

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", SERIES 2025 AND ALL CURRENT GENERAL SUPPLEMENTAL SPECIFICATIONS AND MATERIALS INSTRUCTIONAL MEMORANDUM SHALL GOVERN AS REFERENCED.

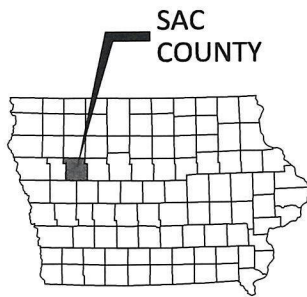
ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.



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."

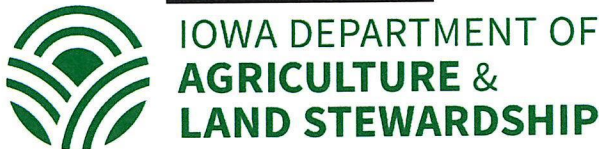
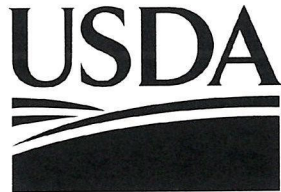
CONTRACTOR IS REQUIRED TO FOLLOW IOWA ONE CALL LAW. IOWAONECALL.COM OR CALL 811. CONTRACTOR MUST PROVIDE ONE CALL TICKET NUMBER PRIOR TO BEGINNING CONSTRUCTION.

TICKET NUMBER _____



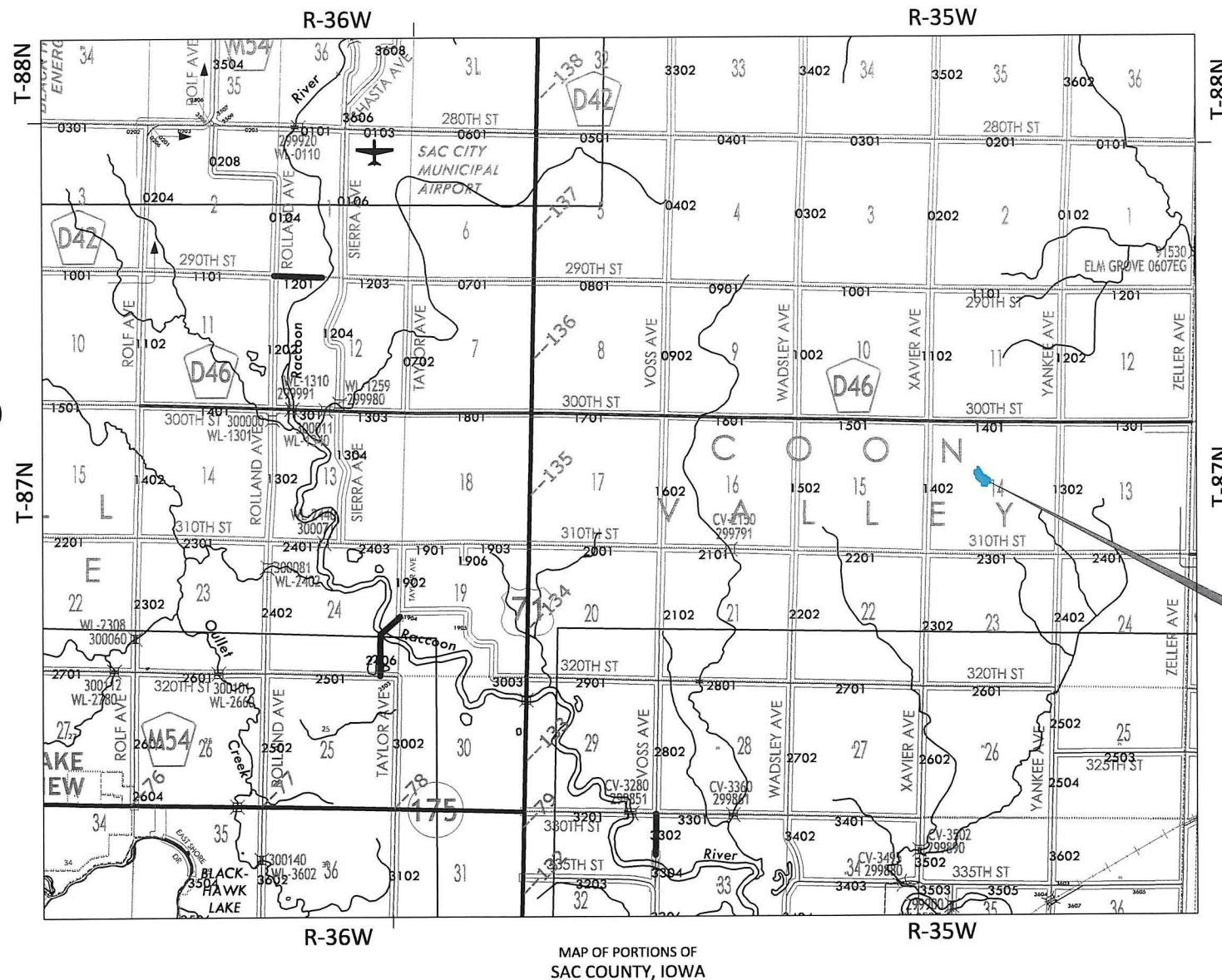
NOTES

- IF A CULTURAL RESOURCE IS IDENTIFIED DURING CONSTRUCTION, CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY THE LOCAL NATURAL RESOURCES CONSERVATION SERVICE OFFICE.
- THIS WETLAND IS NOT GUARANTEED TO FILL OR REMAIN FILLED WITH WATER.



CONSTRUCTION PLANS FOR
IDALS PROJECT NO. SAC873514C
NUTRIENT REDUCTION WETLAND
SAC COUNTY, IOWA

OCTOBER 2025



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THESE PLANS PREPARED IN ACCORDANCE WITH NRCS ENGINEERING JOB CLASS V. STANDARDS FOR TASKS ARE AS FOLLOWS:
659 - SITE DESIGN
356 - SOUTH DIKE DESIGN
TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT, AND BELIEVE, THESE PLANS MEET APPLICABLE NRCS STANDARDS.

PROJECT LOCATION

	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.	
	JONATHAN P. ROSENGREN, P.E.	DATE: Oct 28, 2025
	REG. NO. 21661	MY LICENSE RENEWAL DATE IS 12/31/2026
	PAGES OR SHEETS COVERED BY THIS SEAL: ALL PLAN SHEETS	

DATUM EQUATION - DD 31
1909 DATUM + 1197.00' = NAVD 88
PROJECT DATUM: STATE PLANE
HORIZONTAL: IOWA NORTH
VERTICAL: NAVD 1988



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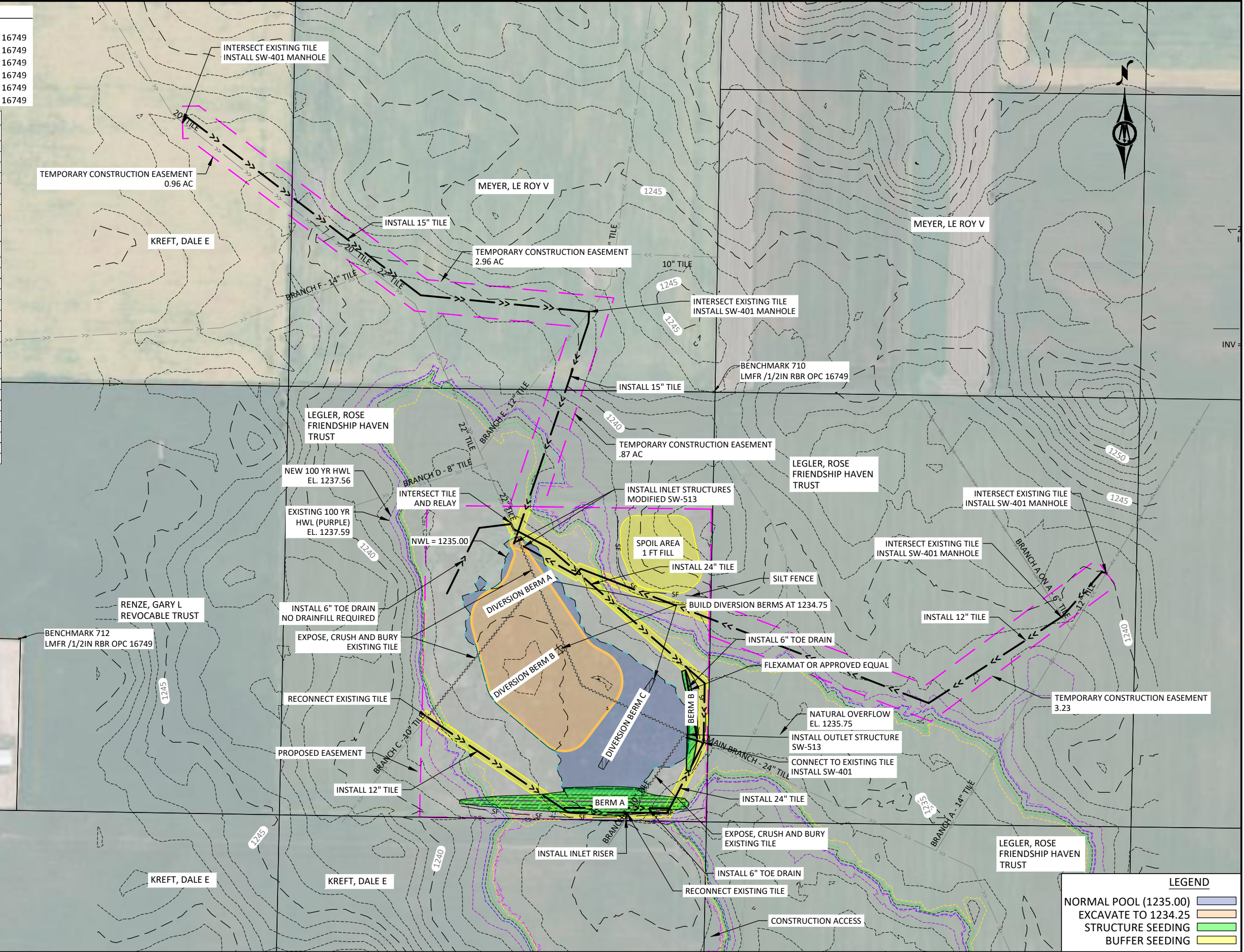
IDALS WATER RESOURCES BUREAU
SAC873514C TILE ZONE WETLAND
TITLE SHEET

SHEET
A.01

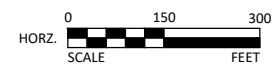
SURVEY BENCHMARKS				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
702	3591272.77	4543742.715	1249.988	LMFR /1/2IN RBR OPC 16749
703	3591273.387	4543702.795	1252.394	LMFR /1/2IN RBR OPC 16749
710	3592556.719	4546368.439	1243.57	LMFR /1/2IN RBR OPC 16749
711	3591802.406	4543754.657	1254.95	LMFR /1/2IN RBR OPC 16749
712	3591794.522	4544222.455	1247.169	LMFR /1/2IN RBR OPC 16749
713	3591803.195	4543714.681	1257.621	LMFR /1/2IN RBR OPC 16749

DESIGN CRITERIA	VALUE	UNIT	Requirement/Note
WATERSHED AREA	513.00	ACRES	513 ac tile drained (treated), 662 ac surface tributary
POOL NORMAL WATER LEVEL (NWL) ELEV	1235.00	FT	
DESIGNED WETLAND POOL AREA (@ NWL)	6.6	ACRES	
PERCENT POOL AREA TO WATERSHED AREA	1.29	%	Range 0.5% to 2% of watershed area
MAXIMUM POOL DEPTH	0.75	FT	
AVERAGE POOL DEPTH	0.62	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	4.2	ACRE-FT	
FULL CAPTURE FLOW RATE	2.6	CFS	Peak tile flow that will be fully intercepted and treated
PRIMARY WEIR CREST	1234.52	FT	Passes average flow at normal pool elevation
PRIMARY WEIR WIDTH	4	FT	Sized to fill existing tile main
AREA OF BUFFER	13.2	ACRES	
RATIO BUFFER AREA TO NWL POOL AREA	2.0		Less than 4
TOTAL EASEMENT	19.8	AC	
STORM ANALYSIS (SURFACE RUNOFF)			
OVERFLOW ELEVATION	1235.75	FT	Natural Overflow
POOL STORAGE VOLUME AT OVERFLOW	10.50	ACRE-FT	
5-YEAR STORM HWL IN POOL	1236.81	FT	
5-YEAR PEAK INFLOW	487	CFS	
5-YEAR PEAK OUTFLOW	392	CFS	Outflows consist mainly of surface flow.
10-YEAR STORM HWL IN POOL	1236.97	FT	
10-YEAR PEAK INFLOW	621	CFS	
10-YEAR PEAK OUTFLOW	519	CFS	
25-YEAR STORM HWL IN POOL	1237.20	FT	
25-YEAR PEAK INFLOW	835	CFS	
25-YEAR PEAK OUTFLOW	723	CFS	
100-YEAR STORM HWL IN POOL	1237.56	FT	
100-YEAR PEAK INFLOW	1250	CFS	
100-YEAR PEAK OUTFLOW	1108	CFS	

WETLAND POOL DEPTH	ELEV	CONTOUR AREA	CUMULATIVE VOLUME	CUMULATIVE VOLUME
(FT)	(FT)	(FT ²)	(FT ³)	(AC-FT)
0.0	1234.0	838		0.00
0.5	1234.5	219,747	55,146	1.27
1.0	1235.0	290,719	182,763	4.20
1.5	1235.5	388,326	352,524	8.09
2.0	1236.0	527,219	581,410	13.35
2.5	1236.5	754,331	901,798	20.70
3.0	1237.0	924,643	1,321,541	30.34
3.5	1237.5	1,094,310	1,826,280	41.93
4.0	1238.0	1,247,155	2,411,646	55.36



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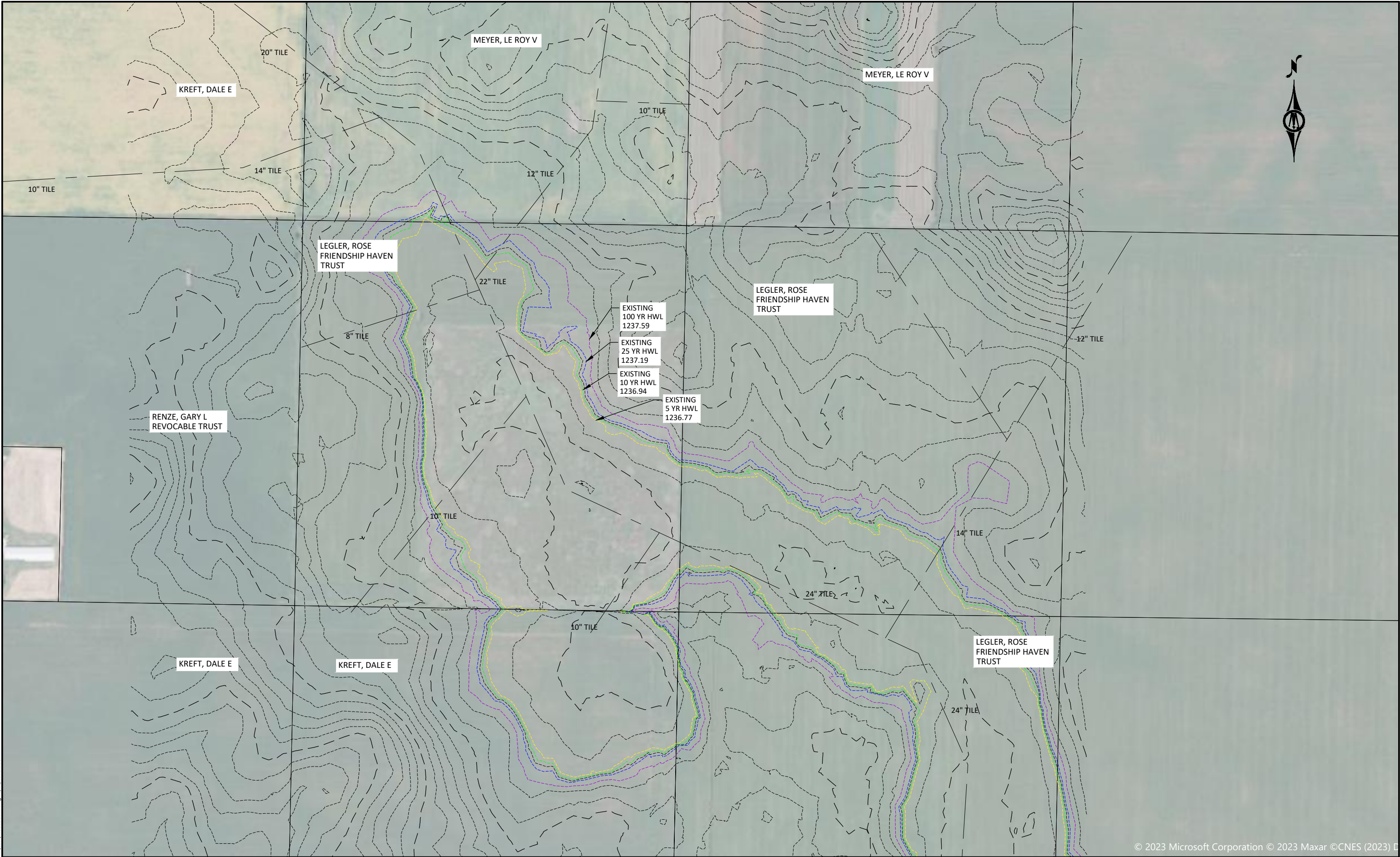


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IDALS WATER RESOURCES BUREAU
SAC873514C TILE ZONE WETLAND
PLAN OVERVIEW SHEET

SHEET
A.02



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IDALS WATER RESOURCES BUREAU

SAC873514C TILE ZONE WETLAND

EXISTING CONDITIONS

SHEET

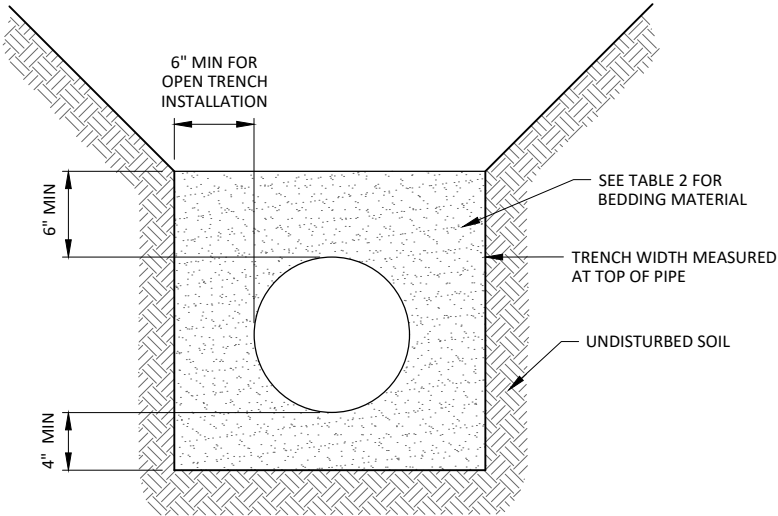
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CORRUGATED POLYETHYLENE DRAINAGE TUBING
MATERIAL & INSTALLATION NOTES

- 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.
- EXCEPT MODIFIED HEREIN OR OTHERWISE APPROVED BY ENGINEER, ALL CPDT SHALL BE INSTALLED IN COMPLIANCE WITH THE ASTM 449 STANDARD PRACTICE.
- 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.
- 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 C.02. IF DUE TO CONTRACTOR ERROR THIS MATERIAL AND WORK IS SUBSIDIARY TO THE INSTALLATION OF THE PIPE. CONTRACTOR MAY SUBSTITUTE PIPE BEDDING ROCK AS THE BEDDING MATERIAL.
- 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 WILL BE PAID UNDER THE TILE TRENCH STABILIZATION AND CRADLING ROCK BID ITEM.
- 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.
- 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. UNLESS DUE TO CONTRACTOR ERROR THIS BEDDING MATERIAL WILL BE PAID UNDER THE TILE TRENCH STABILIZATION AND CRADLING ROCK BID ITEM.
- MANUFACTURER'S ENDCAPS SHALL BE INSTALLED AT THE TERMINATION OF EACH LINE UNLESS A CONNECTION TO AN EXISTING DRAIN IS MADE.
- 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%.
- ALIGNMENT TURNS MAYBE MADE USING EITHER A MANUFACTURED FITTING OR CURVING THE LINE WITH A 25' MINIMUM RADIUS.
- ALL NEW TILE SHALL HAVE AT LEAST 3 FEET OF COVER. IF ADDITIONAL COVER IS NEEDED, GRADING MAY BE DONE ON TILE COVER WITH 10:1 SLOPES.

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					

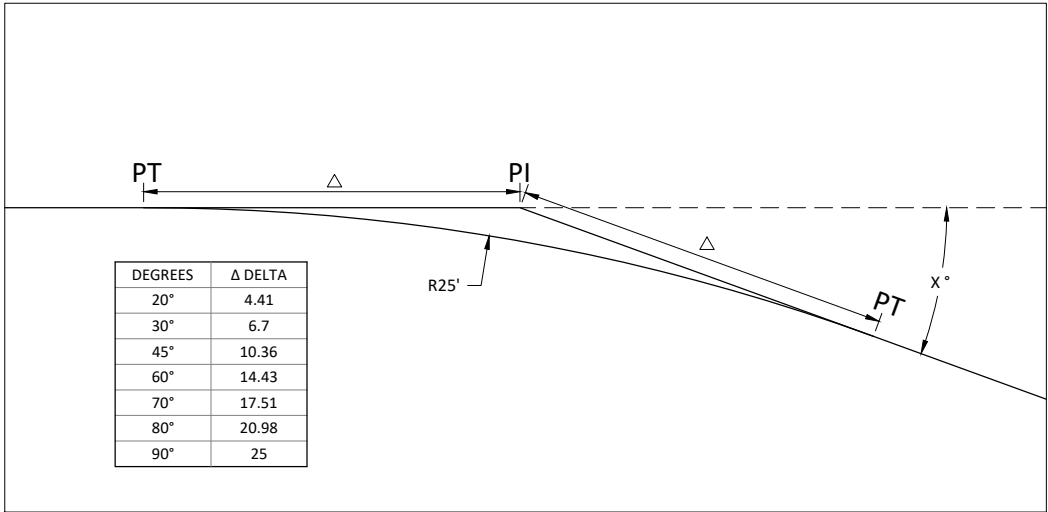


FILL TRENCH TO 6" ABOVE TOP OF PIPE WITH CRUSHED STONE OR GRAVEL MEETING THE REQUIREMENTS IN TABLE 2. BEDDING MATERIAL SHALL BE INCIDENTAL TO THE PIPE INSTALLATION.

FLAT BOTTOM TRENCH INSTALLATION

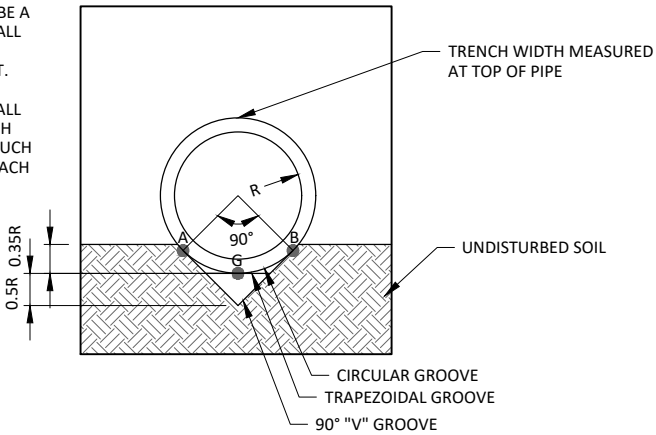
NOT TO SCALE
SOURCE: ASTM F449

NOTE: THIS IS AN ALLOWED ALTERNATIVE INSTALLATION FOR CPDT



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.



PREFERRED TRENCH INSTALLATION BOTTOM

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



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IDALS WATER RESOURCES BUREAU

SAC873514C TILE ZONE WETLAND

CPDT DETAILS

SHEET

B.01

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 MODIFY 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.

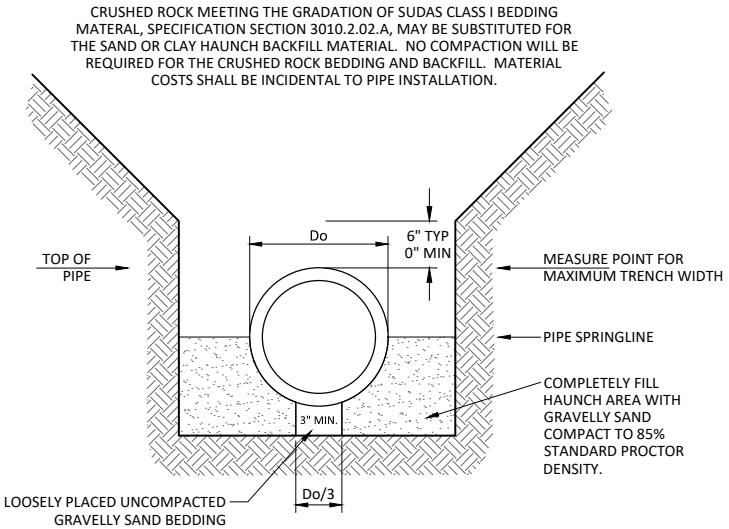
STEP 4A
SOIL OR TRENCH CONDITION CHANGES

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.

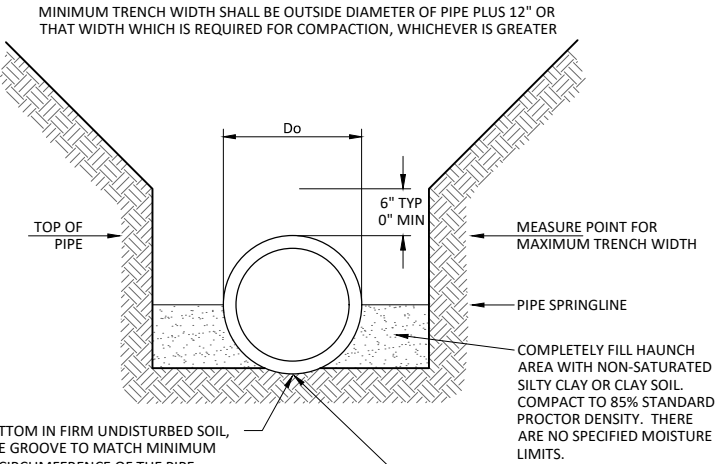
EXCEPTION
IF CONTRACTOR ELECTS TO SHAPE THE TRENCH BOTTOM SUCH THAT A MINIMUM OF 45% OF THE OUTER CIRCUMFERENCE OF THE PIPE IS FIRMLY BEDDED IN AND CONSISTENTLY SUPPORTED BY UNDISTURBED SOIL, PIPE HAUNCH FILL COMPACTION TESTING WILL NOT BE REQUIRED. THE CONTRACTOR IS REQUIRED TO COMPLY WITH A PROPER 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.

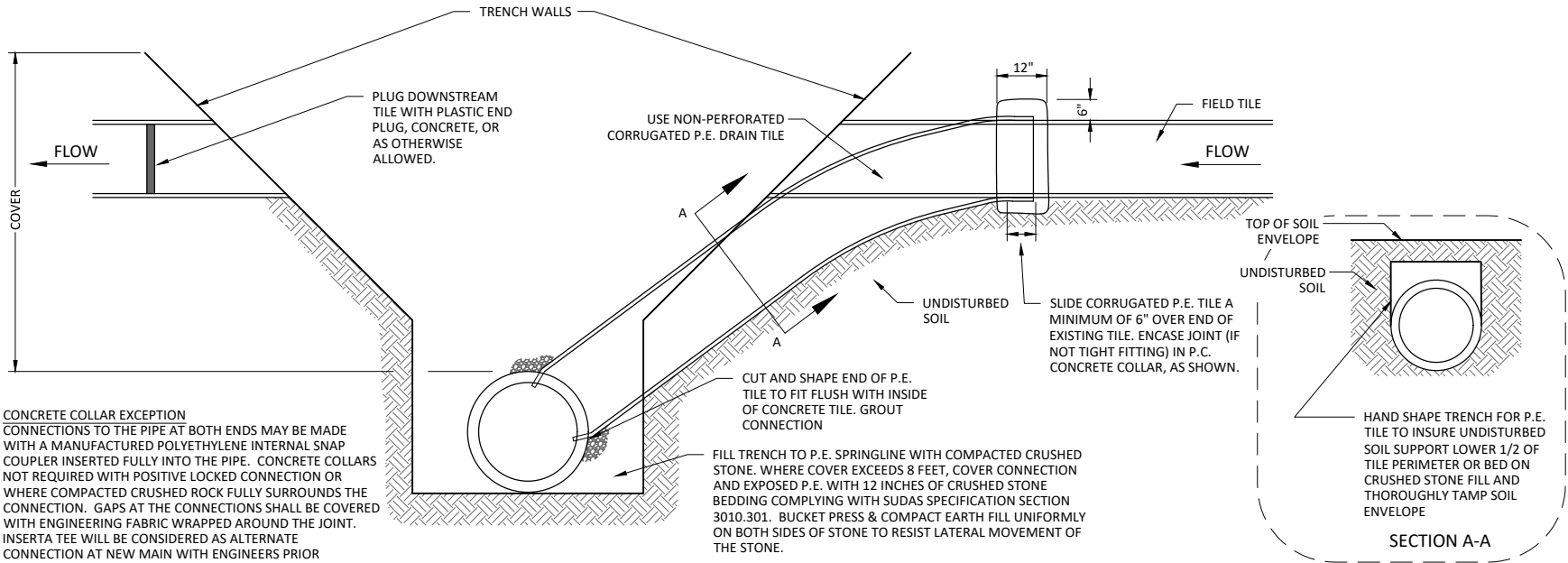
TRENCH INSTALLATION TYPE 3

NOT TO SCALE
SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION
CONCRETE PIPE DESIGN MANUAL



MODIFIED TRENCH INSTALLATION TYPE 4

NOT TO SCALE
SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION
CONCRETE PIPE DESIGN MANUAL



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

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.



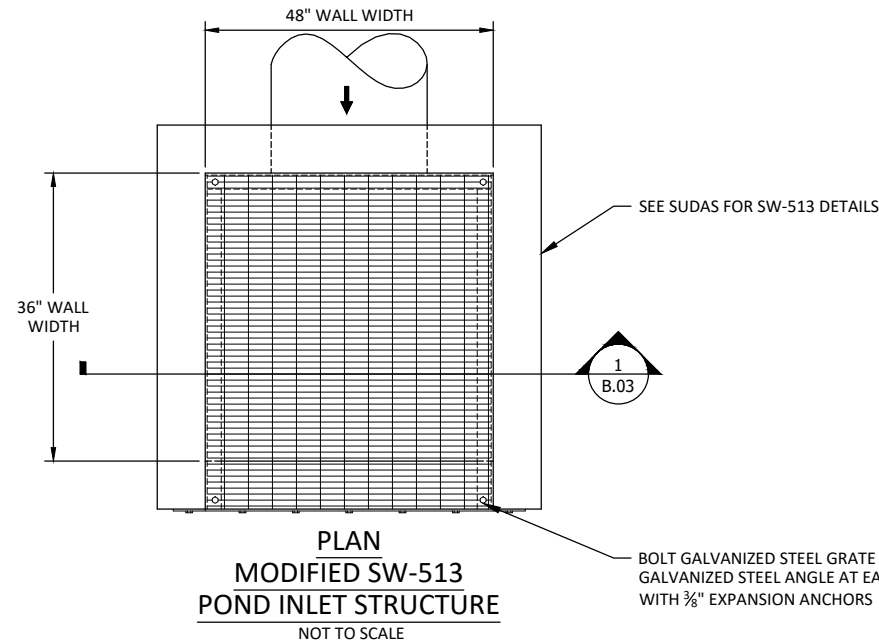
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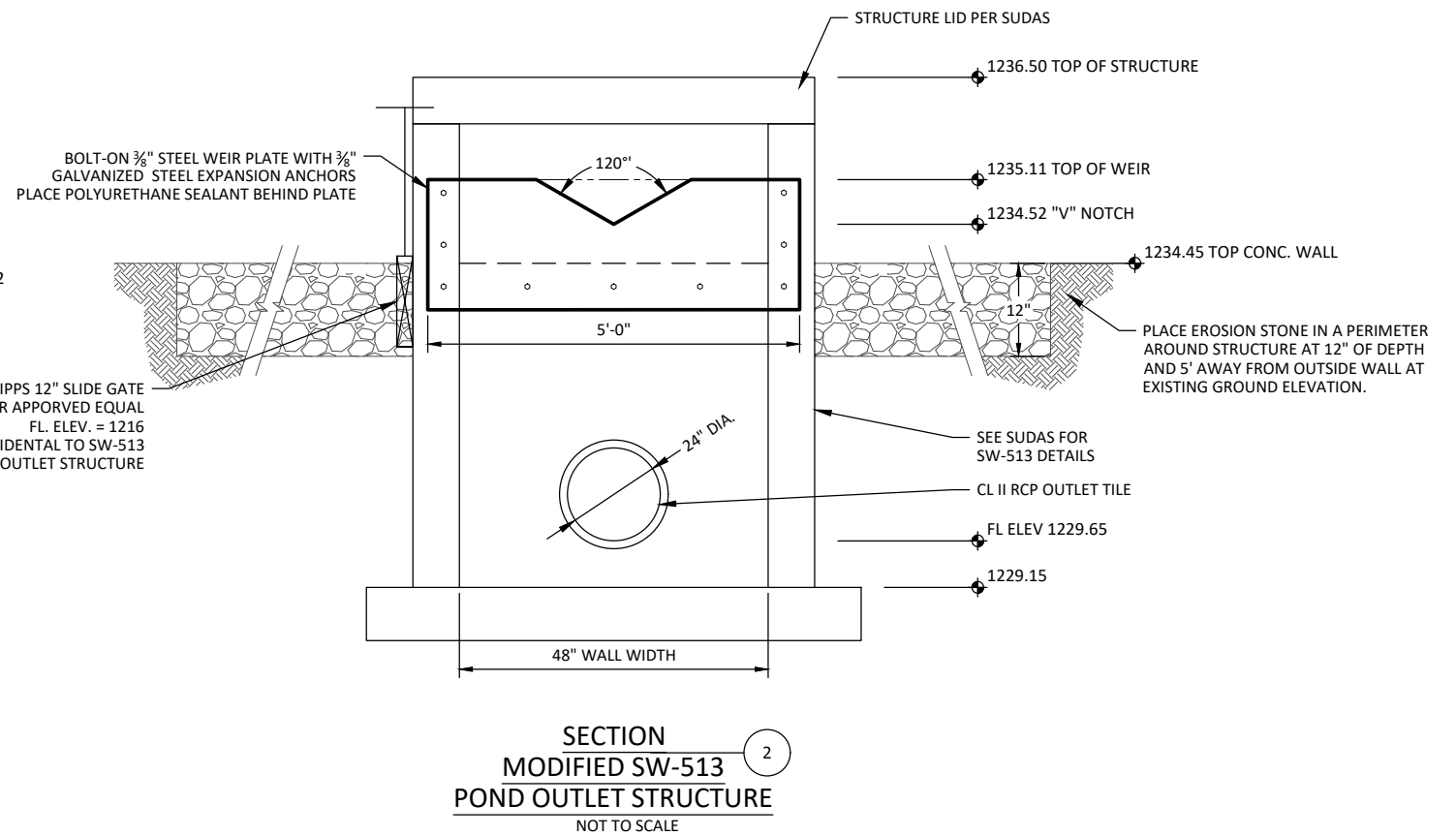
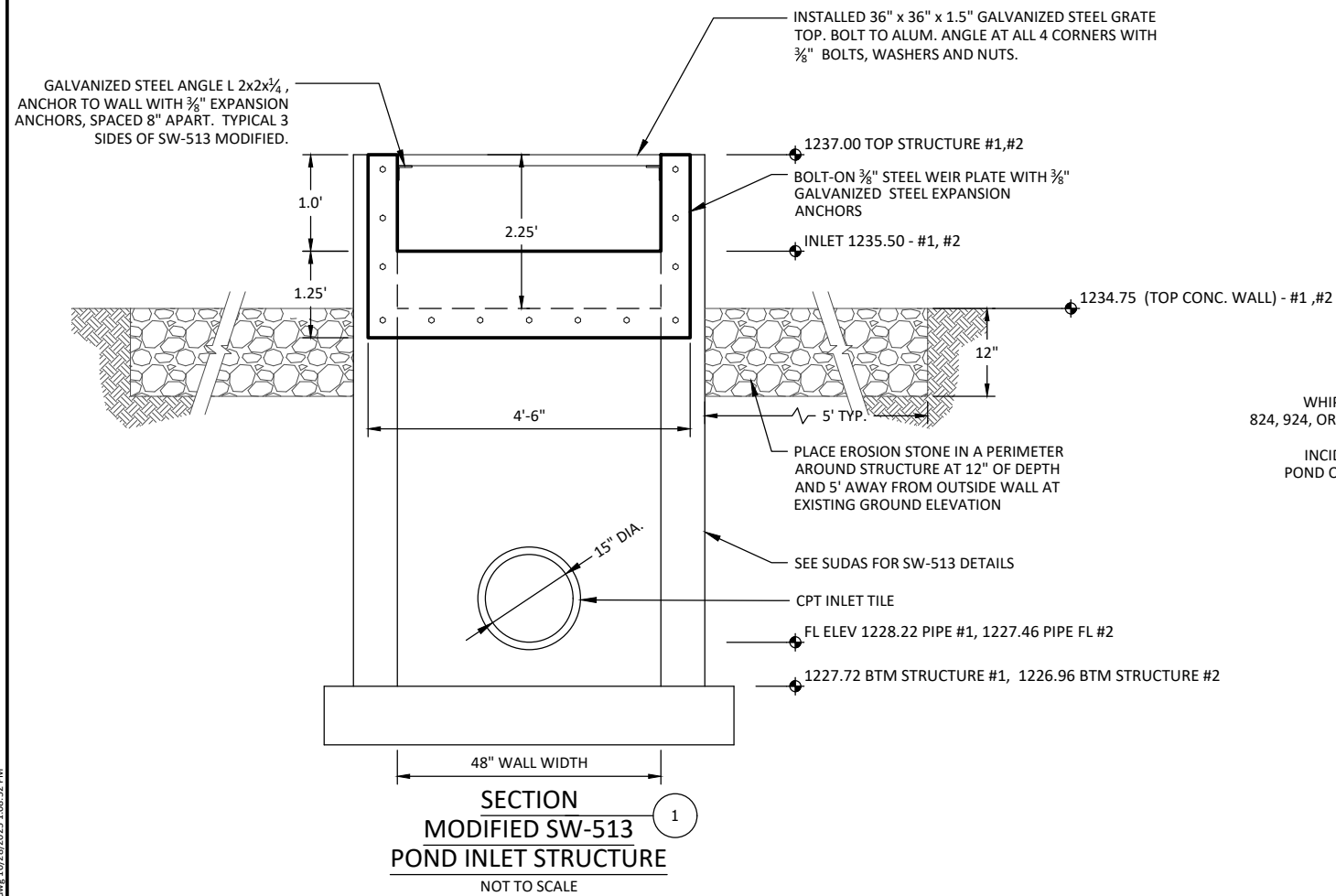
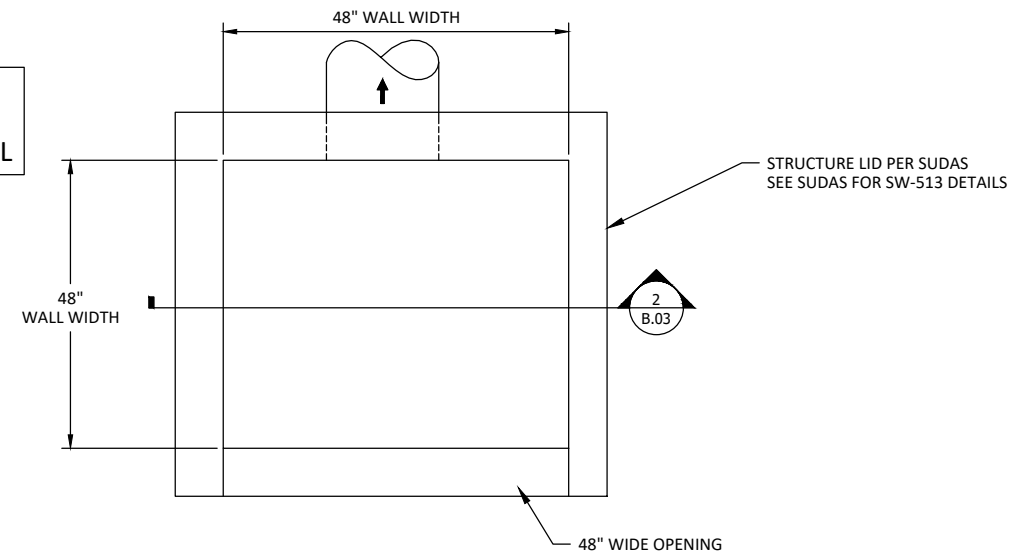
IDALS WATER RESOURCES BUREAU
SAC873514C TILE ZONE WETLAND
RCP INSTALLATION DETAILS

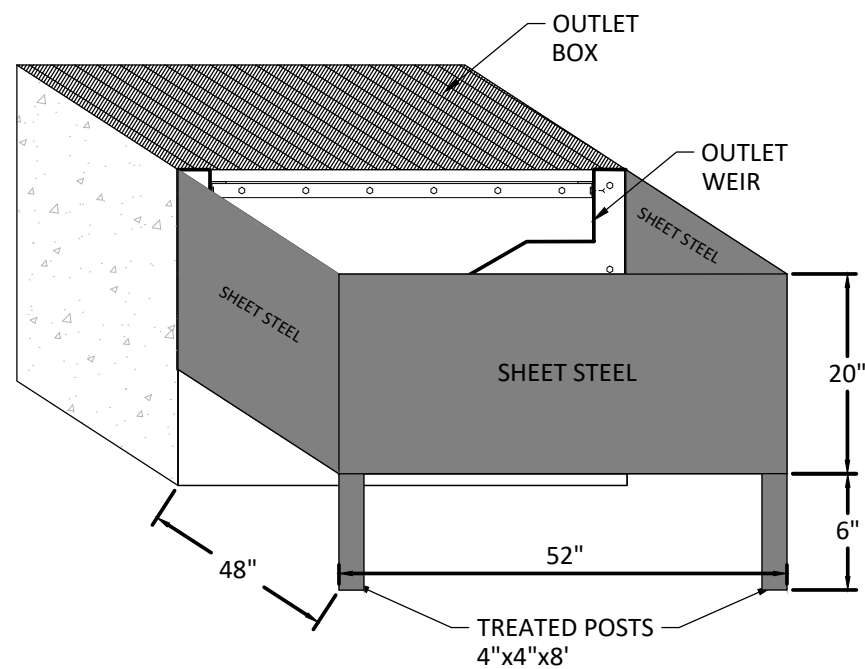
SHEET

B.02



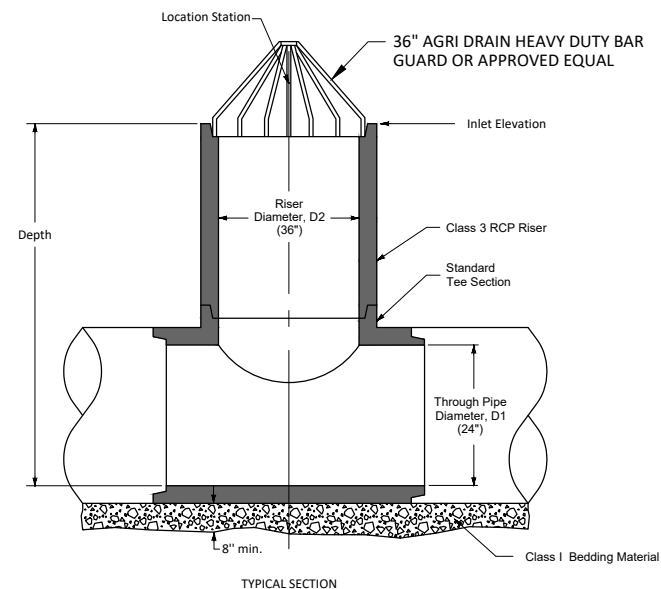
NOTE: BAR GRATE SHALL BE McNICHOLS HEAVY DUTY WELDED GHB-100, 19 W-4, OR APPROVED EQUAL



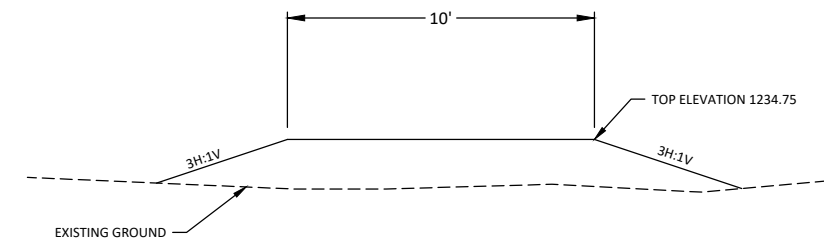


- 2 - 4" x 4" x 8' TREATED POSTS
 3 - SHEET STEEL SHEETS
 1 - 52" x 20" 2 - 48" x 20"
 ANGLE IRON--EITHER WELDED OR BOLTED--ON TOP AND BOTTOM OF EACH SHEET
 AS BRACE
 BOLT TRASH GUARD ONTO BOX
 DIRTWORK AS NECESSARY TO ALLOW FLOW OF WATER UNDER TRASH GUARD WITH
 6" MINIMUM CLEARANCE

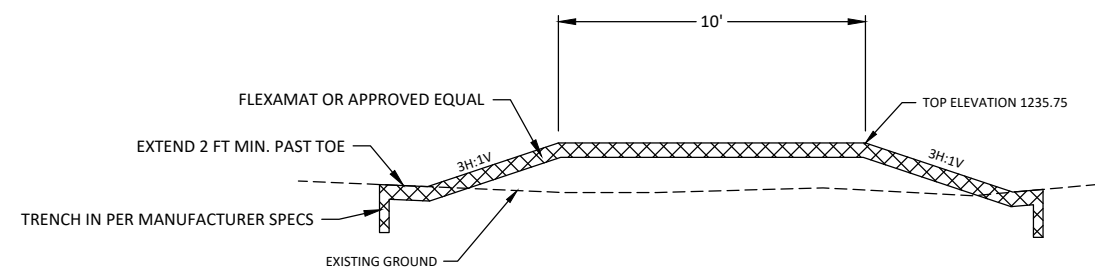
DETAIL - OUTLET TRASH GUARD
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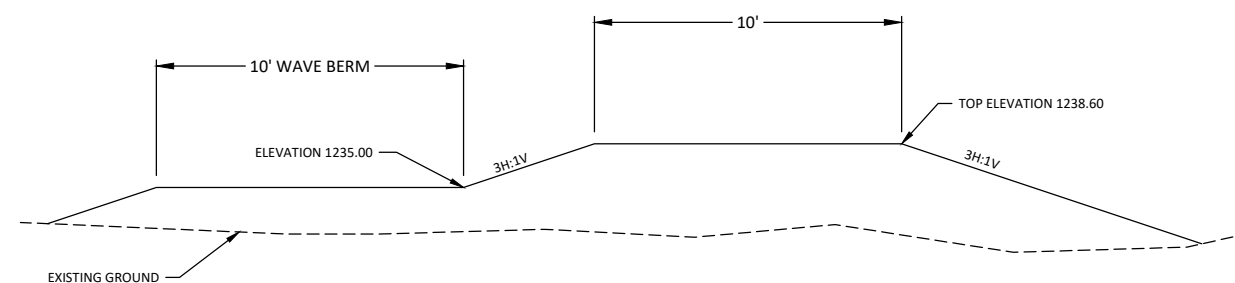
TYPICAL SECTION



TYPICAL DIVERSION BERM SECTION
 NOT TO SCALE



TYPICAL EAST DIKE SECTION
 NOT TO SCALE



TYPICAL SOUTH DIKE SECTION
 NOT TO SCALE



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IDALS WATER RESOURCES BUREAU
 SAC873514C TILE ZONE WETLAND
 MISC. DETAILS AND CROSS SECTIONS

SHEET
B.04

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BID ITEM	SUB-ITEM	DESCRIPTION	SPECIFICATIONS	PAGES	PLAN SHEETS	ESTIMATED QUANTITY	UNITS
1	-	SITE STRIPPING & PREPARATION	IA CS-001	3-4	A.02	1	LS
2	-	CROP DAMAGE	IA CS-001	3-4	A.02	0	AC
3	-	STRUCTURE & CHANNEL SEEDING	IA CS-006	8-11	A.02	1.06	AC
4	-	BUFFER SEEDING	IA CS-006	8-11	A.02	2.8	AC
5	-	MOBILIZATION AND DEMOBILIZATION	IA CS-008	12-13	A.02	1	LS
6	-	DRAIN TILE INVESTIGATION AND REMOVAL	IA CS-009	14-17	A.02, M.01-M.10	15	HR.
7	-	EXCAVATION	IA CS -021	20-22	A.02, D.01-D.05	2063	CY
8	-	EARTHFILL (GENERAL DAM)*	IA CS-023	23-26	D.01-D.05	2990	CY
9	-	TOPSOIL PLACEMENT	IA CS-026	30-31	A.02	3950	CY
10	-	CORRUGATED DUAL WALL POLYETHYLENE PIPE (NON-PERFORATED):					
	A.	12" DIAMETER	IA CS-046	40-44	M.02-M.06	2049	LF
	B.	15" DIAMETER	IA CS-046	40-44	M.01-M.02	2204	LF
11	-	CL III REINFORCED CONCRETE PIPE (RCP):					
	A.	12" DIAMETER	IA CS-031	32-39	M.07-M.08	706	LF
	B.	24" DIAMETER	IA CS-031	32-39	M.09-M.10	1390	LF
12	-	EROSION STONE	IA CS-061	45-46	B.03	46	TN
13	-	FLEXAMAT OR APPROVED EQUAL	Manufacturer	47-56	D.02	7930	SF
14	-	CONCRETE STRUCTURES					
	A.	INLET (MODIFIED SW-513)	IA CS-031	32-39	B.02, B.03, M.01, M.04	2	EA
	B.	OUTLET (MODIFIED SW-513)	IA CS-031	32-39	B.02-B.03, M.07	1	EA
	C.	MANHOLE (SW-401) - 48"	IA CS-031	32-39	B.02, M.01-M.10	4	EA
	D.	MANHOLE (SW-401) - 72"	IA CS-031	32-39	B.02, M.07	1	
15	-	TOE DRAIN - 6" DIAMETER	IA CS-046	39-42	A.02, M.07, M.09	882	LF
16	-	DRAINFILL	IA CS-024	27-29	M.07, M.09	12	TN
17	-	CONCRETE RISER WITH BAR GUARD	IA CS-046	40-44	M.09	1	EA
18	-	TRENCH STABILIZATION AND BEDDING STONE	IA CS-024	27-29	A.02, M.01-M.10	126	TN
19	-	TILE RECONNECTION					
	A.	10" DIA. OR SMALLER	IA CS-046	40-44	M.05-M.06, M.09-M.10	4	EA
	B.	12" DIA. OR LARGER	IA CS-046	40-44	M.02-M.03, M.06-M.08	5	EA
20	-	SILT FENCE	IA CS-005	5-6	A.02	1050	LF



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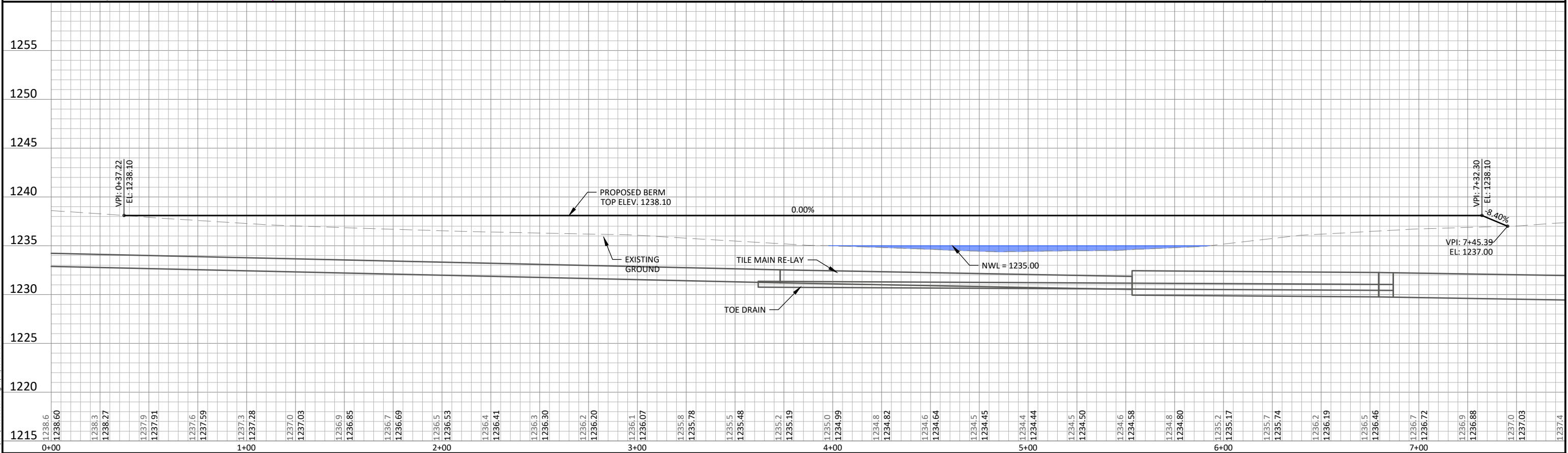
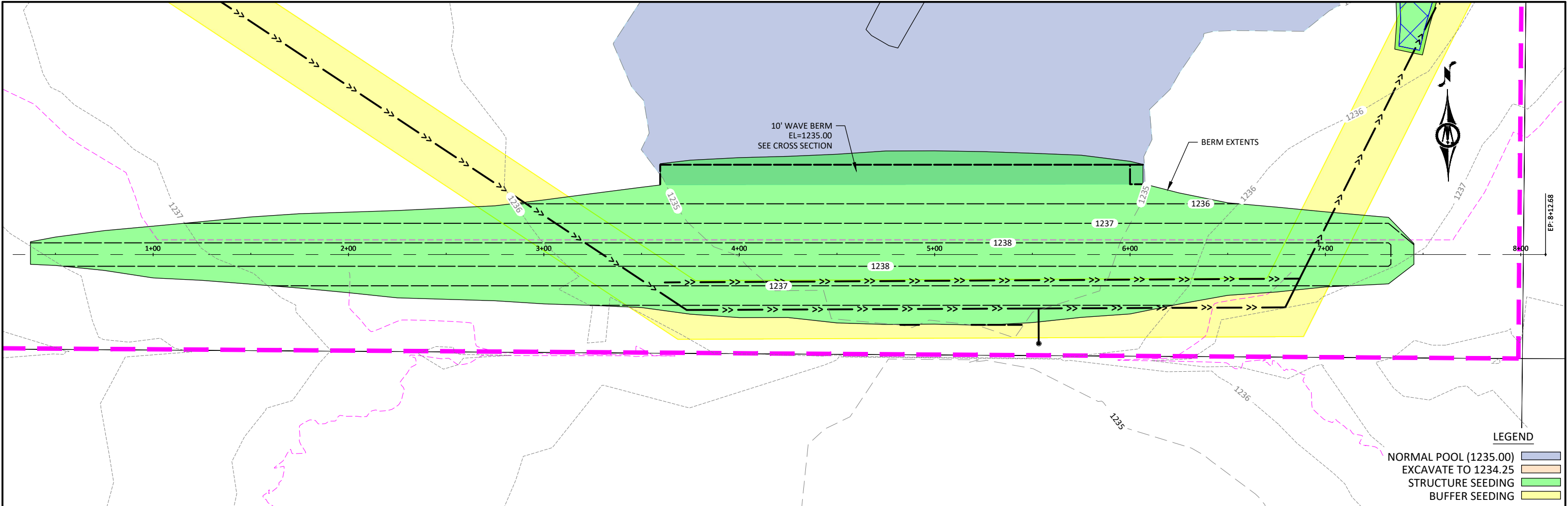
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SAC873514C TILE ZONE WETLAND

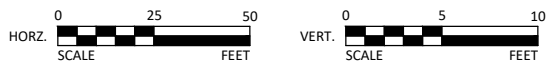
ESTIMATE QUANTITIES

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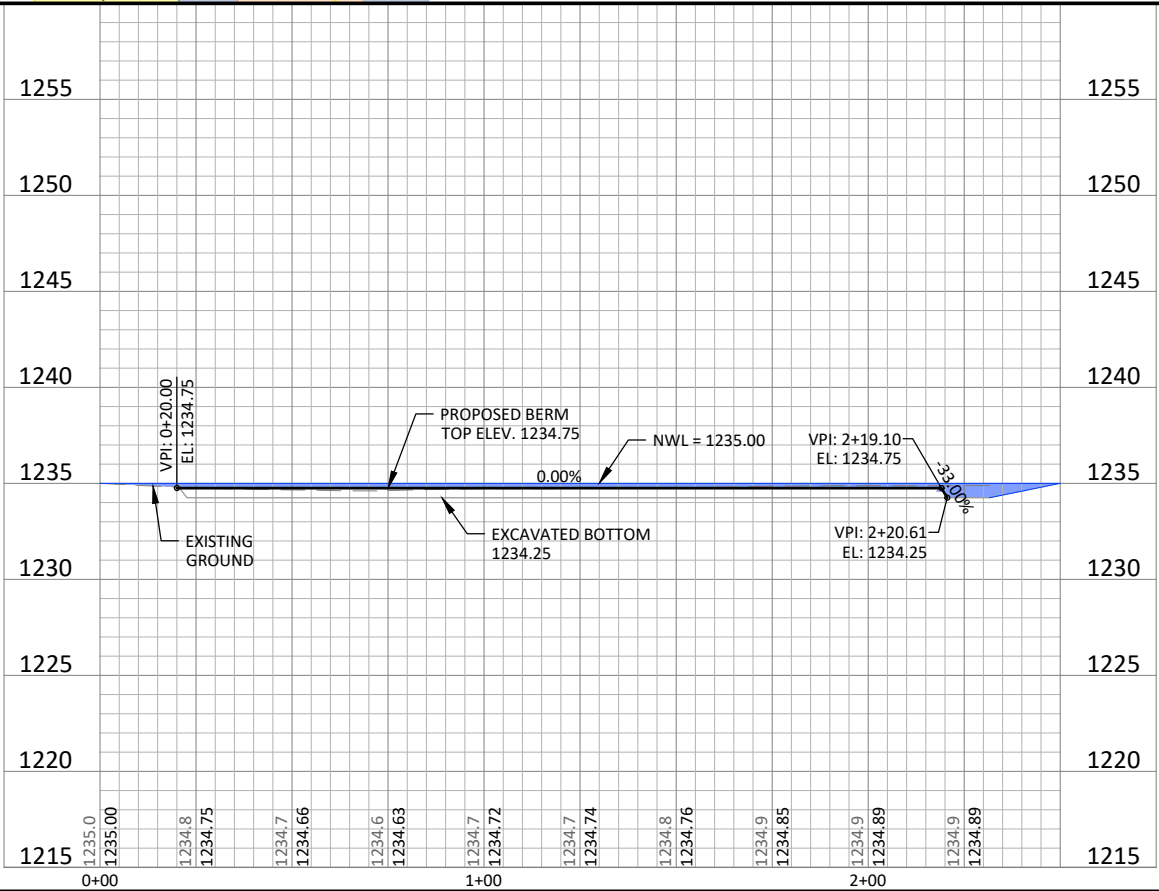
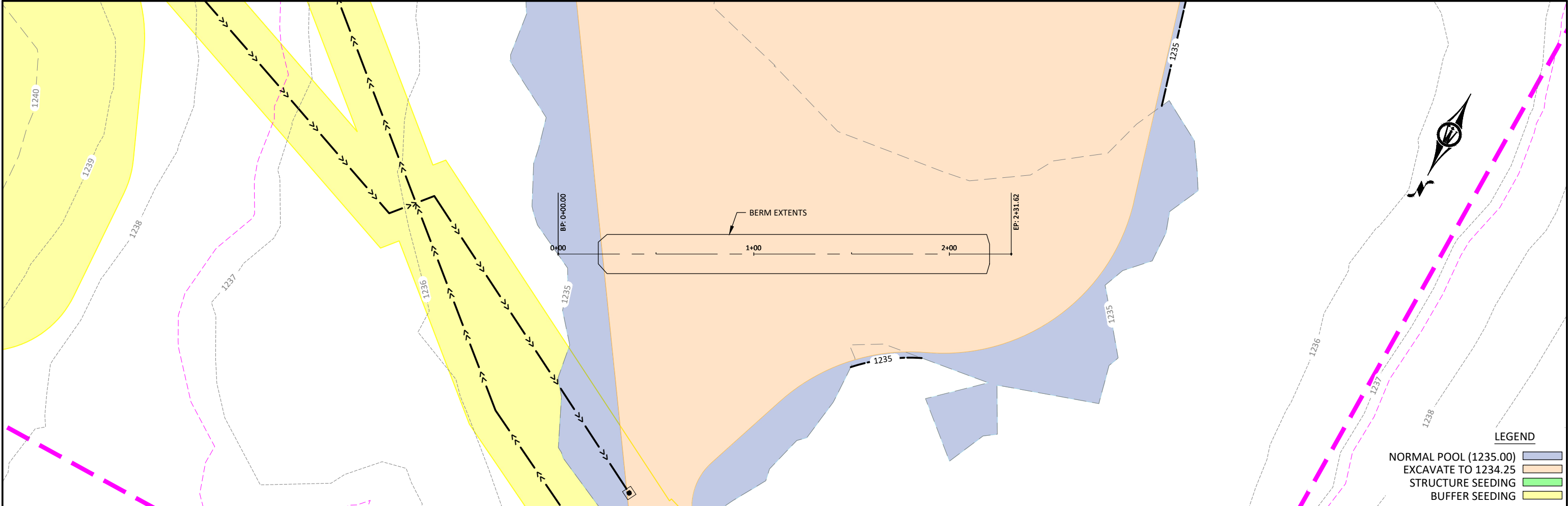


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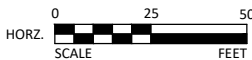
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SAC873514C TILE ZONE WETLAND
PLAN & PROFILE - BERM A

SHEET
D.01



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CHECKED JPR
CLIENT PROJ. NO. 0A1.128928

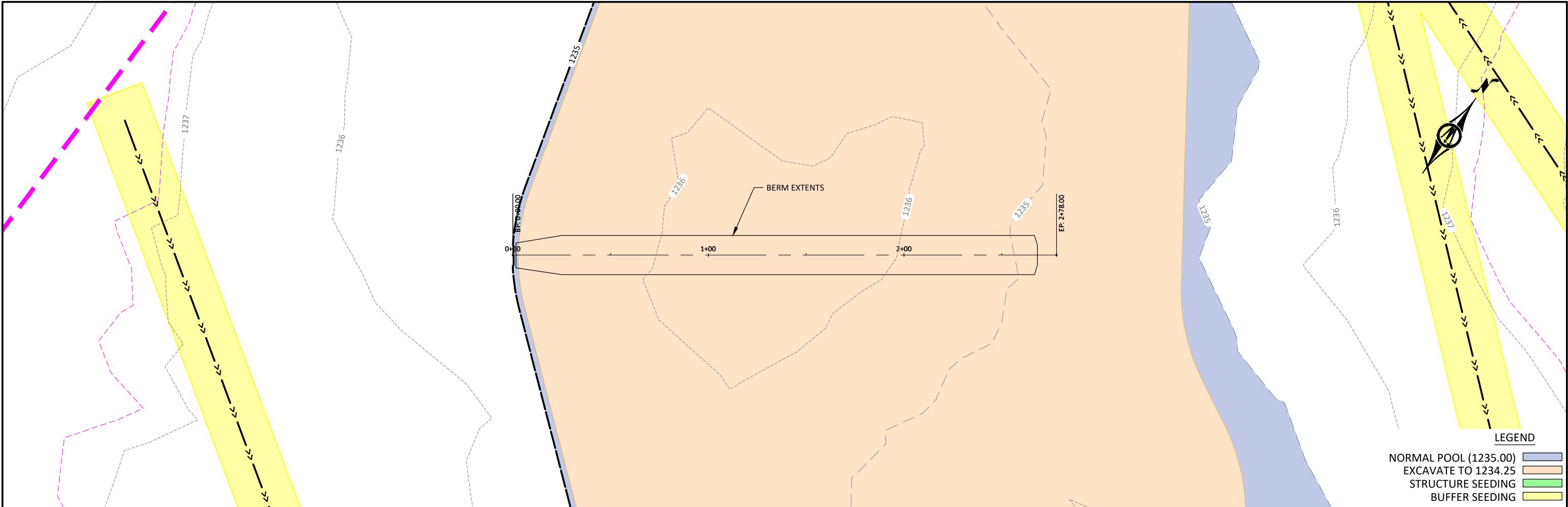
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SAC873514C TILE ZONE WETLAND

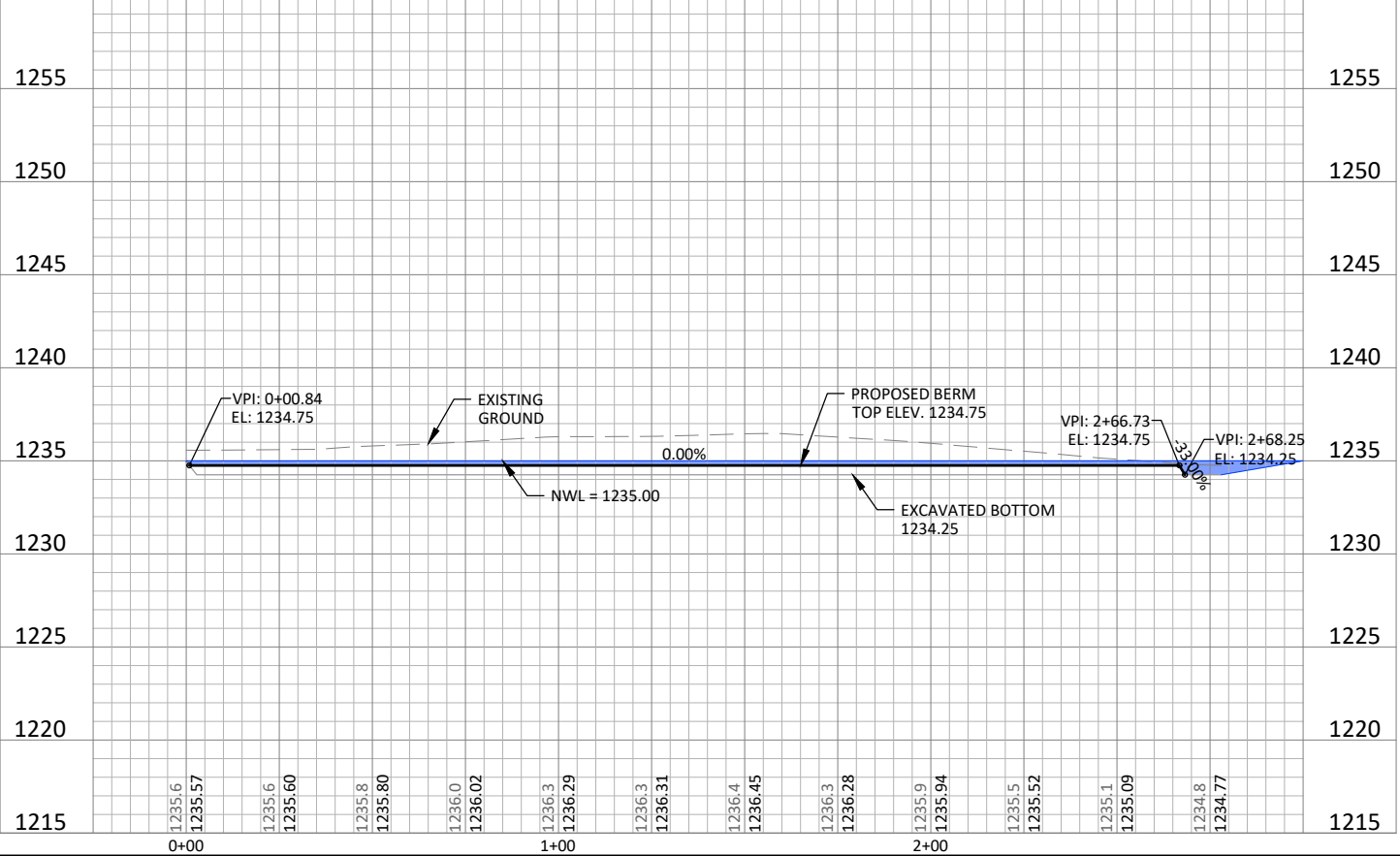
PLAN & PROFILE - DIVERSION BERM A

SHEET

D.03



- LEGEND
- NORMAL POOL (1235.00)
 - EXCAVATE TO 1234.25
 - STRUCTURE SEEDING
 - BUFFER SEEDING



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HORZ. SCALE
0 25 50
FEET

VERT. SCALE
0 5 10
FEET



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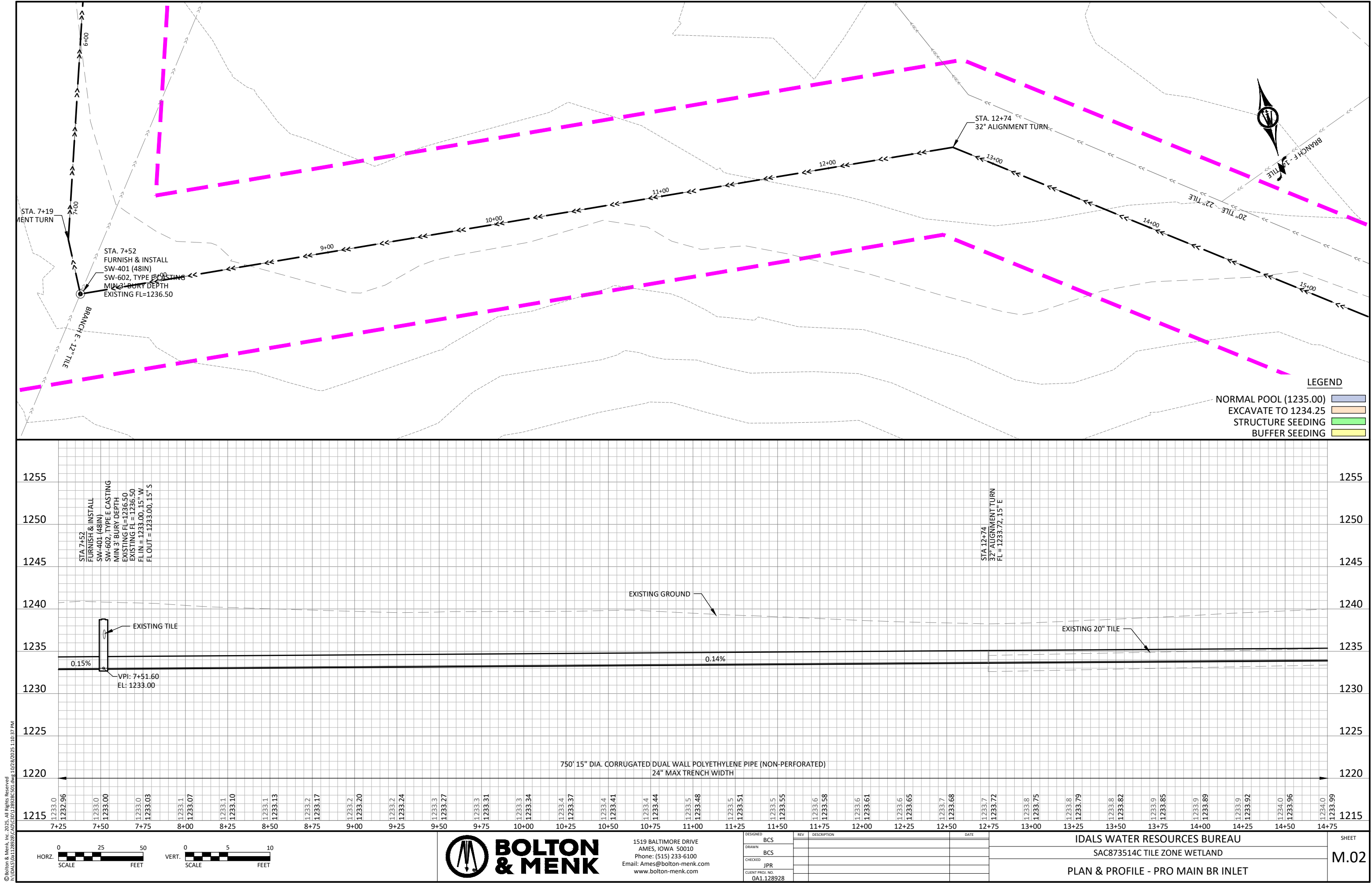
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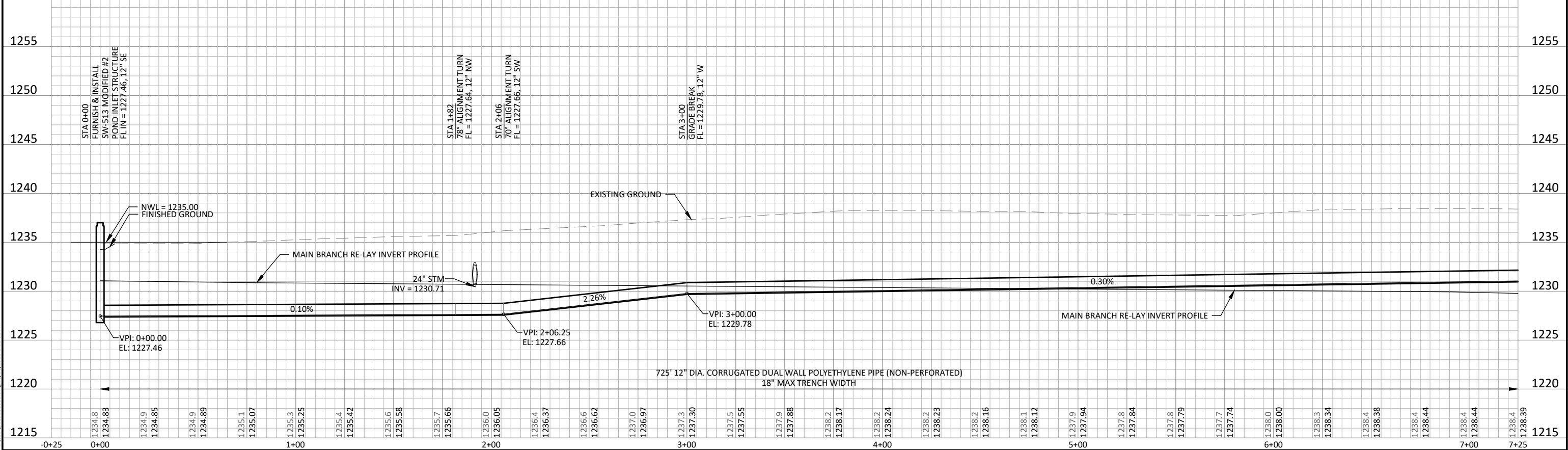
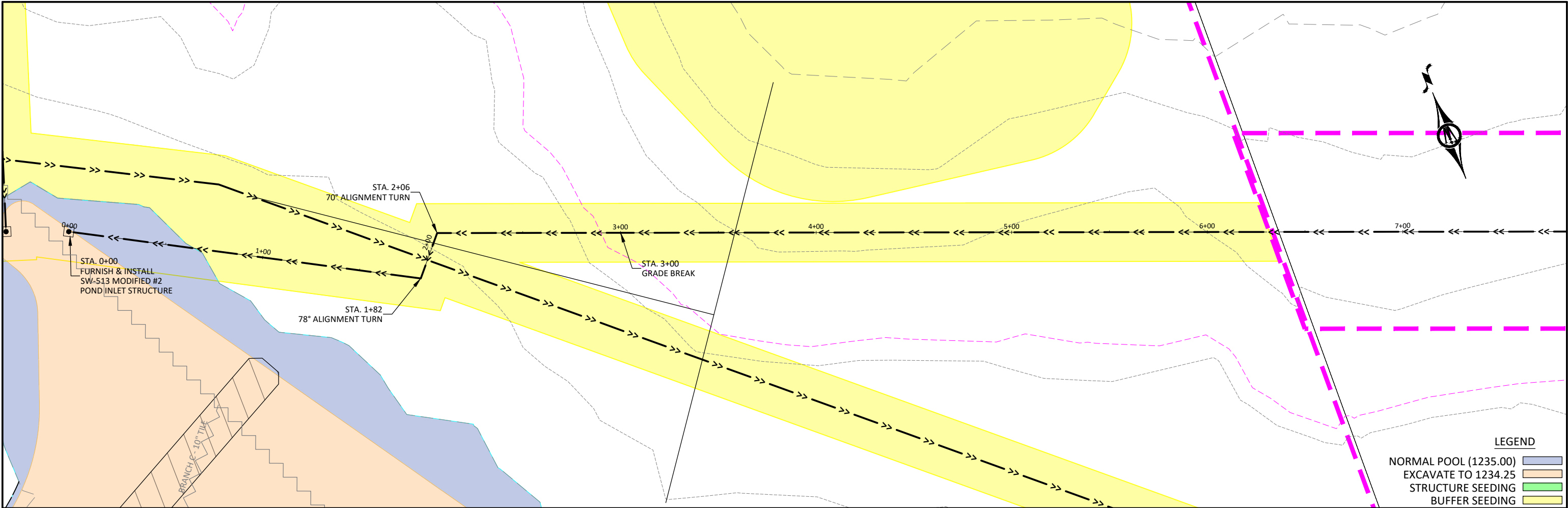
PLAN & PROFILE - DIVERSION BERM B

SHEET

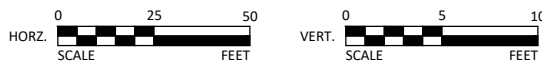
D.04



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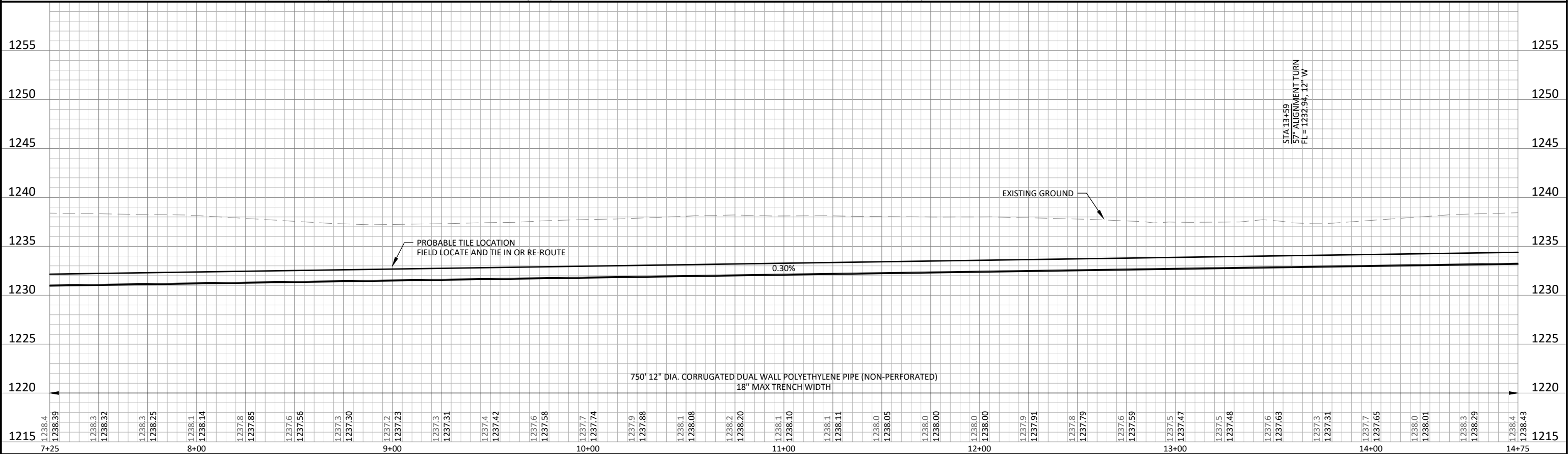
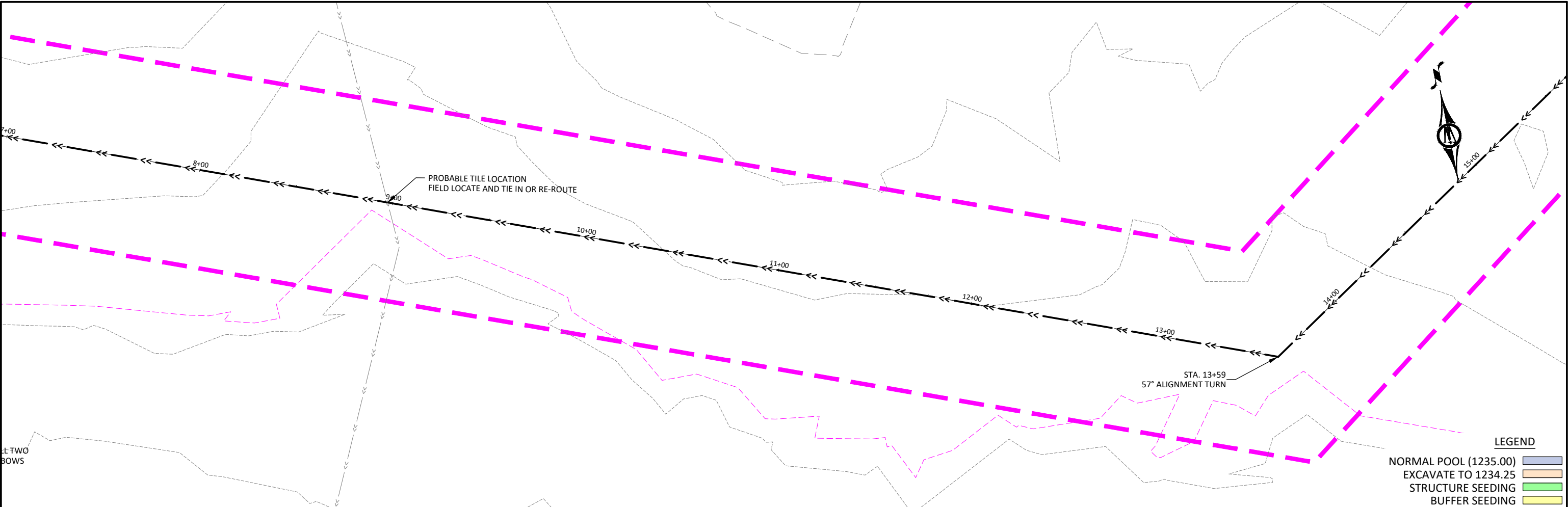
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PLAN & PROFILE - PRO BR A INLET

SHEET
M.04

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HORIZ. SCALE

0 25 50
FEET

VERT. SCALE

0 5 10
FEET

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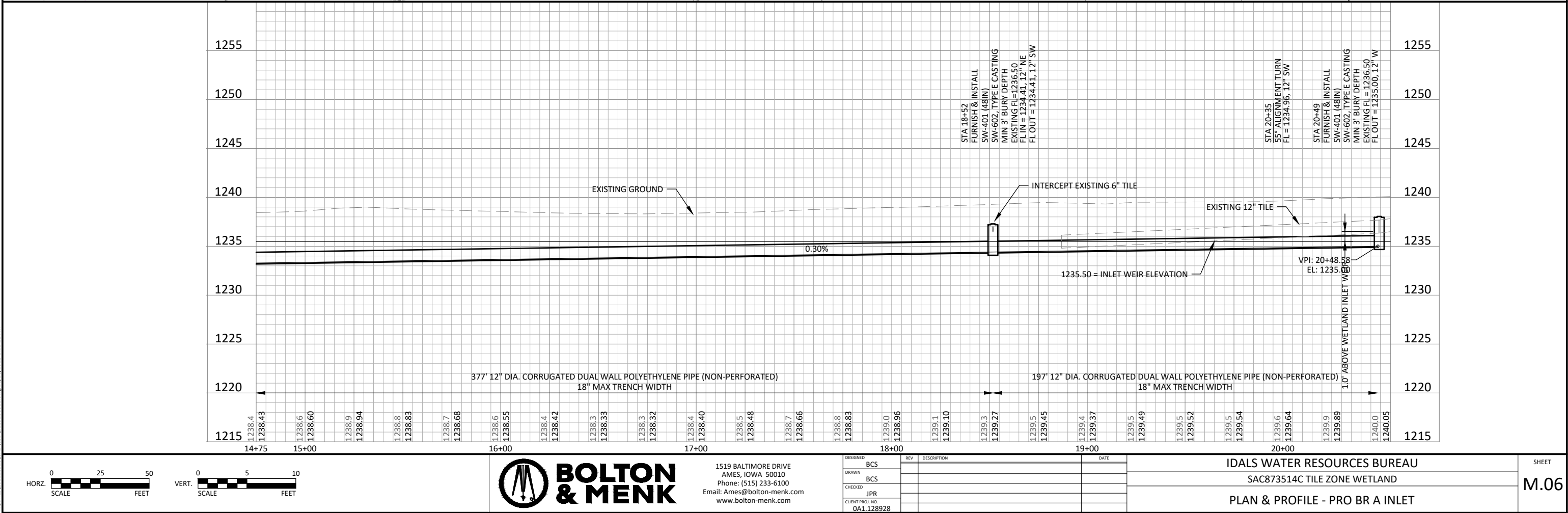
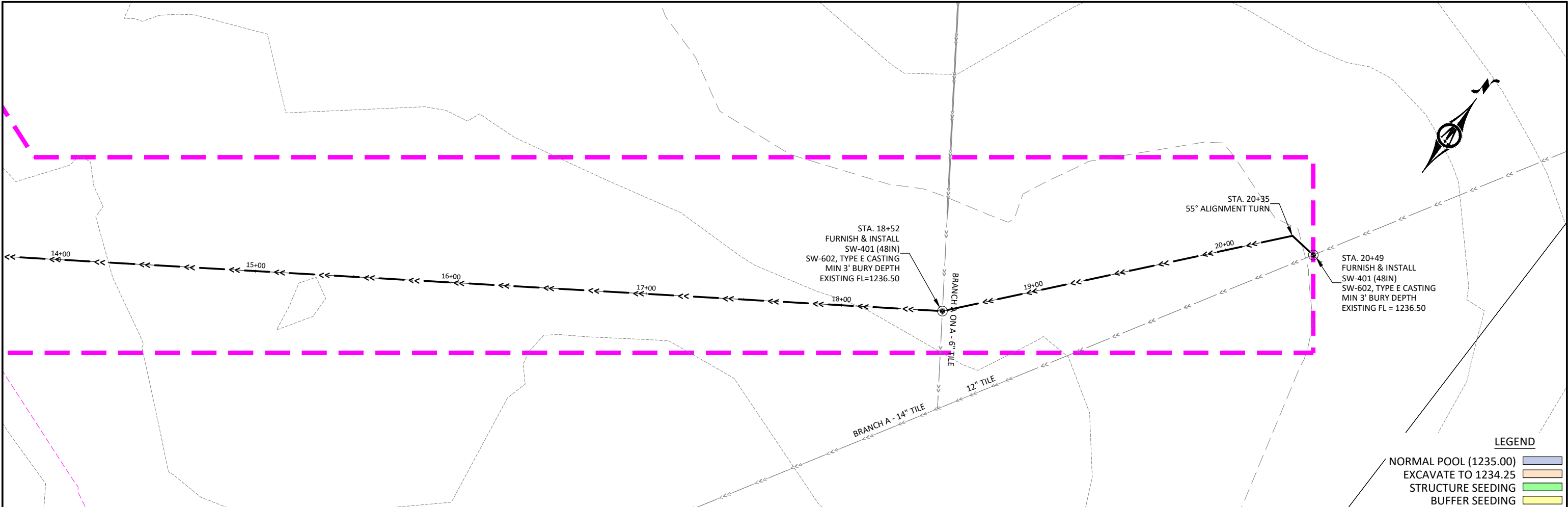
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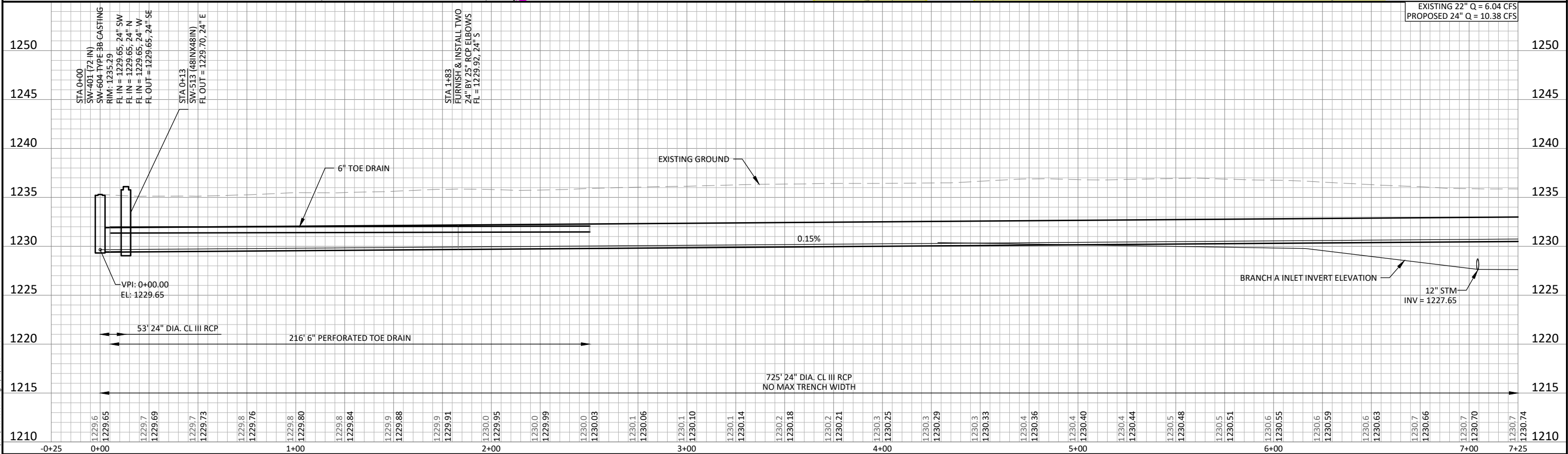
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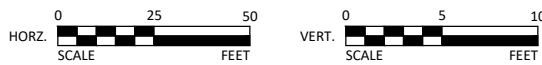
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M.05





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PLAN & PROFILE - PRO MAIN BR RE-LAY

SHEET
M.07

