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WOODBURY COUNTY BOARD OF SUPERVISORS AGENDA ITEM(S) REQ

Date: May 5, 2016

Weekly Agenda Date: May 10, 2016

ELECTED OFFICIAL / DEPARTMENT HEAD / CITIZEN: Mark J. Nahra, Woodbury County Engineer

WORDING FOR AGENDA ITEM: Receipt of drainage engineer's report on Wolf Creek Drainage District and consideration of action based on report

ACTION REQUIRED:

Approve Ordinance

Approve Resolution

Approve Motion

Give Direction

Other: Informational

Attachments

EXECUTIVE SUMMARY: In response to landowner complaints about Wolf Creek Drainage District outlet structures not performing properly, the Board of Supervisors engaged ISG to review the Wolf Creek and Weber Creek Drainage District facilities and prepare a report and preliminary plans for maintenance to address problems within the district. The drainage engineer had recommended work to do immediate cleanouts at five outlet pipes draining to the main ditch, which the Board approved in April 2016. This is the presentation of the report of the engineer for overall district maintenance.

BACKGROUND: The Board functions as the trustees of the Wolf Creek Drainage District.

FINANCIAL IMPACT: No direct impact to county budget. Costs are passed to drainage district for which the services are accrued.

IF THERE IS A CONTRACT INVOLVED IN THE AGENDA ITEM, HAS THE CONTRACT BEEN SUBMITTED AT LEAST ONE WEEK PRIOR AND ANSWERED WITH A REVIEW BY THE COUNTY ATTORNEY'S OFFICE?

Yes No

RECOMMENDATION: Recommend acceptance of the report. Recommend setting a public hearing with drainage district landowners to discuss the report and determine if work should proceed.

ACTION REQUIRED / PROPOSED MOTION: Motion to accept the report of the drainage engineer for the Wolf Creek Drainage District. Motion to schedule a hearing for presenting results of the report to Wolf Creek and Weber Creek Drainage District landowners.

Approved by Board of Supervisors April 5, 2016.

May 4, 2016

Woodbury County Board of Supervisors
Woodbury County Courthouse
620 Douglas St.
Sioux City, Iowa 51101

RE: Wolf Creek Drainage District Preliminary Report

SCOPE OF STUDY:

The Woodbury County Board of Supervisors, acting as trustees for the Wolf Creek Drainage District, directed I+S Group, Inc. (ISG) to perform a preliminary field survey of the existing channel conditions and determine the need for channel cleanout and evaluate the drainage structures for repair. The segment of open channel from the outlet of the Weber Drainage District to County Highway D-25, and the adjacent surface drainage structures are the focus of the proposed investigation. Based on discussions with the Woodbury County Engineer, District landowners have filed multiple complaints about the outlets of the drainage structures not draining properly due to sediment blocking the outlets. This letter report will summarize our findings and provide recommendations for repairs.

To complete our preliminary study, we discussed the history of the District with the Woodbury County Engineer's Office; we researched aerial photography, soils and topographical maps in combination with a preliminary field survey. No original profile or cross-sectional data was found in the District records. Our recommendations are based on best fit data determine from field survey of the existing facility.

DISTRICT HISTORY & DESCRIPTION:

The Wolf Creek Drainage District was established in 1908 and serves approximately 7,681 acres. The watershed of the District is located in Sections 1, 11, 14, 15, 21, 22, 23, 26, 27 & 35 of Willow Township, Section 36 of West Fork Township, and Sections 30 & 31 of Grant Township. This facility also serves as an outlet to the Weber Drainage District in Section 35 of Willow Township. The open channel of the District extends approximately nine (9) miles from the Woodbury-Monona County line north to County Highway D-54. The preliminary field survey shows the approximate dimensions of the channel at the current sediment grade line to be a twenty (20) foot bottom with 2:1 side slopes.

INVESTIGATION OF EXISTING CONDITIONS:

As noted above, no information regarding the original design dimensions of the open channel was found in the District records, therefore the best fit of the facility has been considered for our evaluation. The grade of the open channel was determined starting at the outlet elevation of Weber's Open Ditch and by using the existing outlet elevations of the surface drainage structures. A channel grade of 0.03% was determined from an assumed station (0+00) approximately 100 ft. downstream of the Weber Drainage District outlet upstream to Station 60+00. This would allow for the existing surface drainage structure at Station 51+66 to outlet at the flow line of the channel where currently there is approximately 3 feet of

sediment. From Station 60+00 upstream to Station 178+00 a grade of 0.06% was determined with the grade line daylighting approximately 200ft south of the D-25 Bridge.

From the survey it is apparent sediment deposition is occurring in the channel starting downstream of the grade change at Station 60+00 with the deepest accumulation being from Station 89+00 to 98+00. An inventory of the adjacent twelve (12) surface drain pipes within the described work limits of the project was also made during our field review. We observed sediment removal is necessary from the inlet and outlet of all the structures with ten (10) of these drains found to be in poor condition due to corrosion and/or damage. The replacement culverts are assumed to be of adequate size if they have a free flowing outlet. However, the outlet elevations are raised where practical to provide for more clearance from the proposed cleanout grade and the lengths adjusted to fix the existing channel conditions.

FINDINGS & REPAIR DISCUSSION:

Using the proposed cleanout grade line of the open channel the design dimensions was determined to be a fourteen (14) foot bottom width with approximate 2:1 side slopes. These dimensions will facilitate a cleanout of the channel without under mining the side slopes of the levees. A preliminary excavation quantity was computed based on five (5) typical cross sections at 57,094 cubic yards. The side slopes of the facility currently have vegetation growing on them which protects the slopes from erosion and helps maintain stability. Therefore, slope excavation should only be conducted where stability of the slope is a concern. In addition, approximately 1,180 linear feet of surface pipe will need to be replaced as part of this repair. For those culverts not replaced, we still recommend cleanout/shaping around the inlets and outlets of these surface pipes. Attached with this letter report are preliminary plans showing the proposed cleanout grade of the channel, and the location of the existing surface drains with cross sections of each showing the proposed pipe replacements. Again, it should be noted that capacities of the existing drainage structures are assumed to be adequate for the areas drained. Include as Appendix A, is the preliminary opinion of probable costs for the repair. The construction cost is estimated at \$304,370, with this cost assumed to be spread over the 7,681 acres for an average cost per acre of \$39.63.

RECOMMENDATIONS:

It is apparent, that there is an accumulation of sediment in the channel blocking the free flow of several of the existing surface outlet pipes. In addition, the condition of the several of these surface outlet pipes is poor with 10 out of 12 recommended for replacement. Therefore, a channel cleanout project with culvert replace will improve flow capacity of these surface pipes providing drainage relief to the lands served by this facility. However, it should be noted that during high flow events in the Main Open Ditch of Wolf Creek, back pressure on these surface pipes will still impede the drainage of the lands drained through these pipes.

Therefore, we recommend that an informational meeting be held with the landowners of the Wolf Creek Drainage District to consider this repair project. This meeting will cover topics which include the replacement of surface drain pipes, the open channel excavation, and opinion of project costs. If the project is supported by landowners of the District, a full investigation with engineer's report and public hearing will be necessary for the expected project cost exceeds \$50,000. Cross sections are recommended every 200 ft. in order to

establish the excavation quantity for bidding purposes and to verify the selected channel grade line. In addition to the cleanout of sediment from the bottom of the open channel, ten (10) of the adjacent twelve (12) surface drain pipe are recommended to be replaced with the outlets raised in elevation when possible. This will allow the structures to function with a free flowing outlet for a longer period of time.

Sincerely,



Brian W. Blomme, P.E.
Civil Engineering Group
I+S GROUP

enc: Appendix A - Estimates of Probable Costs
Preliminary Plan Set

c: Mark Nahra, P.E., Woodbury County Engineer

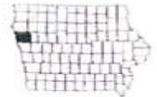
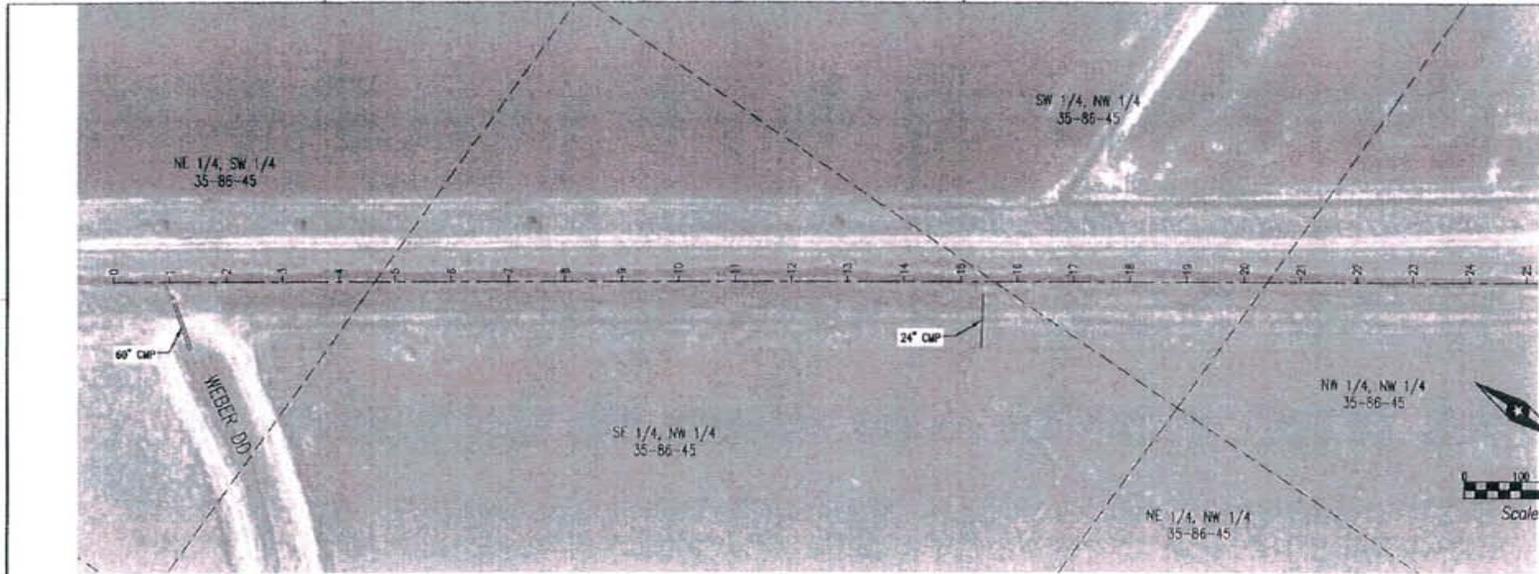
APPENDIX A
OPINION OF COSTS



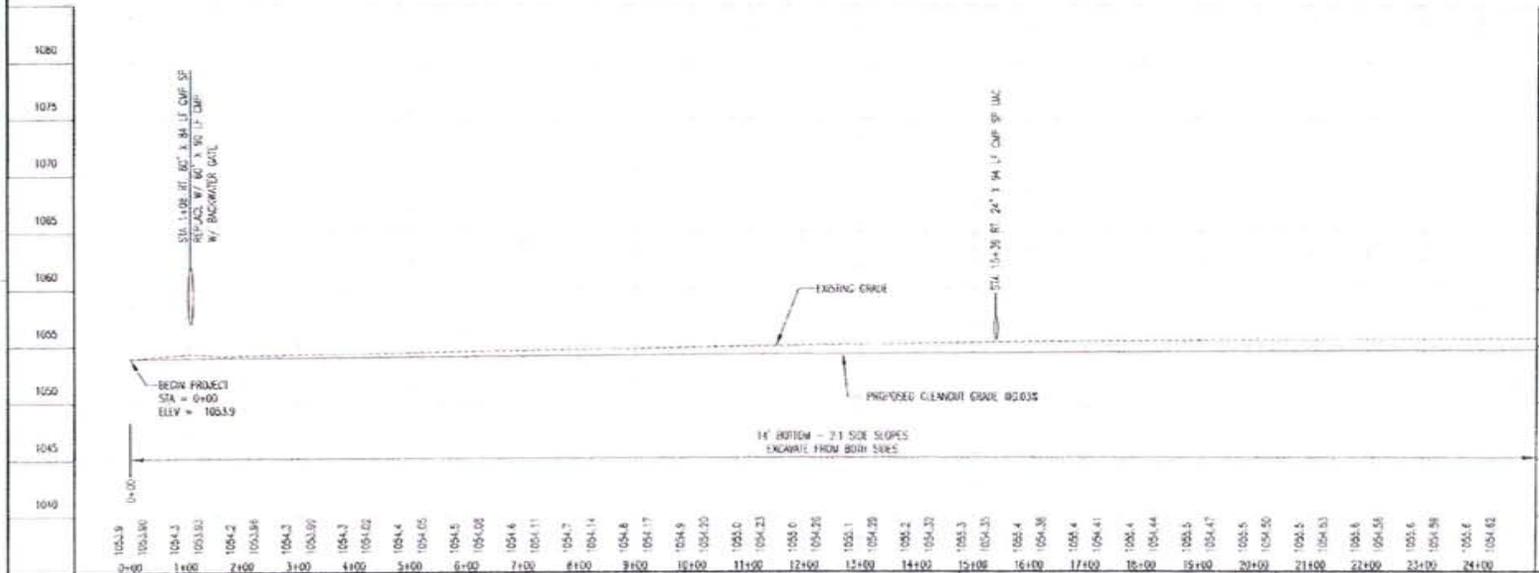
PROJECT NUMBER: 18896

ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1.	Mobilization	1.00	JOB	14,500.00	\$14,500.00
2.	Open Ditch Excavation	57,094	CY	2.80	\$159,870.00
3.	Spoil Bank Leveling (Two Sides)	178.00	STA	120.00	\$21,360.00
4.	Surface Pipe Bank Shaping Around Outlet/Inlet				
	a. STA. 15+39	1.0	EA	450.00	\$450.00
	b. STA. 179+32	1.0	EA	450.00	\$450.00
5.	Furnish & Install Corrugated Metal Surface Pipe				
	a. 24" Dia.	90.00	LF	36.00	\$3,240.00
	b. 30" Dia.	210.00	LF	47.00	\$9,870.00
	c. 36" Dia.	680.00	LF	55.00	\$37,400.00
	d. 42" Dia.	110.00	LF	63.00	\$6,930.00
	e. 60" Dia.	90.00	LF	96.00	\$8,640.00
6.	Furnish & Install Backwater Flap Gate				
	a. 30" Dia.	2.00	EA	1,620.00	\$3,240.00
	b. 36" Dia.	7.00	EA	2,100.00	\$14,700.00
	c. 42" Dia.	1.00	EA	3,000.00	\$3,000.00
	d. 60" Dia.	1.00	EA	6,400.00	\$6,400.00
7.	Furnish & Install Rip Rap @ STA 1+08 (Weber DD Outlet)	50	TON	55.00	\$2,750.00
8.	Open Ditch Fertilizing & Seeding	178.00	STA	65.00	\$11,570.00
CONSTRUCTION COST SUBTOTAL					\$304,370.00
Engineering Services:					
	Survey				\$8,500.00
	Engineer Administration & Design Services				\$24,350.00
	Research/Study/Engineering Report				\$12,180.00
	Final Plans & Specs				\$9,140.00
	Construction Admin/Staking/Observation				\$9,140.00
	Legal & Auditor Services, Publication, Misc.				\$3,000.00
	Damages				\$10,000.00
	Contingencies				\$36,500.00
IMPROVEMENT PROJECT COST SUBTOTAL					\$417,180.00
Other Potential District Costs:					
	Project Warrant Interest				\$30,750.00
TOTAL ESTIMATED PROJECT COST					\$447,930.00
Average Cost per Assessed Acre (7,681 acres)					\$58.32
Average Cost per Watershed Acre for 10 years					\$5.83

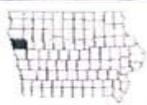
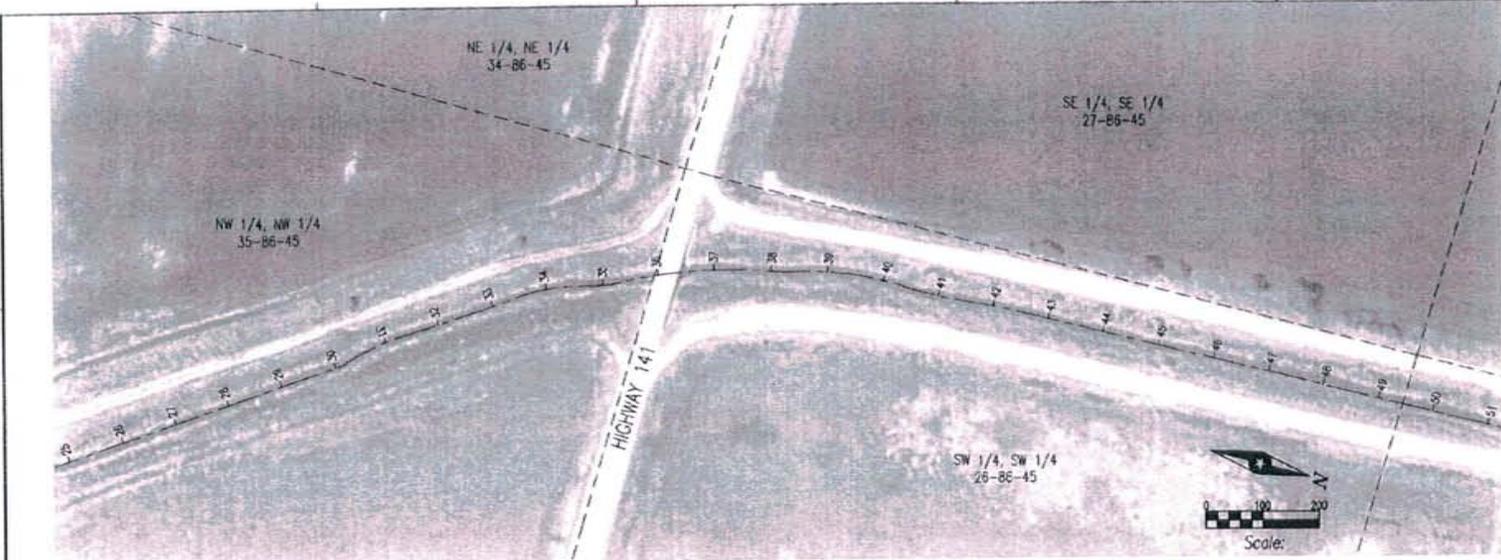
PRELIMINARY PLANS



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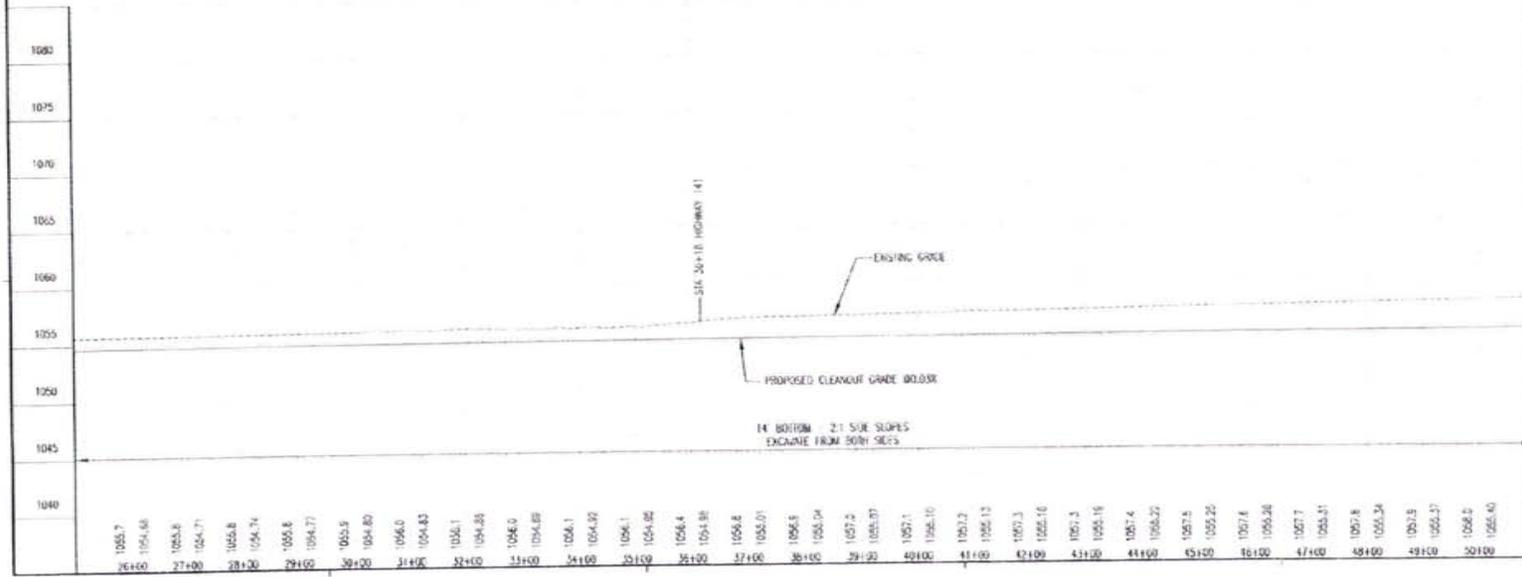


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WOODBURY COUNTY IOWA		
REVISIONS		
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DRAWN BY	S. WITKOWSKI	
DESIGNED BY	B. JOHNSON	
REVIEWED BY	J. JOHNSON	
DATE	10/26/16	
CLIENT PROJECT NO.		
TITLE		
OPEN DITCH PLAN & PROFILE		
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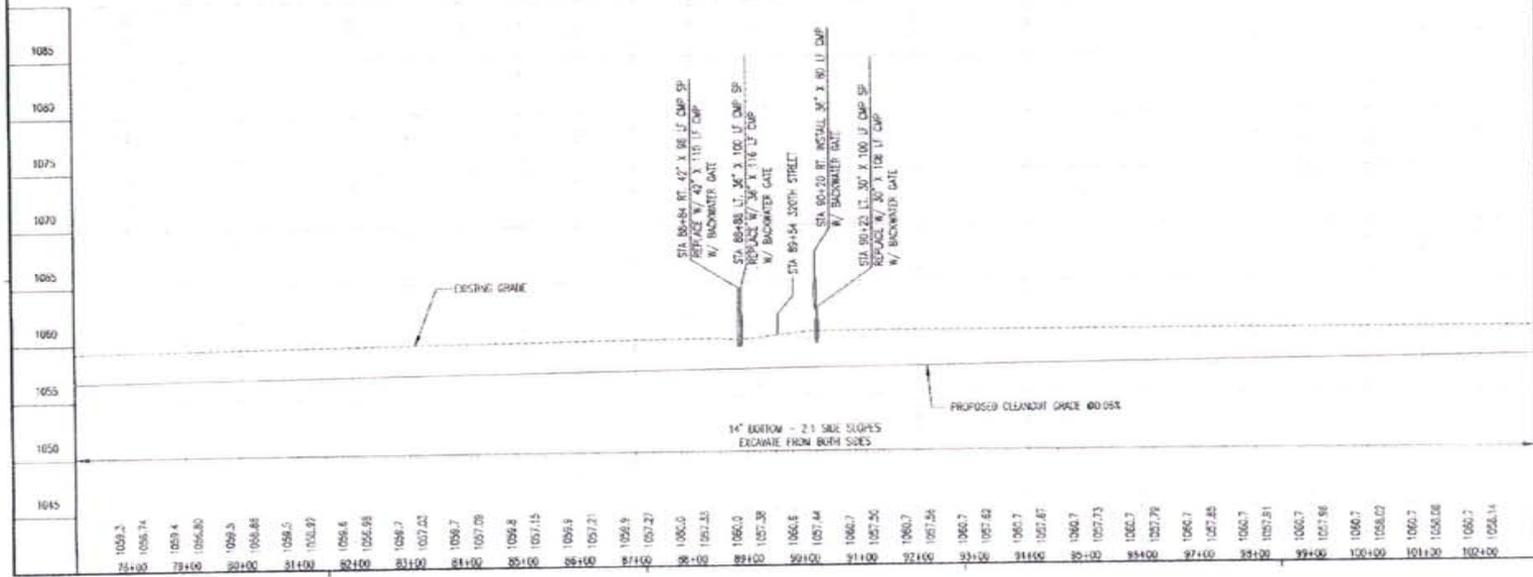
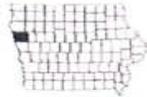
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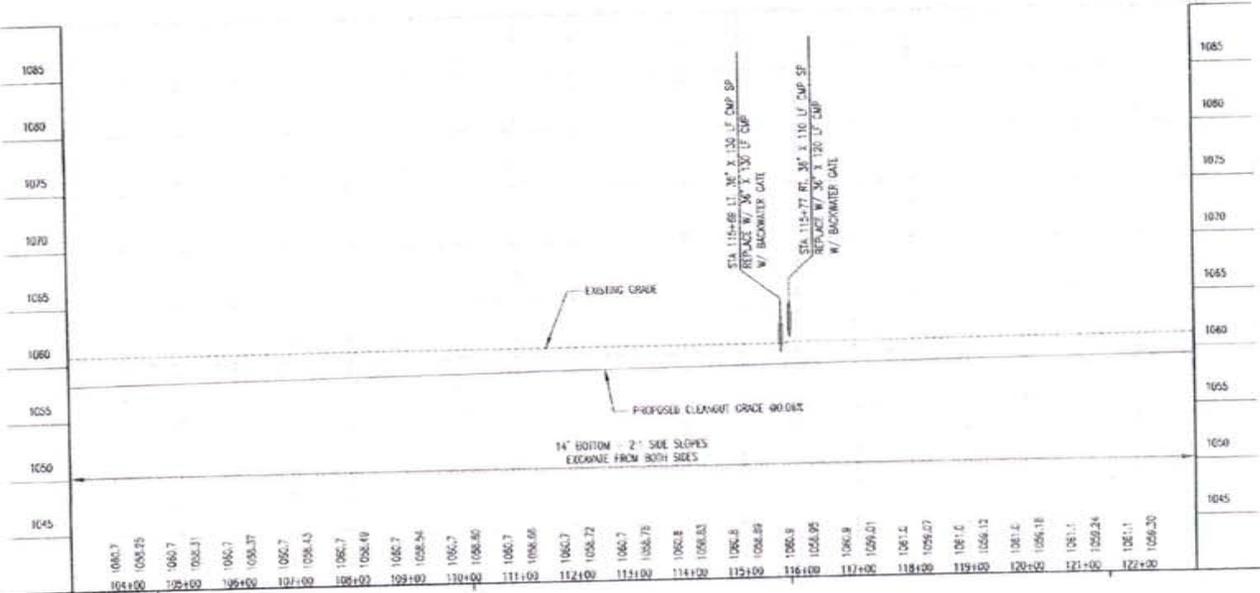
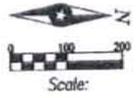
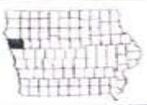


OPEN DITCH PLAN & PROFILE

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PROPOSED OPEN DITCH REPAIR WOLF CREEK

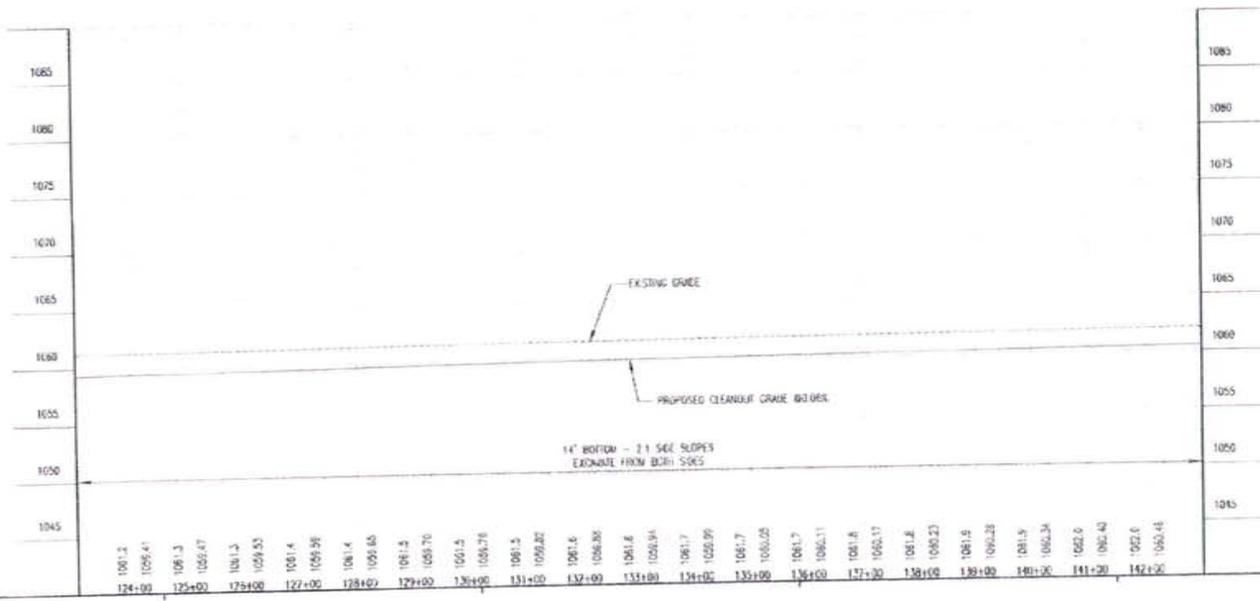
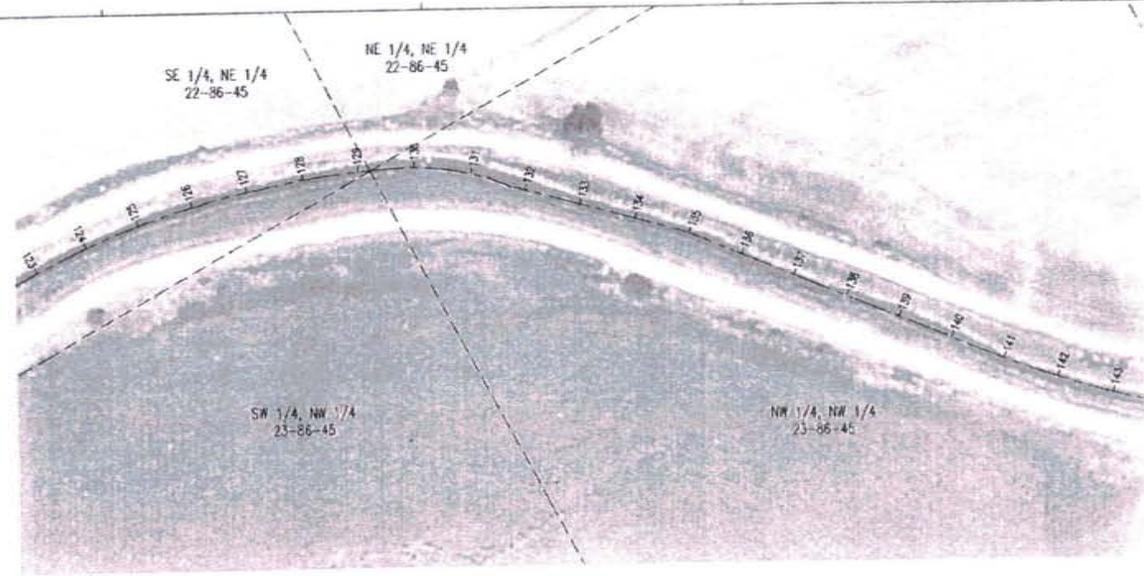
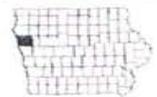
WOODSBURY COUNTY IOWA

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 DRAWN BY: W. H. HARRIS
 DESIGNED BY: B. B. FROST
 REVIEWED BY: J. G. HARRIS, JR.
 CONTRACT NO.: SA 16-208

OPEN DITCH PLAN & PROFILE

D.05



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PROPOSED OPEN DITCH REPAIR WOLF CREEK

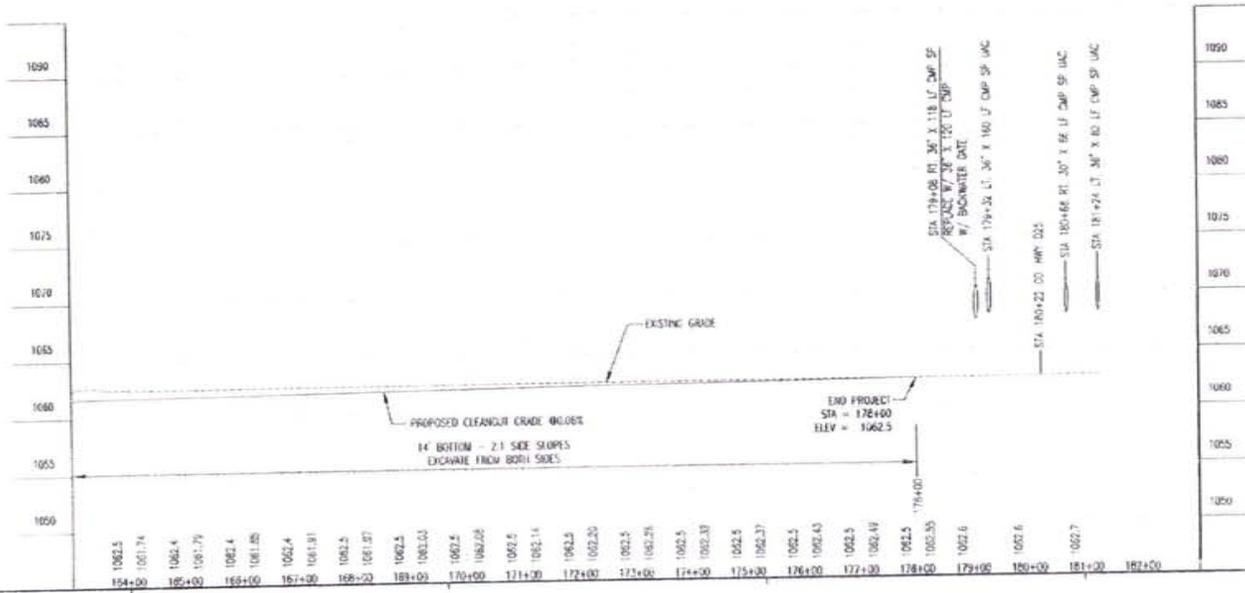
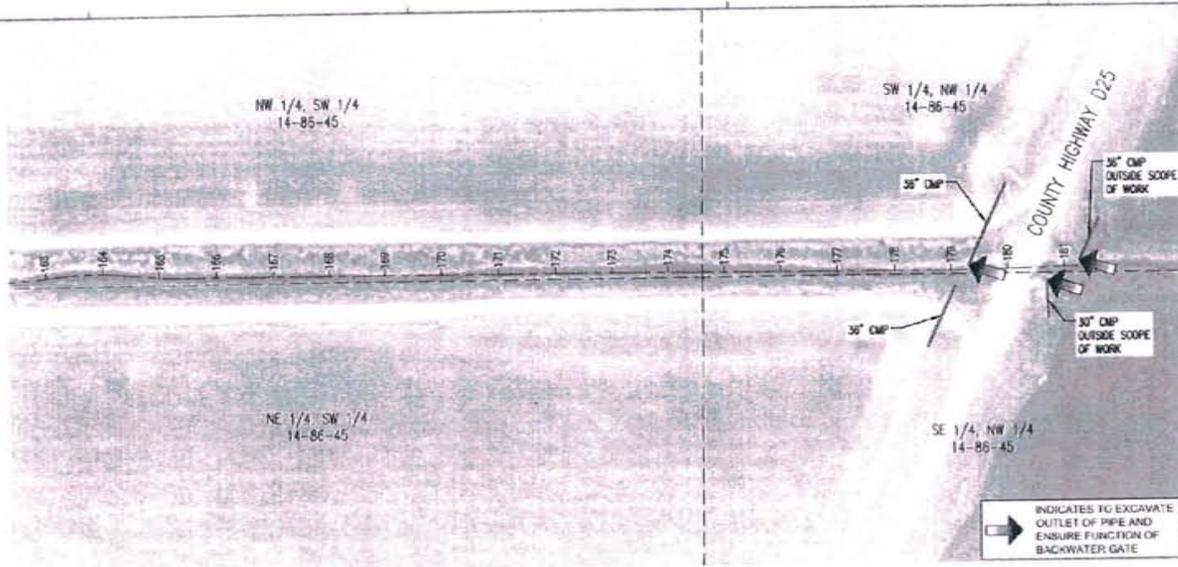
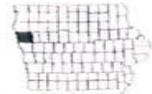
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 REVISIONS BY: J. THORNTON, JR.
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OPEN DITCH PLAN & PROFILE

Sheet No. **D.06**



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PROPOSED OPEN DITCH REPAIR WOLF CREEK

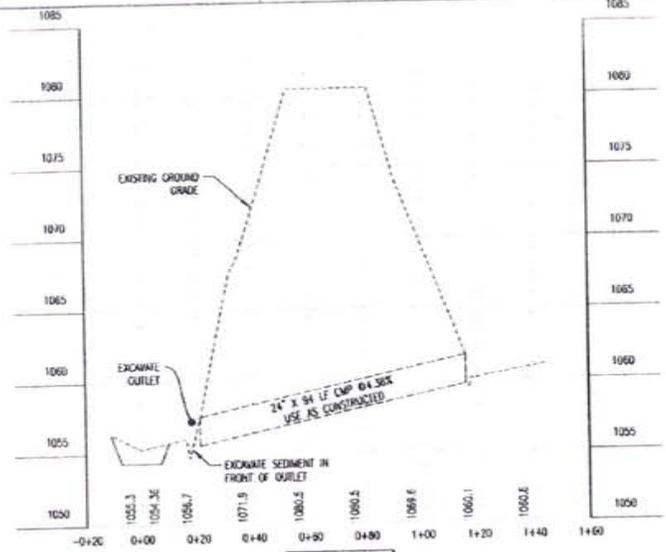
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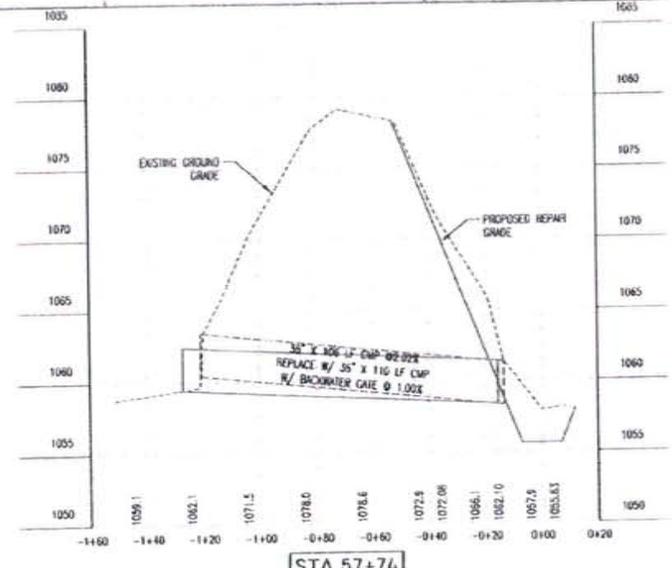
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 CHECKED BY: J. H. LINDSEY
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OPEN DITCH PLAN & PROFILE

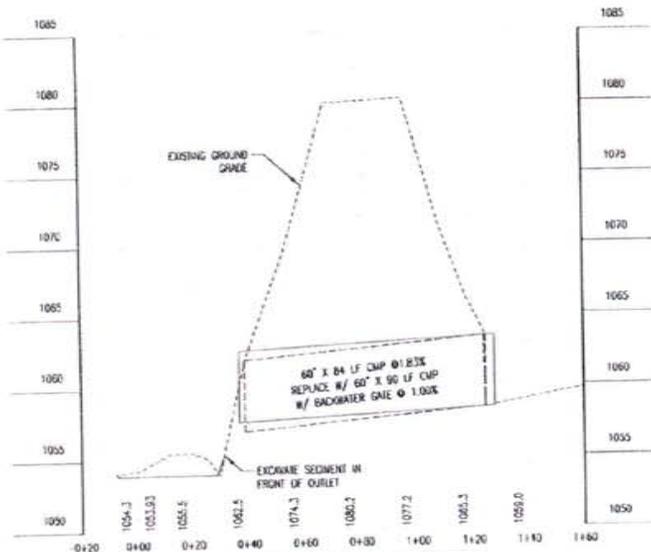
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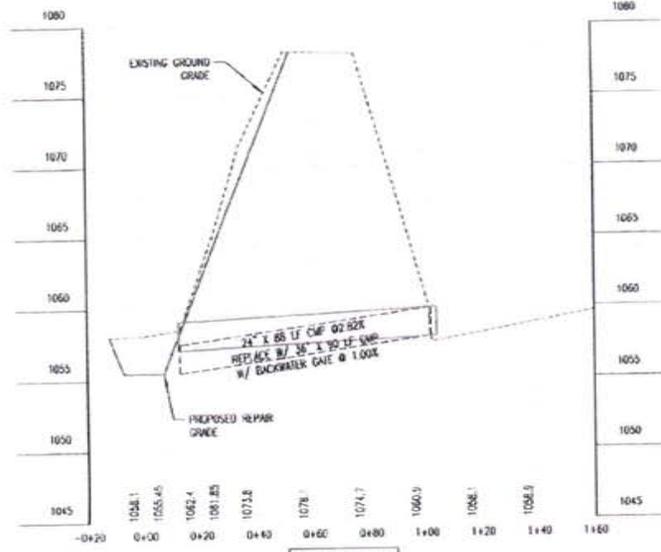
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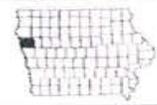
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STA 1+08 = WEBER DD OUTLET



STA 51+66



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PROPOSED OPEN DITCH REPAIR WOLF CREEK

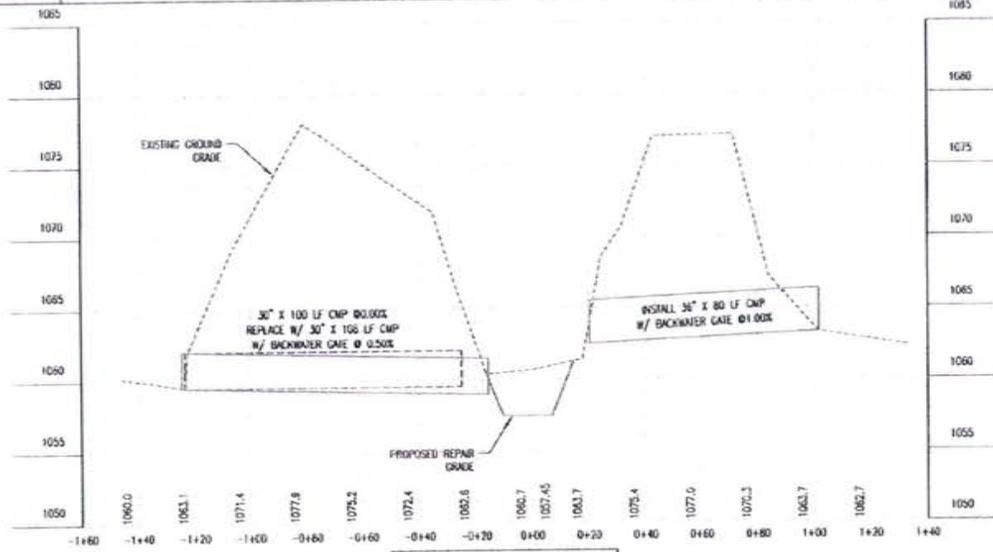
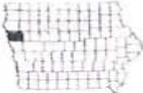
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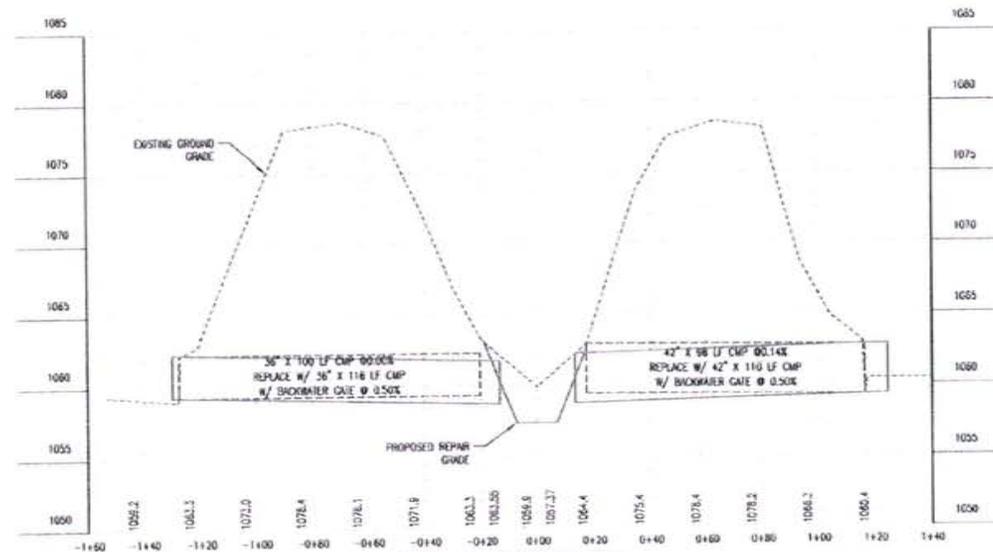
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 CHECKED BY: J. P. HARRIS
 REVISIONS BY: J. P. HARRIS
 ORIGINAL DATE: 08/14/18
 CLIENT PROJECT NO:

SHEET

EXISTING PIPE CROSS SECTIONS



STA 90+23 AND 90+20



STA 88+88 AND 88+84

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PROPOSED OPEN DITCH REPAIR WOLF CREEK

DAKOTA COUNTY, SD

NO.	DATE	DESCRIPTION

CONTRACT NO. 18 1800E
 EXPIRE DATE: NEARLY 4 YRS.
 DESIGNED BY: B. BLOOM
 CHECKED BY: J. ANDERSON
 ORIGINAL DATE: 04/14/2011
 CURRENT PROJECT NO.:

EXISTING PIPE CROSS SECTIONS



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PROJECT:

**PROPOSED OPEN DITCH REPAIR
WOLF CREEK**

WOODRURY COUNTY 1079A

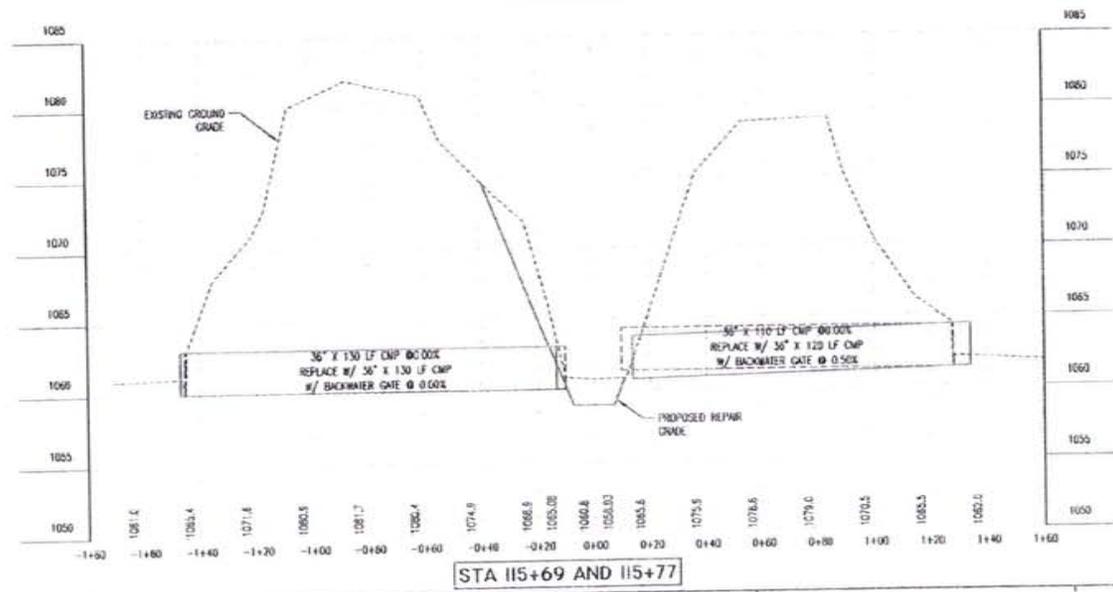
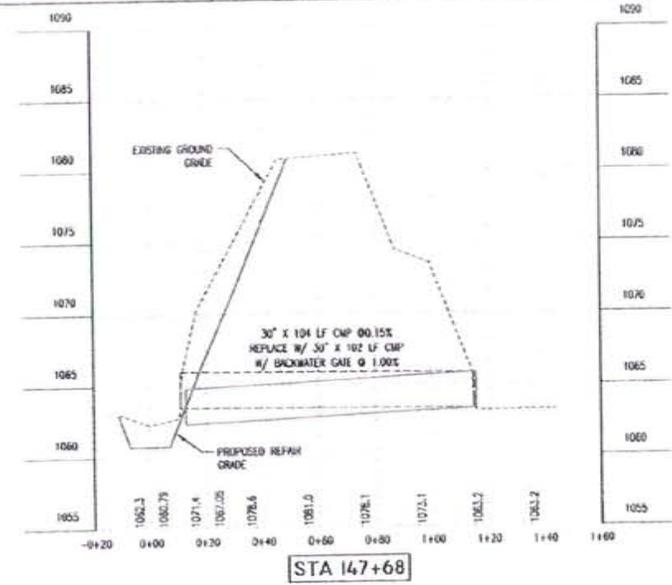
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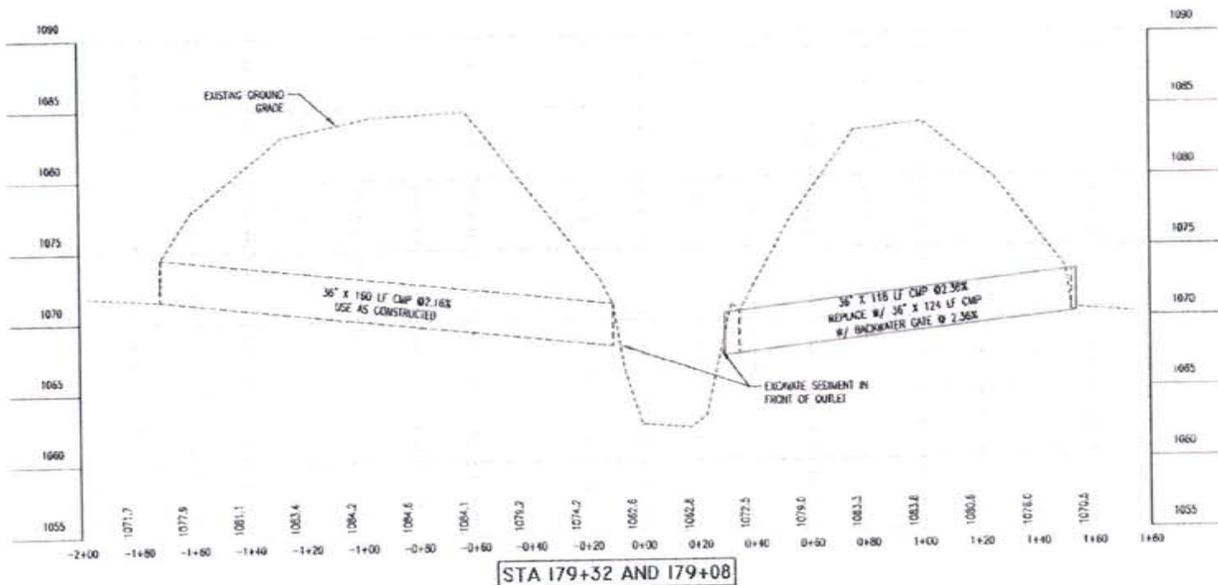
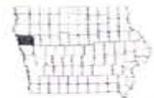
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DESIGNED BY	B. J. DUNN
CHECKED BY	B. J. DUNN
DATE	08/20/16
SCALE	AS SHOWN

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EXISTING PIPE CROSS SECTIONS

SHEET **P.03**





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PROJECT
PROPOSED OPEN DITCH REPAIR WOLF CREEK

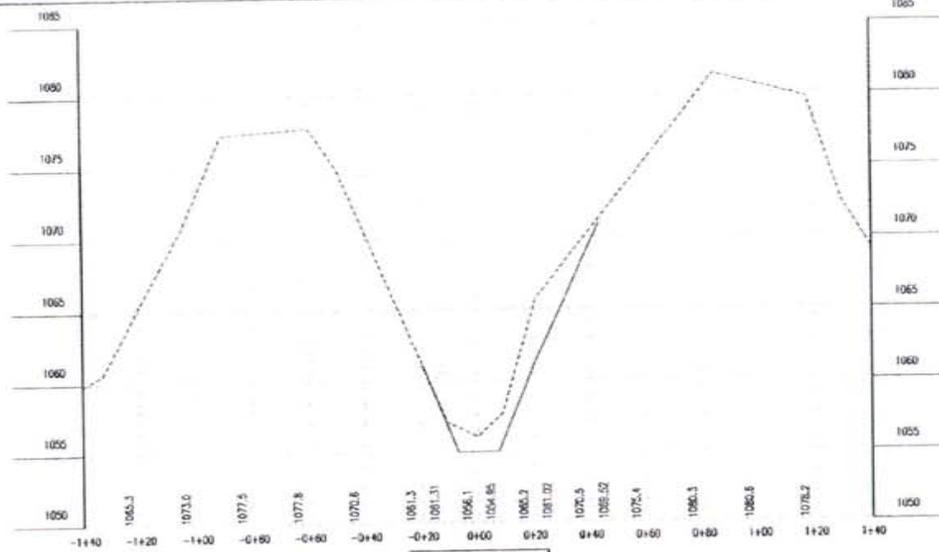
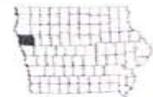
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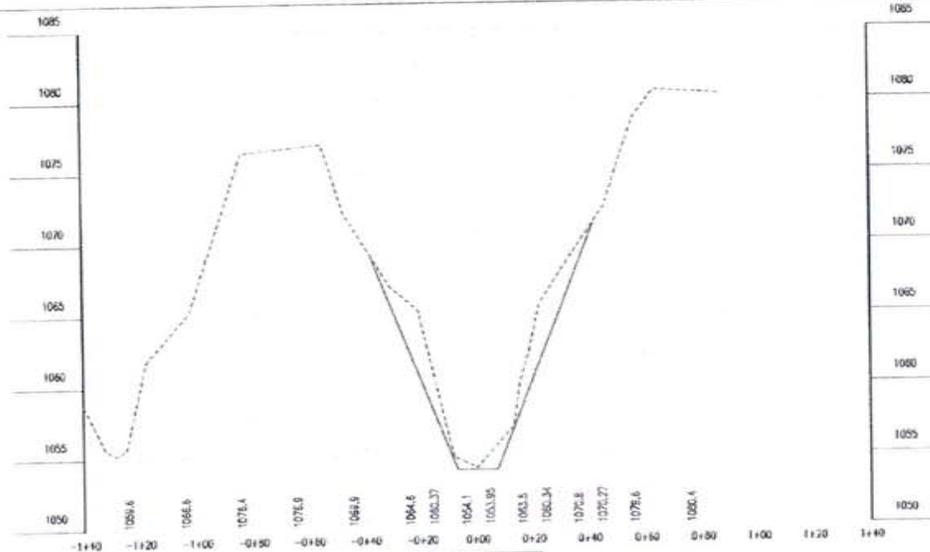
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 CHECKED BY: B. WILSON
 DESIGNED BY: J. DICKENS
 DRAINAGE AREA DATE: 11/27/10
 DRAWING PROJECT NO:

EXISTING PIPE CROSS SECTIONS

DATE: P.04



SECTION 35+15



SECTION 1+63

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PROJECT:

PROPOSED OPEN DITCH REPAIR WOLF CREEK

WOODBURY COUNTY IOWA

SECTION SURVEILLANCE

NO.	DATE	DESCRIPTION

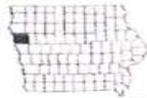
PROJECT NO: 16-18880
 FILE NAME: 1688 CROSS SECTION
 DRAWN BY: S.W. DORR
 DESIGNED BY: S. BLOOM
 REVIEWED BY: J. QUARLES
 DRAINAGE ISSUE DATE: 09-21-2014
 COUNTY PROJECT NO:

DATE:

CROSS SECTIONS

PROJECT

X.01



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PROPOSED OPEN DITCH REPAIR WOLF CREEK

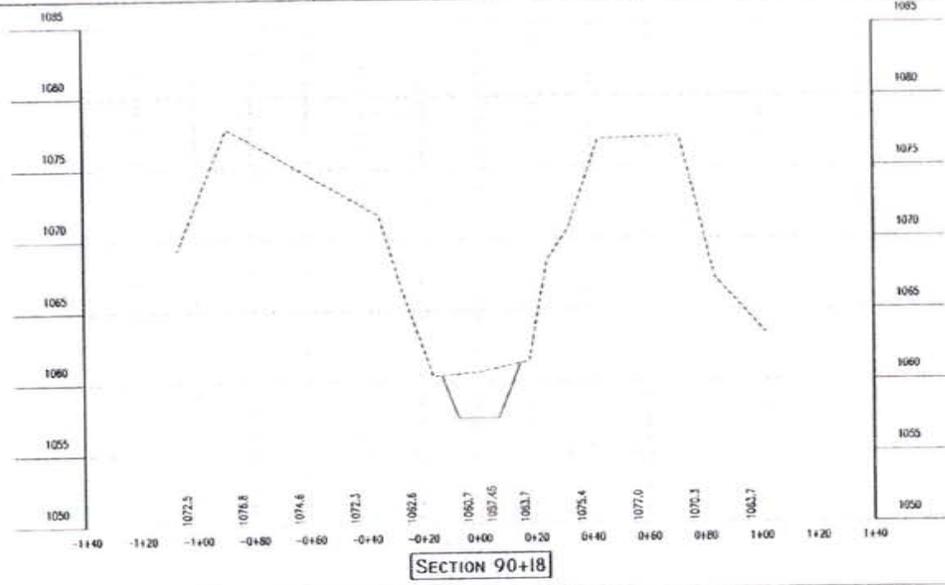
WOODBURY COUNTY IOWA

NO.	DATE	DESCRIPTION

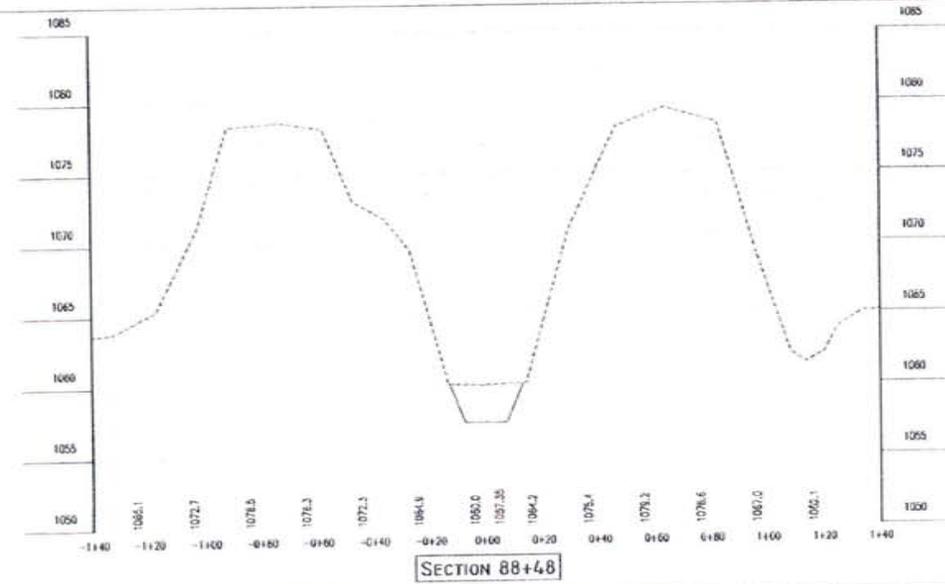
PROJECT NO. 16-14862
 FILE NAME: 2008 CROSS SECTIONS
 DRAWN BY: M. H. HENNING
 CHECKED BY: M. H. HENNING
 REVIEWED BY: J. BRONKHORST
 ORIGINAL DATE: 08/20/08
 CLIENT PROJECT NO.

CROSS SECTIONS

SHEET **X.02**



SECTION 90+18



SECTION 88+48



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**PROPOSED OPEN
DITCH REPAIR
WOLF CREEK**

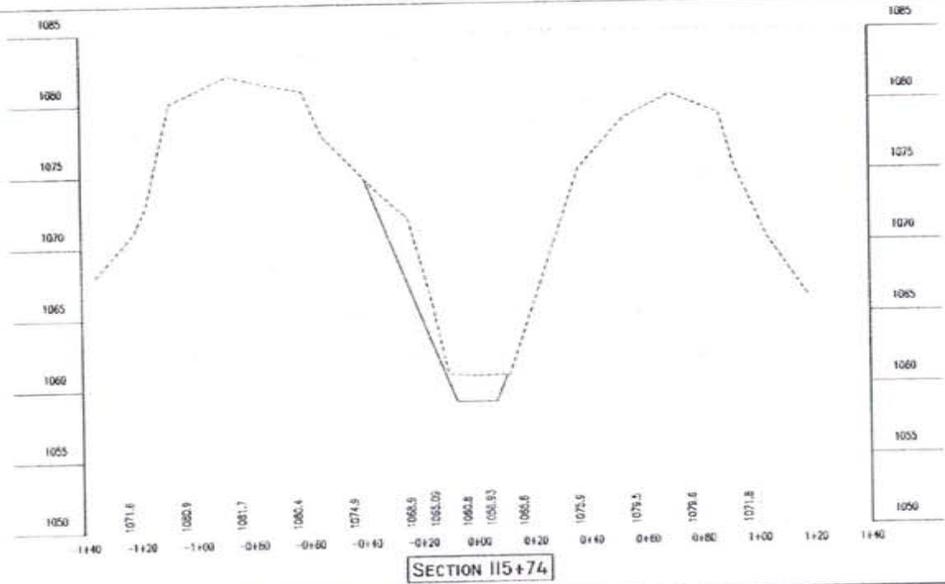
WOODBURY COUNTY IOWA

NO.	DATE	DESCRIPTION

PROJECT NO: 16-1858
 FILE NAME: 1606 CROSS SECTION
 DRAWN BY: N. KRIGER
 DESIGNED BY: B. STANG
 REVIEWED BY: J. GRENBLUP
 SPECIAL INSTRUCTIONS: 3/16/16
 CLIENT PROJECT NO:

**CROSS
SECTIONS**

SHEET **X.03**



SECTION 115+74