CONSTRUCTION PLANS FOR

IDALS NO. CLA953734C

NUTRIENT REDUCTION WETLAND

CLAY COUNTY, IOWA

JUNE 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.

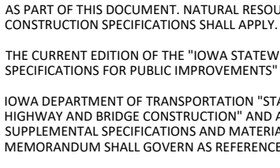
THE CURRENT EDITION OF THE "IOWA STATEWIDE URBAN STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS" SHALL GOVERN.

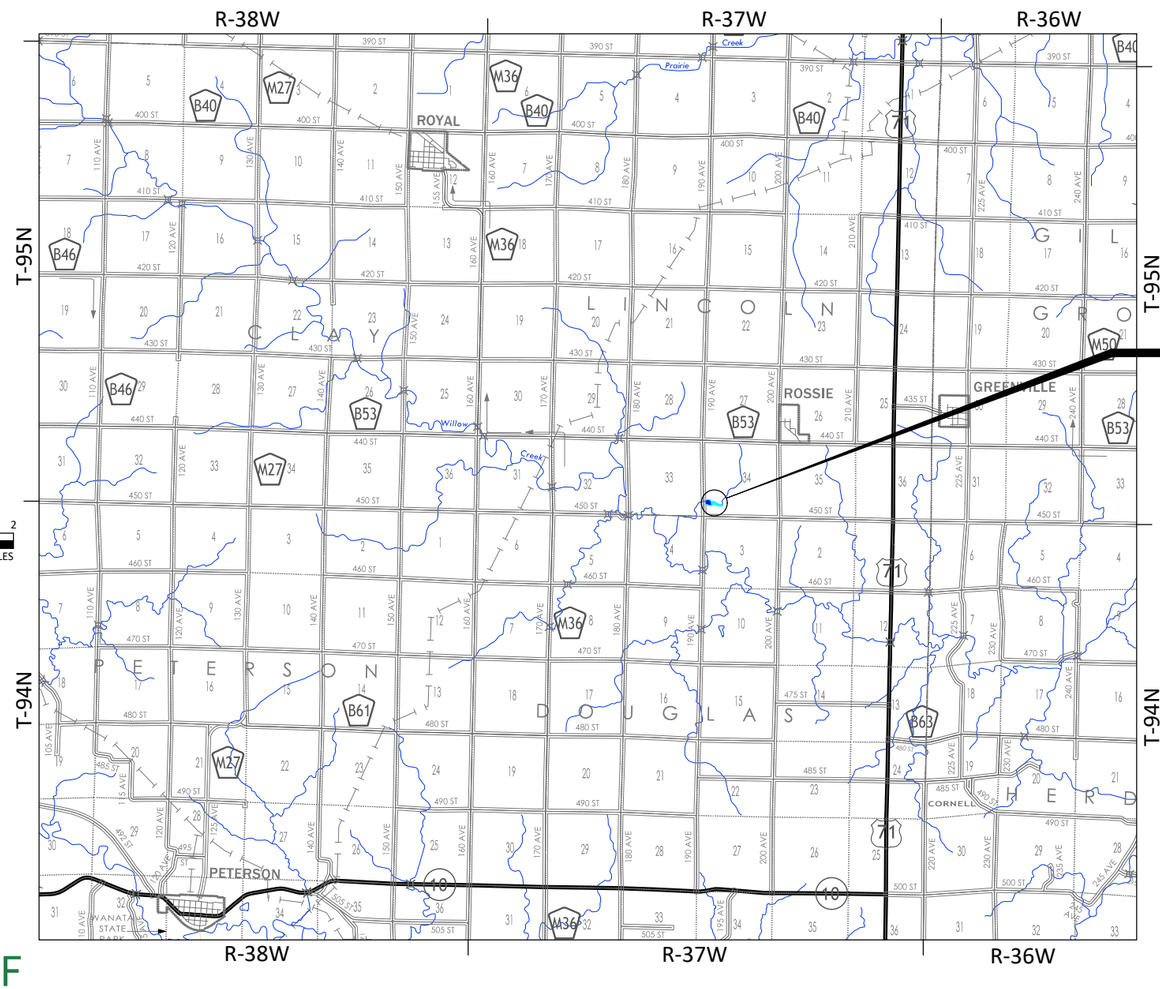
IOWA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION" AND ALL CURRENT GENERAL SUPPLEMENTAL SPECIFICATIONS AND MATERIALS INSTRUCTIONAL MEMORANDUM SHALL GOVERN AS REFERENCED.

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 | 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."
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.





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.

SHEET INDEX

CONSERVATION PRACTICE STANDARDS USED:
656 - CONSTRUCTED WETLAND

NRCS JOB CLASS: IV
300 AC<WATERSHED AREA<1000 AC

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

IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

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

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: 06/10/2026

MY LICENSE RENEWAL DATE IS 12/31/2026

PAGES OR SHEETS COVERED BY THIS SEAL:
ALL SHEETS

LICENSED PROFESSIONAL ENGINEER
BRANDON C. SHORT 29449
IOWA

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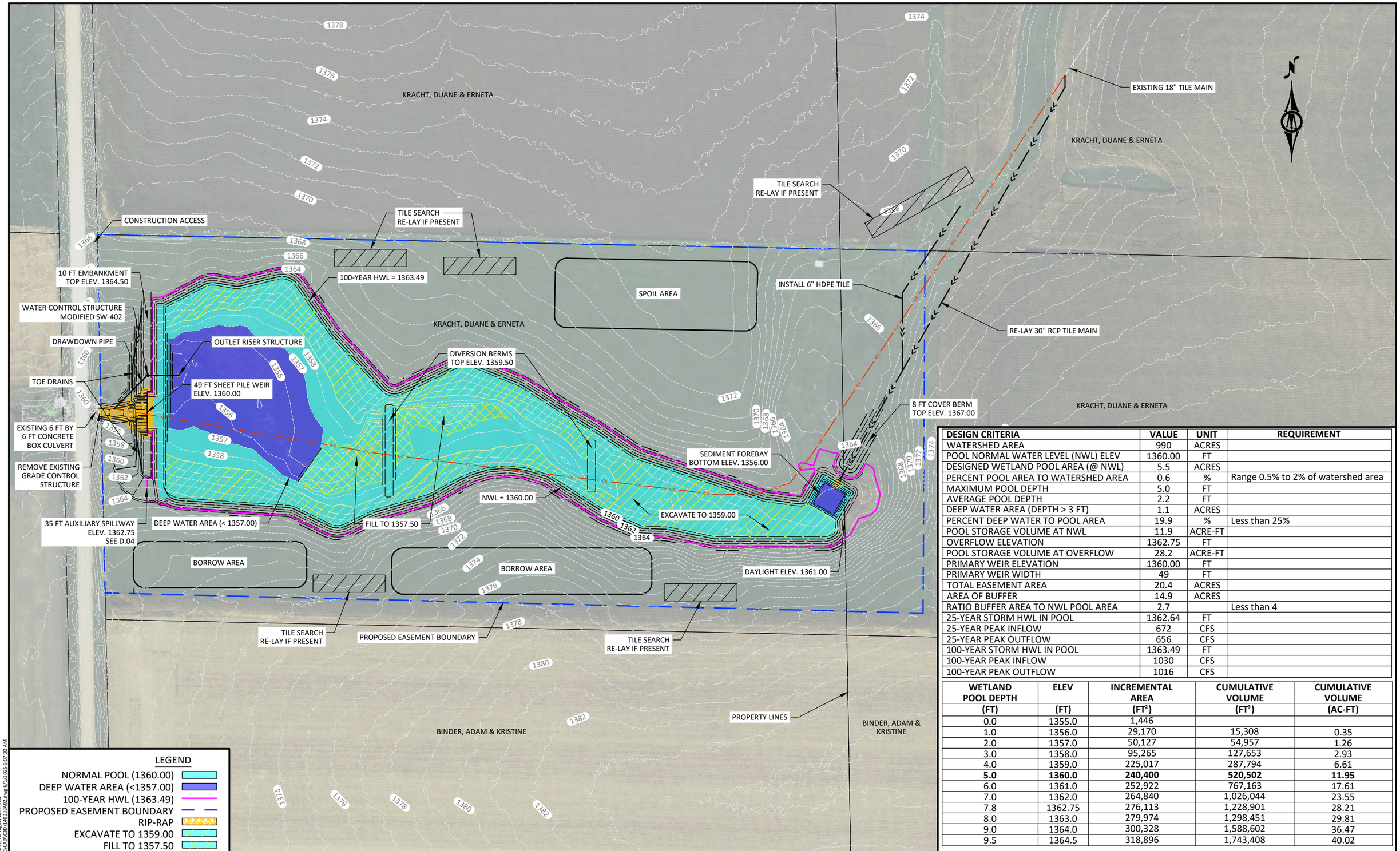
DESIGNED	REV	DESCRIPTION	DATE
BCS	1.1	FINAL DESIGN REV. 1	02-25-2026
DRAWN NVD			
CHECKED JPR			
CLIENT PROJ. NO. 25X.140338.000			

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. CLA953734C
TITLE SHEET

SHEET A.01



DESIGN CRITERIA	VALUE	UNIT	REQUIREMENT
WATERSHED AREA	990	ACRES	
POOL NORMAL WATER LEVEL (NWL) ELEV	1360.00	FT	
DESIGNED WETLAND POOL AREA (@ NWL)	5.5	ACRES	
PERCENT POOL AREA TO WATERSHED AREA	0.6	%	Range 0.5% to 2% of watershed area
MAXIMUM POOL DEPTH	5.0	FT	
AVERAGE POOL DEPTH	2.2	FT	
DEEP WATER AREA (DEPTH > 3 FT)	1.1	ACRES	
PERCENT DEEP WATER TO POOL AREA	19.9	%	Less than 25%
POOL STORAGE VOLUME AT NWL	11.9	ACRE-FT	
OVERFLOW ELEVATION	1362.75	FT	
POOL STORAGE VOLUME AT OVERFLOW	28.2	ACRE-FT	
PRIMARY WEIR ELEVATION	1360.00	FT	
PRIMARY WEIR WIDTH	49	FT	
TOTAL EASEMENT AREA	20.4	ACRES	
AREA OF BUFFER	14.9	ACRES	
RATIO BUFFER AREA TO NWL POOL AREA	2.7		Less than 4
25-YEAR STORM HWL IN POOL	1362.64	FT	
25-YEAR PEAK INFLOW	672	CFS	
25-YEAR PEAK OUTFLOW	656	CFS	
100-YEAR STORM HWL IN POOL	1363.49	FT	
100-YEAR PEAK INFLOW	1030	CFS	
100-YEAR PEAK OUTFLOW	1016	CFS	

WETLAND POOL DEPTH (FT)	ELEV (FT)	INCREMENTAL AREA (FT^2)	CUMULATIVE VOLUME (FT^3)	CUMULATIVE VOLUME (AC-FT)
0.0	1355.0	1,446		
1.0	1356.0	29,170	15,308	0.35
2.0	1357.0	50,127	54,957	1.26
3.0	1358.0	95,265	127,653	2.93
4.0	1359.0	225,017	287,794	6.61
5.0	**1360.0**	**240,400**	**520,502**	**11.95**
6.0	1361.0	252,922	767,163	17.61
7.0	1362.0	264,840	1,026,044	23.55
7.8	1362.75	276,113	1,228,901	28.21
8.0	1363.0	279,974	1,298,451	29.81
9.0	1364.0	300,328	1,588,602	36.47
9.5	1364.5	318,896	1,743,408	40.02

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IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. CLA953734C

PLAN OVERVIEW

SHEET A.02

PRESERVE EXISTING 18" CMP CULVERT

ABANDON EXISTING TILE IN PLACE
FILL WITH GROUT

REMOVE TREES WITHIN EASEMENT

REMOVE EXISTING GRADE
CONTROL STRUCTURE & RUBBLE

PRESERVE EXISTING 6 FT x 6 FT
CONCRETE BOX CULVERT

PRESERVE EXISTING 18" CMP CULVERT

REMOVE EXISTING TILE
OR CRUSH IN PLACE

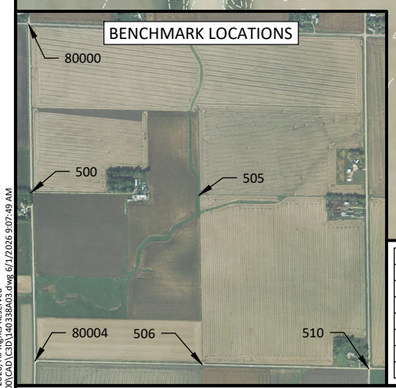
REMOVE EXISTING LIVESTOCK SHELTER

REMOVE EXISTING TILE
OR CRUSH IN PLACE

REMOVE EXISTING TILE
OR CRUSH IN PLACE

N

BENCHMARK LOCATIONS



BENCHMARKS				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
500	3833276.160	4463594.028	1390.68	5/8" REBAR LAND MARKER - BLUE METAL CAP
505	3833231.762	4466247.842	1377.61	1/2" REBAR LAND MARKER - YELLOW PLASTIC CAP
506	3830551.418	4466291.786	1394.73	5/8" REBAR LAND MARKER
510	3830488.550	4468930.299	1394.89	5/8" REBAR LAND MARKER
80000	3835924.809	4463550.929	1402.49	1" METAL ROD
80004	3830611.406	4463652.592	1375.31	1" TEAL PIPE - YELLOW PLASTIC CAP

NOTE: TILE REMOVALS SHALL INCLUDE A MINIMUM OF 20 FT OF TILE REMOVED EVERY 100 FT.

LEGEND
PROPOSED EASEMENT BOUNDARY
EXISTING TILE
TILE REMOVAL

0 60 120
HORZ. SCALE FEET

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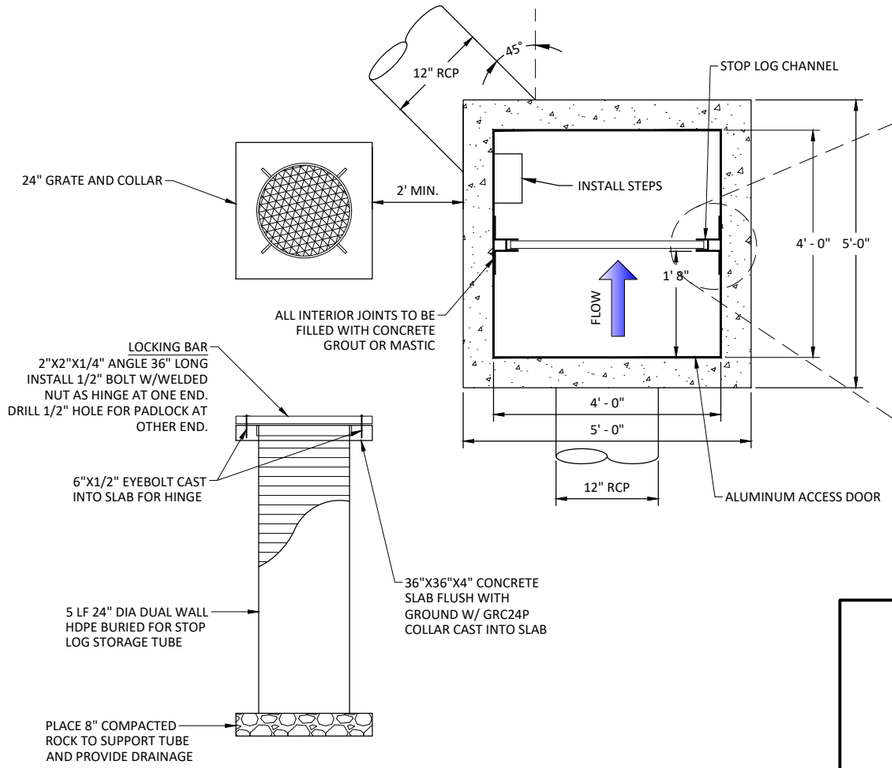
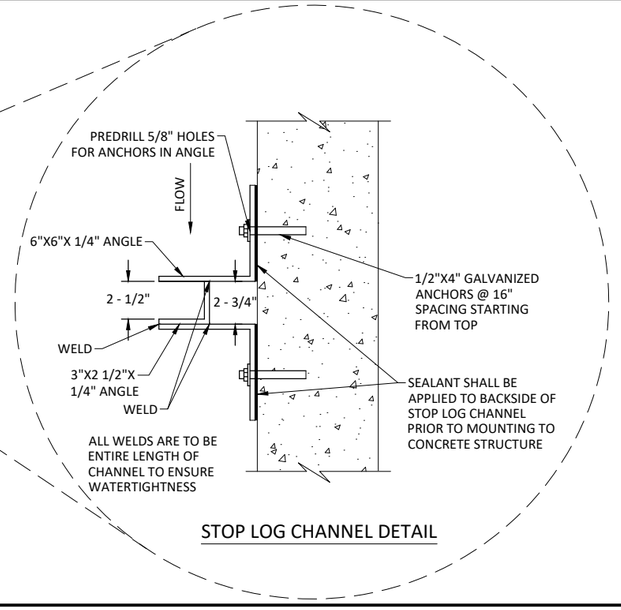
EXISTING CONDITIONS AND REMOVALS

SHEET A.03

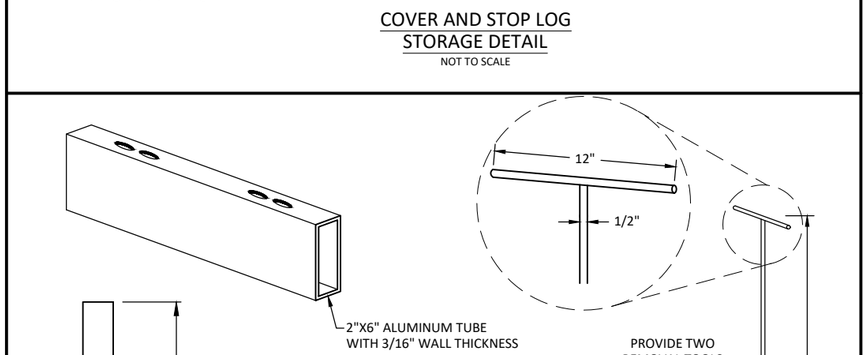


COVER AND STOP LOG STORAGE DETAIL

NOT TO SCALE

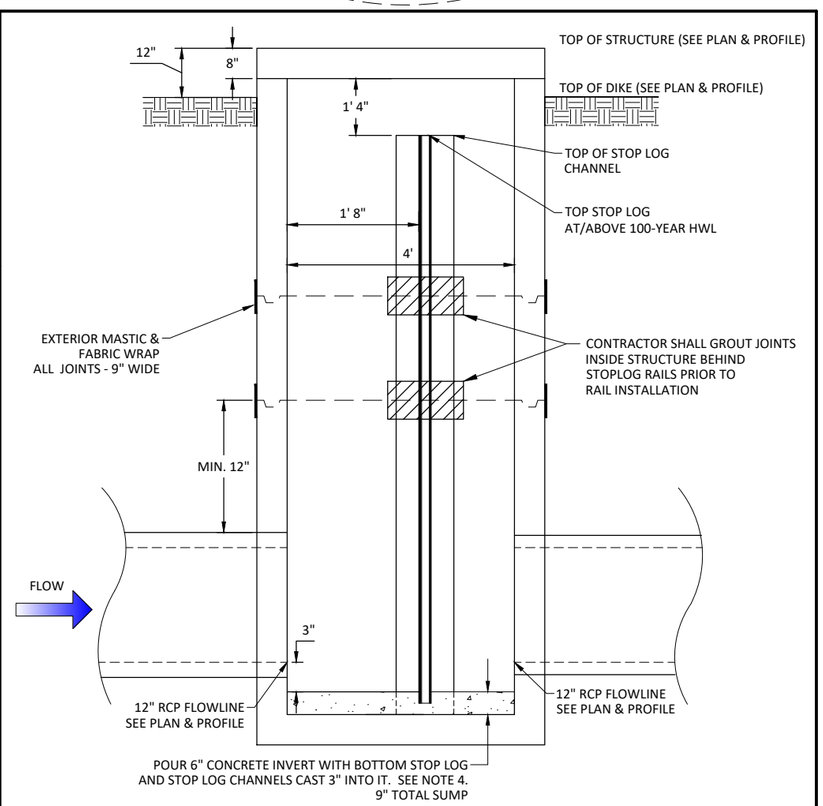


STOP LOG CHANNEL DETAIL



STOP LOG & REMOVAL TOOL DETAIL

NOT TO SCALE



SW-402 WATER CONTROL OUTLET STRUCTURE SECTION

NOT TO SCALE

COVER/STOP LOG STORAGE NOTES:

1. PROVIDE HALLIDAY PRODUCTS MODEL S1R3648 (OR APPROVED EQUAL) 36" x 48" ALUMINUM ACCESS DOOR WITH LOCKING MECHANISM AND LIFTING HANDLE.
2. TOP OF STRUCTURE SHALL BE AN 8" THICK REINFORCED PRECAST TOP WITH ALUMINUM ACCESS DOOR CAST INTO TOP.
3. PROVIDE 24" GRATE AND COLLAR (AGRI DRAIN GR24 GRATE AND GRC24 COLLAR OR APPROVED EQUAL) FOR STOP LOG STORAGE.
4. PADLOCKS FOR ACCESS DOOR AND STOP LOG STORAGE TUBE SHALL BE KEYED ALIKE. FOUR KEYS ARE TO BE SUPPLIED UPON PROJECT COMPLETION.

STOP LOG CHANNEL NOTES:

1. ALL STEEL SHALL BE FY=36 KSI.
2. ANCHORS SHALL BE GALVANIZED STEEL FURNISHED W/NUTS, WASHERS AND LOCK WASHERS.
3. STOP LOG CHANNEL SHALL BE FURNISHED AS ONE CONTINUOUS PIECE W/CONTINUOUS WELDS.
4. ALL STEEL STOP LOG CHANNEL COMPONENTS ARE TO BE GALVANIZED AFTER WELDING AND DRILLING IS COMPLETE.
5. CONTRACTOR IS TO APPLY SEALANT VERY GENEROUSLY TO BACKSIDE OF STOP LOG CHANNEL TO ENSURE WATERTIGHT SEAL. SEALANT SHALL BE SIKA 30 YEAR INDUSTRIAL CAULK IN LIMESTONE GREY OR APPROVED EQUIVALENT.

WATER CONTROL STRUCTURE NOTES:

1. STRUCTURE FABRICATION AND INSTALLATION SHALL CONFORM TO SUDAS 6010.302 SW-402 RECTANGULAR STORM SEWER MANHOLE
2. STRUCTURE SHOP DRAWINGS ARE REQUIRED FOR ENGINEER'S REVIEW AND APPROVAL BEFORE FABRICATION OF WATER CONTROL STRUCTURE.
3. PRECAST WATER CONTROL STRUCTURE SHALL BE SUPPLED IN 2 OR 3 SECTIONS, PLUS AN 8" THICK COVER SECTION. SECTION SIZE IS LEFT TO CONTRACTOR'S DISCRETION EXCEPT BOTTOM SECTION SHALL INCLUDE BASE AND WALLS TO 12" ABOVE INLET HOLE.
4. A CONCRETE INVERT IS TO BE INSTALLED AFTER STOP LOG CHANNEL IS INSTALLED. THE BOTTOM STOP LOG IS TO BE CAST INTO THE INVERT WITH THREE HALF INCH DIA. "J BOLTS" FASTENED TO THE BOTTOM STOP LOG. NO LIFTING HOLES ARE REQUIRED FOR THIS BOTTOM LOG.
5. ALL SECTIONS OF THE STRUCTURE ARE TO HAVE "TONGUE AND GROOVE" JOINTS SEALED WITH O RING GASKETS IN THE JOINT AND MASTIC AND FABRIC WRAP ON THE STRUCTURE EXTERIOR.
6. INTERIOR JOINTS SHALL BE FILLED AND SEALED TO PREVENT WATER FLOW IN JOINT BEHIND STOP LOG CHANNEL USING EITHER CONCRETE GROUT OR MASTIC.
7. A-LOK (OR EQUIVALENT) WATERTIGHT SEAL IS REQUIRED FOR UPSTREAM PIPE CONNECTION TO THE WATER CONTROL STRUCTURE. CONCRETE COLLAR IS REQUIRED FOR DOWNSTREAM CONNECTION.
8. MANHOLE STEPS ARE TO BE INSTALLED FOR MAINTENANCE ACCESS TO THE STOP LOGS. STEPS ARE TO BE PER SUDAS SECTION 6010-2-2.13.
9. ENSURE THAT ALL JOINTS ARE WATER-TIGHT AND PROPERLY SEALED

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WATER CONTROL STRUCTURE DETAILS

SHEET B.01

DESIGN SHEET PILING AREA

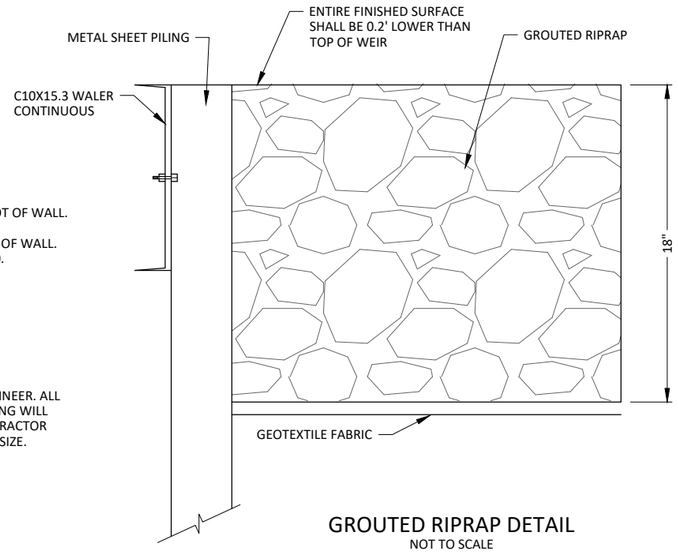
SHEET PILING REQUIREMENTS

MINIMUM SECTION MODULUS OF 34.6 CUBIC INCHES PER FOOT OF WALL.
MINIMUM GRADE OF STEEL IS 36 KSI.
MINIMUM MOMENT OF INERTIA OF 305 INCHES ^ 4 PER FOOT OF WALL.
ALL SHEETING SHALL MEET ASTM A-328, A-572 GR50 OR A-690.

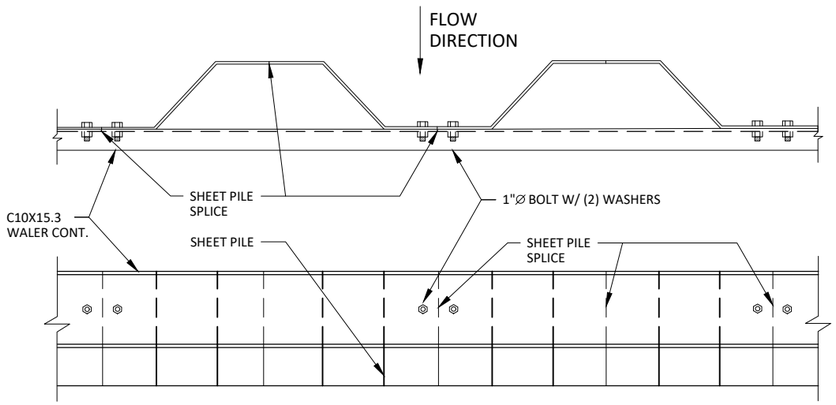
APPROVED PRODUCTS

SHORELINE STEEL SZ-14.5
JD FIELDS PZC 12
GERDAU AMERISTEEL PZC 13, PZC 12
NUCOR SKYLINE SCZ 14

OTHER SHEETING MAY BE ALLOWED WITH PRIOR APPROVAL OF ENGINEER. ALL MATERIALS ARE BASED ON MINIMUM COVERAGE AND FURTHER SIZING WILL NEED TO BE DONE. SIZING IS BASED ON INSTALLED STRENGTH. CONTRACTOR SHALL CONSIDER CONSTRUCTIBILITY WHEN SELECTING A SHEET PILE SIZE.



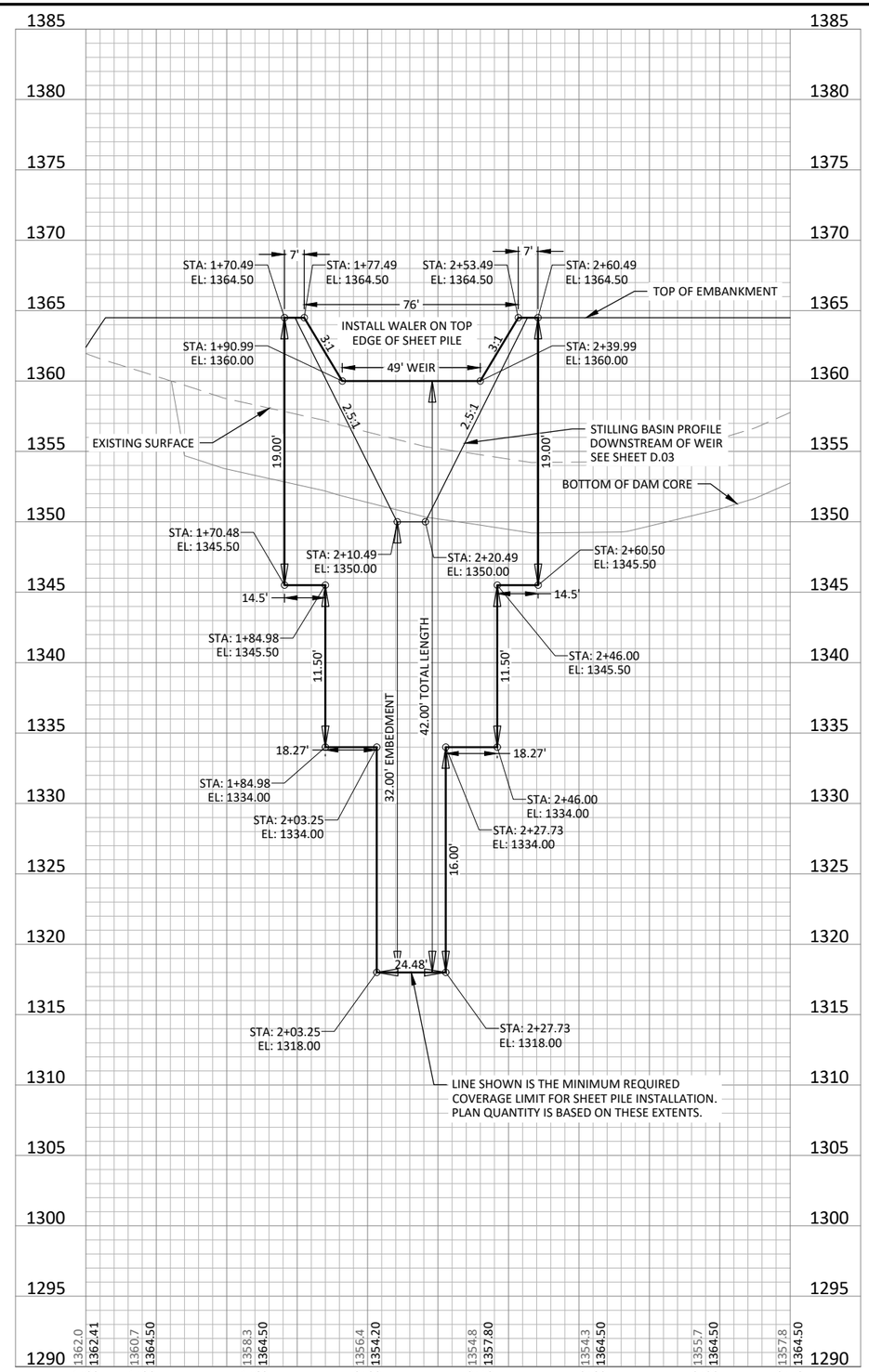
GROUTED RIPRAP DETAIL
NOT TO SCALE



WALER BOLT PLACEMENT
NOT TO SCALE

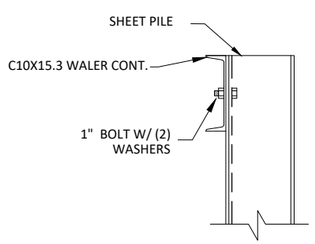
HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET



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 $\frac{1}{16}$" LARGER IN DIAMETER 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

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SHEET PILE DETAILS

SHEET B.02

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.

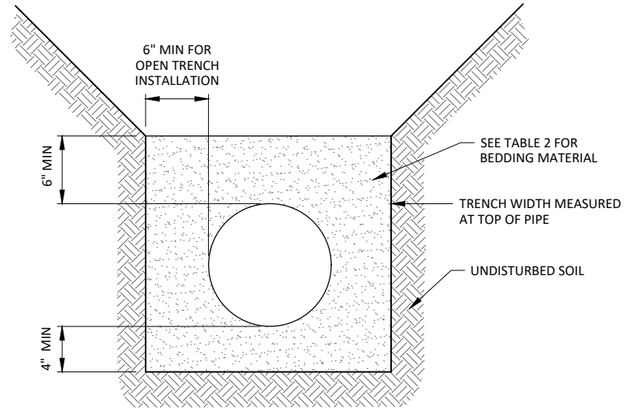
Table 1
Maximum Allowable Buried Depth to Flowline of CPDT

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



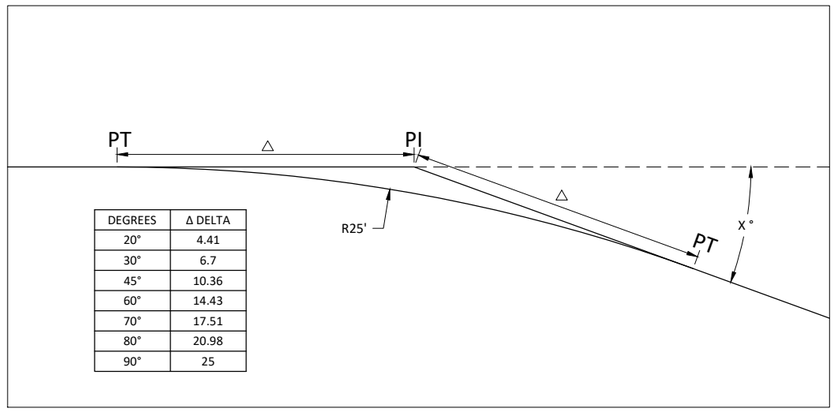
FILL TRENCH TO 6" ABOVE TOP OF PIPE WITH CRUSHED STONE OR GRAVEL MEETING THE REQUIREMENTS IN TABLE 2. BEDDING MATERIAL SHALL BE INCIDENTAL TO THE PIPE INSTALLATION.

FLAT BOTTOM TRENCH INSTALLATION

NOT TO SCALE

SOURCE: ASTM F449

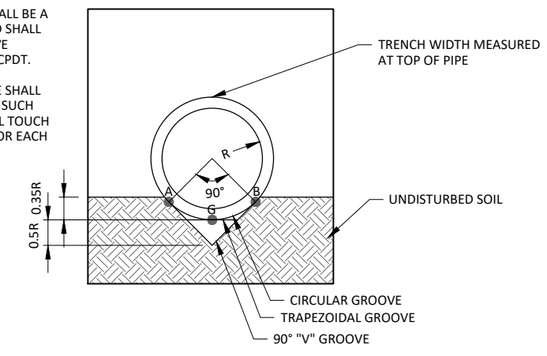
NOTE: THIS IS AN ALLOWED ALTERNATIVE INSTALLATION FOR CPDT



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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CLIENT PROJ. NO. 25X.140338.000			

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. CLA953734C
CPDT INSTALLATION DETAILS

SHEET B.03

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

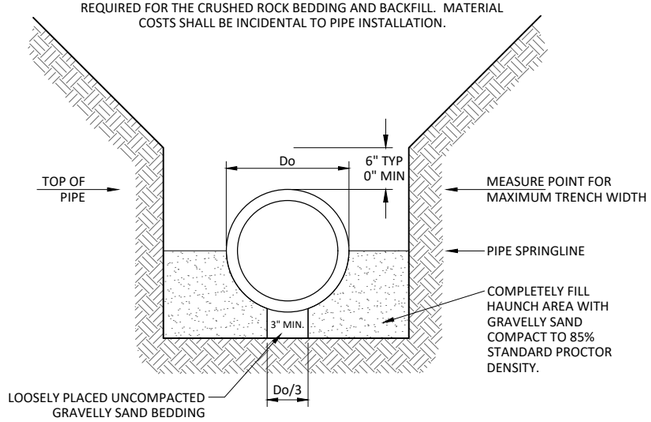
TO VERIFY CONTRACTOR'S COMPLIANCE WITH PLAN REQUIREMENTS UNDER THE CHANGED CONDITIONS, ENGINEER MAY STOP WORK AND REQUIRE ADDITIONAL SOIL PROCTOR TESTS AND/OR SOIL DENSITY TESTS SIMILAR TO STEPS 1 THROUGH 3. THE WORK AND COSTS OF THE FIRST TWO REVERIFICATIONS IS SUBSIDIARY TO THE PIPE INSTALLATION. SUBSEQUENT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

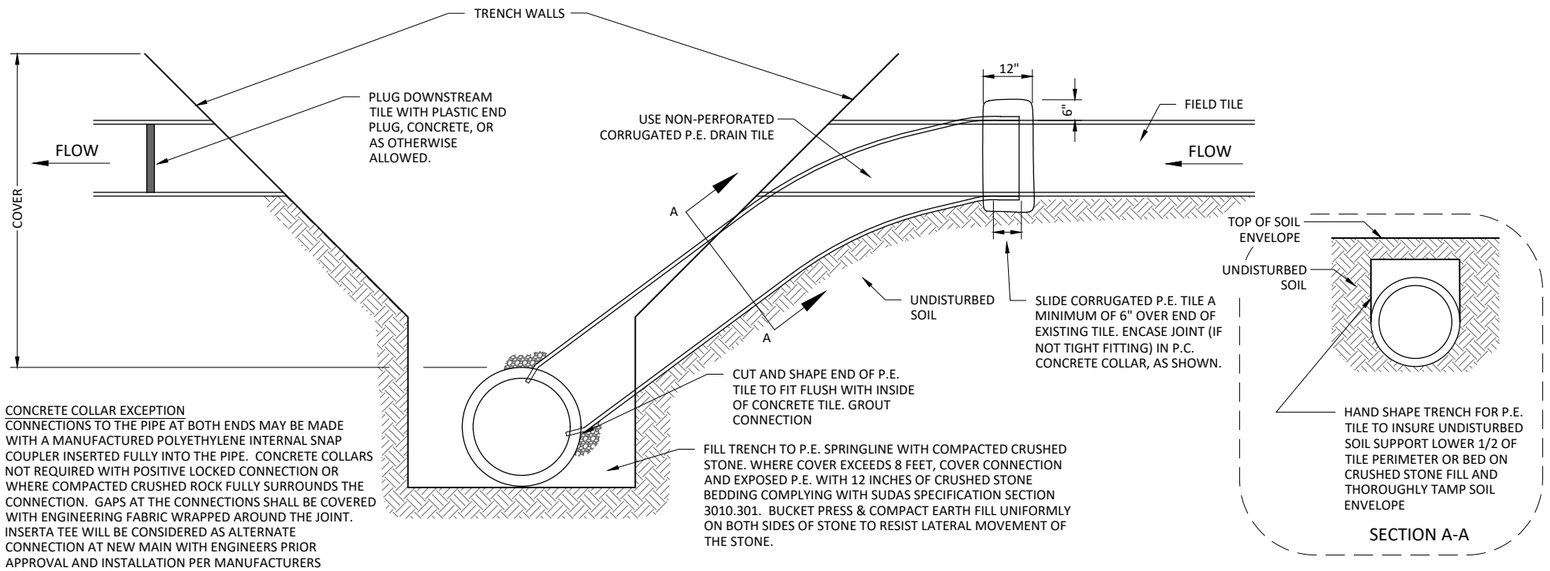
CRUSHED ROCK MEETING THE GRADATION OF SUDAS CLASS I BEDDING MATERAL, SPECIFICATION SECTION 3010.2.02.A, MAY BE SUBSTITUTED FOR THE SAND OR CLAY HAUNCH BACKFILL MATERIAL. NO COMPACTION WILL BE REQUIRED FOR THE CRUSHED ROCK BEDDING AND BACKFILL. MATERIAL COSTS SHALL BE INCIDENTAL TO PIPE INSTALLATION.



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

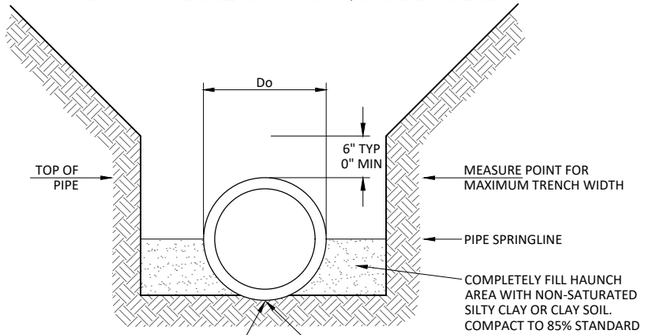


CONCRETE COLLAR EXCEPTION
CONNECTIONS TO THE PIPE AT BOTH ENDS MAY BE MADE WITH A MANUFACTURED POLYETHYLENE INTERNAL SNAP COUPLER INSERTED FULLY INTO THE PIPE. CONCRETE COLLARS NOT REQUIRED WITH POSITIVE LOCKED CONNECTION OR WHERE COMPACTED CRUSHED ROCK FULLY SURROUNDS THE CONNECTION. GAPS AT THE CONNECTIONS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

MODIFIED TRENCH INSTALLATION TYPE 4

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

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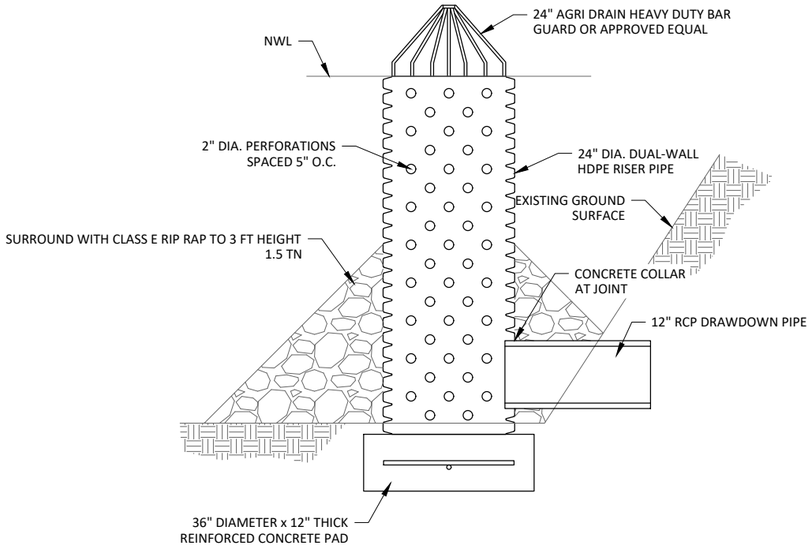
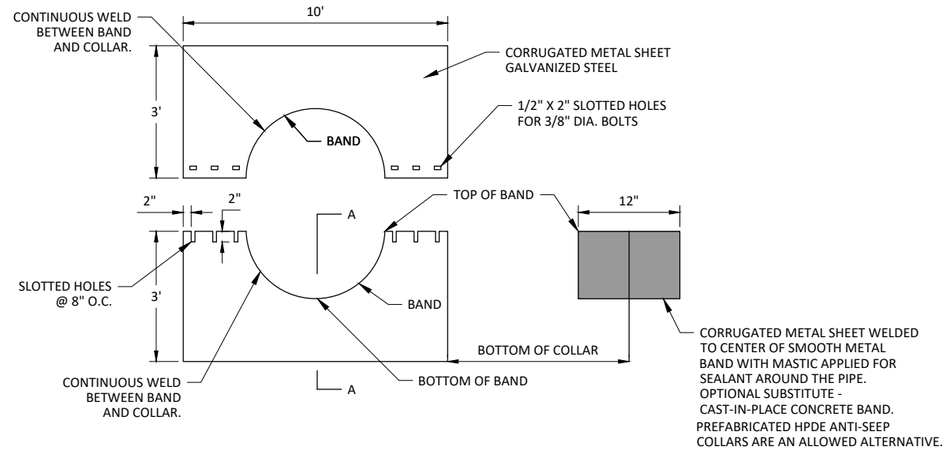
RCP INSTALLATION DETAILS

SHEET B.04

OUTLET RISER DETAIL

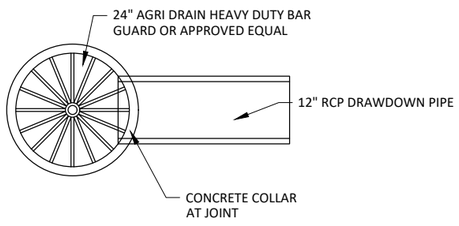


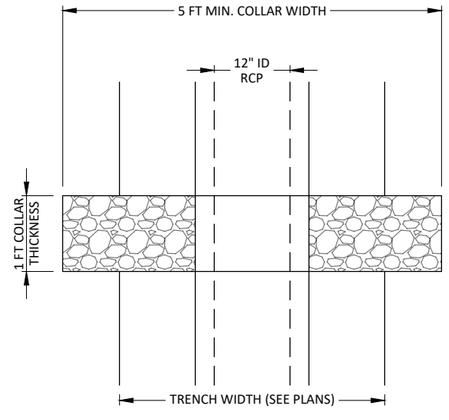
ANTI-SEEP COLLAR DETAILS



ALTERNATIVE 1: RCP ANTI-SEEP 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.

ALTERNATIVE 2: COMPOSITE BENTONITE AGGREGATE COLLAR

NOT TO SCALE

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IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. CLA953734C
MISCELLANEOUS DETAILS

SHEET B.05

Bid Item	Sub-Item	Description	Specifications		Plan No.	Estimated Quantities	
			No.	Page		Quantity	Unit
1	-	Site Stripping & Preparation	IA CS-001	3-4	A.02	1	LS
2	-	Crop Damage	IA CS-001	3-4	-	0	AC
3	-	Structure & Channel Seeding	IA CS-006	7-10	K.01	2.1	AC
4	-	Buffer Seeding	IA CS-006	7-10	K.01	13.1	AC
5	-	Mobilization and Demobilization	IA CS-008	11-12	-	1	LS
6	-	Drain Tile Investigation and Removal					
	1	Tile Removal	IA CS-009	14-17	A.03	8	HR
	2	Tile Abandonment	IA CS-009	14-17	A.03	1	LS
7	-	Steel Sheet Piling	IA CS-013	20-21	B.02, D.02	2523	SF
8	-	Excavation (General)	IA CS-021	22-24	D.01	10944	CY
9	-	Earthfill (General)	IA CS-023	25-28	D.01, D.05	1210	CY
10	-	Earthfill (General Dam)	IA CS-023	25-28	D.02	2283	CY
11	-	Earthfill (Dam Core)	IA CS-023	25-28	D.02	767	CY
12	-	Drainfill, Fine	IA CS-024	29-31	D.02	23	CY
13	-	Topsoil Strip, Salvage, and Respread	IA CS-026	32-33	D.01	3073	CY
14	-	12" Dia. Reinforced Concrete Pipe	IA CS-031	34-40	D.02	16	LF
15	-	12" Dia. Reinforced Concrete Pipe (Gasketed)	IA CS-031	34-40	M.02	136	LF
16	-	30" Dia. Reinforced Concrete Pipe	IA CS-031	34-40	M.01	805	LF
17	-	Modified SW-402 Water Control Structure	IA CS-031	34-40	B.01, M.02	1	EA
18	-	12" Dia. Reinforced Concrete Apron, Footing, Bar Guard	IA CS-031	34-40	M.02	1	EA
19	-	30" Dia. Reinforced Concrete Apron, Footing, Bar Guard	IA CS-031	34-40	M.01	1	EA
20	-	6" Dia. Corrugated HDPE Pipe (Single-Wall; Perforated)	IA CS-046	41-44	D.02, M.02	335	LF
21	-	6" Dia. Corrugated HDPE Pipe (Single-Wall; Non-Perforated)	IA CS-046	41-44	M.02	205	LF
22	-	Stoplog Storage Structure	IA CS-046	41-44	B.01	1	EA
23	-	Outlet Riser Structure	IA CS-046	41-44	B.05, M.02	1	EA
24	-	Anti-Seep Collars	IA CS-051	45-47	B.05, M.02	2	EA
25	-	Rip Rap (Class E)	IA CS-061	48-49	D.03, M.01-M.02	383	TN
26	-	Grout for Rip Rap	IA CS-062	50-52	D.04	46	CY

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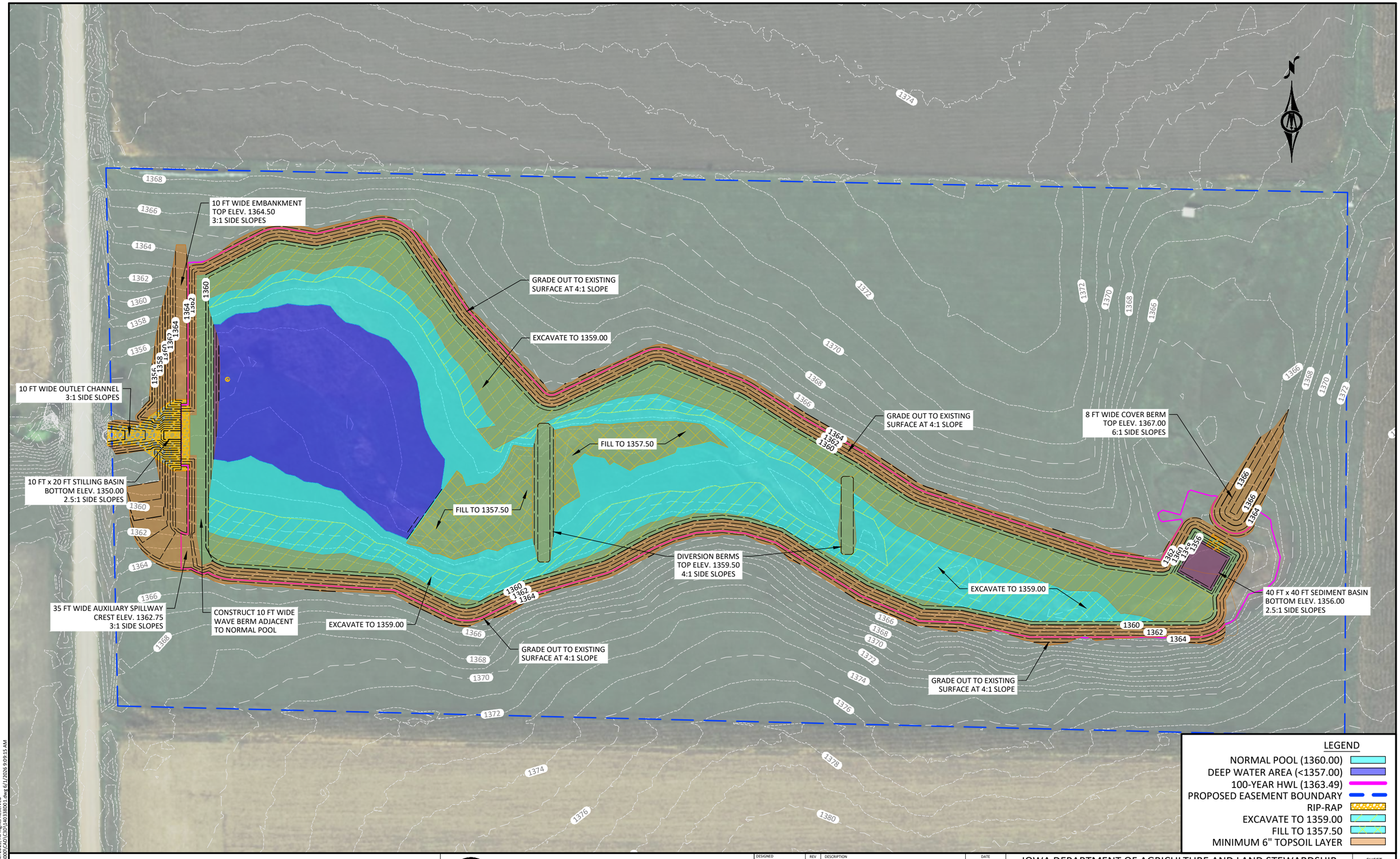
1.1	FINAL DESIGN REV. 1	02-25-2026

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. CLA953734C
ESTIMATED QUANTITIES

SHEET C.01



HORZ. SCALE 0 50 100 FEET

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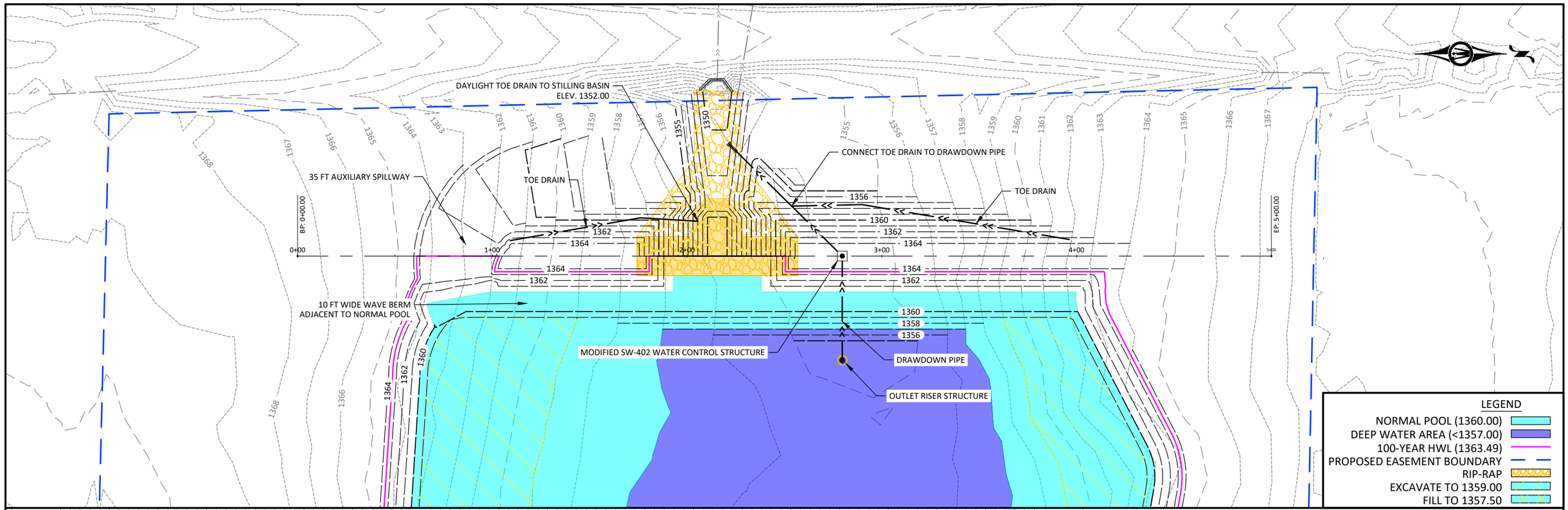
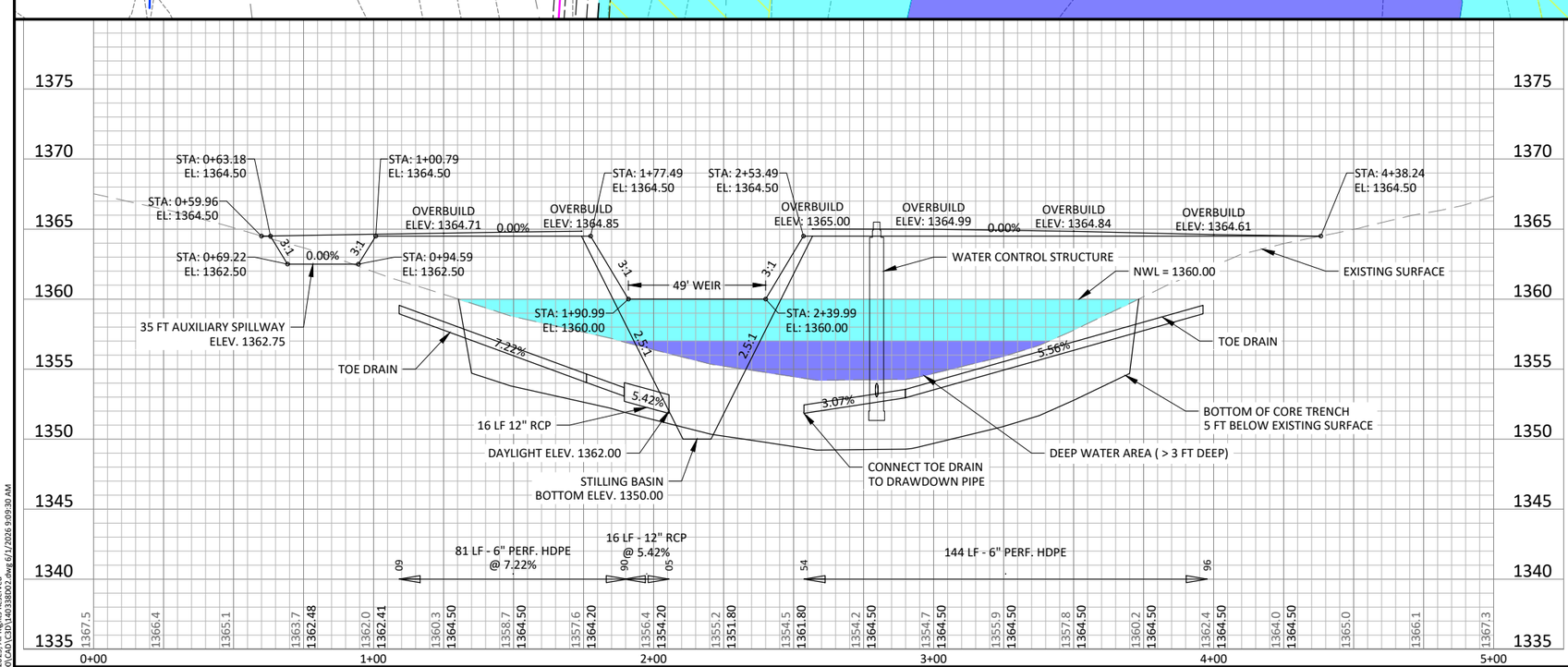
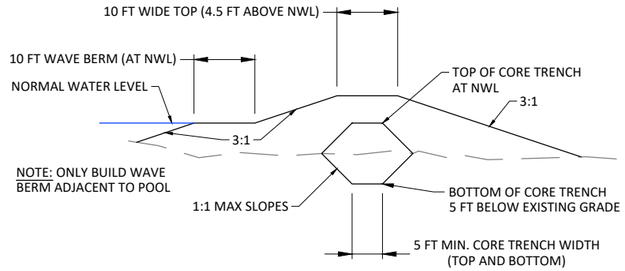
GRADING OVERVIEW

SHEET D.01

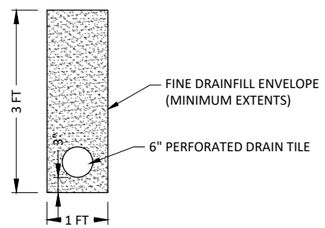




EMBANKMENT CROSS SECTION



TOE DRAIN CROSS SECTION



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

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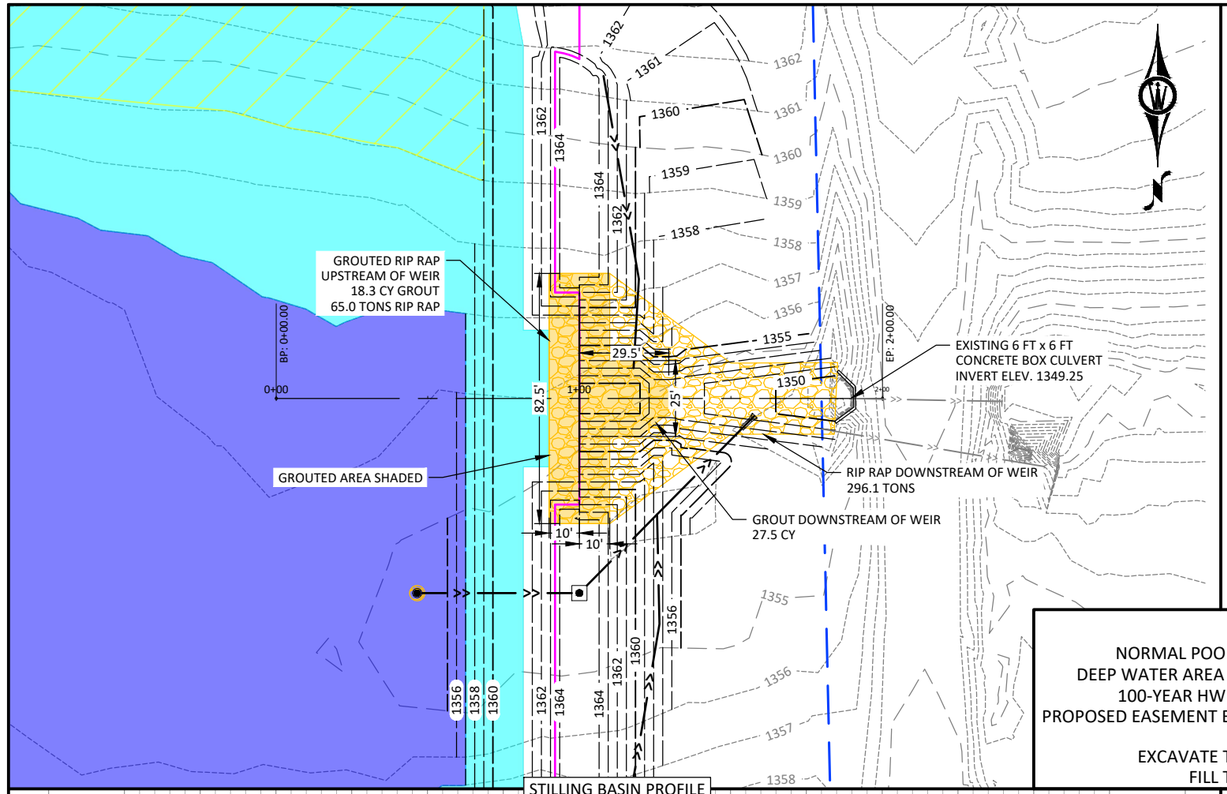
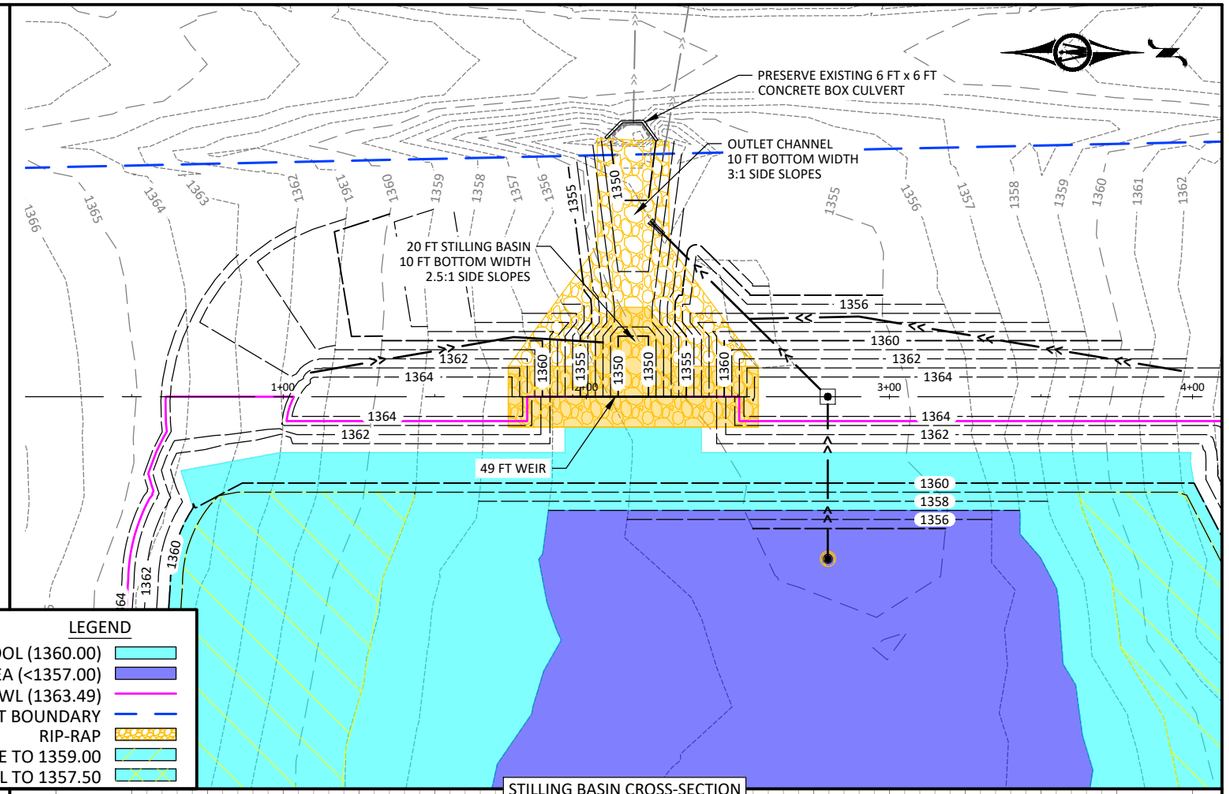
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. CLA953734C
PLAN & PROFILE - EMBANKMENT

SHEET D.02



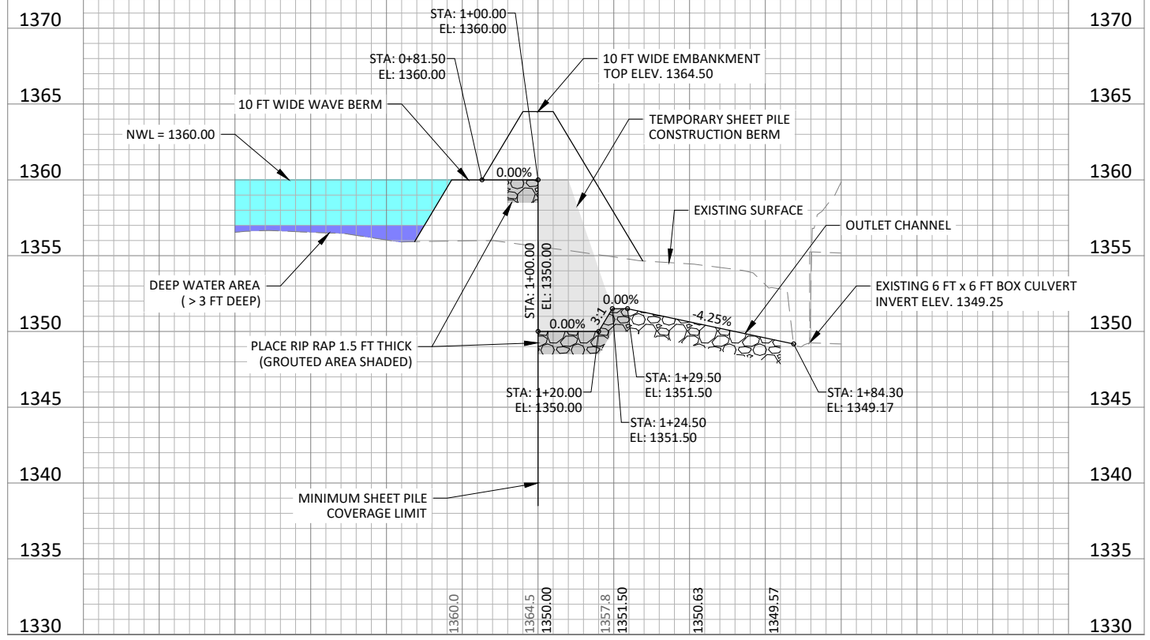
STILLING BASIN PROFILE

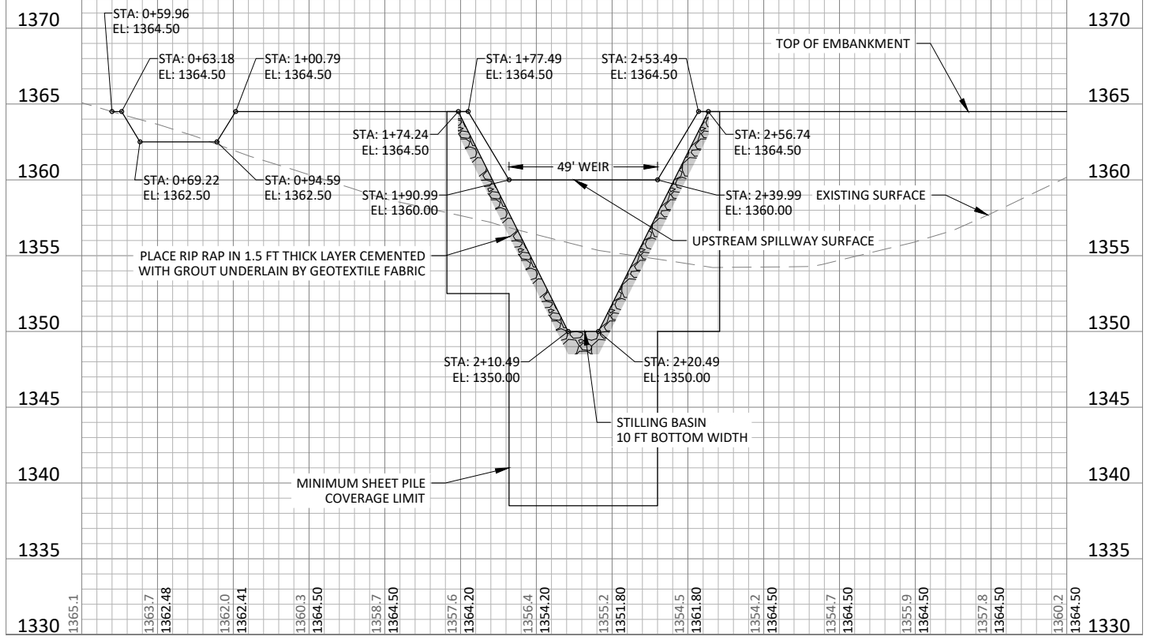


STILLING BASIN CROSS-SECTION

LEGEND

- NORMAL POOL (1360.00)
- DEEP WATER AREA (<1357.00)
- 100-YEAR HWL (1363.49)
- PROPOSED EASEMENT BOUNDARY
- RIP-RAP
- EXCAVATE TO 1359.00
- FILL TO 1357.50





HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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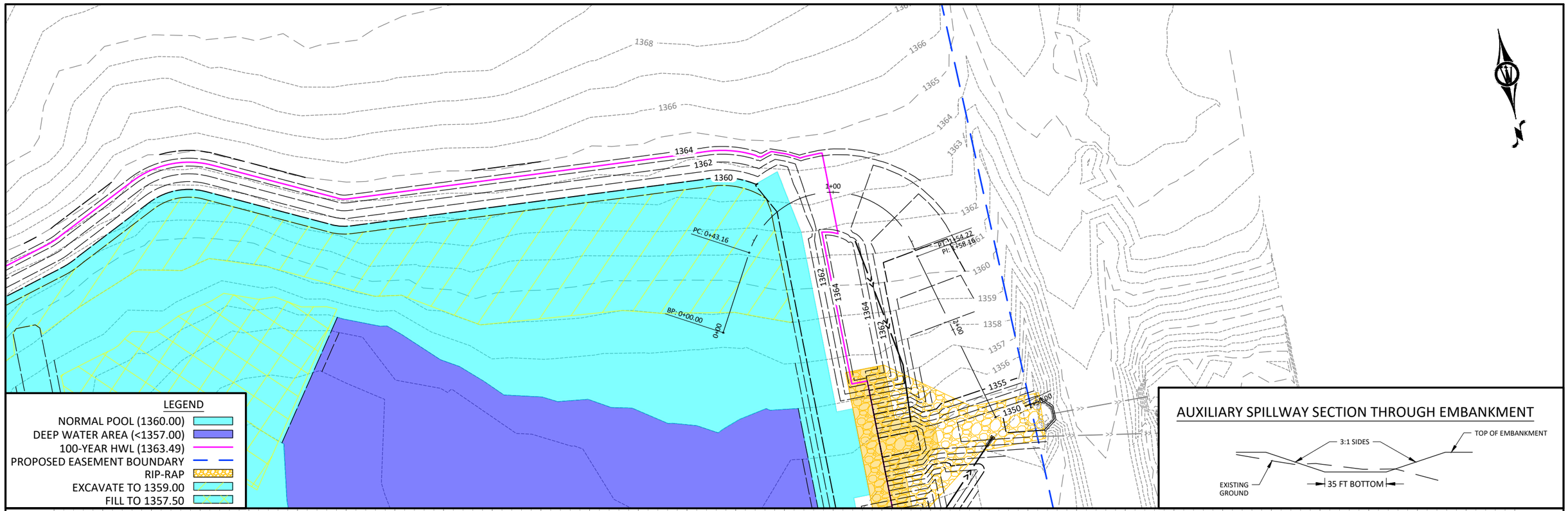
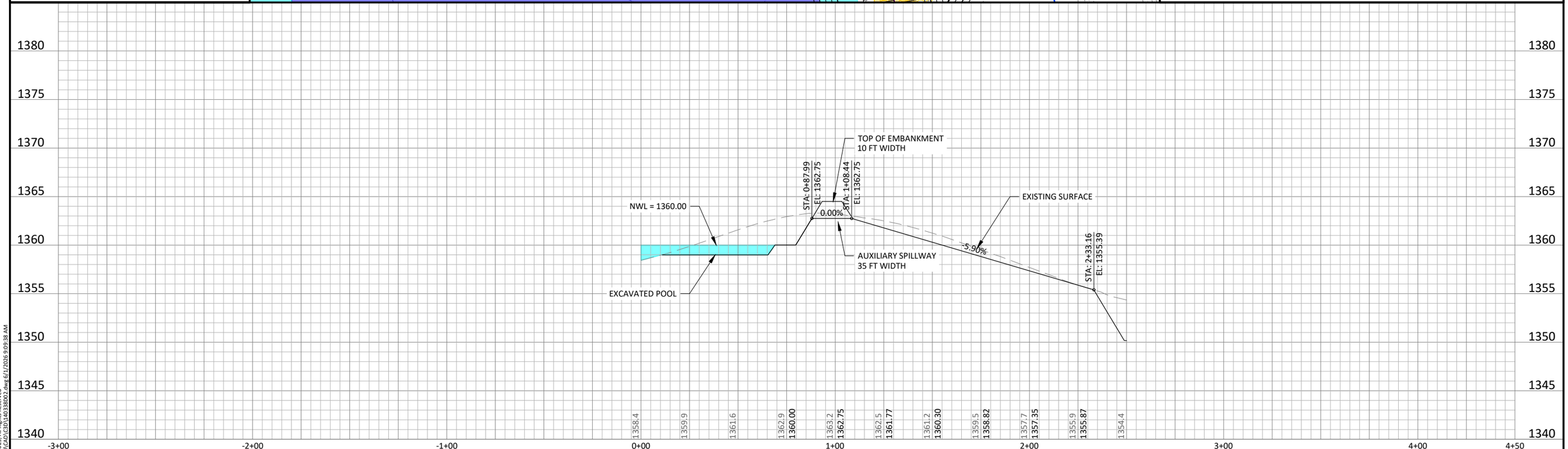
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. CLA953734C

PLAN & PROFILE - STILLING BASIN & OUTLET CHANNEL

SHEET D.03





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

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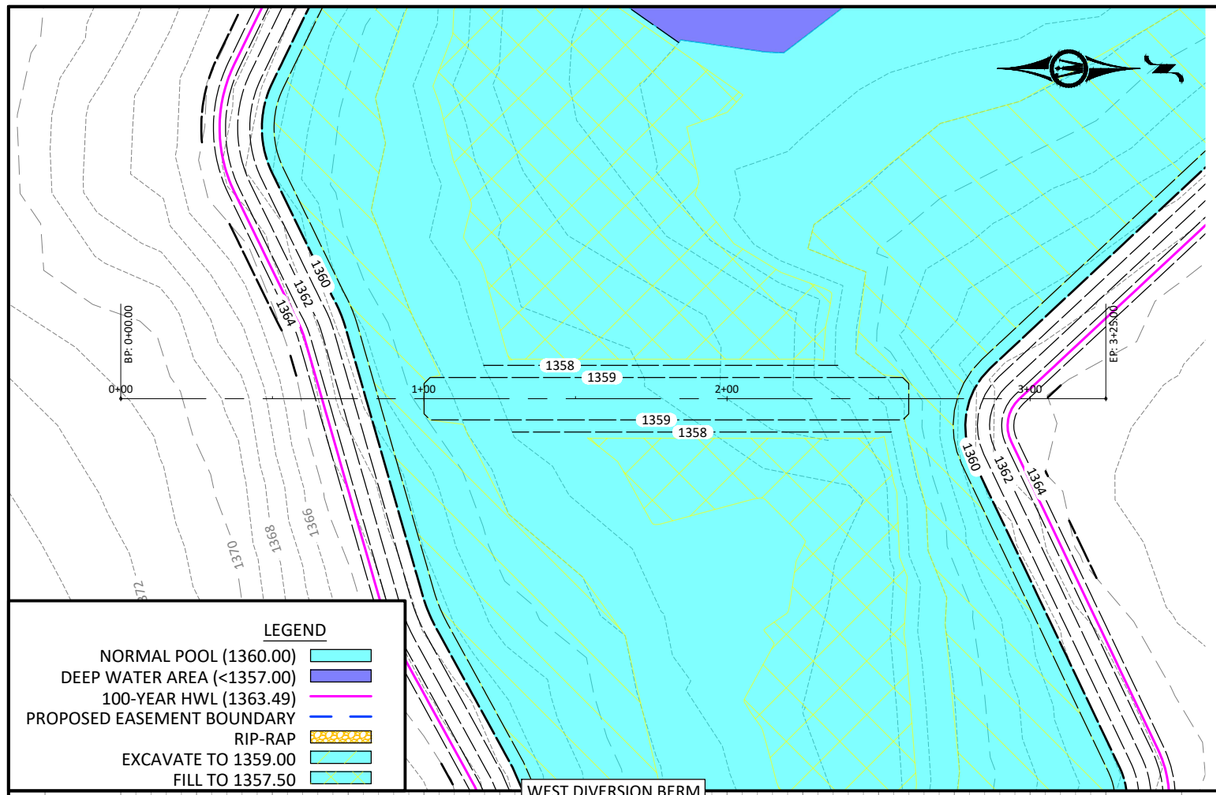
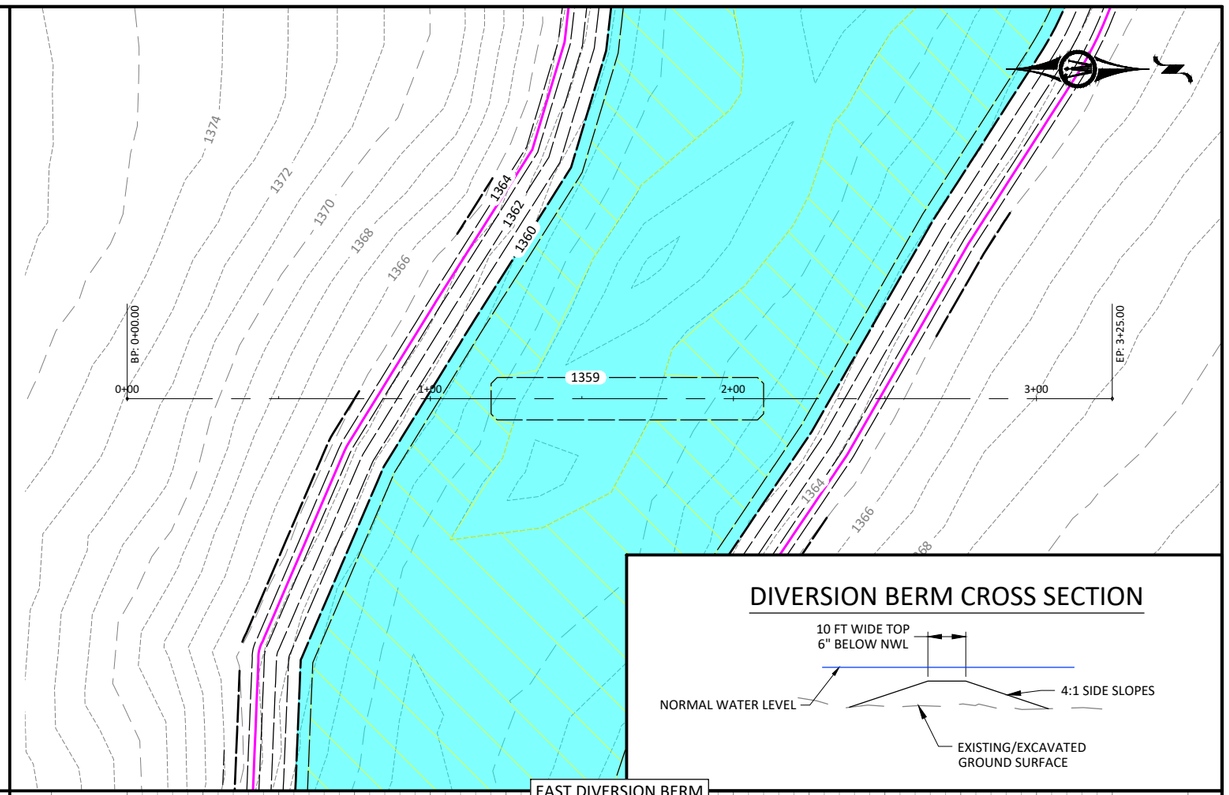
IDALS PROJ. NO. CLA953734C
PLAN & PROFILE - AUXILIARY SPILLWAY

SHEET D.04

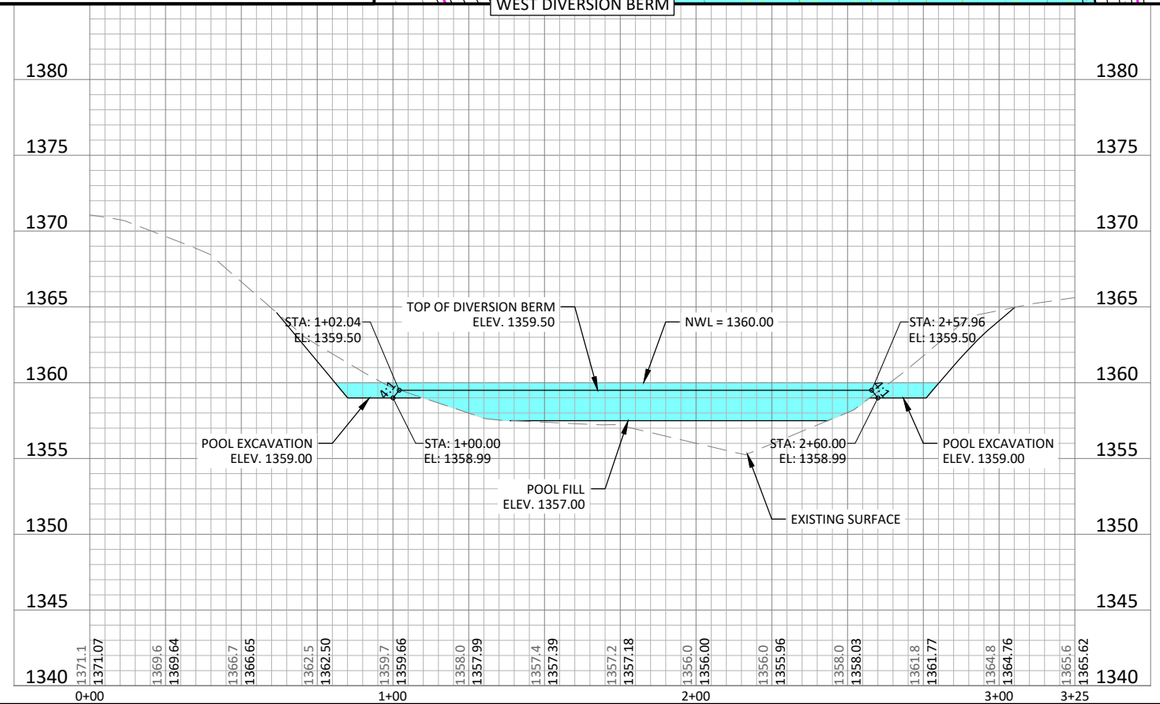


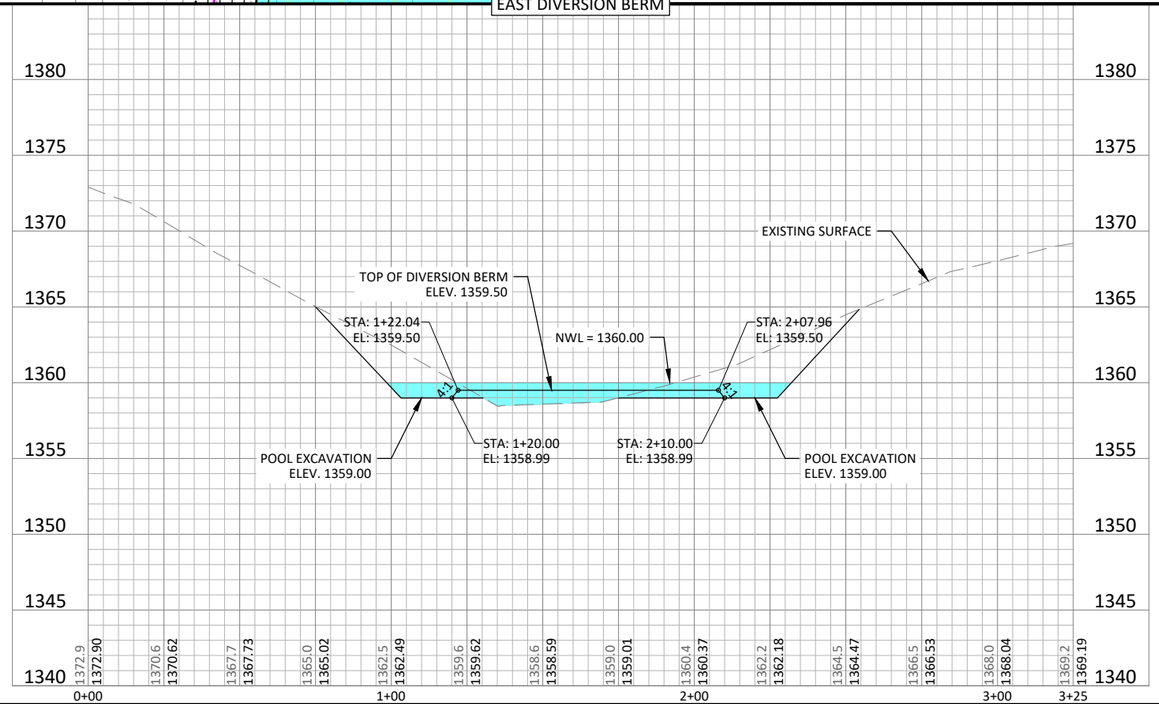


LEGEND

- NORMAL POOL (1360.00)
- DEEP WATER AREA (<1357.00)
- 100-YEAR HWL (1363.49)
- PROPOSED EASEMENT BOUNDARY
- RIP-RAP
- EXCAVATE TO 1359.00
- FILL TO 1357.50

DIVERSION BERM CROSS SECTION





HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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DRAWN NVD			
CHECKED JPR			
CLIENT PROJ. NO. 25X.140338.000			

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. CLA953734C

PLAN & PROFILE - DIVERSION BERMS

SHEET D.05

SEED EMBANKMENT STRUCTURE SEEDING

SEED WAVE BERM TO 1 FT BELOW NORMAL POOL STRUCTURE SEEDING

SEED DISTURBED AREAS TO 1 FT BELOW NORMAL POOL STRUCTURE SEEDING

SEED OUTLET CHANNEL STRUCTURE SEEDING

DO NOT SEED RIP RAP AREAS

SEED BUFFER AREA TO EASEMENT BOUNDARY BUFFER SEEDING

DO NOT SEED POOL OR DIVERSION BERMS

SEED DISTURBED AREAS TO 1 FT BELOW NORMAL POOL STRUCTURE SEEDING

SEED COVER BERM EXTENTS STRUCTURE SEEDING

SEED AUXILIARY SPILLWAY AND SURROUNDING AREA STRUCTURE SEEDING

SEED BUFFER AREA TO EASEMENT BOUNDARY BUFFER SEEDING

SEED DISTURBED AREAS TO 1 FT BELOW NORMAL POOL STRUCTURE SEEDING

SEEDING AREAS	
BUFFER SEEDING	13.1 AC
STRUCTURE SEEDING	2.1 AC

LEGEND

- NORMAL POOL (1360.00)
- DEEP WATER AREA (<1357.00)
- 100-YEAR HWL (1363.49)
- PROPOSED EASEMENT BOUNDARY
- RIP-RAP
- EXCAVATE TO 1359.00
- FILL TO 1357.50
- STRUCTURE SEEDING
- BUFFER SEEDING

HORZ. SCALE 0 50 100 FEET

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

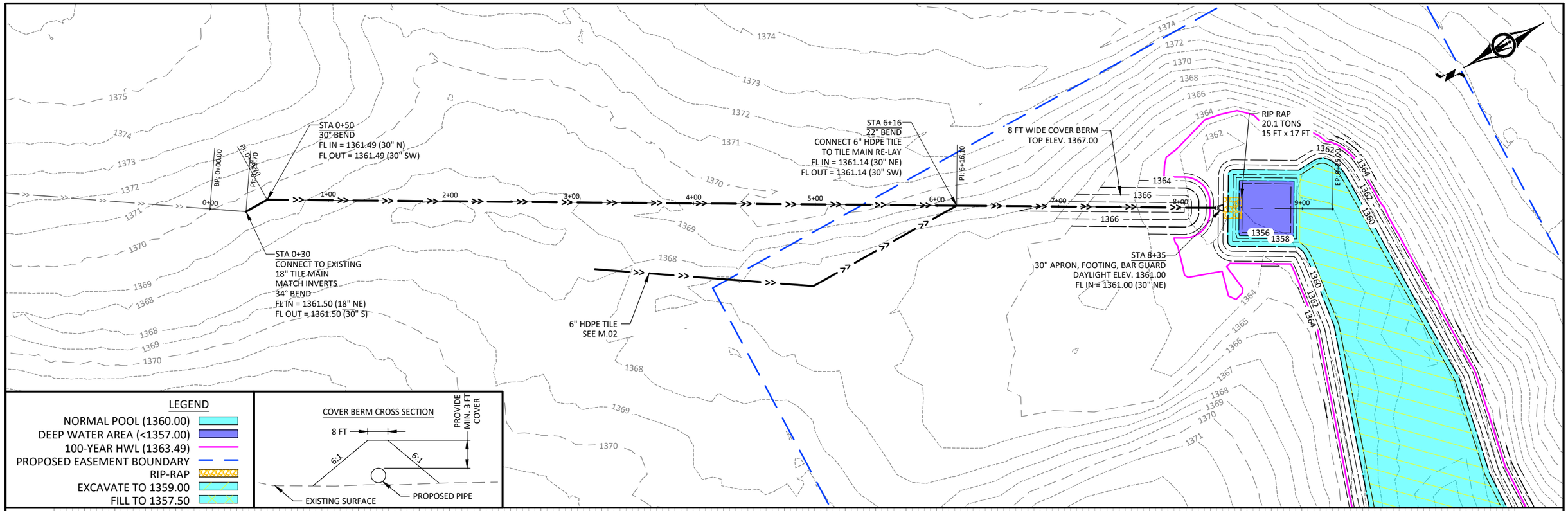
DESIGNED	REV	DESCRIPTION	DATE
BCS	1.1	FINAL DESIGN REV. 1	02-25-2026
DRAWN NVD			
CHECKED JPR			
CLIENT PROJ. NO. 25X.140338.000			

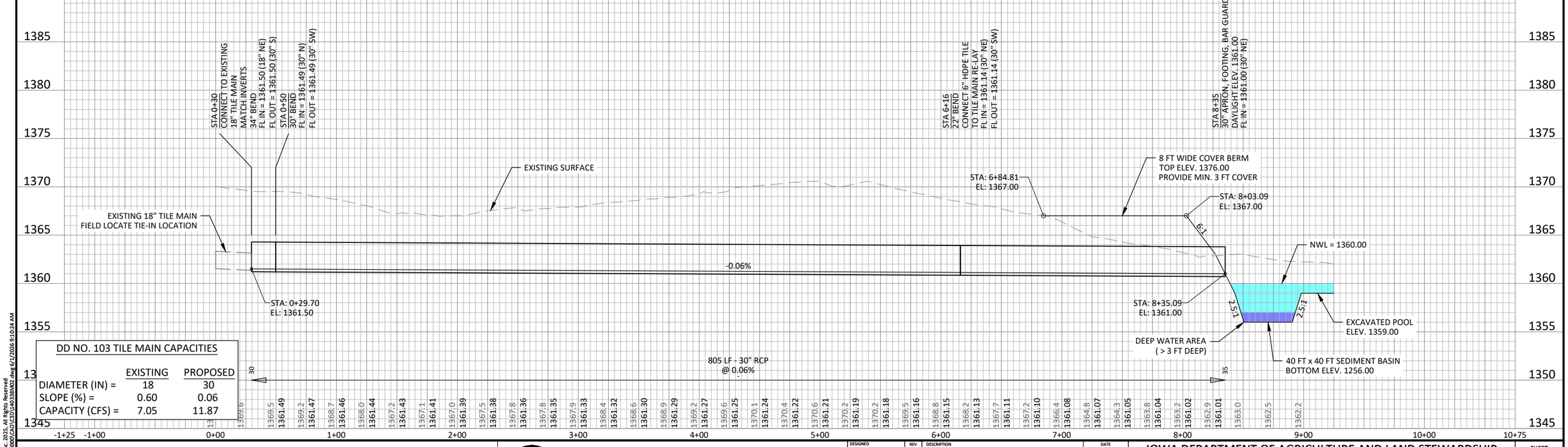
IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. CLA953734C

SEEDING OVERVIEW

SHEET K.01





DD NO. 103 TILE MAIN CAPACITIES

	EXISTING	PROPOSED
DIAMETER (IN) =	18	30
SLOPE (%) =	0.60	0.06
CAPACITY (CFS) =	7.05	11.87

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

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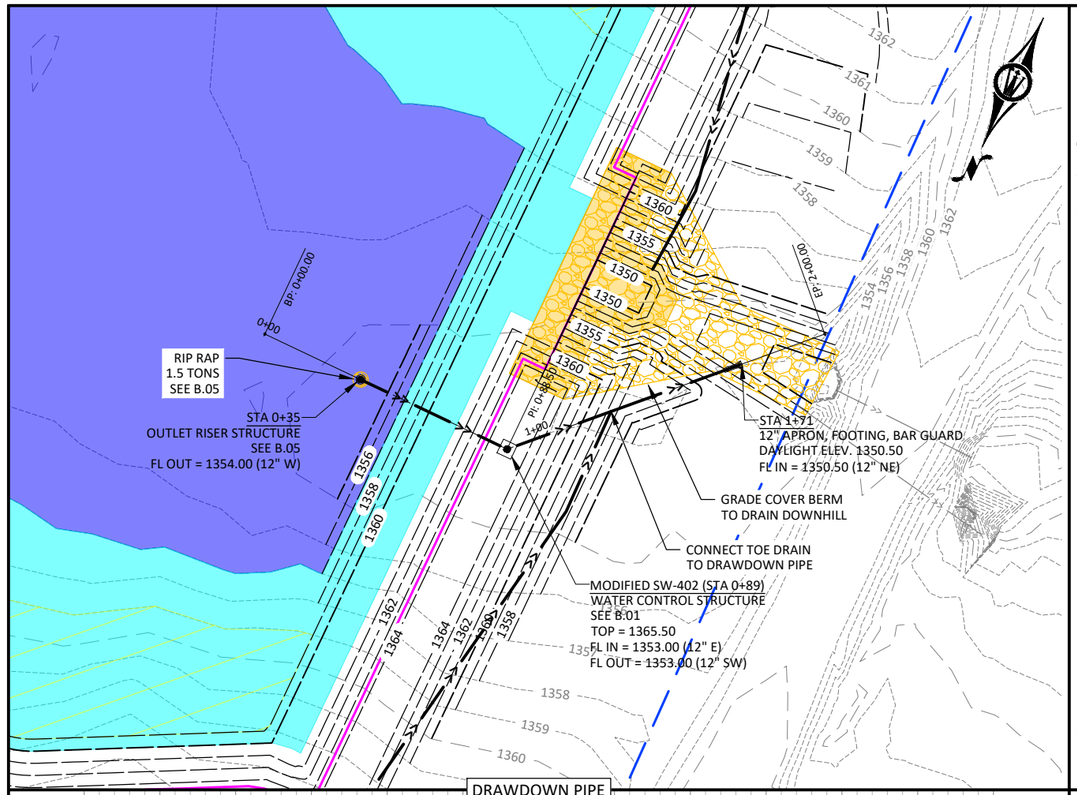
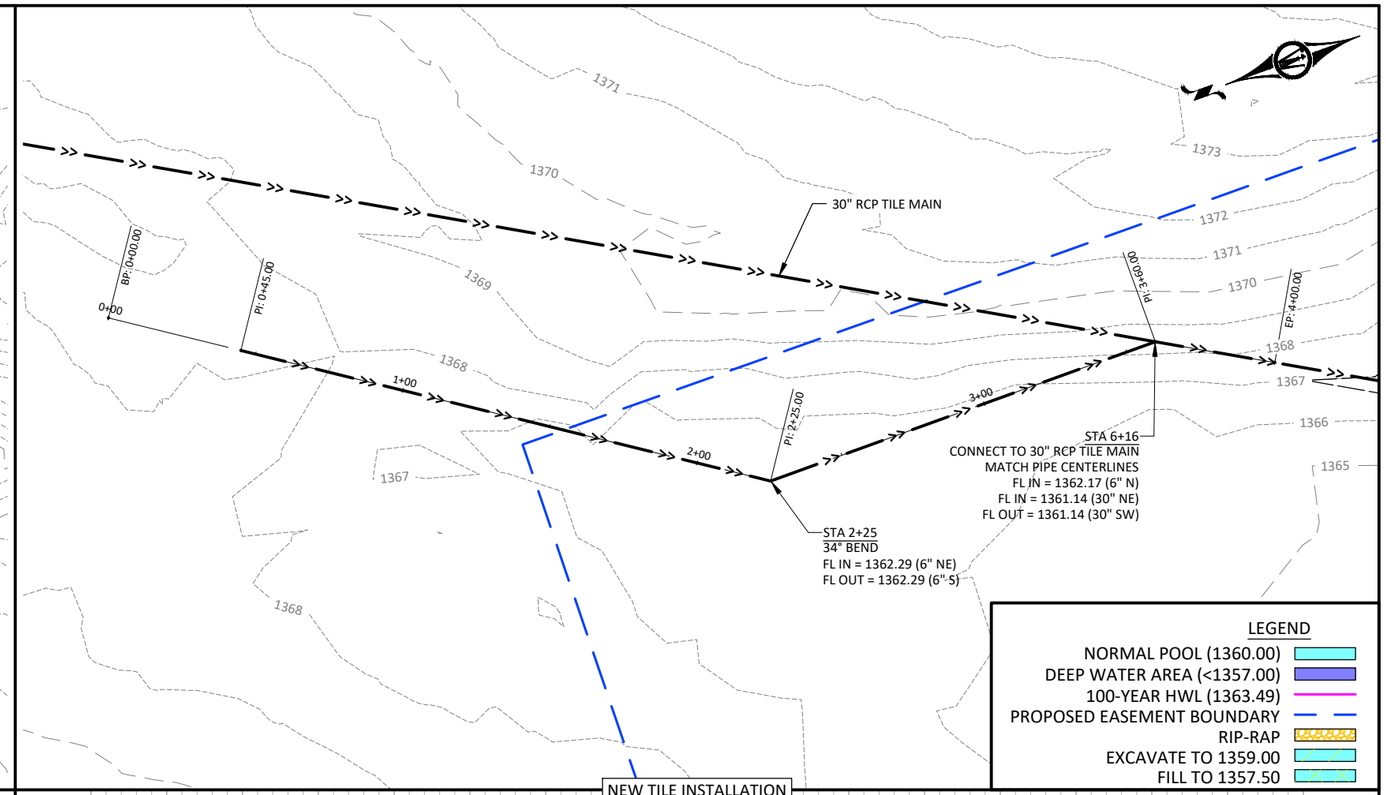
DESIGNED	REV	DESCRIPTION	DATE
BCS	1.1	FINAL DESIGN REV. 1	02-25-2026
DRAWN NVD			
CHECKED JPR			
CLIENT PROJ. NO. 25X.140338.000			

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
IDALS PROJ. NO. CLA953734C
PLAN & PROFILE - TILE MAIN RE-LAY

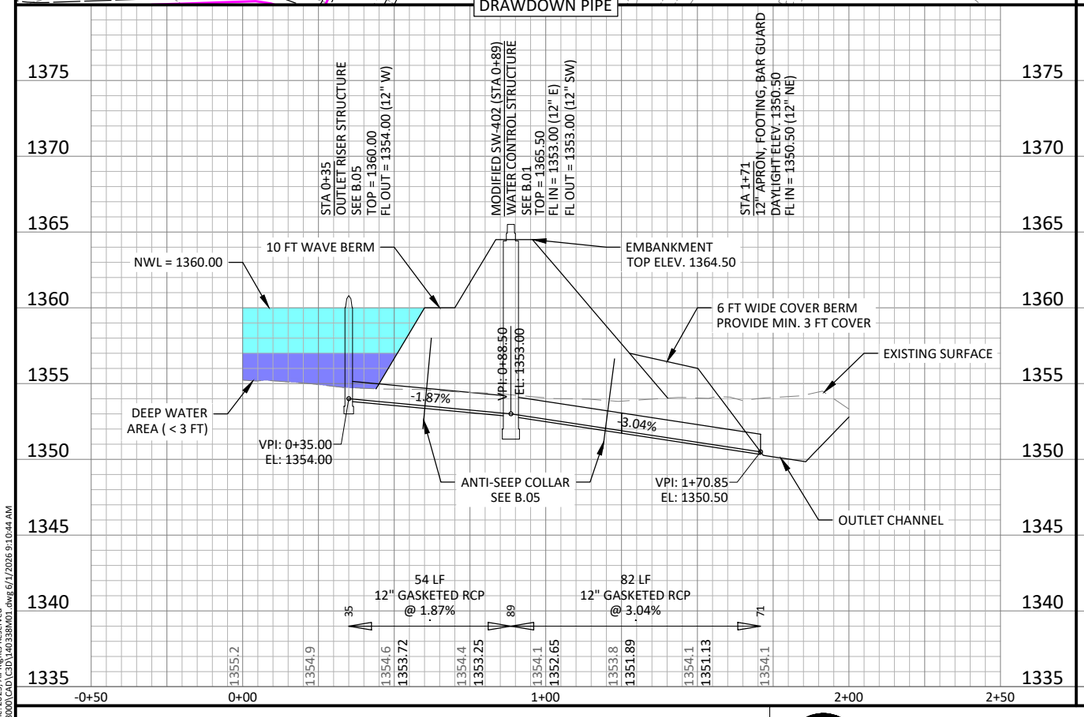
SHEET M.01

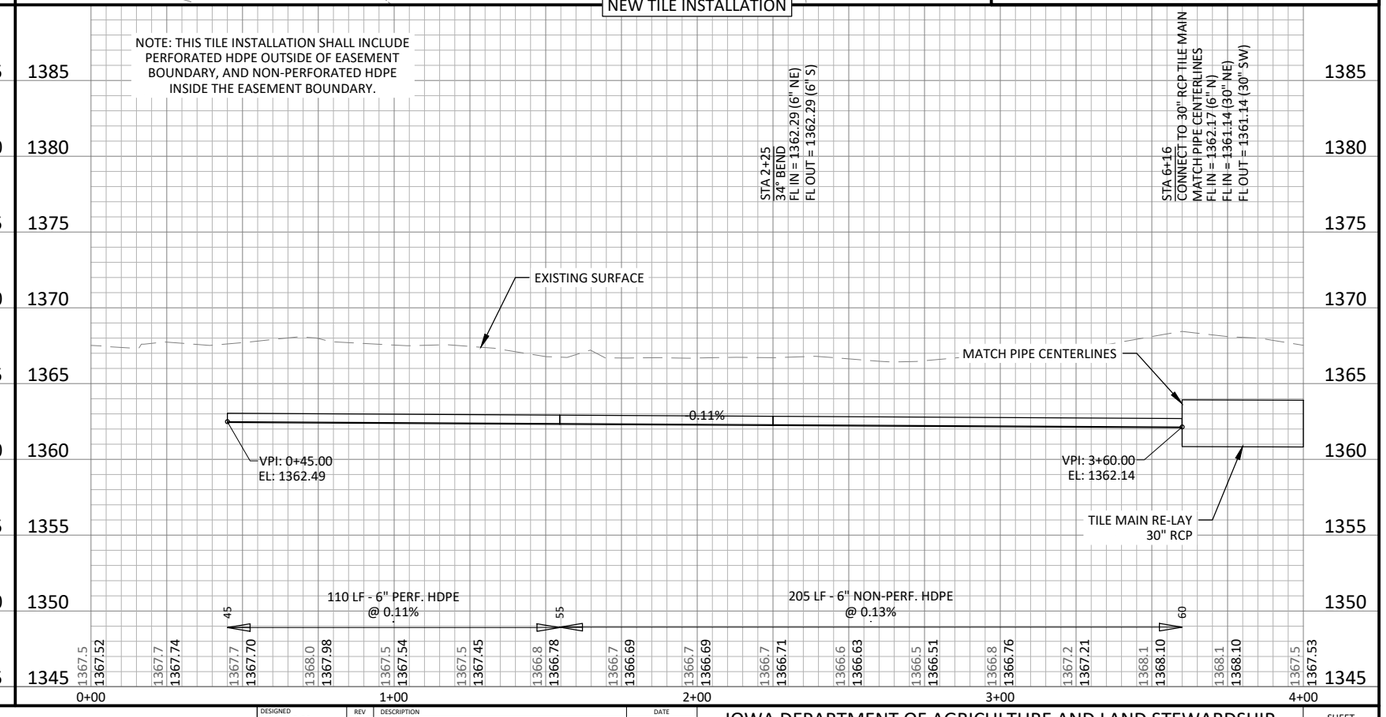


DRAWDOWN PIPE



NEW TILE INSTALLATION





HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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DESIGNED BCS
DRAWN NVD
CHECKED JPR
CLIENT PROJ. NO. 25X.140338.000

REV	DESCRIPTION	DATE
1.1	FINAL DESIGN REV. 1	02-25-2026

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

IDALS PROJ. NO. CLA953734C

PLAN & PROFILE - DRAWDOWN PIPE & NEW TILE INSTALLATION

SHEET M.02