

CONSTRUCTION PLANS FOR CREP PROJ. NO. ST0852311A

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

STORY COUNTY, IA

OCTOBER, 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.

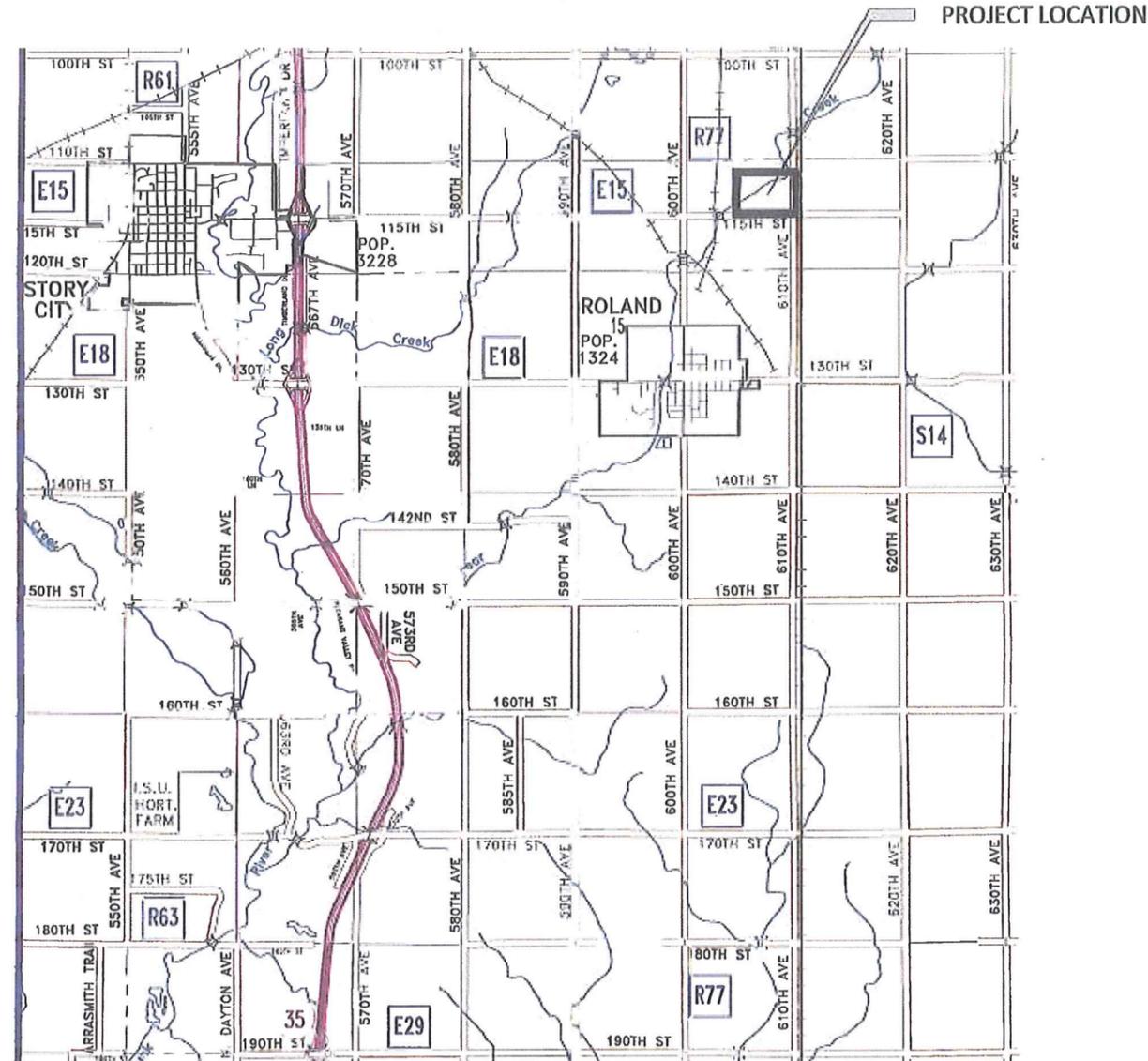
ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.

PLAN REVISIONS		
DATE	SHEET NUMBER	APPROVED BY
10/30/14	ALL SHEETS - BID	JDL
2/2/15	ALL SHEETS - REV #1	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
STORY 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	WETLAND CENTERLINE DETAILS
10.0	SPECIAL 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: 11/10/14

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

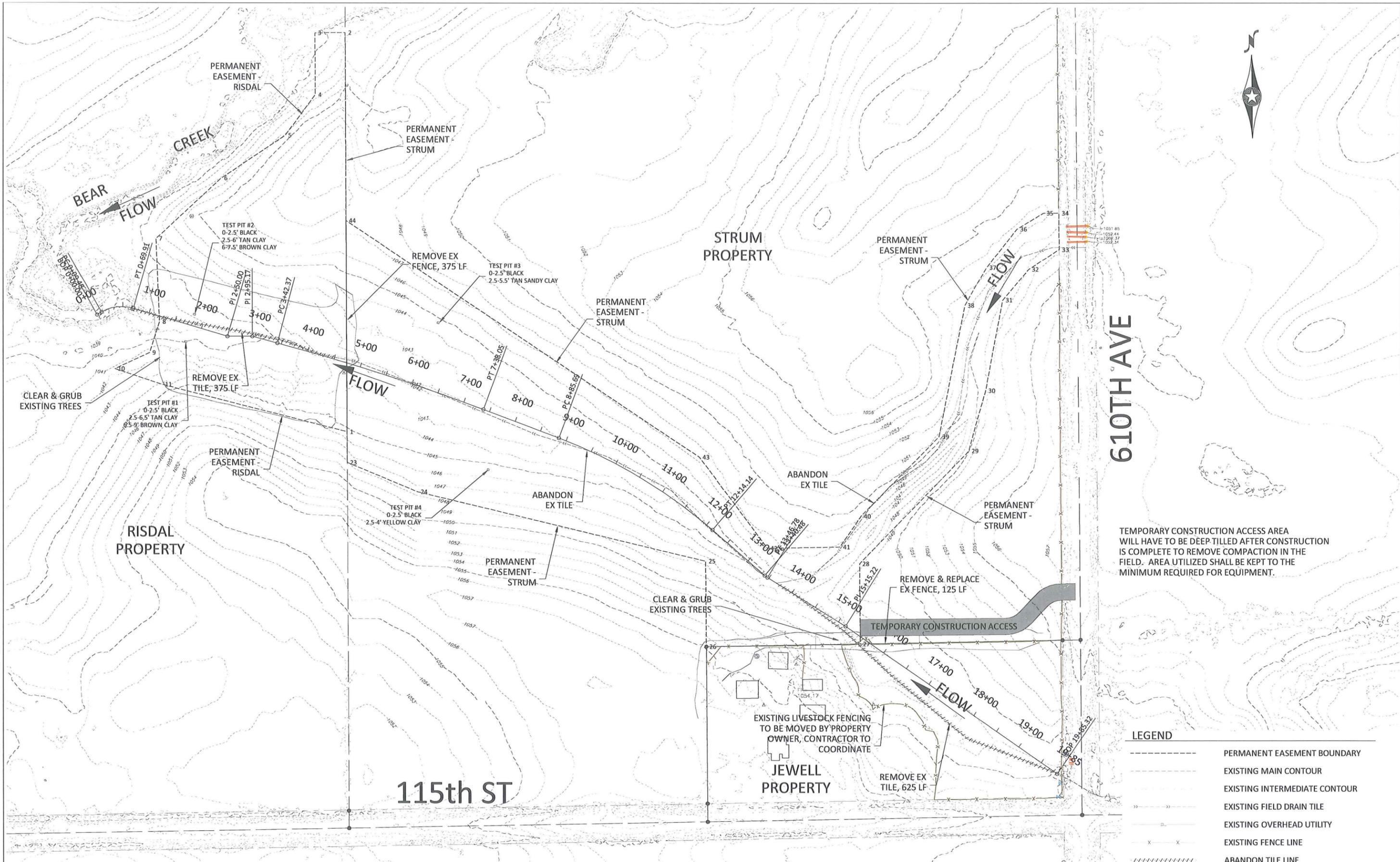
RECORD DRAWING INFORMATION	IOWA DEPARTMENT OF AGRICULTURE	SHEET
OBSERVER:	STORY CREP PROJECT NO. ST0852311A	1.0
CONTRACTOR:	TITLESHEET	
DATE:		

ESTIMATED PROJECT QUANTITIES					
ITEM NO.	WORK OR MATERIAL	SPEC. NO	UNIT	ESTIMATED QUANTITY	AS-BUILT QUANTITY
1	STRUCTURE & CHANNEL SEEDING	IA-6	AC	1.0	
2	STRUCTURE & CHANNEL SEEDING WITH EROSION CONTROL	IA-6	AC	1.5	
3	BUFFER SEEDING	IA-6	AC	5.0	
4	MOBILIZATION & DEMOBILIZATION	IA-8	LS	1	
5	CLEARING AND GRUBBING	IA-1	LS	1	
6	STEEL SHEET PILE	IA-13	SF	1,028	
7	TILE INVESTIGATION & REMOVAL	IA-21	LS	1	
8	EXCAVATION, CHANNEL	IA-21	CY	250	
9	EXCAVATION, CORE TRENCH	IA-21	CY	650	
10	EARTHFILL, CLAY CORE	IA-23	CY	2,100	
11	EARTHFILL, BERM CONSTRUCTION	IA-23	CY	2,620	
12	EARTHFILL, POOL CONSTRUCTION	IA-23	CY	7,130	
13	EARTHFILL, OFFSITE GRADING	IA-23	CY	700	
14	TOPSOIL STRIP, SALVAGE & RESPREAD	IA-26	CY	8,750	
15	CORRUGATED POLY. TUBING, 5"	IA-46	LF	245	
16	CORRUGATED POLY. TUBING, 18"	IA-46	LF	294	
17	CORRUGATED POLY. TUBING, 24"	IA-46	LF	582	
18	CORRUGATED METAL PIPE, 6" DIA.	IA-51	LF	40	
19	CORRUGATED METAL PIPE, 18" DIA.	IA-51	LF	80	
20	CORRUGATED METAL PIPE, 24" DIA.	IA-51	LF	20	
21	CORRUGATED METAL PIPE, 30" DIA.	IA-51	LF	20	
22	CMP BEND, 18" DIA., 45 DEGREE	IA-51	EA	2	
23	WATER CONTROL STRUCTURE	IA-51	LS	1	
24	RIP RAP, CLASS E W/ GEOTEXTILE	IA-52	TONS	500	
25	PCC GROUT	IA-62	CY	85	
26	REMOVE FENCE		LF	375	
27	REMOVE, RELOCATE & REPLACE FENCE		LF	125	
28	CONSTRUCT FIELD ENTRANCE		LS	1	
29	CONSTRUCT LOW WATER CROSSING		LS	1	

ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
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. Locations for removal and abandonment are shown on Sheet 2.0.
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 weir control structure.
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.
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. This material to come from the clay borrow - deep pool area.
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. This material to come from the clay borrow - deep pool area until the approximate dimensions on the plans have been achieved, then 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 or wasted at the designated locations.
13	EARTHFILL, OFFSITE GRADING This is the quantity to construct the overland flow swale and earth berm over drain tile outlet #1 on the Jewell property in the south east area of the site.
14	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. This item is to utilize the existing seed bed as topsoil for disturbed areas.
15	CORRUGATED POLY. TUBING, 5" This quantity includes 245 LF for the two trench drains on the downstream side of the berm structure.
16	CORRUGATED POLY. TUBING, 18" This item is for the relocation of Drain Tile #2.
17	CORRUGATED POLY. TUBING, 24" This item is for the relocation of Drain Tile #1.
18	CORRUGATED METAL PIPE, 6" DIA. This is for 20 LF of CMP pipe at each of the trench drain outlets and includes the installation of the rodent guard.
19	CORRUGATED METAL PIPE, 18" DIA. The item includes the costs for installation, bedding and backfilling of the CMP outlet pipe. Length is based from center of structure to center of structure and through bends.
20	CORRUGATED METAL PIPE, 24" DIA. This is for 20 LF of CMP pipe at the drain tile outlet and includes the installation of the rodent guard.
21	CORRUGATED METAL PIPE, 30" DIA. This is for 20 LF of CMP pipe at the drain tile outlet and includes the installation of the rodent guard.
22	CMP BEND, 18" DIA., 45 DEGREE The item includes the costs for fabrication and installation of an 18" CMP bend.
23	WATER CONTROL STRUCTURE This item includes the main CMP control structure, lid, locking mechanism, pvc or aluminum stop logs, steps, concrete for base, 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 18" CMP pipe shall be paid for separately.
24	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 at the existing outlet control structure. The plan calls for 25 Tons of erosion stone material at the two drain tile outlets, this is different material, but shall be considered rip rap for payment. However, geotextile fabric will not be required at the two tile outlets.
25	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. Grout shall be placed through the low water crossing below the 6" of Macadam base.
26	REMOVE FENCE This item is for the removal of existing fence line located on the common property line between the Risdal and Strum properties.
27	REMOVE, RELOCATE & REPLACE FENCE This item is for the removal of the fence line located on the common property line between the Strum and Jewell properties and then replacing the fence once tile and grading operations are complete. The removal and replacement of the existing livestock fencing on the Jewell property shall be completed by the property owner, the Contractor must coordinate with the property owner to keep livestock out of the work area. Salvaged materials from the fence removal shall be used for fence replacement to the fullest extent possible.
28	CONSTRUCT FIELD ENTRANCE This item is for the construction of a permanent field entrance at the location and as details indicate on the plans and as staked in the field by the Engineer. This entrance is for property owner access to the site and shall not be used for construction access during any part of the project. Payment shall include the cost of hauling excess material from the wetland construction to the proposed location, 6" of Class A Roadstone, grading, sloping and seeding.
29	CONSTRUCT LOW WATER CROSSING This item is for the construction of a permanent low water crossing (Missouri style crossing) at the location and as details indicate on the plans and as staked in the field by the Engineer. This crossing is for property owner access to the land north of the weir control structure. Payment shall include additional excavation, grading and sloping of the crossing and 6" of Macadam stone base on top of the grouted rip rap in the outlet swale.

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	STRUCTURE & CHANNEL SEEDING WITH EROSION CONTROL This seed is for the area in the SE corner of the site on the Jewell property. The entire area shall be seeded with structure and channel seeding and mulched. Erosion protection measures such as silt fence ditch checks shall be installed as per NRCS requirements for the constructed swale and other areas as needed to reduce and control erosion and sediment migration.
3	BUFFER SEEDING This seed is for all other areas above the normal pool elevation and are not part of the structure & channel seeding. No mulch on this area. The preparation for this area shall include the grading to a uniform surface of the area adjacent to 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 any area other than that described in Item #2 shall be considered incidental to this item. The use of the temporary construction access shall include deep tillage of the area once construction is complete and is 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. This includes the fence line trees between the Strum and Jewell property (0.14 Acres) and on the Risdal property between the east property line and the existing weir outlet structure (1.75 Acres).
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. The total quantity shown on sheet 7.1 is figured prior to trimming the sheet pile to match the slopes on the sides, the paid amount is the area after trimming to final elevations and slopes.





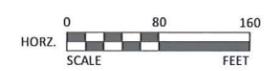
610TH AVE

115th ST

TEMPORARY CONSTRUCTION ACCESS AREA WILL HAVE TO BE DEEP TILLED AFTER CONSTRUCTION IS COMPLETE TO REMOVE COMPACTION IN THE FIELD. AREA UTILIZED SHALL BE KEPT TO THE MINIMUM REQUIRED FOR EQUIPMENT.

LEGEND

---	PERMANENT EASEMENT BOUNDARY
- - - -	EXISTING MAIN CONTOUR
- · - · -	EXISTING INTERMEDIATE CONTOUR
- - - - -	EXISTING FIELD DRAIN TILE
- · - · - ·	EXISTING OVERHEAD UTILITY
- x - x -	EXISTING FENCE LINE
- - - - -	ABANDON TILE LINE



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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
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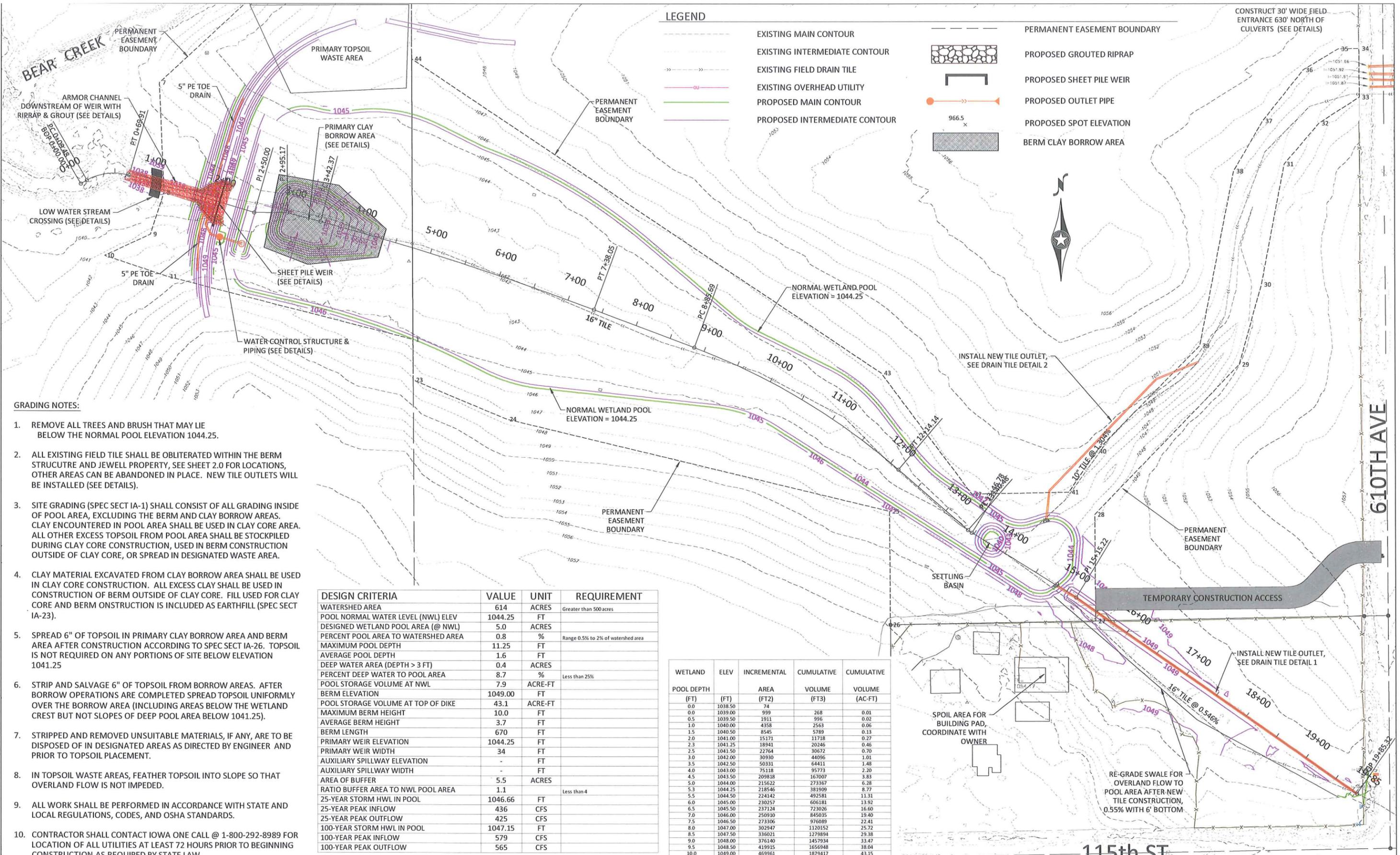
REV.	BY	DATE
0	JDL	10/31/14
1	JDL	2/2/15

IOWA DEPARTMENT OF AGRICULTURE
 STORY CREP PROJECT NO. ST0852311A
 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 GROUDED RIPRAP
- PROPOSED SHEET PILE WEIR
- PROPOSED OUTLET PIPE
- PROPOSED SPOT ELEVATION
- BERM CLAY BORROW AREA

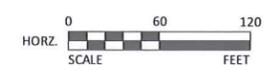


GRADING NOTES:

1. REMOVE ALL TREES AND BRUSH THAT MAY LIE BELOW THE NORMAL POOL ELEVATION 1044.25.
2. ALL EXISTING FIELD TILE SHALL BE OBLITERATED WITHIN THE BERM STRUCTURE AND JEWELL PROPERTY, SEE SHEET 2.0 FOR LOCATIONS, OTHER AREAS CAN BE ABANDONED IN PLACE. 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. FILL 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 CLAY BORROW AREA SHALL BE USED IN CLAY CORE CONSTRUCTION. ALL EXCESS CLAY SHALL BE USED IN CONSTRUCTION OF BERM OUTSIDE OF CLAY CORE. FILL USED FOR CLAY CORE AND BERM ONSTRUCTION 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. TOPSOIL IS NOT REQUIRED ON ANY PORTIONS OF SITE BELOW ELEVATION 1041.25
6. STRIP AND SALVAGE 6" OF TOPSOIL FROM BORROW AREAS. AFTER BORROW OPERATIONS ARE COMPLETED SPREAD TOPSOIL UNIFORMLY OVER THE BORROW AREA (INCLUDING AREAS BELOW THE WETLAND CREST BUT NOT SLOPES OF DEEP POOL AREA BELOW 1041.25).
7. STRIPPED AND REMOVED UNSUITABLE MATERIALS, IF ANY, ARE TO BE DISPOSED OF IN DESIGNATED AREAS AS DIRECTED BY ENGINEER AND PRIOR TO TOPSOIL PLACEMENT.
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	REQUIREMENT
WATERSHED AREA	614	ACRES	Greater than 500 acres
POOL NORMAL WATER LEVEL (NWL) ELEV	1044.25	FT	
DESIGNED WETLAND POOL AREA (@ NWL)	5.0	ACRES	
PERCENT POOL AREA TO WATERSHED AREA	0.8	%	Range 0.5% to 2% of watershed area
MAXIMUM POOL DEPTH	11.25	FT	
AVERAGE POOL DEPTH	1.6	FT	
DEEP WATER AREA (DEPTH > 3 FT)	0.4	ACRES	
PERCENT DEEP WATER TO POOL AREA	8.7	%	Less than 25%
POOL STORAGE VOLUME AT NWL	7.9	ACRE-FT	
BERM ELEVATION	1049.00	FT	
POOL STORAGE VOLUME AT TOP OF DIKE	43.1	ACRE-FT	
MAXIMUM BERM HEIGHT	10.0	FT	
AVERAGE BERM HEIGHT	3.7	FT	
BERM LENGTH	670	FT	
PRIMARY WEIR ELEVATION	1044.25	FT	
PRIMARY WEIR WIDTH	34	FT	
AUXILIARY SPILLWAY ELEVATION	-	FT	
AUXILIARY SPILLWAY WIDTH	-	FT	
AREA OF BUFFER	5.5	ACRES	
RATIO BUFFER AREA TO NWL POOL AREA	1.1		Less than 4
25-YEAR STORM HWL IN POOL	1046.66	FT	
25-YEAR PEAK INFLOW	436	CFS	
25-YEAR PEAK OUTFLOW	425	CFS	
100-YEAR STORM HWL IN POOL	1047.15	FT	
100-YEAR PEAK INFLOW	579	CFS	
100-YEAR PEAK OUTFLOW	565	CFS	

WETLAND POOL DEPTH (FT)	ELEV (FT)	INCREMENTAL AREA (FT ²)	CUMULATIVE VOLUME (FT ³)	CUMULATIVE VOLUME (AC-FT)
0.0	1038.50	74		
0.0	1039.00	999	268	0.01
0.5	1039.50	1911	996	0.02
1.0	1040.00	4358	2563	0.06
1.5	1040.50	8545	5789	0.13
2.0	1041.00	15171	11718	0.27
2.3	1041.25	18941	20246	0.46
2.5	1041.50	22764	30672	0.70
3.0	1042.00	30930	44096	1.01
3.5	1042.50	50331	64411	1.48
4.0	1043.00	75118	95773	2.20
4.5	1043.50	209818	167007	3.83
5.0	1044.00	215622	273367	6.28
5.3	1044.25	218546	381909	8.77
5.5	1044.50	224142	492581	11.31
6.0	1045.00	230257	606181	13.92
6.5	1045.50	237124	723026	16.60
7.0	1046.00	250910	845035	19.40
7.5	1046.50	273306	976089	22.41
8.0	1047.00	302947	1120152	25.72
8.5	1047.50	336021	1279894	29.38
9.0	1048.00	376140	1457934	33.47
9.5	1048.50	419915	1656948	38.04
10.0	1049.00	469961	1879417	43.15



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
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REV.	BY	DATE
0	JDL	10/3/24
1	JDL	2/2/25

IOWA DEPARTMENT OF AGRICULTURE
 STORY CREP PROJECT NO. ST0852311A
 PROPOSED SITE CONDITIONS

SHEET 3.0