

Burleigh County Water Resource District



PO Box 1255
Bismarck, ND 58503
Website: www.bcwrdd.org



BURNT CREEK FLOOD CONTROL OPERATION & MAINTENANCE MANUAL

May 2020

Burleigh County, North Dakota

OPERATION & MAINTENANCE MANUAL

Burnt Creek Flood Control Project Burleigh County, North Dakota

May 2020

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

Michael H. Gunsch
North Dakota Reg. No. 3052

Houston Engineering, Inc.

3712 Lockport St.
Bismarck, ND 58503
Phone # 701-323-0200
HEI No. 6025-0012

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Travis G. Johnson
North Dakota Reg. No. 5746

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1.0 INTRODUCTION

The Burnt Creek Flood Control Project (Project) was constructed in 1975 by the Burleigh County Water Management District (a.k.a. Burleigh County Water Resource District (BCWRD)) utilizing federal funding, design and construction support provided through the Soil Conservation Service (a.k.a. NRCS). The Project provides flood protection to agricultural lands and rural residences between the natural Burnt Creek Channel and the Missouri River for approximately four miles south of the flood diversion channel.

The Project was modified in 2008 via construction of an additional drop structure within the diversion channel west of the original concrete drop structure. This installation addressed severe head cutting issues from the Missouri River. These improvements were paid for through general mill levee funds and a North Dakota State Water Commission cost share. Additional improvements and channel maintenance were completed in 2015, following the historic 2011 flood event, and including major sediment removal, repairing erosion damages along the channel, installing gates at the Highway 1804 diversion structure, and replacing the gated culvert at the north end of Hogue Island located within the oxbow channel. The plan sets associated with the original construction and subsequent project modifications are included in **Appendix A**. Until 2013 the Project was operated and maintained using general county mill levy funding. The 2015 improvements were paid for through a special assessment district created under NDCC 61-16.1-40.1. This district is being used to repay the 2015 project bonds and fund future operations and maintenance expenses.

1.1 PURPOSE OF MANUAL

This operation and maintenance manual summarizes the recommended procedures for project maintenance during non-flood times and operations during flood events.

The manual has been organized with maps, drawings, and references to the pertinent components for operating and maintaining the project. It begins with a description of the project, followed by standard maintenance and operation procedures.

1.2 AUTHORITY

The BCWRD is responsible and has full authority over all operation and maintenance functions. The NRCS transferred all their obligations associated with this project to the BCWRD after the 25-year project life was reached in 2001.

1.3 RESPONSIBLE PARTY CONTACTS

The BCWRD appoints a Manager who is responsible to oversight routine maintenance and is in charge during flood operation periods.

The following parties have been provided a copy of this O&M Manual for their use:

Dennis Reep – Burleigh County Water Resource District (Manager)	(701) 557-9621
Mitch Flannigan – Burleigh County Floodplain Administrator	(701) 221-3727
Mary Senger – Burleigh County Emergency Manager	(701) 222-6727
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Marcus Hall – Burleigh County Highway Department, County Engineer	(701) 204-7748

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Additional contact information is provided below. The assigned Manager should verify and update all contacts and phone numbers as necessary or at least annually.

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City of Bismarck – Public Works	(701) 355-1700
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1.4 PROJECT LOCATION

The flood diversion channel is located approximately five miles north of the City of Bismarck before transgressing to the south and west with its terminus within an oxbow of the Missouri River, then west on the section line between Section 2, T139N R81W and Section 35 T140N R81W. Some project features are located within the old oxbow channel which runs along the eastern edge of Hogue Island.

Figure 1 illustrates the general project location.



Figure 1: Project Location Map

1.5 PROJECT FEATURES

The Project utilizes a diversion structure at the Burnt Creek crossing on State Highway 1804 to convey floodwaters west within a constructed channel. Floodwaters are then conveyed into an old Missouri River oxbow remnant that drains north-south along the east side of Hogue Island. These flows make their way to the Missouri River via the southern part of the oxbow channel. The diversion channel and portions of the oxbow are lined with earthen levees to confine floodwaters and reduce the risk for breakout flows into the adjoining properties. In addition to the diversion structure, the project includes two drop structures, as well as a gated structure located at the northern end of the oxbow. The gate structure is used to control Missouri River mainstem inflows into the oxbow. **Figure 2** illustrates the location of the primary project features.



Figure 2: Burnt Creek Flood Control Project Features

1.5.1 LEVEES

The southern diversion earthen levee was constructed to a height two feet above the northern levee. This ensures flood protection for the intended benefit area to the south by directing excess floodwaters north and west when the diversion channel capacity is exceeded. There are also levees located along portions of the river oxbow used to convey flows to the Missouri River. These earthen levees were constructed to an elevation intended to contain a projected 100-year flow on Burnt Creek, with a 4:1 slope on the water side and a 3:1 slope on the dry side. Top widths vary from 10 feet on the southern levee to 24 feet for the north levee.

As designed the Project provides approximately 10-year flood protection to agricultural properties north of the diversion channel, while 100-year protection is provided to the south with limited freeboard. The southern levee is a non-accredited levee; therefore, it is mapped as not providing any flood control benefit on the DFIRM for this area. (See **Figure 3** for current DFIRM mapping.)

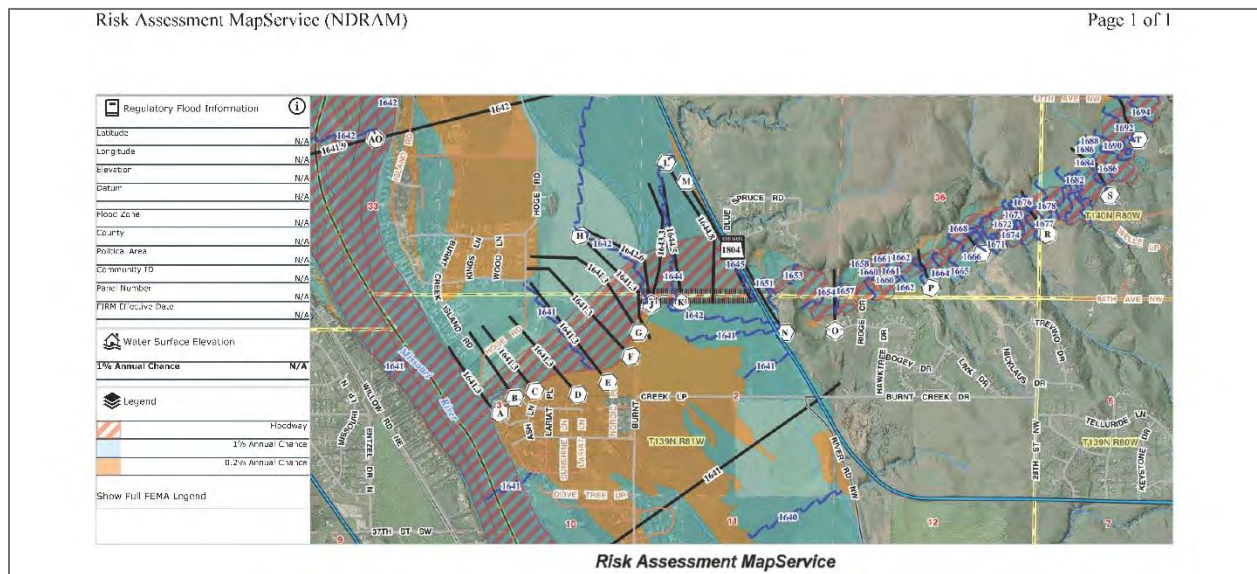


Figure 3 – Regulatory Flood Insurance Mapping

1.5.2 PEDESTRIAN TRAIL

A pedestrian trail easement was secured on the northern levee using a federal grant provided to the Bismarck Parks and Recreation District (BPRD) as part of their participation in the Lewis and Clark Trail System. This trail extends west toward the Hogue Island Park owned by the BPRD. (See **Figure 4**.) While there is a north-south easement crossing the diversion channel west of the concrete drop structure and east of the sheet pile structure, it is not suitable for pedestrian use. These pedestrian trails are maintained by the BPRD, which consists principally of routine mowing.

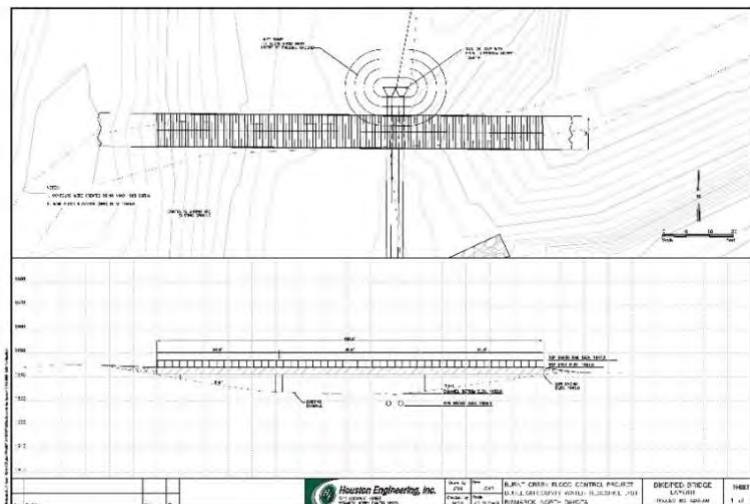


Figure 4 – Oxbow Trail Crossing

1.5.3 STRUCTURES

The flood diversion structure was incorporated into the bridge on State Highway 1804. A concrete sill controls when flows will first occur into the diversion channel. Two 25"x16" Corrugated Metal Pipe Arches (CMPA) divert the base (or low) flows into the natural Burnt Creek Channel to the south. Two sluice gates were placed on these culverts as part of the 2015 modifications to control flows into the original Burnt Creek channel to limit flooding and allow channel maintenance. This base flow feature was required to maintain the natural base flows for environmental mitigation purposes and to provide water to supply existing water rights downstream. **Figure 5** shows these features.



Figure 5: Diversion Structure and Base Flow Gate System

There are two drop structures located within the diversion channel. One is the original concrete drop structure, and the second, located to the west and constructed in 2008, consists of a sheet pile structure with geotextile fabric and riprap protecting the downstream channel. This second drop structure addressed severe head cutting that would have eventually threatened the original drop structure's integrity. **Figure 6** illustrates these features.



Figure 6: Drop Structures in the Diversion Channel – Looking East

The diversion channel discharges into the existing oxbow channel that runs along the east side of Hogue Island. There is a gated 24” CMP culvert at the north end of this oxbow channel with a sluice gate that can be used to control inflows from the Missouri River into the oxbow. There is also a channel block located at the confluence of the constructed channel and this oxbow. In 2008, twin 24” culverts were installed through this block to provide an improved outlet for local runoff and allow for pedestrian trail access (See **Figure 4.**) There are also several culverts with flap gates that provide an outlet for local drainage along the diversion channel when water levels recede.

1.5.4 USGS GAGE AND FLOOD HISTORY

The only active USGS Gaging Station on Burnt Creek is Gage No. 06342450, Burnt Creek Near Bismarck, ND. This gage is located well upstream of the diversion with a contributing drainage area of 108 square miles. The top ten annual peak flows are provided in **Table 1.**

Table 1: Top Ten Recorded Peak Flows (1968-2018)

Ranking	Year	Streamflow (cfs)
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7	2/28/92	5,802
8	4/8/69	3,000
9	3/21/87	2,350
10	3/14/95	2,270

1.6 PROJECT PERFORMANCE

The project has been highly functional in preventing flooding from Burnt Creek into the protected area south of the diversion channel. Areas north of the diversion channel have flooded from several high flow events on Burnt Creek. It should also be noted that flooding has occurred from the watershed draining toward the natural oxbow on the north side of the diversion channel. This floods those areas north of the floodway channel without waters entering the floodway. The project benefits are amplified as a result of the extremely low capacity of the natural Burnt Creek channel located within the Missouri River bottomlands.

2.0 INSPECTIONS AND MAINTENANCE

2.1 GENERAL

The various components of the Burnt Creek Flood Control Project should be inspected periodically to ensure that on-going maintenance is completed as required to ensure continued project functionality.

2.2 LEVEES AND DIVERSION CHANNEL

The levees should be inspected annually and after any significant flood event. They should be inspected for erosion as well as the growth of woody vegetation and animal burrows. Routine maintenance shall include mowing on at least an annual basis. This is typically completed after the initial spring growth to assist in weed control. Spraying for weeds should be completed as necessary and can be done by the Burleigh County Weed Board. Fall mowing may also be prudent to control excessive growth or to maintain optimum vegetative conditions. If significant activity from burrowing animals is noted, measures should be implemented to control that activity and limit future impacts. Any significant erosion damages should be repaired prior to the next season's spring runoff.

The diversion channel should be inspected annually to identify any apparent reduction in conveyance as a result of sedimentation or excessive vegetation growth (i.e., cattails). Maintenance completed in 2015 restored the diversion channel to its original design conditions. Actions should be taken to periodically clear excess cattail growth and sediment from the channel, via either mechanical or chemical means. Periodic chemical control of cattail growth is an ongoing maintenance requirement and should be routinely scheduled, since wet channel conditions can prevent effective spraying.

Public access to the levees has been an issue in the past. As a result, additional barricades were erected, and additional signage installed to limit vehicular access to the southern levee system at the State Highway 1804 crossing. These actions were completed and necessary to eliminate damages to the levee system from vehicular related damages. The tops of the levees can still be used for access for inspections by BCWRD personnel. The northern levee is incorporated into the Lewis and Clark Legacy Trail system, though larger motorized vehicles are prohibited.

2.3 STRUCTURES

All structures should be inspected on an annual basis. This includes the diversion structure at the Highway 1804 crossing, the two drop structures, flap gates along the diversion channel, the pedestrian trail culverts and the gated culvert at the north end of the oxbow channel. Concrete structures should be examined for any cracking, spalling or differential settlement or deflection, which should be documented and monitored. Erosion in the area of the structures, potentially impacting their structural integrity should be documented for repair. All gates should be exercised (i.e., opened and closed) and lubricated on an annual basis to confirm their continued functionality.

Periodic repair of minor issues may help to delay any larger rehabilitations. The scheduling for larger structural repairs will be highly dependent on available funding.

2.4 ANNUAL REPORT

The Manager should prepare a brief condition statement to be presented to the Board. This statement should document any project maintenance needs that should be incorporated into the annual budgeting process. An Annual Reporting Summary sheet is included as **Appendix D**.

3.0 GENERAL OPERATIONS

The Burnt Creek Flood Control Project is largely a passively operated system. The configuration of the diversion structure at the State Highway 1804 crossing is such that any flows above the capacity of the two gated CMPA's are diverted west into the diversion channel.

The only operable components of the project are the two gated CMPA's at the diversion structure as well as the gated 24" CMP at the north end of the oxbow channel. The gates on the two CMPA's at the diversion structure are typically maintained in an open configuration. This is intended to allow the base flow to continue down the original Burnt Creek channel to satisfy existing permitted demands downstream. It should be noted this this downstream original Burnt Creek Channel capacity is very limited. These gates are to be closed during periods when channel maintenance is required. Notice is to be provided to the sole downstream water permit holder, (i.e., Mr. Beck) to advise as to when base flows are halted.

The gate at the north end of the oxbow channel is typically open, allowing incidental local runoff to reach the Missouri River. During times of high Missouri River levels and Burnt Creek flood operations, the gate is closed, to prevent Missouri River flows from entering the system and interfering with Burnt Creek flood flows within the lower portion of the oxbow channel. In those instances where the diversion channel is not under flood operations and the Missouri River is high enough to push water through this structure, the gate may remain open to freshen the oxbow channel.

An easement and ownership map for the facilities is provided in **Appendix E**. These tracts include a variation of easements, including the original temporary easements used during project construction that have since expired. There are limited tracts of fee title ownership.

Burleigh County Water Resource District



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Burleigh County, North Dakota

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Figure 2: Burnt Creek Flood Control Project Features

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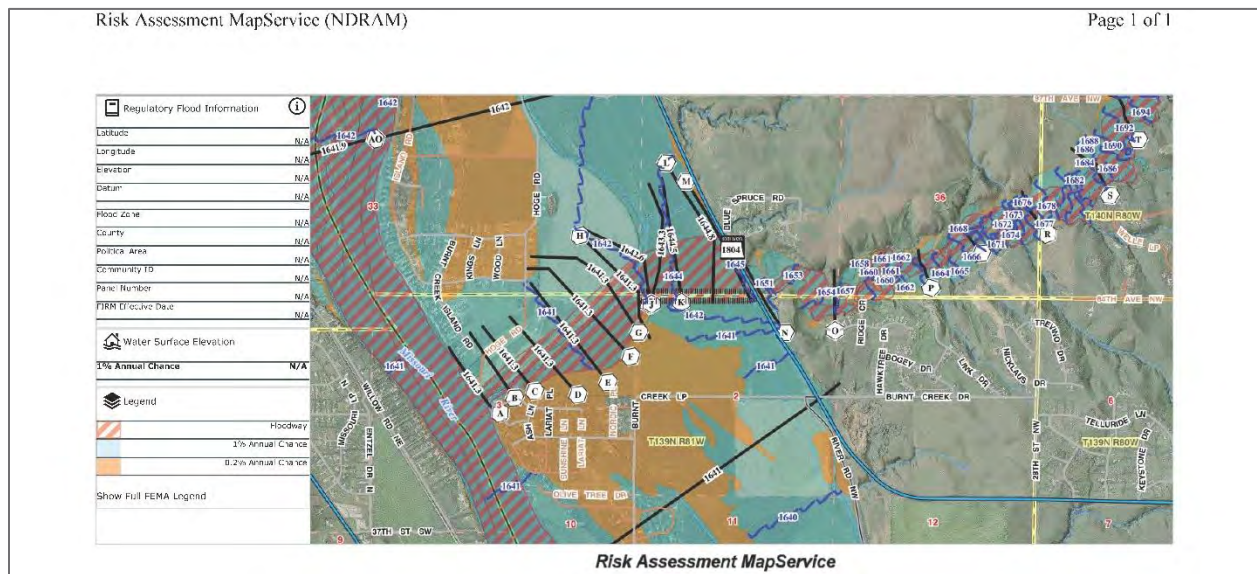


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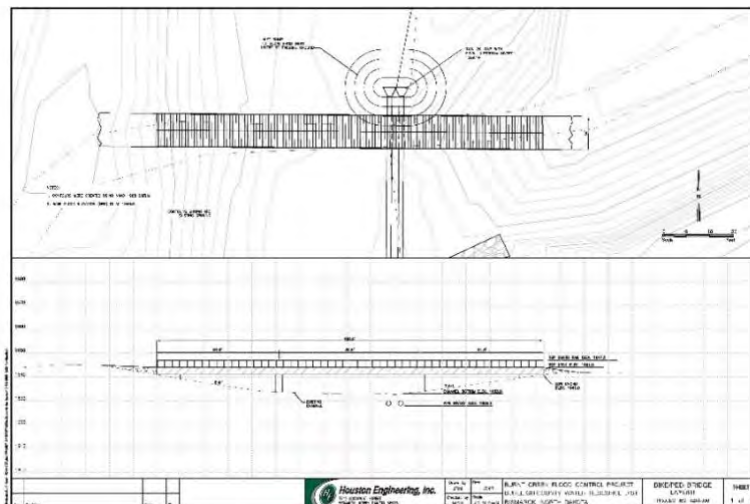


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The levees should be inspected annually and after any significant flood event. They should be inspected for erosion as well as the growth of woody vegetation and animal burrows. Routine maintenance shall include mowing on at least an annual basis. This is typically completed after the initial spring growth to assist in weed control. Spraying for weeds should be completed as necessary and can be done by the Burleigh County Weed Board. Fall mowing may also be prudent to control excessive growth or to maintain optimum vegetative conditions. If significant activity from burrowing animals is noted, measures should be implemented to control that activity and limit future impacts. Any significant erosion damages should be repaired prior to the next season's spring runoff.

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The Manager should prepare a brief condition statement to be presented to the Board. This statement should document any project maintenance needs that should be incorporated into the annual budgeting process. An Annual Reporting Summary sheet is included as **Appendix D**.

3.0 GENERAL OPERATIONS

The Burnt Creek Flood Control Project is largely a passively operated system. The configuration of the diversion structure at the State Highway 1804 crossing is such that any flows above the capacity of the two gated CMPA's are diverted west into the diversion channel.

The only operable components of the project are the two gated CMPA's at the diversion structure as well as the gated 24" CMP at the north end of the oxbow channel. The gates on the two CMPA's at the diversion structure are typically maintained in an open configuration. This is intended to allow the base flow to continue down the original Burnt Creek channel to satisfy existing permitted demands downstream. It should be noted this this downstream original Burnt Creek Channel capacity is very limited. These gates are to be closed during periods when channel maintenance is required. Notice is to be provided to the sole downstream water permit holder, (i.e., Mr. Beck) to advise as to when base flows are halted.

The gate at the north end of the oxbow channel is typically open, allowing incidental local runoff to reach the Missouri River. During times of high Missouri River levels and Burnt Creek flood operations, the gate is closed, to prevent Missouri River flows from entering the system and interfering with Burnt Creek flood flows within the lower portion of the oxbow channel. In those instances where the diversion channel is not under flood operations and the Missouri River is high enough to push water through this structure, the gate may remain open to freshen the oxbow channel.



APPENDICES

[Appendix A: Construction Plan Sets](#)

[Appendix B: Project Easement Maps](#)

[Appendix C: Sluice Gate Submittal Drawings](#)

[Appendix D: Annual Inspection Checklist](#)

[Appendix E: Easement/Ownership Map](#)



APPENDIX A

Construction Plan Sets

A.1 – Original Plan Set

A.2 – 2008 Plan Set

A.3 – 2014 Plan Set



Design Office - As Built file

*Date
for
file*



LEWIS & CLARK 1805

RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

As Built

BURNT CREEK FLOODWAY AND DIKES

BURLEIGH COUNTY, NORTH DAKOTA

SPONSORING AGENCIES

- NORTH BURLEIGH SOIL CONSERVATION DISTRICT
- SOUTH BURLEIGH SOIL CONSERVATION DISTRICT
- BURLEIGH COUNTY WATER MANAGEMENT DISTRICT

WITH ASSISTANCE BY

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

Date construction started - 10-13-75
Date construction complete - 1-10-76
Contractor - Oster Co. Inc. Hazen, N.D.
Sub-Contractor - William J. Jarmut, Inc.
Box 12 - Bismarck, N.D.
Project Inspector - H.H. Suck - Roper St. N.S. Bergantine
12/11/75 11/24/75
Project Eng. Dan Grabe

INDEX TO DRAWINGS

Sheet No.	Contents
1.	Cover Sheet
2.	Location Map, Table of Quantities, Typical Sections
3 & 4.	Ingress, Egress Routes, Dike Locations, and Work Limits
5.	Plan-Profile of Floodway
6 & 7.	Plan-Profile of Dikes
8.	Plan-Drop Structure Site
9.	Profile along \bar{C} of Drop
10-20. 10A	Detail of Drop Structures ELEVATIONS AFTER BACKFILL

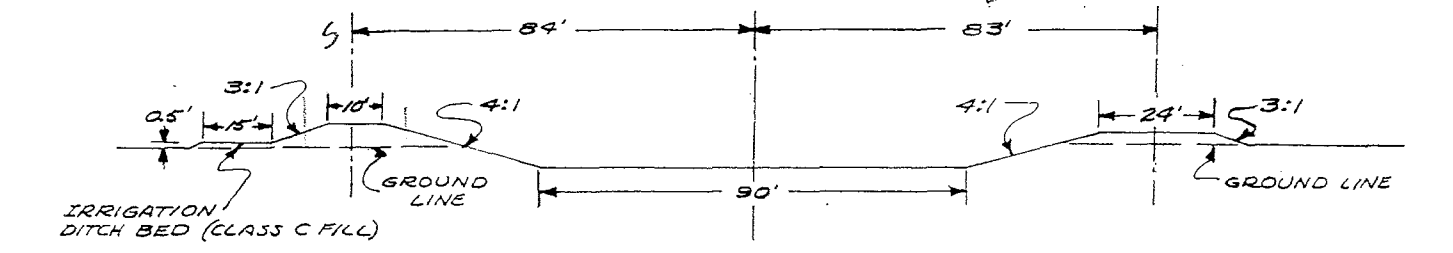
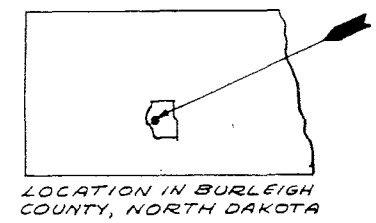
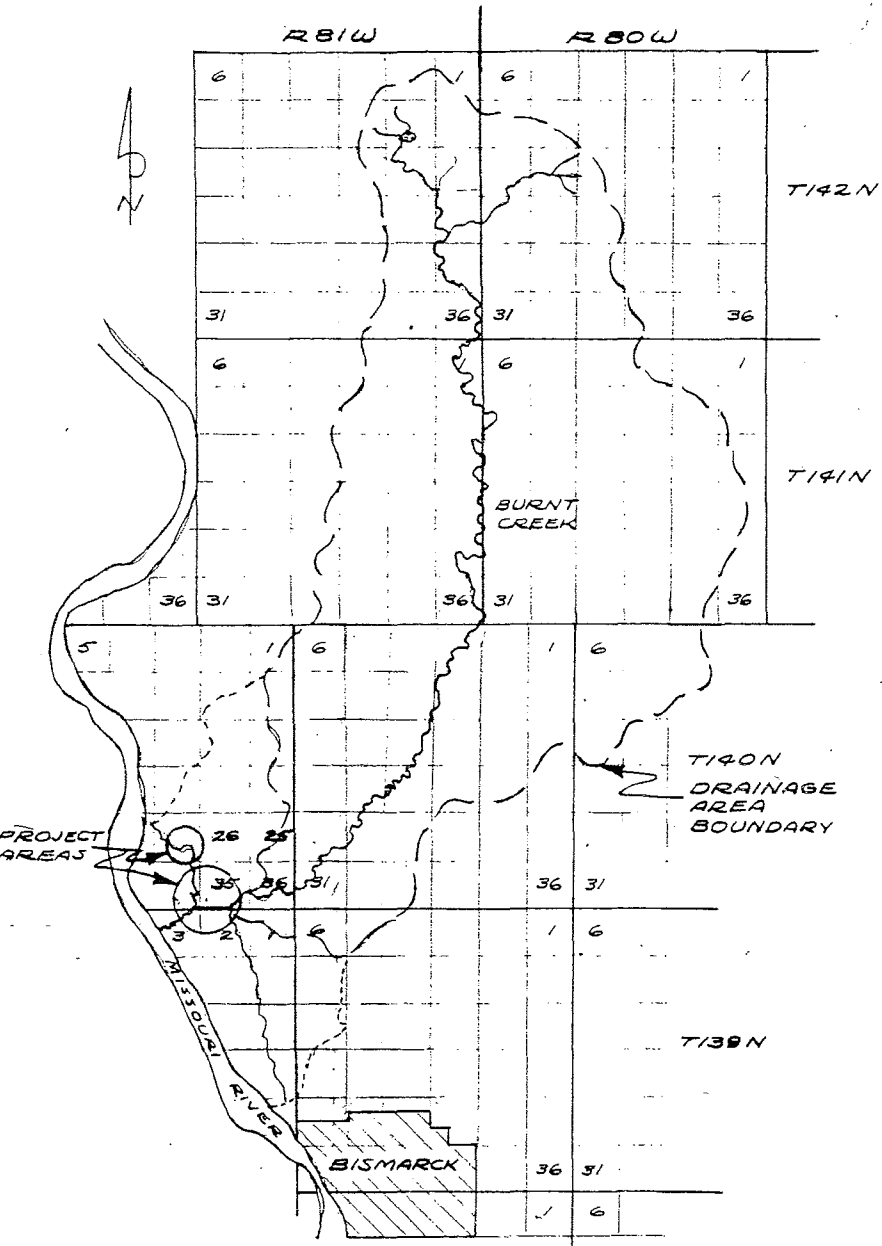


WE CERTIFY THAT THE PLANS AND DETAILED SPECIFICATIONS FOR THIS PROJECT WERE DEVELOPED BY THE SOIL CONSERVATION SERVICE AND ARE APPROVED.

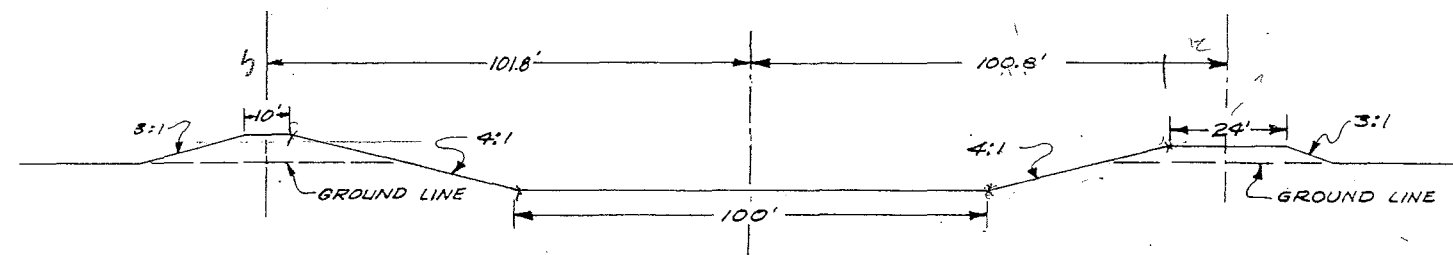
[Signature] 1/25/75
STATE CONSERVATION ENGINEER DATE

[Signature] 1/25/75
HEAD OF ENGINEERING AND WATERSHED PLANNING UNIT DATE

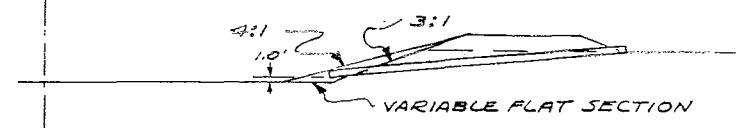
5E-32,350



TYPICAL CROSS SECTION
STA. 104+00 TO STA. 128+00



TYPICAL CROSS SECTION
STA. 132+25 TO STA. 142+00



TYPICAL PIPE INLET
NOT TO SCALE

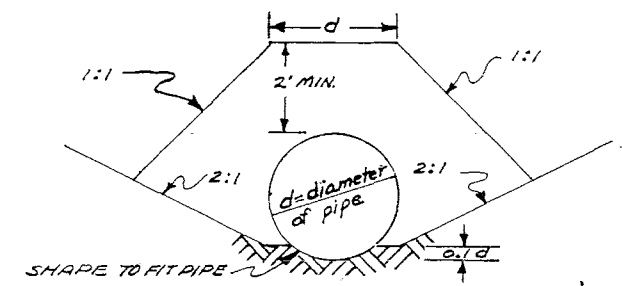


DIAGRAM OF BACKFILL
NOT TO SCALE

TABLE OF QUANTITIES

ITEM No.	ITEM	QUANTITY	UNIT	AS BUILT
1	CLEARING AND GRUBBING	L U M P S U M		
2	MOBILIZATION	L U M P S U M		
3	REMOVAL OF WATER	L U M P S U M		
4	EXCAVATION (COMMON)	92,834	cu. yd.	36,648
5	EARTH FILL, CLASS A	49,432	cu. yd.	52,553
6	REINFORCED CONCRETE, CLASS 4000, AIR-ENTRAINED	450.5	cu. yd.	SAME
7	STEEL REINFORCEMENT	65,265	lbs.	SAME
8	24" DIA. CORRUGATED METAL PIPE, 0.079" WALL THICKNESS, ASBESTOS TREATED, ASPHALT COATED	334	lin. ft.	SAME
9	36" DIA. CORRUGATED METAL PIPE, 0.109" WALL THICKNESS, ASBESTOS TREATED, ASPHALT COATED	128	lin. ft.	SAME
10	ROCK RIPRAP WITH BEDDING	368	cu. yd.	583
11	FLAP GATES, 24"	7	each	8
12	FLAP GATES, 36"	2	each	2
13	SEEDING (INCLUDES FERTILIZING AND MULCHING)	28.4	acres	24.2
14	4" DIA. PERFORATED P.V.C. PIPE	187	lin. ft.	SAME
15	DRAIN FILL	50	cu. yd.	SAME

ALL QUANTITIES ARE ESTIMATED

NOTES:

- ALL PIPE INSTALLATIONS ARE TO BE BEDDED TO A DEPTH OF 0.1 TIMES THE DIAMETER OF THE PIPE.

Rev. 3-10-75
Rev. 10-2-73
Rev. 8/13/73

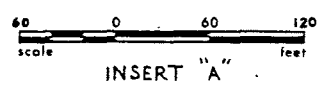
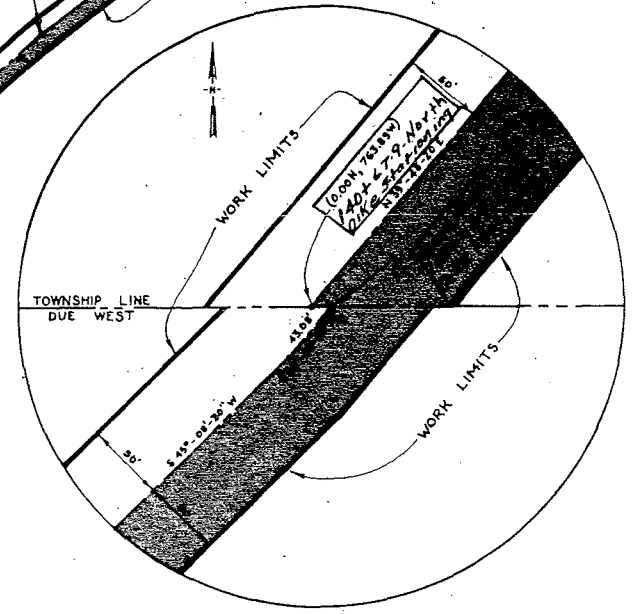
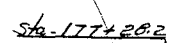
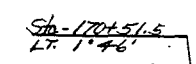
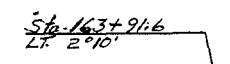
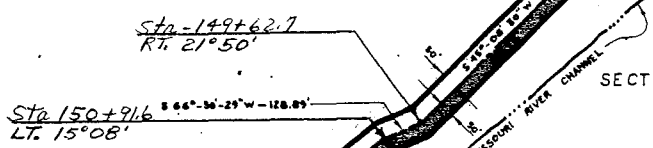
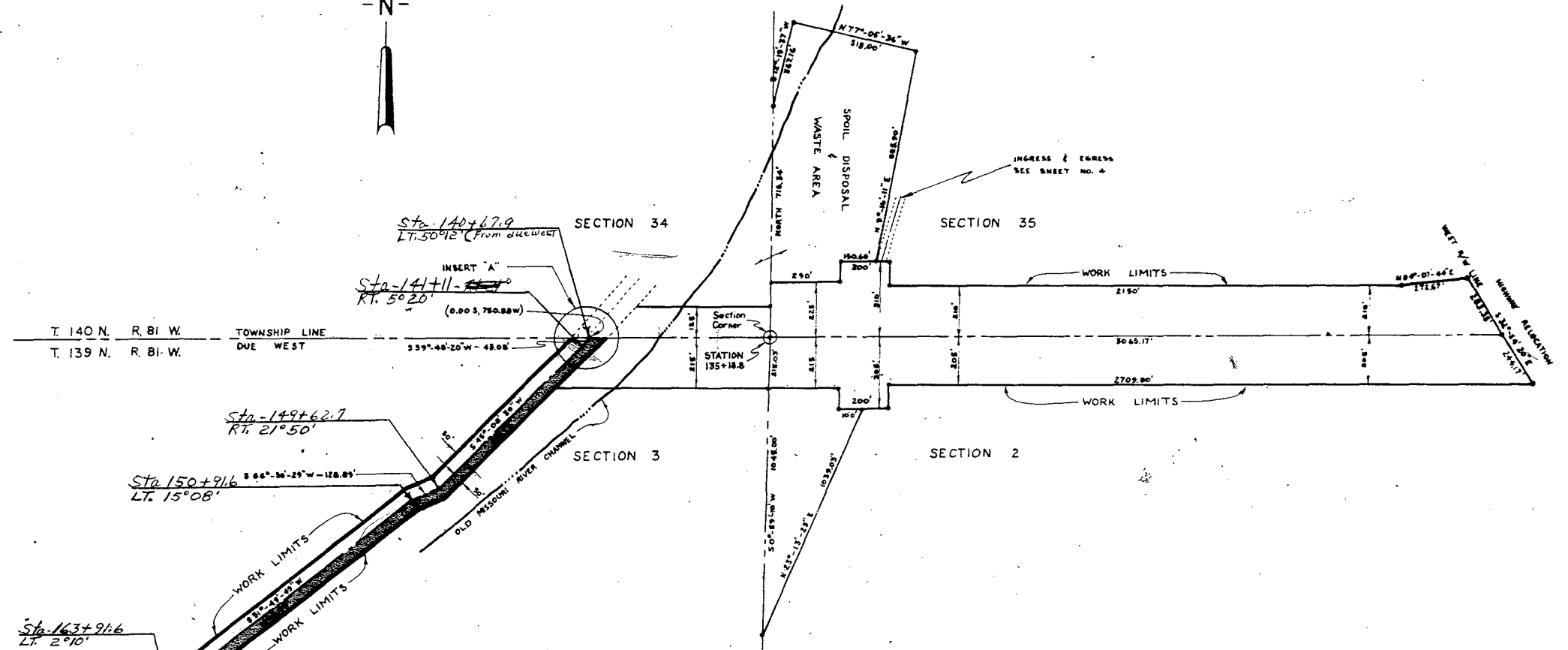
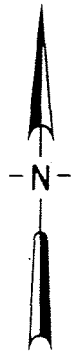
OCT 23 1976
AS BUILT

BURNT CREEK FLOODWAY & DIKES

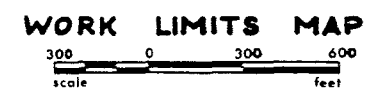
Burleigh County North Dakota

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: <i>LELAND M. SOBLE</i>	Date: 7-73	Approved by: _____
Drawn: <i>[Signature]</i>	Title: 1-13	Title: _____
Traced: _____	Sheet No. 2	Drawing No. 5, E-32, 350
Checked: <i>RONALD D. SANDER</i>	Date: 7-73	at 20



INSERT "A"



WORK LIMITS MAP

- NOTES:
1. THIS MAP WAS TRACED FROM DRAWING NUMBER D-4-242E PREPARED BY SWENSON AND HAGEN CONSULTING ENGINEERS, BISMARCK, NORTH DAKOTA.
 2. THE COORDINATES ON THIS MAP ARE BASED ON THE SOUTHWEST CORNER OF SECTION 34 AS BEING ZERO.
 3. THE BEARINGS ON THIS MAP ARE BASED ON THE SOUTH LINE OF SECTION 34 AS BEING DUE WEST.
 4. THE SHADED AREAS, WITHIN THE WORK LIMITS, INDICATE LOCATIONS OF DIKES TO BE CONSTRUCTED ALONG THE OLD MISSOURI RIVER CHANNEL.
 5. THE CENTERLINE OF THE DIKES WILL BE LOCATED IN THE CENTER OF THE SHADED AREAS OR AS STAKED BY THE ENGINEER.
 6. SPOIL DISPOSAL AND WASTE AREAS, INDICATED ON THIS SHEET, WILL BE LIMITED ON THE NORTH AND WEST SIDES BY THE TOP OF THE BANKS OF THE OLD MISSOURI RIVER CHANNEL. VEGETATION ALONG THE CHANNEL BANKS WILL NOT BE DISTURBED.

OCT 23 1976

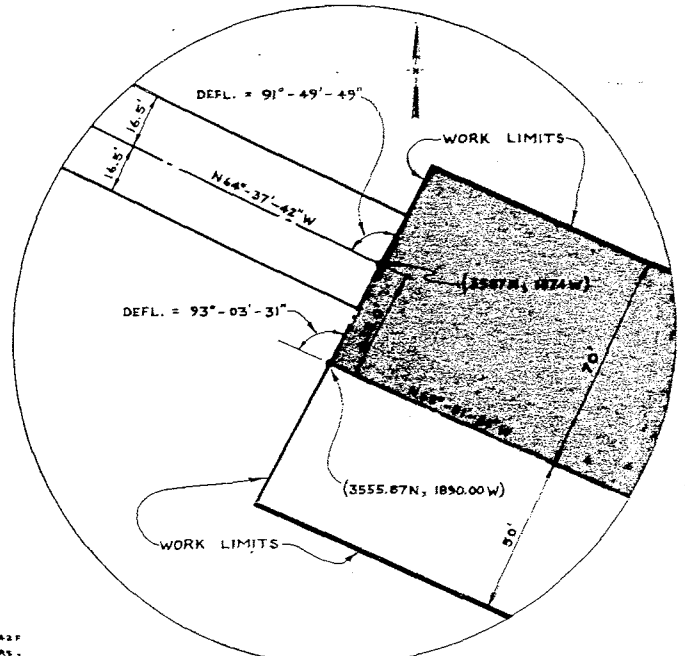
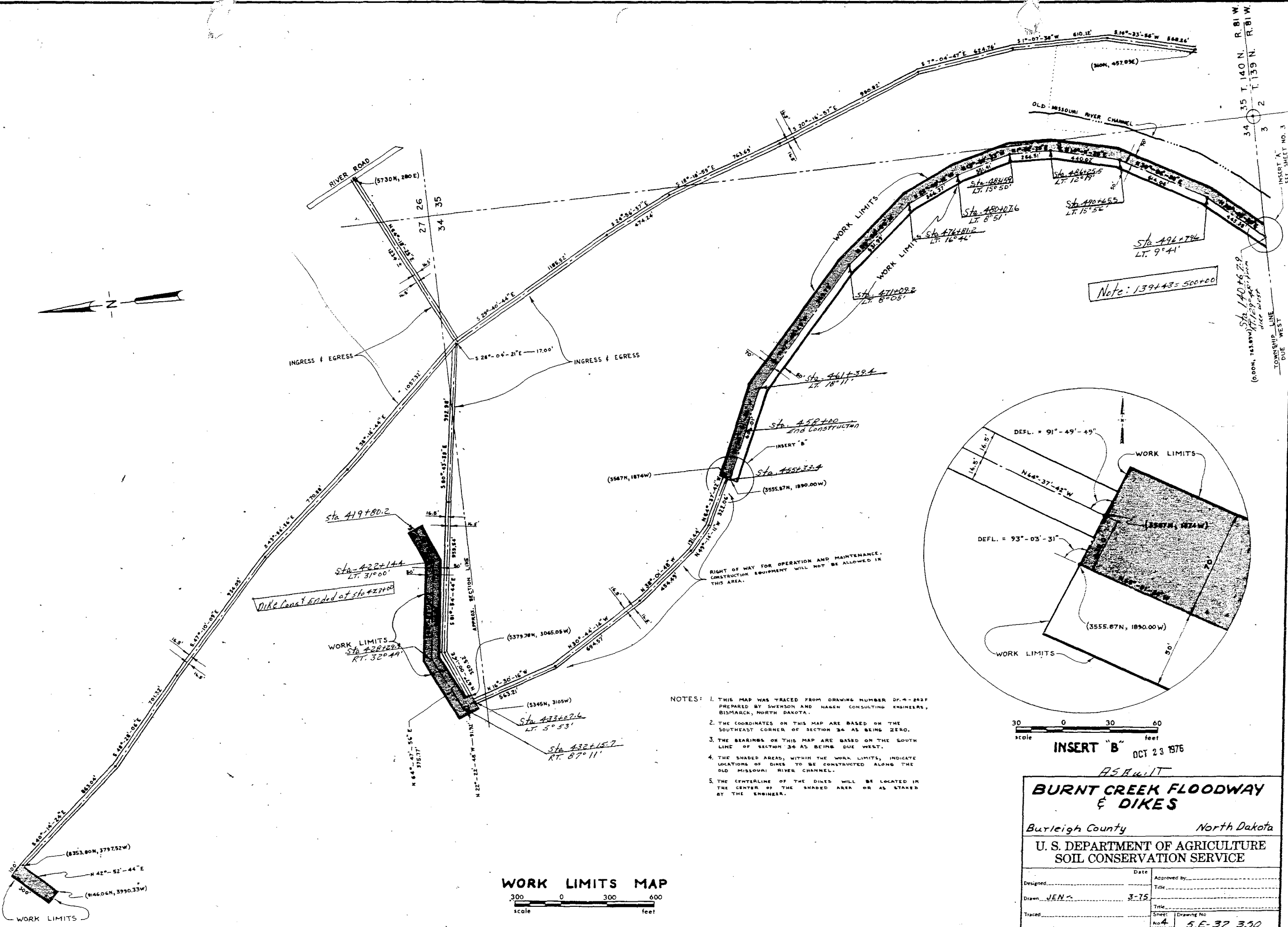
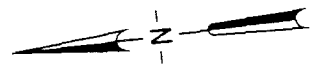
A.S. BUILT

BURNT CREEK FLOODWAY & DIKES

Burleigh County North Dakota

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn JEM	3-75	Title
Traced	Checked	Drawing No.
Checked RDS	3-75	30
		S.E. 32, 350



- NOTES:
1. THIS MAP WAS TRACED FROM DRAWING NUMBER DF-4-2027 PREPARED BY SWENSON AND HAGEN CONSULTING ENGINEERS, BISMARCK, NORTH DAKOTA.
 2. THE COORDINATES ON THIS MAP ARE BASED ON THE SOUTHEAST CORNER OF SECTION 34 AS BEING ZERO.
 3. THE BEARINGS ON THIS MAP ARE BASED ON THE SOUTH LINE OF SECTION 34 AS BEING DUE WEST.
 4. THE SHADDED AREAS, WITHIN THE WORK LIMITS, INDICATE LOCATIONS OF DIKES TO BE CONSTRUCTED ALONG THE OLD MISSOURI RIVER CHANNEL.
 5. THE CENTERLINE OF THE DIKES WILL BE LOCATED IN THE CENTER OF THE SHADDED AREA OR AS STAKED BY THE ENGINEER.

30 0 30 60
scale feet
OCT 23 1976

WORK LIMITS MAP
300 0 300 600
scale feet

ASB:MIT

BURNT CREEK FLOODWAY & DIKES

Burleigh County North Dakota

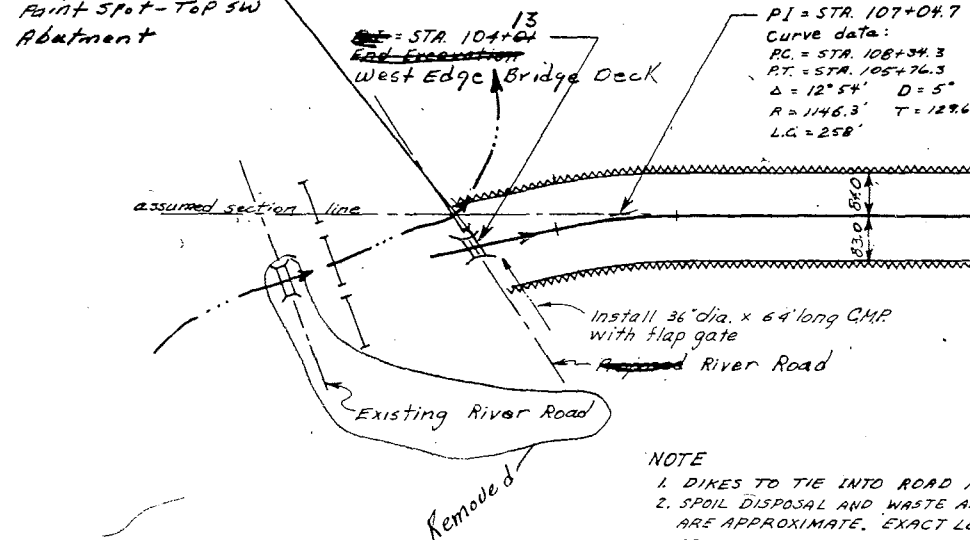
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	Date	Approved by
Drawn JEN	3-75	Title
Traced		Title
Checked RDS	3-26	Sheet No. 4
		Drawing No. 5, E-32, 350

34 35 T. 140 N. R. 81 W.
3 2 T. 139 N. R. 81 W.
INSERT "A"
SEE SHEET NO. 3
TOWNSHIP LINE
DUE WEST

Note: See sheets 3&4 for work limit boundaries of ingress and egress routes.

B.M. BL-13 Elev 1649.97
Paint Spot - Top SW
Abutment



Rural Water

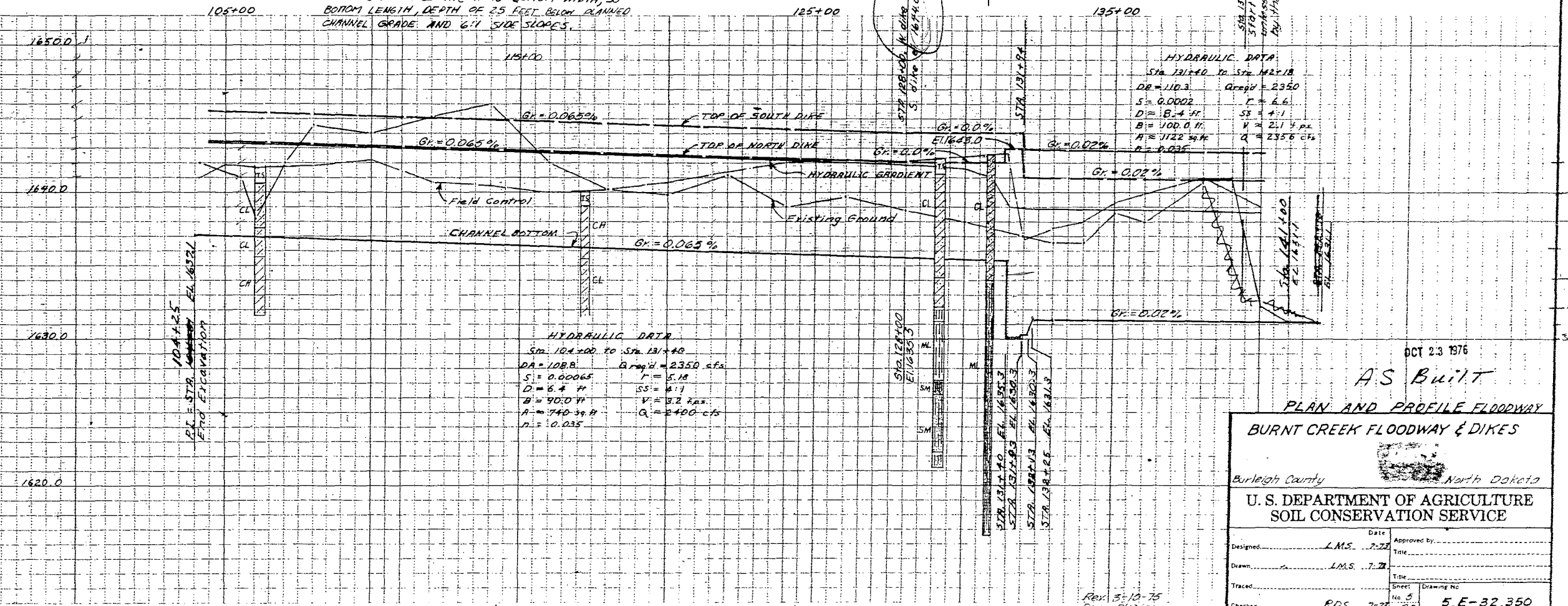
STA. 131+40
TYPE 'C' DROP
STRUCTURE

Buried Telephone

Power Line

2 OLD MISSOURI
RIVER CHANNEL

- NOTE
1. DIKES TO TIE INTO ROAD FILL
 2. SPOIL DISPOSAL AND WASTE AREA LIMITS ARE APPROXIMATE. EXACT LOCATIONS WILL BE AS STAKED BY THE ENGINEER.
 3. DEBRIS BASIN IS TO BE INSTALLED IN CHANNEL BOTTOM PRIOR TO FLOODWAY OR STRUCTURAL EXCAVATION. THE DEBRIS BASIN SHALL HAVE A 70' BOTTOM WIDTH, 50' BOTTOM LENGTH, DEPTH OF 2.5 FEET BELOW PLANNED CHANNEL GRADE AND 6:1 SIDE SLOPES.



HYDRAULIC DATA
Sta. 131+40 to Sta. 142+18
DA = 110.3 Q req'd = 2350
S = 0.0002 T = 6.6
D = 8.4 ft SS = 4:1
B = 100.0 ft V = 2.1 f.p.s.
A = 1122 sq ft Q = 2356 cfs
n = 0.035

HYDRAULIC DATA
Sta. 104+00 to Sta. 131+40
DA = 108.8 Q req'd = 2350 cfs
S = 0.00065 T = 5.18
D = 6.4 ft SS = 4:1
B = 90.0 ft V = 3.2 f.p.s.
A = 740 sq ft Q = 2400 cfs
n = 0.035

OCT 23 1976

AS BUILT

PLAN AND PROFILE FLOODWAY
BURNT CREEK FLOODWAY & DIKES

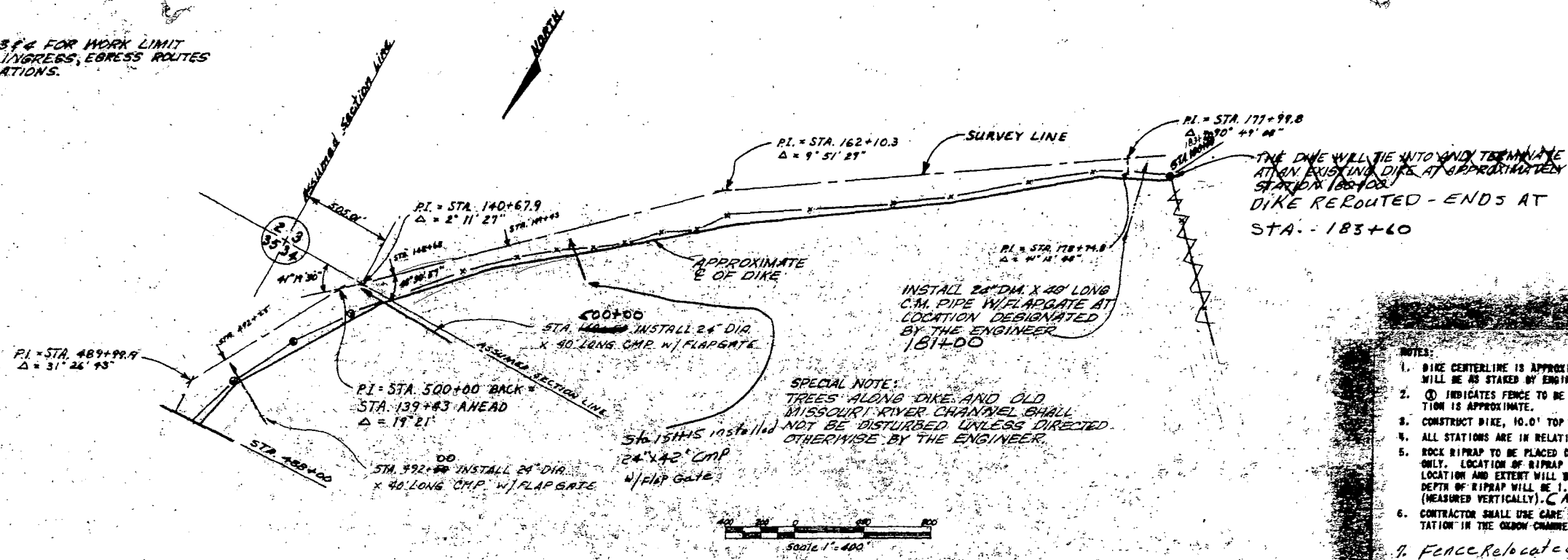
Burleigh County North Dakota

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	LMS	Date	7-77	Approved by	
Drawn	LMS	Date	7-77	Title	
Traced		Date		Sheet	
Checked	R.R.S.	Date	7-77	Drawing No.	5, E-32,350

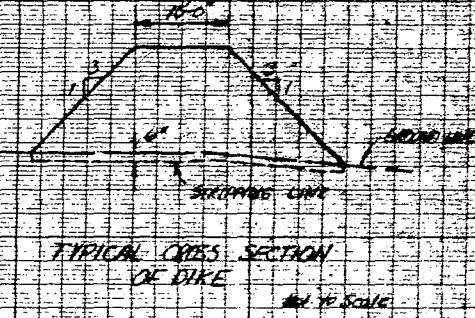
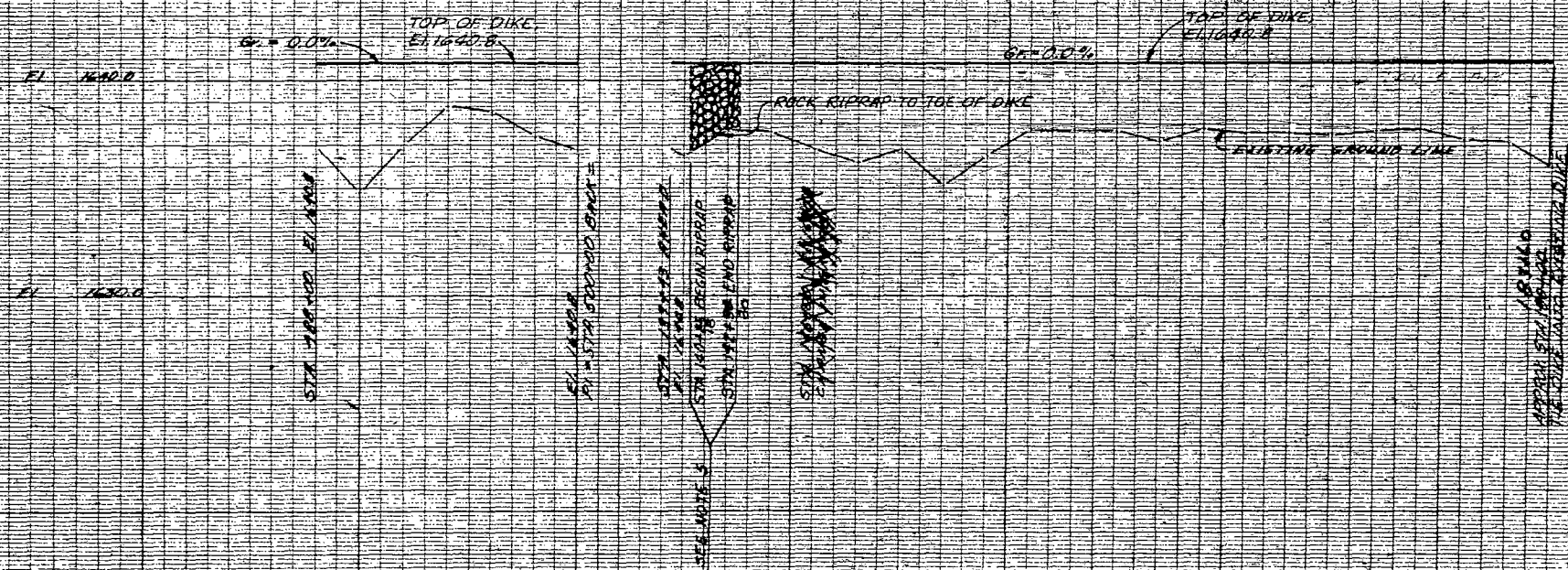
REV 3-10-75
REV 5/13/75

NOTE:
SEE SHEETS 5 & 6 FOR WORK LIMIT
BOUNDARIES, INGRESS, EGRESS ROUTES
AND DIKE LOCATIONS.



- NOTES:
- DIKE CENTERLINE IS APPROXIMATE. EXACT CENTERLINE WILL BE AS STAKED BY ENGINEER (SEE SHEETS 5 AND 6).
 - ⊙ INDICATES FENCE TO BE REMOVED. FENCE LINE LOCATION IS APPROXIMATE.
 - CONSTRUCT DIKE, 10.0' TOP WIDTH AND 3:1 SIDE SLOPES.
 - ALL STATIONS ARE IN RELATION TO SURVEY LINE.
 - ROCK RIPRAP TO BE PLACED ON INSIDE SLOPE OF DIKE ONLY. LOCATION OF RIPRAP IS APPROXIMATE. EXACT LOCATION AND EXTENT WILL BE AS DIRECTED BY ENGINEER. DEPTH OF RIPRAP WILL BE 1.0' WITH 0.5' BEDDING (MEASURED VERTICALLY). (RIPRAP 15' WIDE)
 - CONTRACTOR SHALL USE CARE TO AVOID DISTURBING VEGETATION IN THE CROWN CHANNEL.
 - FENCE RELOCATED ON TOP OF CONSTRUCTED DIKE.

490+00 500+00 195+00 177+00 165+00 177+00 185+00 195+00



OCT 23 1976
AS BUILT
PLAN AND PROFILE OF DIKE
BURNT CREEK FLOODWAY & DIKES

Burleigh County, North Dakota
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date	Approved by
Designed: WILLIAM M. SQUIRE 7-78	Title
Drawn: L.M.S. 9-78	Checked
Traced	Checked
Checked: DONALD A. SQUIRE DE 7-78	Sheet No. 5, E-32, 350

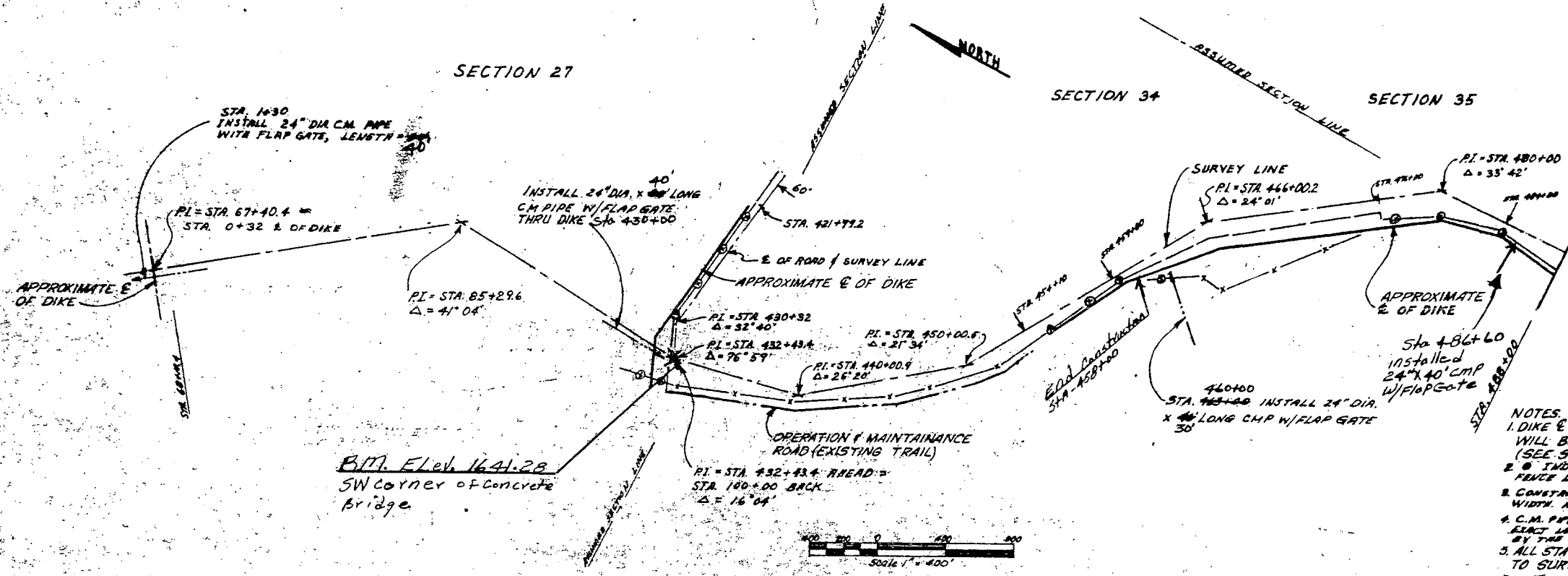
REV: 8/12/75
REV: 10/12/78
REV: 8/13/73

NOTE:
SEE SHEETS 3 & 4 FOR WORK LIMIT
BOUNDARIES, INGRESS, EGRESS
ROUTES AND DIKE LOCATIONS

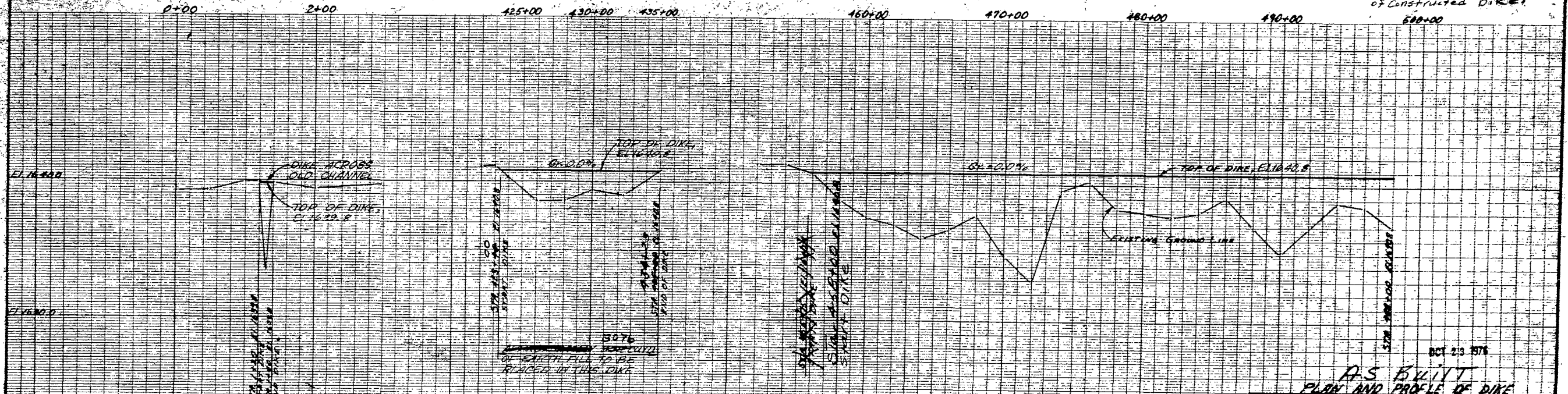
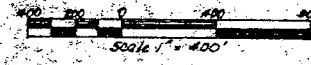
SECTION 27

SECTION 34

SECTION 35



- NOTES:
1. DIKE E IS APPROXIMATE. EXACT E WILL BE AS STAKED BY ENGINEER (SEE SHEETS 3 & 4)
 2. O INDICATES FENCE TO BE REMOVED. FENCE LINE LOCATION IS APPROXIMATE.
 3. CONSTRUCT DIKE WITH 40' TOP WIDTH AND 3:1 SIDE SLOPES.
 4. C.M. PIPE LOCATIONS ARE APPROXIMATE. EXACT LOCATION WILL BE DETERMINED BY THE ENGINEER.
 5. ALL STATIONS ARE IN RELATION TO SURVEY LINE.
 6. FENCE RELOCATED ON TOP OF CONSTRUCTED DIKE.



BURNT CREEK FLOODWAY & DIKES

Burleigh County North Dakota

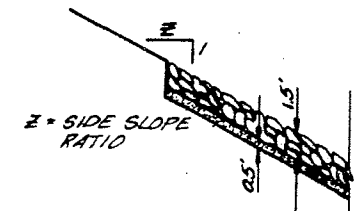
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	LELAND N. SWELE 7-75	Approved by	
Drawn	L.M.S. 7-75	Title	
Traced		Date	
Checked	ROBERT D. SANDOZ 7-75	Sheet	No. 7
		Drawing No.	5, E-52, 350

REV. 3-10-75

OCT 23 1976

A.S. BYLINT
PLAN AND PROFILE OF DIKE



PARTIAL SECTION OF ROCK RIPRAP WITH BEDDING ON SLOPES OF FLOODWAY (NOT TO SCALE)

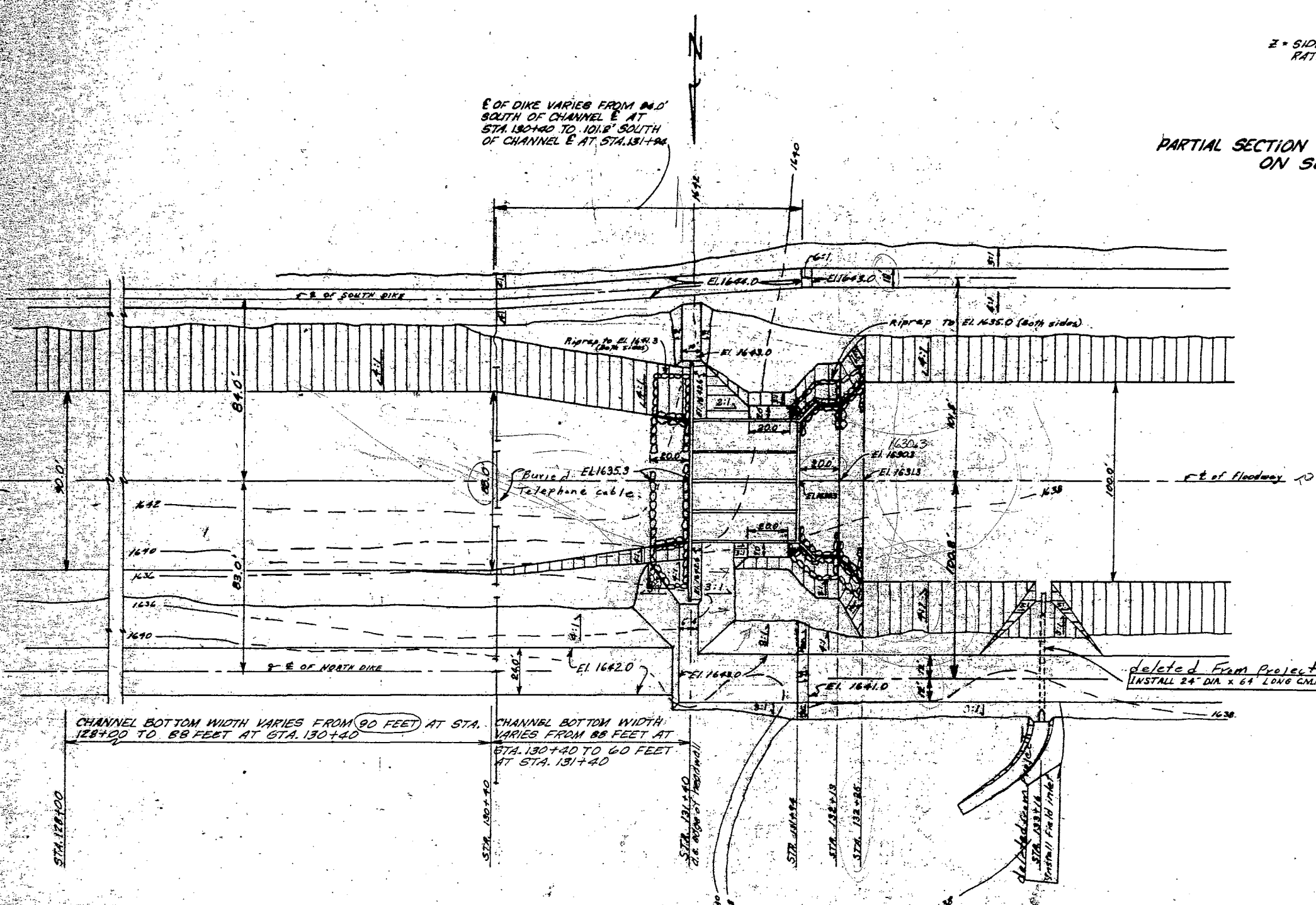
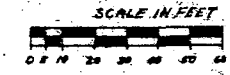
E OF DIKE VARIES FROM 84.0' SOUTH OF CHANNEL E AT STA. 130+00 TO 101.8' SOUTH OF CHANNEL E AT STA. 131+40

QUANTITIES:
RIPRAP & BEDDING 430 CU. YD.

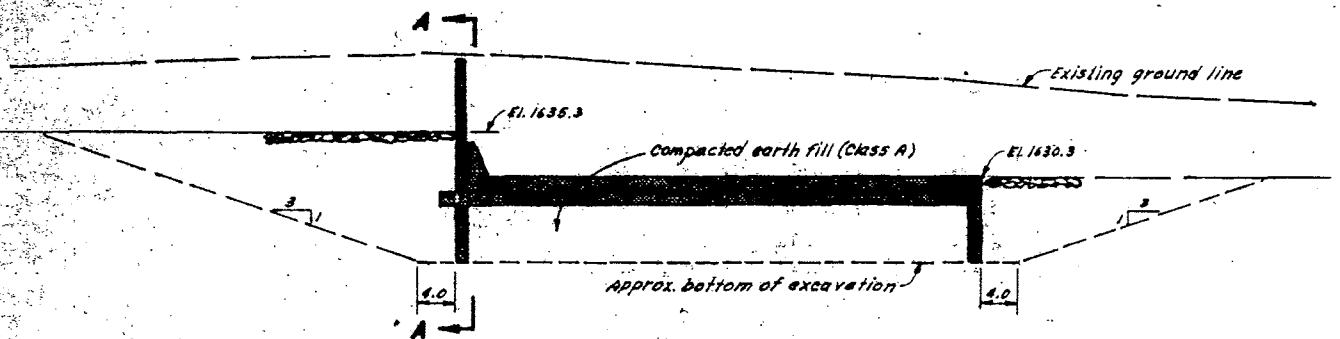
NOTES: Deleted from Project
1. CONSTRUCT FIELD INLET AS DIRECTED BY THE ENGINEER; INLET CHANNEL, 10.0' BOTTOM WIDTH, 3:1 SIDE SLOPES.
2. Rock riprap 1.5' thick plus 0.5' bedding measured vertically.

AS BUILT OCT 23 1976
STATION 131+40
PLAN VIEW TYPE "C" DROP

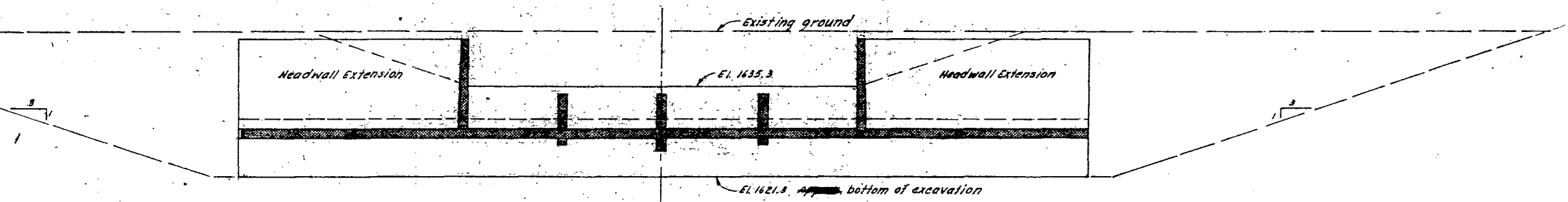
BURNT CREEK FLOODWAY & DIKES	
Burleigh County	North Dakota
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed LELAND M. SWEENEY 7-71	Date 7-71
Drawn L.M.S. 7-71	Approved by
Checked RONALD D. SWANSON 2-71	Title
Rev. 3-10-75 Rev. 10-12-73	Sheet No. 8 of 22
	Drawing No. 5, E-32, 350



Flow →



PROFILE ALONG E OF STRUCTURE



SECTION A-A

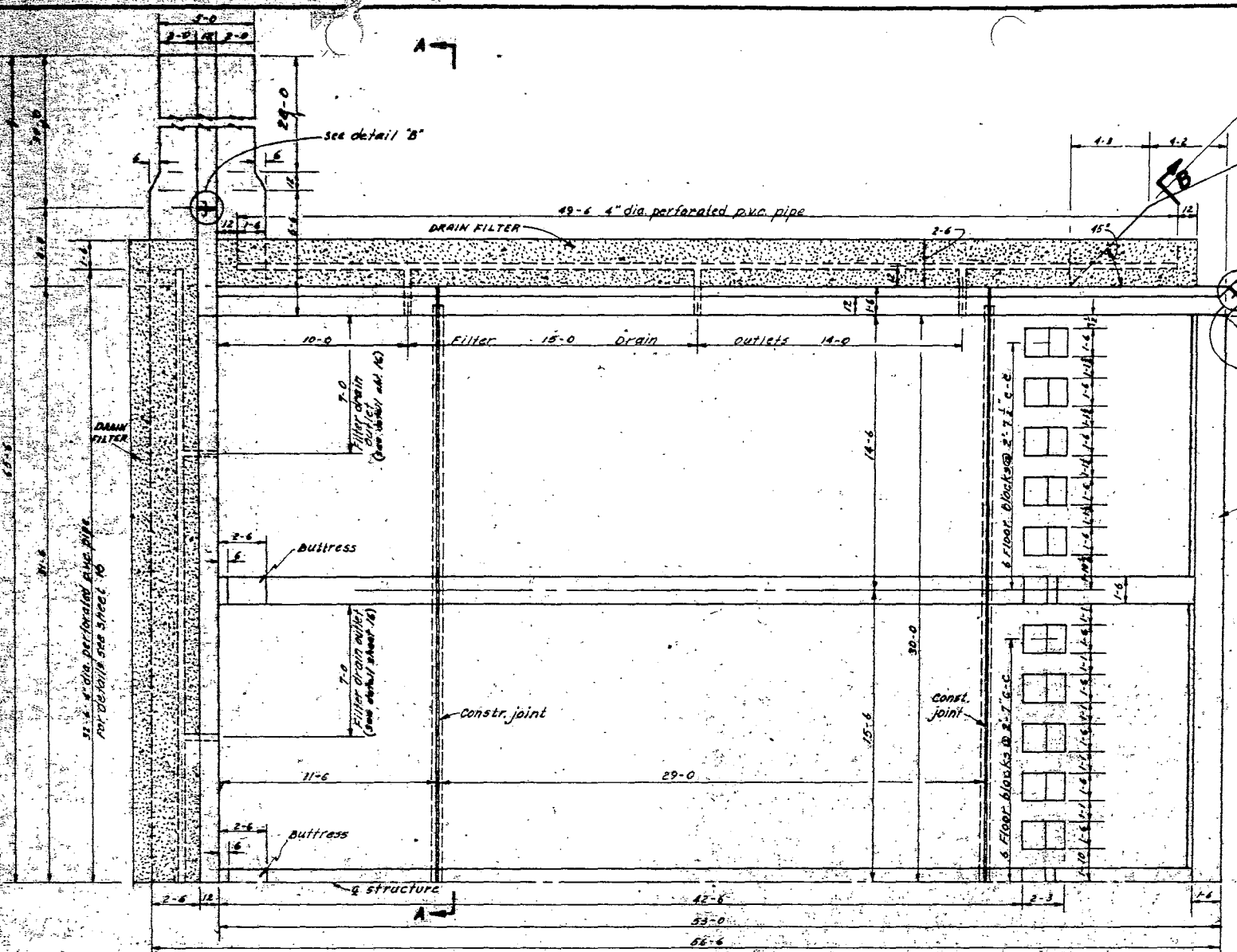


- NOTE:
1. The side slopes on the excavation for the concrete structure may be constructed steeper than 2:1 with the engineers approval, if slope stability, safety and other construction requirements are met.
 2. The structural excavation is approximately 10,000 cubic yards. This includes the excavation for the ppc inlets.

AS BUILT
 DETAILS OF OCT 23 1976
 STRUCTURAL EXCAVATION LIMITS

BURNT CREEK FLOODWAY & DIKES	
Burleigh County	North Dakota
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Date: 7-78	Approved by:
Designed by: M. Seale	Title:
Drawn: J.R.D. 7-78	Title:
Traced:	Title:
Checked: RONALD R. SANDOZ	Drawing No. 5, E-32,350

REV. 3-10-75
 BY 6/13/73



HALF PLAN

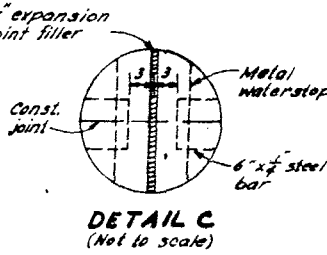
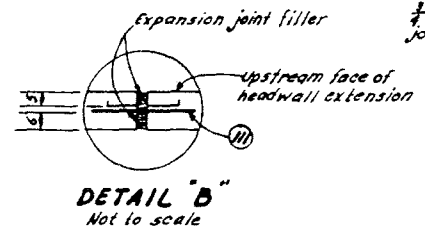
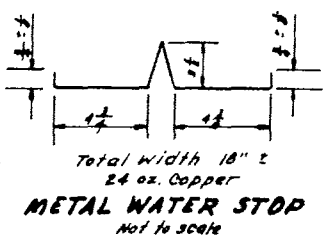
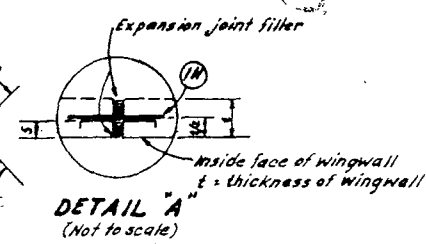
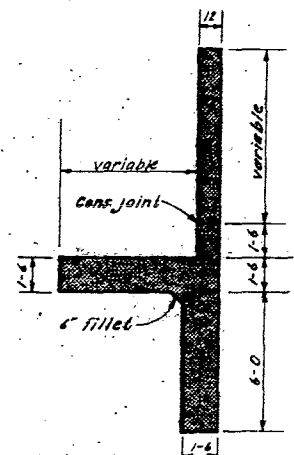
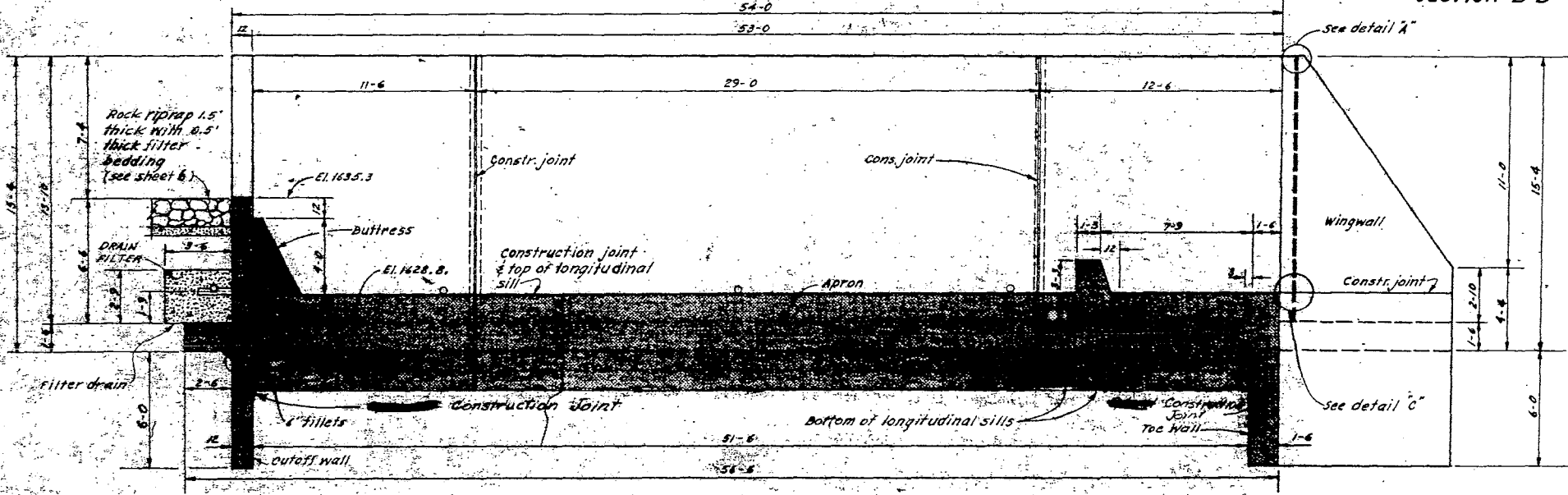
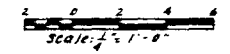


TABLE OF QUANTITIES

ITEM NO	ITEM	UNIT	QUANTITY
1.	Concrete, class	Cu. Yd.	490.6
2.	Steel bar reinforcement	Lb.	65,265
3.	Drain-filler material	Cu. Yd.	50
4.	Drain-4" dia. perforated p.v.c. pipe (including fittings & outlet pipes)	Lin. Ft.	187.0



- NOTES:
1. CHAMFER ALL EXPOSED EDGES 3/4".
 2. SECURE EXPANSION JOINT FILLER TO CONCRETE FACE LAST POURED WITH 100 CEMENT COATED NAILS @ 12" C-C.
 3. DRAIN FILTER MATERIAL SHALL BE A REASONABLY WELL-GRADED SAND-GRAVEL MIXTURE WITH 15% LARGER THAN 1/4" MAXIMUM SIZE OF 3" AND NOT MORE THAN 10% PASSING A NO 10 SIEVE AND NOT MORE THAN 37% PASSING A NO 200 SIEVE.
 4. PLUG ENDS OF PERFORATED PIPE WITH CONCRETE.
 5. FOR DETAILS OF CONSTRUCTION JOINTS SEE SHEET 9.
 6. IF THE TOE WALL, CUTOFF WALL, AND BOTTOMS OF THE LONGITUDINAL SILLS ARE FORMED IN EARTH, ADD 1 INCH OF CONCRETE THICKNESS TO EACH SIDE.
 7. The upstream face of the Headwall below the wier was coated with asphaltic foundation coating.



CROSS SECTION ALONG E OF STRUCTURE

AS BUILT OCT 23 1976

BURNT CREEK FLOODWAY & DIKES

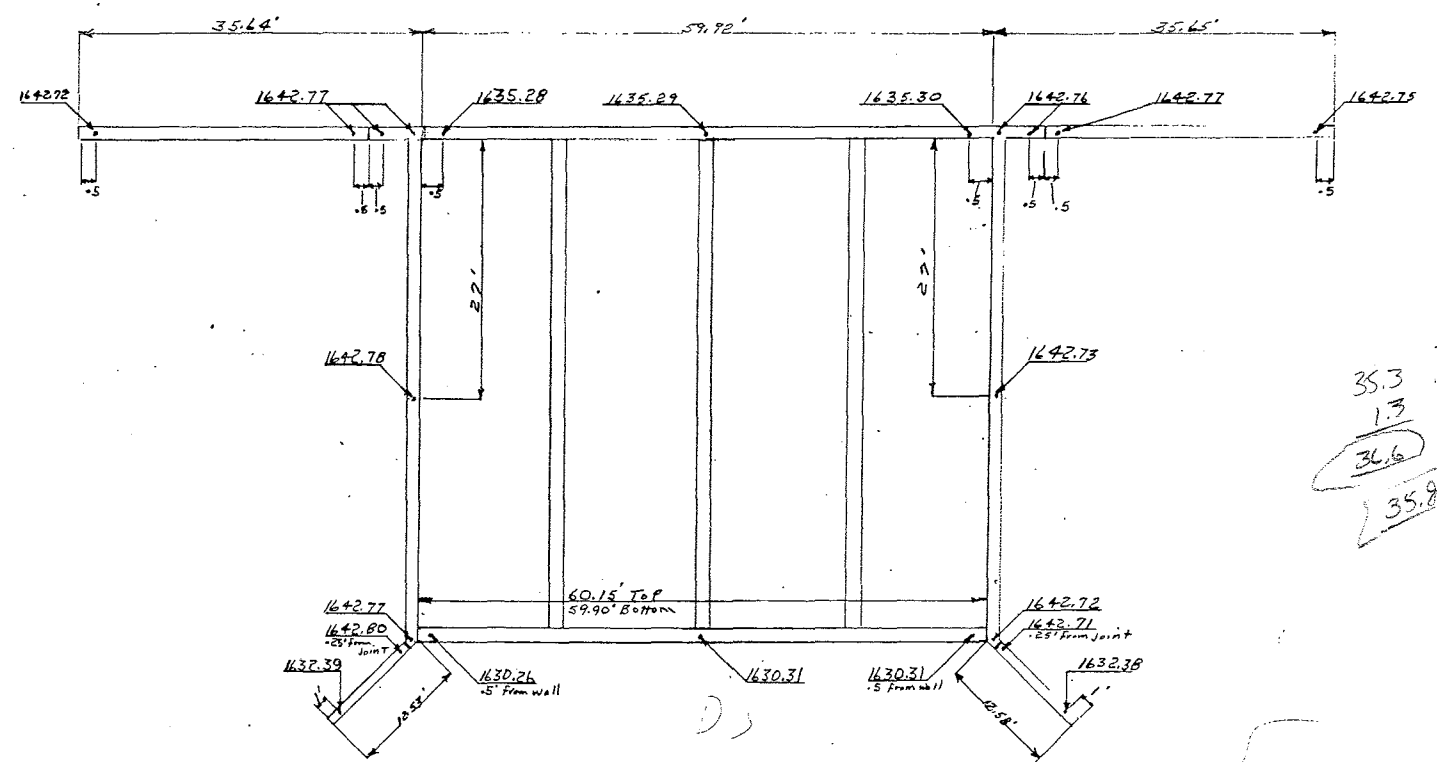
Burleigh County, North Dakota

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: WELAND M. SAELE 6-73
Drawn: J.R.D. 6-77
Traced: _____
Checked: RONALD D. SANDY 8-7-77

Date: _____
Approved by: _____
Title: _____
Sheet No. 10 of 20
Drawing No. **5, E-32, 350**

Rev. 3-10-75
Rev. 8/15/75



35.3
 1.3
 36.6
 35.8
 35.3
 2.5 ft off
 Survey
 8 ft

Note: Elev. & dimensions taken after structure was backed filled.

OCT 23 1976

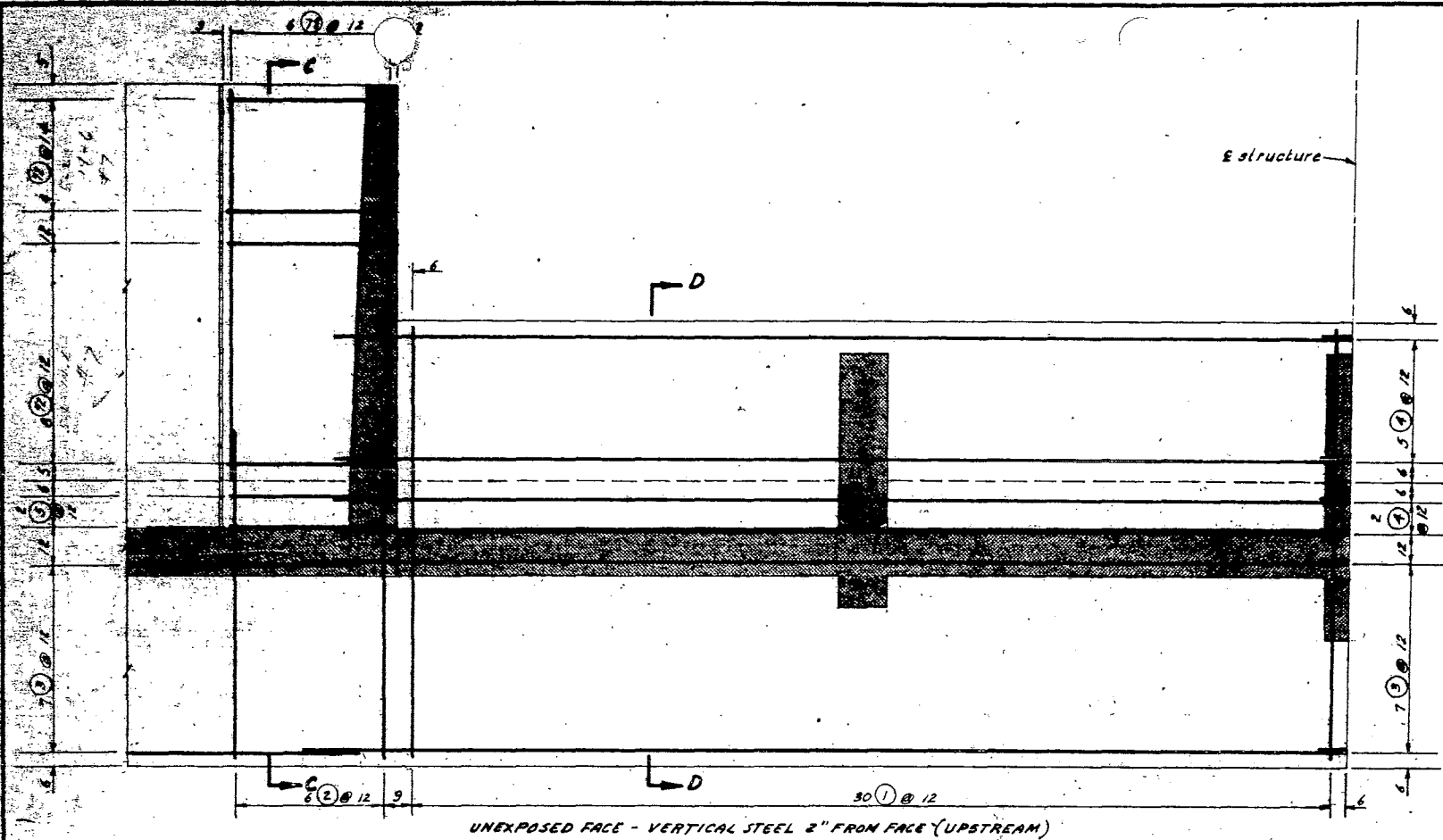
AS BUILT

Burnt Creek Drip structure
Scale: 1" = 10'

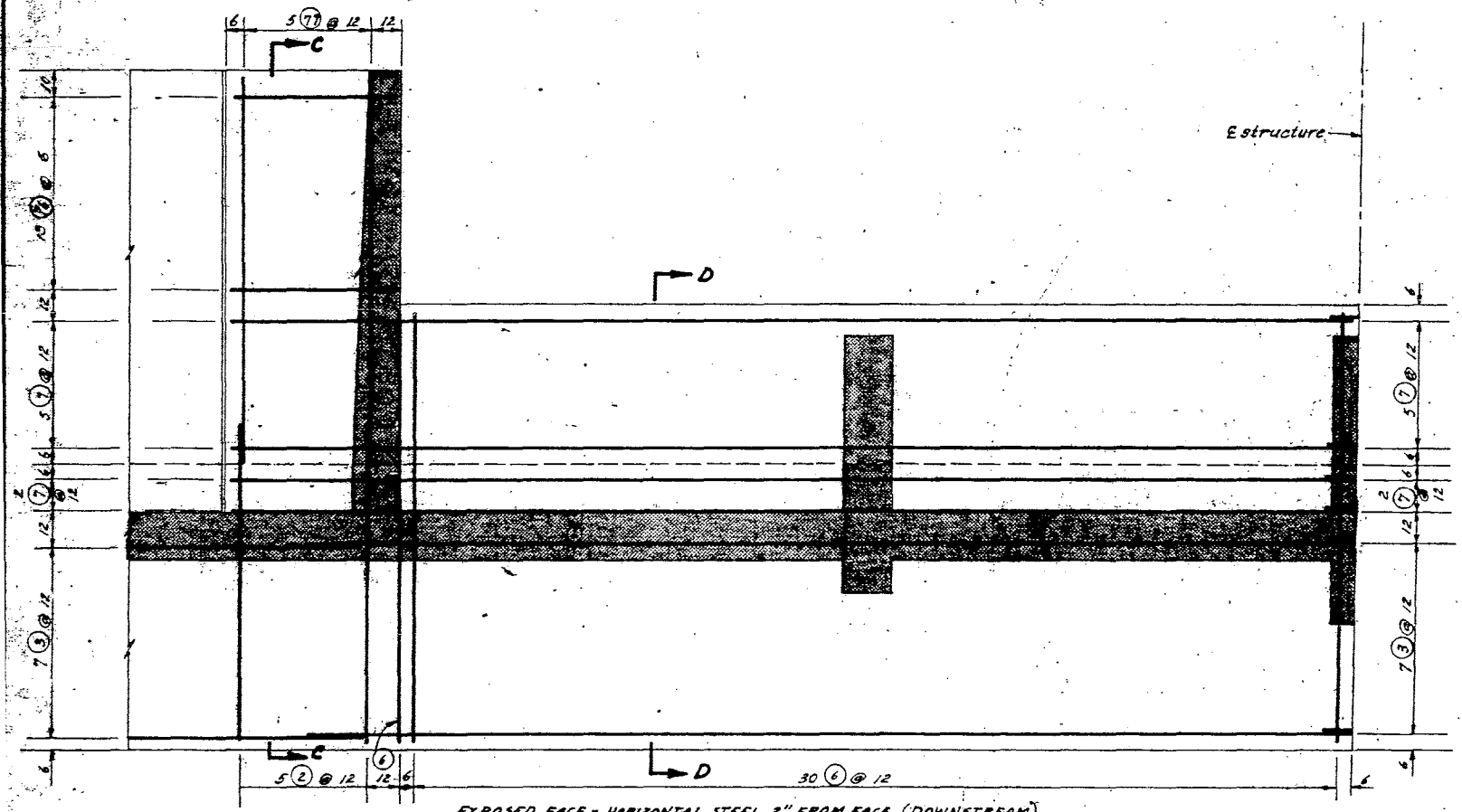
**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

Designed _____	Approved by _____
Drawn <i>C. Sted</i>	Title _____
Traced _____	_____
Checked _____	_____

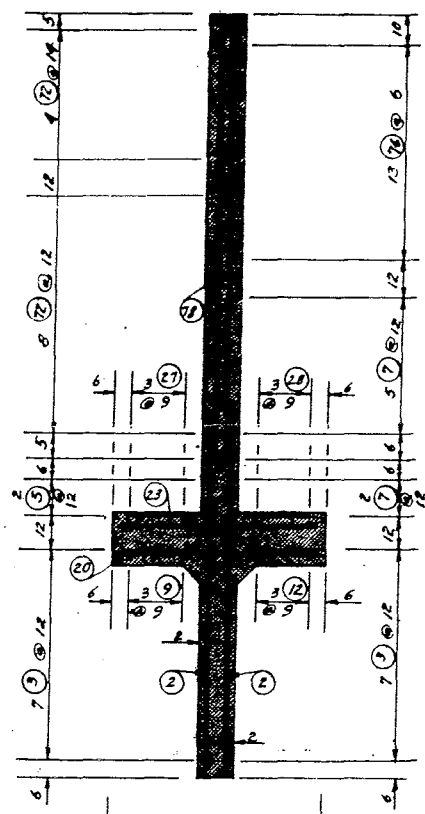
Drawing No. 5, E-32,350
20



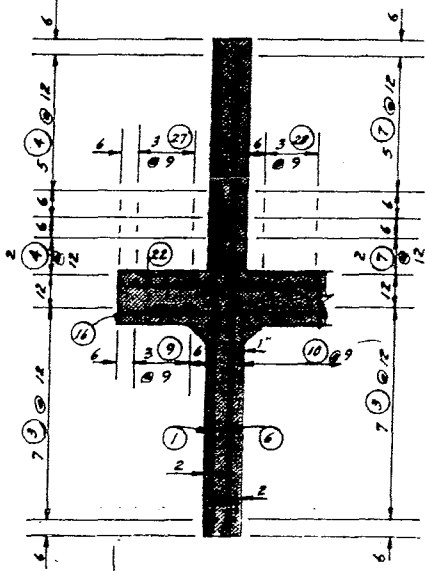
UNEXPOSED FACE - VERTICAL STEEL 2" FROM FACE (UPSTREAM)



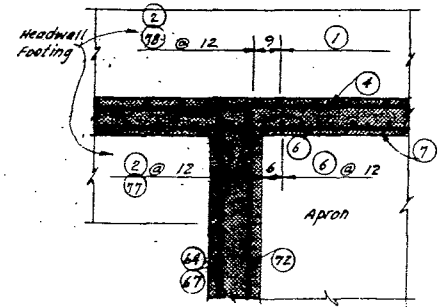
EXPOSED FACE - HORIZONTAL STEEL 2" FROM FACE (DOWNSTREAM)
SECTION ELEVATION OF HEADWALL (HALF PLAN) K-K



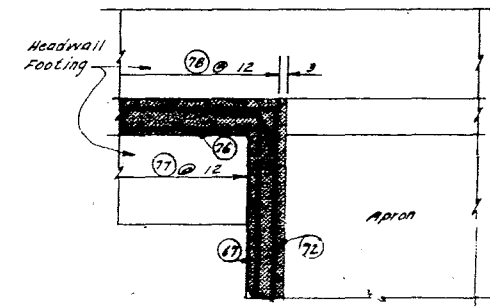
SECTION C-C



SECTION D-D

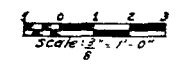


BELOW CREST



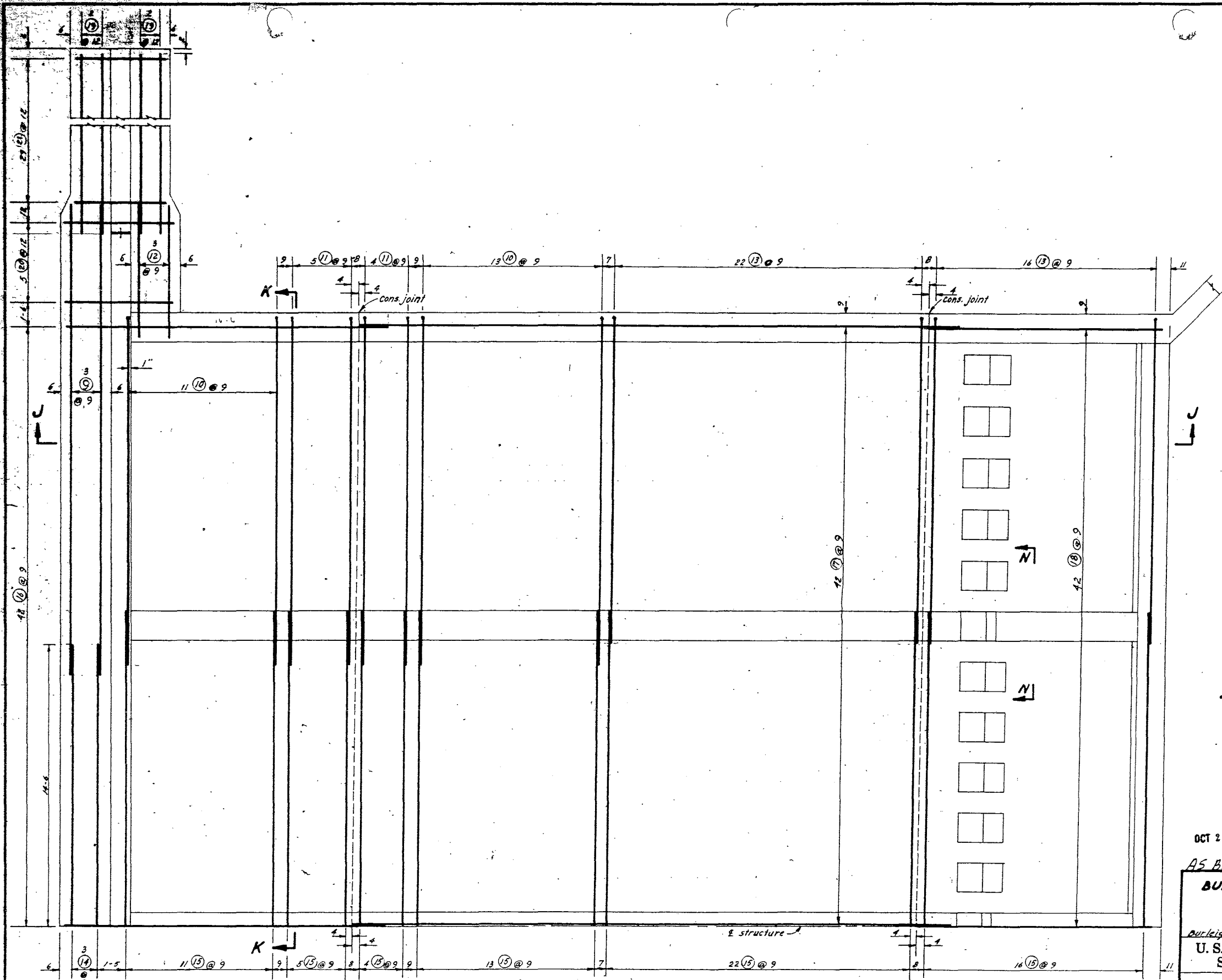
ABOVE CREST

PLAN - JUNCTION OF SIDEWALL & HEADWALL EXTENSION
OCT 23 1976
AS BUILT



REV. 3-10-75
REV. 8/13/73

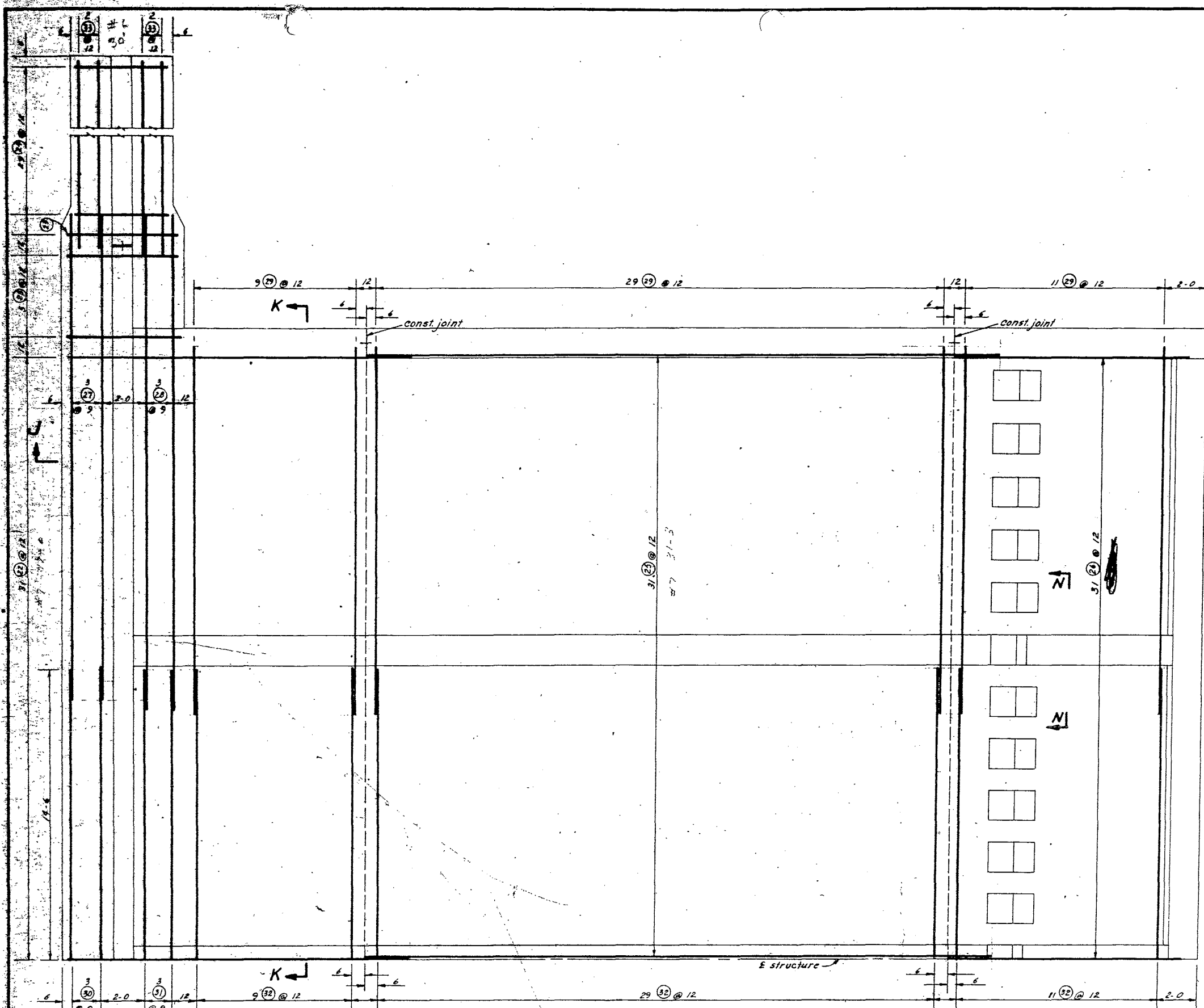
Burleigh County, North Dakota	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed: LELAND M. SAELE 6-73	Date: 6-73
Drawn: L.R.D. 6-73	Approved By: _____
Traced: _____	Title: _____
Checked: RONALD D. SANDER, DE. 7-73	Sheet: 12 of 20
	Drawing No. 5, E-32,350



TRANSVERSE STEEL 3" FROM FACE
STEEL IN BOTTOM FACE
HALF PLAN

OCT 23 1976
AS Built
Scale 3/8" = 1'-0"

BURNT CREEK FLOODWAY & DIKES	
Burlingame County, North Dakota	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed: <u>LELAND M. SOELLE</u> 6-73	Date: _____
Drawn: <u>J.R.D.</u> 6-73	Approved by: _____
Traced: _____	Title: _____
Checked: <u>RONALD D. SANDOZ</u> 7-73	Sheet: <u>13</u> of <u>20</u>
Rev: 3-10-75	Drawing No: 5,E-32,350



TRANSVERSE STEEL 2" FROM FACE
 STEEL IN TOP FACE
 HALF PLAN

OCT 23 1976
 AS Built
 scale 1/2" = 1'-0"

BURNT CREEK FLOODWAY & DIKES

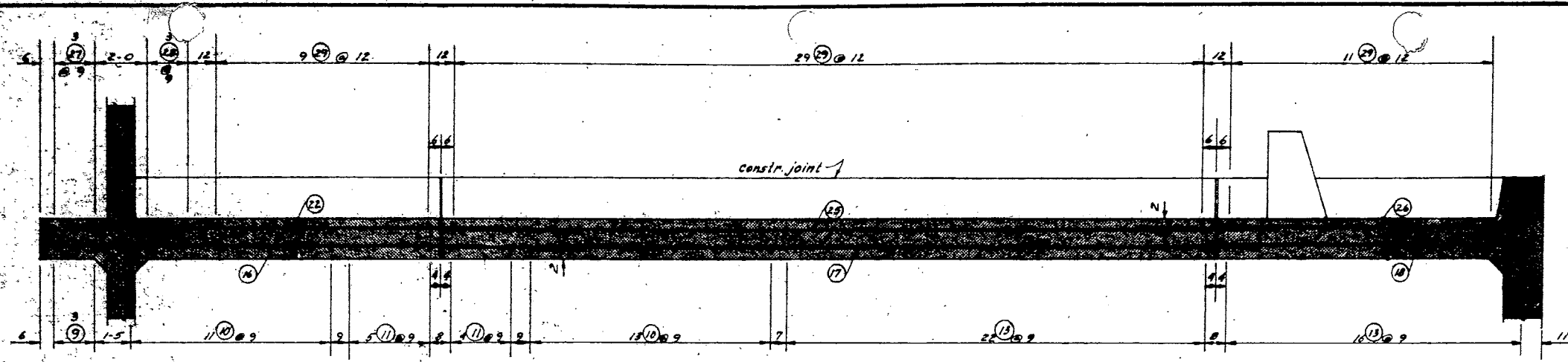
Burling County, North Dakota

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

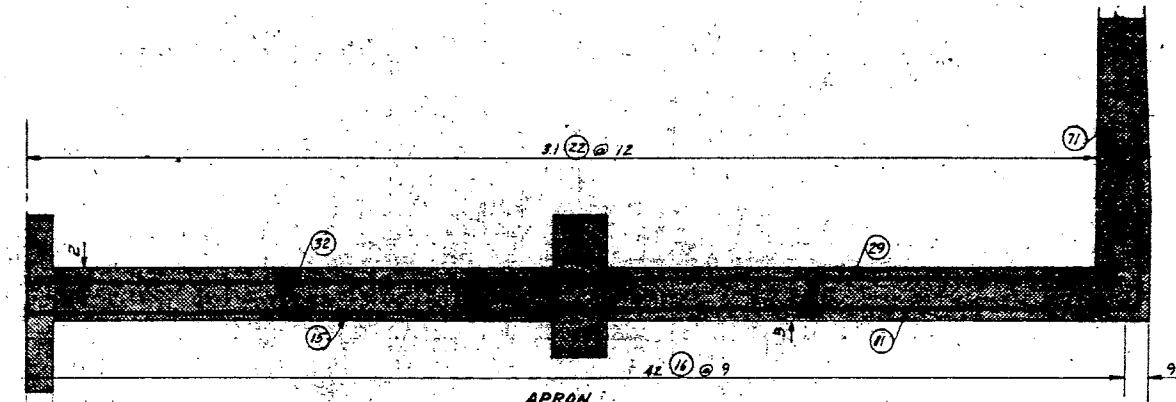
Designed	LELAND M. SOBIE	Date	6-72	Approved by	
Drawn	J.R.D.	Date	6-72	Title	
Traced		Sheet	14	Drawing No.	
Checked	RONALD R. SIMON	of	20		

Rev. 5-10-75

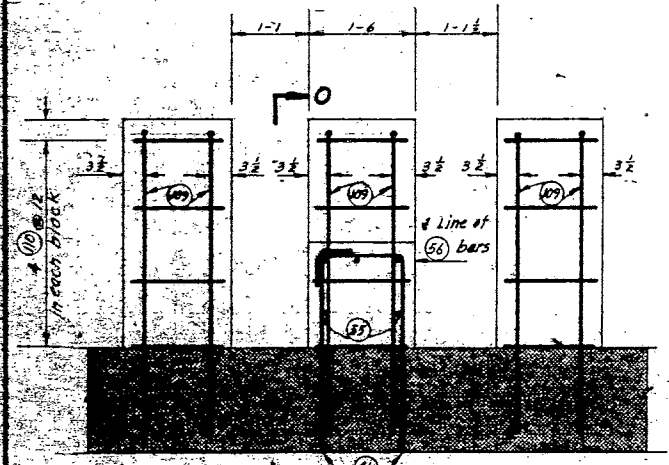
5, E-32, 350



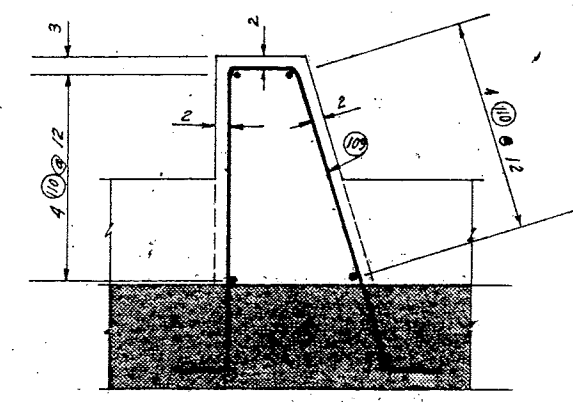
(APRON)
SECTION J-J



(APRON)
SECTION K-K (HALF PLAN)

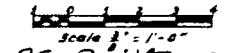
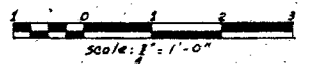


SECTION N-N



SECTION O-O

LONGITUDINAL SILL & FLOOR BLOCKS

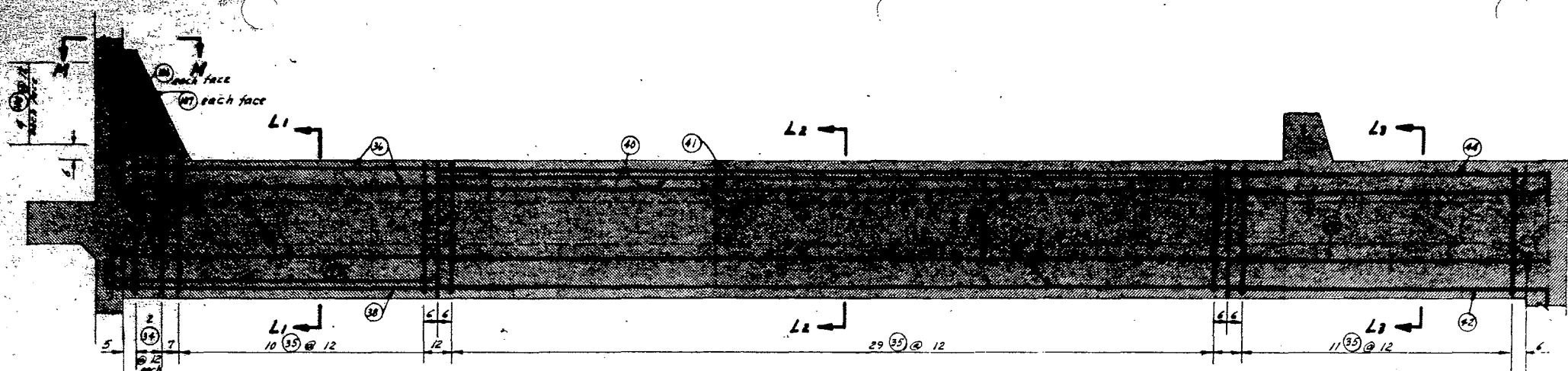


AS BUILT OCT 23 1976

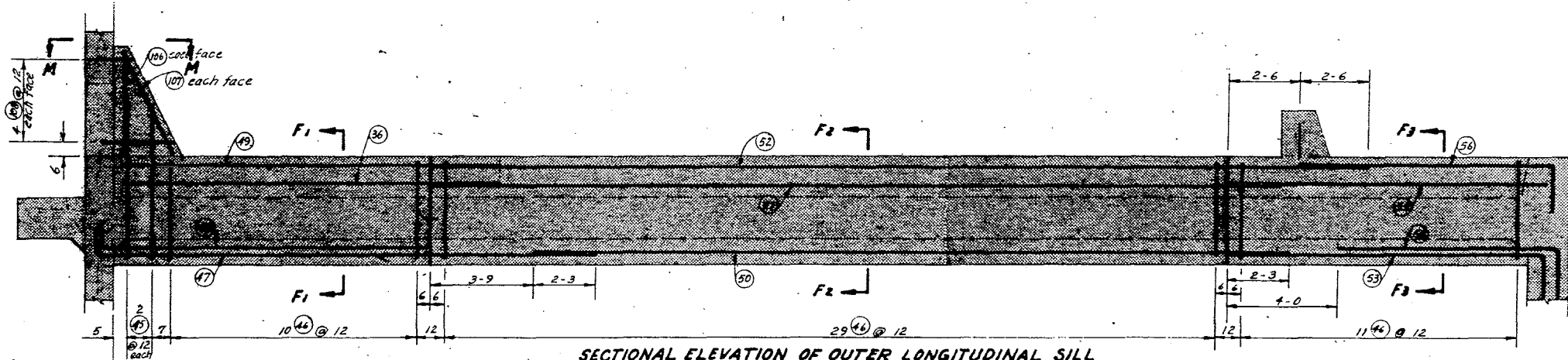
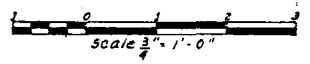
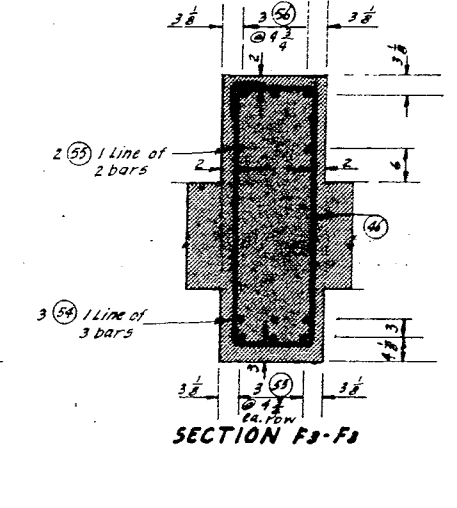
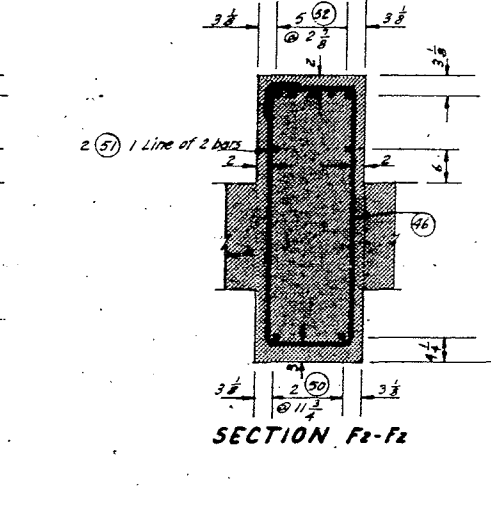
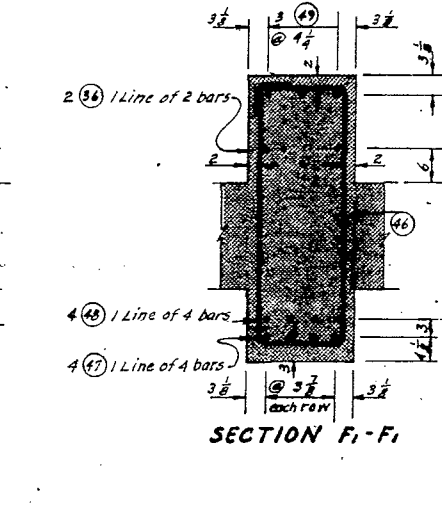
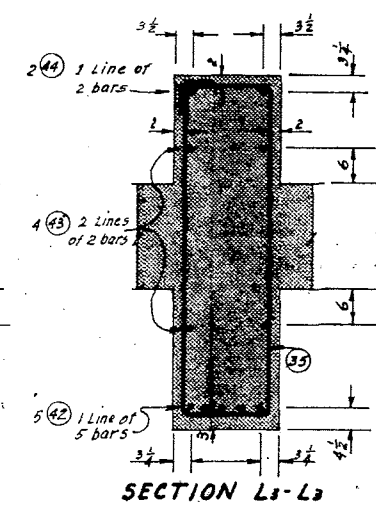
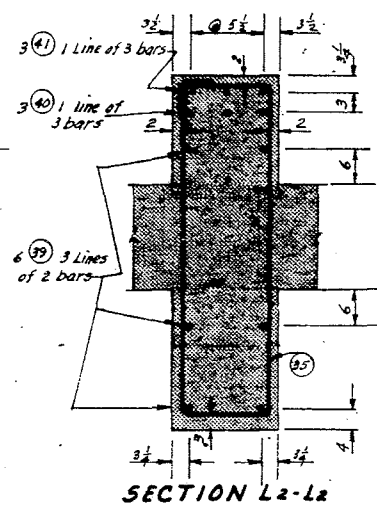
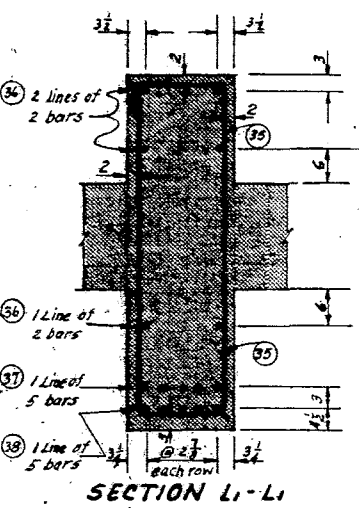
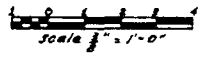
BURNT CREEK FLOODWAY & DIKES
Burleigh County North Dakota
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Design: Lehard, M. S. 6-75	Date: 6-75	Approved by:
Drawn: J.R.D.	6-75	Title:
Traced:		Sheet: 15
Checked: B. D. D. Sande, Dec 21st		Drawing No: 5, E-32,350

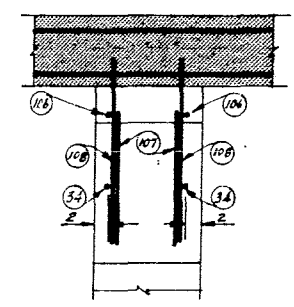
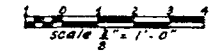
REV. 3-10-75



SECTIONAL ELEVATION OF CENTER LONGITUDINAL SILL



SECTIONAL ELEVATION OF OUTER LONGITUDINAL SILL



SECTION M-M (BUTTRESS)

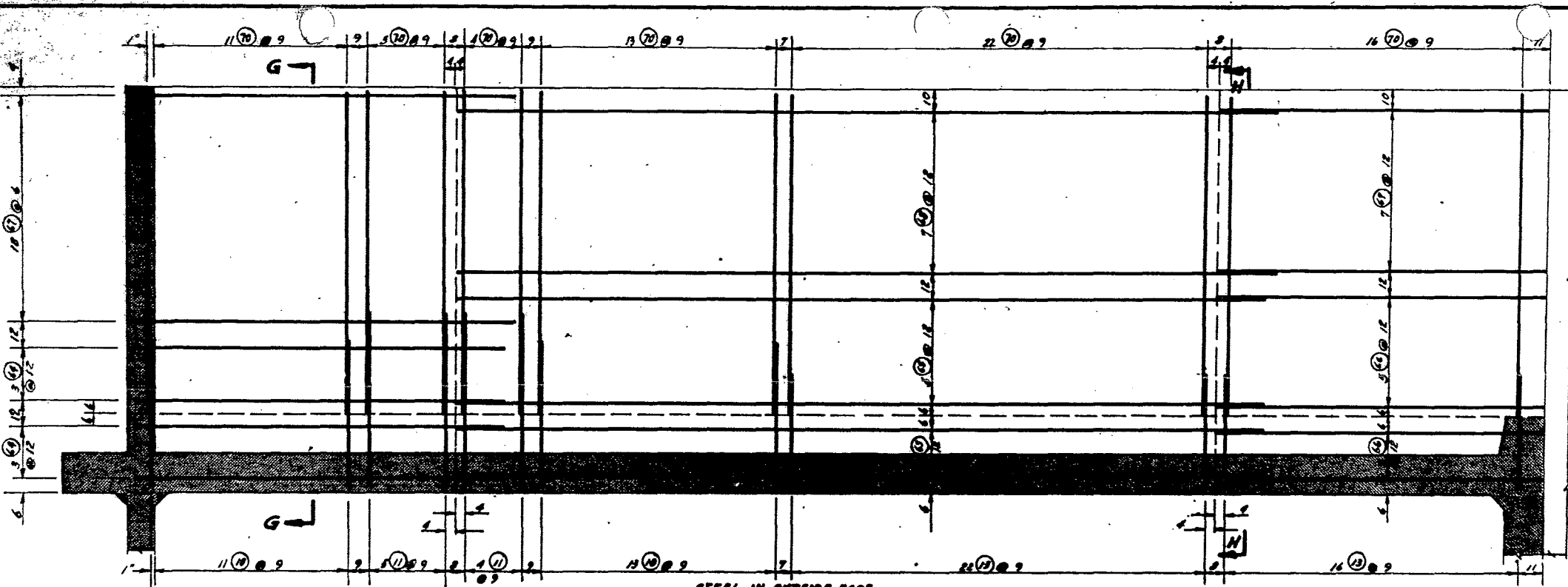
AS BUILT OCT 23 1976

BURNT CREEK FLOODWAY & DIKES

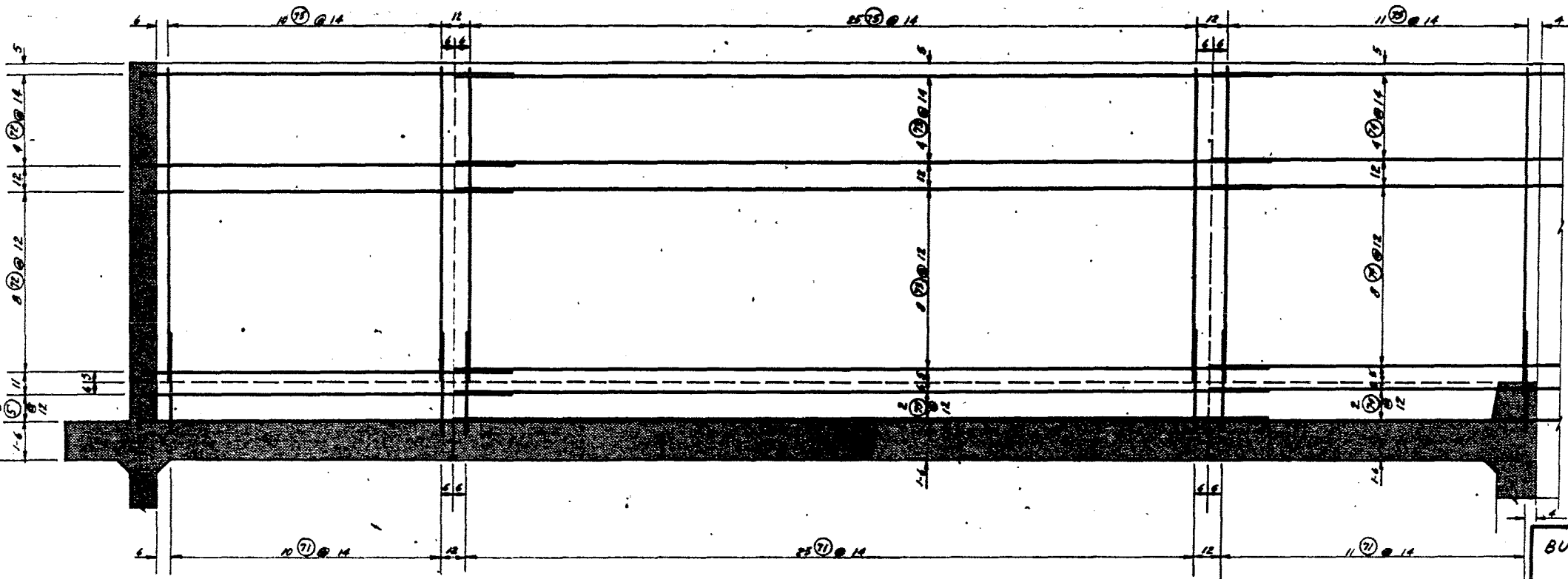
Burleigh County North Dakota
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed by <i>Leland M. Saska</i>	Date <i>6/73</i>	Approved by	Title
Drawn by <i>J.R.D.</i>	Date <i>6/73</i>	Traced	Sheet
Checked by <i>Ronald D. Sando</i>	Date <i>11/78</i>	Drawing No.	<i>5, E-32, 360</i>

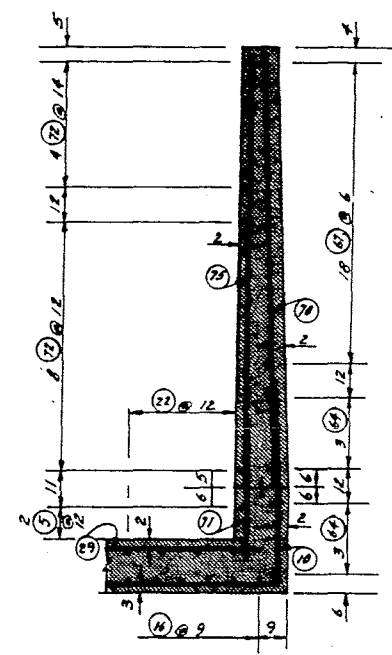
Rev. 5-10-75



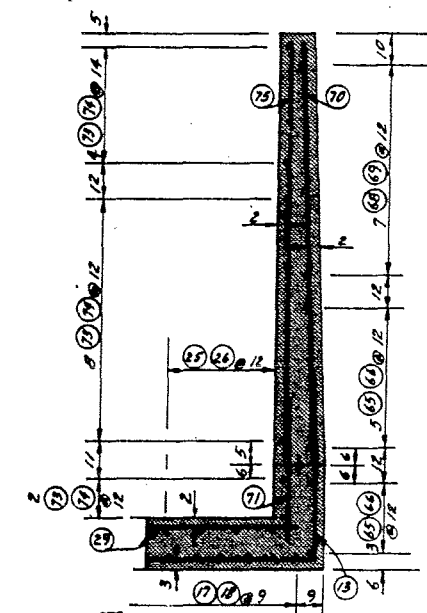
STEEL IN OUTSIDE FACE
VERTICAL STEEL 2" FROM FACE
SECTION ELEVATION OF SIDEWALL



STEEL IN INSIDE FACE
HORIZONTAL STEEL 2" FROM FACE
SECTION ELEVATION OF SIDEWALL



SECTION G-G

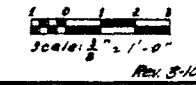


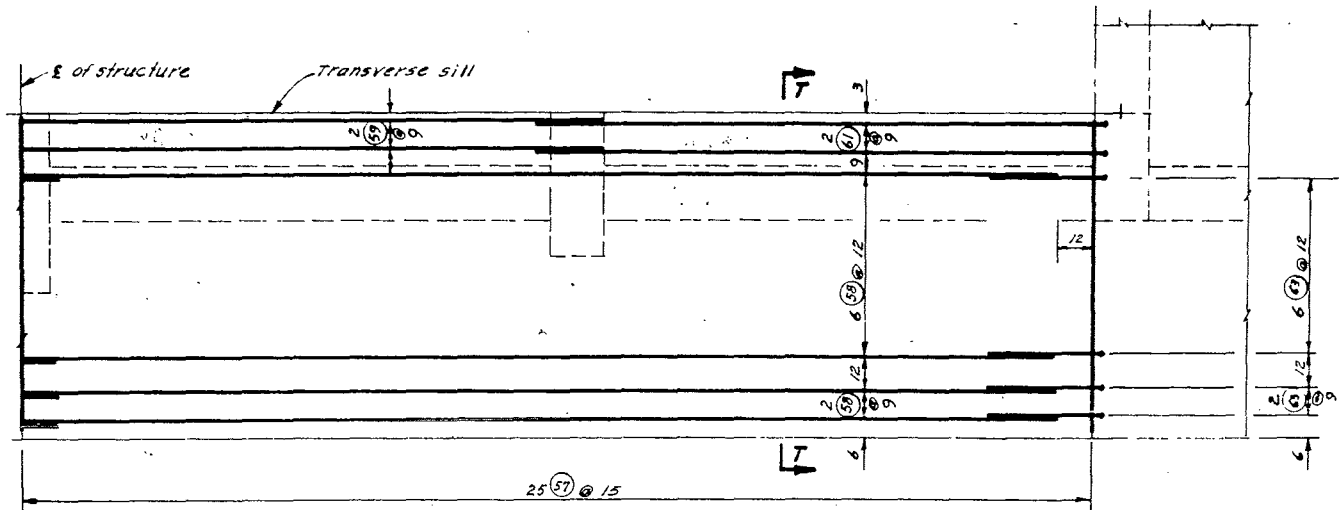
OCT 23 1976
SECTION H-H

BURNT CREEK FLOODWAY & DIKES

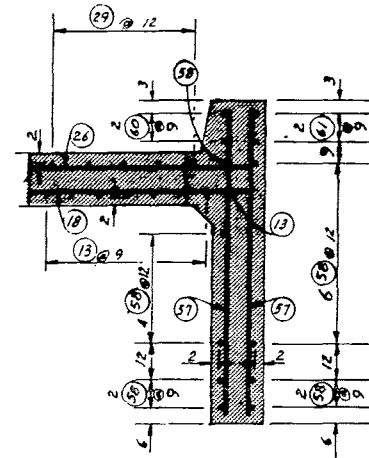
Burleigh County North Dakota
**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

Designed <i>Edward M. Smith</i>	Date <i>6-78</i>	Approved by _____
Drawn <i>S.R.D.</i>	Date <i>6-78</i>	Title _____
Traced _____	Checked <i>Ronald D. Sando</i>	Date <i>6-20</i>
Drawing No. 5, E-32,350		

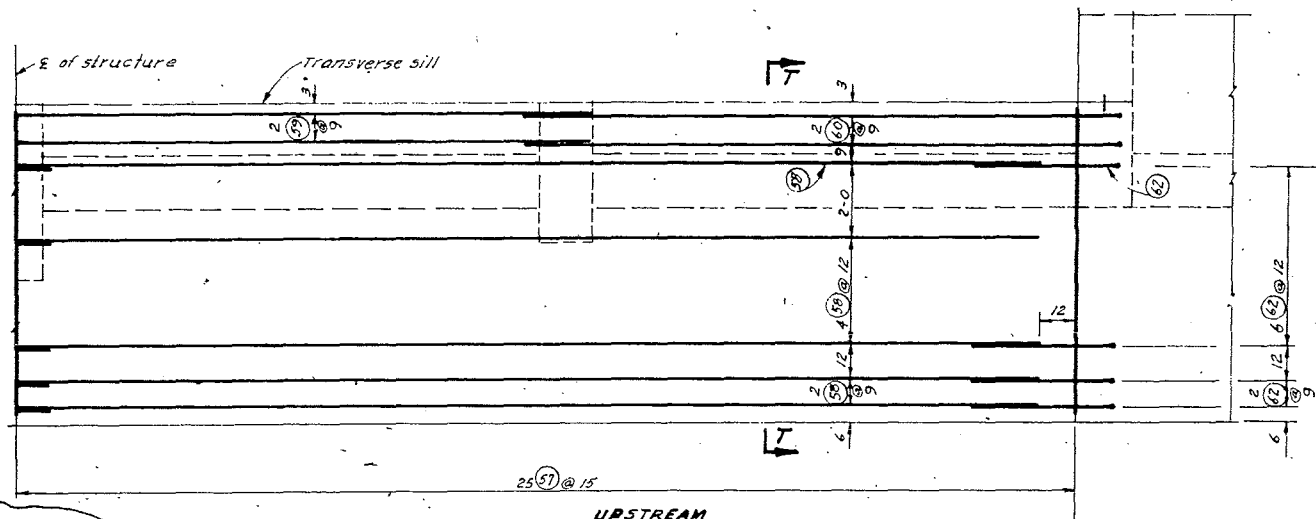




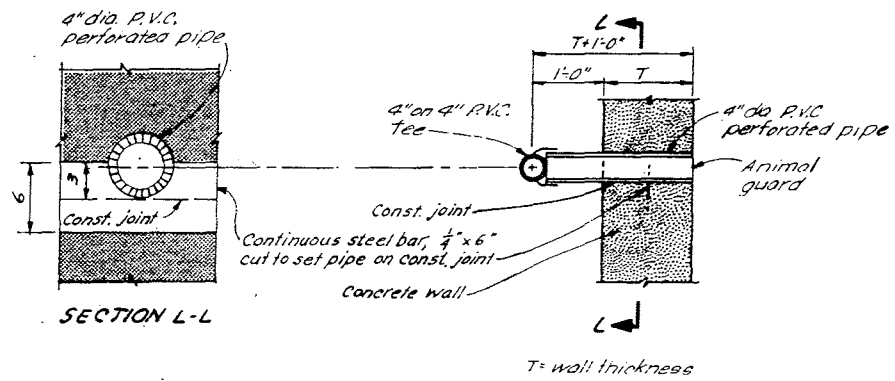
DOWNSTREAM
HALF SECTION ELEVATION OF TOEWALL CUTOFF



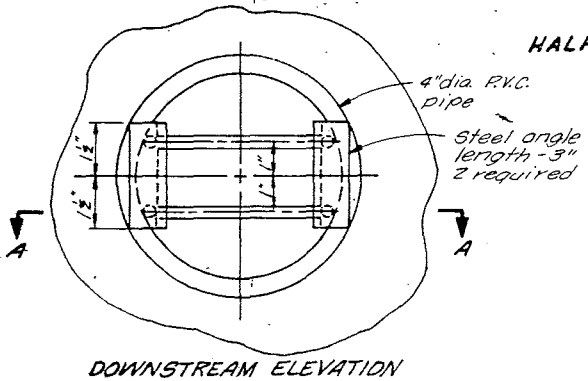
SECTION T-T



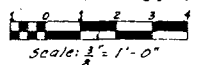
UPSTREAM
HALF SECTION ELEVATION OF TOEWALL CUTOFF



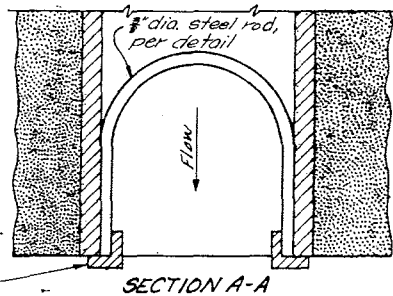
DETAIL OF CONSTRUCTION JOINT AND DRAIN OUTLET
OF 4" P.V.C. PIPE FOR HEADWALL & SIDEWALL
NOT TO SCALE



DOWNSTREAM ELEVATION

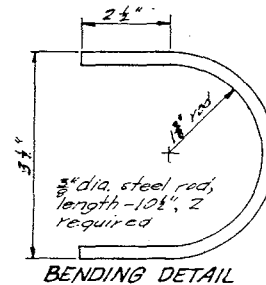


DETAIL OF ANIMAL GUARD
NOT TO SCALE



SECTION A-A

Note: Animal guard shall be galvanized after bending and welding.



BENDING DETAIL

AS BUILT OCT 23 1976

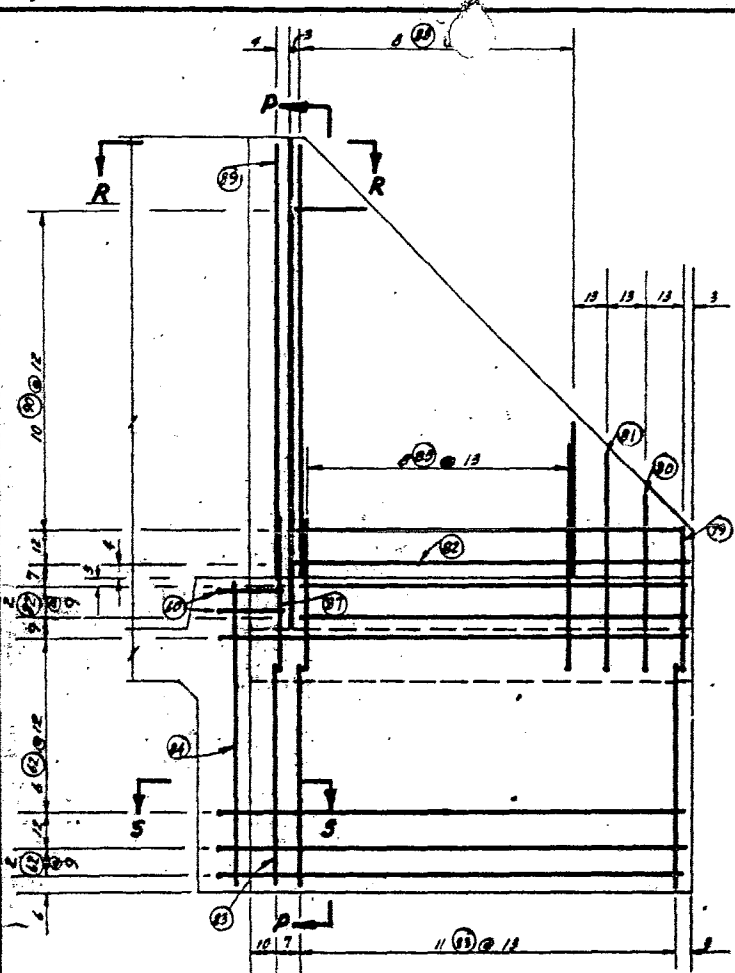
BURNT CREEK FLOODWAY & DIKES

Burlington County, North Dakota

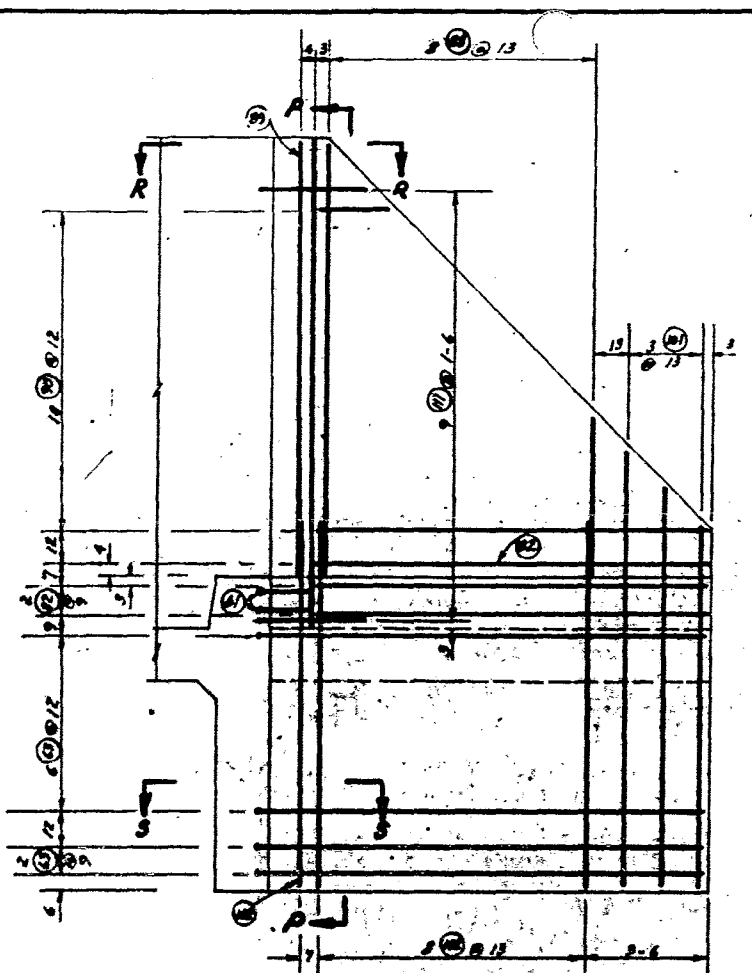
**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

Designed LELAND M. SMITH, E-28	Date 6-28	Approved by _____
Drawn J. B. D., E-28	Title _____	_____
Traced _____	Sheet _____	_____
Checked ROYALD A. SANDO, PE 7-75	No. 18 of 20	Drawing No. 5, E-32, 350

REV. 3-10-75

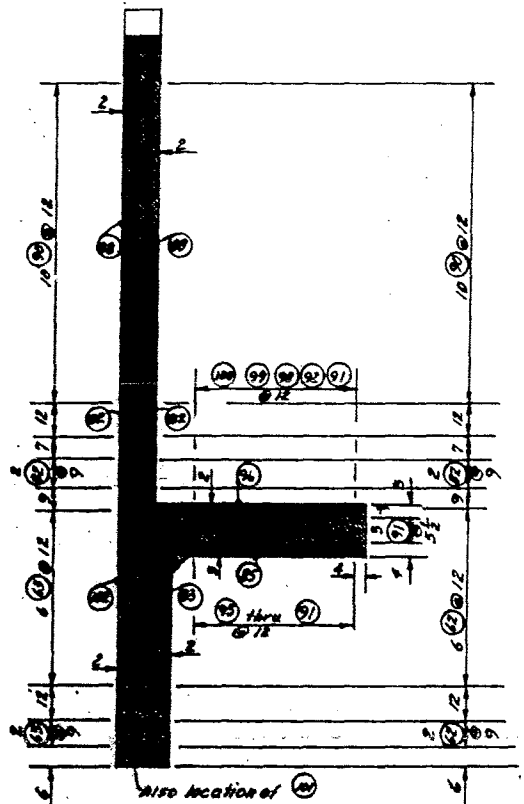


STEEL IN UNEXPOSED FACE

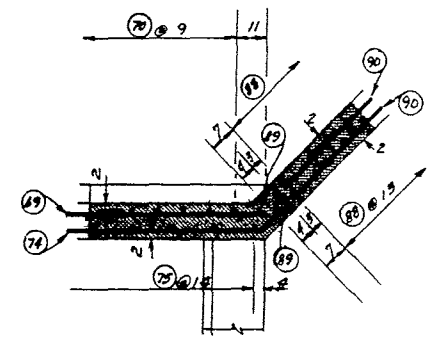


STEEL IN EXPOSED FACE

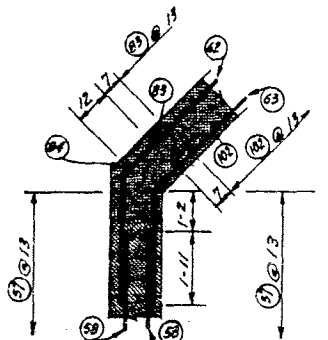
ELEVATION WINGWALL



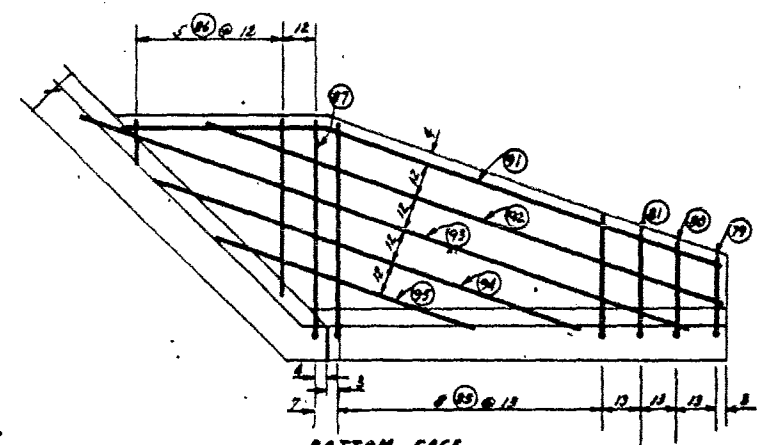
SECTION P-P



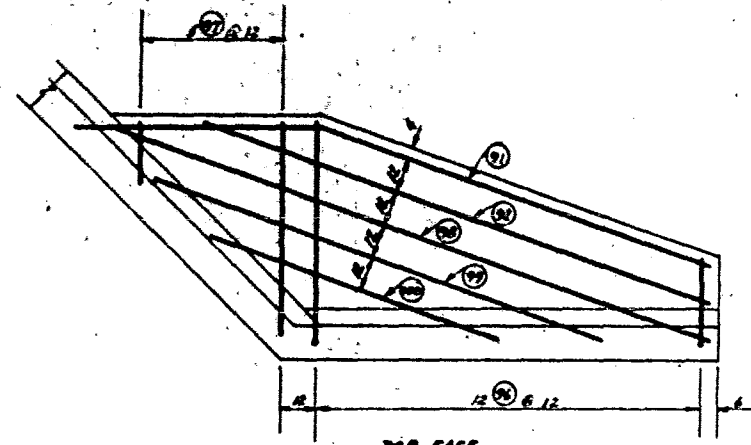
SECTION R-R



SECTION S-S



BOTTOM FACE



TOP FACE
(steel perpendicular to wall 2' from face)

WINGWALL FOOTING

scale 1" = 1'-0" O.C.J. 23 1976
AS BUILT

BURNT CREEK FLOODWAY & DIKES

Burlington County North Dakota

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed LELAND H. SABLE 6-73	Date 6-73	Approved by _____
Drawn W.R.D. 6-73	Title _____	
Traced _____	Sheet No. 19	Drawing No. 5, E-32, 350
Checked ROBERTA D. SANDOZ P.E. 7-73	of 20	

REV. 3-10-75

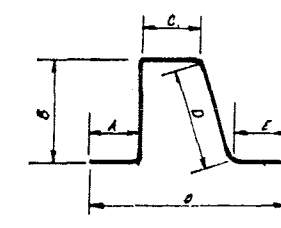
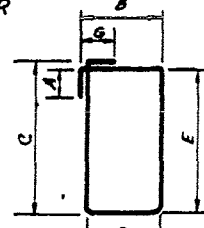
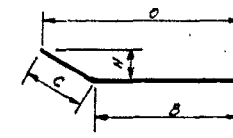
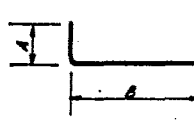
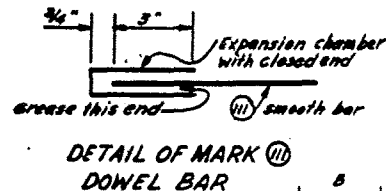
BAR SCHEDULE

MARK	SIZE	QUANTITY	LENGTH	TOTAL LENGTH	TYPE	A	B	C	D	E	G	H	O	REMARKS
1	4	60	13-8	820-0	STR									HEADMALL
2	4	142	10-0	1420-0	STR									" & HEADMALL KIT.
3	5	36	34-0	1224-0	STR									"
4	5	14	33-8	474-4	STR									"
5	7	4	19-8	79-4	2	5-2	11-6							" & SIDEMALL
6	5	42	13-8	579-4	STR									HEADMALL
7	6	14	36-5	507-6	STR									"
8	5	42	29-6	1239-0	STR									HEADMALL EXT. FOOTING
9	5	4	24-0	144-0	STR									APRON
10	9	48	23-5	1124-0	2	17-10	5-7							"
11	9	18	24-5	439-6	2	17-10	6-7							"
12	5	6	6-9	40-4	STR									"
13	5	76	21-0	1596-0	2	16-8	1-4							"
14	5	3	29-0	87-0	STR									"
15	5	71	32-6	2307-6	STR									"
16	5	43	16-6	719-6	STR									"
17	5	43	30-8	1324-4	STR									"
18	5	43	11-10	982-2	STR									"
19	6	8	31-0	248-0	STR									HEADMALL EXT. FOOTING
20	4	10	5-6	56-0	STR									"
21	4	36	4-6	261-0	STR									"
22	7	61	17-10	1047-10	STR									APRON
23	4	12	5-6	66-0	STR									HEADMALL EXT. FOOTING
24	4	38	4-6	261-0	STR									"
25	7	61	31-3	1906-9	STR									APRON
26	7	61	11-6	701-6	STR									"
27	5	6	21-0	144-0	STR									HEADMALL FOOTING
28	6	6	21-6	147-0	STR									"
29	7	96	18-5	1746-6	STR									APRON
30	5	3	29-0	87-0	STR									HEADMALL FOOTING
31	6	3	29-0	87-0	STR									"
32	7	49	29-0	1421-0	STR									APRON
33	6	8	30-0	240-0	STR									HEADMALL EXT.
34	6	4	6-8	26-4	STR									NOTHING & BOWL KILL
35	5	30	12-4	616-8	2	0-5	1-2	4-7	1-2	4-7	0-5			BOWL KILL
36	6	10	13-5	135-6	STR									"
37	9	5	12-9	65-9	2	11-9	1-0							"
38	9	5	15-9	79-9	2	11-9	1-0							"
39	6	6	31-0	186-0	STR									"
40	8	3	28-10	86-6	STR									"
41	8	3	31-6	94-6	STR									"
42	9	5	12-9	65-9	2	11-9	1-0							"
43	6	4	11-9	47-0	STR									"
44	6	2	12-9	25-4	2	11-9	1-0							"
45	6	8	6-9	54-0	STR									BOWL KILL & NOTHING
46	5	100	10-4	1040-4	2	0-5	1-2	4-7	1-2	4-7	0-5			"
47	8	8	19-5	156-0	2	18-5	1-0							"
48	8	8	12-9	102-0	2	11-9	1-0							"
49	8	6	13-9	83-4	STR									"
50	7	4	27-6	110-0	STR									"
51	6	4	31-0	124-0	STR									"
52	8	10	34-0	340-0	STR									"
53	8	6	13-5	79-6	2	11-4	1-9							"
54	8	6	9-9	58-6	2	8-0	1-9							"
55	8	4	11-9	47-0	STR									"
56	8	6	11-0	66-0	2	1-5	1-9							"
57	6	98	8-6	843-0	STR									HEADMALL
58	6	30	30-0	900-0	STR									"
59	6	4	32-6	130-0	STR									"
60	6	4	17-11	71-4	19	16-8	1-3	0-10	13-4					"
61	6	4	16-11	67-4	19	16-0	0-11	0-8	16-8					"
62	6	16	16-3	260-0	19	11-9	1-6	2-6	15-8					"
63	6	16	15-6	249-0	19	12-4	1-6	2-6	14-7					"
64	6	12	15-3	183-0	2	1-6	1-9							HEADMALL
65	6	16	13-0	208-0	STR									"
66	6	16	13-6	200-0	STR									"
67	7	36	16-3	587-0	2	1-9	1-6							"
68	7	14	11-3	477-6	STR									"
69	7	14	12-6	177-0	STR									"
70	6	112	12-6	1427-4	STR									"
71	6	92	4-0	368-0	STR									"
72	7	24	12-8	472-0	2	1-2	1-6							"
73	7	28	11-3	315-0	STR									"
74	7	28	13-2	368-8	19	12-4	0-10	0-8	13-0					"
75	6	92	12-6	1159-4	STR									"
76	7	26	6-6	169-0	2	5-0	1-6							HEADMALL

MARK	SIZE	QUANTITY	LENGTH	TOTAL LENGTH	TYPE	A	B	C	D	E	G	H	O	REMARKS
77	4	20	12-2	244-0	STR									HEADMALL
78	5	12	12-2	146-0	STR									"
79	5	2	6-2	12-0	2	4-0	2-2							WINDMALL
80	5	2	7-7	15-2	2	5-1	2-6							"
81	5	2	9-0	18-4	2	6-2	2-10							"
82	6	12	11-0	132-0	STR									"
83	4	26	6-5	169-0	STR									"
84	4	2	8-7	17-2	STR									"
85	5	2 sets of 2 bars	10-0 to 1-6 @ 0-4" incr	141-4	2	1-4	6-2 to 1-6 @ 0-4" incr							"
86	4	1 set of 5 bars	1-0 to 1-10 @ 1-0" incr	30-0	STR									"
87	5	2	20-4	20-8	2	1-4	6-0							"
88	5	1 set of 8 bars	12-4 to 1-4 @ 13" incr	267-4	STR									"
89	5	4	12-1	48-4	STR									"
90	5	1 set of 10 bars	11-0 to 3-0 @ 12" incr	260-0	STR									"
91	6	6	19-3	115-6	19	11-9	7-6							WINDMALL FOOTING
92	4	4	15-5	62-0	STR									"
93	4	2	15-4	30-0	STR									"
94	4	2	12-0	24-0	STR									"
95	4	2	6-4	12-0	STR									"
96	4	1 set of 12 bars	1-2 to 1-6 @ 1" incr	128-0	2	1-0	6-2 to 1-6 @ 1" incr							"
97	4	1 set of 5 bars	1-0 to 1-10 @ 1" incr	42-4	STR									"
98	4	2	17-6	35-0	STR									"
99	4	2	13-0	26-0	STR									"
100	4	2	8-0	16-0	STR									"
101	5	1 set of 3 bars	12-3 to 1-3 @ 13" incr	61-0	STR									WINDMALL & WINDMALL FOOTING
102	5	18	10-5	189-0	STR									WINDMALL FOOTING
103	6	14	20-4	425-0	STR									HEADMALL EXT.
104	5	60	12-4	730-0	STR									"
105	4	60	12-2	730-0	STR									"
106	6	6	3-9	23-6	STR									NOTHING
107	6	4	4-3	25-4	STR									"
108	6	4 sets of 4 bars	1-4 to 1-10 @ 3" incr	45-0	STR									"
109	5	48	11-2	531-6	27	0-8	4-3	0-11	4-6	0-9			3-10	FLOOR FLOORS
110	5	124	1-2	211-8	STR									"
111	6	36	2-4	90-0	STR									WINDMALL & HEADMALL KIT.

* BOWL BAR TO BE LOCATED IN CENTER OF HEADMALL EXTENSION AND REINFORCED AS SHOWN AND CHANGED ON ONE END TO REMOVE BOWL BAR IN BOWEN AND NOT INCLUDING IN TOTAL.

BAR TYPES



BAR QUANTITY

SIZE	LENGTH (FE)	WEIGHT (LB)
4	4810-4	2879
5	18047-2	18823
6	9172-0	12781
7	18173-11	28500
8	1118-6	2965
9	1762-9	6817
TOTAL		66,265

NOTES:

1. BAR REINFORCEMENT ARE OUT TO OUT OF BAR
2. NUMBER OF BARS BEING 3 BAR REINFORCEMENT FOR # 7 OR SMALLER BARS
3. BARS PASSING THROUGH DRAIN COUPLER PIPE WILL BE FIELD OUT 2" FROM PIPE OR MORE TO CLEAR AS INDICATED BY THE ENGINEER

AS BUILT OCT 9 1976

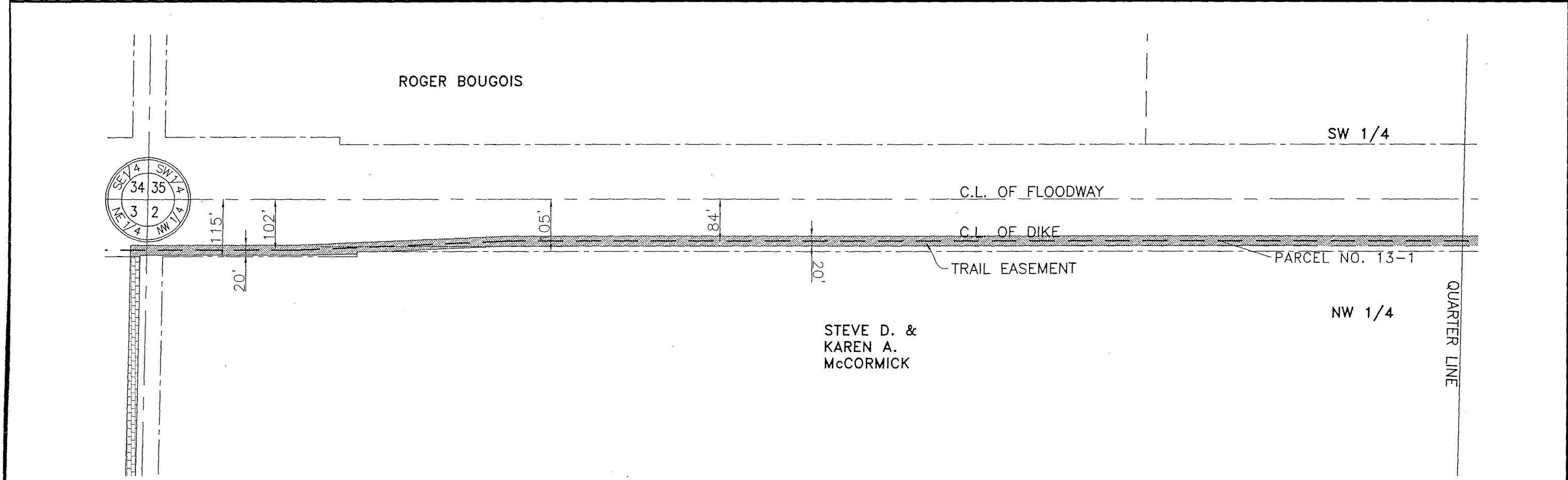
BURNT CREEK FLOODWAY & DIKES


Aurleigh County, North Dakota

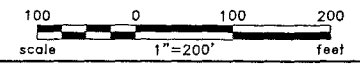
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

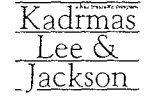
DATE: 8-77
Designed: LEONARD M. SARKIS, 8-77
Approved: _____
Title: _____
Drawn: L.P.D., 7-77
Checked: _____
Title: _____
Drawing No: _____
Sheet No: 20 of 20
5, E-32, 350

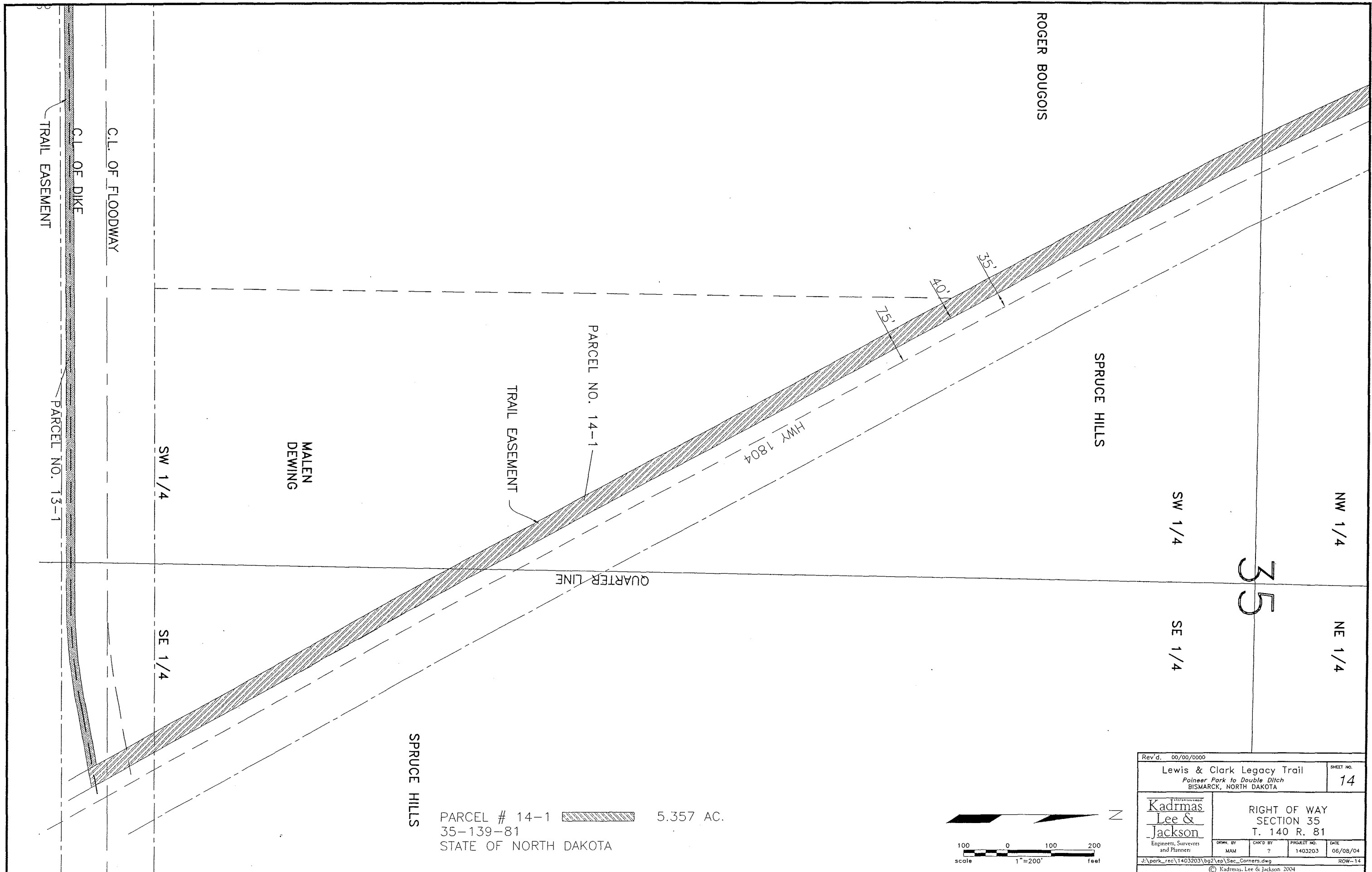
REV. 3-10-75
REV. 8/13/73



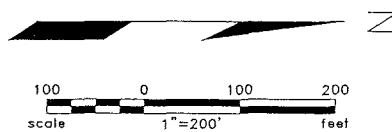
PARCEL # 13-1  0.721 AC.
 NORTH 1/2 - 2-139-81
 BURLEIGH COUNTY WATER MANAGEMENT DISTRICT

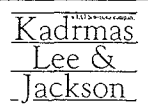


Rev'd. 00/00/0000	Lewis & Clark Legacy Trail <i>Pioneer Park to Double Ditch</i> BISMARCK, NORTH DAKOTA		SHEET NO. 13
 Kadmas Lee & Jackson <small>Engineers, Surveyors and Planners</small>	RIGHT OF WAY SECTION 2 T. 139, R. 81		
	<small>DRAWN BY</small> MAM	<small>CHECKED BY</small> ?	<small>PROJECT NO.</small> 1403203
<small>J:\park_rec\1403203\bg2\ep\Sec_Corners.dwg</small>			<small>ROW-13</small>



PARCEL # 14-1  5.357 AC.
 35-139-81
 STATE OF NORTH DAKOTA



Rev'd. 00/00/0000		SHEET NO.	
Lewis & Clark Legacy Trail Pioneer Park to Double Ditch BISMARCK, NORTH DAKOTA		14	
 Kadmas Lee & Jackson Engineers, Surveyors and Planners		RIGHT OF WAY SECTION 35 T. 140 R. 81	
DRAWN BY MAM	CHECKED BY ?	PROJECT NO. 1403203	DATE 05/08/04
J:\park_rec\1403203\bg2\ep\Sec_Corners.dwg			ROW-14
© Kadmas, Lee & Jackson 2004			

PARCEL NO. 13-1

An easement for trail purposes over a tract of land located in the north half of Sections 2 and 3, Township 139 North, Range 81 West of the Fifth Principal Meridian, Burleigh County, North Dakota, described more particularly as follows:

The south 3 feet of the north 115 feet of the east 33 feet of the northeast quarter of said Section 3,

And said easement being 10 feet on either of the centerline of Burleigh County Water Management District dike and described as follows:

Beginning at a point 102 feet south of and 33 feet west of the northeast corner of said Section 3, thence in an easterly direction for a distance of 326 feet, more or less, thence in a northeasterly direction for a distance of 425 feet, more or less, to a point 84 feet south of the north line of said Section 2, thence in an easterly direction for a distance of 1966 feet, more or less, thence in a northeasterly direction for a distance of 400 feet, more or less, to a point on the west right of way line of State Highway 1804, said point being 30 feet, more or less, south of the north line of said Section 2,

And said easement described above excludes any land that falls outside of the property owned by Burleigh County Water Management District.

Said tract is shown on the plat as Parcel No. 13-1 and contains 1.413 acres, more or less.

PARCEL NO. 14-1

An easement for trail purposes over a tract of land located in the northeast quarter of Section 2, Township 139 North, Range 81 West of the Fifth Principal Meridian, Burleigh County, North Dakota, described more particularly as follows:

And section 35 – 140 – 81
And section 26 – 140 – 81
And section 27 – 140 – 81
And section 22 – 140 – 81

The southwest 40 feet of the 75-foot right of way along the southwest side of State Highway 1804.

Said tract is shown on the plat as Parcel No. 14-1 and contains _____ acres, more or less.

PARCEL NO. 19-1

An easement for trail purposes over a tract of land located in the southwest quarter of Section 22, Township 140 North, Range 81 West of the Fifth Principal Meridian, Burleigh County, North Dakota, described more particularly as follows:

Said tract is shown on the plat as Parcel No. 19-1 and contains 0.136 acres, more or less.

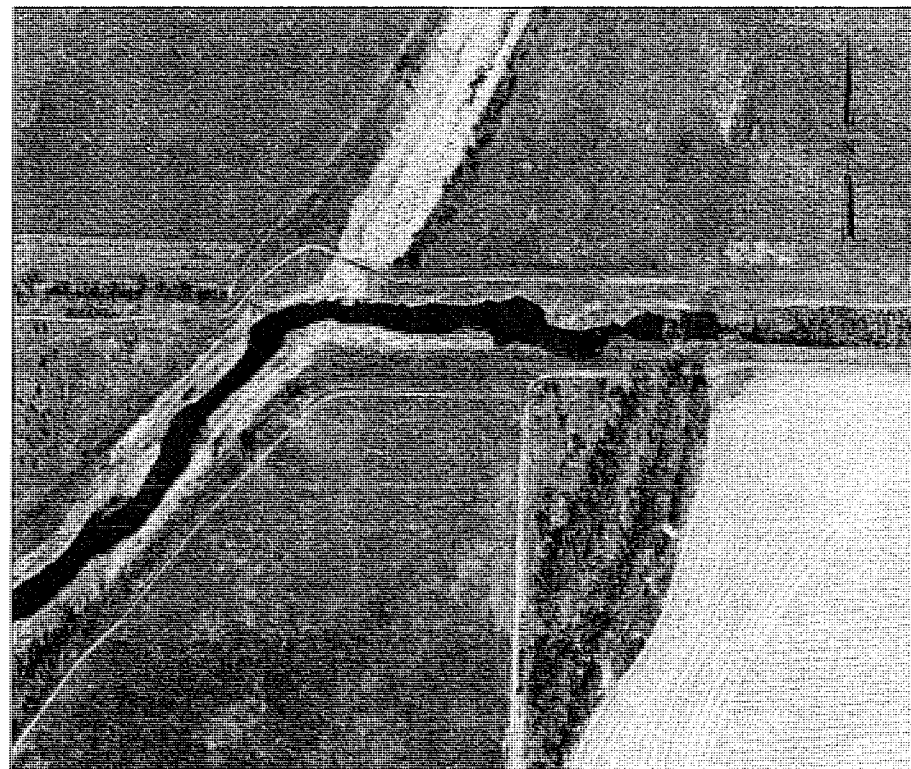
PARCEL NO. 19-2

An easement for trail purposes over a tract of land located in the east half of Section 21, Township 140 North, Range 81 West of the Fifth Principal Meridian, Burleigh County, North Dakota, described more particularly as follows:

Said tract is shown on the plat as Parcel No. 19-2 and contains 0.700 acres, more or less.

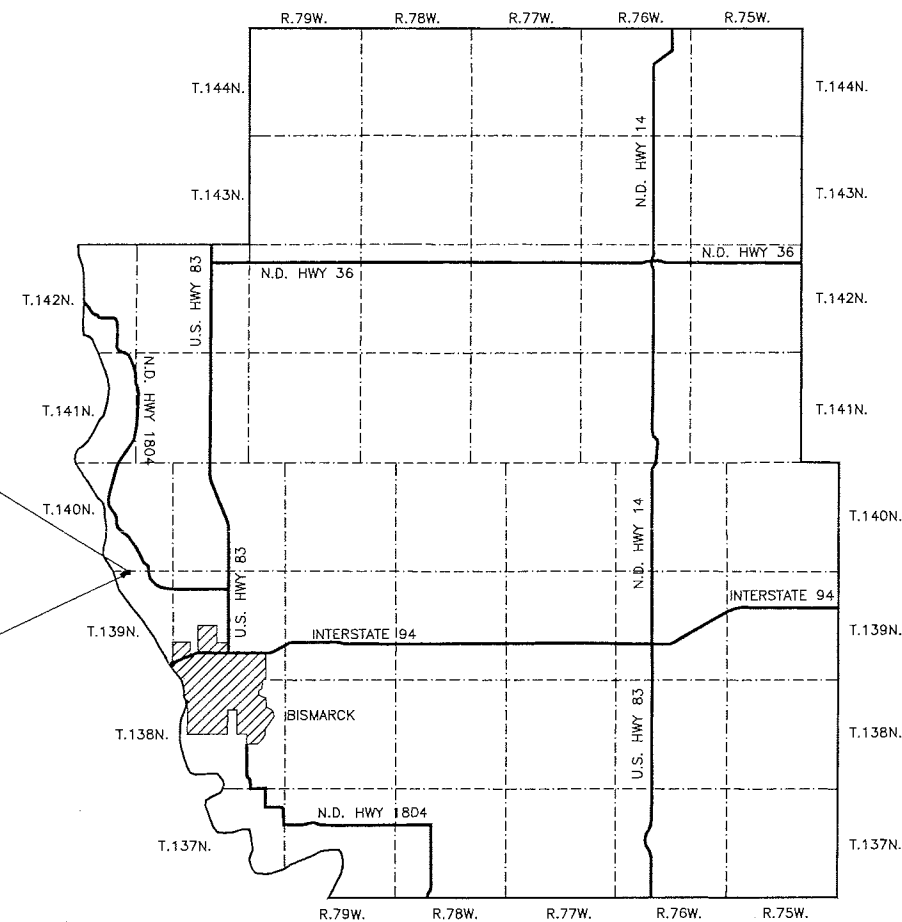
CONSTRUCTION PLANS FOR BURNT CREEK FLOOD CONTROL PROJECT

BURLEIGH COUNTY WATER RESOURCE DISTRICT BISMARCK, NORTH DAKOTA July 2008



END PROJECT
STA. 57+17

BEGIN PROJECT
STA. 41+00



BURLEIGH COUNTY, NORTH DAKOTA

SHEET INDEX

- 1 COVER SHEET
- 2 ESTIMATED QUANTITIES & CONSTRUCTION NOTES
- 3 PLAN AND PROFILE
- 4 SHEET PILE DROP STRUCTURE
- 5 SHEET PILE DROP STRUCTURE
- 6 CHANNEL RIPRAP & SLOPE PROTECTION DETAILS
- 7 TWIN 24" CULVERT DETAILS
- 8 SINGLE 24" CULVERT DETAILS
- 9 PED./BIKE PATH PLAN AND PROFILE
- 9a. STANDARD BARBED WIRE FENCE
- 10-18 CROSS-SECTION SHEETS
- 19-20 DIKE CONSTRUCTION PLAN AND PROFILE
- 21-24 DIKE CONSTRUCTION CROSS SECTIONS

THIS PLAN SET CONTAINS 25 SHEETS

ENGINEER'S CERTIFICATE

I, TERRY RAGAN, A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NORTH DAKOTA, HEREBY CERTIFY THAT THE CONSTRUCTION PLANS FOR BURNT CREEK FLOOD CONTROL PROJECT, BISMARCK, NORTH DAKOTA WERE PREPARED UNDER MY SUPERVISION AND ARE COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE: 7/21/2008

TERRY RAGAN
REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA REGISTRATION NO. 4158

PREPARED BY: **HOUSTON ENGINEERING, INC.** BISMARCK, NORTH DAKOTA

C:\Projects\Burnt Creek 4241-300\Proj\PROJECT DIRECTOR\EST_SHEET.dwg EST QUAN AND NOTES-7/21/2008 AM (mehoy)

ESTIMATED QUANTITIES

ITEM NO.	NOTES	ITEM DESCRIPTION	UNIT	QUANTITY
1		CLEARING AND GRUBBING	LS	1
2	9	REMOVAL OF CULVERTS- ALL TYPES AND SIZES	LF	40
3	3	SALVAGE ROCK RIPRAP	SY	285
4	1	UNCLASSIFIED EXCAVATION (P)	CY	22,100
5		REMOVE & SALVAGE TOPSOIL (P)	CY	1,750
6	2	CONSTRUCTION OF EMBANKMENT AND TREATMENT OF CUT AREAS WITH COMPACTION, TYPE A (P)	CY	8,450
7	12	AGGREGATE SURFACE COURSE CL13	TON	130
8	10	STEEL SHEET PILING (P)	SF	2,371
9		MOBILIZATION	LS	1
10		TRAFFIC CONTROL	LS	1
11	3	ROCK RIPRAP	CY	955
12	3	RELAY SALVAGED ROCK RIPRAP	CY	190
13	4	SEEDING TYPE B, CL II	AC	8.6
14	6	TOPSOIL FOR SEEDING (P)	CY	1,750
15	5	MULCH	AC	3.6
16		WOOD EXCELSIOR FIBER MAT	SY	24,545
17		TYPE RR GEOTEXTILE FILTER FABRIC	SY	1,561
18		RELAY 24 IN CSP	LF	40
19		PIPE CORR STEEL .064 IN 24 IN	LF	133
20		END SECTION CORR STEEL .064 IN 24 IN	EA	3
21		24 INCH LONG SLOPE CSP FLARED END SECTION	EA	2
22	8	EROSION AND SEDIMENT CONTROL	LS	1
23	13	REMOVAL OF FENCE	LF	785
24	14	WIRE FENCING	LF	785
25	7	WATER CONTROL	LS	1
26	15	TESTING LABORATORY SERVICES	LS	1

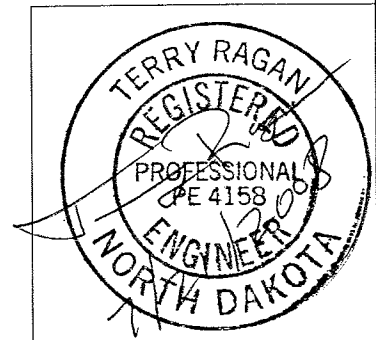
(P) - PLAN QUANTITY


LEGEND

OVERHEAD POWER	— P —
UTILITY POLE	Ø
TOE OF CHANNEL SIDE SLOPES	=====
FENCE	— X — X —
EXISTING EDGE OF WATER	=====
EXISTING PEDESTRIAN/BIKE PATH	=====
PROPOSED PEDESTRIAN/BIKE PATH	=====

CONSTRUCTION NOTES:

- (1) THE BID ITEM FOR UNCLASSIFIED EXCAVATION INCLUDES THE ESTIMATED QUANTITY NECESSARY TO SUBCUT FOR THE RIPRAP AS DETAILED IN THE PLANS, RESHAPING THE CHANNEL ACCORDING TO THE CROSS SECTIONS, WHICH WILL REQUIRE EXCAVATION IN SOME AREAS AND EMBANKMENT IN OTHERS. THE REQUIRED EMBANKMENT FOR THE PROJECT IS 10,508 CY COMPACTED VOLUME (13,660 CY LOOSE VOLUME BASED ON 130% COMPACTION FACTOR) WITH AN EXCESS OF 8,450 CY.
- (2) THE EXCESS 8,450 CY WILL BE USED FOR DIKE CONSTRUCTION TO THE EAST ON THE SOUTH SIDE OF THE CHANNEL. TOPSOIL REMOVE AND REPLACE FOR THE DIKE CONSTRUCTION WILL BE INCIDENTAL TO THE CONSTRUCTION OF EMBANKMENT AND TREATMENT OF CUT AREAS WITH COMPACTION, TYPE A. SEE SHEETS 19-24.
- (3) THE SALVAGE ROCK RIPRAP IS BASED ON THE EXISTING RIPRAP AREA SURVEYED AND IS GIVEN IN SY. THE SALVAGED RIPRAP SHALL BE STOCKPILED ON SITE PRIOR TO PLACEMENT. THE RELAY OF SALVAGED RIPRAP IS GIVEN IN VOLUME AND WAS CALCULATED USING THE AREA OF THE SALVAGED ROCK RIPRAP WITH AN ESTIMATED DEPTH OF 2 FEET. THE SALVAGED RIPRAP SHALL BE CLEAN OF SOIL/DEBRIS PRIOR TO PLACEMENT AND SHALL BE INSTALLED AT THE SHEET PILE DROP STRUCTURE AS DETAILED IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE FINAL PAY QUANTITY WILL BE BASED ON THE STOCKPILE MEASUREMENT.
- (4) THE BID ITEM FOR SEEDING SHALL INCLUDE A COVER CROP OF OATS APPLIED AT A RATE OF 45 POUNDS PER ACRE.
- (5) STRAW MULCHING SHALL BE APPLIED AT THE RATE OF 2 TONS PER ACRE AND SHALL INCLUDE DISK ANCHORING.
- (6) TOPSOIL PLACEMENT IS BASED ON A 3" DEPTH APPLIED TO THE CHANNEL SIDE SLOPES AND ANY DISTURBED AREAS ON TOP OF THE CHANNEL SLOPES. TOPSOIL WILL NOT BE REQUIRED ON THE CHANNEL BOTTOM.
- (7) THE SITE IS INFLUENCED BY BACKWATER FROM THE MISSOURI RIVER AS WELL AS RUNOFF FROM UPSTREAM STORM EVENTS. ALL EXCAVATION AND EMBANKMENT REQUIRED FOR THIS PROJECT SHALL BE PERFORMED IN A DRY ENVIRONMENT. THE PROJECTED FLOWS ON THE MISSOURI RIVER IN FALL OF 2008 WILL BE APPROXIMATELY 15,000 CFS. THIS PROJECTS TO AN ESTIMATED BACKWATER ELEVATION OF 1628.70. THE CONTRACTOR SHALL BE RESPONSIBLE TO RECOGNIZE THAT THE WATER LEVELS MAY VARY. THE CONTRACTOR SHALL SUBMIT A WATER CONTROL PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO ANY EXCAVATION WORK.
- (8) THIS PROJECT SHALL BE COVERED UNDER A STATE OF NORTH DAKOTA, NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT. THE CONTRACTOR WILL BE THE ORIGINATOR AND SIGNER OF THE PERMIT AND BE RESPONSIBLE FOR CONTROLLING EROSION AND SEDIMENT RUNOFF FROM THE PROJECT. THE CONTRACTOR SHALL SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCING ANY WORK ON THE PROJECT SITE.
- (9) CONTRACTOR TO REMOVE AND SALVAGE EXISTING 24 INCH CSP AS IDENTIFIED ON PLANS. SALVAGED 24 INCH CSP WILL BE REPLACED AS IDENTIFIED ON PLANS. CONTRACTOR SHALL TAKE CARE TO NOT DAMAGE 24 INCH CSP DURING REMOVAL. DAMAGED 24 INCH CSP WILL BE REPLACED AT CONTRACTOR'S EXPENSE.
- (10) CONTRACTOR SHALL ALSO REMOVE AND SALVAGE 24" FLAP GATE. SALVAGED FLAP GATE SHALL BE REINSTALLED ON 24" CSP AS IDENTIFIED ON PLANS. ALL COST ASSOCIATED WITH SALVAGING AND REINSTALLING 24" FLAP GATE SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM "REMOVAL OF CULVERTS-ALL TYPES AND SIZES."
- (11) STEEL SHEET PILE IS P222 OR APPROVED EQUIVALENT.
- (12) AGGREGATE SURFACE COURSE CL13 IS BASED ON A 12' WIDE, 4" DEPTH, 475' LONG PEDESTRIAN/BIKE PATH. SEE SHEET 9. A CONVERSION FACTOR OF 1.85 TONS/CY WAS USED.
- (13) THE BID ITEM FOR REMOVAL OF FENCE APPLIES TO REMOVAL AND PROPER DISPOSAL OF FENCE ON THE WESTERLY SIDE OF BURNT CREEK AS IDENTIFIED IN THE PLANS.
- (14) THE BID ITEM FOR WIRE FENCING APPLIES TO CONSTRUCTING NEW FENCE WHERE REMOVED AS IDENTIFIED ON THE PLANS. FENCE CAN BE CONSTRUCTED WITH EITHER STEEL OR WOODEN POSTS WITH SMOOTH STRANDS.
- (15) TESTING LABORATORY SERVICES BID ITEM INCLUDES TWO PROCTORS, COMPACTION TESTS EVERY 200' FOR THE DIKE CONSTRUCTION ALONG THE SOUTH BANK EAST OF THE PROJECT AREA AND EVERY 100' BETWEEN THE NEW AND EXISTING DROP STRUCTURE.




Houston Engineering, Inc.
 3712 Lockport Street TEL: (701) 323-0200
 BISMARCK, NORTH DAKOTA 58501 FAX: (701) 323-0300

Drawn by	Date
JRM	7-17-08
Checked by	Scale
TLR	NONE

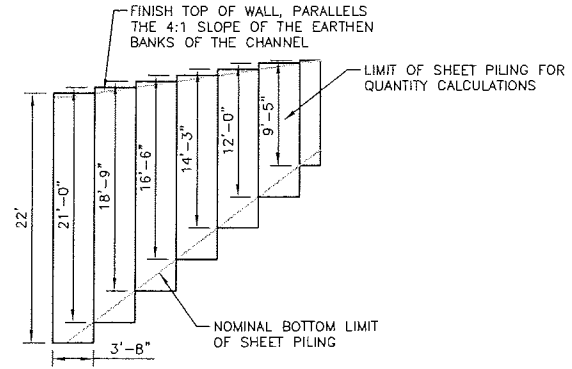
BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

ESTIMATED QUANTITIES & CONSTRUCTION NOTES PROJECT NO. 4241-300	SHEET 2 of 24
--	------------------

No.	Revision	Date	By

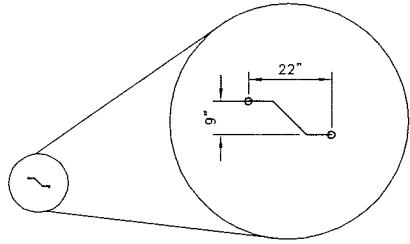
NOTES:

ALL SHEET PILING SHALL BE PZ22 OR APPROVED EQUIVALENT.
 STEEL TO BE HIGH STRENGTH ASTM A 572-GRADE 50.
 CONTRACTOR TO DRIVE SHEET PILING TO NOMINAL LENGTHS SHOWN ON PLANS.
 FLAME CUT TOP EDGE OF SHEET PILING TO PROVIDE FINAL ELEVATION OF DROP STRUCTURE.
 CONTRACTOR TO TAKE CARE DURING DRIVING OF SHEET PILING TO ENSURE TOP OF SHEET PILING REMAINS IN ALIGNMENT WITH WALL CENTERLINE TO FACILITATE PLACEMENT OF STEEL ANGLE WHALER.
 CONTRACTOR TO PROVIDE PERMANENT MARKINGS ON SHEET PILING PRIOR TO DRIVING TO DELINEATE MINIMUM LENGTH OF PILE REQUIRED TO PROVIDE NOMINAL DEPTH FROM FINISH ELEVATION.
 CONTRACTOR MAY SPLICE UP TO TWO SEGMENTS OF SHEET PILING (5' MIN. LENGTH) TO PROVIDE REQUIRED NOMINAL LENGTH OF SHEET PILE FOR EACH SEGMENT OF WALL.



ESTIMATED AREA OF THE DROP STRUCTURE WING SEGMENT ABOVE IS 419 SQUARE FEET.
 ESTIMATED AREA OF THE CHANNEL SECTION OF THE WALL, LESS THE PORTION CONTAINED IN THE SLOPED SECTION ABOVE IS 1533 SQUARE FEET.
 TOTAL AREA OF SHEET PILING IS TWO TIMES THE WING AREA PLUS THE CHANNEL WALL AREA OR 2 X 419 SQUARE FEET PLUS 1533 SQUARE FEET TOTALING 2,371 SQUARE FEET.

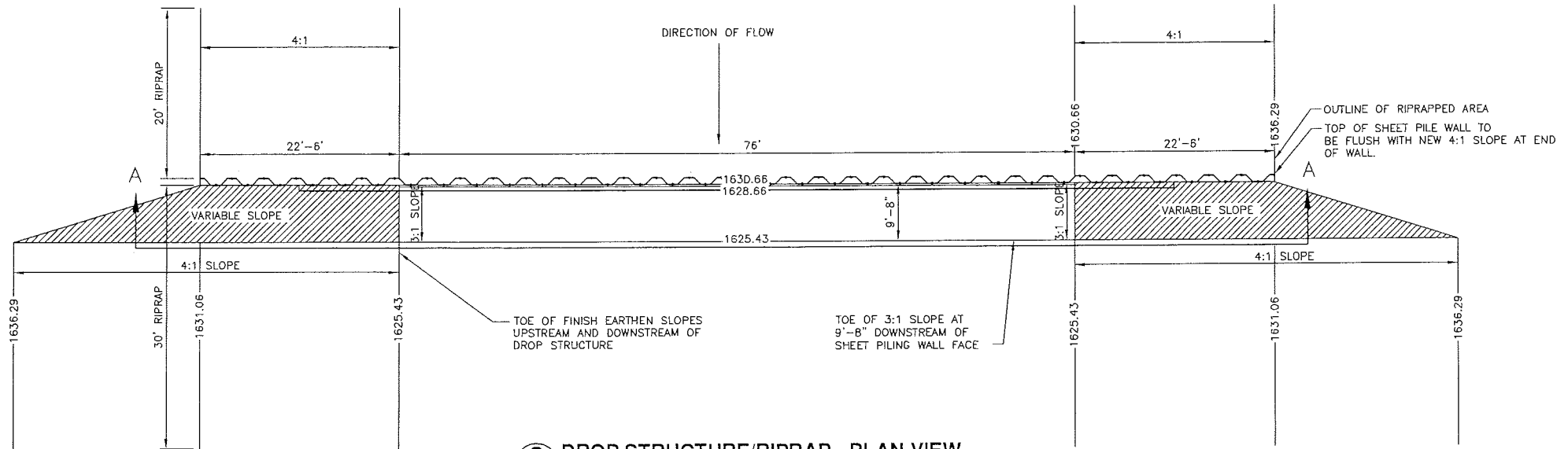
A SHEET PILE WING
 4 NOT TO SCALE



B PZ22 DETAIL
 4 NOT TO SCALE

NOTES:

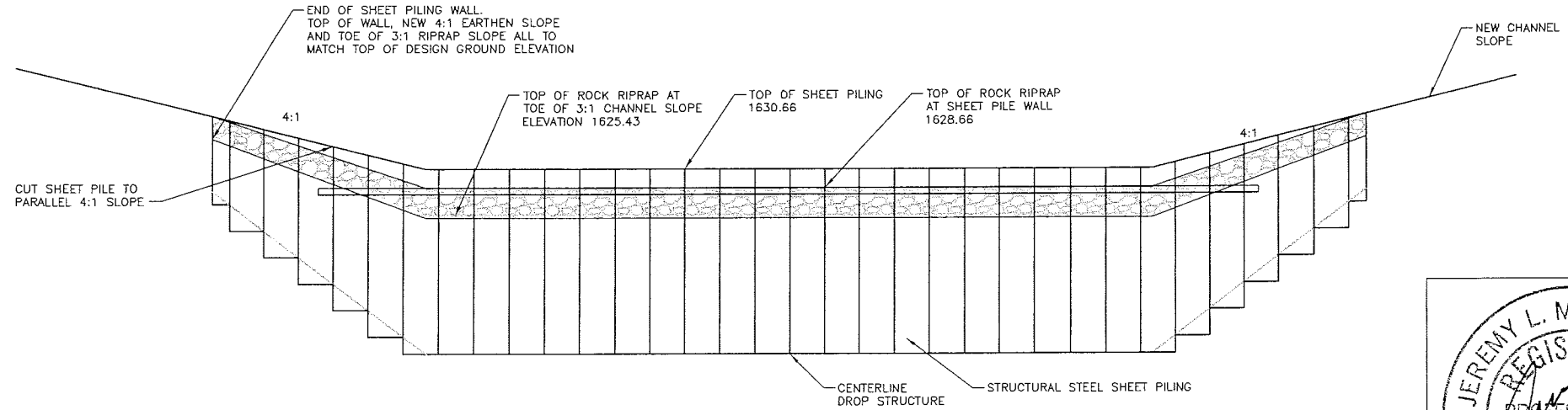
ROCK RIPRAP UPSTREAM AND DOWNSTREAM OF STRUCTURE NOT SHOWN. SEE DETAILS ON SHEET 6 FOR DIMENSIONS.
 SEE SHEET 6 FOR MORE DETAILED GRADING AND RIPRAP, SHEET PILING AND CHANNEL BANK TREATMENT



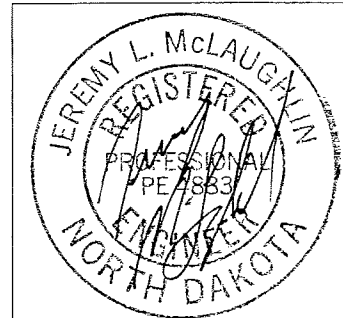
C DROP STRUCTURE/RIPRAP - PLAN VIEW
 4 NOT TO SCALE

NOTES:

ROCK RIPRAP UPSTREAM AND DOWNSTREAM OF STRUCTURE NOT SHOWN. SEE DETAILS ON SHEET 6 FOR DIMENSIONS.
 SEE SHEET 6 FOR MORE DETAILED GRADING AND RIPRAP, SHEET PILING AND CHANNEL BANK TREATMENT



D DROP STRUCTURE - SECTION A-A
 4 NOT TO SCALE



G:\Projects\Burnt Creek 4241-300\Drawings\PROJECT DIRECTORY\Structure-1.dwg - WALL DETAILS 4 OF 24-7/21/2008 2:54 PM -[jmlsey]

No.	Revision	Date	By

Houston Engineering, Inc.
 3712 LOCKPORT STREET
 BISMARCK, NORTH DAKOTA 58503

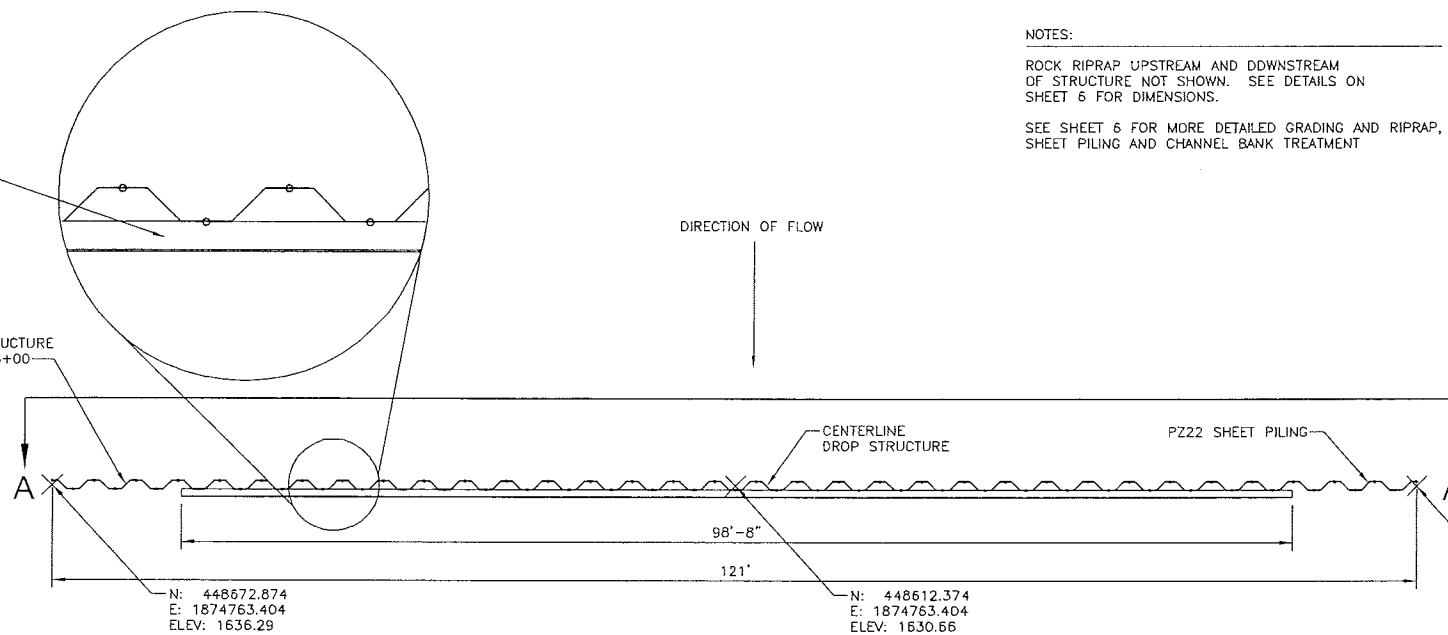
Drawn by JRM	Date 7-17-08
Checked by JLM	Scale AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DIST.
 BISMARCK, NORTH DAKOTA

SHEET PILE DROP STRUCTURE	SHEET
PROJECT NO. 4241-300	4 of 24

98'-8" - 8"x8"x1/2" ANGLE WHALER.
WELD AT ALL POINTS OF CONTACT WITH
WALL 1/2" WELD MINIMUM (GRIND PILING
JOINT SOCKETS SMOOTH AS REQUIRED)

MIDPOINT STRUCTURE
WALL STA. 53+00



N: 448672.874
E: 1874763.404
ELEV: 1636.29

N: 448612.374
E: 1874763.404
ELEV: 1630.66

N: 448551.874
E: 1874763.404
ELEV: 1636.29

A DROP STRUCTURE - PLAN VIEW
5 NOT TO SCALE

NOTES:

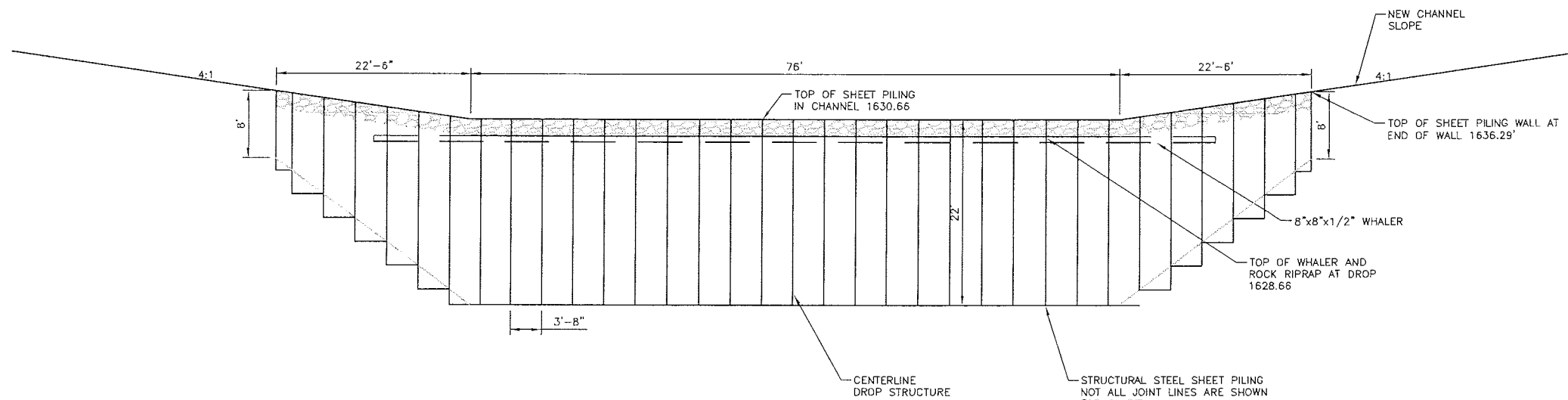
ROCK RIPRAP UPSTREAM AND DDWNSTREAM
OF STRUCTURE NOT SHOWN. SEE DETAILS ON
SHEET 6 FOR DIMENSIONS.

SEE SHEET 6 FOR MORE DETAILED GRADING AND RIPRAP,
SHEET PILING AND CHANNEL BANK TREATMENT

NOTES:

ROCK RIPRAP UPSTREAM AND DOWNSTREAM
OF STRUCTURE NOT SHOWN. SEE DETAILS ON
SHEET 6 FOR DIMENSIONS.

SEE SHEET 6 FOR MORE DETAILED GRADING AND RIPRAP,
SHEET PILING AND CHANNEL BANK TREATMENT



B DROP STRUCTURE - SECTION A-A
5 NOT TO SCALE



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No.	Revision	Date	By

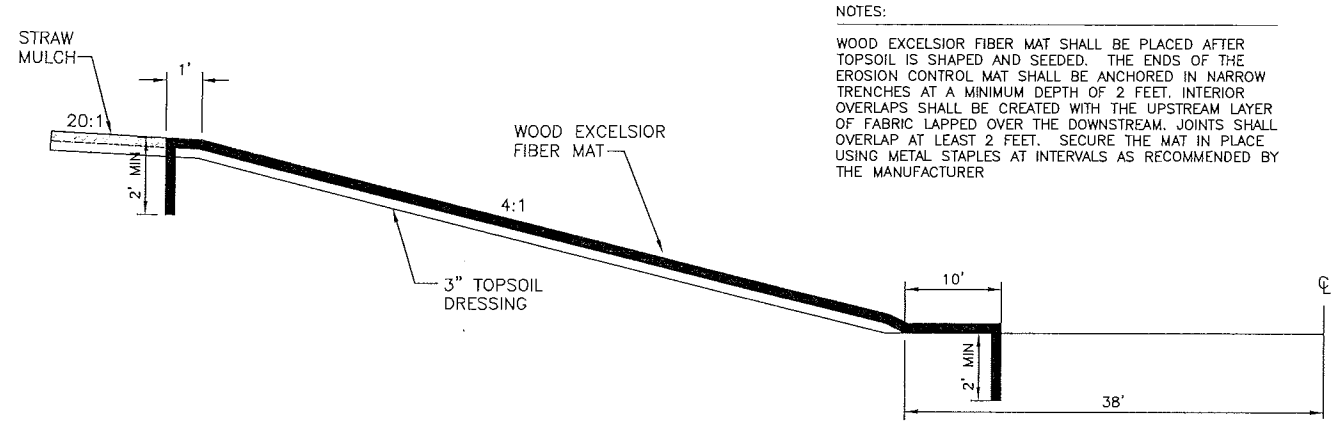
Houston Engineering, Inc.
3712 LOCKPORT STREET
BISMARCK, NORTH DAKOTA 58503

Drawn by JRM	Date 7-17-08
Checked by JLM	Scale AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
BURLEIGH COUNTY WATER RESOURCE DIST.
BISMARCK, NORTH DAKOTA

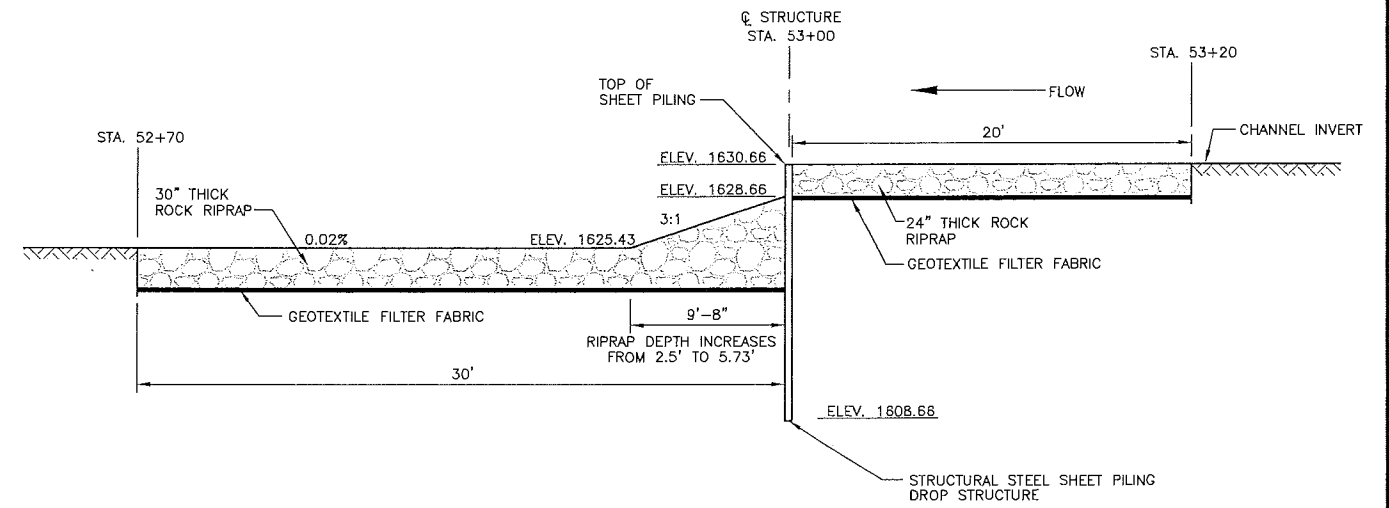
SHEET PILE DROP
STRUCTURE
PROJECT NO. 4241-300

SHEET
5 of 24

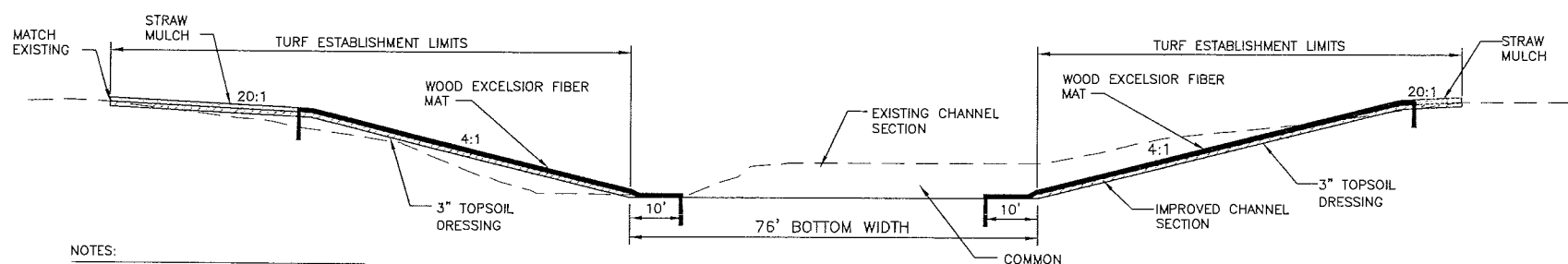


NOTES:
 WOOD EXCELSIOR FIBER MAT SHALL BE PLACED AFTER TOPSOIL IS SHAPED AND SEEDED. THE ENDS OF THE EROSION CONTROL MAT SHALL BE ANCHORED IN NARROW TRENCHES AT A MINIMUM DEPTH OF 2 FEET. INTERIOR OVERLAPS SHALL BE CREATED WITH THE UPSTREAM LAYER OF FABRIC LAPPED OVER THE DOWNSTREAM. JOINTS SHALL OVERLAP AT LEAST 2 FEET. SECURE THE MAT IN PLACE USING METAL STAPLES AT INTERVALS AS RECOMMENDED BY THE MANUFACTURER

A PERMANENT EROSION CONTROL MAT
 6 NOT TO SCALE



C SHEET PILE DROP SECTION
 6 NOT TO SCALE

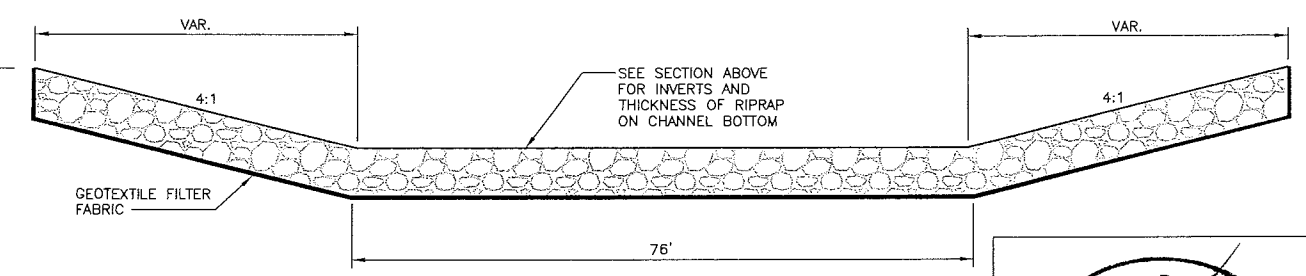


NOTES:
 COMPACTED EMBANKMENT. EXISTING VEGETATED AREAS TO BE THOROUGHLY DISKED PRIOR TO PLACING FILL.
 PROVIDE WOOD EXCELSIOR FIBER MAT TO EXTEND FROM TOP OF 4:1 SLOPE TO 10' BEYOND TOE INTO CHANNEL.
 STRAW MULCHING SHALL BE PLACED ON ALL OTHER DISTURBED AREAS EXCLUDING CHANNEL BOTTOM.

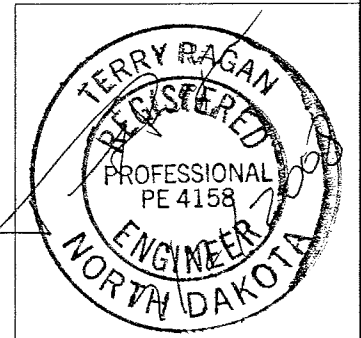
B TYPICAL CHANNEL SECTION
 6 NOT TO SCALE

NOTES:
 PLACE GEOTEXTILE FILTER FABRIC PRIOR TO PLACING RIPRAP. FABRIC SHALL EXTEND UP THE SIDES OF THE AREA TO BE RIPRAPED. INTERIOR JOINT OVERLAPS SHALL BE CREATED WITH THE UPSTREAM LAYER OF FABRIC LAPPED OVER THE DOWNSTREAM LAYER OF FABRIC. JOINTS SHALL OVERLAP AT LEAST 2 FEET. SECURE THE FABRIC IN PLACE AGAINST MOVEMENT DURING PLACEMENT OF RIPRAP MATERIAL USING METAL STAPLES AT INTERVALS AS RECOMMENDED BY THE MANUFACTURER.
 TAKE CARE DURING PLACEMENT OF ROCK RIPRAP TO ENSURE THE FABRIC IS NOT DISPLACED OR DAMAGED DURING PLACEMENT OF THE ROCK RIPRAP.

NOTES (continued):
 ROCK RIPRAP SHALL BE IN ACCORDANCE WITH NDDOT SECTION 708.04 EXCEPT THAT BROKEN CONCRETE MAY NOT BE USED FOR ROCK RIPRAP. ROCK RIPRAP VOLUME SHALL BE COMPUTED BY SURFACE AREA OF ROCK RIPRAP AND DESIGN THICKNESS OF THE RIPRAP.
 CARE SHALL BE TAKEN DURING PLACEMENT OF ROCK RIPRAP AGAINST THE SHEET PILING AND OTHER STRUCTURAL ELEMENTS TO ENSURE THE ROCK PARTICLES COMPLETELY FILL VOIDS BETWEEN LARGER STONES AND THE STRUCTURE. FILL VOIDS BETWEEN LARGER SIZES OF STONES WITH SMALLER SIZED STONES.
 THE FINAL RIPRAP PRODUCT MUST BE A RELATIVELY SMOOTH ROCK STRUCTURE WITH VOIDS BETWEEN LARGER SIZED STONES THOROUGHLY CHINKED WITH SMALLER SIZED STONES TO PRESENT A TIGHTLY KNIT STRUCTURE WITH FEW VOIDS AS POSSIBLE.



D CHANNEL DROP RIPRAP SECTION
 6 NOT TO SCALE



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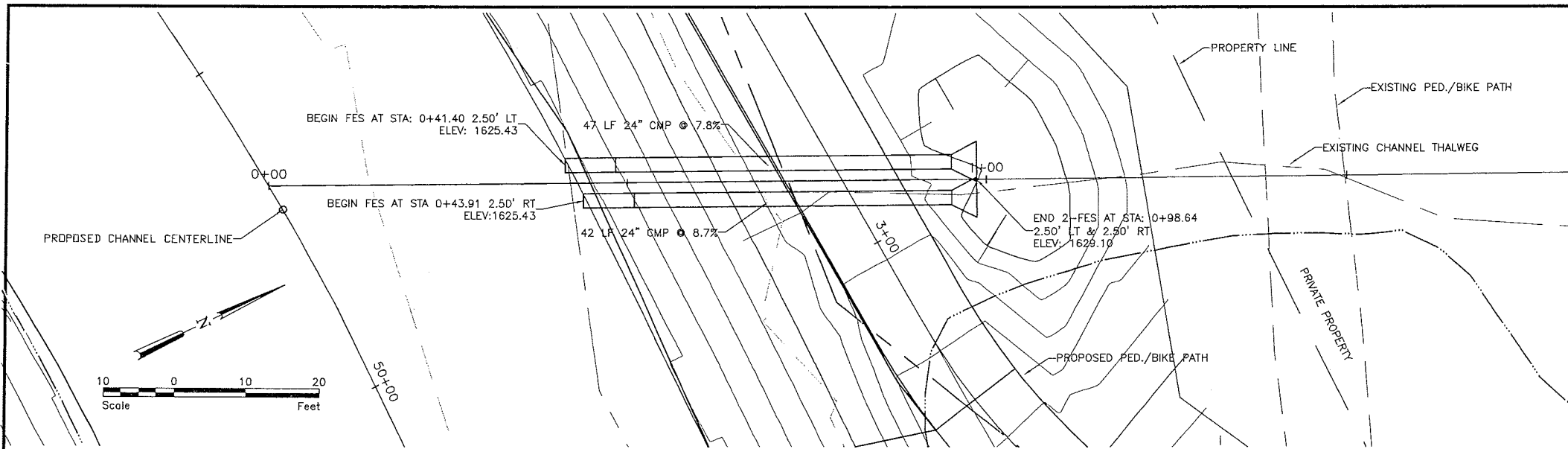
Drawn by	Date
JRM	7-17-08
Checked by	Scale
TLR	AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DIST.
 BISMARCK, NORTH DAKOTA

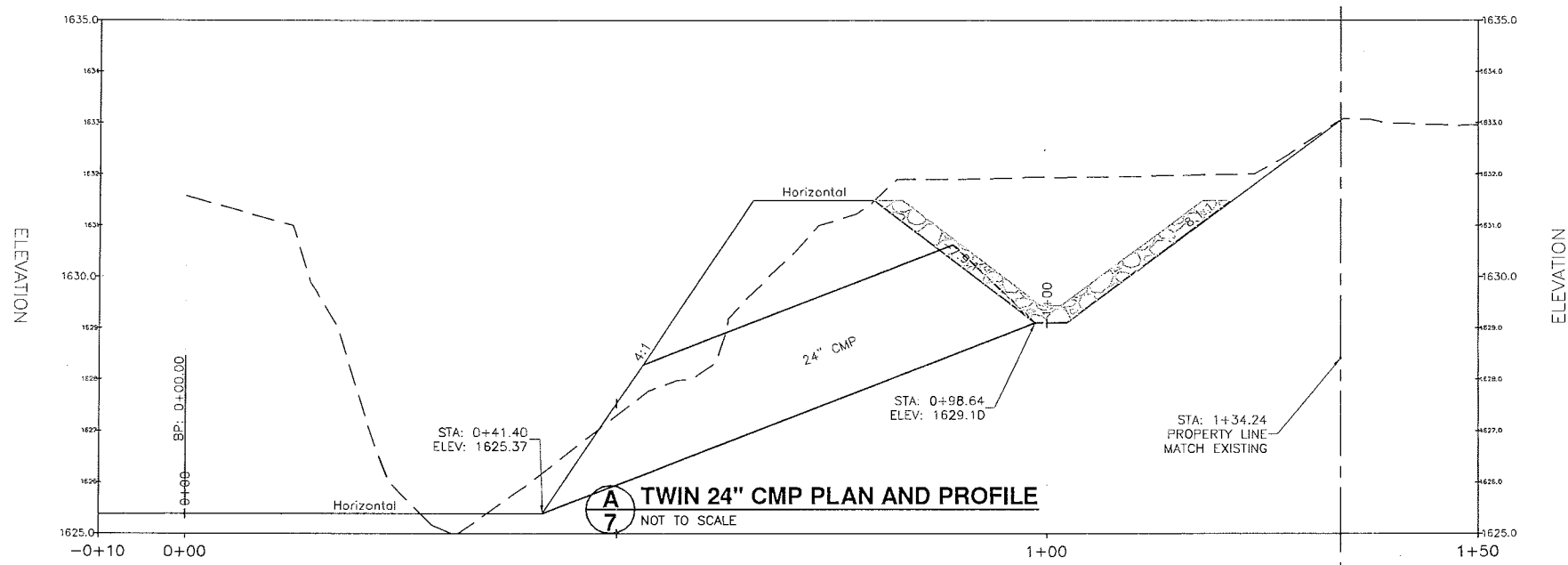
CHANNEL RIPRAP & SLOPE PROTECTION DETAILS
 PROJECT NO. 4241-300

SHEET
 6 of 24

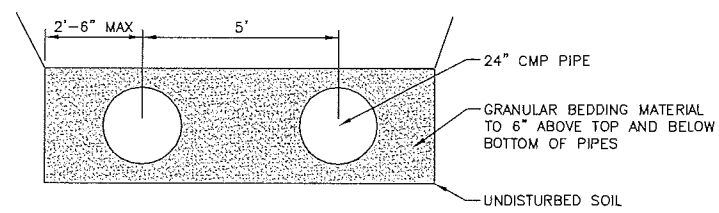
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NOTES:
 GRADE CHANNEL THALWEG TO DRAIN TO INLET AND REMOVE ANY SHALLOW PONDING TO THE NORTH. MATCH NEWLY GRADED CHANNEL TO EXISTING GROUND AT STA: 1+34.24
 CONSTRUCT AN INLET SUMP. MAXIMUM 4:1 SLOPE FROM INLET TO EXISTING GROUND. THIS WORK WILL BE INCIDENTAL TO PROJECT.
 18" THICK ROCK RIPRAP WITH GEOTEXTILE FILTER FABRIC LOCATED AT THE INLET OF THE TWIN CULVERTS (30 CY)
 REMOVE EXISTING PED./BIKE PATH. CONSTRUCT NEW 12' WIDE GRAVEL PED./BIKE PATH.
 CONTRACTOR SHALL STAY WITHIN THE CONSTRUCTION LIMITS UNLESS GIVEN WRITTEN PERMISSION FROM THE LAND OWNER TO ENTER UPON AND UTILIZE HIS PROPERTY.



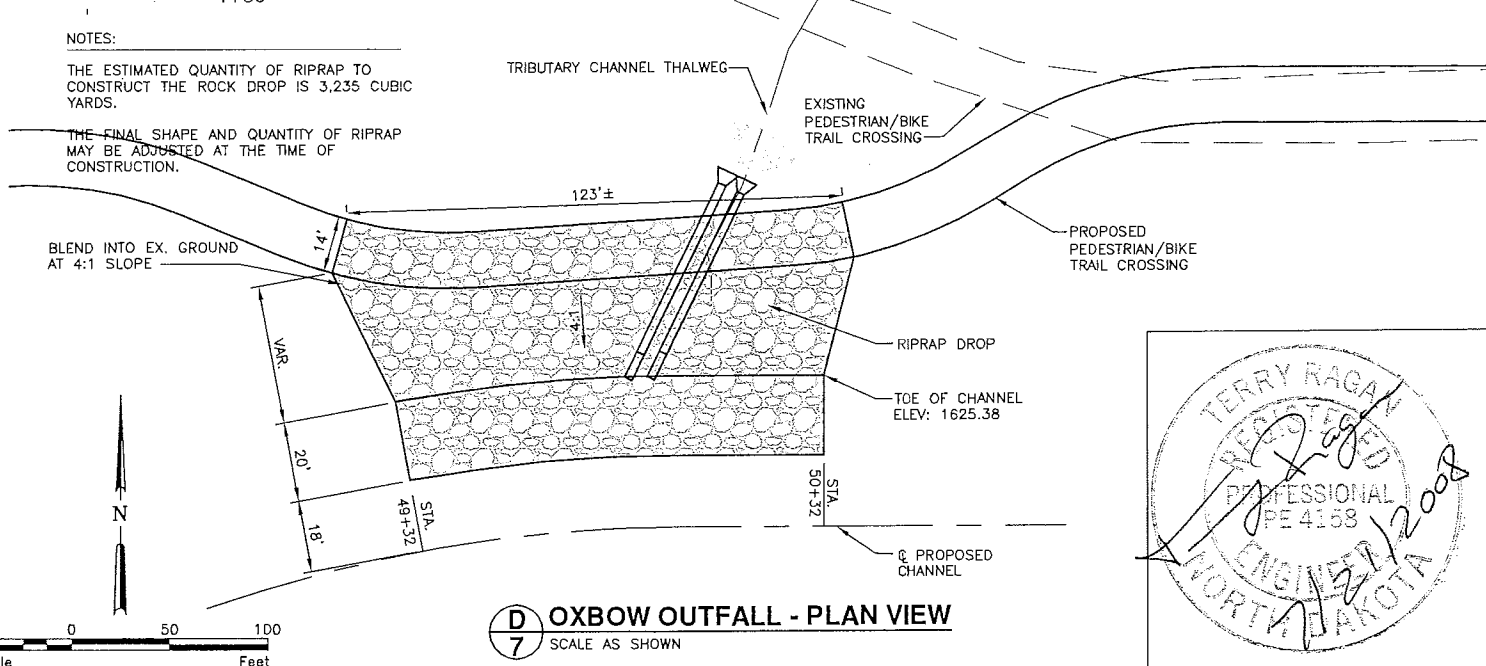
A TWIN 24" CMP PLAN AND PROFILE
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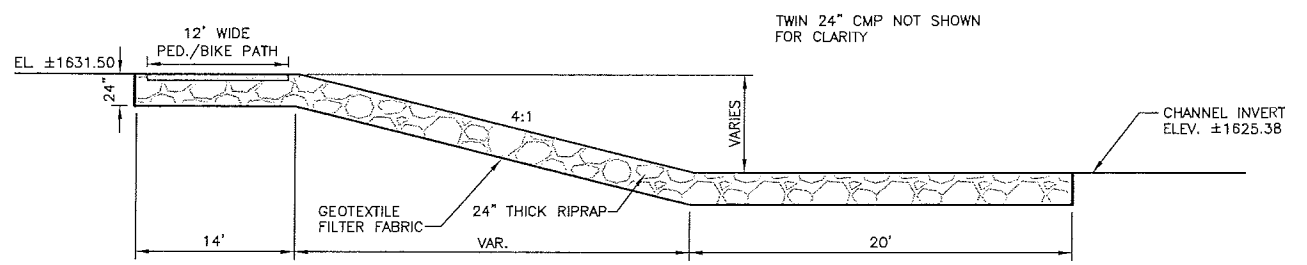
B DOUBLE PIPE BEDDING DETAIL
 NOT TO SCALE

NOTES:
 3' SPACING IS DETERMINED BY WIDTH OF STANDARD F.E.S. ON INLET END OF PIPE. SPACING MAY BE REDUCED THROUGH USE OF A SINGLE F.E.S. FOR BOTH PIPES, IF AVAILABLE.
 F.E.S. ON OUTLET ENDS OF PIPES ARE LOW SLOPE F.E.S. AS SUPPLIED BY CONTECH. SUPPLY WITH OPTIONAL SAFETY BARS.

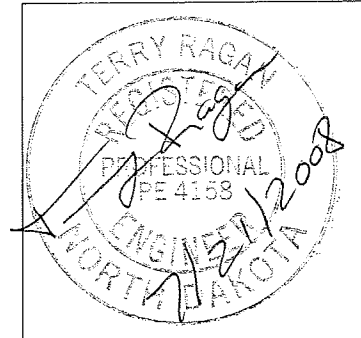
NOTES:
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 THE FINAL SHAPE AND QUANTITY OF RIPRAP MAY BE ADJUSTED AT THE TIME OF CONSTRUCTION.



D OXBOW OUTFALL - PLAN VIEW
 SCALE AS SHOWN



C OXBOW OUTFALL SECTION
 NOT TO SCALE



No.	Revision	Date	By

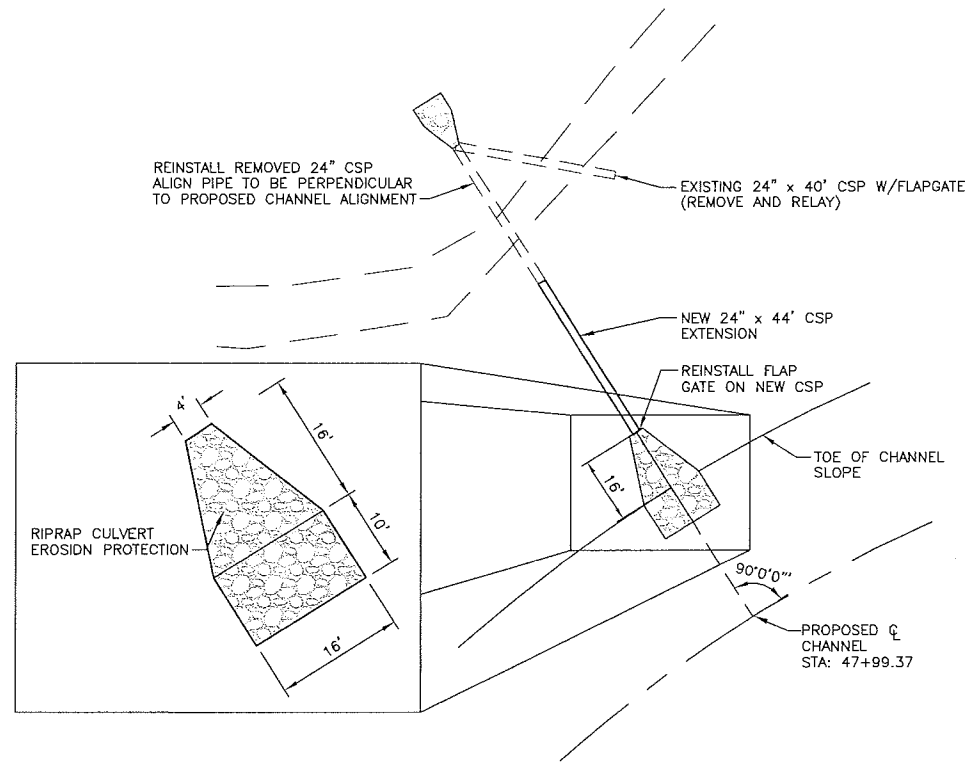
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 3712 LOCKPORT STREET
 BISMARCK, NORTH DAKOTA 58503

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Checked by TLR	Scale AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DIST.
 BISMARCK, NORTH DAKOTA

TWIN 24" CULVERT
 DETAILS
 PROJECT NO. 4241-300

SHEET
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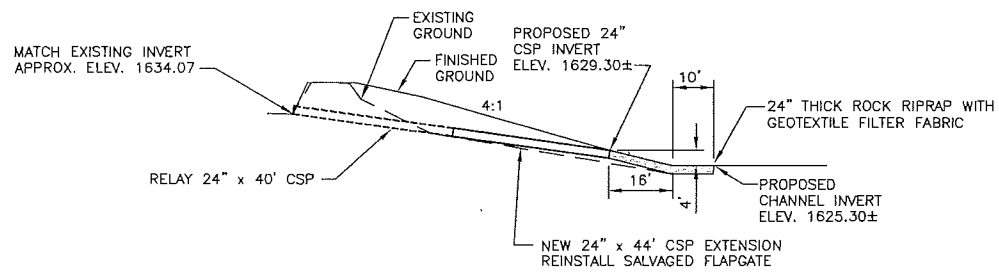
NOTES:

SALVAGING AND REINSTALLING THE EXISTING 24" FLAPGATE SHALL BE INCIDENTAL TO THE BID ITEM RELAY 24" CSP.

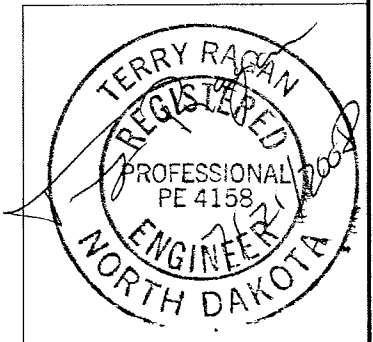
THE ESTIMATED QUANTITY OF RIPRAP TO CONSTRUCT THE ROCK DROP IS 24 CUBIC YARDS.

THE ESTIMATED QUANTITY OF AGGREGATE THE FINAL SHAPE AND QUANTITY OF RIPRAP MAY BE ADJUSTED AT THE TIME OF CONSTRUCTION.

CONSTRUCT POCKET FOR FLAP GATE TO ENSURE FLAP GATE CAN OPEN FREELY WITH NO INTERFERENCE FROM TRASH AND DEBRIS.



A SINGLE 24" CULVERT DETAILS
8 NOT TO SCALE



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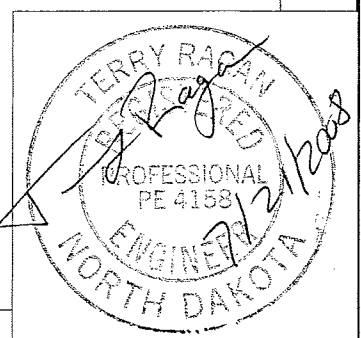
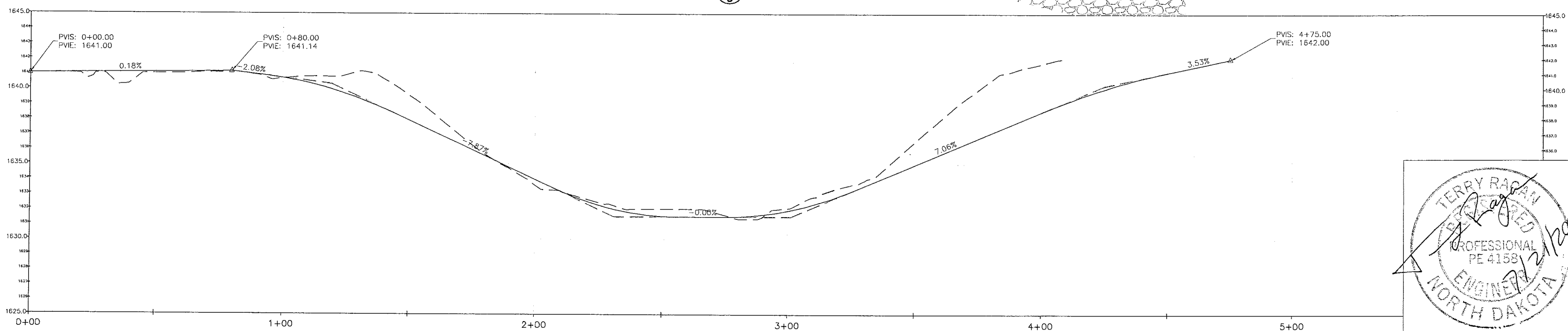
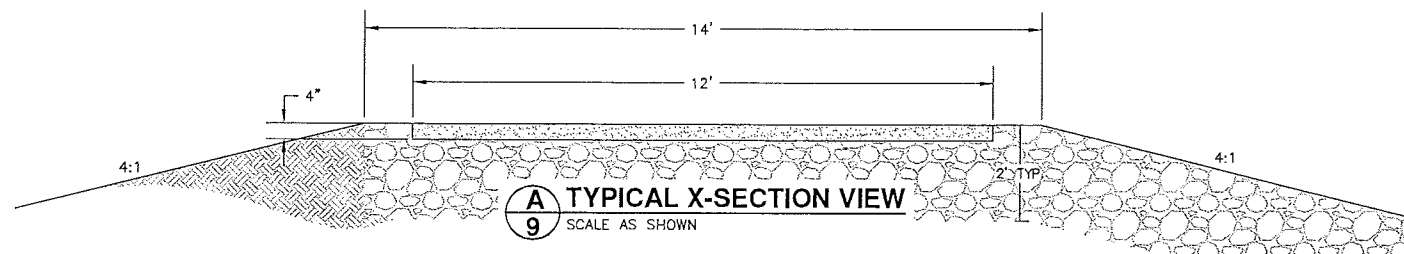
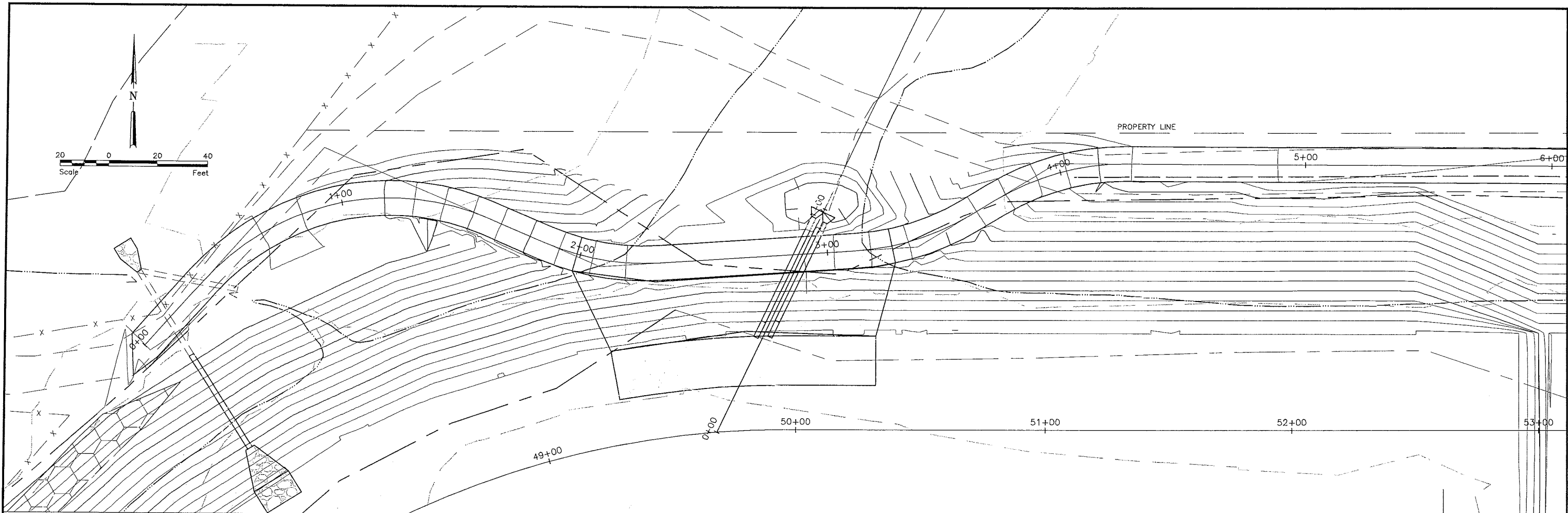
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BISMARCK, NORTH DAKOTA 58503

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JRM	7-17-08
Checked by	Scale
TLR	AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
BURLEIGH COUNTY WATER RESOURCE DIST.
BISMARCK, NORTH DAKOTA

SINGLE 24" CULVERT
DETAILS
PROJECT NO. 4241-300

SHEET
8 of 24



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No.	Revision	Date	By

HE Houston Engineering, Inc.
 3712 Lockport Street
 BISMARCK, NORTH DAKOTA 58501
 TEL: (701) 323-0200
 FAX: (701) 323-0300

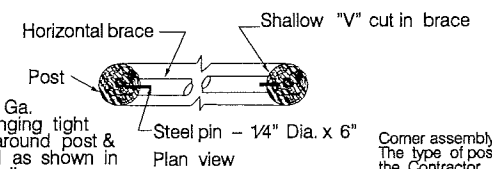
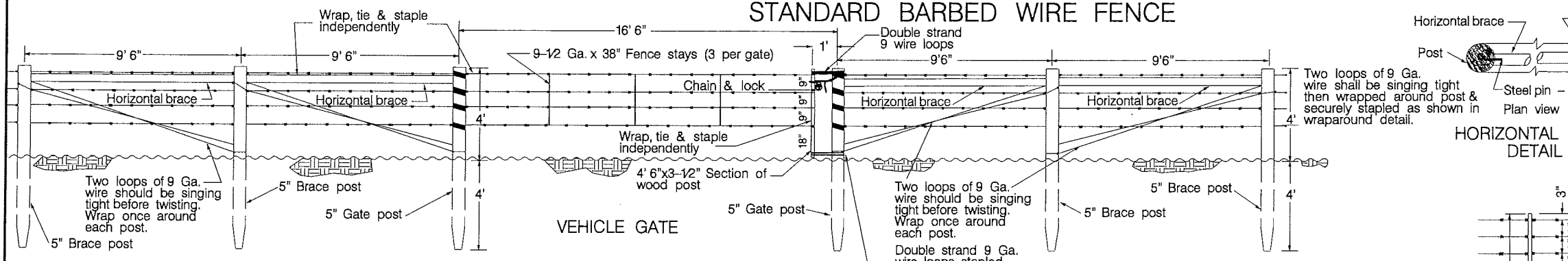
Drawn by JRM	Date 7-17-08
Checked by TLR	Scale AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DIST.
 BISMARCK, NORTH DAKOTA

PED./BIKE PATH
 PLAN AND PROFILE
 PROJECT NO. 4241-300

SHEET
 9 of 24

STANDARD BARBED WIRE FENCE



NOTES:

Corner assembly posts shall be round-back angle steel or treated wood. The type of post used under the above option shall be determined by the Contractor. Treated wood posts shall be used for gates, double brace assemblies and fence terminals. Type of line post to be indicated on plans.

No deduction in measured pay length of wire fence will be made for gates, corner assemblies, double brace assemblies, fence terminals or depression fencing. Depression fencing and abutment fencing shall be included in the price bid for fencing.

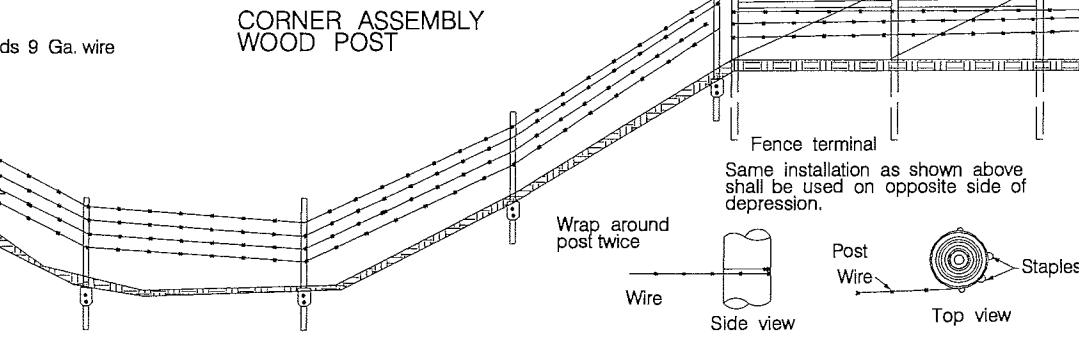
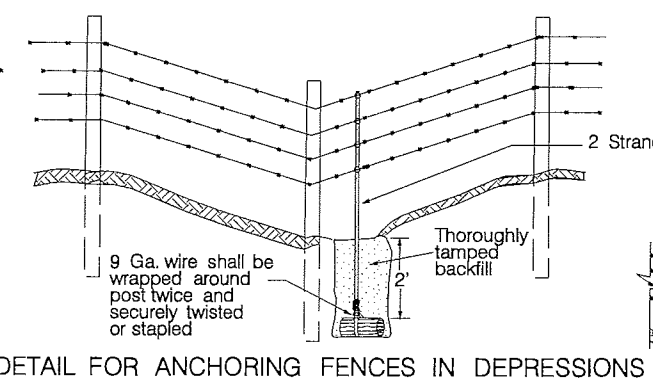
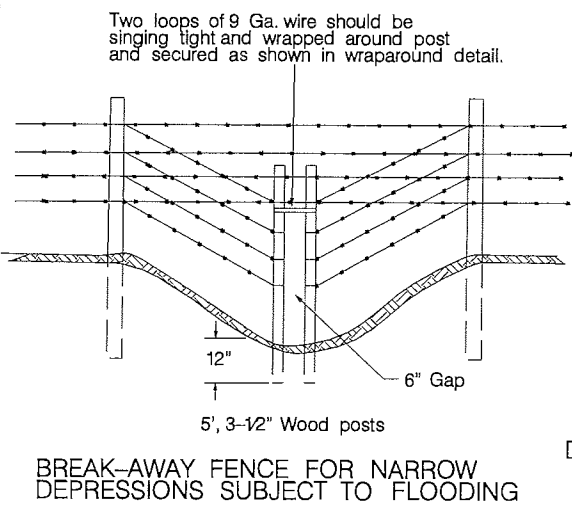
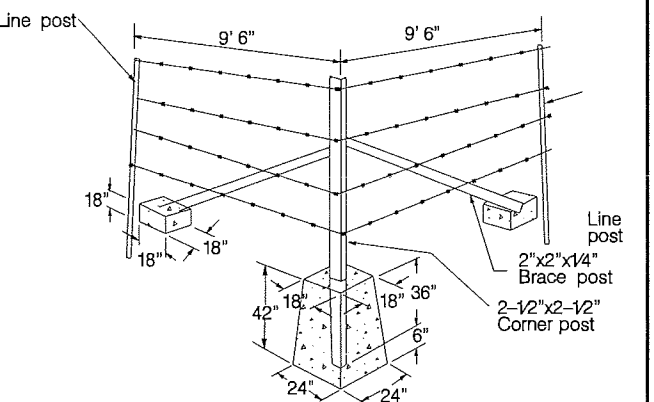
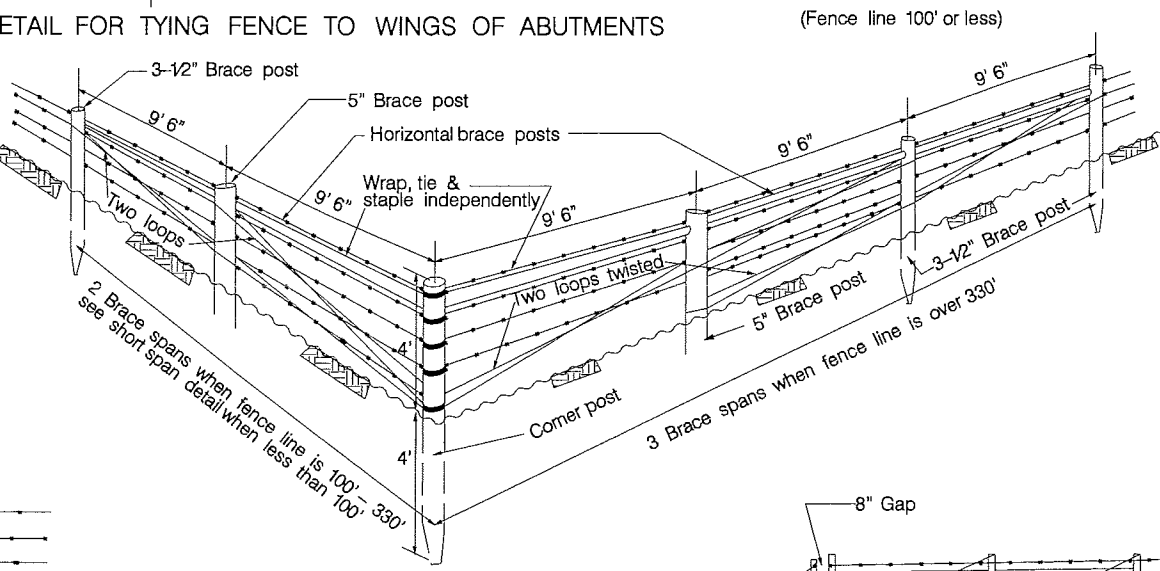
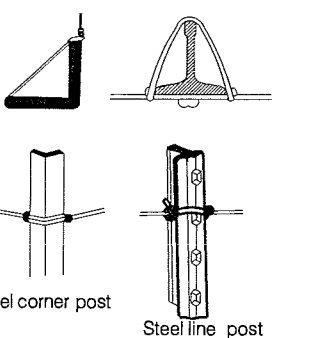
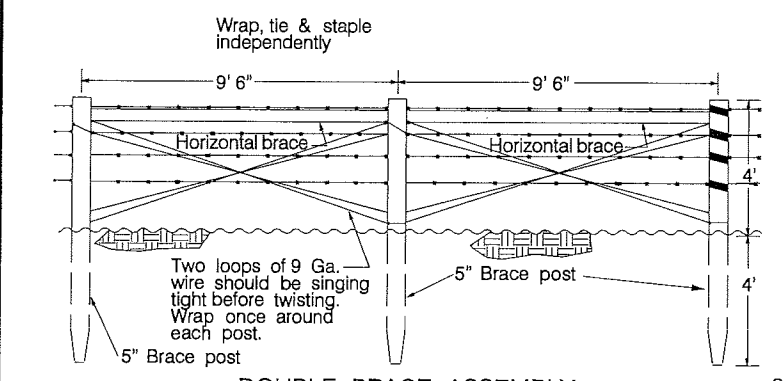
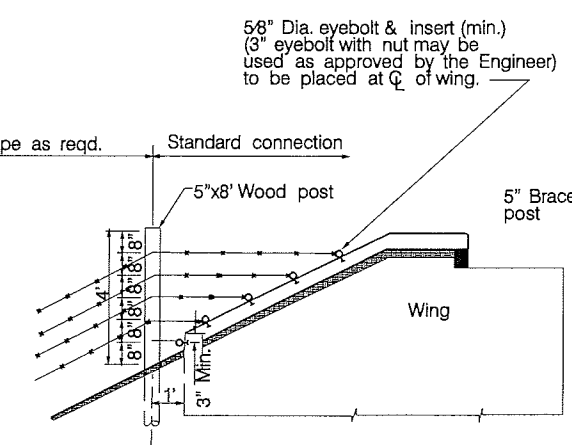
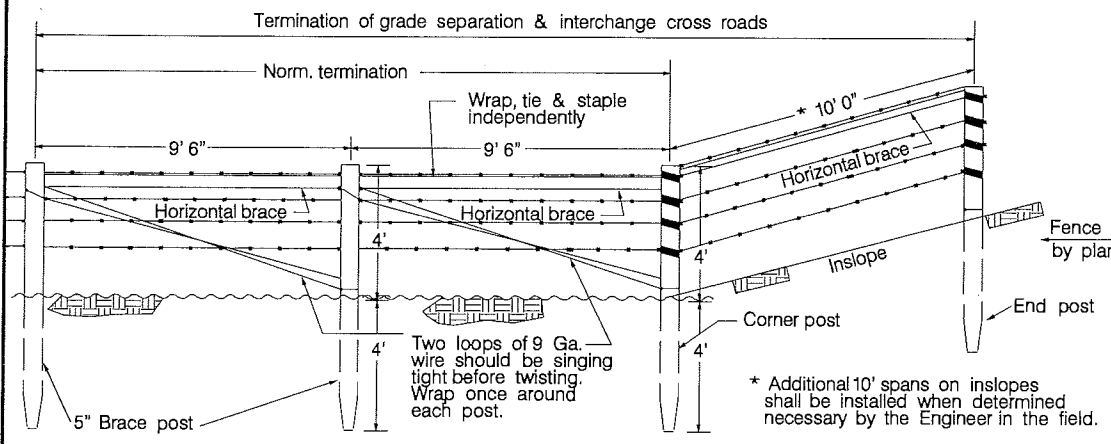
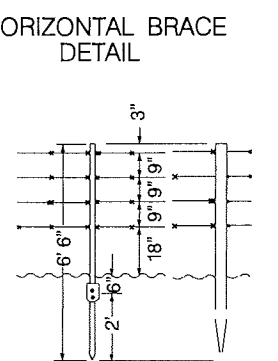
All materials shall be in accordance with Sec. 752 of the Standard Specifications. Posts and braces shall be galvanized in accordance with requirements of AASHTO M-111 or painted with paint conforming to section 852 of the Standard Specifications.

Unless otherwise shown on the plans the barb wire shall be 12-1/2 gauge wire with 2 point barbs.

Double brace assemblies shall be installed at locations shown on the plans or established by the Engineer. The distance between adjacent fence terminals, corner assemblies, or double brace assemblies shall not exceed 1320 feet.

Additional materials and labor for each fence terminal will be paid for at the price bid for double brace assembly.

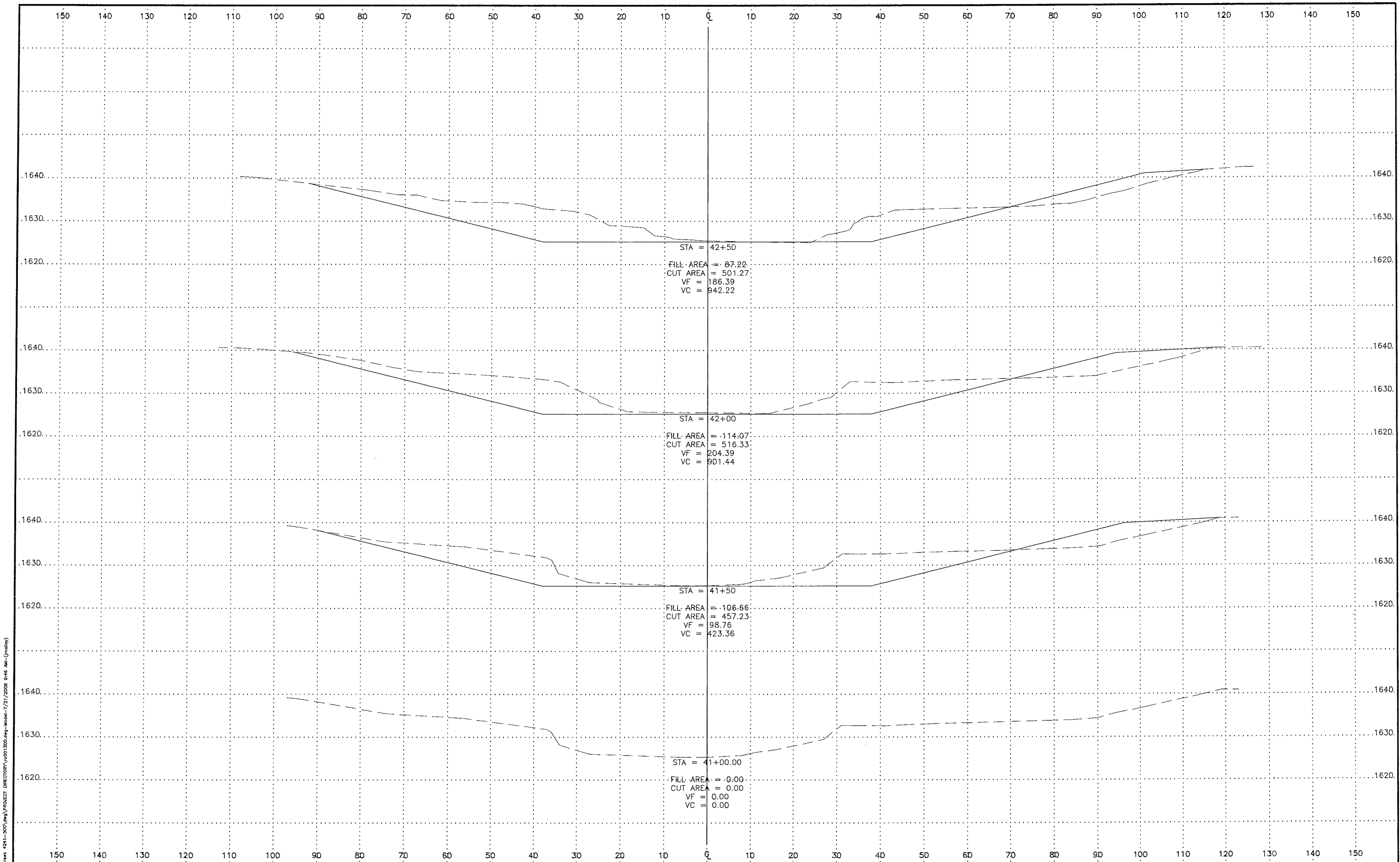
Cost of furnishing and installing inserts and eyebolts shall be included in the unit price bid for fencing. Eyebolts shall be galvanized according to AASHTO designation: M-30, inserts of corrosion resistant material need not be galvanized. Concrete inserts shall be of such design that when installed in concrete, will be capable of developing the full strength of the 5/8" Dia. threaded eye bolt.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
02-04-87	Gate post
06-01-89	Note wire gauge
09-04-90	Remove private fence note
03-07-01	Layout revision
12-01-04	PE Stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

The number of fence anchors shown in the plans is approximate only. The exact number and locations shall be determined in the field and payment made accordingly. Other methods of anchoring the fence may be used if approved by the Engineer.



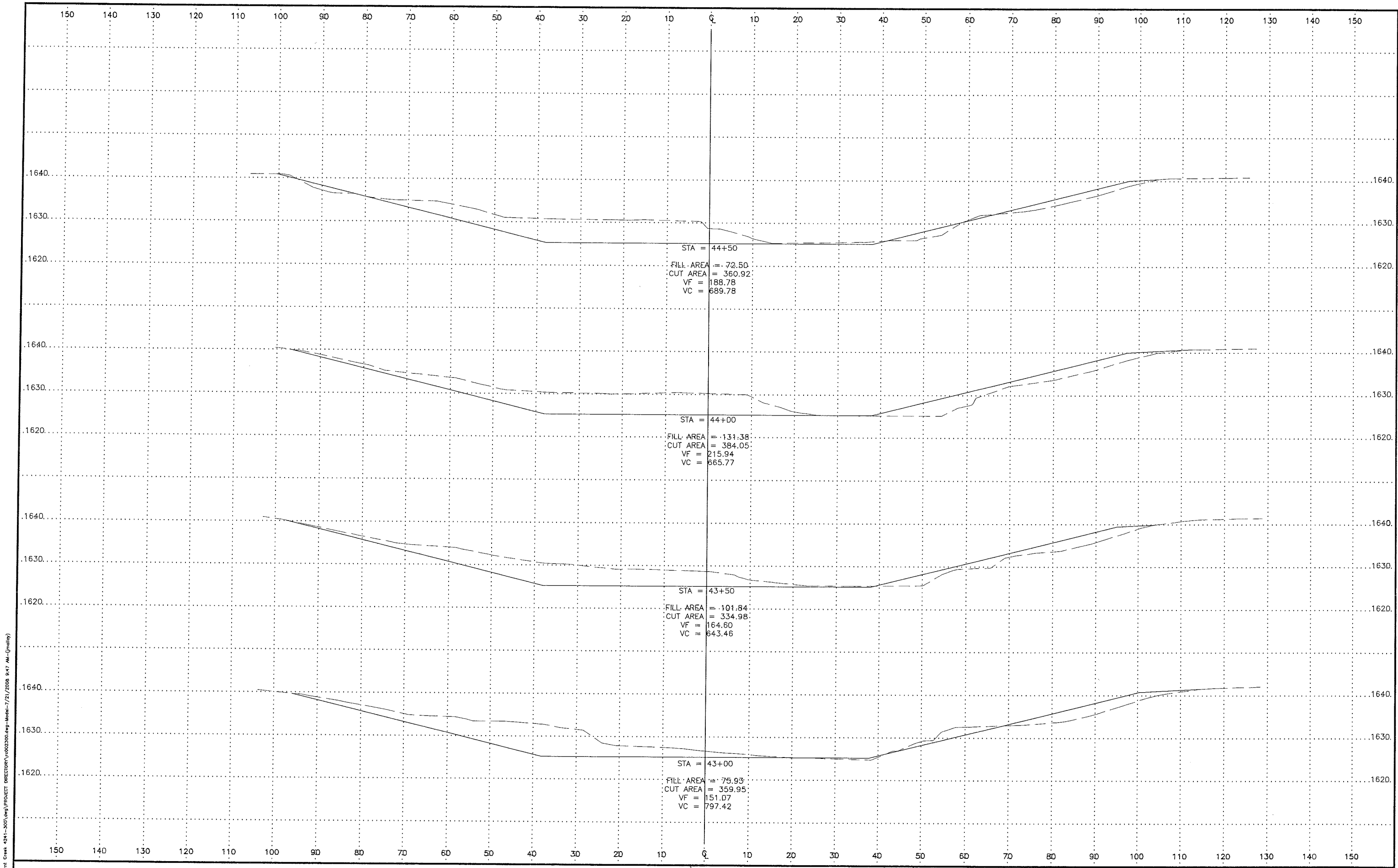
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H.E. PROJ. NO. 4241-300

BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

CROSS SECTIONS

Sheet 10 of 24



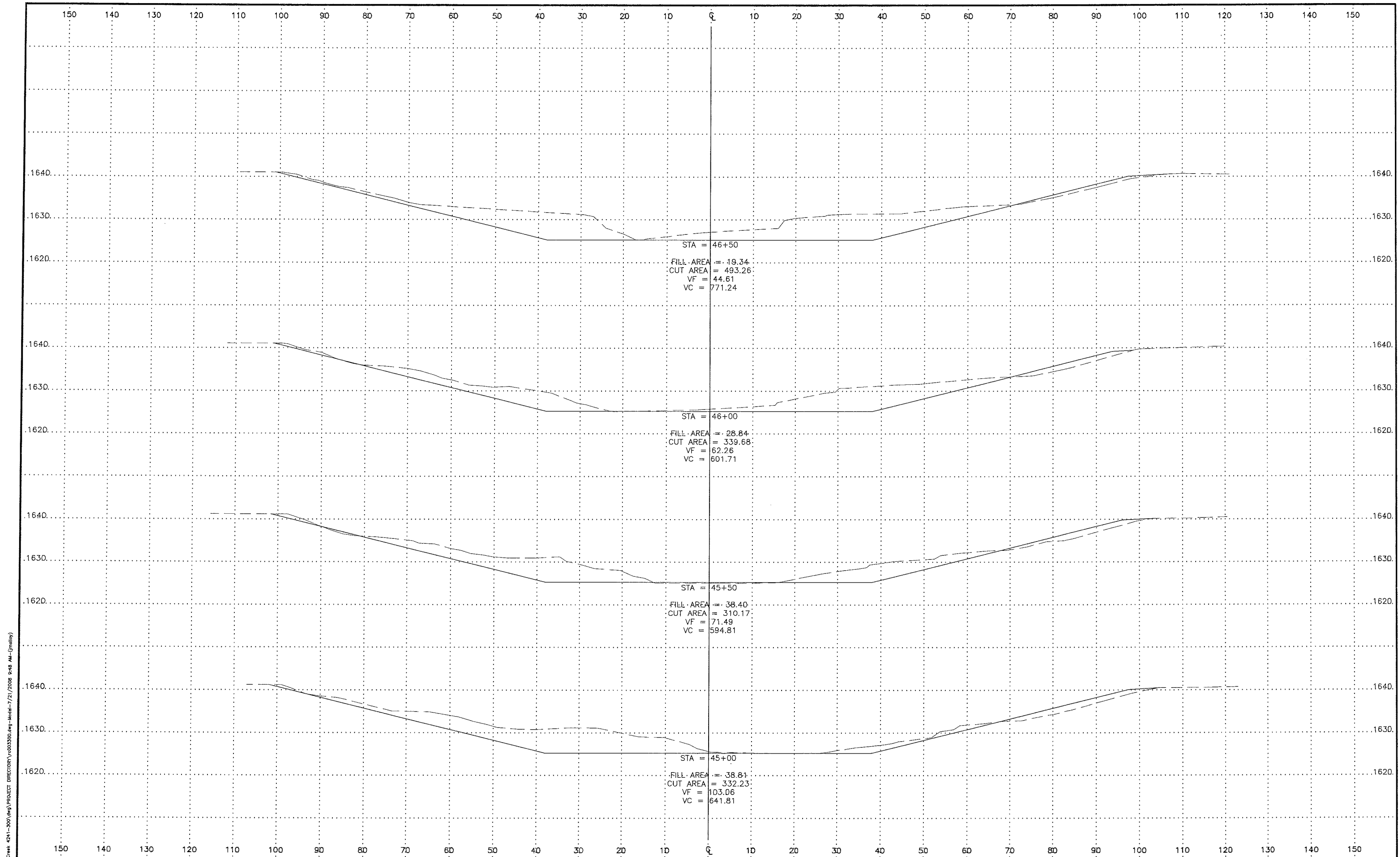
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BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

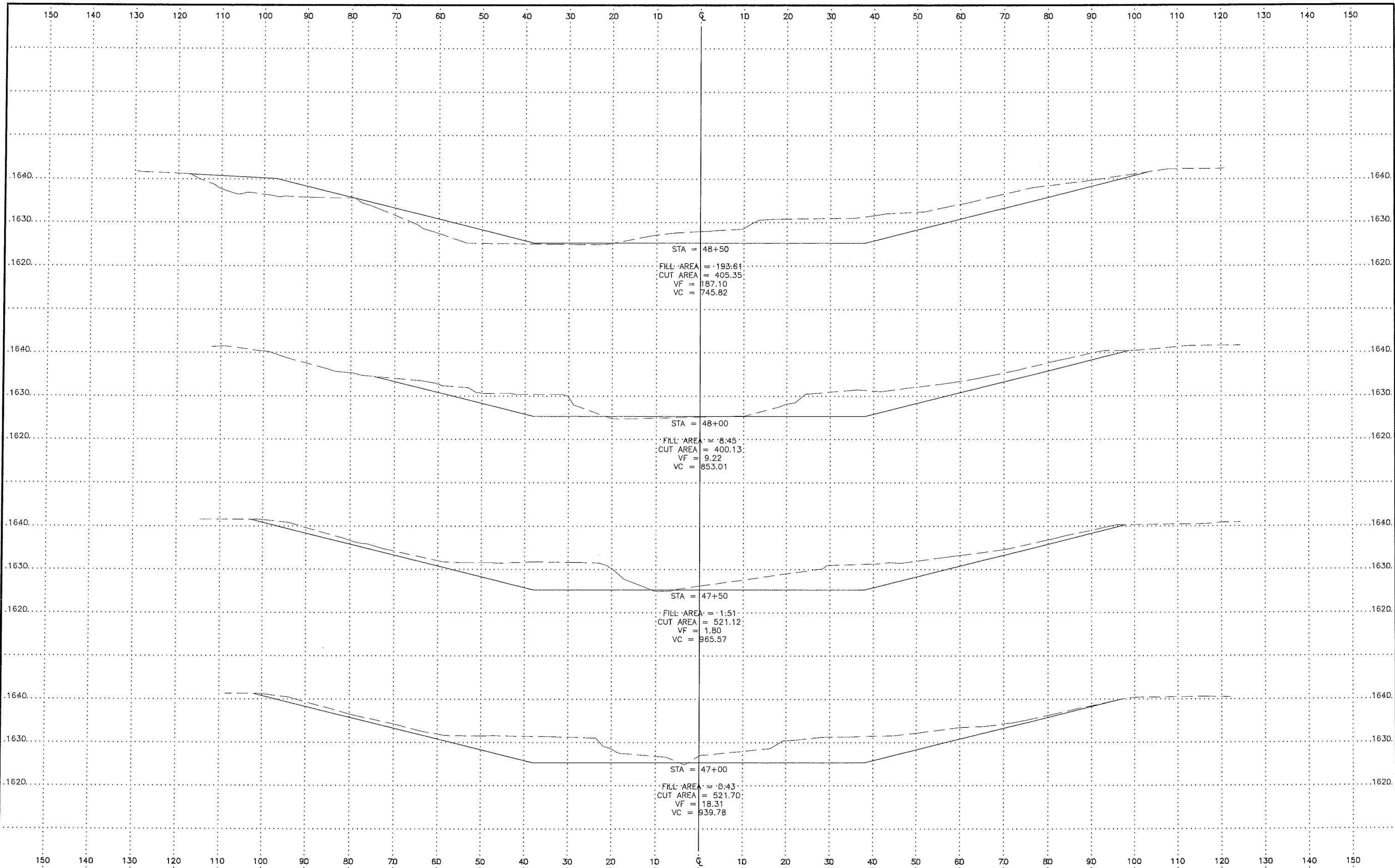
CROSS SECTIONS

Sheet 11 of 24



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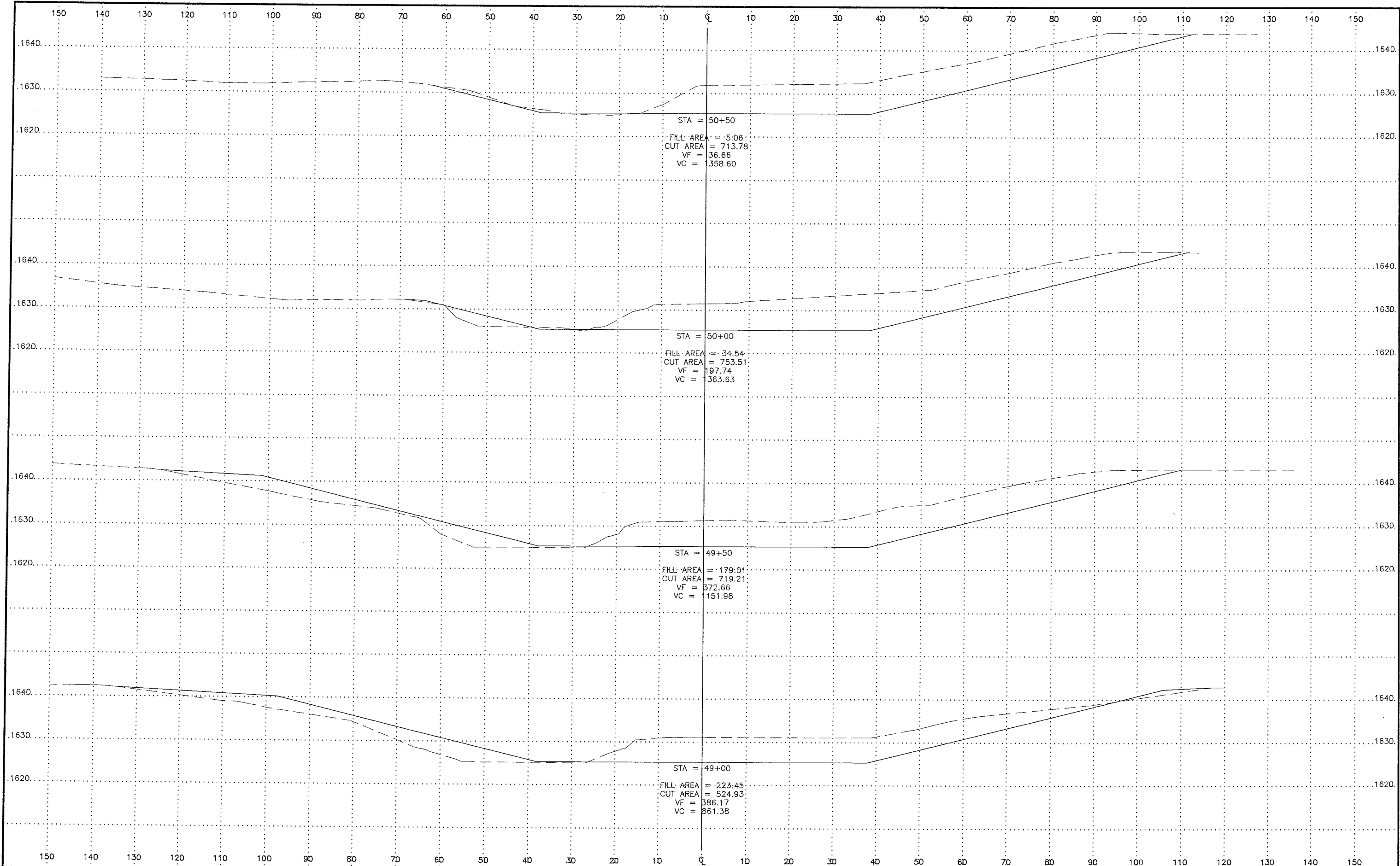
H.E. PROJ. NO. 4241-300

BURNT CREEK FLOOD CONTROL PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

CROSS SECTIONS

Sheet 13 of 24

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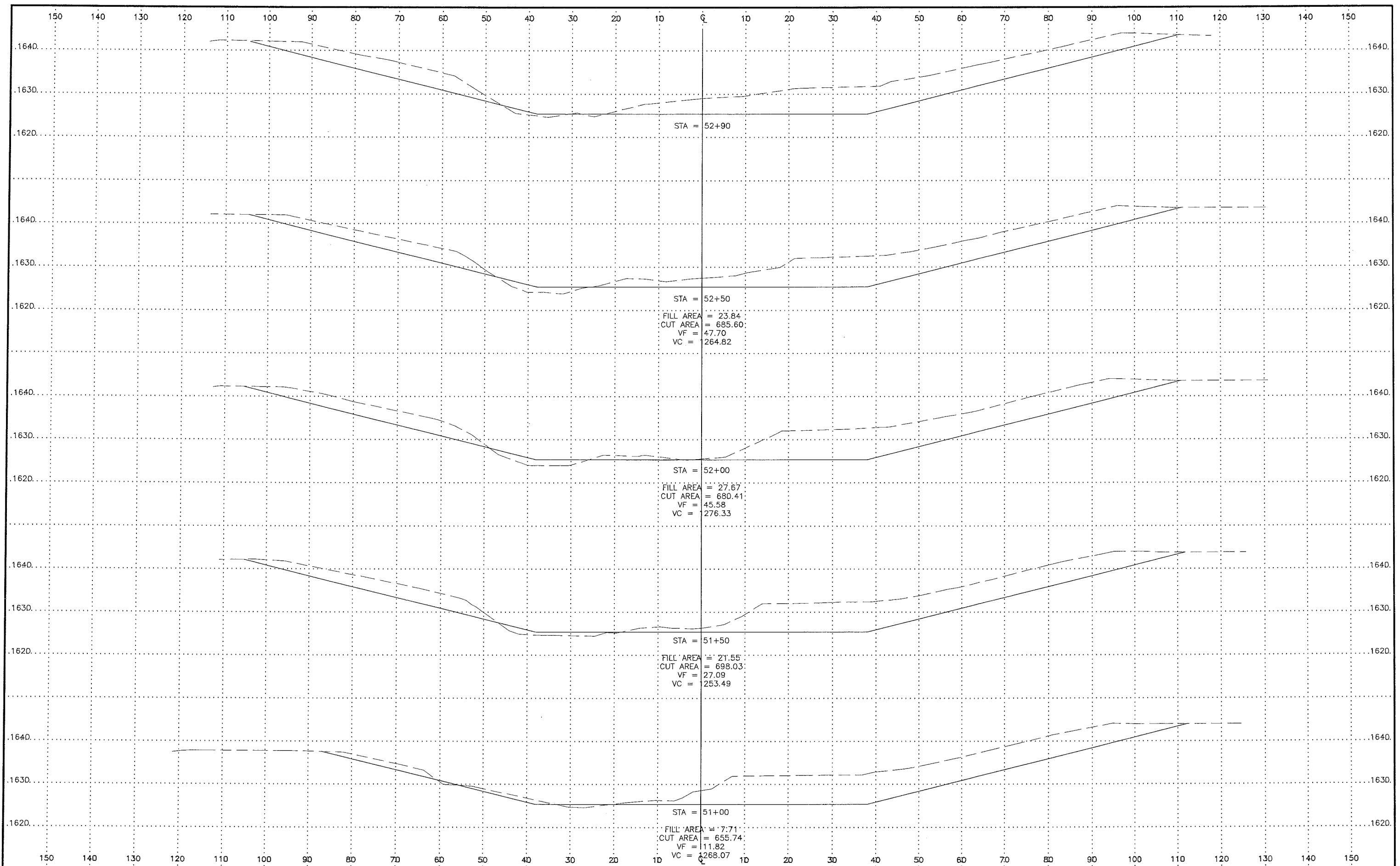


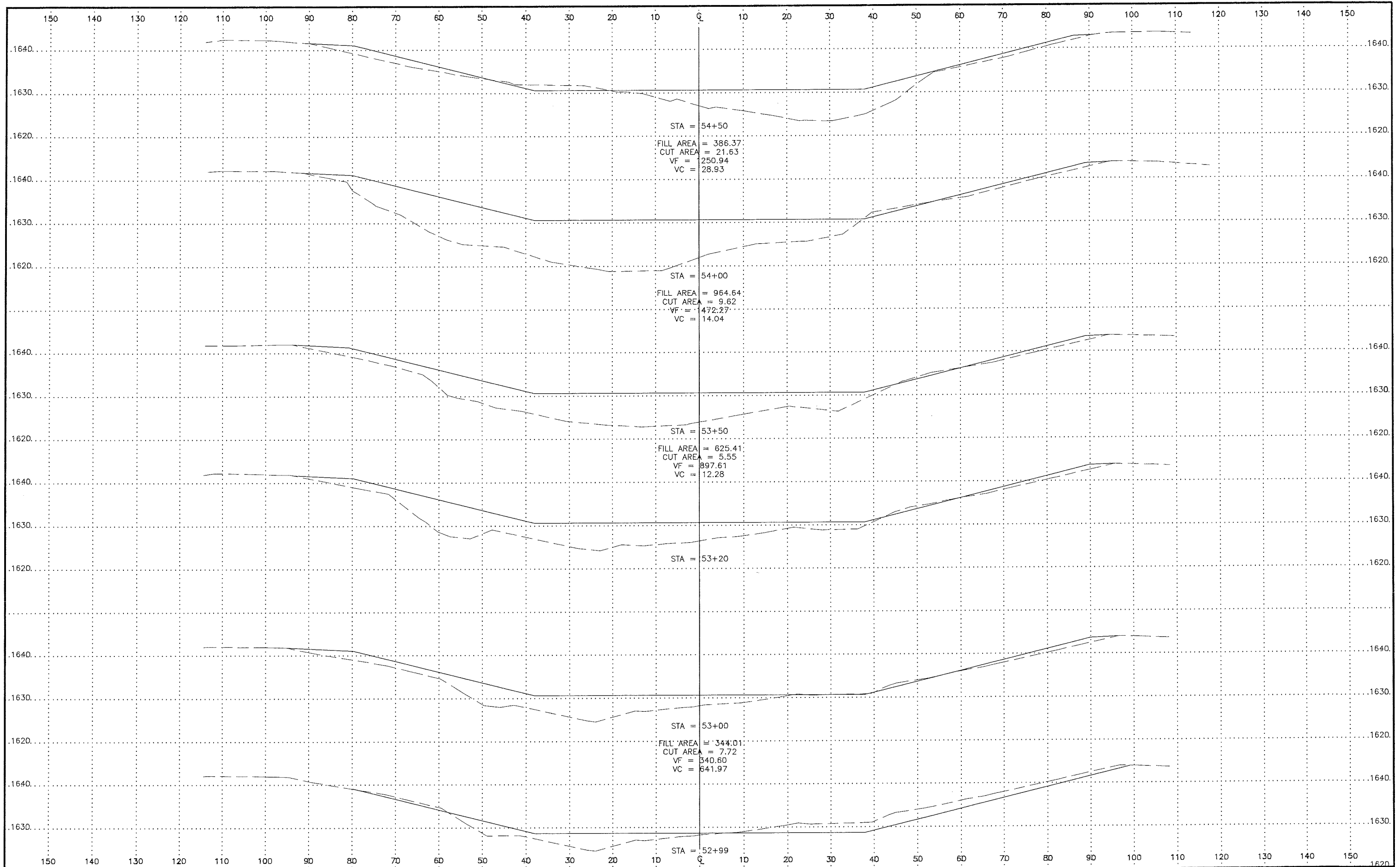
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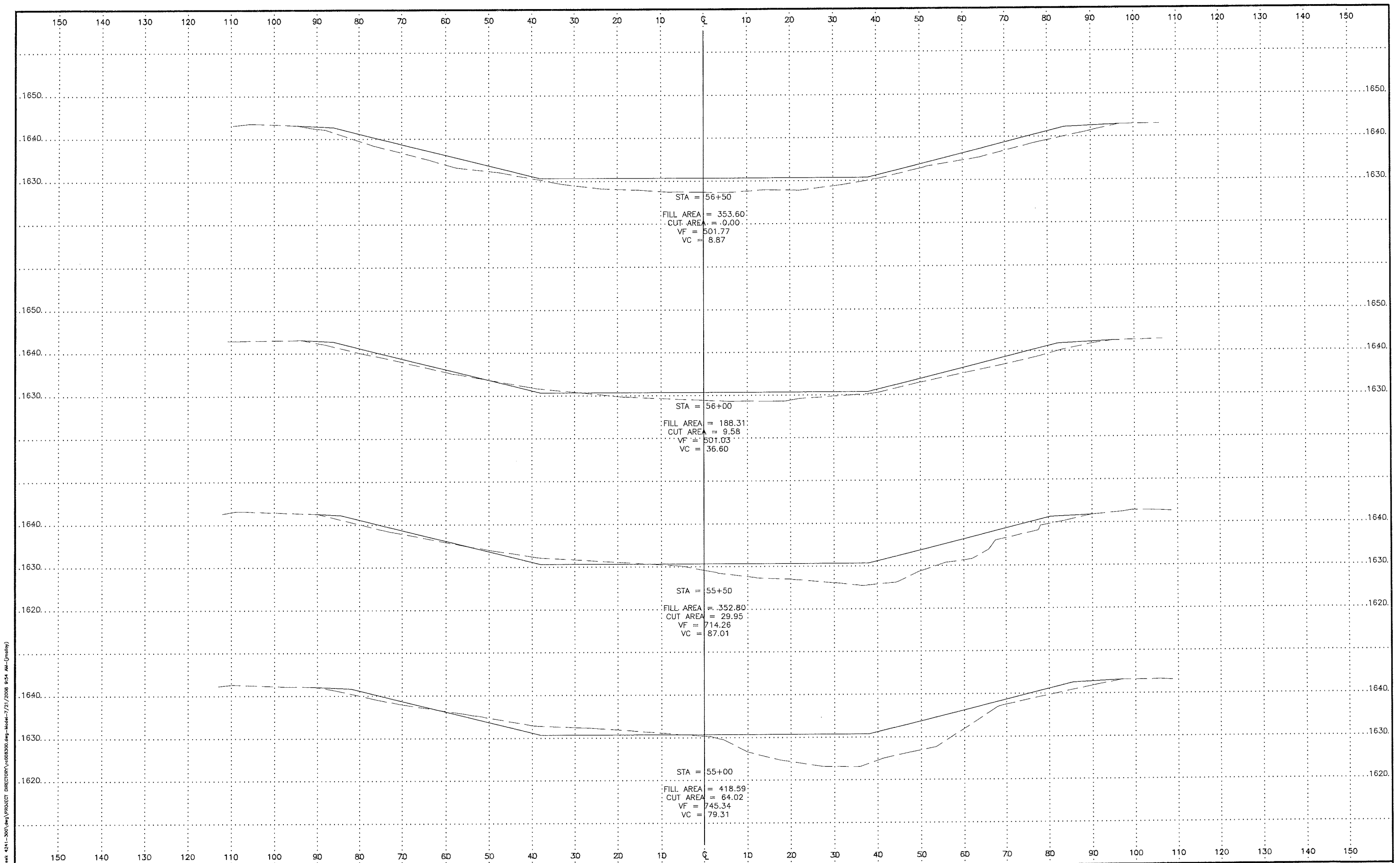
BURNT CREEK FLOOD CONTROL PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

CROSS SECTIONS

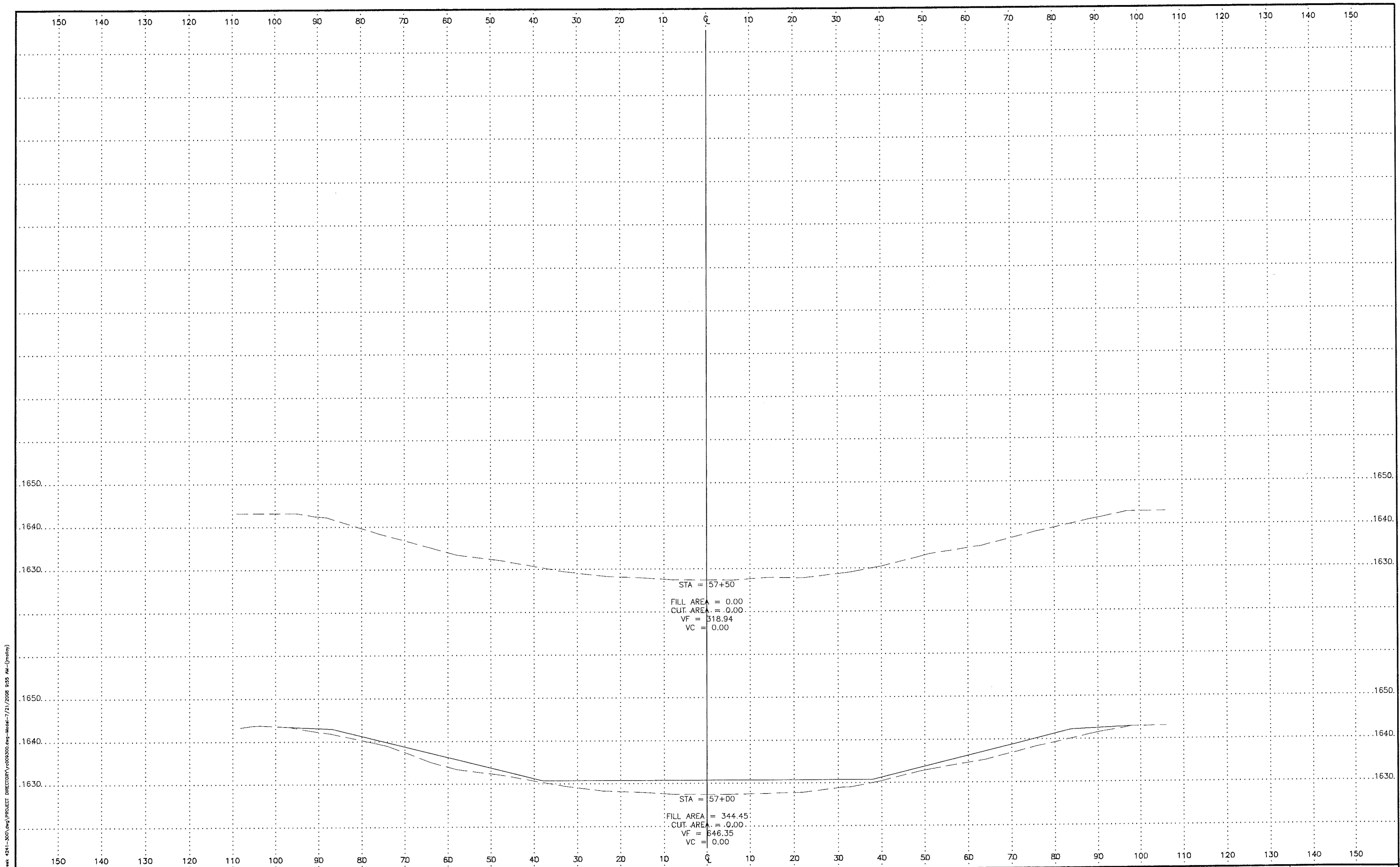
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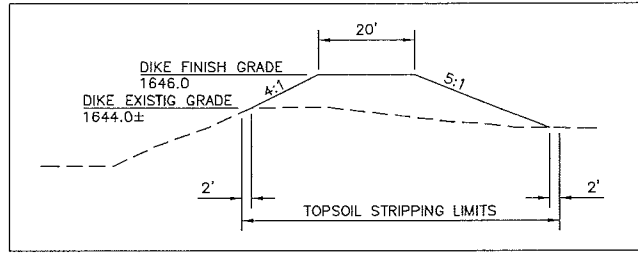
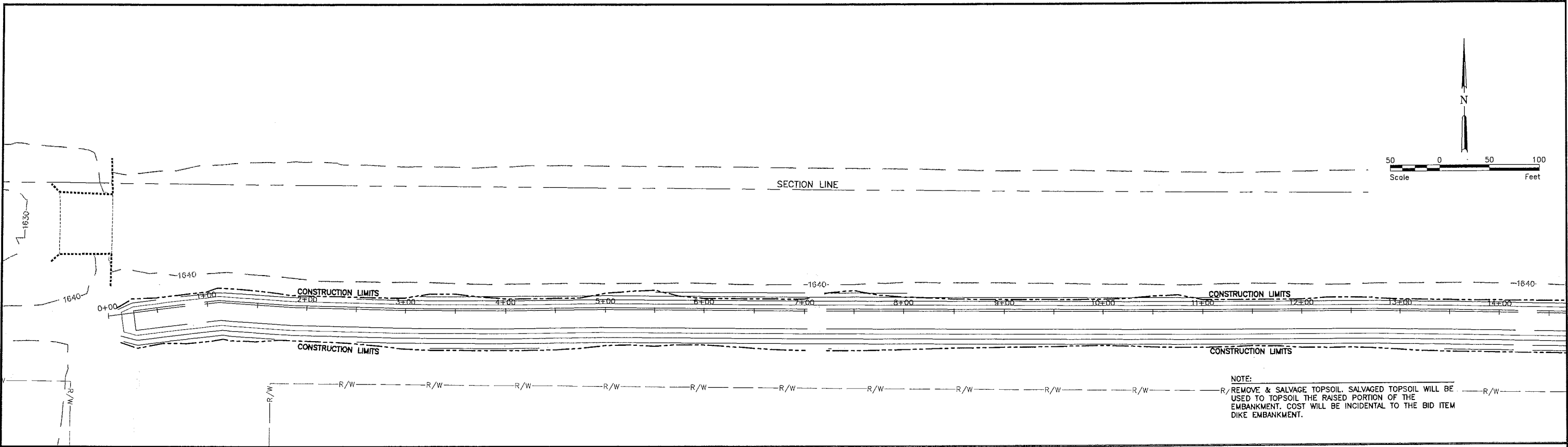
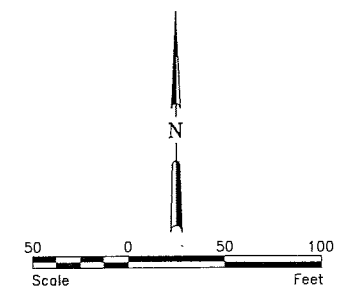




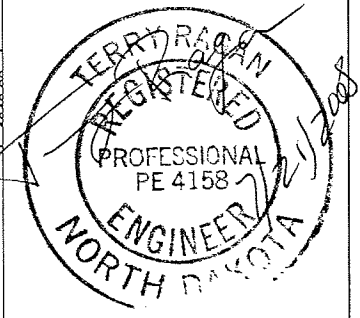
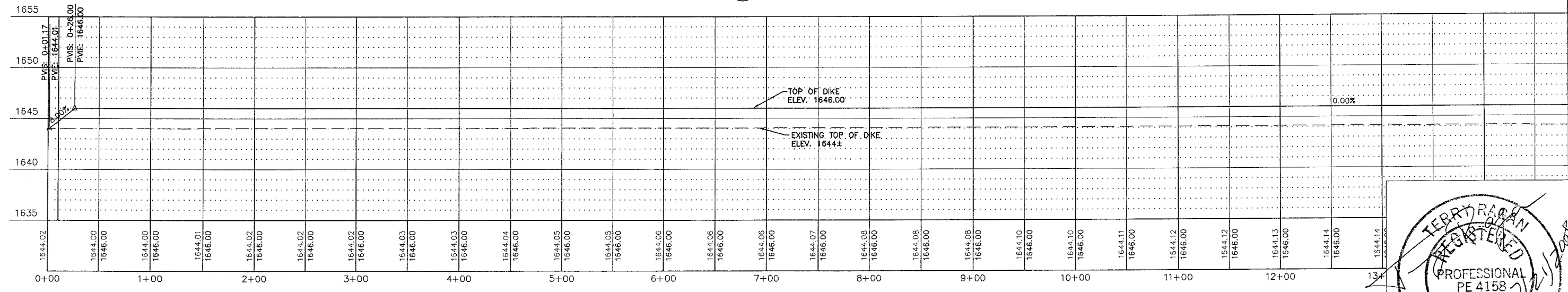
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A TYPICAL X-SECTION VIEW
 19 SCALE AS SHOWN



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No.	Revision	Date	By

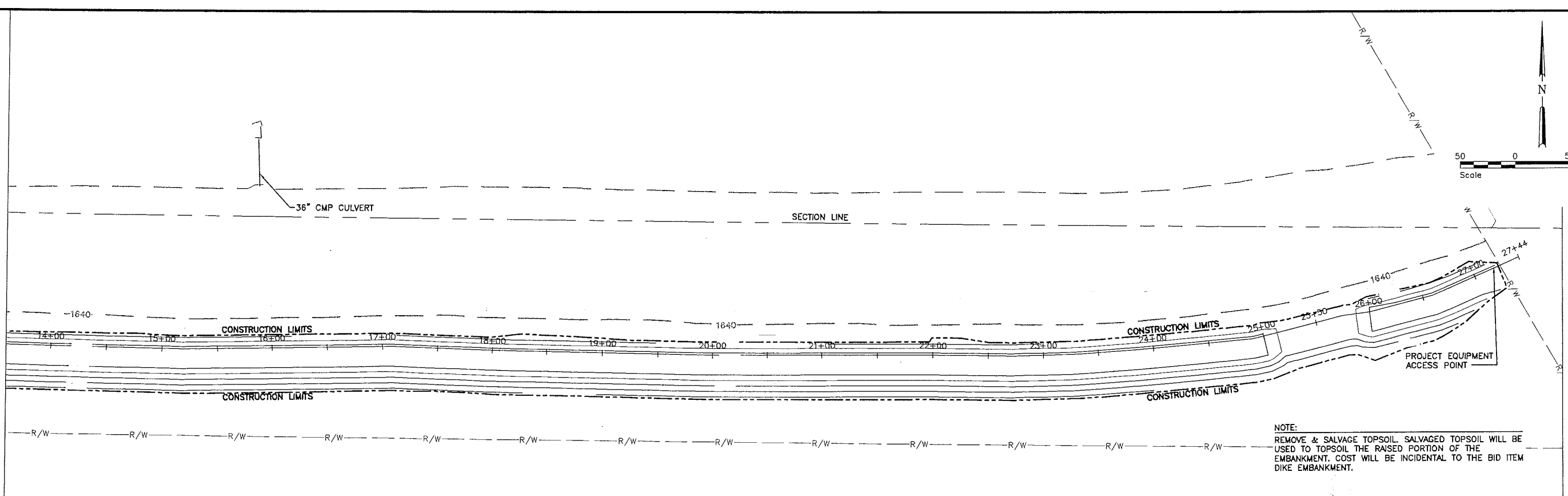
HE Houston Engineering, Inc.
 3712 Lockport Street BISMARCK, NORTH DAKOTA 58501
 TEL: (701) 323-0200 FAX: (701) 323-0300

Drawn by: BJH
 Date: 7-2-08
 Checked by: TLR
 Scale: AS SHOWN

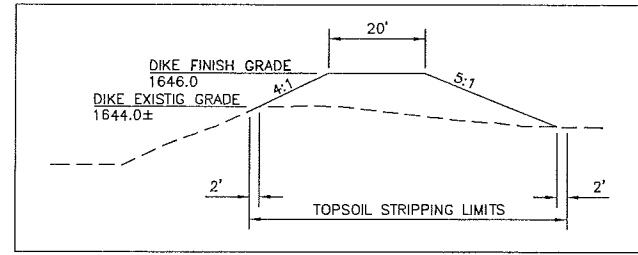
BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

DIKE CONSTRUCTION
 PLAN AND PROFILE
 PROJECT NO. 4241-300

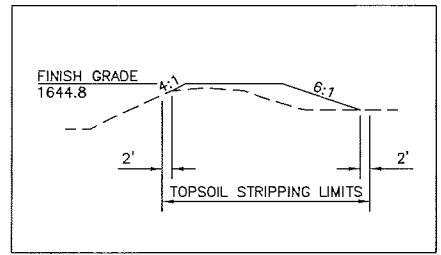
SHEET
 19 of 24



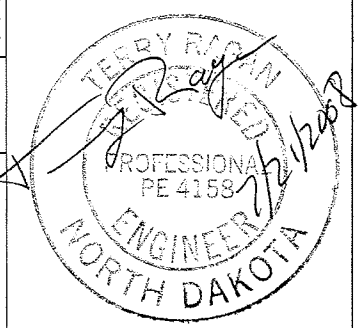
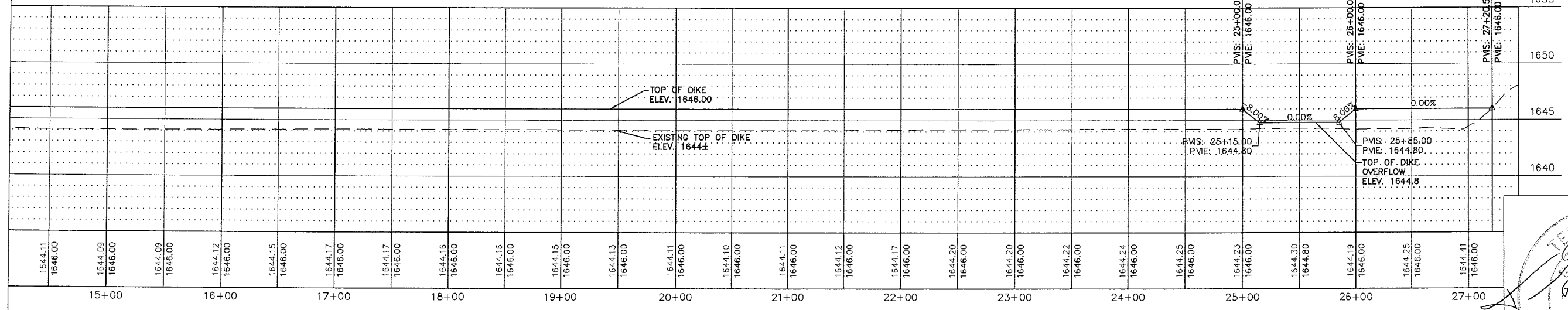
NOTE:
REMOVE & SALVAGE TOPSOIL. SALVAGED TOPSOIL WILL BE USED TO TOPSOIL THE RAISED PORTION OF THE EMBANKMENT. COST WILL BE INCIDENTAL TO THE BID ITEM DIKE EMBANKMENT.



A TYPICAL X-SECTION VIEW
SCALE AS SHOWN



B X-SECTION VIEW @ 25+50
SCALE AS SHOWN



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No.	Revision	Date	By

HE Houston Engineering, Inc.
3712 Lockport Street
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TEL: (701) 323-0200
FAX: (701) 323-0300

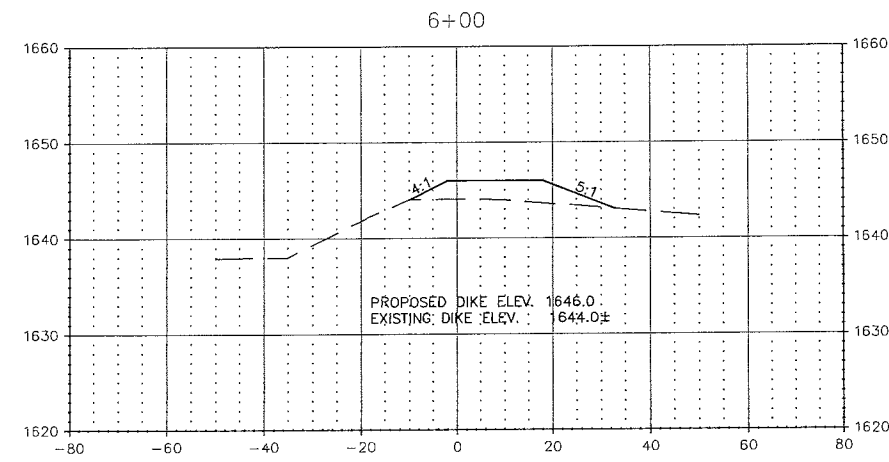
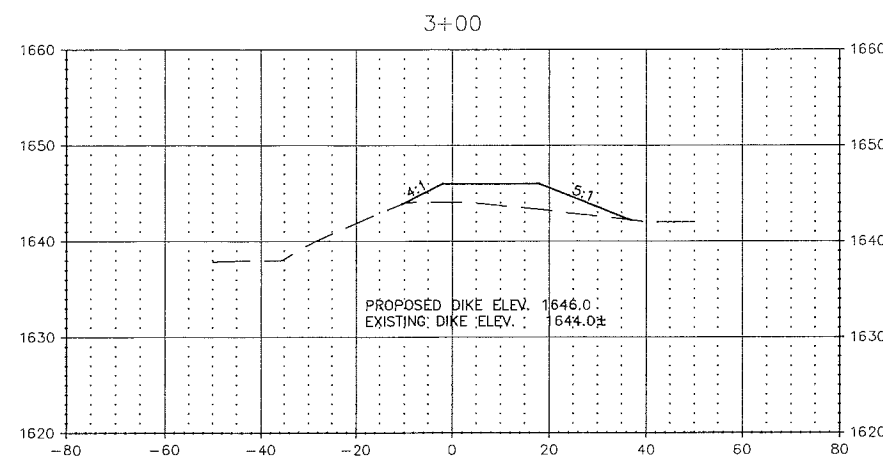
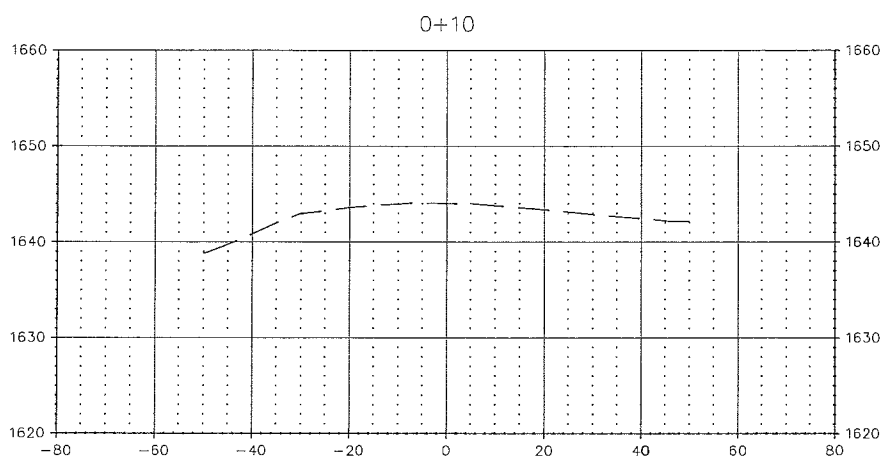
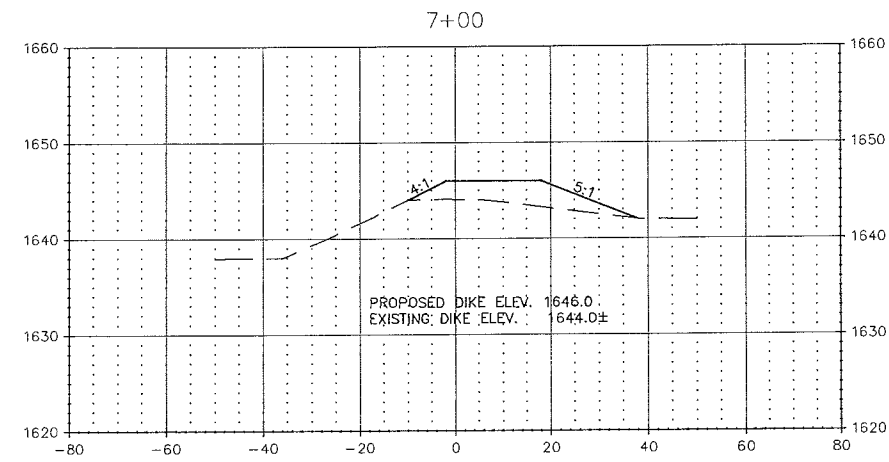
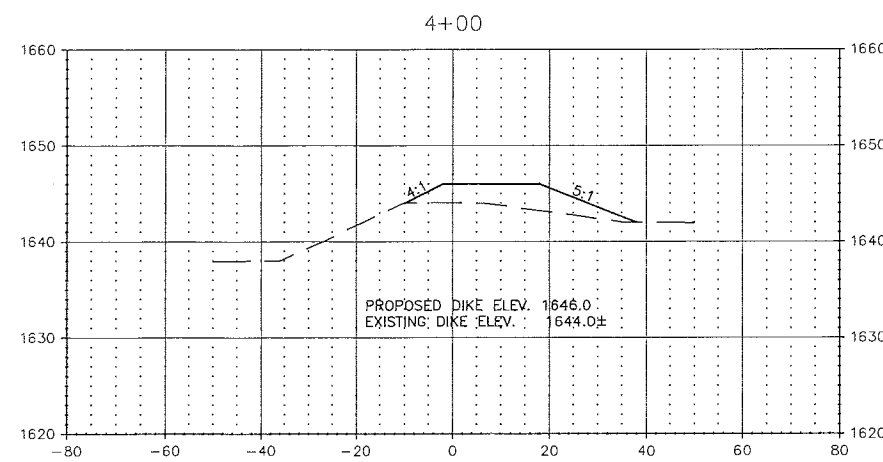
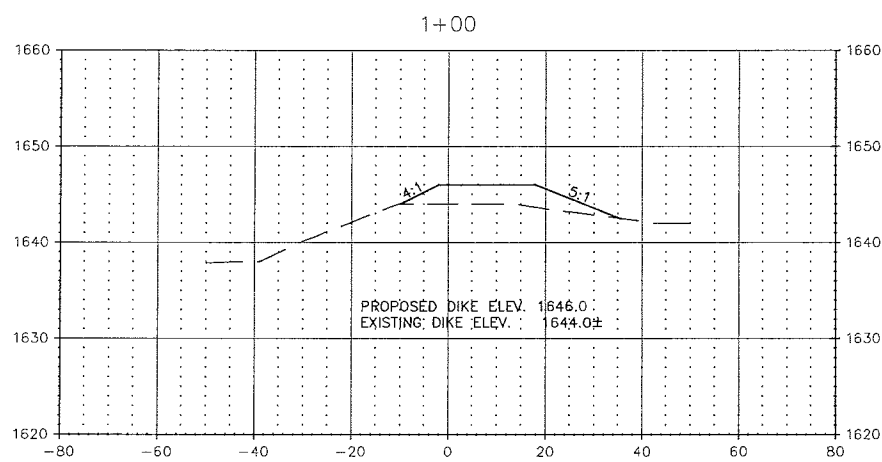
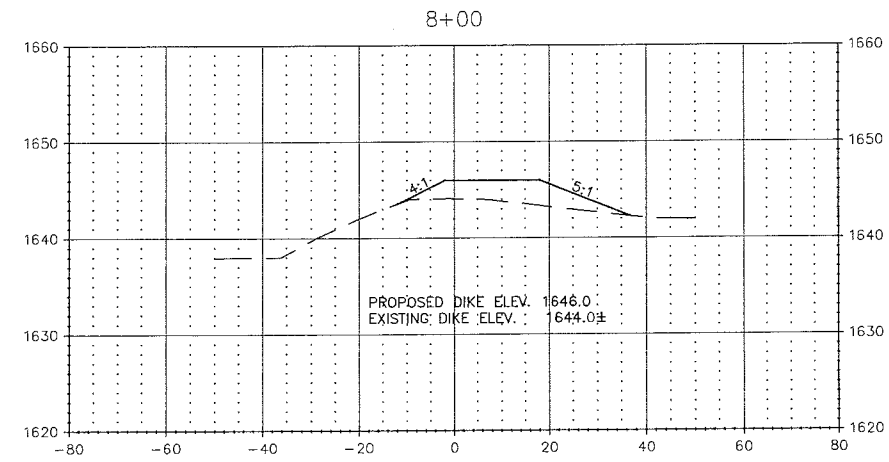
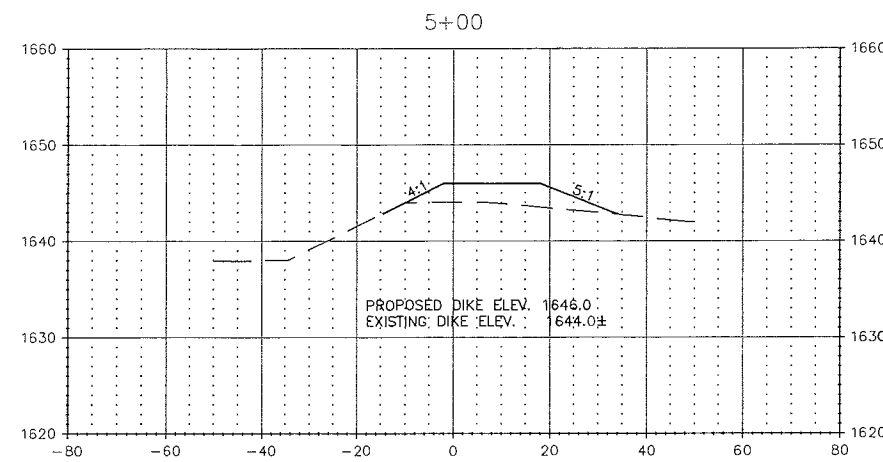
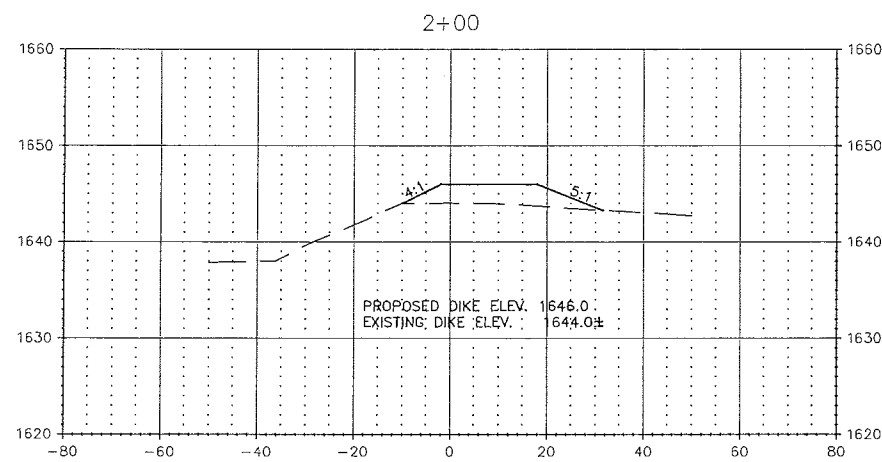
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Date: 7-2-08
Checked by: TLR
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BURNT CREEK FLOOD CONTROL PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

DIKE CONSTRUCTION
PLAN AND PROFILE
PROJECT NO. 4241-300

SHEET
20 of 24

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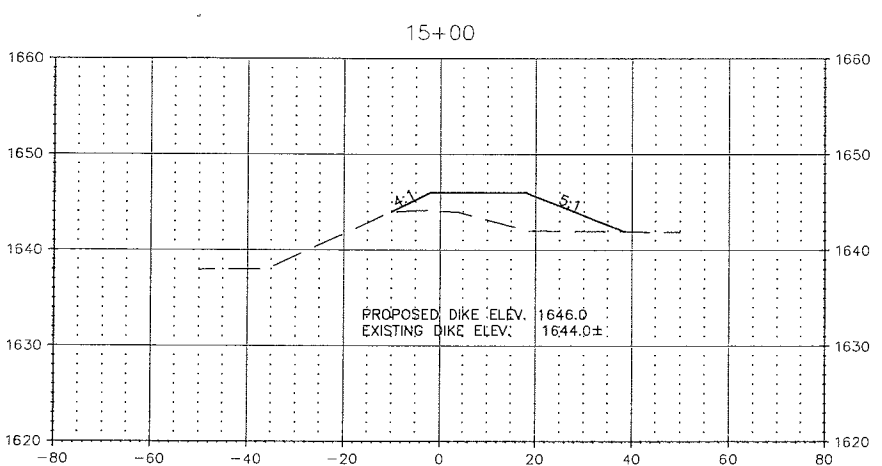
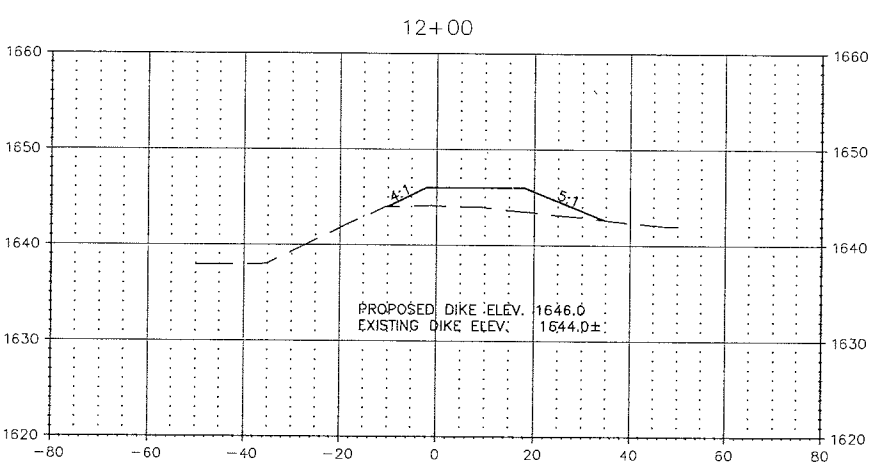
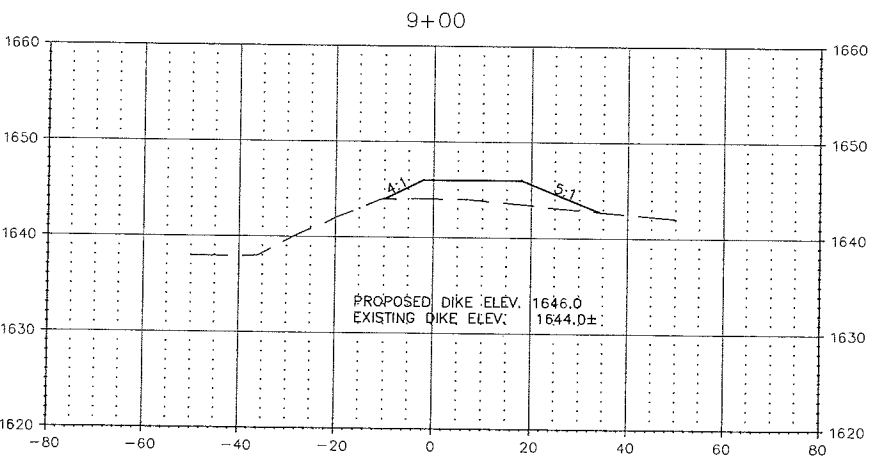
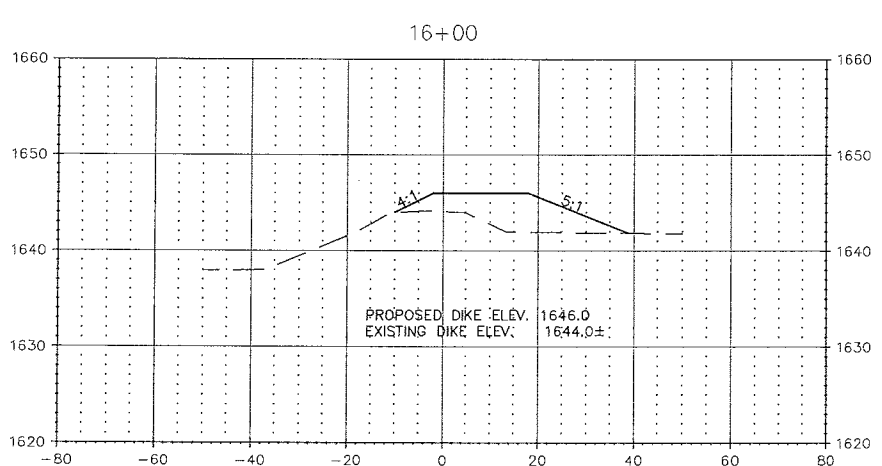
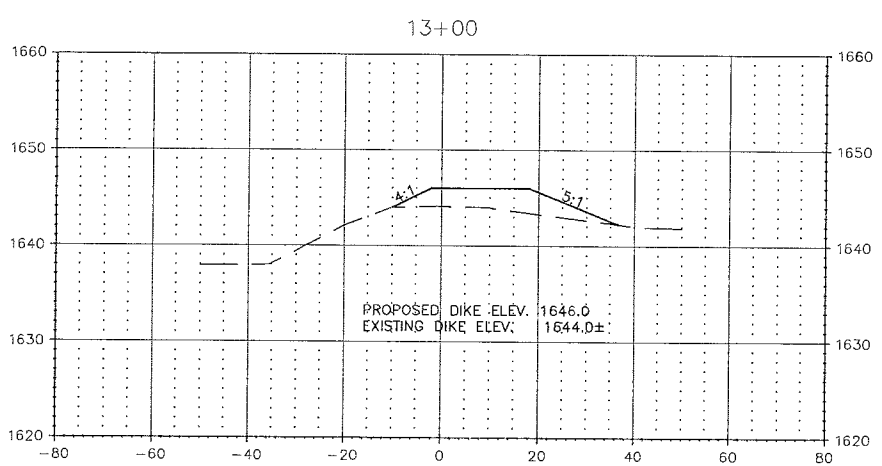
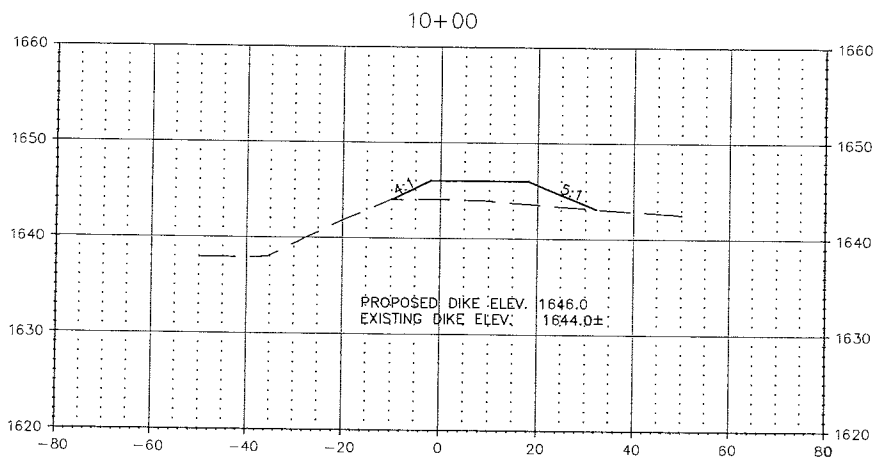
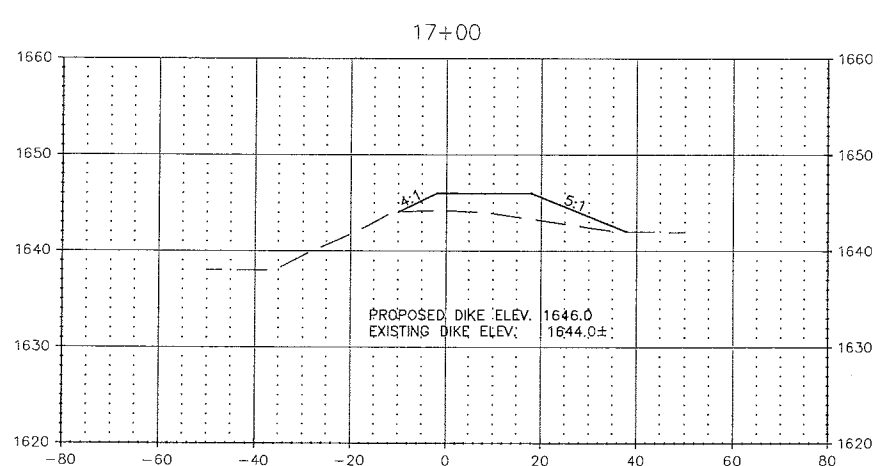
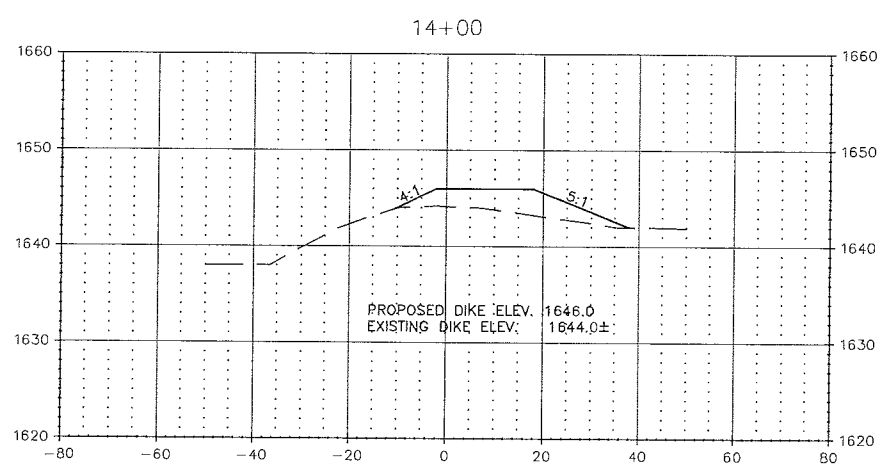
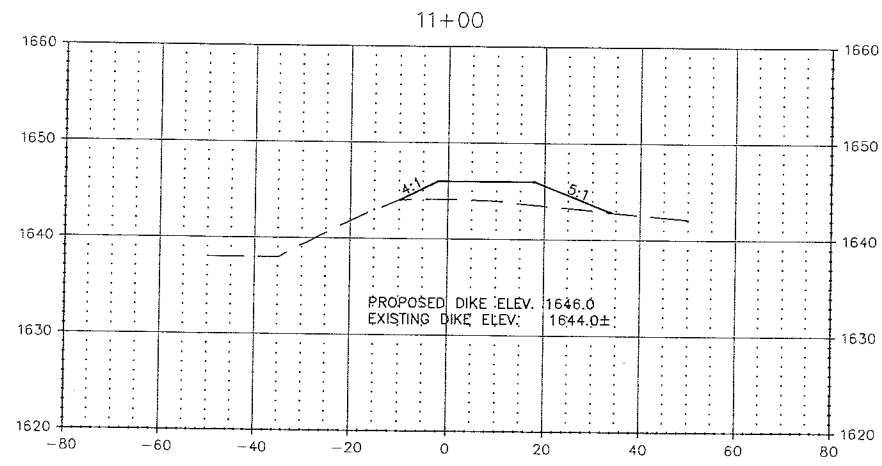
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BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

DIKE CONSTRUCTION
 CROSS SECTIONS
 PROJECT NO. 4241-300



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No.	Revision	Date	By

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3712 Lockport Street
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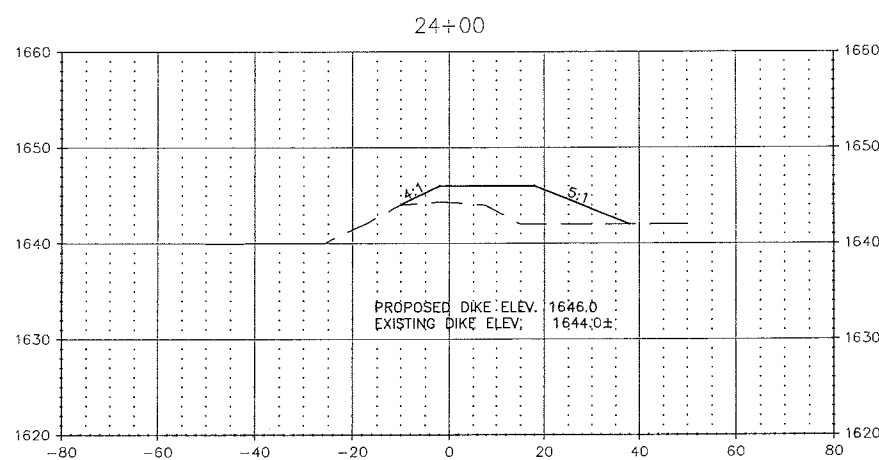
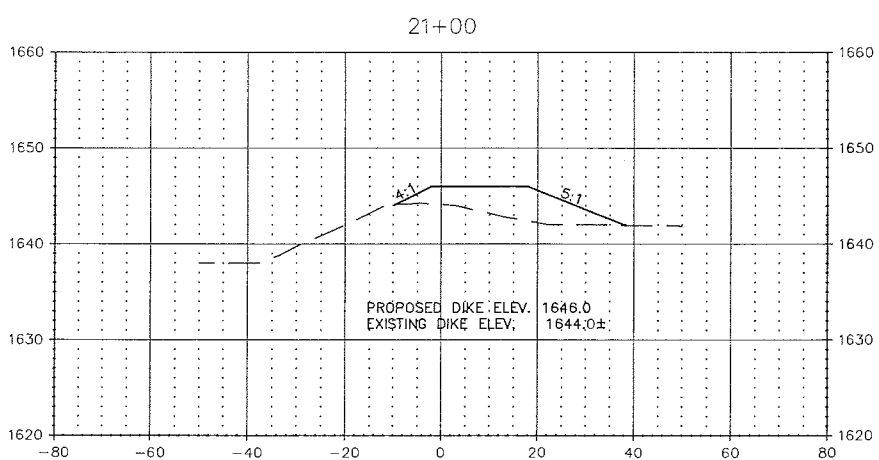
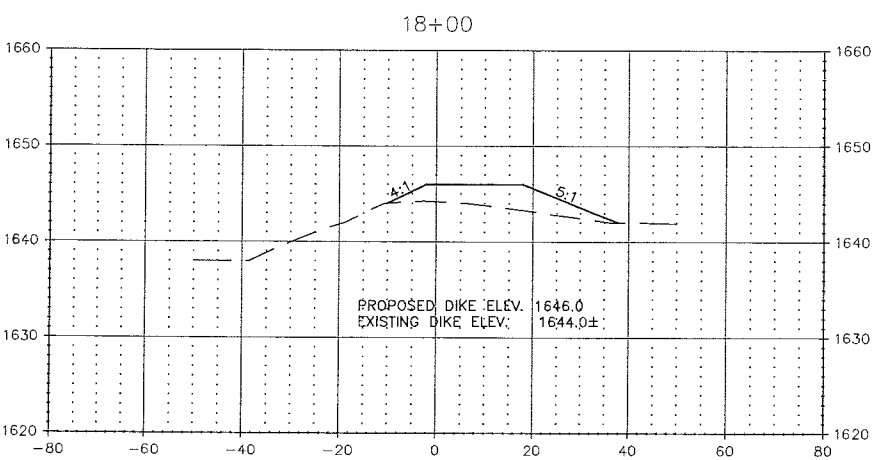
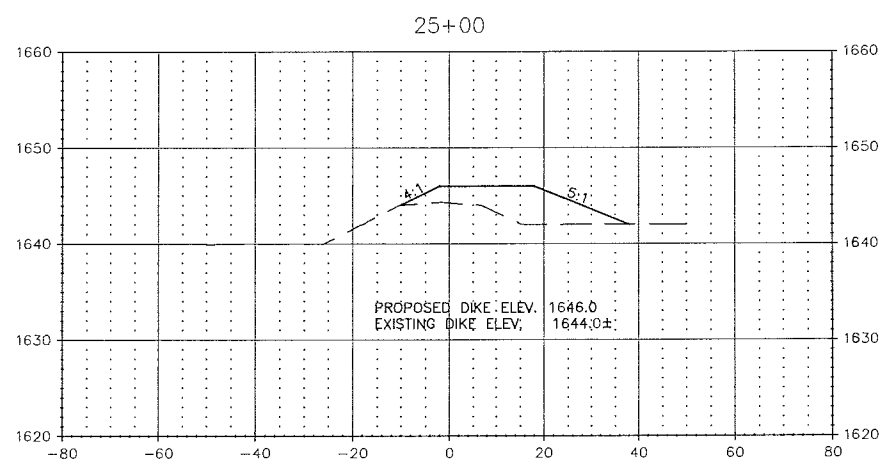
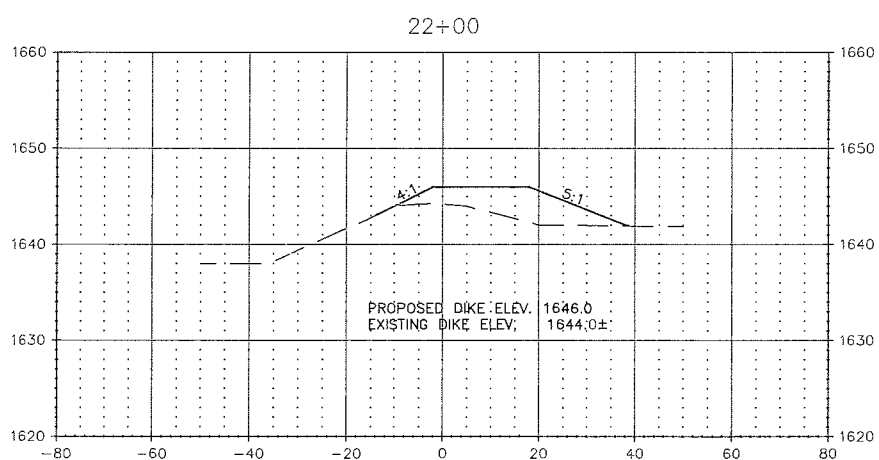
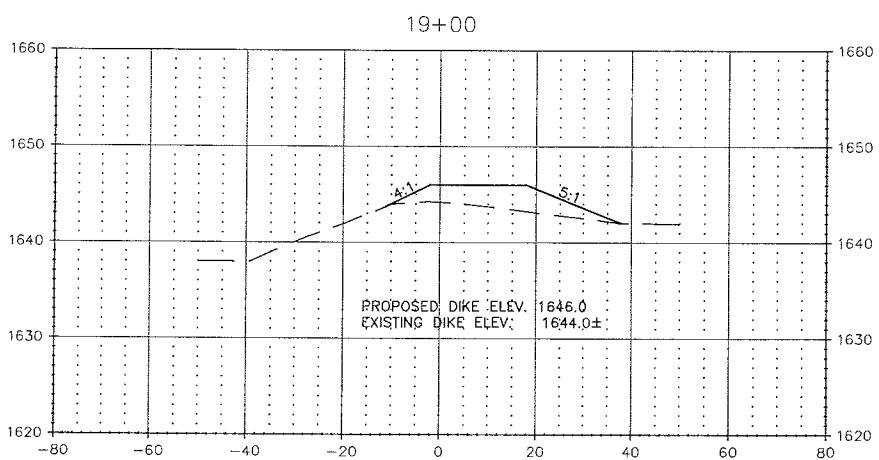
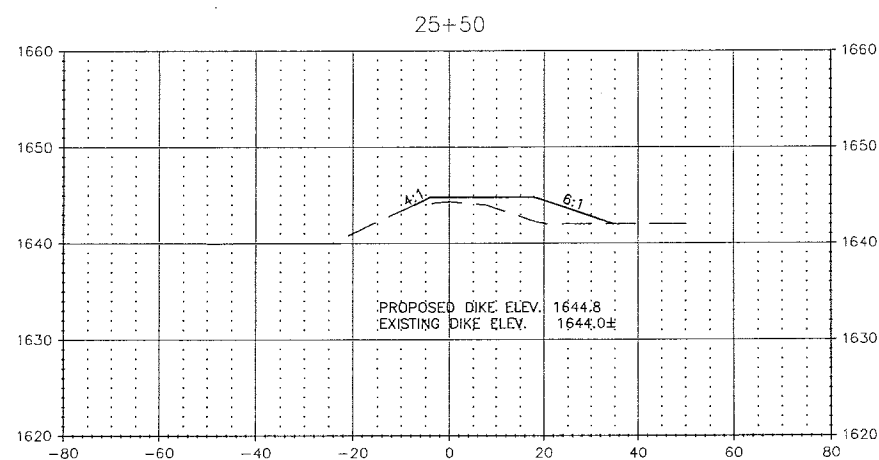
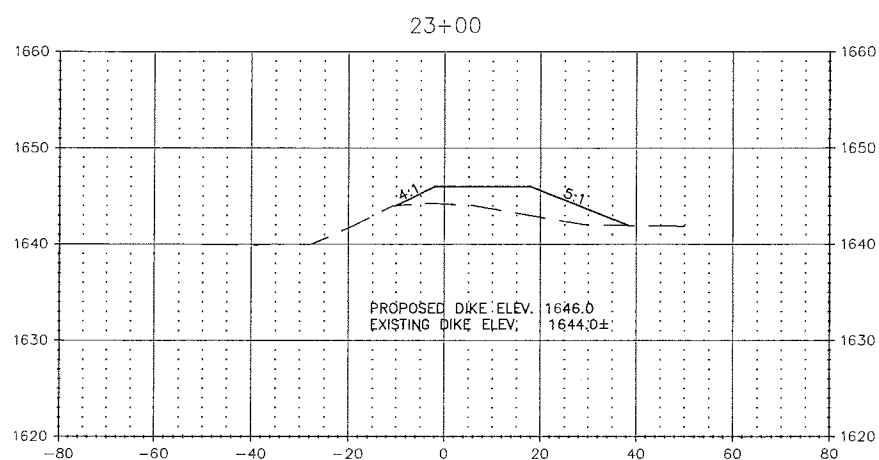
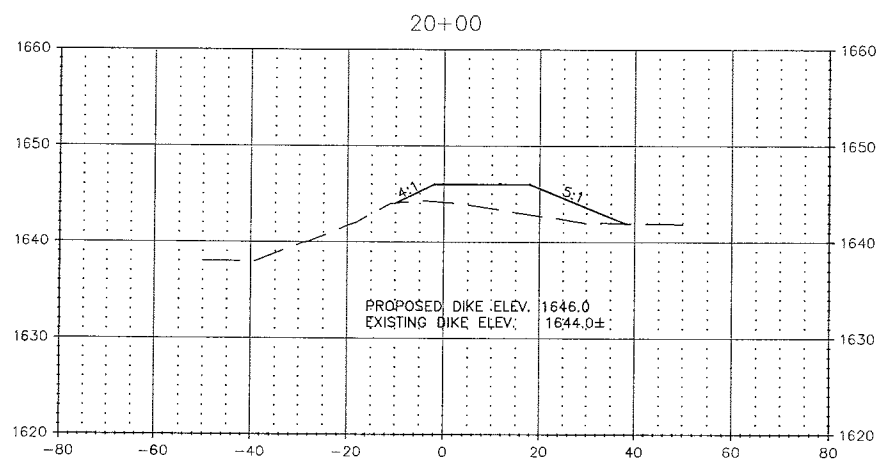
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BJH
Date
7-2-08
Checked by
TLR
Scale
AS SHOWN

BURNT CREEK FLOOD CONTROL PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

DIKE CONSTRUCTION
CROSS SECTIONS
PROJECT NO. 4241-300

SHEET
22 of 24

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No.	Revision	Date	By

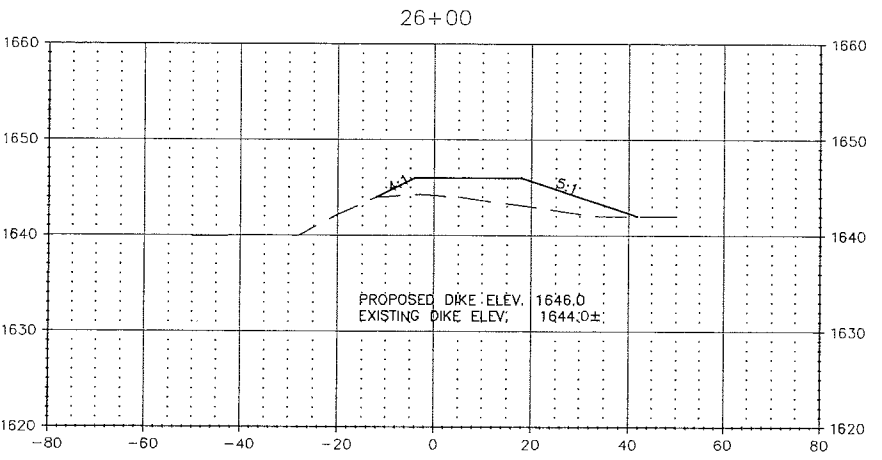
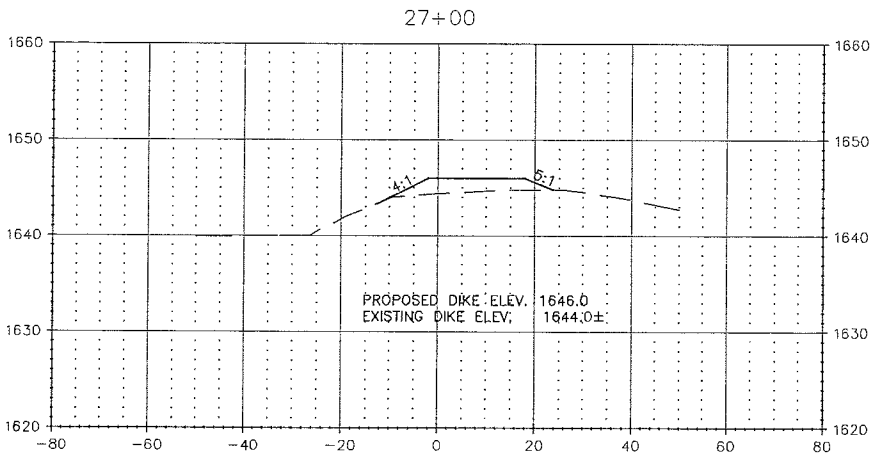
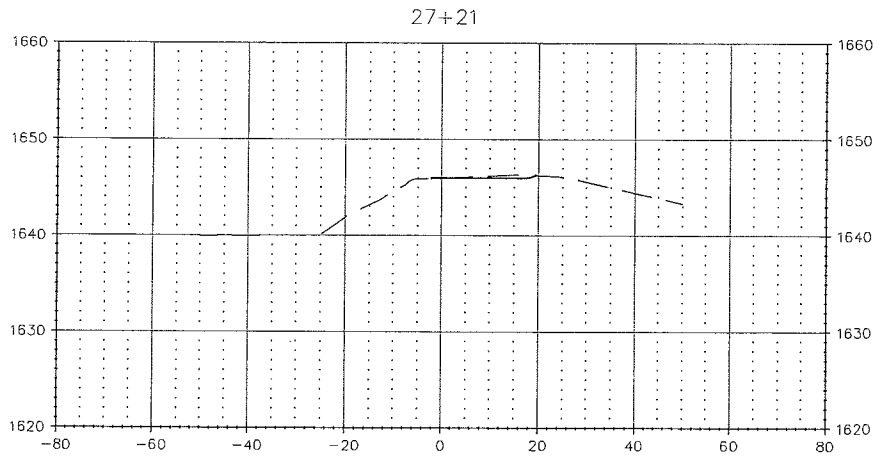
Houston Engineering, Inc.
 3712 Lockport Street TEL: (701) 323-0200
 BISMARCK, NORTH DAKOTA 58501 FAX: (701) 323-0300

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BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

DIKE CONSTRUCTION
 CROSS SECTIONS
 PROJECT NO. 4241-300

SHEET
 23 of 24



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BURNT CREEK FLOOD CONTROL PROJECT
 BURLEIGH COUNTY WATER RESOURCE DISTRICT
 BISMARCK, NORTH DAKOTA

DIKE CONSTRUCTION
 CROSS SECTIONS
 PROJECT NO. 4241-300

SHEET
 24 of 24

CONSTRUCTION PLANS FOR BURNT CREEK FLOOD CONTROL 2011 FLOOD DAMAGE RESTORATION PROJECT

BURLEIGH COUNTY WATER RESOURCE DISTRICT BISMARCK, NORTH DAKOTA FEBRUARY 2015

UTILITY NOTE:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, AS-BUILT MAPS AS PROVIDED BY MUNICIPALITIES OR UTILITY COMPANIES, AND/OR EXISTING DRAWINGS. THERE IS NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN INDICATE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. NOR IS THERE A GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY RESULT FROM HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES.

GOVERNING SPECIFICATIONS:

STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, ADOPTED BY THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION, OCTOBER 2008 SHALL APPLY TO ALL STANDARD DRAWINGS CURRENTLY IN EFFECT AND OTHER CONTRACT PROVISIONS SUBMITTED HEREIN:

GOVERNING STANDARDS:

MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009 EDITION. THIS SPECIFICATION INCLUDES THE SHAPES, COLORS, AND FONTS USED IN ROAD MARKINGS AND SIGNS. ALL TRAFFIC CONTROL DEVICES MUST CONFORM TO THESE STANDARDS.



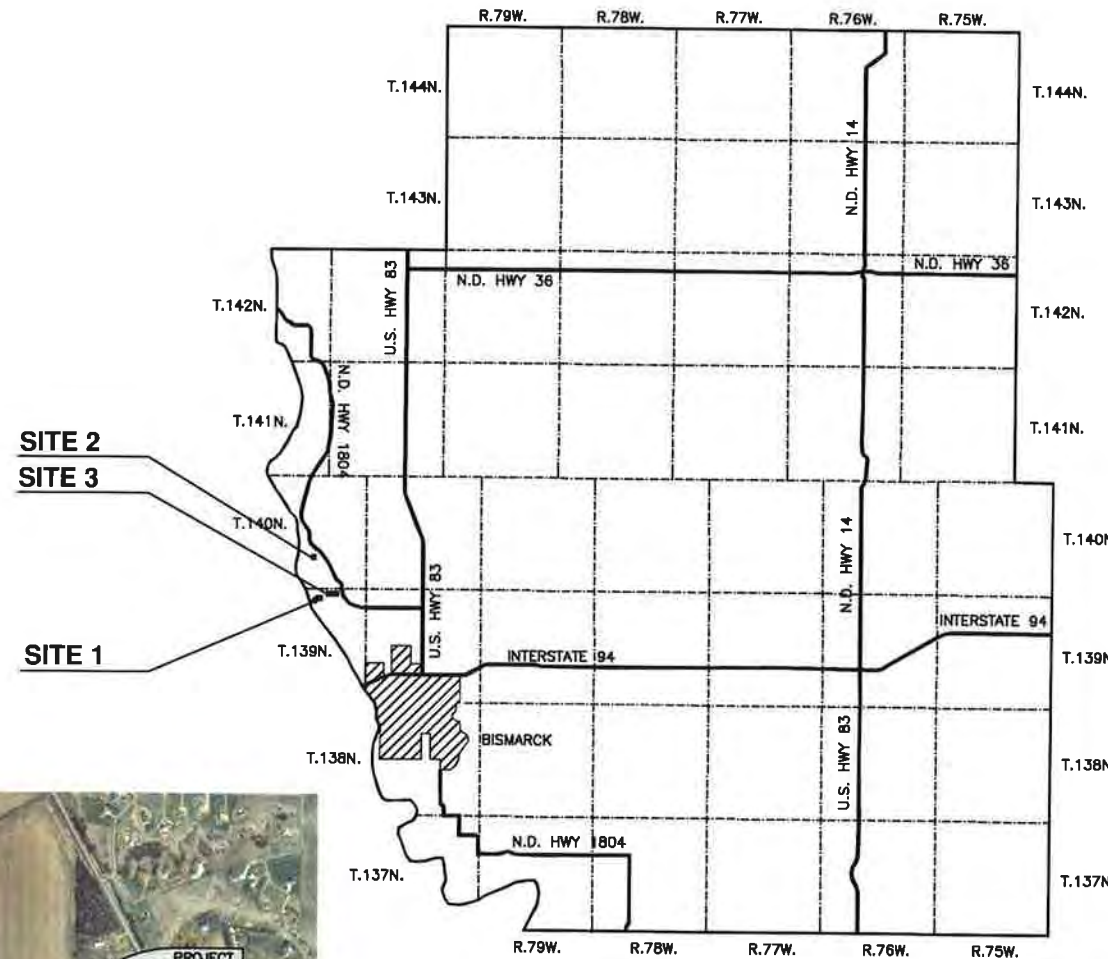
SITE 1



SITE 2



SITE 3



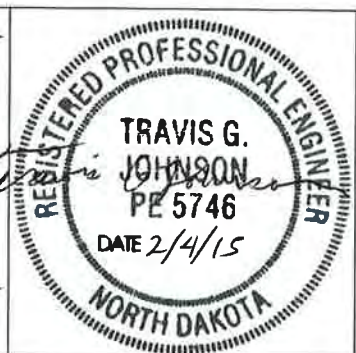
BURLEIGH COUNTY, NORTH DAKOTA

ENGINEER'S CERTIFICATE

I, TRAVIS G. JOHNSON, A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NORTH DAKOTA, HEREBY CERTIFY THAT THE CONSTRUCTION PLANS FOR BURNT CREEK FLOOD CONTROL 2011 FLOOD DAMAGE RESTORATION PROJECT, BISMARCK, NORTH DAKOTA WERE PREPARED UNDER MY SUPERVISION AND ARE COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Travis G. Johnson DATE: 2/4/15

TRAVIS G. JOHNSON, PE
REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA REGISTRATION NO. 5746



SHEET INDEX

1. COVER SHEET, VICINITY, AND LOCATION MAPS
2. ESTIMATED QUANTITIES & CONSTRUCTION NOTES
3. DETAILS
- 4-7. SITE 1, 2, AND 3 PLAN AND PROFILE
- 8-11. SITE 3 CROSS SECTIONS

LOCATION MAP



ESTIMATED QUANTITIES

Item No.	Description	Unit	Quantity
1	CONTRACT BOND	LSUM	1
2	MOBILIZATION	LSUM	1
3	BORROW EXCAVATION	CY	3,785
4	WASTE EXCAVATION	CY	90
5	RIPRAP	TON	899
6	IMPORT TOPSOIL	CY	2,182
7	SEEDING CLASS II	ACRE	7
8	SEEDING CLASS III	ACRE	2.70
9	GEOTEXTILE FABRIC	SY	693
10	WOOD EXCELSIOR FIBER MAT	SY	8,260
11	REMOVE AND SALVAGE CULVERT-ALL TYPES & SIZES	LF	40
12	PIPE CONDUIT 24IN	LF	40
13	CANAL GATE 24IN	EA	1
14	MUCK EXCAVATION	LS	1
15	NEW 32" DOUBLE SWING GATE	LS	1
16	CLEAN CULVERTS	EA	1
17	FLOATING SILT CURTAIN	LF	555
18	CLEARING & GRUBBING	LS	1
ALTERNATES			
19	SLUICE GATE	EA	2
20	FENCE	LS	1
21	SALVAGE AND REPAIR EXISTING GATE	LS	1

BASIS OF ESTIMATE

TOPSOIL
6" DEPTH APPLIED TO SEEDED AND MULCHED AREAS

RIPRAP
2' DEPTH AT 1.7TON/CY

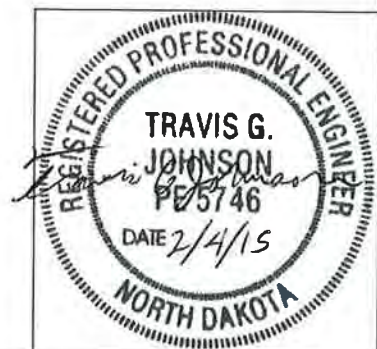
BORROW EXCAVATION
1.2 FILL FACTOR

LEGEND

WATER MAIN	--- W ---
SANITARY SEWER MAIN	--- SS ---
SANITARY SEWER FORCE	--- SS _F ---
STORM SEWER MAIN	--- STS ---
STORM INLET	⊠
MANHOLE	○
CLEANOUT	▽
FIRE HYDRANT	⊙
GATE VALVE	⊗
CURBSTOP	○
UTILITY POLE	⊙
W / GUY WIRE	⊙ →
LIGHT POLE	⊙
FLOOD LIGHT	⊙
TELEPHONE RISER	△
ELECTRICAL PLUG IN	⊠
OVERHEAD POWER	--- P ---
UNDERGROUND ELECTRIC	--- UGE ---
UNDERGROUND TELEPHONE	--- UGT ---
UNDERGROUND FIBER OPTIC	--- FO ---
CABLE TV	--- CTV ---
GAS MAIN	--- G ---
CONIFEROUS TREE	⊙
DECIDUOUS TREE	⊙
HEDGE	⊠
SIGN	⊙
FENCE	--- X ---
RAILROAD TRACKS	⊠
SPOT ELEVATION	+ 897.165
STANDARD CURB & GUTTER	⊠
MOUNTABLE CURB & GUTTER	⊠
BUILDING	⊠
RIGHT OF WAY LINE	--- R/W ---
DIRECTION OF DRAINAGE	→
IRON MONUMENT FOUND	⊙
IRON MONUMENT SET	⊙
CHISELED MARK ON CONCRETE	⊙
PK NAIL	⊙
SOIL BORING	⊙

CONSTRUCTION NOTES

- CONSTRUCTION STAKING WILL BE SUPPLIED BY THE OWNER. THE CONTRACTOR SHALL PROTECT AND PRESERVE ALL SURVEY STAKES AND MONUMENTS. STAKES OR MONUMENTS DAMAGED BY THE CONTRACTOR SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE BY A REGISTERED SURVEYOR. THE CONTRACTOR SHALL NOTIFY SURVEYOR 72 HOURS IN ADVANCE OF CONSTRUCTION SURVEY.
- THIS PROJECT SHALL BE COVERED UNDER A STATE OF NORTH DAKOTA, NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT. THE CONTRACTOR WILL BE THE ORIGINATOR AND SIGNER OF THIS PERMIT AND BE RESPONSIBLE FOR CONTROLLING EROSION AND SEDIMENT RUNOFF FROM THE PROJECT. THE CONTRACTOR SHALL SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCING ANY WORK ON THE PROJECT SITE.
- CONTRACTOR SHALL PLACE EROSION CONTROL AS REQUIRED BY NPDES PERMIT AND AS DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL KEEP ALL STOCKPILES AND CONSTRUCTION EQUIPMENT WITHIN THE DESIGNATED CONSTRUCTION LIMITS AND SHALL PROTECT WITH EROSION CONTROLS TO PREVENT WIND AND WATER EROSION. NO PERMISSION HAS BEEN GRANTED FROM ANY ADJACENT LANDOWNERS. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY AGREEMENT WITH ADJACENT LANDOWNERS ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR ALL PROJECT SITE SAFETY.
- ALL BENCHMARKS ARE NAVD 88.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING TESTING. THE OWNER, COUNTY ENGINEER, AND ENGINEER SHALL BE SUPPLIED WITH COPIES OF ALL TEST REPORTS.
- ALL PERMITS SHALL BE OBTAINED BY THE CONTRACTOR.
- WATER FOR COMPACTION SHALL BE OBTAINED FROM AN APPROVED SOURCE AND THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS.
- TOPSOIL PLACEMENT IS BASED ON A 6" DEPTH AND PLACED IN ALL THE SEEDED AREAS.
- ALL COORDINATES ARE IN NAD83 NORTH DAKOTA STATE PLANE SOUTH ZONE (3302), INTERNATIONAL FOOT.
- CANAL GATE SHALL BE WATERMAN C-10 OR APPROVED EQUAL.
- IMPORT TOPSOIL QUANTITY MAY BE REDUCED AS NECESSARY, ACCORDING TO THE AMOUNT OF EXISTING SALVAGEABLE TOPSOIL.
- TOP OF LEVEE AND BERM ELEVATIONS ARE FINAL GRADE AFTER TOPSOILING.



Bismarck	Drawn by NRC	Date 2-4-15
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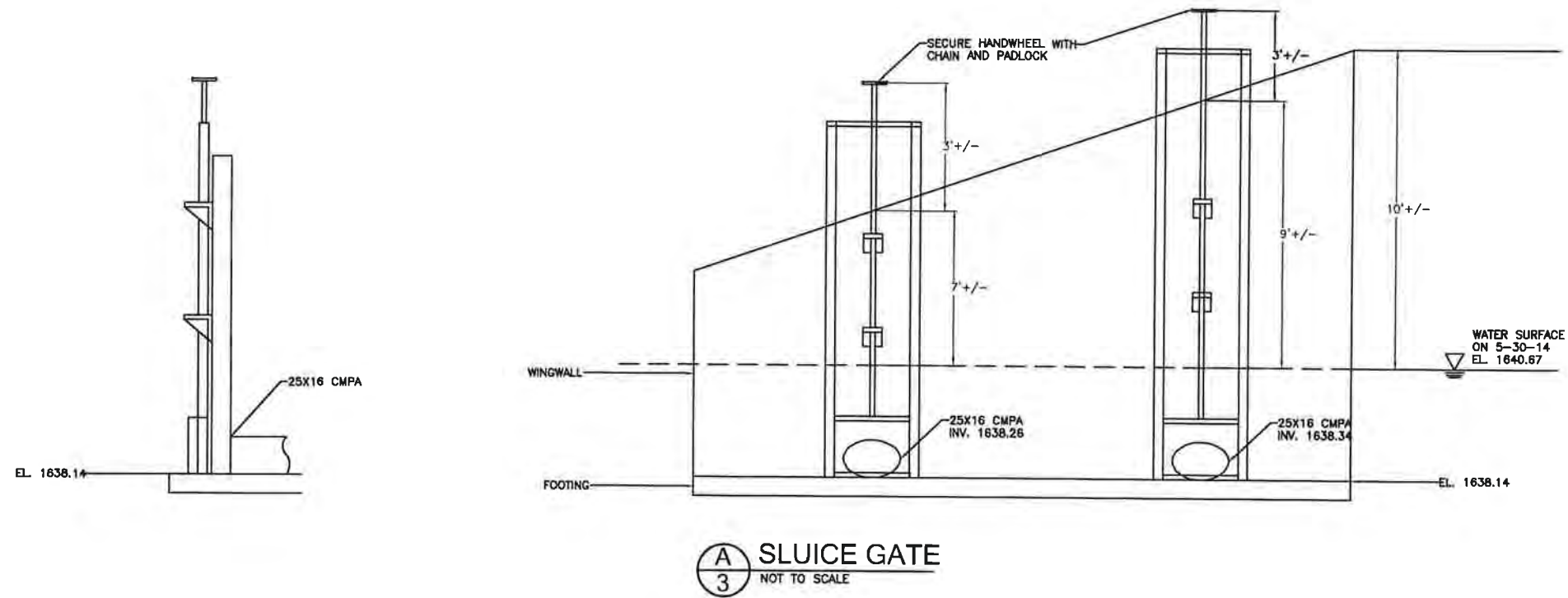
BURNT CREEK FLOODWAY PROJECT RESTORATION
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

ESTIMATED QUANTITIES & CONSTRUCTION NOTES	SHEET
PROJECT NO. 4241-300	2 of 11

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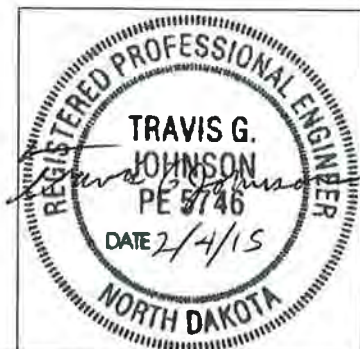
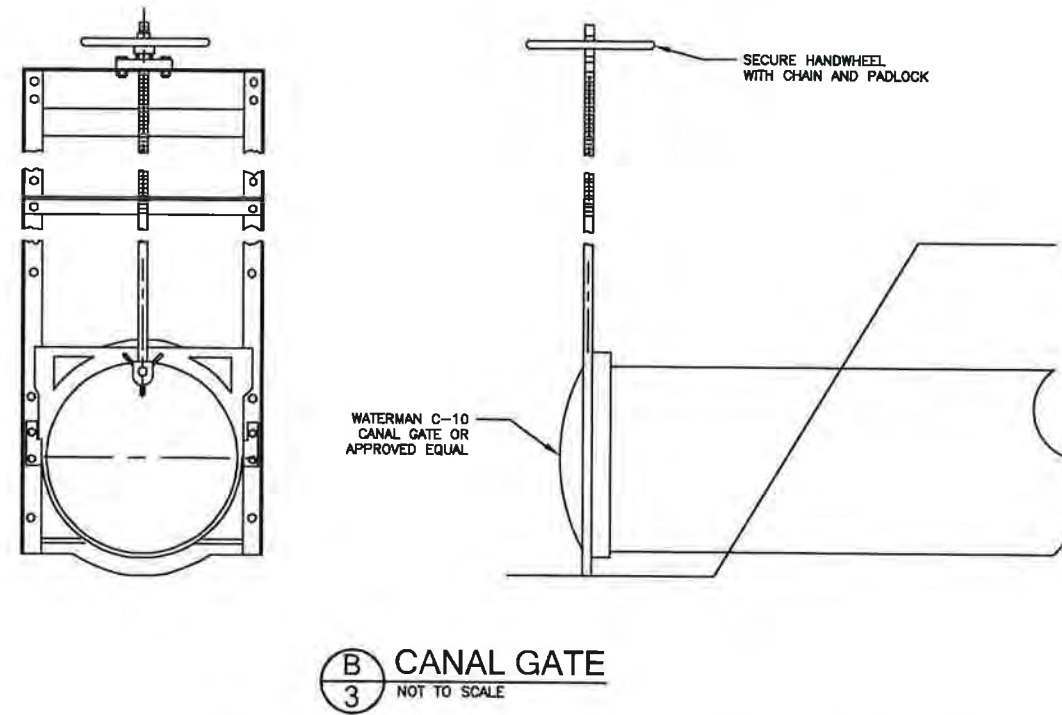
HIGHWAY 1804 BRIDGE WINGWALL



NOTES:

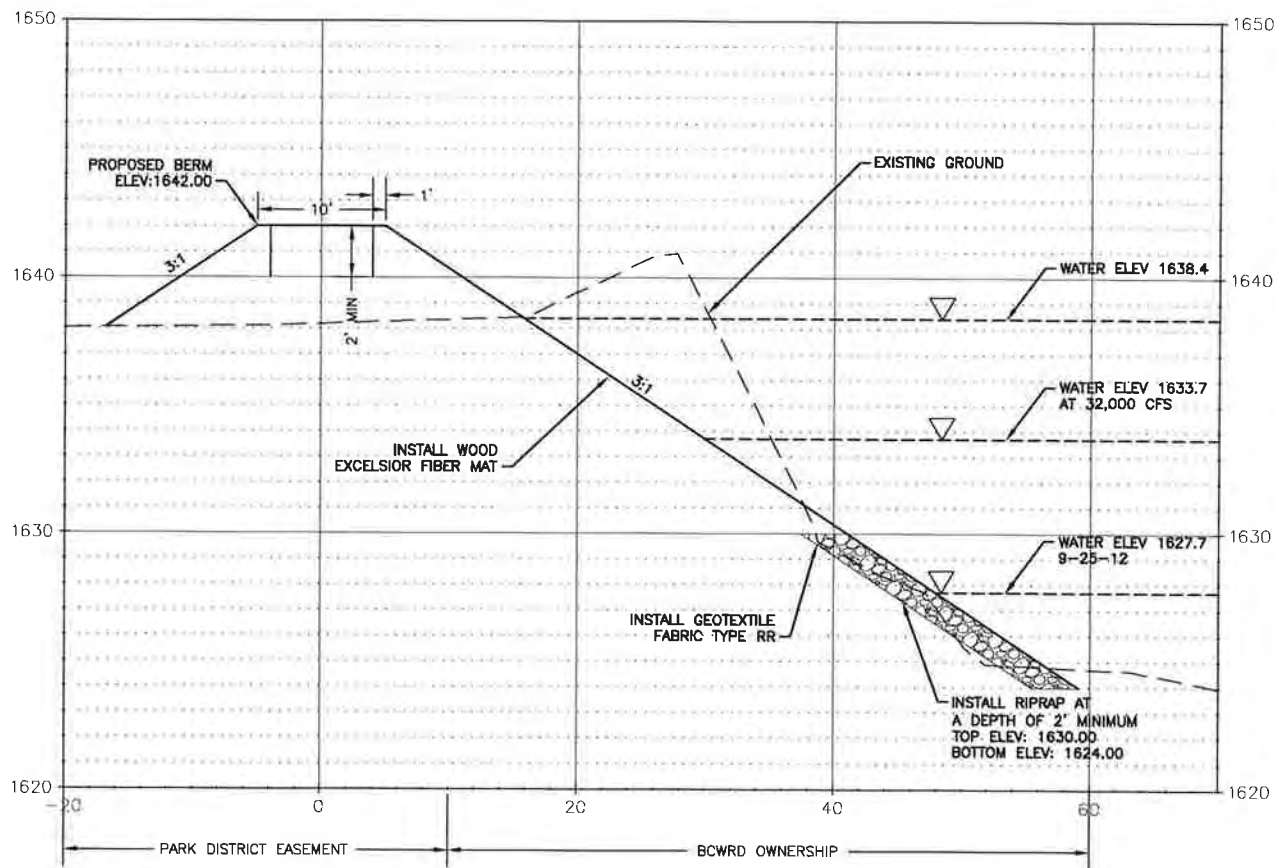
- HANDWHEEL SHALL BE SET APPROXIMATELY 3' ABOVE TOP OF WINGWALL CONCRETE.
- CONTRACTOR SHALL VERIFY ALL MEASUREMENTS PRIOR TO ORDERING SLUICE GATES.

SEE SITE 2 CROSS SECTION ON PAGE 5

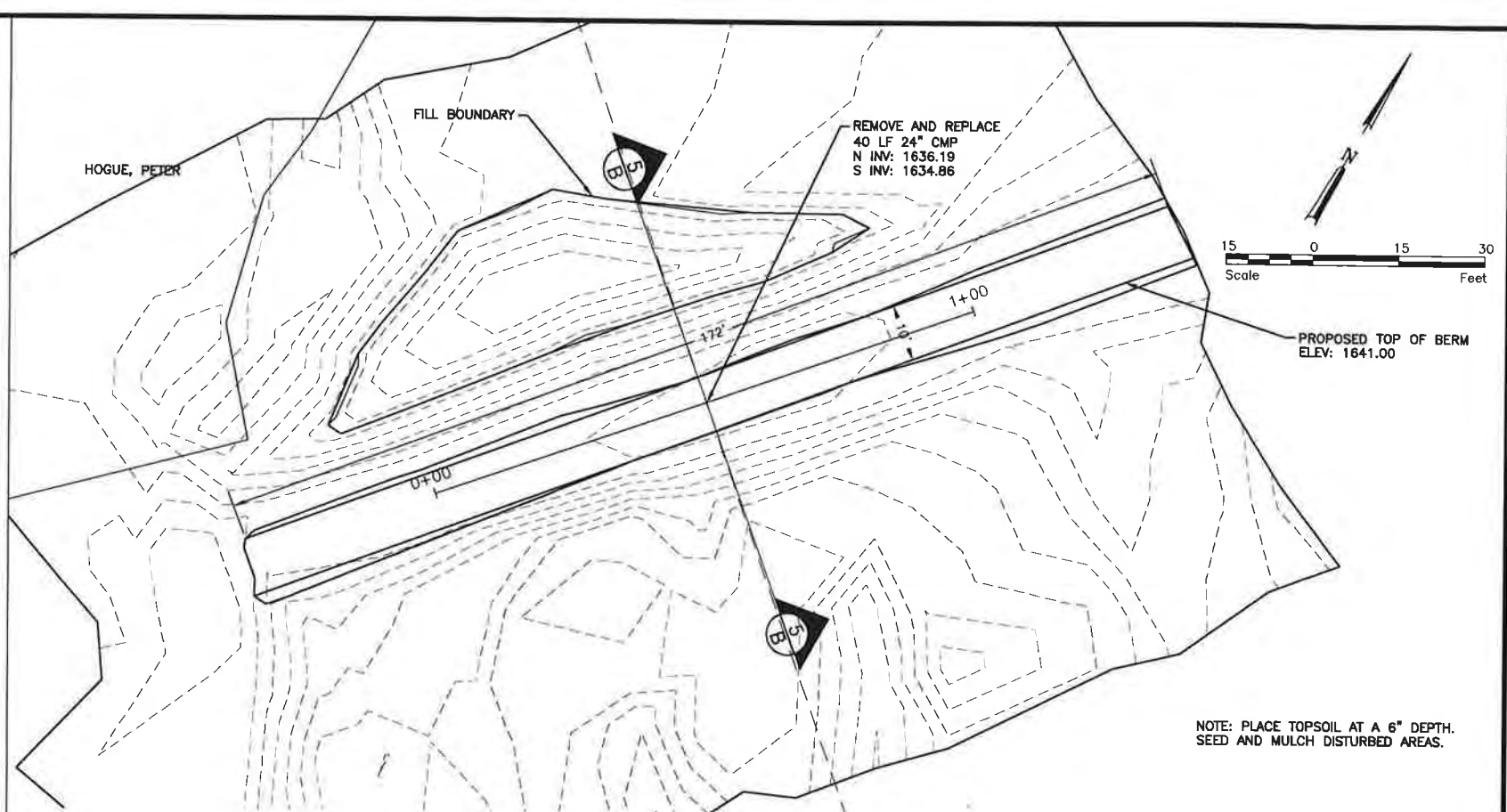


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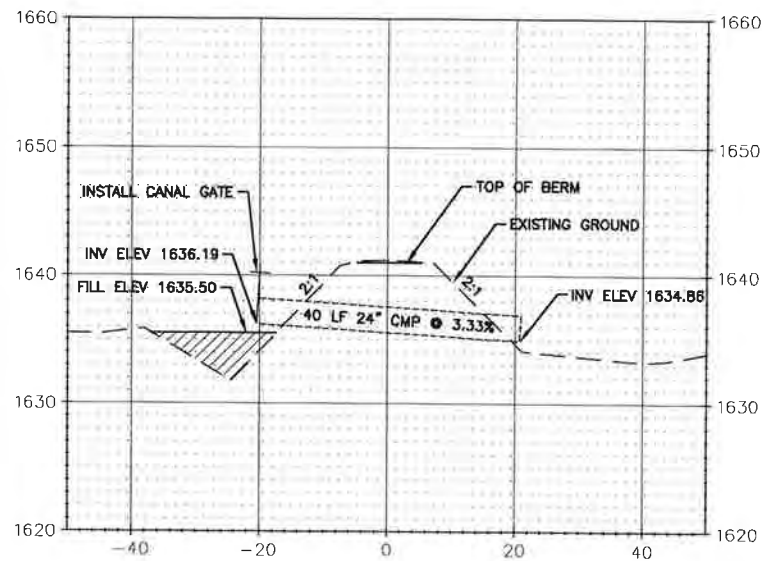
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						Checked by TGJ	Scale AS SHOWN			



(A)
5 SITE 1 CROSS SECTION OF NORTH BANK

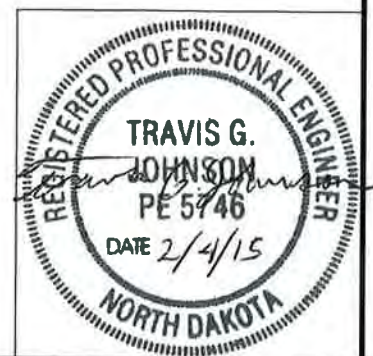


SITE 2 PLAN VIEW
NOT TO SCALE



(B)
5 SITE 2 CROSS SECTION
NOT TO SCALE

- REMOVE AND SALVAGE CULVERT-ALL TYPES & SIZES
40 LF
- BORROW EXCAVATION
175 CY
- TOPSOILING
70 CY
- SEEDING CLASS III
0.09 ACRE
- PIPE CONDUIT 24IN
40 LF
- CANAL GATE 24IN
1 EA



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No.	Revision	Date	By



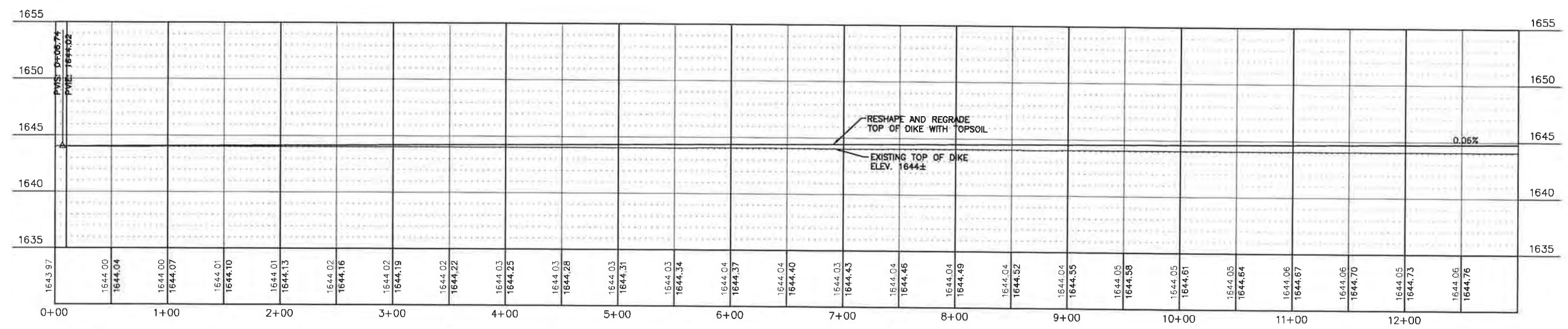
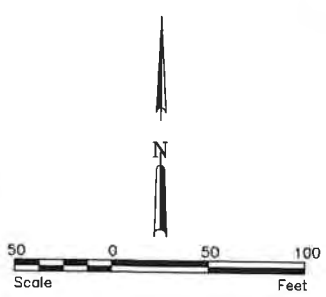
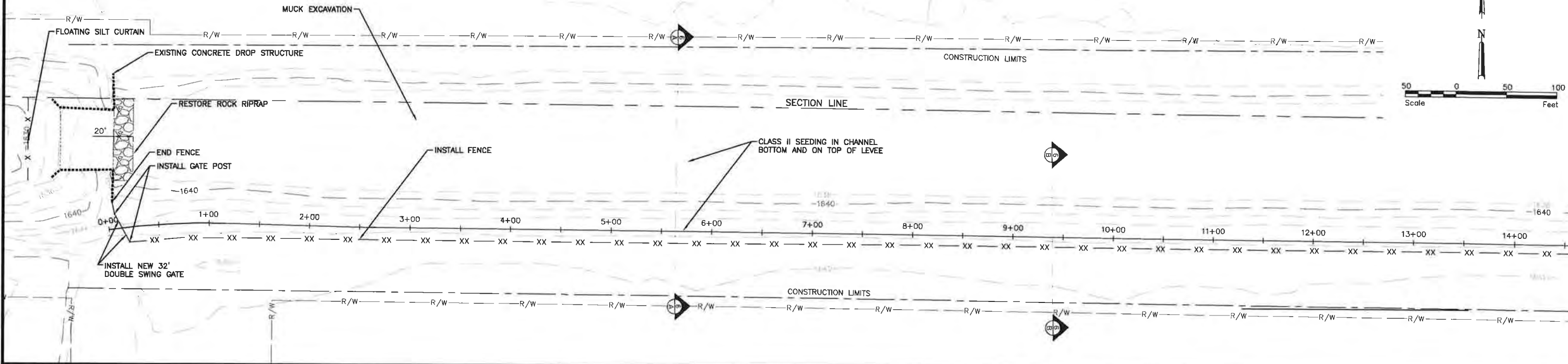
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BURNT CREEK FLOODWAY RESTORATION PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BURLEIGH COUNTY, NORTH DAKOTA

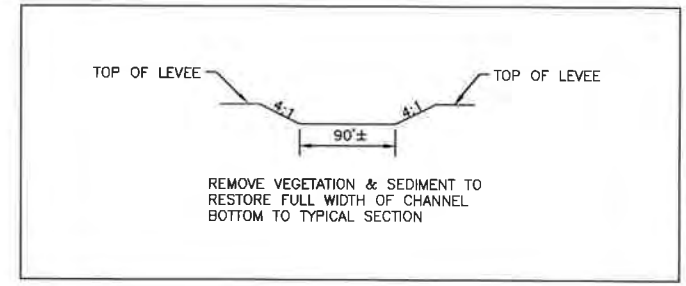
SITE 1 NORTHERN DIKE
SITE 2 OXBOW CHANNEL
PROJECT NO. 4241-300

SHEET
5 of 11

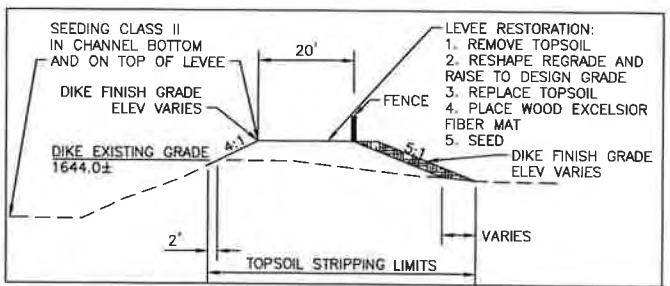
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- BORROW EXCAVATION**
3,610 CY
- TOPSOILING**
1,686 CY
- SEEDING CLASS II**
6.93 ACRE
- SEEDING CLASS III**
2.09 ACRE
- WOOD EXCELSIOR FIBER MAT**
5,892 SY
- FLOATING SILT CURTAIN**
82 LF
- RIPRAP**
60 TON
(ESTIMATED, ACTUAL QUANTITY MAY VARY)
- MUCK DISPOSAL AREA**

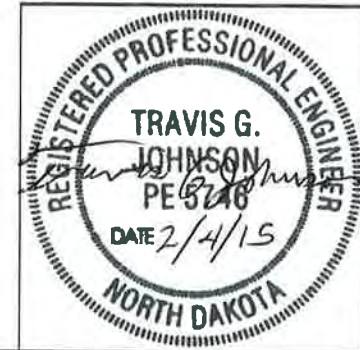


A SITE 3 TYPICAL CROSS SECTION VIEW
6 NOT TO SCALE



B SITE 3 TYPICAL CROSS SECTION VIEW
6 NOT TO SCALE

- NOTES:**
1. REMOVE & SALVAGE TOPSOIL. SALVAGED TOPSOIL WILL BE USED TO TOPSOIL THE RAISED PORTION OF THE EMBANKMENT. COST WILL BE INCIDENTAL TO THE PLACEMENT OF BORROW ON THE EMBANKMENT.
 2. TOPSOIL MAY BE STOCKPILED WITHIN CONSTRUCTION LIMITS SOUTH OF THE DIKE PENDING COORDINATION WITH LANDOWNER.



No.	Revision	Date	By



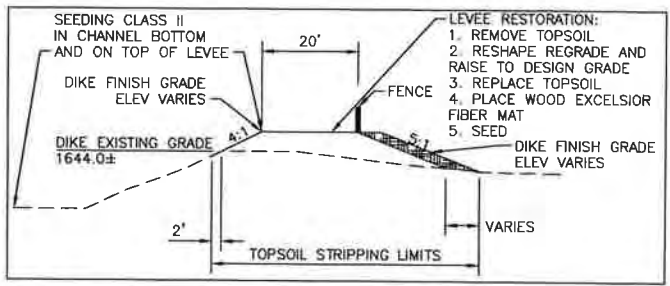
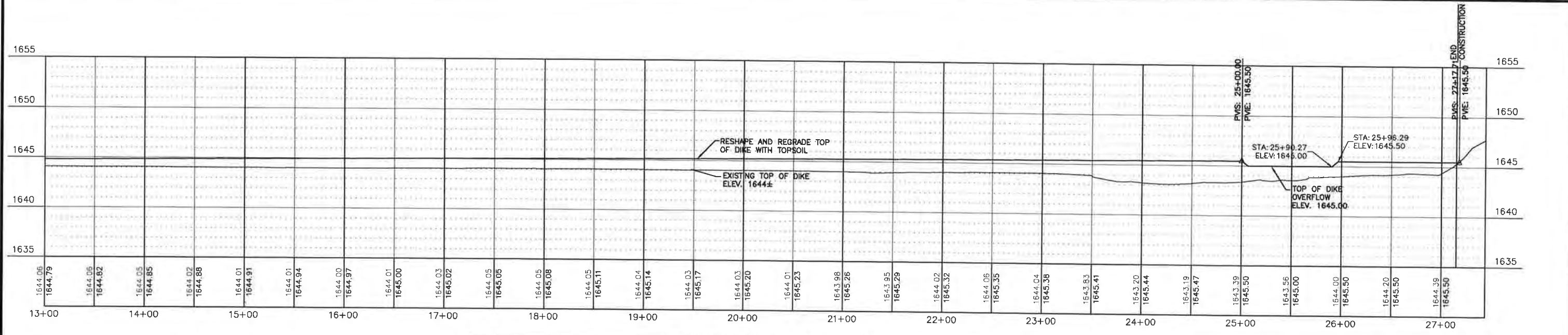
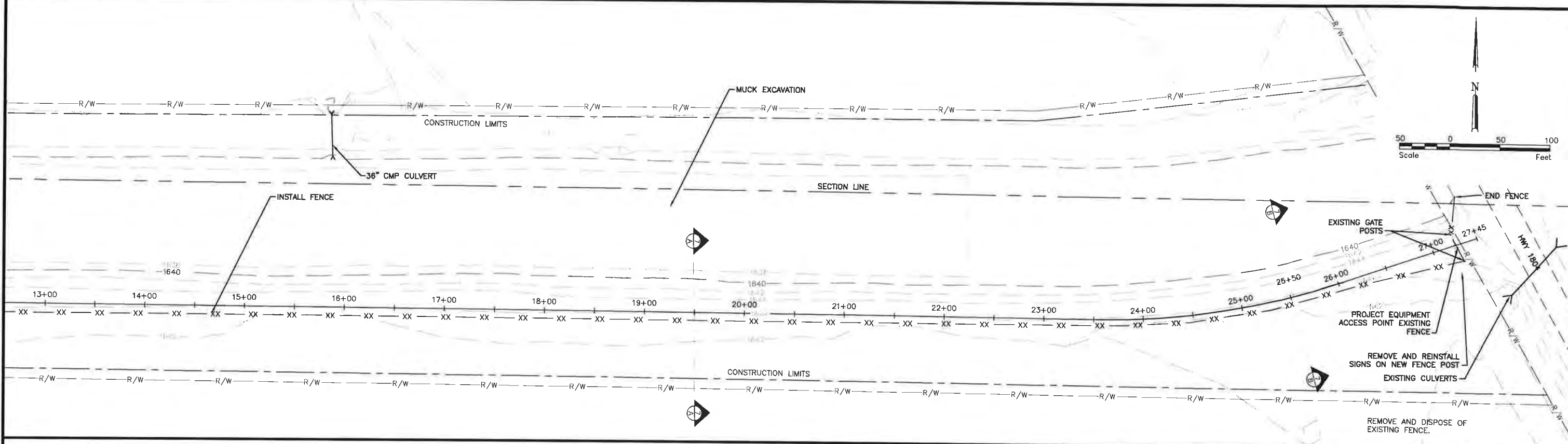
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P 701.323.0200	F 701.323.0300	Checked by TGT	Scale AS SHOWN

BURNT CREEK FLOODWAY RESTORATION PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

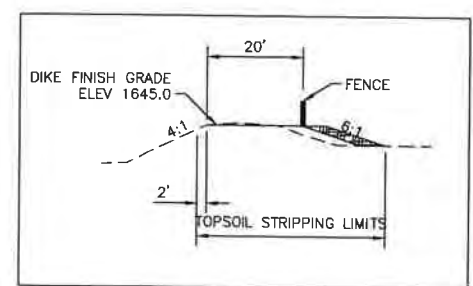
**SITE 3 DIKE RESTORATION
PLAN AND PROFILE**
PROJECT NO. 4241-300

SHEET
6 of 11

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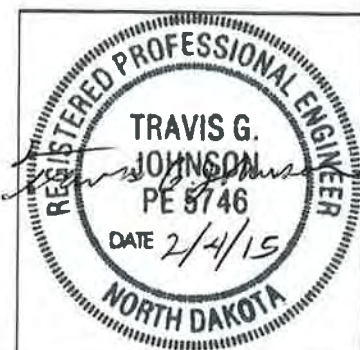


A SITE 3 TYPICAL CROSS SECTION VIEW
NOT TO SCALE



B SITE 3 CROSS SECTION VIEW STA 25+50
NOT TO SCALE

- NOTES:**
1. REMOVE & SALVAGE TOPSOIL, SALVAGED TOPSOIL WILL BE USED TO TOPSOIL THE RAISED PORTION OF THE EMBANKMENT. COST WILL BE INCIDENTAL TO THE PLACEMENT OF BORROW ON THE EMBANKMENT.
 2. TOPSOIL MAY BE STOCKPILED WITHIN CONSTRUCTION LIMITS SOUTH OF THE DIKE PENDING COORDINATION WITH LANDOWNER.



No.	Revision	Date	By



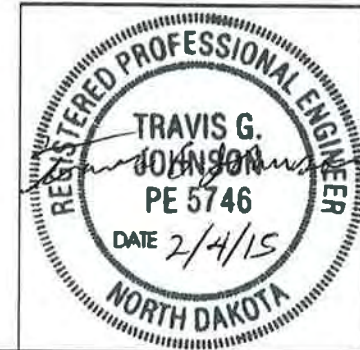
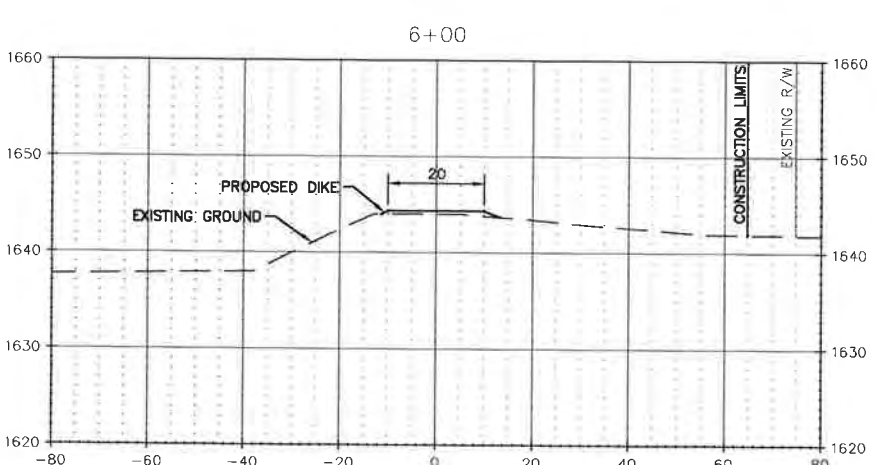
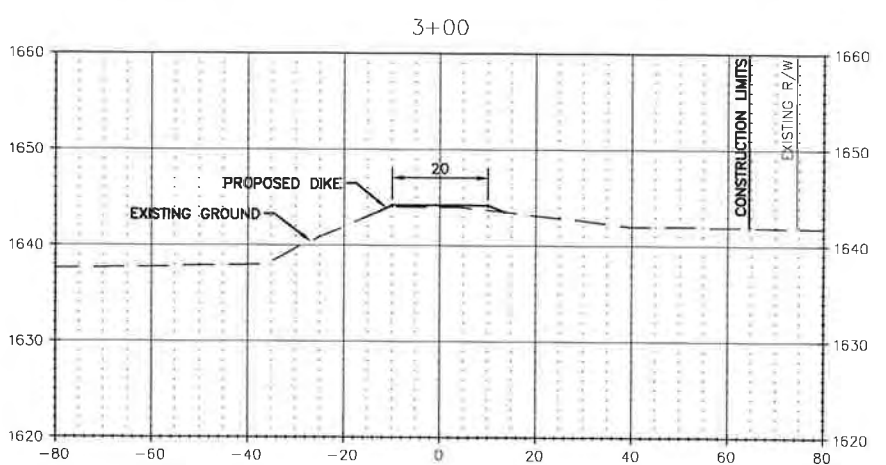
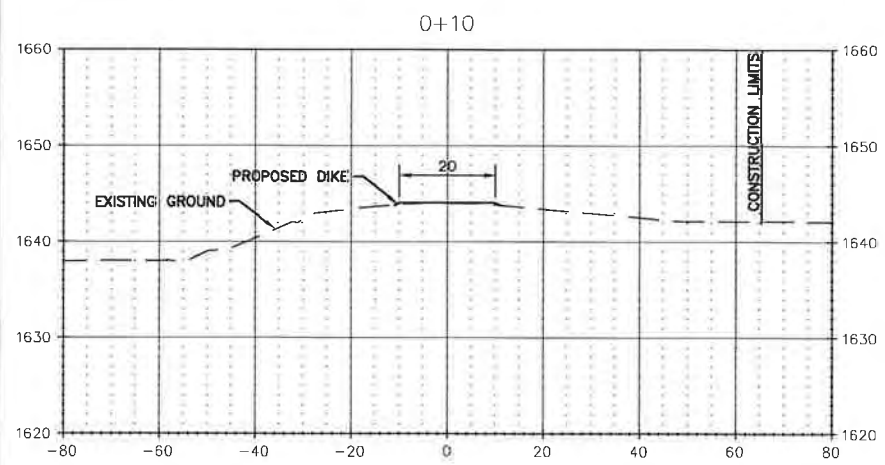
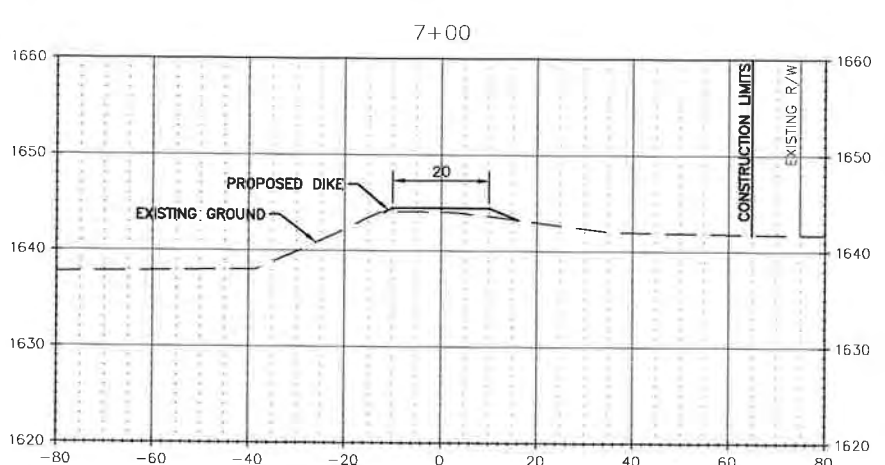
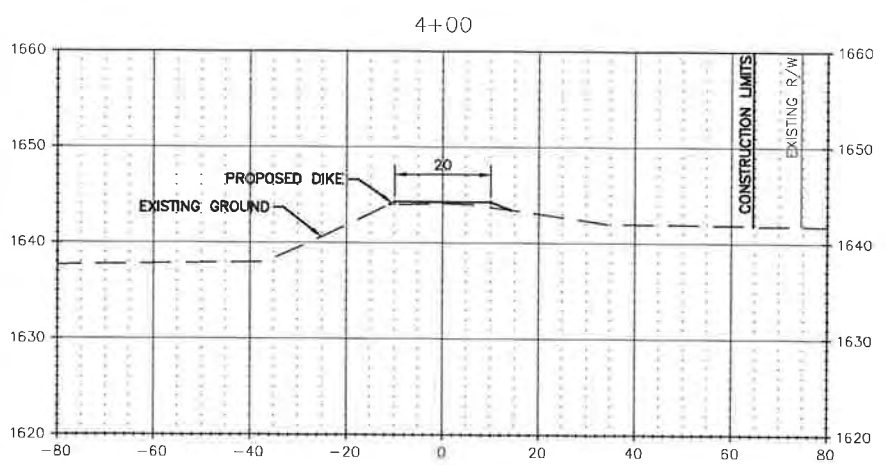
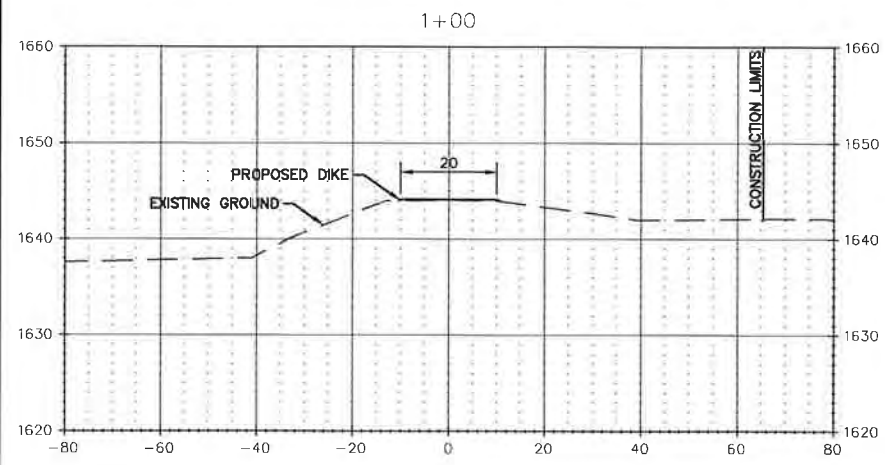
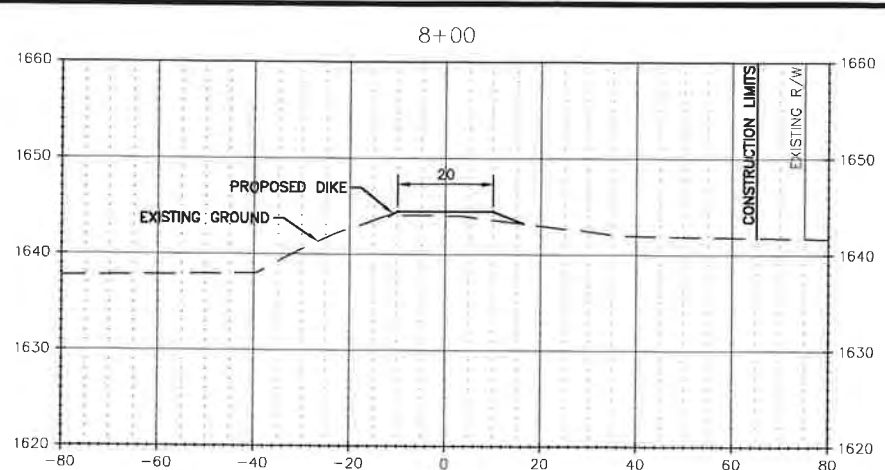
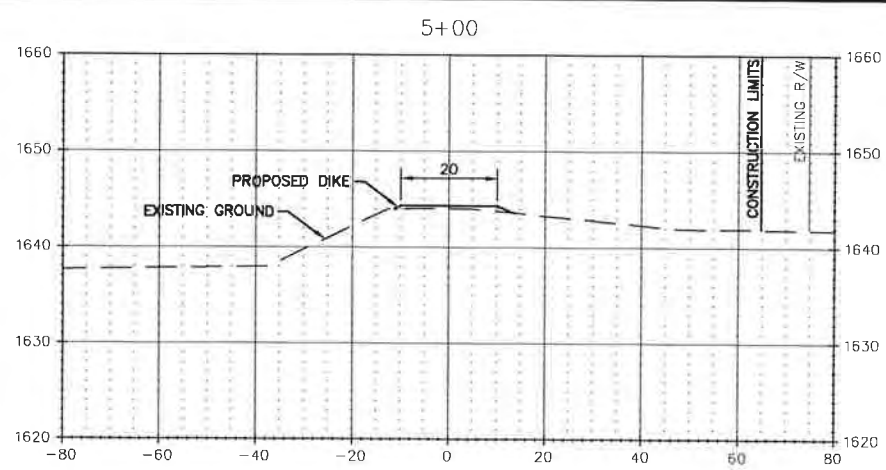
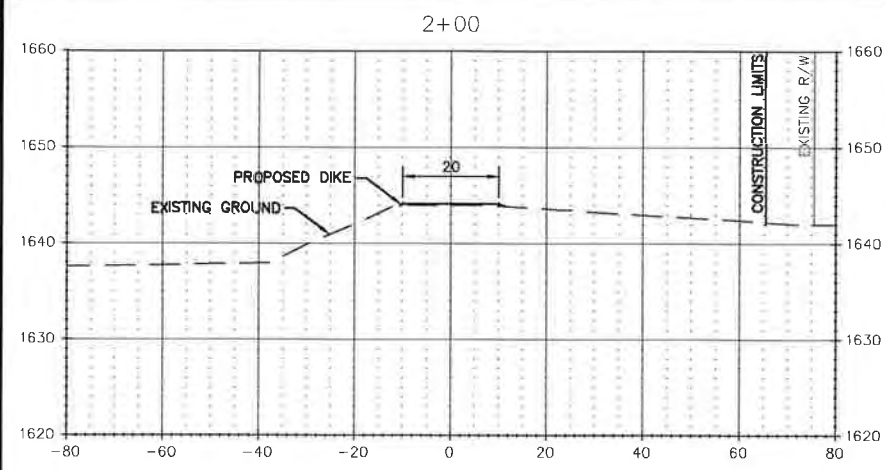
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701.323.0200 701.323.0300	Checked by TGJ	Scale AS SHOWN

BURNT CREEK FLOODWAY RESTORATION PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

SITE 3 DIKE RESTORATION
PLAN AND PROFILE
PROJECT NO. 4241-300

SHEET
7 of 11

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No.	Revision	Date	By

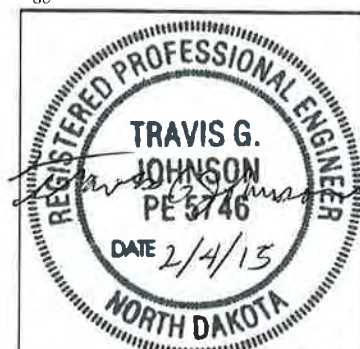
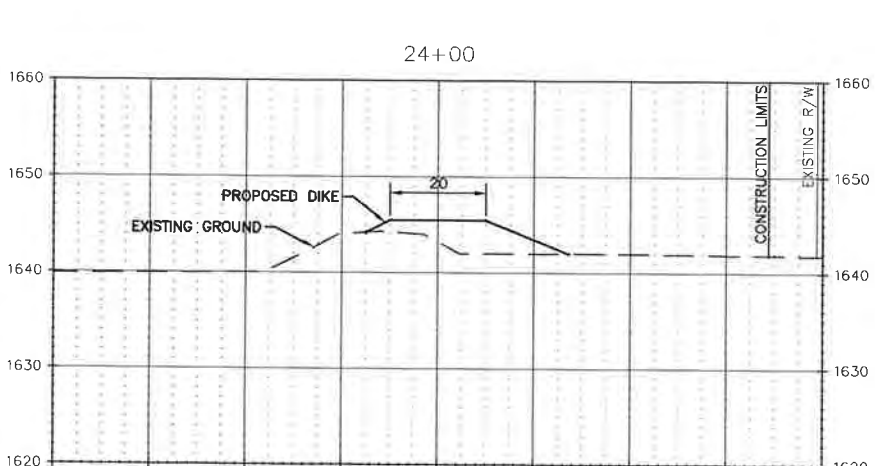
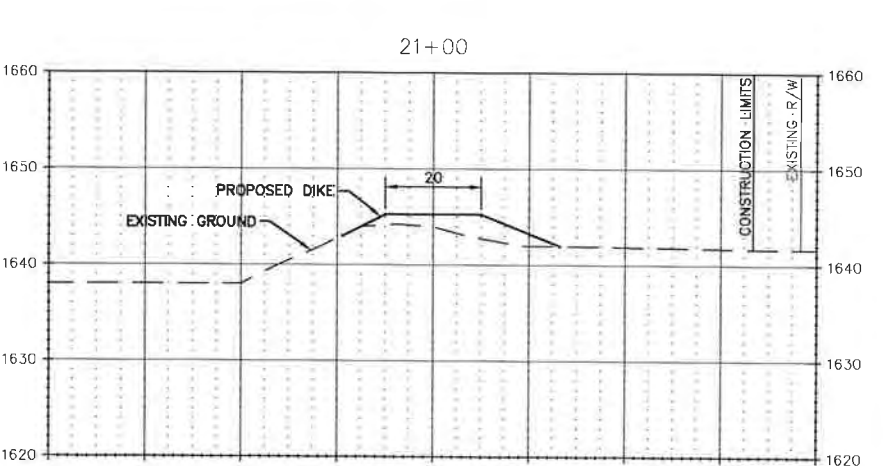
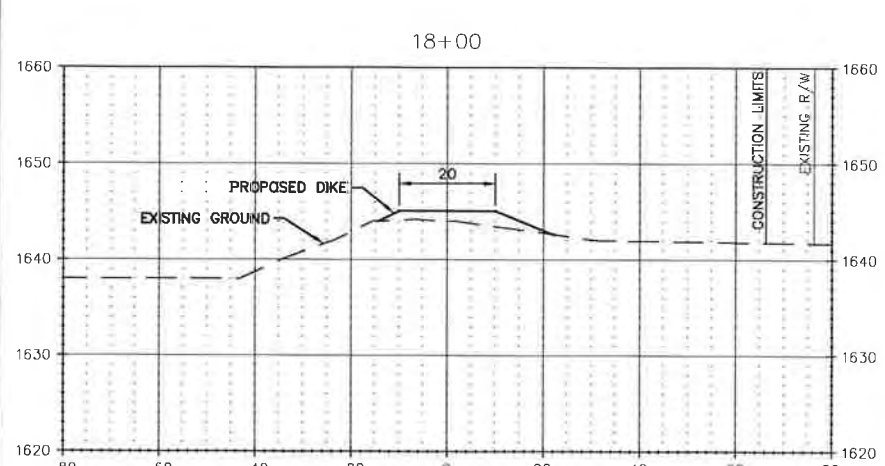
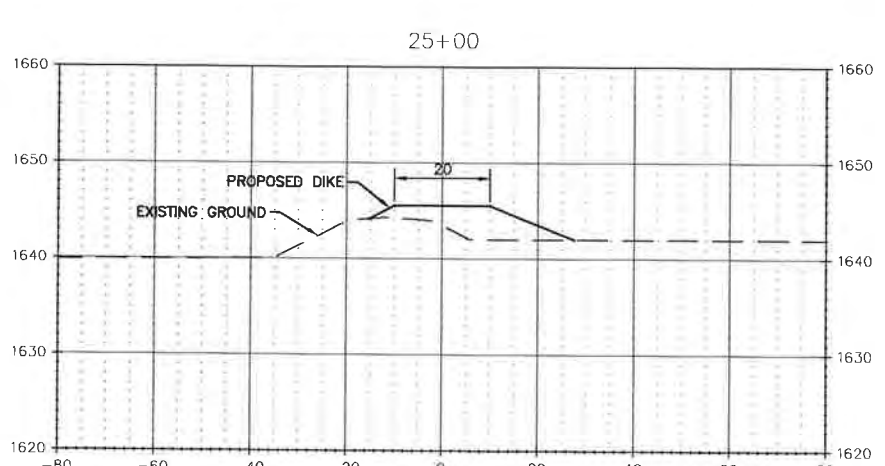
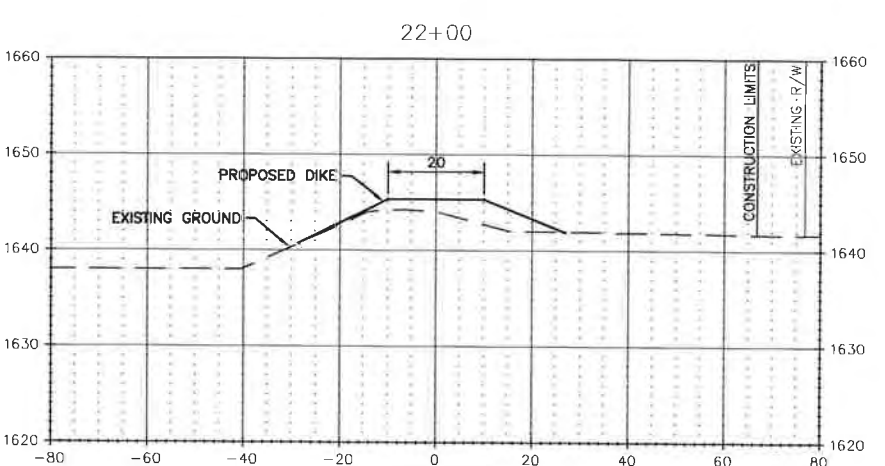
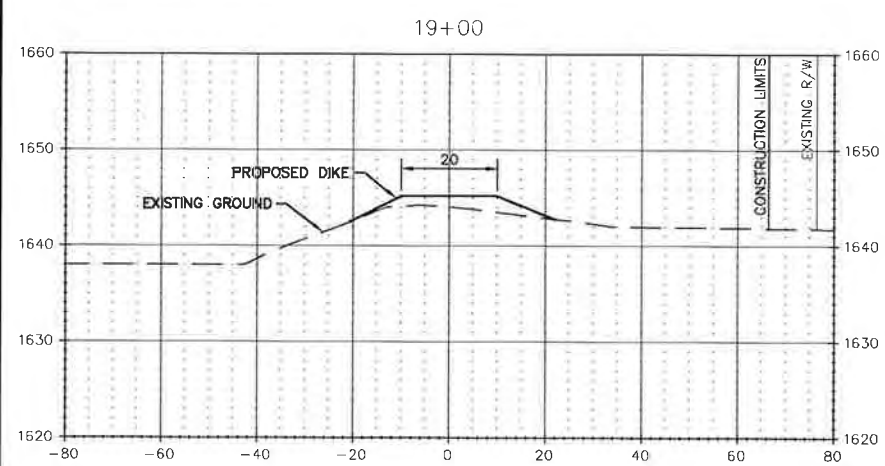
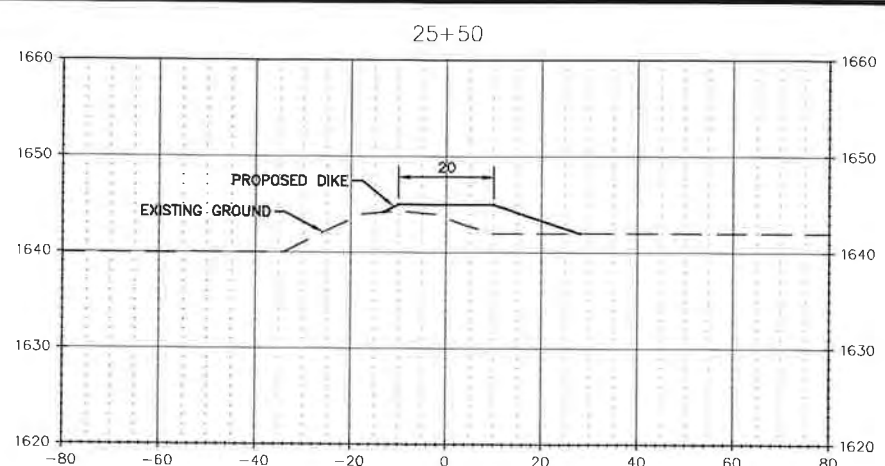
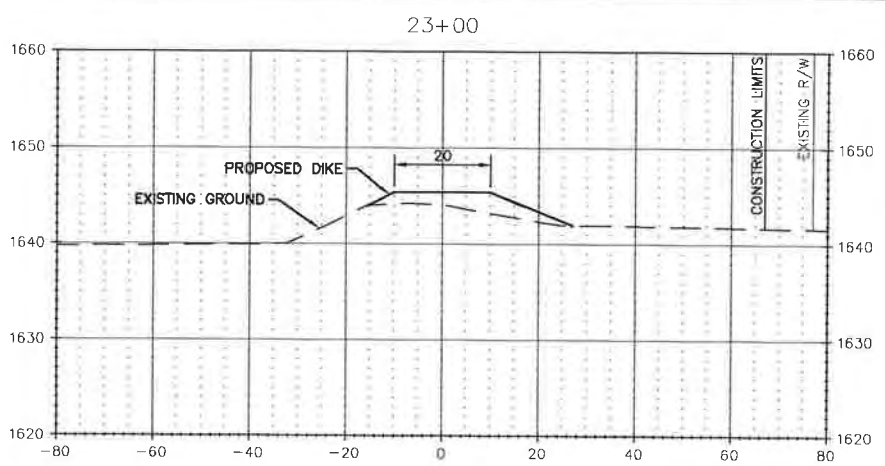
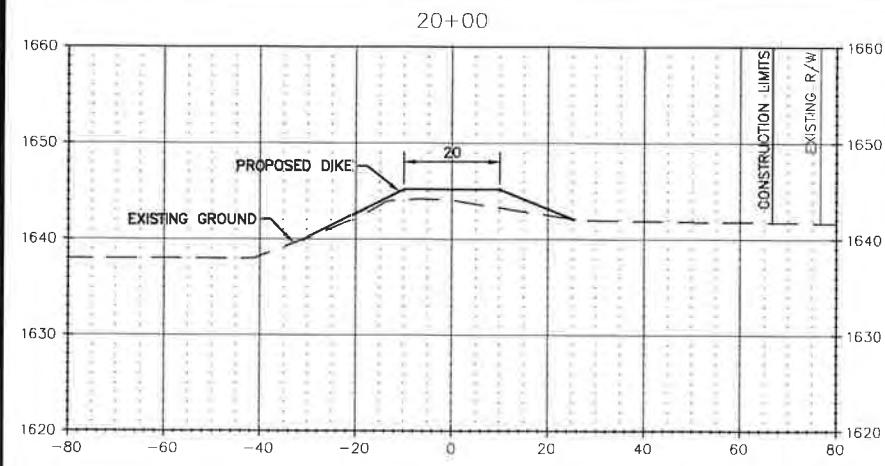


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P 701.323.0200 F 701.323.0300	Checked by TGJ	Scale AS SHOWN

BURNT CREEK FLOODWAY RESTORATION PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

SITE 3 DIKE RESTORATION
CROSS SECTIONS
PROJECT NO. 4241-300

SHEET
8 of 11



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No.	Revision	Date	By



Bismarck	Drawn by NRC	Date 2-4-15
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BURNT CREEK FLOODWAY RESTORATION PROJECT
BURLEIGH COUNTY WATER RESOURCE DISTRICT
BISMARCK, NORTH DAKOTA

SITE 3 DIKE RESTORATION
CROSS SECTIONS
PROJECT NO. 4241-300

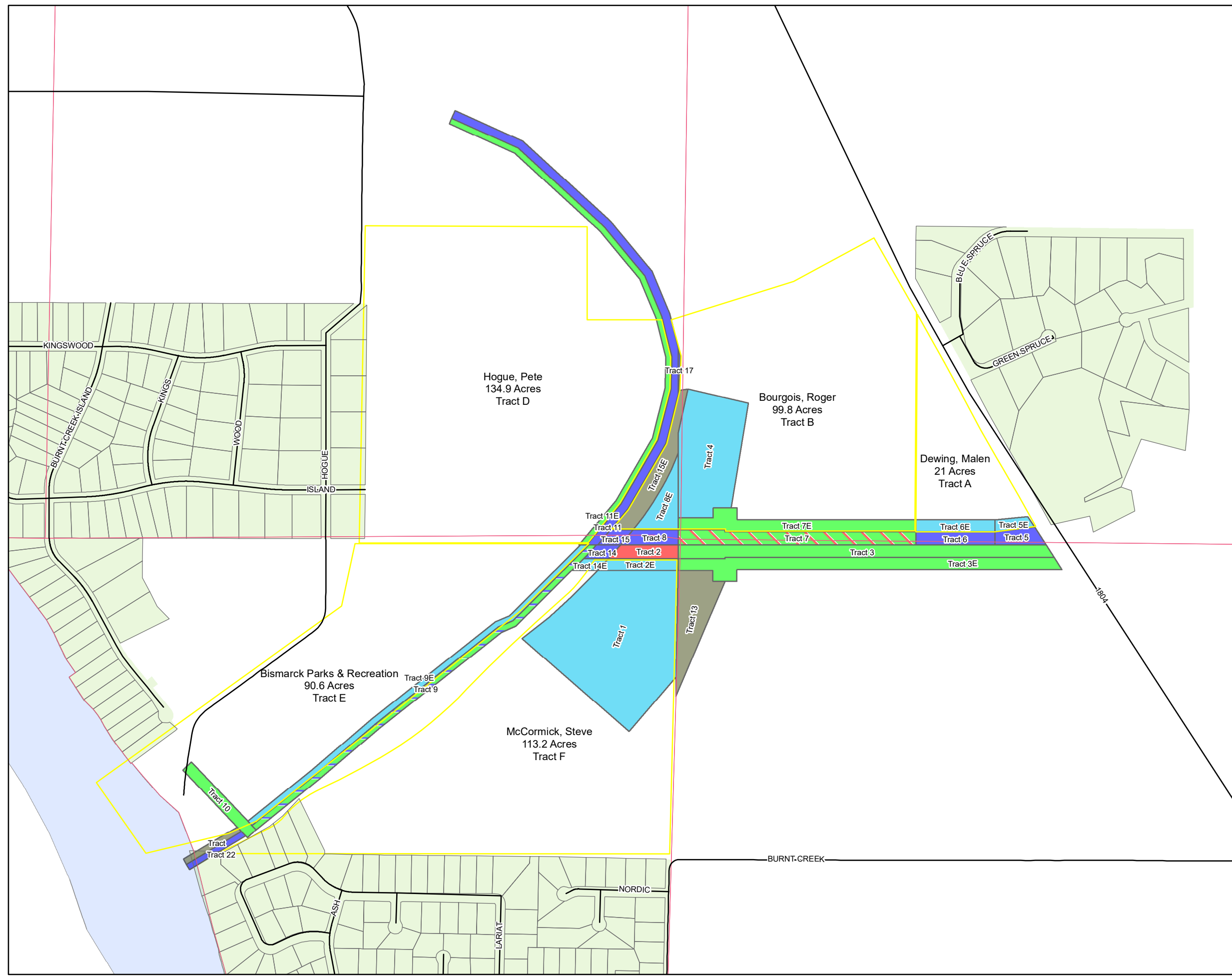
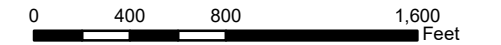
SHEET
10 of 11



APPENDIX B

Project Easement Maps





Legend

- Street Centerlines
- Section Lines
- Lots
- Subdivisions
- Water
- Property Lines

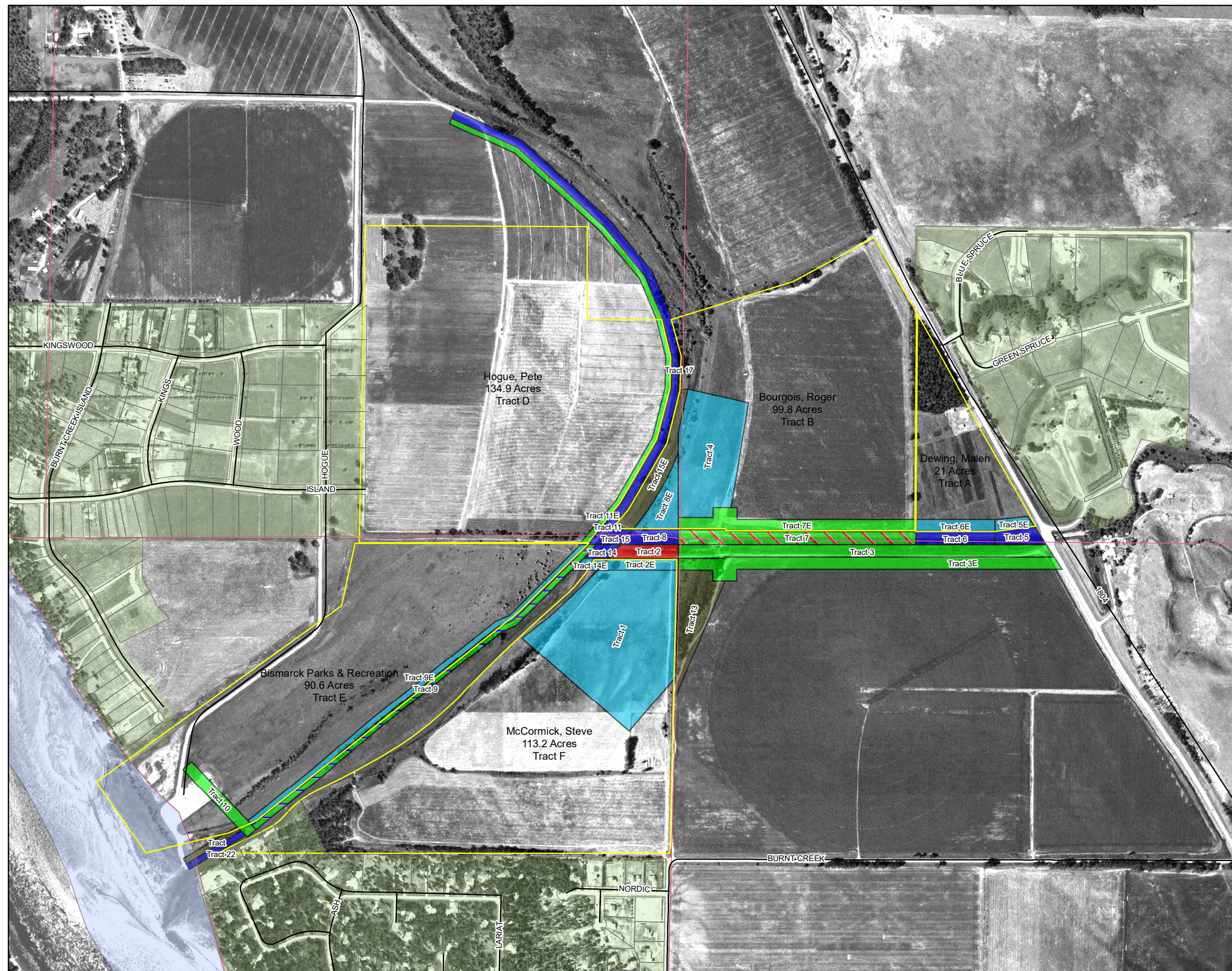
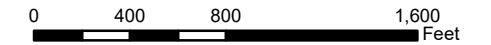
Easement Types

- Unknown
- Fee Title
- Fee Title & Indefinite Easement
- Indefinite Easement
- Permanent & Indefinite Easement
- Permanent Easement
- Temporary Easement

Data Source: ND GIS Hub & City of Bismarck

BURNT CREEK FLOODWAY TRACTS					
Scale:	Drawn by:	Checked by:	Project No.:	Date:	Sheet:
AS SHOWN	MKB	MHG	4241-000	9-30-05	8 of 8

HE Houston Engineering, Inc.
 3712 LOCKPORT STREET
 BISMARCK, NORTH DAKOTA 58503
 TEL: (701) 323-0200
 FAX: (701) 323-0300



Legend

- Street Centerlines
- Section Lines
- Lots
- Subdivisions
- Water
- Property Lines

Easement Types

- Unknown
- Fee Title
- Fee Title & Indefinite Easement
- Indefinite Easement
- Permanent & Indefinite Easement
- Permanent Easement
- Temporary Easement

Data Source: ND GIS Hub & City of Bismarck

BURNT CREEK FLOODWAY TRACTS					
Scale: AS SHOWN	Drawn by: MKB	Checked by: MHG	Project No.: 4241-000	Date: 9-30-05	Sheet: 8 of 8
		Houston Engineering, Inc. 3712 LOCKPORT STREET BISMARCK, NORTH DAKOTA 58503 TEL: (701) 323-0200 FAX: (701) 323-0300			



APPENDIX C

Sluice Gate Submittal Drawings



**SLIDE GATES
SUBMITTAL DRAWINGS**

S/O: 844

P/O: 150434KK

Project Name: **Burnt Creek Floodway Restoration**

Customer: **Northwestern Power Equipment Co., Inc.**

Date: Sept 18th, 2015
Submittal No.: 1
Revision No.: 1

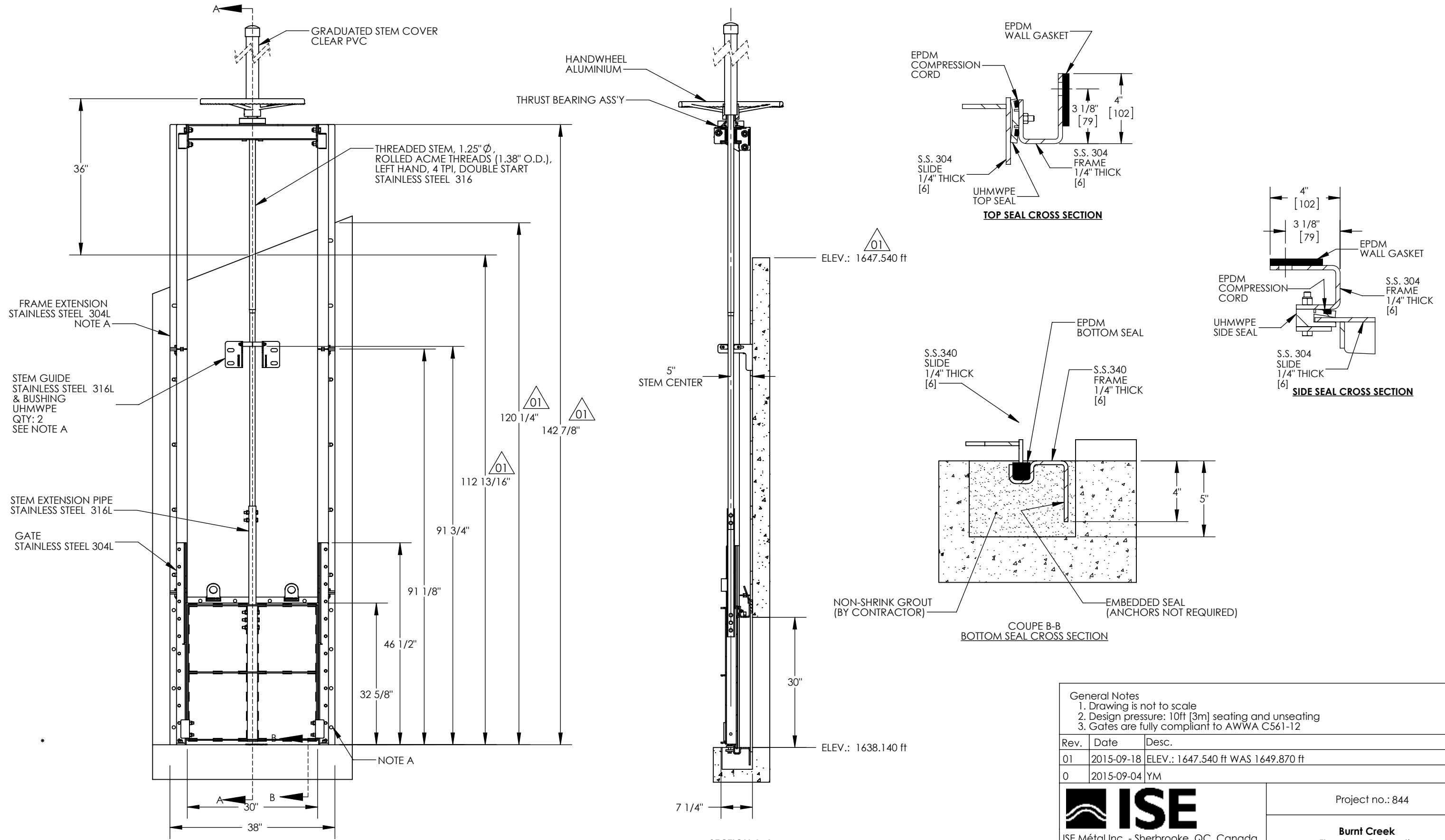
TABLE OF CONTENT

Item	Ident.	Qty	Model
1	Gate 1	1	S21-Y1X-30x30-B-FB/ES-10
2	Gate 2	1	S21-Y1X-30x30-B-FB/ES-10


Aquanox Contact: **Rosaire St-Laurent**
Toll Free: (855) 769-0157 ext 360
rosaire.st-laurent@iseaquanox.com



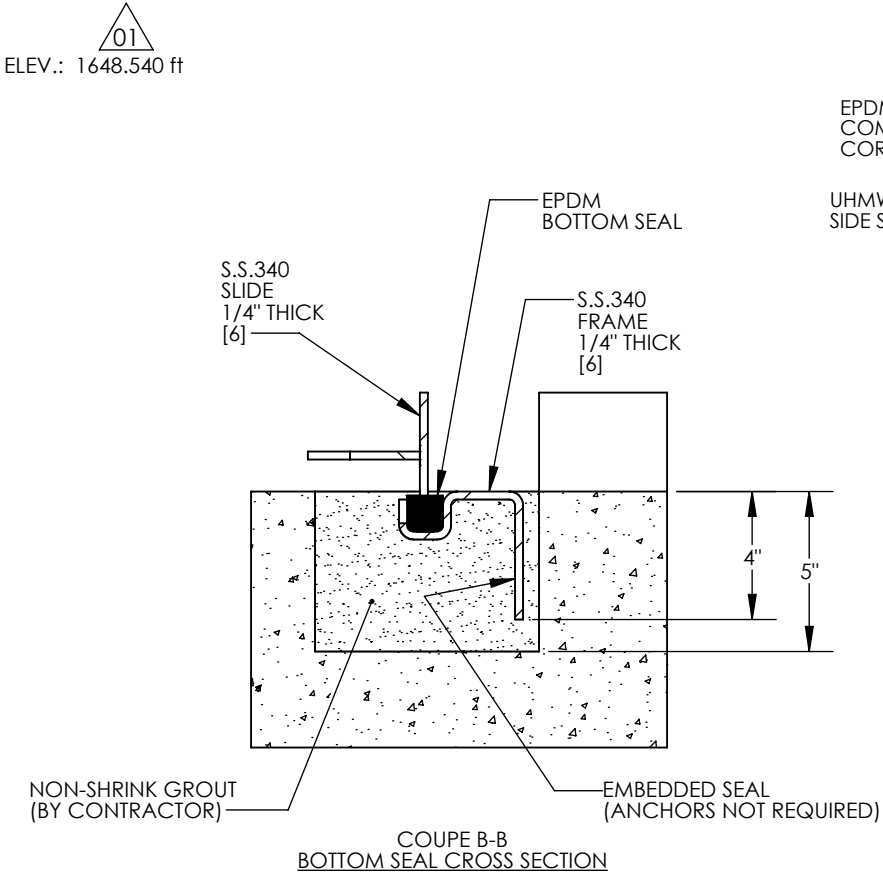
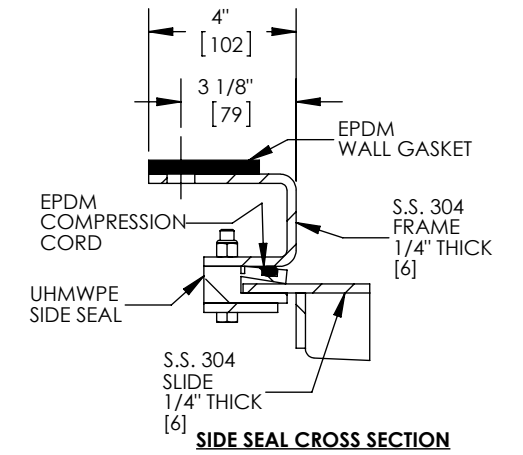
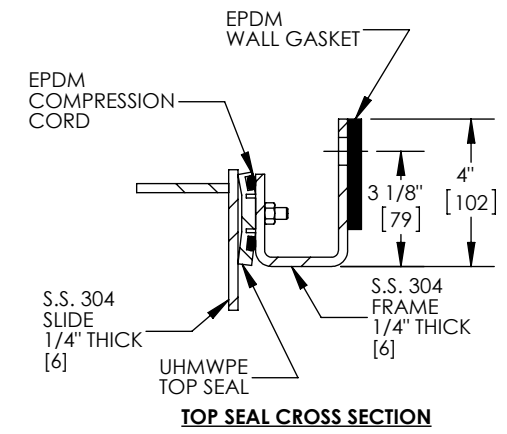
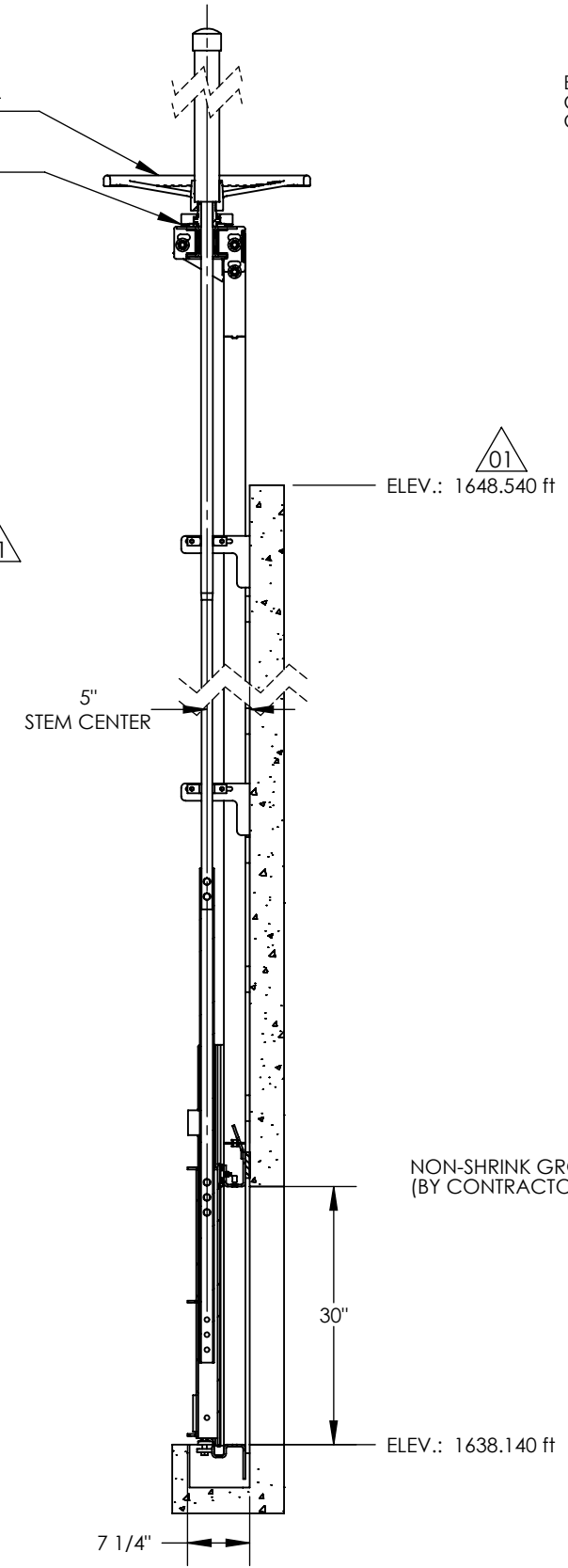
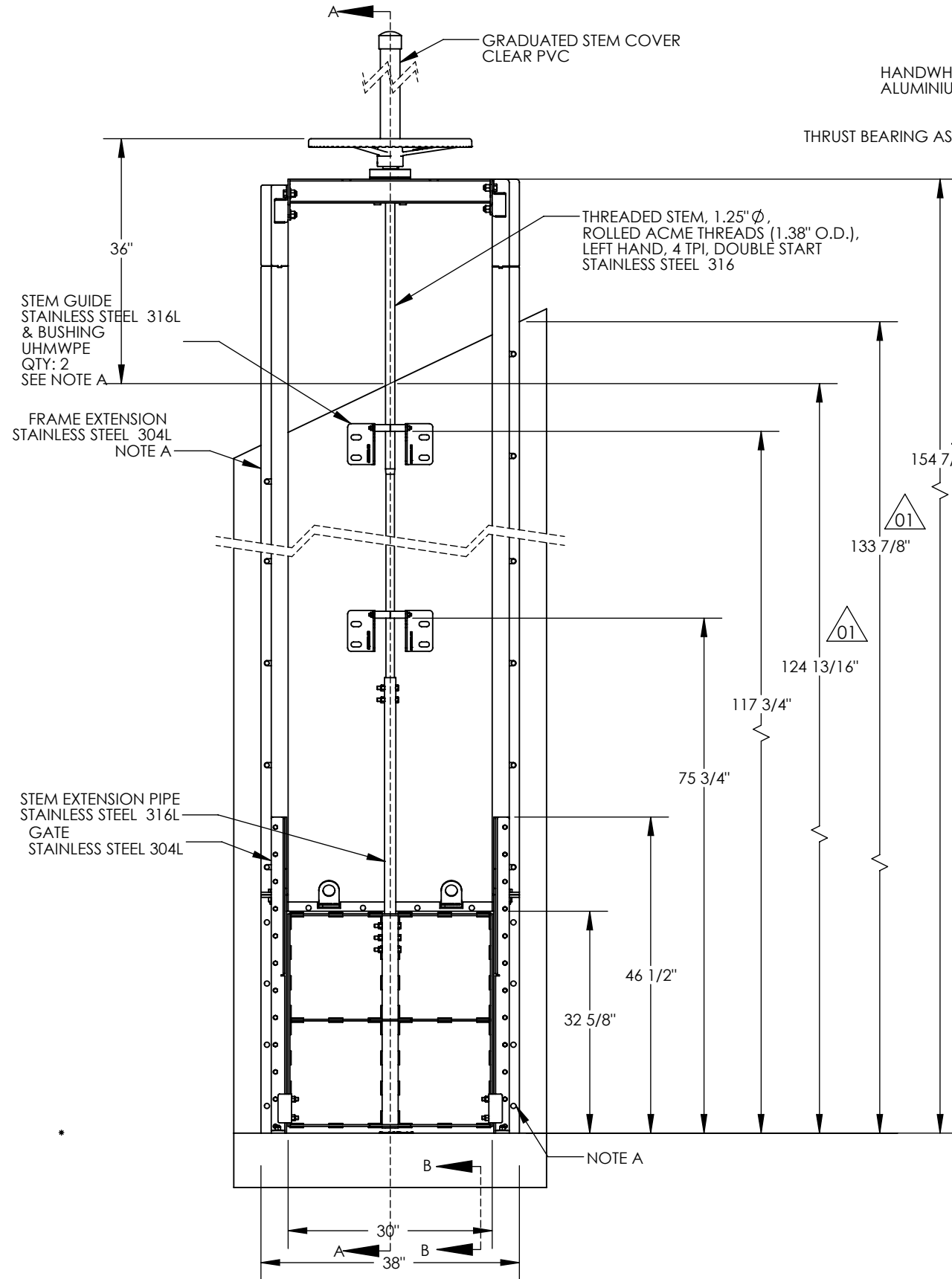
Stainless Steel Slide Gates - Series S



NOTE A: ANCHORS NOT SUPPLIED. QTY: 23
 MECHANICAL: HILTI KWIK BOLT 3 OR BETTER, 1/2" [13mm] DIA.X 3.5" [89mm] EMBEDMENT IN 2000 PSI [14 Mpa] CONCRETE.
 ADHESIVE: HILTI HVA OR BETTER, 1/2" [13mm] DIA.X 4.25" [110mm] EMBEDMENT IN 2000 PSI [14 Mpa] CONCRETE.

General Notes		
1. Drawing is not to scale		
2. Design pressure: 10ft [3m] seating and unseating		
3. Gates are fully compliant to AWWA C561-12		
Rev.	Date	Desc.
01	2015-09-18	ELEV.: 1647.540 ft WAS 1649.870 ft
0	2015-09-04	YM
		Project no.: 844
ISE Métal Inc. - Sherbrooke, QC, Canada www.iseaquanox.com - 819-769-0157		Burnt Creek Floodway Restoration
Item 1: Gate 1		Model no.: S21-Y1X-30x30-B-FB/ES-10
Qty: 1	Drawing no.: D844-1-S21Y1X3030BFBS10	Page 1/1

Stainless Steel Slide Gates - Series S



NOTE A: ANCHORS NOT SUPPLIED. QTY: 27
 MECHANICAL: HILTI KWIK BOLT 3 OR BETTER, 1/2" [13mm] DIA.X 3.5" [89mm] EMBEDMENT IN 2000 PSI [14 Mpa] CONCRETE.
 ADHESIVE: HILTI HVA OR BETTER, 1/2" [13mm] DIA.X 4.25" [110mm] EMBEDMENT IN 2000 PSI [14 Mpa] CONCRETE.

General Notes
 1. Drawing is not to scale
 2. Design pressure: 10ft [3m] seating and unseating
 3. Gates are fully compliant to AWWA C561-12

Rev.	Date	Desc.
01	2015-09-18	ELEV.: 1648.54 ft WAS 1649.870 ft
0	2015-09-04	YM

<p>ISE Métal Inc. - Sherbrooke, QC, Canada www.iseaquanox.com - 819-769-0157</p>	Project no.: 844
	<p>Burnt Creek Floodway Restoration</p>
Item 2: Gate 2	Model no.: S21-Y1X-30x30-B-FB/ES-10
Qty: 1	Drawing no.: D844-2-S21Y1X3030BFBES10 Page 1/1



APPENDIX D

Annual Inspection Checklist

**Burnt Creek Flood Control Operation & Maintenance Manual
Annual Inspection Checklist**

Date Inspected: _____ Inspected By: _____ Title: _____

Water Level: _____ Accompanied By: _____ Title: _____
(low/normal/high)

Weather Conditions: _____

Site Observations and Actions

Dike/Levee	Status	Comments/Location Noted/Actions Required
Erosion		
Wave erosion / scarp at waterline		
Riprap adequate		
Grass cover adequate		
Trees / bushes		
Animal burrows		
Cracks (Earth Levee)		
Settlement / depressions		
Sinkholes		
Slides / bulges		
Rutting / tracking		
Gate / fence condition		
Signage / notices / postings		
Open / close fence gate		
Additional observations:		
Drop Structures	Status	Comments/Location Noted/Actions Required
Drop structure condition		
Sheet Pile Weir Condition		
Additional observations:		
Channel	Status	Comments/Location Noted/Actions Required
Debris in channel / clogging		
Additional observations:		
Sluice Gates	Status	Comments/Location Noted/Actions Required
Corrosion/Attachment/Condition		
Operate 1804 sluice gates		
Operate Hoge Island sluice gate		
Additional observations:		