



# ESTIMATE OF QUANTITIES

## Grading

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3200	Construction Staking	Lump Sum	LS
009E3300	Three Man Survey Crew	40	Hour
120E0010	Unclassified Excavation	62	CuYd
120E0600	Contractor Furnished Borrow Excavation	355	CuYd
230E0010	Placing Topsoil	35	CuYd
250E0020	Incidental Work, Grading	Lump Sum	LS
632E2530	Type 3 Object Marker	4	Each
634E0110	Traffic Control Signs	109.0	SqFt
634E0120	Traffic Control Miscellaneous	Lump Sum	LS
634E0260	Type 3 Barricade, 6' Single Sided	6	Each
634E0265	Type 3 Barricade, 6' Double Sided	2	Each
734E0010	Erosion Control	Lump Sum	LS
734E0602	Low Flow Silt Fence	498	Ft
734E0610	Mucking Silt Fence	25	CuYd
734E0620	Repair Silt Fence	249	Ft
734E0900	Temporary Diversion Channel and/or Pipe	1	Each

## Structure 03-055-280

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
250E0030	Incidental Work, Structure	Lump Sum	LS
420E0200	Structure Excavation, Box Culvert	59	CuYd
421E0200	Box Culvert Undercut	185	CuYd
460E0120	Class A45 Concrete, Box Culvert	123.0	CuYd
480E0100	Reinforcing Steel	22,904	Lb
700E0210	Class B Riprap	155.0	Ton
831E0110	Type B Drainage Fabric	225	SqYd

### SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

### ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer.

These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

### COMMITMENT B1: CONSTRUCTION PRACTICES FOR STREAMS INHABITED BY THE TOPEKA SHINER

The US Fish and Wildlife Service (USFWS) have designated the following as Topeka Shiner streams associated with this project.

#### Table of Topeka Shiner Streams

Station	Stream Name	Ordinary High Water Elevation
5+00	creek - unnamed	1410.2

#### Action Taken/Required:

The Contractor shall adhere to the "Special Provision for Construction Practices in Streams Inhabited by the Topeka Shiner".

Stream turbidity will be monitored during all stages of the project. Turbidity measurements should be taken in conjunction with normal storm water inspections.

The Contractor shall produce a comprehensive Construction Plan that includes all products, materials, and methods of construction and removal for temporary water barriers, cofferdams, and diversion channels including dewatering, handling, storage, and disposal of excavated material and pumped effluent throughout all phases of construction, including post-construction stabilization. This plan shall be approved by the SDDOT Environmental office prior to any work occurring in the above streams. Upon plan approval the Construction Plan shall be amended to the SWPPP document located in Section D – Erosion and Sediment Control Plans.

### COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

#### Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

### COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

#### Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

### COMMITMENT D: WATER QUALITY STANDARDS

#### COMMITMENT D1: SURFACE WATER QUALITY

The creek is classified as warm water, marginal fishery with a total suspended solids standard of 150 milligrams/liter.

#### Action Taken/Required:

The Contractor is advised the South Dakota Surface Water Quality Standards, administered by the Department of Environment and Natural Resources (DENR), apply to this project. Special construction measures shall be taken to ensure the above standard(s) of the surface waters are maintained and protected.

### COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

#### Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	BRO 8003(23)	3	26

**COMMITMENT H: WASTE DISPOSAL SITE**

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

**Action Taken/Required:**

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the Public ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".
2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

**Action Taken/Required:**

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to:

Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

**COMMITMENT N: SECTION 404 PERMIT**

The SDDOT has obtained a Section 404 Permit from the US Army Corps of Engineers for the permanent actions associated with this project.

**Action Taken/Required:**

The Contractor shall comply with all requirements contained in the Section 404 permit.

The Contractor shall also be responsible for obtaining a Section 404 permit for any dredge, excavation, or fill activities associated with staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetlands or waters of the United States.

The State of South Dakota has designated warm water fishery associated with this project.

Construction or demolition activities should not take place during the Seasonal Work Restriction listed in the below table to avoid conflicts with spawning fish. If flows during this time are nonexistent or extremely low, the seasonal use restriction may not be applicable. The Contractor shall not conduct in-stream work during the Seasonal Work Restriction without prior approval from the SDDOT Environmental Office.

Stream Name	Stream Classification	Seasonal Work Restriction
Creek	Warm Water	April 1 to June 30

**LOW FLOW SILT FENCE**

The low flow silt fence fabric provided shall be from the approved product list. The approved product list for low flow silt fence may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

Low flow silt fence shall be placed at the locations noted in the table shown on sheet 12 of 26 and at locations that will minimize siltation of adjacent streams, lakes, dams, or drainage areas as determined by the Engineer during construction. Refer to Standard Plate 734.04 for details.

An additional 50 feet of Low Flow Silt Fence has been added to the Estimate of Quantities for temporary sediment control as directed by the Engineer.



**SHRINKAGE FACTOR**

Embankment Plus 35%

**COMPACTION**

Compaction of earth embankment and box culvert backfill material shall be governed by the Ordinary Compaction Method.

**HAUL OF EXCAVATION**

Included in the Estimate of Quantities are 2,085 Cubic Yard Station for Haul. This is not a pay item and is for information purpose only.

Haul; Quantity calculated (CuYdSta) for moving Unclassified Excavation material to the location where it is needed throughout the earthwork balance.

**WATER FOR COMPACTION**

Water for compaction of earth embankment is estimated at the rate of 15 gallons of water per cubic yard of "Unclassified Excavation" and "Contractor Furnished Borrow Excavation". The estimated quantity of water is 7.0 M.Gal. All costs for furnishing and installing water for compaction shall be incidental to the contract unit price per cubic yard for "Unclassified Excavation" and "Contractor Furnished Borrow Excavation".

**UNCLASSIFIED EXCAVATION**

Payment for "Unclassified Excavation" will be on a contract quantity basis as provided in Section 120 of the Specification. No separate field measurement will be made.

**COUNTY RESPONSIBILITIES**

Beadle County will be responsible for the following items without Federal Participation.

1. Remove existing fence, provide temporary fence as necessary, and replace fence on the right-of-way line upon completion of the project.
2. Obtain temporary easements and/or permanent right of way for construction.
3. Coordination of the utility adjustments.
4. Furnish and install surfacing.
5. Furnish and install new permanent signing (except Type 3 Object Markers).
6. Remove silt fence when vegetation has been established in areas where Permanent seeding is required.

**GRADING OPERATIONS**

All advertising signs will be removed from the right of way by the Owners.

The estimated cubic yards of excavation and/or embankment required to construct outlet ditches, ditch blocks and approaches are included in the earthwork balance notes on profile sheet.

Special ditch grades and other sections of the roadway different than the typical section(s) shall be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction, the Engineer shall contact the Designer for the proposed change.

Generally, all shallow inlet and outlet ditches as noted on the plan sheets shall be cut with a 10-foot wide bottom with 5:1 backslopes. However, the Engineer may direct the Contractor to adjust the ditch width for proper alignment with the drainage structure.

The Contractor shall be responsible for coordinating work with the County. Also the Contractor shall notify the County two weeks prior to beginning work so that the necessary prep work by the County can be completed.

**GENERAL MAINTENANCE OF TRAFFIC**

This project will be closed to traffic during construction and the roadway will be barricaded. The Contractor is responsible for installing traffic control prior to roadway closure or in place structure removal.

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit price for various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the County.

All vehicles and equipment shall be stored behind the full roadway closure barricades.

**TYPE 3 OBJECT MARKERS**

Type 3 object markers shall be furnished and installed by the Contractor in accordance with chapter 2C of the current edition of the Manual on Uniform Traffic Control Devices.

**SEQUENCE OF OPERATIONS**

The Contractor shall utilize the following sequence. In the event the Contractor can furnish the Engineer an alternate Sequence of Operations or Traffic Control plan which meets the approval of all parties involved, the below sequence may be changed. This alternate Sequence of Operations or Traffic Control plan must be submitted to the Engineer a minimum of two (2) weeks prior to the Preconstruction meeting.

1. Install traffic control devices and close project as shown on the plans.
2. Install Erosion Control Measures.
3. Dismantle and remove existing structure.
4. Construct the new structure, grade the roadway.
6. Open the roadway to through traffic.
7. Complete the miscellaneous cleanup under traffic.

**CONTRACTOR FURNISHED BORROW EXCAVATION**

The Contractor shall provide a suitable site for Contractor furnished borrow excavation material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site. The borrow material shall be approved by the Engineer. The plans quantity for "Contractor Furnished Borrow Excavation" as shown in the Estimate of Quantities will be the basis of payment for this item.

Restoration of the Contractor furnished borrow excavation site shall be the responsibility of the Contractor.

**UTILITIES**

The Contractor shall be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor shall contact each utility owner and confirm the status of all existing and new utility facilities.

Utility owners are as follows:

Centurylink (Telephone): 1-800-879-4357

Dakota Energy Cooperative Inc. (Power): 1-605-352-8591

Mid-Dakota Rural Water Systems: 1-605-352-9008

**EROSION CONTROL (TEMPORARY STRUCTURE)**

Erosion protection for temporary culvert ends, temporary channel retaining structures, necessary dikes, or causeways shall be constructed from Class B Riprap or other non-erodible material approved by the Engineer.

These temporary structures shall be removed from the waterway upon completion of the structure, with minimal disturbance of the streambed. The Cost of this erosion work shall be incidental to the contract lump sum price for Erosion Control.



**SALVAGE, STOCKPILING AND PLACING TOPSOIL**

Existing vegetation shall be salvaged, incorporated and placed with topsoil as far as practicable.

The areas to be covered with topsoil to a depth of 3± inches comprise all newly graded areas within the right of way limits. All areas designated as temporary easements shall be covered with topsoil to a depth of 6± inches. Exception is top of earth subgrade.

The removal of topsoil is incidental to the contract unit price bid per cubic yard of "Unclassified Excavation". No separate field measurement will be made.

The estimated quantities of salvaged topsoil required to cover the designated areas to the specified depth, including 30% allowance for shrinkage, are as follows:

Station	to	Station	Topsoil (CuYd)
4+00		6+00	35
Total:			35

The plans quantity for "Placing Topsoil" as shown in the Estimate of Quantities will be the basis of payment for this item. No separate field measurement will be made.

**PERMANENT SEEDING**

The areas to be seeded comprises all newly graded areas within the project limits except for the top of the roadway and temporary easements under cultivation.

Type C Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	16
Slender Wheatgrass	Adanac, Pryor, Primer, Revenue	2
Total:		18

For this project 4 lbs. of permanent seed is required. The cost of seeding shall be incidental to the contract lump sum price for "Erosion Control".

**MULCHING (GRASS HAY OR STRAW)**

Following seeding, a mulch consisting of grass hay or straw shall be blown on and punched into all newly areas of permanent seeding. Estimate of Quantities for grass hay or straw is based on assumed coverage of all newly seeded areas at the rate of two (2) tons per acre. Bales with noxious weed contamination will be rejected and the Contractor will be required to remove the contaminated bales from the project.

For this project 0.5 ton of mulch is needed, the cost of mulching shall be incidental to the contract lump sum price for "Erosion Control".

**MYCORRHIZAL INOCULUM**

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

- Glomus intraradices* 25%
- Glomus aggregatu* 25%
- Glomus mosseae* 25%
- Glomus etunicatum* 25%

All seed shall be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the the contract lump sum price for "Erosion Control".



FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	6	26

**TABLE OF CONSTRUCTION STAKING**

(See Special Provision for Contractor Staking)

Roadway and Description	Begin Station	End Station	Number of Lanes	Grade Staking			Set of Stakes	Grade Staking Quantity (Mile)	Miscellaneous Staking Quantity (Mile)	Slope Staking Quantity (Mile)	Structure Staking Quantity (Each)
				Length (Ft)	Length (Mile)	Lane Factor					
Twp. Rd. (2 Lanes Gravel Surface)	4+00	6+00	2	200	0.038	1	2	0.076	0.038	0.038	
Twp. Rd. (2-12' X 6' Reinf. Conc. Box Culvert)	4+87.21	5+12.79									1
Total								0.076	0.038	0.038	1

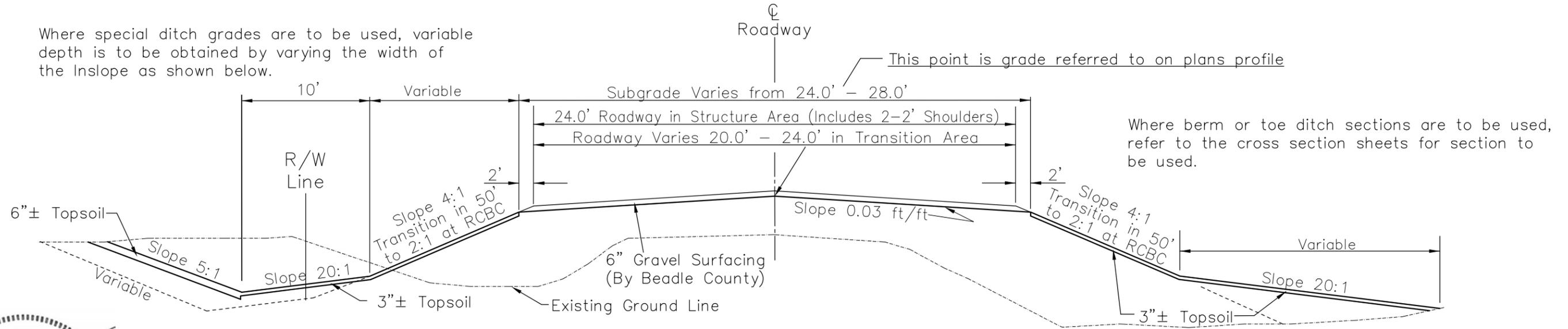
**CONSTRUCTION STAKING**

Grade staking, miscellaneous staking, slope staking and structure staking will not be measured for payment, but are incidental to the contract lump sum price for "Construction Staking".



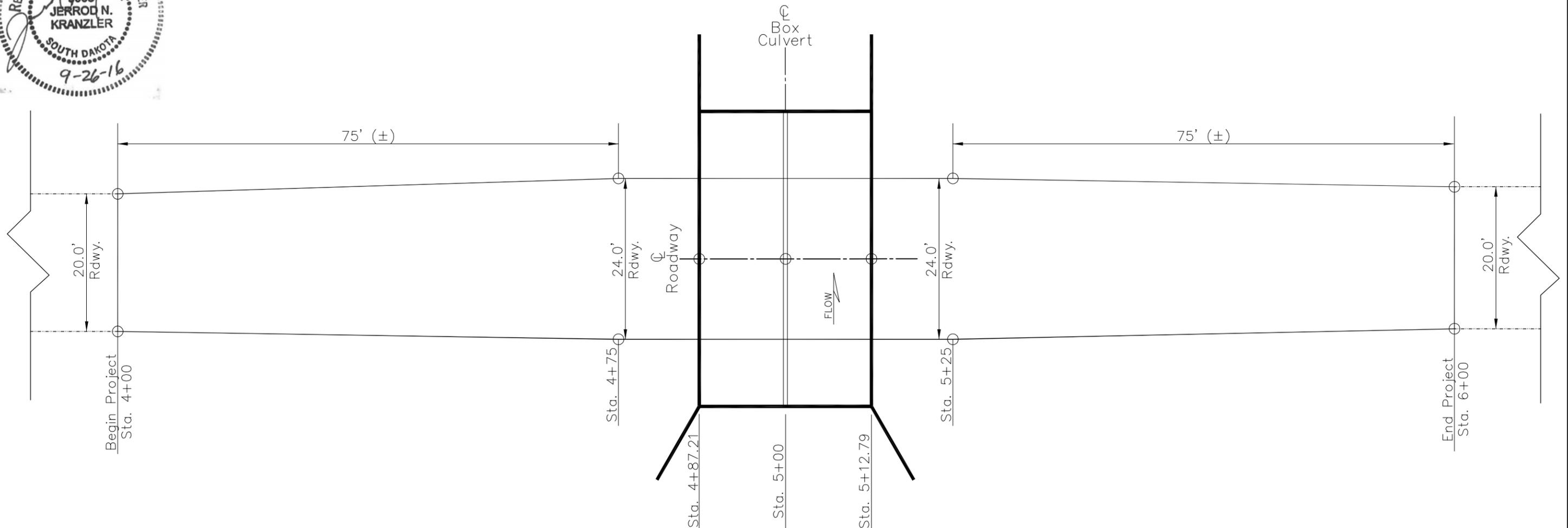
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	7	26

Where special ditch grades are to be used, variable depth is to be obtained by varying the width of the inslope as shown below.



Where berm or toe ditch sections are to be used, refer to the cross section sheets for section to be used.

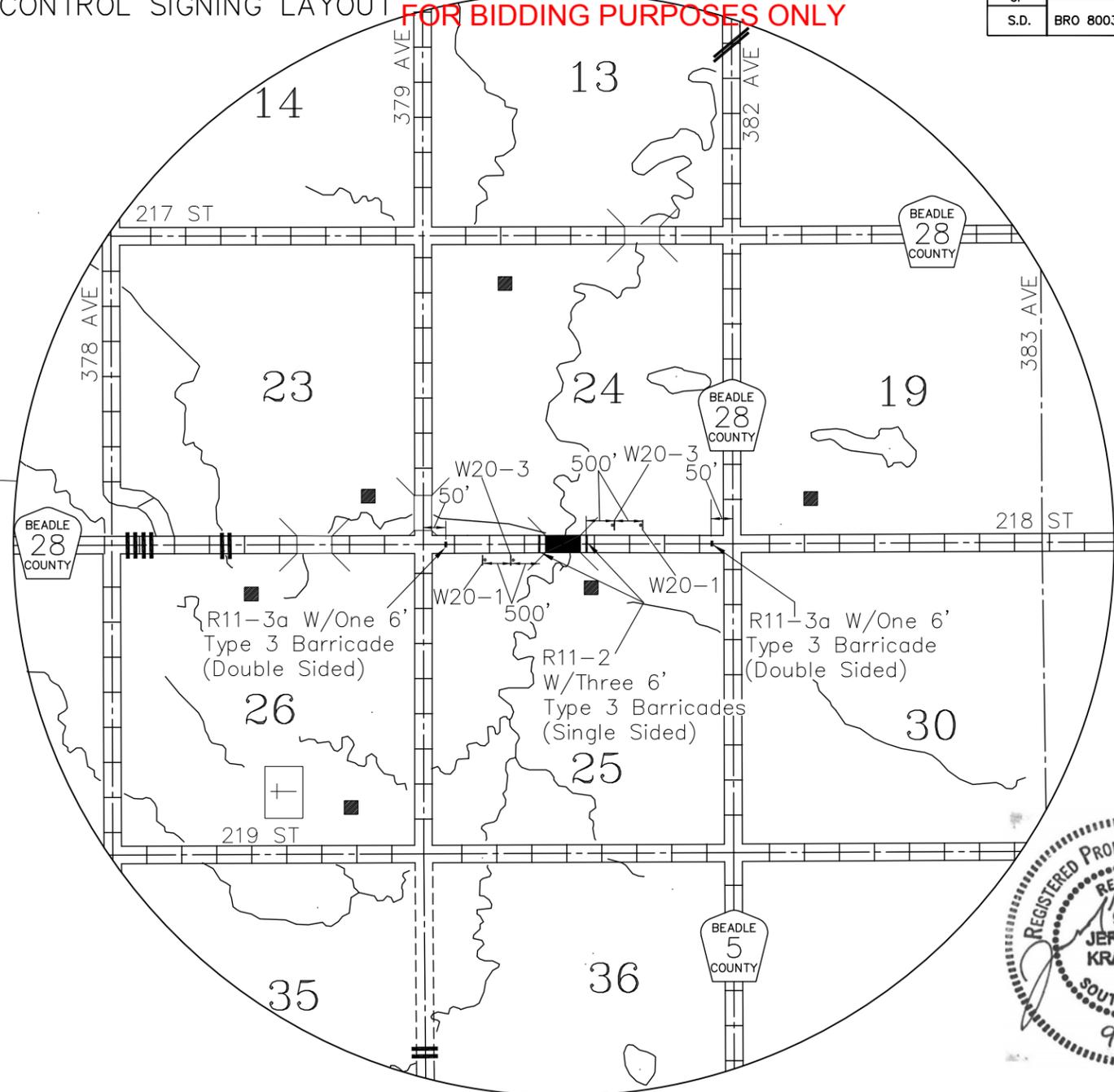
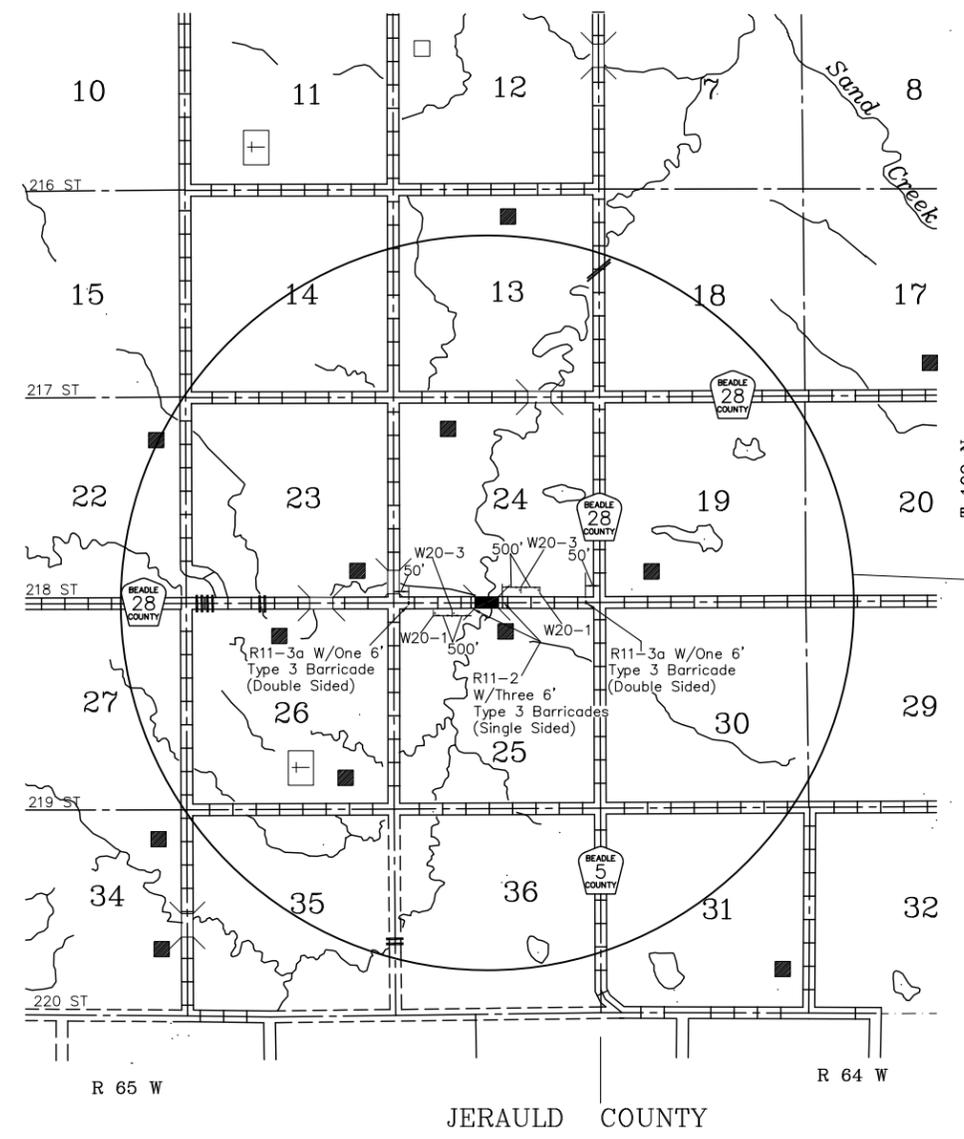
TYPICAL GRADING & SURFACING SECTION



TYPICAL ROADWAY TRANSITION DETAIL

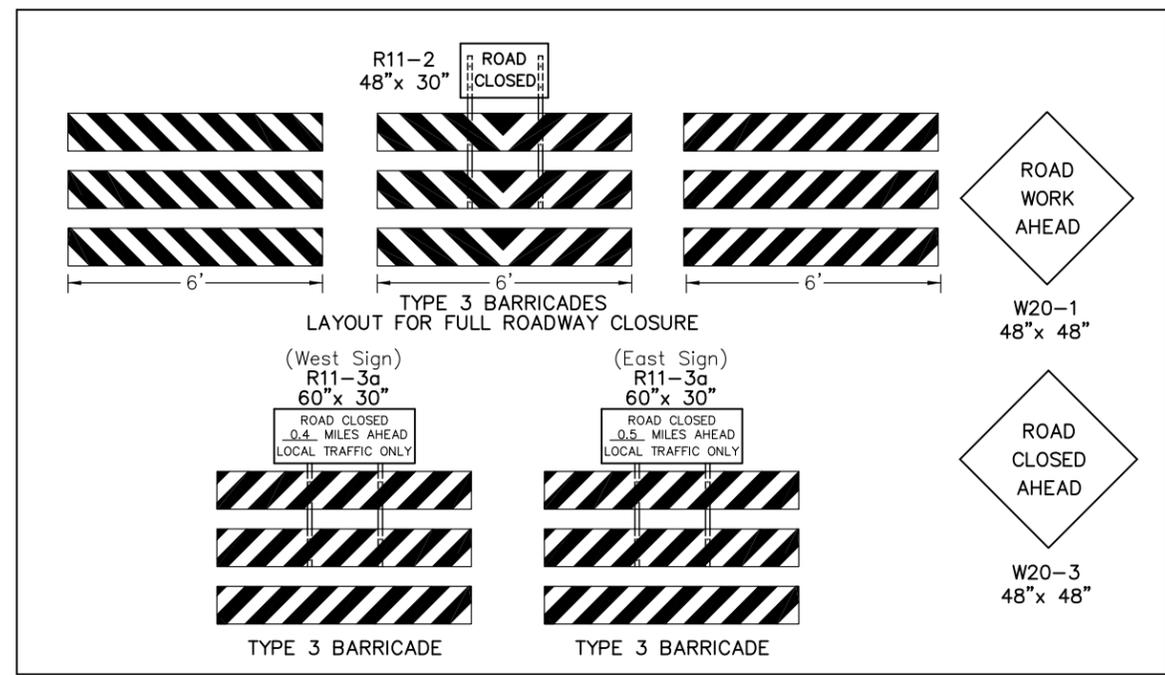
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	8	26

TRAFFIC CONTROL SIGNING LAYOUT **FOR BIDDING PURPOSES ONLY**

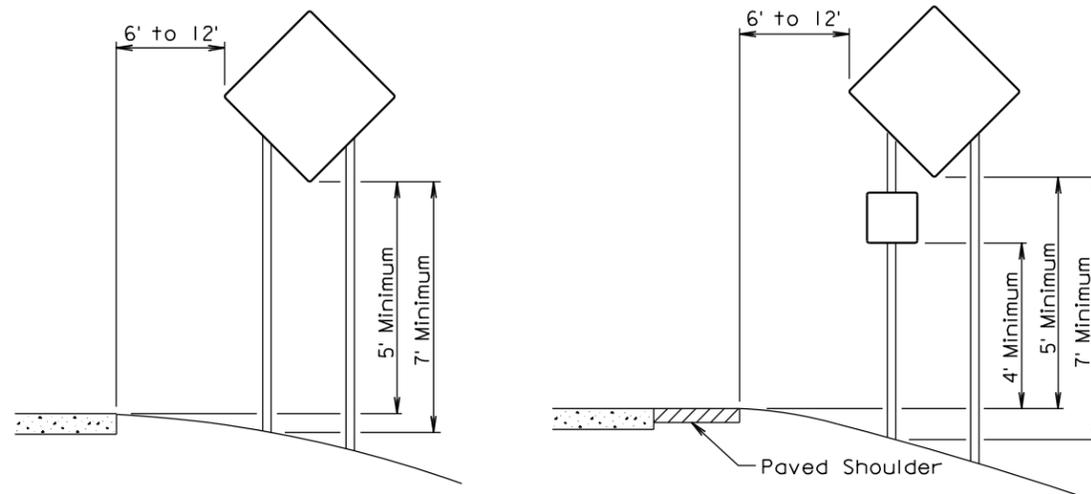


**ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS**

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R11-2	ROAD CLOSED	2	48" x 30"	10.0	20.0
R11-3a	ROAD CLOSED MILES AHEAD LOCAL TRAFFIC ONLY	2	60" x 30"	12.5	25.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-3	ROAD CLOSED AHEAD	2	48" x 48"	16.0	32.0
CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT				<b>109.0</b>	

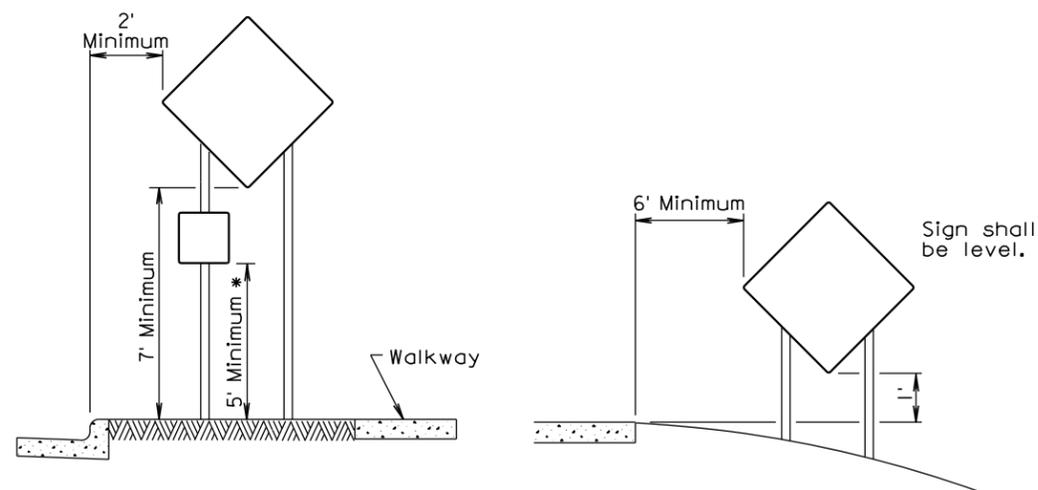


FOR BIDDING PURPOSES ONLY



RURAL DISTRICT

RURAL DISTRICT WITH SUPPLEMENTAL PLATE



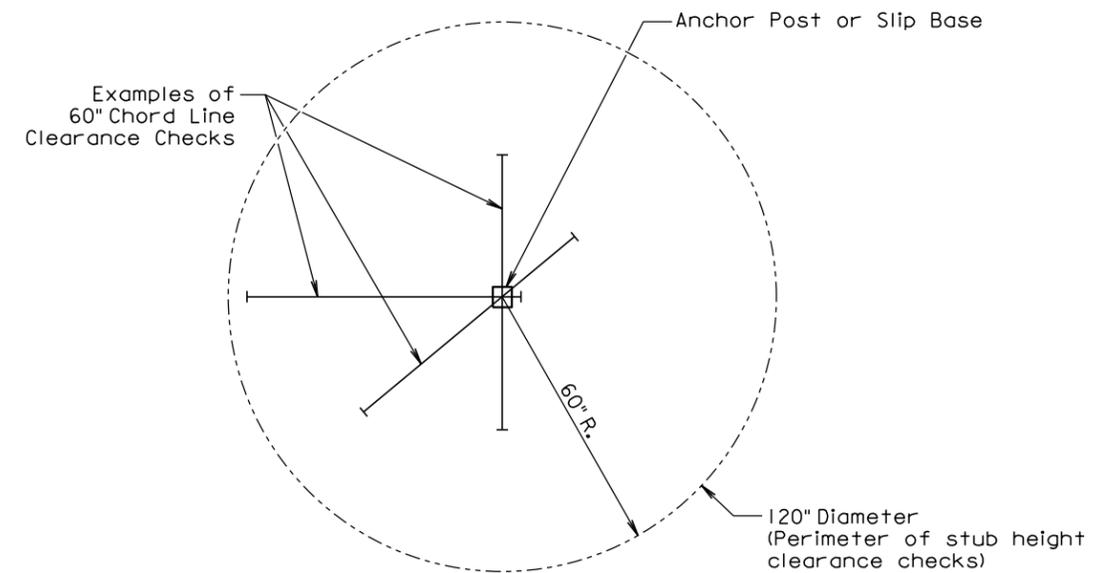
URBAN DISTRICT

RURAL DISTRICT 3 DAY MAXIMUM  
(Not applicable to regulatory signs)

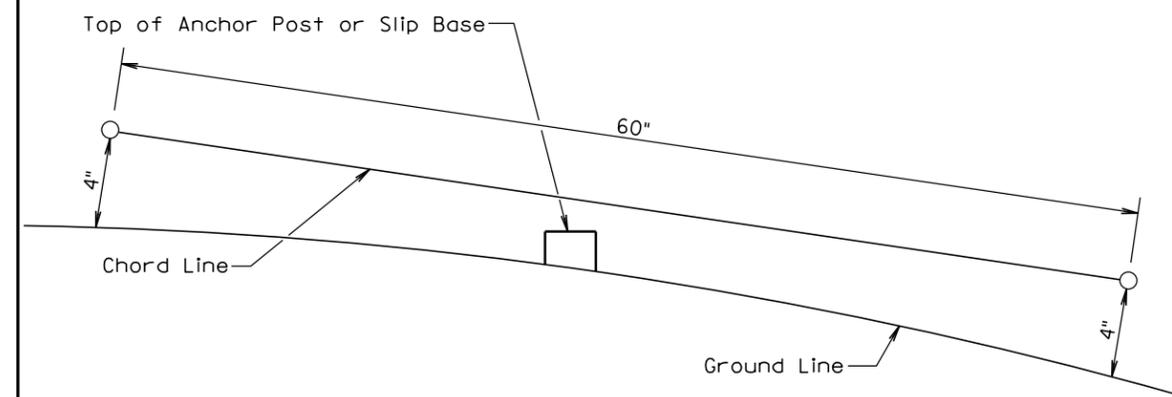
\* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

September 22, 2014

Published Date: 3rd Qtr. 2016	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW  
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 3rd Qtr. 2016	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

# PROJECT PLAN VIEW

S.W. 1/4 Sec. 24, T. 109 N., R. 65 W.

Owners: Gary & Verna Thum  
 PO Box 293  
 Wessington Springs, So.Dak. 57382  
 Tel. No. (605) 539-1652

4+83.5 to 5+16.5  
 33' Length by 21.7' Roadway  
 Steel I-beam Bridge with Concrete Deck,  
 Abutments and Wings.  
 (Incidental Work, Structure)

5+00  
 Install 2-12'x 6'x 69'-0" RCBC  
 (See Structure Plans)  
 DA = 14.4 Sq. Miles

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	10	26

S.E. 1/4 Sec. 24, T. 109 N., R. 65 W.

Owners: Kevin & Nichole VonEye  
 Undivided 1/2 interest  
 37939 217th Street  
 Virgil, So.Dak. 57379  
 Tel. No. (605) 849-3232

Owners: David J. Von Eye & Evelyn R. Von Eye  
 Undivided 1/2 interest  
 21963 378th Avenue  
 Wessington Springs, So.Dak. 57382  
 Tel. No. (605) 539-0222

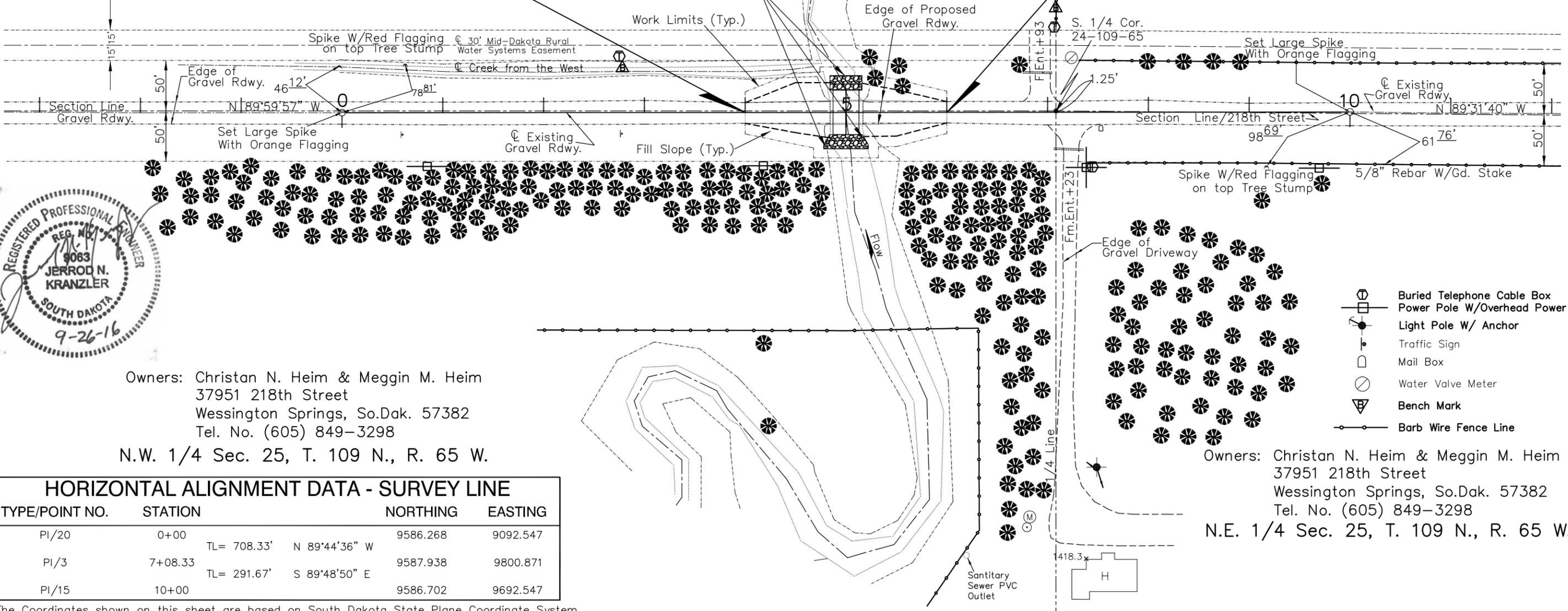
**BEGIN PROJECT**  
 Sta. 4+00 = 308.33' West of the  
 S. 1/4 Cor. of Sec. 24, T.109 N., R. 65 W.

**END PROJECT**  
 Sta. 6+00 = 108.33' West of the  
 S. 1/4 Cor. of Sec. 24, T.109 N., R. 65 W.

SCALE: 1"=100'

Mid-Dakota Rural Water Systems  
 30' Right of Way Easement 2-60, Dated Sept. 17, 2001  
 Filed as 2E 1389 in the Beadle Co. Court House

Install Class B Riprap  
 (See Structure Plans)



Owners: Christan N. Heim & Meggin M. Heim  
 37951 218th Street  
 Wessington Springs, So.Dak. 57382  
 Tel. No. (605) 849-3298

N.W. 1/4 Sec. 25, T. 109 N., R. 65 W.

## HORIZONTAL ALIGNMENT DATA - SURVEY LINE

TYPE/POINT NO.	STATION		NORTHING	EASTING
PI/20	0+00	TL= 708.33' N 89°44'36" W	9586.268	9092.547
PI/3	7+08.33	TL= 291.67' S 89°48'50" E	9587.938	9800.871
PI/15	10+00		9586.702	9692.547

The Coordinates shown on this sheet are based on South Dakota State Plane Coordinate System, North Zone (NAD 83/96) SF=0.99987869

Owners: Christan N. Heim & Meggin M. Heim  
 37951 218th Street  
 Wessington Springs, So.Dak. 57382  
 Tel. No. (605) 849-3298

N.E. 1/4 Sec. 25, T. 109 N., R. 65 W.

# PROJECT PROFILE VIEW

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	11	26

SCALES:  
 HORIZONTAL 1 INCH = 100 FEET  
 VERTICAL 1 INCH = 10 FEET



Begin Work 4+00      End Work 6+00

Exc.	27	Emb.	176
Topsoil	35	+35%	61
Borrow	355	Topsoil	27
	417	+30%	8
Haul	2085 C.Y.Sta's.		417

P.I. 4+50  
El. 1413.70

P.I. 5+50  
El. 1414.70

1420

1420

D.H.W. Elev. 1412.4  
(10 yr.) 340 cfs

Q<sub>0T</sub> = Q<sub>22</sub> 600 cfs Elev. 1413.8

Q<sub>100</sub> = 1330 cfs Elev. 1414.8

Existing Roadway C. Profile

1410

1410

1.000%

Proposed Subgrade Profile

Proposed RCBC Opening

1400

1400

Box FL Elev. 1405.9 @ C  
(Countersunk 1 ft. Below Creek FL)

### HYDRAULIC DATA

Flow	Elevation
Q <sub>d</sub> = 340 cfs	1412.4
Q <sub>100</sub> = 1330 cfs	1414.8
Q <sub>0T</sub> = Q <sub>22</sub> = 600 cfs	1413.8

BM#1 Elev. 1411.03  
Rebar & Gd.Stake 51.3' Lt. 2+78

Proposed Subgrade  
C. Elevation

BM#2 Elev. 1417.90  
Rebar & Gd.Stake 110.4' Lt. 7+08

1413.70

1414.20

1414.70

-3

-2

-1

0

1

2

3

4

+50

5

+50

6

7

8

9

10

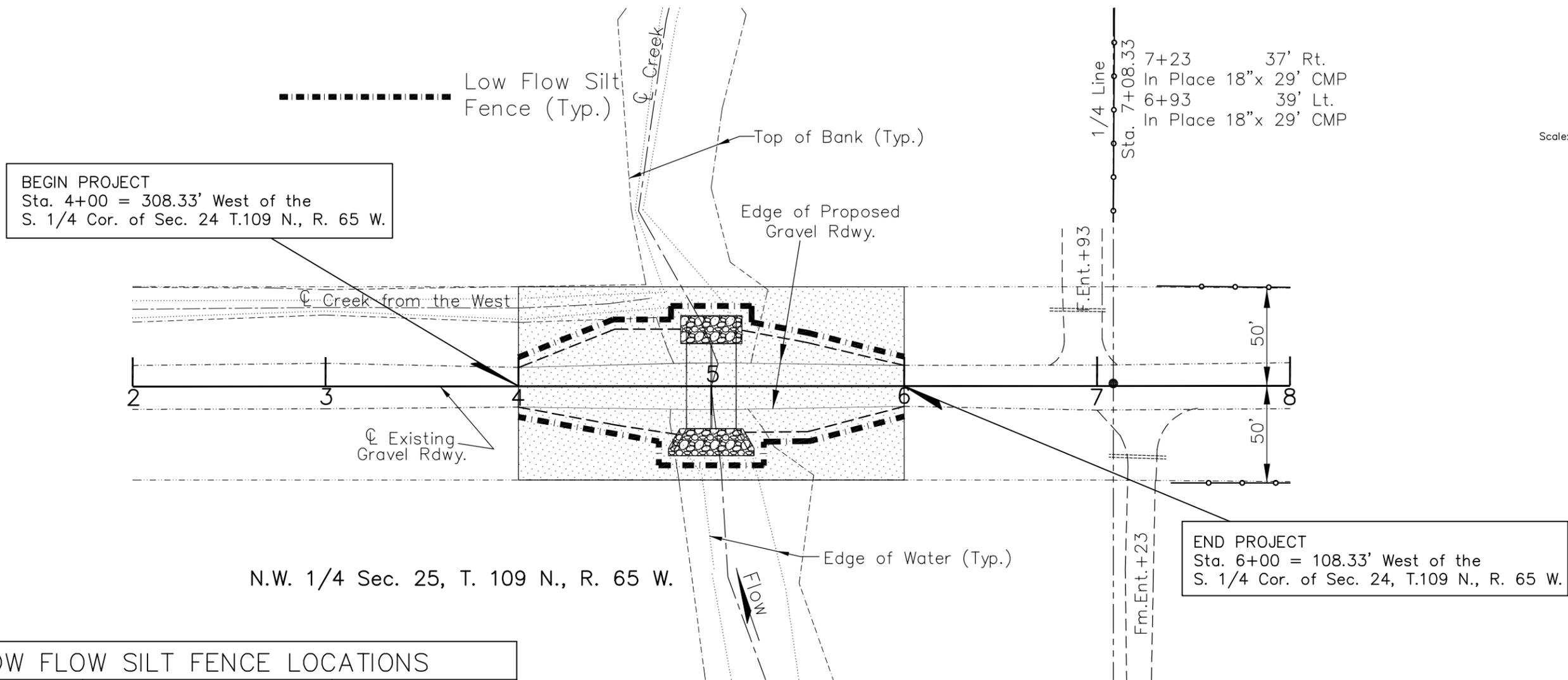
# EROSION CONTROL

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	12	26

S.W. 1/4 Sec. 24, T. 109 N., R. 65 W.

S.E. 1/4 Sec. 24 T. 109 N., R. 65 W.

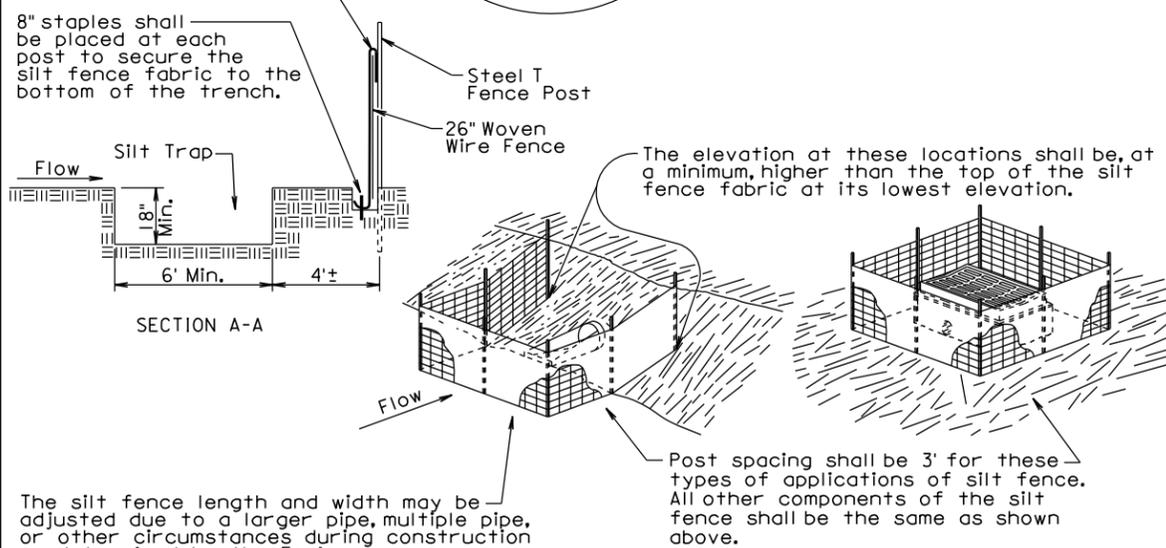
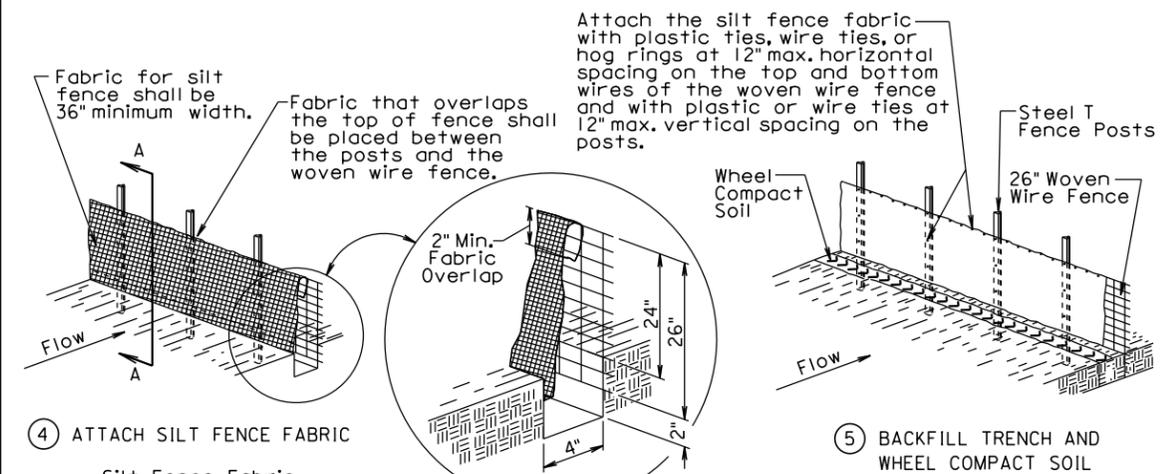
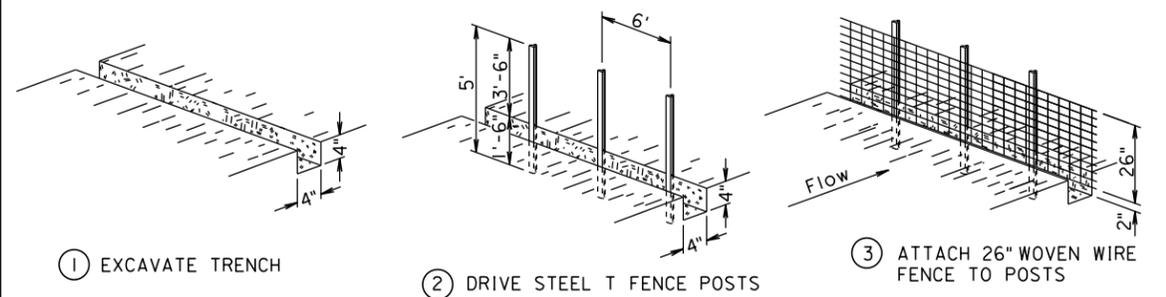


LOW FLOW SILT FENCE LOCATIONS		
Station	Description	Quantity (FT.)
4+00-16' to 4+73-28'-41' to 5+27-41'-29' to 5+50-29' to 6+00-16' Rt.	At bottom of fill south of roadway and along south of riprap	227
4+00-15' to 4+50-35' to 4+79-35'-42' to 5+21-42' - 33' to 6+00-15' Lt.	At bottom of fill north of roadway and along north of riprap	221
As directed by the Engineer		50
Total		498



**FOR BIDDING PURPOSES ONLY**

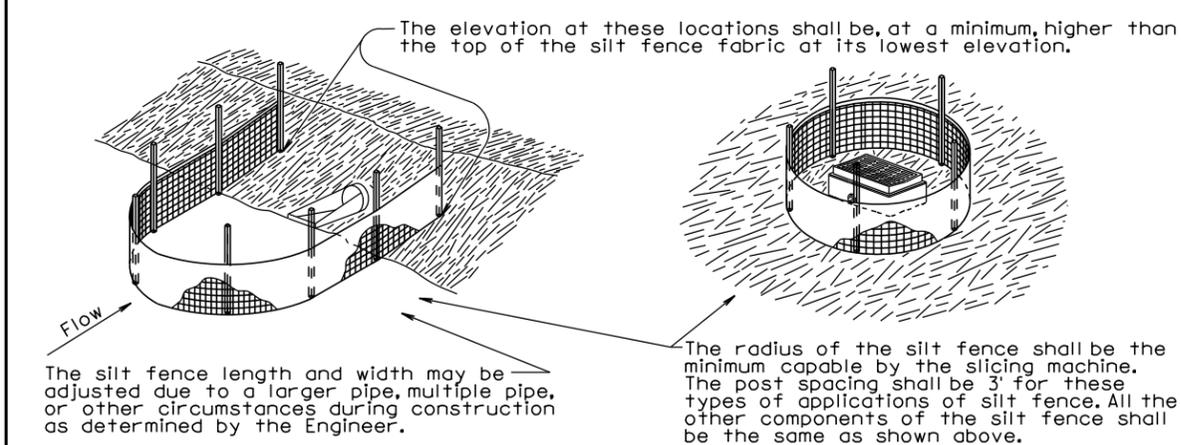
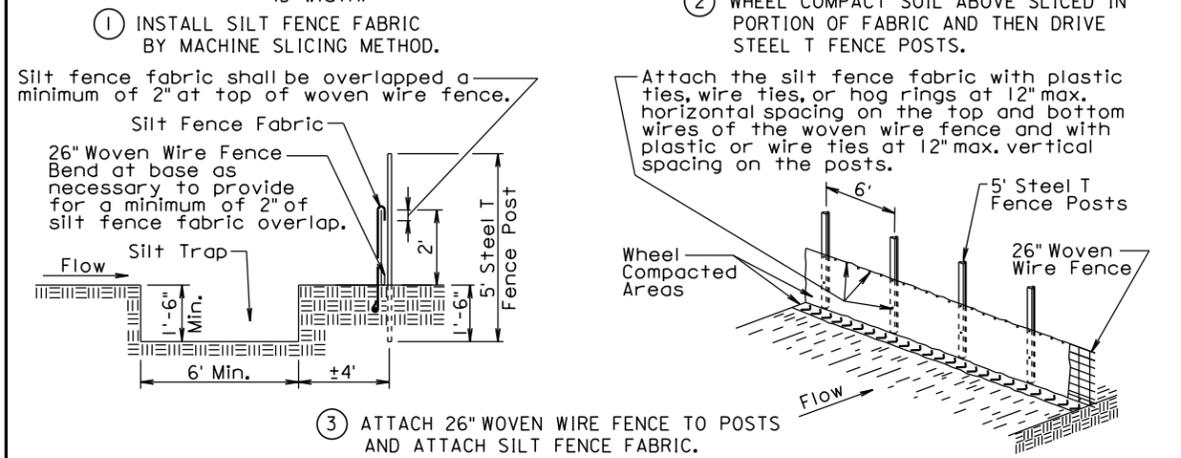
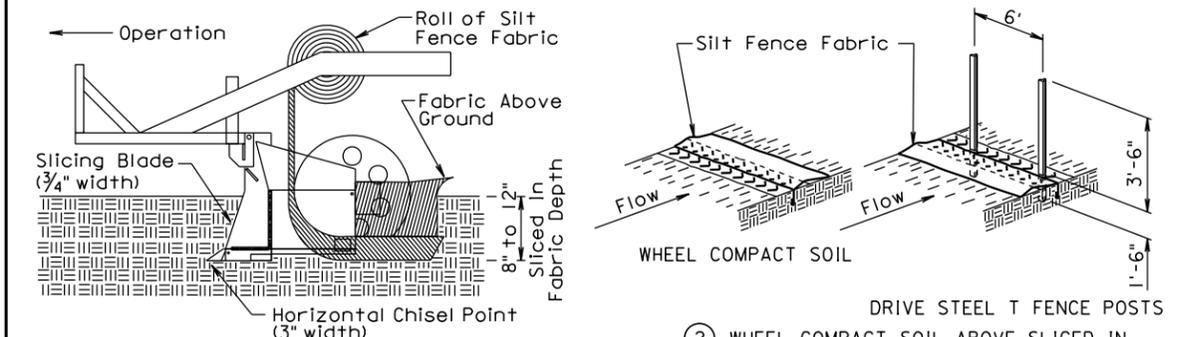
**MANUAL LOW FLOW SILT FENCE INSTALLATION**



December 23, 2003

<b>S D D O T</b>	<b>LOW FLOW SILT FENCE AND SILT TRAP</b>	PLATE NUMBER <b>734.04</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 2

**MACHINE SLICED LOW FLOW SILT FENCE INSTALLATION**



**GENERAL NOTES:**

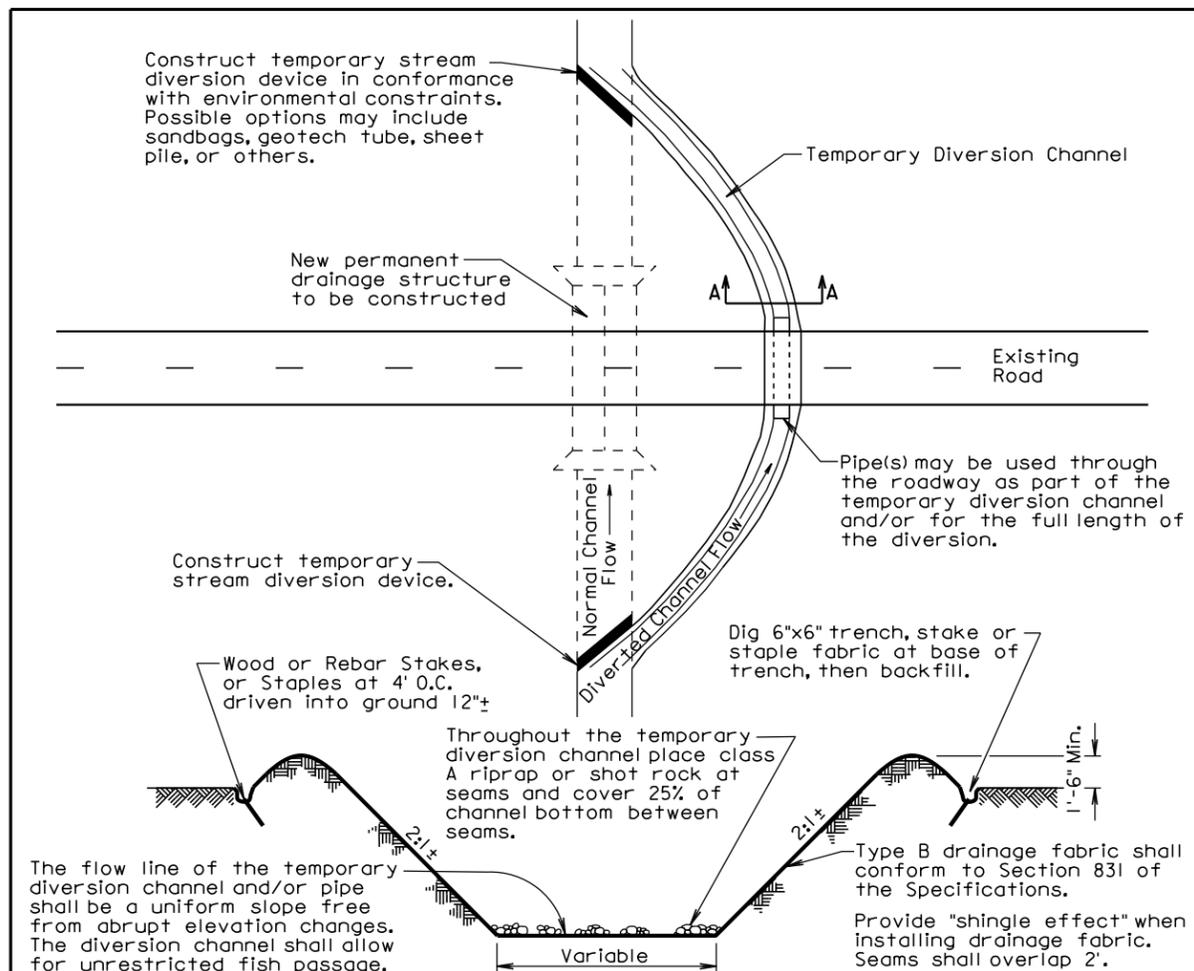
A silt trap shall be provided when specified by a plan note. All costs for constructing the silt trap shall be incidental to the contract unit price per cubic yard for "Silt Trap".

If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen material (such as rock), then a row of 30 to 40 pound sandbags butted end to end shall be provided on top of the extra length of silt fence fabric to prevent underflow.

December 23, 2003

<b>S D D O T</b>	<b>LOW FLOW SILT FENCE AND SILT TRAP</b>	PLATE NUMBER <b>734.04</b>
	Published Date: 3rd Qtr. 2016	Sheet 2 of 2

FOR BIDDING PURPOSES ONLY



SECTION A-A  
TEMPORARY DIVERSION CHANNEL

GENERAL NOTES:

A temporary diversion channel and/or pipe(s) shall be used to divert stream or drainage away from a construction area to provide a dry work area for construction. The diversion of streams and waterways is intended to protect the streams and waterways from various construction contaminants and sediment. Disturbing the existing stream channel and riparian zone should be minimized. Equipment shall not cross through the stream outside of the work area.

Sizing of the temporary diversion channel and/or pipe(s) shall be the Contractor's responsibility.

The method and materials used to construct the stream diversion device shall be the Contractor's responsibility, however, earthen berms are not acceptable since their removal causes siltation problems.

The Contractor shall restore the original channel bottom to its original condition prior to returning any flows. Upon completion of the new permanent drainage structure, the temporary stream diversion block or device shall be removed in a manner that will not cause violation of water quality standards. The temporary diversion channel shall then be backfilled and any pipe(s) (if used) shall be removed. The entire work area shall be cleaned and restored to smooth/even contours.

All costs for labor, equipment, materials and incidentals as indicated on this sheet to complete a satisfactory Temporary Diversion Channel and/or Pipe(s) shall be incidental to the contract unit price per each for "Temporary Diversion Channel and/or Pipe(s)". "Temporary Diversion Channel and/or Pipe(s)" will be paid for once per structure site regardless of the number of times water is diverted at the individual site.

June 26, 2015

<b>S D D O T</b>	<b>TEMPORARY DIVERSION CHANNEL</b>	PLATE NUMBER <b>734.30</b>
	Published Date: 3rd Qtr. 2016	Sheet 1 of 1

**STORM WATER POLLUTION PREVENTION PLAN CHECKLIST**

(The numbers right of the title headings are **reference numbers** to the GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES)

**FOR BIDDING PURPOSES ONLY**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	BRO 8003(23)	15	26

**SITE DESCRIPTION (4.2 1)**

- **Project Limits: See Title Sheet (4.2 1.b)**
- **Project Description: See Title Sheet (4.2 1.a.)**
- **Site Map(s): See Title Sheet and Plans (4.2 1.f. (1)-(6))**
- **Major Soil Disturbing Activities** (check all that apply)
  - Clearing and grubbing
  - Excavation/borrow
  - Grading and shaping
  - Filling
  - Cutting and filling
  - Other (describe):
- **Total Project Area** 0.37 acres **(4.2 1.b.)**
- **Total Area To Be Disturbed** 0.27 acres **(4.2 1.b.)**
- **Existing Vegetative Cover (%)** 65
- **Soil Properties:** AASHTO Soil Classification A4 to A7 **(4.2 1. d.)**
- **Name of Receiving Water Body/Bodies** creek - unnamed **(4.2 1.e.)**

**ORDER OF CONSTRUCTION ACTIVITIES (4.2 1.c.)**

(Stabilization measures shall be initiated as soon as possible, but in no case later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Initiation of final or temporary stabilization may exceed the 14-day limit if earth disturbing activities will be resumed within 21 days.)

- **Install perimeter protection where runoff sheets from the site.**
- **Install channel and ditch bottom protection.**
- **Remove and store topsoil.**
- **Stabilize disturbed areas.**
- **Complete final grading.**
- **Complete traffic control installation and protection devices.**
- **Reseed areas disturbed by removal activities.**

**EROSION AND SEDIMENT CONTROLS (4.2 2.a.(1)(a)-(f))**

(Check all that apply)

- **Stabilization Practices (See Detail Plan Sheets)**
  - Temporary Seeding (Cover Crop Seeding)
  - Permanent Seeding
  - Sodding
  - Planting (Woody Vegetation for Soil Stabilization)
  - Mulching (Grass Hay or Straw)
  - Hydraulic Mulch (Wood Fiber Mulch)
  - Soil Stabilizer
  - Bonded Fiber Matrix
  - Erosion Control Blankets or Mats
  - Vegetation Buffer Strips
  - Roughened Surface (e.g. tracking)
  - Dust Control (See Section F – Surfacing Plans)
  - Other:
- **Structural Temporary Erosion and Sediment Controls**
  - Silt Fence
  - Floating Silt Curtain
  - Straw Bale Check
  - Temporary Berm
  - Temporary Slope Drain
  - Straw Wattles or Rolls
  - Turf Reinforcement Mat
  - Rip Rap
  - Gabions

- Rock Check Dams
- Sediment Traps/Basins
- Inlet Protection
- Outlet Protection
- Surface Inlet Protection (Area Drain)
- Curb Inlet Protection
- Stabilized Construction Entrances
- Entrance/Exit Equipment Tire Wash
- Interceptor Ditch
- Concrete Washout Facility
- Temporary Diversion Channel
- Work Platform
- Temporary Water Barrier
- Temporary Water Crossing
- Other:

➤ **Wetland Avoidance**

Will construction and/or erosion and sediment controls impinge on regulated wetlands? Yes  No  If yes, the structural and erosion and sediment controls have been included in the total project wetland impacts and have been included in the 404 permit process with the USACE.

➤ **Storm Water Management (4.2 2.b., (1) and (2))**

Storm water management will be handled by temporary controls outlined in "EROSION AND SEDIMENT CONTROLS" above, and any permanent controls needed to meet permanent storm water management needs in the post construction period. Permanent controls will be shown on the plans and noted as permanent.

➤ **Other Storm Water Controls (4.2 2.c., (1) and (2))**▪ **Waste Disposal**

All liquid waste materials will be collected and stored in sealed metal containers approved by the project engineer. All trash and construction debris from the site will be deposited in the approved containers. Containers will be serviced as necessary, and the trash will be hauled to an approved disposal site or licensed landfill. All onsite personnel will be instructed in the proper procedures for waste disposal, and notices stating proper practices will be posted in the field office. The general Contractor's representative responsible for the conduct of work on the site will be responsible for seeing waste disposal procedures are followed.

▪ **Hazardous Waste**

All hazardous waste materials will be disposed of in a manner specified by local or state regulations or by the manufacturer. Site personnel will be instructed in these practices, and the individual designated as the Contractor's on-site representative will be responsible for seeing that these practices are followed.

▪ **Sanitary Waste**

Portable sanitary facilities will be provided on all construction sites. Sanitary waste will be collected from the portable units in a timely manner by a licensed waste management Contractor or as required by any local regulations.

**MAINTENANCE AND INSPECTION (4.2 3. and 4.2 4.)**➤ **Maintenance and Inspection Practices**

- Inspections will be conducted at least one time per week and after a storm event of 0.50 inches or greater.
- All controls will be maintained in good working order. Necessary repairs will be initiated within 24 hours of the site inspection report.
- Silt fence will be inspected for depth of sediment and for tears in order to ensure the fabric is securely attached to the posts and that the posts are well anchored. Sediment buildup will be

removed from the silt fence when it reaches 1/3 of the height of the silt fence.

- Sediment basins and traps will be checked. Sediment will be removed when depth reaches approximately 50 percent of the structure's capacity, and at the conclusion of the construction.
- Check dams will be inspected for stability. Sediment will be removed when depth reaches 1/2 the height of the dam.
- All seeded areas will be checked for bare spots, washouts, and vigorous growth free of significant weed infestations.
- Inspection and maintenance reports will be prepared on form DOT 298 for each site inspection, this form will also be used to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents.
- The SDDOT Project Engineer and Contractor's Erosion Control Supervisor are responsible for inspections. Maintenance, repair activities are the responsibility of the Contractor. The SDDOT Project Engineer will complete the inspection and maintenance reports and distribute copies per the distribution instructions on DOT 298.

**NON-STORM WATER DISCHARGES (3.0)**

The following non-storm water discharges are anticipated during the course of this project (check all that apply).

- Discharges from water line flushing.
- Pavement wash-water, where no spills or leaks of toxic or hazardous materials have occurred.
- Uncontaminated ground water associated with dewatering activities.

**MATERIALS INVENTORY (4.2. 2.c.(2))**

The following materials or substances are expected to be present on the site during the construction period. These materials will be handled as noted under the headings "EROSION AND SEDIMENT CONTROLS" and "SPILL PREVENTION" (check all that apply).

- Concrete and Portland Cement
- Detergents
- Paints
- Metals
- Bituminous Materials
- Petroleum Based Products
- Cleaning Solvents
- Wood
- Cure
- Texture
- Chemical Fertilizers
- Other:

**SPILL PREVENTION (4.2 2.c.(2))**

➤ **Material Management**

▪ Housekeeping

- Only needed products will be stored on-site by the Contractor.
- Except for bulk materials the contractor will store all materials under cover and in appropriate containers.
- Products must be stored in original containers and labeled.
- Material mixing will be conducted in accordance with the manufacturer's recommendations.
- When possible, all products will be completely used before properly disposing of the container off-site.
- The manufacturer's directions for disposal of materials and containers will be followed.
- The Contractor's site superintendent will inspect materials storage areas regularly to ensure proper use and disposal.
- Dust generated will be controlled in an environmentally safe manner.
- Vegetation areas not essential to the construction project will be preserved and maintained as noted on the plans.

▪ Hazardous Materials

- Products will be kept in original containers unless the container is not resealable.
- Original labels and material safety data sheets will be retained in a safe place to relay important product information.
- If surplus product must be disposed of, manufacturer's label directions for disposal will be followed.
- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
- Wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any storm water system or storm water treatment system.
- Potential pH-modifying materials such as: bulk cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, residuals from concrete saw cutting (either wet or dry), and mixer washout waters will be collected on site and managed to prevent contamination of storm water runoff.

➤ **Product Specific Practices (6.8)**

▪ Petroleum Products

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

▪ Fertilizers

Fertilizers will be applied only in the amounts specified by the SDDOT. Once applied, fertilizers will be worked into the soil to limit the exposure to storm water. Fertilizers will be stored in an enclosed area. The contents of partially used fertilizer bags will be transferred to sealable containers to avoid spills.

▪ Paints

All containers will be tightly sealed and stored when not required for use. The excess will be disposed of according to the

manufacturer's instructions and any applicable state and local regulations.

▪ Concrete Trucks

Contractors will provide designated truck washout facilities on the site. These areas must be self-contained and not connected to any storm water outlet of the site. Upon completion of construction, the area at the washout facility will be properly stabilized.

➤ **Spill Control Practices (4.2 2 c.(2))**

In addition to the previous housekeeping and management practices, the following practices will be followed for spill prevention and cleanup if needed.

- For all hazardous materials stored on site, the manufacturer's recommended methods for spill cleanup will be clearly posted. Site personnel will be made aware of the procedures and the locations of the information and cleanup supplies.
- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for cleanup purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- After a spill a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator. The Contractor is responsible for ensuring that the site superintendent has had appropriate training for hazardous materials handling, spill management, and cleanup.

➤ **Spill Response (4.2 2 c.(2))**

The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into storm water runoff and conveyance systems. If the release has impacted on-site storm water, it is critical to contain the released materials on-site and prevent their release into receiving waters. If a spill of pollutants threatens storm water or surface water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants.

- The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
- If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
- Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
- If oil sheen is observed on surface water (e.g. settling ponds, detention ponds, swales), action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.

- If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to SD DENR.
- Personnel with primary responsibility for spill response and clean up will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

**SPILL NOTIFICATION**

In the event of a spill, the Contractor's site superintendent will make the appropriate notification(s), consistent with the following procedures:

- A release or spill of a regulated substance (includes petroleum and petroleum products) must be reported to DENR immediately **if any one of the following** conditions exists:
  - The discharge threatens or is in a position to threaten the waters of the state (surface water or ground water).
  - The discharge causes an immediate danger to human health or safety.
  - The discharge exceeds 25 gallons.
  - The discharge causes a sheen on surface water.
  - The discharge of any substance that exceeds the ground water quality standards of ARSD (Administrative Rules of South Dakota) chapter 74:51:01.
  - The discharge of any substance that exceeds the surface water quality standards of ARSD chapter 74:51:01.
  - The discharge of any substance that harms or threatens to harm wildlife or aquatic life.
  - The discharge of crude oil in field activities under SDCL (South Dakota Codified Laws) chapter 45-9 is greater than 1 barrel (42 gallons).

To report a release or spill, call DENR at 605-773-3296 during regular office hours (8 a.m. to 5 p.m. Central time). To report the release after hours, on weekends or holidays, call State Radio Communications at 605-773-3231. Reporting the release to DENR does not meet any obligation for reporting to other state, local, or federal agencies. Therefore, the responsible person must also contact local authorities to determine the local reporting requirements for releases. DENR recommends that spills also be reported to the National Response Center at (800) 424-8802.

**CONSTRUCTION CHANGES (4.4)**

When changes are made to the construction project that will require alterations in the temporary erosion controls of the site, the Storm Water Pollution Prevention Plan (SWPPP) will be amended to provide appropriate protection to disturbed areas, all storm water structures, and adjacent waters. The SDDOT Project Engineer will modify the SWPPP plan (DOT 298) and drawings to reflect the needed changes. Copies of changes will be routed per DOT 298. Copies of forms and the SWPPP will be retained in a designated place for review over the course of the project.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	BRO 8003(23)	17	26

**CERTIFICATIONS**

➤ **Certification of Compliance with Federal, State, and Local Regulations**

The Storm Water Pollution Prevention Plan (SWPPP) for this project reflects the requirements of all local municipal jurisdictions for storm water management and sediment and erosion control as established by ordinance, as well as other state and federal requirements for sediment and erosion control plans, permits, notices or documentation as appropriate.

➤ **South Dakota Department of Transportation**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Authorized Signature (See the General Permit, Section 6.9.1.C.)

➤ **Prime Contractor**

This section is to be executed by the General Contractor after the award of the contract. This section may be executed any time there is a change in the Prime Contractor of the project.

I certify under penalty of law that this document and all attachments will be revised or maintained under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Signature

**CONTACT INFORMATION**

➤ **Contractor Information:**

- Prime Contractor Name: \_\_\_\_\_
- Contractor Contact Name: \_\_\_\_\_
- Address: \_\_\_\_\_
- \_\_\_\_\_
- City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- Office Phone: \_\_\_\_\_ Field: \_\_\_\_\_
- Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

➤ **Erosion Control Supervisor**

- Name: \_\_\_\_\_
- Address: \_\_\_\_\_
- \_\_\_\_\_
- City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- Office Phone: \_\_\_\_\_ Field: \_\_\_\_\_
- Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

➤ **SDDOT Project Engineer**

- Name: \_\_\_\_\_
- Business Address: \_\_\_\_\_
- Job Office Location: \_\_\_\_\_
- City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- Office Phone: \_\_\_\_\_ Field: \_\_\_\_\_
- Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

➤ **SD DENR Contact Spill Reporting**

- Business Hours Monday-Friday (605) 773-3296
- Nights and Weekends (605) 773-3231

➤ **SD DENR Contact for Hazardous Materials.**

- (605) 773-3153

➤ **National Response Center Hotline**

- (800) 424-8802.

BM#1 Elev. 1411.03  
Rebar & Gd.Stake 51.3' Lt. 2+78

BM#2 Elev. 1417.90  
Rebar & Gd.Stake 110.4' Lt. 7+08

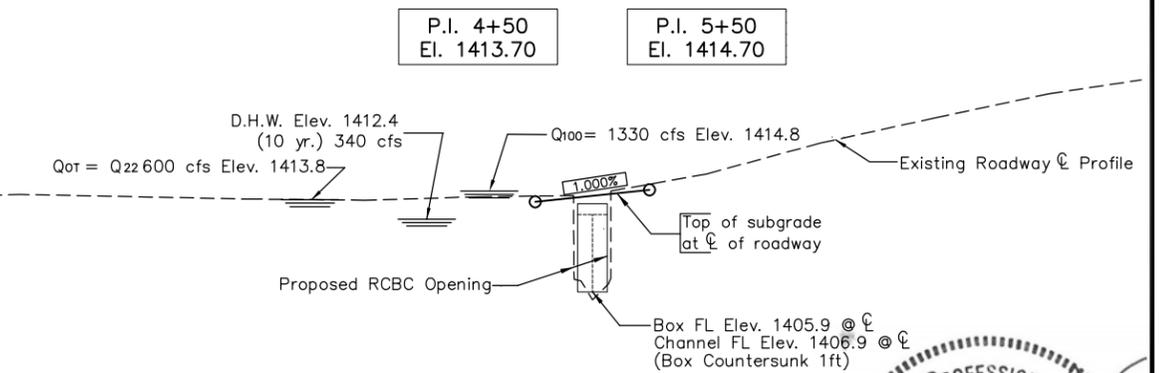
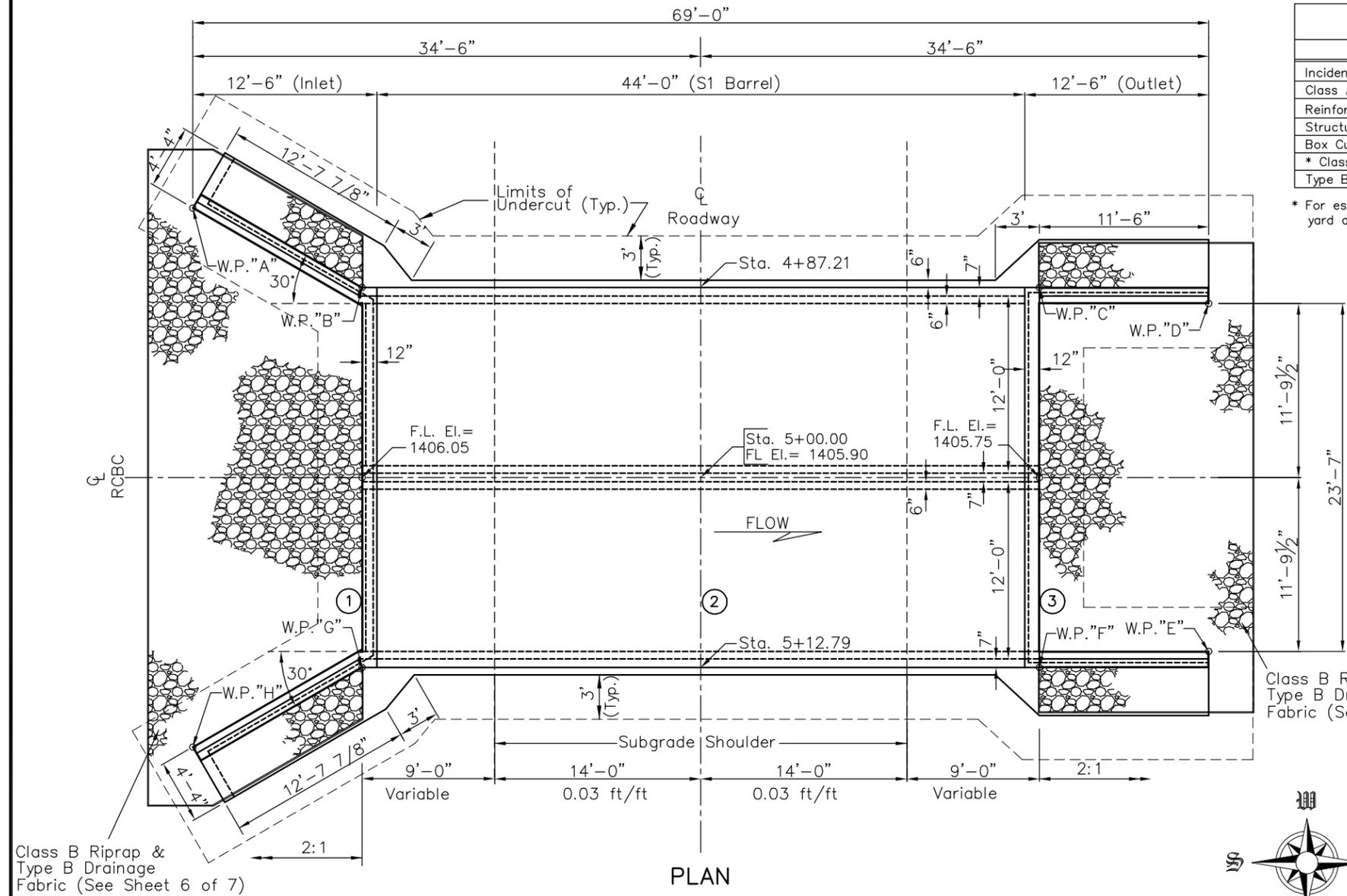
**FOR BIDDING PURPOSES ONLY**

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	18	26

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Incidental Work, Structure	LS	Lump Sum
Class A45 Concrete, Box Culvert	CuYd	123.0
Reinforcing Steel	Lb	22,904
Structure Excavation, Box Culvert	CuYd	59
Box Culvert Undercut	CuYd	185
* Class B Riprap	Tons	155.0
Type B Drainage Fabric	SqYd	225

\* For estimating purposes only, a factor of 1.4 tons per cubic yard as used to convert cubic yards to tons.

-X028-  
**INDEX OF CULVERT SHEETS**  
Sheet No. 1- General Drawing and Quantities  
Sheet No. 2- Notes and Undercut Details  
Sheet No. 3- Inlet Details  
Sheet No. 4- Outlet Details  
Sheet No. 5- S1 Barrel Section Details  
Sheet No. 6- Riprap Details  
Sheet No. 7- Standard Plate No. 460.02 and No. 620.16



HYDRAULIC DATA	
Qd	340 cfs
Ad	120 sq ft
Vd	2.8 fps
Qf	340 cfs
Q100	1330 cfs
QoTfr	600 cfs
Vmax	7.0 fps

\*Topeka Shiner Stream

Qd = design discharge for the proposed culvert based on 10 year frequency. El. 1412.4  
QOT fr = overtopping discharge and frequency 22 yr. recurrence interval, El. 1413.8±. Location west approach.  
Qf = designated peak discharge for the basin approaching proposed project based on 10 year frequency.  
Q100 = computed discharge for the basin approaching proposed project based on 100 year frequency, El. 1414.8.  
Vmax = maximum computed outlet velocity and frequency of 85 yr. for the proposed culvert.  
The hydraulic data contained in these plans is valid only if the overflow section is maintained. Alteration of the overflow section will require reanalysis of the hydraulics at this site to determine its effect on public safety.

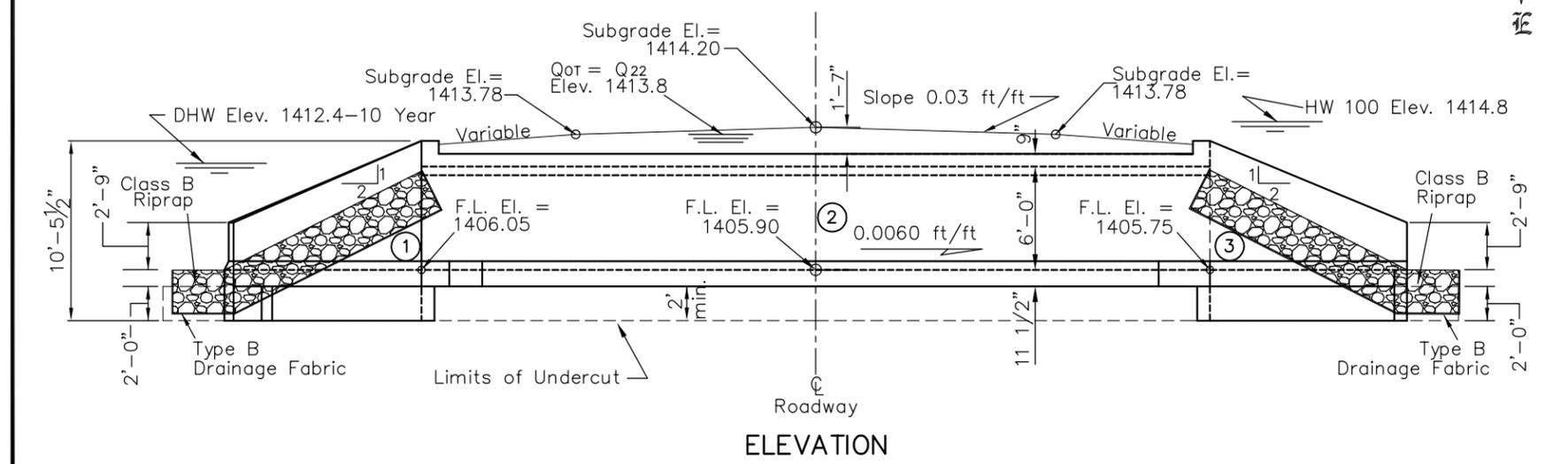


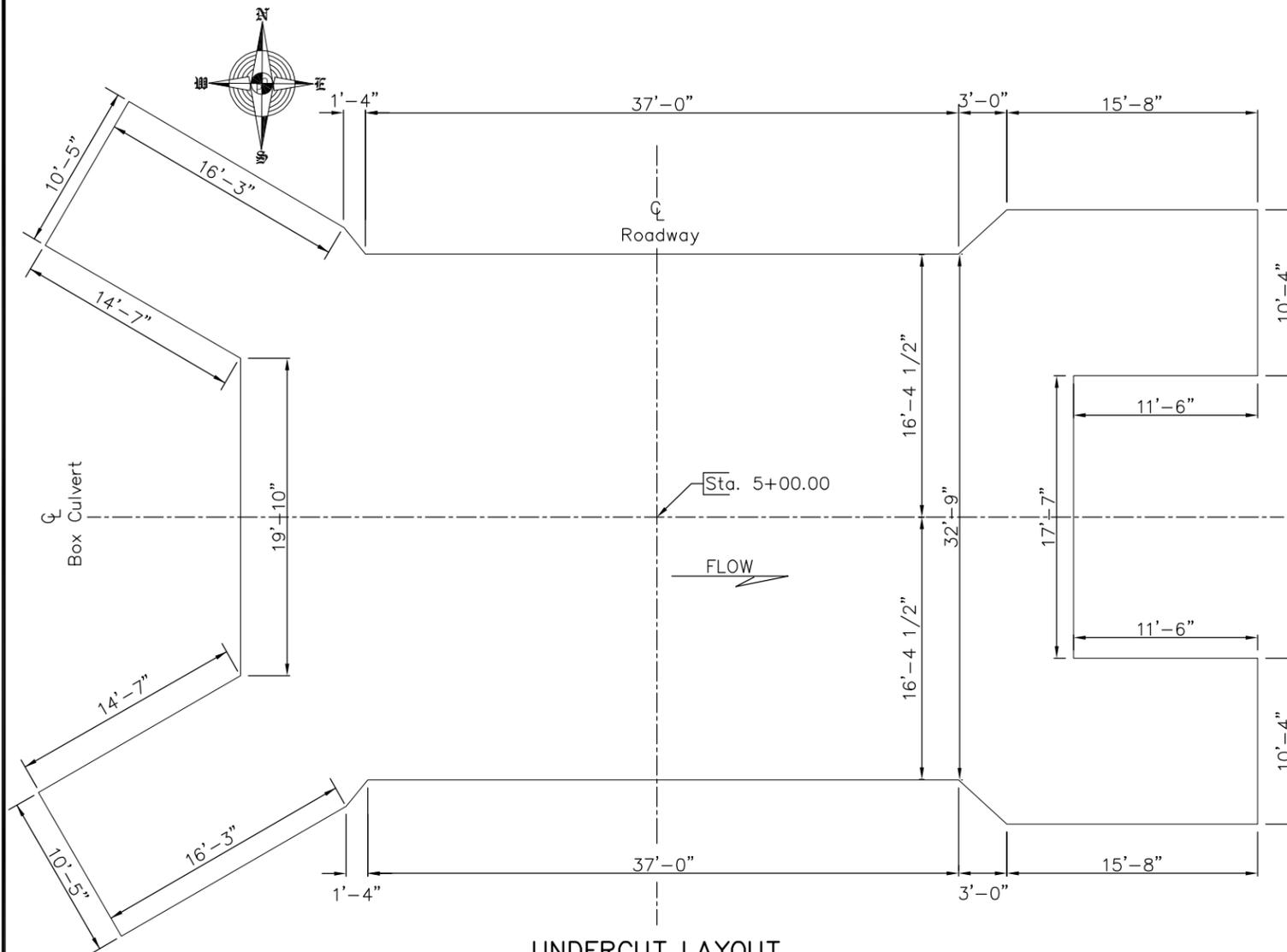
TABLE OF WORKING POINTS		
W.P.	STATION	OFFSET
A	4+81.74	34.50' Lt.
B	4+86.63	23.00' Lt.
C	4+86.63	23.00' Rt.
D	4+88.63	34.50' Rt.
E	5+11.79	34.50' Rt.
F	5+13.37	23.00' Rt.
G	5+13.37	23.00' Lt.
H	5+18.26	34.50' Lt.

GENERAL DRAWING & QUANTITIES  
FOR  
**2-12' X 6' REINFORCED CONCRETE BOX CULVERT**  
24'-0" ROADWAY SEC.24/25-T109N-R65W  
OVER CREEK 0° SKEW  
STA. 5+00 HL-93 LOADING  
BEADLE COUNTY BRO 8003(23) PCN 02T6  
STRUCTURE NO. 03-055-280  
PIERCE & HARRIS ENGINEERING CO. INC.  
15 MASONIC BLDG. HURON, S.D. 57350  
SEPTEMBER 2016 ① OF ⑦

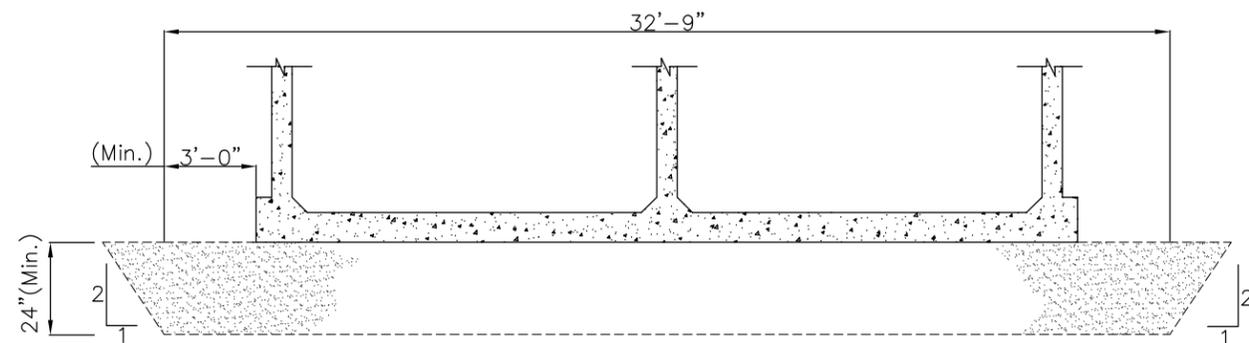
Note:  
Box culvert flow line has been depressed 1'-0" below channel flow line to accommodate aquatic organisms. The 1'-0" depression will be allowed to fill in naturally over time.

-X028-	DESIGNED BY JNK	DRAWN BY DAG/CAD	CHECKED BY RVH	APPROVED
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	19	26



UNDERCUT LAYOUT  
(Bottom Dimensions)



TYPICAL SECTION  
(For Limits of Undercut)

**SPECIFICATIONS:**

Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition, with 2015 Interim Revisions.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

**GENERAL NOTES**

- 1- Design Live Load: HL-93. No Construction loading in excess of Legal Load was considered.
- 2- The design of the barrel section is based on a minimum fill height of one (1) foot and includes all subsequent fill heights up to and including the maximum fill height of five (5) feet (S1).
- 3- Design Material Strengths: Concrete  $f'c = 4500$  psi  
Reinforcing Steel  $f_y = 60000$  psi
- 4- High sulfate levels are likely to be encountered on this project. All concrete shall be Class A45 conforming to section 460, with the following modifications: the type of cement shall be either type V or a type II with 20 to 25 percent Class F Modified Fly Ash substituted for cement in accordance with section 605.
- 5- All reinforcing steel shall conform to ASTM A615 Grade 60.
- 6- All exposed edges shall be chamfered 3/4".
- 7- Use 1" clear cover on all reinforcing steel except as shown.
- 8- The Contractor shall imprint on the structure the date of the Construction as specified and detailed on Standard Plate No. 460.02, which is shown on Sheet 7 of 7.
- 9- Care shall be taken to establish working points (W.P.) as shown on wings.
- 10- Circled numbers in PLAN and ELEVATION Views on Sheet 1 of 7 are Section I.D. Numbers (See SDDOT Materials Manual).
- 11- Compaction of earth embankment and box culvert backfill material shall be governed by the Ordinary Compaction method.

**INCIDENTAL WORK, STRUCTURE**

In place on the existing road is a 21'-8" wide roadway by 33'-0" steel stringer bridge with concrete deck, concrete abutments & concrete wings.

The Contractor shall remove and dispose of the in-place structure at a site obtained by the Contractor and approved of by the Engineer. The concrete abutments and any piling shall be removed to below the undercutting limits. All costs for removing and disposing of the in-place structure shall be incidental to the contract lump sum price for Incidental Work, Structure.

The foregoing is a general description of the in-place structure and the incidental work involved and should not be construed to be complete in all details. Before preparing a bid, it shall be the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of work and materials involved.

**NOTICE - LEAD BASED PAINT**

Be advised that the paint, if any, on the steel surfaces of the existing structure may be a paint containing lead. The Contractor should plan operations accordingly and inform his/her employees of the hazards of lead exposure.

**SUBSURFACE NOTES**

Subsurface soils below the existing flow line consist of approximately 2' of brown sandy silt-clay overlying brown to gray silt-sand. Classification results of soil samples collected from below flow line during the subsurface investigation were clay-sand to silt-sand.

It is anticipated that dewatering will be required to construct the box culvert. The Contractor will be responsible to verify groundwater location prior to construction and provide necessary means of dewatering the construction site and prevention of the inflow of additional water. The use of well points may be required in dewatering the site for construction.

**ESTIMATED QUANTITIES**

ITEM	UNIT	QUANTITY
<input checked="" type="checkbox"/> Undercutting - Box Culvert	Cu. Yd.	185

For payment quantity is based on plan shown undercut dimensions and will not be measured unless the engineer orders a change.

**NOTES AND UNDERCUT DETAILS FOR**

**2-12' X 6' REINFORCED CONCRETE BOX CULVERT**  
 24'-0" ROADWAY SEC.24/25-T109N-R65W  
 OVER CREEK 0° SKEW  
 STA. 5+00 HL-93 LOADING  
 BEADLE COUNTY BRO 8003(23) PCN 02T6  
 STRUCTURE NO. 03-055-280

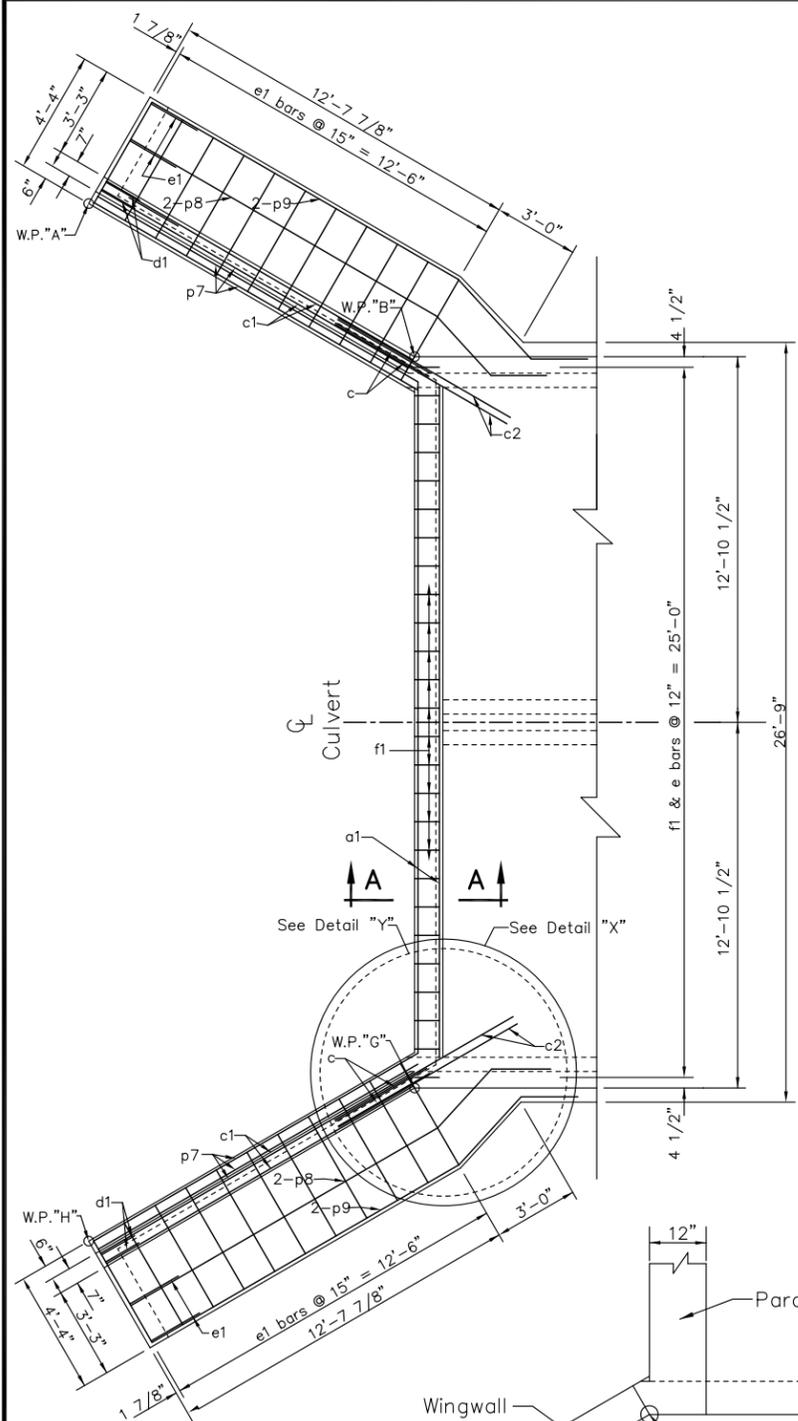
PIERCE & HARRIS ENGINEERING CO. INC.  
 15 MASONIC BLDG. HURON, S.D. 57350

SEPTEMBER 2016 ② OF ⑦

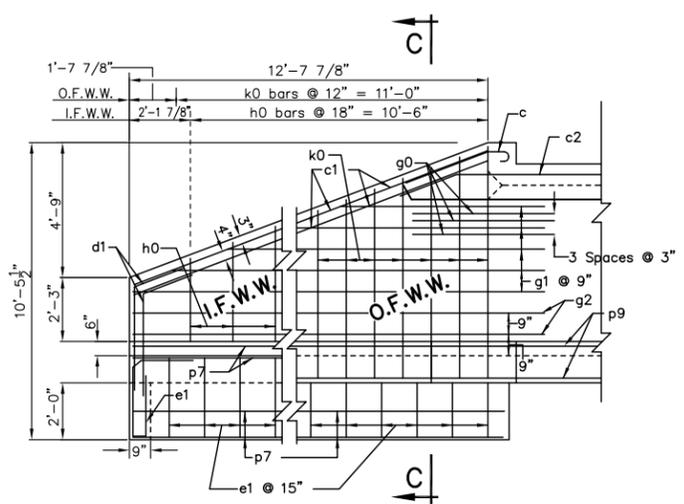


DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
JNK	JNK /CAD	RVH	

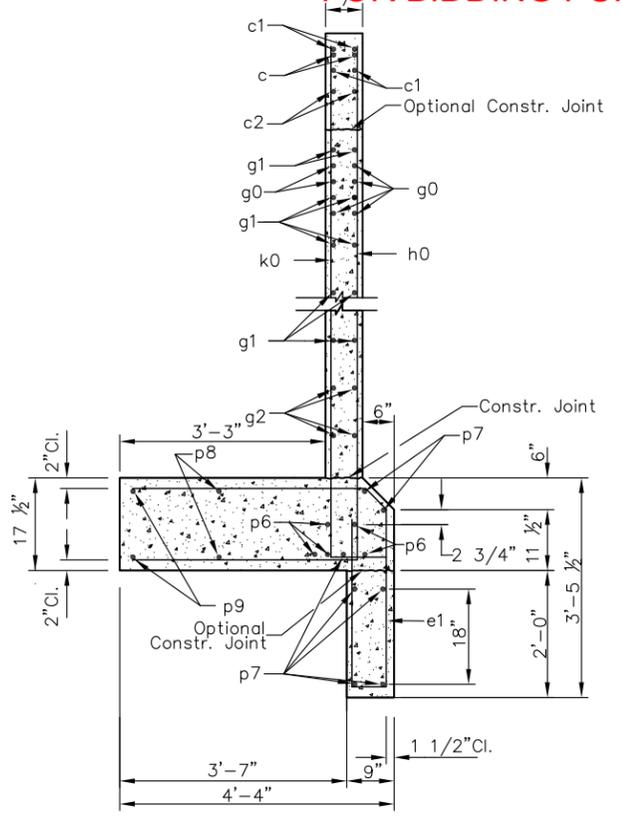
**FOR BIDDING PURPOSES ONLY**



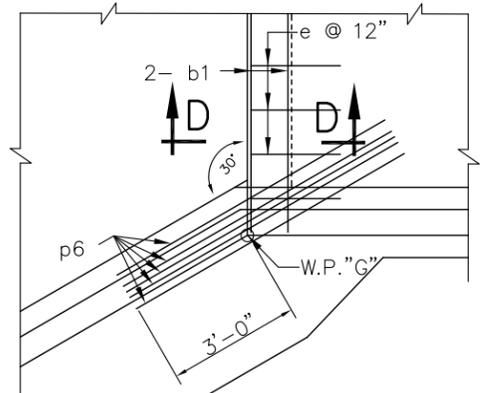
PLAN



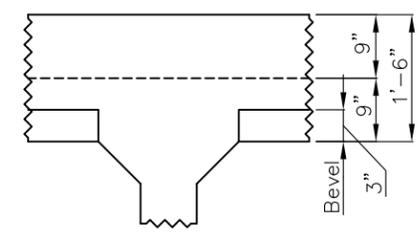
ELEVATION



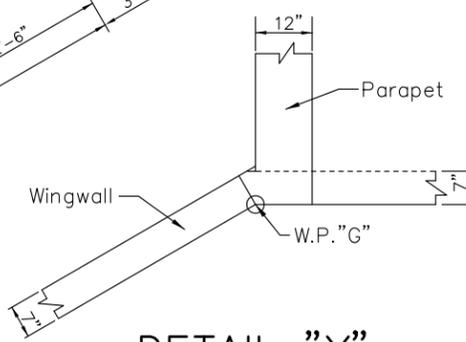
SEC. C-C



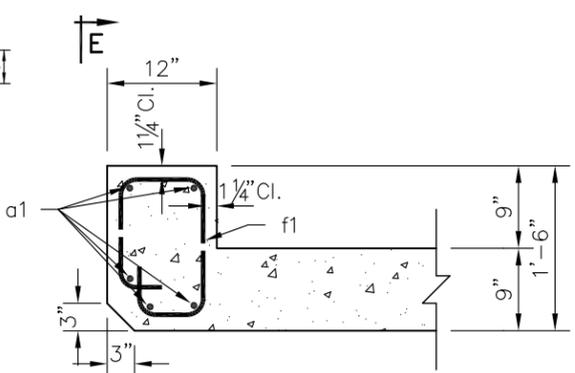
DETAIL "X"  
(At Bottom Slab)



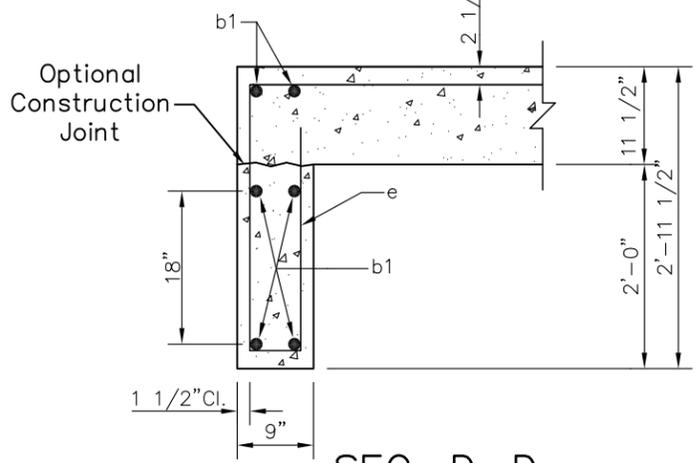
VIEW E-E  
(at interior wall)



DETAIL "Y"  
(Fillet Not Shown)



SEC. A-A  
(At Top Slab)



SEC. D-D

REINFORCING SCHEDULE				
Mk	No.	Size	Length	Type
a1	5	6	25'-6"	Str.
b1	6	6	23'-9"	Str.
c	4	5	4'-6"	1A
c1	8	5	13'-5"	Str.
c2	4	5	7'-0"	19B
d1	8	5	6'-9"	19B
e	26	4	7'-4"	S12
e1	26	4	10'-2"	S12A
f1	26	4	5'-6"	S6A
g0	12	5	5'-0"	19B
g1	10	4	22'-5"	19
g2	8	4	14'-7"	Str.
h0	8	4	19'-9"	17A
k0	12	5	14'-0"	17A
p6	10	6	7'-0"	Str.
p7	14	4	15'-2"	Str.
p8	4	4	17'-4"	Str.
p9	4	4	18'-4"	Str.

Bending Details		
Type 19B	Type S12	Type S12A
Type 17A	Type 19B	Type S6A
Type 19A	Type 19	

\* See cutting Diagram  
 ~ Bend in field as necessary to fit  
 All dimensions are out to out of bars.

ESTIMATED QUANTITIES			
Item	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
Unit	Cu Yd	Lb	Cu Yd
1-Inlet	15.1	1,935	9

LEGEND FOR PLACING RE-STEEL	
I.F.W.W.	— Inside Face of Wing Wall
O.F.W.W.	— Outside Face of Wing Wall

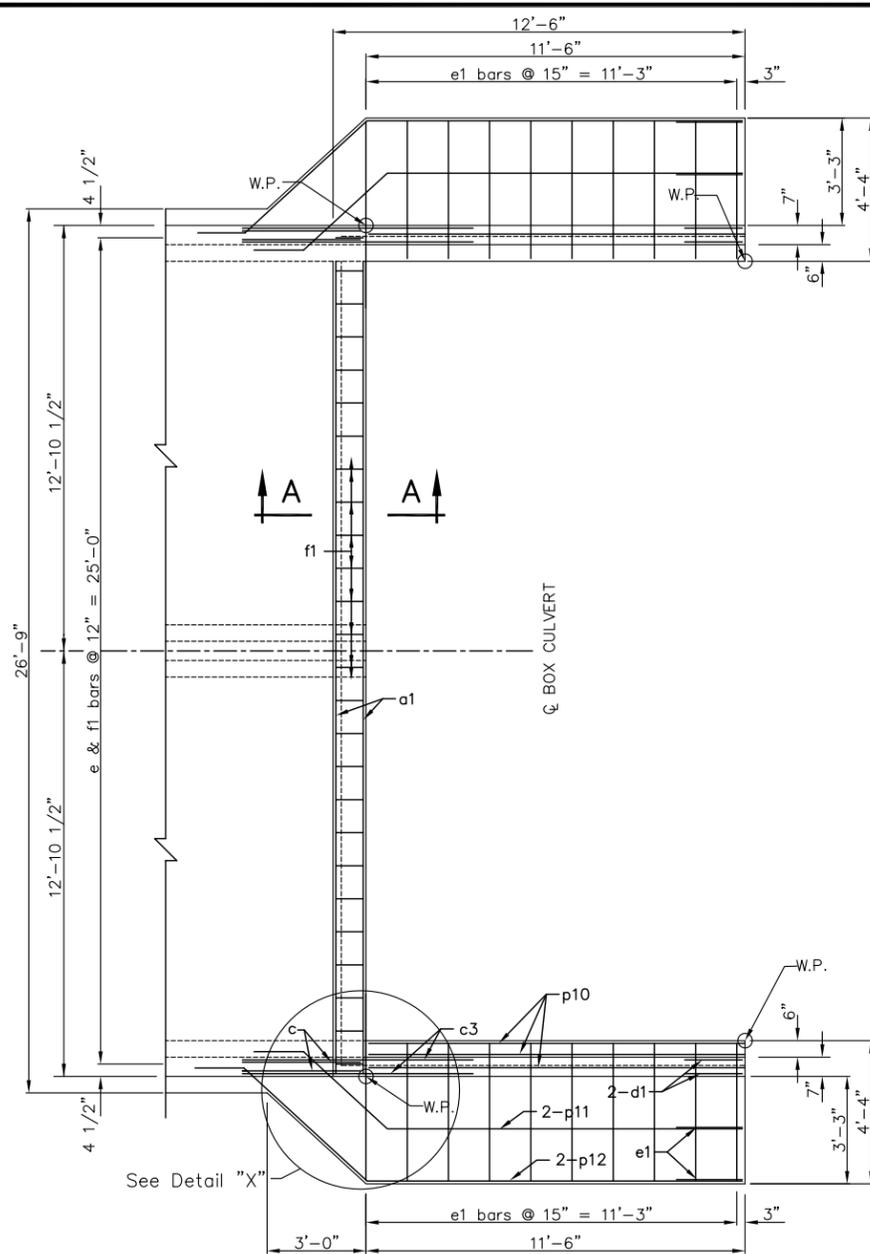
INLET DETAILS  
 FOR  
**2-12' X 6' REINFORCED CONCRETE BOX CULVERT**  
 24'-0" ROADWAY SEC.24/25-T109N-R65W  
 OVER CREEK 0° SKEW  
 STA. 5+00 HL-93 LOADING  
 BEADLE COUNTY BRO 8003(23) PCN 02T6  
 STRUCTURE NO. 03-055-280  
 PIERCE & HARRIS ENGINEERING CO. INC.  
 15 MASONIC BLDG. HURON, S.D. 57350  
 SEPTEMBER 2016 ③ OF ⑦



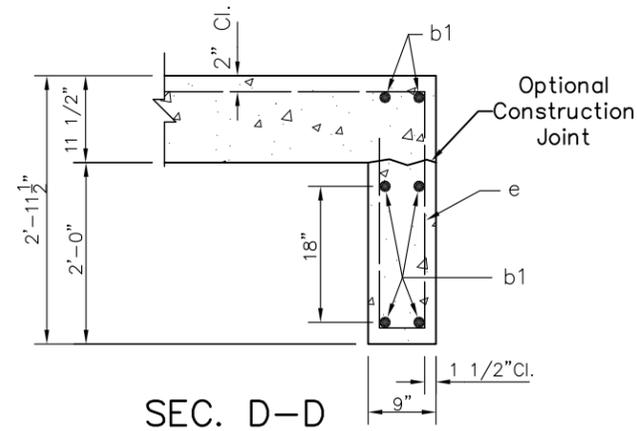
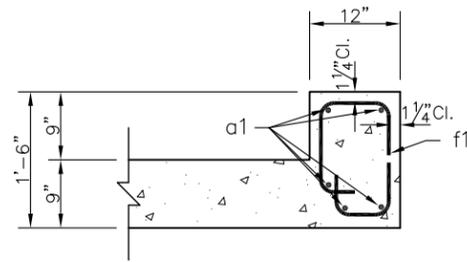
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
JNK	JNK /CAD	RVH	

FOR BIDDING PURPOSES ONLY

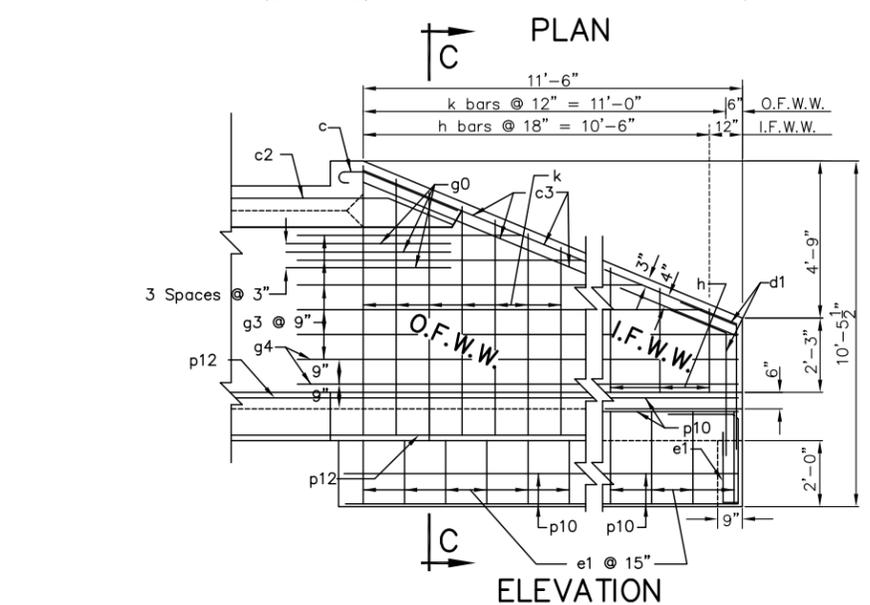
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	21	26



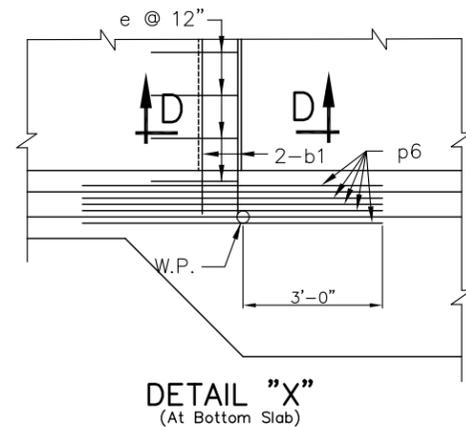
SEC. A-A  
(At Top Slab)



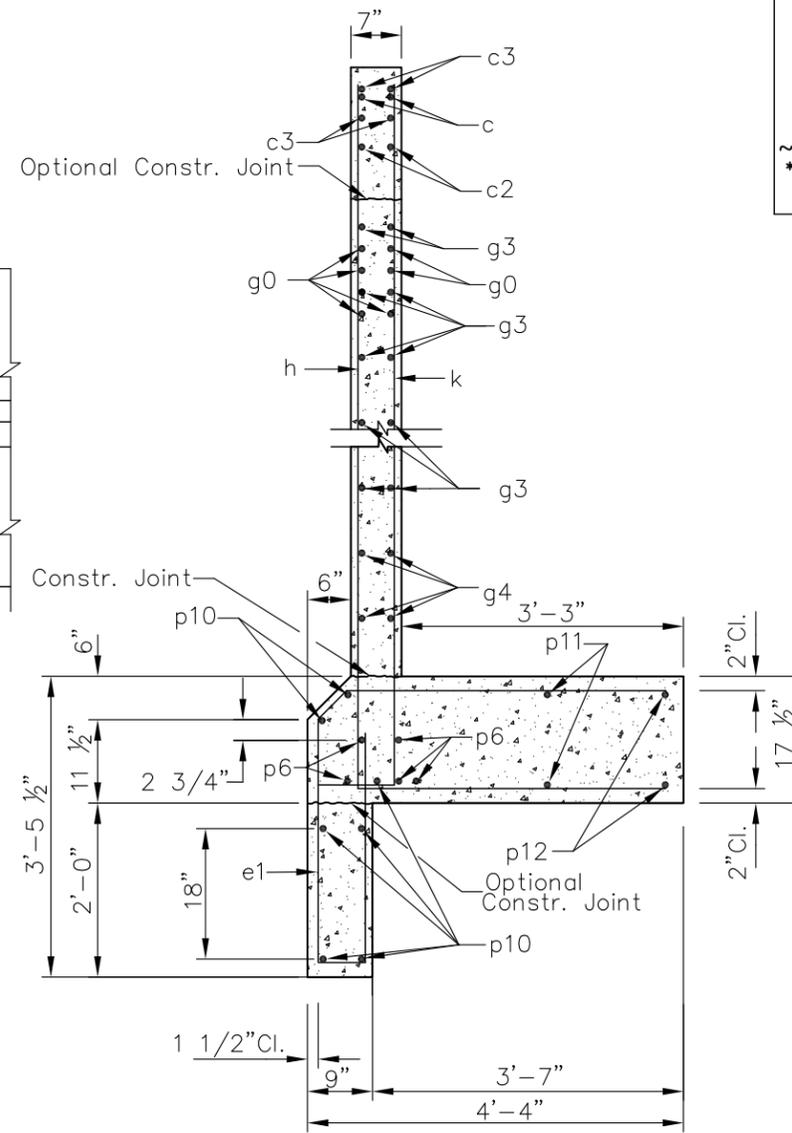
SEC. D-D



ELEVATION



DETAIL "X"  
(At Bottom Slab)



SEC. C-C

REINFORCING SCHEDULE				
Mk	No.	Size	Length	Type
a1	5	6	25'-6"	Str.
b1	6	6	23'-9"	Str.
c	4	5	4'-6"	1A
c2	4	5	7'-0"	19B
c3	8	5	12'-3"	Str.
d1	8	5	6'-9"	19B
e	26	4	7'-4"	S12
e1	24	4	10'-2"	S12A
f1	26	4	5'-6"	S6A
g0	12	5	5'-0"	Str.
g3	10	4	21'-0"	19
g4	8	4	13'-5"	Str.
h	8	4	19'-4"	17A
k	12	5	13'-7"	17A
p6	10	6	7'-0"	Str.
p10	14	4	14'-0"	Str.
p11	4	4	15'-9"	Str.
p12	4	4	17'-10"	Str.

Bending Details		
Type 19B	Type S12	Type S12A
Type 17A	Type 1A	Type S6A
Type 19		

~ See cutting Diagram  
\* Bend in field as necessary to fit  
All dimensions are out to out of bars.

ESTIMATED QUANTITIES			
Item	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
Unit	Cu Yd	Lb	Cu Yd
1-Inlet	14.3	1,872	8

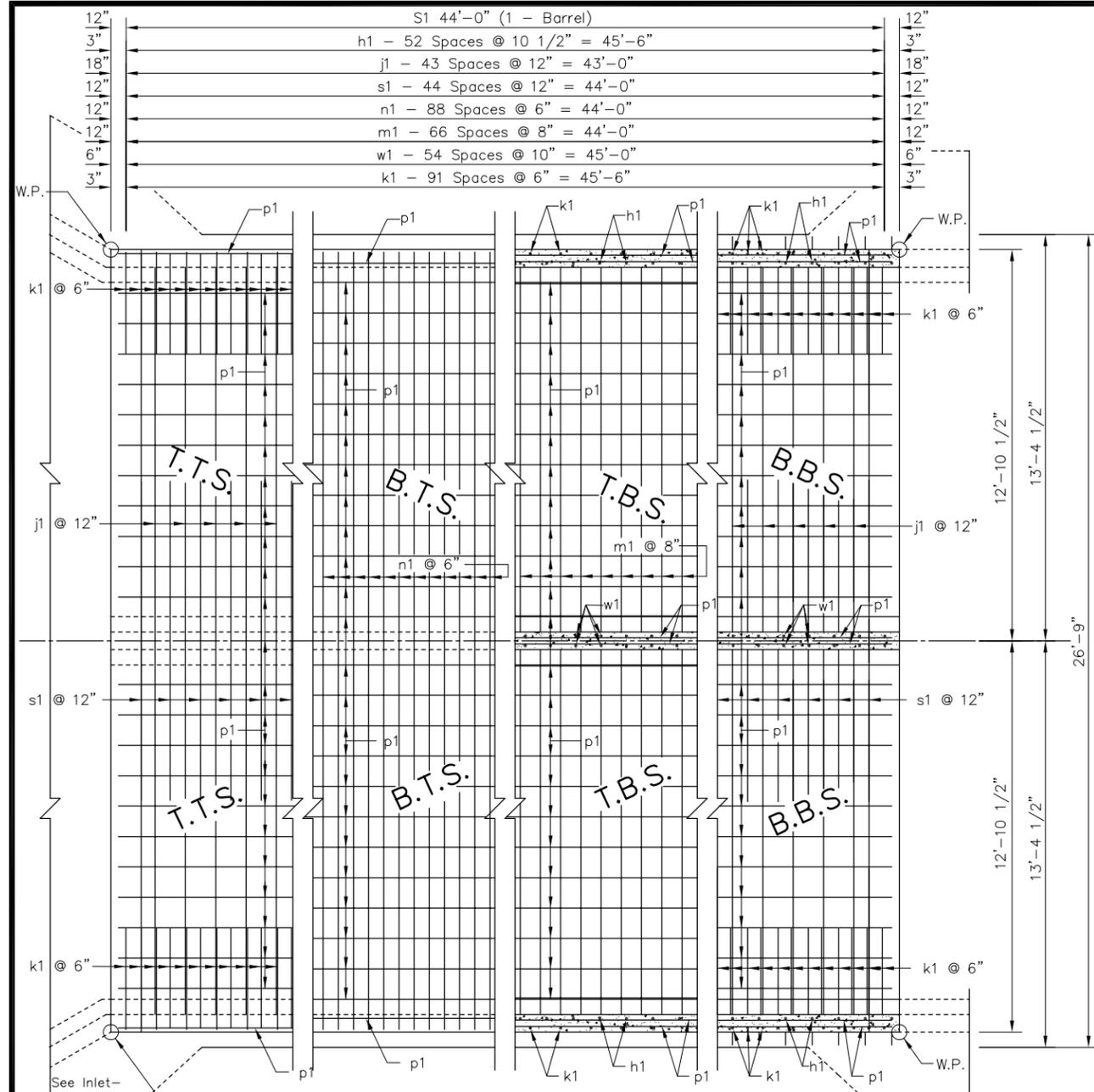
LEGEND FOR PLACING RE-STEEL	
I.F.W.W.	— Inside Face of Wing Wall
O.F.W.W.	— Outside Face of Wing Wall

OUTLET DETAILS FOR  
**2-12' X 6' REINFORCED CONCRETE BOX CULVERT**  
 24'-0" ROADWAY SEC.24/25-T109N-R65W  
 OVER CREEK 0° SKEW  
 STA. 5+00 HL-93 LOADING  
 BEADLE COUNTY BRO 8003(23) PCN 02T6  
 STRUCTURE NO. 03-055-280  
 PIERCE & HARRIS ENGINEERING CO. INC.  
 15 MASONIC BLDG. HURON, S.D. 57350  
 SEPTEMBER 2016 (4) OF (7)

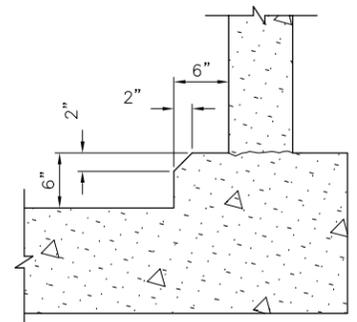


DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
JNK	JNK /CAD	RVH	

**FOR BIDDING PURPOSES ONLY**



PLAN



OPTIONAL FILLET DETAIL  
(At Bottom Slab)

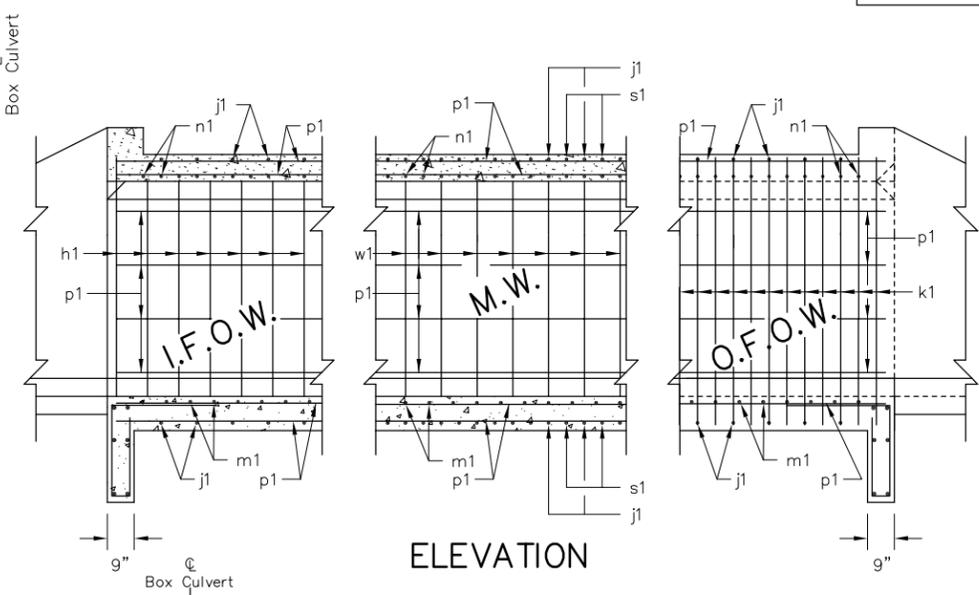
Note: Contractor may form the optional full fillet, with 2" chamfer, as detailed. The cost of the additional concrete shall be borne by the Contractor.

REINFORCING SCHEDULE				
Mk	No.	Size	Length	Type
h1	106	4	8'-2"	17A
j1	88	6	24'-9"	Str.
k1	184	6	14'-1 1/2"	17
m1	67	5	26'-7"	Str.
n1	89	6	25'-7"	Str.
p1	127	4	45'-6"	Str.
s1	90	6	9'-0"	Str.
w1	55	5	17'-3"	S11A

**Bending Details**

**NOTE-**  
All dimensions are out to out of bars. Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

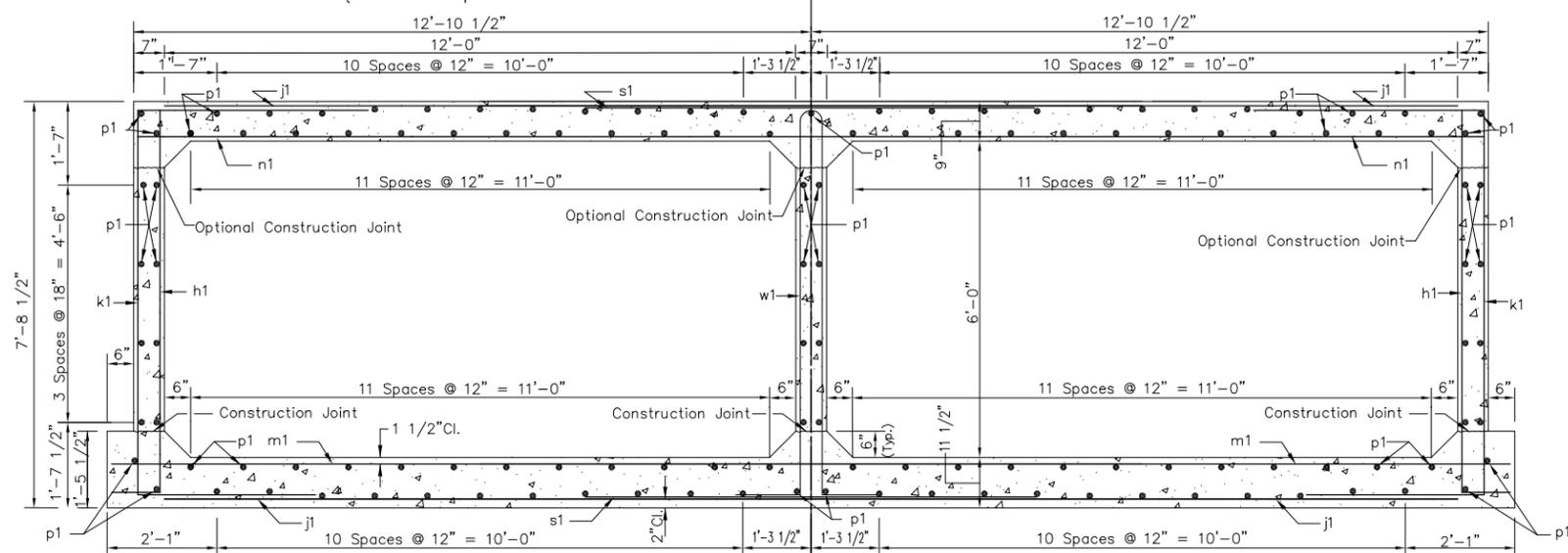
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel shall be borne by the Contractor.



ELEVATION

ESTIMATED QUANTITIES			
Item	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
Unit	Cu Yd	Lb	Cu Yd
S1 Barrel	93.6	19,097	43

LEGEND FOR PLACING RE-STEEL	
I.F.O.W.	Inside Face of Outside Wall
O.F.O.W.	Outside Face of Outside Wall
M.W.	Middle Wall
T.B.S.	Top of Bottom Slab
B.B.S.	Bottom of Bottom Slab
T.T.S.	Top of Top Slab
B.T.S.	Bottom of Top Slab



BARREL SECTION (5 FT. MAX FILL)

S1-BARREL SECTION DETAILS  
FOR  
2 - 12' X 6' BOX CULVERT  
24'-0" ROADWAY SEC.24/25-T109N-R65W  
OVER CREEK 0° SKEW  
STA. 5+00 HL-93 LOADING  
BEADLE COUNTY BRO 8003(23) PCN 02T6  
PIERCE & HARRIS ENGINEERING CO. INC.  
15 MASONIC BLDG. HURON, S.D. 57350  
SEPTEMBER 2016 (5) OF (7)



DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
JNK	JNK /CAD	RVH	

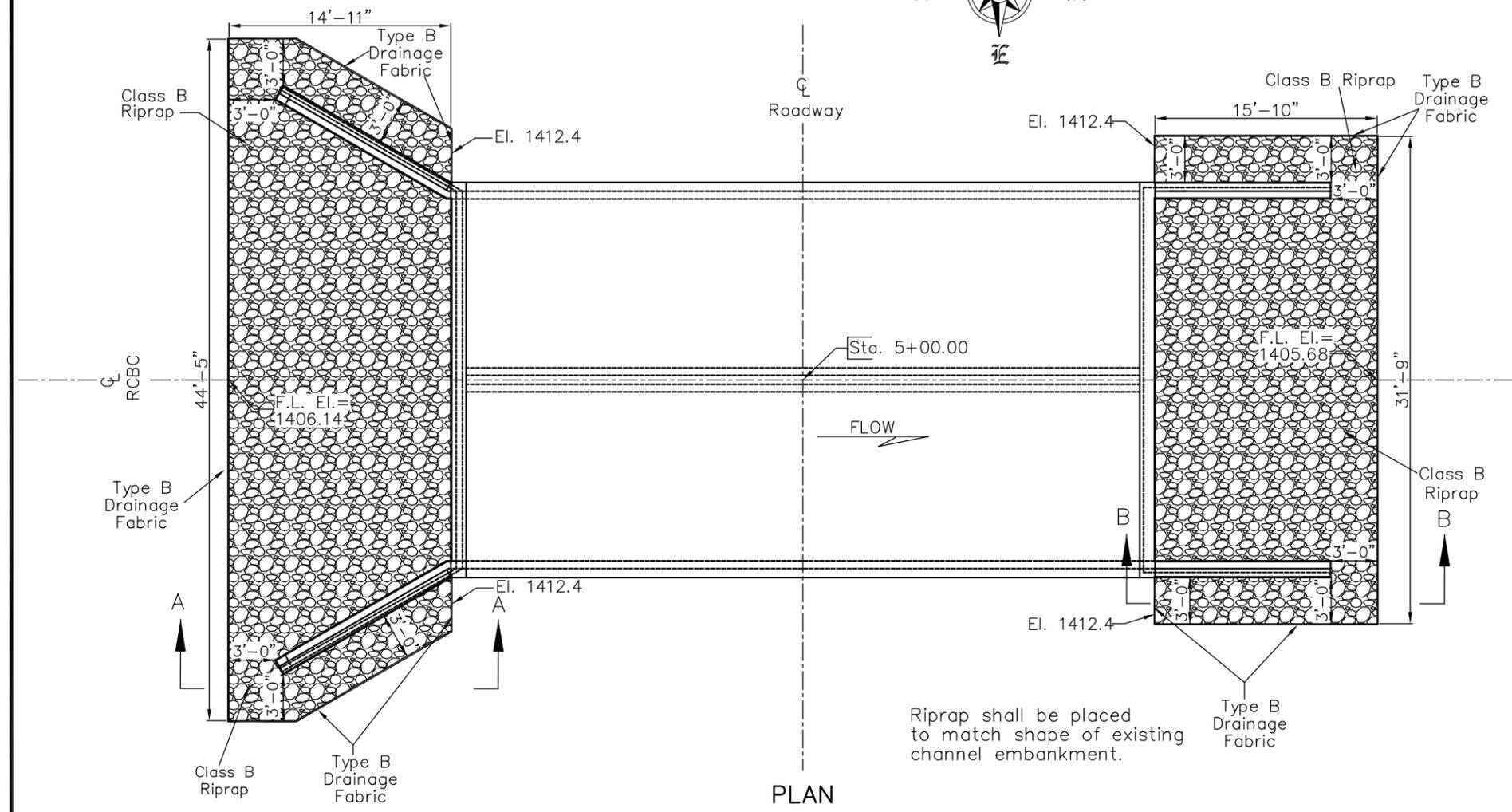
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	BRO 8003(23)	23	26

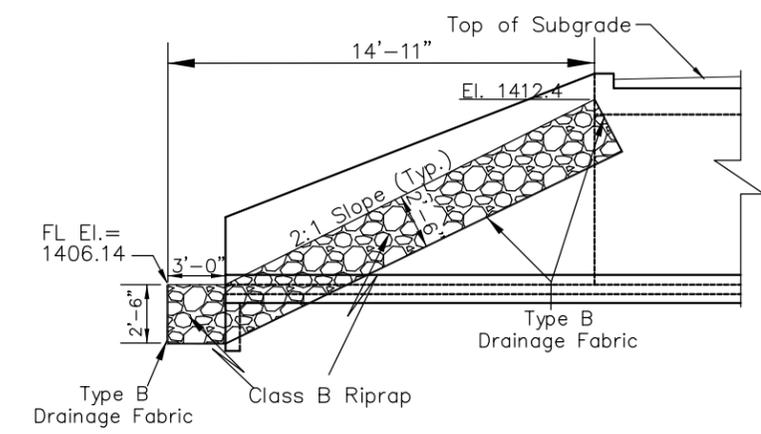


TOTAL ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
* Class B Riprap	Tons	155.0
Type B Drainage Fabric	Sq Yd.	225

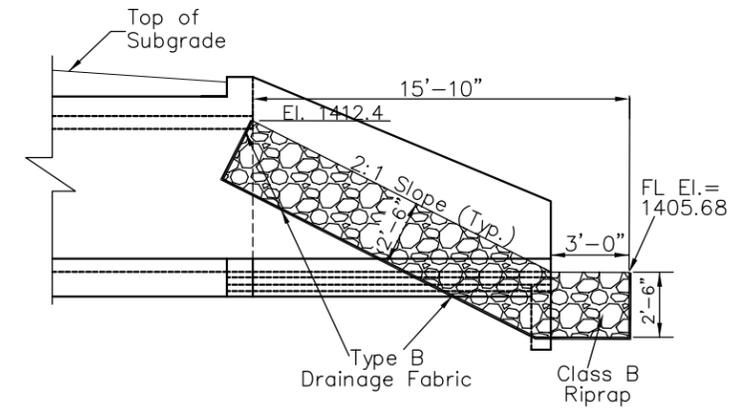
\* For estimating purposes only, a factor of 1.4 tons per cubic yard as used to convert cubic yards to tons.



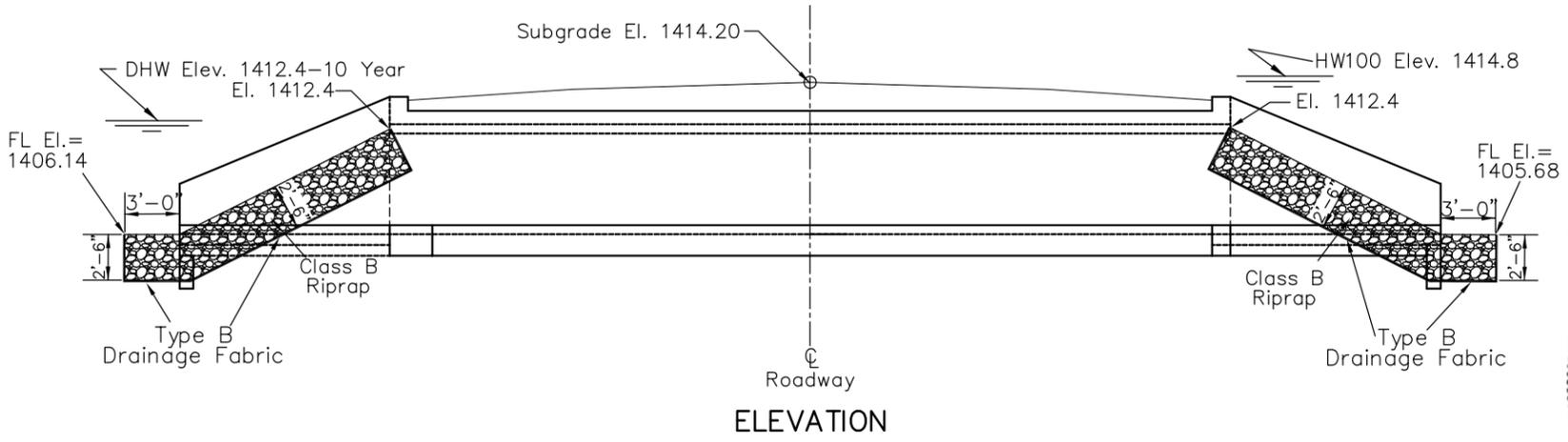
PLAN



SECTION A-A



SECTION B-B



ELEVATION

RIPRAP DETAILS FOR  
**2-12' X 6' REINFORCED CONCRETE BOX CULVERT**  
 24'-0" ROADWAY SEC.24/25-T109N-R65W  
 OVER CREEK 0° SKEW  
 STA. 5+00 HL-93 LOADING  
 BEADLE COUNTY BRO 8003(23) PCN 02T6  
 STRUCTURE NO. 03-055-280

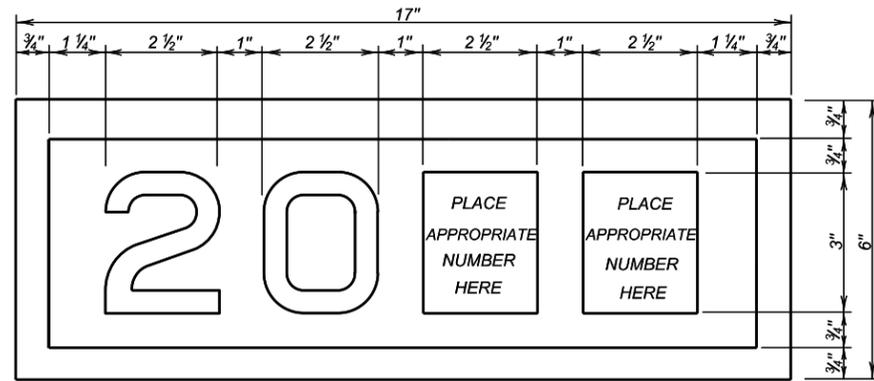
PIERCE & HARRIS ENGINEERING CO. INC.  
 15 MASONIC BLDG. HURON, S.D. 57350

SEPTEMBER 2016 ⑥ OF ⑦



DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
JNK	DAG/CAD	RVH	

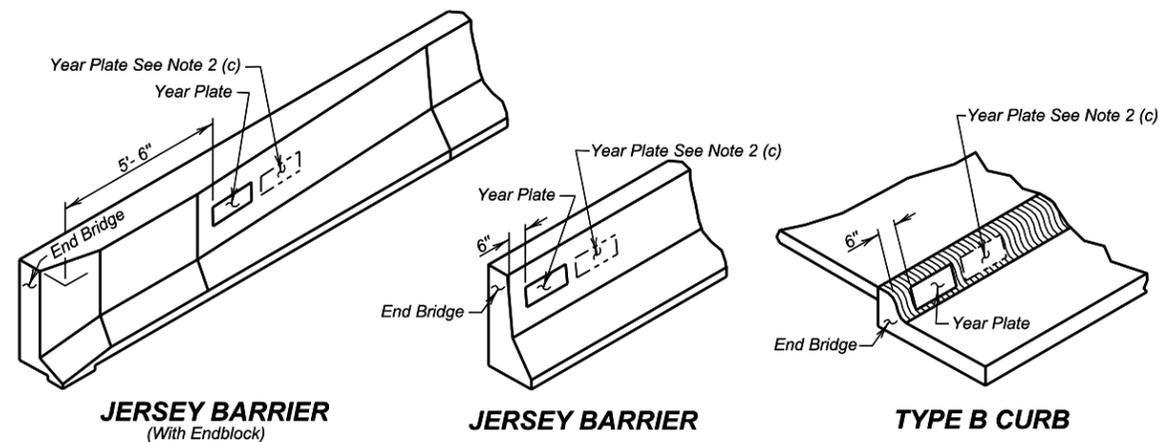
FOR BIDDING PURPOSES ONLY



**YEAR PLATE DETAILS**

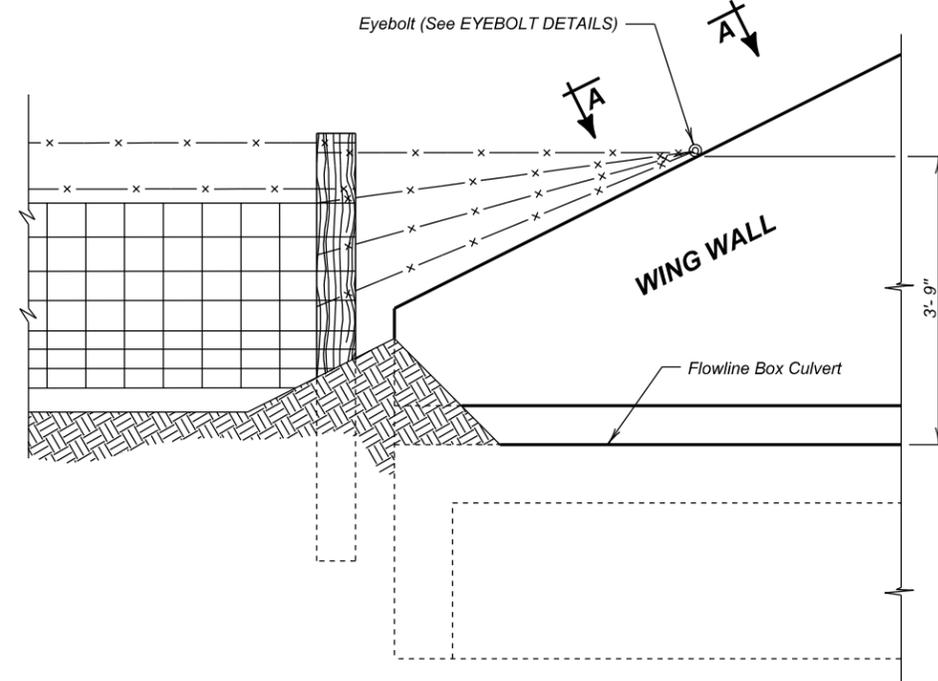
**GENERAL NOTES:**

- Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates shall be located on structure (s) as follows:
  - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.
  - On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'-6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
  - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.



June 26, 2012

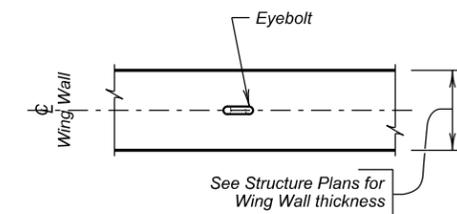
Published Date: 3rd Qtr. 2016	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



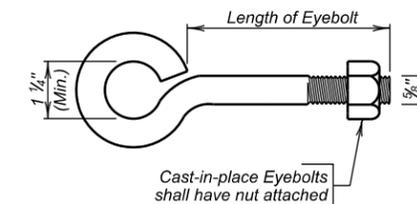
**DETAIL FOR FENCE ANCHORS**

**GENERAL NOTES:**

- The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
- Eyebolts shall be placed on all of the box culvert wing walls.
- Eyebolts shall be 5/8 inch diameter and shall conform to ASTM A307.
- Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
- Cast-in-place eyebolts shall have a nut attached, be 4 1/2 inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the 5/8 inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
- The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



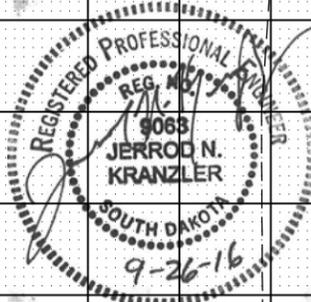
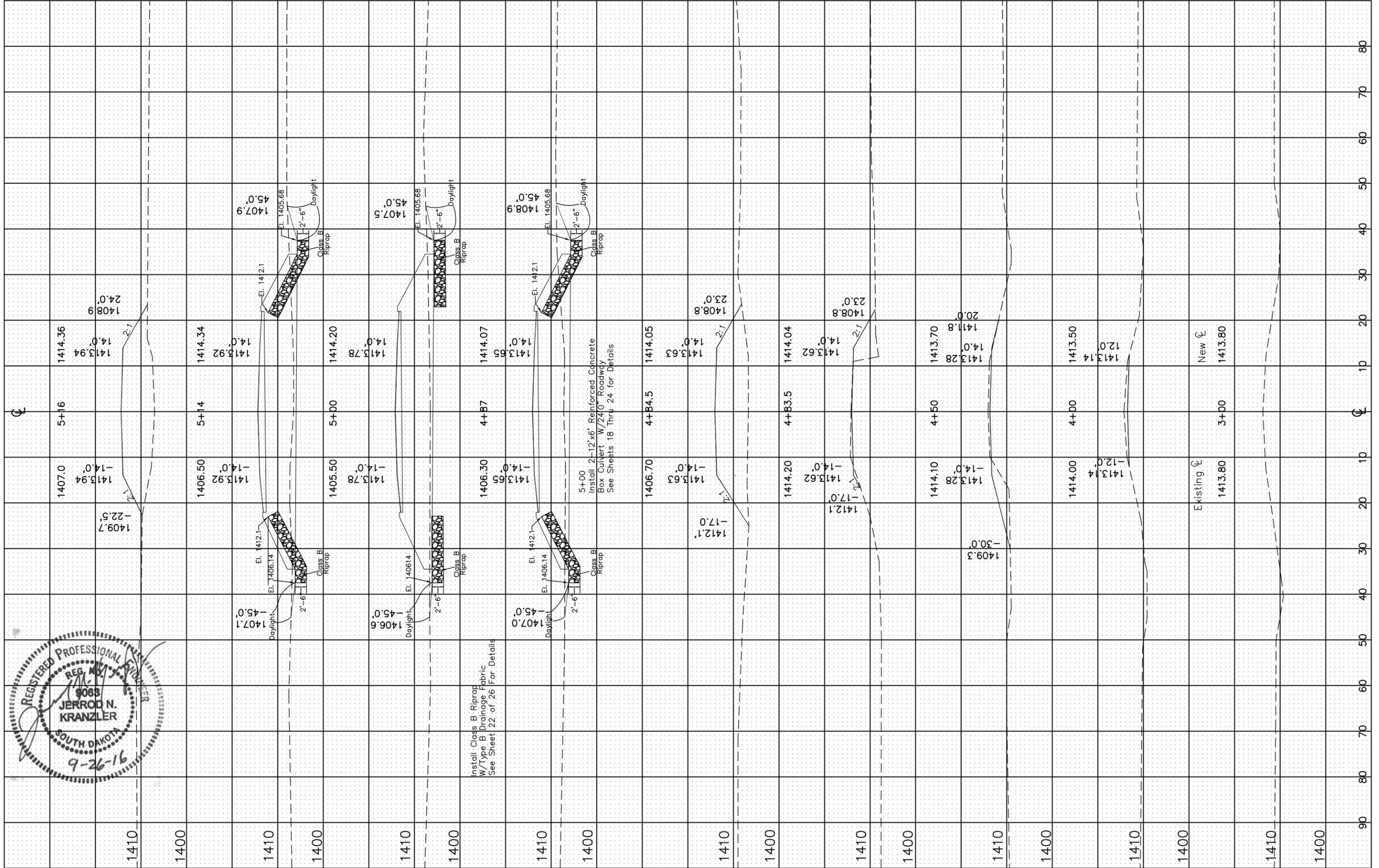
**VIEW A - A**



**EYEBOLT DETAILS**

December 23, 2012

Published Date: 3rd Qtr. 2016	S D D O T	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16
			Sheet 1 of 1



HORIZ. SCALE: 1" = 20'  
VERT. SCALE: 1" = 20'

**FOR BIDDING PURPOSES ONLY**

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
SD	BRO 8003(23)	26	26

