CONSTRUCTION PLANS FOR

IDALS NO. STO822305D

NUTRIENT REDUCTION WETLAND

STORY COUNTY, IOWA

JANUARY 2026

GOVERNING SPECIFICATIONS

THE SPECIFICATIONS AS PREPARED BY IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP AND BOLTON & MENK, INC. SHALL BE CONSIDERED AS PART OF THIS DOCUMENT. NATURAL RESOURCES CONSERVATION SERVICE CONSTRUCTION SPECIFICATIONS SHALL APPLY.

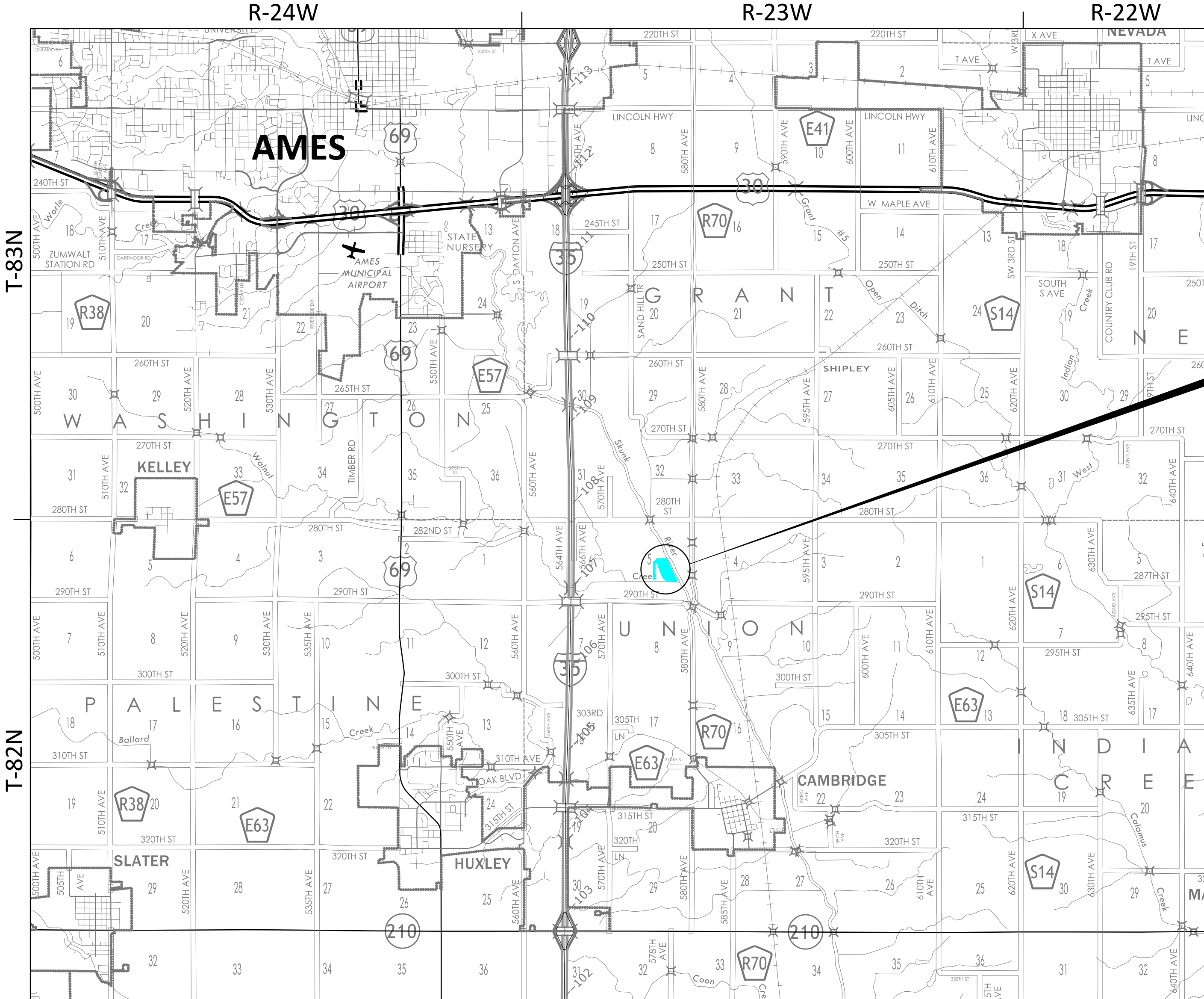
THE CURRENT EDITION OF THE "IOWA STATEWIDE URBAN STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS" SHALL GOVERN.

IOWA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION" AND ALL CURRENT GENERAL SUPPLEMENTAL SPECIFICATIONS AND MATERIALS INSTRUCTIONAL MEMORANDUM SHALL GOVERN AS REFERENCED.

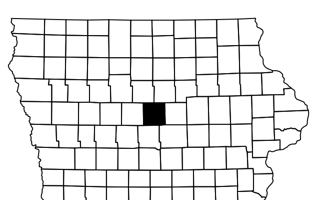
ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."
THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING IOWA ONE CALL BY PHONE AT 811, OR ON THE WEB AT HTTP://WWW.IOWAONECALL.COM/. TICKET# ___________. TICKET NUMBER MUST BE PROVIDED TO THE NRCS PRIOR TO COMMENCEMENT OF WORK.



SCALE 0 1 2 FEET



STORY COUNTY, IA

NOTES
1. IF A CULTURAL RESOURCE IS IDENTIFIED DURING CONSTRUCTION, STOP WORK IMMEDIATELY AND NOTIFY THE LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE.
2. THERE IS NO GUARANTEE THAT THE WETLAND WILL FILL OR REMAIN FILLED WITH WATER.

IOWA DEPARTMENT OF **AGRICULTURE & LAND STEWARDSHIP**

SHEET INDEX

SHEET NO.	SHEET TITLE
A.01	TITLE SHEET
A.02	PLAN OVERVIEW SHEET
B.01	RCP INSTALLATION DETAIL
B.02	CPDT INSTALLATION DETAIL
B.03	PUMP BASIN DETAIL
B.04	WETLAND OUTLET STRUCTURE & TRASH GUARD DETAIL
B.05	ANTI-SEEP COLLAR DETAIL
C.01	ESTIMATED QUANTITIES
D.01	GRADING OVERVIEW
D.02	INLET CHANNEL
D.03	NORTHEAST BERM & AUXILIARY SPILLWAY
D.04	SOUTH BERM
D.05	NORTH POOL CROSS SECTION (E-W)
D.06	SOUTH POOL CROSS SECTION (E-W)
D.07	POOL CROSS SECTION (N-S)
K.01	SEEDING PLAN
M.01	PUMP INLET PIPE & WETLAND OUTLET PIPE
M.02	RING TILE

CONSERVATION PRACTICE STANDARDS USED:
656 - CONSTRUCTED WETLAND

NRCS JOB CLASS: III
WATERSHED AREA < 300 AC

TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT, AND BELIEF, THESE PLANS MEET APPLICABLE NRCS STANDARDS AND APPLICABLE LAWS AND REGULATIONS.

CLIENT ACCEPTANCE

SIGNATURE ____________________ DATE

PROJECT DATUM: STATE PLANE
HORIZONTAL: IOWA NORTH
VERTICAL: NAVD 1988

LICENSED PROFESSIONAL ENGINEER
BRANDON C. SHORT
29449
IOWA

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

BRANDON C. SHORT, PE

LICENSE NUMBER: 29449 DATE: ____________

MY LICENSE RENEWAL DATE IS 12/31/2026

PAGES OR SHEETS COVERED BY THIS SEAL:

ALL SHEETS

BOLTON & MENK
1519 BALTIMORE DRIVE
AMES, IA 50010
Phone: (515) 233-6100
Email: Ames@bolton-menk.com
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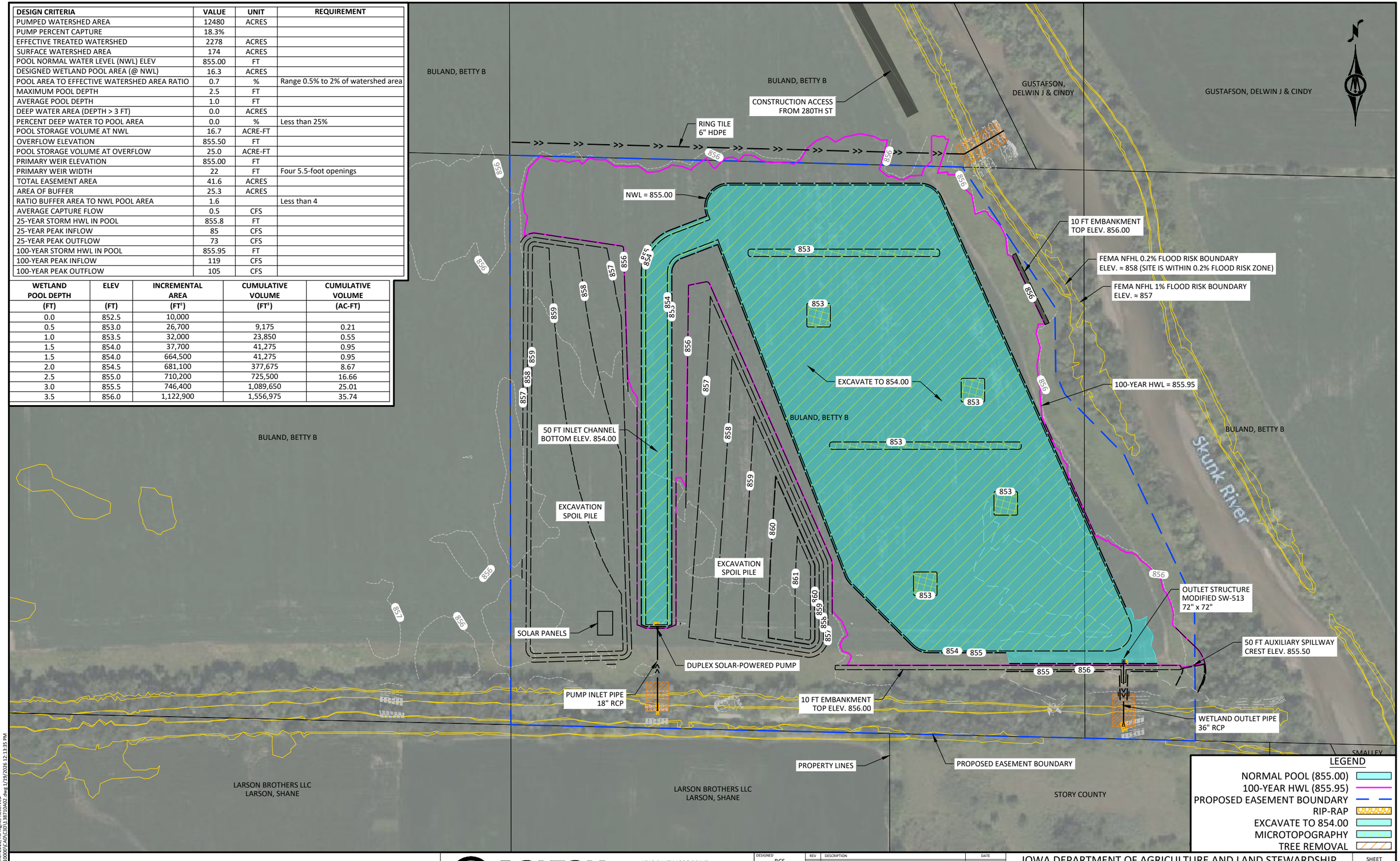
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
STO822305D - BULAND WETLAND
TITLE SHEET

SHEET A.01

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DESIGN CRITERIA	VALUE	UNIT	REQUIREMENT
PUMPED WATERSHED AREA	12480	ACRES	
PUMP PERCENT CAPTURE	18.3%		
EFFECTIVE TREATED WATERSHED	2278	ACRES	
SURFACE WATERSHED AREA	174	ACRES	
POOL NORMAL WATER LEVEL (NWL) ELEV	855.00	FT	
DESIGNED WETLAND POOL AREA (@ NWL)	16.3	ACRES	
POOL AREA TO EFFECTIVE WATERSHED AREA RATIO	0.7	%	Range 0.5% to 2% of watershed area
MAXIMUM POOL DEPTH	2.5	FT	
AVERAGE POOL DEPTH	1.0	FT	
DEEP WATER AREA (DEPTH > 3 FT)	0.0	ACRES	
PERCENT DEEP WATER TO POOL AREA	0.0	%	Less than 25%
POOL STORAGE VOLUME AT NWL	16.7	ACRE-FT	
OVERFLOW ELEVATION	855.50	FT	
POOL STORAGE VOLUME AT OVERFLOW	25.0	ACRE-FT	
PRIMARY WEIR ELEVATION	855.00	FT	
PRIMARY WEIR WIDTH	22	FT	Four 5.5-foot openings
TOTAL EASEMENT AREA	41.6	ACRES	
AREA OF BUFFER	25.3	ACRES	
RATIO BUFFER AREA TO NWL POOL AREA	1.6		Less than 4
AVERAGE CAPTURE FLOW	0.5	CFS	
25-YEAR STORM HWL IN POOL	855.8	FT	
25-YEAR PEAK INFLOW	85	CFS	
25-YEAR PEAK OUTFLOW	73	CFS	
100-YEAR STORM HWL IN POOL	855.95	FT	
100-YEAR PEAK INFLOW	119	CFS	
100-YEAR PEAK OUTFLOW	105	CFS	

WETLAND POOL DEPTH (FT)	ELEV (FT)	INCREMENTAL AREA (FT^2)	CUMULATIVE VOLUME (FT^3)	CUMULATIVE VOLUME (AC-FT)
0.0	852.5	10,000		
0.5	853.0	26,700	9,175	0.21
1.0	853.5	32,000	23,850	0.55
1.5	854.0	37,700	41,275	0.95
1.5	854.0	664,500	41,275	0.95
2.0	854.5	681,100	377,675	8.67
2.5	855.0	710,200	725,500	16.66
3.0	855.5	746,400	1,089,650	25.01
3.5	856.0	1,122,900	1,556,975	35.74



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HORZ. SCALE 0 100 200 FEET

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IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
STO822305D - BULAND WETLAND
PLAN OVERVIEW SHEET

SHEET A.02

PIPE HAUNCH FILL AND COMPACTION METHOD
PLAN REQUIREMENTS COMPLIANCE VERIFICATION

THE CONTRACTOR IS SOLEY RESPONSIBLE FOR THE INSTALLATION OF ALL PIPE ACCORDING TO PLAN REQUIREMENTS. THE CONTRACTOR'S PARTICIPATION IN AND COMPLIANCE WITH THE FOLLOWING PROCEDURE IS REQUIRED AND WILL ALLOW FOR FEWER SOIL DENSITY TESTS TO ENSURE PROPER PIPE INSTALLATION.

STEP 1
BEFORE COMMENCING PIPE INSTALLATION, STANDARD SOIL PROCTOR DENSITY TEST RESULTS OF REPRESENTATIVE SAMPLE(S) OF PIPE HAUNCH FILL SHALL BE PROVIDED BY AN INDEPENDENT QUALIFIED SOILS TESTING LAB. THE SELECTION OF THE SAMPLE(S) WILL BE MADE BY THE ENGINEER AND CONTRACTOR (WHEN SPECIFIED).

STEP 2
CONTRACTOR MAY BEGIN EXCAVATING THE MODIFIED TYPE 4 TRENCH
WITH THE REQUIRED SHAPED BOTTOM GROOVE AND PLACE SEVERAL PIPE SECTIONS ONLY WHEN BOTH ENGINEER AND TESTING LAB TECHNICIAN ARE PRESENT

CONTRACTOR SHALL DEMONSTRATE THE INTENDED METHODS FOR COMPACTING THE FILL FOR THE PIPE HAUNCH AREAS. SOIL DENSITY TESTS SHALL BE TAKEN AT LOCATIONS DESIGNATED BY THE ENGINEER TO CONFIRM THAT THE INTEDNED METHODS FOR FILL AND COMPACTION OF THE PIPE HAUNCH AREAS SATIFIES THE PLAN REQUIREMENTS. CONTRACTOR SHALL MODIFIY THE INSTALLATION METHODS AND REPEAT STEP 2 UNTIL ACCEPTABLE TESTS RESULTS ARE ACHIEVED.

STEP 3
CONTRACTOR MAY INSTALL THE NEXT SEVERAL HUNDRED FEET OF PIPE. ENGINEER SHALL DESIGNATE SEVERAL LOCATIONS (APPROXIMATELY 10% OF THE INSTALLED LENGTH) WHERE CONTRACTOR SHALL LEAVE THE PIPE UNBLINDED FOR FURTHER DENSITY TESTS OF THE HAUNCH FILL AREA. ALL DENSITY TESTS MUST MEET PLAN REQUIREMENTS BEFORE WORK MAY PROCEED FURTHER.

IF DENSITY TESTING DATA CONFIRMS TO THE SATISFACTION OF THE ENGINEER THAT THE CONTRACTOR'S INSTALLATION METHOD WILL PRODUCE CONSISTENT COMPLIANCE WITH PLAN REQUIREMENTS, CONTRACTOR MAY CONTINUE INSTALLATION OF THE PIPE WITH NO ADDITIONAL TESTING REQUIRED. IF NOT, STEPS 2 AND 3 SHALL BE REPEATED UNTIL A RELIABLE, SUCCESSFUL METHOD OF PIPE INSTALLATION THAT PRODUCES SATISFACTORY RESULTS IS ESTABLISHED.

CONTRACTOR IS REQUIRED TO PROPERLY AND ADEQUATELY INSTRUCT SUBCONTRACTORS AND/OR SUBSEQUENT PIPE INSTALLATION WORKERS ON THE PROPER INSTALLATION METHOD.

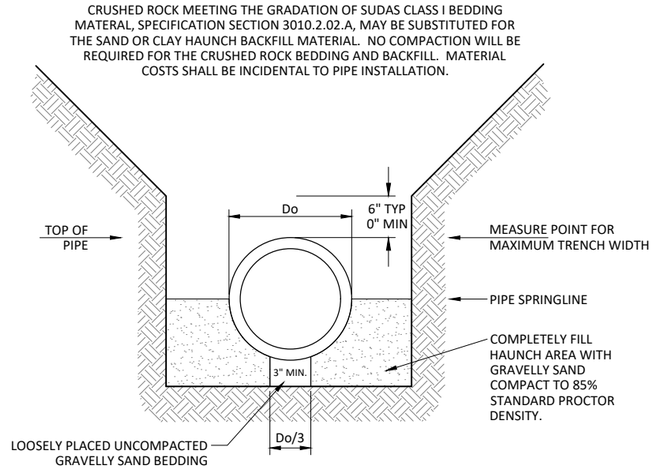
STEP 4A
SOIL OR TRENCH CONDITION CHANGES

TO VERIFY CONTRACTOR'S COMPLIANCE WITH PLAN REQUIREMENTS UNDER THE CHANGED CONDITIONS, ENGINEER MAY STOP WORK AND REQUIRE ADDITIONAL SOIL PROCTOR TESTS AND/OR SOIL DENSITY TESTS SIMILAR TO STEPS 1 THROUGH 3. THE WORK AND COSTS OF THE FIRST TWO REVERIFICATIONS IS SUBSIDIARY TO THE PIPE INSTALLATION. SUBSEQUENT VERIFICATIONS WILL BE CONSIDERED EXTRA WORK.

STEP 4B
CONTRACTOR FAILS TO CONSISTENTLY PERFORM INSTALLATION METHOD OR INSTRUCT OTHER INSTALLERS

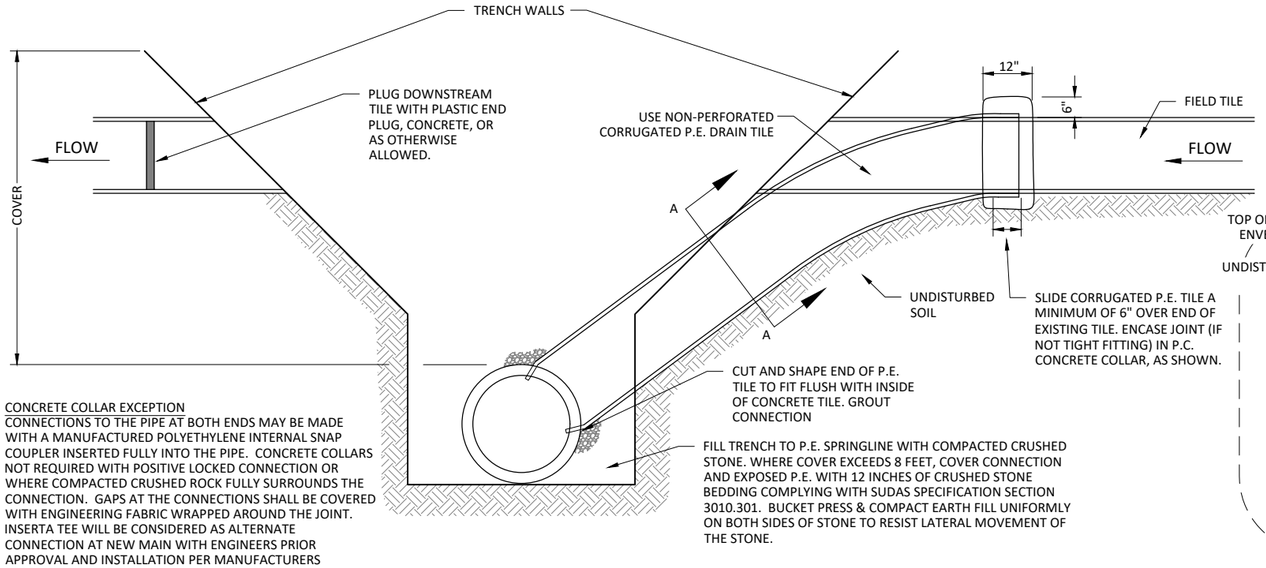
IF CONTRACTOR FAILS TO CONSISTENTLY PERFORM OR ADEQUATELY INSTRUCT SUBCONTRACTORS AND/OR SUBSEQUENT PIPE INSTALLATION WORKERS ON THE APPROVED INSTALLATION METHOD, ENGINEER MAY STOP WORK AND REQUIRE ADDITIONAL SOIL PROCTOR TESTS AND/OR SOIL DENSITY TESTS SIMILAR TO STEPS 1 THROUGH 3 TO VERIFY CONTRACTOR'S COMPLIANCE WITH PLAN REQUIREMENTS. THE WORK AND COSTS OF ALL VERIFICATIONS UNDER SUCH CONDITIONS IS SUBSIDIARY TO THE PIPE INSTALLATION.

EXCEPTION
IF CONTRACTOR ELECTS TO SHAPE THE TRENCH BOTTOM SUCH THAT A MINIMUM OF 45% OF THE OUTER CIRCUMFERENCE OF THE PIPE IS FIRMLY BEDDED IN AND CONSISTENTLY SUPPORTED BY UNDISTURBED SOIL, PIPE HAUNCH FILL COMPACTION TESTING WILL NOT BE REQUIRED. THE CONTRACTOR IS REQUIRED TO COMPLY WITH A PROPER INSTALLATION METHOD AND TO FULLY COMPLY WITH THE REQUIREMENTS OF THE VERIFICATION OUTLINED ABOVE FOR ALL SITUATIONS WHERE THIS EXCEPTION IS NOT MET.



GRAVELLY SAND BEDDING SHALL BE CONSISTENT WITH THE GRADATION AND OTHER CHARACTERISTICS OF STANDARD AASHTO A1 OR A3 SOIL. A REPRESENTATIVE SAMPLE OF THE MATERIAL AND A GRADATION REPORT OR SUPPLIER'S CERTIFICATION OF COMPLIANCE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO DELIVERY TO SITE. SEE SOIL DATA IN APPENDIX OF SPECIFICATIONS BOOKLET.

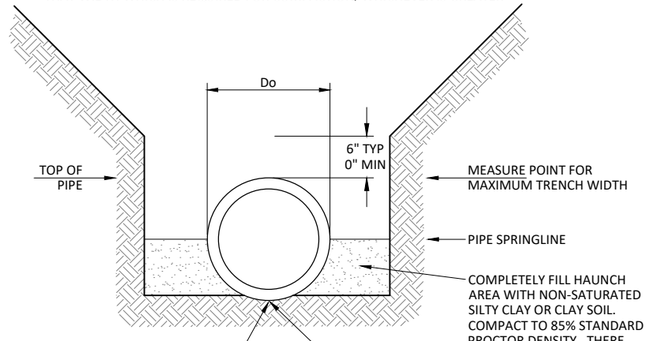
TRENCH INSTALLATION TYPE 3
NOT TO SCALE
SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION
CONCRETE PIPE DESIGN MANUAL



CONCRETE COLLAR EXCEPTION
CONNECTIONS TO THE PIPE AT BOTH ENDS MAY BE MADE WITH A MANUFACTURED POLYETHYLENE INTERNAL SNAP COUPLER INSERTED FULLY INTO THE PIPE. CONCRETE COLLARS NOT REQUIRED WITH POSITIVE LOCKED CONNECTION OR WHERE COMPACTED CRUSHED ROCK FULLY SURROUNDS THE CONNECTION. GAPS AT THE CONNECTIONS SHALL BE COVERED WITH ENGINEERING FABRIC WRAPPED AROUND THE JOINT. INSERTA TEE WILL BE CONSIDERED AS ALTERNATE CONNECTION AT NEW MAIN WITH ENGINEERS PRIOR APPROVAL AND INSTALLATION PER MANUFACTURERS RECOMMENDATION.

TYPICAL FIELD TILE CONNECTION
FOR FIELD TILE UP TO 10" DIAMETER

MINIMUM TRENCH WIDTH SHALL BE OUTSIDE DIAMETER OF PIPE PLUS 12" OR THAT WIDTH WHICH IS REQUIRED FOR COMPACTION, WHICHEVER IS GREATER



MODIFIED TRENCH INSTALLATION TYPE 4
NOT TO SCALE
SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION
CONCRETE PIPE DESIGN MANUAL

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IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
STO822305D - BULAND WETLAND
RCP INSTALLATION DETAIL

SHEET B.01

CORRUGATED POLYETHYLENE DRAINAGE TUBING
MATERIAL & INSTALLATION NOTES

1. ALL CPDT AND CONNECTORS FURNISHED SHALL BE IN COMPLIANCE WITH MATERIAL STANDARDS ASTM F405 AND F667, AS APPLICABLE, AND SHALL BE CLASSIFIED AS HEAVY-DUTY UNDER THOSE STANDARDS.
2. EXCEPT MODIFIED HEREIN OR OTHERWISE APPROVED BY ENGINEER, ALL CPDT SHALL BE INSTALLED IN COMPLIANCE WITH THE ASTM 449 STANDARD PRACTICE.
3. FOR PIPES 6" DIAMETER AND SMALLER A 90° V GROOVE BOTTOM MAY BE USED, FOR ALL LARGER PIPE A TRAPEZOIDAL BOTTOM OR A CIRCULAR BOTTOM CONFORMING TO THE OUTSIDE DIAMETER OF THE PIPE SHALL BE USED. PRIOR TO THE INSTALLATION OF CPDT, CONTRACTOR MUST PROVE TO ENGINEER THAT THE INSTALLATION REQUIREMENTS, INCLUDING THE SHAPE OF THE TRENCH BOTTOM, WILL BE ACCOMPLISHED.
4. WHERE TRENCH BOTTOM IS IN FIRM UNDISTURBED SOIL, SHAPE TRENCH BASE GROOVE. WHERE EXCESS CUT OCCURS, OVEREXCAVATE AND PLACE MINIMUM THREE (3) INCH THICK, GRAVELLY SAND BEDDING TO RESTORE GRADE. THIS BEDDING SHALL MEET THAT REQUIRED FOR TRENCH INSTALLATION TYPE 3 ON PLAN SHEET B.02. THIS MATERIAL AND WORK SHALL BE INCIDENTAL TO THE INSTALLATION OF THE PIPE. CONTRACTOR MAY SUBSTITUTE PIPE BEDDING ROCK AS THE BEDDING MATERIAL.
5. NATIVE SOILS MAY BE USED AS BACKFILL MATERIAL UNLESS UNSTABLE TRENCH CONDITIONS PREVENT THE TRENCH BOTTOM HOLDING THE SHAPED GROOVE. IF TRENCH BOTTOM WILL NOT HOLD GROOVE SHAPE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY. A FLAT BOTTOM TRENCH INSTALLATION WILL THEN BE ASSUMED. THE REQUIRED BEDDING MATERIAL SHALL BE INCIDENTAL TO THE INSTALLATION OF THE PIPE.
6. MINIMUM TRENCH WIDTH IS PIPE OUTSIDE DIAMETER PLUS FOUR (4) INCHES FOR PLOWED INSTALLATION AND PIPE OUTSIDE DIAMETER PLUS TWELVE (12) INCHES FOR OPEN TRENCH INSTALLATION.
7. ALL LATERAL CONNECTIONS, ELBOWS, TEES, ALIGNMENT CURVES, START HOLES AND ALL PORTIONS OF THE TRENCH NOT MEETING THE GROOVED TRENCH INSTALLATION REQUIREMENTS SHALL BE FILLED TO A MINIMUM OF SIX (6) INCH COVER OVER THE PIPE WITH GRADED CRUSHED STONE OR GRAVEL AS SHOWN ON TABLE 2 OF THIS SHEET. BEDDING MATERIAL SHALL BE INCIDENTAL TO THE INSTALLATION OF THE PIPE.
8. MANUFACTURER'S ENDCAPS SHALL BE INSTALLED AT THE TERMINATION OF EACH LINE UNLESS A CONNECTION TO AN EXISTING DRAIN IS MADE.
9. WITH THE INSTALLATION OF THE FIRST REACH OF CPDT ON THE PROJECT, CONTRACTOR IS REQUIRED TO WORK WITH THE ENGINEER TO CHECK AND CONFIRM THAT THE PIPE STRETCH, IF ANY, DOES NOT EXCEED 5%.
10. ALIGNMENT TURNS MAYBE MADE USING EITHER A MANUFACTURED FITTING OR CURVING THE LINE WITH A 25' MINIMUM RADIUS.

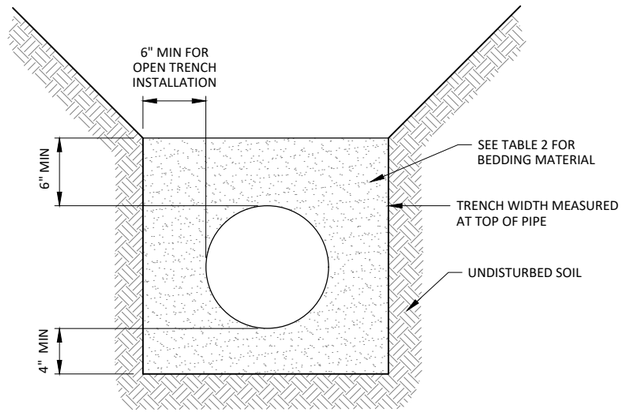
Table 1
Maximum Allowable Buried Depth to Flowline of CPDT

Nominal Pipe Diameter (IN)	Pipe Quality (ASTM)	Trench Width at Top of the Pipe (FT)			
		12"	18"	24"	30" or Greater
4	Standard	13	7	5.5	5
	Heavy-duty	Any	10	7	6
6	Standard	10	7	5.5	5
	Heavy-duty	Any	9.5	6.5	6
8	Standard	10	7	5.5	5
	Heavy-duty	Any	10	7	6
10	Heavy-duty	...	9	7	6
12	Heavy-duty	...	9	7	6
15	Heavy-duty	...	...	7	6

Table 2
Acceptable Bedding Material and Compaction Requirements

Description	Percentage Passing Sieve Sizes			Minimum Standard Density (%)	Maximum Compaction Layer Height (IN.)
	1"	3/4"	No. 4		
Crushed Stone Crushed Gravel*	100%	> 95%	< 5%	Dumped	18

* Class 1 Bedding Material Per SUDAS 3010.202A is an Allowable Substitute



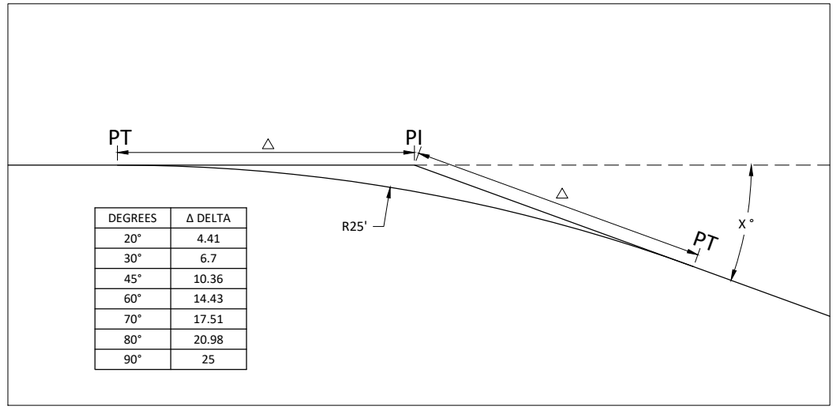
FILL TRENCH TO 6" ABOVE TOP OF PIPE WITH CRUSHED STONE OR GRAVEL MEETING THE REQUIREMENTS IN TABLE 2. BEDDING MATERIAL SHALL BE INCIDENTAL TO THE PIPE INSTALLATION.

FLAT BOTTOM TRENCH INSTALLATION

NOT TO SCALE

SOURCE: ASTM F449

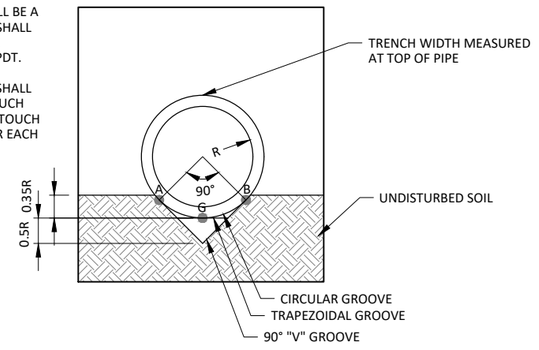
NOTE: THIS IS AN ALLOWED ALTERNATIVE INSTALLATION FOR CPDT



DEGREES	Δ DELTA
20°	4.41
30°	6.7
45°	10.36
60°	14.43
70°	17.51
80°	20.98
90°	25

THE CIRCULAR GROOVE SHALL BE A MINIMUM 0.35R DEEP AND SHALL MATCH THE OUTSIDE CURVE SHAPE OF THE DEFLECTED CPDT.

THE TRAPEZOIDAL GROOVE SHALL BE SHAPED AND ADJUSTED SUCH THAT POINTS A, B, & C WILL TOUCH THE UNDEFLECTED CPDT FOR EACH SIZE INSTALLED.



PREFFERED TRENCH INSTALLATION BOTTOM

TRAPEZOIDAL GROOVE, "V" GROOVE, & CIRCULAR GROOVE
NOT TO SCALE
SOURCE: ASTM F449

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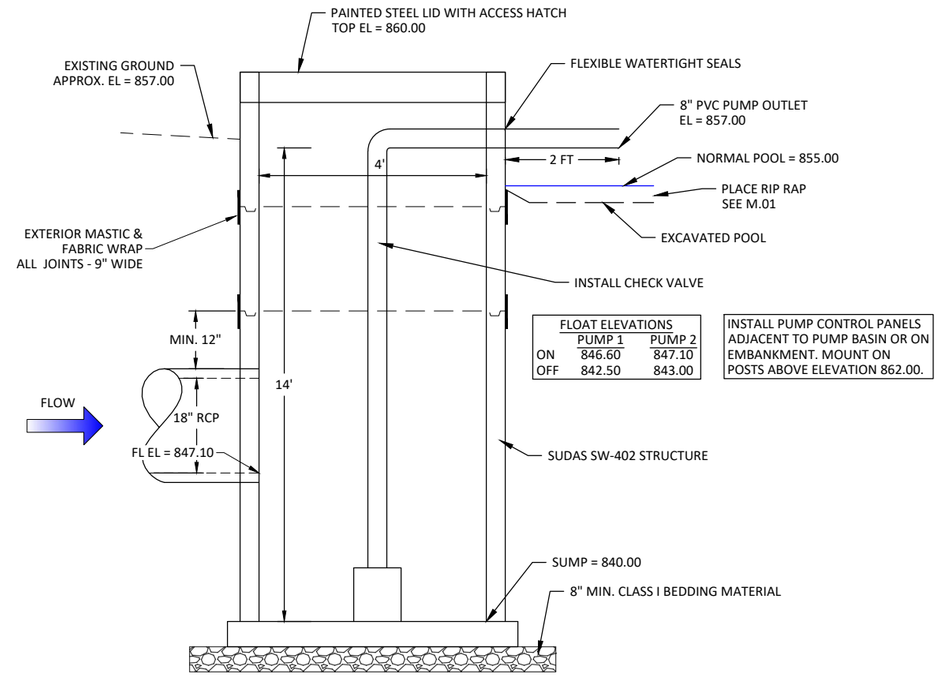
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IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
STO822305D - BULAND WETLAND
CPDT INSTALLATION DETAIL

SHEET B.02

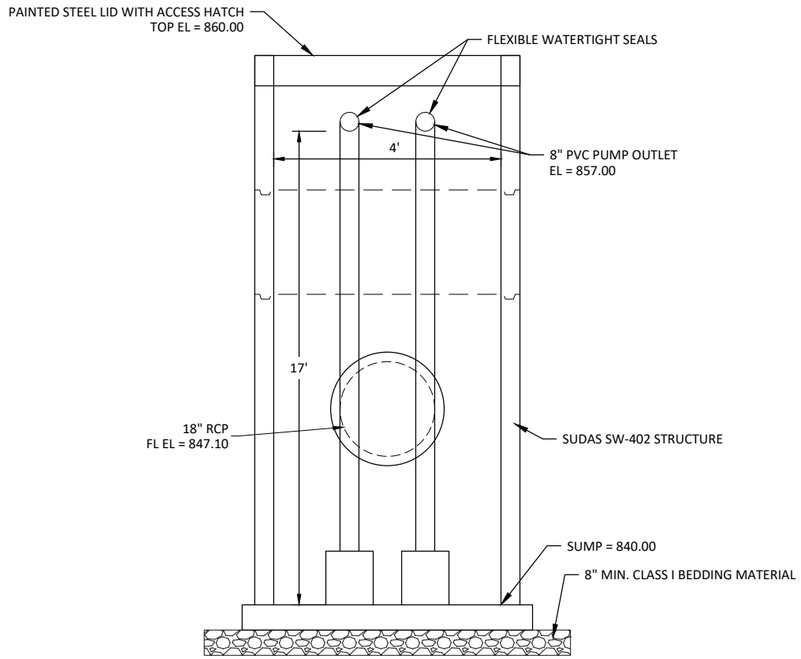
SW-402 WEIR & PUMP BASIN ELEVATION

NOT TO SCALE



FLOAT ELEVATIONS	PUMP 1	PUMP 2
ON	846.60	847.10
OFF	842.50	843.00

INSTALL PUMP CONTROL PANELS ADJACENT TO PUMP BASIN OR ON EMBANKMENT. MOUNT ON POSTS ABOVE ELEVATION 862.00.



NOTE: SOLAR PANELS SHALL BE INSTALLED IN THE LOCATION SHOWN ON A.02 AND M.01 WITH A SOUTHWARD ORIENTATION.

SOLAR POWERED PUMP SYSTEM (BID ITEM 16) SHALL INCLUDE THE FOLLOWING:

- SOLAR PANELS
- SOLAR DRIVE
- 3-PHASE, 3 HP AXIAL PUMP (CARRY CP-04 WITH 17° IMPELLER OR APPROVED EQUAL, PROVIDING 350 GPM AT 10.5 FT TDH)
- FLOAT SWITCH
- MOUNTING CLAMPS FOR CONTROLLER
- SOLAR PANEL MOUNTING KIT
- STEEL PIPE EXTENDERS
- WIRED GENERATOR PLUG
- LIGHTNING & SURGE PROTECTOR
- WIRING FOR PANELS, PUMP, AND CONTROLLER

CONTRACTOR SHALL PROVIDE THE FOLLOWING, SUBSIDIARY TO BID ITEM XX:

- STEEL PIPE FOR MOUNTING
- CONCRETE AND ROCK BEDDING FOR MOUNTING POLES
- PVC DISCHARGE PIPE
- CHECK VALVE

PUMP BASIN (BID ITEM XX) SHALL INCLUDE THE FOLLOWING:

- PUMP BASIN (MODIFIED SW-401, SEE DETAILS)
- STEEL LID WITH STAND

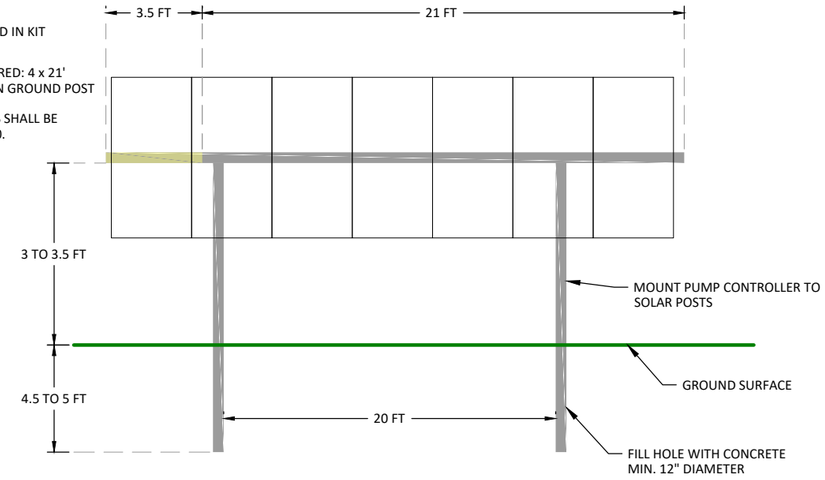
SW-402 WEIR & PUMP BASIN ELEVATION

NOT TO SCALE

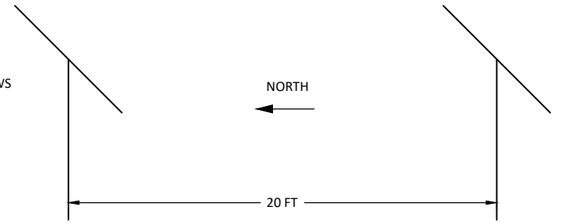
PIPE INCLUDED IN KIT

4" SCHEDULE 40 STEEL PIPE REQUIRED: 4 x 21'
*CUT TWO IN HALF TO MAKE 4 x 10.5' IN GROUND POST

PUMP CONTROLLER AND SOLAR PANELS SHALL BE ENTIRELY ABOVE THE ELEVATION 862.00.

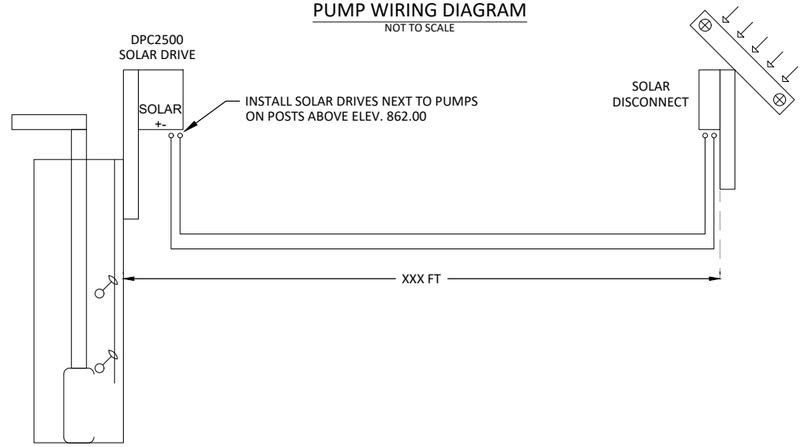


INSTALL SOLAR ARRAYS IN TWO ROWS OF 7 PANELS. ARRAYS SHALL HAVE A SOUTHWARD ORIENTATION AND BE SPACED 20 FT APART.



PUMP WIRING DIAGRAM

NOT TO SCALE



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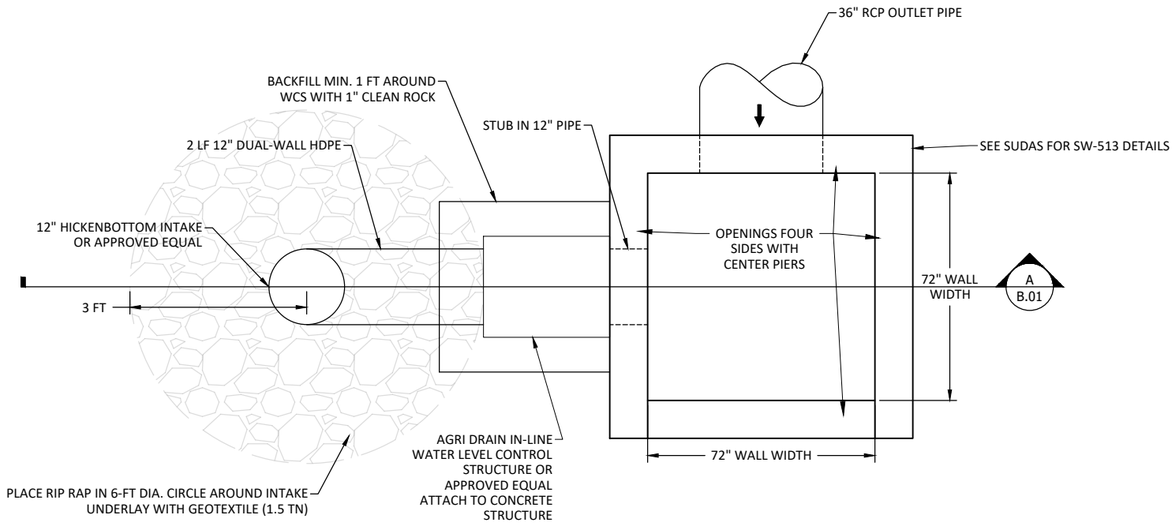
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STO822305D - BULAND WETLAND

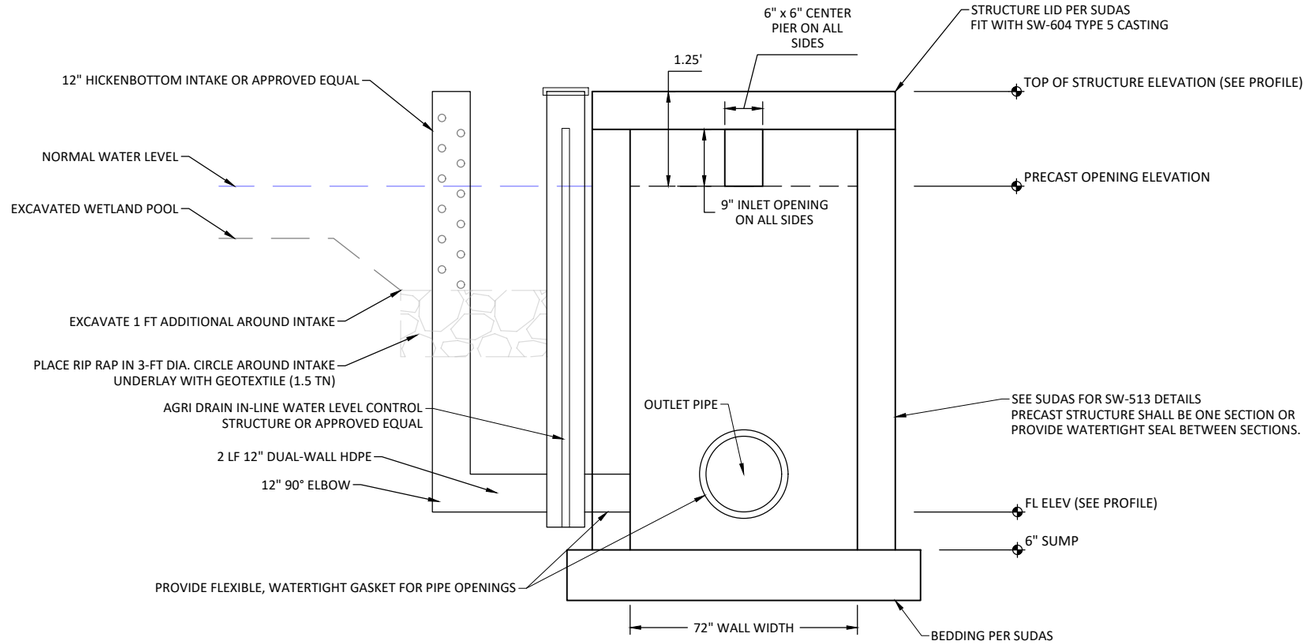
PUMP BASIN DETAIL

SHEET B.03

PLAN
MODIFIED SW-513
OUTLET STRUCTURE
NOT TO SCALE



SECTION A
MODIFIED SW-513
OUTLET STRUCTURE
NOT TO SCALE



NOTES:
1. ALL FASTENERS SHALL BE GALVANIZED OR STAINLESS STEEL.
2. HICKENBOTTOM INTAKE, WATER LEVEL CONTROL STRUCTURE, DUAL-WALL HDPE, ELBOW, TRASH GUARD, CASTING, AND ALL HARDWARE AND APPURTENANCES SHOWN ON THIS PAGE OR REQUIRED FOR INSTALLATION ARE SUBSIDIARY TO THE OUTLET STRUCTURE.

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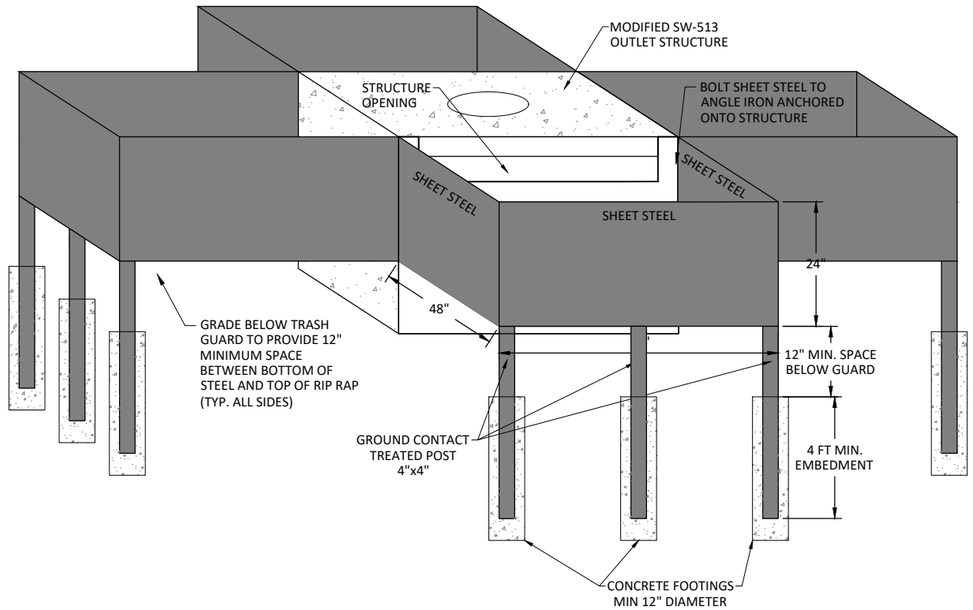
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STO822305D - BULAND WETLAND
WETLAND OUTLET STRUCTURE DETAIL

SHEET B.04

TRASH GUARD FOR WETLAND OUTLET STRUCTURE
NOT TO SCALE



NOTE: TRASH GUARD AND APPURTENANCES ARE TYPICAL FOR ALL SIDES OF OUTLET STRUCTURE. QUANTITIES AND DIMENSIONS FOR STEEL SHEETS PER SIDE OF STRUCTURE ARE AS FOLLOWS:

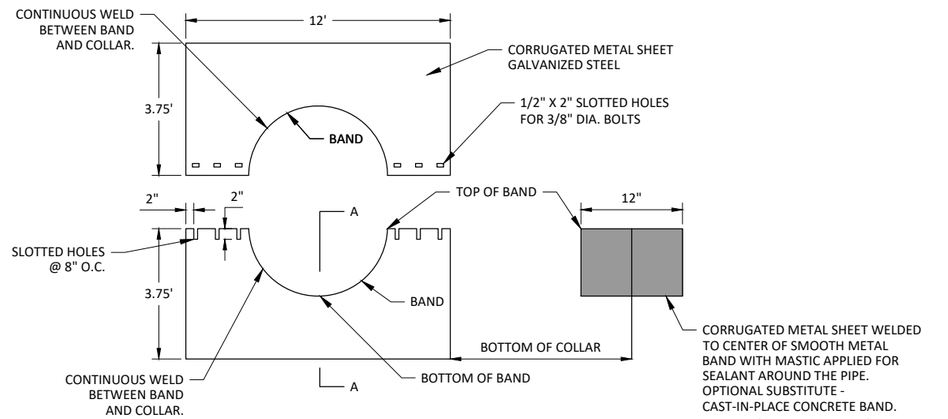
1 - STEEL SHEET - 90" x 24" x 3/8"
2 - STEEL SHEETS - 48" x 24" x 3/8"

ANGLE IRON--EITHER WELDED OR BOLTED--ON TOP AND BOTTOM OF EACH SHEET AS BRACE.
BOLT TRASH GUARD ONTO ANGLE IRON ANCHORED TO OUTLET STRUCTURE.
PROVIDE THREE POSTS WITH CONCRETE FOOTINGS ON EACH SIDE
GRADE AS NECESSARY TO ALLOW FLOW OF WATER UNDER TRASH GUARD WITH 12" MINIMUM CLEARANCE.

ALL FASTENERS SHALL BE GALVANIZED OR STAINLESS STEEL

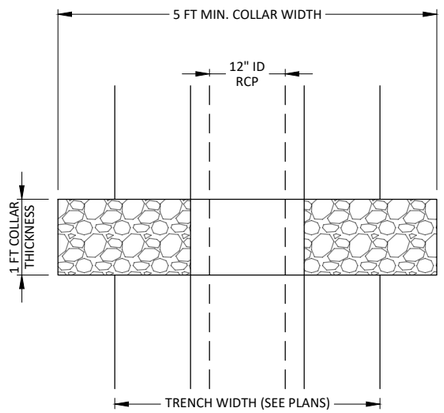
ANTI-SEEP COLLAR DETAILS

ALTERNATIVE 1: RCP ANTI-SEEP COLLAR
NOT TO SCALE



PREFABRICATED HPDE ANTI-SEEP COLLARS ARE AN ALLOWED ALTERNATIVE.

ALTERNATIVE 2: COMPOSITE BENTONITE AGGREGATE COLLAR
NOT TO SCALE



NOTES:
1. COMPOSITE BENTONITE AGGREGATE (CBA) SHALL BE AQUABLOK OR APPROVED EQUAL.
2. COLLAR SHALL EXTEND 1.75 FT BELOW BOTTOM OF PIPE AND 1.75 FT ABOVE TOP OF PIPE
3. COLLAR SHALL BE A MINIMUM OF 5 FT WIDE AND EXTEND A MINIMUM OF 6" BEYOND EDGE OF TRENCH
4. NO COMPACTION OF CBA IS REQUIRED.
5. EXCAVATE AND BACKFILL THE REMAINDER OF THE TRENCH AS NOTED IN THE PLANS.

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STO822305D - BULAND WETLAND
TRASH GUARD & ANTI-SEEP COLLAR DETAIL

SHEET B.05

Bid Item	Description	Specifications		Plan No.	Estimated Quantities	
		No.	Page		Quantity	Unit
1	Site Stripping & Preparation	IA CS-001	3	A.02	1	LS
2	Crop Damage	IA CS-001	3		0	AC
3	Structure and Channel Seeding	IA CS-006	7	K.01	0.7	AC
4	Buffer Seeding	IA CS-006	7	K.01	10.8	AC
5	Mobilization and Demobilization	IA CS-008	11		1	LS
6	Excavation (General)	IA CS-021	16	D.01	34,679	CY
7	Earthfill (General)	IA CS-023	19	D.01	64	CY
8	Earthfill (General Dam)	IA CS-023	19	D.01, D.03-D.04	317	CY
9	Earthfill (Dam Core)	IA CS-023	19	D.04	1,110	CY
10	Topsoil Strip, Salvage, and Respread	IA CS-026	23	D.01	8,593	CY
11	18" Dia. Reinforced Concrete Pipe	IA CS-031	25	B.01, M.01	190	LF
12	36" Dia. Reinforced Concrete Pipe	IA CS-031	25	B.01, M.01	150	LF
13	18" Dia. Concrete Apron, Footing, Bar Guard	IA CS-031	25	M.01	1	EA
14	36" Dia. Concrete Apron, Footing, Bar Guard	IA CS-031	25	M.01	1	EA
15	SW-402 Pump Basin	IA CS-031	25	B.03, M.01	1	EA
16	Solar Pump System	IA CS-031	25	B.03, M.01	2	EA
17	72" x 72" Modified SW-513 Outlet Structure	IA CS-031	25	B.04, M.01	1	EA
18	6" Dia. Corrugated HDPE Pipe (Single-Wall; Perforated)	IA CS-046	33	B.02, M.02	1,044	LF
19	6" Dia. Corrugated HDPE Pipe (Single-Wall; Non-Perforated)	IA CS-046	33	B.02, M.02	85	LF
20	Anti-Seep Collars	IA CS-051	37	B.05, M.01	3	EA
21	8" Dia. CMP Tile Outlet (20 LF Each)	IA CS-051	37	M.02	1	EA
22	Rip Rap (Class E)	IA CS-061	41	M.01	42.7	TN

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ESTIMATED QUANTITIES

SHEET C.01

BULAND, BETTY B

PROPERTY LINES

BULAND, BETTY B

GUSTAFSON, DELWIN J & CINDY

GUSTAFSON, DELWIN J & CINDY

NWL = 855.00

10 FT EMBANKMENT
TOP ELEV. 856.00

EXCAVATE CHANNEL TO 854.00
GRADE OUT AT 10:1

EXCAVATE TO 853.00
440'x17' 4:1 SIDES

EXCAVATE TO 852.50
50'x50' 4:1 SIDES

EXCAVATE TO 854.00

EXCAVATE TO 852.50
50'x50' 4:1 SIDES

EXCAVATE POOL TO 854.00
GRADE OUT AT 10:1

EXCAVATE TO 853.00
440'x17' 4:1 SIDES

EXCAVATE TO 852.50
50'x50' 4:1 SIDES

EXCAVATE TO 852.50
50'x50' 4:1 SIDES

BULAND, BETTY B

BULAND, BETTY B

BULAND, BETTY B

Skunk River

SPOIL PILE

SPOIL PILE

50 FT AUXILIARY SPILLWAY
CREST ELEV. 855.50
3:1 SIDES

50 FT INLET CHANNEL
ELEV. 854.00
10:1 SIDES

10 FT EMBANKMENT
TOP ELEV. 856.00
4:1 SIDES

10 FT COVER BERM
SEE M.01
4:1 SIDES

LARSON BROTHERS LLC
LARSON, SHANE

LARSON BROTHERS LLC
LARSON, SHANE

STORY COUNTY

STORY

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LEGEND

- NORMAL POOL (855.00)
- 100-YEAR HWL (855.95)
- PROPOSED EASEMENT BOUNDARY
- RIP-RAP
- EXCAVATE TO 854.00
- MICROTOPOGRAPHY
- TREE REMOVAL
- MINIMUM 6" TOPSOIL LAYER

HORZ. SCALE 0 100 200 FEET

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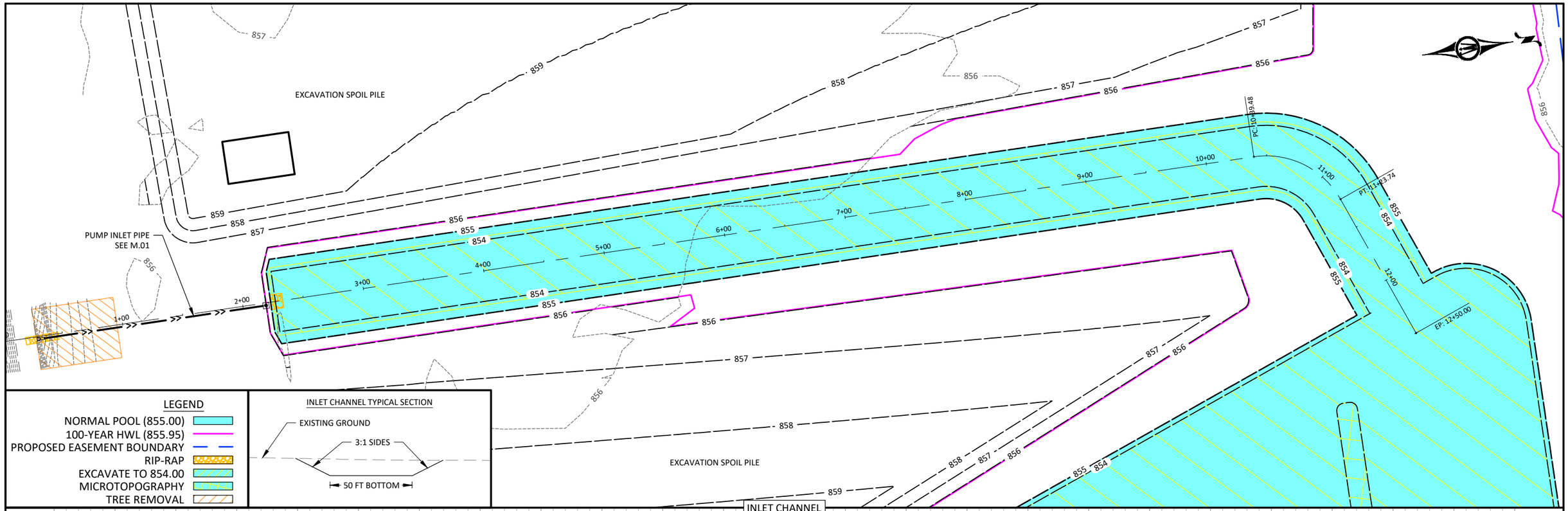
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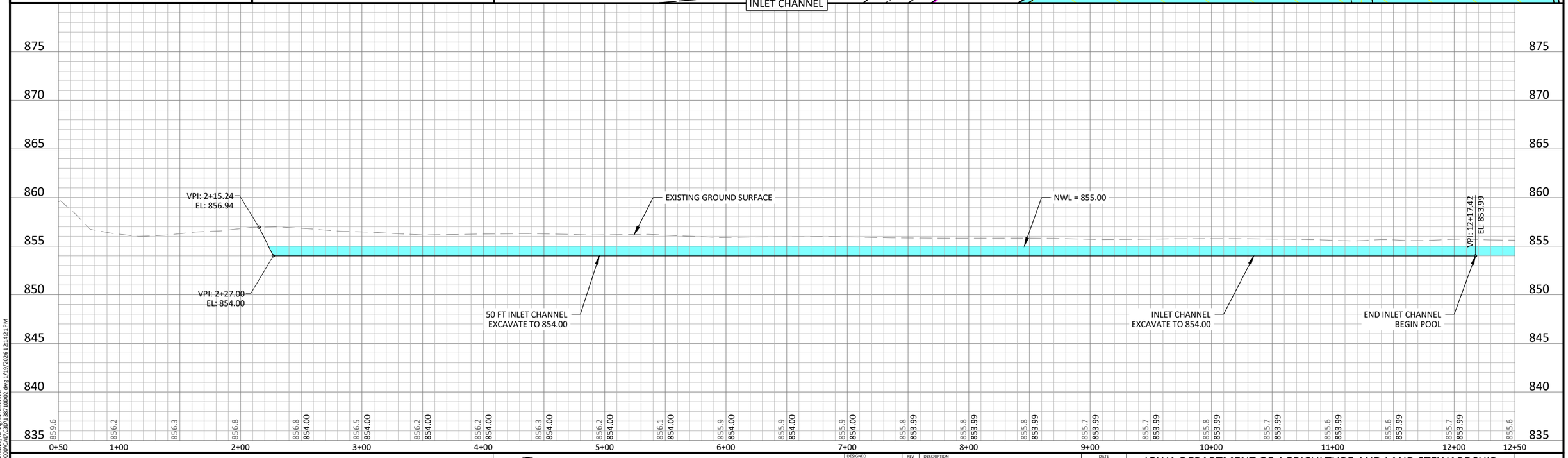
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STO822305D - BULAND WETLAND

GRADING OVERVIEW

SHEET D.01





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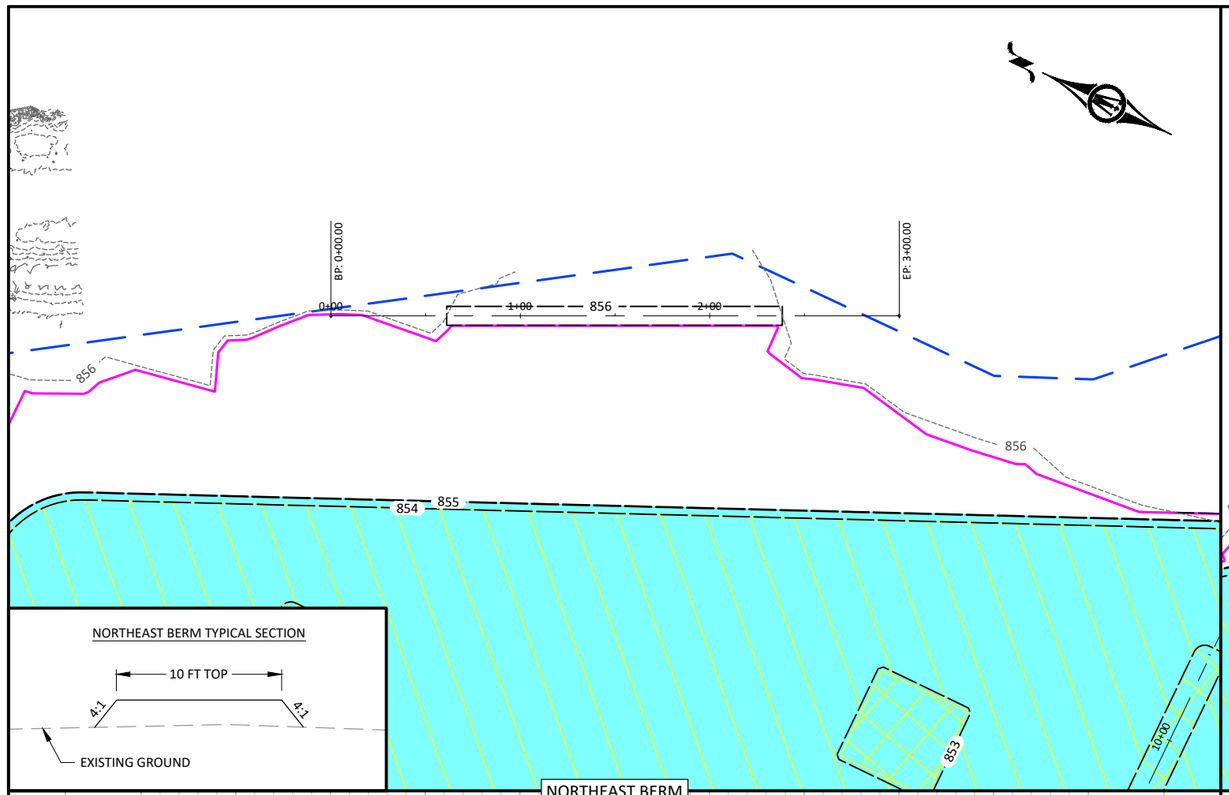
HORZ. SCALE 0 40 80 FEET
VERT. SCALE 0 5 10 FEET

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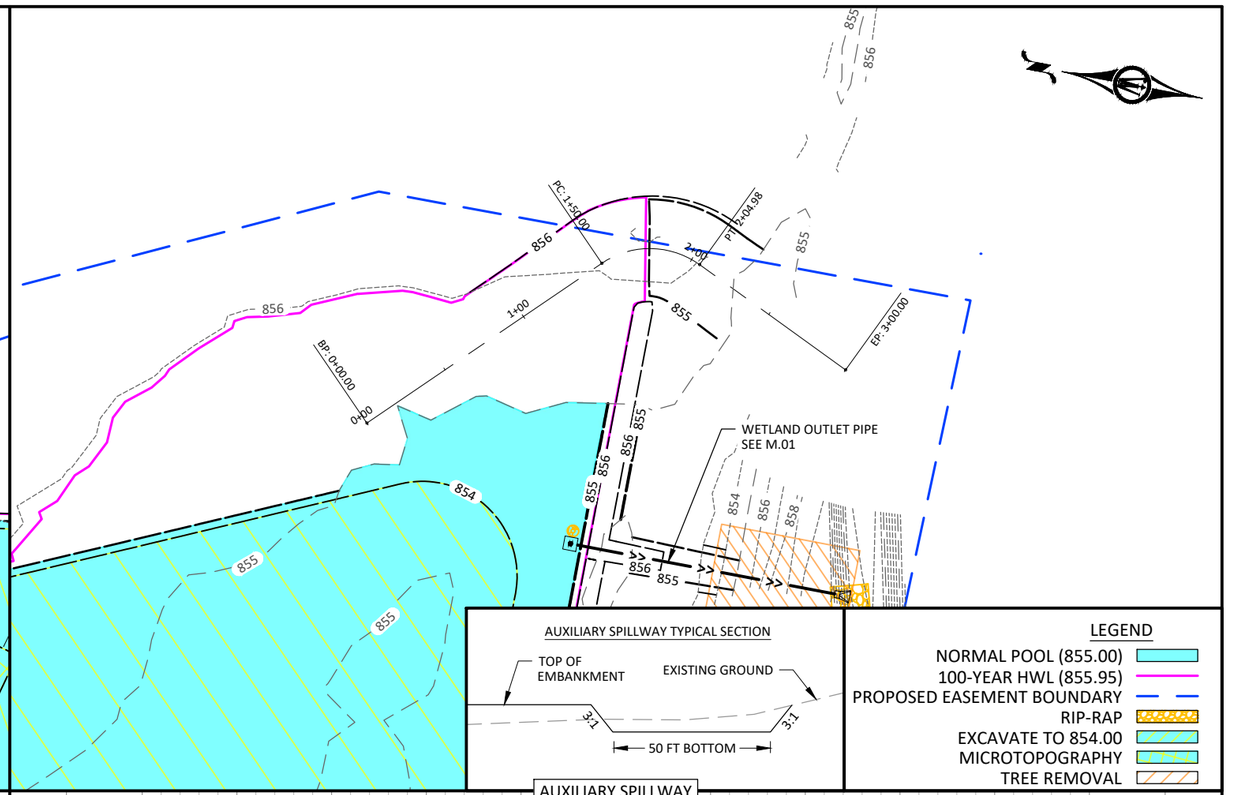
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STO822305D - BULAND WETLAND
INLET CHANNEL

SHEET D.02



NORTHEAST BERM

NORTHEAST BERM TYPICAL SECTION

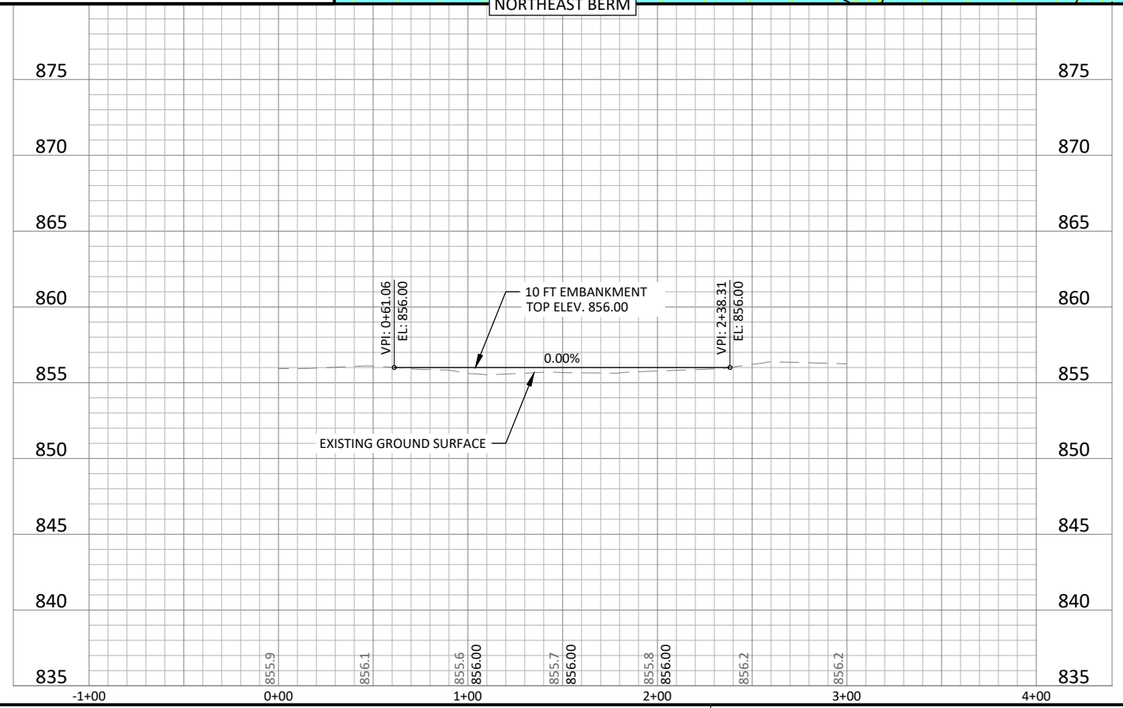


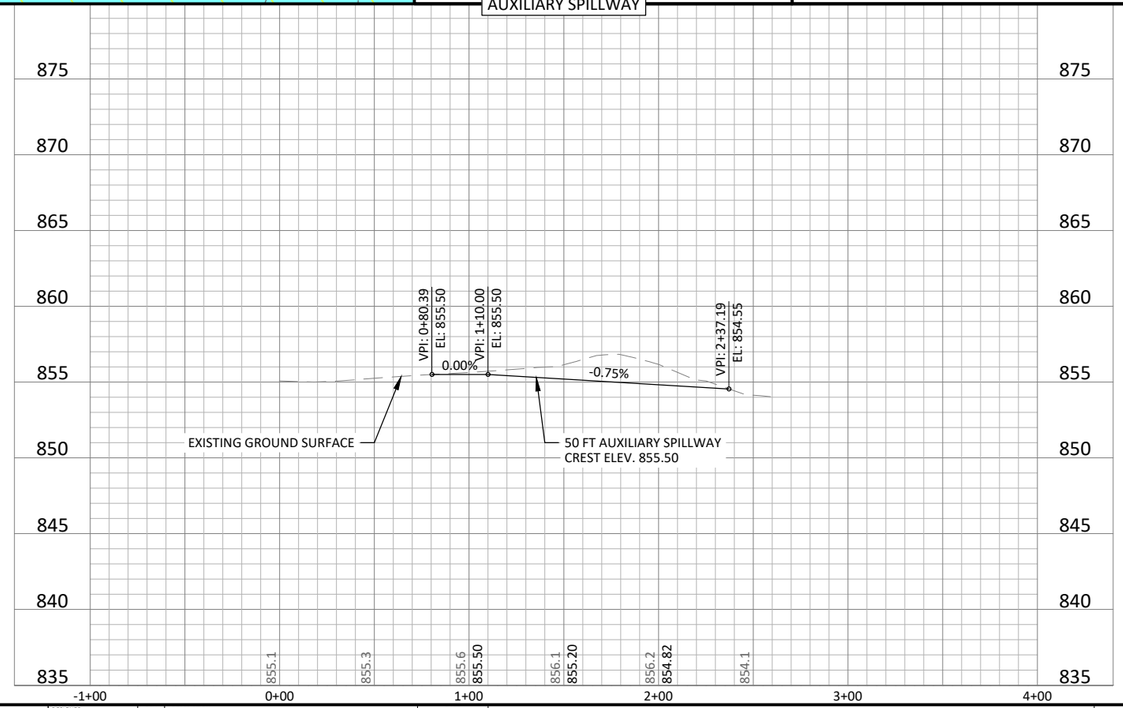
AUXILIARY SPILLWAY

AUXILIARY SPILLWAY TYPICAL SECTION

LEGEND

- NORMAL POOL (855.00)
- 100-YEAR HWL (855.95)
- PROPOSED EASEMENT BOUNDARY
- RIP-RAP
- EXCAVATE TO 854.00
- MICROTOPOGRAPHY
- TREE REMOVAL





HORZ. 0 40 80 SCALE FEET

VERT. 0 5 10 SCALE FEET

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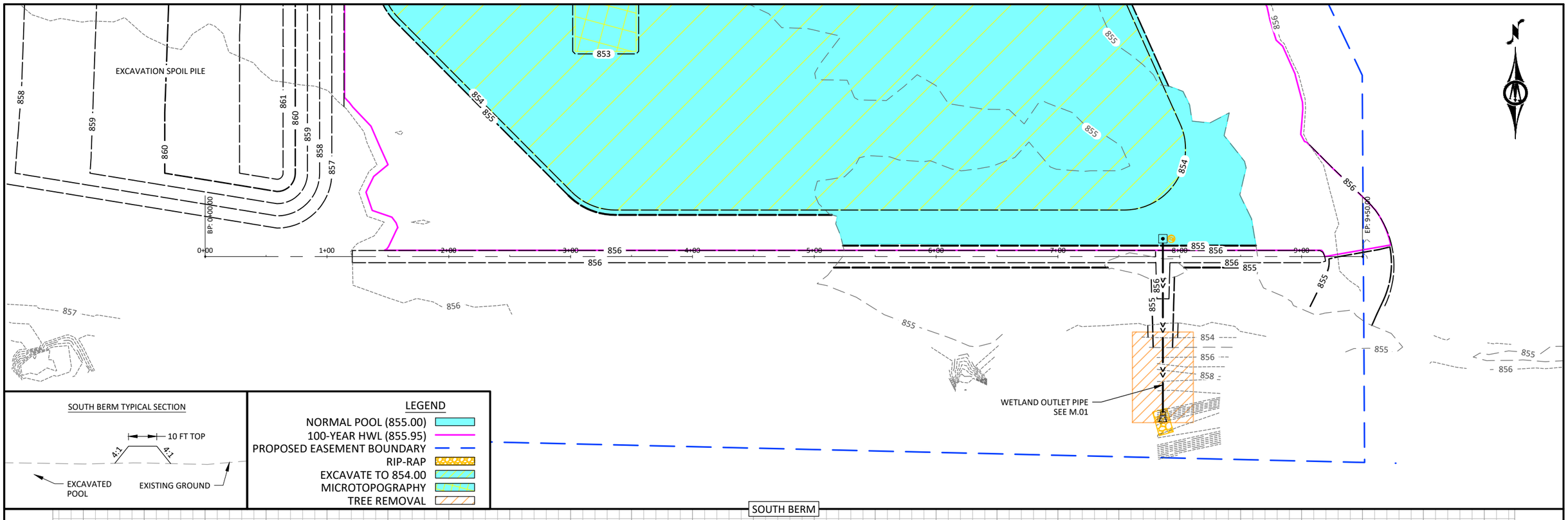
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NORTHEAST BERM & AUXILIARY SPILLWAY

SHEET D.03

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VERT. SCALE 0 5 10 FEET

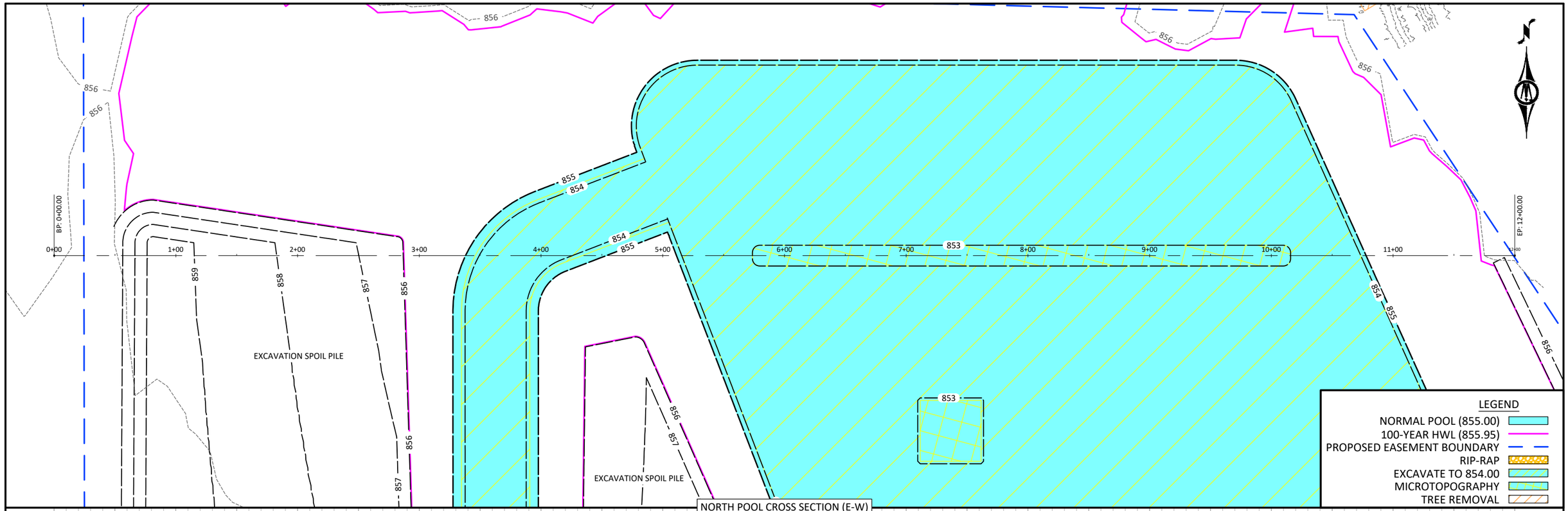
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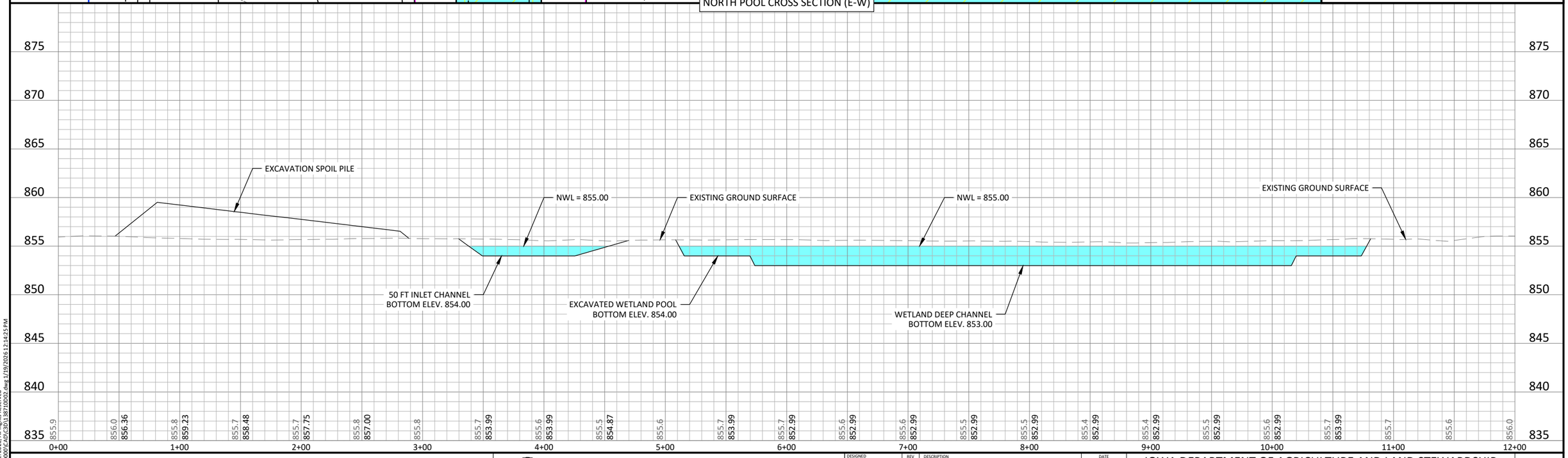
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STO822305D - BULAND WETLAND
SOUTH BERM

SHEET D.04



NORTH POOL CROSS SECTION (E-W)



HORZ. SCALE 0 40 80 FEET

VERT. SCALE 0 5 10 FEET

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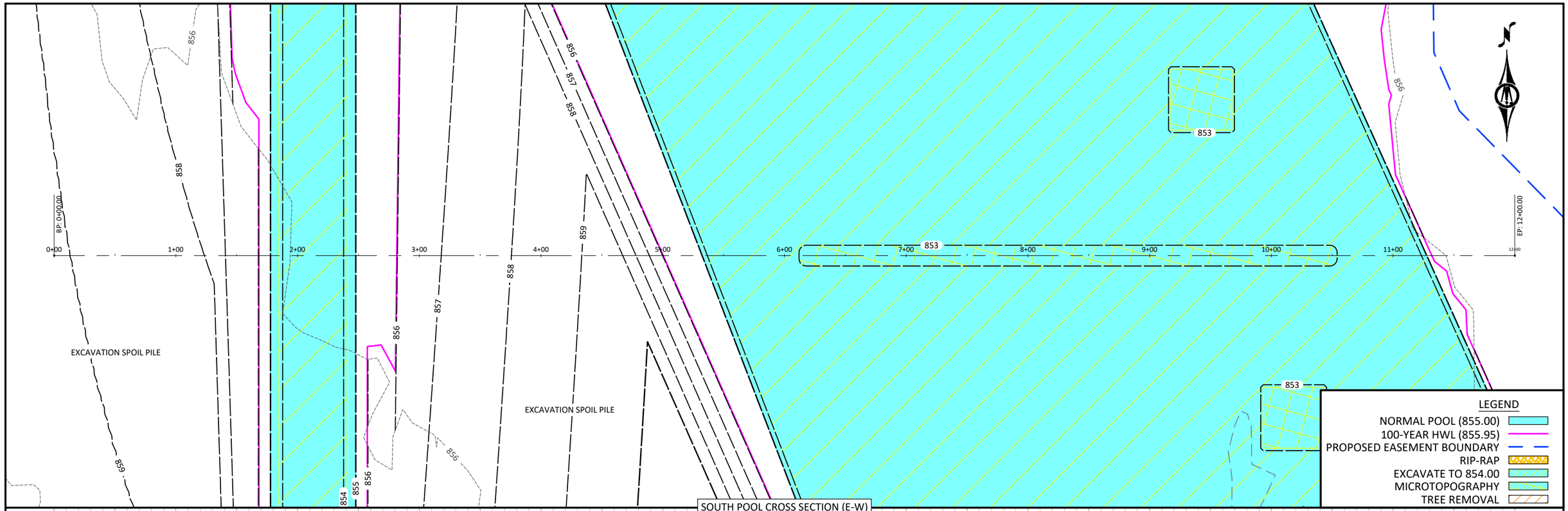
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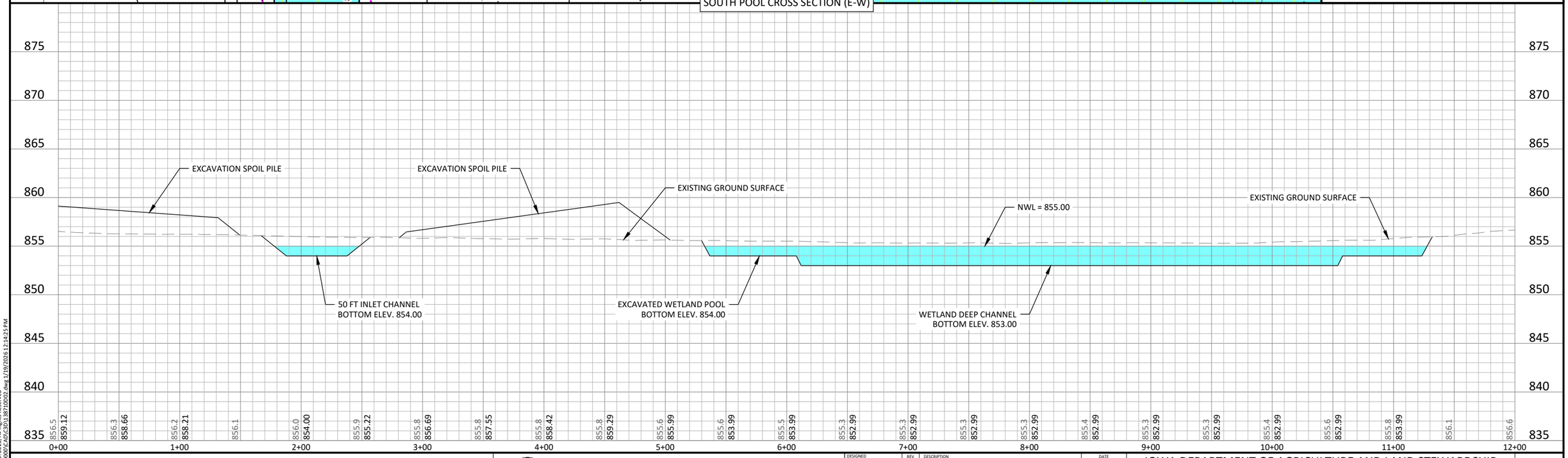
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NORTH POOL CROSS SECTION (E-W)

SHEET D.05



SOUTH POOL CROSS SECTION (E-W)



HORZ. 0 40 80 SCALE FEET

VERT: 0 5 10 SCALE FEET

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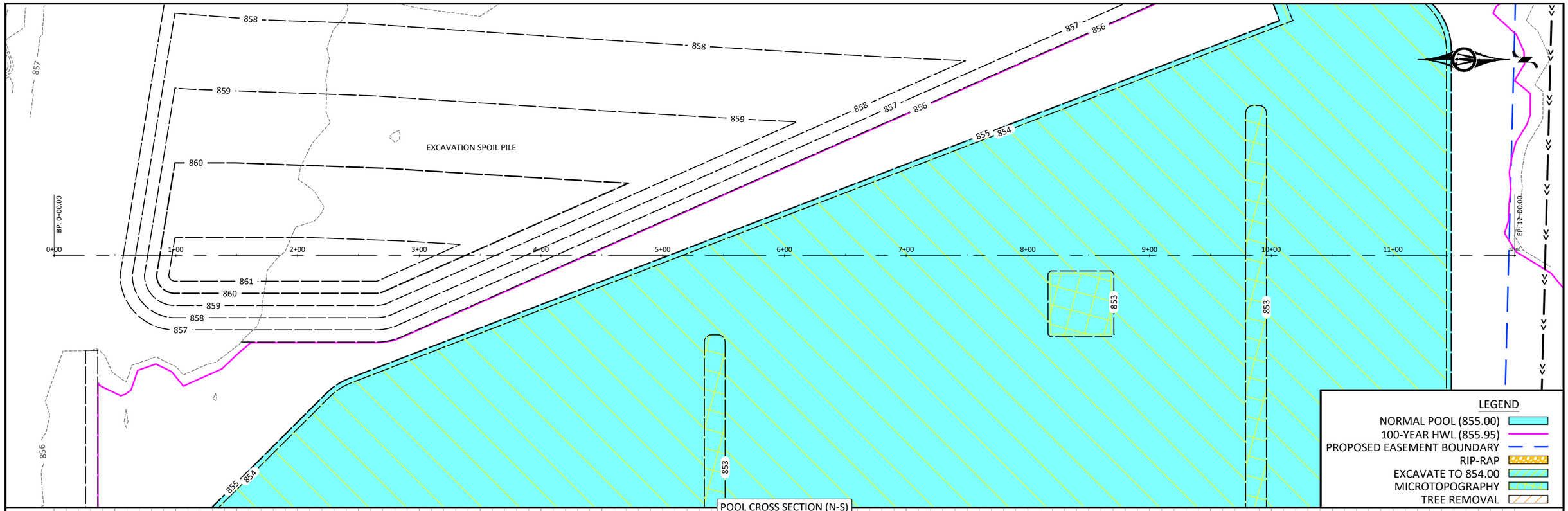
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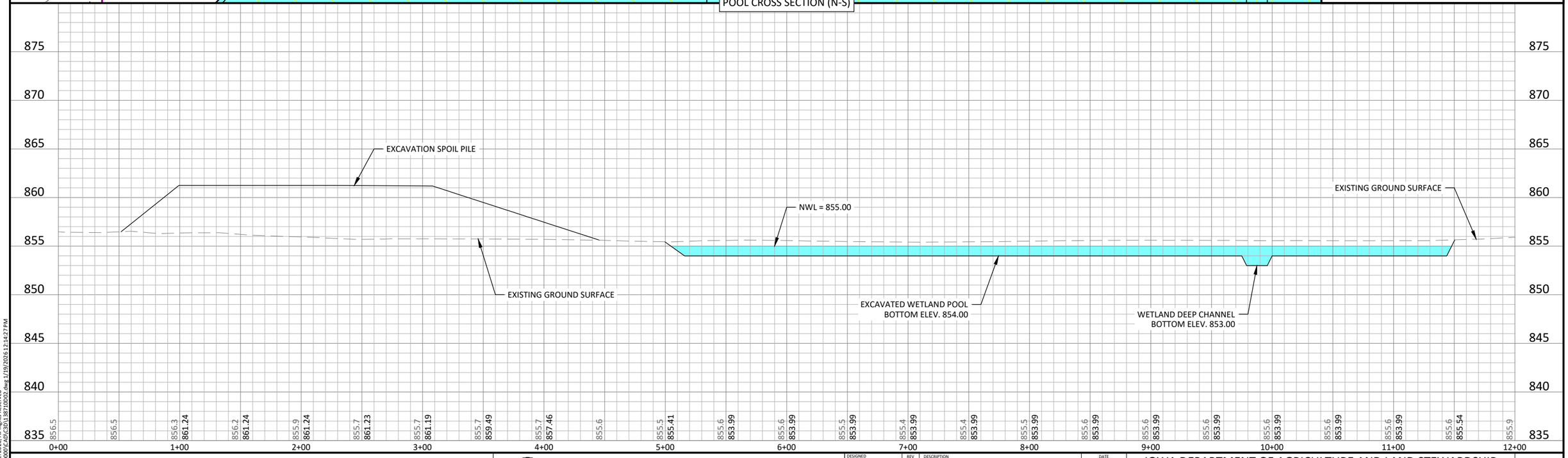
SOUTH POOL CROSS SECTION (E-W)

SHEET D.06

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POOL CROSS SECTION (N-S)



HORZ. 0 40 80 SCALE FEET

VERT: 0 5 10 SCALE FEET

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STO822305D - BULAND WETLAND

POOL CROSS SECTION (N-S)

SHEET D.07

SEED DISTURBED AREAS TO 1 FT BELOW NORMAL POOL BUFFER SEEDING

SEED NORTHEAST BERM STRUCTURE SEEDING

DO NOT SEED POOL

SEED EXCAVATION SPOIL PILE EXTENTS BUFFER SEEDING

SEED DISTURBED AREAS TO 1 FT BELOW NORMAL POOL BUFFER SEEDING

SEED EXCAVATION SPOIL PILE EXTENTS BUFFER SEEDING

SEED SOUTH BERM STRUCTURE SEEDING

SEED AUXILIARY SPILLWAY AND SURROUNDING AREA STRUCTURE SEEDING

SEED OUTLET PIPE COVER BERM STRUCTURE SEEDING

Skunk River

SEEDING AREAS	
BUFFER SEEDING	10.8 AC
STRUCTURE SEEDING	0.7 AC

LEGEND

- NORMAL POOL (855.00)
- 100-YEAR HWL (855.95)
- PROPOSED EASEMENT BOUNDARY
- RIP-RAP
- EXCAVATE TO 854.00
- MICROTOPOGRAPHY
- TREE REMOVAL

HORZ. SCALE 0 100 200 FEET

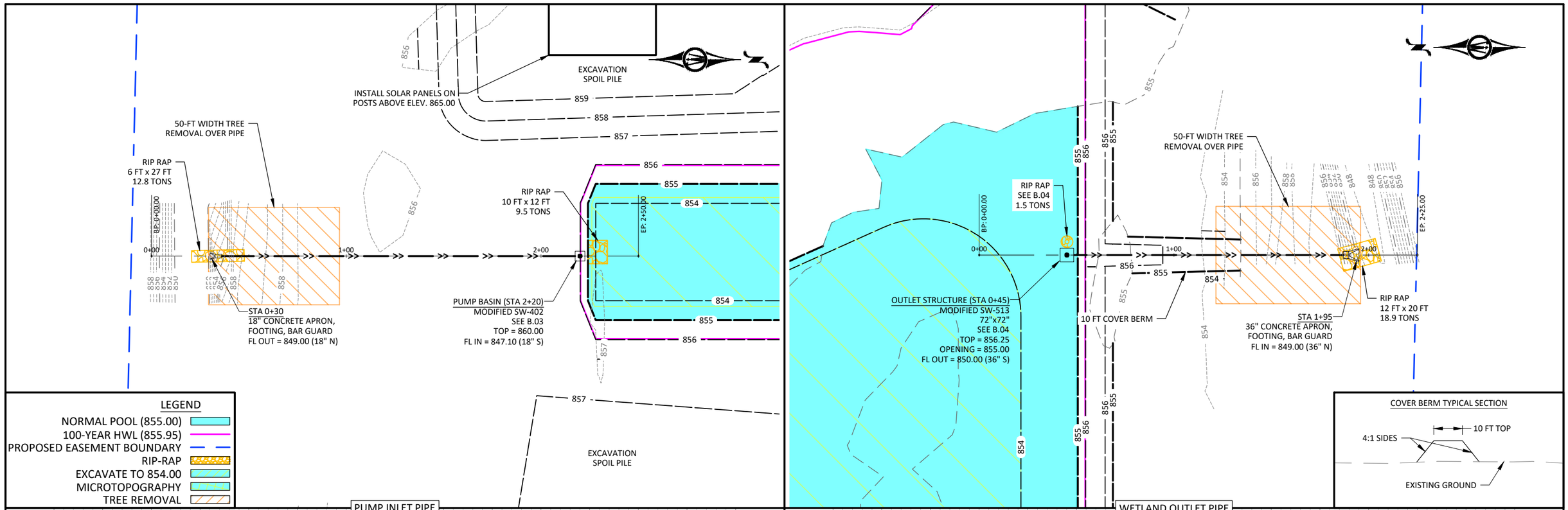
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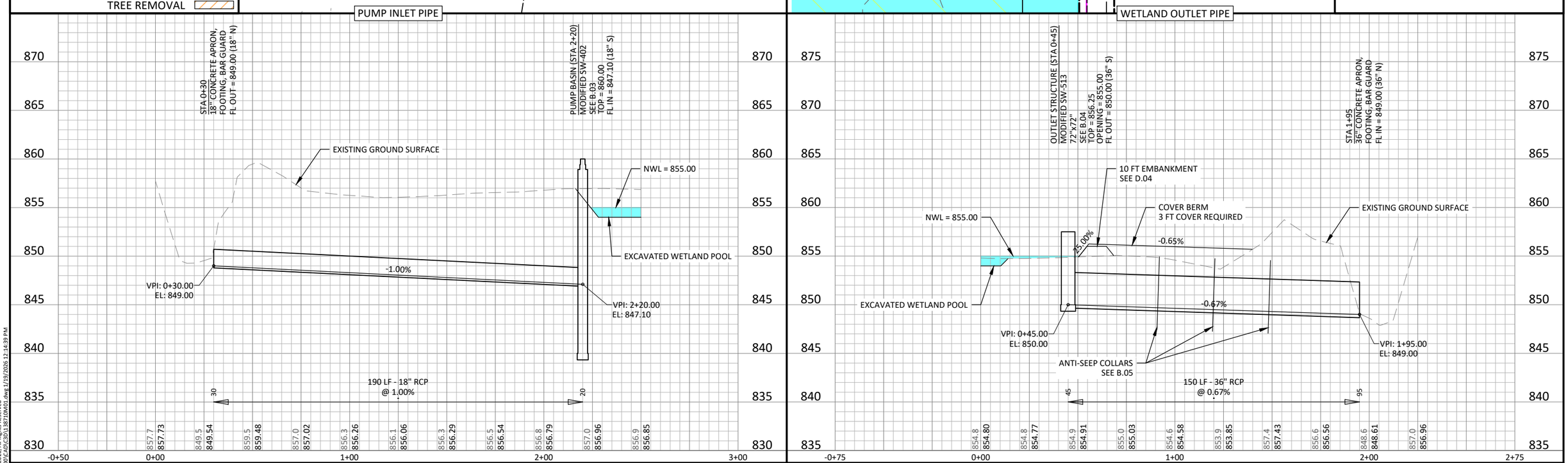
DESIGNED	REV	DESCRIPTION	DATE
BCS			
DRAWN NVD			
CHECKED JPR			
CLIENT PROJ. NO. 25X.138710.000			

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
STO822305D - BULAND WETLAND
SEEDING PLAN

SHEET K.01

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HORZ. SCALE 0 25 50 FEET
VERT. SCALE 0 5 10 FEET

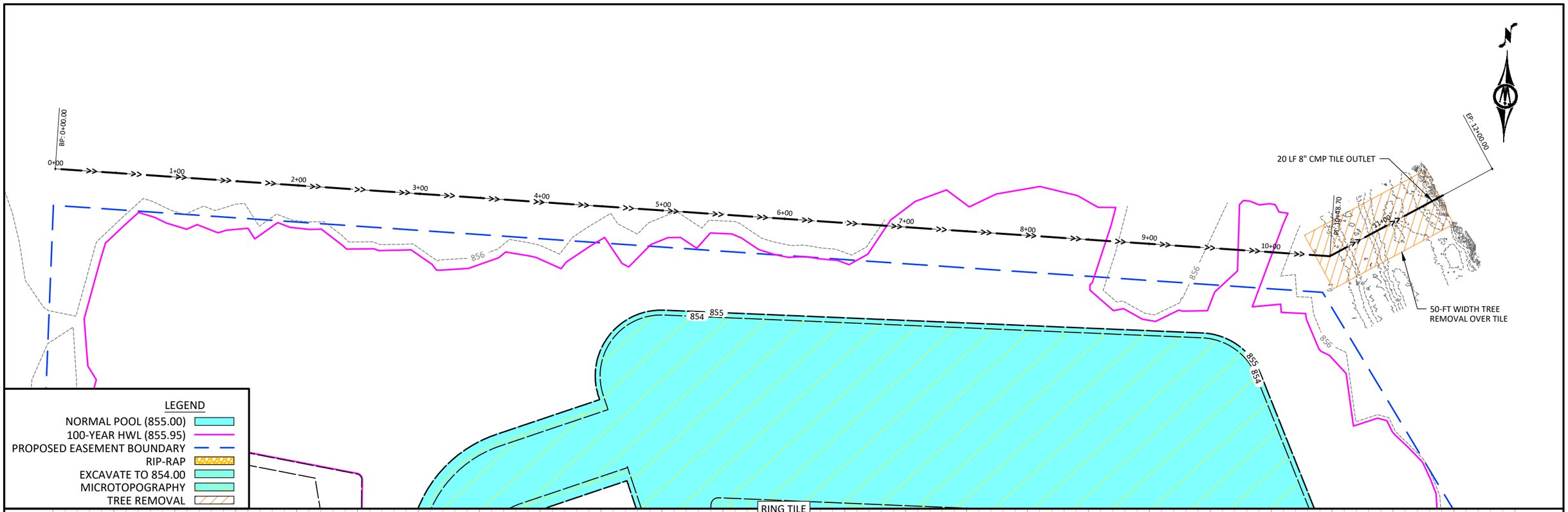
BOLTON & MENK
1519 BALTIMORE DRIVE
AMES, IA 50010
Phone: (515) 233-6100
Email: Ames@bolton-menk.com
www.bolton-menk.com

DESIGNED	BCS
DRAWN	NVD
CHECKED	JPR
CLIENT PROJ. NO.	25X.138710.000

REV	DESCRIPTION	DATE

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
STO822305D - BULAND WETLAND
PUMP INLET PIPE & WETLAND OUTLET PIPE

SHEET M.01



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HORZ. SCALE 0 40 80 FEET

VERT. SCALE 0 5 10 FEET

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CHECKED	JPR
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REV	DESCRIPTION	DATE

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

STO822305D - BULAND WETLAND

RING TILE

SHEET M.02