HERBERT, ROWLAND & GRUBIC, INC.
1275 GLENLIVET DRIVE
SUITE 145
ALLENTOWN, PA 18106
610.351.0311 | hrg-inc.com

CONSTRUCTION AND EROSION CONTROL PLANS

FOR

SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

FEBRUARY 2025 REVISED OCTOBER 2025

LEGEND

- Iron Pin
- Benchmark
- Property Line
- Legal Right-of-Way Line
- Floodplain
- 540 Existing Contour Major
- Existing Contour Minor
- Existing Stream Line
- Existing Ground Elevation
- Existing Deciduous Tree
- Tree/Brush Line
- Shrub Row
- Wetland Flag
- Road Centerline
- Existing Edge of Road
- Existing Edge of Gravel
- X Existing Fence
- Existing Sign
- E Existing Above Ground Electric Line
- EU Existing Underground Electric Line
- Existing Private Utility Pole
- G Existing Gas Line
- S Existing Sanitary Sewer Line
- 12" CMP Existing Storm Sewer Line
- Existing Storm Sewer Inlet
- W Existing Water Line
- Existing Ordinary High Water Mark
- Existing Floodplain

- 1010 PROPOSED CONTOUR
- LOD LIMIT OF DISTURBANCE
- TOPSOIL STOCKPILE
- CSF-12 12" COMPOST FILTER SOCK
- SSF SUPER SILT FENCE
- TIMBER MATTING ACCESS ROAD
- TEMPORARY STREAM CROSSING
- X 540.3 PROPOSED SPOT ELEVATION
- PROPOSED CASCADE WEIR STRUCTURE
- PROPOSED HABITAT BOULDER REVETMENT
- PROPOSED BENDWAY WEIR
- PROPOSED SAWTOOTH DEFLECTOR
- PROPOSED SAWTOOTH DEFLECTOR W/ PLANTING BED

DEMOLITION NOTES

1. ALL DEMOLITION SHALL BE CONDUCTED IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
2. ALL DEMOLITION MATERIAL SHALL BE DISPOSED OF IN A LEGAL MANNER.
3. ITEMS TO REMAIN SHALL BE PROTECTED DURING DEMOLITION AND CONSTRUCTION ACTIVITIES. IF ANY ITEM TO REMAIN IS DAMAGED OR MADE INOPERABLE FOR ITS INTENDED FUNCTION, IT SHALL BE REPAIRED OR REPLACED TO A CONDITION EQUAL TO OR BETTER THAN ITS CONDITION WHEN DAMAGED AT CONTRACTOR'S EXPENSE.

TRAFFIC CONTROL NOTES

1. THE CONTRACTOR WILL FURNISH, ERECT, PLACE AND MAINTAIN TRAFFIC CONTROL SIGNS AND DEVICES AND MAINTAIN TRAFFIC DURING HOURS OF CONSTRUCTION AND AT ALL OTHER TIMES IN ACCORDANCE WITH THE METHODS BELOW:
   - 1.1. 67 PA CODE, CHAPTER 212, OFFICIAL TRAFFIC CONTROL DEVICES
   - 1.2. PENNDOT PUBLICATION NO. 213
   - 1.3. PENNDOT PUBLICATION NO. 35 APPROVED CONSTRUCTION MATERIALS (BULLETIN 15)
   - 1.4. PENNDOT PUBLICATION NO. 408, SPECIFICATIONS, CURRENT EDITION

GENERAL UTILITY NOTES

1. THE CONTRACTOR MUST CONTACT THE PENNSYLVANIA ONE-CALL NUMBER THREE WORKING DAYS PRIOR TO THE START OF WORK TO HAVE ALL UTILITIES MARKED IN THE WORK AREA. THE CONTRACTOR SHALL ALSO COMPLY WITH ALL APPLICABLE REGULATIONS OF ACT 199 NOTIFICATION OF UTILITIES PRIOR TO CONSTRUCTION.
2. EXISTING UTILITIES ARE SHOWN IN ACCORDANCE WITH THE BEST INFORMATION AVAILABLE AND ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. AS SUCH, THESE LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY, AND MUST BE FIELD VERIFIED PRIOR TO ANY CONSTRUCTION ACTIVITIES FOR THE PROJECT. HRG, INC. PROVIDES NO CERTIFICATION, EITHER IMPLICITLY OR EXPLICITLY, CONCERNING THE LOCATION, ABSENCE, OR PRESENCE OF ANY UNDERGROUND UTILITY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE EXACT LOCATION AND DEPTH OF ALL UTILITY LINES OR OTHER CONFLICTS (WHETHER OR NOT SHOWN ON THE PLAN) PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES, BY DIGGING TEST PITS (AT CONTRACTOR'S EXPENSE) WELL IN ADVANCE OF CONSTRUCTION. IF LOCATION OF UTILITIES ARE NOT AS SHOWN ON THE PLAN, CONTACT THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.

WORK RESTRICTION NOTES

1. NO TREE CLEARING OPERATIONS SHALL BE PERFORMED BETWEEN MAY 15 AND AUGUST 15.

RECEIVING WATERCOURCES

STORMWATER FROM THIS SITE FLOWS TO THE LEHIGH RIVER. THE CHAPTER 93 CLASSIFICATION OF THE LEHIGH RIVER IS WARM WATER FISHES (WWF), MIGRATORY FISHES (MF).

GENERAL NOTES

1. THE CONTRACTOR SHALL CHECK AND VERIFY ALL FIELD DIMENSIONS AND SITE CONDITIONS PRIOR TO CONSTRUCTION.
2. ALL HORIZONTAL MEASUREMENTS ARE U.S. STANDARD MEASUREMENTS, UNLESS OTHERWISE NOTED.
3. UNLESS OTHERWISE NOTED, ALL WORK AND MATERIALS SHALL COMPLY WITH ALL LOCAL AND STATE REGULATIONS AND CODES AND OSHA STANDARDS, INCLUDING BUT NOT LIMITED TO LATEST VERSIONS OF:
   - 3.1. BETHLEHEM TOWNSHIP SPECIFICATIONS
   - 3.2. PENNDOT PUBLICATION 408 SPECIFICATIONS
   - 3.3. PENNDOT PUBLICATION 72M, ROADWAY CONSTRUCTION DRAWINGS
   - 3.4. PENNDOT PUBLICATION 35, APPROVED CONSTRUCTION MATERIALS
   - 3.5. PENNDOT PUBLICATION 213, TEMPORARY TRAFFIC CONTROL GUIDELINES
4. FIELD ADJUSTMENTS SHALL BE MADE AS NECESSARY TO PROVIDE A SMOOTH TRANSITION BOTH VERTICALLY AND HORIZONTALLY FROM EXISTING TO PROPOSED GRADES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AT THE START OF CONSTRUCTION, OF ALL RELOCATIONS OR ADJUSTMENTS NECESSARY FOR THIS PROJECT, INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS AND POLES, ETC. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS AND SPECIFICATIONS AND SHALL BE APPROVED BY SUCH.
6. DETERMINATION OF SUBSURFACE CONDITIONS, INCLUDING BUT NOT LIMITED TO EXISTENCE OF ROCK, IS THE RESPONSIBILITY OF THE CONTRACTOR.
7. THE CONTRACTOR SHALL PROVIDE TEMPORARY SEDIMENT EROSION CONTROL MEASURES AS SHOWN ON THE PLANS. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE PLACED IN ACCORDANCE WITH ALL RULES AND REGULATIONS OF THE LEHIGH COUNTY CONSERVATION DISTRICT AND THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION APPLICABLE TO 25 PA CODE CHAPTER 102.
8. ALL MATERIALS AND DETAILS SPECIFIED SHALL NOT BE ALTERED DURING CONSTRUCTION WITHOUT WRITTEN APPROVAL BY THE ENGINEER.
9. EROSION AND SEDIMENT (E&S) CONTROL PLANS HAVE BEEN PREPARED. CONTRACTOR MUST REFER TO THE OFFICIAL E&S PLANS.
10. SHOULD A SINKHOLE(S) OPEN WITHIN THE WORK SITE, IMMEDIATELY DIVERT ALL SURFACE RUNOFF AND CONTACT THE ENGINEER FOR BACKFILLING GUIDANCE.
11. ALL MATURE TREES ARE TO BE PROTECTED UNLESS NOTED FOR REMOVAL AND REPLACEMENT. PRIOR TO MOBILIZING EARTHMOVING EQUIPMENT, THE CONTRACTOR SHALL FLAG ALL TREES PLANNED FOR REMOVAL AND CONDUCT AN ON-SITE MEETING WITH THE OWNER AND ENGINEER TO CONFIRM. TO THE EXTENT POSSIBLE, CONTRACTOR SHALL REUSE STUMPS ON-SITE IN THE CONSTRUCTION OF ROOT WAD BANK PROTECTION.
12. ALL WORK TO BE COMPLETED WITHIN THE AUTHORITY RIGHT-OF-WAY, AUTHORITY PROPERTY, OR EASEMENTS ACQUIRED.
13. THE CONTRACTOR SHALL NOTIFY OWNER AND ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY CONDITIONS THAT ARE NOT CONSISTENT WITH THE CONTENT OF THESE PLANS.

GRADING AND STORMWATER NOTES

1. EXISTING CONTOURS ARE SHOWN AT 1' INTERVALS.
2. THE CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS. ALL AREAS OF THE SITE MUST BE GRADED TO MAINTAIN POSITIVE DRAINAGE TO A DRAINAGE FACILITY. ANY LOCALIZED DEPRESSIONS WITHIN PAVED AREAS MUST BE ELIMINATED.
3. THE CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH AND CONTINUOUS GRADE TO TIE-IN TO EXISTING GRADE.
4. THE CONTRACTOR SHALL ADHERE TO ALL TERMS AND CONDITIONS OF THE PERMITS ISSUED BY THE GOVERNING REGULATORY AGENCY.
5. THE CONTRACTOR SHALL APPLY A STABILIZATION MATTING, OR EQUIVALENT, TO ALL SLOPES 3:1 OR STEEPER FOR ANY TEMPORARY OR PERMANENT CUTS OR FILLS.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION RESOLUTION OF ALL UTILITY CONFLICTS SHOWN (OR NOT SHOWN) ON PLANS.

ROCK MATERIAL USE NOTES

1 USE OF APPROPRIATE ROCK MATERIAL THROUGHOUT THE PROJECT AREA IS CRITICAL TO SUCCESSFUL RECOLONIZATION OF MACROINVERTEBRATES AND OTHER AQUATIC SPECIES. ACCORDINGLY, THE CONTRACTOR IS DIRECTED TO USE VARIOUS ROCK MATERIALS REQUIRED IN THE SUBJECT WORK ONLY IN ACCORDANCE WITH THE FOLLOWING:

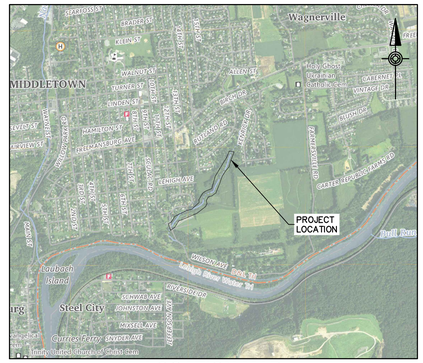
2 NATIVE STREAMBED MATERIAL
THE CONTRACTOR SHALL RE-USE NATIVE STREAMBED MATERIAL THROUGHOUT THE PROJECT TO THE GREATEST EXTENT FEASIBLE. WHEN THE ELEVATION OF THE STREAM BED TO BE RAISED, THE CONTRACTOR SHALL REMOVE AND STOCKPILE THE NATIVE STREAMBED MATERIAL, PLACE STREAM SUBGRADE MATERIAL, AND THEN REPLACE THE STREAMBED MATERIAL. STREAM SUBGRADE MATERIAL SHALL BE A MIXTURE OF ROCK, SILT AND SAND, AND NATIVE SOIL MATERIALS BLENDED AND PLACED TO APPROXIMATE THE MAKEUP OF THE EXISTING STREAM SUBGRADE.

3 LIMESTONE QUARRY ROCK
THE PROJECT AREA IS LOCATED WITHIN THE EPLER AND ONTELAUNEE FORMATION WHICH IS PRIMARILY MADE OF LIMESTONE AND DOLOMITE ROCK. AS SUCH, LIMESTONE QUARRY ROCK MAY BE USED AS FOLLOWS:

- 3.1 LARGE BLOCKY LIMESTONE QUARRY ROCK MAY BE USED TO CONSTRUCT IN-STREAM STRUCTURES.
- 3.2 MID-SIZED ANGULAR LIMESTONE QUARRY ROCK MAY BE USED AS THE RIP-RAP TOE IN BANK STABILIZATION METHODS AND FOR THE PREFORMED SCOUR HOLE.
- 3.3 LIMESTONE GRAVEL MATERIAL MAY BE USED AS STREAMBED MATERIAL OR INCORPORATED INTO THE STREAMBED SUBGRADE.

SURVEY NOTES

1. SUBJECT PROPERTY LINES DEPICTED ON THIS PLAN HAVE BEEN ESTABLISHED BASED UPON DEED PLOTTING AND GIS PARCEL INFORMATION AND NOT A RESULT FROM A FIELD RUN BOUNDARY SURVEY.
2. THIS SURVEY HORIZONTALLY REFERENCES NORTH AMERICAN DATUM OF 1983 (NAD83) PA STATE PLANE, SOUTH ZONE DERIVED OR DETERMINED THROUGH GNSS, CONVENTIONAL METHODS BASED UPON POSITIONAL INFORMATION REFERENCED THROUGH THE FOLLOWING PUBLISHED HORIZONTAL CONTROL MONUMENTS, CORS OR KEYNETGPS GNSS VRS NETWORK.
3. THE VERTICAL DATUM IS BASED ON NAVD88. DERIVED OR DETERMINED THROUGH GNSS, CONVENTIONAL METHODS BASED UPON POSITIONAL INFORMATION REFERENCED THROUGH THE FOLLOWING PUBLISHED BENCH MARK MONUMENTS, CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) OR KEYNETGPS GNSS VRS NETWORK. DATUM REFERENCED PROJECT BENCH MARK LOCATED AT THE INTERSECTION OF HAMPTON ROAD AND WASHINGTON STREET WITH AN ELEVATION OF 339.83.
4. TOPOGRAPHIC EXISTING CONDITIONS AND CONTOURS SHOWN ARE DERIVED FROM A FIELD RUN TOPOGRAPHIC SURVEY AND SUPPLEMENTED BY UAV LIDAR ON AUGUST 21, 2024.
5. THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND MAY BE SUBJECT TO EASEMENTS AND OTHER RESTRICTIONS, EITHER RECORDED OR UNRECORDED. THE SURVEYOR HAS MADE NO INVESTIGATION OR INDEPENDENT SEARCH FOR EASEMENT OF RECORD, ENCUMBRANCES, RESTRICTIVE COVENANTS, OWNERSHIP TITLE EVIDENCE OR ANY OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE OTHER THAN WHAT IS SHOWN ON THIS PLAN.
6. THE LOCATIONS OF UTILITIES AS SHOWN HEREON ARE BASED ON ABOVEGROUND FEATURES, FIELD OBSERVATIONS/SURVEY, AND RECORD DRAWINGS PROVIDED BY UTILITY COMPANIES. LOCATIONS OF UNDERGROUND UTILITIES/STRUCTURES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO LOCATE BURIED UTILITIES/STRUCTURES. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE EXACT LOCATION AND DEPTH OF ALL UTILITY LINES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES IN COMPLIANCE WITH ACT 187 TO VERIFY THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES. A PA ONE CALL WAS PERFORMED PRIOR TO FIELD SURVEYING. SERIAL NO. 20242114315 & 20242114338.



LOCATION MAP

SCALE: 1"=2000'

PA ONE CALL

ACT 287, AS AMENDED

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP-CALL BEFORE YOU DIG!

PENNSYLVANIA ACT 287 (1974) AS AMENDED, REQUIRES NOTIFICATION BY EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN THE COMMONWEALTH. PA ONE-CALL SERIAL NO. 20242114315 & 20242114338 HAS BEEN ASSIGNED TO THIS PROJECT ON July-30-2024.

PA ONE CALL-UTILITY LIST

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE BETHLEHEM, PA 18020
JOHN BARTHOLOMEW
JOHNB@BETHLEHEMTWP.COM
(610) 814-6400

FIRST ENERGY PENELEC
21 S. MAIN STREET AKRON, OH, 44308
MELLYSSA ADAMS
MELLYSSAADAMS@FIRSTENERGYCORP.COM
(800) 545-7741

PPL ELECTRIC UTILITIES CORPORTATION
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ASTOUND BROADBAND POWERED BY RCN
5508 NOR BATH BOULEVARD NORTHAMPTON, PA 18067
ERIC BEERS
ERIC.BEERS@ASTOUND.COM
(833) 249-2786

UGI UTILITIES INC.
2121 CITY LINE ROAD BETHLEHEM, PA 18017
TIMOTHY STEWARD
TSTEWARD@UGI.COM
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CITY OF BETHLEHEM
10 EAST CHURCH STREET BETHLEHEM, PA 18018
ROBERT TAYLOR
RTAYLOR@BETHLEHEM-PA.GOV
(610) 865-7000

VERIZON BUSINESS
700 WESTTON PARKWAY CARY, NC 27513
VICTOR WOOD
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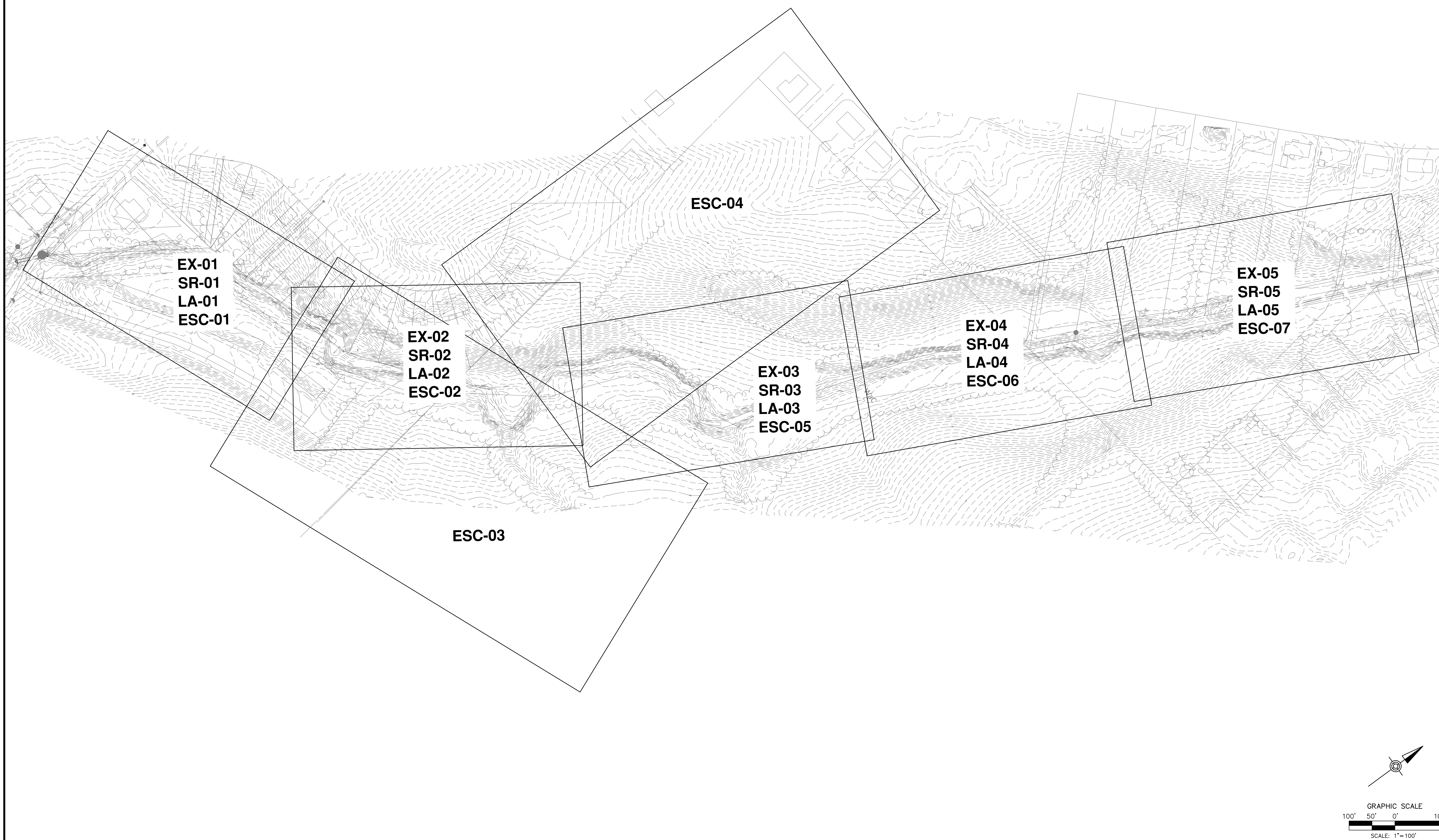

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FOR
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4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
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IND-01 02

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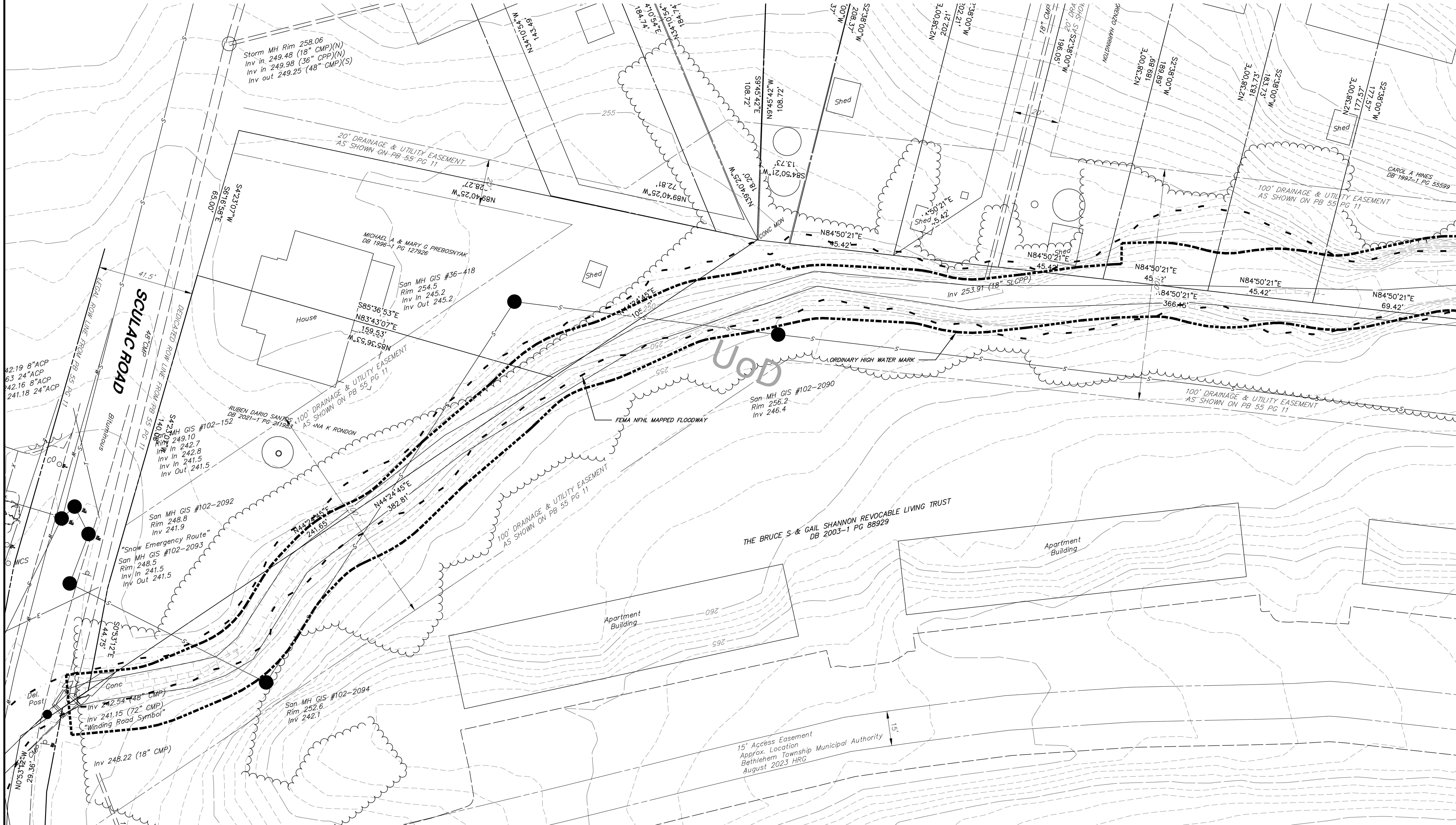

GRAPHIC SCALE
20' 10' 0' 20'
SCALE: 1" = 20'

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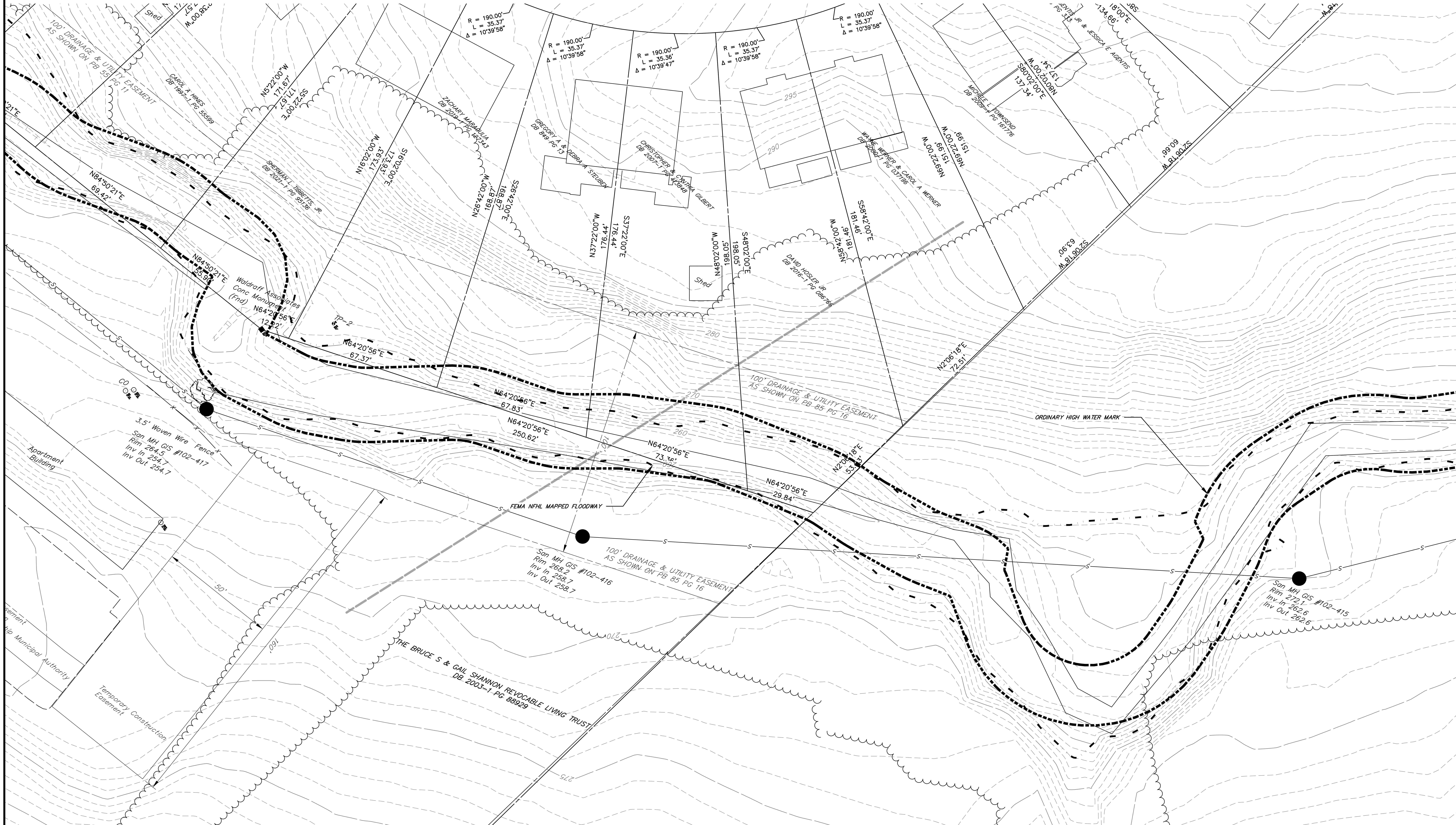
SHEET TITLE:
EXISTING CONDITIONS PLAN

SHEET: EX-01 | 03



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PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — JAMES D. POWELL — PE094717 — 10/29/2025

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EXISTING CONDITIONS PLAN

SHEET: EX-02 | 04

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SHEET TITLE:
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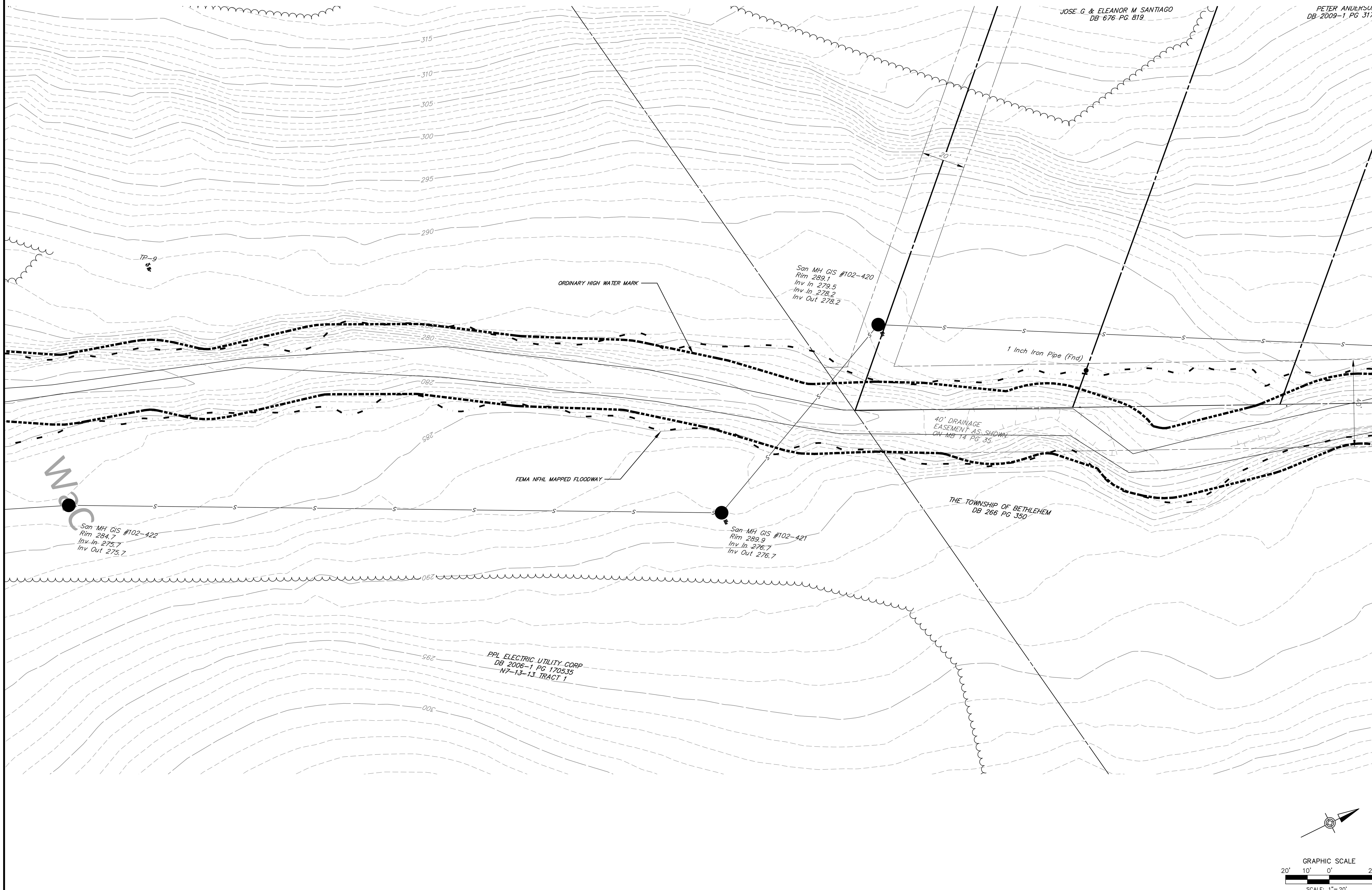
SHEET: EX-03 | 05



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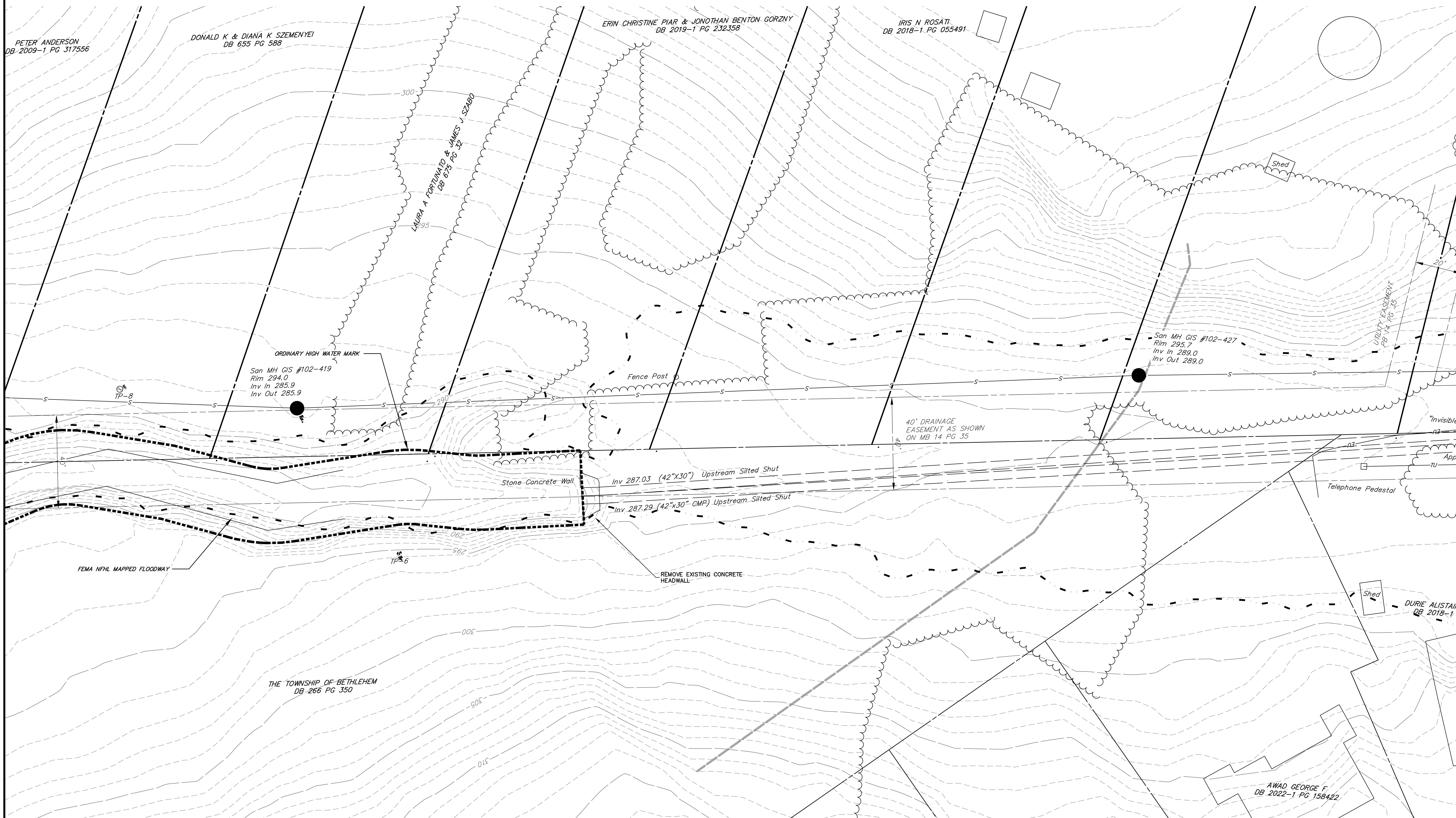
SHEET: EX-04 06



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REGISTERED PROFESSIONAL
JAMES D. POWELL
ENGINEER
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10/29/2025

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SHEET TITLE:
EXISTING CONDITIONS PLAN

SHEET: EX-05 | 07

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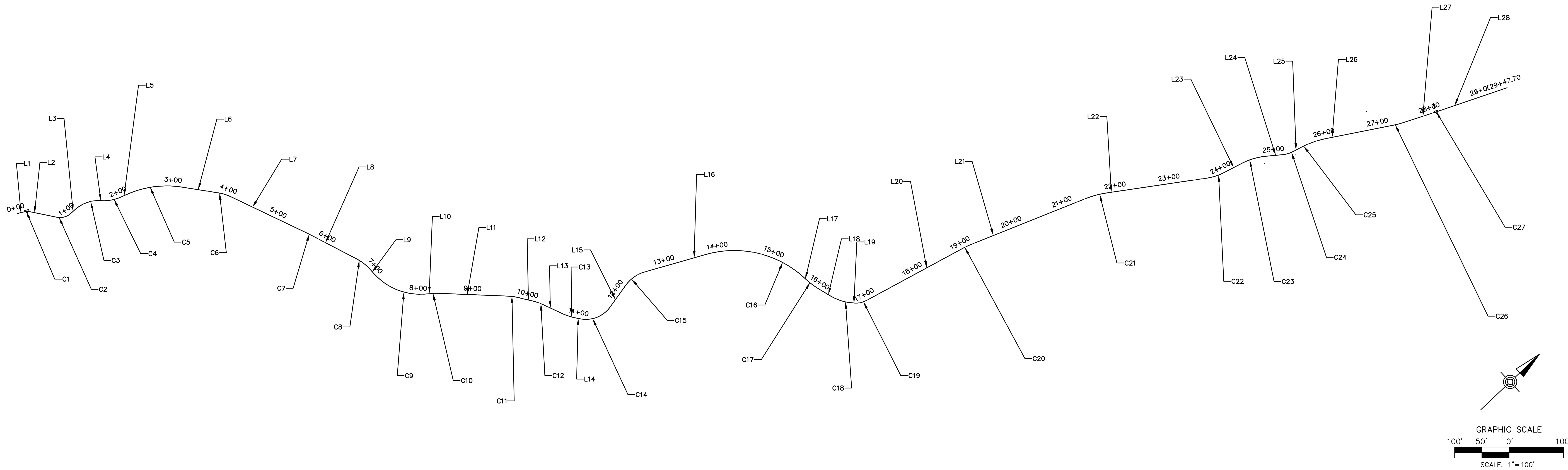

PROPOSED STREAM CENTERLINE				
NUMBER	LENGTH	RADIUS	LINE / CHORD BEARING	A VALUE
C1	14.362	31.441	N41° 54' 33.34"E	
C2	28.484	30.000	N27° 47' 40.32"E	
C3	52.276	65.000	N23° 38' 02.88"E	
C4	38.894	80.000	N32° 44' 47.16"E	
C5	105.592	180.000	N35° 37' 26.88"E	
C6	24.476	85.000	N60° 40' 43.93"E	
C7	3.169	95.000	N69° 53' 01.20"E	
C8	32.165	90.000	N81° 04' 39.82"E	
C9	111.360	115.000	N63° 34' 30.29"E	
C10	13.747	80.000	N40° 45' 23.98"E	
C11	30.341	120.000	N52° 55' 21.86"E	
C12	25.261	120.000	N62° 28' 38.92"E	
C13	28.796	120.000	N61° 38' 00.67"E	
C14	63.088	55.000	N21° 53' 54.47"E	
C15	43.596	65.000	N8° 15' 08.58"E	
C16	192.833	190.000	N56° 32' 31.06"E	
C17	30.061	150.000	N79° 52' 33.34"E	
C18	43.031	90.000	N60° 26' 15.50"E	
C19	22.145	40.000	N30° 52' 50.08"E	
C20	13.714	120.000	N18° 17' 40.47"E	

PROPOSED STREAM CENTERLINE			
C21	42.188	180.000	N28° 16' 58.49"E
C22	31.640	95.000	N25° 27' 21.47"E
C23	46.430	120.000	N26° 59' 55.99"E
C24	22.913	55.000	N26° 08' 53.68"E
C25	59.724	190.000	N23° 13' 06.31"E
C26	21.686	180.000	N28° 46' 19.36"E
C27	0.411	31.441	N24° 56' 44.99"E
L1	10.963		N28° 49' 24.49"E
L2	48.797		N54° 59' 42.20"E
L3	8.558		N0° 35' 38.45"E
L4	0.658		N46° 40' 27.32"E
L5	8.887		N18° 49' 07.00"E
L6	67.370		N52° 25' 46.77"E
L7	156.426		N68° 55' 41.10"E
L8	96.746		N70° 50' 21.30"E
L9	10.483		S88° 41' 01.66"E
L10	1.977		N35° 50' 02.24"E
L11	128.064		N45° 40' 45.72"E
L12	15.162		N56° 26' 48.96"E
L13	34.476		N68° 30' 28.88"E

PROPOSED STREAM CENTERLINE		
L14	7.397	N54° 45' 32.46"E
L15	48.543	N10° 57' 43.52"W
L16	116.724	N27° 28' 00.67"E
L17	5.787	N85° 37' 01.45"E
L18	24.712	N74° 08' 05.22"E
L19	3.228	N46° 44' 25.78"E
L20	202.709	N15° 01' 14.37"E
L21	226.772	N21° 34' 06.56"E
L22	186.134	N34° 59' 50.41"E
L23	37.238	N15° 54' 52.52"E
L24	30.173	N38° 04' 59.46"E
L25	6.234	N14° 12' 47.89"E
L26	122.469	N32° 13' 24.73"E
L27	61.331	N25° 19' 13.99"E
L28	137.296	N24° 34' 15.99"E

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

HRG PROJECT NUMBER: R009170.0431
PLAN DATE: FEBRUARY 2025
DRAWING SCALE: AS SHOWN
PROJ. MANAGER: MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
3		
4		
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9		

SHEET TITLE:
STREAM CENTERLINE GEOMETRY PLAN

SHEET: GEO-01 | 08

STRUCTURES TABLE – CASCADES		
ID NUMBER	WIDTH (FT.)	DEPTH (FT.)
C.1	25'	1.0
C.2	25'	1.0
C.3	25'	1.25
C.4	31'	1.0
C.5	25'	1.0
C.6	25'	1.0
C.7	31'	1.0
C.8	25'	1.0
C.9	25'	1.50
C.10	25'	1.50
C.11	25'	1.0
C.12	28'	1.0
C.13	25'	1.50
C.14	25'	1.0
C.15	43'	1.50
C.16	33'	1.50
C.17	31'	1.0
C.18	27'	1.0
C.19	28'	1.0
C.20	30'	1.50
C.21	33'	1.25
C.22	25'	1.25
C.23	25'	1.50
C.24	53'	1.50
C.25	30'	1.50
C.26	38'	1.50
C.27	25'	1.50
C.28	25'	1.0
C.29	25'	1.0
C.30	25'	1.0
C.31	25'	1.0
C.32	25'	1.0
C.33	25'	1.0

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BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JAMES D. POWELL PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
OVERALL STREAM RESTORATION PLAN

SHEET: **SR-OVR** **09**

LAYOUT: OVR-SI LAST PLOTTED: 10/29/2025 11:55 AM BY: JPOWELL

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CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

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BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

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PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
STREAM RESTORATION PLAN

SHEET: SR-01 | 10

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CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

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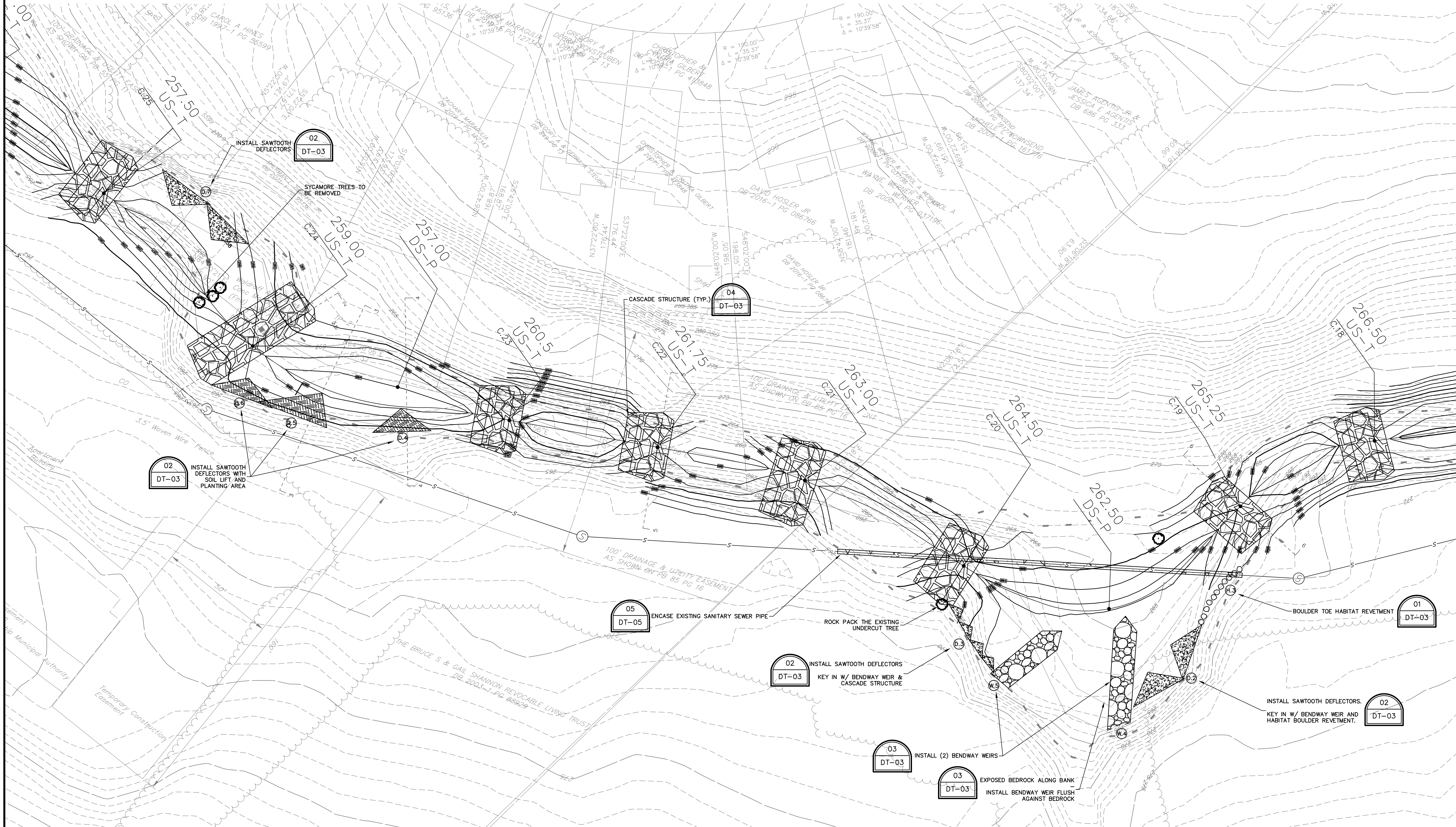
INSTALL SAWTOOTH DEFLECTORS
02 DT-03
SYCAMORE TREES TO BE REMOVED
CASCADE STRUCTURE (TYP.)
04 DT-03
INSTALL SAWTOOTH DEFLECTORS WITH SOIL LIFT AND PLANTING AREA
02 DT-03
257.50 US-T
259.00 US-T
257.00 DS-P
260.5 US-T
261.75 US-T
263.00 US-T
264.50 US-T
262.50 DS-P
265.25 US-T
266.50 US-T
3.5' Woven Wire Fence
100' DRAINAGE & UTILITY EASEMENT AS SHOWN ON PB 85 PG 16
ENCASE EXISTING SANITARY SEWER PIPE
05 DT-05
ROCK PACK THE EXISTING UNDERCUT TREE
BOULDER TOE HABITAT REVETMENT
01 DT-03
INSTALL SAWTOOTH DEFLECTORS
KEY IN W/ BENDWAY WEIR & CASCADE STRUCTURE
02 DT-03
INSTALL SAWTOOTH DEFLECTORS.
KEY IN W/ BENDWAY WEIR AND HABITAT BOULDER REVETMENT.
02 DT-03
INSTALL (2) BENDWAY WEIRS
03 DT-03
EXPOSED BEDROCK ALONG BANK
INSTALL BENDWAY WEIR FLUSH AGAINST BEDROCK
03 DT-03
THE BRUCE S & GAIL SHANNON REVOCABLE LIVING TRUST DB 2003-1 PG 86929
DAVID HOSLER JR DB 2016-1 PG 086766
Temporary Construction Easement

GRAPHIC SCALE
25' 12.5' 0' 25'
SCALE: 1"= 25'

PROFESSIONAL SEAL:

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
STREAM RESTORATION PLAN

SHEET: SR-02 | 11


OPTION TO INSTALL WOODY DEBRIS STRUCTURE, PER TYP. DETAIL IF ENOUGH AVAILABLE ON-SITE RESOURCES.
268.75 US-
C.17
270.50 US-T
C.16
CASCADE STRUCTURE (TYP.)
04 DT-03
272.00 US-T
C.15
ENCASE EXISTING SANITARY SEWER PIPE
05 DT-05
269.40 DS-P
LARGE TREE - NOT TO BE REMOVED
273.00 US-T
C.14
271.00 DS-P
ROCK PACK EXISTING UNDERCUT TREE
275.00 US-T
C.13
277.00 US-T
C.12
275.00 DS-P
INSTALL SAWTOOTH DEFLECTORS
02 DT-03
KEY INTO BENDWAY WEIR & CASCADE STRUCTURE
03 DT-03
INSTALL (3) BENDWAY WEIRS
LARGE TREE - TO BE REMOVED
OPTION TO INSTALL WOODY DEBRIS STRUCTURE, PER TYP. DETAIL IF ENOUGH AVAILABLE ON-SITE RESOURCES.
01 DT-05
LARGE ROOT-EXPOSED TREE - NOT TO BE REMOVED
INSTALL HABITAT BOULDER REVETMENT
01 DT-03
INSTALL RIPRAP APRON WHERE OFF-SITE CHANNEL FLOW ENTERS STREAM
03 DT-05
PENNSYLVANIA POWER & LIGHT CO DB 448 PG 000075 N7-13-13 TRACT 1
GRAPHIC SCALE
20' 10' 0' 20'
SCALE: 1"= 20'

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JAMES S. POWELL PE094717

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
STREAM RESTORATION PLAN

SHEET: SR-03

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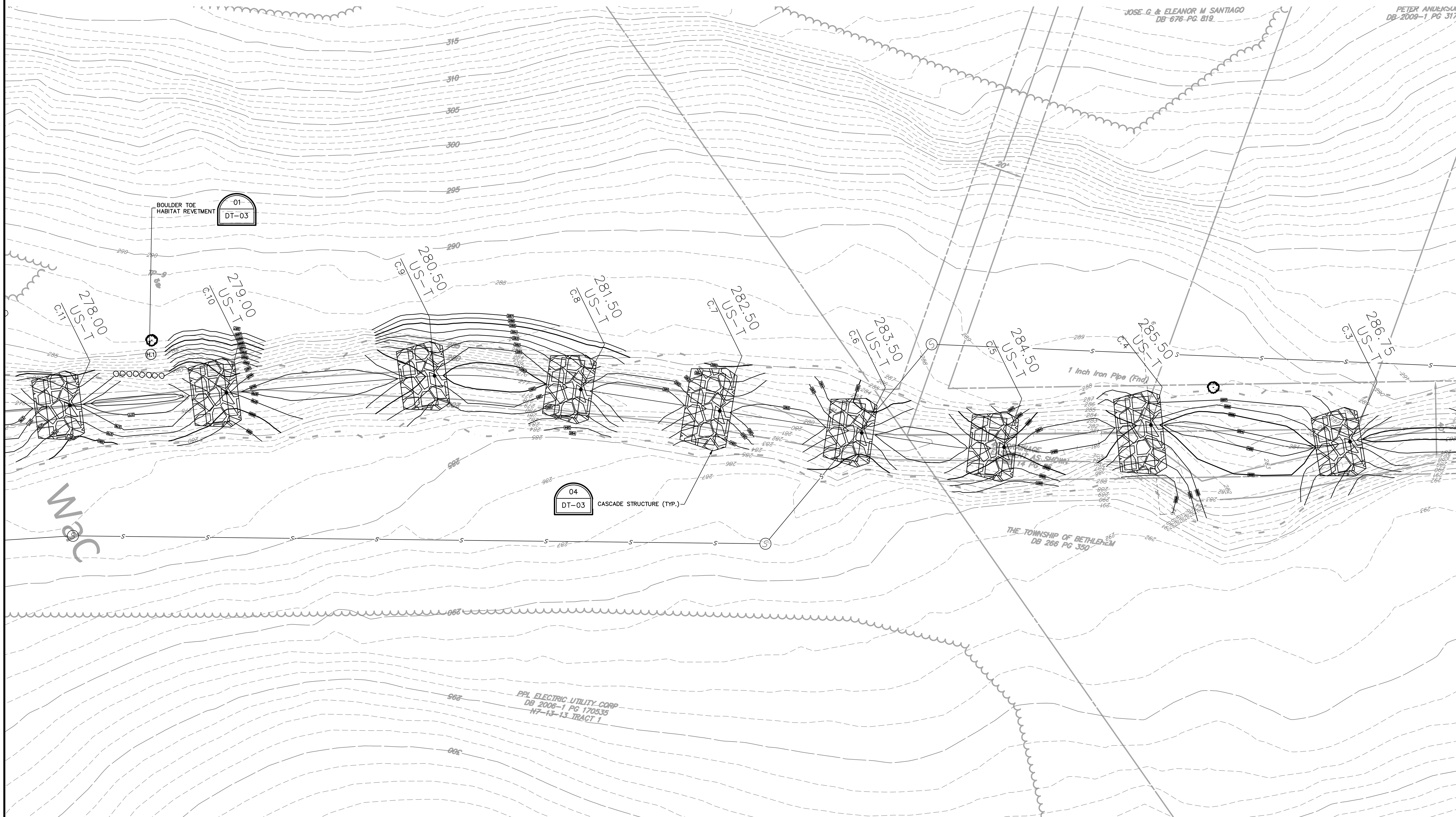

GRAPHIC SCALE
20' 10' 0' 20'
SCALE: 1"= 20'

CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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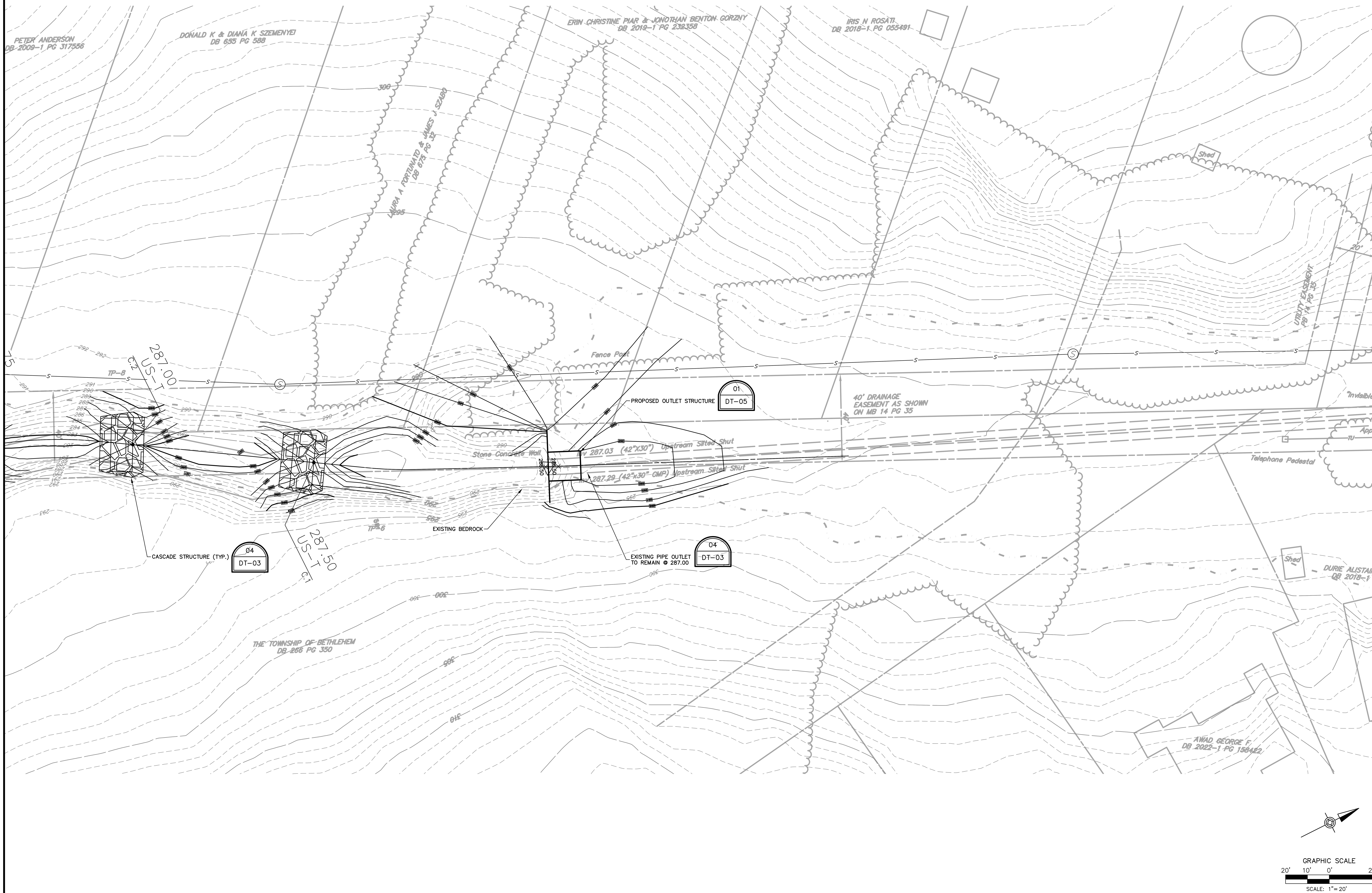
SHEET TITLE:
STREAM RESTORATION PLAN

SHEET: SR-04 | 13



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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PE094717

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
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PROJ. MANAGER:	MATTHEW VANASKIE

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3		
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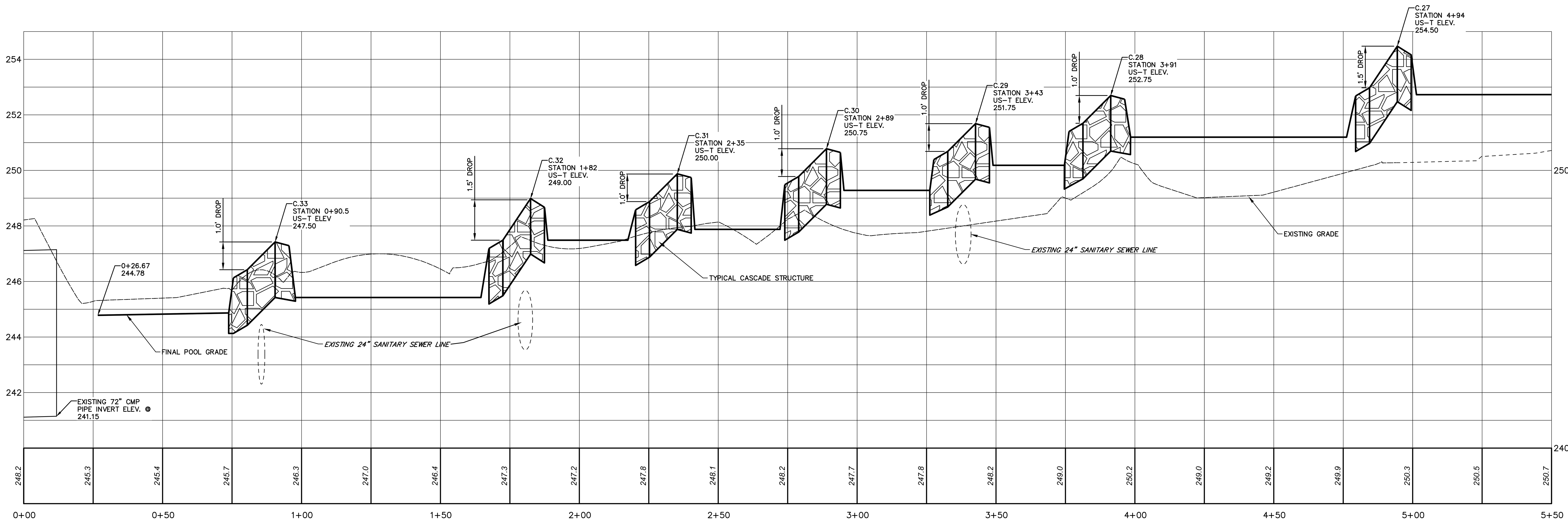
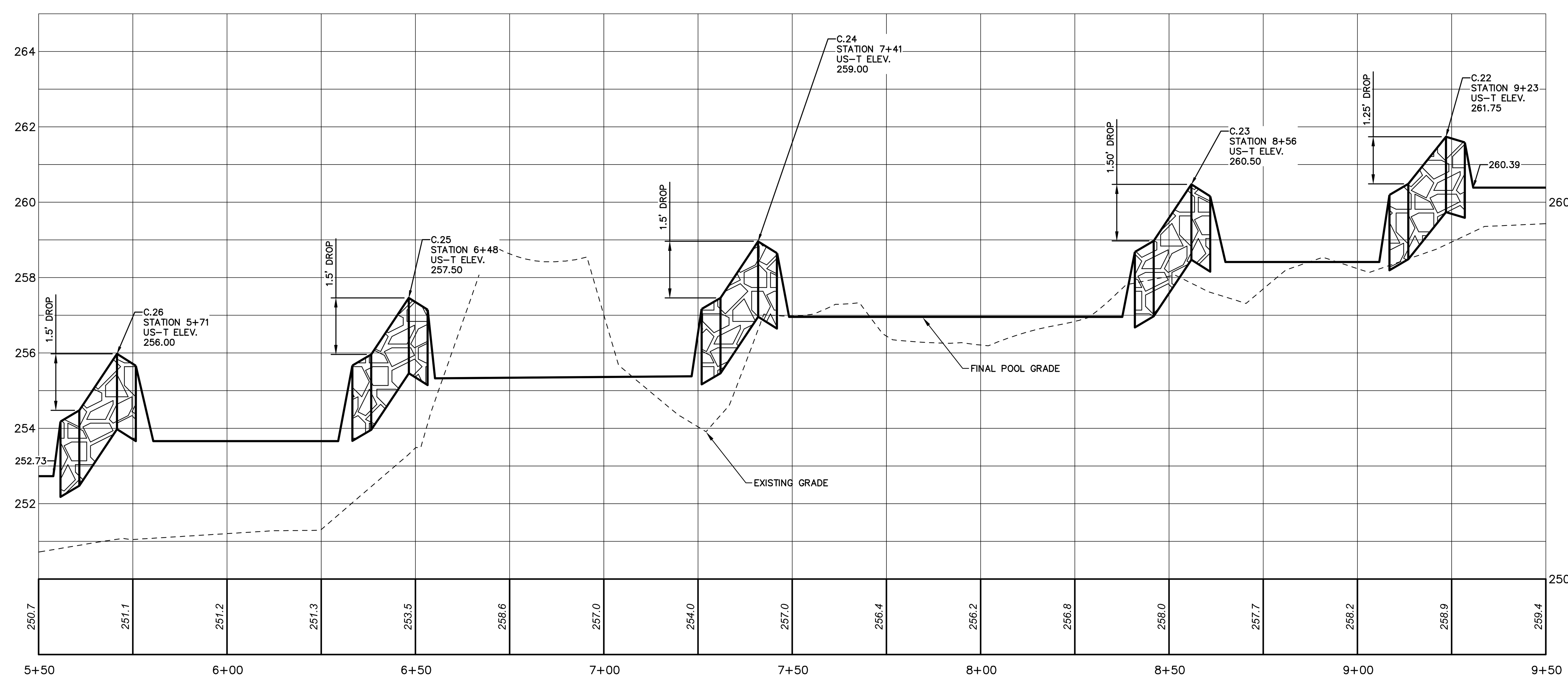
SHEET TITLE:
STREAM RESTORATION PLAN

SHEET: SR-05 | 14



PROPOSED STREAM PROFILE 00+00 TO 05+50



PROPOSED STREAM PROFILE 05+50 TO 9+50

PROFILE VIEW SCALE

HORIZ: 20' 10' 0' 20'
VERT: 2' 1' 0' 2'
SCALE IN FEET

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
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BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JAMES R. POWELL PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
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3		
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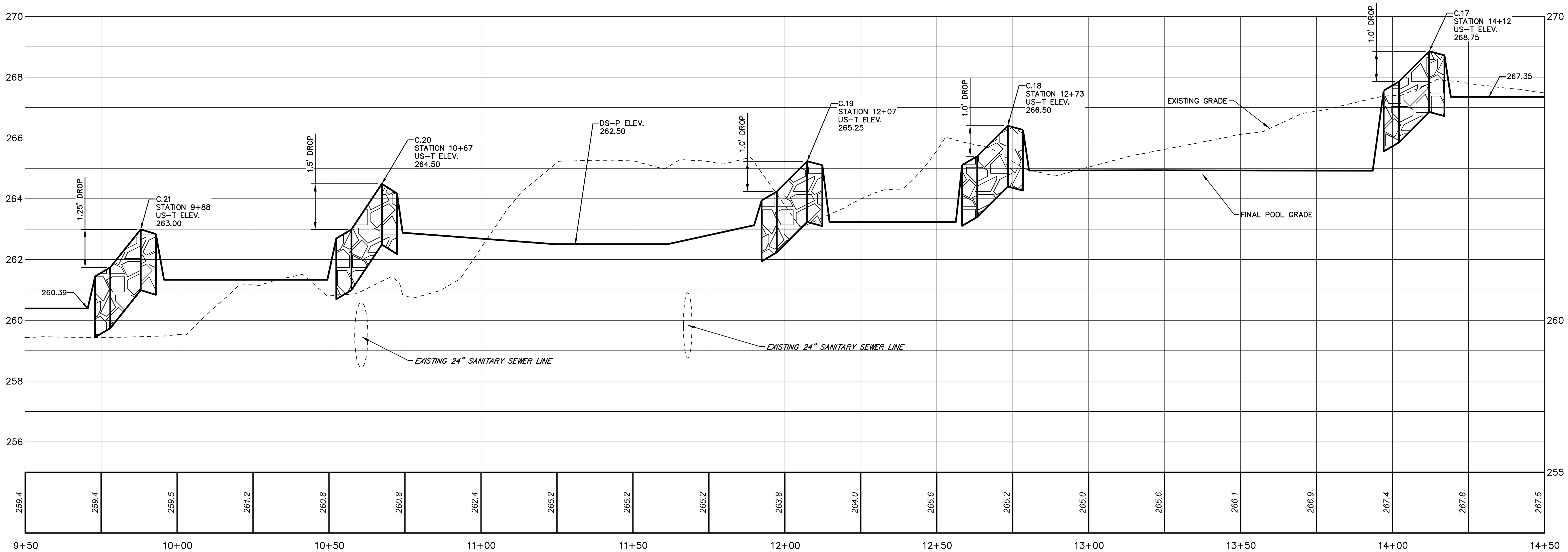
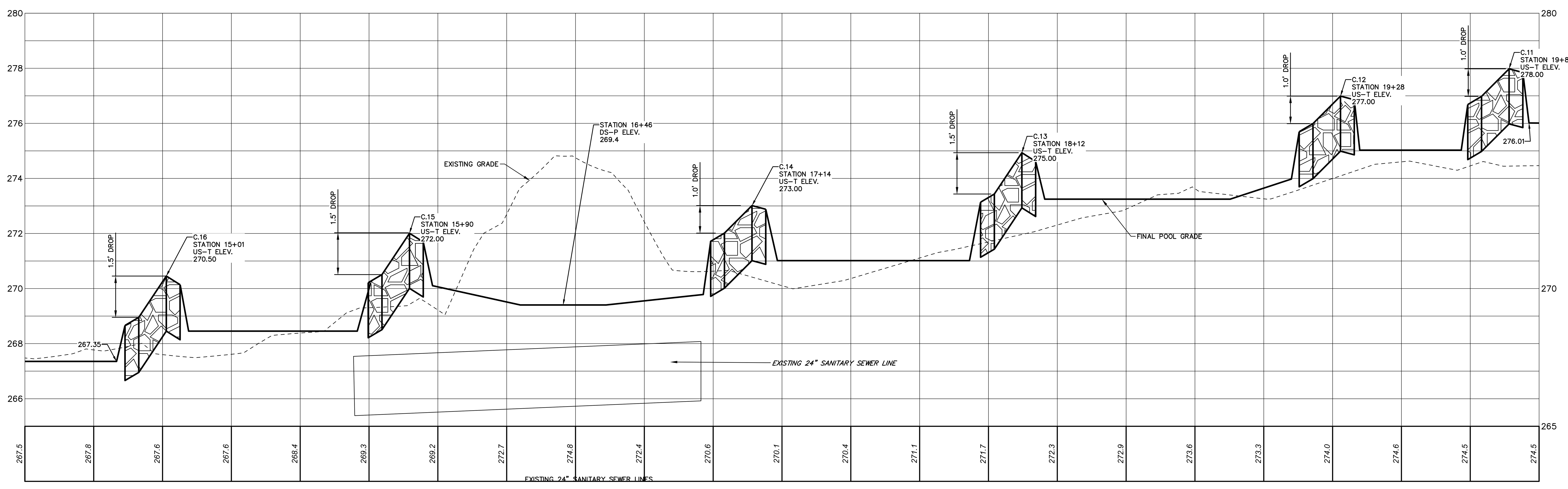
SHEET TITLE:
PROPOSED
STREAM
PROFILES

SHEET: PR-01 15



PROPOSED STREAM PROFILE 09+50 TO 14+50



PROPOSED STREAM PROFILE 14+50 TO 20+00

PROFILE VIEW SCALE

HORIZ: 30' 15' 0' 30'

VERT: 6' 3' 0' 6'

SCALE IN FEET

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CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
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BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

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3		
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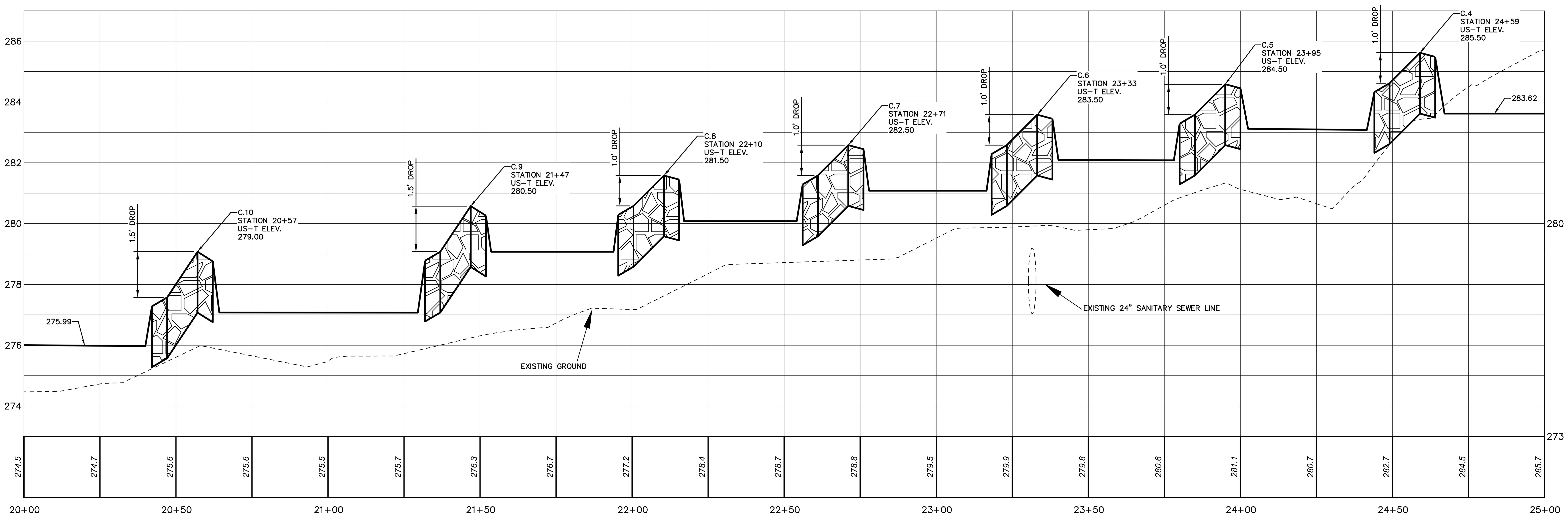
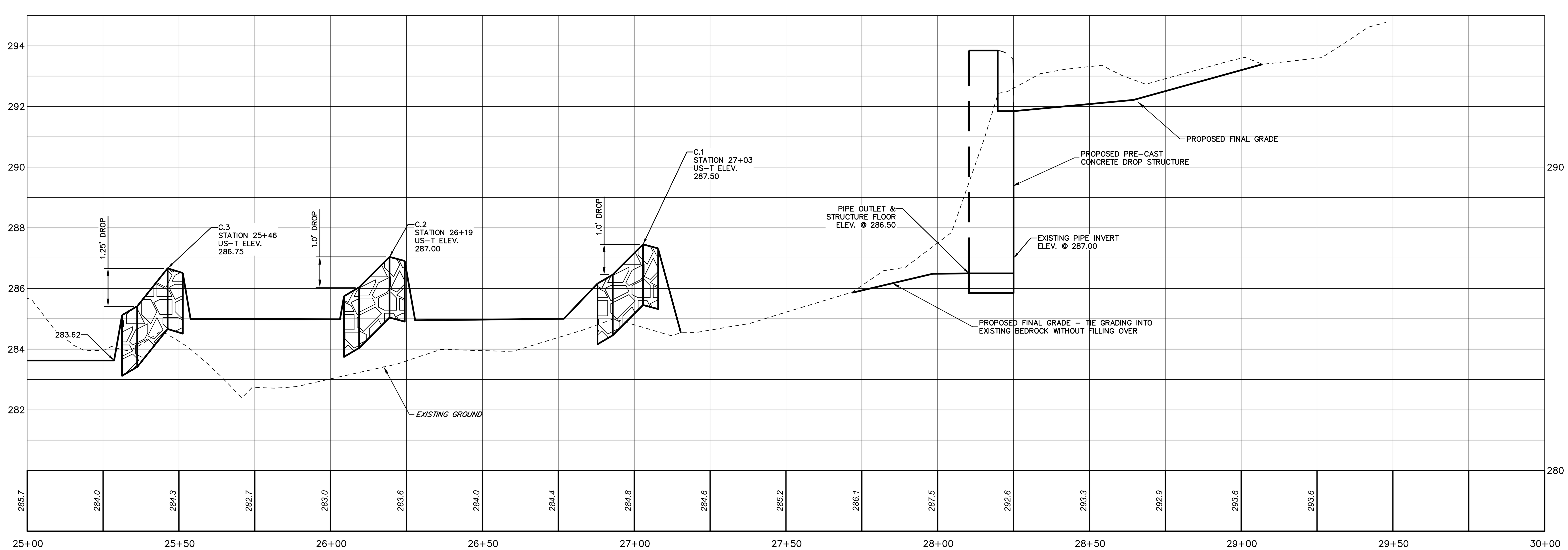
SHEET TITLE:
PROPOSED STREAM PROFILES

SHEET: PR-02 16



PROPOSED STREAM PROFILE 20+00 TO 25+00



PROPOSED STREAM PROFILE 25+00 TO 30+00

PROFILE VIEW SCALE

HORIZ: 30' 15' 0' 30'
VERT: 6' 3' 0' 6'
SCALE IN FEET

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PE094717 10/29/2025

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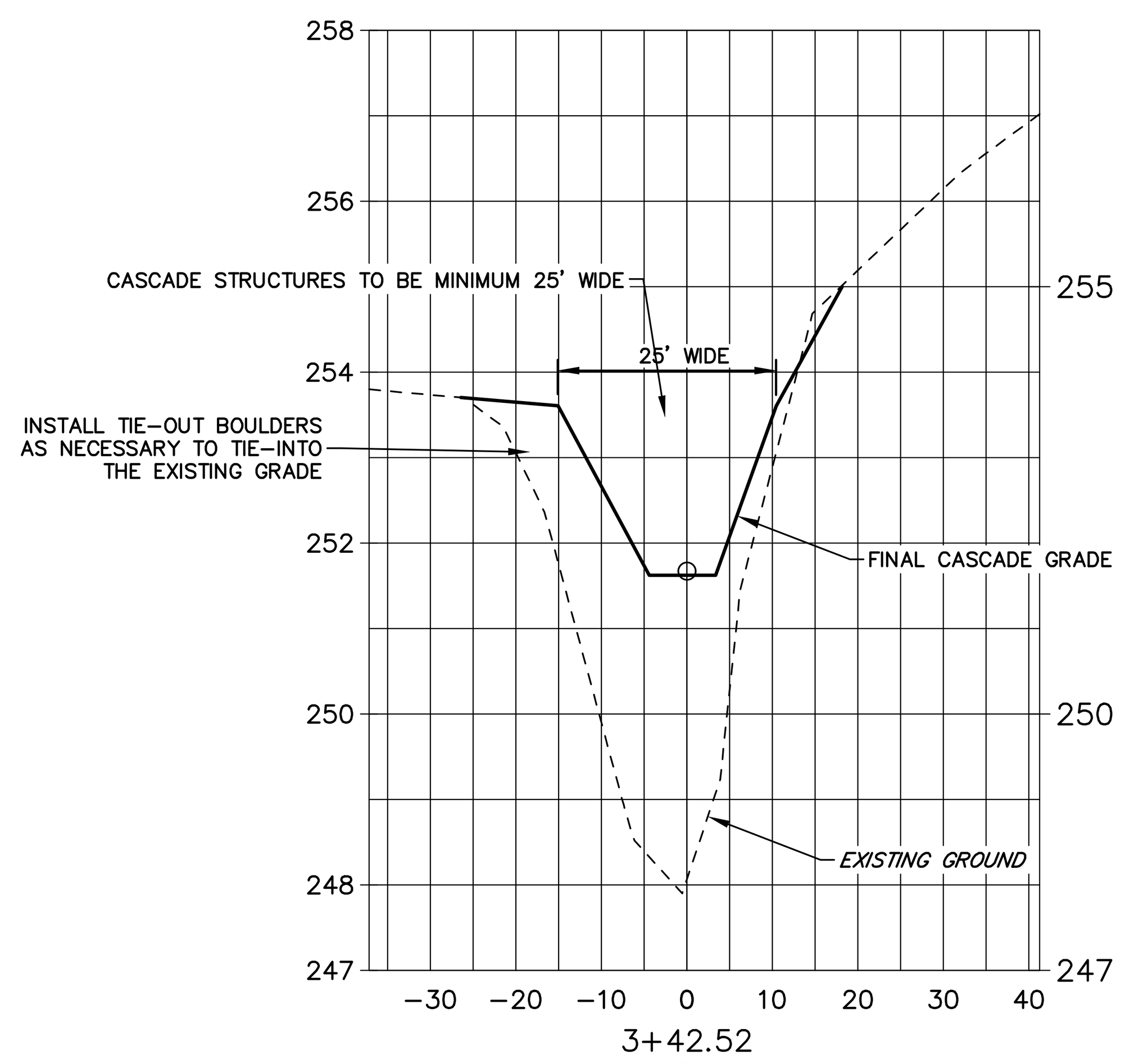
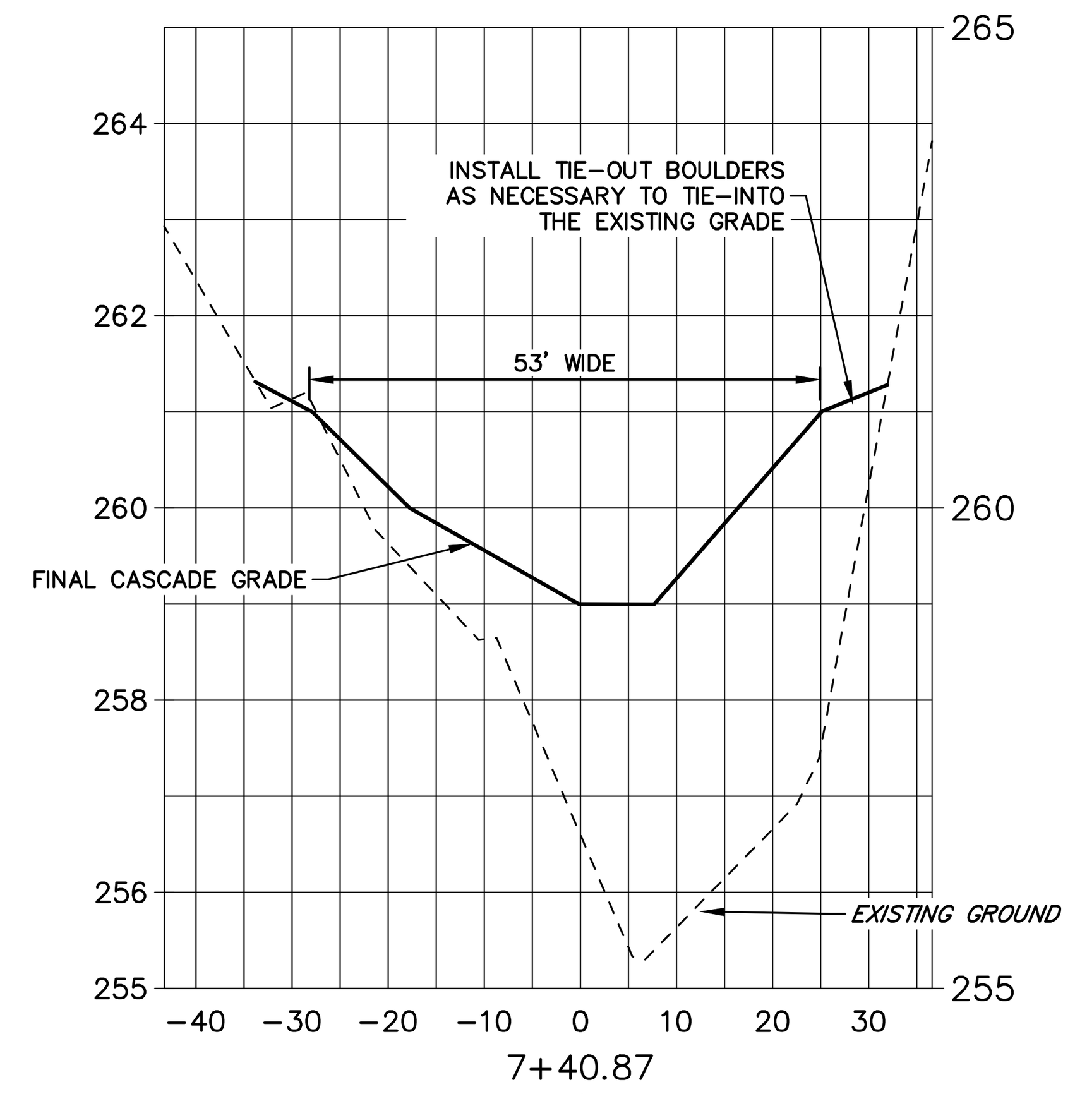
SHEET TITLE:
PROPOSED STREAM PROFILES

SHEET: **PR-03** **17**

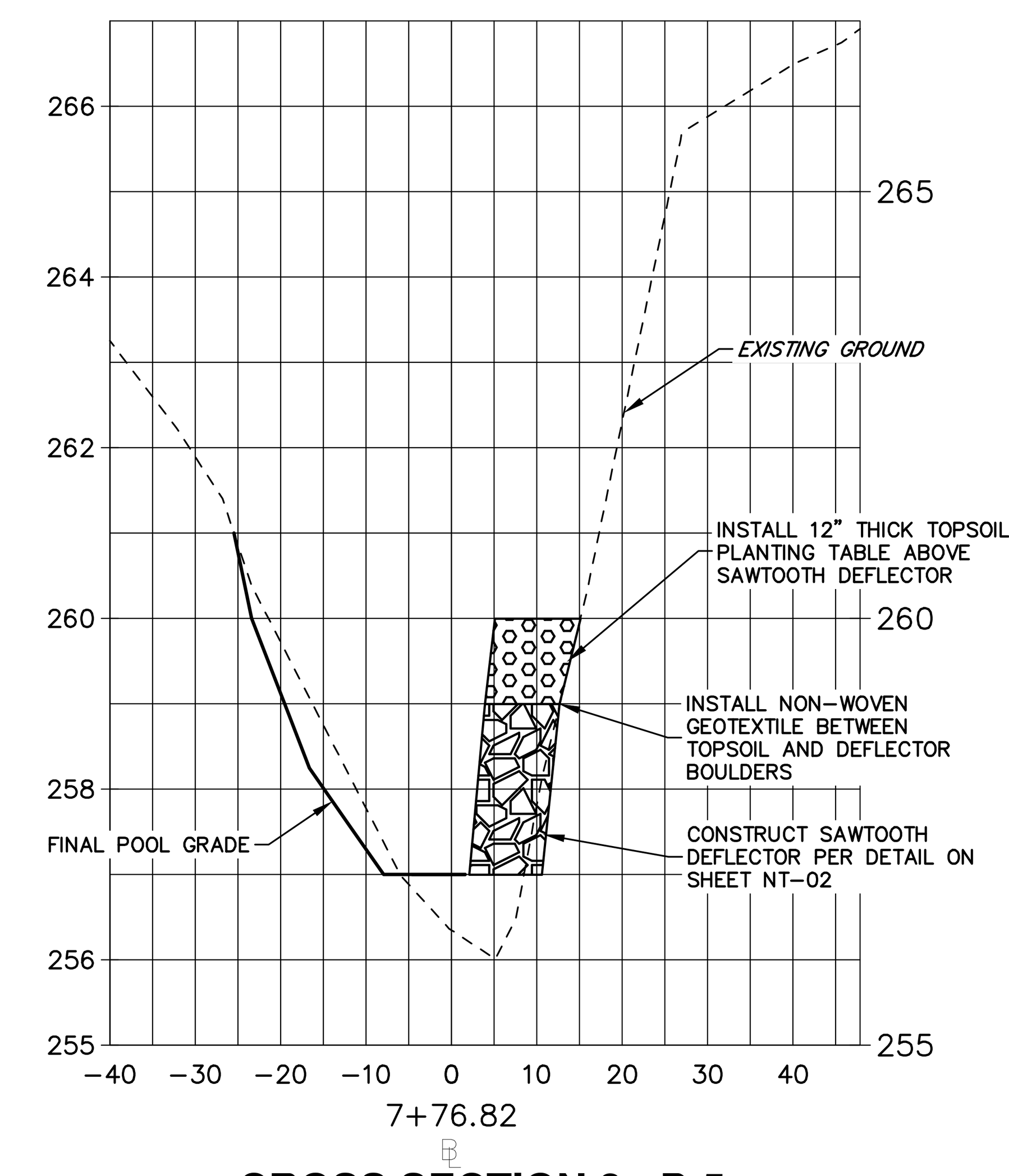
...170_0431\C3D\Plan Sets\CONS\RE-DESIGN 9.2025\C009170043151.dwg LAYOUT: PR-03 LAST PLOTTED: 10/29/2025 11:56 AM BY: JPOWELL



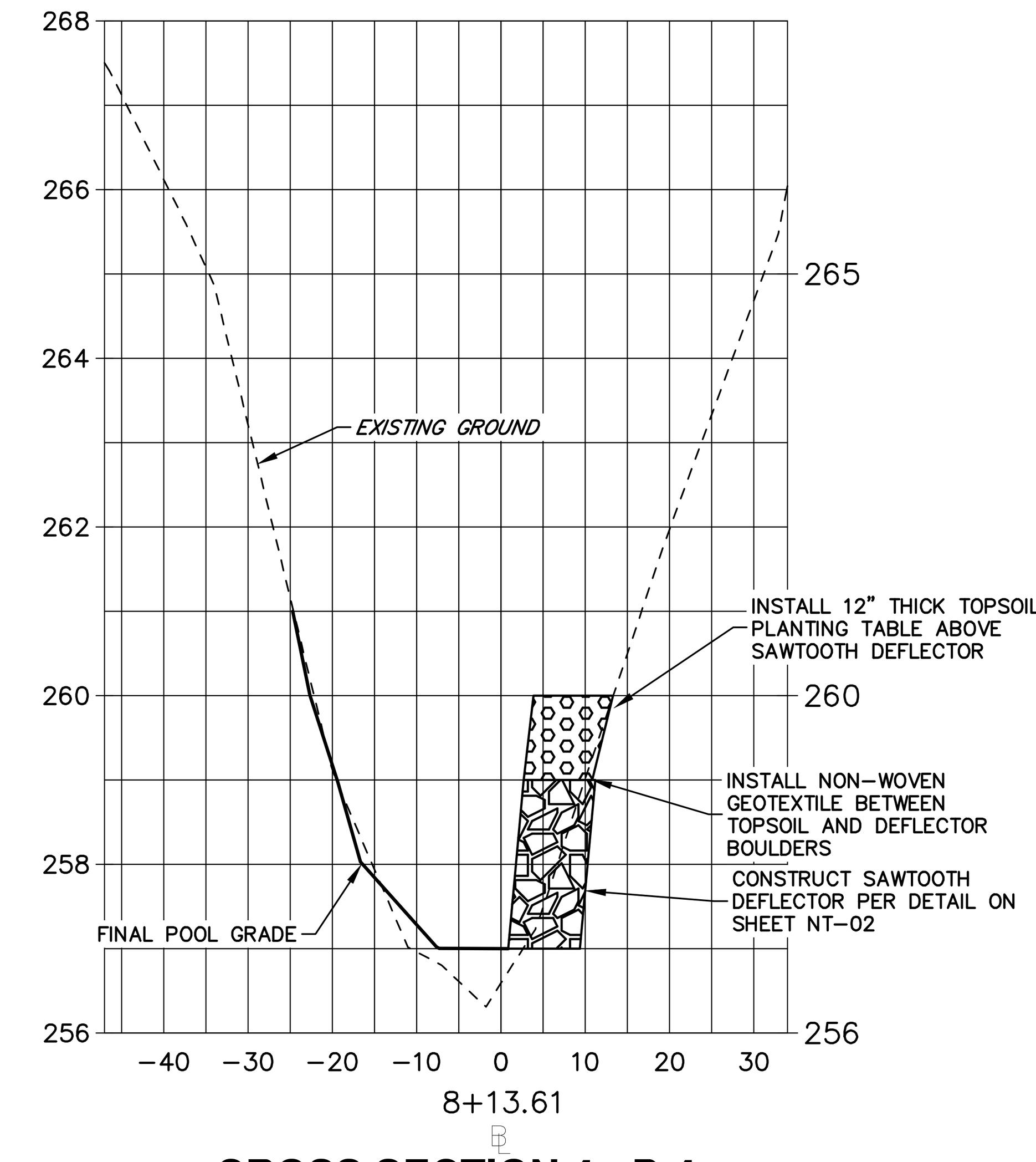
CROSS SECTION 1 - C.29



CROSS SECTION 2 - C.24

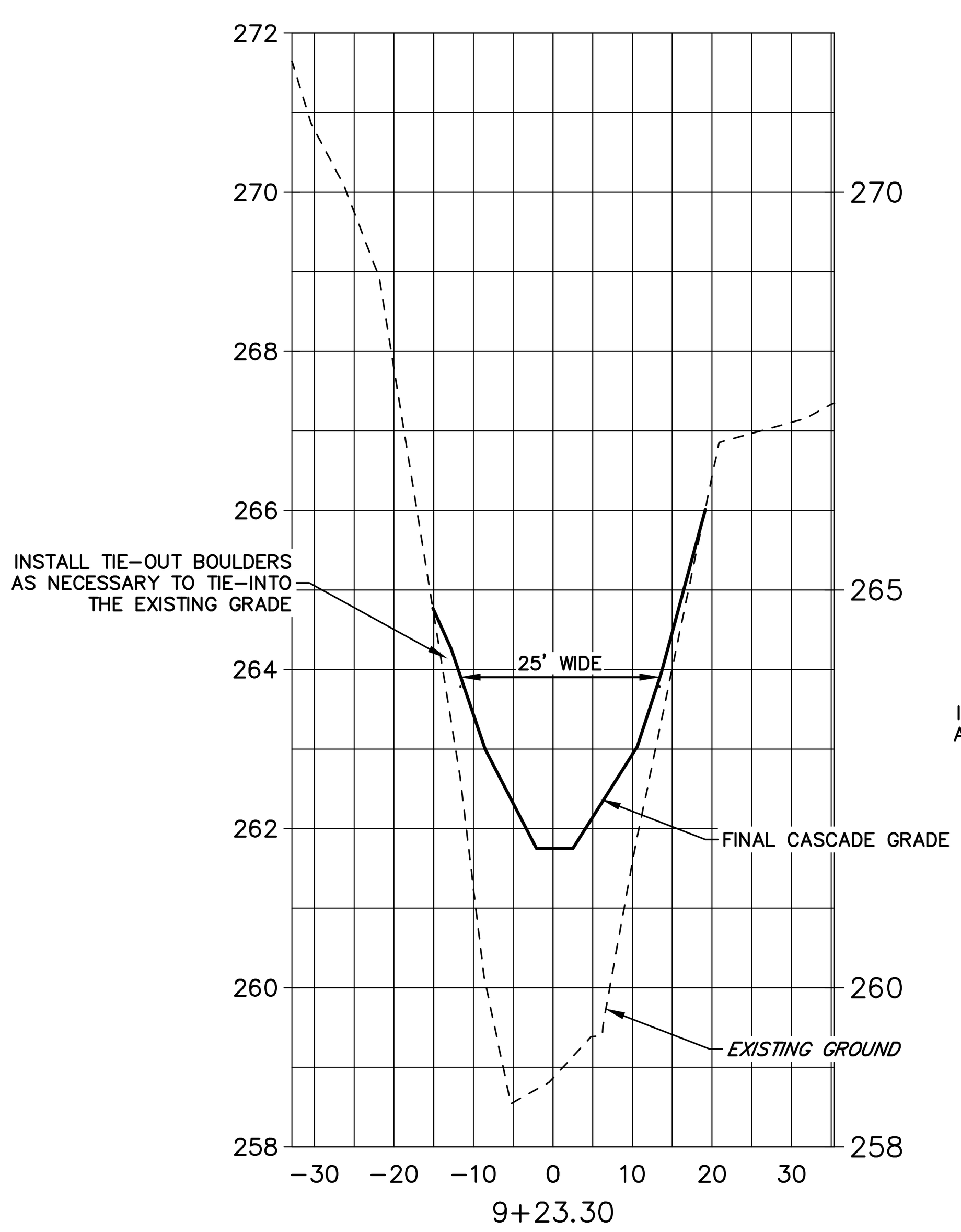


CROSS SECTION 3 - D.5

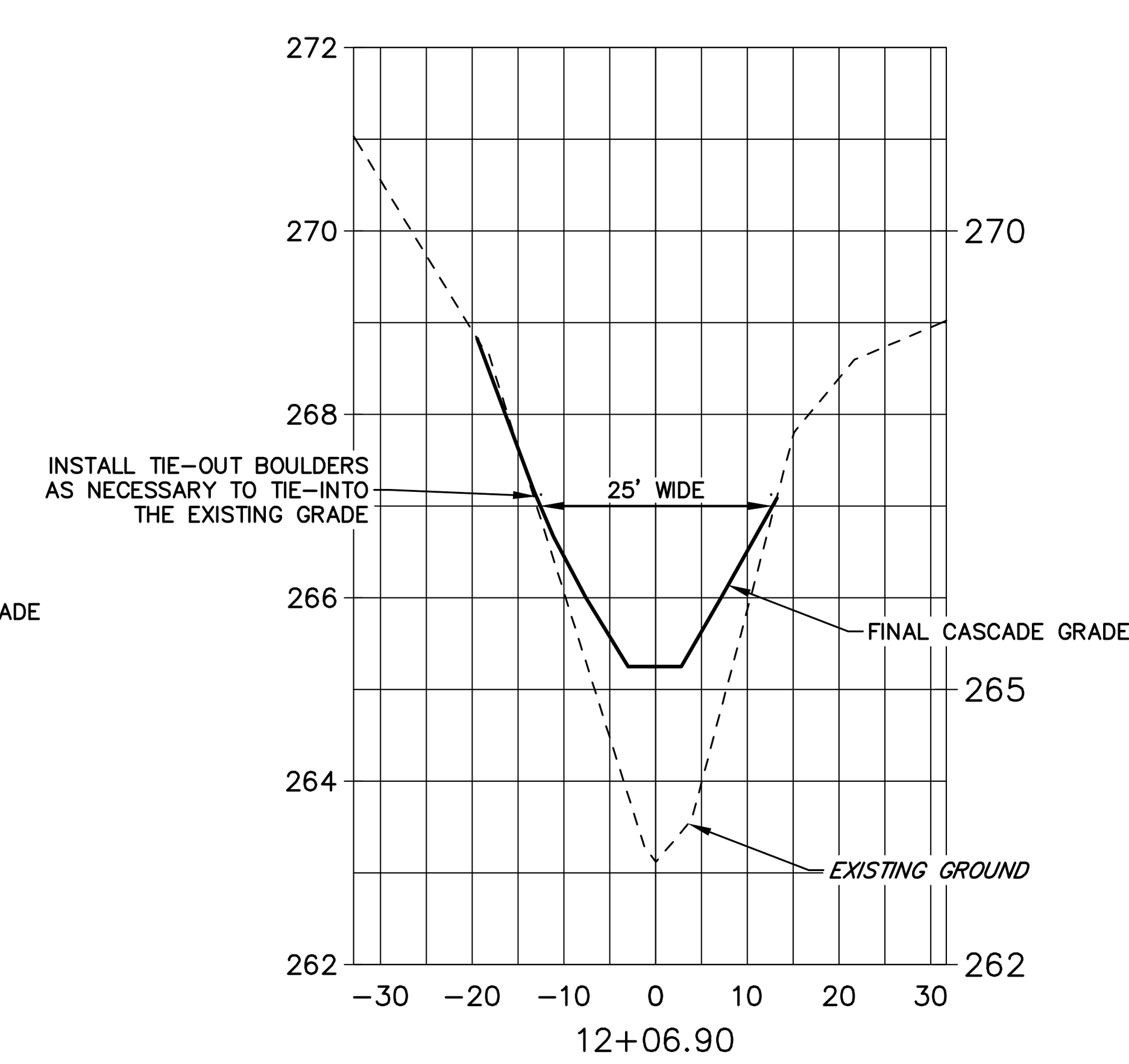


CROSS SECTION 4 - D.4

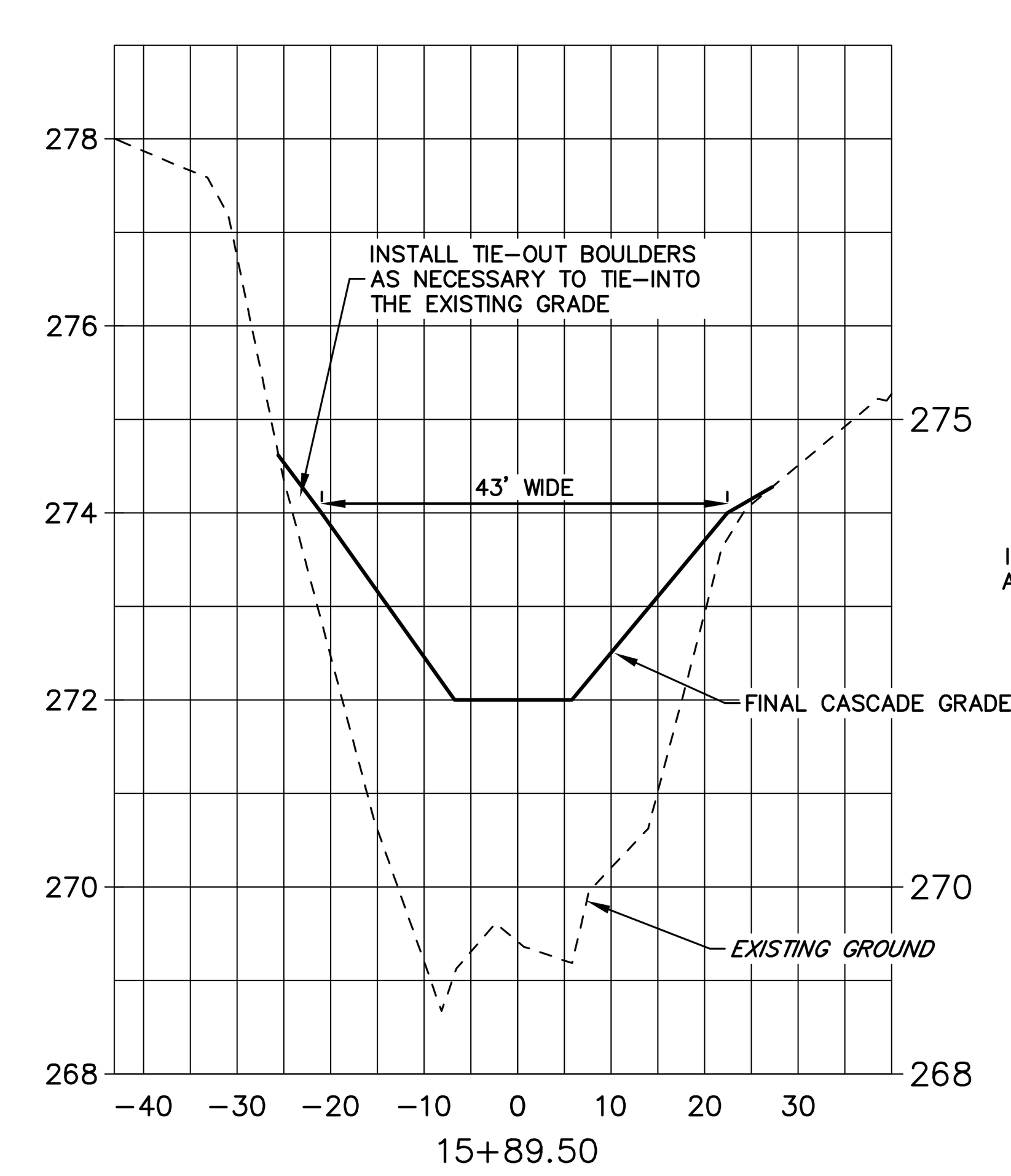
CONSTRUCT CASCADE STRUCTURES PER DETAIL ON SHEET DT-01. REFERENCE CASCADE STRUCTURE TABLE ON SHEET SR-OVR FOR DIMENSIONS OF EACH CASCADE WEIR.



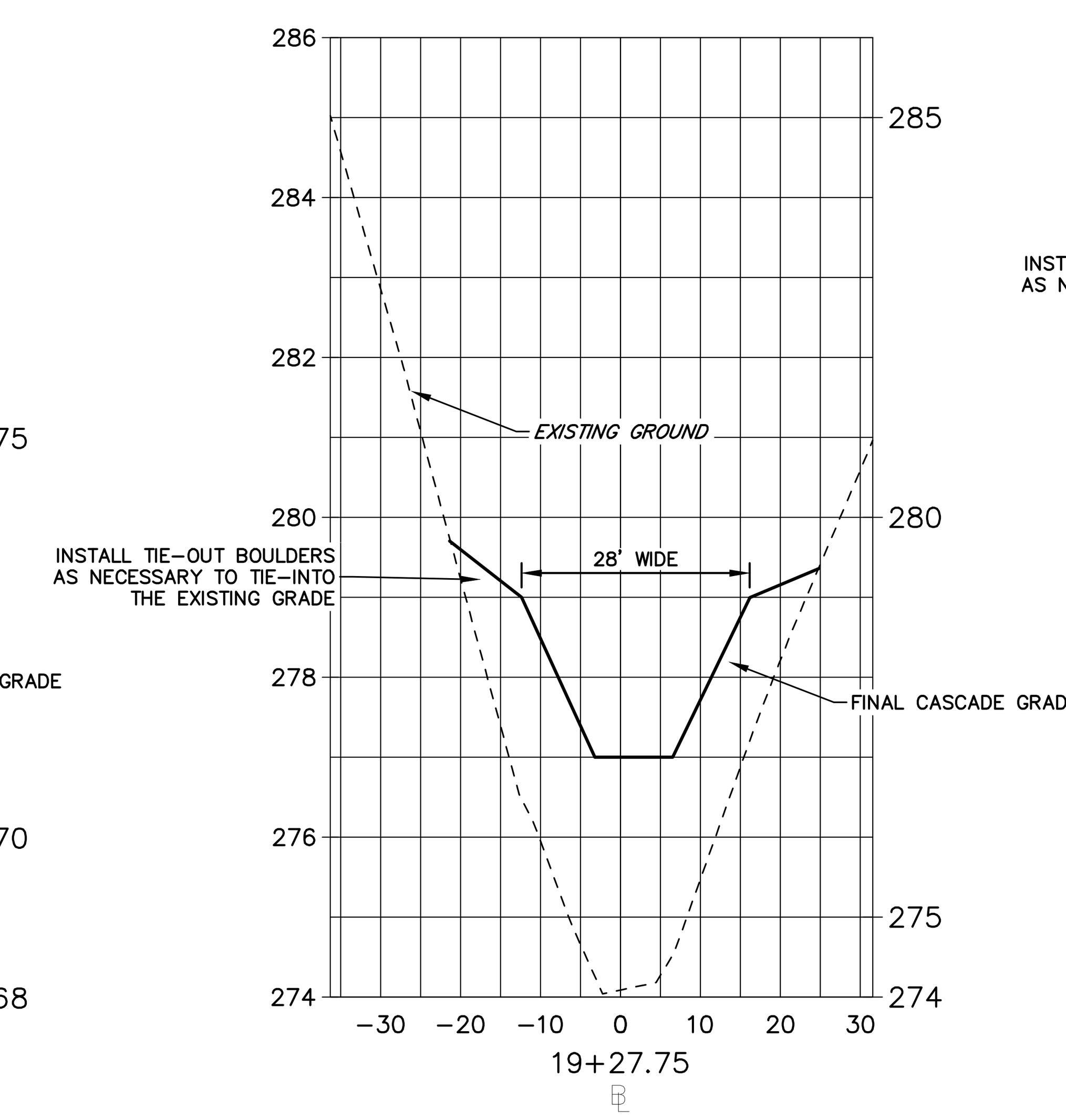
CROSS SECTION 5 - C.22



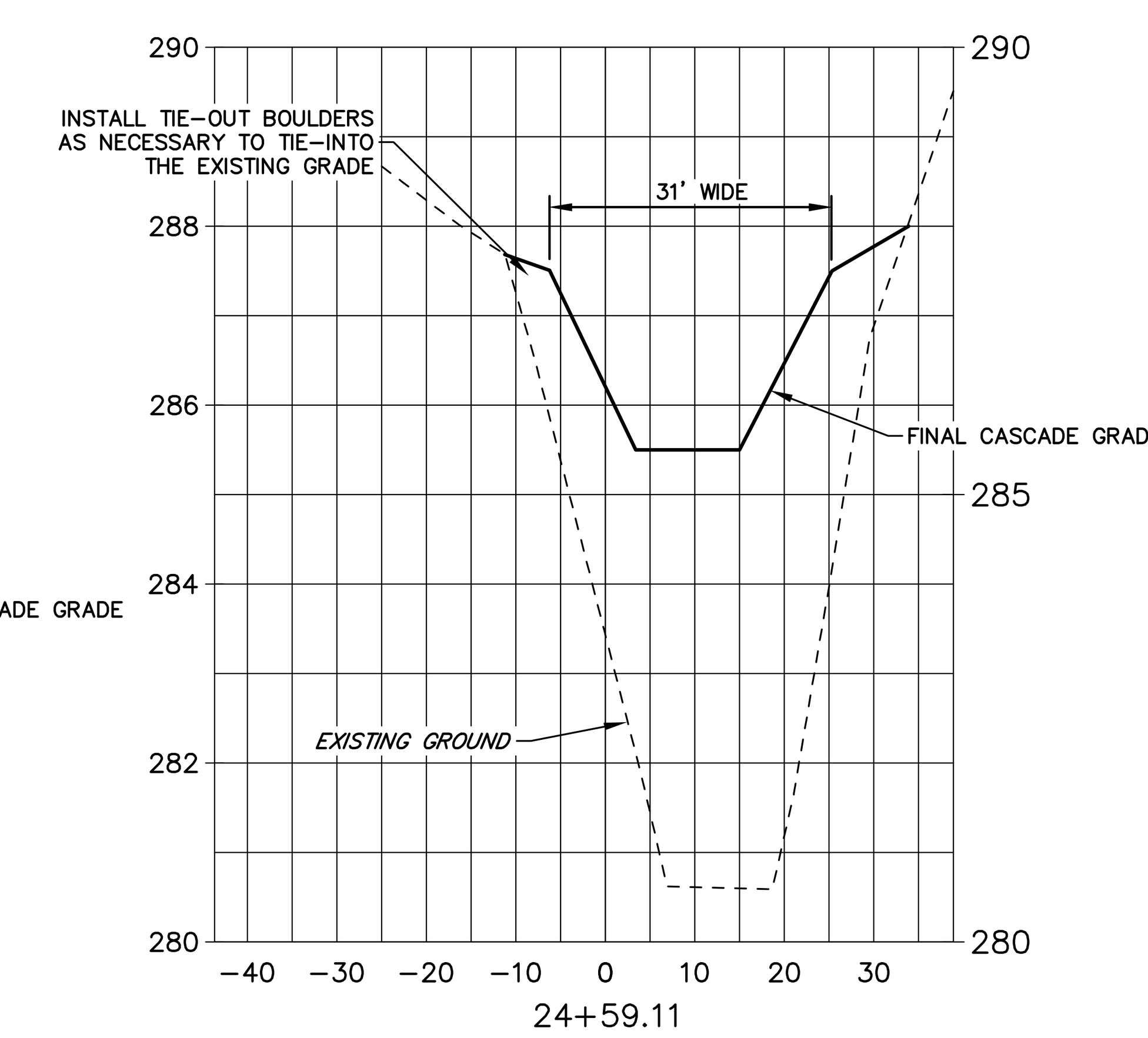
CROSS SECTION 6 - C.19



CROSS SECTION 7 - C.15



CROSS SECTION 8 - C.12



CROSS SECTION 9 - C.4

CROSS SECTION VIEW SCALE

HORIZ: 20' 10' 0' 20'
VERT: 2' 1' 0' 2'
SCALE IN FEET

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ALLENTOWN, PA 18106
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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

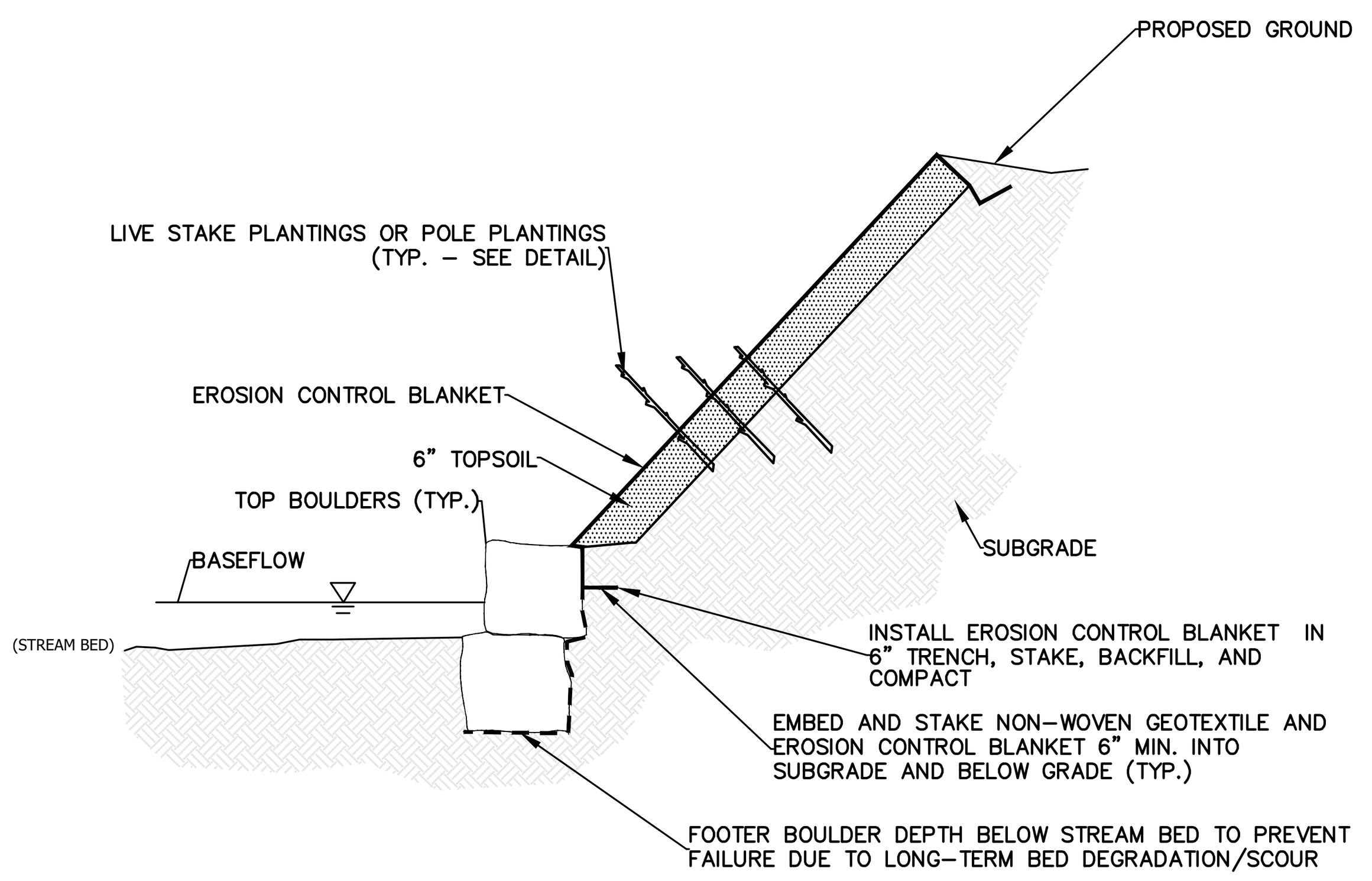
HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

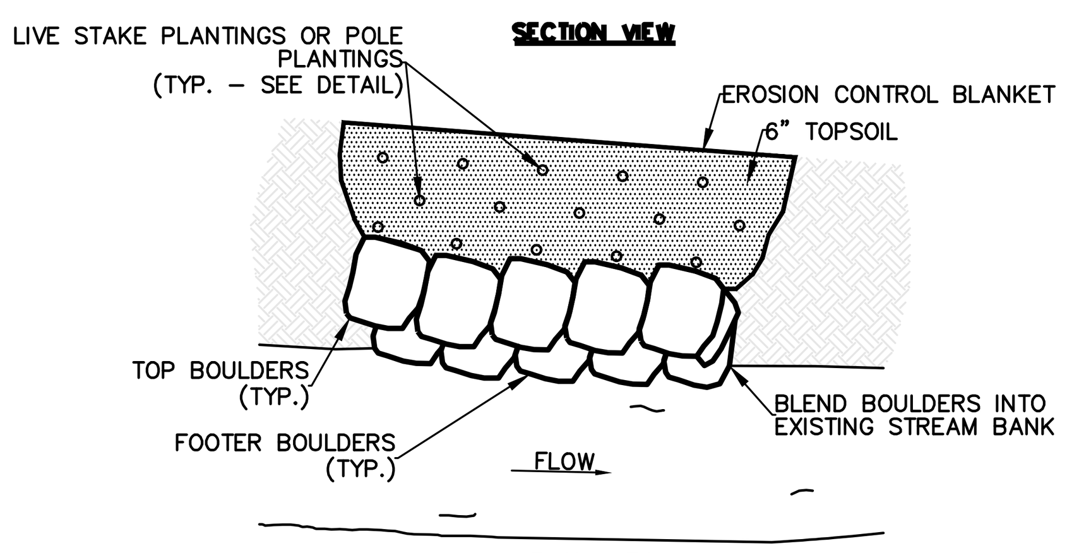
NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
3		
4		
5		
6		
7		
8		
9		

SHEET TITLE:
PROPOSED STREAM CROSS SECTIONS

SHEET: XS-01 | 18

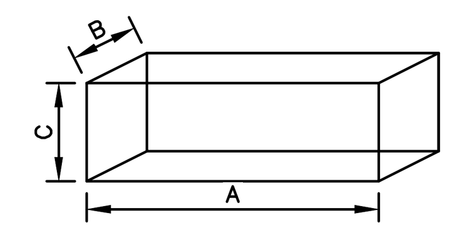


SECTION VIEW



PLAN VIEW

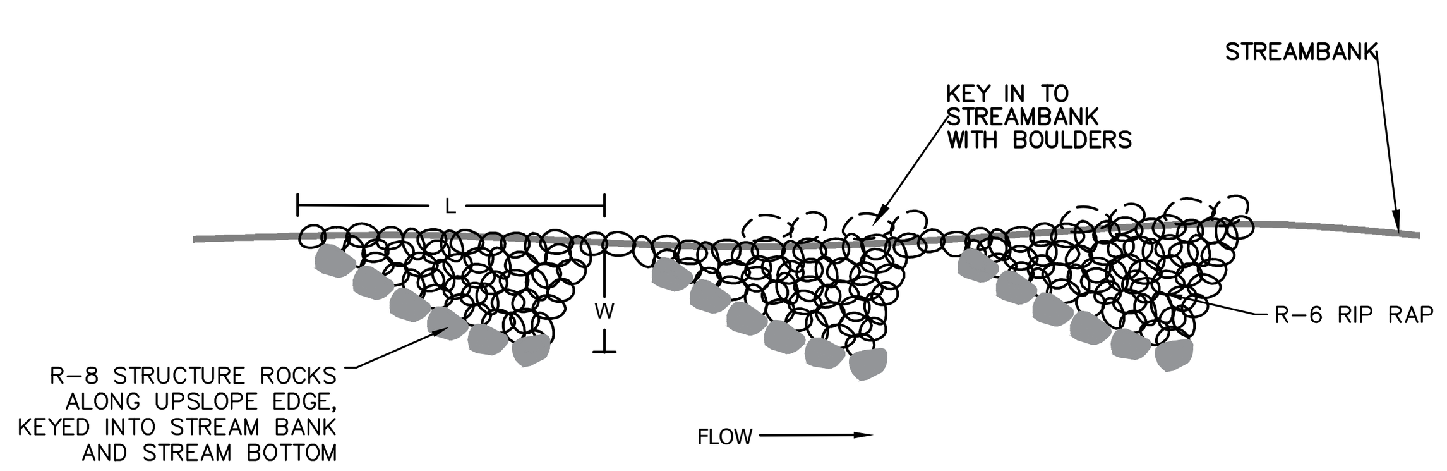
HABITAT TOE & FOOTER BOULDER DIMENSTIONS (FT.)			
STRUCTURE ID	A - AXIS	B - AXIS	C - AXIS
H.1	3.0 - 4.0	2.5 - 3.5	2.0 - 2.5
H.2	3.0 - 4.0	2.5 - 3.5	2.0 - 2.5
H.3	3.0 - 4.0	2.5 - 3.5	2.0 - 2.5
H.4	3.0 - 4.0	2.5 - 3.5	2.0 - 2.5



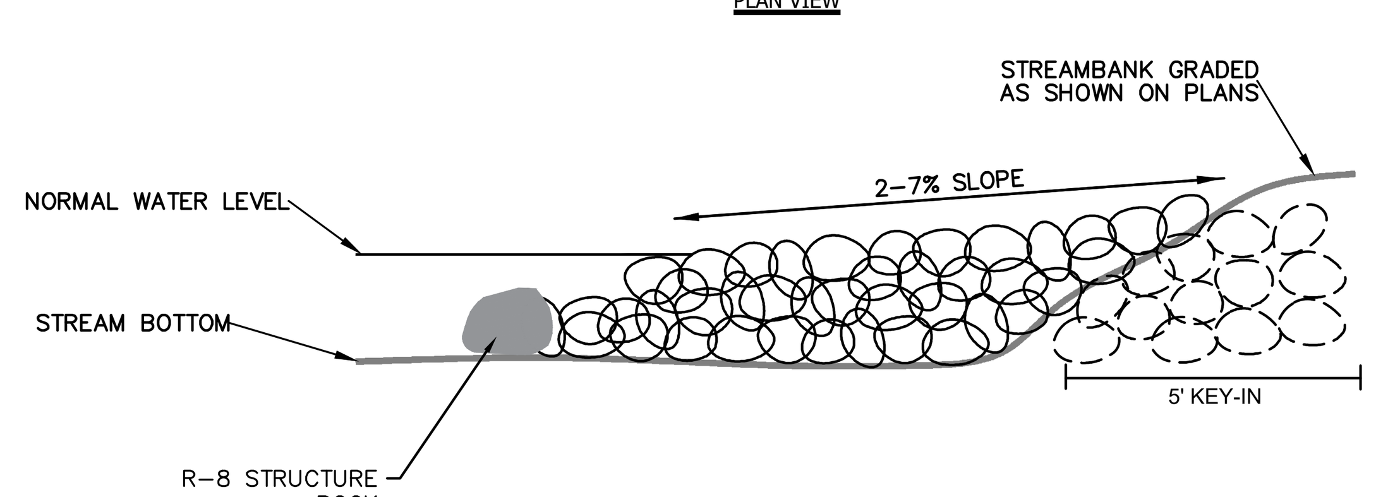
BOULDER SIZING DETAIL

1 HABITAT BOULDER TOE REVETMENT WITH LIVING WALL STABILIZATION

NOT TO SCALE



PLAN VIEW



SECTION VIEW A-A

SAWTOOTH DEFLECTOR STRUCTURES TABLE				
STRUCTURES ID	MIN. # STRUCTURES	STRUCTURE LENGTH (FT.)	STRUCTURE WIDTH (FT.)	NOTES
D.1	2	10	4	
D.2	2	25	10	
D.3	4	10	4	
D.4	1	25	10	
D.5	1	32	13	SOIL LIFT W/ PLANTING BED
D.6	1	28	8.5	SOIL LIFT W/ PLANTING BED
D.7	2	25	10	

SAWTOOTH STONE DEFLECTOR STRUCTURE NOTES

1. DEFLECTOR SIZES MAY VARY; REFER TO STRUCTURES TABLE
2. SAWTOOTH STONE DEFLECTOR STRUCTURES SHALL BE CONSTRUCTED W/ R-6 RIP RAP WITH SELECT R-8 BOULDERS PLACED AS STRUCTURE ROCKS AT THE UPSTREAM EDGE OF STRUCTURES

02 SAWTOOTH STONE DEFLECTOR DETAIL

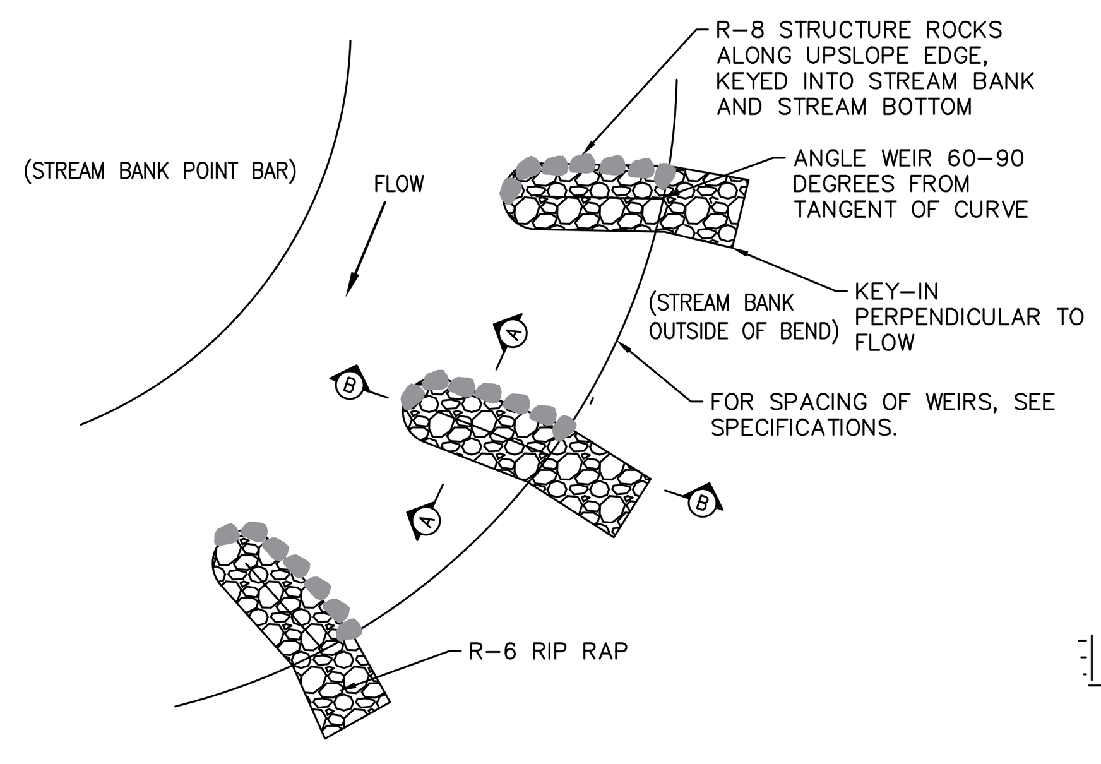
NOT TO SCALE

BENDWAY WEIR MATERIAL NOTES

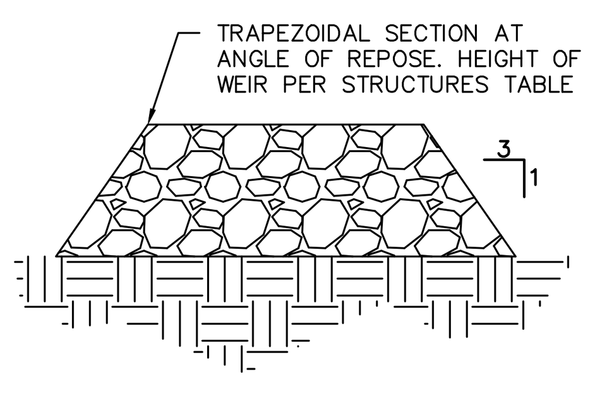
1. GEOTEXTILE FABRIC SHALL BE A BLACK NON-WOVEN GEOTEXTILE COMPOSED OF POLYPROPYLENE FIBERS THAT MEET THE FOLLOWING SPECIFICATIONS:

MECHANICAL PROPERTIES	ASTM STANDARD
GRAB TENSILE STRENGTH	D 4632
GRAB TENSILE ELONGATION	D 4632
TRAPEZOID TEAR STRENGTH	D 4533
CBR PUNCTURE STRENGTH	D 6241
APPARENT OPENING SIZE	D 4751
PERMITTIVITY	D 4491
FLOW RATE	D 4491
UV RESISTANCE (AT 500 HOURS)	D 4355

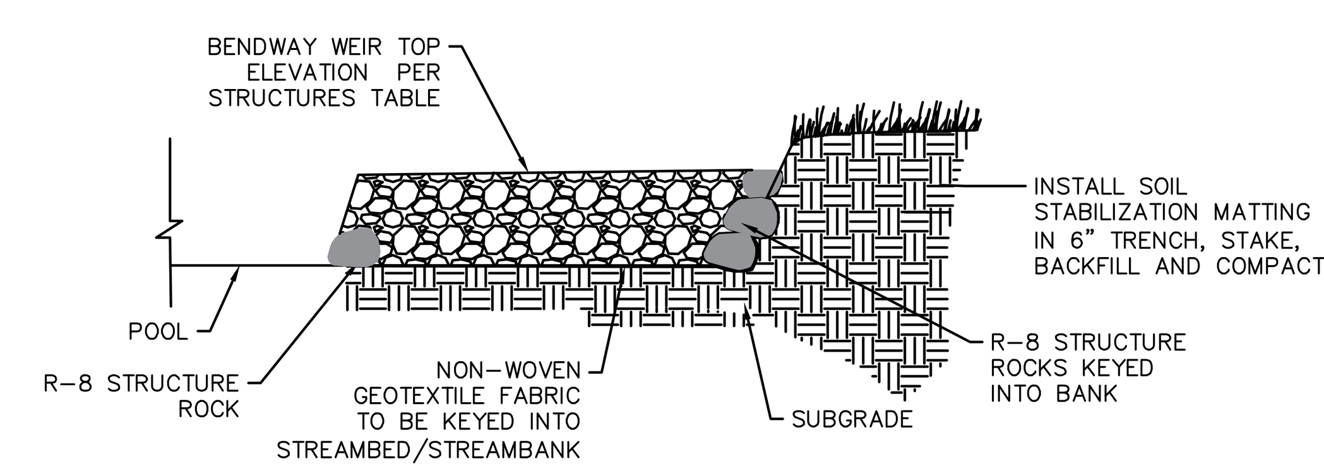
2. STONE RIPRAP UTILIZED SHALL HAVE A MINIMUM SPECIFIC GRAVITY OF 2.5 ACCORDING TO AASHTO T85, BULK SATURATED, BUT SURFACE-DRY BASIS. GRADATIONS UTILIZED SHALL CONFORM TO PENNDOT PUBLICATION 408, SECTION 850.2(A).
3. SOIL STABILIZATION MATTING SHALL BE BRISTLE COIR FIBER MATTING CONSISTING OF MACHINE TWISTED TWINES AND BE 100 PERCENT BIODEGRADABLE. STABILIZATION MATTING SHALL BE REISTANT TO THE TRACTIVE FORCES OF THE STREAM CHANNEL DURING HIGH FLOW EVENTS. STABILIZATION MATTING WHICH USES PLASTICS, METALS, OR OTHER MAN-MADE MATERIALS IN THE CONSTRUCTION OF THE MATERIAL WILL NOT BE PERMITTED. APPARENT OPENING SIZE SHALL BE SUFFICIENT TO FOSTER THE SPROUTING OF STABILIZATION/RESTORATION SEED MIXES.



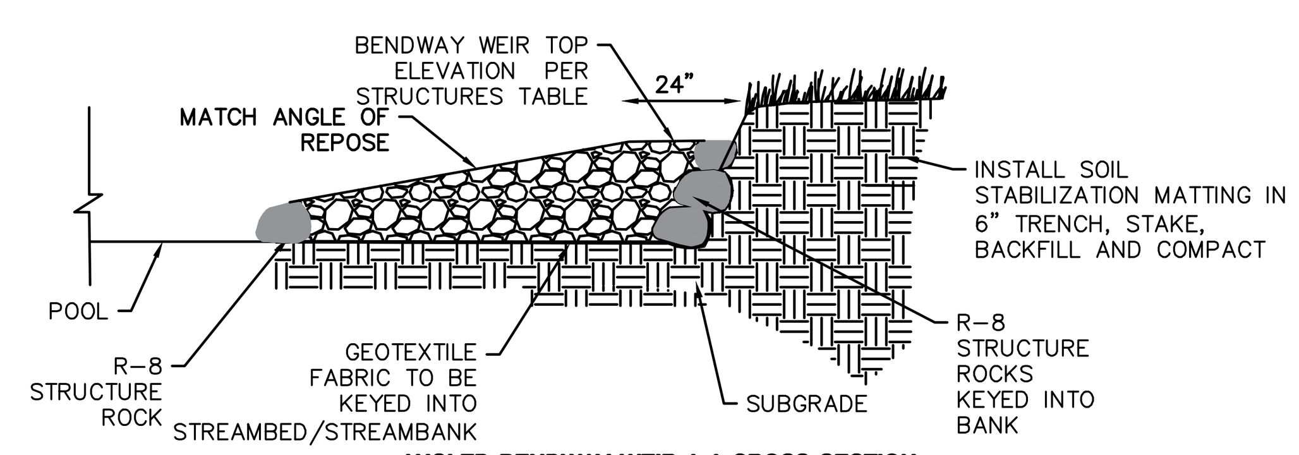
TYPICAL BENDWAY WEIR PLAN VIEW
NOT TO SCALE



BENDWAY WEIR B-B CROSS SECTION
NOT TO SCALE



TYPICAL BENDWAY WEIR A-A CROSS SECTION
NOT TO SCALE



ANGLED BENDWAY WEIR A-A CROSS SECTION
NOT TO SCALE

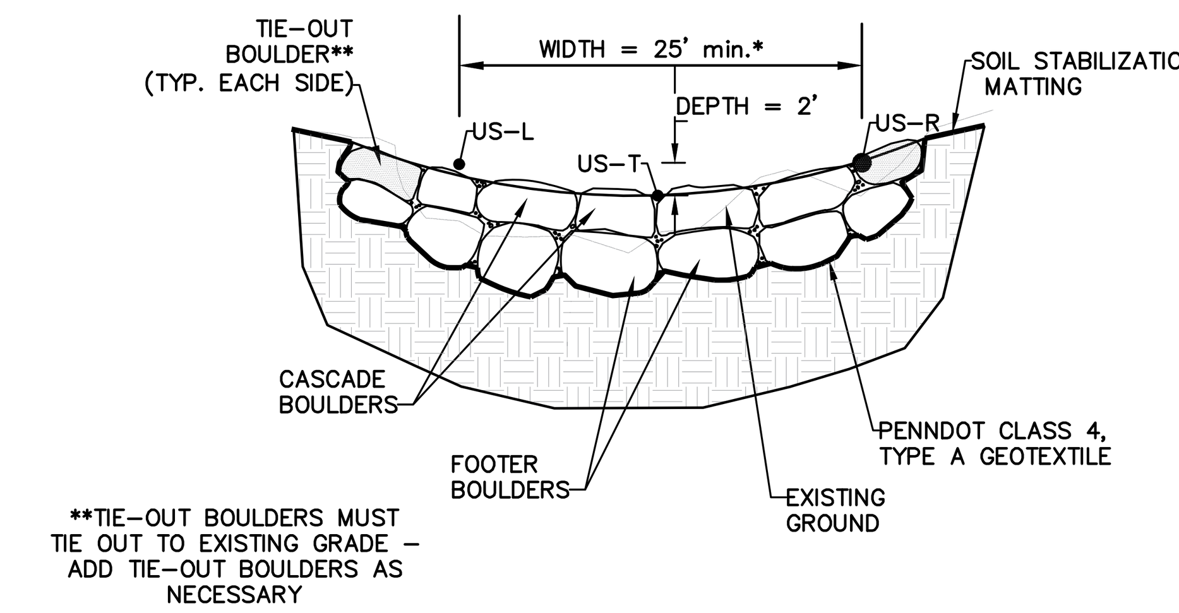
BENDWAY WEIR STRUCTURES TABLE				
STRUCTURE ID	TOP ELEVATION	WEIR TYPE	WIDTH (FEET)	SPACING (FEET)
W.1	271.0	STANDARD	10	15
W.2	271.0	STANDARD	10	15
W.3	271.0	STANDARD	10	15
W.4	264.0	STANDARD	10	30
W.5	264.0	ANGLED	10	30

BENDWAY WEIR CONSTRUCTION NOTES

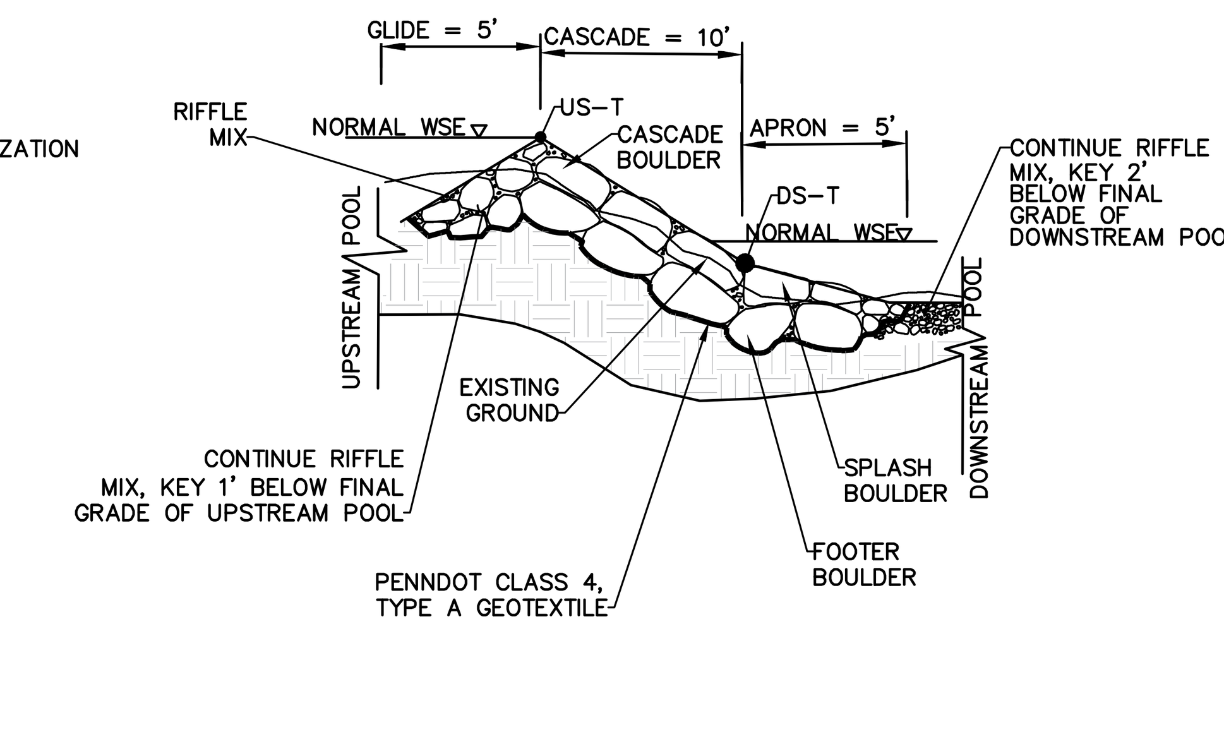
1. BENDWAY WEIR STRUCTURES SHALL BE CONSTRUCTED W/ R-6 RIP RAP WITH SELECT R-8 BOULDERS PLACED AS STRUCTURE ROCKS AT THE UPSTREAM EDGE OF STRUCTURES
2. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH AN APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN (ESPCP).
3. CHANNEL FLOW SHOULD BE DIVERTED AWAY FROM THE WORK AREA I ACCORDANCE WITH THE APPROVED ESPCP, AND THE SITE SHOULD BE DEWATERED.
4. PLACE GEOTEXTILE ON AN EVEN FOOTING IN THE STREAM CHANNEL. KEY IN GEOTEXTILE A MINIMUM OF 2 FEET.
5. STONE SHALL BE PLACED BY MECHANICAL OR OTHER ACCEPTABLE METHODS WITH A MINIMUM OF VOIDS. THE STONE SHALL BE PLACED TO FORM A NEAT AND UNIFORM SURFACE AREA. NO MORTAR IS PERMITTED.
6. PLACE STONE AT THE DESIGN DIMENSIONS AND APPROPRIATE STRUCTURE SPACING.
7. INSTALL AND STABILIZE ANY DISTURBANCES ALONG THE STREAMBANK WITH SOIL STABILIZATION MATTING IN ACCORDANCE WITH THE SPECIFICATION.
8. REMOVE APPROVED ESPCP DEVICES UPON STABILIZATION OF THE CHANNEL IN ACCORDANCE WITH THE APPROVED PLAN.
9. STREAMBANKS IMMEDIATELY UPSTREAM AND DOWNSTREAM OF THE BENDWAY WEIR MAY REQUIRE ADDITIONAL STREAMBANK PROTECTION MEASURES AND SHOULD BE MONITORED CLOSELY.

03 BENDWAY WEIR DETAIL

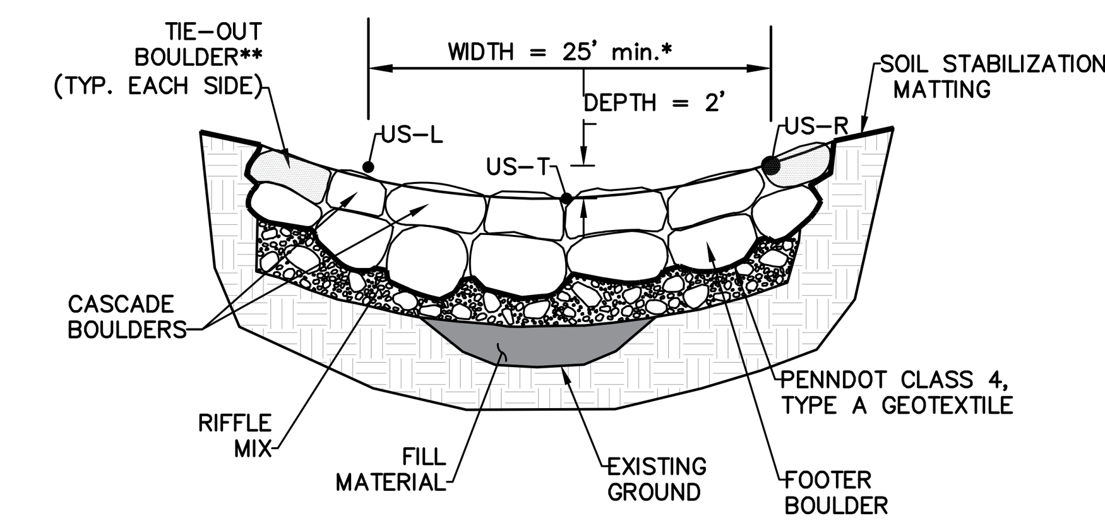
NOT TO SCALE



CASCADE CROSS SECTION - CUT
NOT TO SCALE



CASCADE CROSS PROFILE - CUT
NOT TO SCALE



CASCADE CROSS SECTION - FILL
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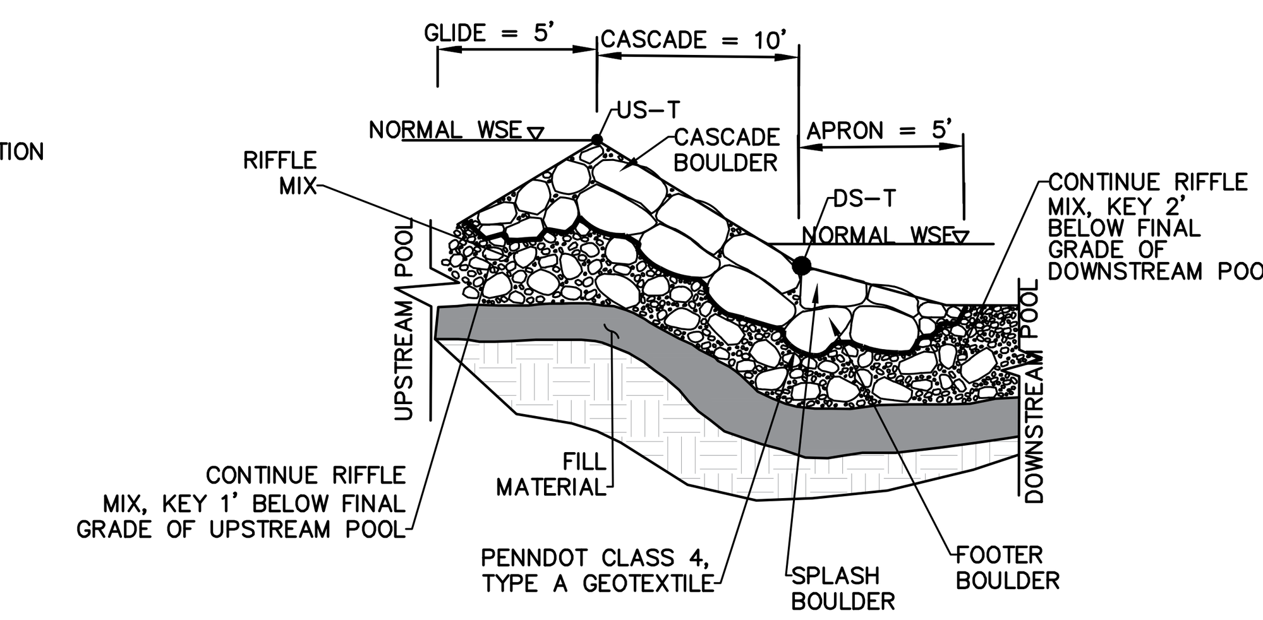

CASCADE CROSS PROFILE - FILL
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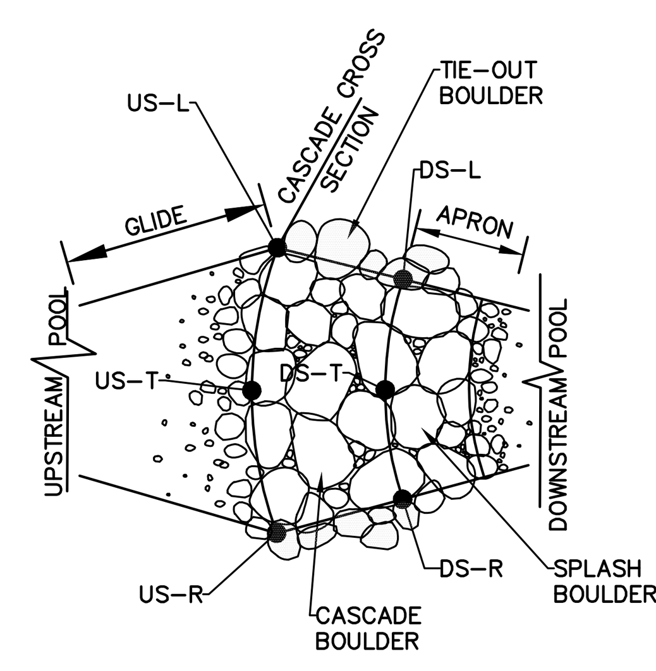
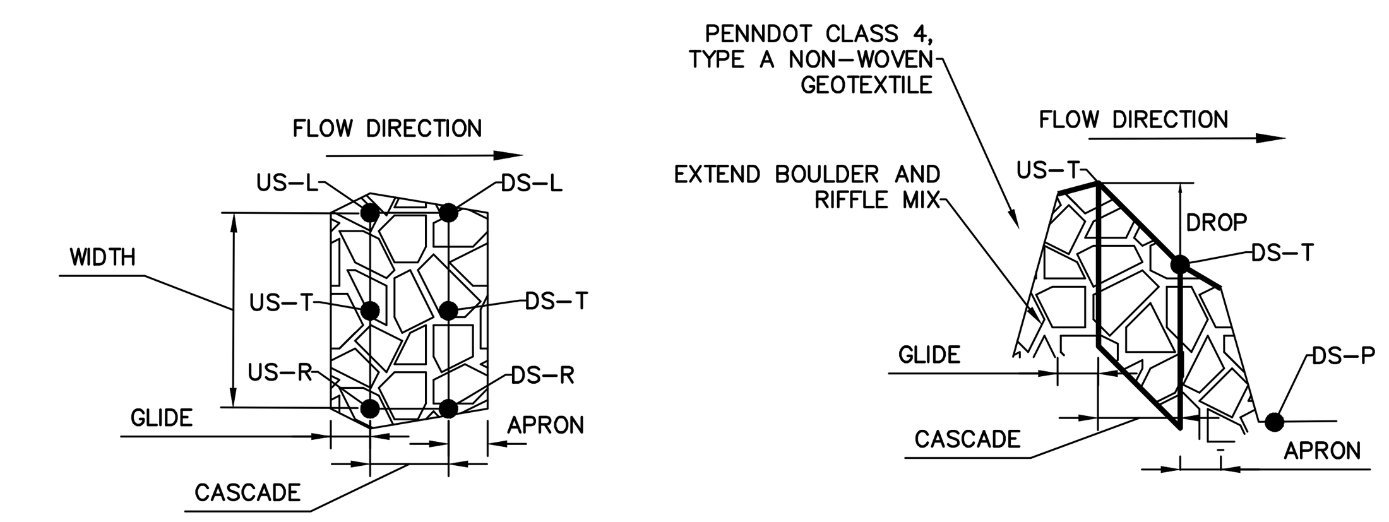


CASCADE PLAN VIEW
NOT TO SCALE



NOTES:
1. THE SITE PLAN PROVIDES THE US-T ELEVATION. REFER TO PROFILE SHEETS 01-05 FOR OTHER DESIGN ELEVATION VALUES AND SHEET ### FOR CASCADE GEOMETRY DIMENSIONS.
2. WHEN THE CASCADE STRUCTURE IS ADJACENT TO A BOULDER WALL OR TOE STRUCTURE, CASCADE TIE-OUT BOULDERS SHALL BE EXTENDED TO THE BOULDER WALL OR TOE STRUCTURE.

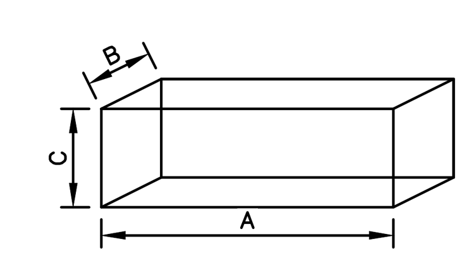
CASCADE LEGEND
NOT TO SCALE

BOULDER DIMENSIONS (FT) - CASCADES			
BOULDER TYPE	A-AXIS	B-AXIS	C-AXIS
CASCADE	3.0-4.0	2.5-3.5	2.0-2.5
SPLASH	2.5-3.5	2.0-3.0	1.5-2.0
TIE-OUT	2.5-3.5	2.0-3.0	1.5-2.0
FOOTER	3.0-4.0	2.5-3.5	2.0-2.5

BOULDERS SHALL CONSTITUTE 70% OF EACH CASCADE STRUCTURE MATERIAL

RIFFLE MIX MATERIAL SIZING		
MATERIAL	SIZE RANGE (INCHES)	% MIX
FINE GRAVEL	0.15 -0.24	15
COARSE GRAVEL	0.62 - 0.87	25
VERY COARSE GRAVEL	1.25 - 1.75	35
VERY LARGE COBBLE	7 - 10	25

RIFFLE MIX SHALL CONSTITUTE 30% OF EACH CASCADE STRUCTURE MATERIAL



CASCADE NOTES:

1. *CASCADE SHALL BE A MINIMUM OF 25' WIDE, AND SHALL BE INSTALLED WIDER AS NECESSARY TO KEY IN EDGE OF CASCADE WEIR INTO THE EXISTING GRADE. SEE CASCADE STRUCTURES TABLE ON SHEET XXX.
2. IMPORTED GRAVEL COMPONENTS CAN BE REPLACED W/ NATIVE STREAMBED SUBSTRATE, IF AVAILABLE.
3. REFER TO PLANS AND PROFILE FOR ADDITIONAL ELEVATION AND LOCATION INFORMATION FOR CASCADE PLACEMENT.
4. THE CROSS SECTION SHALL BE CONSTRUCTED IN A PARABOLIC SHAPE.
5. FOR ALL MATERIAL SIZES, REFER TO SPECIFICATIONS AND TABLES PROVIDED ON THIS DETAIL.
6. NATURAL CHANNEL MATERIAL MAY BE HARVESTED ON-SITE PRIOR TO INSTALLATION OF CASCADE IF IT MEETS THE SPECIFICATIONS.
7. RIFFLE MIX SHALL BE A MINIMUM THICKNESS OF TWICE THE SPECIFIED D50 OF THE MATERIAL OR 2', WHICHEVER IS LARGER. TAPER UPSTREAM AND DOWNSTREAM LIMITS AS SHOWN.
8. THE NUMBER OF BOULDERS VARIES DEPENDING ON TYPICAL SECTION WIDTH AND BOULDER DIMENSIONS.
9. IN AREAS OF CUT, CHANNEL FILL MATERIAL UNDER RIFFLE MIX IS NOT NEEDED. IN AREAS OF FILL, EXISTING STREAM CHANNEL TO BE FILLED IN 8" LIFTS WITH CHANNEL FILL MATERIAL TO ELEVATION SPECIFIED ON PROFILE.
10. AS NEEDED, EXCAVATE THE DOWNSTREAM TIE OUT AREA FOR SPLASH BOULDERS AND INSTALL THE SPLASH AND CASCADE BOULDERS, LAYING A CONTINUOUS SHEET OF GEOTEXTILE UNDER ALL BOULDERS. TOP OF CASCADE BOULDERS SHALL BE INSTALLED IN A MANNER CONFORMING TO THE PARABOLIC CASCADE SHAPE, SHOWN IN THE DETAIL AND SHALL MEET FINISHED GRADE.
11. RIFFLE MIX OR SALVAGED NATURAL CHANNEL MATERIAL SHALL BE REGULARLY WORKED INTO THE FULL DEPTH OF CASCADE TO FILL VOIDS BETWEEN BOULDERS.
12. THE BOULDERS SHALL BE TILTED DOWNSTREAM AS SHOWN ON THE DETAIL AND NOT STACKED. STAGGER SEAMS OF BOULDERS BETWEEN EACH ROW. INSTALL RIFFLE MIX APRON TO BLEND INTO OWN STREAM POOL AS SHOWN ON DETAIL.
13. TIE-OUT BOULDER SHALL EXTEND PAST THE CORNER NODES DS-R & DS-L A MIN. OF ONE BOULDER LENGTH (B-AXIS) INTO EXISTING BANK. WHERE THIS CONFLICTS WITH EXISTING TREE ROOTS OR BEDROCK, TIE-OUT BOULDER MAY BE ELIMINATED OR ADJUSTED AT DIRECTION OF ENGINEER. WHEN THE CASCADE STRUCTURE IS ADJACENT TO A BOULDER WALL OR TOE STRUCTURE, CASCADE TIE-OUT BOULDERS SHALL BE EXTENDED TO THE BOULDER WALL OR TOE STRUCTURE.
14. PLACE RIFFLE MIX UPSTREAM OF THE BOULDER GRADE CONTROL TO THE FINISHED GRADES, COMPRESSING MATERIALS TO MAINTAIN PARABOLIC CROSS SECTION SHAPE.
15. SALVAGED NATURAL CHANNEL MATERIAL SHALL BE REPEATEDLY WORKED INTO FULL DEPTH OF THE RIFFLE MIX TO FILL VOIDS.
16. EXCAVATE UPSTREAM POOL AND INSTALL RIFFLE MIX GLIDE AS SHOWN ON DETAIL.
17. TRIM ALL GEOTEXTILE AT OR BELOW FINISHED GRADE.
18. ONCE CASCADE IS CONSTRUCTED, STABILIZE ALL DISTURBED TIE-IN LOCATIONS AS SPECIFIED.

04 CASCADE STRUCTURE DETAIL

NOT TO SCALE

HERBERT, ROWLAND & GRUBIC, INC.
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PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES D. POWELL
ENGINEER
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
3		
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SHEET TITLE:
IN-STREAM STRUCTURE DETAILS

SHEET: DT-01 19

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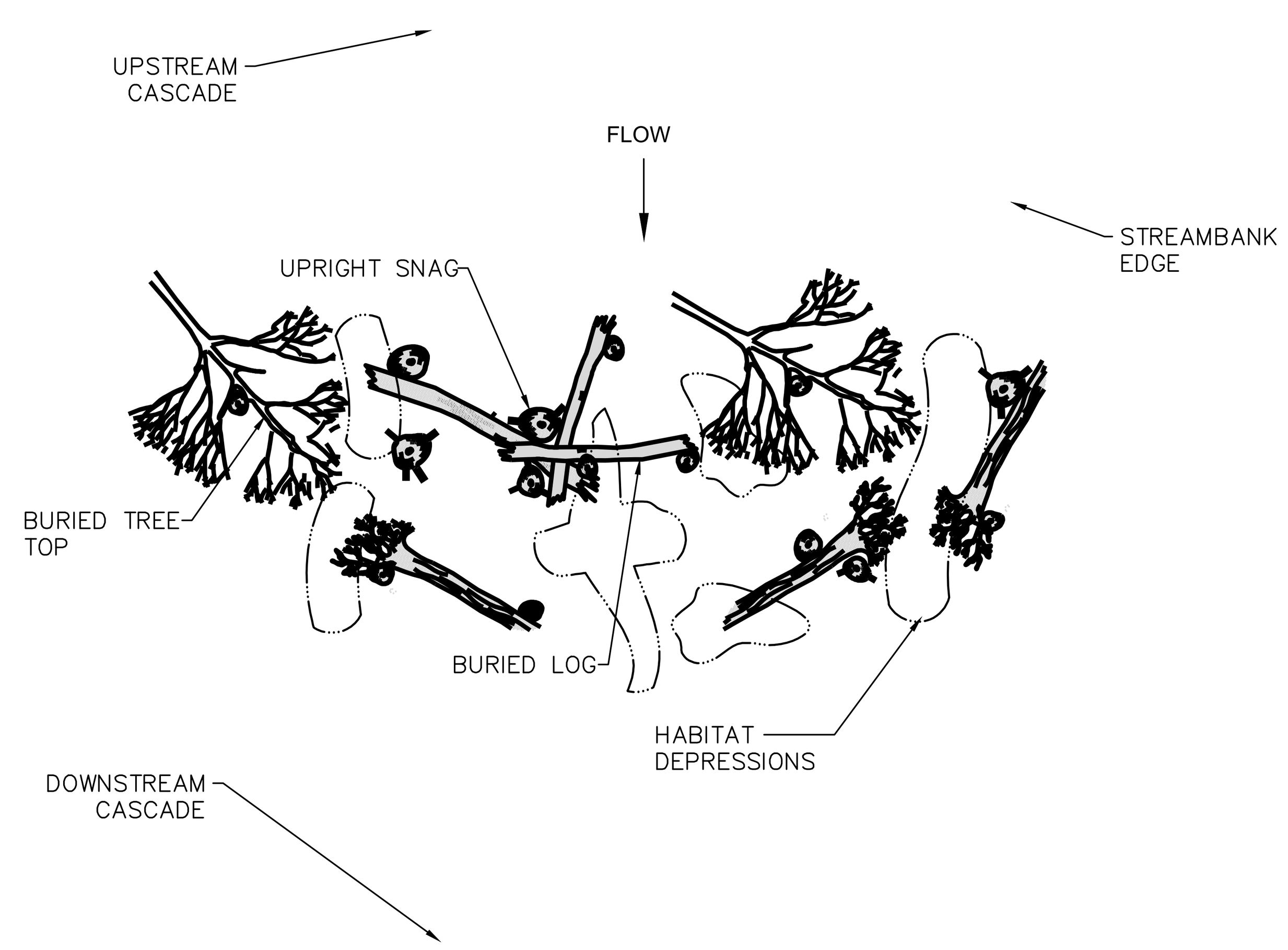
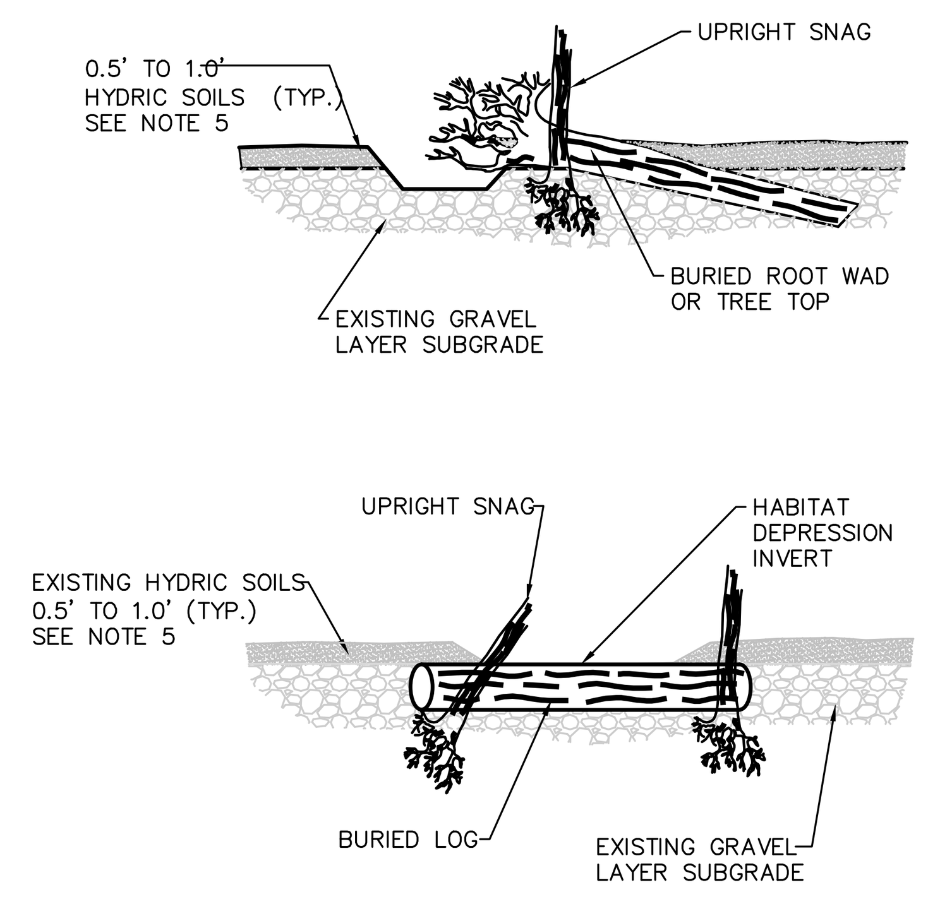
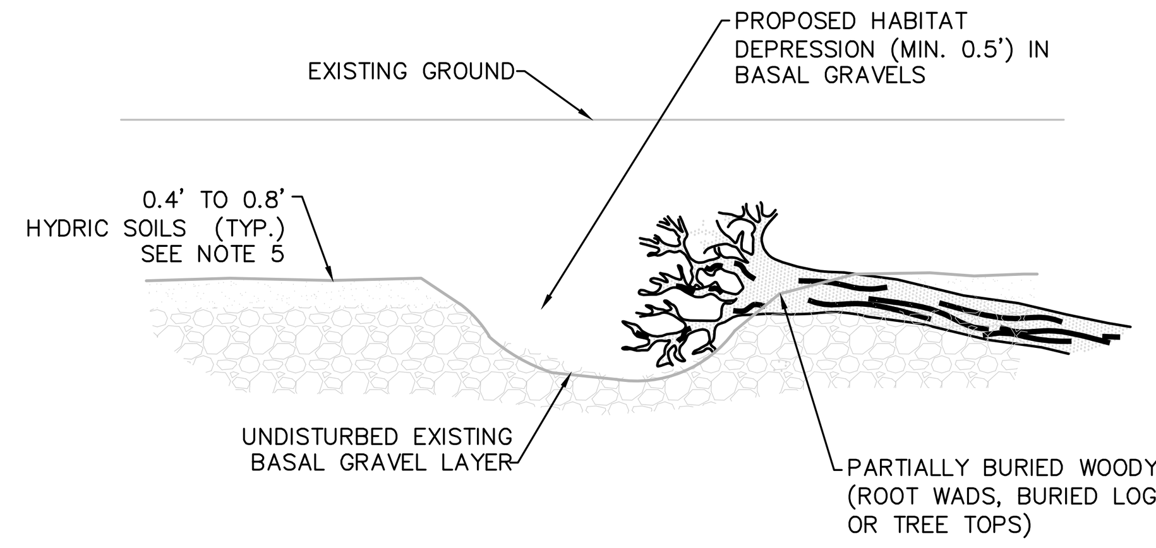




CROSS SECTION VIEWS



NOTES:

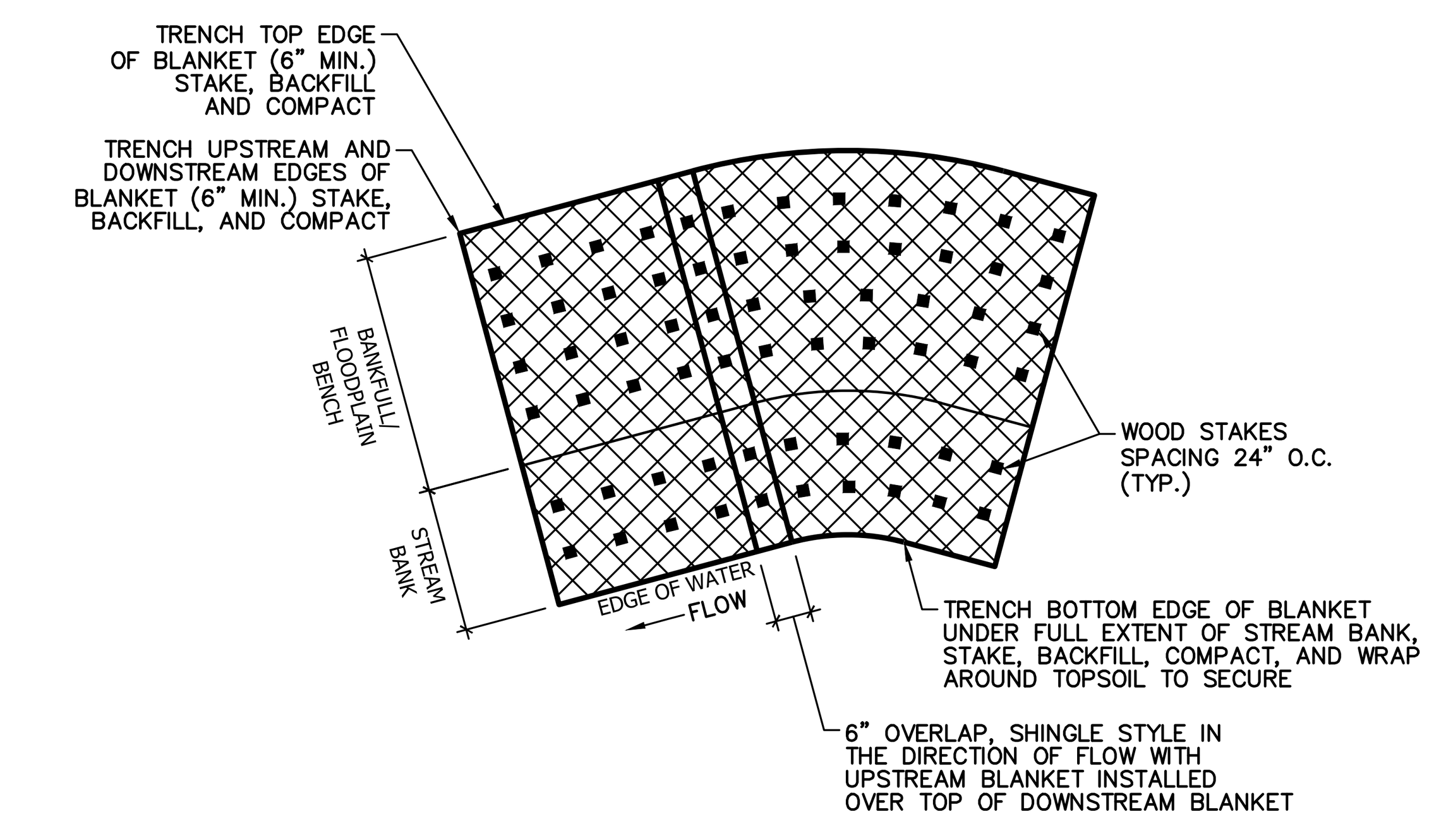
1. INSTALL HABITAT DEPRESSIONS THROUGHOUT CONSTRUCTED FLOODPLAIN AT THE DIRECTION OF THE DESIGNATED SPECIALIST. THE SIZE, FINAL LOCATION, AND ORIENTATION OF PROPOSED HABITAT DEPRESSION BOUNDARIES MAY VARY BASED ON SITE CONDITIONS DURING CONSTRUCTION.
2. THE CUMULATIVE TOTAL AREA OF HABITAT DEPRESSIONS SHALL BE EQUAL TO OR GREATER THAN 20% OF THE CONSTRUCTED FLOODPLAIN AREA.
3. HABITAT DEPRESSIONS INVERTS SHALL VARY IN DEPTH, WITH A TYPICAL MINIMUM OF 0.5–FT BELOW THE PROPOSED FLOODPLAIN ELEVATION AND MAY CONTAIN SALVAGED LOGS, ROOT WADS, AND TREE TOPS HARVESTED FROM TREES/BRUSH THAT HAS BEEN CLEARED FROM THE SITE. IMPORT ADDITIONAL WOODY DEBRIS TO THE SITE IF NECESSARY. WOODY DEBRIS AND HABITAT DEPRESSIONS SHALL BE USED IN CONJUNCTION, OR INDEPENDENTLY TO PROVIDE SURFACE ROUGHNESS, GROUNDWATER CONNECTIVITY THROUGH BASAL GRAVELS, MICROTOPOGRAHY AND HABITAT DIVERSITY.
4. HABITAT DEPRESSIONS MAY EXTEND THROUGH THE GRAVEL LAYER TO BEDROCK, AND MAY REMAIN INUNDATED WITH WATER AS EXPOSURE OF THE GRAVEL LAYER INCREASES GROUNDWATER CONNECTIVITY.

HABITAT DEPRESSION DETAIL
NOT TO SCALE

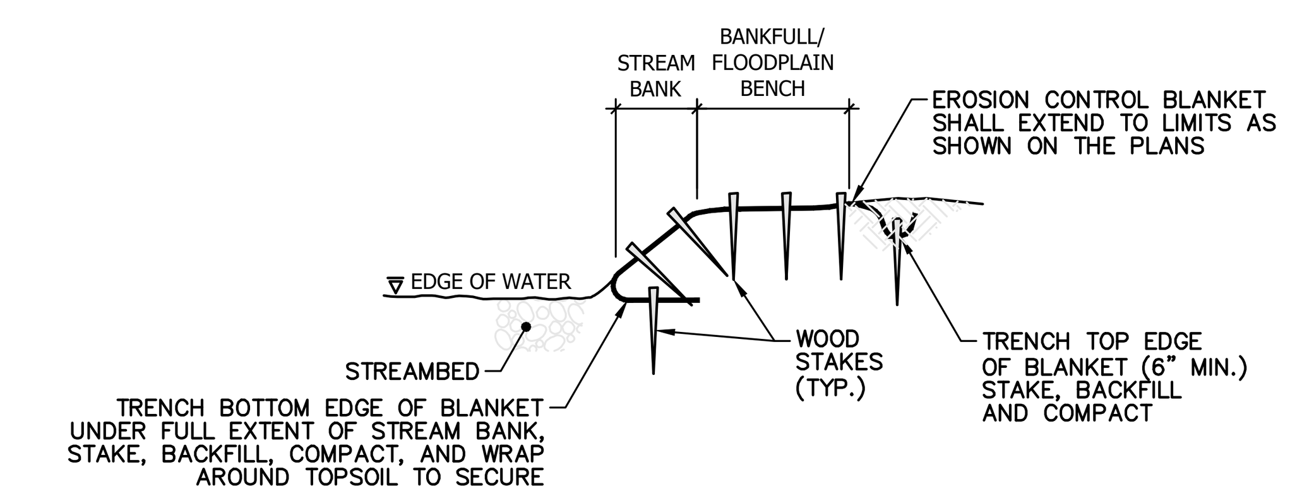
NOTES:

1. WOODY DEBRIS SHALL BE INSTALLED AT THE DIRECTION OF THE DESIGN ENGINEER. THE SIZE, FINAL LOCATION, AND ORIENTATION OF PROPOSED WOODY DEBRIS MAY VARY AND WILL BE DETERMINED BY THE DESIGN ENGINEER BASED ON SITE CONDITIONS DURING CONSTRUCTION AND AVAILABILITY OF MATERIALS.
2. WOODY DEBRIS SHALL CONSIST OF A COMBINATION OF INDIVIDUAL LOGS, ROOT WADS, AND TREE TOPS HARVESTED FROM TREES/BRUSH THAT HAS BEEN CLEARED FROM THE SITE. ALL AVAILABLE ON–SITE WOODY MATERIAL SHALL BE USED. WOODY DEBRIS SHALL NOT BE IMPORTED TO THE SITE.
3. WOODY DEBRIS HARVESTED FROM MATERIAL ON SITE SHALL BE INSTALLED IN THE GENERAL LOCATIONS SHOWN ON THE PLAN. TYPES AND SIZES OF STRUCTURES WILL BE DEPENDENT UPON AVAILABLE MATERIAL AND SHALL BE DETERMINED BY THE ENGINEER OR CONSTRUCTION MANAGER.
4. A TYPICAL 15 LINEAR FEET TOTAL OF LOG AND/OR BRANCHES SHALL BE ASSUMED FOR EACH STRUCTURE.
5. ALL WOODY DEBRIS SHALL BE BURIED WITH FILL $\frac{2}{3}$ – $\frac{3}{4}$ OF FINAL GRADE. MATERIAL MAY ALSO BE PINNED WITH UPRIGHT SNAGS OR BOULDERS SO AS NOT BE DISPLACED BY HIGH FLOWS.
9. THE CONSTRUCTED HEIGHT OF THE WOODY DEBRIS STRUCTURE SHALL NOT EXCEED HALF THE IMPOUNDED WATER ELEVATION OF THE DOWNSTREAM STRUCTURE.
10. WOODY DEBRIS AND HABITAT DEPRESSIONS SHALL BE USED IN CONJUNCTION, OR INDEPENDENTLY TO PROVIDE SURFACE ROUGHNESS, GROUNDWATER CONNECTIVITY THROUGH BASAL GRAVELS, MICROTOPOGRAHY AND HABITAT DIVERSITY.
11. NO DEBRIS OR LOGS WITH A DIAMETER OF 12" OR LESS SHALL BE USED.
12. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH AN APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN (ESPCP).
13. CHANNEL FLOW SHOULD BE DIVERTED AWAY FROM THE WORK AREA I ACCORDANCE WITH THE APPROVED ESPCP, AND THE SITE SHOULD BE DEWATERED.
14. PLACE WOODY DEBRIS STRUCTURES AT THE DESIGN DIMENSIONS, ELEVATIONS AND APPROPRIATE STRUCTURE SPACING.
15. INSTALL AND STABILIZE ANY DISTURBANCES ALONG THE STREAMBANK WITH SOIL STABILIZATION MATTING IN ACCORDANCE WITH THE SPECIFICATION.
16. REMOVE APPROVED ESPCP DEVICES UPON STABILIZATION OF THE CHANNEL IN ACCORDANCE WITH THE APPROVED PLAN.
17. AS NEEDED, SECURE WOODY DEBRIS STRUCTURE LOGS VIA DUCK BILL ANCHORS WITH A 5,000 LBS RESISTANCE ON EACH END OF THE LOG

01 WOODY DEBRIS STRUCTURE DETAIL
NOT TO SCALE

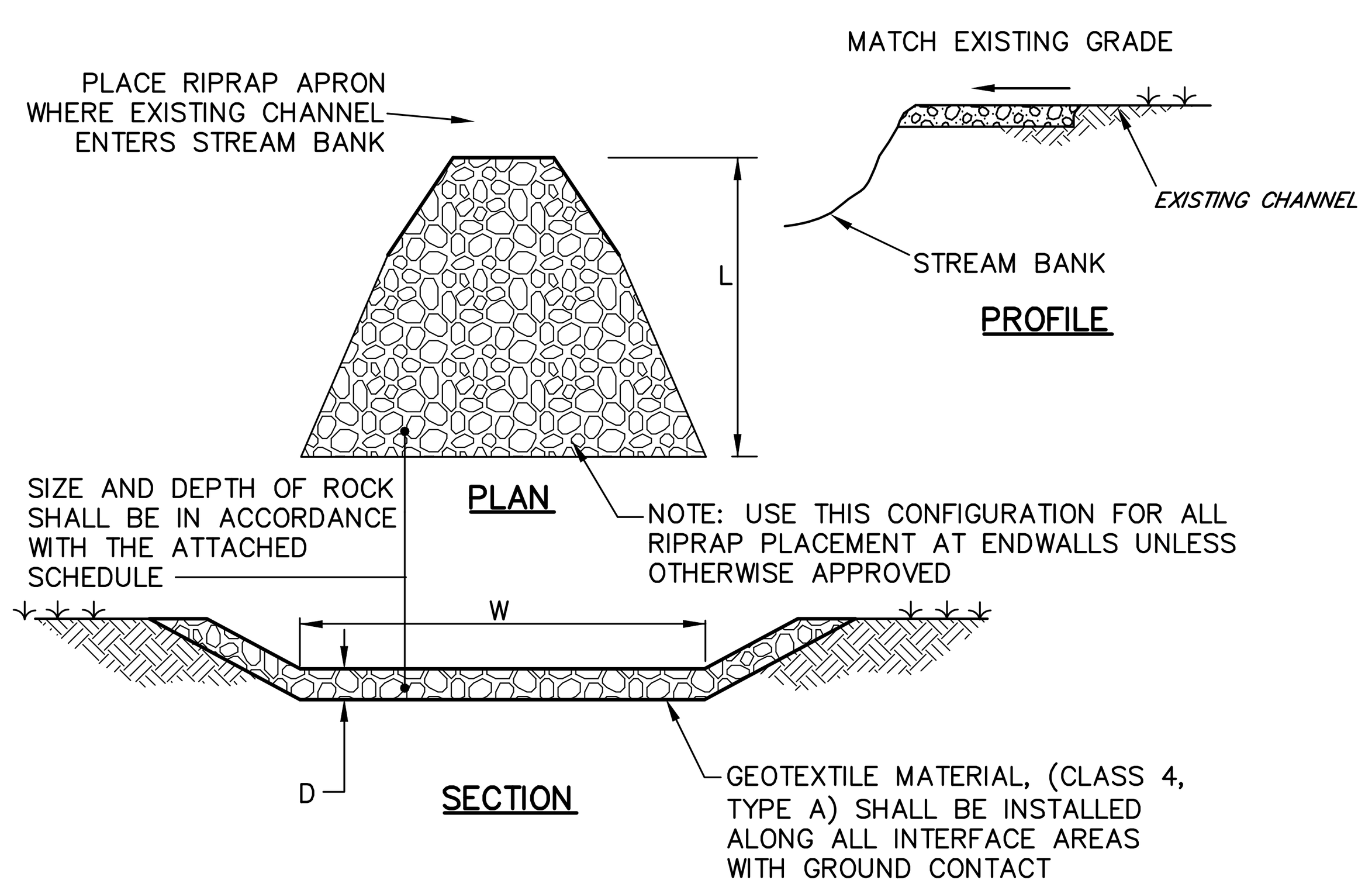


STREAM BANK INSTALLATION (PLAN VIEW)



STREAM BANK INSTALLATION (SECTION VIEW)

02 STREAM BANK MATTING STABILIZATION
NOT TO SCALE

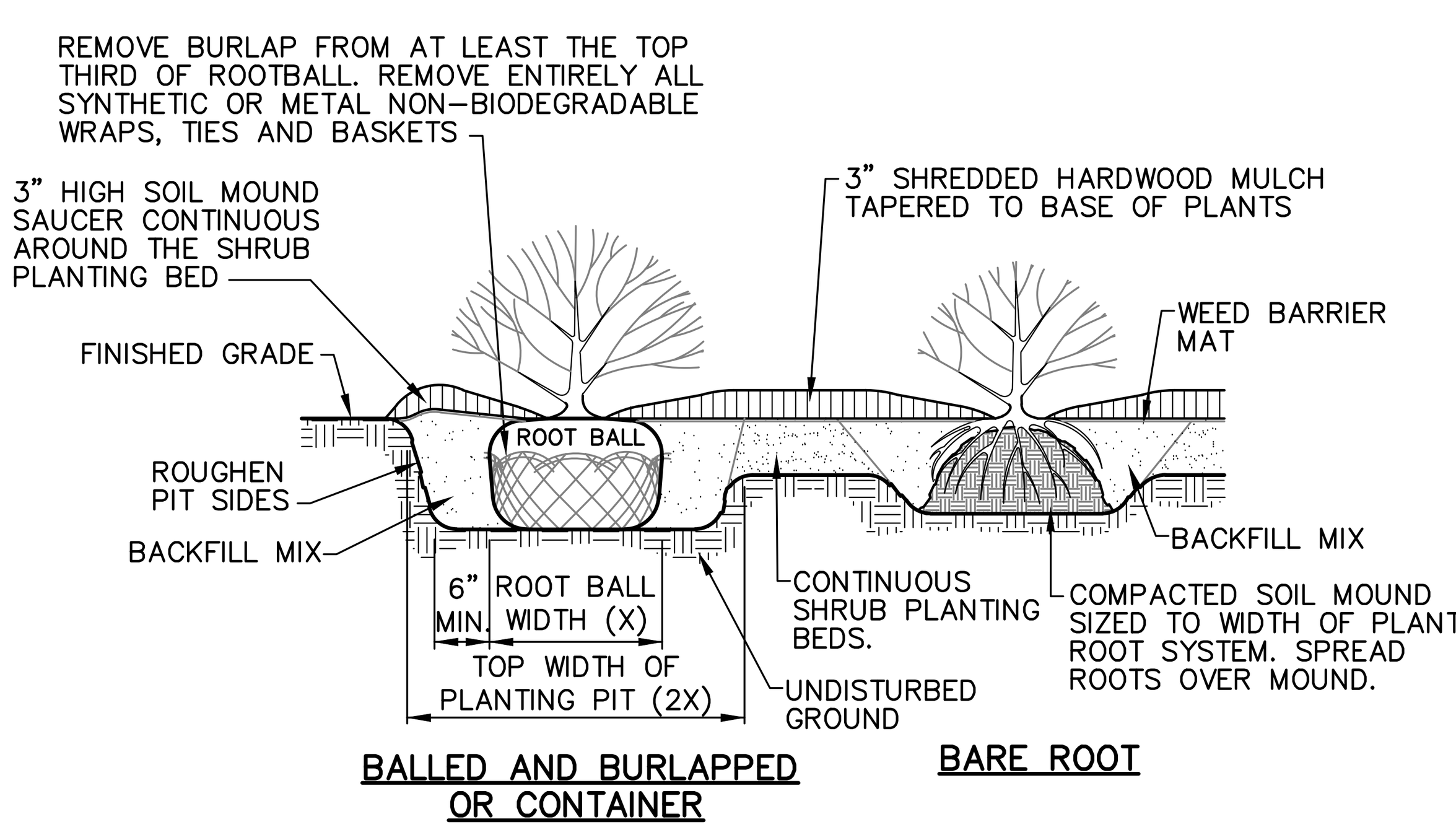


SCHEDULE				
STRUCTURE ID	LENGTH L	WIDTH W[1]	RIPRAP SIZE	DEPTH D
A.1	16'	15'	R–6	36"

NOTES:

1. CONSTRUCT ALL APRONS TO THE DIMENSIONS SHOWN. ADJUST TERMINAL WIDTHS AS NECESSARY TO MATCH RECEIVING CHANNELS.
2. EXTEND RIPRAP ON BACK SIDE OF APRON TO AT LEAST 1/2 DEPTH OF PIPE ON BOTH SIDES TO PREVENT SCOUR AROUND PIPE.
3. INSPECT ALL APRONS ON AT LEAST A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT.
4. REPLACE DISPLACED RIRPAP WITHIN THE APRON IMMEDIATELY

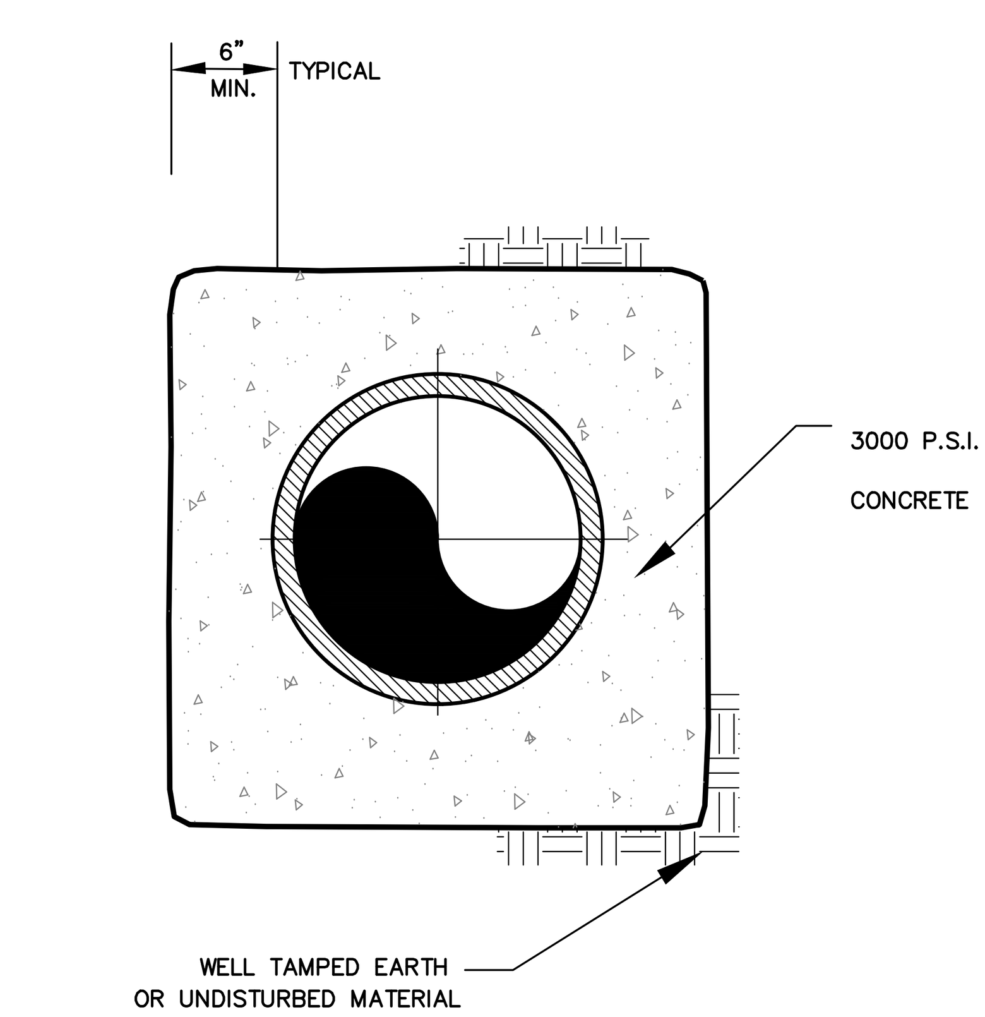
03 RIPRAP APRON DETAIL
NOT TO SCALE



NOTES:

1. SLICE ROOT MASS OF CONTAINERIZED PLANTS ALONG HEIGHT OF ROOTMASS AT 90° INTERVALS
2. PLANT MATERIAL SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO THE ORIGINAL NURSERY CONDITION.
3. BACKFILL MIX SHALL BE 3:1 RATIO OF COMPOSTED ORGANINC MATERIAL AND NATIVE SOIL AMENDED IN ACCORDANCE WITH PENNDOT PUBLICATION 408. BACKFILL SHALL BE TAMPED AND WATERED TO REMOVE VOIDS.
4. CONTINUOUS SHRUB PLANTING BEDS SHALL THOROUGHLY INCORPORATE 3" OF COMPOSTED ORGANIC MATERIAL INTO THE TOP 6" OF NATIVE SOIL AMENDED IN ACCORDANCE WITH PENNDOT PUBLICATION 408.

04 SHRUB PLANTING AND SHRUB BED PREPARATION DETAILS
NOT TO SCALE



NOTES:

1. INSTALL CONCRETE ENCASEMENT AT EXISTING SANITARY SEWER LINES AS SPECIFIED ON PLAN SET

05 CONCRETE ENCASEMENT DETAIL
NOT TO SCALE

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

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1	03/05/2025	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
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SHEET TITLE:
STREAM RESTORATION DETAIALS

SHEET: **DT-02** **20**

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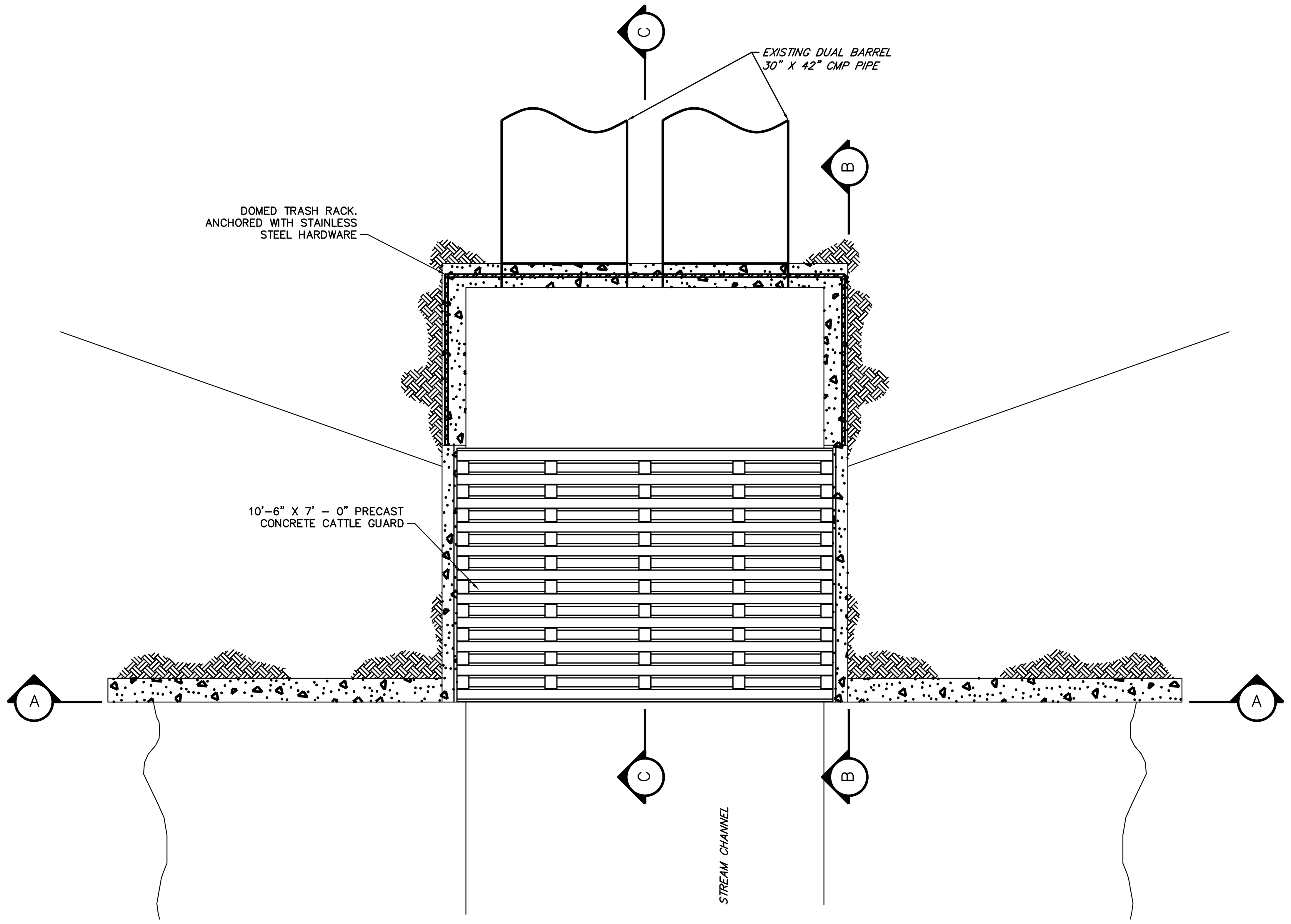
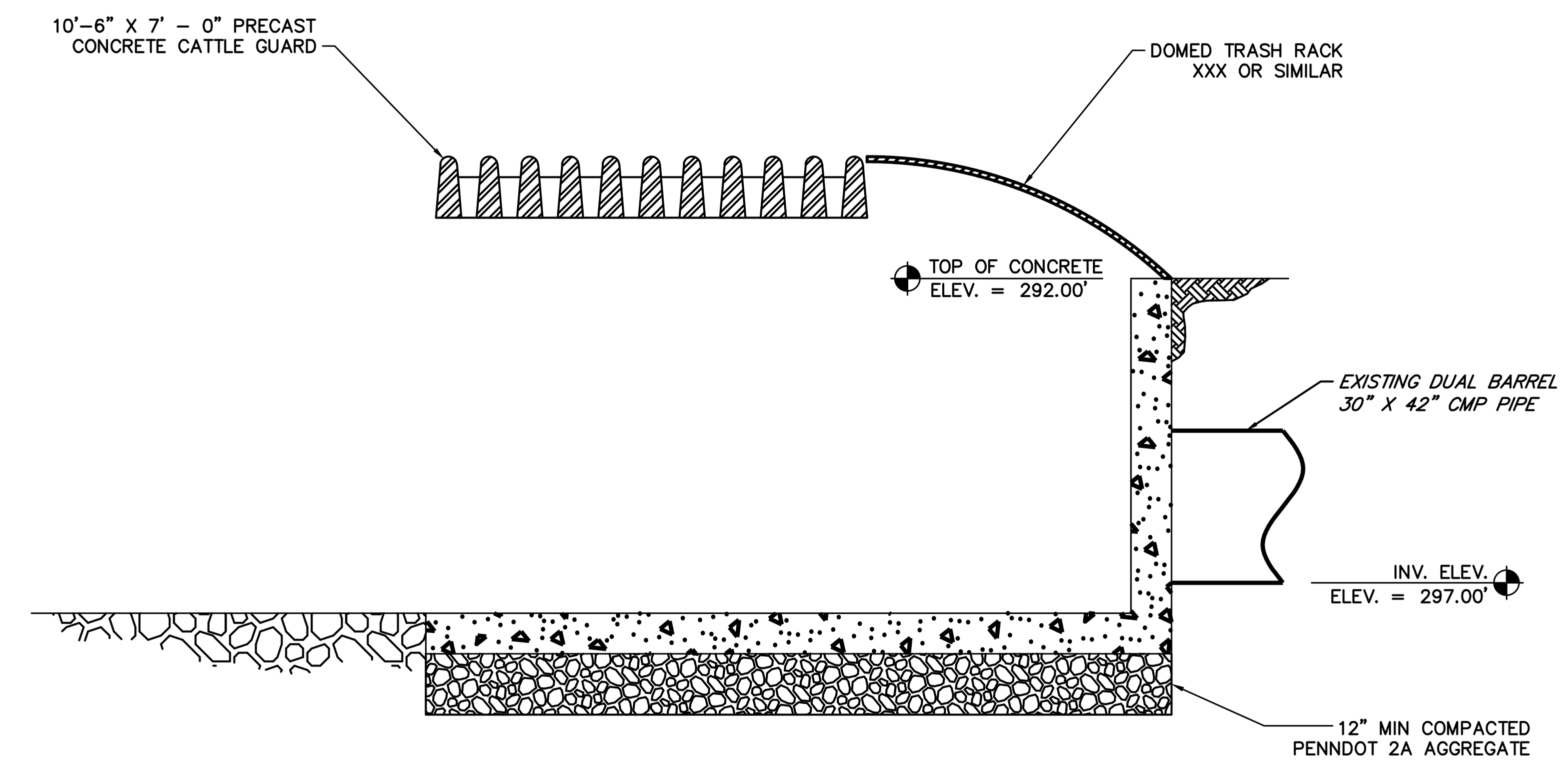


PLAN VIEW
NOT TO SCALE



SECTION VIEW C-C
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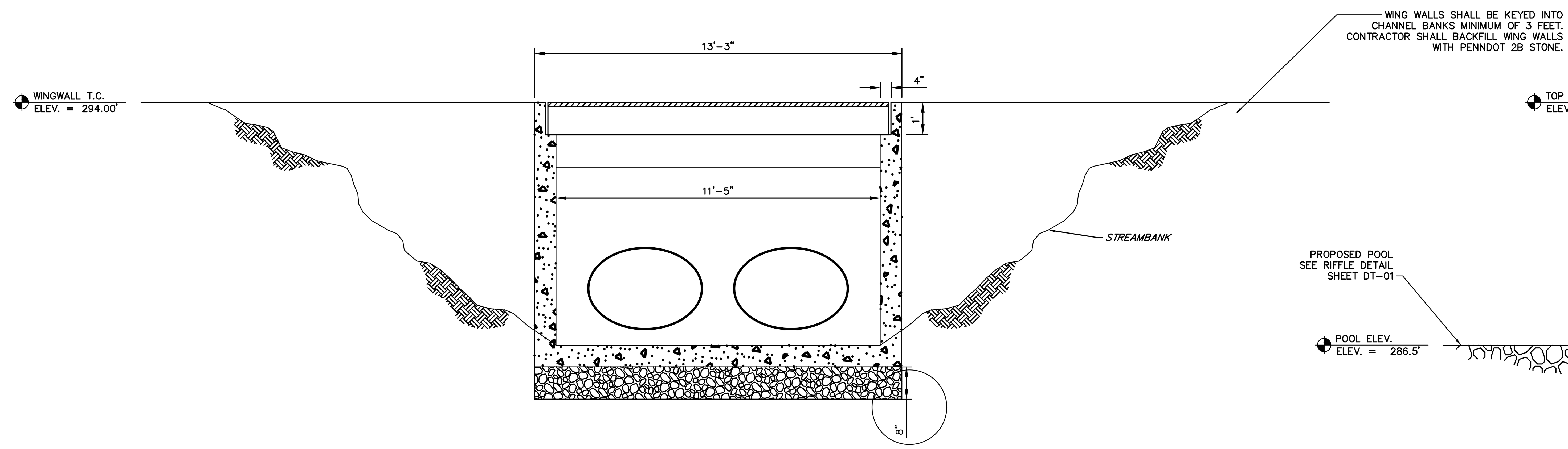

SECTION VIEW A-A
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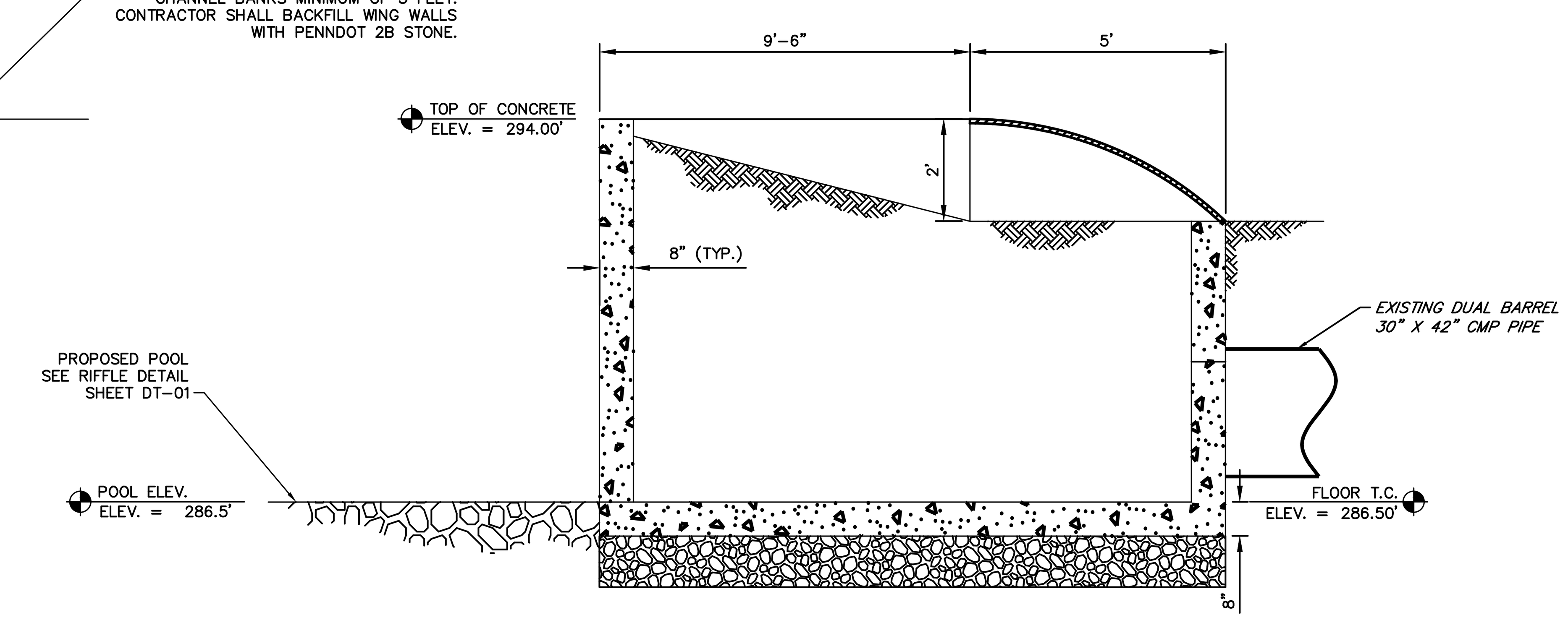

SECTION VIEW B-B
NOT TO SCALE

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BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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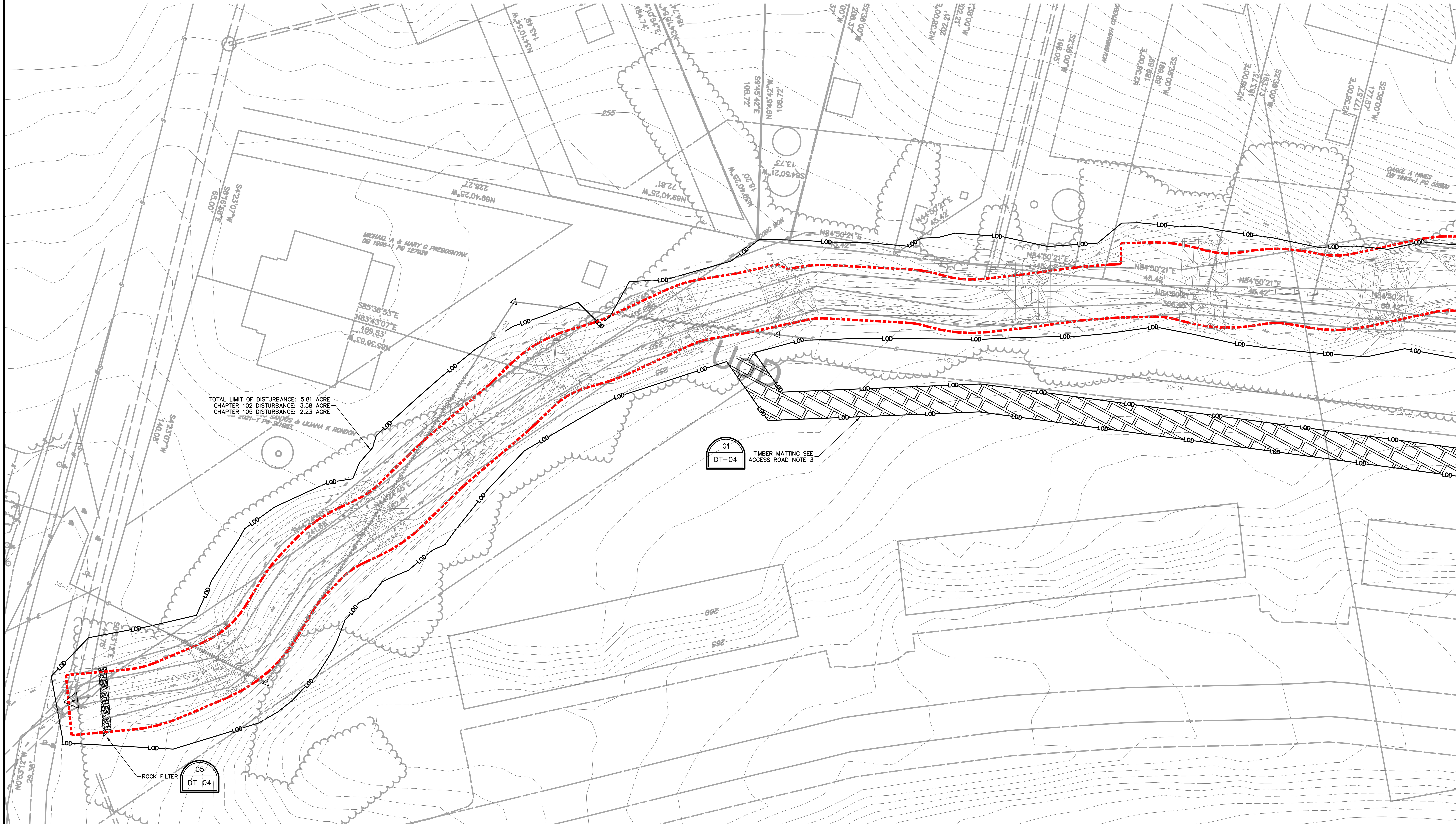
SHEET TITLE:
PRECAST ENERGY DISSIPATER DETAILS

SHEET: **DT-03** **33**



LIMIT OF DISTURBANCE LEGEND

- - - - LIMIT OF CHAPTER 105 DISTURBANCE

——LOD—— LIMIT OF DISTURBANCE

ACCESS ROAD NOTES

1. FOR ACCESS ROADS IN FIELDS, TOPSOIL IS TO BE STRIPPED, STOCKPILED AND MAINTAINED IN A CLEANLY SEGREGATED MANNER FOR RESPREADING. ACCESS ROAD SHALL HAVE PERIMETER CONTROLS APPROPRIATE TO THE SPECIFIC SITE CONDITIONS. IF POSSIBLE, CONTRACTOR SHALL USE STOCKPILED SOIL AS DIVERSION BERMS TO PREVENT CONTAMINATION.
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3. FOR SPECIFIC AREAS AS CALLED OUT ON PLANS, INSTALL TIMBER MATTING PER DETAIL ON SHEET DT-02..

GRAPHIC SCALE
20' 10' 0' 20'
SCALE: 1"=20'

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BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES D. POWELL
ENGINEER
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
EROSION CONTROL PLAN

SHEET: **ESC-01** **22**

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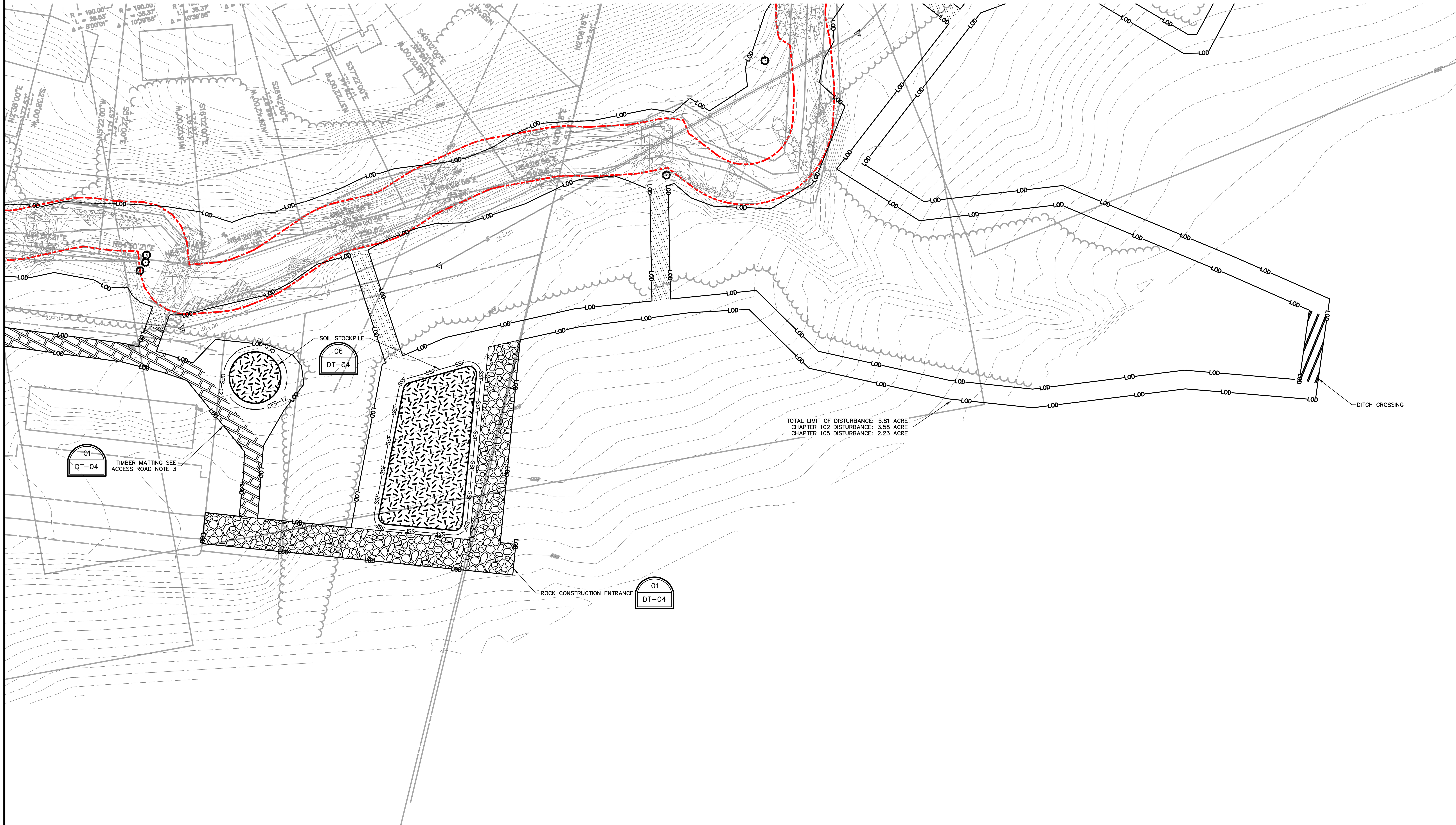

LIMIT OF DISTURBANCE LEGEND

- - - - - LIMIT OF CHAPTER 105 DISTURBANCE

——LOD—— LIMIT OF DISTURBANCE

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3. FOR SPECIFIC AREAS AS CALLED OUT ON PLANS, INSTALL TIMBER MATTING PER DETAIL ON SHEET DT-02..

GRAPHIC SCALE

20' 10' 0' 20'

SCALE: 1"=20'

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PE094717 10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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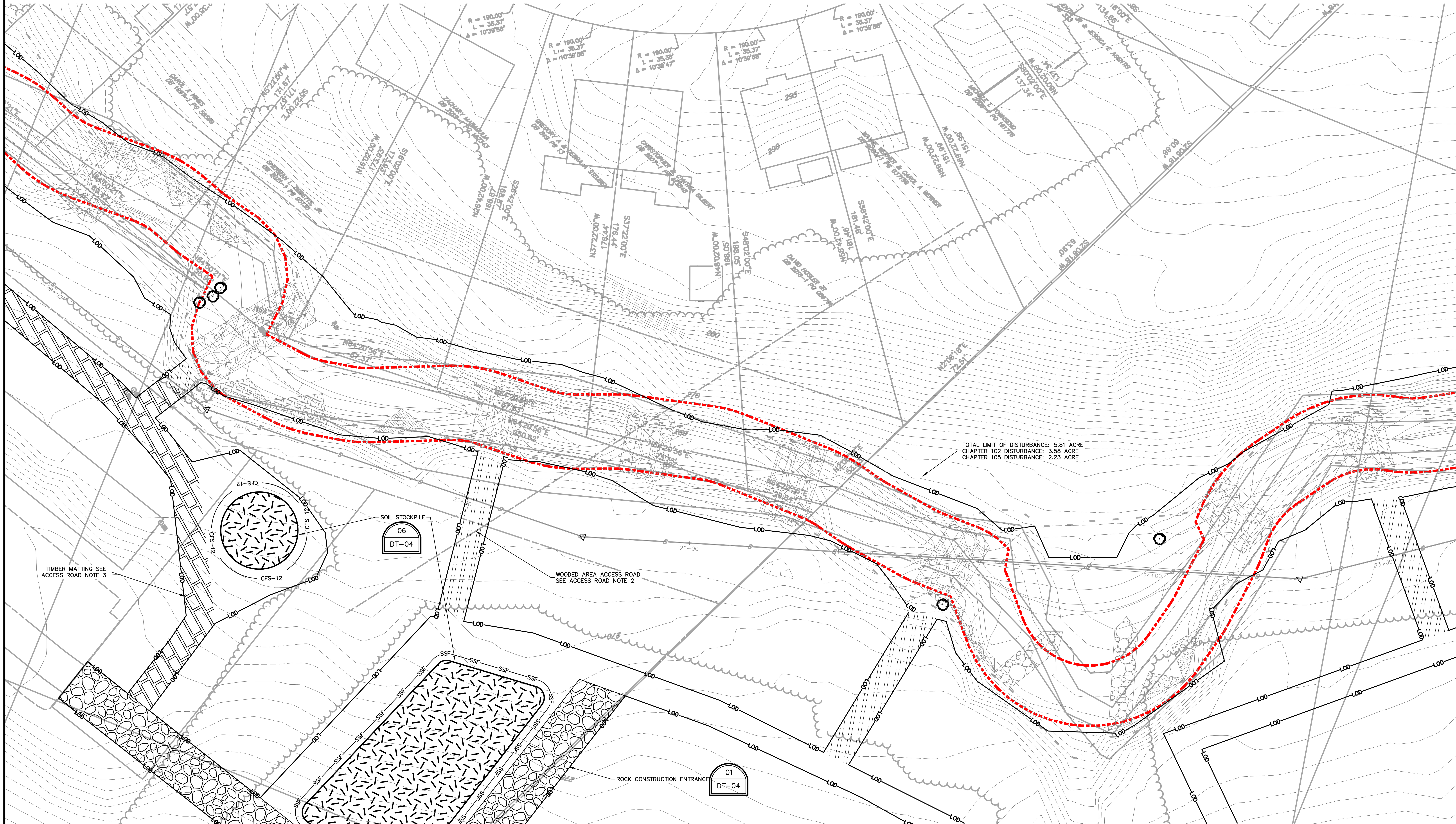
SHEET TITLE:
EROSION CONTROL PLAN

SHEET: ESC-01 | 23



LIMIT OF DISTURBANCE LEGEND

- - - - - LIMIT OF CHAPTER 105 DISTURBANCE

——LOD—— LIMIT OF DISTURBANCE

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SCALE: 1"= 20'

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JAMES D. POWELL ENGINEER PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
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DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
EROSION CONTROL PLAN

SHEET: ESC-02

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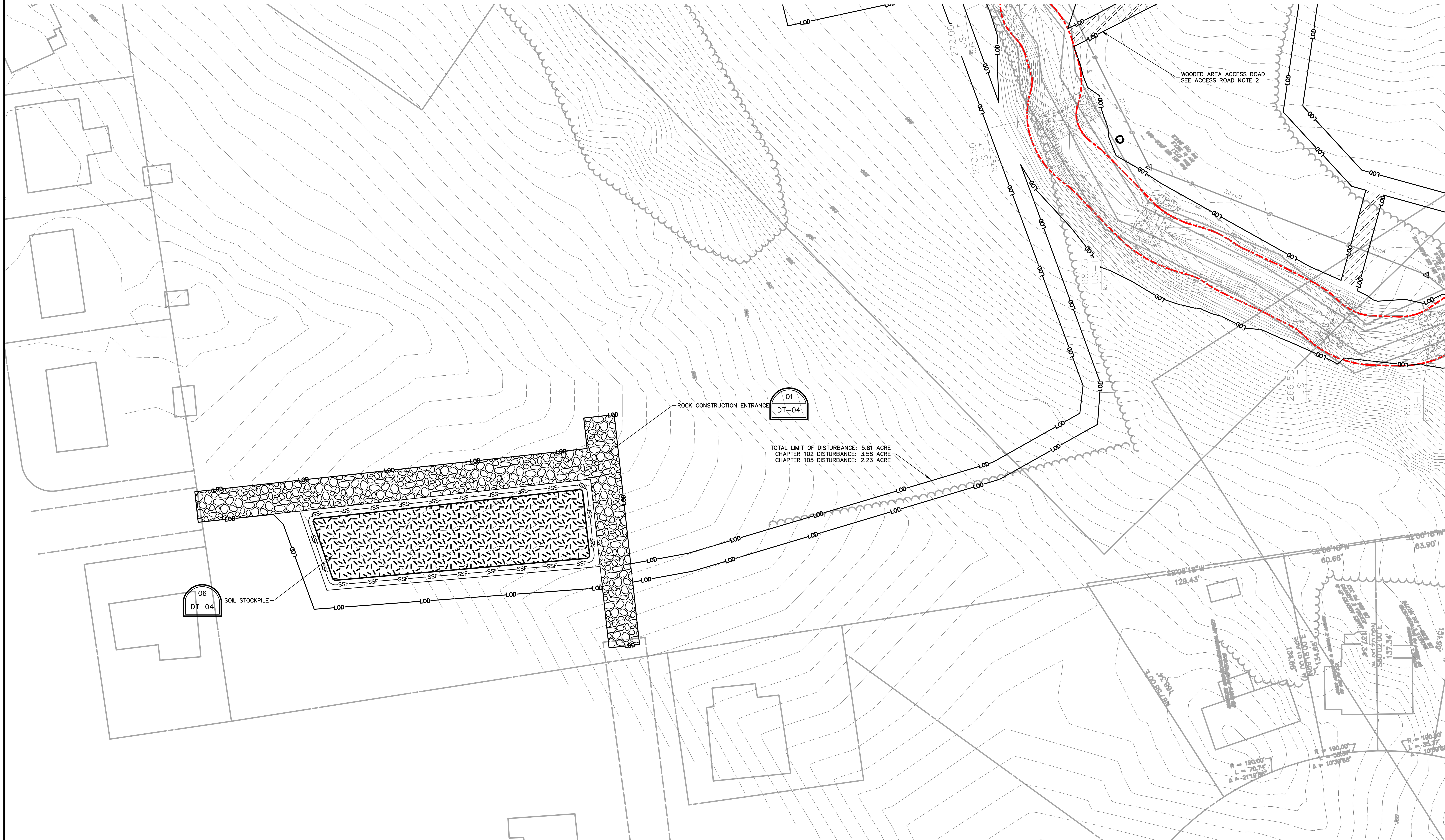
CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA



LIMIT OF DISTURBANCE LEGEND

- - - - LIMIT OF CHAPTER 105 DISTURBANCE

—LOD— LIMIT OF DISTURBANCE

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3. FOR SPECIFIC AREAS AS CALLED OUT ON PLANS, INSTALL TIMBER MATTING PER DETAIL ON SHEET DT-02..

GRAPHIC SCALE
30' 15' 0' 30'
SCALE: 1"= 30'

PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES D. POWELL
ENGINEER
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
EROSION CONTROL PLAN

SHEET: ESC-02 | 25

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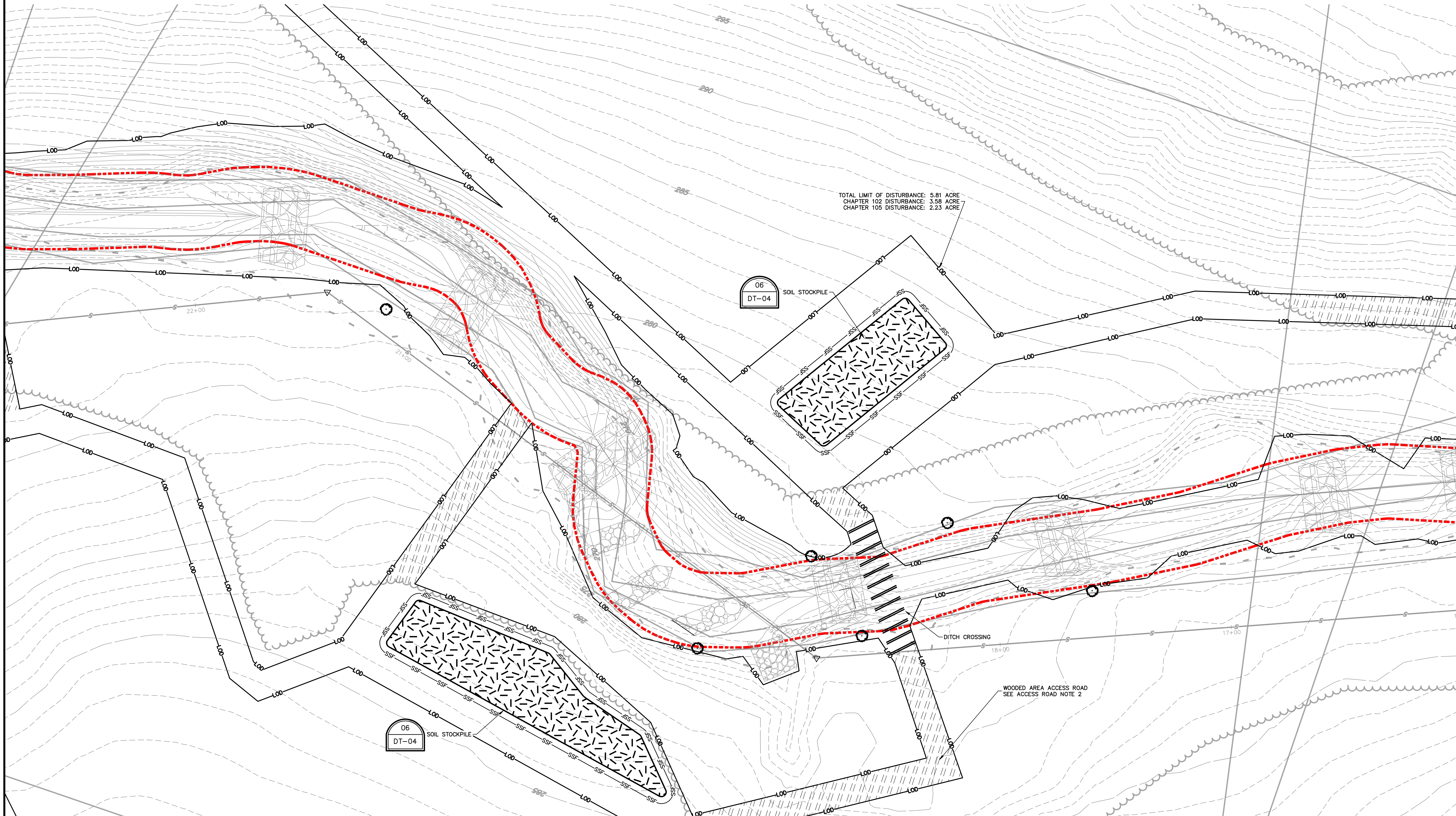

LIMIT OF DISTURBANCE LEGEND

LIMIT OF CHAPTER 105 DISTURBANCE

LOD — LIMIT OF DISTURBANCE

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GRAPHIC SCALE

20' 10' 0' 20'

SCALE: 1" = 20'

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JAMES D. POWELL ENGINEER PE094717 10/29/2025

HRG PROJECT NUMBER:	R009170.0431
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SHEET TITLE:

EROSION CONTROL PLAN

SHEET: ESC-03 | 26

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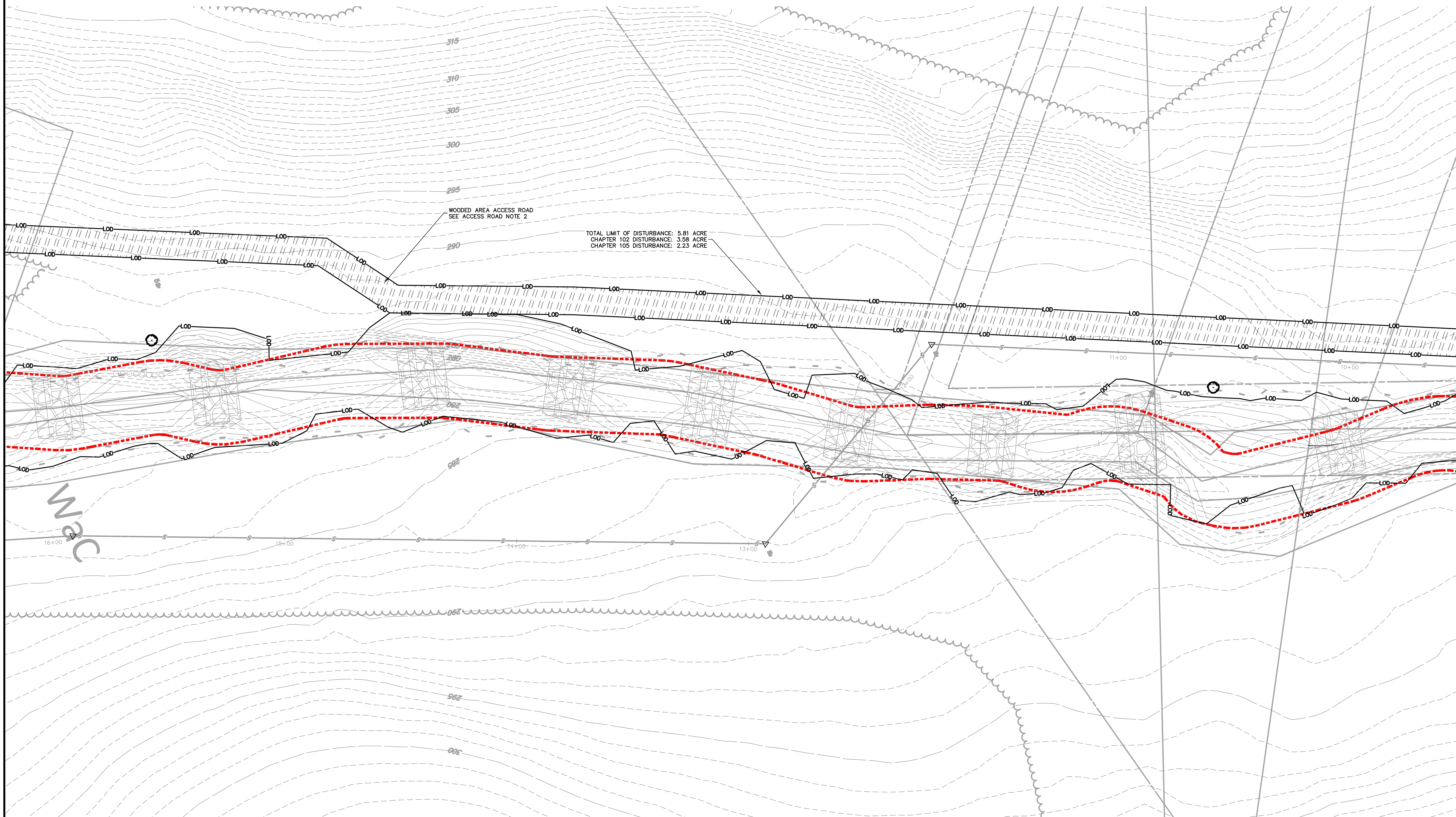

LIMIT OF DISTURBANCE LEGEND

- - - - - LIMIT OF CHAPTER 105 DISTURBANCE

—LOD— LIMIT OF DISTURBANCE

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GRAPHIC SCALE

20' 10' 0' 20'

SCALE: 1"=20'

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION

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PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES D. POWELL
ENGINEER
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
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SHEET TITLE:
EROSION CONTROL PLAN

SHEET: ESC-04 | 27

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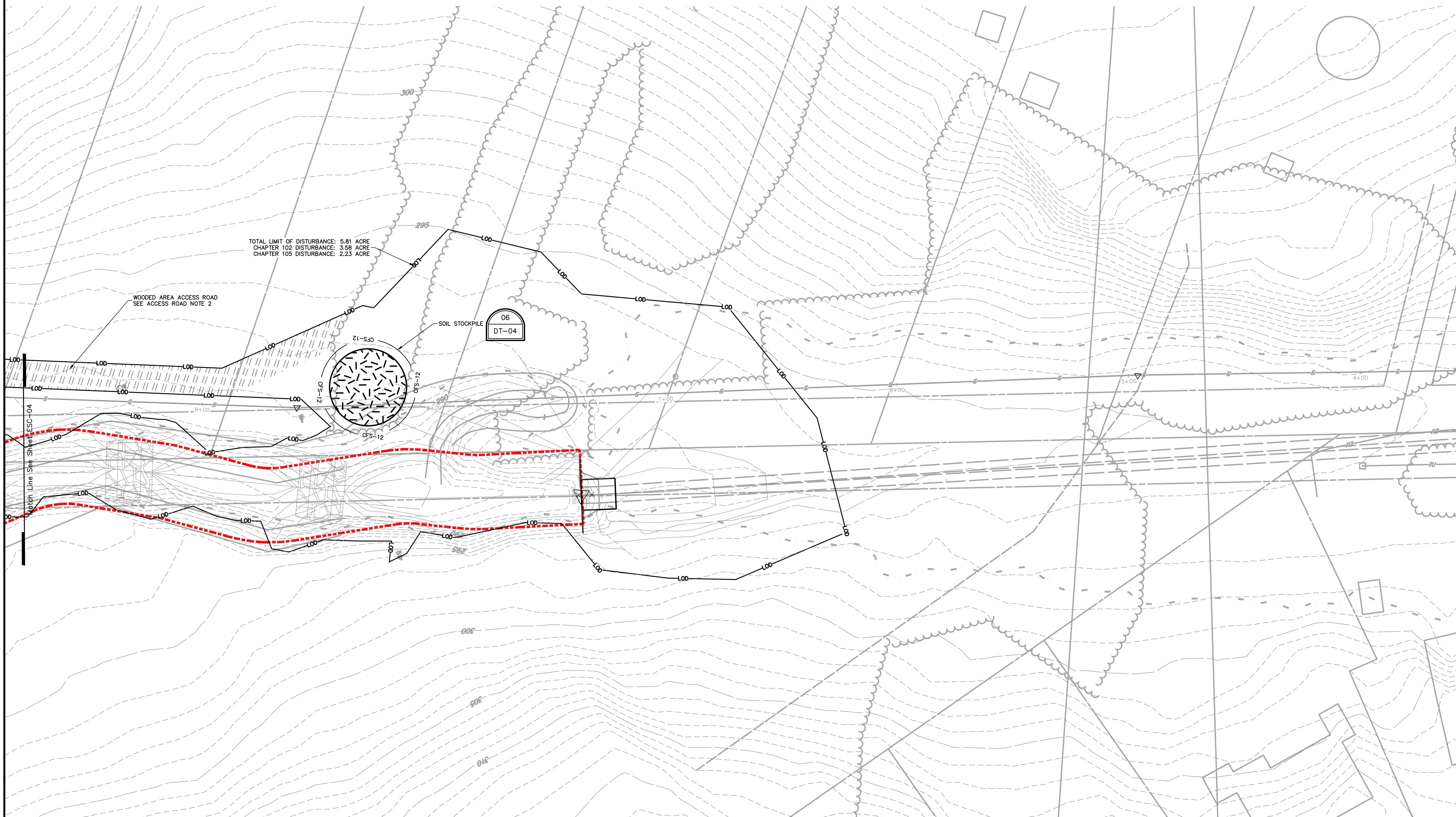

LIMIT OF DISTURBANCE LEGEND

- - - - - LIMIT OF CHAPTER 105 DISTURBANCE

——LOD—— LIMIT OF DISTURBANCE

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GRAPHIC SCALE

20' 10' 0' 20'

SCALE: 1"= 20'

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FOR
SCULAC ROAD STREAM RESTORATION

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BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JAMES D. POWELL PE094717 10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
3		
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SHEET TITLE:
EROSION CONTROL PLAN

SHEET: **ESC-05** **28**

FILE PATH & NAME: P:\0091\009170_0431\C3D\Plan Sets\CONS\RE-DESIGN 9.2025\C0091700431ESC.dwg LAYOUT:ESC-07 LAST PLOTTED:10/29/2025 11:58 AM BY:JPOWELL

GENERAL EROSION CONTROL NOTES

1. EROSION AND SEDIMENTATION CONTROLS MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE GENERAL SITE DISTURBANCE WITHIN THE TRIBUTARY AREAS OF THOSE CONTROLS.
2. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE NORTHAMPTON COUNTY CONSERVATION DISTRICT.
3. ENVIRONMENTAL DUE DILIGENCE MUST BE PERFORMED TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF A REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF CLEAN FILL".
4. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1–800–242–1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
5. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE REVIEWING AGENCY PRIOR TO IMPLEMENTATION.
6. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.
7. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.
8. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
9. CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON–WATER SOLUBLE, NON–DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE–USE.)
10. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
11. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 8 INCHES IN THICKNESS.
12. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, LARGE STONES OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
13. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
14. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
15. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
16. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENTATION CONTROL MUST BE REMOVED. AREAS DISTURBED DURING REMOVAL OF THE CONTROLS MUST BE STABILIZED.
17. VEHICLES MAY ONLY ENTER AND EXIT WITHIN THE PROJECT LIMIT OF DISTURBANCE.
18. STOCK PILE HEIGHTS MUST NOT EXCEED 35 FEET NOR SHALL THE SIDE SLOPES EXCEED 2:1. STOCK PILES SHALL BE LOCATED ON SITE BY THE CONTRACTOR AT LOCATIONS APPROVED BY THE COUNTY CONSERVATION DISTRICT.
19. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENTATION CONTROLS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENTATION CONTROLS AFTER EACH STORM EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEANOUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING, AND RENETTING MUST BE PERFORMED IMMEDIATELY.
20. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON–GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE DRAWING. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
21. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE PROPER CONSTRUCTION, STABILIZATION, AND MAINTENANCE OF ALL EROSION AND SEDIMENTATION CONTROLS AND RELATED ITEMS INCLUDED ON THIS PLAN.
22. SHOULD ANY MEASURES CONTAINED WITHIN THIS PLAN PROVE INCAPABLE OF ADEQUATELY REMOVING SEDIMENT FROM ON–SITE FLOWS PRIOR TO DISCHARGE OR STABILIZING THE SURFACES INVOLVED, ADDITIONAL MEASURES MUST BE IMMEDIATELY IMPLEMENTED BY THE APPLICANT TO ELIMINATE ALL SUCH PROBLEMS.
23. SHOULD UNFORESEEN EROSIVE CONDITIONS DEVELOP DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE ACTION TO REMEDY SUCH CONDITIONS AND TO PREVENT DAMAGE TO ADJACENT PROPERTIES AS A RESULT OF INCREASED RUNOFF AND/OR SEDIMENT DISPLACEMENT. STOCKPILES OF WOOD CHIPS, HAY BALES, CRUSHED STONE AND OTHER MULCHES SHALL BE HELD IN READINESS TO DEAL IMMEDIATELY WITH EMERGENCY PROBLEMS OF EROSION.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF EXISTING TREES AND SHRUBS TO REMAIN FROM UNNECESSARY DAMAGE.
25. A COPY OF THE APPROVED EROSION AND SEDIMENTATION CONTROL PLANS MUST BE POSTED AT THE CONSTRUCTION SITE AT ALL TIMES IN ACCORDANCE WITH THE LAWS OF THE COMMONWEALTH OF PENNSYLVANIA.
26. THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF APPENDIX 64, EROSION CONTROLS AND REGULATIONS, TITLE 25, PART 1, DEPARTMENT OF ENVIRONMENTAL RESOURCES, SUB–PART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.
27. THE EROSION AND SEDIMENT CONTROL PLAN AND PLAN NARRATIVE ARE FOR THE INSTALLATION, MAINTENANCE AND MEASURES TO CONTROL EROSION AND SEDIMENTATION ONLY. REFER TO APPROPRIATE PLAN SHEETS FOR ALL UTILITY, STORMWATER, SITE IMPROVEMENT AND OTHER CONSTRUCTION INFORMATION.
28. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REMOVAL OF ANY EXCESS MATERIAL AND MAKE SURE THE SITE(S) RECEIVING THE EXCESS HAS AN APPROVED EROSION AND SEDIMENT CONTROL PLAN THAT MEETS THE CONDITIONS OF CHAPTER 102 AND/OR OTHER STATE OR FEDERAL REGULATIONS. THE DISPOSAL SITE SHALL BE LOCATED GREATER THAN 100 FEET FROM ANY WETLAND, LOCATED OUTSIDE THE FLOODPLAIN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE APPROPRIATE CONSERVATION DISTRICT TO ENSURE THAT THE DISPOSAL SITE IS AN APPROVED FACILITY.
29. ALL BUILDING MATERIALS AND WASTES MUST BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS § AT 25 PA. CODE 260.1 ET. SEQ., § 287.1 ET. SEQ. § 271.1 ET. SEQ.. NO BUILDING MATERIAL AND OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
30. THE CONTRACTOR SHALL TAKE ALL REASONABLE STEPS TO MINIMIZE OR PREVENT ANY DISCHARGE IN VIOLATION OF THIS PERMIT WHICH HAS A REASONABLE LIKELIHOOD OF ADVERSELY AFFECTING HUMAN HEALTH OR ENVIRONMENT.
31. ALL MUD, DIRT AND DEBRIS TRACKED INTO EXISTING ROADS FROM THESE SITES SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR. WASHING OF SUCH WITH WATER SHALL NOT BE PERMITTED.
32. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT–LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.
33. ALL CHANNELS SHALL BE KEPT FREE OF OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO FILL, ROCKS, LEAVES, WOODY DEBRIS, ACCUMULATED SEDIMENT, EXCESS VEGETATION, AND CONSTRUCTION MATERIAL/WASTES.
34. UNDERGROUND UTILITIES CUTTING THROUGH ANY ACTIVE CHANNEL SHALL BE IMMEDIATELY BACKFILLED AND THE CHANNEL RESTORED TO ITS ORIGINAL CROSS–SECTION AND PROTECTIVE LINING. ANY BASE FLOW WITHIN THE CHANNEL SHALL BE CONVEYED PAST THE WORK AREA IN THE MANNER DESCRIBED IN THIS PLAN UNTIL SUCH RESTORATION IS COMPLETE.
35. ANY PLACEMENT OF CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP–001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL.
36. FOR EARTH DISTURBANCE ACTIVITIES AUTHORIZED BY A PERMIT UNDER CHAPTER 102, A PRECONSTRUCTION MEETING IS REQUIRED UNLESS THE PERMITTEE HAS BEEN NOTIFIED OTHERWISE IN WRITING BY THE DEPARTMENT OR CONSERVATION DISTRICT. THE PERMITTEE SHALL INVITE THE DEPARTMENT OR CONSERVATION DISTRICT TO ATTEND THE PRECONSTRUCTION MEETING AND PROVIDE AT LEAST 7 DAYS NOTICE OF THE PRECONSTRUCTION MEETING TO ALL INVITED ATTENDEES. PERMITTEES, CO–PERMITTEES, OPERATORS, AND LICENSED PROFESSIONALS OR DESIGNEES RESPONSIBLE FOR THE EARTH DISTURBANCE ACTIVITY, INCLUDING IMPLEMENTATION OF E&S PLANS SHALL ATTEND A PRECONSTRUCTION MEETING.
37. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE CONTRACTOR SHALL CONTACT THE APPROPRIATE REGULATORY AGENCY TO SCHEDULE A FINAL INSPECTION.

STABILIZATION NOTES

1. UPON FINAL COMPLETION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY, THE SITE SHALL IMMEDIATELY HAVE TOPSOIL RESTORED, REPLACED, OR AMENDED, SEEDED, MULCHED OR OTHERWISE PERMANENTLY STABILIZED AND PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION.
2. E&S BMPS SHALL BE IMPLEMENTED AND MAINTAINED UNTIL THE PERMANENT STABILIZATION IS COMPLETED. ONCE PERMANENT STABILIZATION HAS BEEN ESTABLISHED, THE TEMPORARY E&S BMPS SHALL BE REMOVED. ANY AREAS DISTURBED IN THE ACT OF REMOVING TEMPORARY E&S BMPS SHALL BE PERMANENTLY STABILIZED UPON COMPLETION OF THE TEMPORARY E&S BMP REMOVAL ACTIVITY.
3. FOR AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY TO BE CONSIDERED PERMANENTLY STABILIZED, THE DISTURBED AREAS SHALL BE COVERED WITH A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER, WITH A DENSITY CAPABLE OF RESISTING ACCELERATED EROSION AND SEDIMENTATION OR AN ACCEPTABLE BMP WHICH PERMANENTLY MINIMIZES ACCELERATED EROSION AND SEDIMENTATION.
4. UPON TEMPORARY CESSATION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY WHERE A CESSATION OF EARTH DISTURBANCE ACTIVITIES WILL EXCEED 4 DAYS, THE SITE SHALL BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION PENDING FUTURE EARTH DISTURBANCE ACTIVITIES.
5. FOR AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY TO BE CONSIDERED TEMPORARILY STABILIZED, THE DISTURBED AREAS SHALL BE COVERED WITH A MINIMUM UNIFORM COVERAGE OF MULCH AND SEED, WITH A DENSITY CAPABLE OF RESISTING ACCELERATED EROSION AND SEDIMENTATION OR AN ACCEPTABLE BMP WHICH TEMPORARILY MINIMIZES ACCELERATED EROSION AND SEDIMENTATION.
6. AN EROSION CONTROL BLANKET WILL BE INSTALLED ON ALL DISTURBED SLOPES 3:1 OR STEEPER, ALL AREAS OF CONCENTRATED FLOWS, AND DISTURBED AREAS WITHIN 50' OF WATERS OF THE COMMONWEALTH.
7. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES AND 6 TO 12 INCHES ON COMPACTED SOILS PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 6 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING.
8. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED.
9. ALL EARTHWORK IS TO BE ACCOMPLISHED DURING DRY WEATHER DUE TO THE EPHEMERAL NATURE OF THE TRIBUTARY. ALL DISTURBANCES SHALL BE STABILIZED BEFORE ANY EXPECTED FLOW IN THE TRIBUTARY.

MAINTENANCE PROGRAM NOTES

1. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT CONTROL BMPS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL BMPS AFTER EACH STORMWATER EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEANOUT, REPAIR, REPLACEMENT, RE–GRADING, RESEEDING, RE–MULCHING AND RE–NETTING MUST BE PERFORMED IMMEDIATELY. IF EROSION AND SEDIMENT CONTROL BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
2. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
3. THE CONTRACTOR MUST ENSURE THAT VISUAL SITE INSPECTIONS ARE CONDUCTED WEEKLY, AND AFTER EACH MEASURABLE STORMWATER EVENT BY QUALIFIED PERSONNEL, TRAINED AND EXPERIENCED IN EROSION AND SEDIMENT CONTROL, TO ASCERTAIN THAT THE EROSION AND SEDIMENT CONTROL (E&S) BMPS ARE OPERATIONAL AND EFFECTIVE IN PREVENTING POLLUTION TO THE WATERS OF THE COMMONWEALTH. A WRITTEN REPORT OF EACH INSPECTION SHALL BE KEPT, AND INCLUDE:
   - 3.A. A SUMMARY OF THE SITE CONDITIONS, E&S BMPS, AND COMPLIANCE; AND
   - 3.B. THE DATE, TIME, AND THE NAME OF THE PERSON CONDUCTING THE INSPECTION.
4. IF BMPS ARE FOUND TO BE INOPERATIVE OR INEFFECTIVE DURING AN INSPECTION, OR ANY OTHER TIME, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE DISTRICT. DOCUMENTATION SHOULD INCLUDE WHAT STEPS ARE BEING TAKEN TO REDUCE, ELIMINATE AND PREVENT RECURRENCE OF THE PROBLEM.
5. ANY SEDIMENT REMOVED FROM BMPS DURING CONSTRUCTION WILL BE RETURNED TO UPLAND AREAS ON SITE AND INCORPORATED INTO THE SITE GRADING.
6. ANY SILT SOCK THAT HAS BEEN UNDERMINED OR TOPPED MUST BE REPLACED WITH FILTER OUTLETS IMMEDIATELY.
7. ANY SEDIMENT REMOVED FROM BMPS DURING CONSTRUCTION WILL BE RETURNED TO UPLAND AREAS ON SITE AND INCORPORATED INTO THE SITE GRADING.

CONSTRUCTION SEQUENCE

1. COPY OF THE APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES.
2. AT LEAST SEVEN (7) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE CONTRACTOR SHALL INVITE ALL OPERATORS INVOLVED IN THE ACTIVITIES, THE LANDOWNERS, ALL APPROPRIATE MUNICIPAL OFFICIALS, AND REPRESENTATIVES FROM ANY OTHER AGENCY.
3. NOTIFY PA ONE–CALL SYSTEM AT 1–800–242–1776 AT LEAST 3 OR MORE DAYS PRIOR TO GROUND DISTURBANCE ACTIVITIES.
4. ALL EARTH DISTURBANCE SHALL PROCEED IN ACCORDING WITH THE FOLLOWING SEQUENCE. EACH STAGE SHALL BE COMPLETED AND IMMEDIATELY STABILIZED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED ONLY TO THOSE AREAS DESCRIBED IN EACH STAGE. TOPSOIL SHALL BE STOCKPILED IN THE AREAS DESIGNATED ON THE PLAN DRAWING AND IMMEDIATELY STABILIZED. ALL AREAS MUST BE STABILIZED IMMEDIATELY UPON REACHING FINAL GRADE.
5. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO ELIMINATE THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION.
6. PRIOR TO CONSTRUCTION, DELINEATE THE LIMITS OF DISTURBANCE AND EXTENT OF WETLANDS WITH SURVEY STAKES, FLAGGING, OR ORANGE CONSTRUCTION FENCING.
7. AN INSPECTION OF THE LOD AND CLEARING LIMITS IS TO BE CONDUCTED WITH THE ENGINEER PRIOR TO COMMENCEMENT OF ACTIVITIES. UNLESS OTHERWISE NOTED. EXISTING MATURE TREES AND VEGETATION SHALL BE PROTECTED TO THE GREATEST EXTENT POSSIBLE.
8. ALL ACCESS TO THE WORK AREA SHALL BE ACCESSED FROM THE DESIGNATED ACCESS POINTS MARKED ON THE PLANS.
9. AT THE END OF EACH CONSTRUCTION DAY, STABILIZE ANY DISTURBED AREAS. ALL STOCKPILED EXCAVATED MATERIAL SHALL BE HAULED OFFSITE AT THE END OF EACH WORKDAY TO AN APPROVED STOCKPILING LOCATION LOCATED OUTSIDE OF THE FLOODPLAIN OF ANY WATERWAY.
10. CLEARING IS TO COMMENCE ONLY IN THE IMMEDIATE VICINITY OF PROPOSED GRADING TO LIMIT EARTH DISTURBANCE WITHIN THE CHANNEL TO GREATEST EXTENT POSSIBLE. CLEARING THAT MUST PROCEED PRIOR TO GRADING WORK REQUIRES STUMPS BE CUT AND REMAIN IN PLACE UNTIL PROPOSED GRADING WORK OCCURS IN THAT AREA. ANY DISTURBANCE IS TO BE STABILIZED IMMEDIATELY.
11. INSTALL UPPER PORTION OF E&S AND ACCESS ROADS FROM LEHIGH AVE. TO MAIN CHANNEL STREAM CROSSING LOCATED AT APPROXIMATELY STREAM STATION 17+25. DO NOTE PROCEED PAST THIS STREAM CROSSING TO CONSTRUCT CHANNEL UNTIL REMAINING PORTION OF E&S PLAN AND ACCESS HAS BEEN INSTALLED.
12. BEGINNING AT UPPER LIMITS OF RESTORATION PLANS, SET–UP DEWATERING PRACTICE, DEMO AND PREPARED SUBGRADE AROUND PROPOSED DROP STRUCTURE. ALL CONSTRUCTION DEBRIS CREATED FROM DEMO OF EXISTING STRUCTURE SHALL BE PROMPTLY REMOVED FROM SITE AND DEPOSED OF AT AN APPROVED FACILITY.
13. PREP TWIN PIPES AND INSTALL THE PRE–CAST DROP STRUCTURE. PRIOR TO MOVING ON GRADE RETENTION BERM AND CATCHMENT AREA UPSTREAM OF STRUCTURE. ALL EARTH DISTURBANCE SHALL BE STABILIZED IMMEDIATELY AFTER INSTALLATION OF THE DROP STRUCTURE.
14. INSTALL PROPOSED SINKHOLE PROTECTION IN ACCORDANCE WITH DETAILS AND IMMEDIATELY STABILIZE THE AREA.
15. RESET DEWATERING AND COFFERDAMS FROM STATION 28+00 DOWNSTREAM TO STATION 21+47. BEGIN CONSTRUCTION OF PROPOSED CHANNEL GRADING AND STRUCTURE INSTALLATION IN A DOWNSTREAM FASHION.
16. UPON COMPLETION OF THIS SECTION PERMANENTLY STABILIZE ALL COMPLETED AREAS. REMOVE STOCKPILED MATERIALS ASSOCIATED WITH UPSTREAM WORK BUT MAINTAIN ACCESS ROADS UNTIL SUBSTANTIAL COMPLETION OF PROJECT.
17. RESET DEWATERING SETUP FROM 21+47 UPSTREAM OF MAINSTREAM CROSSING AT STATION 17+25. PROCEED WITH INSTALLATION OF CHANNEL RESTORATION PLAN FROM 21+47 TO 17+25 IN DOWNSTREAM FASHION.
18. ONCE COMPLETE PERMANENTLY STABILIZE ALL WORK IN THIS SECTION. STREAM CROSSING IS TO BE MAINTAINED THROUGH REMAINDER OF CONSTRUCTION.
19. INSTALL THE REMAINDER OF PROPOSED E&S PLAN AND ACCESS TO APPROXIMATELY STATION 8+50. INSTALL THE RCE FROM THE APARTMENT PARKING LOT, BUT DO NOT INSTALL TIMBER MAT ACCESS ROAD UNTIL LATER.
20. PROCEED WITH IMPLEMENTATION OF CHANNEL RESTORATION PLAN IN DEWATERING SET–UP IN PLACE BETWEEN STATION 17+25 TO 15+50. AFTER WORK IS COMPLETE IMMEDIATELY IMPLEMENT ALL PERMANENT STABILIZATION MEASURES.
21. INSTALL CONCRETE ENCASEMENT OF THE SANITARY SEWER LINE IN THIS REACH AS PRESCRIBED ON PLANS AND BACKFILL PRIOR TO FINAL GRADING.
22. RE–SET DEWATERING CONTROL FROM STATION 15+50 DOWNSTREAM TO APPROXIMATELY 13+25. INSTALL CHANNEL RESTORATION PLAN IN DOWNSTREAM FASHION. IMMEDIATELY AFTER IMPLEMENTATION OF PROPOSED CONDITIONS PERMANENTLY STABILIZE ALL DISTURBED AREAS IN THIS SECTION.
23. RESET DEWATERING CONTROL FROM STATION 13+25 TO APPROXIMATELY STATION 8+50. PROCEED WITH IMPLEMENTATION OF PROPOSED CHANNEL RESTORATION PLANS IN DOWNSTREAM FASHION. ONCE COMPLETE PERMANENTLY STABILIZE ALL DISTURBED AREAS IN THIS SECTION.
24. PRIOR TO PROCEEDING WITH DOWNSTREAM RESTORATION CLEAN UP AND REMOVE ALL STOCKPILED MATERIALS ASSOCIATED WITH PRIOR WORK AND DISPOSE OF AT AN APPROVED FACILITY.
25. INSTALL THE TEMPORARY TIMBER MAT ACCESS ROAD AS PROPOSED TO ACCESS STREAM WORK FROM SECTIONS 8+50 TO 4+00. INSTALL BLAZE ORANGE CONSTRUCTION FENCE IMMEDIATELY TO PREVENT PEDESTRIAN ACCESS TO THE WORK AREAS.
26. PERFORM SELECT TREE REMOVAL OF TRIPLE SYCAMORES PRIOR TO DISTURBING ANY OF THE STREAM RESTORATION GRADING AREA. REMOVE OR STOCKPILE MATERIALS APPROPRIATE TO CONTRACTOR MATERIAL PLANNING.
27. ONCE SELECT REMOVAL OF TRIPLE SYCAMORES IS COMPLETE, PROCEED WITH PROPOSED CHANNEL RESTORATION WORK FROM 8+50 THROUGH 4+00 IN DOWNSTREAM FASHION. PERMANENTLY STABILIZE ALL DISTURBED AREAS IMMEDIATELY AFTER IMPLEMENTATION.
28. RE–SET DEWATERING AND FINISHED PROPOSED RESTORATION CONSTRUCTION FROM 4+50 TO 0+00.
29. IMPLEMENT SANITARY SEWER ENCASEMENT ACTIVITIES AND BACKFILL PRIOR TO FINAL GRADING. PERMANENTLY STABILIZE ALL AREAS THROUGHOUT CHANNEL RESTORATION AREA.
30. SCHEDULE A SUBSTANTIAL SITE INSPECTIONS WITH ENGINEER AND ADDRESS AND DEFICIENCIES PRIOR TO REMOVAL OF E&S AND ACCESS ROADS.
31. AT ACCEPTANCE OF STREAM RESTORATION REMOVE ALL STOCKPILED MATERIALS AND PROCEED WITH INSTALLATION OF THE FINAL LANDSCAPE PLAN. PRIOR TO INSTALLATION OF LANDSCAPE PLAN REVIEW SITE AND PLANTING AREAS WITH THE ENGINEER.
32. ONCE FINAL LANDSCAPE HAS BEEN INSTALLED PROCEED WITH REMOVAL OF E&S AND ACCESS ROADS TO RESTORE TEMPORARY ACCESS AREAS TO ORIGINAL CONDITION. ANY MULCH OR TIMBER MATS NEED TO BE REMOVED FROM SITE AND DISPOSED OF IN AN APPROVED MANNER.
33. ANY ACCESS ROADS IN AGRICULTURAL FIELDS MUST BE INSPECTED FOR COMPACTION AND RIPPED TO RESTORE SOIL CONDITIONS TO PRE–CONSTRUCTION STATE.
34. STABILIZE ALL ACCESS ROADS IN ACCORDANCE WITH PLANS AND DEMOBILIZE FROM SITE.

SOIL LIMITATIONS

SOIL NAME	CUTBACKS CAVE	CORROSIVE TO CONCRETE \ STEEL*	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE \ SEASONAL HIGH WATER TABLE	HYDRIC\HYDRIC INCLUSIONS	LOW STRENGTH \ LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK–SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
WASHINGTON	X	S				X	X	X	X	X		X	X	X		

SOIL LIMITATION RESOLUTIONS

LIMITATION	RESOLUTION
CUTBANKS CAVE	CONDUCT TRENCHING OPERATIONS IN ACCORDANCE WITH OSHA TECHNICAL MANUAL FOR TRENCHING. STABILIZE BANKS IMMEDIATELY WITH SEED, MULCH, EROSION CONTROL MATS, BONDED FIBER MATRIX, OR A COMBINATION OF THESE AND/OR OTHER METHODS.
CORROSIVE TO CONCRETE OR STEEL	PROTECT CONCRETE AND STEEL WITH PROTECTIVE COATINGS, SELECT ALTERNATIVE MATERIALS IN LIEU OF CONCRETE OR STEEL, OR A COMBINATION OF THESE AND OR OTHER METHODS.
DROUGHTY	SELECT VEGETATIVE SPECIES TOLERANT TO DRY CONDITIONS, IRRIGATE VEGETATED AREAS, OR IMPLEMENT COMBINATIONS OF THESE AND/OR OTHER METHODS.
EASILY ERODIBLE	PROVIDE TEMPORARY OR PERMANENT CHANNEL LINING, DECREASE CHANNEL GRADE, INCREASE CHANNEL WIDTH, SELECT VEGETATION WITH A GREATER RETARDANCE, SELECT PERMANENT LININGS OTHER THAN GRASSES, OR IMPLEMENTING COMBINATIONS OF THESE AND/OR OTHER METHODS.
DEPTH TO SATURATED ZONE \ SEASONAL HIGH WATER TABLE \ WETNESS \ HYDRIC SOILS	SELECT VEGETATIVE SPECIES TOLERANT TO WET CONDITIONS, TILE VEGETATED AREAS, OR IMPLEMENT COMBINATIONS OF THESE AND/OR OTHER METHODS. UTILIZE PUMPED WATER FILTER BAGS TO DEWATER DISTURBED AREAS DURING CONSTRUCTION.
LOW STRENGTH \ LANDSLIDE PRONE	LOCATE ROADWAYS TO OTHER SOIL TYPES, IMPORT OTHER SOILS FOR THESE ROADWAY CONSTRUCTION, OR IMPLEMENT A COMBINATION OF THESE AND/OR OTHER METHODS. FOR CUT/FILL SLOPES, REDUCE SLOPE, INSTALL EROSION CONTROL MATTING, OR IMPLEMENT A COMBINATION OF THESE AND/OR OTHER METHODS.
SLOW PERCOLATION	LOCATE INFILTRATION FACILITIES TO ANOTHER SOIL TYPE, RESTRICT CONSTRUCTION TRAFFIC AT THOSE LOCATIONS, TILL SOIL IN THOSE LOCATIONS, ADD SOIL AMENDMENTS SUCH AS COMPOST AT THOSE LOCATIONS.
PIPING	IMPORT OTHER SOIL FOR EMBANKMENTS OF SEDIMENT BASINS, SEDIMENT TRAPS, STORM WATER RETENTION BASINS AND STORM WATER DETENTION BASINS, LOCATE THOSE FACILITIES ON OTHER SOIL TYPES, LIMIT EMBANKMENT SLOPE STEEPNESS, OR IMPLEMENT COMBINATIONS OF THESE AND/OR OTHER METHODS.
POOR SOURCE OF TOPSOIL	IDENTIFY AND RESOLVE CHARACTERISTICS THAT RENDER THE SOIL TYPES POORLY SUITED AS TOPSOIL. PERFORM SOIL TESTS TO DETERMINE THE REQUIRED SOIL AMENDMENTS AND APPLICATION RATES. IDENTIFY SOILS ON–SITE THAT ARE ADEQUATE SOURCES OF TOPSOIL AND STOCKPILE THESE FOR USE DURING RESTORATION.
FROST ACTION	IMPORT OTHER SOIL FOR EMBANKMENTS OF SEDIMENT BASINS, SEDIMENT TRAPS, STORM WATER RETENTION BASINS AND STORM WATER DETENTION BASINS, LOCATE THOSE FACILITIES ON OTHER SOIL TYPES, DO NOT CONSTRUCT EMBANKMENTS DURING PERIODS PRONE TO FROST, OR IMPLEMENT COMBINATIONS OF THESE AND/OR OTHER METHODS.
SHRINK–SWELL	LOCATE FACILITIES THAT MAY BE SUSCEPTIBLE TO DAMAGE FROM SHRINK OR SWELLING TO ANOTHER SOIL TYPE, IMPORT OTHER SOILS FOR THESE FACILITIES, OR IMPLEMENT COMBINATION OF THESE AND/OR OTHER METHODS.
POTENTIAL SINKHOLE	LOCATE SEDIMENT BASINS, SEDIMENT TRAPS, STORM WATER RETENTION BASINS AND STORM WATER DETENTION BASINS ON THER TYPES OF SOIL, LINE RESERVOIR ARES WITH IMPERMEABLE LININGS, LIMIT STANDING WATER DEPTHS, LIMIT RETENTION TIMES, AND IMPLEMENT COMBINATIONS OF THESE AND/OR OTHER METHODS.

SOILS

UoB – URBAN LAND–DUFFIELD COMPLEX, 0 TO 8 PERCENT SLOPES – HSG B
UoD – URBAN LAND–DUFFIELD COMPLEX, 8 TO 25 PERCENT SLOPES – HSG B
WaC – WASHINTON SILT LOAM, 8 TO 15 PERCENT SLOPES – HSG B

HRG

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

JAMES D. POWELL
PE094717
James D Powell
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
3		
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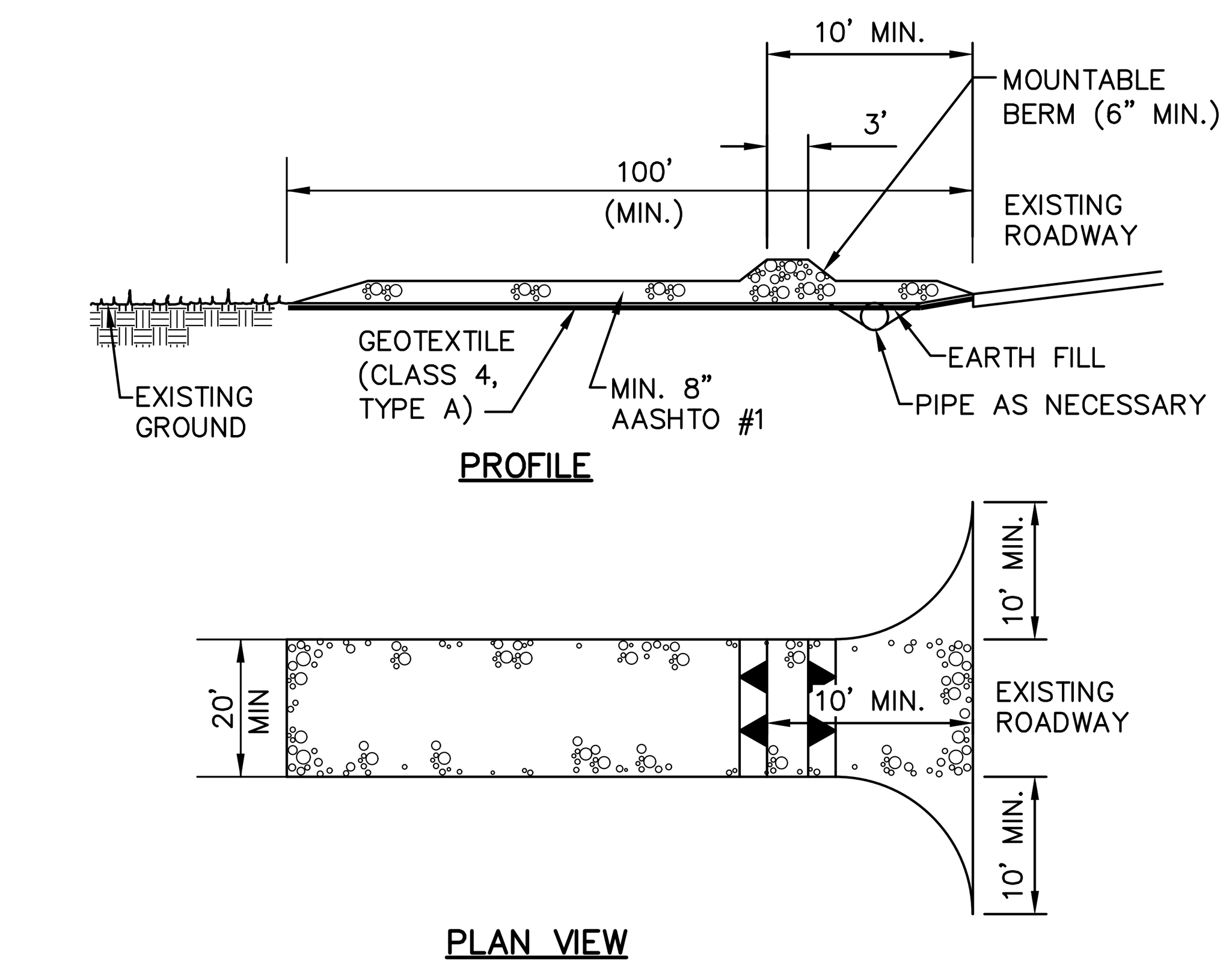
SHEET TITLE:
EROSION
CONTROL NOTES

SHEET: NT-01 29

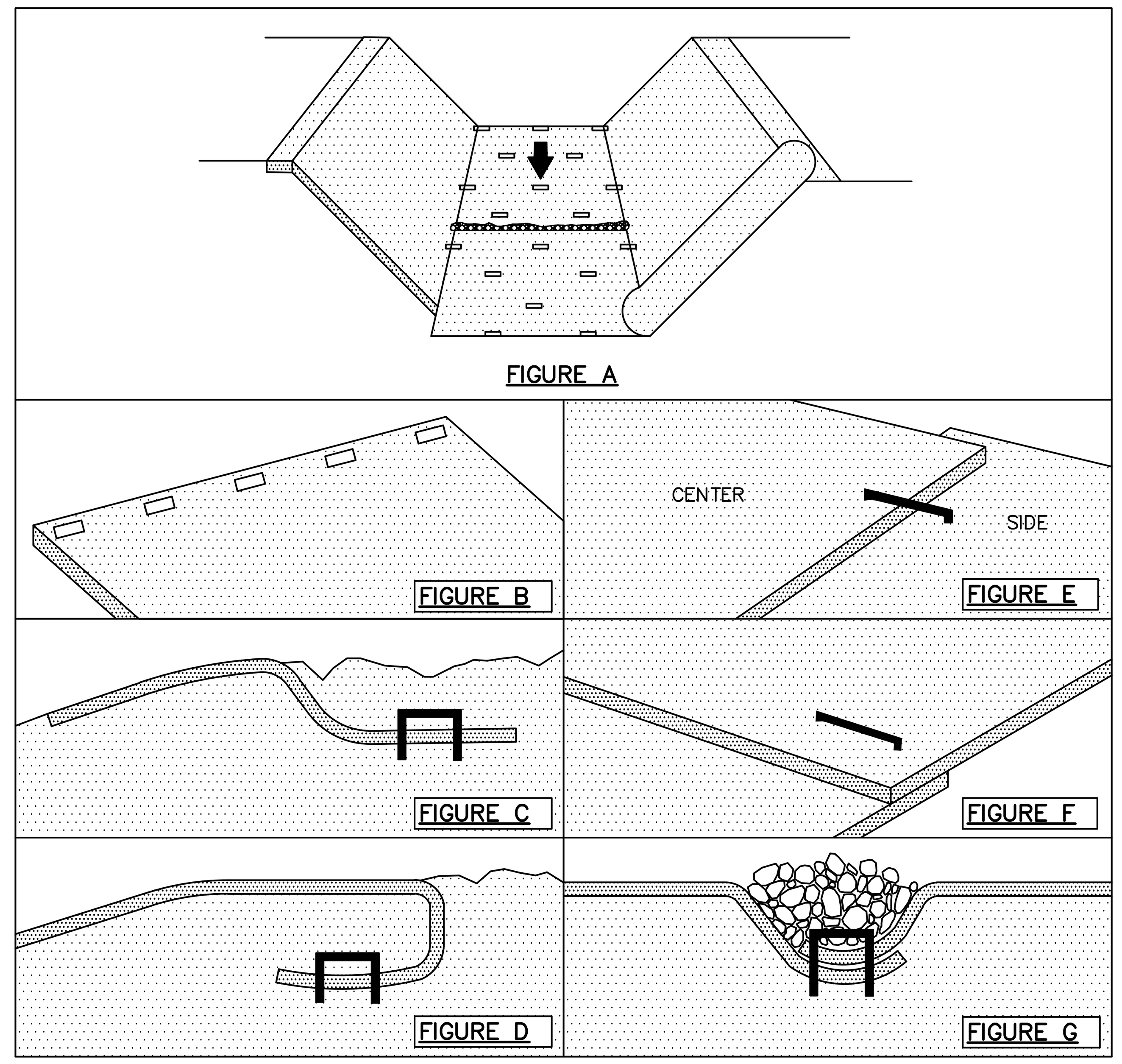
FILE PATH & NAME: P:\0091\009170_0431\C3D\Plan Sets\CONS\RE-DESIGN 9.2025\C0091700431NT.dwg LAYOUT:NT-01 LAST PLOTTED:10/29/2025 11:58 AM BY:JPOWELL



NOTES:
1. TOPSOIL SHOULD BE REMOVED PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE.
2. EXTEND ROCK OVER FULL DISTANCE OF ENTRANCE.
3. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
4. MOUNTABLE BERM SHOULD BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED. PIPE TO BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
5. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50' INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL A WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE WAYS IS NOT ACCEPTABLE.

01 ROCK CONSTRUCTION ENTRANCE

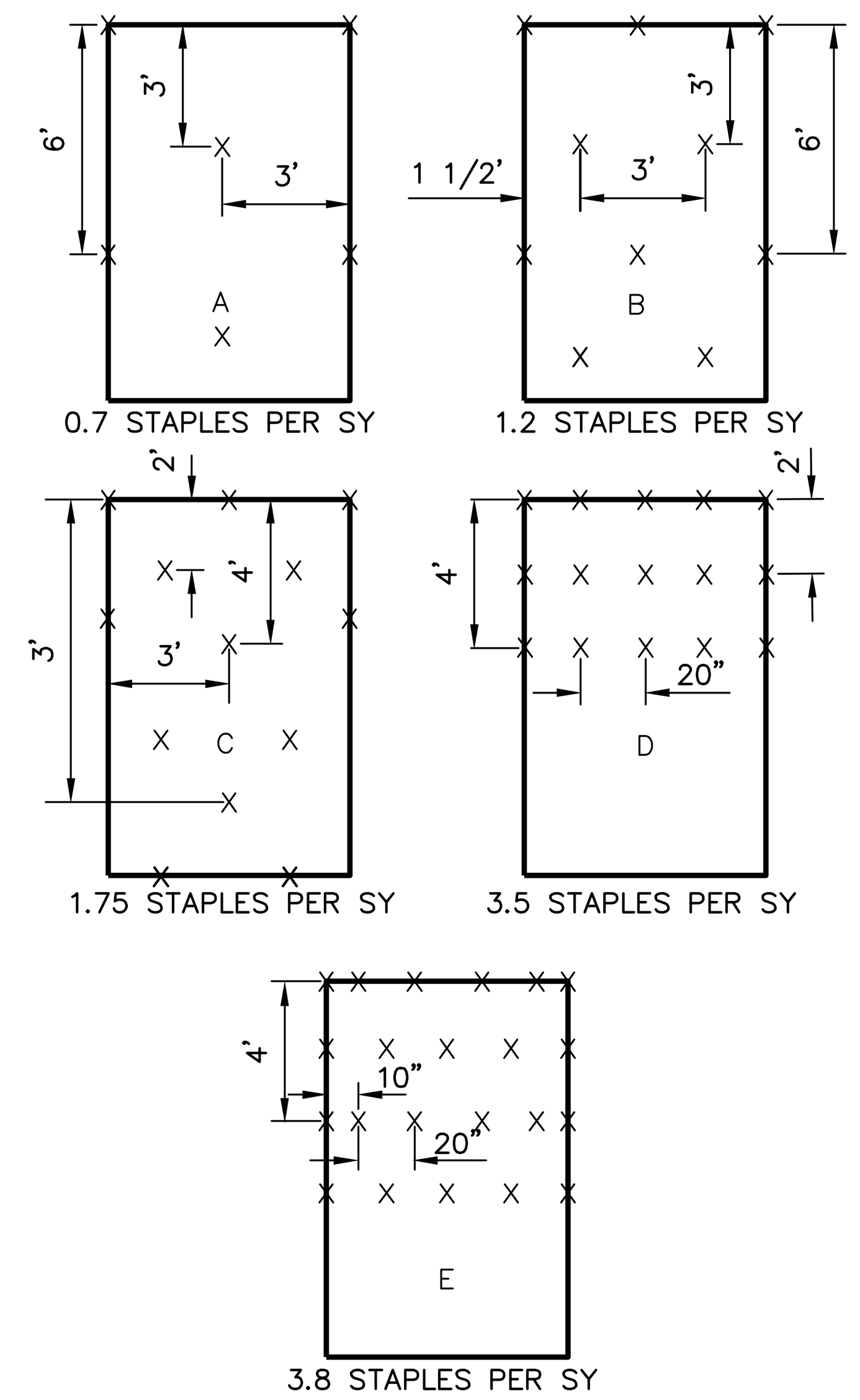
NOT TO SCALE



NOTES
1. GRADE AND CONTOUR CHANNEL. APPLY FERTILIZER AND SEED PRIOR TO INSTALLING BLANKETS.
2. ANCHOR BLANKETS AT TOP OF CHANNEL (FIG. C OR FIG. D). BACKFILL WITH CHECK SLOT MATERIAL (FIG. G). FOR CULVERT OUTFALLS, PLACE BLANKET UNDER PIPE AT LEAST 12" UP STREAM FROM PIPE OPENING.
3. INSTALL A BLANKET IN THE CENTER OF THE CHANNEL, IN THE DIRECTION OF WATER FLOW (FIG. A). ADDITIONAL BLANKETS ARE INSTALLED AT THE EDGES OF THIS CENTERED BLANKET.
4. CONSTRUCT CHECK SLOTS WITH SOIL, GRAVEL OR STONE IN THE MIDDLE AND AT THE END OF EACH BLANKET (FIG. G).
5. OVERLAP SIDE CHANNEL BLANKET EDGES +6" OVER THE CENTER CHANNEL BLANKET AND STAPLE (FIG. E)
6. ANCHOR THE TOP EDGE OF SIDE BLANKETS (FIG. C).
7. ANCHOR THE TERMINAL ENDS OF BLANKETS IN A CHECK SLOT ACCORDING TO FIG. G.

02 EROSION CONTROL BLANKET IN CHANNEL

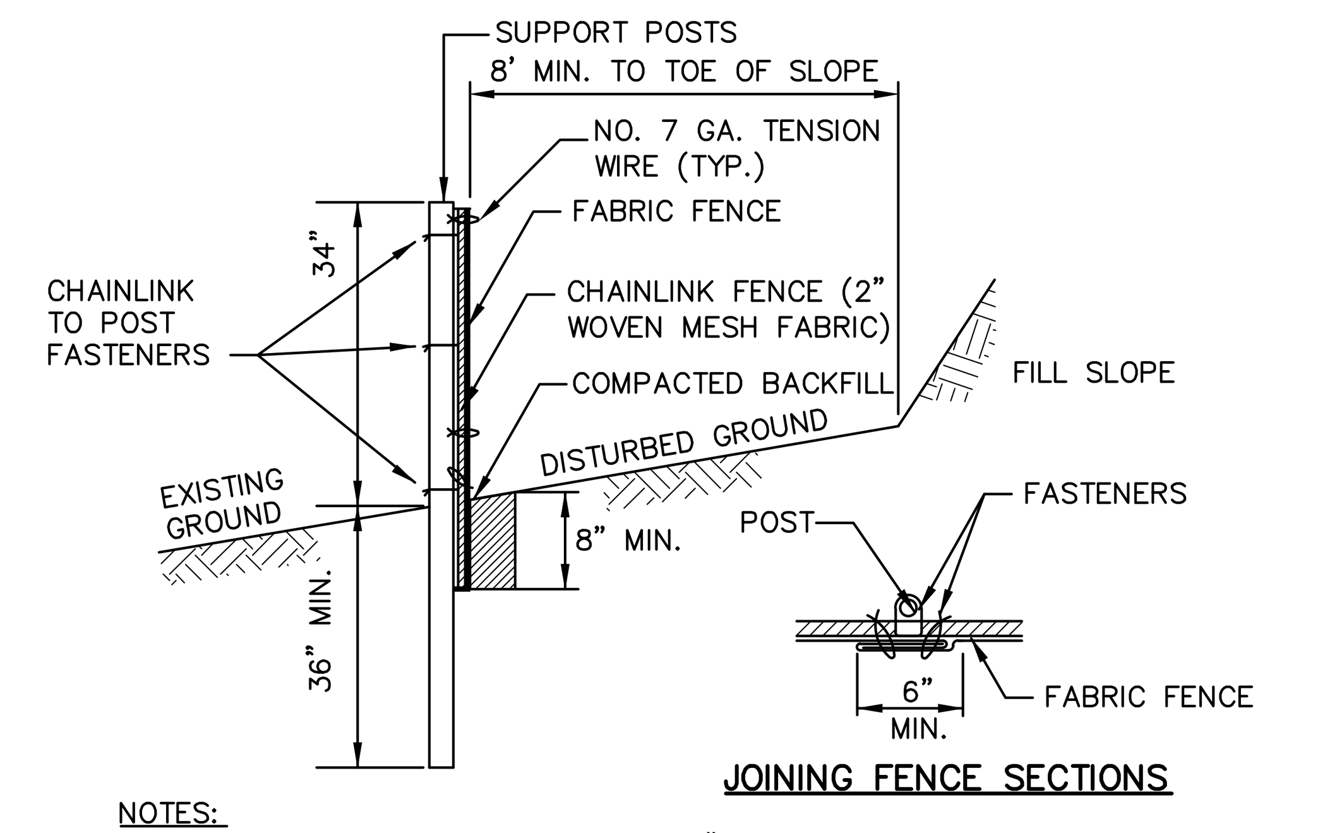
NOT TO SCALE



NOTES:
1. STAPLE PATTERN INDICATED IS FOR USE WITH SPECIFIED MATTING ONLY. CONSULT MANUFACTURER FOR PATTERN SHOULD AN ALTERNATE MATTING BE USED.
2. INCREASED STAPLE RATES MAY BE NECESSARY DEPENDING UPON SITE CONDITIONS. CONSULT MANUFACTURER FOR SPECIFIC RECOMMENDATIONS.

STAPLE PATTERN GUIDE

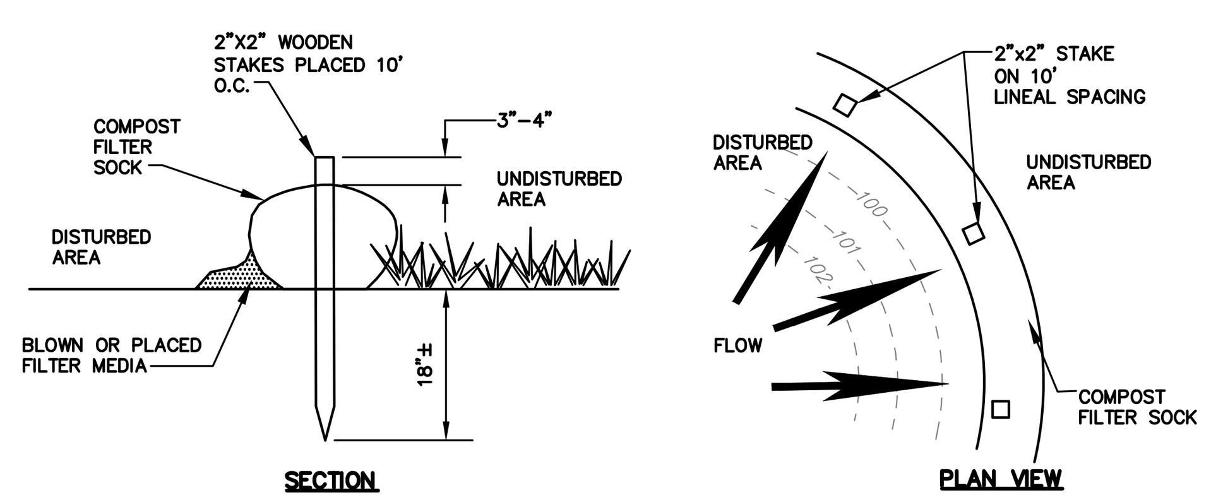
NOT TO SCALE



NOTES:
1. FILTER FABRIC WIDTH SHALL BE 42" MINIMUM.
2. POSTS SHALL BE INSTALLED USING A POSTHOLE DRILL. POSTS SPACED AT 10' MAX. USE 2 1/2" DIA. HEAVY DUTY GALVANIZED OR ALUMINUM POSTS.
3. CHAINLINK TO POST FASTENERS SPACED AT 14" MAX. USE NO. 9 GA. ALUMINUM WIRE OR NO. 9 GA. GALVANIZED STEEL PRE-FORMED CLIPS. CHAINLINK TO TENSION WIRE FASTENERS SPACED AT 60" MAX. USE NO. 13.5 GA. GALVANIZED STEEL WIRE. FABRIC TO CHAIN FASTENERS SPACED AT 24" MAX. C.C.
4. CHAINLINK SHALL BE GALVANIZED NO. 11.5 GA. STEEL WIRE WITH 2 1/4" OPENING, NO. 11 GA. ALUMINUM COATED STEEL WIRE IN ACCORDANCE WITH ASTM-A-491, OR GALVANIZED BI, 9 GA. STEEL WIRE TOP AND BOTTOM WITH GALVANIZED NO. 11 GA. STEEL INTERMEDIATE WIRES. NO. 7 GA. TENSION WIRE INSTALLED HORIZONTALLY THROUGH HOLES AT TOP AND BOTTOM OF CHAINLINK FENCE OR ATTACHED WITH HOG RINGS AT 5' (MAX.) CENTERS.
5. FILTER FABRIC FENCE MUST BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8' UPSLOPE AT 45' TO MAIN BARRIER ALIGNMENT.
6. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.
7. FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.
8. SILT FENCE FABRIC MUST MEET PA DEP SPECIFICATIONS AS SHOWN IN THE CURRENT EROSION AND SEDIMENT CONTROL BMP MANUAL.
9. ADHERE TO ANY MANUFACTURER'S AND DEP RECOMMENDATIONS FOR REPLACING FILTER FABRIC FENCE DUE TO WEATHERING.

03 SUPER SILT FENCE DETAIL

NOT TO SCALE



NOTES:
1. ALL MATERIAL TO MEET PADEP SPECIFICATIONS.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8' UP SLOPE AT 45° TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED PADEP SPECIFICATIONS.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND PROPERLY DISPOSED.
5. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

TABLE 4.1
COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS

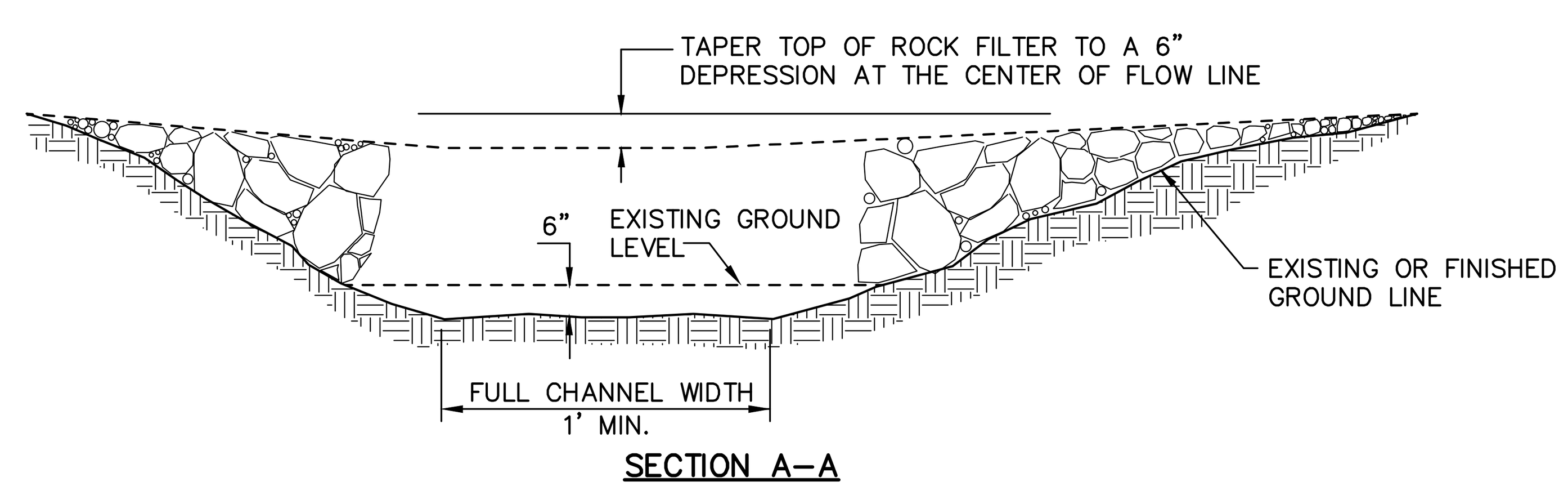
MATERIAL TYPE	3 MIL HDPE	5 MIL HDPE	5 MIL HDPE	MULTI-FILAMENT POLYPROPYLENE (MFPP)	HEAVY DUTY MULTI-FILAMENT POLYPROPYLENE (HDMFPP)
MATERIAL CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	1/8"
TENSILE STRENGTH		26 psi	26 psi	44 psi	202 psi
ULTRAVIOLET STABILTY % ORIGINAL STRENGTH (ASTM G-155)	23% at 1000 HR.	23% at 1000 HR.		100% at 1000 HR.	100% at 1000 HR.
MINMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS
TWO-PLY SYSTEMS					
INNER CONTAINMENT NETTING			HDPE BIAXIAL NET CONTINUOUSLY WOUND FUSION-WELDED JUNCTURES 3/4" X 3/4" MAX. APERTURE SIZE		
OUTER FILTRATION MESH			COMPOSITE POLYPROPYLENE FABRIC (WOVEN LAYER AND NON-WOVEN FLEECE MECHANICALLY FUSED VIA NEEDLE PUNCH) 3/16" MAX. APERTURE		
SOCK FABRICS COMPOSED OF BURLAP MAY BE USED ON PROJECTS LASTING 6 MONTHS OR LESS.					

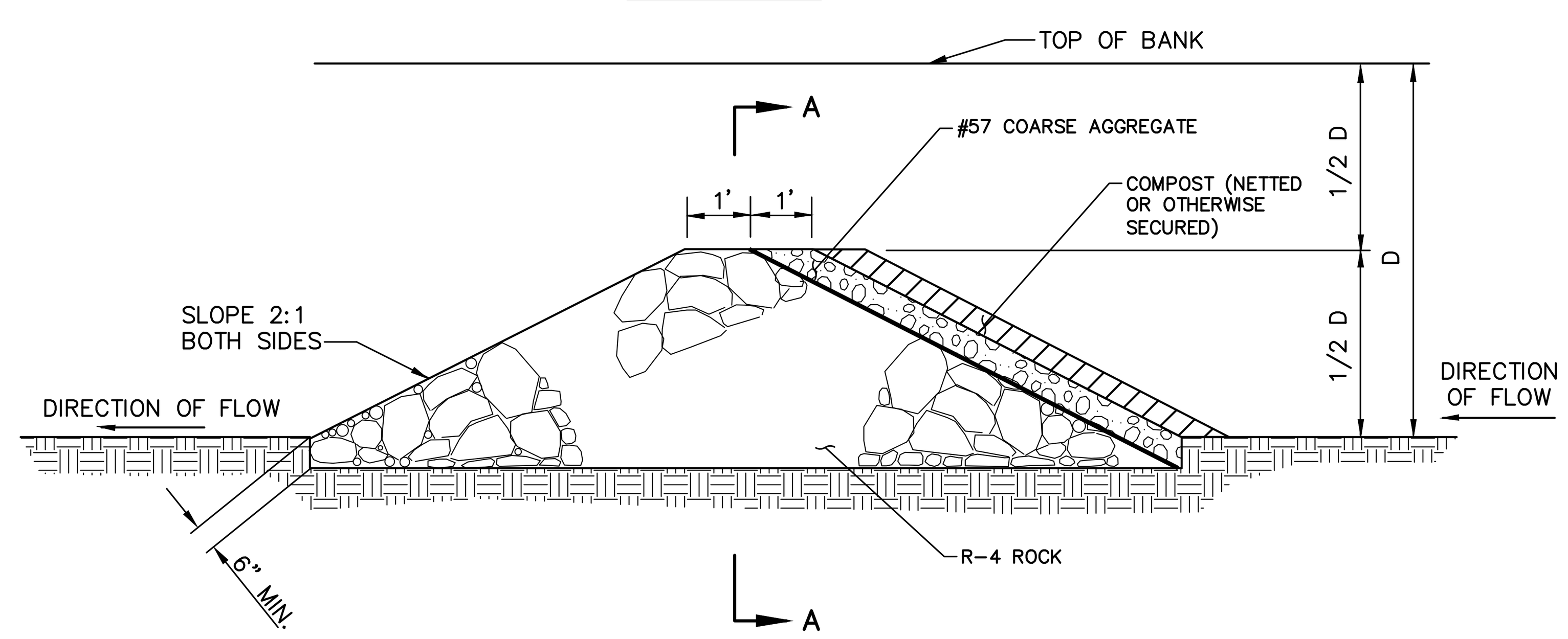
TABLE 4.2
COMPOST STANDARDS

ORGANIC MATTER CONTENT	80% – 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 – 8.0
MOISTURE CONTENT	35% – 55%
PARTICLE SIZE	98% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	SOLUBLE SALT CONCENTRATION

04 COMPOST FILTER SOCK

NOT TO SCALE

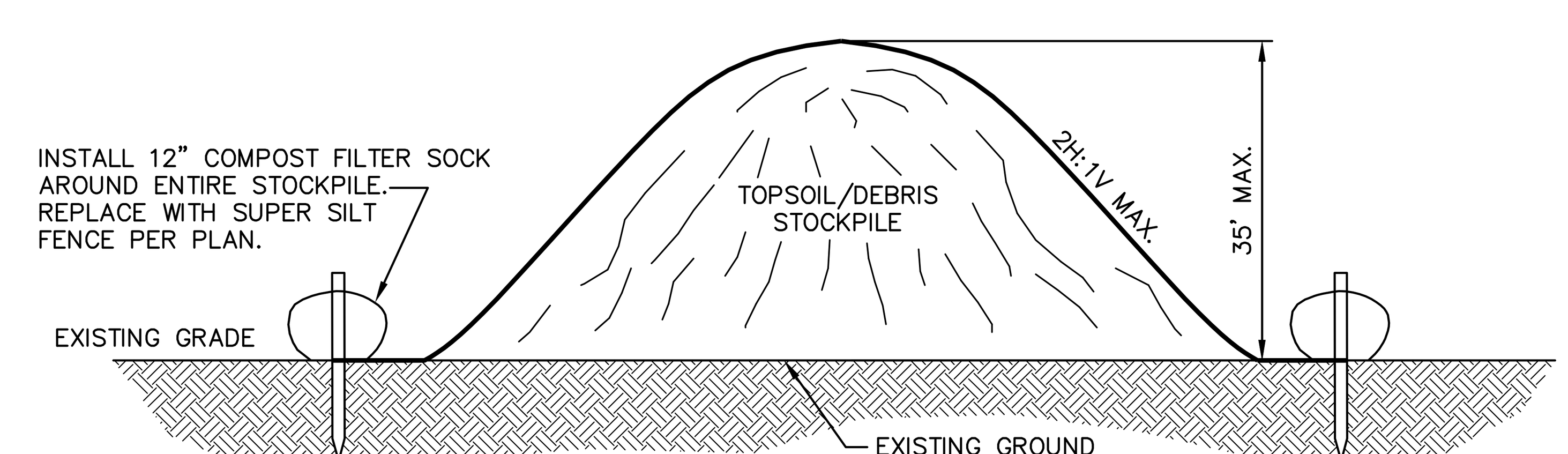




NOTES:
1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH ½ HEIGHT OF THE FILTER.
2. IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

05 ROCK FILTER DETAIL

NOT TO SCALE



NOTES:
1. ANIONIC PAM MAY BE USED TO TEMPORARILY STABILIZE TOPSOIL STOCKPILES. HOWEVER, ANIONIC PAM MAY LOSE ITS EFFECTIVENESS IN AS LITTLE AS 2 MONTHS. THEREFORE, REAPPLY MIXTURE AS NECESSARY.

06 TOPSOIL/DEBRIS STOCKPILE DETAIL

NOT TO SCALE

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CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

HRG PROJECT NUMBER: R009170.0431
PLAN DATE: FEBRUARY 2025
DRAWING SCALE: AS SHOWN
PROJ. MANAGER: MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
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SHEET TITLE:
EROSION CONTROL DETAILS

SHEET: DT-04 | 30

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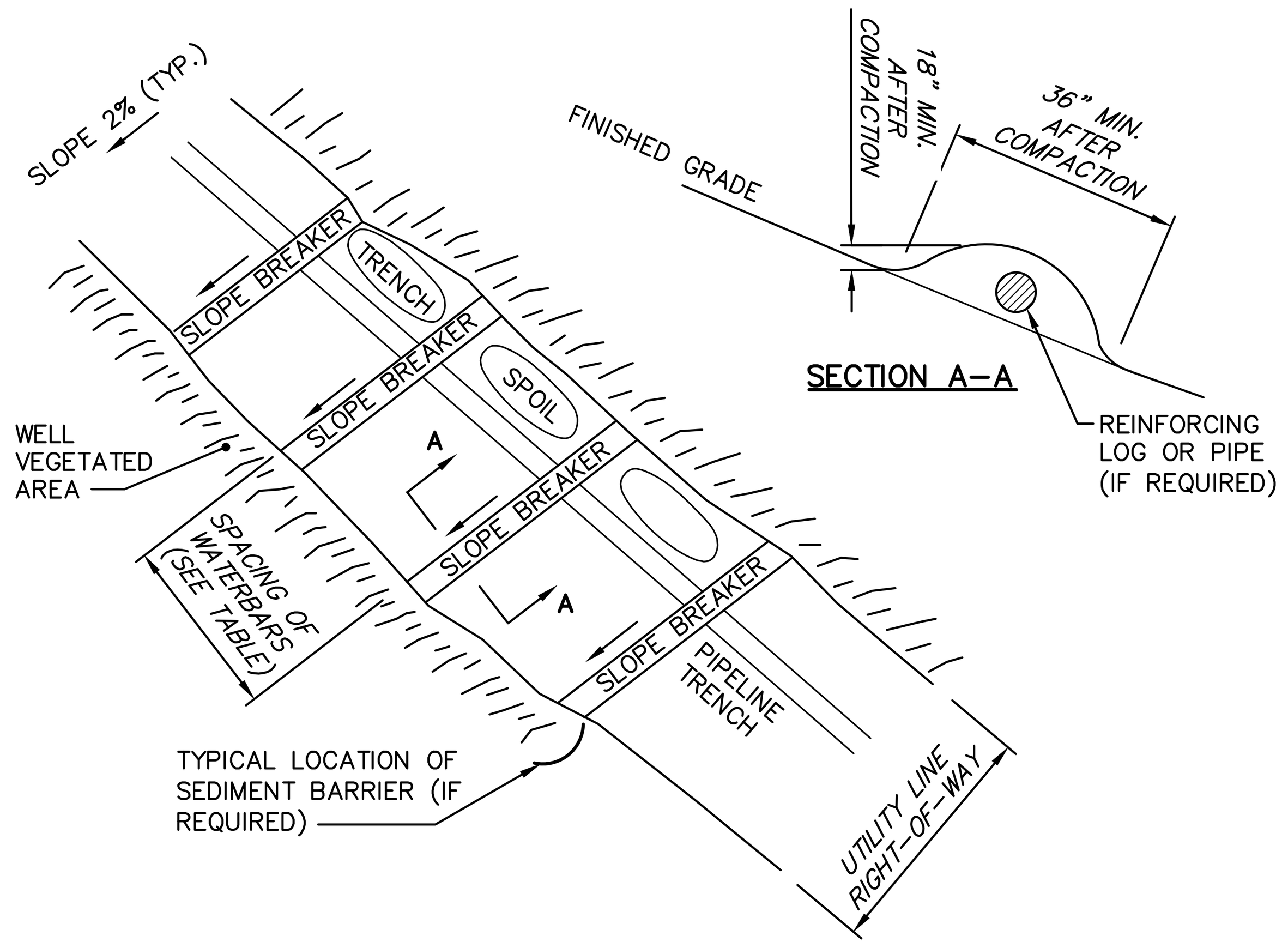

REQUIRED SPACING FOR PERMANENET WATERBARS

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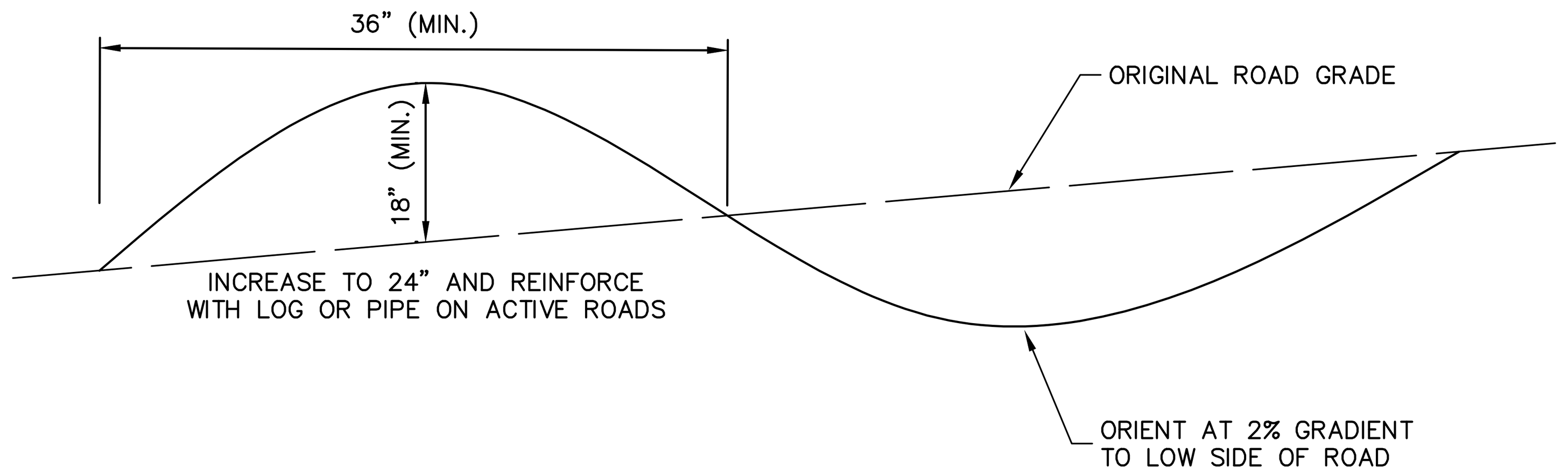
NOTES:

1. WATERBARS (SLOPE BREAKERS, INTERCEPTOR DIKES) SHOULD BE INSTALLED ACROSS THE ENTIRE RIGHT–OF–WAY ON ALL SLOPES GREATER THAN 5%.
2. WATERBARS SHOULD BE CONSTRUCTED AT A SLOPE OF 2% AND DISCHARGED TO A WELL VEGETATED AREA. WATERBARS SHOULD NOT DISCHARGE INTO AN OPEN TRENCH. WATERBARS SHOULD BE ORIENTED SO THAT THE DISCHARGE DOES NOT FLOW BACK ONTO THE RIGHT–OF–WAY. OBSTRUCTIONS (E.G. STRAW BALES, SILT FENCE, ROCK FILTERS, ETC.) SHOULD NOT BE PLACED IN ANY WATERBARS. WHERE NEEDED, THEY SHOULD BE LOCATED BELOW THE DISCHARGE END OF THE WATERBAR.
3. WHERE WATERBARS ARE USED ON ACTIVE ACCESS ROADS, IT IS NECESSARY TO PROVIDE REINFORCEMENT OF THE BERM WITH A LOG, STEEL PIPE, ETC. TO MAINTAIN INTEGRITY OF THE WATERBAR BETWEEN MAINTENANCE OPERATIONS. ALL SUCH WATERBARS SHOULD BE RESTORED TO ORIGINAL DIMENSIONS AT THE END OF EACH WORK DAY.
4. ALL WATERBARS SHOULD BE VEGETATED.

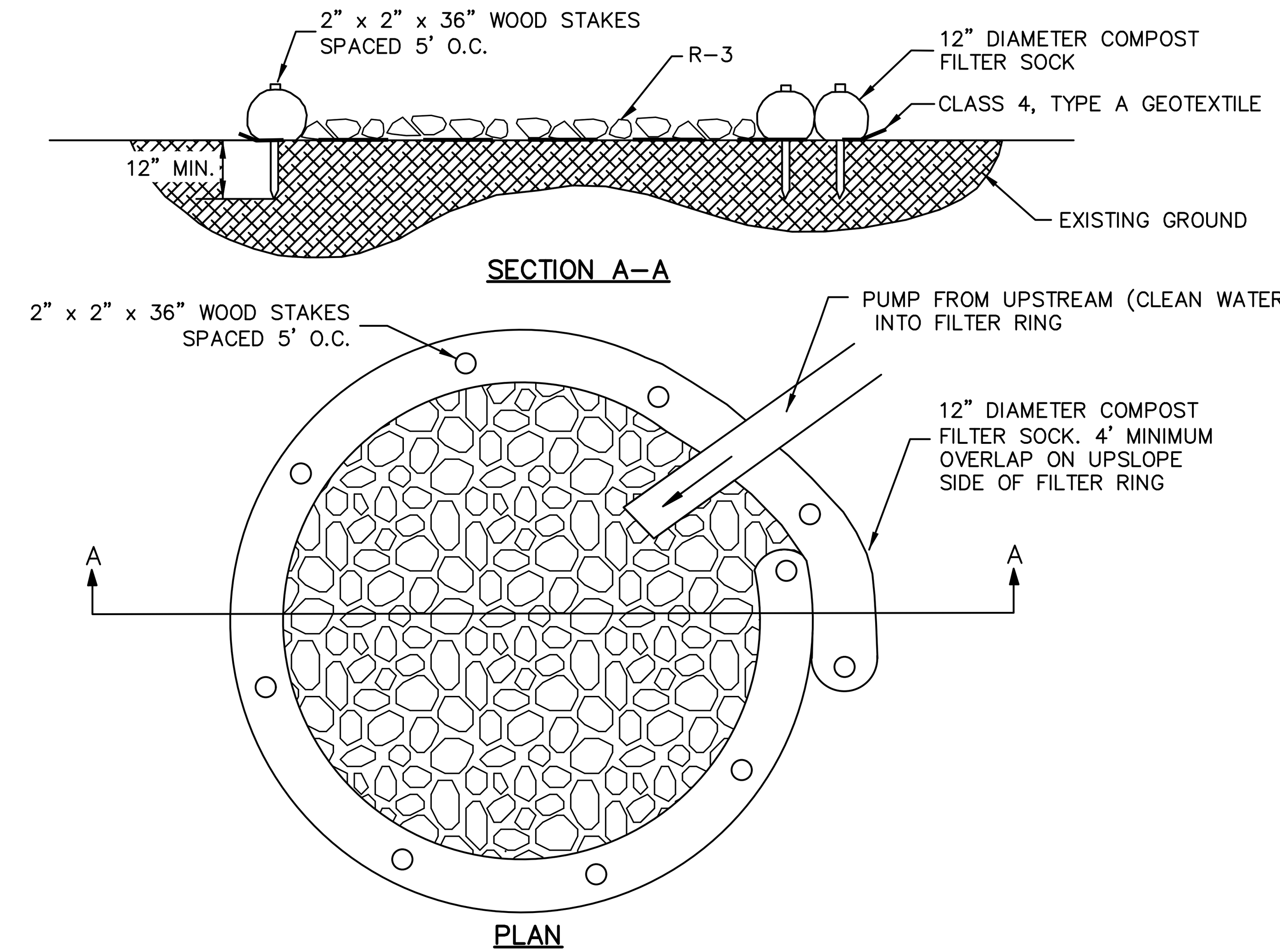
01 WATERBAR INSTALLATION DETAIL
NOT TO SCALE



NOTES:

1. WATERBARS MUST DISCHARGE TO A STABLE AREA.
2. WATERBARS SHALL BE INSPECTED WEEKLY (DAILY ON ACTIVE ROADS) AND AFTER EACH RUNOFF EVENT. DAMAGED OR ERODED WATERBARS SHALL BE RESTORED TO ORIGINAL DIMENSIONS WITHIN 24 HOURS OF INSPECTION.
3. MAINTENANCE OF WATERBARS SHALL BE PROVIDED UNTIL ROADWAY, SKIDTRAIL, OR RIGHT–OF–WAY HAS ACHIEVED PERMANENT STABILIZATION.
4. WATERBARS ON RETIRED ROADWAYS, SKIDTRAILS, AND RIGHTS–OF–WAY SHALL BE LEFT IN PLACE AFTER PERMANENT STABILIZATION HAS BEEN ACHIEVED.

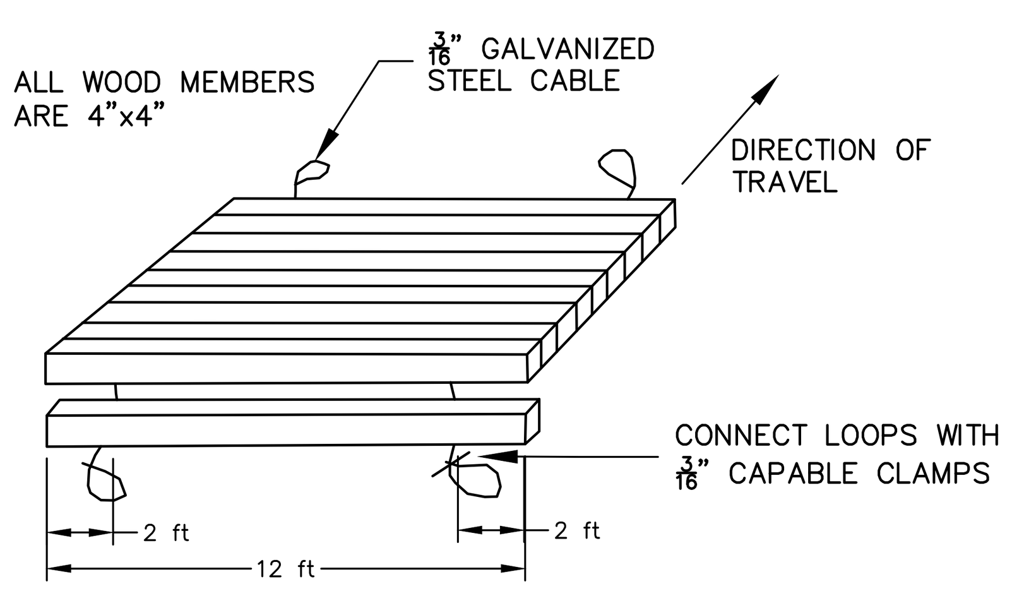
02 WATERBAR DETAIL
NOT TO SCALE



NOTES:

1. INSTALL ON FLAT GRADE (0 < 2% SLOPE).
2. 18" DIAMETER FILTER SOCK MAY BE STACKED ONTO DOUBLE 24" DIAMETER SOCKS IN PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT.

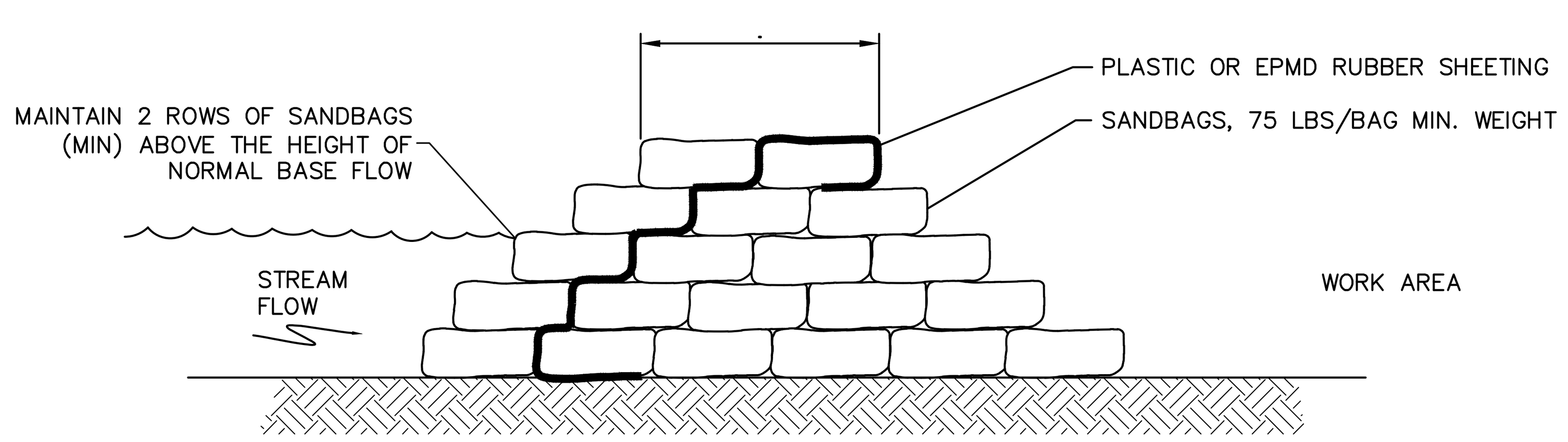
03 PUMP DISCHARGE ENERGY DISSIPATOR DETAIL
NOT TO SCALE



NOTES:

1. GEOTEXTILE UNDERLAYMENT SHALL BE USED UNDER TIMBER MATTING FOR EACH WETLAND CROSSING.
2. WETLAND SHALL BE CROSSED AT SHORTEST WIDTH PRACTICABLE.

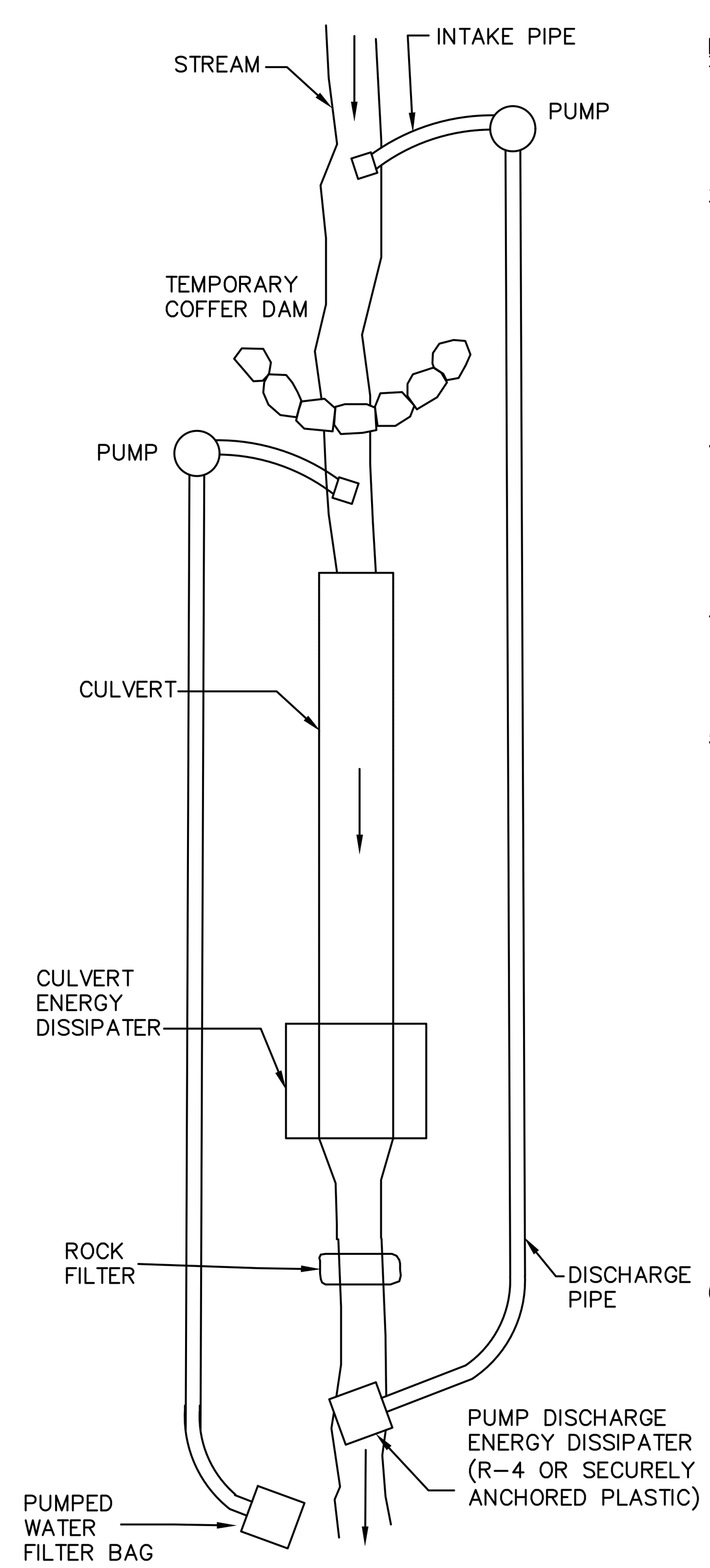
04 TYPICAL TIMBER MAT DETAIL
NOT TO SCALE



NOTES:

1. TOE THE SANDBAGS INTO THE EMBANKMENT. SECURE THE PLASTIC SHEETING OR EPMD LINER TO THE TOP, BOTTOM AND SIDES OF THE COFFERDAM WITH SANDBAGS TO FORM A WATERTIGHT SEAL.

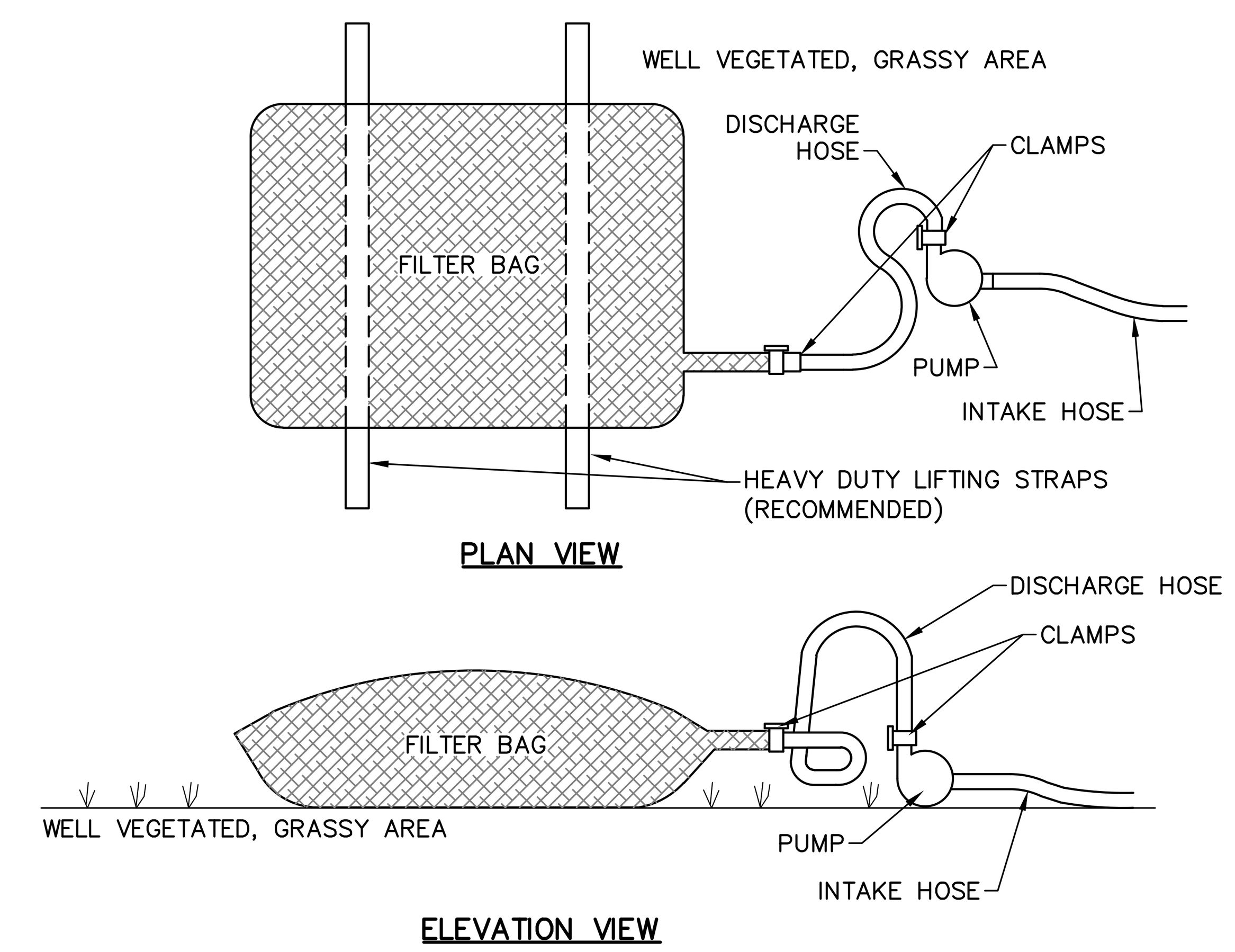
05 SANDBAG COFFER DAM FOR PUMP BY-PASS DETAIL
NOT TO SCALE



NOTES:

1. NORMAL FLOW SHOULD BE CONVEYED PAST THE WORK AREA BY MEANS OF A BYPASS PUMP. ALL SUCH BYPASSES SHOULD BE COMPLETED AND STABILIZED PRIOR TO DIVERTING FLOW.
2. ANY IN–CHANNEL EXCAVATIONS SHOULD BE DONE FROM THE TOP OF BANKS WHEREVER POSSIBLE. WHERE THIS IS NOT POSSIBLE, A TEMPORARY CROSSING SHOULD BE PROVIDED FOR ANY EQUIPMENT WORKING WITHIN THE CHANNEL. UPON COMPLETION, ALL CHANNEL ENTRANCES SHOULD BE RESTORED TO PRE–CONSTRUCTION CONFIGURATIONS, AS MUCH AS POSSIBLE, AND STABILIZED.
3. ALL EXCAVATED CHANNEL MATERIALS THAT WILL BE SUBSEQUENTLY USED AS BACKFILL SHOULD BE PLACED IN A TEMPORARY STOCKPILE LOCATED OUTSIDE THE CHANNEL. A SEDIMENT BARRIER SHOULD BE INSTALLED BETWEEN THE STORAGE PILE AND THE STREAM CHANNEL.
4. ALL EXCAVATED MATERIALS THAT WILL NOT BE USED ON SITE MUST BE IMMEDIATELY REMOVED TO A DISPOSAL SITE HAVING AN APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN.
5. ANY PUMPED WATER FROM EXCAVATED AREAS MUST BE FILTERED PRIOR TO DISCHARGING INTO WATERS OF THE COMMONWEALTH. THE USE OF FILTER BAGS IS ANOTHER ACCEPTABLE METHOD IF LOCATED ON A RELATIVELY FLAT (<5% SLOPE), WELL VEGETATED AREA. THE BAG SHOULD BE DESIGNED TO TRAP PARTICLES LARGER THAN 150 MICRONS. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. WHEN THE BAG HAS BEEN FILLED TO 1/2 ITS TOTAL CAPACITY, IT SHOULD BE REPLACED WITH A NEW BAG AND PROPERLY DISPOSED. WHEREVER WELL VEGETATED AREAS ARE NOT AVAILABLE, A GEOTEXTILE UNDERLAYMENT SHOULD BE USED. CONSIDERATION SHOULD BE GIVEN TO HOW THE BAG WILL BE ACCESSED AND REMOVED ONCE IT HAS BEEN 1/2 FILLED WITH SEDIMENT.
6. ALL DISTURBED AREAS WITHIN THE EXISTING CHANNEL SHOULD BE COMPLETED AND STABILIZED BEFORE FLOW IS REDIRECTED INTO IT. SUITABLE PROTECTION SHOULD BE PROVIDED FOR THE STREAM CHANNEL FROM ANY DISTURBED AREAS THAT HAVE NOT YET ACHIEVED STABILIZATION.

06 IN-CHANNEL WORK/PUMPED BYPASS DETAIL
NOT TO SCALE



NOTES:

1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON–WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D–4884	60 LB/IN
GRAB TENSILE	ASTM D–4632	205 LB
PUNCTURE	ASTM D–4833	110 LB
MULLEN BURST	ASTM D–3786	350 PSI
UV RESISTANCE	ASTM D–4355	70%
AOS % RETAINED	ASTM D–4751	80 SIEVE

2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
3. BAGS SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON–ERODIBLE AND NON–POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
4. NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
5. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
6. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
7. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

07 PUMPED WATER FILTER BAG DETAIL
NOT TO SCALE

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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PE094717

HRG PROJECT NUMBER: R009170.0431
PLAN DATE: FEBRUARY 2025
DRAWING SCALE: AS SHOWN
PROJ. MANAGER: MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/2025	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
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SHEET TITLE:
EROSION CONTROL DETAILS

SHEET: DT-05 | 31

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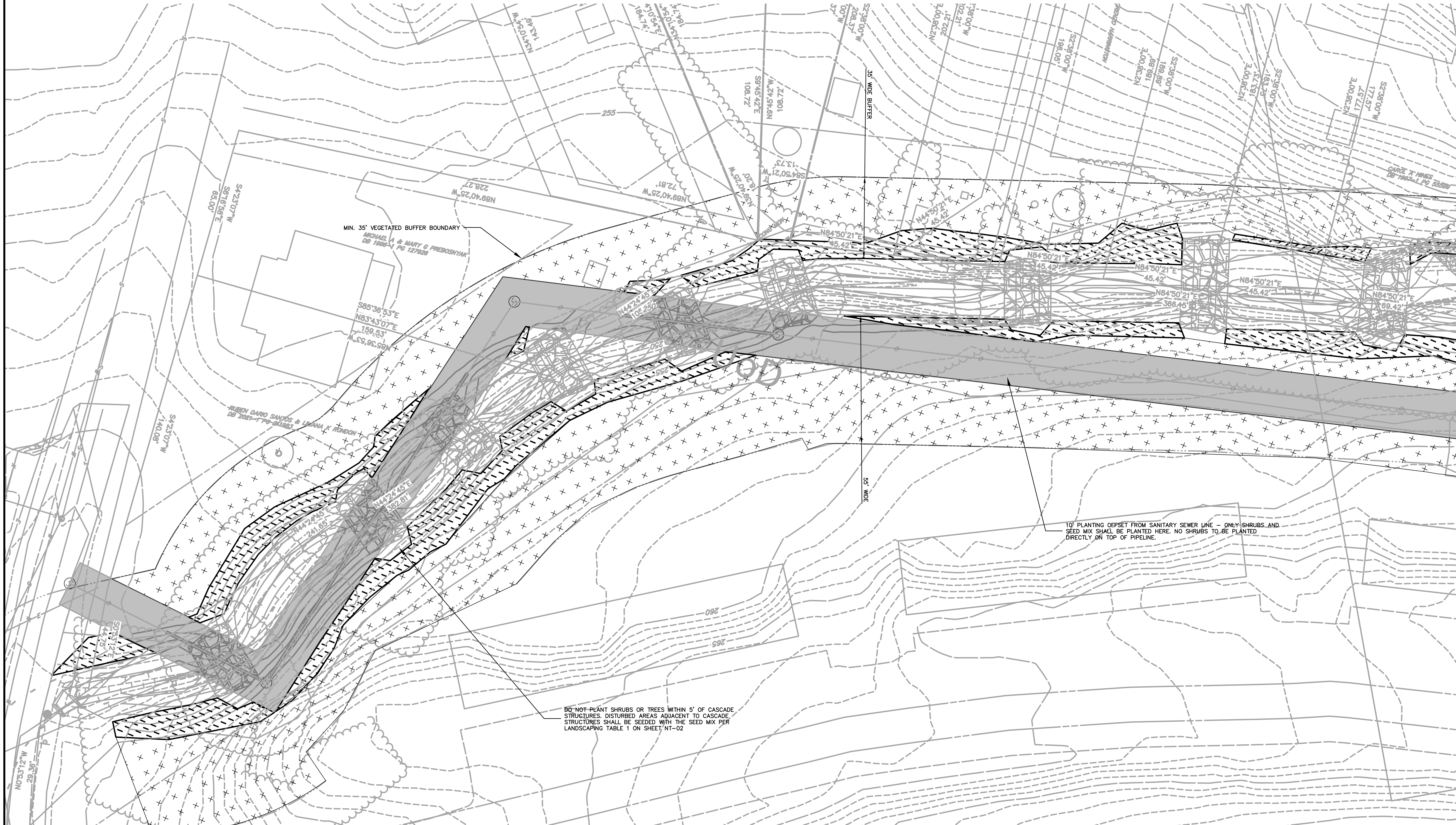

LEGEND

- 20' SANITARY SEWER LINE OFFSET
- PROPOSED HIGH-DENSITY DISTURBED PLANTING AREA – SEE LANDSCAPING TABLE 1
- PROPOSED LOW-DENSITY UPLAND RIPARIAN PLANTING AREA – SEE LANDSCAPING TABLE 2
- VEGETATED BUFFER BOUNDARY – MINIMUM 35' EACH BANK

NOTES

1. FINAL PLANTING AREA LAYOUT TO BE COORDINATED IN THE FIELD WITH HRG ENGINEER AS A CRITICAL INSPECTION STAGE.
2. SEE SHEET NT-02 FOR PLANT SCHEDULE.
3. NO PLANT SUBSTITUTIONS WITHOUT PRIOR APPROVAL OF LANDSCAPE ARCHITECT.
4. NO TREES SHALL BE PLANTED WITHIN THE 10' OFFSET OF THE EXISTING SANITARY SEWER LINE. SHRUBS CAN BE PLANTED WITHIN THE 10' OFFSET, BUT SHALL NOT BE PLANTED DIRECTLY ON TOP OF PIPELINE.
5. DO NOT PLANT SHRUBS OR TREES WITHIN 5' OF THE EDGE OF EACH CASCADE STRUCTURE. ALL DISTURBED AREAS ADJACENT TO CASCADE STRUCTURES SHALL BE SEEDED WITH THE SEED MIX AS INDICATED IN LANDSCAPING TABLE #1 ON SHEET NT-02.

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PROFESSIONAL SEAL:

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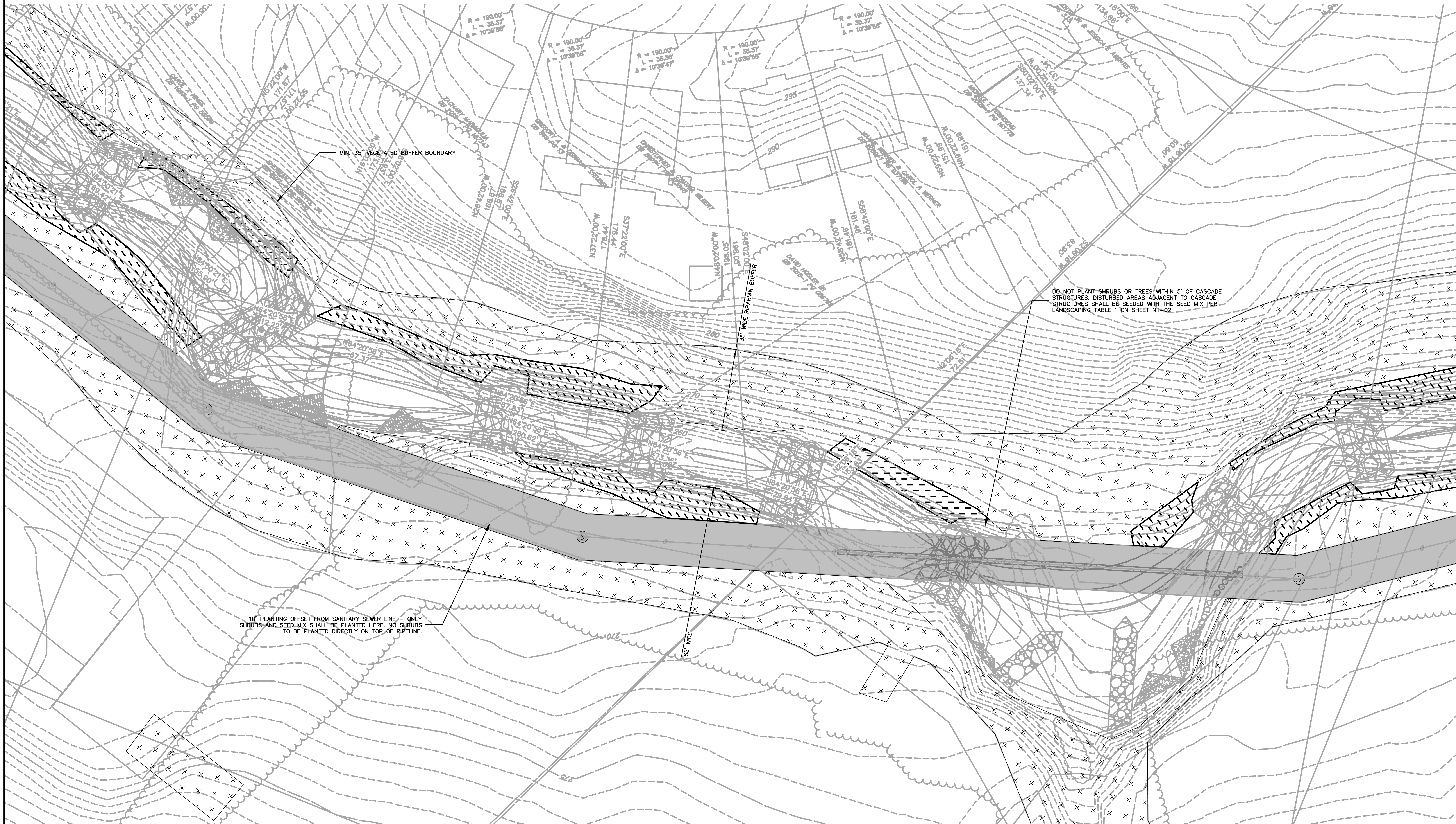
SHEET TITLE:
LANDSCAPING PLAN

SHEET: LS-01 | 32



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GRAPHIC SCALE
20' 10' 0' 20'
SCALE: 1"= 20'

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PROJ. MANAGER:	MATTHEW VANASKIE

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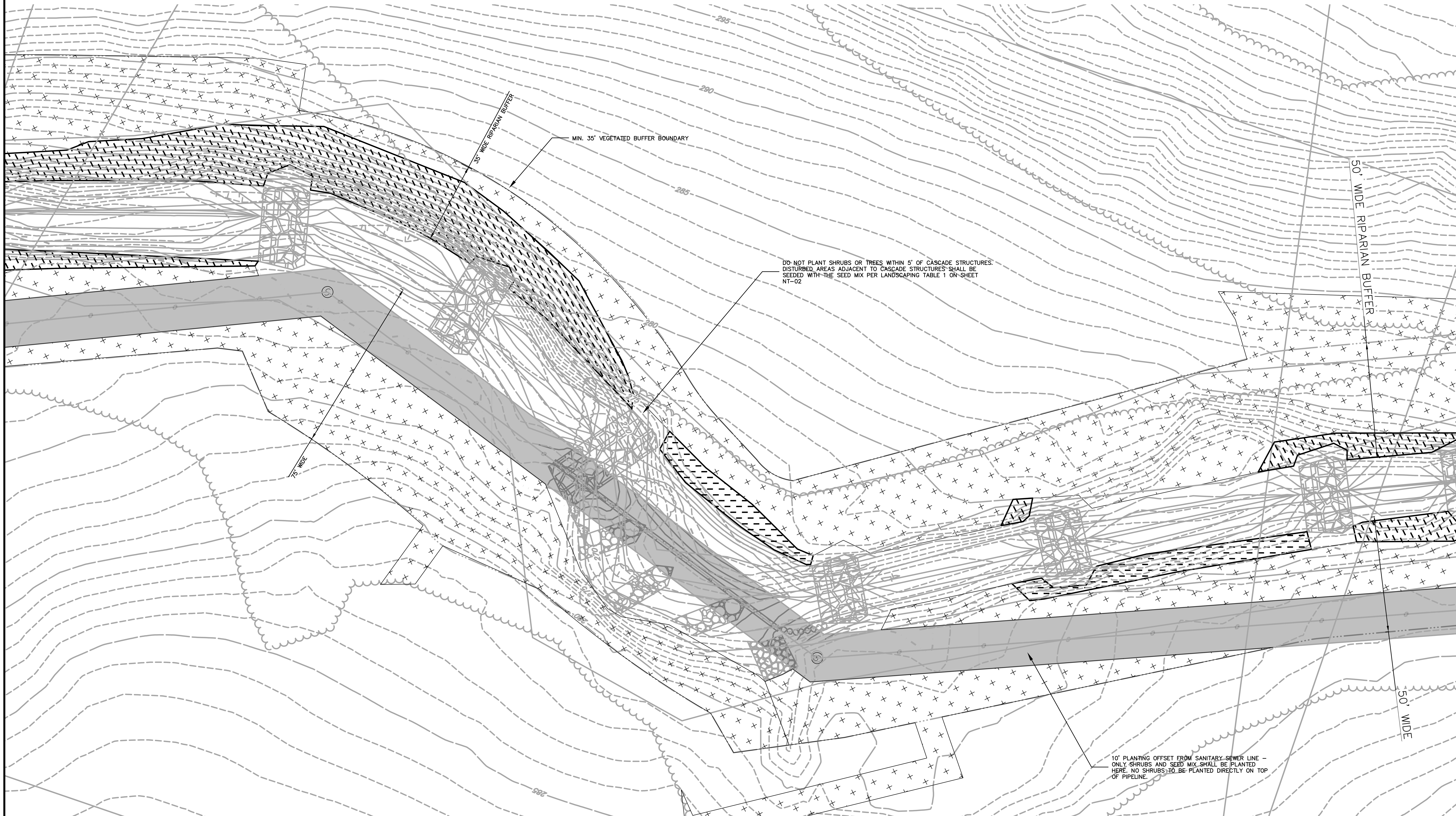
SHEET TITLE:
LANDSCAPING PLAN

SHEET: LS-02 | 33



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PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL PE094717

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
LANDSCAPING PLAN

SHEET: LS-03 | 34

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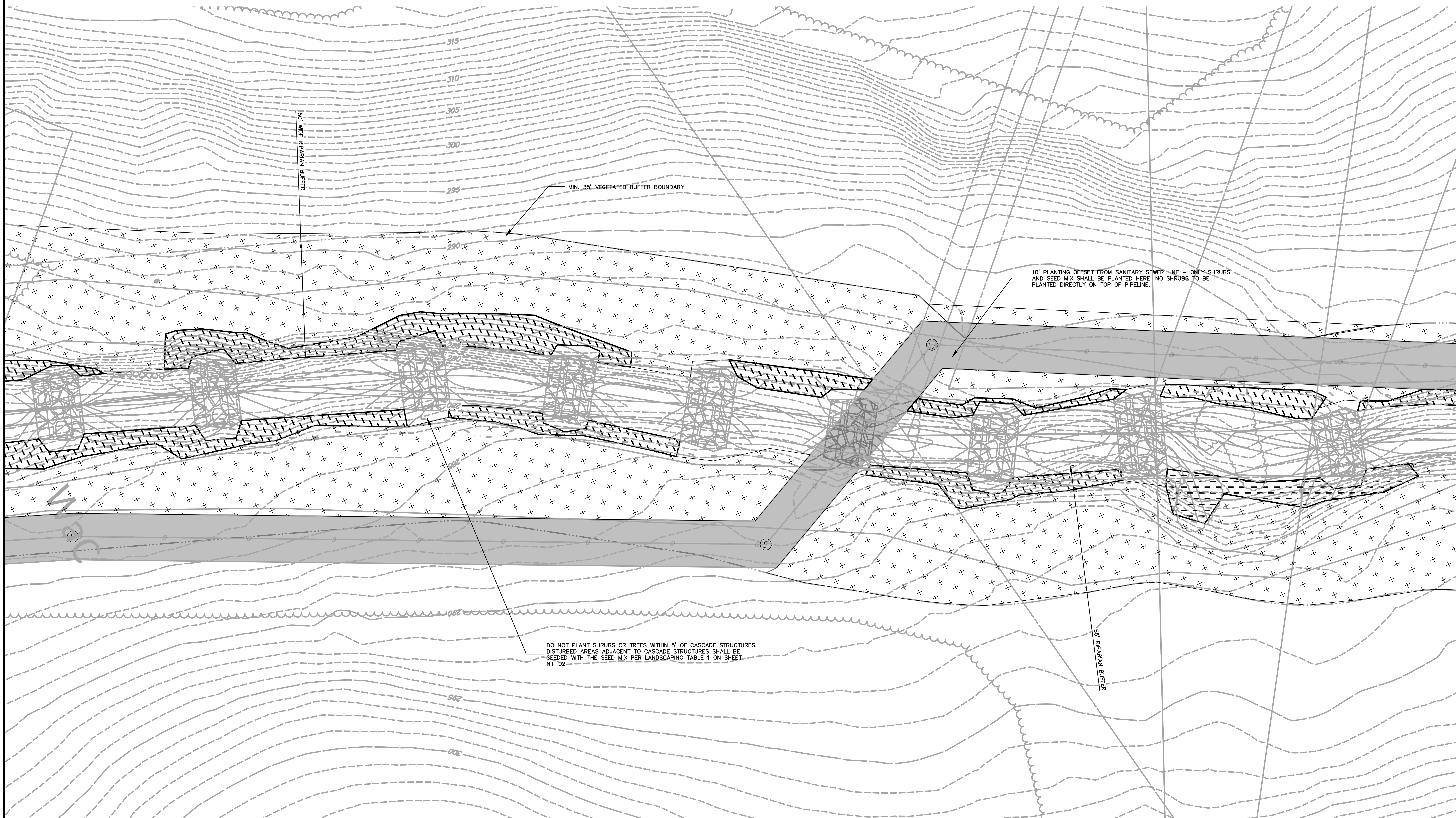
CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020

BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA



LEGEND

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NOTES

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GRAPHIC SCALE
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SCALE: 1"= 20'

PROFESSIONAL SEAL:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER PE094717

HRG PROJECT NUMBER:	R009170.0431
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PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
LANDSCAPING PLAN

SHEET: LS-04 35

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CONSTRUCTION AND EROSION CONTROL PLANS FOR SCULAC ROAD STREAM RESTORATION

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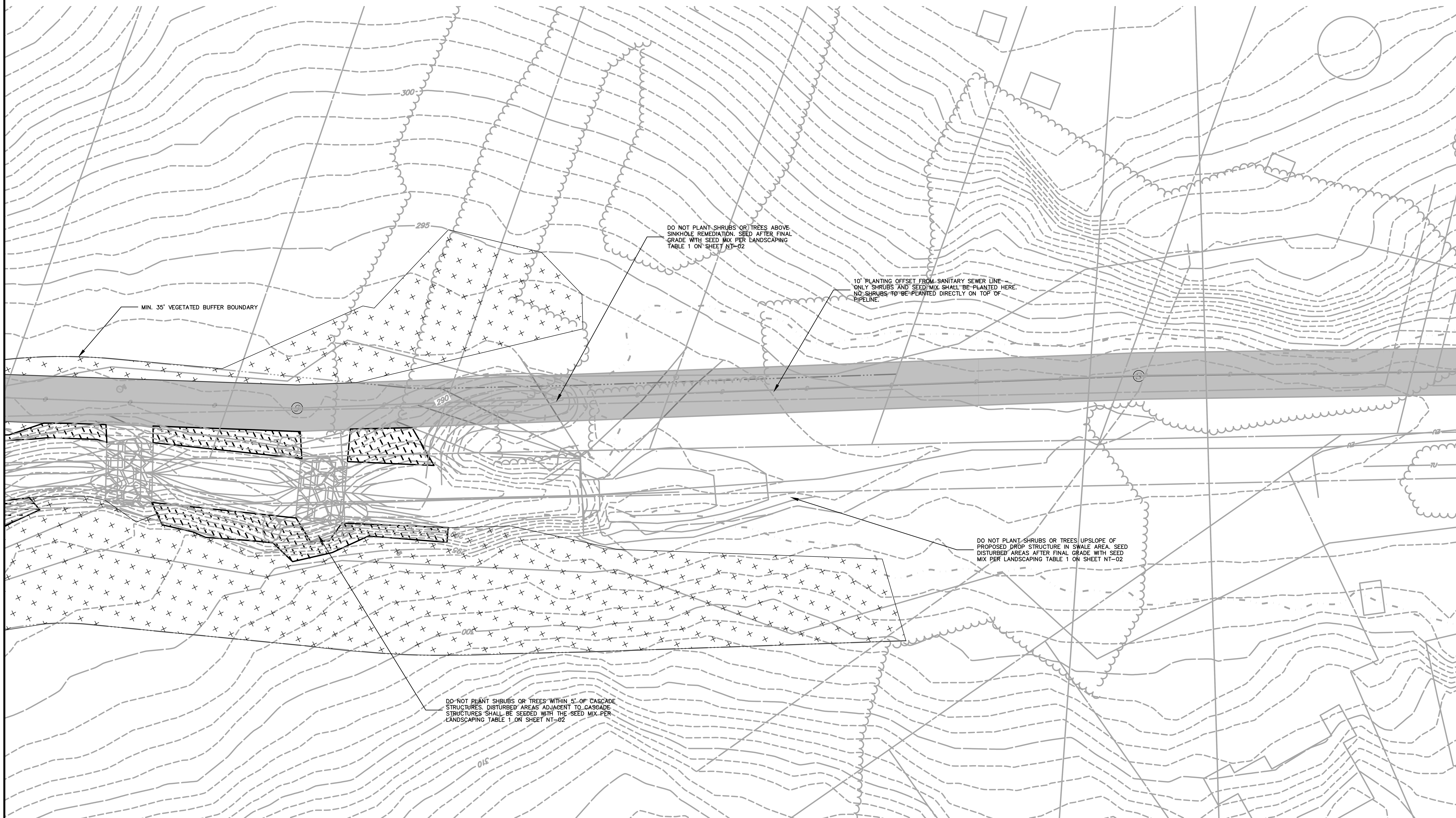

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PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
JAMES D. POWELL
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
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PROJ. MANAGER:	MATTHEW VANASKIE

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SHEET TITLE:
LANDSCAPING PLAN

SHEET: LS-05 | 36

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SUBMITTALS

1. PRODUCT DATA: SUBMIT LIST OF PLANT MATERIAL SOURCES, DATA FOR SOIL AMENDMENTS AND OTHER ACCESSORIES.
2. PRODUCT DATA: SUBMIT DATA FOR SEED MIX, MULCH, AND OTHER ACCESSORIES.
3. MANUFACTURER'S CERTIFICATE: CERTIFY PRODUCTS MEET OR EXCEED SPECIFIED REQUIREMENTS.

QUALITY ASSURANCE

1. PROVIDE SEED MIXTURE IN CONTAINERS SHOWING PERCENTAGE OF SEED MIX, GERMINATION PERCENTAGE, INERT MATTER PERCENTAGE, WEED PERCENTAGE, YEAR OF PRODUCTION, NET WEIGHT, DATE OF PACKAGING, AND LOCATION OF PACKAGING.
2. PROVIDE TREE SEEDLINGS THAT ARE STRAIGHT, STURDY AND OF REGULAR SHAPE, FREE OF WOUNDS, DECAY, FUNGUS, INSECTS, BACTERIA, AND OTHER DISEASES.

SOURCE QUALITY CONTROL

1. TEST AND ANALYZE IMPORTED OR EXISTING TOPSOIL.
2. ANALYZE TO ASCERTAIN PERCENTAGE OF NITROGEN, PHOSPHOROUS, POTASH, SOLUBLE SALT AND ORGANIC MATTER; AND PH VALUE.
3. PROVIDE RECOMMENDATION FOR SOIL AMENDMENT APPLICATION RATES FOR SPECIFIED PLANTING AS RESULT OF TESTING.
4. TESTING IS NOT REQUIRED WHEN RECENT TESTS ARE AVAILABLE FOR IMPORTED OR EXISTING TOPSOIL. SUBMIT THESE TEST RESULTS TO TESTING LABORATORY. INDICATE, BY TEST RESULTS, INFORMATION NECESSARY TO DETERMINE SUITABILITY.

PRODUCTS

1. TREE SEEDLINGS
   a. SPECIES: ACCORDING TO STANDARDIZED PLANT NAMES, OFFICIAL CODE OF AMERICAN JOINT COMMITTEE ON HORTICULTURE NOMENCLATURE.
   b. SPECIES AND SIZES IDENTIFIABLE IN PLANT SCHEDULE, GROWN IN CLIMATIC CONDITIONS SIMILAR TO THOSE IN LOCALITY OF THE WORK.
   c. IDENTIFICATION: LABEL INDIVIDUAL PLANTS OR EACH BUNDLE OF PLANTS WHEN TIED IN BUNDLES.
   d. PLANTS: NO.1 GRADE CONFORMING TO "AMERICAN STANDARD FOR NURSERY STOCK" OF AMERICAN ASSOCIATION OF NURSERYMEN (AAN); WELL-BRANCHED, VIGOROUS AND BALANCE ROOT AND TOP GROWTH; FREE FROM DISEASE, INJURIOUS INSECTS, MECHANICAL WOUNDS, BROKEN BRANCHES, DECAY AND OTHER DEFECTS.

GENERAL PRODUCT DELIVERY, STORAGE AND HANDLING GUIDELINES

1. TRANSPORT AND HANDLE PRODUCTS ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
2. DELIVER PRODUCTS IN MANUFACTURER'S ORIGINAL SEALED CONTAINER OR PACKAGING, COMPLETE WITH LABELS/INSTRUCTIONS FOR STORING, HANDLING, UNPACKING, PROTECTING, AND INSTALLING.
3. PROMPTLY INSPECT SHIPMENTS TO ENSURE PRODUCTS COMPLY WITH REQUIREMENTS, QUANTITIES ARE CORRECT, AND PRODUCTS ARE UNDAMAGED.
4. DELIVER FERTILIZER IN WATERPROOF BAGS SHOWING WEIGHT, CHEMICAL ANALYSIS, AND NAME OF MANUFACTURER.
5. STORE AND PROTECT PRODUCTS ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
6. STORE PRODUCTS WITH SEALS AND LABELS INTACT AND LEGIBLE.
7. STORE SENSITIVE PRODUCTS IN WEATHERTIGHT, CLIMATE-CONTROLLED ENCLOSURES IN AN ENVIRONMENT SUITABLE TO PRODUCT.
8. PROTECT AND MAINTAIN PLANT LIFE UNTIL PLANTED.
9. DELIVER PLANT LIFE MATERIALS IMMEDIATELY PRIOR TO PLACEMENT. KEEP PLANTS MOIST.
10. PLANT MATERIAL DAMAGED AS A RESULT OF DELIVERY, STORAGE OR HANDLING WILL BE REJECTED.

CONTAINERIZED SEEDLING TRANSPORT, STORAGE AND HANDLING GUIDELINES

TRANSPORT:

1. KEEP SEEDLINGS SHADED AND COVERED DURING TRANSPORT. COVER WITH A TARP OR HARD-SHELL COVER WHILE IN TRANSIT, IF NOT INSIDE A CLOSED VEHICLE.
2. AVOID DAMAGING SEEDLING BAGS OR BOXES; TAPE ANY ACCIDENTAL HOLES IN PACKAGING TO PREVENT MOISTURE LOSS.

STORAGE:

1. DO NOT EXPOSE SEEDLINGS TO EXTREME TEMPERATURES, WIND, OR CONTAMINANTS (FUEL OR HERBICIDES).
2. KEEP SEEDLINGS MOIST.
3. KEEP SEEDLINGS SHADED AND COVERED.
4. STORE SEEDLINGS AND THEIR CONTAINERS OUT OF DIRECT SUNLIGHT.
5. ALLOW SPACE FOR AIR CIRCULATION BETWEEN SEEDLING BOXES/BAGS.
6. DO NOT EXPOSE SEEDLING ROOTS TO EXCESSIVE DRYING CONDITIONS.
7. DO NOT ALLOW SEEDLINGS TO FREEZE. DO NOT PLANT SEEDLINGS IF THEY ARE FROZEN FOR MORE THAN 2 DAYS.
8. SEEDLINGS FOUR WEEKS OR OLDER SHOULD BE CAREFULLY CHECKED FOR MILDEW, MOLD OR DECAY.
9. DON'T STACK SEEDLINGS MORE THAN 2 BOXES/BAGS DEEP WITHOUT SPACERS TO PROVIDE SUPPORT.

HANDLING:

1. PLANT SEEDLINGS WITHIN TWO WEEKS OF DELIVERY TO PROJECT SITE IF POSSIBLE.
2. REMOVE ONLY MINIMUM NUMBER OR SEEDLINGS THAT CAN BE PLANTED QUICKLY AND CORRECTLY TO AVOID EXPOSING ROOTS TO WIND AND SUN.
3. CLOSE BOXES OR BAGS AND PLACE OUT OF DIRECT SUNLIGHT. DO NOT LEAVE SEEDLING BAGS OR BOXES OPEN WHILE PLANTING.
4. DO NOT DUMP THE CONTENTS OF SEEDLING BAGS OR BOXES ON THE GROUND TO SORT BEFORE PLANTING.
5. DO NOT PRUNE ROOTS UNLESS THE LATERALS ARE 5" OR LONGER. PRUNE THE LATERALS WITH A SHARP MACHETE TO 3 TO 4 INCHES IN LENGTH.
6. DO NOT BEAT SEEDLINGS AGAINST OBJECTS TO REMOVE CLAY SLURRY.
7. DISCARD CULL SEEDLINGS SUCH AS THOSE WITH A STEM DIAMETER SMALLER THAN A KITCHEN MATCH, DRY SEEDLINGS, OR SEEDLINGS WITHOUT A GOOD ROOT SYSTEM.

SOIL AMENDMENTS AND ACCESSORIES

1. SOIL AMENDMENT MATERIALS
   a. WHEN SOIL TESTS INDICATE SOIL AMENDMENT, APPLY SOIL CONDITIONERS OR FERTILIZERS TO AMEND SOIL TO SPECIFIED CONDITIONS.
   b. PEAT MOSS: SHREDDED, LOOSE, SPHAGNUM MOSS; FREE OF LUMPS, ROOTS, INORGANIC MATERIAL OR ACIDIC MATERIALS; MINIMUM OF 85 PERCENT ORGANIC MATERIAL MEASURED BY OVEN DRY WEIGHT, PH RANGE OF 4 TO 5; MOISTURE CONTENT OF 30 PERCENT.
   c. BONE MEAL: RAW, FINELY GROUND, COMMERCIAL GRADE, MINIMUM OF 3 PERCENT NITROGEN AND 20 PERCENT PHOSPHOROUS.
   d. LIME: GROUND LIMESTONE, DOLOMITE TYPE, MINIMUM 95 PERCENT CARBONATES.
2. ACCESSORIES
   a. SEEDING AREA MULCHING MATERIAL: OAT OR WHEAT STRAW, FREE FROM WEEDS, FOREIGN MATTER DETRIMENTAL TO PLANT LIFE, AND DRY. HAY OR CHOPPED CORNSTALKS ARE NOT ACCEPTABLE.
   b. FERTILIZER: COMMERCIAL GRADE; RECOMMENDED FOR GRASS; OF PROPORTION NECESSARY TO ELIMINATE DEFICIENCIES OF TOPSOIL, AS INDICATED IN SOIL ANALYSIS TEST RESULTS.
   c. LIME: ASTM C602, CLASS T AGRICULTURAL LIMESTONE CONTAINING A MINIMUM 80 PERCENT CALCIUM CARBONATE EQUIVALENT.
   d. WOOD STAKES: WHITE OAK LUMBER, POINTED END.
   e. PLANT PROTECTORS: TUBEX COMBITUBE, 5' TREE SHELTER (OR APPROVED EQUAL); TUBEX BIRD NETTING (OR APPROVED EQUAL).

SEEDING INSTRUCTIONS

TIME OF PLANTING

1. FALL (AUGUST 20 TO OCTOBER 20). FALL IS THE BEST TIME TO PLANT. COOL TEMPS AND GENTLE RAINS PROMOTE GERMINATION OF COOL SEASON FESCUES. WEED GERMINATION IS LOWER IN FALL THAN IN SPRING. FALL-SEEDED LAWNS TYPICALLY HAVE FAR FEWER WEEDS THAN SPRING-SEEDED LAWNS.
2. SPRING (MARCH 15 TO MAY 15). SPRING PLANTING IS A GOOD SECOND OPTION. SPRING SEEDINGS OFTEN REQUIRE WATERING MORE FREQUENTLY, SUMMER DROUGHT CAN BE A THREAT, AND WEEDS ARE TYPICALLY MORE COMPETITIVE. SEEDING NO MOW BETWEEN MAY 16TH AND AUGUST 19TH IS NOT RECOMMENDED.
3. INSTALL PER MANUFACTURER'S INSTRUCTIONS. DRILLING INTO EXISTING CONDITIONS PREFERRED.
4. DO NOT SEED AREAS MORE THAN WHICH CAN BE MULCHED ON SAME DAY.
5. DO NOT SOW IMMEDIATELY FOLLOWING RAIN, WHEN GROUND IS TOO DRY, OR WHEN WINDS ARE OVER 12 MPH.

WARRANTY

1. WARRANT PLANTS FOR THE FOLLOWING DURATION AFTER DATE OF SUBSTANTIAL COMPLETION, AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH, BUT EXCEPTING DEFECTS RESULTING FROM NEGLECT BY OWNER, ABUSE OR DAMAGE BY OTHERS, OR UNUSUAL PHENOMENA OR INCIDENTS BEYOND CONTRACTOR'S CONTROL:
   a. TREES AND SEEDED AREAS: TWO YEARS
2. REMOVE AND REPLACE TREES OR OTHER PLANTS FOUND TO BE DEAD OR IN UNHEALTHY CONDITION DURING WARRANTY PERIOD. MAKE REPLACEMENTS DURING GROWTH SEASON FOLLOWING END OF WARRANTY PERIOD. REPLACE TREES WHICH ARE MORE THAN 25% DEAD AT END OF WARRANTY PERIOD; UNLESS, IN THE OPINION OF DESIGN PROFESSIONAL, IT IS ADVISABLE TO EXTEND WARRANTY PERIOD FOR A FULL GROWING SEASON.

FINAL ACCEPTANCE

FINAL ACCEPTANCE OF THE LANDSCAPING PLAN SHALL INCLUDE ESTABLISHMENT OF SEEDED AREAS TO A MINIMUM UNIFORM 70% COVERAGE, AND ESTABLISHMENT OF A MINIMUM SURVIVAL RATE OF 50% FOR TREE SEEDLINGS. CONSERVATION LANDSCAPING TO BE COMPLETED PER THE PLANT AND SEEDING SCHEDULE AND PLANTING DETAILS.

SITE PREPARATION NOTES

1. WARRANT PLANTS FOR THE FOLLOWING DURATION AFTER DATE OF SUBSTANTIAL COMPLETION, AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH, BUT EXCEPTING DEFECTS RESULTING FROM NEGLECT BY OWNER, ABUSE OR DAMAGE BY OTHERS, OR UNUSUAL PHENOMENA OR INCIDENTS BEYOND CONTRACTOR'S CONTROL:
   a. TREES AND SEEDED AREAS: TWO YEARS
2. REMOVE AND REPLACE TREES OR OTHER PLANTS FOUND TO BE DEAD OR IN UNHEALTHY CONDITION DURING WARRANTY PERIOD. MAKE REPLACEMENTS DURING GROWTH SEASON FOLLOWING END OF WARRANTY PERIOD. REPLACE TREES WHICH ARE MORE THAN 25% DEAD AT END OF WARRANTY PERIOD; UNLESS, IN THE OPINION OF DESIGN PROFESSIONAL, IT IS ADVISABLE TO EXTEND WARRANTY PERIOD FOR A FULL GROWING SEASON.

POST-PLANTING OPERATION AND MAINTENANCE PROCEDURES

WATERING – SEEDING AREAS

1. MAINTAIN SEEDED AREAS IMMEDIATELY AFTER PLACEMENT UNTIL GRASS IS WELL ESTABLISHED AND EXHIBITS VIGOROUS GROWING CONDITION.
2. SEEDS SHOULD BE WATERED EVERY OTHER MORNING FOR 15 TO 30 MINUTES DURING THE FIRST FOUR TO SIX WEEKS AFTER PLANTING, ESPECIALLY IF PLANTING ON DRY SOILS OR IN LATE SPRING WHEN TEMPERATURES ARE HIGHER.
3. ONCE ESTABLISHED, SEEDED AREAS SHOULD BE WATERED ONLY DURING DRY PERIODS.
   A. OCCASIONAL THOROUGH SOAKINGS ARE BETTER THAN FREQUENT, LIGHT SPRINKLINGS.
4. DURING PERIODS OF HOT, DRY WEATHER, SEEDED AREAS SHOULD RECEIVE AT LEAST 2 INCHES OF WATER PER WEEK, APPLIED AS 1 OR 2 DEEP SOAKINGS.

WATERING – SEEDLINGS

1. MAINTAIN TREE SEEDLINGS IMMEDIATELY AFTER PLACEMENT, UNTIL PLANTS ARE WELL ESTABLISHED AND EXHIBIT VIGOROUS GROWING CONDITION.
2. WATERING NEEDS CAN VARY DEPENDING ON THE TIME OF YEAR AND SITE CONDITIONS.
3. APPLY SUPPLEMENTAL WATERING DURING FIRST PLANTING SEASON DURING DRY PERIODS (LESS THAN 1 INCH OF RAIN PER WEEK) TO IMPROVE SURVIVAL.

FERTILIZING AND WEED CONTROL

1. FERTILIZING IS NOT RECOMMENDED FOR SEEDED AREAS, AND SHOULD BE APPLIED SPARINGLY, IF AT ALL, IN EARLY SPRING OR LATE SUMMER.
   A. USE A SLOW-RELEASE, BALANCED FERTILIZER WITH EQUAL PORTIONS NITROGEN, PHOSPHORUS, AND POTASSIUM.
   B. DO NOT USE HIGH LEVELS OF NITROGEN FERTILIZER ON SEEDED AREAS.
2. FERTILIZING IS NOT RECOMMENDED FOR SEEDLINGS.
3 PROBLEM WEEDS SHOULD BE HAND PULLED OR SPOT SPRAYED WITH AN APPROVED HERBICIDE SUCH AS ROUNDUP, RODEO, OR GARLON 3A.

REGULAR INSPECTION OF PROTECTIVE TREE SHELTERS

1. AT MINIMUM, AN ANNUAL INSPECTION OF EACH PLANTING SITE IS REQUIRED. IDEALLY, SITES SHOULD BE INSPECTED ON A SEASONAL BASIS (EVERY THREE MONTHS) AS WELL AS AFTER ANY SIGNIFICANT RAINFALL OR STORM EVENT.
2. SITE INSPECTIONS SHOULD INCLUDE: EVALUATING FOR COMPETING GRASSES AND NOXIOUS WEEDS, CHECKING TREE SHELTERS AND BIRD NETTING, ASSESSING FOR VOLE OR RODENT DAMAGE, CHECKING STAKING, AND EVALUATING SURVIVORSHIP. PROBLEMS SHOULD BE CORRECTED AS THEY ARE DISCOVERED. REPLANT AS NECESSARY IN THE APPROPRIATE SEASONS.
3. PROTECTIVE TREE SHELTERS ARE DESIGNED TO REMAIN IN PLACE FOR A MINIMUM OF FIVE (5) YEARS, OR UNTIL THE BASE OF TREE TRUNKS REACHES 3-3.5" CAL., OR TREES BEGIN TO BREAK OUT OF THEIR TUBES NATURALLY.
4. INSPECT PROTECTIVE TREE SHELTERS MONTHLY DURING EACH GROWING SEASON (MARCH – NOVEMBER).
5. REPLACE DAMAGED OR BENT SHELTERS, STAKES, AND TIES, AND ENSURE THAT TUBE BASES ARE FIRMLY TOUCHING THE SOIL AROUND SEEDLINGS.
6. IF INVASIVE PLANT SPECIES ARE FOUND GROWING INSIDE A SHELTER, GENTLY LOOSEN TIES, LEFT THE SHELTER SEVERAL INCHES OFF THE GROUND, AND HAND PULL WEEDS. REPLACE THE SHELTER AROUND THE BASE OF THE SEEDLING AND RETIGHTEN THE TIES. DISCARD WEEDS OFF-SITE.
7. REMOVE BIRD NETTING FROM TOPS OF SHELTERS WHEN FOLIAGE IS WITHIN 2-3" OF THE TOP OF THE TUBE.

SANITARY PROTECTION NOTES

1. SEEDLINGS SHALL NOT BE PLANTED WITHIN 10' OFFSET OF EXISTING SANITARY SEWER LINE AND MANHOLES. SHRUBS AND GRASSES SHALL ONLY BE PLANTED WITHIN 10' OF PIPELINE AND MANHOLES.

LANDSCAPE TABLE 1: HIGH-DENSITY DISTURBED AREA PLANTING SCHEDULE
NO SUBSTITUTIONS WITHOUT PRIOR APPROVAL OF LANDSCAPE DESIGNER

QTY	BOTANICAL NAME	COMMON NAME	SPACING	MIN. SIZE	CONTAINER	COMMENTS
SHRUB SEEDLING PLANTINGS - PLANT AT A DENSITY OF 200 SHRUBS/ACRE						
25	CORNUS SERICEA	REDOSIER DOGWOOD	15'	3'	LS	
25	CORNUS AMOMUM	SILKY DOGWOOD	15'	3'	LS	
25	SALIX DISCOLOR	PUSSY WILLOW	15'	3'	LS	
26	SAMBUCUS L.	ELDERBERRY	15'	2'	2-GAL	
26	PHYSOCARPUS RAF.	NINEBARK	15'	2'	2-GAL	
27	AMELANCHIER	SERVICEBERRY	15'	2'	2-GAL	
TREE SEEDLING PLANTINGS - PLANT AT A DENSITY OF 200 TREES/ACRE						
51	PLATANUS L.	SYCAMORE	15'	N/A	1" CAL	Provide Tree Shelter w/ Stake
51	FRAXINUS AMERICANA	WHITE ASH	15'	N/A	1" CAL	Provide Tree Shelter w/ Stake
52	CERCIS L.	REDBUD	15'	N/A	1" CAL	Provide Tree Shelter w/ Stake
HERBACEOUS PLANTINGS - PLANT AT A DENSITY OF 200 PLANTS/ACRE						
154	POLYPODIOPSIDA	ASSORTED FERNS	14'	N/A	DP-50	

SEED MIX

Seed Mix #	SF	Seed Mix Name	Seeding Rate	Seed Source	COMMENTS
ERNMX-111				Ernst Conservation Seeds (or approved equal)	Contractor to confirm all Seed Mix quantity prior to ordering and installing
ERNMX-181				Ernst Conservation Seeds (or approved equal)	Contractor to confirm all Seed Mix quantity prior to ordering and installing

LANDSCAPE TABLE 2 :LOW-DENSITY UPLAND RIPARIAN BUFFER PLANTING SCHEDULE
NO SUBSTITUTIONS WITHOUT PRIOR APPROVAL OF LANDSCAPE DESIGNER

QTY	BOTANICAL NAME	COMMON NAME	SPACING	MIN. SIZE	CONTAINER	COMMENTS
SHRUB SEEDLING PLANTINGS - PLANT AT A DENSITY OF 150 SHRUBS/ACRE						
303	LINDERA	SPICEBUSH	17'	2'	2-GAL	Provide Shrub Shelter
304	HAMAMELIS VIRGINIANA L.	AMERICAN WITCHHAZEL	17'	2'	2-GAL	Provide Shrub Shelter
TREE SEEDLING PLANTINGS - PLANT AT A DENSITY OF 50 TREES/ACRE						
40	FAGUS GRANDIFOLIA	AMERICAN BEECH	26'	N/A	1" CAL	Provide Tree Shelter w/ Stake
40	BETULA POPULIFOLIA	GRAY BIRCH	26'	2'	2-GAL	Provide Tree Tube
41	CORNUS FLORIDA	WHITE FLOWERING DOGWOOD	26'	2'	2-GAL	Provide Tree Tube
41	QUERCUS ALBA L.	WHITE OAK	26'	N/A	1" CAL	Provide Tree Shelter w/ Stake
41	JUGLANS NIGRA	BLACK WALNUT	26'	N/A	1" CAL	Provide Tree Shelter w/ Stake
HERBACEOUS PLANTINGS - PLANT AT A DENSITY OF 150 PLANTS/ACRE						
607		ASSORTED WET SEDGES	17'	N/A	DP-50	

SEED MIXES

Seed Mix #	SF	Seed Mix Name	Seeding Rate	Seed Source	COMMENTS
ERNMX 132-1				Ernst Conservation Seeds (or approved equal)	Contractor to confirm all Seed Mix quantity prior to ordering and installing This seed mix shall be used for re-seeding the disturbed ESC access roads
		TEMPORARY SEEDING – SEE	200 LBS/ACRE	Ernst Conservation Seeds (or approved equal)	Contractor to confirm all Seed Mix quantity prior to ordering and installing Temporary seeding

ACCESSORIES

QTY	SIZE	ITEM	INSTALL WITH:
	5' ht.	Tree Shelter – Tubex – combitube (or approved equal)	Tree Seedlings
	5' ht.	Wood Stakes	Tree Seedlings
	NA	Tubex Bird Netting (or approved equal)	Tree Seedlings
NOTES:			
Contractor to verify all shelter, wood stake, and bird netting quantities prior to purchasing and installing.			
Contractor to verify if any protective shelters require zip ties or other fasteners to be purchased separately.			

HRG

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ALLENTOWN, PA 18106
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CONSTRUCTION AND EROSION CONTROL PLANS
FOR
SCULAC ROAD STREAM RESTORATION
BETHLEHEM TOWNSHIP MUNICIPAL AUTHORITY
4225 EASTON AVENUE
BETHLEHEM, PA 18020
BETHLEHEM TOWNSHIP NORTHAMPTON COUNTY PENNSYLVANIA

PROFESSIONAL SEAL:
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
JAMES D. POWELL
ENGINEER
PE094717
10/29/2025

HRG PROJECT NUMBER:	R009170.0431
PLAN DATE:	FEBRUARY 2025
DRAWING SCALE:	AS SHOWN
PROJ. MANAGER:	MATTHEW VANASKIE

REVISIONS

NO.	DATE	DESCRIPTION
1	03/05/25	REVISED PER NCCD COMMENTS
2	10/01/25	REVISED PER CONSTRUCTABILITY REVIEW
3		
4		
5		
6		
7		
8		
9		

SHEET TITLE:
LANDSCAPING NOTES AND DETAILS

SHEET: NT-02 | 37

FILE PATH & NAME: P:\0091\009170_0431\C3D\Plan Sets\CONS\RE-DESIGN 9.2025\C00917004311NT.dwg LAYOUT:NT-02 LAST PLOTTED:10/29/2025 12:00 PM BY:JPOWELL