

# CONSTRUCTION PLANS FOR CREP PROJ. NO. HAR892029C

SITE GRADING, BERM CONSTRUCTION, SHEET PILE, RIP RAP AND ARMORING,  
WETLAND SEEDING, DRAIN TILE, EROSION AND SEDIMENT CONTROL

## HARDIN COUNTY, IA

AUGUST, 2014

### 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.

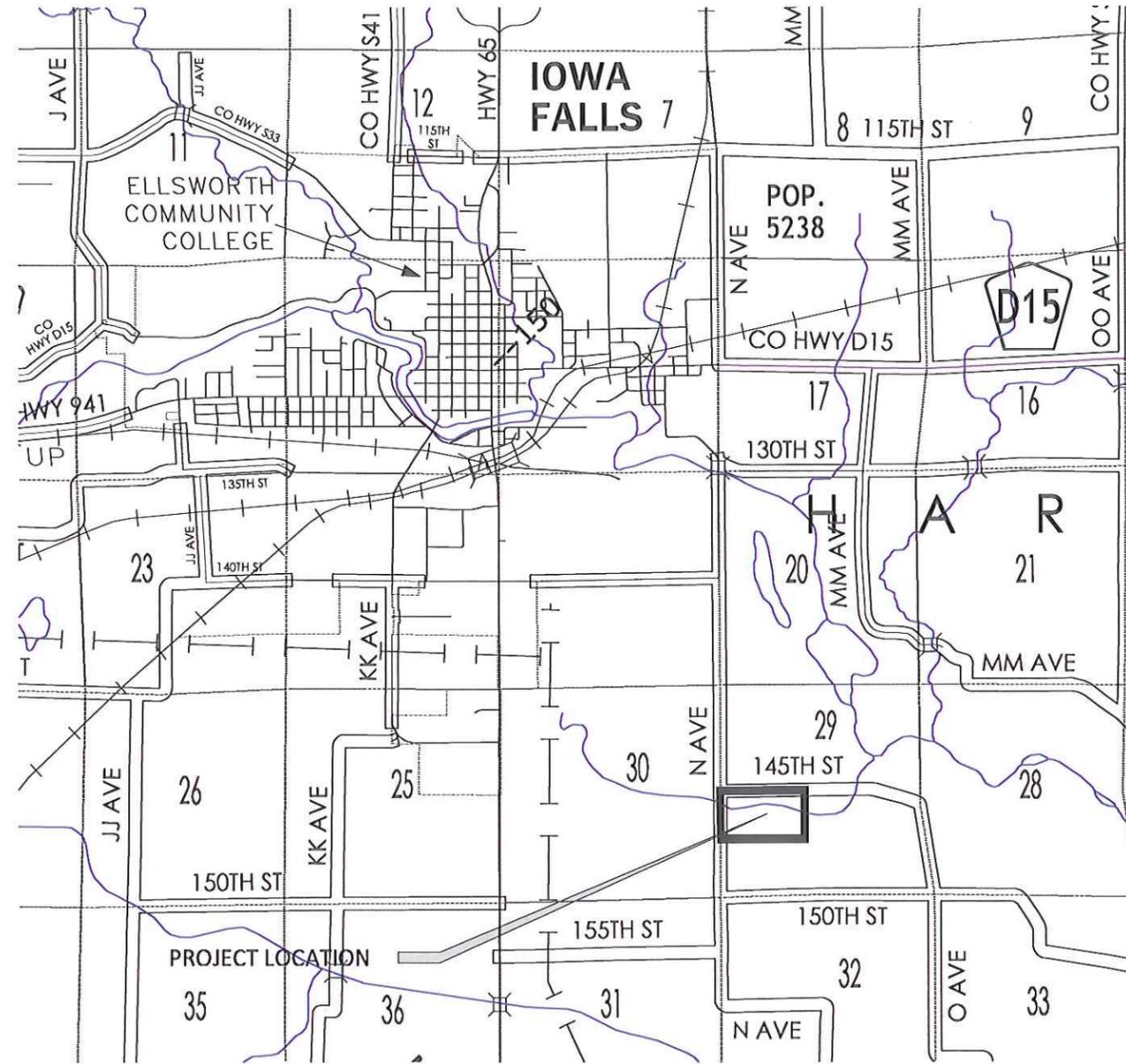
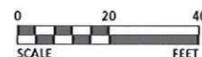
ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.

PLAN REVISIONS		
DATE	SHEET NUMBER	APPROVED BY
9/19/14	ALL SHEETS - BID	JDL
11/4/14	1.0, 5.1, 8.0	JDL
12/2/14	1.0, 1.1, 4.0, 7.0, 7.1	JDL
1/8/15	All Sheets for Bid	JDL



NOTE: EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY IOWA ONE CALL, 1-800-292-8989.

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  
HARDIN COUNTY, IOWA

#### MAP LEGEND

— PROJECT LIMITS

### SHEET INDEX

SHEET NO.	TITLE
1.0	TITLE SHEET
1.1	ESTIMATED QUANTITIES AND REFERENCE NOTES
2.0	EXISTING SITE CONDITIONS
3.0	PROPOSED SITE GRADING
4.0	BERM PROFILE AND DETAILS
5.0 - 5.1	WETLAND OUTLET CONTROL DETAILS
6.0 - 6.1	DRAIN TILE DETAILS
7.0 - 7.1	SHEET PILE DETAILS
8.0	SEEDING AREAS
9.0 - 9.3	WETLAND CENTERLINE DETAILS
10.0	BYPASS CHANNEL DETAILS

LICENSED PROFESSIONAL ENGINEER

JAMES D. LEIDING  
17000

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.

*James D. Leiding*  
JAMES D. LEIDING  
REG. NO. 17000 DATE: 9/19/14

MY LICENSE RENEWAL DATE IS DECEMBER 31, 2015

PAGES OR SHEETS COVERED BY THIS SEAL:  
ALL SHEETS

PROJECT DATUM:  
HORIZONTAL: IOWA STATE PLANE - NORTH ZONE  
VERTICAL: NAVD 88

**BOLTON & MENK, INC.**  
Consulting Engineers & Surveyors  
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN BURNSVILLE, MN WILLMAR, MN  
CHASKA, MN RAMSEY, MN MAPLEWOOD, MN BAXTER, MN ROCHESTER, MN  
AMES, IA SPENCER, IA DES MOINES, IA FARGO, ND

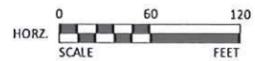
RECORD DRAWING INFORMATION	IOWA DEPARTMENT OF AGRICULTURE	SHEET
OBSERVER:	HARDIN CREP PROJECT NO. HAR892029C	1.0
CONTRACTOR:	TITLE SHEET	
DATE:		

ESTIMATED PROJECT QUANTITIES					
ITEM NO.	WORK OR MATERIAL	SPEC. NO	UNIT	ESTIMATED QUANTITY	AS-BUILT QUANTITY
1	STRUCTURE & CHANNEL SEEDING	IA-6	AC	2.6	
2	FIRE BREAK SEEDING	IA-6	AC	1.4	
3	BUFFER SEEDING	IA-6	AC	15.3	
4	MOBILIZATION & DEMOBILIZATION	IA-8	LS	1	
5	CLEARING AND GRUBBING	IA-1	LS	1	
6	STEEL SHEET PILE	IA-13	SF	2,170	
7	TILE INVESTIGATION & REMOVAL	IA-21	LS	1	
8	EXCAVATION, CHANNEL	IA-21	CY	1,300	
9	EXCAVATION, CORE TRENCH	IA-21	CY	3,450	
10	EARTHFILL, CLAY CORE	IA-23	CY	1,850	
11	EARTHFILL, BERM CONSTRUCTION	IA-23	CY	7,450	
12	EARTHFILL, POOL CONSTRUCTION	IA-23	CY	9,575	
13	TOPSOIL STRIP, SALVAGE & RESPREAD	IA-26	CY	4,825	
14	CORRUGATED POLY. TUBING, 5"	IA-46	LF	1,350	
15	CORRUGATED POLY. TUBING, 8"	IA-46	LF	335	
16	CORRUGATED POLY. TUBING, 12"	IA-46	LF	180	
17	CORRUGATED METAL PIPE, 6" DIA.	IA-51	LF	40	
18	CORRUGATED METAL PIPE, 10" DIA.	IA-51	LF	20	
19	CORRUGATED METAL PIPE, 15" DIA.	IA-51	LF	20	
20	CORRUGATED METAL PIPE, 18" DIA.	IA-620	LF	117	
21	CORRUGATED METAL PIPE BEND, 18" DIA., 45 DEGREE	IA-620	EA	2	
22	WATER CONTROL STRUCTURE	IA-620	LS	1	
23	RIP RAP, CLASS E W/ GEOTEXTILE	IA-52	TONS	700	
24	PCC GROUT	IA-62	CY	85	

ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
6	STEEL SHEET PILE Sheet Piling shall be as detailed in the plans, bends and deflections shall be made by prefabricated pieces specifically made for a location. Any additional length necessary to meet angles, construction tolerances, etc. shall be incidental to the overall construction.
7	TILE INVESTIGATION & REMOVAL This item will consist of the exploratory excavations required to locate and abandon the tiles shown on the plans. This is full compensation for the excavation, backfilling and abandonment of the tile trenches within the permanent easement boundary.
8	EXCAVATION, CHANNEL This is the earthwork required to construct the settling basin on the downstream side of the weir wall and the channel structure to the existing culverts and includes the earthwork for the Overland Flow Bypass Channel.
9	EXCAVATION, CORE TRENCH This is the excavation required to construct the core trench below the existing ground level as detailed along the centerline of the embankment berm and including the area to 10 feet upstream of the sheet pile weir.
10	EARTHFILL, CLAY CORE This is the quantity of material necessary to fill the clay core trench excavation and build the clay core trench to within 3 feet of the top of the berm as detailed. This quantity assumed a 30% shrinkage factor on the material. It is anticipated that select clay material for the clay core construction will have to be brought in from an offsite source secured by the contractor, this price should include loading, hauling and placement of the material.
11	EARTHFILL, BERM CONSTRUCTION This is the quantity of material necessary to construct the embankment berm outside of the clay core trench to the slopes and elevations detailed on the plans. The contractor shall provide for a minimum allowable settlement of 5% of the total fill depth when constructing the berm. This additional quantity of material is not figured into the bid quantity. Excess material from other excavations can be used or wasted here to build slopes outside the core.
12	EARTHFILL, POOL CONSTRUCTION This is the amount of material excavated to cut and shape the pool as designed. Other areas will require filling with the excess material from that excavation to meet the proposed design. This quantity was based on the proposed finished grade compared to the 0.5' Strip surface. Excess material from this work shall be used for embankment berm construction outside of the clay core or stockpiled at the designated location.
13	TOPSOIL STRIP, SALVAGE & RESPREAD This is the quantity to remove, salvage and stockpile 6" of existing material from all areas to be excavated or disturbed. All areas to receive seed, borrow areas and excavations below the normal pool elevation shall have a minimum of 6" of topsoil placed.
14	CORRUGATED POLY. TUBING, 5" This quantity includes 850 LF for the two trench drains on the downstream side of the berm structure and an estimated 500 LF for re-laying of the tiles that are south of the manifold tile for Tile Outlet #2. This second quantity is approximate only as the exact location, elevation and number of tiles to connect are unknown and the quantity may be adjusted based on the conditions found in the field.
15	CORRUGATED POLY. TUBING, 8"
16	CORRUGATED POLY. TUBING, 12"
17	CORRUGATED METAL PIPE, 6" DIA.
18	CORRUGATED METAL PIPE, 10" DIA.
19	CORRUGATED METAL PIPE, 15" DIA.
20	CORRUGATED METAL PIPE, 18" DIA. The item includes the costs for installation, bedding and backfilling of the CMP pipe. Length is based from center of structure to center of structure and through bends.
21	CORRUGATED METAL PIPE BEND, 18" DIA., 45 DEGREE The item includes the costs for fabrication and installation of an 18" CMP bend.
22	WATER CONTROL STRUCTURE This item includes the main control structure, lid, locking mechanism, pvc or aluminum stop logs, steps, stop log removal tools, CMP pipe stubs, stop log storage tube, slab and grate, downstream CMP apron and animal guard and the upstream CMP perforated intake riser, grate and rip rap. The fabrication and installation of the four CMP anti-seep collars shall be included in this item. The 18" RCP pipe shall be paid for separately.
23	RIP RAP, CLASS E W/ GEOTEXTILE This item includes excavation, geotextile fabric placement and rip rap material at the outlet channel from the upstream side of the weir wall to the existing channel and at the outlet of the overland flow bypass channel to the existing channel. The plan calls for 20 Tons of erosion stone material at the two drain tile outlets, this different material shall be considered rip rap for payment, but geotextile fabric will not be required at the tile outlets.
24	PCC GROUT Grout mix shall be as specified and placed at 5.4 cubic feet of grout per square yard of rip rap area. The grout shall fully encase the bottom of the rip rap but not fill around the rip rap so as to reduce the energy dissipation capabilities of the rip rap. No grout shall be placed on the rip rap for the overland flow bypass channel or the tile outlets.

ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
1	STRUCTURE & CHANNEL SEEDING This seed is for the embankment and berm area, outlet channel area, tile outlet areas and areas where the ground slopes will be steeper than 5:1. This will include any topsoil waste areas or slopes from the borrow area to the existing ground. Mulching shall be included for this area.
2	FIRE BREAK SEEDING This seed is for the 30 foot wide area around the perimeter of the permanent easement area, except for the western side along N Ave and the northern side along 145th Street. Mulching shall be included for this area.
3	BUFFER SEEDING This seed is for all other areas above the normal pool elevation and are not part of the fire break or structure & channel seeding. No mulch on this area. The preparation for this area shall include the grading to a uniform surface of the 10:1 safety bench around the perimeter of the pool area.
4	MOBILIZATION & DEMOBILIZATION This work shall include the mobilization and demobilization of the Contractor's forces and equipment for performing the work under the contract. Any installation of the silt fence through the waterways shall be considered incidental to this item.
5	CLEARING AND GRUBBING This shall be considered full compensation to remove all trees, stumps and brush from within the permanent easement area.





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DESIGNED: JPR  
DRAWN: JDL  
CHECKED: JDL

**BOLTON & MENK, INC.**  
Consulting Engineers & Surveyors  
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN BURNSVILLE, MN WILLMAR, MN  
CHASKA, MN RAMSEY, MN MAPLEWOOD, MN BAXTER, MN ROCHESTER, MN  
AMES, IA SPENCER, IA DES MOINES, IA FARGO, ND

REV	BY	DATE
0	JDL	5/15/14
1	JDL	1/8/15

IOWA DEPARTMENT OF AGRICULTURE  
HARDIN CREP PROJECT NO. HAR892029C  
EXISTING SITE CONDITIONS

SHEET  
**2.0**

**LEGEND**

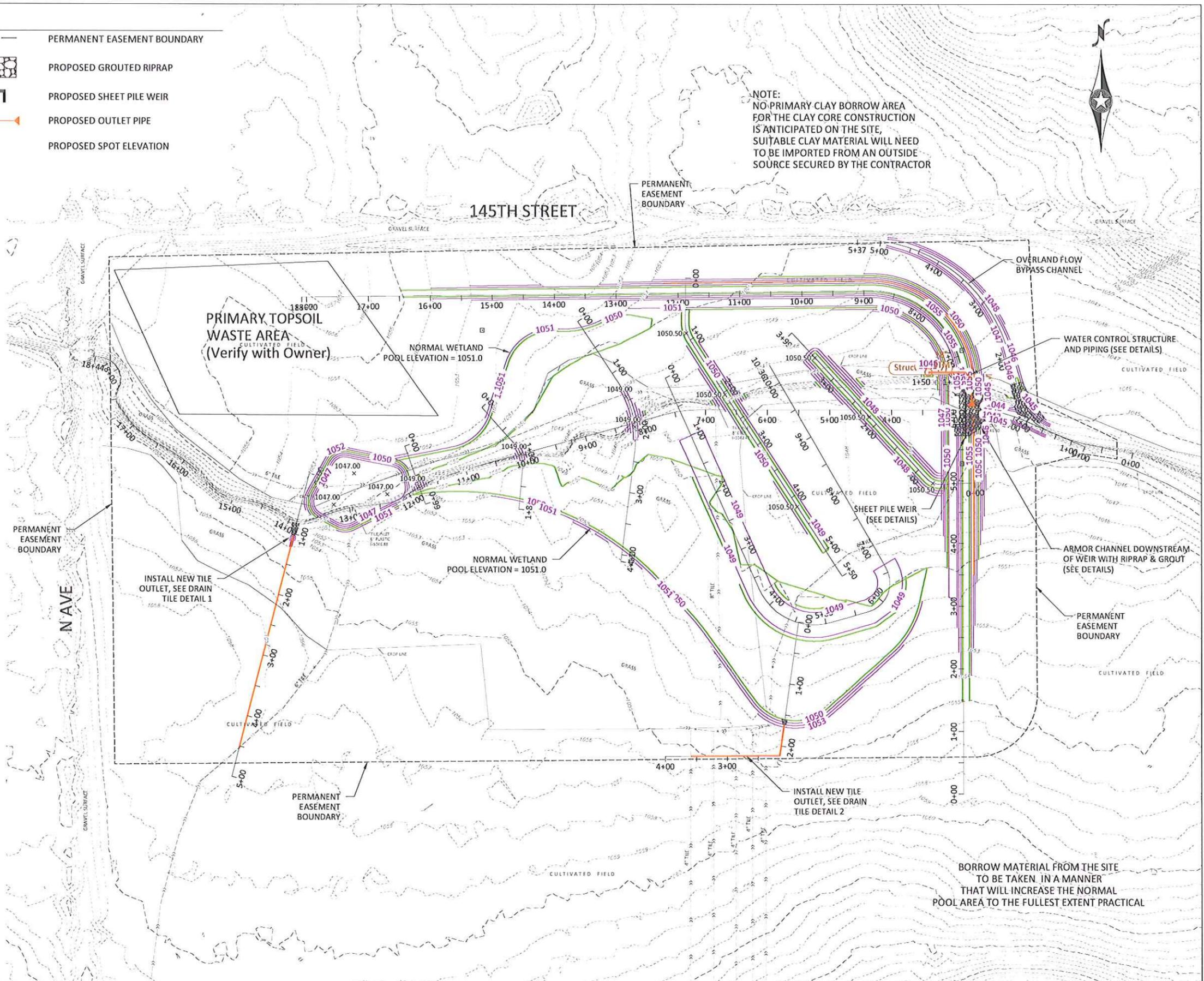
- EXISTING MAIN CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING FIELD DRAIN TILE
- EXISTING OVERHEAD UTILITY
- PROPOSED MAIN CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PERMANENT EASEMENT BOUNDARY
- PROPOSED GROUTED RIPRAP
- PROPOSED SHEET PILE WEIR
- PROPOSED OUTLET PIPE
- PROPOSED SPOT ELEVATION

**GRADING NOTES:**

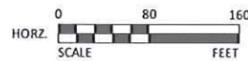
1. REMOVE ALL TREES AND BRUSH THAT MAY LIE BELOW THE NORMAL POOL ELEVATION 1051.0.
2. ALL EXISTING FIELD TILE SHALL BE ABANDONED WITHIN THE EASEMENT AREA, AND REMOVED THROUGH THE BERM STRUCTURE. NEW TILE OUTLETS WILL BE INSTALLED (SEE DETAILS).
3. SITE GRADING (SPEC SECT IA-1) SHALL CONSIST OF ALL GRADING INSIDE OF POOL AREA, EXCLUDING THE BERM AND CLAY BORROW AREAS. CLAY ENCOUNTERED IN POOL AREA SHALL BE USED IN CLAY CORE AREA. ALL OTHER EXCESS TOPSOIL FROM POOL AREA SHALL BE STOCKPILED DURING CLAY CORE CONSTRUCTION, USED IN BERM CONSTRUCTION OUTSIDE OF CLAY CORE, OR SPREAD IN DESIGNATED WASTE AREA.
4. CLAY MATERIAL EXCAVATED FROM THE SITE SHALL BE USED IN CLAY CORE CONSTRUCTION. IT IS ANTICIPATED THAT ADDITIONAL MATERIAL WILL NEED TO BE HAULED IN FROM AN OFFSITE SOURCE. ANY EXCESS MATERIAL SHALL BE USED IN CONSTRUCTION OF BERM OUTSIDE OF CLAY CORE. FILL USED FOR CLAY CORE AND BERM CONSTRUCTION IS INCLUDED AS EARTHFILL (SPEC SECT IA-23).
5. SPREAD 6" OF TOPSOIL IN PRIMARY CLAY BORROW AREA AND BERM AREA AFTER CONSTRUCTION ACCORDING TO SPEC SECT IA-26.
6. STRIP AND SALVAGE 6" OF TOPSOIL FROM BORROW AREAS WHETHER ONSITE OR OFFSITE. AFTER BORROW OPERATIONS ARE COMPLETED SPREAD TOPSOIL UNIFORMLY OVER THE BORROW AREA (INCLUDING AREAS BELOW THE WETLAND CREST IF ONSITE).
7. STRIPPED AND REMOVED UNSUITABLE MATERIALS, IF ANY, ARE TO BE DISPOSED OF IN THE PRIMARY WASTE AREA AFTER COMPLETION OF GRADING OPERATIONS AND PRIOR TO TOPSOIL PLACEMENT. VERIFY LOCATION WITH LAND OWNER.
8. IN TOPSOIL WASTE AREAS, FEATHER TOPSOIL INTO SLOPE SO THAT OVERLAND FLOW IS NOT IMPEDED.
9. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS, CODES, AND OSHA STANDARDS.
10. CONTRACTOR SHALL CONTACT IOWA ONE CALL @ 1-800-292-8989 FOR LOCATION OF ALL UTILITIES AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION AS REQUIRED BY STATE LAW.

DESIGN CRITERIA	VALUE	UNIT
WATERSHED AREA	916	ACRES
POOL NORMAL WATER LEVEL (NWL) ELEV	1051.0	FT
DESIGNED WETLAND POOL AREA (@ NWL)	8.8	ACRES
PERCENT POOL AREA TO WATERSHED AREA	0.96	%
MAXIMUM NORMAL POOL DEPTH	9.5	FT
AVERAGE POOL DEPTH	2.1	FT
DEEP WATER AREA (DEPTH>3 FT)	2.0	ACRES
PERCENT AREA DEEP WATER TO POOL AREA	22.7	%
POOL STORAGE VOLUME AT NWL	18.1	ACRE-FT
BERM ELEVATION	1055.5	FT
MAXIMUM BERM HEIGHT	11	FT
AVERAGE BERM HEIGHT	5.2	FT
BERM LENGTH	1540	FT
PRIMARY WEIR ELEVATION	1051.0	FT
PRIMARY WEIR WIDTH	46	FT
WETLAND STORAGE TO TOP OF BERM	65.58	AC-FT
AUXILIARY SPILLWAY ELEVATION	NA	FT
AUXILIARY SPILLWAY WIDTH	NA	FT
AREA OF BUFFER	19.3	ACRES
RATIO BUFFER AREA TO NWL POOL AREA	2.2	
25-YEAR STORM HWL IN POOL	1053.47	FT
25-YEAR PEAK INFLOW	776	CFS
100-YEAR STORM HWL IN POOL	1054.14	FT
100-YEAR PEAK INFLOW	1148.99	CFS

NOTE:  
NO PRIMARY CLAY BORROW AREA FOR THE CLAY CORE CONSTRUCTION IS ANTICIPATED ON THE SITE, SUITABLE CLAY MATERIAL WILL NEED TO BE IMPORTED FROM AN OUTSIDE SOURCE SECURED BY THE CONTRACTOR



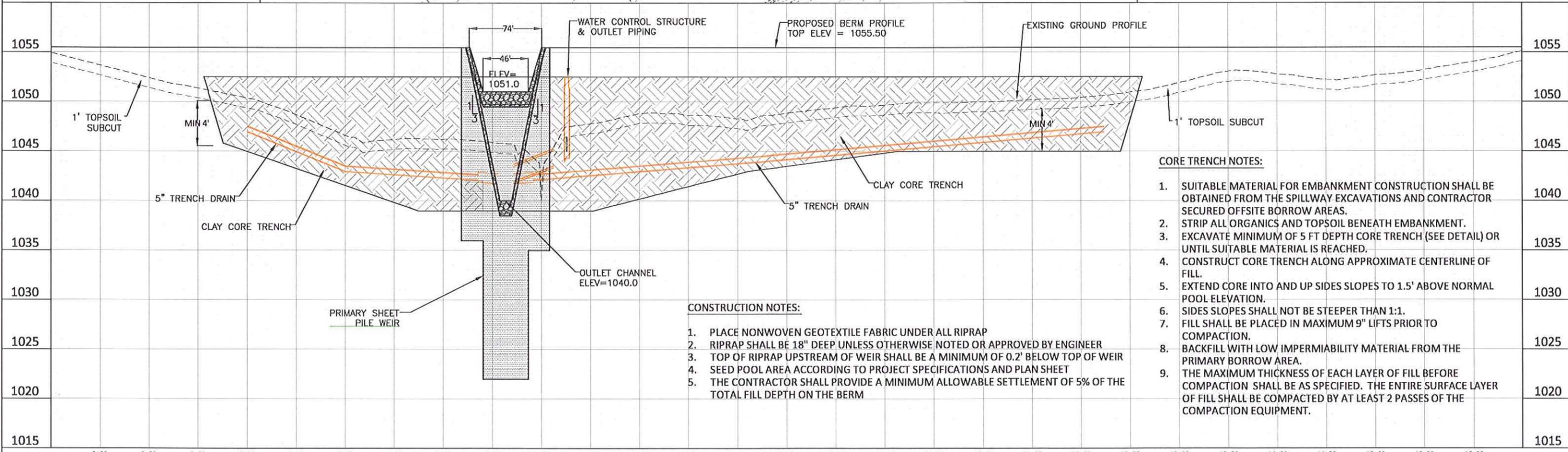
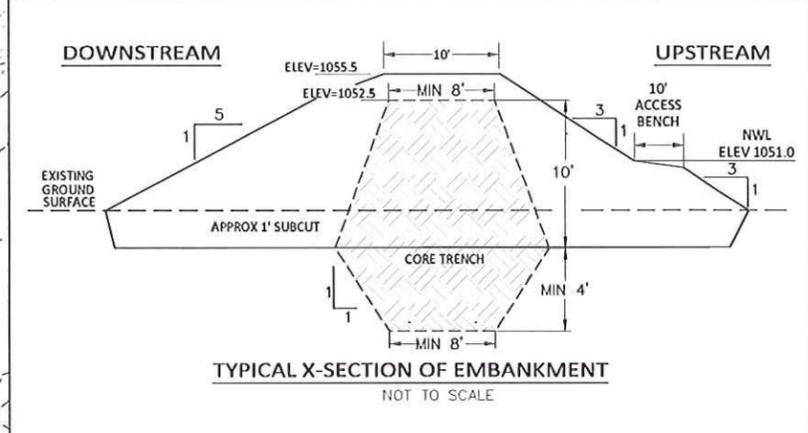
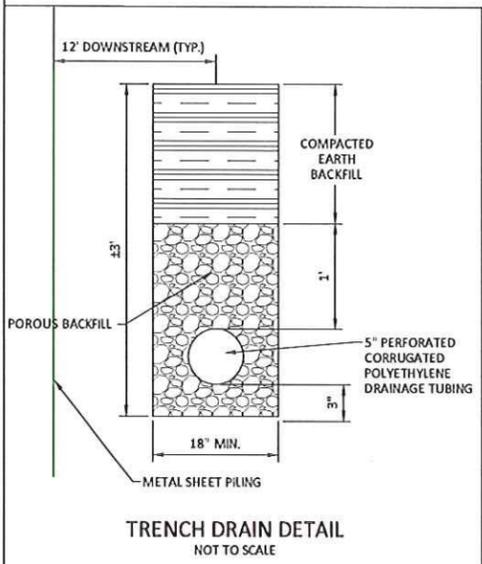
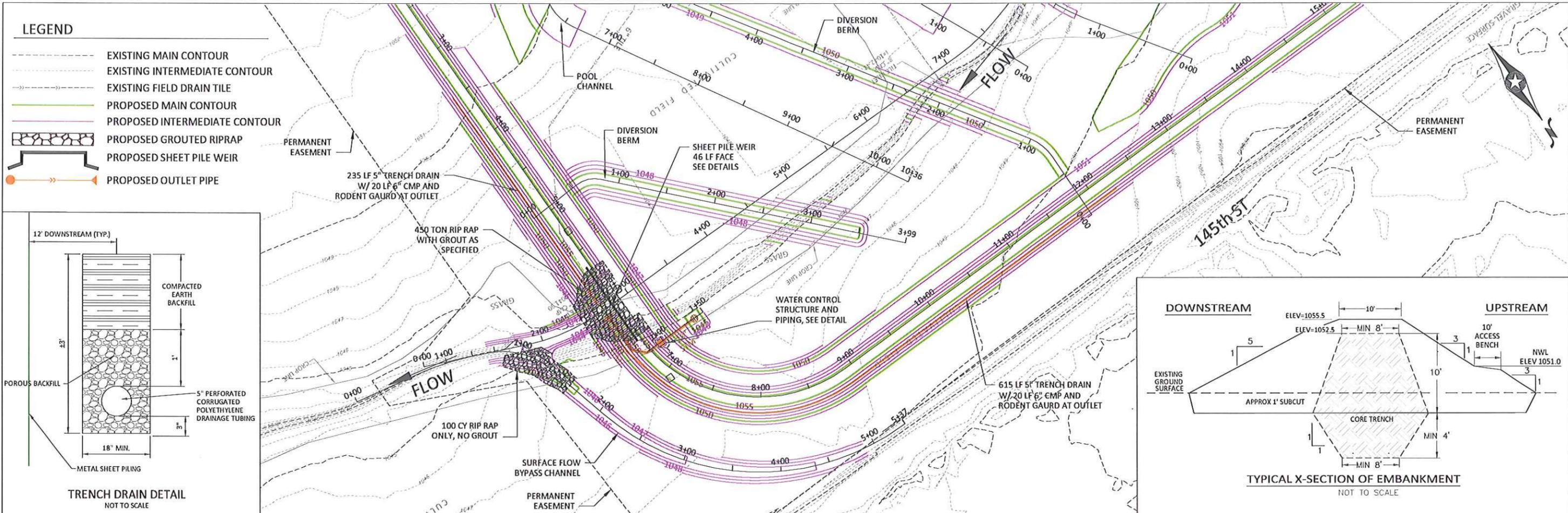
BORROW MATERIAL FROM THE SITE TO BE TAKEN IN A MANNER THAT WILL INCREASE THE NORMAL POOL AREA TO THE FULLEST EXTENT PRACTICAL



DESIGNED: JPR  
 CHECKED: JDL  
**BOLTON & MENK, INC.**  
 Consulting Engineers & Surveyors  
 MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN BURNSVILLE, MN WILLMAR, MN  
 CHASKA, MN RAMSEY, MN MAPLEWOOD, MN BAXTER, MN ROCHESTER, MN  
 AMES, IA SPENCER, IA DES MOINES, IA FARGO, ND

REV	BY	DATE
0	JDL	5/21/14
1	JDL	1/8/15

IOWA DEPARTMENT OF AGRICULTURE  
 HARDIN CREP PROJECT NO. HAR892029C  
 PROPOSED SITE CONDITIONS

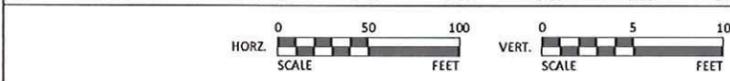


**CONSTRUCTION NOTES:**

1. PLACE NONWOVEN GEOTEXTILE FABRIC UNDER ALL RIPRAP
2. RIPRAP SHALL BE 18" DEEP UNLESS OTHERWISE NOTED OR APPROVED BY ENGINEER
3. TOP OF RIPRAP UPSTREAM OF WEIR SHALL BE A MINIMUM OF 0.2' BELOW TOP OF WEIR
4. SEED POOL AREA ACCORDING TO PROJECT SPECIFICATIONS AND PLAN SHEET
5. THE CONTRACTOR SHALL PROVIDE A MINIMUM ALLOWABLE SETTLEMENT OF 5% OF THE TOTAL FILL DEPTH ON THE BERM

**CORE TRENCH NOTES:**

1. SUITABLE MATERIAL FOR EMBANKMENT CONSTRUCTION SHALL BE OBTAINED FROM THE SPILLWAY EXCAVATIONS AND CONTRACTOR SECURED OFFSITE BORROW AREAS.
2. STRIP ALL ORGANICS AND TOPSOIL BENEATH EMBANKMENT.
3. EXCAVATE MINIMUM OF 5 FT DEPTH CORE TRENCH (SEE DETAIL) OR UNTIL SUITABLE MATERIAL IS REACHED.
4. CONSTRUCT CORE TRENCH ALONG APPROXIMATE CENTERLINE OF FILL.
5. EXTEND CORE INTO AND UP SIDES SLOPES TO 1.5' ABOVE NORMAL POOL ELEVATION.
6. SIDES SLOPES SHALL NOT BE STEEPER THAN 1:1.
7. FILL SHALL BE PLACED IN MAXIMUM 9" LIFTS PRIOR TO COMPACTION.
8. BACKFILL WITH LOW IMPERMIABILITY MATERIAL FROM THE PRIMARY BORROW AREA.
9. THE MAXIMUM THICKNESS OF EACH LAYER OF FILL BEFORE COMPACTION SHALL BE AS SPECIFIED. THE ENTIRE SURFACE LAYER OF FILL SHALL BE COMPACTED BY AT LEAST 2 PASSES OF THE COMPACTION EQUIPMENT.



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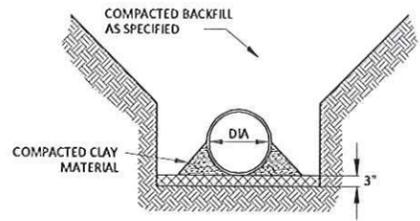
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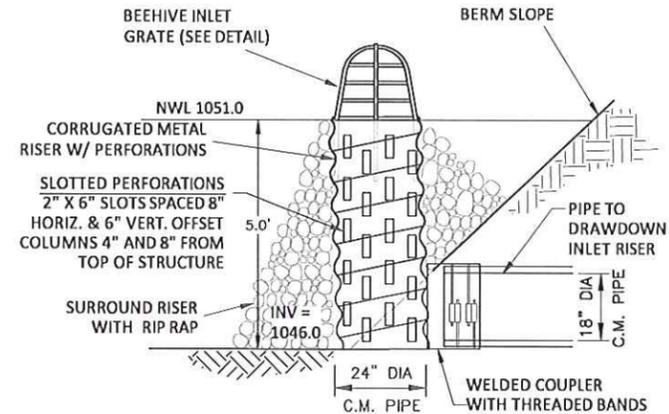
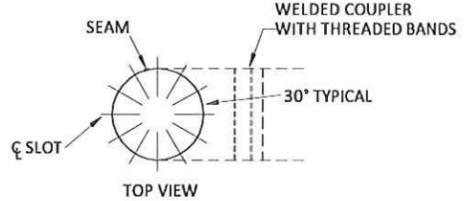
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 HARDIN CREP PROJECT NO. HAR892029C  
**BERM PROFILE**

SHEET  
**4.0**

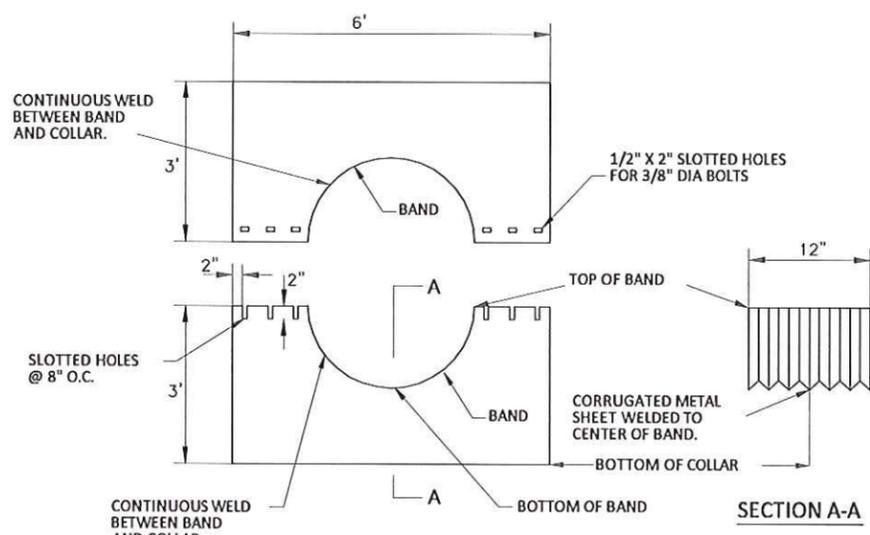
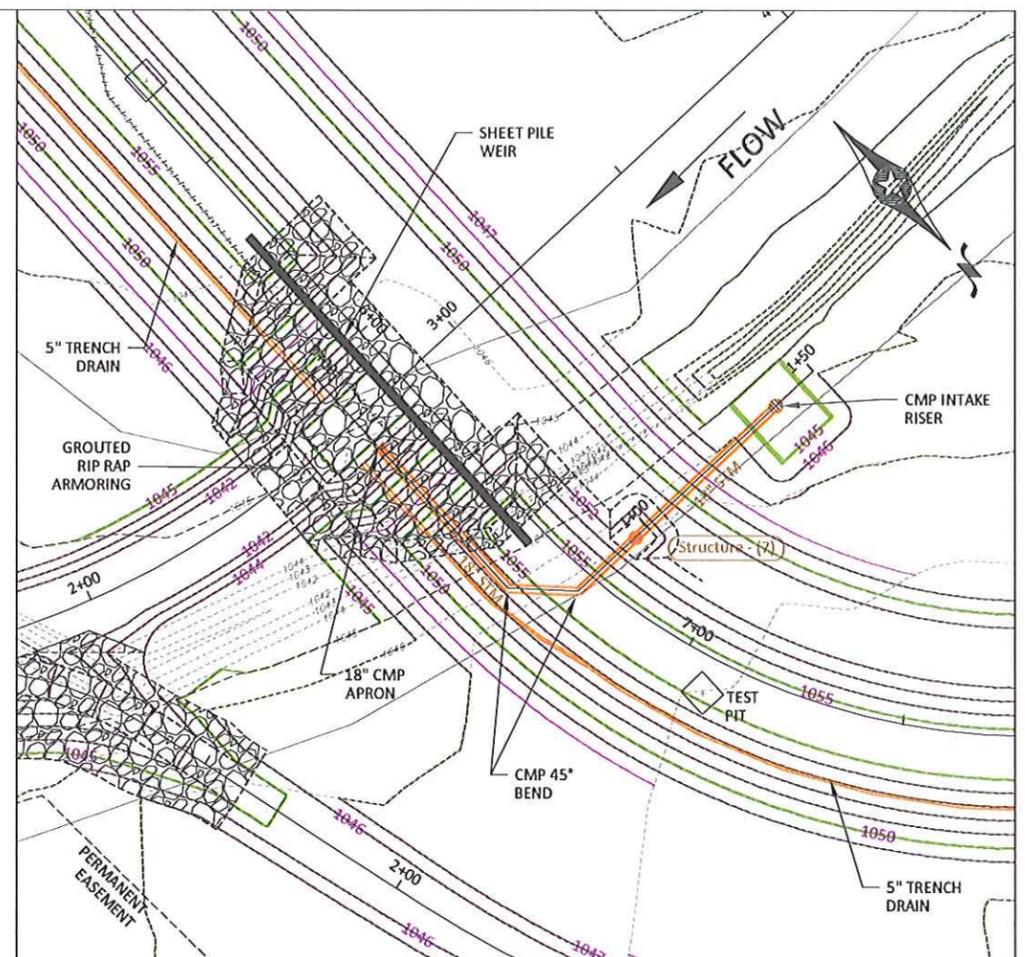


- NOTES:
- BEGIN BACKFILL IMMEDIATELY AFTER PIPE HAS BEEN PLACED
  - EXCAVATE 3" BELOW PIPE GRADE. THEN BACKFILL WITH DAMP FRIABLE SOIL FREE FROM LUMPS AND RAKED OR GRADED TO A TRUE PLANE BEFORE PLACING CMP. NO COMPACTION OF BEDDING IS REQUIRED.
  - USE COMPACTED CLAY MATERIAL FOR PIPE BEDDING UPSTREAM OF PIPE DIAPHRAGM.
  - PIPE BEDDING MATERIAL SHALL BE HAND TAMPED ONLY. POWER TAMPING IS NOT ALLOWED.

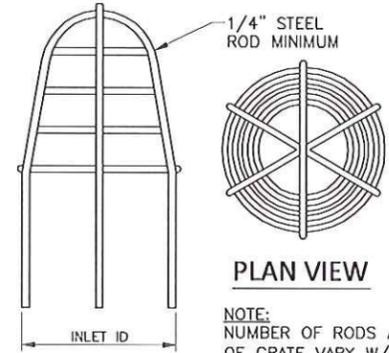
**CMP PIPE BEDDING FOR WATER CONTROL STRUCTURE**  
NOT TO SCALE



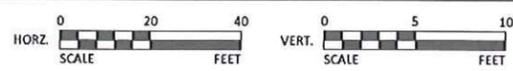
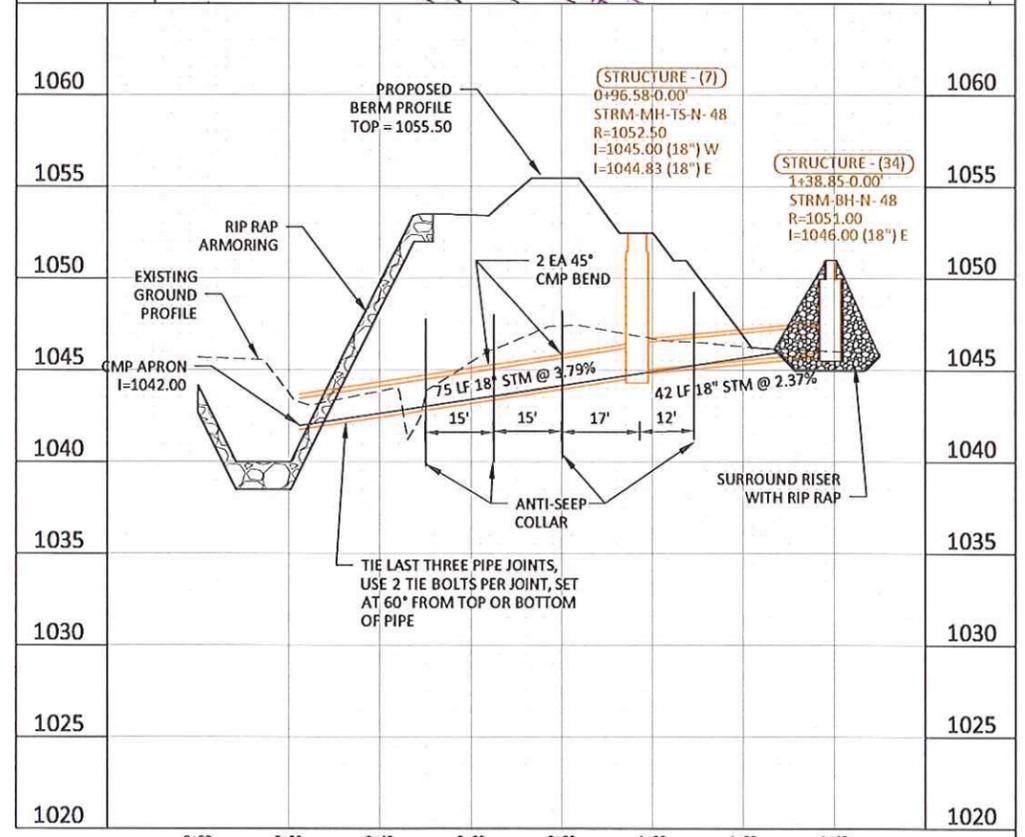
**CMP SLOTTED INTAKE RISER**  
NOT TO SCALE



**CMP ANTI-SEEP COLLAR**  
NOT TO SCALE  
(SOURCE: SUDAS 9040.17)



**BEEHIVE INLET GRATE (STEEL BARS)**  
NOT TO SCALE



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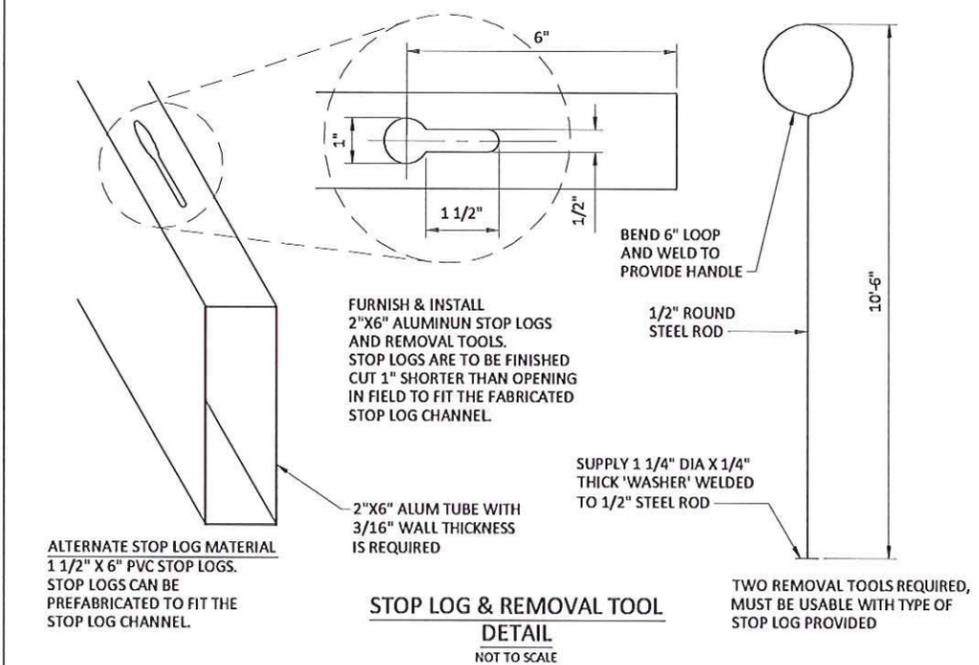
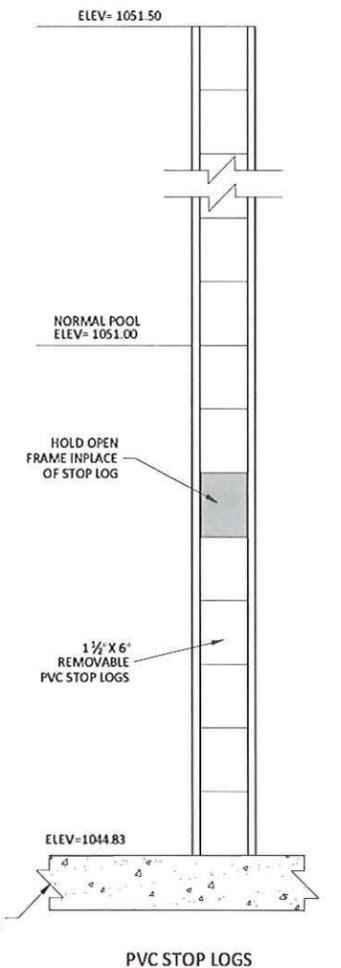
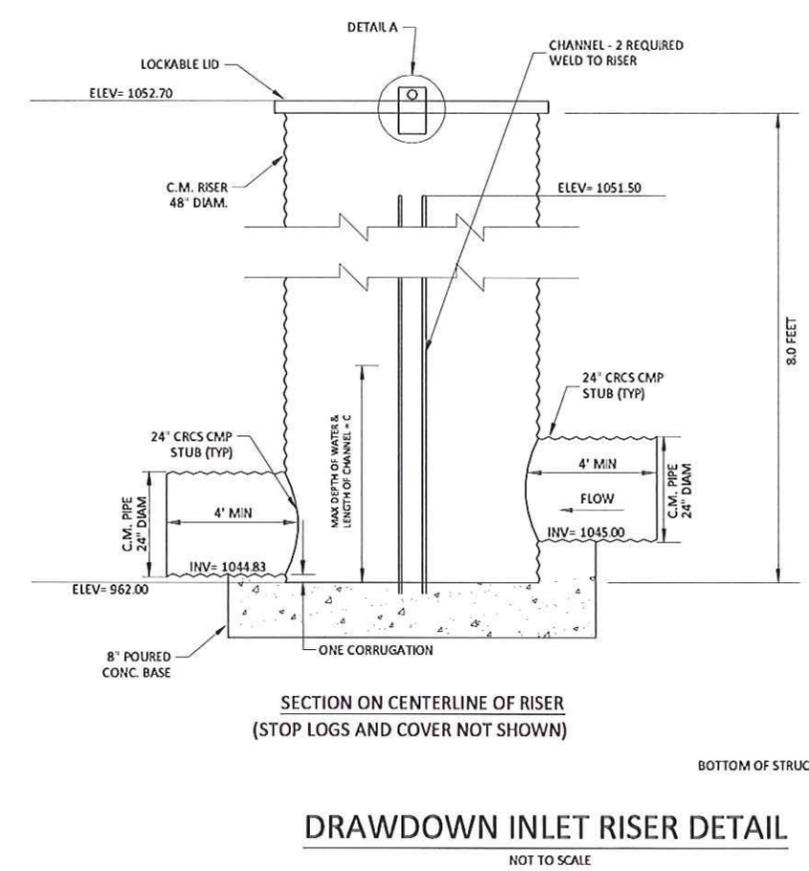
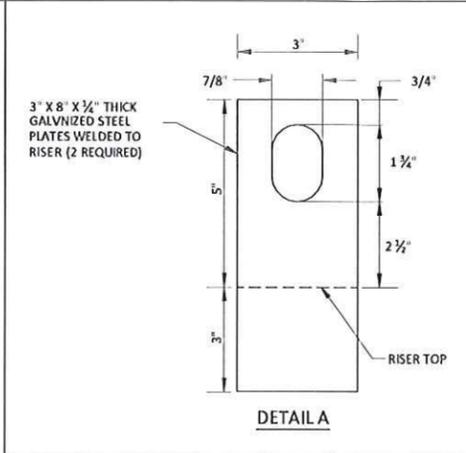
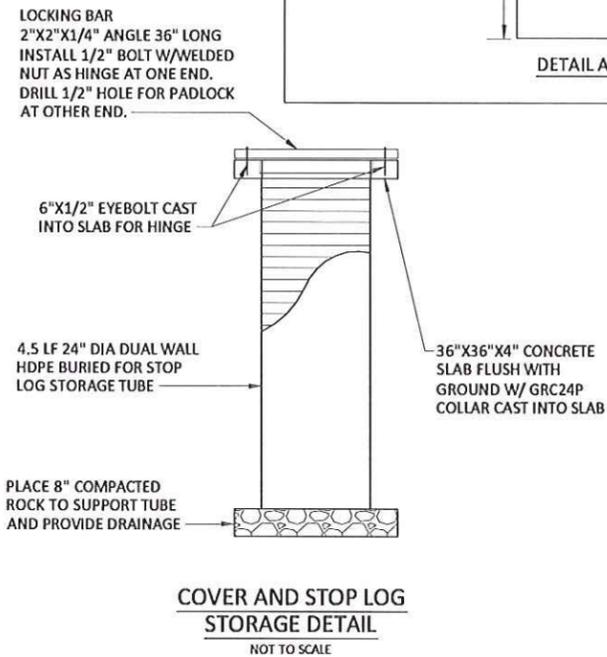
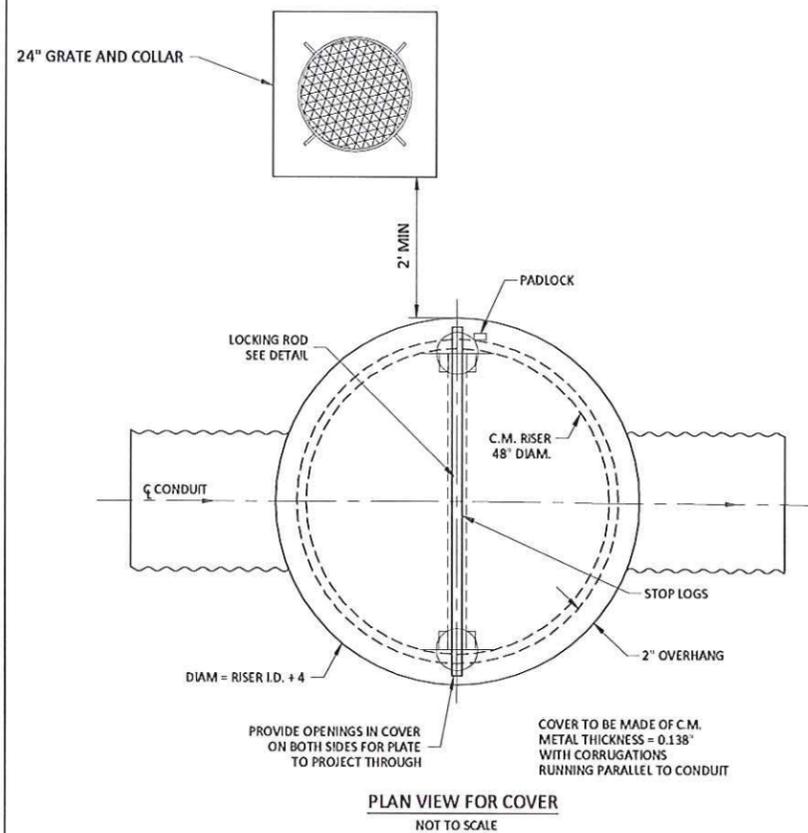
DESIGNED: JPR  
DRAWN: JPR  
CHECKED: JDL

**BOLTON & MENK, INC.**  
Consulting Engineers & Surveyors  
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CHASKA, MN RAMSEY, MN MAPLEWOOD, MN BAXTER, MN ROCHESTER, MN  
AMES, IA SPENCER, IA DES MOINES, IA FARGO, ND

REV.	BY	DATE
0	JDL	5/13/14
1	JDL	1/7/15

IOWA DEPARTMENT OF AGRICULTURE  
HARDIN CREP PROJECT NO. HAR892029C  
WATER CONTROL STRUCTURE AND OUTLET PIPE

SHEET 5.0



- COVER/STOP LOG STORAGE NOTES:**
- BOTH PADLOCKS FOR ACCESS COVER AND STOP LOG STORAGE TUBE SHALL BE KEYPED ALIKE. FOUR KEYS ARE TO BE SUPPLIED UPON PROJECT COMPLETION.
  - PROVIDE 24" GRATE AND COLLAR (AGRI DRAIN GR24 GRATE AND GRC24 COLLAR OR APPROVED EQUAL) FOR STOP LOG STORAGE.
  - STOP LOGS ARE TO BE PLACED AFTER SEEDING IS COMPLETE TO AN ELEVATION 1.5 FEET BELOW NORMAL POOL ELEVATION.
  - STOP LOGS NOT USED ARE TO BE PLACED IN THE STOP LOG STORAGE UNIT.

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

- WATER CONTROL STRUCTURE NOTES:**
- STRUCTURE SHOP DRAWINGS ARE REQUIRED FOR ENGINEER'S REVIEW AND APPROVAL BEFORE FABRICATION OF WATER CONTROL STRUCTURE.
  - STOP LOG CHANNEL IS TO BE ANCHORED TO THE WALLS AND FLOOR PRIOR TO PLACING CONCRETE INVERT.
  - 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.
  - ALL SECTIONS OF THE STRUCTURE ARE TO HAVE MASTIC APPLIED TO THE JOINTS.
  - PLACE BASE OF STRUCTURE ON FIRM UNDISTURBED EARTH FOUNDATION APPROVED BY ENGINEER.
  - MANHOLE STEPS ARE TO BE INSTALLED FOR MAINTENANCE ACCESS TO THE STOP LOGS.

NOTE: DETAILS ARE NOT TO SCALE

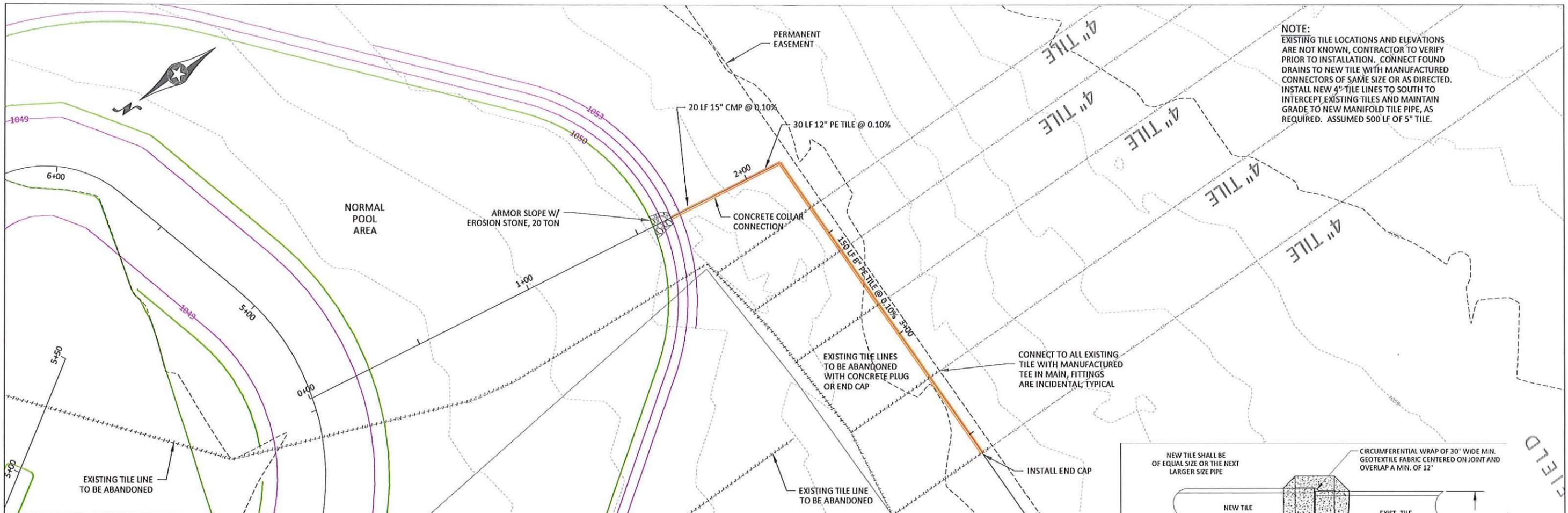
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REV	BY	DATE
0	JDK	8/23/14
1	JDK	11/4/14
2	JDK	1/2/15

IOWA DEPARTMENT OF AGRICULTURE  
HARDIN CREP PROJECT NO. HAR892029C  
WATER CONTROL STRUCTURE DETAILS

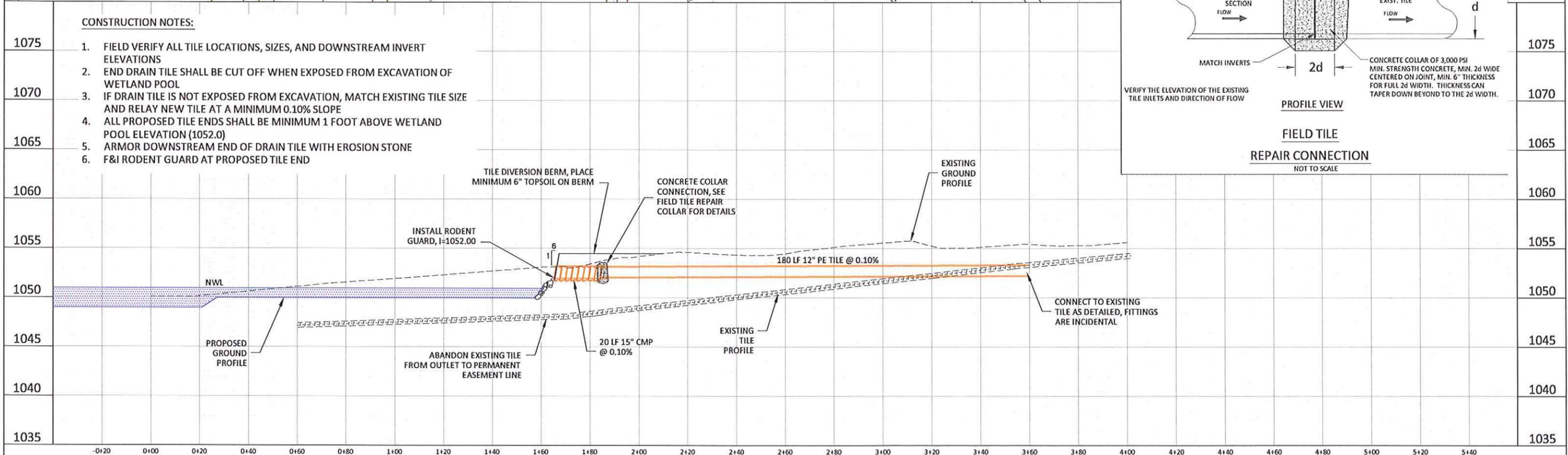
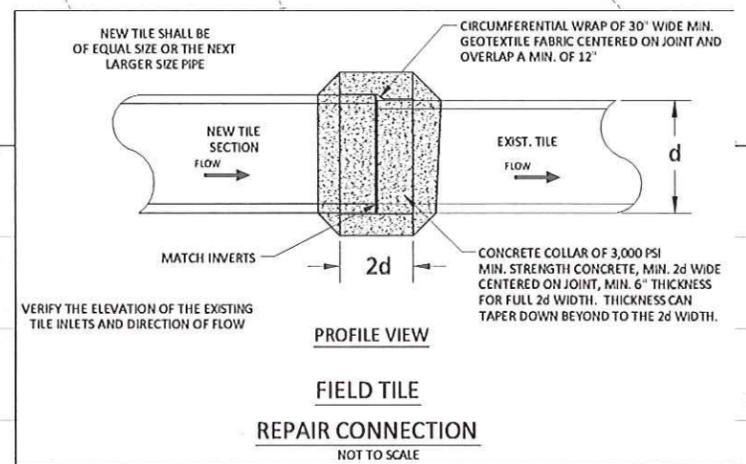




**NOTE:**  
 EXISTING TILE LOCATIONS AND ELEVATIONS ARE NOT KNOWN, CONTRACTOR TO VERIFY PRIOR TO INSTALLATION. CONNECT FOUND DRAINS TO NEW TILE WITH MANUFACTURED CONNECTORS OF SAME SIZE OR AS DIRECTED. INSTALL NEW 4" TILE LINES TO SOUTH TO INTERCEPT EXISTING TILES AND MAINTAIN GRADE TO NEW MANIFOLD TILE PIPE, AS REQUIRED. ASSUMED 500 LF OF 5" TILE.

**CONSTRUCTION NOTES:**

1. FIELD VERIFY ALL TILE LOCATIONS, SIZES, AND DOWNSTREAM INVERT ELEVATIONS
2. END DRAIN TILE SHALL BE CUT OFF WHEN EXPOSED FROM EXCAVATION OF WETLAND POOL
3. IF DRAIN TILE IS NOT EXPOSED FROM EXCAVATION, MATCH EXISTING TILE SIZE AND RELAY NEW TILE AT A MINIMUM 0.10% SLOPE
4. ALL PROPOSED TILE ENDS SHALL BE MINIMUM 1 FOOT ABOVE WETLAND POOL ELEVATION (1052.0)
5. ARMOR DOWNSTREAM END OF DRAIN TILE WITH EROSION STONE
6. F&I RODENT GUARD AT PROPOSED TILE END



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REV	BY	DATE
0	JDL	9/3/14
1	JDL	1/7/15

IOWA DEPARTMENT OF AGRICULTURE  
 HARDIN CREP PROJECT NO. HAR892029C  
**DRAIN TILE DETAIL**  
 CONNECTION #2

SHEET  
**6.1**