PLANS

CONSTRUCTION PLANS FOR

IDALS PROJECT NO. KOS952921C

NUTRIENT REDUCTION WETLAND PROJECT

KOSSUTH COUNTY, IOWA

DECEMBER 2024

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.

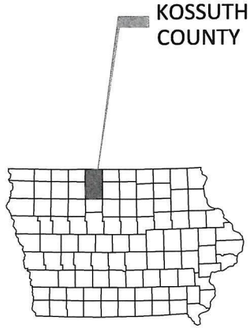
THE CURRENT EDITION OF THE "IOWA STATEWIDE URBAN STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS" SHALL GOVERN.

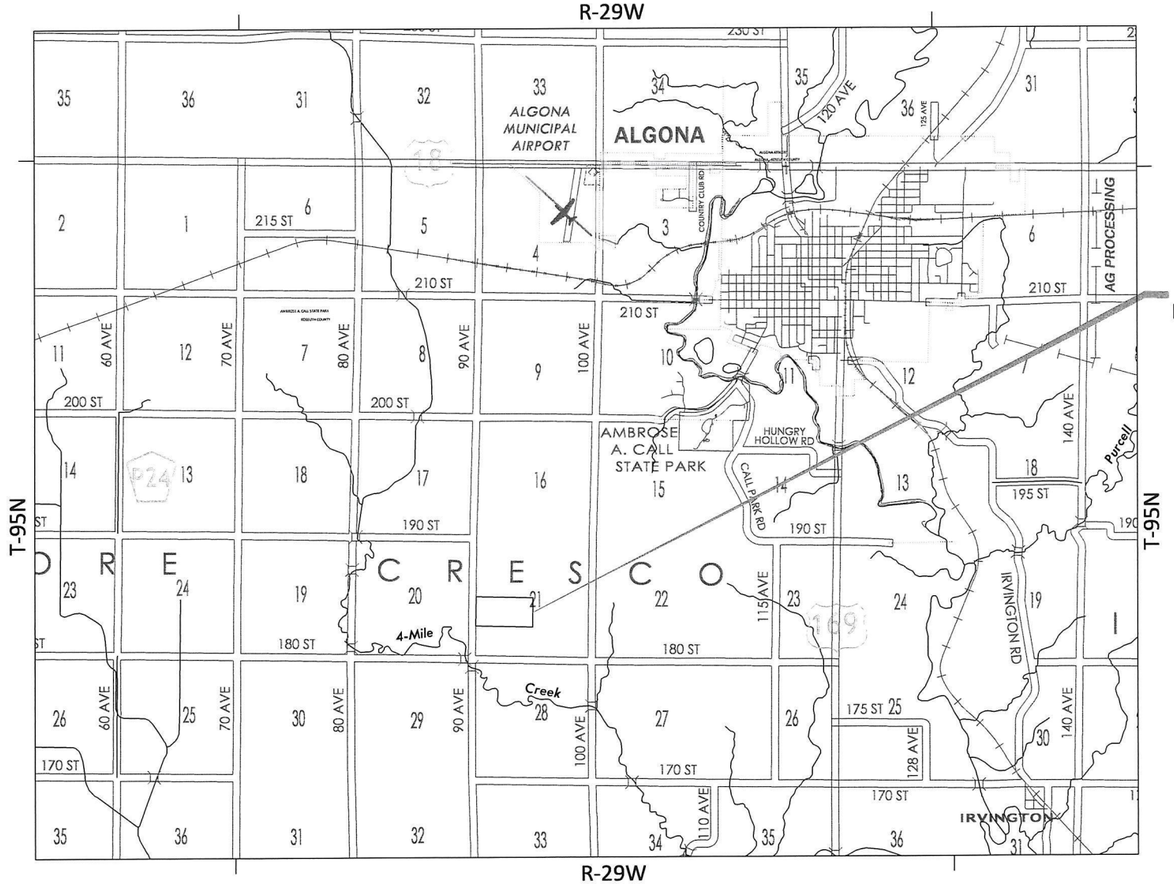
IOWA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION",
SERIES 2021 AND ALL CURRENT GENERAL SUPPLEMENTAL SPECIFICATIONS AND MATERIALS INSTRUCTIONAL MEMORANDUM
SHALL GOVERN AS REFERENCED.

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 | 811
www.iowaonecall.com

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."





MAP OF PORTIONS OF
KOSSUTH COUNTY, IOWA

SHEET INDEX

THESE PLANS PREPARED IN ACCORDANCE WITH NRCS ENGINEERING JOB CLASS V. STANDARDS FOR TASKS ARE AS FOLLOWS:
656 - SITE DESIGN
410 - OUTLET CAPACITY
378 - POOL DESIGN
TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT, AND BELIEF, THESE PLANS MEET APPLICABLE NRCS STANDARDS.

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

PROFESSIONAL ENGINEER
JONATHAN P. ROSENGREN
21661
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.

JONATHAN P. ROSENGREN, P.E.

REG. NO. 21661 DATE: Dec 2, 2024

MY LICENSE RENEWAL DATE IS 12/31/2024

PAGES OR SHEETS COVERED BY THIS SEAL:

ALL PLAN SHEETS

BOLTON & MENK
1519 BALTIMORE DRIVE
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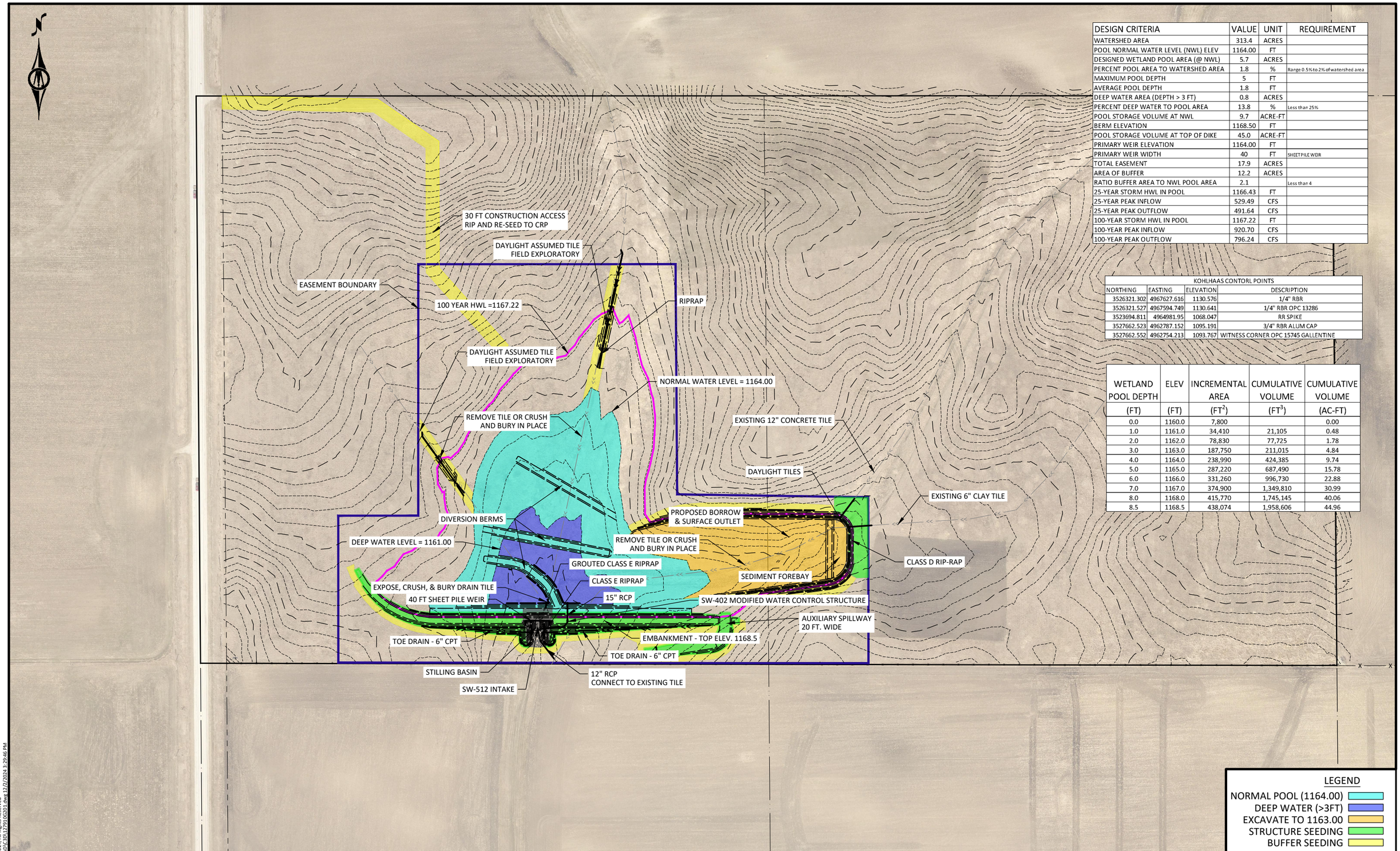
DRAWN	BCS
CHECKED	JPR
CLIENT PROJ. NO.	OP1.127910

REV	DESCRIPTION	DATE

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. KOS952921C
TITLE SHEET

SHEET A.01



DESIGN CRITERIA	VALUE	UNIT	REQUIREMENT
WATERSHED AREA	313.4	ACRES	
POOL NORMAL WATER LEVEL (NWL) ELEV	1164.00	FT	
DESIGNED WETLAND POOL AREA (@ NWL)	5.7	ACRES	
PERCENT POOL AREA TO WATERSHED AREA	1.8	%	Range 0.5% to 2% of watershed area
MAXIMUM POOL DEPTH	5	FT	
AVERAGE POOL DEPTH	1.8	FT	
DEEP WATER AREA (DEPTH > 3 FT)	0.8	ACRES	
PERCENT DEEP WATER TO POOL AREA	13.8	%	Less than 25%
POOL STORAGE VOLUME AT NWL	9.7	ACRE-FT	
BERM ELEVATION	1168.50	FT	
POOL STORAGE VOLUME AT TOP OF DIKE	45.0	ACRE-FT	
PRIMARY WEIR ELEVATION	1164.00	FT	
PRIMARY WEIR WIDTH	40	FT	SHEET PILE WEIR
TOTAL EASEMENT	17.9	ACRES	
AREA OF BUFFER	12.2	ACRES	
RATIO BUFFER AREA TO NWL POOL AREA	2.1		Less than 4
25-YEAR STORM HWL IN POOL	1166.43	FT	
25-YEAR PEAK INFLOW	529.49	CFS	
25-YEAR PEAK OUTFLOW	491.64	CFS	
100-YEAR STORM HWL IN POOL	1167.22	FT	
100-YEAR PEAK INFLOW	920.70	CFS	
100-YEAR PEAK OUTFLOW	796.24	CFS	

KOHLHAAS CONTORL POINTS			
NORTHING	EASTING	ELEVATION	DESCRIPTION
3526321.302	4967627.616	1130.576	1/4" RBR
3526321.527	4967594.749	1130.641	1/4" RBR OPC 13286
3523694.811	4964981.95	1068.047	RR SPIKE
3527662.523	4962787.152	1095.191	3/4" RBR ALUM CAP
3527662.552	4962754.213	1093.767	WITNESS CORNER OPC 15745 GALLENTINE

WETLAND POOL DEPTH (FT)	ELEV (FT)	INCREMENTAL AREA (FT^2)	CUMULATIVE VOLUME (FT^3)	CUMULATIVE VOLUME (AC-FT)
0.0	1160.0	7,800		0.00
1.0	1161.0	34,410	21,105	0.48
2.0	1162.0	78,830	77,725	1.78
3.0	1163.0	187,750	211,015	4.84
4.0	1164.0	238,990	424,385	9.74
5.0	1165.0	287,220	687,490	15.78
6.0	1166.0	331,260	996,730	22.88
7.0	1167.0	374,900	1,349,810	30.99
8.0	1168.0	415,770	1,745,145	40.06
8.5	1168.5	438,074	1,958,606	44.96

LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

HORZ. SCALE 0 60 120 FEET

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REV	DESCRIPTION	DATE

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. KOS952921C

OVERVIEW PLAN DESIGN

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.

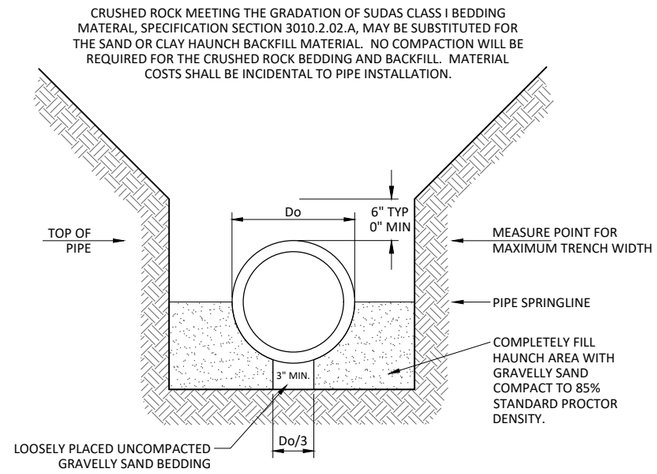
STEP 4A
SOIL OR TRENCH CONDITION CHANGES

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.

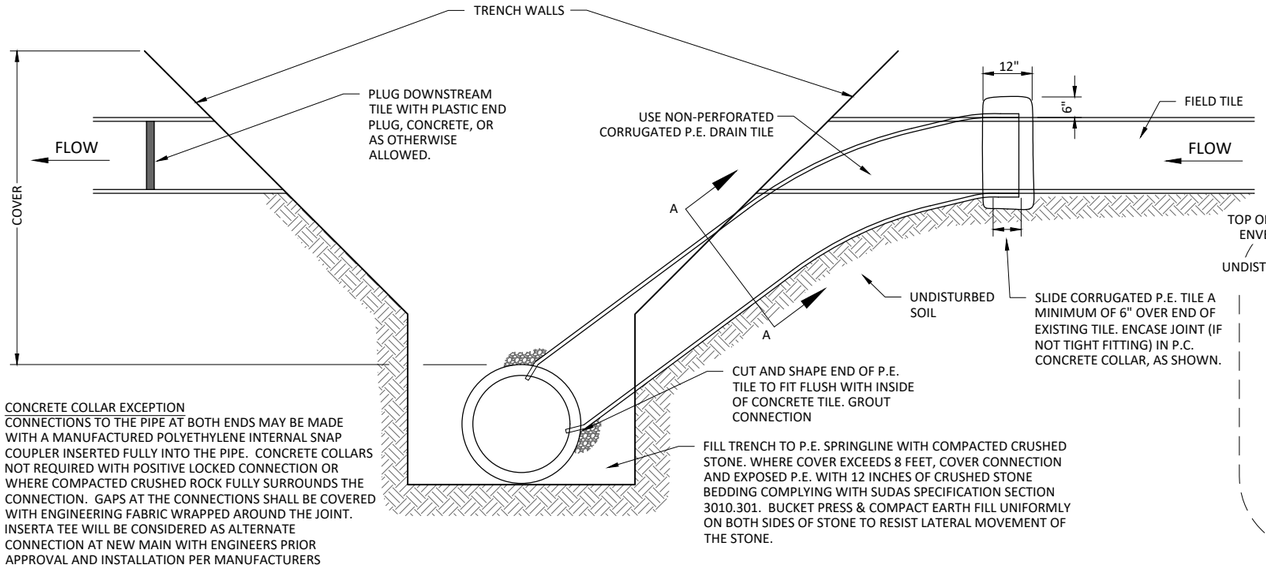


GRAVELLY SAND BEDDING SHALL BE CONSISTENT WITH THE GRADATION AND OTHER CHARACTERISTICS OF STANDARD AASHTO A1 OR A3 SOIL. A REPRESENTATIVE SAMPLE OF THE MATERIAL AND A GRADATION REPORT OR SUPPLIER'S CERTIFICATION OF COMPLIANCE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO DELIVERY TO SITE.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

TRENCH INSTALLATION TYPE 3

NOT TO SCALE

SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION
CONCRETE PIPE DESIGN MANUAL

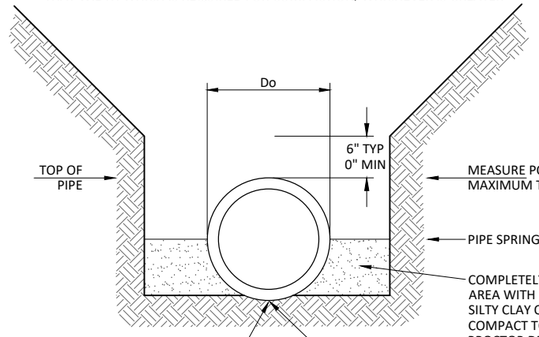


CONCRETE COLLAR EXCEPTION
CONNECTIONS TO THE PIPE AT BOTH ENDS MAY BE MADE WITH A MANUFACTURED POLYETHYLENE INTERNAL SNAP COUPLER INSERTED FULLY INTO THE PIPE. CONCRETE COLLARS NOT REQUIRED WITH POSITIVE LOCKED CONNECTION OR WHERE COMPACTED CRUSHED ROCK FULLY SURROUNDS THE CONNECTION. GAPS AT THE CONNECTIONS 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



WHERE TRENCH BOTTOM IN FIRM UNDISTURBED SOIL, SHAPE TRENCH BASE GROOVE TO MATCH MINIMUM 1/6 OF THE OUTER CIRCUMFERENCE OF THE PIPE. WHERE THE SHAPED GROOVE CANNOT BE CONSTRUCTED INTO UNDISTURBED GROUND OR WHERE EXCESS CUT OCCURS OVER EXCAVATE AND PLACE MINIMUM 3-INCH THICK COMPACTED GRAVELLY SAND BEDDING TO RESTORE GRADE SUCH THAT 1/6 OR MORE OF THE OUTER CIRCUMFERENCE OF THE PIPE IS BEDDED. THIS MATERIAL AND WORK IS SUBSIDIARY TO THE INSTALLATION OF THE PIPE. CONTRACTOR MAY SUBSTITUTE PIPE BEDDING ROCK AS THE BEDDING MATERIAL. IT ALSO IS SUBSIDIARY.

WHERE FIRM BASE IS NOT ENCOUNTERED. OVER EXCAVATE AS DIRECTED BY ENGINEER. PLACE CRADLING ROCK AND BED PIPE IN IT SUCH THAT 1/6 OR MORE OF THE OUTER CIRCUMFERENCE OF THE PIPE IS SUPPORTED. THIS ROCK IS PAID FOR UNDER A SEPARATE BID ITEM.

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
IDALS PROJ. NO. KOS952921C
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 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.
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 WILL BE PAID UNDER THE TILE TRENCH STABILIZATION AND CRADLING ROCK BID ITEM.
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. UNLESS DUE TO CONTRACTOR ERROR THIS BEDDING MATERIAL WILL BE PAID UNDER THE TILE TRENCH STABILIZATION AND CRADLING ROCK BID ITEM.
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.

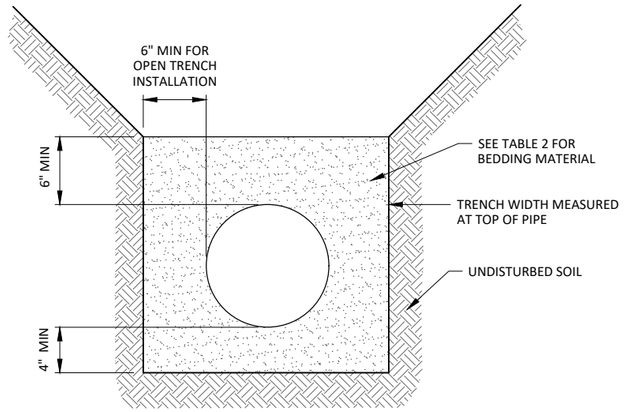
Table 1
Maximum Allowable Buried Depth to Flowline of CPDT

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

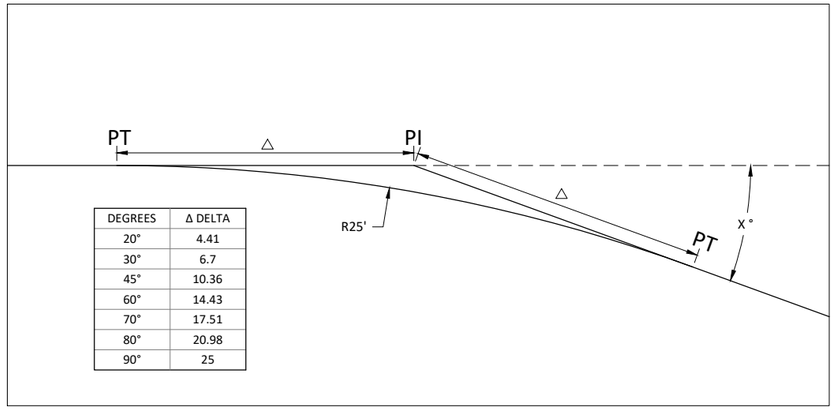


FILL TRENCH TO 6" ABOVE TOP OF PIPE WITH CRUSHED STONE OR GRAVEL MEETING THE REQUIREMENTS IN TABLE 2. BEDDING MATERIAL SHALL BE INCIDENTAL TO THE PIPE INSTALLATION.

FLAT BOTTOM TRENCH INSTALLATION

NOT TO SCALE
SOURCE: ASTM F449

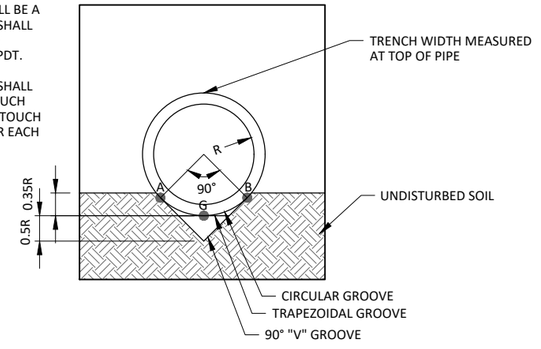
NOTE: THIS IS AN ALLOWED ALTERNATIVE INSTALLATION FOR CPDT



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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REV	DESCRIPTION	DATE

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. KOS952921C
CPDT INSTALLATION DETAIL

SHEET B.02

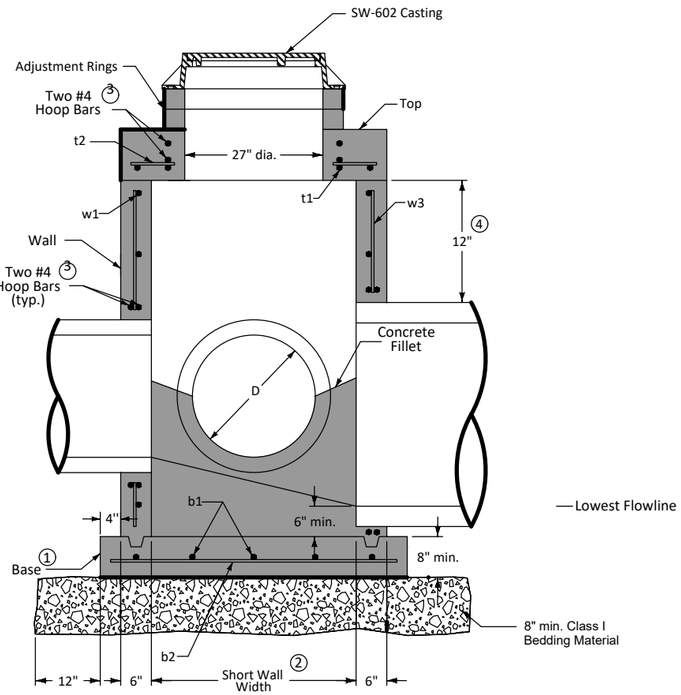
Adjacent walls may have different widths based upon pipe configuration, but structure must be rectangular.

(1) Cast-in-place base shown. If base is precast integral with walls, the footprint of the base is not required to extend beyond the outer edge of the walls.

(2) Wall widths vary with pipe diameter and range from 40 inches minimum to 77 inches maximum. Provide 6 inches of wall width (minimum) each side of pipe opening.

(3) Provide two #4 hoop bars at top opening and at all pipe openings.

(4) 12 inch minimum wall height above all pipes.



TYPICAL SECTION
(not to scale)

SW-402
FOR INFORMATION ONLY

SUDAS	Iowa Department of Transportation	REVISION
FIGURE 6010.402	STANDARD ROAD PLAN	NEW 04-21-09
		SW-402
		SHEET 1 of 1
REVISIONS:		
SUDAS DIRECTOR	DESIGN METHODS ENGINEER	
RECTANGULAR STORM SEWER MANHOLE		

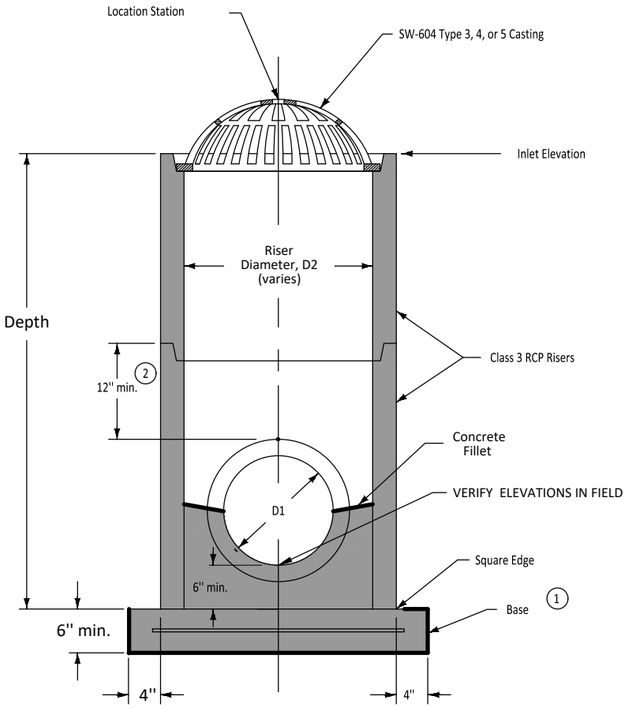
(1) Precast (shown) or cast-in-place base:

Precast: 6 inch thick concrete with #6 welded wire mesh on 4 inch centers (WWF 4'' x 4''). Center mesh vertically within base.

Cast-in-place: 8 inch thick non-reinforced concrete.

(2) 12 inch minimum riser height above all pipes.

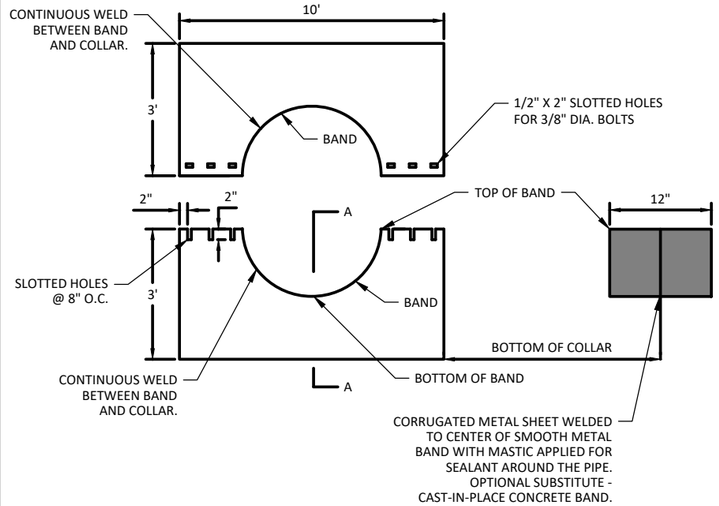
INTAKE SIZE - CASE 1	
Outlet Pipe Diameter, D1	Minimum Riser Diameter, D2
12''	18''
15''	24''
18''	24''
21''	30''
24''	30''
27''	36''



TYPICAL SECTION
(not to scale)

SW-512
BID ITEM No. 21

SUDAS	Iowa Department of Transportation	REVISION
FIGURE 6010.512	STANDARD ROAD PLAN	4 04-21-20
		SW-512
		SHEET 1 of 2
REVISIONS: Changed 1 to I on Bedding Material. MODIFICATIONS:		
SUDAS DIRECTOR	DESIGN METHODS ENGINEER	
CIRCULAR AREA INTAKE		



CMP ANTI-SEEP COLLAR
NOT TO SCALE

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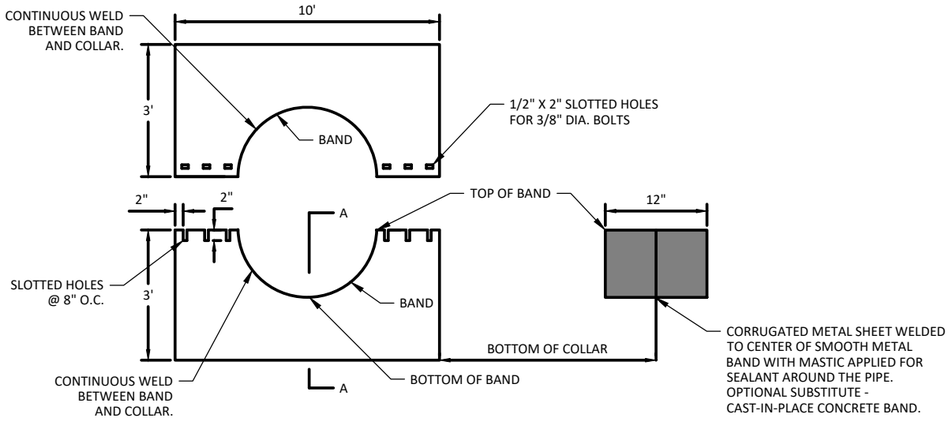
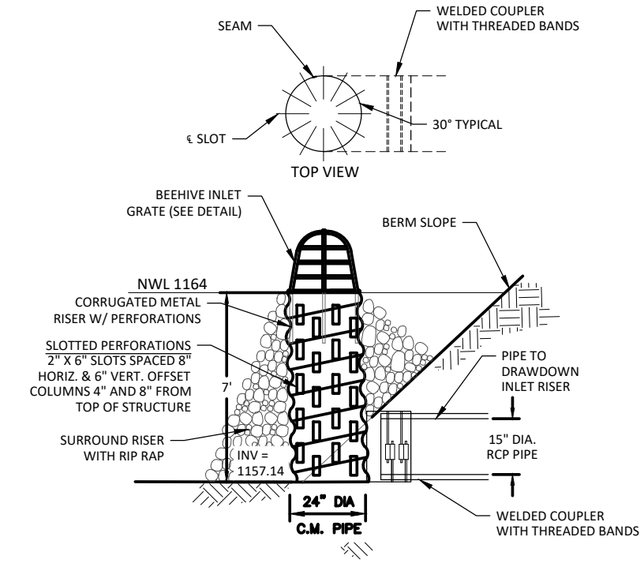
IDALS PROJ. NO. KOS952921C
IOWA DOT STRUCTURE DETAILS

SHEET B.03



RCP ANTI-SEEP COLLAR

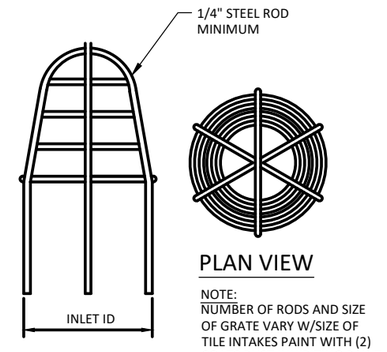
NOT TO SCALE



CMP RISER INLET STRUCTURE

BID ITEM No. 15

NOT TO SCALE



SECTION VIEW

PLAN VIEW

NOTE:
NUMBER OF RODS AND SIZE OF GRATE VARY W/SIZE OF TILE INTAKES PAINT WITH (2) COATS RUST INHIBITING PAINT FOLLOWING FABRICATION

BEEHIVE INLET GRATE (STEEL BARS)

NOT TO SCALE

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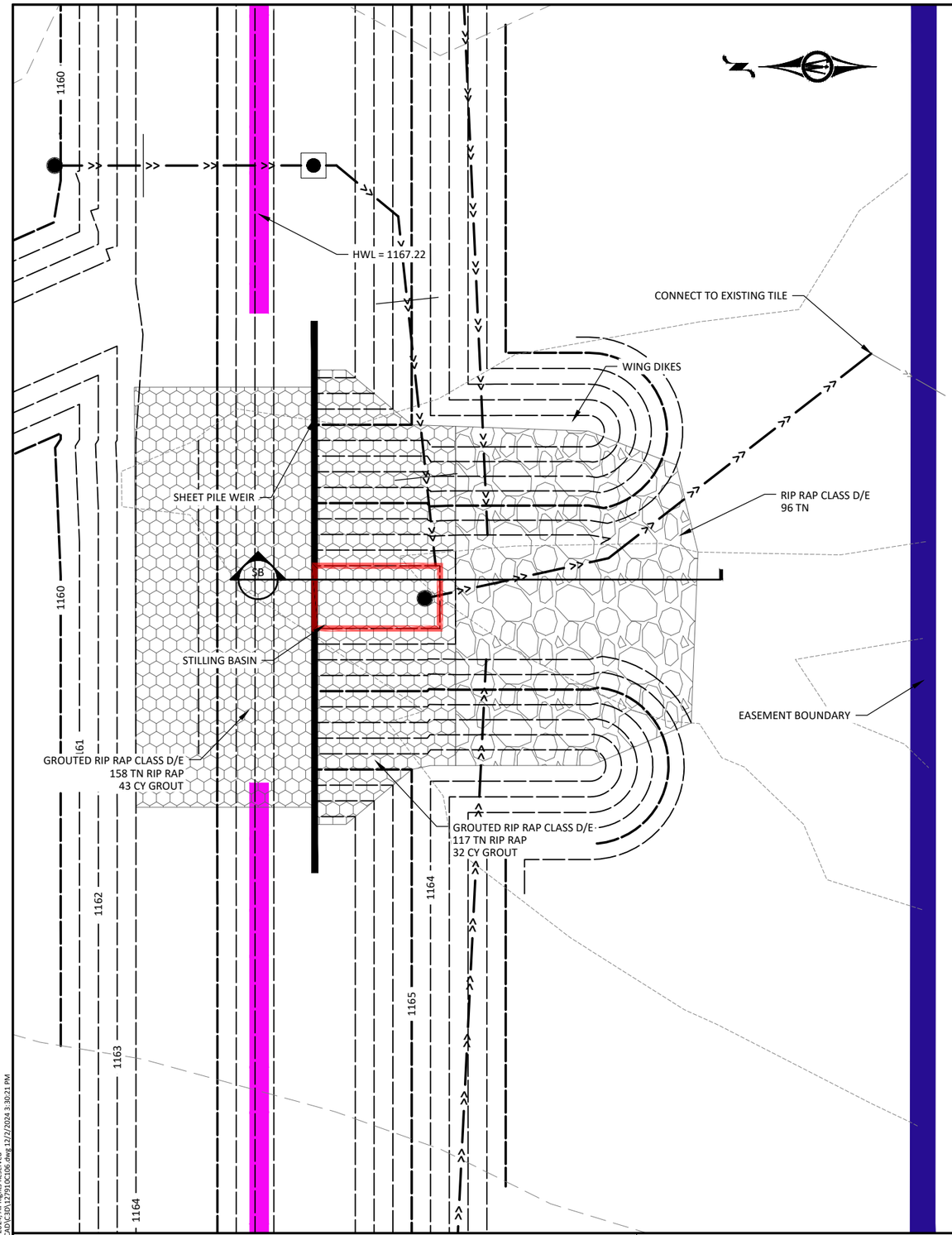
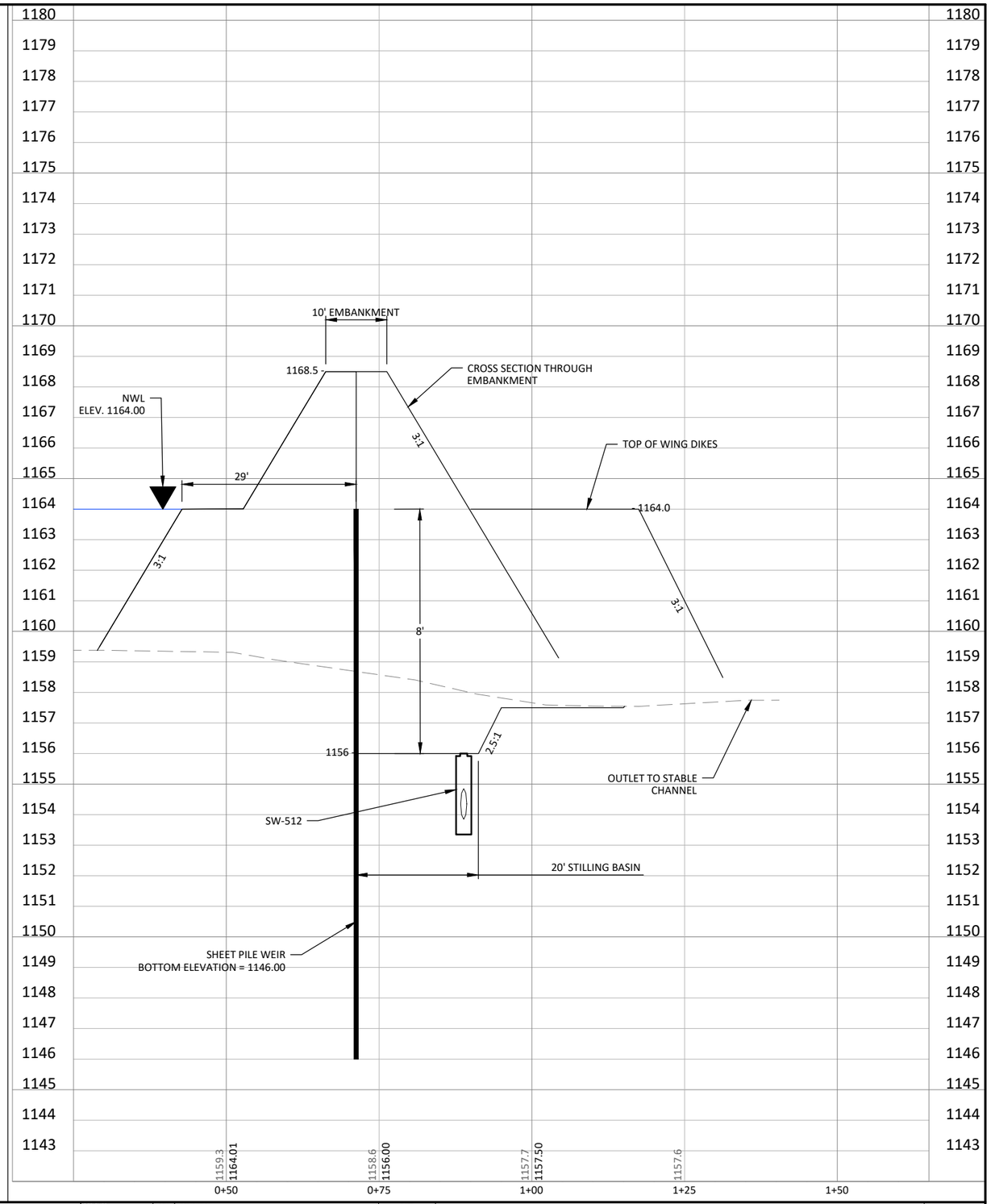
IDALS PROJ. NO. KOS952921C

MODIFIED STRUCTURES

SHEET B.04





HORZ. SCALE 0 10 20 FEET

VERT. SCALE 0 2 4 FEET

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STILLING BASIN DETAIL

SHEET B.05

DESIGN SHEET PILING AREA

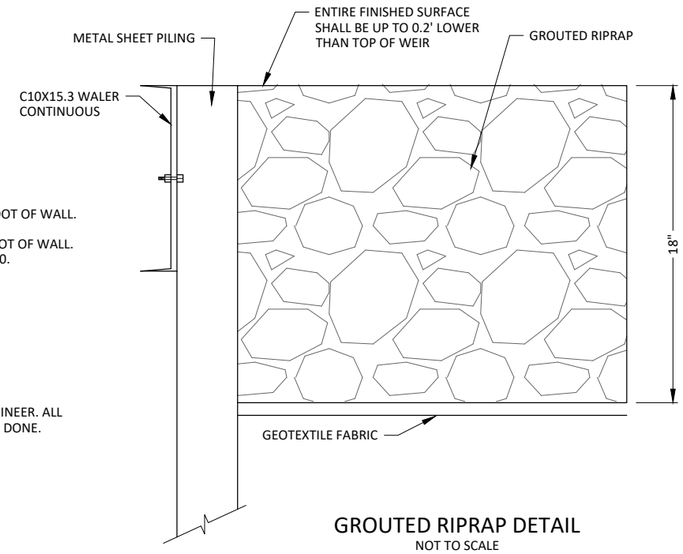
SHEET PILING REQUIREMENTS

MINIMUM SECTION MODULUS OF 9.06 CUBIC INCHES PER FOOT OF WALL.
MINIMUM GRADE OF STEEL IS 36 KSI.
MINIMUM MOMENT OF INERTIA OF 33.92 INCHES ^ 4 PER FOOT OF WALL.
ALL SHEETING SHALL MEET ASTM A-328, A-572 GR50 OR A-690.

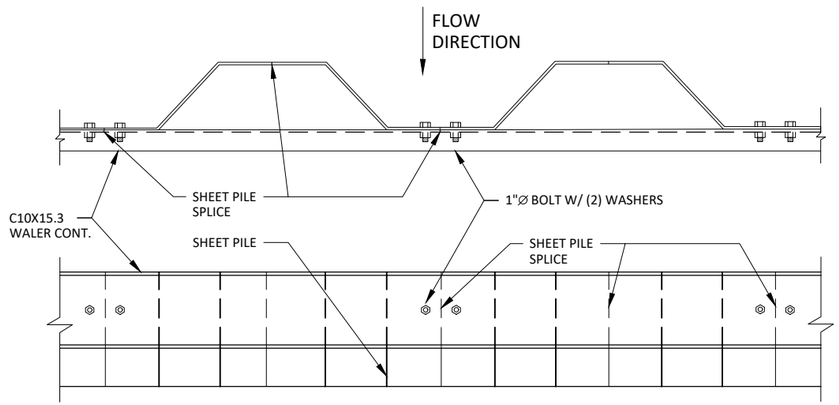
APPROVED PRODUCTS

SHORELINE STEEL SZ-12
CONTECH SZ-12
JD FIELDS PZC13
GERDAU AMERISTEEL (CHAPPARRAL) PZC13
SKYLINE SCZ 14

OTHER SHEETING MAYBE ALLOWED WITH PRIOR APPROVAL OF ENGINEER. ALL MATERIALS ARE ESTIMATED AND FURTHER SIZING WILL NEED TO BE DONE.



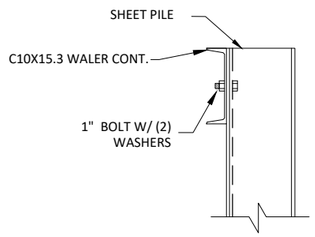
GROUTED RIPRAP DETAIL
NOT TO SCALE



WALER BOLT PLACEMENT
NOT TO SCALE

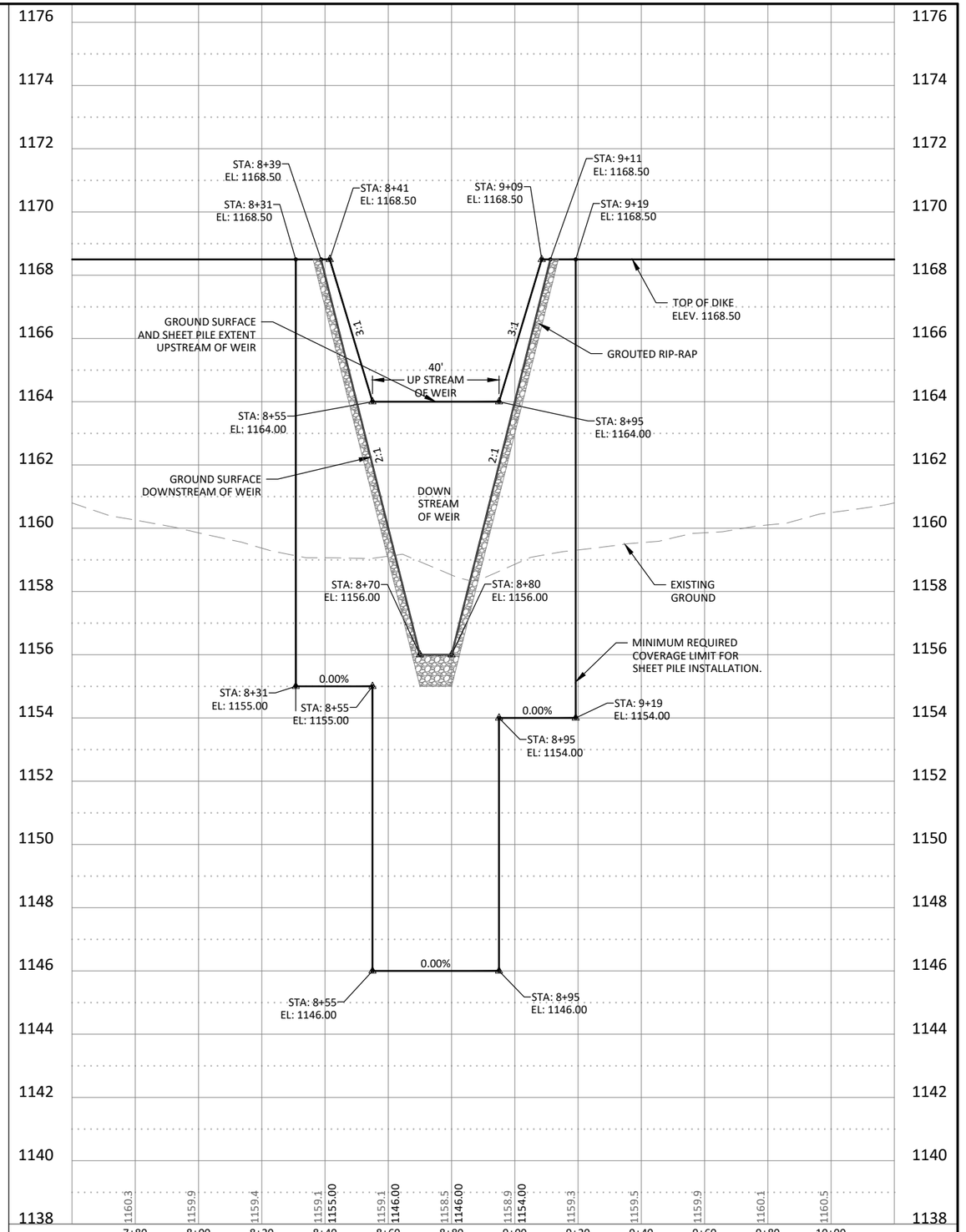
NOTES:

1. ALL BOLTS WILL BE 1" DIA. WITH 2 WASHERS. BOLT SHALL BE EXTENDED AT A MINIMUM OF $\frac{3}{8}$" BEYOND THE NUT.
2. ALL HOLES SHALL BE DRILLED $\frac{1}{16}$" DIA. LARGER THAN THE BOLT.
3. THE WALER SHALL BE PLACED ON THE DOWNSTREAM SIDE OF THE WEIR.
4. ANY HOLES LEFT IN SHEET PILE (LIFTING HOLES ETC.) SHALL BE WELDED CLOSED.
5. AFTER SHEETING AND WALER INSTALLATION ALL SHEETING ON THE WEIR IS TO BE CUT TO CONFORM WITH 3:1 SLOPE AND THE DESIGN ELEVATIONS.
6. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDING WITH THE LATEST SPECIFICATION OF AISC. FABRICATOR SHALL SUBMIT SHOP DRAWINGS SHOWING THAT PLANNED STEEL WILL COMPLETELY COVER INTENDED WALL AREA. FABRICATE AFTER ENGINEERS REVIEW.
7. DEFLECTIONS SHALL BE MADE IN FABRICATED PIECES AND STILL CONFORM TO THE DIMENSIONS GIVEN.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ALLOWABLE CONSTRUCTION LIVE LOADS.
9. PROVIDE ALL NECESSARY TEMPORARY BRACING, SHORING, GUYING OR OTHER MEANS TO AVOID EXCESSIVE STRESSES AND TO HOLD STRUCTURAL ELEMENTS IN PLACE DURING CONSTRUCTION.



NOTE: 1 BOLT TO BE PLACED ON EACH SIDE OF SPLICE

BOLT DETAIL
NOT TO SCALE



HORZ. 0 20 40 SCALE FEET

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IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. KOS952921C
SHEET PILE DETAIL

SHEET B.06

QUANTITY ESTIMATE - KOHLHAAS

PROJECT: KOS952921C
CREP: X **WQI:**

Bid Item	Sub-Item	Description	Specifications		Plan No.	Estimated Quantities	
			No.	Page		Quantity	Unit
1	-	SITE STRIPPING & PREPARATION	IA CS-001	2-3		1	LS
2	-	CROP DAMAGE	IA CS-001	2-3		0	AC
3	-	STRUCTURE & CHANNEL SEEDING	IA CS-006	7-10	A.02	1.3	AC
4	-	BUFFER SEEDING	IA CS-006	7-10	A.02	2.2	AC
5	-	MOBILIZATION AND DEMOBILIZATION	IA CS-008	11-13		1	LS
6	-	DRAIN TILE INVESTIGATION AND REMOVAL	IA CS-009	14-17	A.02, M.01-M.05	24	HR.
7	-	STEEL SHEET PILING	IA CS-013	20-21	B.07-B.08	1340	SF
8	-	EARTHFILL (GENERAL)	IA CS-023	24-28	D.01-D.06	1075	CY
9	-	EARTHFILL (GENERAL DAM)	IA CS-023	24-28	D.01-D.02	5750	CY
10	-	EARTHFILL (DAM CORE)	IA CS-023	24-28	D.01-D.02	2223	CY
11	-	DRAINFILL, FINE	IA CS-024	29-30	M.05	49	CY
12	-	TOPSOIL PLACEMENT	IA CS-026	31-32	A.02	2690	CY
13	-	CORRUGATED POLYETHYLENE PIPE (PERFORATED):	IA CS-045	41-44			
	A	6" DIAMETER			M.05	582	LF
14	-	CORRUGATED POLYETHYLENE PIPE (NON-PERFORATED):	IA CS-045	41-44			
	A	6" DIAMETER			M.04	54	LF
	B	12" DIAMETER			M.02-M.04	444	LF
15	-	CMP TILE OUTLETS (20 LF EACH):	IA CS-051	45-48			
	A	8" X 20'			M.04-M.05	3	EA
	B	15" X 20'			M.02-M.04	3	EA
16	-	RIPRAP (CLASS D/E)	IA CS-061	49-50	B.07-B.08, M.04	584	TN
17	-	EROSION STONE	IA CS-061	49-50	B.07-B.08, M.04	6	TN
18	-	CONCRETE GROUT	IA CS-062	51-53	B.07-B.08	75	CY
19	-	CONCRETE STRUCTURE SW-402 WATER CONTROL OUTLET STRUCTURE	IA CS-031, SUDAS 6010 -1.08	33-40	M.01	1	EA
20	-	CONCRETE STRUCTURES (OUTLET) SW - 512	IA CS-031, SUDAS 6010 -1.08	33-40	M.01	2	EA
21	-	REINFORCED CONCRETE PIPE (RCP)	IA CS-031, SUDAS SEC 4020	33-40			
	A	15" DIAMETER - GASKETED			M.01	114	LF
	B	12" DIAMETER			M.01	131	LF

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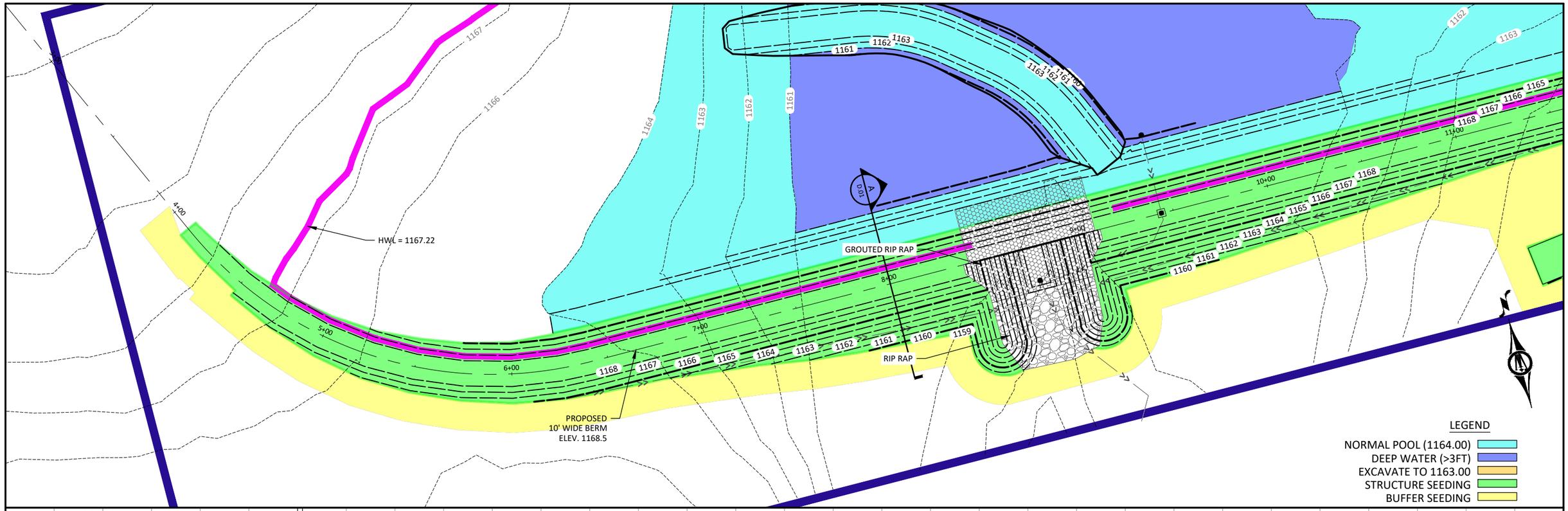
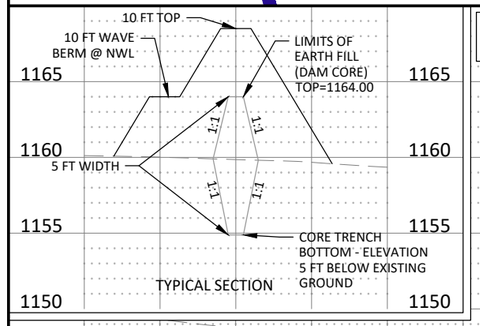
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. KOS952921C
QUANTITIES

SHEET C.01





NOTE: THE CONTRACTOR SHALL OVERBUILD THE EMBANKMENT BY 5% OF THE FILL DEPTH TO allow FOR SETTLEMENT.

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

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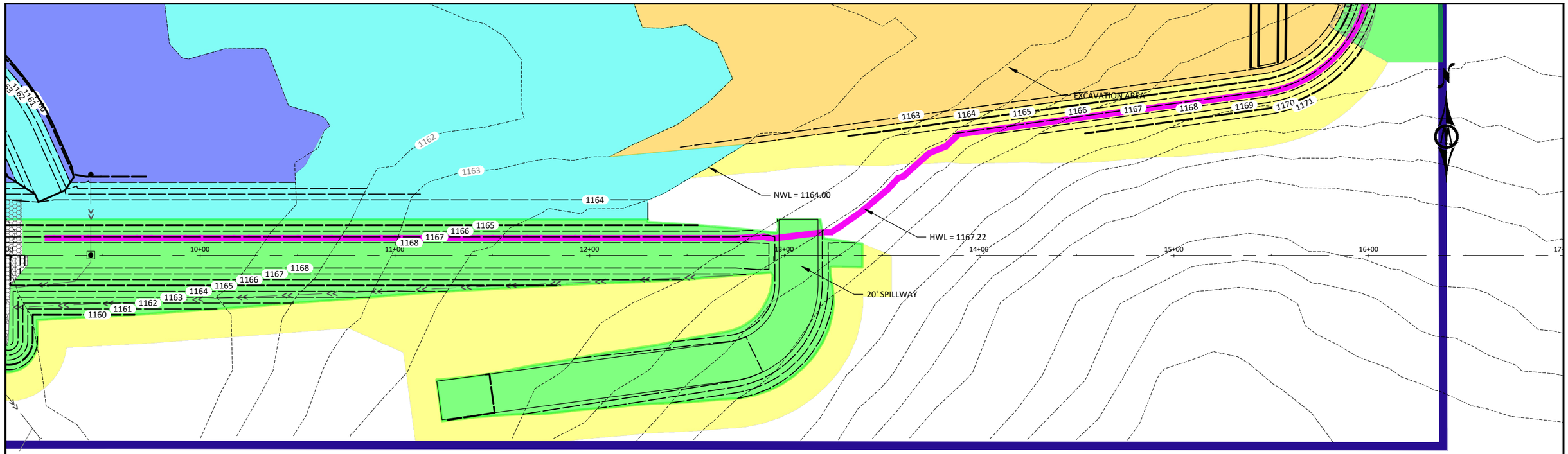
REV	DESCRIPTION	DATE

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. KOS952921C
PLAN & PROFILE - 10' WIDE BERM

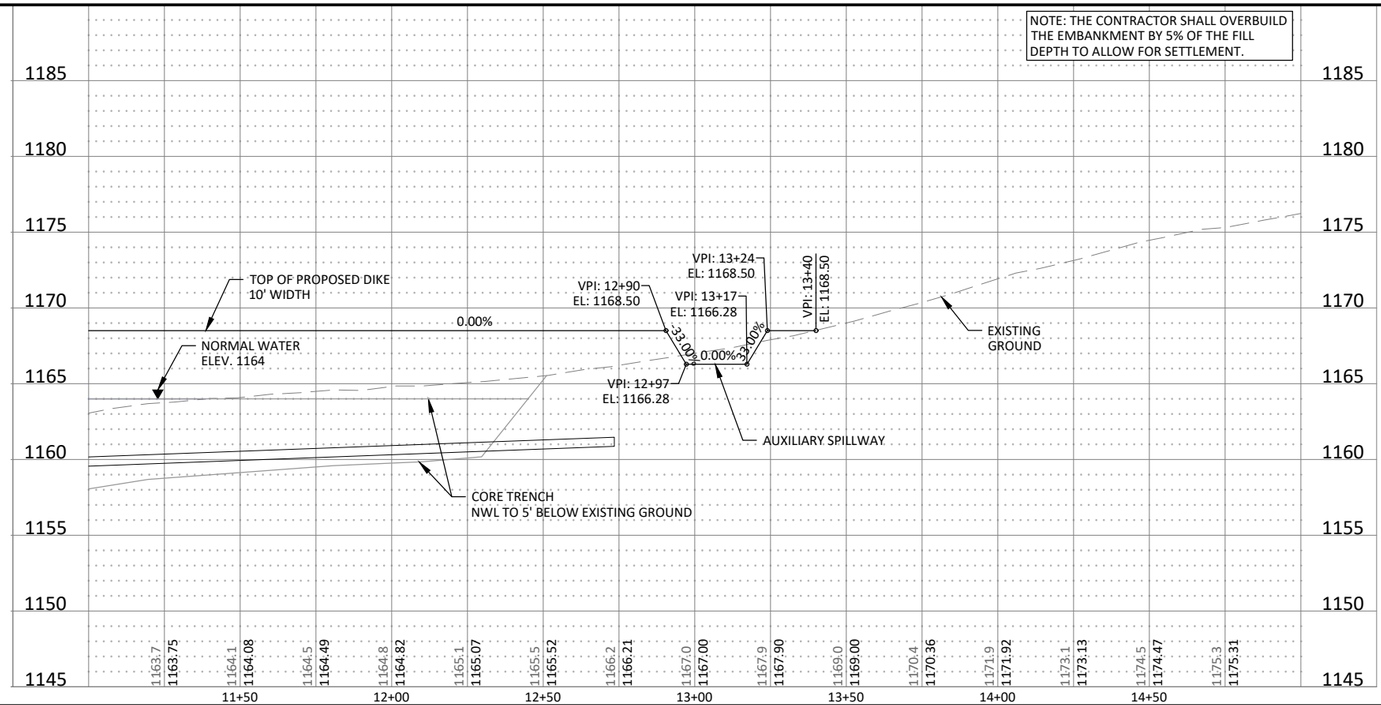
SHEET D.01



NOTE: THE CONTRACTOR SHALL OVERBUILD THE EMBANKMENT BY 5% OF THE FILL DEPTH TO ALLOW FOR SETTLEMENT.

LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING



HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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REV	DESCRIPTION	DATE

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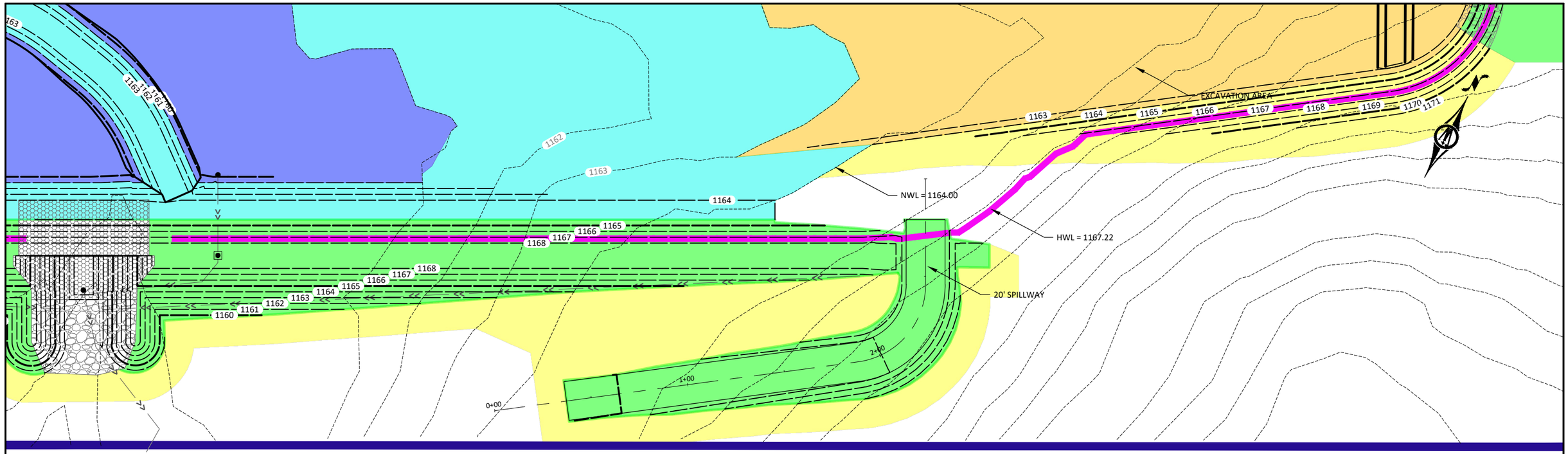
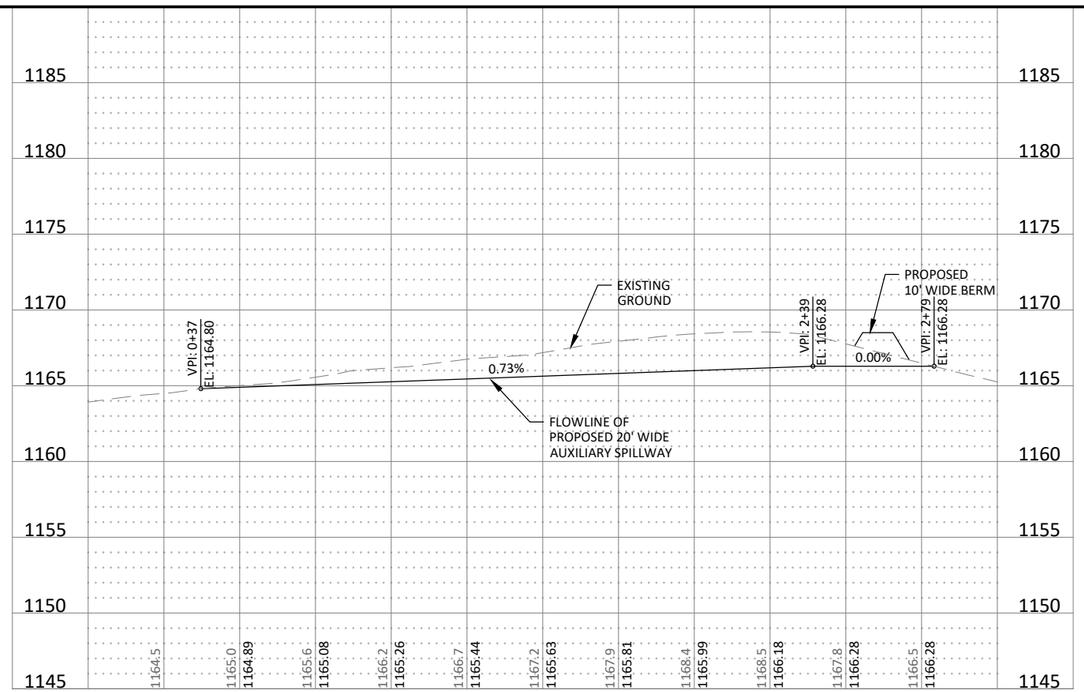
IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - 10' WIDE BERM

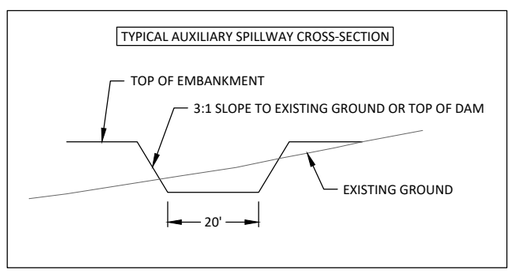
SHEET D.02





LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING



HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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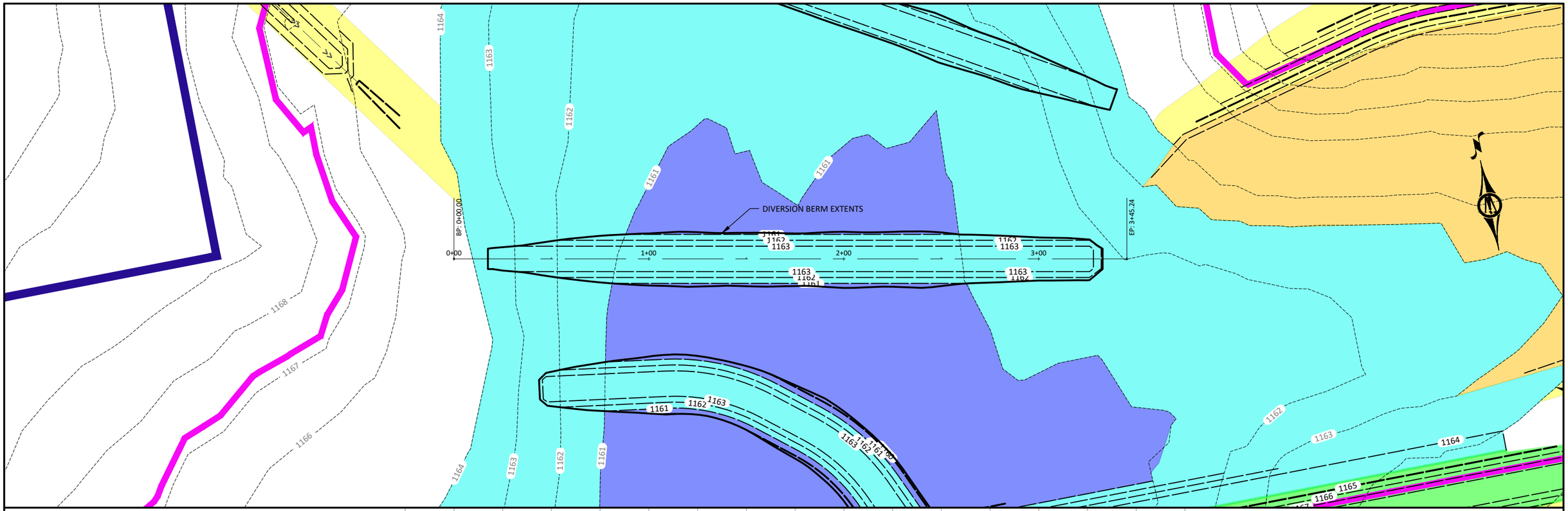
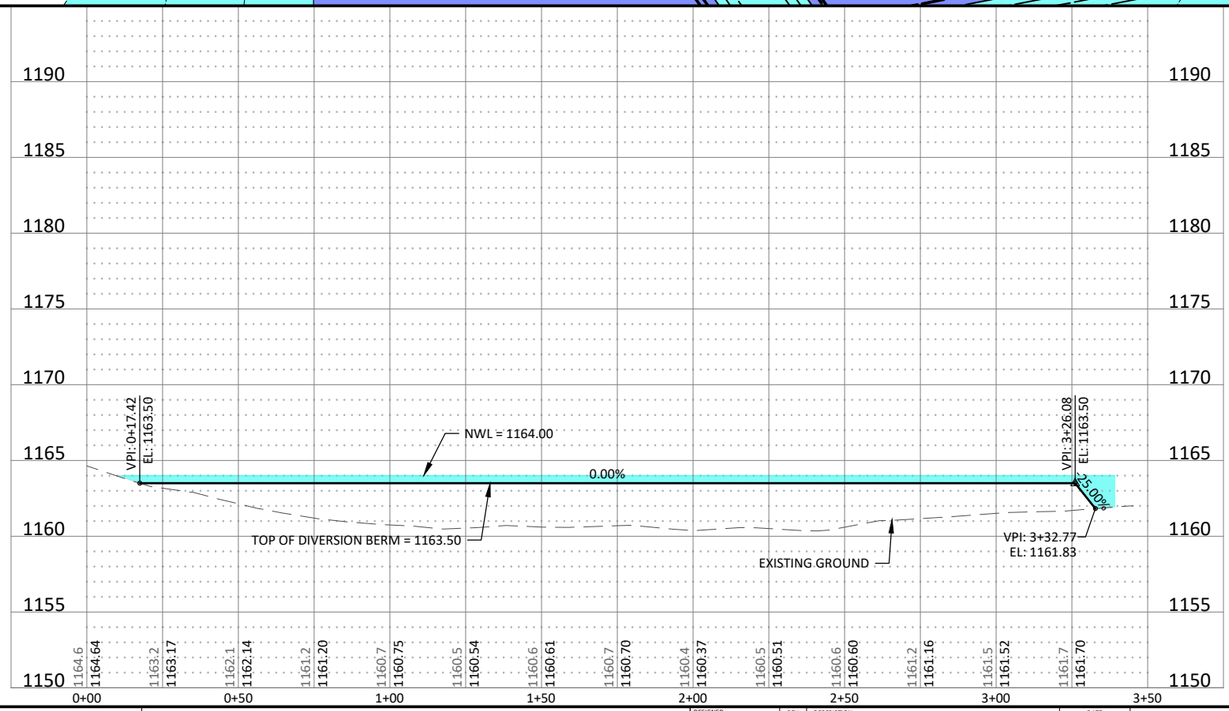
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - AUXILIARY SPILLWAY

SHEET D.03





LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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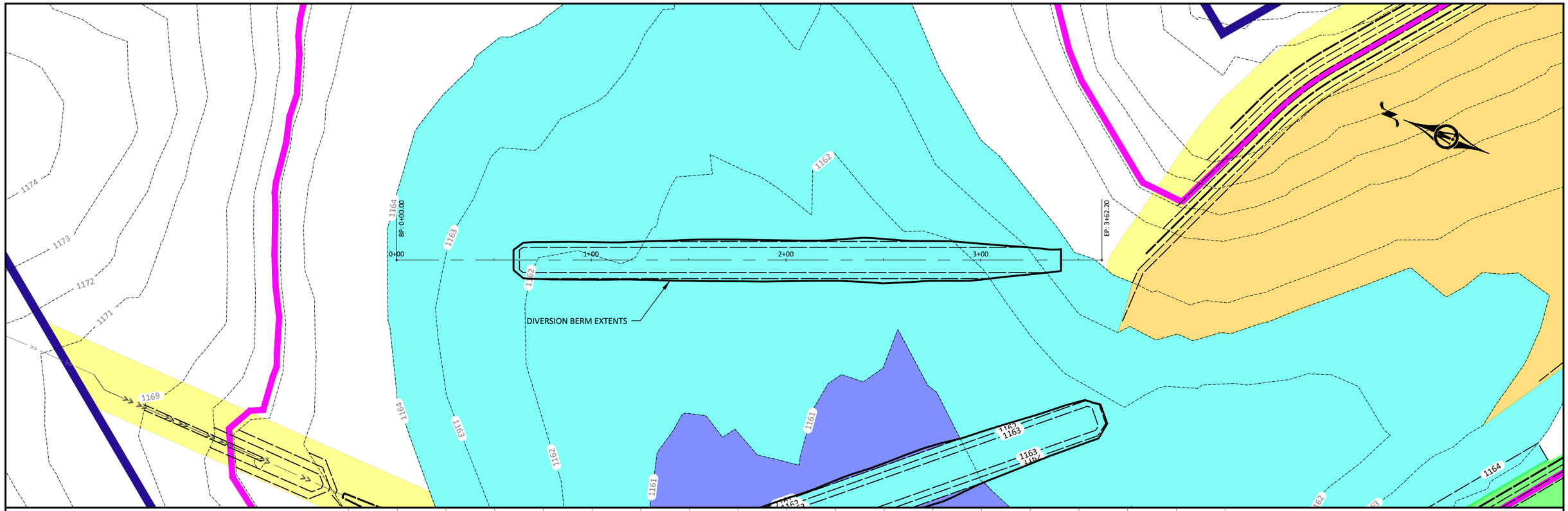
IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - DIVERSION BERM 1

SHEET D.04



LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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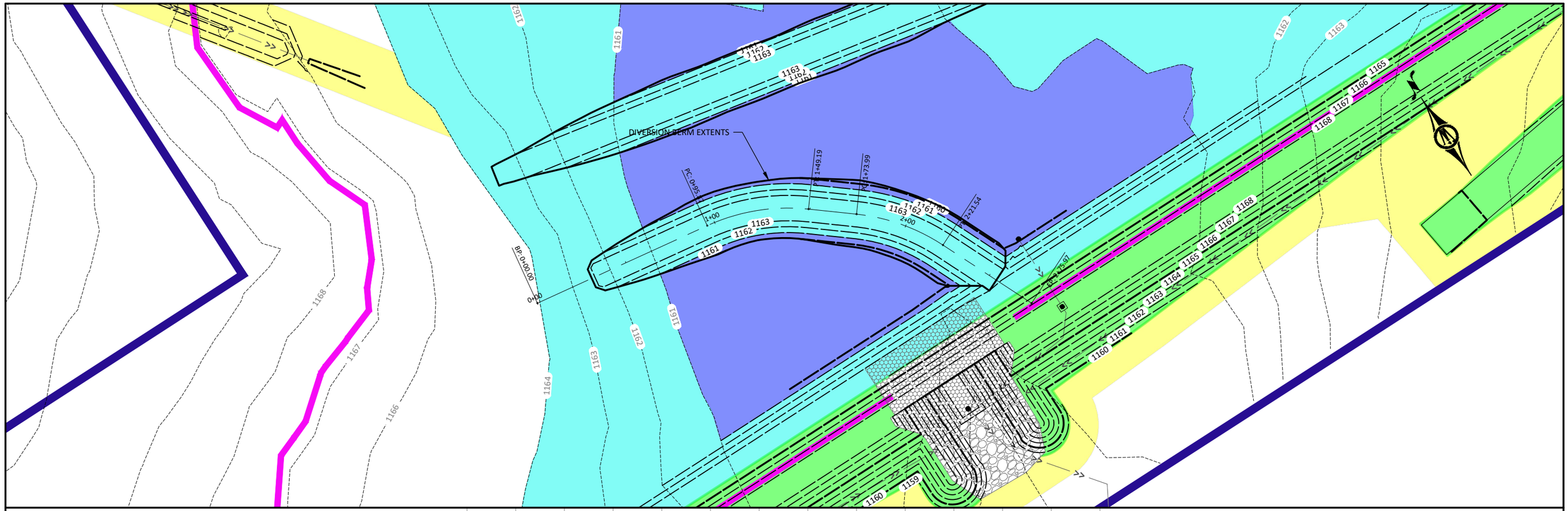
IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - DIVERSION BERM 2

SHEET D.05



LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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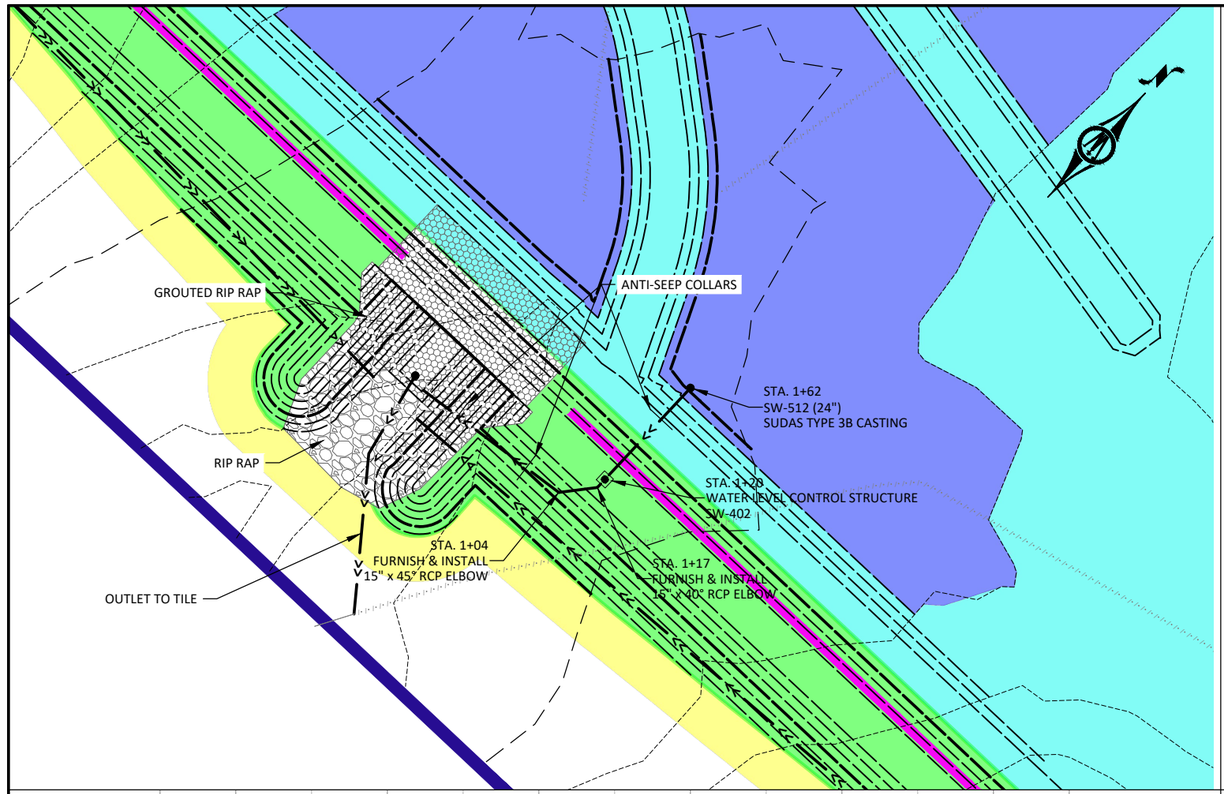
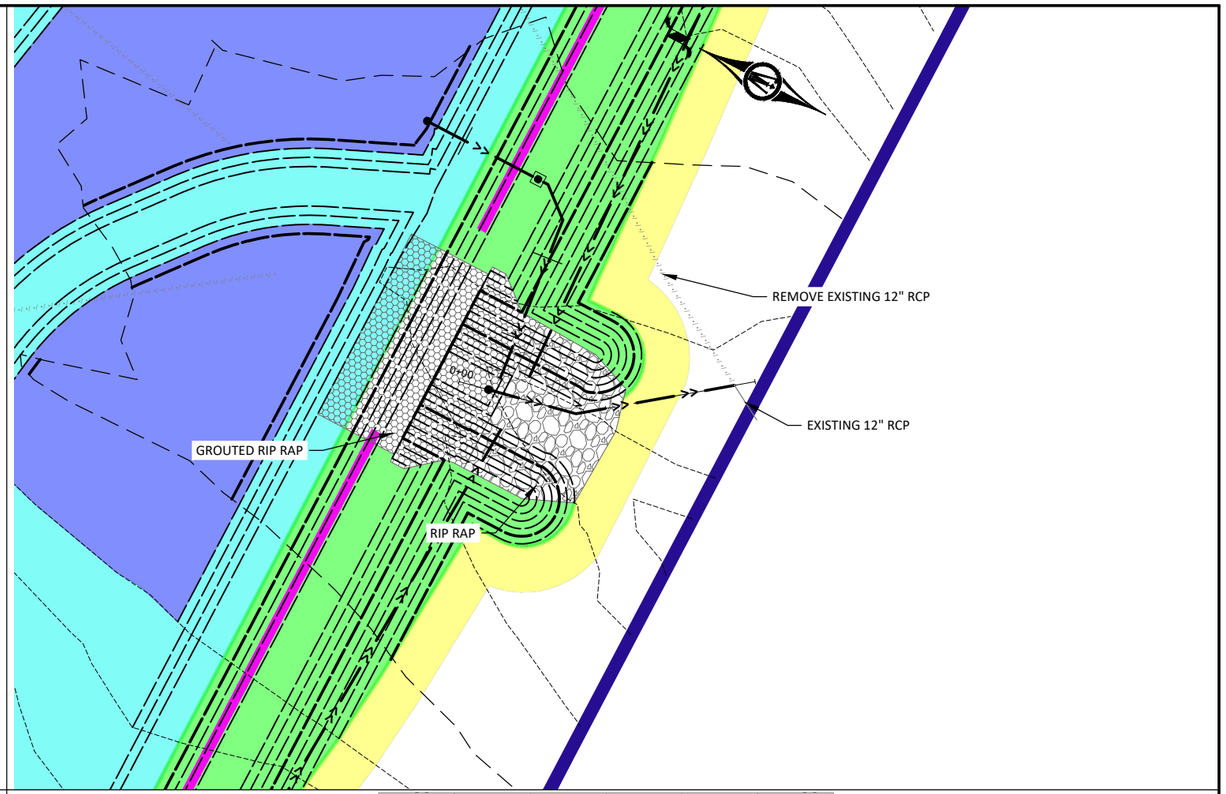
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

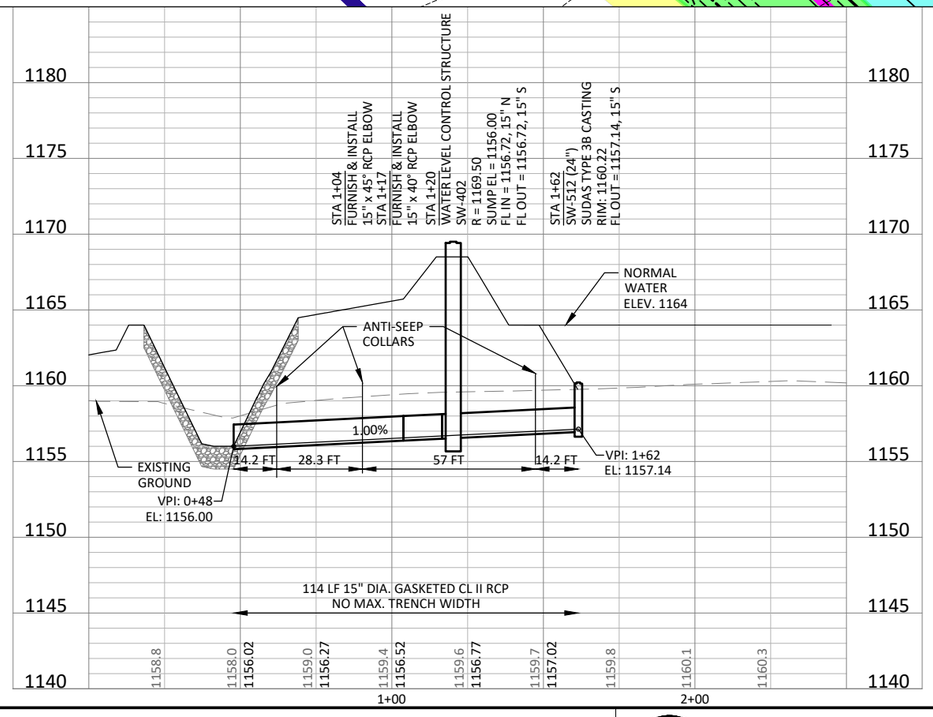
IDALS PROJ. NO. KOS952921C

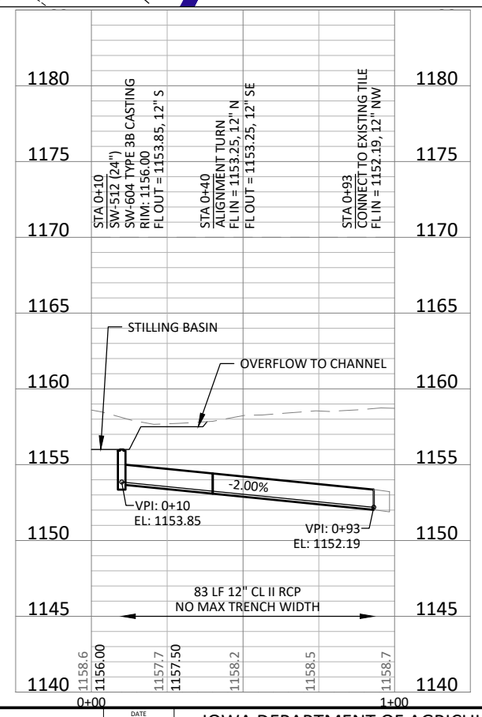
PLAN & PROFILE - DIVERSION BERM 3

SHEET D.06









LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

NOTE: CAPACITY OF PROPOSED 12" RCP EXCEEDS THAT OF EXISTING TILE. MAX SLOPE OF EXISTING TILE AS SURVEYED IS 1.8%. PROPOSED SLOPE OF OUTLET TO EXISTING TILE IS 2%.

NOTE: CONTRACTOR SHALL VERIFY DEPTH, SIZE AND MATERIAL OF EXISTING TILES BEFORE ORDERING STRUCTURES OR MATERIALS FOR PROPOSED TILES.

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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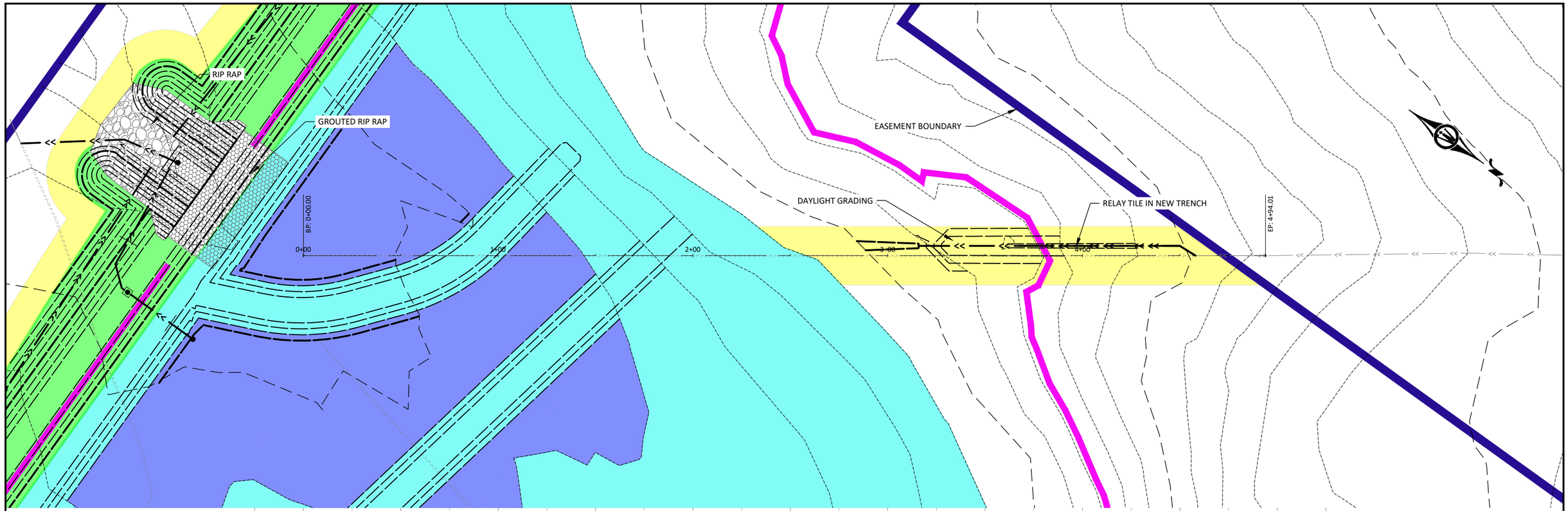
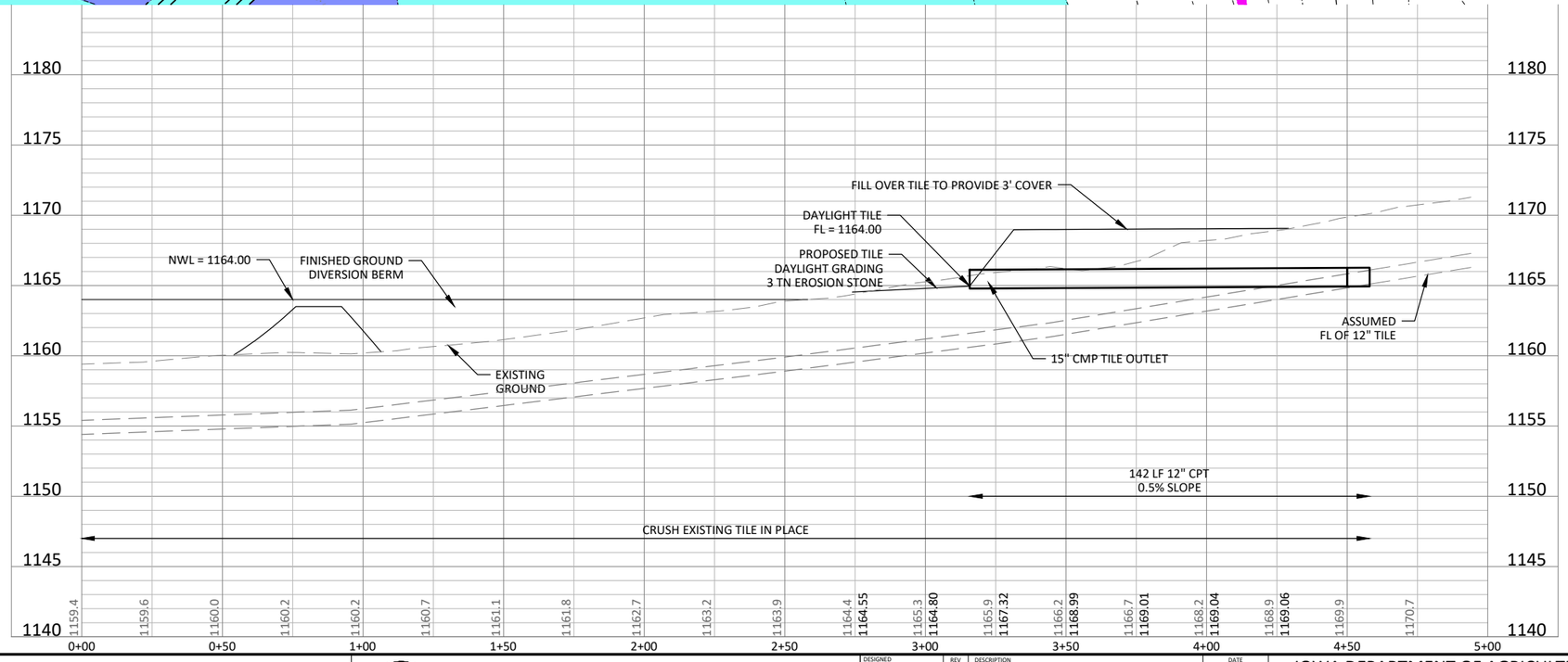
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - DRAW DOWN STRUCTURE & OUTLET TO TILE

SHEET M.01





LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

NOTE: CONTRACTOR SHALL VERIFY DEPTH, SIZE AND MATERIAL OF EXISTING TILES BEFORE ORDERING STRUCTURES OR MATERIALS FOR PROPOSED TILES.

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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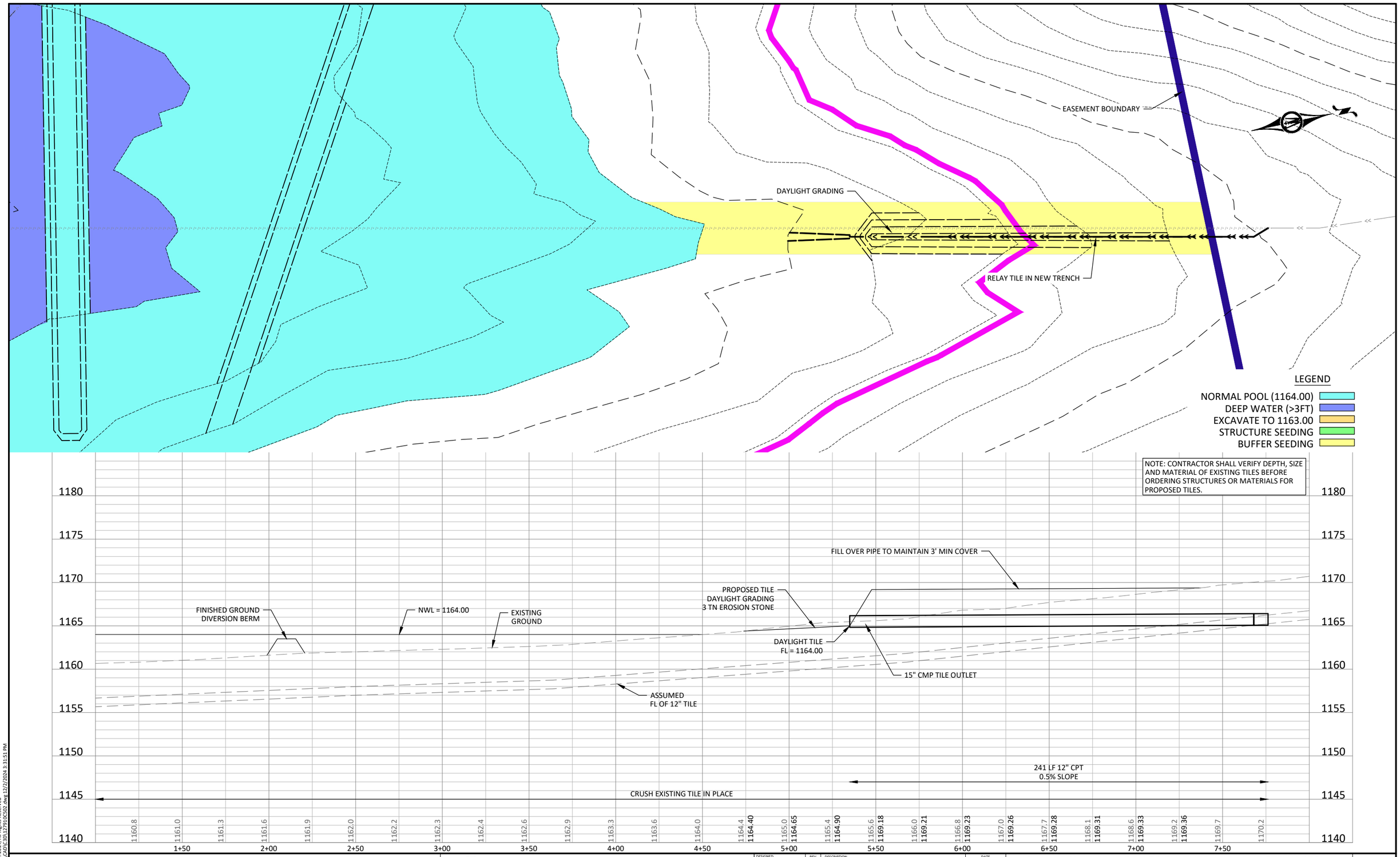
IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - WEST TILE INLET

SHEET M.02



HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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

DESIGNED	BCS
DRAWN	BCS
CHECKED	JPR
CLIENT PROJ. NO.	0P1.127910

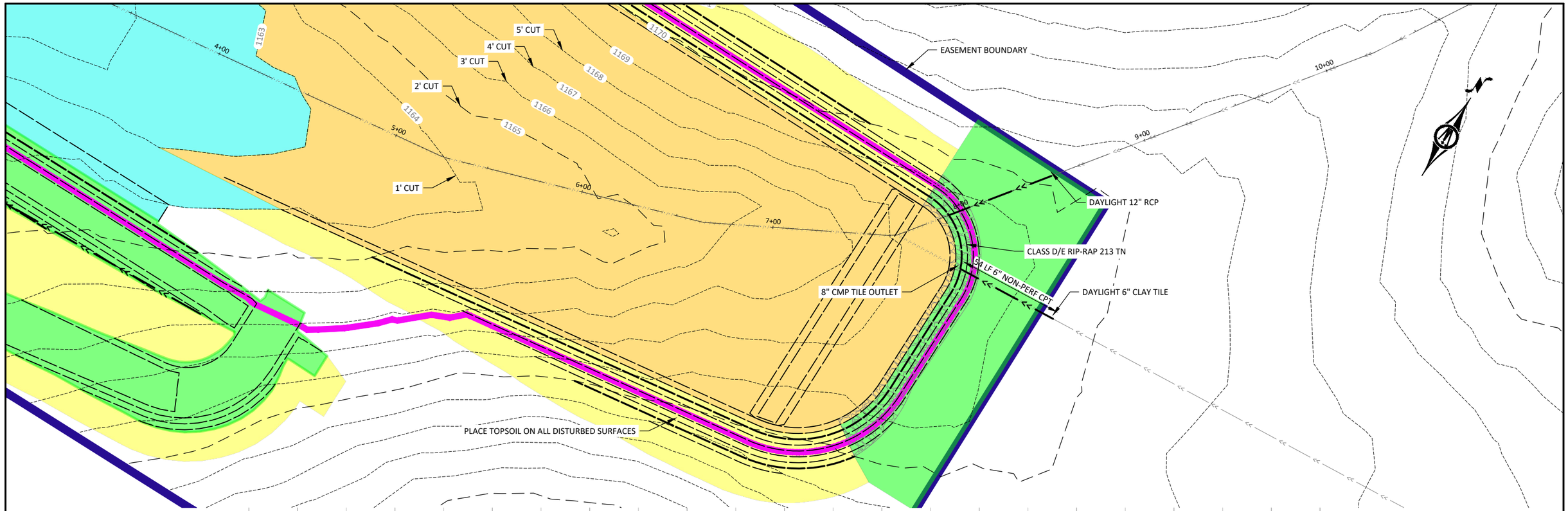
REV	DESCRIPTION	DATE

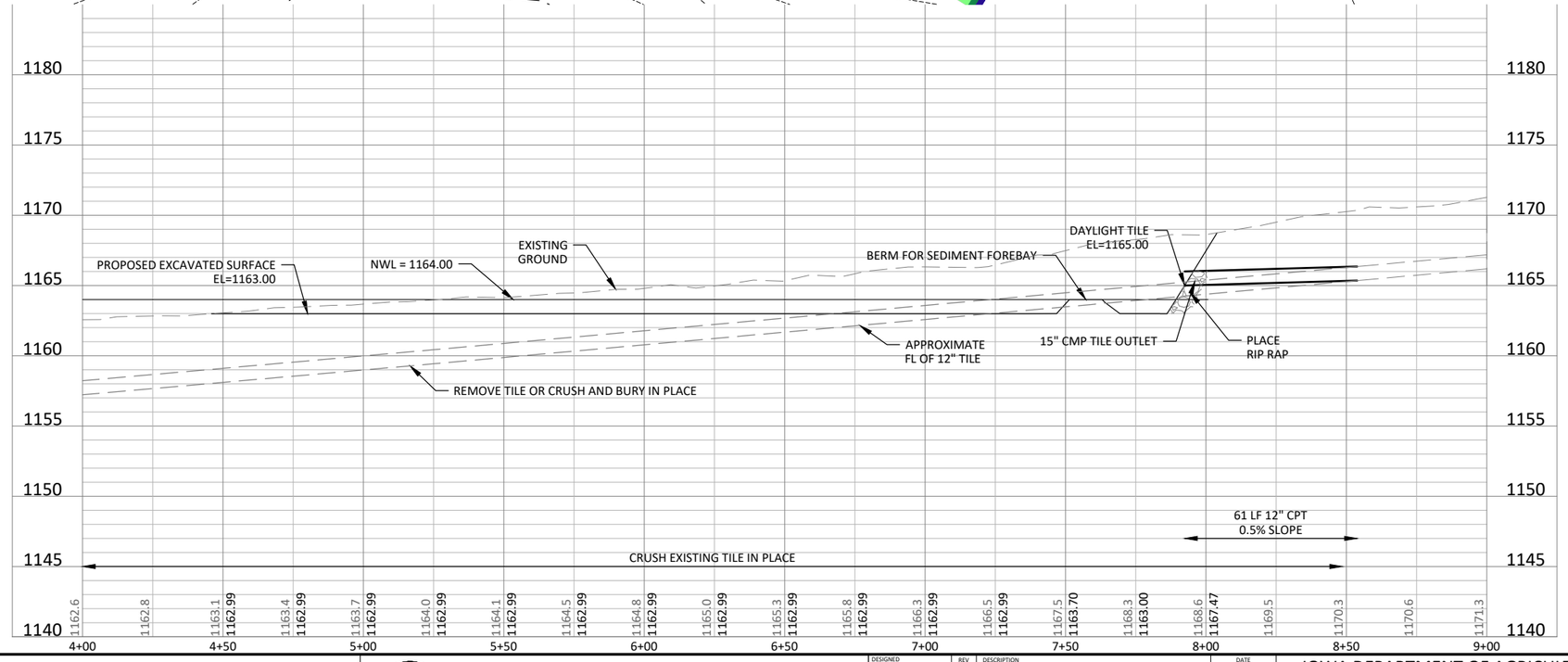
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - NORTH TILE INLET

SHEET M.03





LEGEND

- NORMAL POOL (1164.00)
- DEEP WATER (>3FT)
- EXCAVATE TO 1163.00
- STRUCTURE SEEDING
- BUFFER SEEDING

NOTE: CONTRACTOR SHALL VERIFY DEPTH, SIZE AND MATERIAL OF EXISTING TILES BEFORE ORDERING STRUCTURES OR MATERIALS FOR PROPOSED TILES.

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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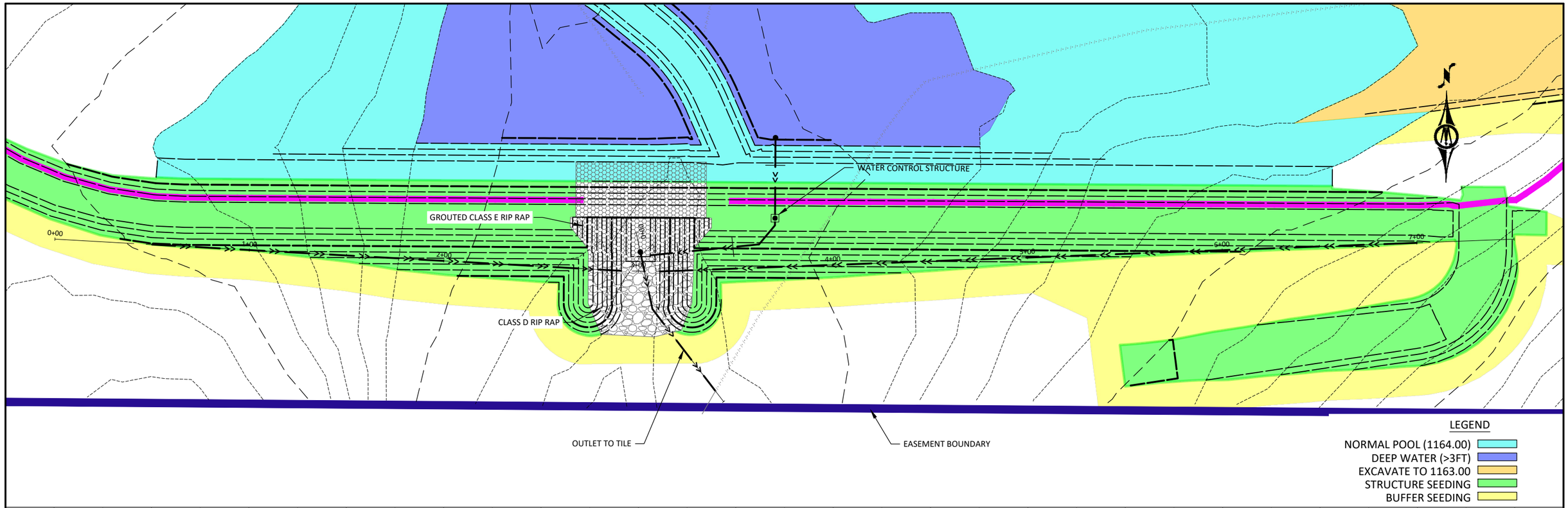
REV	DESCRIPTION	DATE

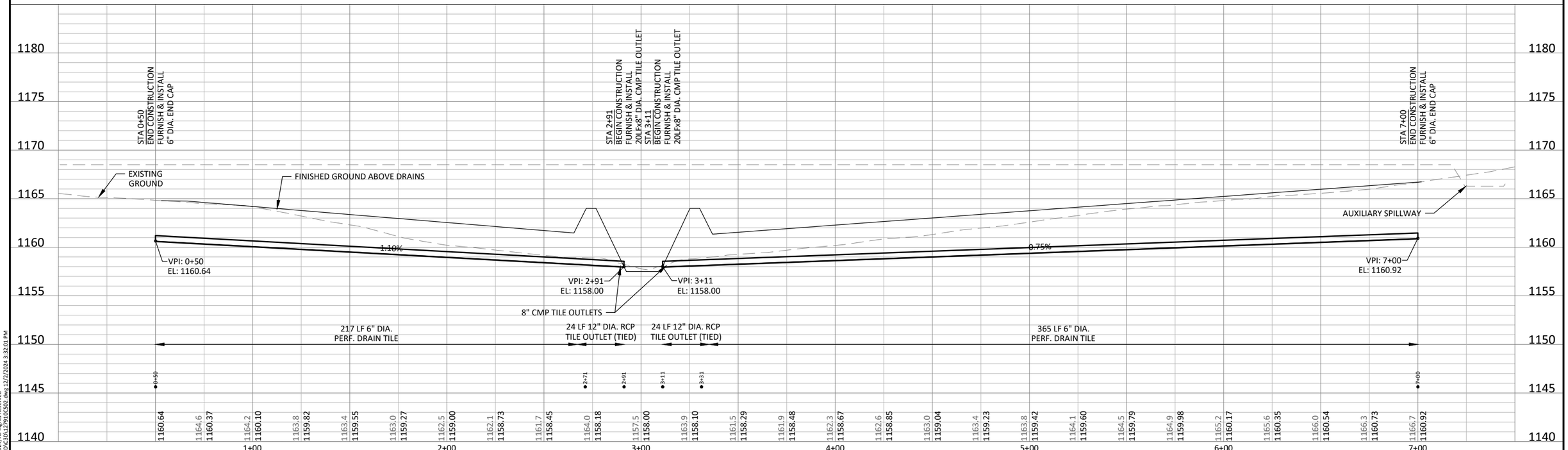
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - EAST TILE INLET

SHEET M.04





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

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REV	DESCRIPTION	DATE

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IDALS PROJ. NO. KOS952921C

PLAN & PROFILE - TOE DRAINS

SHEET M.05