTED FOR MORE THAN 24 HOURS SHALL BE PROTECTED FROM DIRECT SUN AND WEATHER AND KEPT MOIST. BARE ROOT STOCK, WHICH ARE UNPLANTED FOR MORE THAN 24 HOURS, SHALL BE HEeled IN. NURSERY STOCK SHALL NOT BE LEFT UNPLANTED FOR MORE THAN 2 WEEKS. ON-SITE OR LOCAL TRANSPLANTED MATERIALS SHALL BE STORED IN TREE BANKS IF UNPLANTED FOR MORE THAN 24 HOURS.
5. ON-SITE INSPECTION

PRIOR TO PLANTING, PLANTING STOCK SHALL BE INSPECTED. PLANTS NOT CONFORMING TO STANDARD NURSERYMAN SPECIFICATIONS FOR SIZE, FORM, VIGOR, ROOTS, TRUNK WOUNDS, INSECTS, AND DISEASE SHALL BE REPLACED.
6. PLANTING SPECIFICATIONS

A. SEEDLINGS/WHIPS:

PLANTING SMALL STOCK, SUCH AS SEEDLINGS AND WHIPS, AND BALLED AND BURLAPPED STOCK UP TO 2" CALIPER, CAN BE ACCOMPLISHED USING MANUAL METHODS OF PLANTING. SATISFACTORY EQUIPMENT INCLUDES SHOVELS, PLANTING OR DIBBLE BARS, AND MATTOCKS. FOR LARGER AREAS, PLANTING MACHINES MAY BE USED, BUT LINEAR, PLANTATION-TYPE PLANTINGS SHALL BE AVOIDED.

EXTREME CARE SHOULD BE TAKEN TO INSURE RETAINED MOISTURE OF THE ROOTS. WHILE PLANTING SEEDLINGS AND WHIPS, A MOIST CARRYING CONTAINER SHALL BE USED TO FURTHER PREVENT DESICCATION. FOR GREATER PROTECTION, SEEDLINGS MAY BE PLANTED WITH TREE SHELTERS.

AREAS PLANTED WITH SEEDLINGS OR WHIPS SHALL BE MULCHED AFTER PLANTING.

B. CONTAINER-GROWN STOCK

SUCCESSFUL PLANTING OF CONTAINER-GROWN STOCK REQUIRES CAREFUL SITE PREPARATION AND INSPECTION OF THE PLANT MATERIAL ROOT SYSTEM. CAUTION IS RECOMMENDED WHEN SELECTING PLANTS GROWN IN A SOILS MEDIUM DIFFERENT FROM THAT OF THE PLANTING SITE. THE PLANT SHOULD BE REMOVED FROM THE CONTAINER AND THE ROOTS GENTLY LOOSENED FROM THE SOILS. IF THE ROOTS ENIRCLE THE ROOT BALL, SUBSTITUTION IS STRONGLY RECOMMENDED. J-SHAPED OR KINKED ROOT SYSTEMS SHOULD ALSO BE NOTED AND SUBSTITUTED IF NECESSARY. ROOTS MAY NOT BE TRIMMED ON-SITE DUE TO THE INCREASED CHANCES OF SOIL BORNE DISEASES.

THE PLANTING FIELD SHOULD BE PREPARED AS SPECIFIED. NATIVE STOCKPILED SOILS SHALL BE USED TO BACKFILL PLANTING FIELD. RAKE SOILS EVENLY OVER THE PLANTING FIELD AND COVER WITH 2 TO 4 INCHES OF MULCH.

C. BALLED AND BURLAPPED TREES

TREE SPADES ARE USUALLY EMPLOYED TO PLANT LARGER TREE STOCK (BALLED AND BURLAPPED STOCK GREATER THAN 2" CALIPER). THIS TECHNIQUE IS PARTICULARLY USEFUL WHEN TRANSPLANTING ON-SITE OR WITH LOCAL PLANT MATERIALS. FOR TREES LARGER THAN 6" DIAMETER AT BREAST HEIGHT (DBH), SPECIALIZED EQUIPMENT IS RECOMMENDED.

BALLED AND BURLAPPED TREES MUST BE HANDLED WITH CARE WHILE PLANTING. TREES SHALL NOT BE PICKED UP BY THE TRUNK OR DROPPED, AS BOTH PRACTICES WILL TEND TO SEPARATE THE TRUNK FROM THE ROOT BALL. PRIOR TO PLANTING, ROOT BALLS SHALL BE KEPT MOIST.
7. PLANTING METHODS

PLANTING FIELDS SHOULD BE CREATED. USE WATERING TO SETTLE SOIL BACKFILLED AROUND TREES. STOCKPILED NATIVE TOPSOILS, IF AVAILABLE, SHALL BE USED TO BACKFILL THE PLANTING FIELD. AMENDMENTS ARE NOT RECOMMENDED IN THE PLANTING FIELD, AS STUDIES HAVE SHOWN THAT ROOTS WILL BE ENCOURAGED TO STAY WITHIN THE AMENDED SOILS. SOILS SHOULD BE RAKED EVENLY OVER THE PLANTING FIELD AND COVERED WITH 2 TO 4 INCHES OF MULCH.

STAKING OF TREES IS NOT RECOMMENDED EXCEPT IN AREAS OF HIGH WINDS. STAKINGS MAY BE USED FOR TREES LARGER THAN 8 FEET IN HEIGHT. MOVEMENT IS NECESSARY TO STRENGTHEN THE TRUNK OF THE PLANTED TREE. IF STAKES ARE USED, THEY SHALL BE REMOVED AFTER THE FIRST GROWING SEASON. WRAPPING IS ALSO NOT RECOMMENDED DUE TO THE INCREASED OPPORTUNITIES FOR INSECT INFESTATION AND DISEASE.
8. POST CONSIDERATIONS

A. SOIL STABILIZATION

FOR AREAS OF LARGE-SCALE DISTURBANCE, SOILS MUST BE STABILIZED USING A NON-GROUND COVER OR ENGINEERING FABRIC.

B. PROTECTION DEVICES

TO PREVENT DAMAGE OF PLANTED AREAS, ALL REFORESTATION AND AFFORESTATION SITES MUST BE POSTED WITH APPROPRIATE SIGNS AND FENCED. CONSTRUCTION EQUIPMENT SHALL BE PROHIBITED IN THESE AREAS.

C. WATERING

HOW OFTEN:

ANY WATERING PLAN SHOULD COMPENSATE FOR RECENT RAINFALL PATTERNS. TREES CAN DIE FROM TOO MUCH WATER, AS WELL AS TOO LITTLE. NEWLY PLANTED TREES MAY NEED WATER AS MUCH AS ONCE A WEEK FOR THE ENTIRE GROWING SEASON. THE NEXT TWO YEARS MAY REQUIRE WATERING ONLY A FEW TIMES A YEAR, EVERY MONTH DURING JULY AND AUGUST. AFTER THAT PERIOD, TREES SHOULD ONLY NEED WATER IN SEVERE DROUGHTS. BARE ROOT TRANSPLANTS, AS OPPOSED TO BALLED AND BURLAP MATERIAL, IF THEY WERE SUFFICIENTLY WATERED DURING PLANTING, MAY NOT NEED WATER FOR ALMOST 2-4 WEEKS AFTER GROWTH BEGINS.

SOIL AND WATERING

SOIL TEXTURE INFLUENCES THE DOWNWARD FLOW OF WATER. SOILS WITH MORE CLAY TEND TO HOLD ON TO THE WATER MORE AND CAN BE WATERED LESS OFTEN; SOILS WITH MORE SAND DRAIN MORE QUICKLY AND NEED TO BE WATERED MORE OFTEN.

IF THE SOIL WAS WELL PREPARED BEFORE PLANTING, THEN THERE SHOULD NOT BE MANY DRAINAGE PROBLEMS. IF THERE IS RESTRICTED DOWNWARD FLOW OF WATER, THEN THE SOIL MAY HAVE BEEN COMPACTED DURING CONSTRUCTION AND NOT AERATED BEFORE PLANTING, OR THERE MAY BE A CLAY HARDPAN.

WHEN TO FERTILIZE

IN GENERAL, WHILE SOILS MAY BE DEFICIENT IN NITROGEN, IT IS NOT RECOMMENDED TO FERTILIZE A TREE WITHIN THE FIRST GROWING SEASON AFTER PLANTING. TOO MUCH NITROGEN MAY CAUSE A SPURT OF CANOPY GROWTH, WHICH THE ROOTS CANNOT SUPPORT. IT IS BEST TO WAIT UNTIL AFTER THE END OF THE FIRST GROWING SEASON, EITHER IN THE LATE FALL OR EARLY SPRING.

WHAT TYPE OF FERTILIZER

WHEN IT IS TIME TO FERTILIZE, ORGANIC FERTILIZERS ARE PREFERRED TO SYNTHETIC FERTILIZERS. BONE MEAL OR SEAWEED PRODUCTS ARE AVAILABLE COMMERCIALY. THEIR EFFECTIVENESS IS BASED ON THEIR ABILITY TO SUPPLY NUTRIENTS TO THE PLANT AS NEEDED WHILE MINIMIZING THE RISK OF EXCESS NUTRIENTS ENTERING THE FOREST SYSTEM AND THE WATER SUPPLY. SOME SYNTHETIC FERTILIZERS CAN MIMIC THIS SLOW ACTION AND MAY BE APPROPRIATE FOR USE.

E. CONTROL OF COMPETING VEGETATION

IN SOME CASES, UNWANTED VEGETATION GROWING NEAR NEWLY PLANTED TREES CAN TAKE OVER THE SITE. THE EXTENT TO WHICH THIS PROBLEM IS CONTROLLED DEPENDS ON THE ABILITY OF THE PLANTED MATERIAL TO WITHSTAND THE INTRUSION. SMALLER TREES NEED MORE CARE, ALTHOUGH SOME SEEDLINGS SURVIVE AMONG THE OVERGROWTH AND SHADE IT OUT WHEN THEY REACH A GREATER HEIGHT. AS A PREVENTIVE MEASURE, CONSIDER THE POTENTIAL FOR GROWTH OF INVASIVE SPECIES WHILE CHOOSING A REFORESTATION OR AFFORESTATION AREA. UNFORTUNATELY, GOOD SITES FOR REFORESTATION AND AFFORESTATION ARE GENERALLY GOOD SITES FOR UNWANTED VEGETATION AS WELL.

MULCH IS ONE OF THE BEST DETERRENTS TO WEEDS. SPREAD A 2-4" LAYER OF MULCH OVER THE ROOT AREA OF THE NEWLY PLANTED TREES AVOIDING DIRECT CONTACT WITH THE TRUNK, A PRIME SPOT FOR FUNGAL GROWTH. MULCH HELPS MAINTAIN THE SOIL MOISTURE LEVEL AND MAY PROVIDE A BUFFER FOR ANY EQUIPMENT, SUCH AS MOWERS, THAT MAY BE BROUGHT THROUGH THE AREA. MULCHING AND MANUAL CONTROL OF COMPETING VEGETATION IS MORE COMPATIBLE WITH THE LONG-TERM FOREST HEALTH THAN THE USE OF HERBICIDES.

F. PROTECTION: PESTS, DISEASES AND MECHANICAL INJURY

AN INTEGRATED PEST MANAGEMENT (IPM) PROGRAM IS ONE OF THE MOST EFFECTIVE AND SAFE APPROACHES FOR MAINTAINING A HEALTHY FOREST. THE BASICS OF IPM INCLUDE PROPER SPECIES SELECTION FOR THE SITE, GOOD PRUNING, MULCHING AND FERTILIZING PRACTICES, REGULAR MONITORING, AND PROPER TIMING OF NECESSARY SPRAYS. GOOD CULTURAL PRACTICES WILL MINIMIZE THE AMOUNT OF SPRAYING. PROFESSIONAL IPM PROGRAMS HAVE REDUCED PESTICIDE USE BY 90%. SOME ASPECTS OF A FULL IPM PROGRAM INCLUDE:

1) ELIMINATION OF SOME LOW VEGETATION BEFORE PLANTING. THIS WILL HELP CONTROL THE RODENT POPULATION, WHICH THRIVES IN BRUSHY ENVIRONMENTS.

2) USE OF TREE SHELTERS TO PROTECT THE TRUNKS OF SEEDLINGS OR WHIPS FROM ANIMAL DAMAGE. THE SHELTERS ACT AS MINI GREENHOUSES TO SPEED GROWTH. THESE TREES NEED MORE WATER THAN THOSE PLANTED WITHOUT TREE SHELTERS.

3) MULCHING AROUND THE TREES TO MINIMIZE INVASION BY EXOTIC PLANT SPECIES.

4) PRUNING DEAD AND DISEASED BRANCHES WITH A CLEAN CUT TO PREVENT SPREADING OF DISEASE.

SUNSCALD IS A PROBLEM, WHICH THIN, YOUNG TREES ENCOUNTER. TREE WRAP IS COMMONLY USED TO PROTECT THESE TREES FROM SUNSCALD, BUT IS NOT RECOMMENDED DUE TO THE INCREASED OPPORTUNITIES FOR INSECT INFESTATION AND DISEASE. AN ALTERNATIVE IS TO ALLOW SMALL NONCOMPETITIVE BRANCHES, COMMONLY PRUNED, TO GROW ALONG THE SUNNY SIDE OF THE TRUNK TO HELP SHADE THE TRUNK.

NEWLY PLANTED TREES USUALLY DO NOT HAVE THE STRUCTURAL ROOTS TO SUPPORT THEM DURING HIGH WINDS. STAKES AND GUY WIRES, APPROPRIATE ONLY IN LOCATIONS WITH HIGH WINDS, SHOULD BE USED, BUT MUST BE REMOVED AFTER ONE GROWING SEASON OR THEY MAY CAUSE DAMAGE TO THE TREE AS IT GROWS

TREE/SHRUB PLANTING SPECIFICATIONS

COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS	QUANTITY	HEIGHT AT MATURITY (FEET)	SPACING (FEET)	PLANTING SPECIFICATIONS
TREES						PLANTING HOLE SHOULD BE AT LEAST TWICE DIAMETER OF THE PLANT'S CONTAINER. SET PLANT SO THAT THE TOP OF THE ROOT MASS IS LEVEL WITH THE SURROUNDING SOIL. DIG HOLE 4-6" DEEPER THAN THE CONTAINER, THEN BACKFILL TO PROPER DEPTH. FIRM BOTTOM SOIL BEFORE SETTING PLANT. CONTAINERS WITH SLANTED SIDES MAY BE INVERTED AND TAPPED TO REMOVE THE PLANT. STRAIGHT-SIDED CONTAINERS SHOULD BE SLIT OR CUT TO ALLOW PLANT REMOVAL. DO NOT PULL THE PLANT FREE FROM ITS CONTAINER. PRUNE ANY BOUND ROOTS FROM THE OUTSIDE OF THE ROOT MASS. GENTLY SCARIFY SIDES OF ROOT MASS WITH HANDS, BUT KEEP ROOT MASS INTACT. PLACE 3 TABLETS (10 GRAMS) OF AGRIFORM 20-10-5 FERTILIZER OR APPROVED SUBSTITUTE UNIFORMLY AROUND THE HOLE'S PERIMETER AT ONE HALF THE HOLE'S DEPTH WHILE BACKFILLING WITH SOIL. SET THE PLANT SO THAT THE TOP OF THE ROOT MASS IS LEVEL WITH THE SURROUNDING SOIL. BACKFILL WITH QUALITY SOIL FREE OF ROCK AND STONE. PACK FIRMLY WITH FEET. DO NOT "MOUND" THE PLANT. WATER THE PLANT GENEROUSLY. ADD ADDITIONAL SOIL IF IF BACKFILL SETTLES AFTER WATERING.
RED MAPLE	ACER RUBRUM	FAC	50	90	12	
AMERICAN HOLLY	ILEX OPACA	FAC	50	60	12	
AMERICAN HORNBEAM	CARPINUS CAROLINIANA	FAC	50	60	12	
AMERICAN BEECH	FAGUS GRANDIFOLIA	FACU	50	100	12	
TULIPTREE	LIRIODENDRON TULIPIFERA	FACU	50	100	12	
AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	FACW	50	120	12	
PIN OAK	QUERCUS PALUSTRIS	FACW	50	80	12	
NORTHERN RED OAK	QUERCUS RUBRA	FACU	50	90	12	
SHRUBS						
SILKY DOGWOOD	CORNUS AMOMUM	FACW	50	5	12	
SOUTHERN ARROWWOOD	VIBURNUM DENTATUM	FAC	50	10	12	
NORTHERN SPICEBUSH	LINDERA BENZOIN	FACW	50	5	12	
NOTE: ALL TREES AND SHRUBS WILL BE PLANTED FROM 2- TO 3-GALLON CONTAINER-GROWN STOCK.						

RIPARIAN PLANTING SPECIFICATIONS (SEED) FOR GRADED STREAM BANKS AND FLOODPLAIN AREAS

MARYLAND COASTAL PLAIN RIPARIAN MIX (ERNMX-732; OR EQUIVALENT)					
COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS	HEIGHT AT MATURITY (FEET)	PERCENT IN MIX	PLANTING SPECIFICATION
INDIAN GRASS	SORGHASTRUM NUTANS	FACU	8	30%	SEEDING RATE: 15 LBS/ACRE SEED THIS MIX WITH OATS (AVENA SATIVA) AS A COMPANION CROP AND FOR EROSION CONTROL AT 30 LBS/ACRE. SEEDING METHOD: WEATHER AND SUB-CONTRACTOR DEPENDENT. METHOD TO BE APPROVED BY OVERSEEING BIOLOGIST PRIOR TO COMMENCEMENT OF SEEDING ACTIVITIES. BROADCAST SEEDING AND STRAW MULCHING BY HAND IS ENCOURAGED, EXCEPT WHERE EROSION CONTROL MATTING IS SPECIFIED. SEED SHALL BE PROVIDED IN SEALED CONTAINERS CLEARLY LABELED WITH SEED NAME, WEIGHT, AND PERCENTAGES OF SEED MIXTURE. THE CONTRACTOR SHALL PROVIDE A SIGNED COPY OF A SEED CERTIFICATION STATEMENT PROVIDED BY THE VENDOR. THIS STATEMENT SHALL INCLUDE THE NAME AND ADDRESS OF THE VENDOR AND STATEMENT OF CERTIFICATION. PRIOR TO SEEDING, ALL PROPOSED SEEDING AREAS SHALL BE RAKED OR DISKED TO MAXIMIZE SOIL-SEED CONTACT AND TO CLEAR SOILS OF STONES, DEBRIS, WEEDS, PRIOR PLANT GROWTH, STICKS, STUMPS, AND OTHER DEBRIS OR IRREGULARITIES WHICH MIGHT INTERFERE WITH THE SEEDING OPERATION, GROWTH OF PLANT SPECIES, OR SUBSEQUENT MAINTENANCE OF THE GRASS COVERED AREAS. MULCHING: STRAW MULCH TO BE APPLIED AT 3 TONS PER ACRE (OR 140 LBS PER 1,000 SQ. FT.) TO SEEDDED AREAS WHEN NON-TACKIFIER SEEDING METHOD IS IMPLEMENTED. HAND APPLICATION OF MULCH IS ENCOURAGED.
VIRGINIA WILDRYE	ELYMUS VIRGINICUS	FAC	5	18%	
BEAKED PANICGRASS	PANICUM ANCEPS	FAC	4	17.80%	
BIG BLUESTEM	ANDROPOGON GERARDII	FAC	10	15%	
FOX SEDGE	CAREX VULPINOIDEA	FACW	3	6.20%	
SWITCHGRASS	PANICUM VIRGATUM	FAC	9	5%	
AUTUMN BENTGRASS	AGROSTIS PERENNANS	FACU	4	4%	
WILD SENNA	SENNA HEBECARPA	FAC	6	1%	
NEW YORK IRONWEED	VERNONIA NOVEBORACENSIS	FACW	6.5	1%	
JOE PYE WEED	EUPATORIUM FISTULOSUM	FACW	10	0.50%	
GRASSLEAF GOLDENROD	EUTHAMIA GRAMINIFOLIA	FAC	5	0.50%	
NOTE: SEED MIXES ARE AVAILABLE FROM ERNST CONSERVATION SEEDS, 8884 MERCER PIKE, MEADVILLE, PA 16335. EQUIVALENT SEED MIX IS ACCEPTABLE.					

TEMPORARY ACCESS ROAD, STOCKPILE, & STAGING AREA PLANTING SPECIFICATIONS (SEED)

RIGHT-OF-WAY NATIVE WOODS MIX W/ANNUAL RYEGRASS (ERNMX-132-1; OR EQUIVALENT)					
COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS	HEIGHT AT MATURITY (FEET)	PERCENT IN MIX	PLANTING SPECIFICATION
DEERTONGUE	PANICUM CLANDESTINUM	FACW	5	29%	SEEDING RATE: 30 LB/ACRE SEED THIS MIX WITH OATS (AVENA SATIVA) AS A COMPANION CROP AND FOR EROSION CONTROL AT 30 LB/ACRE. SEEDING METHOD: WEATHER AND SUB-CONTRACTOR DEPENDENT. METHOD TO BE APPROVED BY OVERSEEING BIOLOGIST PRIOR TO COMMENCEMENT OF SEEDING ACTIVITIES. BROADCAST SEEDING AND STRAW MULCHING BY HAND IS ENCOURAGED, EXCEPT WHERE EROSION CONTROL MATTING IS SPECIFIED. SEED SHALL BE PROVIDED IN SEALED CONTAINERS CLEARLY LABELED WITH SEED NAME, WEIGHT, AND PERCENTAGES OF SEED MIXTURE. THE CONTRACTOR SHALL PROVIDE A SIGNED COPY OF A SEED CERTIFICATION STATEMENT PROVIDED BY THE VENDOR. THIS STATEMENT SHALL INCLUDE THE NAME AND ADDRESS OF THE VENDOR AND STATEMENT OF CERTIFICATION. PRIOR TO SEEDING, ALL PROPOSED SEEDING AREAS SHALL BE RAKED OR DISKED TO MAXIMIZE SOIL-SEED CONTACT AND TO CLEAR SOILS OF STONES, DEBRIS, WEEDS, PRIOR PLANT GROWTH, STICKS, STUMPS, AND OTHER DEBRIS OR IRREGULARITIES WHICH MIGHT INTERFERE WITH THE SEEDING OPERATION, GROWTH OF PLANT SPECIES, OR SUBSEQUENT MAINTENANCE OF THE GRASS COVERED AREAS. MULCHING: STRAW MULCH TO BE APPLIED AT 3 TONS PER ACRE (OR 140 LBS PER 1,000 SQ. FT.) TO SEEDDED AREAS WHEN NON-TACKIFIER SEEDING METHOD IS IMPLEMENTED. HAND APPLICATION OF MULCH IS ENCOURAGED.
RIVERBANK WILDRYE	ELYMUS RIPARIUS	FACW	5	21%	
ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	NI	4	20%	
SWITCHGRASS	PANICUM VIRGATUM	FAC	9	14%	
CREEPING RED FESCUE	FESTUCA RUBRA	NI	2	10%	
FOX SEDGE	CAREX VULPINOIDEA	FACW	3	3%	
PARTRIDGE PEA	CHAMAECRISTA FASCICULATA	FACU	3	3%	
NOTE: SEED MIXES ARE AVAILABLE FROM ERNST CONSERVATION SEEDS, 8884 MERCER PIKE, MEADVILLE, PA 16335. EQUIVALENT SEED MIX IS ACCEPTABLE.					

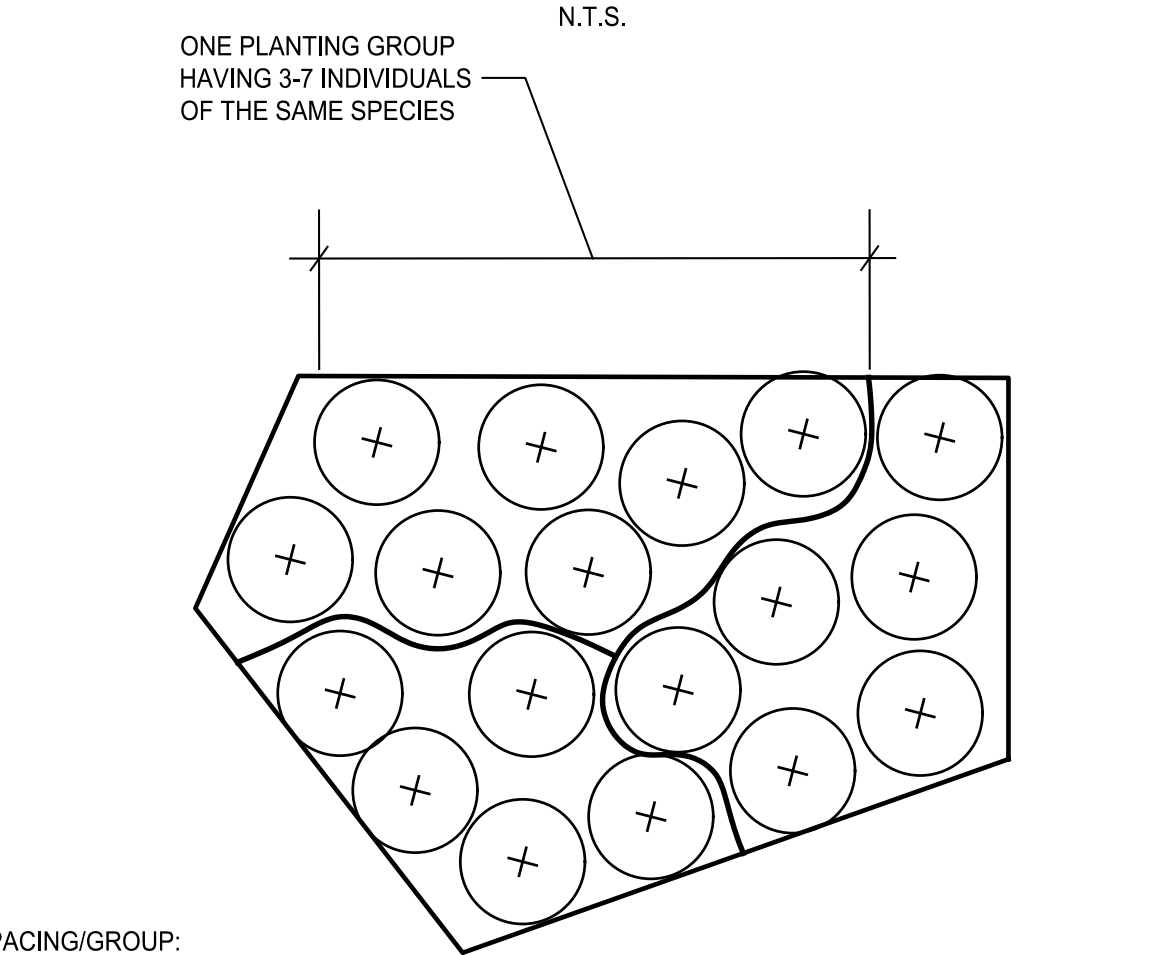
PLANTING AND MAINTENANCE CALENDAR

TASKS	MONTHS											
	*JAN	*FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV*	DEC*
TRANSPLANT OF 2" DBH OR GREATER												
PLANTING SEEDLINGS, WHIPS												
MINIMUM MONITORING												
FERTILIZER (IF NEEDED)*												
WATER**												

- RECOMMENDED, OPTIMAL TIME
- RECOMMENDED, WITH ADDITIONAL CARE
- RECOMMENDED
- \* DEPENDENT UPON SITE CONDITIONS
- \*\* DEPENDENT UPON SITE CONDITIONS: WEEKLY WATERING IS STRONGLY RECOMMENDED FROM MAY THROUGH OCTOBER 1ST UNLESS WEEKLY RAINFALL EQUALS 1.

- NOTES:
- ACTIVITIES DURING NOVEMBER THROUGH FEBRUARY DEPEND ON GROUND CONDITIONS.
  - THE PLANTING AND CARE OF TREES IS MOST SUCCESSFUL WHEN COORDINATED WITH LOCAL CONDITIONS. THIS CALENDAR SUMMARIZES SOME OF THE RECOMMENDED TIME FRAMES FOR BASIC REFORESTATION AND STRESS REDUCTION ACTIVITIES.

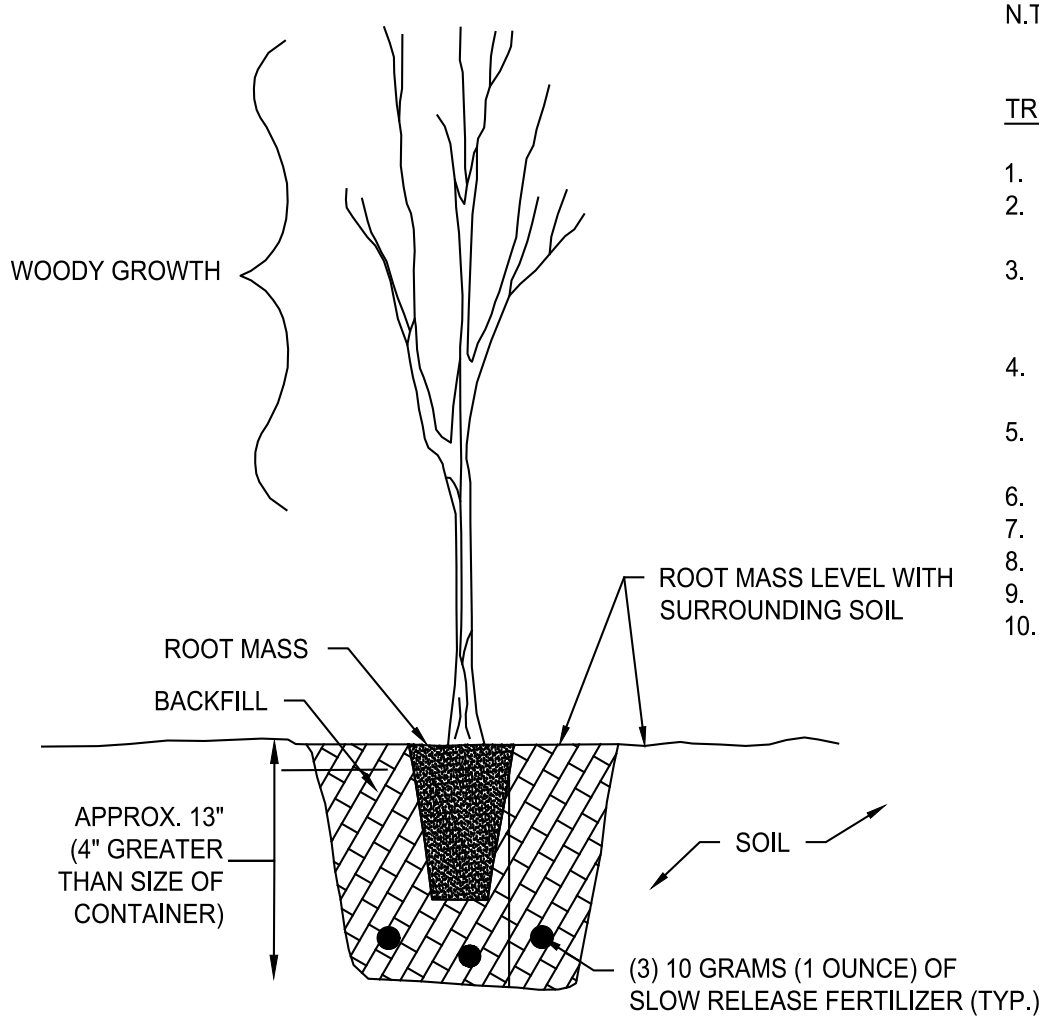
TYPICAL PLANTING LAYOUT DETAIL



SPACING/GROUP:

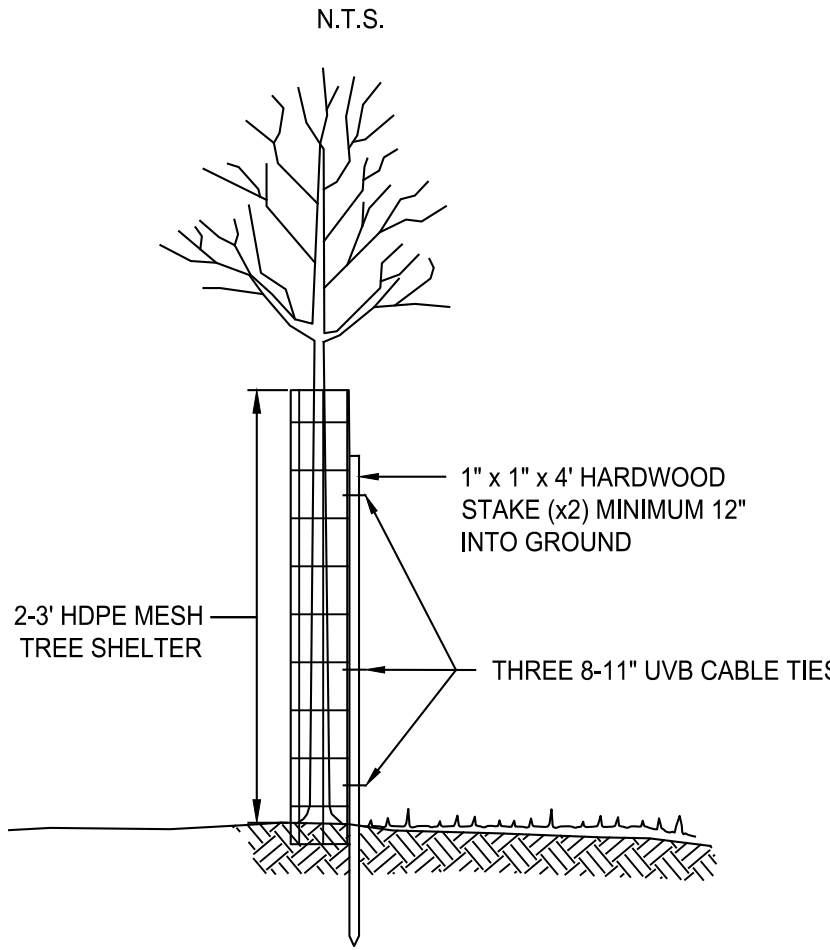
THE SPACING OF TREES SHALL VARY TO AVOID THE APPEARANCE OF A GRID. TREES SHALL BE PLANTED IN ACCORDANCE WITH THE AVERAGE SPACING SHOWN WITHIN THE PLANTING SCHEDULE. THE PLANTING ROWS SHALL NOT BE STRAIGHT, BUT SHALL BE STAGGERED SLIGHTLY TO REDUCE THE VISUAL PERCEPTION OF THE ROWS. THE TREES SHALL BE PLANTED IN GROUPS HAVING 3-7 INDIVIDUALS OF THE SAME SPECIES. PLANT TREE GROUPS A MINIMUM OF TWO ROWS WIDE. GROUPS OF EACH SPECIES IN THE PLANTING SCHEDULE SHALL BE MIXED RANDOMLY AND EQUALLY IN EACH AFFORESTATION/MITIGATION AREA. (THESE GROUPING SPECIFICATIONS MAY BE ALTERED AND DIRECTED IN THE FIELD BY THE ENVIRONMENTAL CONSULTANT.)

CONTAINER STOCK TREE AND SHRUB PLANTING DETAIL

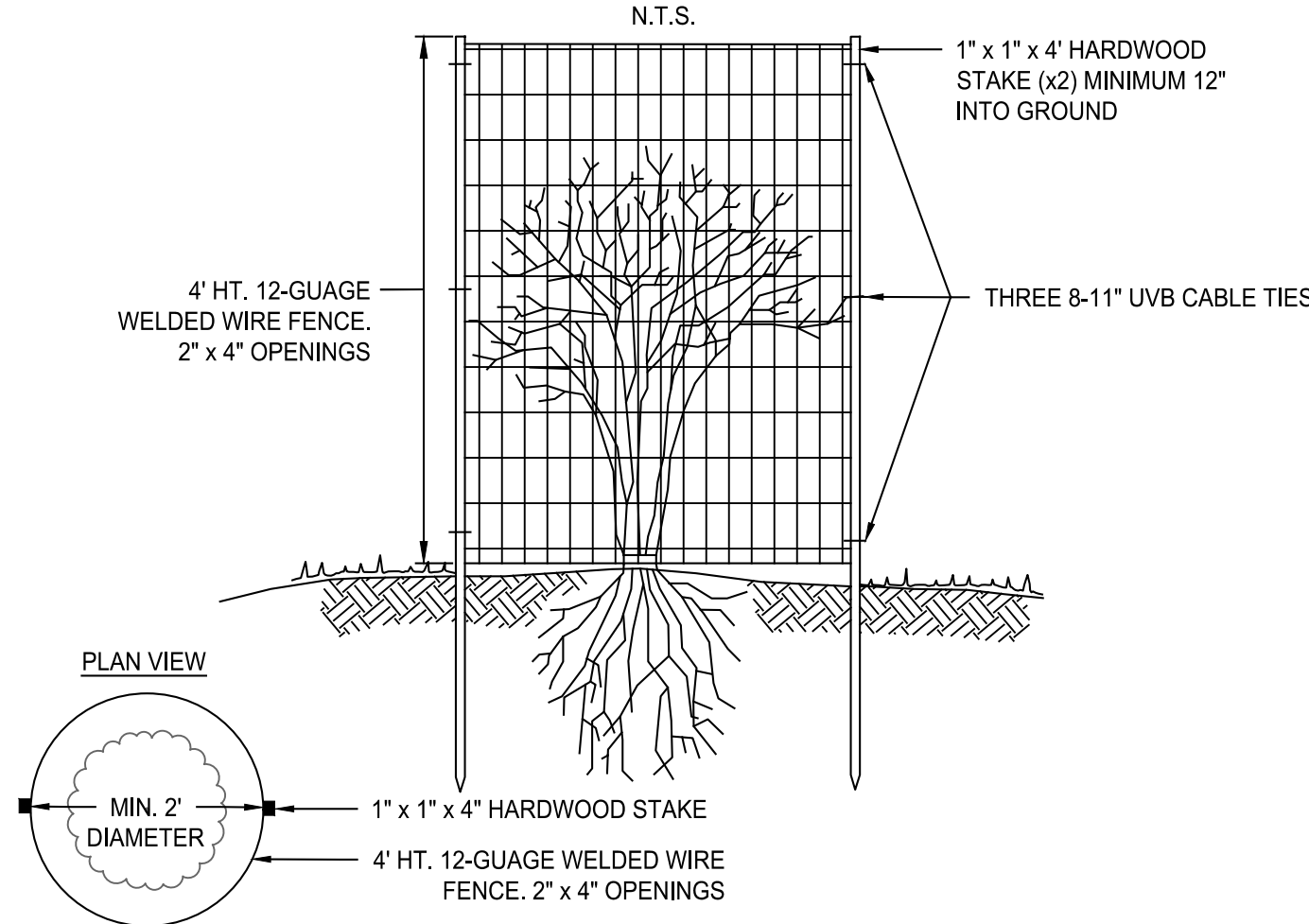


- N.T.S.
- TREE AND SHRUB PLANTING NOTES:
- PLANTING HOLE SHOULD BE AT LEAST TWICE DIAMETER OF THE PLANT'S CONTAINER.
  - DIG HOLE 2" DEEPER THAN THE DEPTH OF CONTAINER, THEN BACKFILL TO PROPER DEPTH. FIRM BOTTOM SOIL BEFORE SETTING PLANT.
  - CONTAINERS WITH SLANTED SIDES MAY BE INVERTED AND TAPPED TO REMOVE THE PLANT. STRAIGHT-SIDED CONTAINERS SHOULD BE SLIT OR CUT TO ALLOW PLANT REMOVAL. DO NOT PULL THE PLANT FREE FROM ITS CONTAINER!
  - PRUNE ANY BOUND ROOTS FROM THE OUTSIDE OF THE ROOT MASS. GENTLY SCARIFY SIDES OF ROOT MASS WITH HANDS, BUT KEEP ROOT MASS INTACT.
  - PLACE SLOW RELEASE FERTILIZER UNIFORMLY AROUND THE HOLE'S PERIMETER AT ONE HALF THE HOLE'S DEPTH WHILE BACKFILLING WITH SOIL.
  - SET PLANT SO THAT THE TOP OF THE ROOT MASS IS LEVEL WITH THE SURROUNDING SOIL.
  - BACKFILL WITH QUALITY SOIL FREE OF ROCK AND STONE. PACK FIRMLY WITH FEET.
  - DO NOT "MOUND" THE PLANT.
  - WATER PLANT GENEROUSLY. ADD ADDITIONAL SOIL IF BACKFILL SETTLES AFTER WATERING.
  - INSTALL DEER PROTECTION SHELTERS AROUND ALL TREES AND SHRUBS.

DEER PROTECTION - TREE DETAIL



DEER PROTECTION - SHRUB DETAIL



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PLANTING SCHEDULE AND DETAILS

**PRINCIPIO BUSINESS PARK -  
BUILDING SITE 'C'  
PHASE II STREAM MITIGATION PLAN**

CECIL COUNTY, MARYLAND

REVISIONS:  
6/24/2022 – GRADING AND E&S

JOB NO: 31200335X2  
SCALE: N/A  
DATE: JUNE 1, 2022  
DRAWN BY: TAB  
DESIGN BY: DPS/TAB  
REVIEW BY: DPS/TAS  
SHEET: 15 OF 15