

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	23635	1	1

# NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SS-4-999(048)

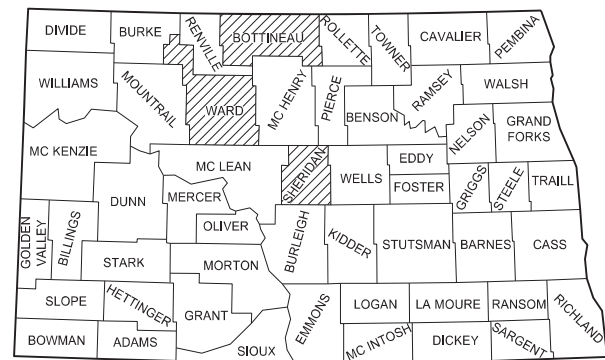
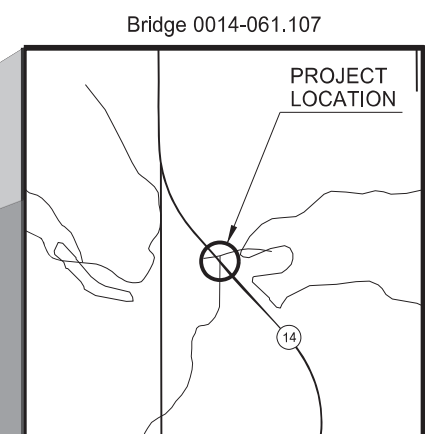
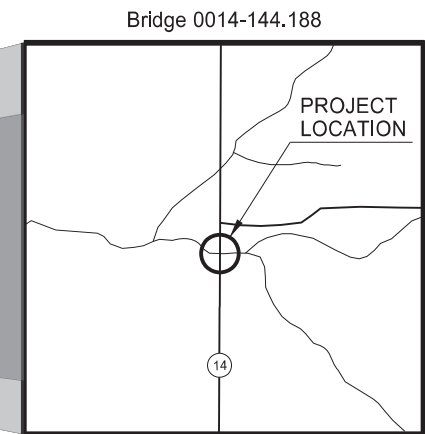
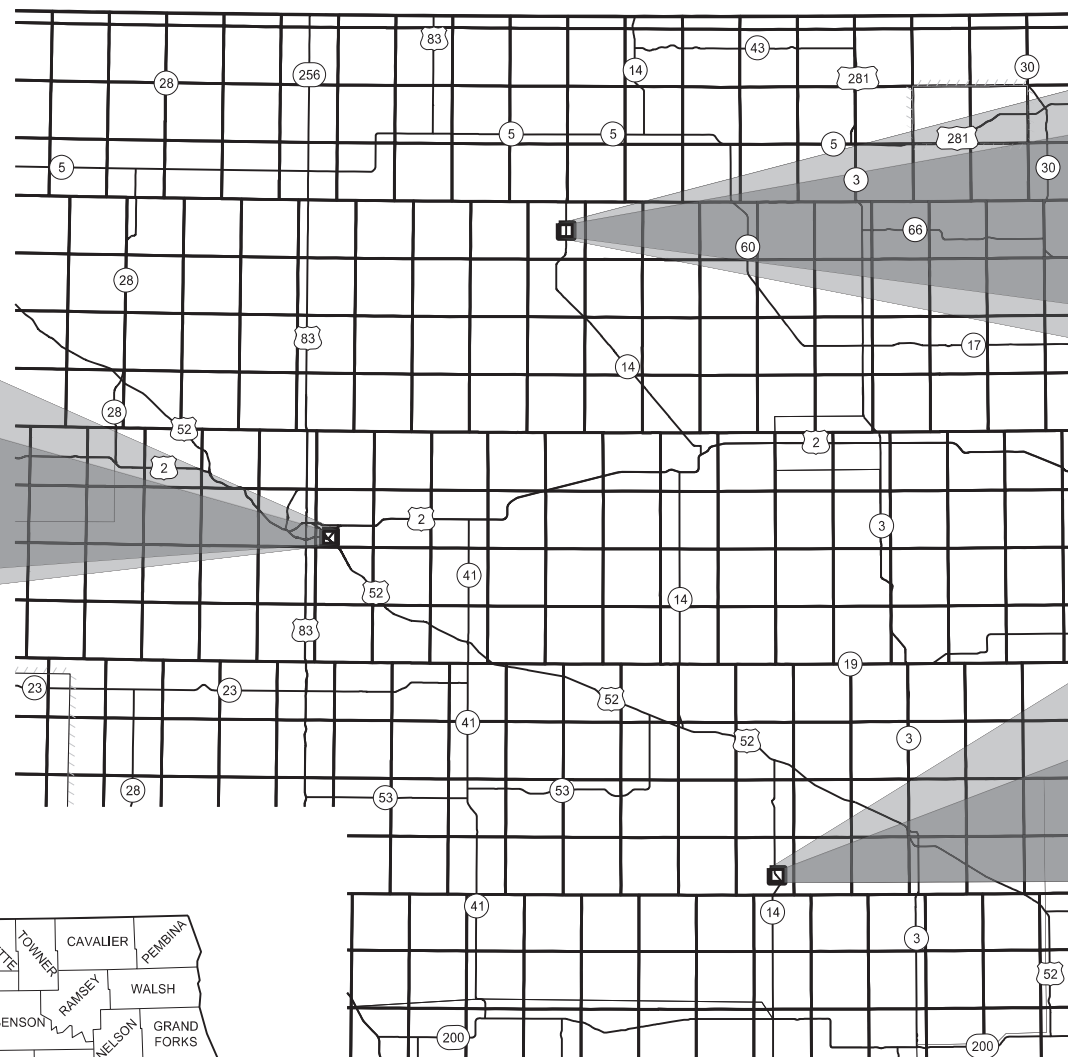
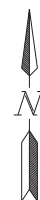
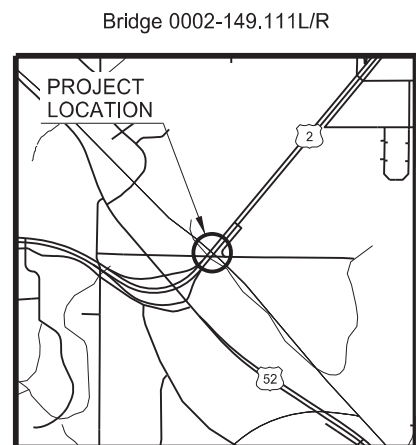
Ward County  
Bridges 0002-149.111L/R  
0.2 mi. NE of US 2/52 Interchange  
Bridge Deck Overlay, Approach Slabs,  
Concrete Spall Repairs, Beam Seat Repairs,  
Barrier Refinishing, Concrete Pipe Removal,  
Joint Sealing, Bituminous Paving, and Guardrail

Sheridan County  
Bridge 0014-061.107  
12.0 mi. S of Anamoose, ND  
Bridge Deck Overlay, Rail Retrofit,  
Concrete Spall Repair, Bituminous Paving,  
and Guardrail

Bottineau County  
Bridge 0014-144.188  
1.0 mi. S of Kramer, ND  
Bridge Deck Overlay, Rail Retrofit,  
Concrete Spall Repairs, Deck Drains,  
Scour Repairs, Bituminous Paving,  
and Guardrail

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	4/1/2023
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-4-999(048)	N/A	N/A



STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION  
OFFICE OF PROJECT DEVELOPMENT

*Jason Thorenson*  
Jason Thorenson  
10/19/23

NDDOT DIV-DIST OR  
CONSULTANT FIRM

REGISTERED PROFESSIONAL ENGINEER

MICHAEL  
HULSTEIN

PE-29767

DATE  
10/19/23

NORTH DAKOTA

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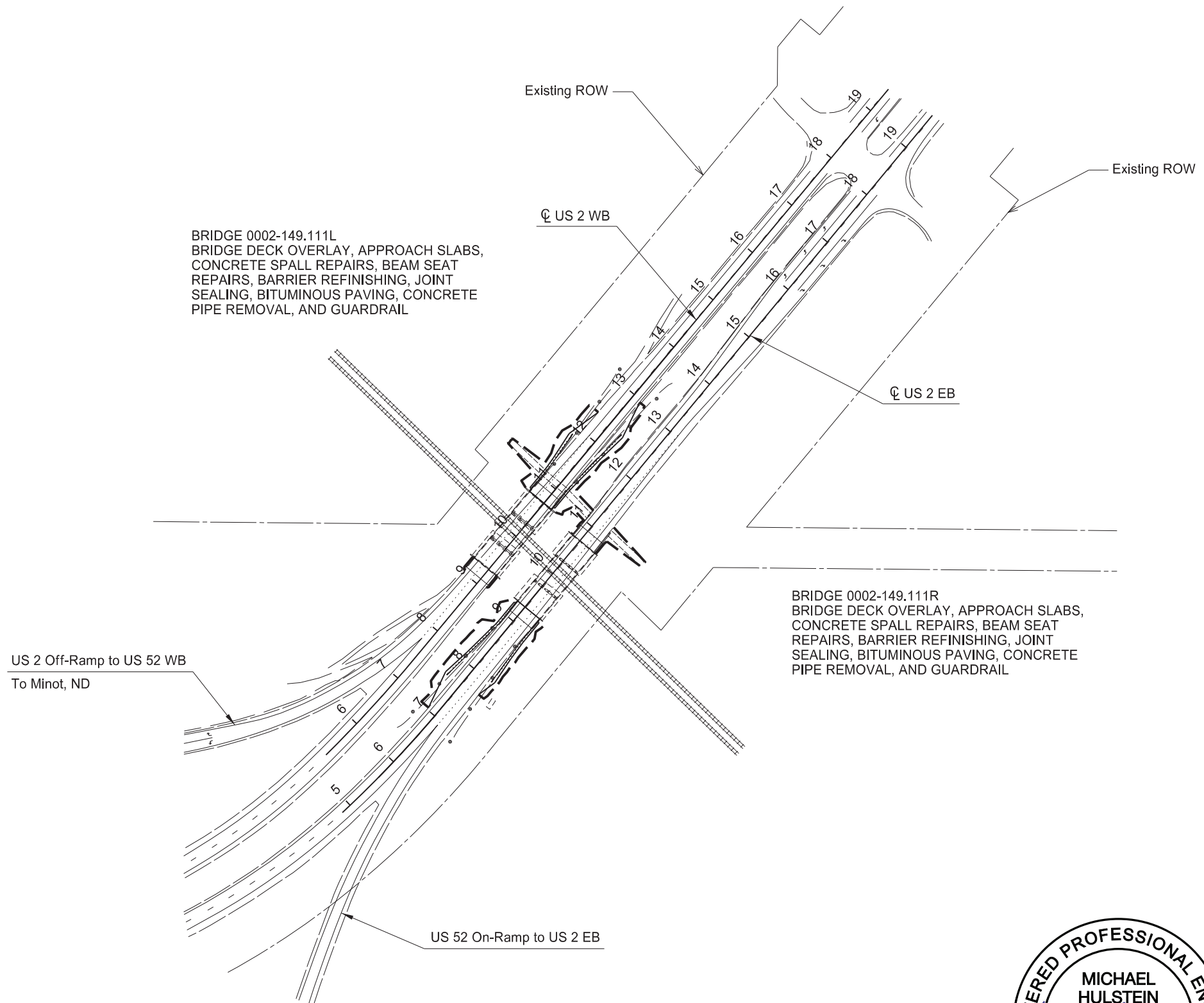
**LIST OF STANDARD DRAWINGS**

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D-704-14	Construction Sign Punching and Mounting Details
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D-704-22	Construction Truck and Temporary Detour Layouts
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**SPECIAL PROVISIONS**

Number	Description
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 2	Federal Migratory Bird Treaty Act
SSP 10	E-Ticketing
PSP 27(23)	Permits and Environmental Considerations
SP 188(23)	Railroad Requirements
SP 189(23)	Utility Coordination
SP 190(23)	Commercial Grade Hot Mix Asphalt
SP 203(23)	Temporary Water Diversion

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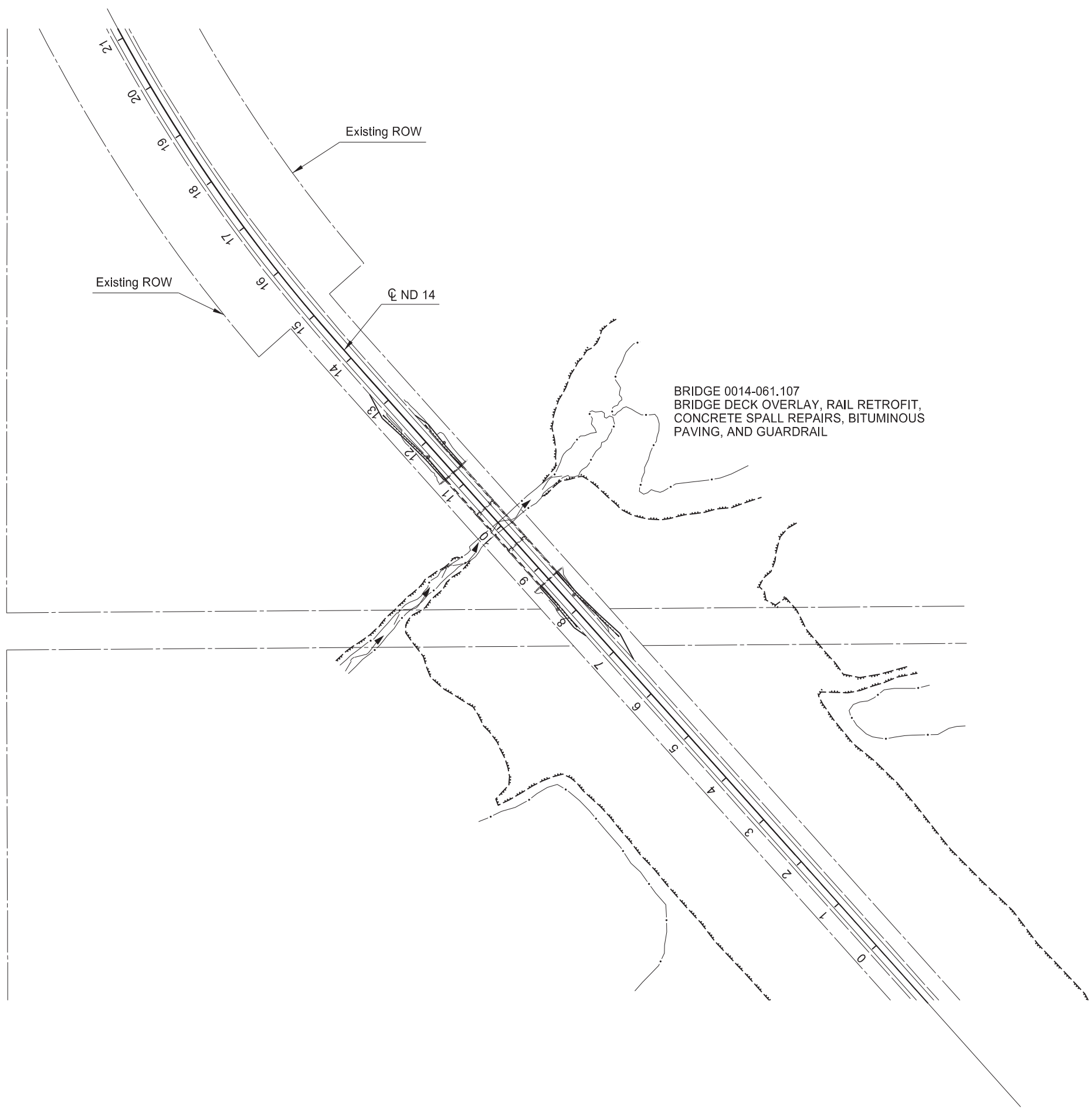


Scope of Work

0.2 mi. NE of US 2/52 Interchange

Bridge 0002-149.111L/R  
US 2 Soo Line Separation

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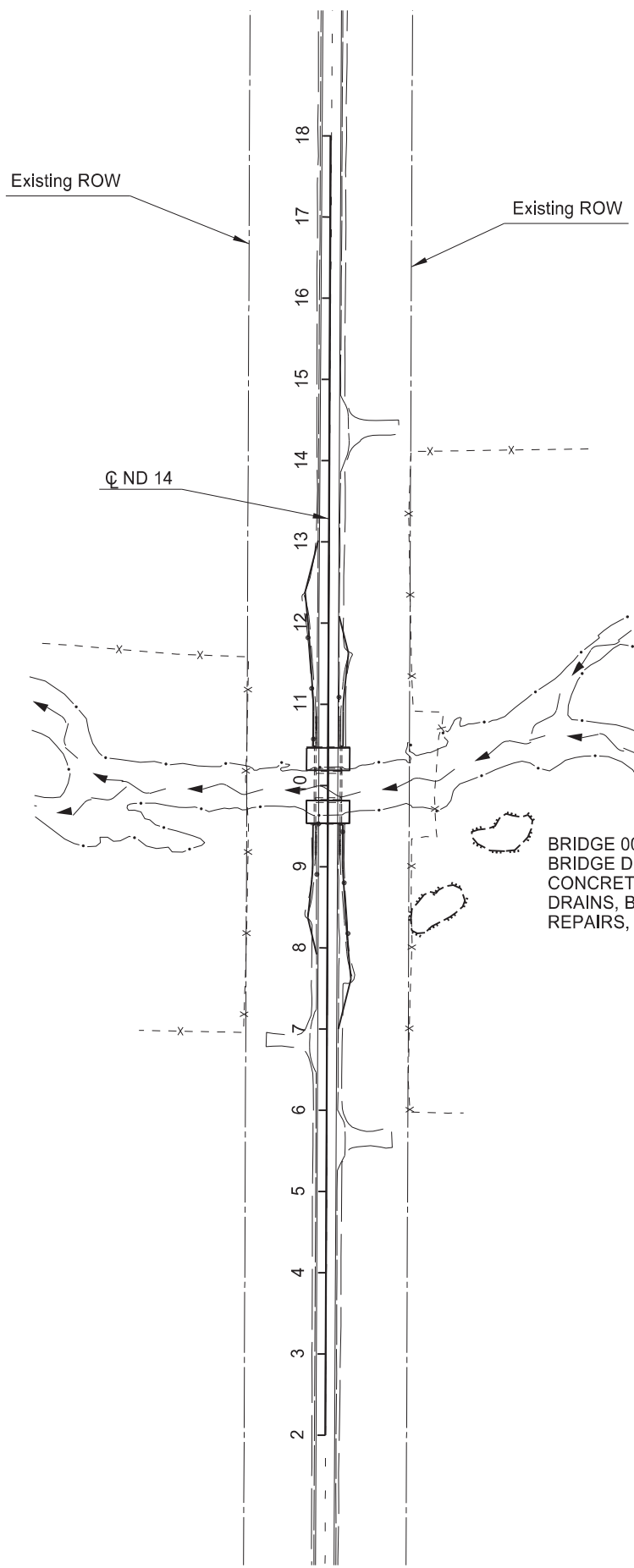


BRIDGE 0014-061.107  
 BRIDGE DECK OVERLAY, RAIL RETROFIT,  
 CONCRETE SPALL REPAIRS, BITUMINOUS  
 PAVING, AND GUARDRAIL



Scope of Work  
 12.0 mi. S of Anamoose, ND  
 Bridge 0014-061.107  
 ND 14 Lone Tree Reservoir

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BRIDGE 0014-144.188  
 BRIDGE DECK OVERLAY, RAIL RETROFIT,  
 CONCRETE SPALL REPAIRS, EXTEND DECK  
 DRAINS, BITUMINOUS PAVING, SCOUR  
 REPAIRS, AND GUARDRAIL



Scope of Work  
 1.0 mi. S of Kramer, ND  
 Bridge 0014-144.188  
 ND 14 Stone Creek

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**NOTES**

202-P01 REMOVAL OF INLETS: Remove the existing inlet structure as approved by the Engineer in the field. Backfill the excavation area with suitable borrow material to the bottom of the road base and reconstruct the road section above the excavation footprint. Include the cost of materials, labor, equipment, and disposal of inlet structure in the contract unit price for "Removal of Inlets".

202-P02 REMOVAL OF BITUMINOUS SURFACING: Include all cost to remove the existing 3 inches of bituminous, 7 inches of aggregate base, and 4 inches of sub-base as part of approach slab installation. Include all labor, equipment, and disposal in the price bid for "Removal of Bituminous Surfacing".

203-P01 GUARDRAIL EMBANKMENT: The embankment material required for guardrail installation at bridge 0014-144.188 is not available within the highway right of way. It will be the contractor's responsibility to obtain embankment material.

The excess embankment material at bridges 0002-149.111 L&R and 0014-061.107 from constructing aggregate/pavement pads will be the contractor's responsibility to remove and dispose of.

Include all costs to locate or remove the embankment material in the contract unit price bid for "Guardrail Embankment."

210-P01 CLASS 1 EXCAVATION: Excavate material from the back of each abutment to expose the existing concrete ledge and to the lower limits necessary to construct the approach slabs. Include the cost of materials, labor, equipment, and disposal of excess material in the contract unit price for "Class 1 Excavation".

302-P01 AGGREGATE BASE COURSE CL 5: The quantity for Aggregate Base Course Class 5 will be paid for at the plan quantity listed in the plans. No measurement of Aggregate Base Course Class 5 will be made in the field.

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (130) 22.5" x 12.5' concrete barriers. They can be picked up and returned to the Minot District yard at 1305 Hwy 2 Bypass E in Minot ND 58701. Contact the Minot District office at 701-857-6925 to facilitate the exchanges.

Section 704.04 J "Precast Concrete Median Barrier (State Furnished)" applies to the contract item "State Furnished Median Barrier".

If returning barriers with connection components, coordinate the delivery location for the connecting components with the Engineer. Some 4 inch x 4 inch boards are available at the return location. Provide any additional 4 inch x 4 inch boards necessary to stack barriers. The boards will become property of the Department.

Payment for the State Furnished Median Barrier will follow Section 704.06 D "Precast Concrete Median Barrier (State Furnished)". Include all costs associated with median barriers in the contract unit price for "State Furnished Median Barrier".

704-450 LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL: Install either the signal controlled lane closure on Standard D-704-16 or the flagging controlled lane closure on Standard D-704-17.

Obtain an electrical source for traffic signals. Solar powered signals may be used. Place generators a minimum of 60 feet from the roadway centerline, unless the generator and signal are part of a trailer mounted unit.

Place utility poles and equipment a minimum of 60 feet from the roadway centerline and place power conductors a minimum of 6 inches below the ground surface. Remove poles after they are no longer necessary.

The Engineer will measure individual traffic control devices, other than the signal system and flaggers, shown on the standards. Payment will be made at the respective contract unit price.

Include the cost of either a traffic signal system or flaggers in the contract unit price for "Lane Closure – Signal Control/Flagging Control".

704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacture's speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS constructed in one of the following manners:

- A single piece;
- Interlocking segments; or
- Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 3 individual strips.

Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.



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**NOTES**

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-510 OBLITERATION OF PAVEMENT MARKINGS: Masking of pavement markings designation for obliteration is allowed. Choose to remove or mask marking as specified in Section 704.04 N, "Obliteration of Pavement Markings".

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list for each bridge has been developed using the list below and traffic control layouts as shown in the plans.

BRIDGE 0002-149.111 L (US 2 Soo Line Separation):

D-704-22, Layouts K & L for Construction Trucks Hauling Material.

D-704-26, Layouts Type BB, EE, and GG as needed.

D-704-34 Layout for one lane closure.

BRIDGE 0002-149.111 R (US 2 Soo Line Separation):

D-704-22, Layouts K & L for Construction Trucks Hauling Material.

D-704-26, Layouts Type BB, EE, and GG as needed.

D-704-34 Layout for one lane closure.

BRIDGE 0014-061.107 (ND Hwy 14 Lone Tree Reservoir):

D-704-16, Sign layout for Lane Closure on a Two Lane Road Using Traffic Control Signals or D-704-17, Sign layout for Lane Closure on a Two Lane Road Using Flaggers. Use for bridge deck overlay, curb repair, spall repair on approach slabs, bridge rail retrofit, seal beams, remove and reset guardrail, and guardrail surfacing.

D-704-22, Layouts K & L for Construction Trucks Hauling Material.

D-704-26, Layouts Type BB, EE, and GG as needed.

D-704-33 for installing, relocating, and removing the portable precast concrete median barriers, attenuation devices, Type III barricades, delineator drums, along with obliteration of pavement marking, placement of interim pavement marking, or when any flagging is needed.

BRIDGE 0014-144.188 (ND Hwy 14 Stone Creek):

D-704-16, Sign layout for Lane Closure on a Two Lane Road Using Traffic Control Signals or D-704-17, Sign layout for Lane Closure on a Two Lane Road Using Flaggers. Use for bridge deck overlay, curb repair, spall repair on approach slabs, bridge rail retrofit, seal beams, remove and reset guardrail, and guardrail surfacing.

D-704-22, Layouts K & L for Construction Trucks Hauling Material.

D-704-26, Layouts Type BB, EE, and GG as needed.

D-704-33 for installing, relocating, and removing the portable precast concrete median barriers, attenuation devices, Type III barricades, delineator drums, along with obliteration of pavement marking, placement of interim pavement marking, or when any flagging is needed.

714-P01 PLUG PIPE ALL TYPES AND SIZES: Pipe removal and inlet removal at the plug pipe location is included separately in the unit price bid for "REMOVAL OF PIPE ALL TYPES AND SIZES" and "REMOVAL OF INLETS". Plug the existing pipes designated to be abandoned in the plans. Dewater the existing pipe prior to installing plug. Construct the plug of controlled density fill to fully fill the entire pipe remaining. Ensure that Engineer-approved means (of identifying that the pipe is completely full) are in place prior to placement of controlled density backfill.

Provide controlled density backfill consisting of cement, water, fly ash, and aggregate at the ratio specified below. Mix the material continuously during pumping and replace to keep the solution separating.

Cement (Section 804.01):	70 lbs.
Fly Ash (Section 820.02):	125 lbs.
Fine Aggregate (Section 802.01 C)	2600 lbs.
Water (Section 812)	50 gallons

Include all labor, materials, and equipment necessary to perform this work in the price bid for "Plug Pipe-All Types & Sizes".

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for pavement marking items.

762-P01 PVMT MK PAINTED 4IN LINE: Include all materials, labor, and equipment required to return the centerline, edge lines, and pavement markings as required to their preconstruction condition in the bid item "PVMT MK Painted 4in Line".



**NOTES**

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Quantity shown on the Section 8 Estimated Quantities sheet is based on the existing pavement markings at time of survey and includes both yellow and white striping. See Section 10 Basis of Estimated Quantities for striping tabulation.

Striping limits will be marked by the Engineer in the field.

764-P01 REMOVED W-BEAM GUARDRAIL MATERIALS: Deliver the removed guardrail materials to the NDDOT Maintenance Storage Yard nearest the bridge, and neatly stack them at a location designated by the Engineer. The location and address for delivery from each bridge is provided below. Include all costs for delivery of the removed guardrail materials in the contract unit prices bid for "Remove W-Beam Guardrail & Posts" and Remove End Treatment & Transition".  
Bridge 002-149.111L & 002-149.111R:

NDDOT Minot Section Yard  
1305 Hwy 2 Bypass E  
Minot, ND 58701

Bridge 014-061.107

NDDOT Harvey Section Yard  
501 Jackson Ave.  
Harvey, ND 58341

Bridge 014-144.188

NDDOT Bottineau Section Yard  
9840 Lake Road  
Bottineau, ND 58318





## ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest) (online at <http://oeaaa.faa.gov>).

EN-1 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - [bholen@nd.gov](mailto:bholen@nd.gov) for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-2 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following table:

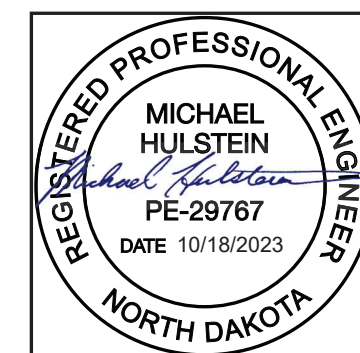
SPECIES	HABITAT	PRESENCE
Whooping Crane	Cropland/Wetland Associations	Spring: April 1 - May 15* Fall: September 10 - October 31
Piping Plover	Sparsely Vegetated Islands/Shoreline	April 15 - August 15*
Dakota Skipper	Native Prairie	Year-Round
Rufa Red Knot	Sparsely Vegetated Islands/Shoreline	Spring: April 15 - May 31* Fall: August 1 - September 15*
Northern Long-Eared Bat	Forested/Wooded Areas/Bridges/Box Culverts/Caves/Mines	Active Season: April 1 - October 31* Inactive Season: November 1 - March 31*

\*Time frames can differ slightly, depending on the year

If any of the above threatened and endangered species are identified within 1 mile of the project, the Contractor will notify the Engineer immediately and cease construction activities in the vicinity until an avoidance area is established. The Engineer will establish an avoidance area that is at least a 0.5 mile and immediately coordinate with the USFWS (701-355-8513), FHWA (701-221-9464), and NDDOT Environmental and Transportation Services (701-328-2592). The Contractor will not resume work within the avoidance area until the Engineer has confirmed with the agencies that work may proceed (either the species have left the area, or approved avoidance/minimization measures have been implemented).

EN-3 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

EN-4 FAA Notice: Notification is required for work within 3 nautical miles of the airport. Complete the Federal Aviation Administration Notice of Proposed Construction or Alteration Form 7460-1 in accordance with 14 CFR 77.7 and 77.9 (at least 45 days



ESTIMATED QUANTITIES

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SPEC	CODE	ITEM DESCRIPTION	UNIT	Bridge	Bridge	Bridge	Bridge	TOTAL
				0002-149.111L	0002-149.111R	0014-061.107	0014-144.188	
103	0100	CONTRACT BOND	L SUM	1	-	-	-	1
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	0.5	0.5	-	-	1
107	0140	RAILROAD COORDINATION	L SUM	0.5	0.5	-	-	1
107	0151	RAILROAD FLAGGING	L SUM	0.5	0.5	-	-	1
202	0130	REMOVAL OF CURB & GUTTER	LF	55	55	-	152	262
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	218	216	-	-	434
202	0152	REMOVAL OF BRIDGE RAIL	L SUM	-	-	-	1	1
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	135	74	-	-	209
202	0230	REMOVAL OF INLETS	EA	2	2	-	-	4
203	0218	GUARDRAIL EMBANKMENT	EA	2	2	4	4	12
210	0099	CLASS I EXCAVATION	L SUM	0.5	0.5	-	-	1
251	0200	SEEDING CLASS II	ACRE	0.13	0.17	0.23	0.27	0.80
251	2000	TEMPORARY COVER CROP	ACRE	0.23	0.27	0.37	0.51	1.38
253	0201	HYDRAULIC MULCH	ACRE	-	-	0.60	0.78	1.38
255	0102	ECB TYPE 2	SY	592	741	-	-	1333
256	0201	RIPRAP GRADE II	TON	-	-	-	390	390
261	0112	FIBER ROLLS 12IN	LF	1250	1470	1628	2218	6566
261	0113	REMOVE FIBER ROLLS 12IN	LF	625	735	814	1109	3283
262	0100	FLOTATION SILT CURTAIN	LF	-	-	-	195	195
262	0101	REMOVE FLOTATION SILT CURTAIN	LF	-	-	-	195	195
302	0120	AGGREGATE BASE COURSE CL 5	TON	30	30	-	-	60
401	0060	PRIME COAT	GAL	42	41	40	49	172
411	0105	MILLING PAVEMENT SURFACE	SY	493	480	379	301	1653
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	95	93	88	109	385
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	212	212	-	-	424
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	900	900	1020	317	3137
602	7000	SPECIAL SURFACE FINISH	SF	2150	2150	-	-	4300
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	-	-	-	190	190
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	-	-	510	-	510
650	0704	OVERLAY CONCRETE	CY	35	39	50	16	140
650	0707	DECK CONCRETE	CY	13	13	5	2	33
650	0710	CLASS 1-H REMOVAL	SY	-	-	1020	317	1337
650	0711	CLASS 2-H REMOVAL	SY	-	-	51	16	67
650	0712	CLASS 3-H REMOVAL	SY	-	-	11	4	15
650	0720	CLASS 1 REMOVAL	SY	700	700	-	-	1400
650	0721	CLASS 2 REMOVAL	SY	140	140	-	-	280
650	0722	CLASS 2-A REMOVAL	LF	252	252	-	-	504
650	0723	CLASS 3 REMOVAL	SY	35	35	-	-	70
702	0100	MOBILIZATION	L SUM	0.25	0.25	0.25	0.25	1
704	0100	FLAGGING	MHR	30	30	30	30	120
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1150	1290	1811	1811	6062
704	1018	LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL	EA	-	-	1	1	2
704	1041	ATTENUATION DEVICE TYPE B-55	EA	1	1	-	-	2
704	1043	ATTENUATION DEVICE TYPE B-65	EA	-	-	2	2	4

ESTIMATED QUANTITIES

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SPEC	CODE	ITEM DESCRIPTION	UNIT	Bridge 0002-149.111L	Bridge 0002-149.111R	Bridge 0014-061.107	Bridge 0014-144.188	TOTAL
704	1048	PORTABLE RUMBLE STRIPS	EA	-	-	2	2	4
704	1052	TYPE III BARRICADE	EA	2	2	4	4	12
704	1060	DELINEATOR DRUMS	EA	21	19	10	10	60
704	1087	SEQUENCE ARROW PANEL - TYPE C	EA	1	1	-	-	2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	239	272	730	630	1871
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	387	387	500	350	1624
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	-	-	-	418	418
714	9680	PLUG PIPE-ALL TYPES & SIZES	EA	2	-	-	-	2
748	0140	CURB & GUTTER-TYPE 1	LF	-	-	-	40	40
762	0420	SHORT TERM 4IN LINE - TYPE R	LF	527	540	1018	855	2940
762	0426	SHORT TERM 24IN LINE - TYPE R	LF	-	-	24	24	48
762	1104	PVMT MK PAINTED 4IN LINE	LF	715	735	1420	1560	4430
764	0131	W-BEAM GUARDRAIL	LF	180	192	308	287	967
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	2	2	4	4	12
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	441	442	180	454	1517
764	1990	REMOVE CONCRETE SAFETY SHAPE TRANSITION	EA	2	2	-	-	4
764	2081	REMOVE END TREATMENT & TRANSITION	EA	2	2	4	4	12
900	1000	TEMPORARY STREAM DIVERSION	EA	-	-	-	1	1
930	9534	MODIFY DECK DRAIN	EA	-	-	-	14	14
930	9612	SPALL REPAIR	SF	20	31	11	22	84
930	9696	BEAM END REPAIR	EA	2	-	-	-	2

**BASIS OF ESTIMATED QUANTITIES**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	10	1

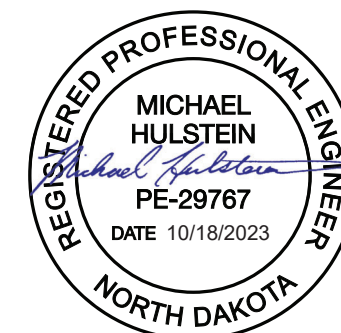
BASIS OF ESTIMATED QUANTITIES

COMMERCIAL GRADE HOT MIX ASPHALT	2.0 TON/CY
GRADE II RIPRAP	1.4 TON/CY
AGGREGATE BASE COURSE CL 5	1.875 TON/CY
TACK COAT	0.05 GAL/SY
PRIME COAT	0.25 GAL/SY

**BASIS OF ESTIMATED QUANTITIES - STRIPING**

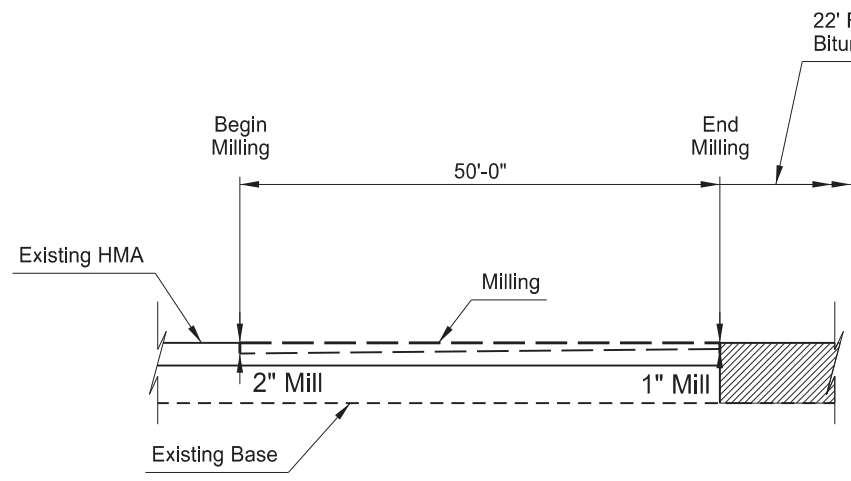
BRIDGE 0002-149.111L				BRIDGE 0014-061.107			
SPEC	CODE	BID ITEM	UNIT QUANTITY	SPEC	CODE	BID ITEM	UNIT QUANTITY
762	1104	PVMT MK PAINTED 4IN LINE		762	1104	PVMT MK PAINTED 4IN LINE	
		4" SOLID WH				4" SOLID WH	
		Sta 8+58.00 L to Sta 11+42.00 L	LF 284			Sta 8+22.50 L to Sta 11+77.50 L	LF 355
		4" BROKEN WH				Sta 8+22.50 R to Sta 11+77.50 R	LF 355
		Sta 8+58.00 to Sta 11+42.00	LF 72			4" SOLID DBL YW	
		4" DASHED WH				Sta 8+22.50 to Sta 11+77.50	LF 355
		Sta 8+58.00 L to Sta 11+42.00 L	LF 75				
		4" SOLID YW					
		Sta 8+58.00 R to Sta 11+42.00 R	LF 284				
BRIDGE 0002-149.111R				BRIDGE 0014-144.188			
SPEC	CODE	BID ITEM	UNIT QUANTITY	SPEC	CODE	BID ITEM	UNIT QUANTITY
762	1104	PVMT MK PAINTED 4IN LINE		762	1104	PVMT MK PAINTED 4IN LINE	
		4" SOLID WH				4" SOLID WH	
		Sta 8+58.00 L to Sta 11+42.00 L	LF 284			Sta 9+02.50 L to Sta 10+97.50 L	LF 390
		4" BROKEN WH				Sta 9+02.50 R to Sta 10+97.50 R	LF 390
		Sta 8+58.00 to Sta 11+42.00	LF 92			4" SOLID DBL YW	
		4" DASHED WH				Sta 9+02.50 to Sta 10+97.50	LF 390
		Sta 8+58.00 L to Sta 11+42.00 L	LF 75				
		4" SOLID YW					
		Sta 8+58.00 R to Sta 11+42.00 R	LF 284				

Pavement Marking [LF]			
Bridge	4in Yellow	4in White	Total
0002-149.111L	284	431	715
0002-149.111R	284	451	735
0014-061.107	710	710	1420
0014-144.188	780	780	1560

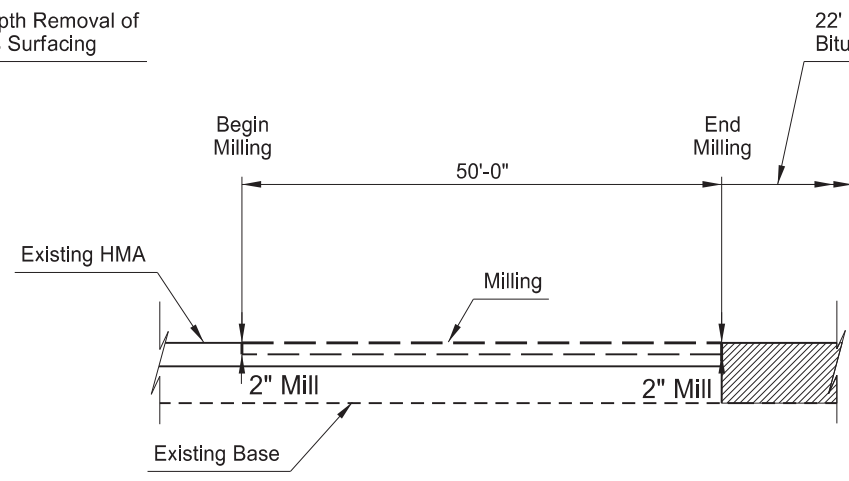


Basis of Estimated Quantities

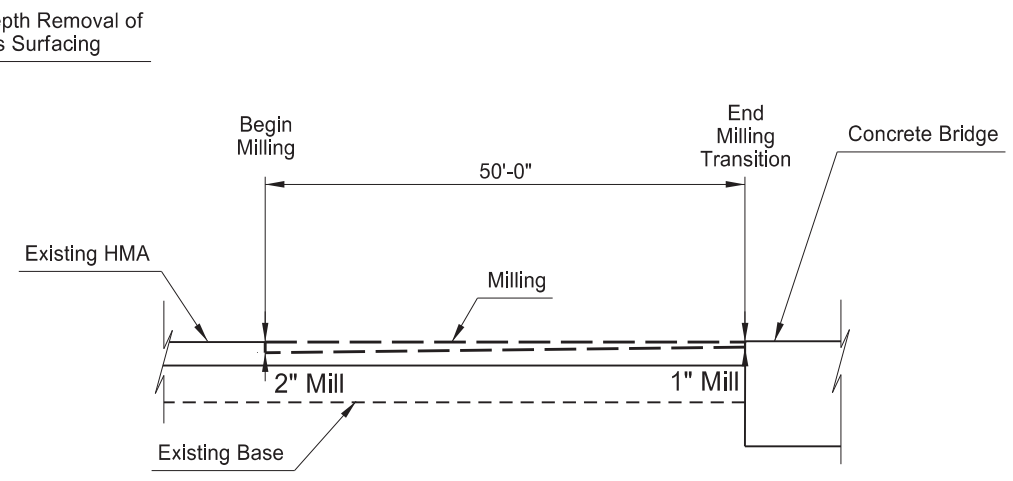
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	20	1



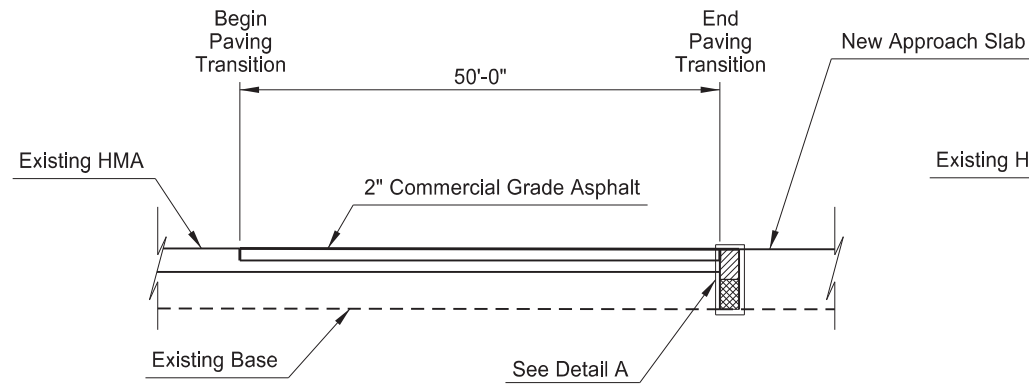
**PROPOSED MILLING TRANSITION**  
Both Ends of Bridge 0002-149.111L



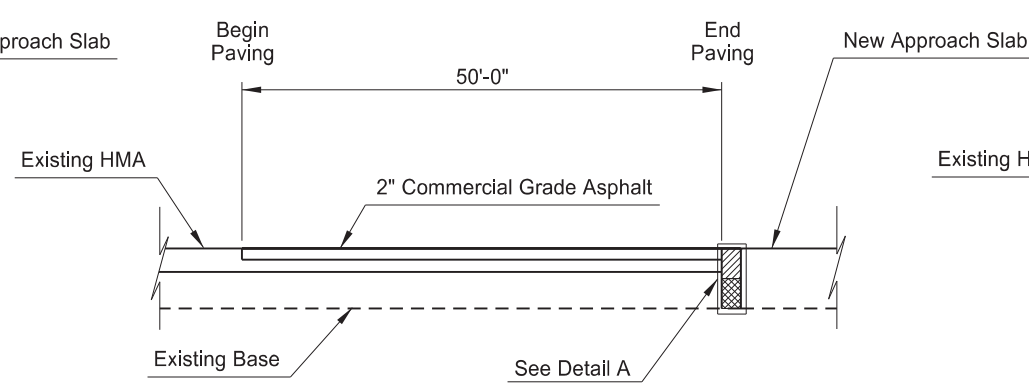
**PROPOSED MILLING TRANSITION**  
Both Ends of Bridge 0002-149.111R



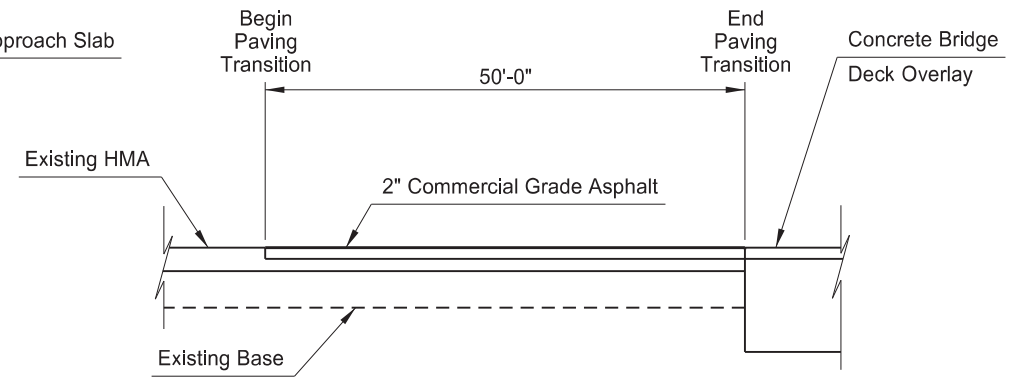
**PROPOSED MILLING TRANSITION**  
Both Ends of Bridge 0014-144.188  
Both Ends of Bridge 0014-061.107



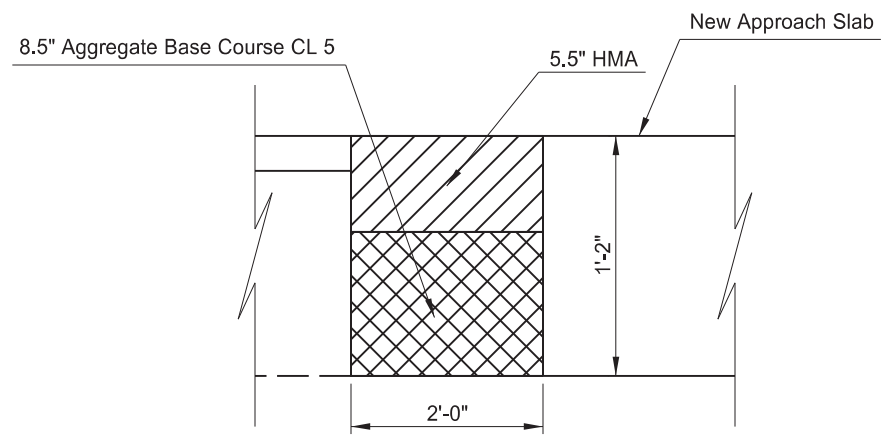
**PROPOSED PAVING**  
Both Ends of Bridge 0002-149.111L



**PROPOSED PAVING**  
Both Ends of Bridge 0002-149.111R



**PROPOSED PAVING**  
Both Ends of Bridge 0014-144.188  
Both Ends of Bridge 0014-061.107

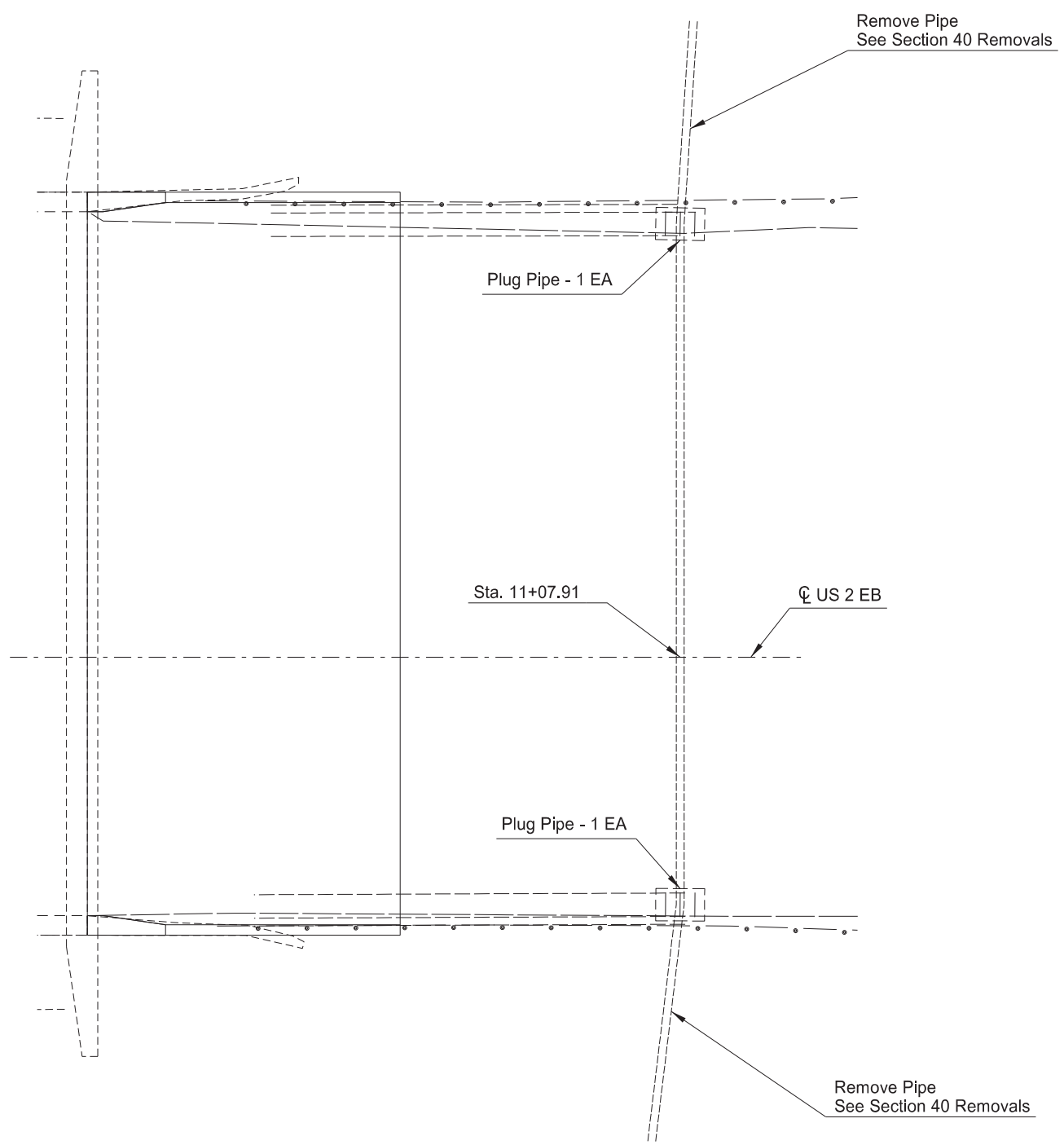
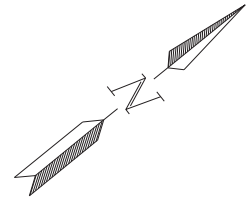


**DETAIL A**  
HMA and Aggr. Patch

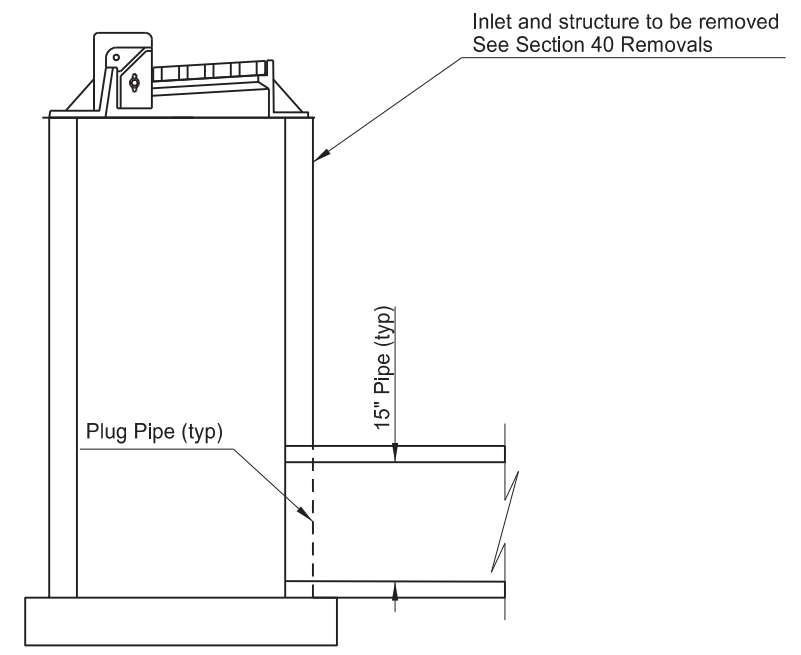


General Details  
Milling and Paving Transitions

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	20	2



PLAN VIEW



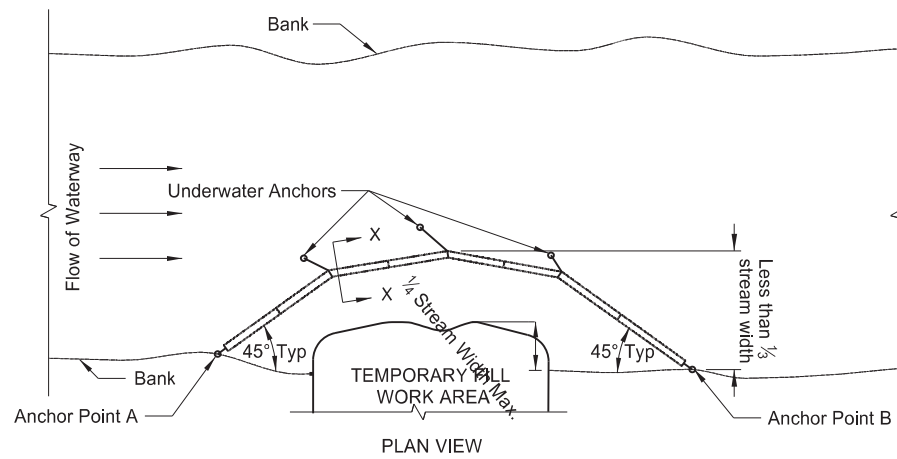
STRUCTURE VIEW (NTS)



General Details  
 Plug Pipe Details  
 0.2 mi NE of US 2/52 Interchange  
 Bridge 0002-149.111 L/R  
 US 2 Soo Line Separation

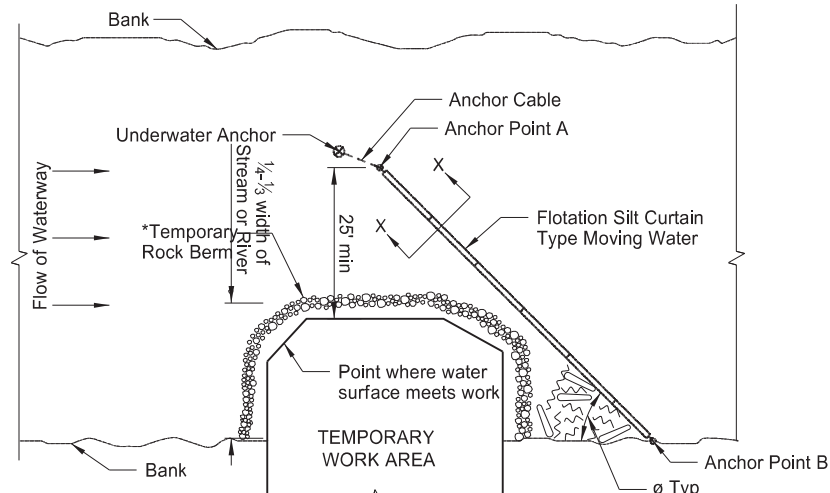
TYPICAL INSTALLATIONS  
May vary with conditions

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	20	3



PLAN VIEW  
FLOTATION SILT CURTAIN - TYPE WORK AREA

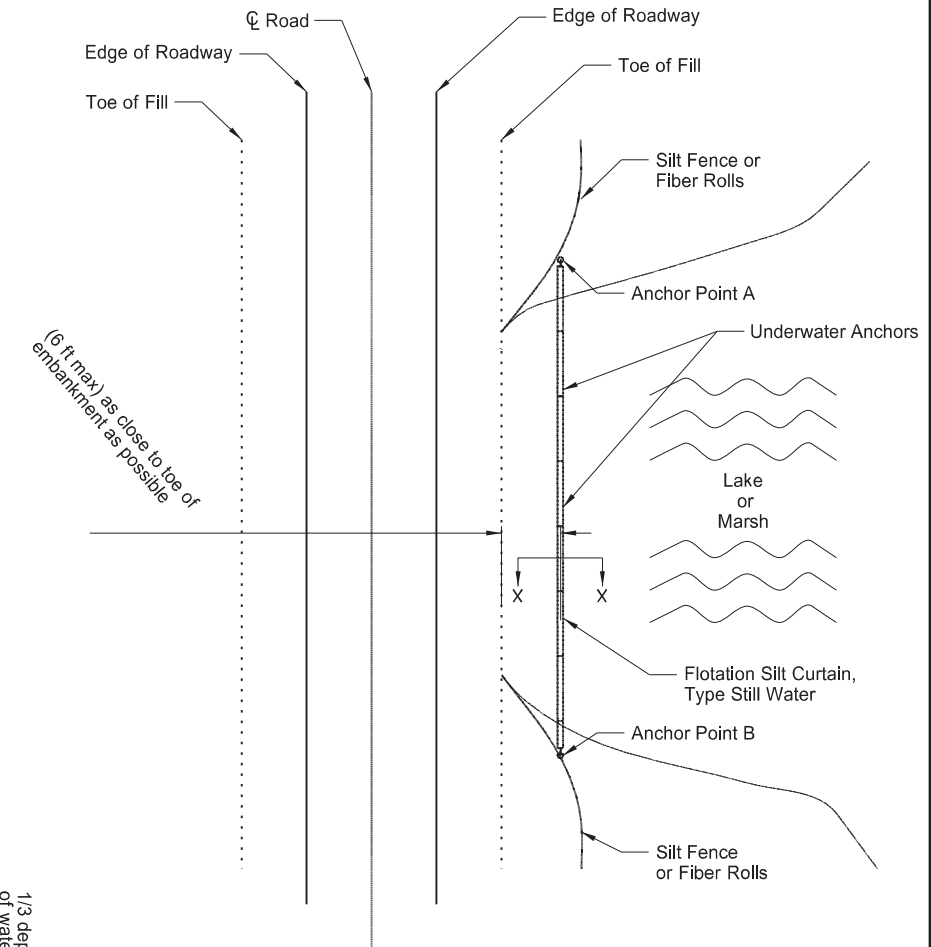
DESIGN GUIDELINES:  
When temporary work encroaches less than 1/4 of the width of stream.



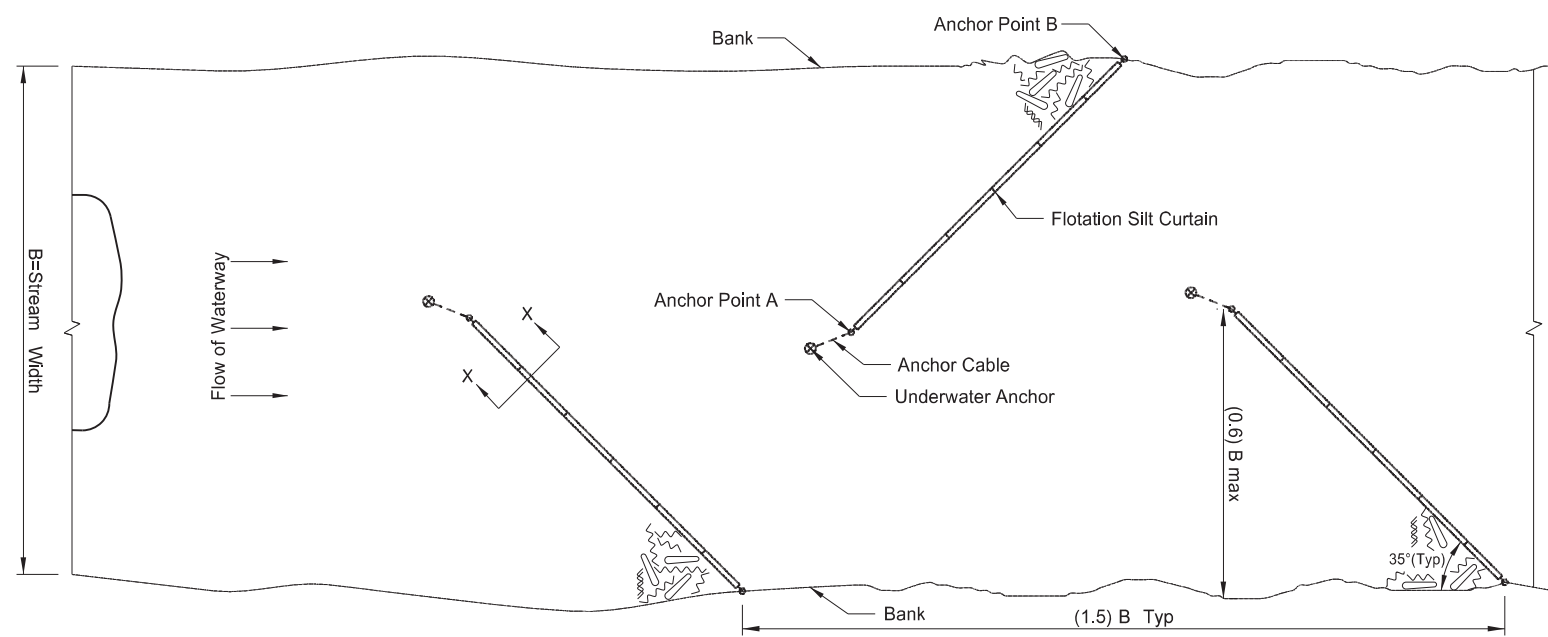
ø	WATER VELOCITY
45°	slow, less than 3 ft/sec
35°	moderate, 3 - 5 ft/sec

PLAN VIEW  
FLOTATION SILT CURTAIN - TYPE MOVING WATER

DESIGN GUIDELINES:  
When temporary work encroaches more than 1/4 but less than 1/3 width of the stream.  
For narrow waterways, the curtain may be placed 1 foot above the bottom of waterway to allow water flow.  
\*In areas where the plans call for riprap at the bridge, provide a temporary rock berm. Include all costs for the temporary rock berm in price bid for the "Riprap".

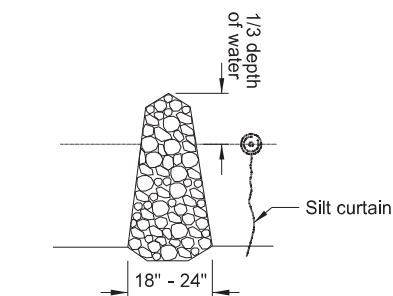


PLAN VIEW  
FLOTATION SILT CURTAIN - TYPE STILL WATER  
Extend silt curtain onto shore and anchor there also.

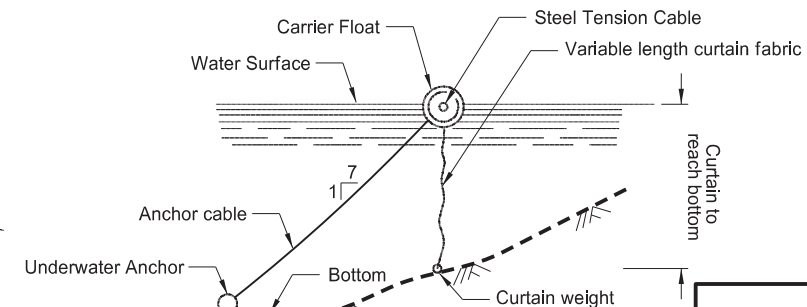


PLAN VIEW  
FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:  
When temporary work encroaches more than 1/3 width of the stream  
Or where stream width doesn't allow use of Type Moving Water



TEMPORARY ROCK BERM



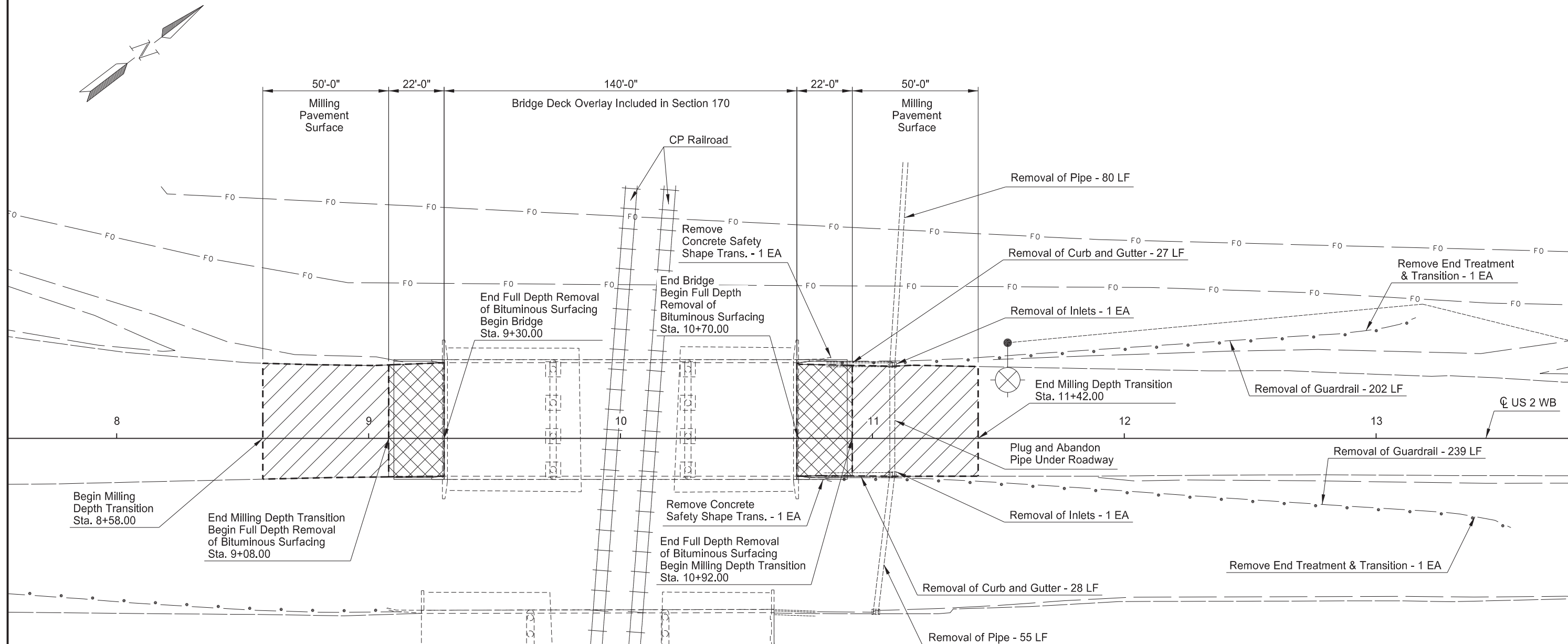
SECTION X-X  
FLOTATION SILT CURTAINS

Note:  
Maximum water velocity for moving water = 5 ft/sec



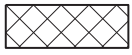

General Details  
Temporary Erosion Control - Flotation Silt Curtain

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	40	1



SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0130	REMOVAL OF CURB & GUTTER		
		Sta 10+81.74 to Sta 11+07.91 Lt	LF	27
		Sta 10+80.66 to Sta 11+08.27 Rt	LF	28
202	0174	REMOVAL OF PIPE ALL TYPES & SIZES		
		Sta 11+07.91 Lt	LF	80
		Sta 11+07.91 Rt	LF	55
202	0230	REMOVAL OF INLETS		
		Sta 11+07.91 Lt	EA	1
		Sta 11+07.91 Rt	EA	1
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 12+78.67 to Sta 13+15.74 Lt	EA	1
		Sta 13+16.44 to Sta 13+53.51 Rt	EA	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
764	1990	REMOVE CONCRETE SAFETY SHAPE TRANSITION		
		Sta 10+70.00 to Sta 10+83.51 Lt	EA	1
		Sta 10+70.00 to Sta 10+83.85 Rt	EA	1
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 10+77.53 to Sta 12+78.67 Lt	LF	202
		Sta 10+78.29 to Sta 13+16.44 Rt	LF	239
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 9+08.00 to Sta 9+30.00	SY	110
		Sta 10+70.00 to Sta 10+92.00	SY	108
411	0105	MILLING PAVEMENT SURFACE		
		Sta 8+58.00 to Sta 9+08.00	SY	250
		Sta 10+92.00 to Sta 11+42.00	SY	243

 Full Depth Removal of Bituminous Surfacing  
 Milling Pavement Surface

Existing ROW out of view

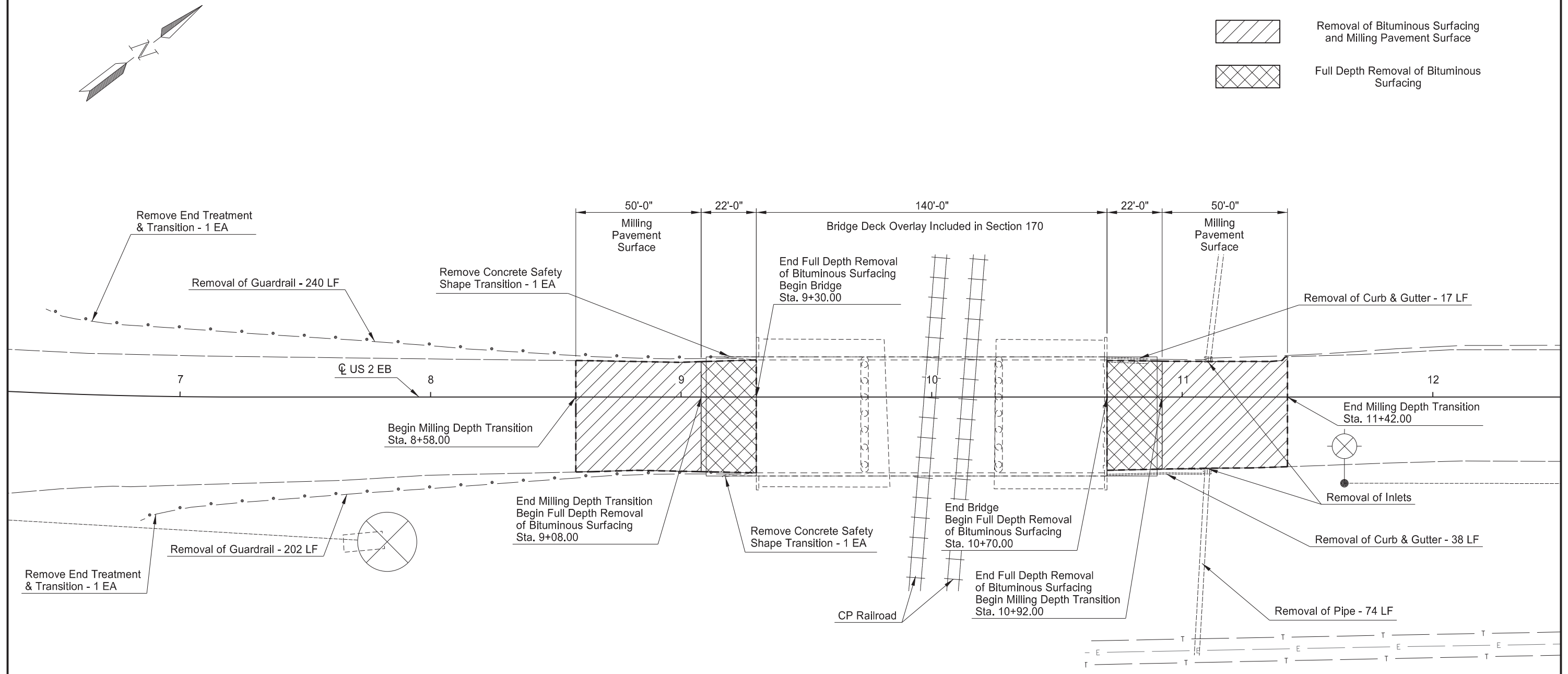
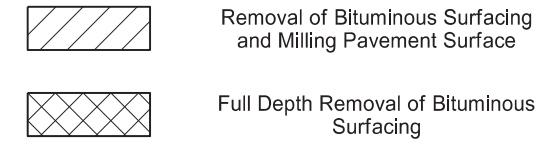
Removals

Bridge 0002-149.111L  
US 2 Soo Line Separation

Ward County

REGISTERED PROFESSIONAL ENGINEER  
**MICHAEL HULSTEIN**  
 PE-29767  
 DATE 10/18/2023  
 NORTH DAKOTA





SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0130	REMOVAL OF CURB & GUTTER		
		Sta 10+71.35 to Sta 10+87.75 Lt	LF	17
		Sta 10+71.10 to Sta 11+08.98 Rt	LF	38
202	0174	REMOVAL OF PIPE ALL TYPES & SIZES		
		Sta 11+11.00 Rt	LF	74
202	0230	REMOVAL OF INLETS		
		Sta 11+11.38 Lt	EA	1
		Sta 11+11.00 Rt	EA	1
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 6+45.04 to Sta 6+82.90 Lt	EA	1
		Sta 6+85.22 to Sta 7+21.30 Rt	EA	1

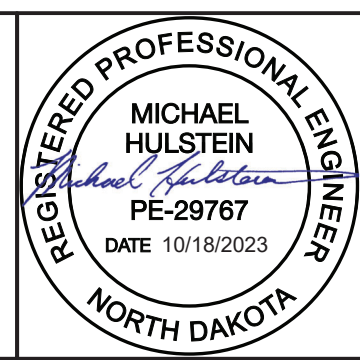
SPEC	CODE	BID ITEM	UNIT	QUANTITY
764	1990	REMOVE CONCRETE SAFETY SHAPE TRANSITION		
		Sta 9+17.23 to Sta 9+31.00 Lt	EA	1
		Sta 9+17.45 to Sta 9+31.00 Rt	EA	1
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 6+82.90 to Sta 9+22.32 Lt	LF	240
		Sta 7+21.30 to Sta 9+22.43 Rt	LF	202
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 9+08.00 to Sta 9+30.00	SY	109
		Sta 10+70.00 to Sta 10+92.00	SY	107
411	0105	MILLING PAVEMENT SURFACE		
		Sta 8+58.00 to Sta 9+08.00	SY	243
		Sta 10+92.00 to Sta 11+42.00	SY	237

Existing ROW out of view

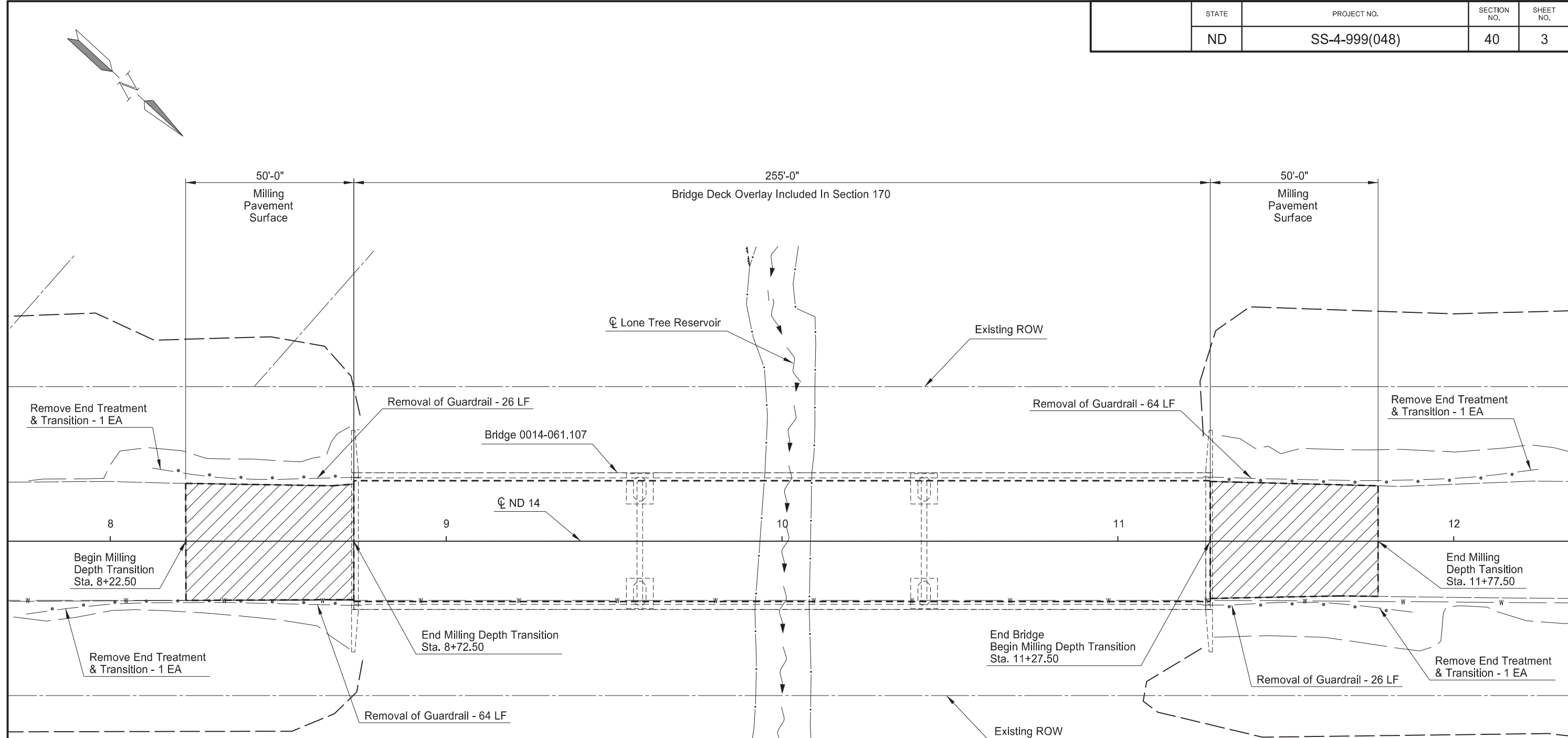
Removals

Bridge 0002-149.111R  
US 2 Soo Line Separation

Ward County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	40	3



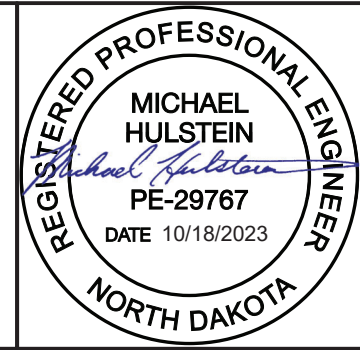
SPEC	CODE	BID ITEM	UNIT	QUANTITY
411	0105	MILLING PAVEMENT SURFACE		
		Sta 8+22.50 to Sta 8+72.50	SY	191
		Sta 11+27.50 to Sta 11+77.50	SY	188
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 8+11.18 to Sta 8+74.84 Rt	LF	64
		Sta 8+49.04 to Sta 8+74.90 Lt	LF	26
		Sta 11+25.28 to Sta 11+51.34 Rt	LF	26
		Sta 11+25.27 to Sta 11+88.98 Lt	LF	64
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 7+73.78 to Sta 8+11.18 Rt	EA	1
		Sta 8+11.61 to Sta 8+49.04 Lt	EA	1
		Sta 11+51.34 to Sta 11+88.79 Rt	EA	1
		Sta 11+88.98 to Sta 12+26.39 Lt	EA	1

Milling Pavement Surface

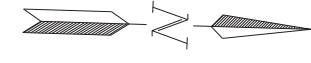
Removals  
Removals

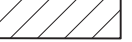
Bridge 0014-061.107  
ND 14 Lone Tree Reservoir

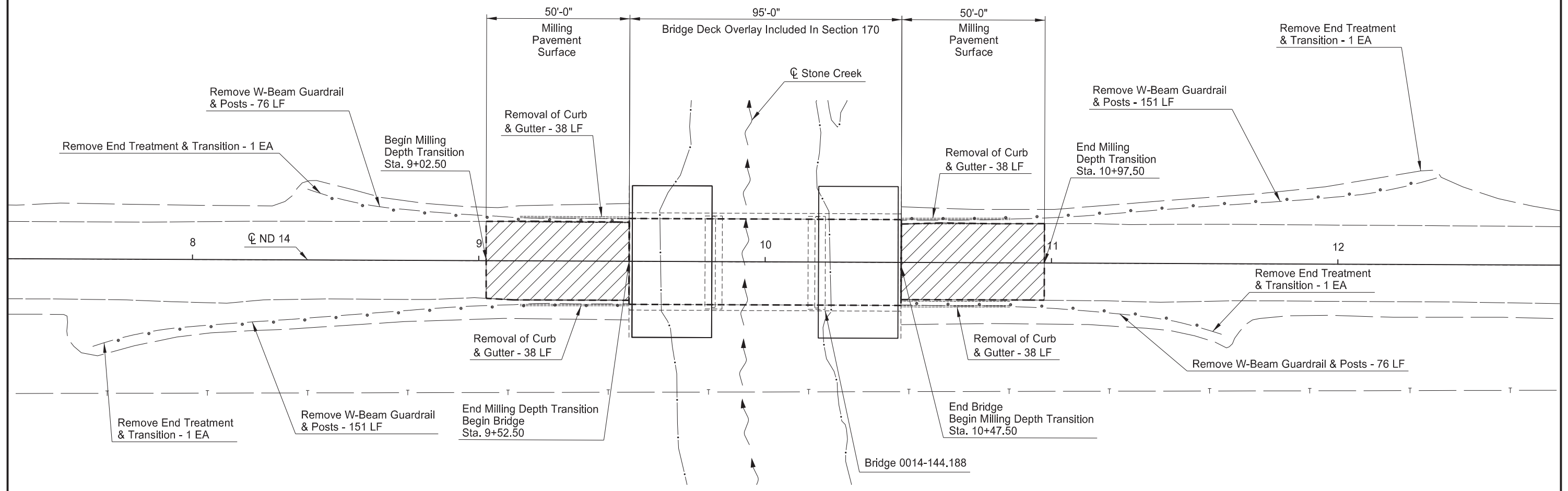
Sheridan County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	40	4




 Milling Pavement Surface  
 Existing ROW out of view



SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0130	REMOVAL OF CURB & GUTTER		
		Sta 9+14.38 to Sta 9+52.50 Rt	LF	38
		Sta 9+14.38 to Sta 9+52.50 Lt	LF	38
		Sta 10+46.49 to Sta 10+85.51 Rt	LF	38
		Sta 10+46.49 to Sta 10+85.51 Lt	LF	38
411	0105	MILLING PAVEMENT SURFACE		
		Sta 9+02.50 to Sta 9+52.50	SY	152
		Sta 10+47.50 to Sta 10+97.50	SY	149

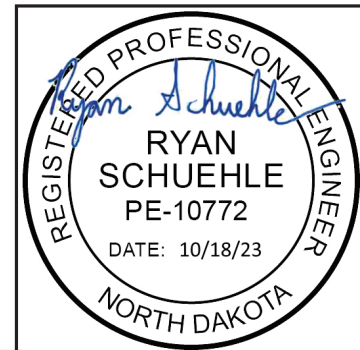
SPEC	CODE	BID ITEM	UNIT	QUANTITY
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 8+02.23 to Sta 9+53.04 Rt	LF	151
		Sta 8+77.06 to Sta 9+53.11 Lt	LF	76
		Sta 10+46.49 to Sta 11+22.51 Rt	LF	76
		Sta 10+46.96 to Sta 11+97.42 Lt	LF	151
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 7+65.25 to Sta 8+02.23 Rt	EA	1
		Sta 8+40.06 to Sta 8+77.06 Lt	EA	1
		Sta 11+22.51 to Sta 11+59.51 Rt	EA	1
		Sta 11+97.42 to Sta 12+34.43 Lt	EA	1

Removals	
Bridge 0014-144.188 ND 14 Stone Creek	
Bottineau County	

Wetland Impact Table												
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands <sup>1</sup>	Wetland Impact					Wetland Mitigation		
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS
4	Sec.32, T155N, R82W	Basin	Natural	Y	-	-						
5A	Sec.32, T155N, R82W	Ditch	Created	Y	-	-						
5B	Sec.32, T155N, R82W	Ditch	Created	Y	-	-						
6	Sec.32, T155N, R82W	Ditch	Created	Y	-	-						
8	Sec.32, T155N, R82W	Ditch	Created	Y	-	-						
9	Sec.32, T155N, R82W	Basin	Natural	Y	-	-						
10	Sec.29, T155N, R82W	Ditch	Created	Y	-	-						
11	Sec.29, T155N, R82W	Ditch	Created	Y	-	-						
12	Sec.29, T155N, R82W	Ditch	Created	Y	-	-						
13	Sec.29, T155N, R82W	Ditch	Created	Y	-	-						
14	Sec.29, T155N, R82W	Ditch	Created	Y	-	-						
Totals					0.000	0.000						

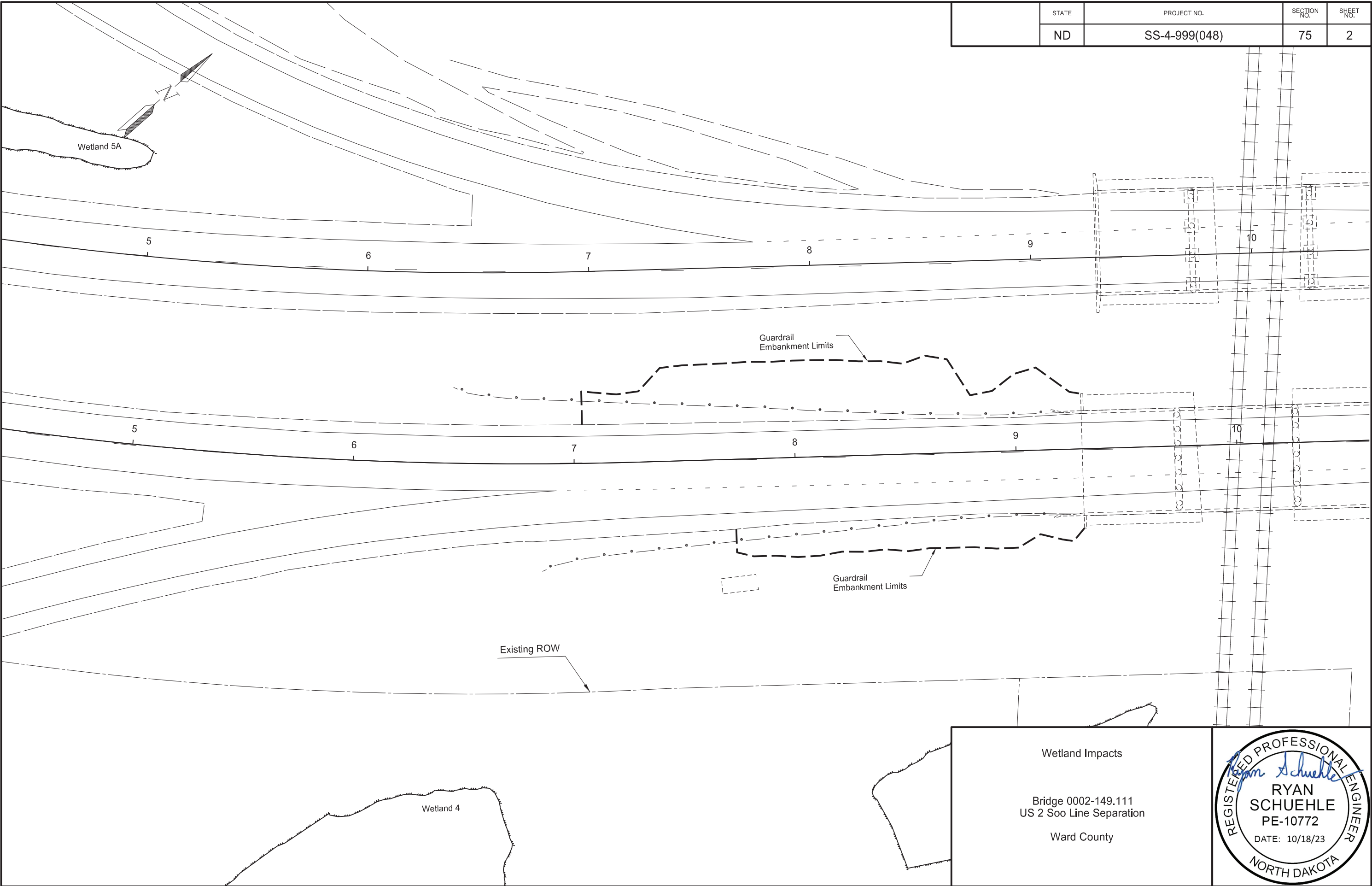
<sup>1</sup> Wetlands assumed jurisdictional for permitting purposes.

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	-	Temporary Wetland JD	-
Natural/Non-JD (Fill/Drain)	-	Non-JD Wetland Temporary	-
Artificial/JD (Fill/Drain)	-		
Artificial /Non-JD (Fill/Drain)	-	Permanent OW	-
<b>Total</b>	<b>0.000</b>	Temporary OW	-
JD Natural (Cut)	-	Permanent OW-d	-
JD Artificial (Cut)	-	Temporary OW-d	-
Non-JD Natural (Cut)	-		
Non-JD Artificial (Cut)	-		
<b>Total</b>	<b>0.000</b>		



Wetlands Mitigation and Environmental  
Bridge 0002-149.111

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	75	2



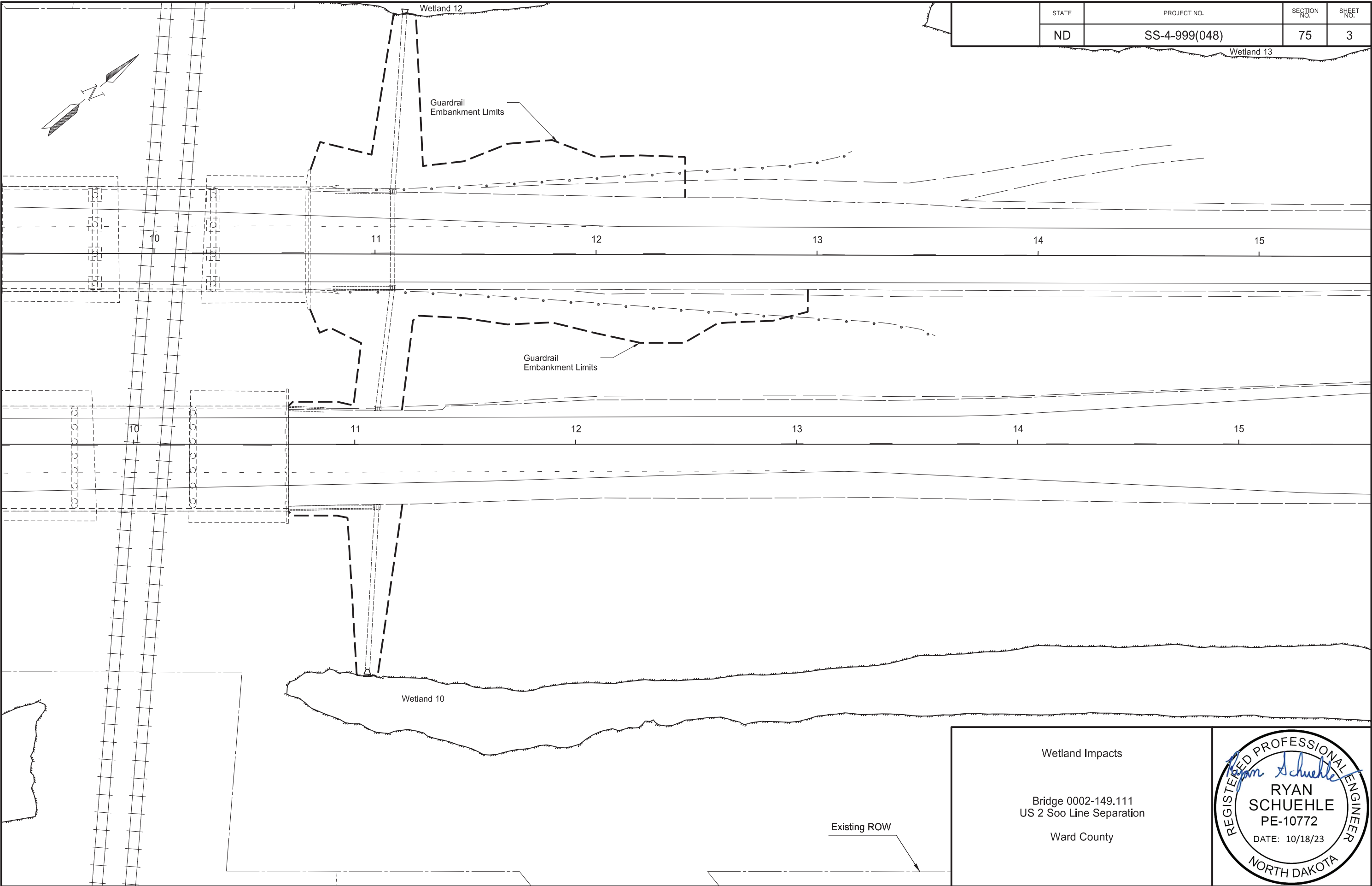
Wetland Impacts

Bridge 0002-149.111  
US 2 Soo Line Separation

Ward County



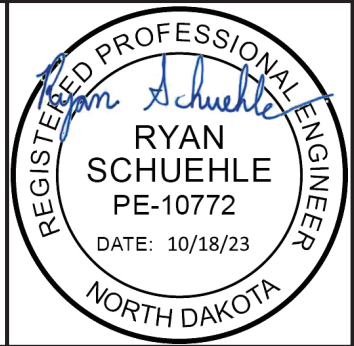
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	75	3



Wetland Impacts

Bridge 0002-149.111  
US 2 Soo Line Separation

Ward County

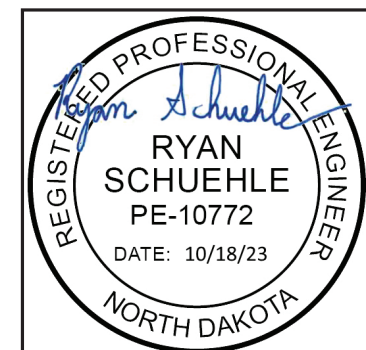


Wetland Impact Table												
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands <sup>1</sup>	Wetland Impact					Wetland Mitigation		
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS
1A	Sec.26, T149N, R75W	Fringe	Natural	Y	-	-						
1C	Sec.23, T149N, R75W	Fringe	Natural	Y	-	-						
1D	Sec.23, T149N, R75W	Fringe	Natural	Y	-	-						
2	Sec.23, T149N, R75W	Basin	Natural	Y	-	-						
3	Sec.23, T149N, R75W	Basin	Natural	Y	-	-						
Totals					0.000	0.000						

Other Waters Impact Table										
Number	Location	Type	Feature	USACE Jurisdictional <sup>1</sup>	Impacts to Other Waters					
					Acres			Linear Feet		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)
OW-1B	Sec.23, T149N, R75W	River	Natural	Y	-	-				
Totals					0.000	0.000				

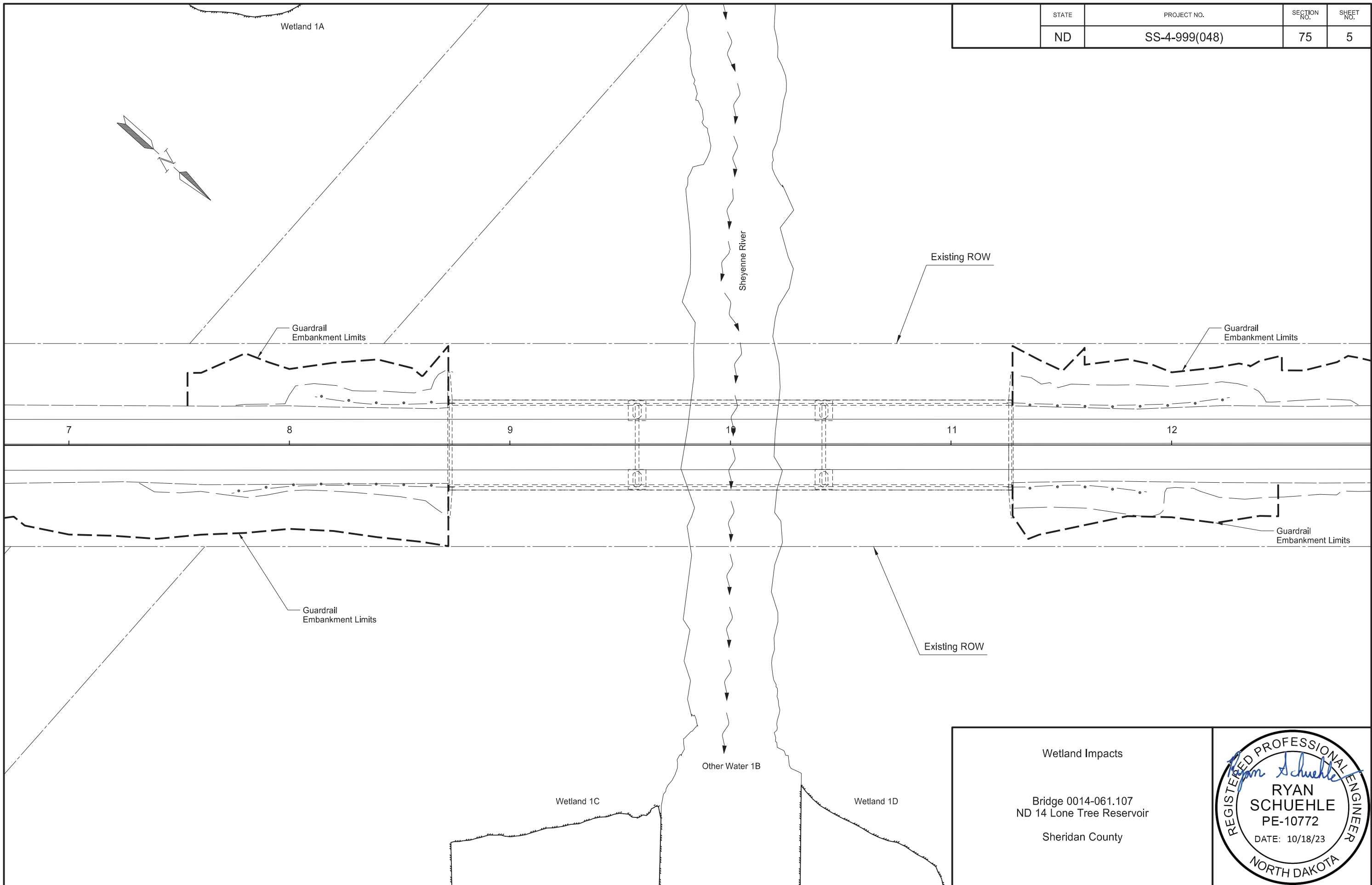
<sup>1</sup> Wetlands assumed jurisdictional for permitting purposes.

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	-	Temporary Wetland JD	-
Natural/Non-JD (Fill/Drain)	-	Non-JD Wetland Temporary	-
Artificial/JD (Fill/Drain)	-		
Artificial /Non-JD (Fill/Drain)	-	Permanent OW	-
<b>Total</b>	<b>0.000</b>	Temporary OW	-
JD Natural (Cut)	-	Permanent OW-d	-
JD Artificial (Cut)	-	Temporary OW-d	-
Non-JD Natural (Cut)	-		
Non-JD Artificial (Cut)	-		
<b>Total</b>	<b>0.000</b>		



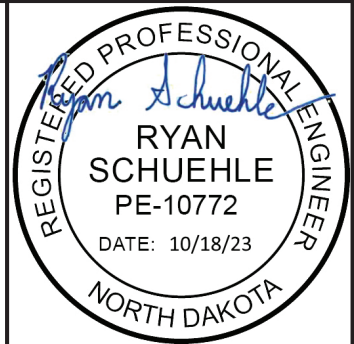
Wetlands Mitigation and Environmental  
Bridge 0014-061.107

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	75	5



Wetland Impacts

Bridge 0014-061.107  
 ND 14 Lone Tree Reservoir  
 Sheridan County





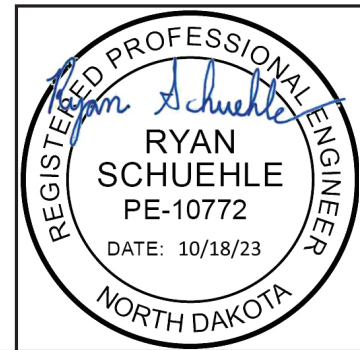
Wetland Impact Table													
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands <sup>1</sup>	Wetland Impact					Wetland Mitigation			
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed			
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS	
15A	Sec.23, T160N, R78W	Ditch	Created	Y	-	-							
15B	Sec.23, T160N, R78W	Ditch	Created	Y	-	-							
15C	Sec.14 & 23, T160N, R78W	Fringe	Natural	Y	-	-							
15E	Sec.22, T160N, R78W	Ditch	Created	Y	-	-							
15F	Sec.22, T160N, R78W	Ditch	Created	Y	-	-							
15G	Sec.15 & 22, T160N, R78W	Fringe	Natural	Y	-	-							
15H	Sec.15, T160N, R78W	Fringe	Natural	Y	-	-							
15I	Sec.14, T160N, R78W	Fringe	Natural	Y	-	-							
16A	Sec.14, T160N, R78W	Ditch	Ditch	Y	-	-							
16B	Sec.14, T160N, R78W	Ditch	Ditch	Y	-	-							
Totals					0.000	0.000							

Other Waters Impact Table															
Number	Location	Type	Feature	USACE Jurisdictional <sup>1</sup>	Impacts to Other Waters						Other Water Mitigation				
					Acres			Linear Feet			Mitigation Proposed			USACE Mitigation Bank	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)
OW-15D	Sec.14 & 15, T160N, R78W	Stream	Natural	Y	0.048	0.040	0.000		73.0						
Totals					0.048	0.040	0.000	0.000	73.0	0.000				0.000	

<sup>1</sup> Wetlands assumed jurisdictional for permitting purposes.

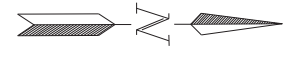
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)		Temporary Wetland JD	
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	
Artificial/JD (Fill/Drain)			
Artificial /Non-JD (Fill/Drain)	-	Permanent OW	0.040 (Fill)
<b>Total</b>	<b>0.000</b>	Temporary OW	0.005
JD Natural (Cut)	-	Permanent OW-d	-
JD Artificial (Cut)	-	Temporary OW-d	-
Non-JD Natural (Cut)	-		
Non-JD Artificial (Cut)	-		
<b>Total</b>	<b>0.000</b>		

Mitigation Summary Table					
	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only					
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



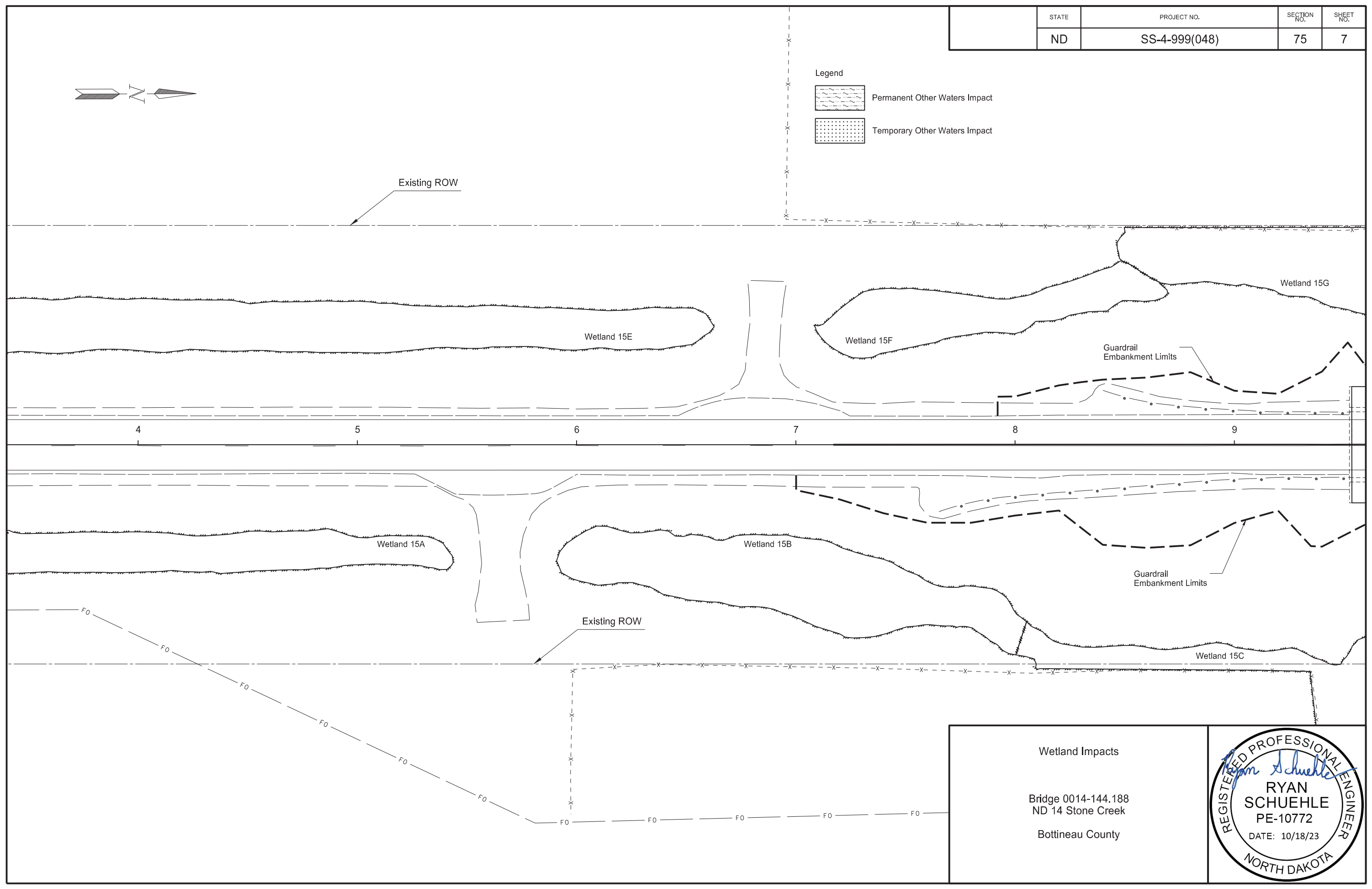
Wetlands Mitigation and Environmental  
Bridge 0014-144.188

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	75	7



Legend

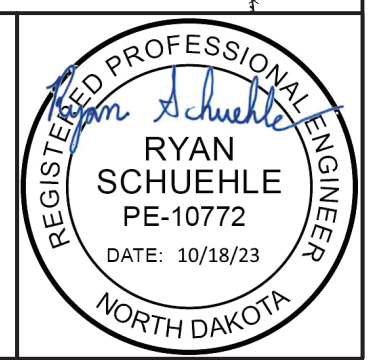
- Permanent Other Waters Impact
- Temporary Other Waters Impact



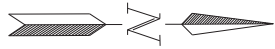
Wetland Impacts

Bridge 0014-144.188  
 ND 14 Stone Creek

Bottineau County

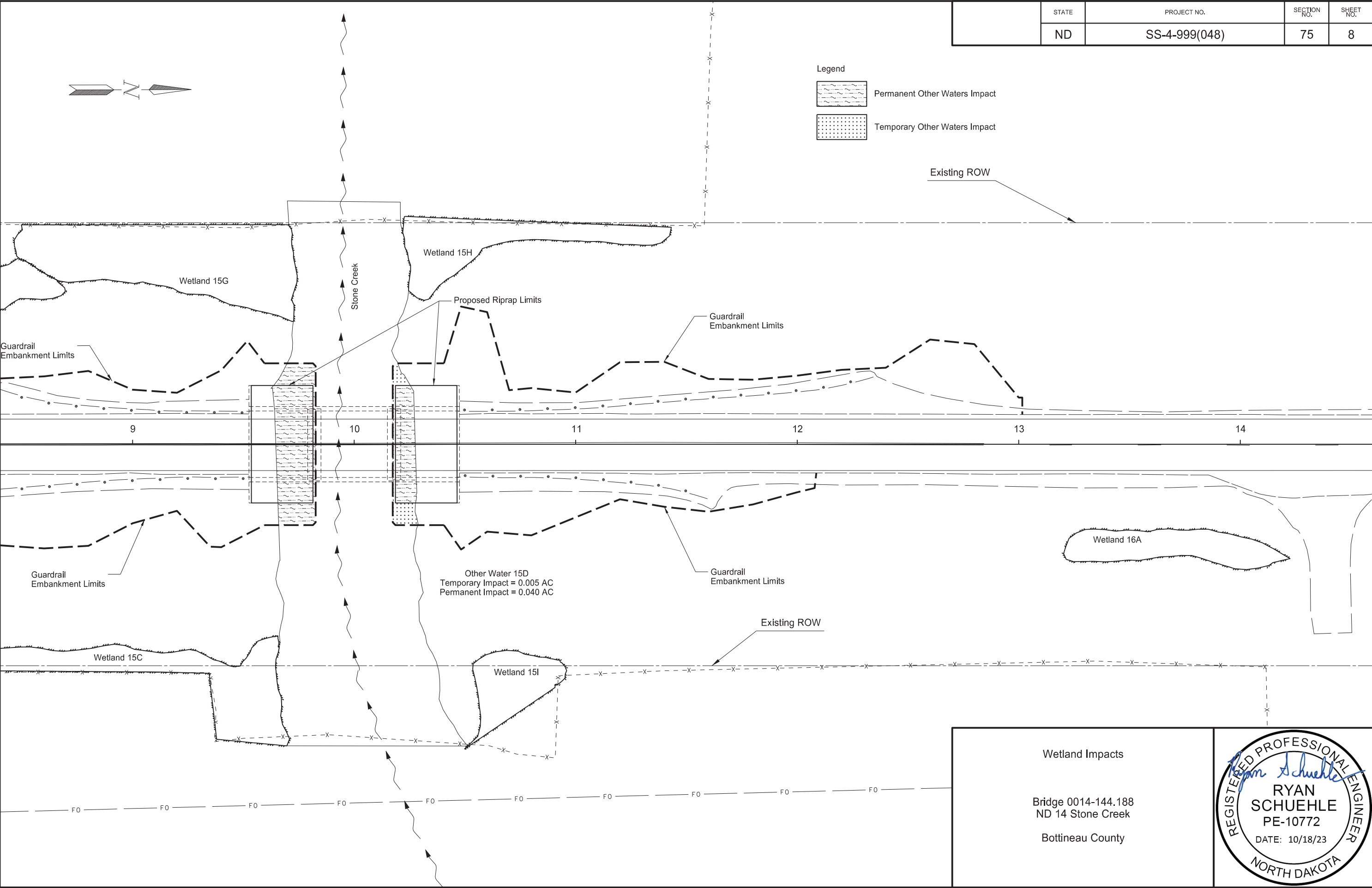


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	75	8



Legend

- Permanent Other Waters Impact
- Temporary Other Waters Impact



Other Water 15D  
 Temporary Impact = 0.005 AC  
 Permanent Impact = 0.040 AC

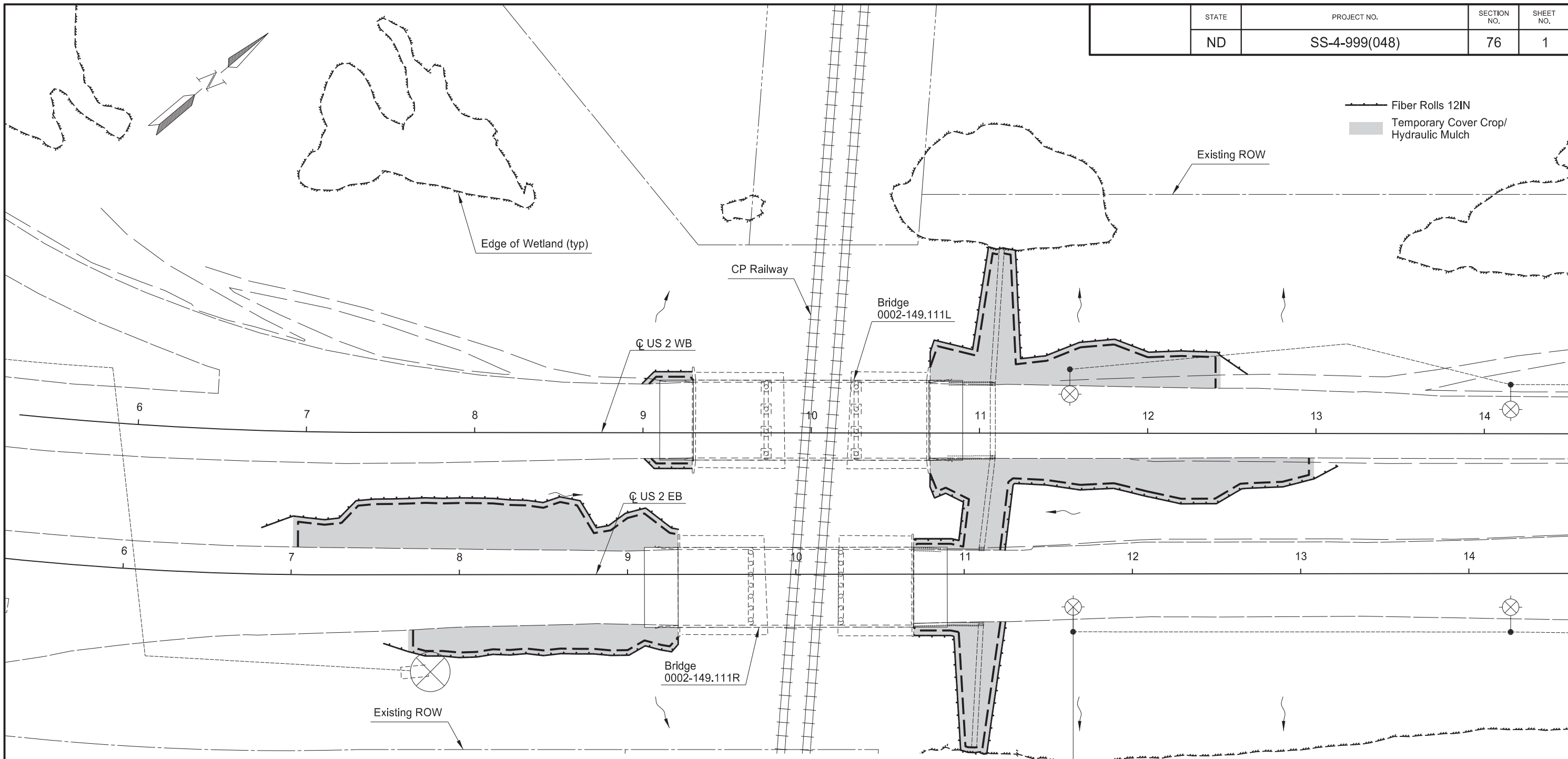
Wetland Impacts

Bridge 0014-144.188  
 ND 14 Stone Creek

Bottineau County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	76	1



SPEC	CODE	BID ITEM	UNIT	QUANTITY
Bridge 0002-149.111L				
251	2000	TEMPORARY COVER CROP		
		Sta 8+99.31 to Sta 9+29.33	ACRE	0.01
		Sta 10+70.00 to Sta 12+98.90	ACRE	0.22
253	0201	HYDRAULIC MULCH		
		Sta 8+99.31 to Sta 9+29.33	ACRE	0.01
		Sta 10+70.00 to Sta 12+98.90	ACRE	0.22
261	0112	FIBER ROLLS 12IN		
		Sta 8+99.35 to Sta 9+29.31	LF	65
		Sta 10+70.70 to Sta 13+13.22	LF	560
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 8+99.35 to Sta 9+29.31	LF	65
		Sta 10+70.70 to Sta 13+13.22	LF	560

SPEC	CODE	BID ITEM	UNIT	QUANTITY
Bridge 0002-149.111R				
251	2000	TEMPORARY COVER CROP		
		Sta 7+00.82 to Sta 9+30.00	ACRE	0.20
		Sta 10+70.70 to Sta 11+31.04	ACRE	0.07
253	0201	HYDRAULIC MULCH		
		Sta 7+00.82 to Sta 9+30.00	ACRE	0.20
		Sta 10+70.70 to Sta 11+31.04	ACRE	0.07
261	0112	FIBER ROLLS 12IN		
		Sta 6+81.65 to Sta 9+30.00	LF	457
		Sta 10+70.70 to Sta 11+31.04	LF	278
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 6+81.65 to Sta 9+30.00	LF	457
		Sta 10+70.70 to Sta 11+31.04	LF	278

Existing ROW

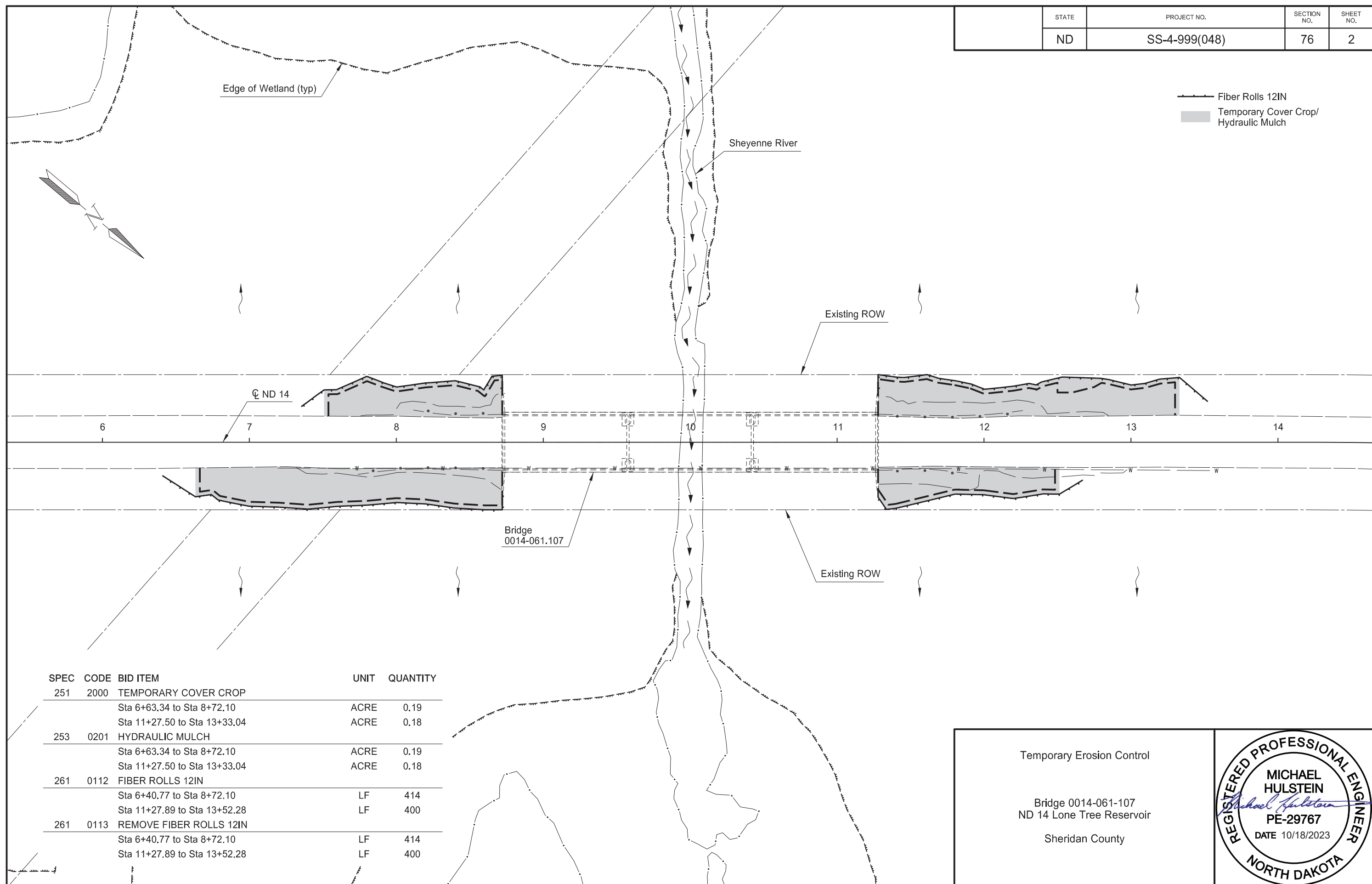
Temporary Erosion Control

Bridge 0002-149.111 L/R  
US 2 Soo Line Separation

Ward County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	76	2



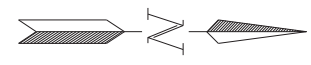
SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		Sta 6+63.34 to Sta 8+72.10	ACRE	0.19
		Sta 11+27.50 to Sta 13+33.04	ACRE	0.18
253	0201	HYDRAULIC MULCH		
		Sta 6+63.34 to Sta 8+72.10	ACRE	0.19
		Sta 11+27.50 to Sta 13+33.04	ACRE	0.18
261	0112	FIBER ROLLS 12IN		
		Sta 6+40.77 to Sta 8+72.10	LF	414
		Sta 11+27.89 to Sta 13+52.28	LF	400
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 6+40.77 to Sta 8+72.10	LF	414
		Sta 11+27.89 to Sta 13+52.28	LF	400

Temporary Erosion Control

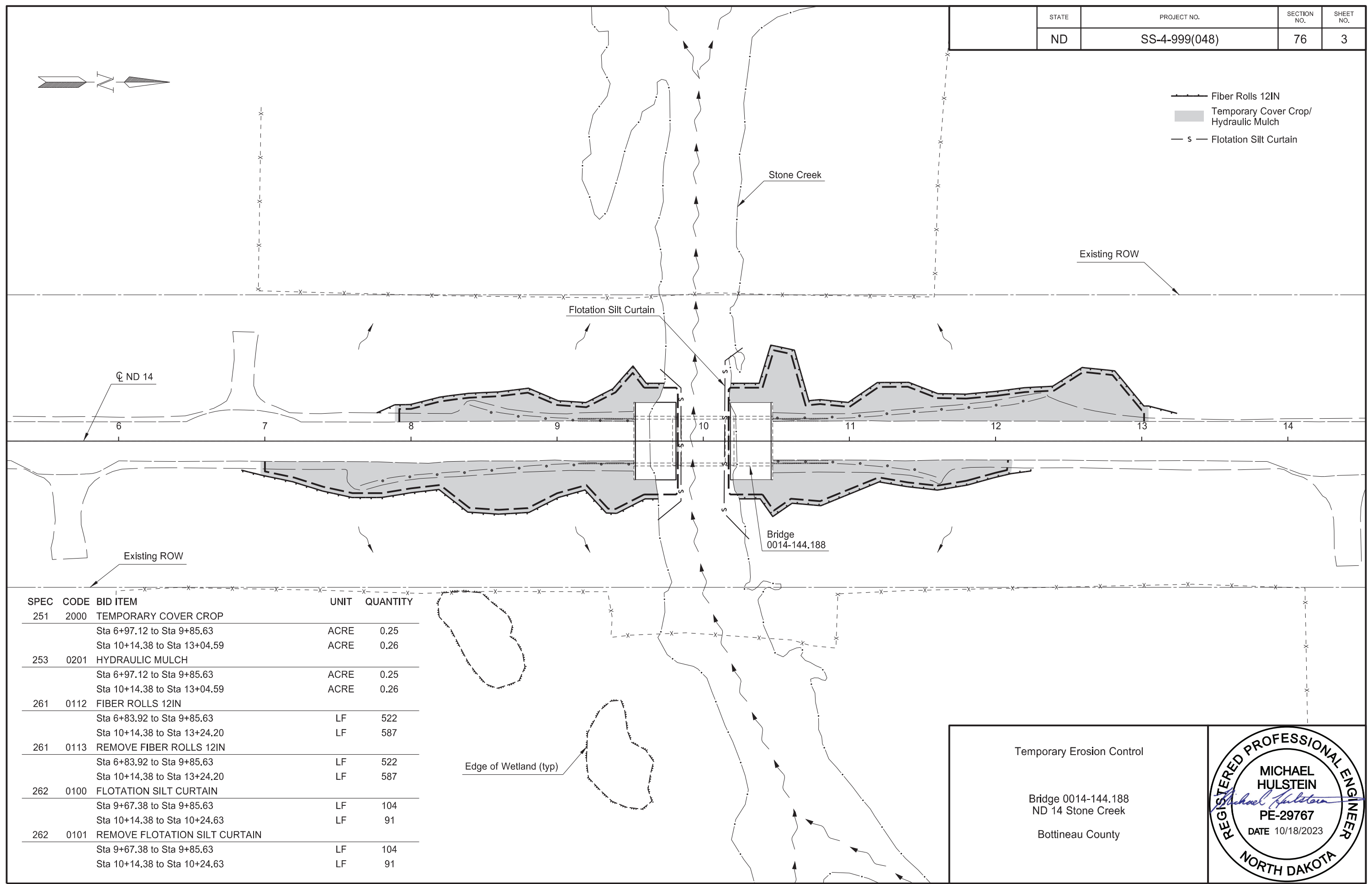
Bridge 0014-061-107  
ND 14 Lone Tree Reservoir  
Sheridan County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	76	3



- Fiber Rolls 12IN
- Temporary Cover Crop/  
Hydraulic Mulch
- Flotation Silt Curtain



SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		Sta 6+97.12 to Sta 9+85.63	ACRE	0.25
		Sta 10+14.38 to Sta 13+04.59	ACRE	0.26
253	0201	HYDRAULIC MULCH		
		Sta 6+97.12 to Sta 9+85.63	ACRE	0.25
		Sta 10+14.38 to Sta 13+04.59	ACRE	0.26
261	0112	FIBER ROLLS 12IN		
		Sta 6+83.92 to Sta 9+85.63	LF	522
		Sta 10+14.38 to Sta 13+24.20	LF	587
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 6+83.92 to Sta 9+85.63	LF	522
		Sta 10+14.38 to Sta 13+24.20	LF	587
262	0100	FLOTATION SILT CURTAIN		
		Sta 9+67.38 to Sta 9+85.63	LF	104
		Sta 10+14.38 to Sta 10+24.63	LF	91
262	0101	REMOVE FLOTATION SILT CURTAIN		
		Sta 9+67.38 to Sta 9+85.63	LF	104
		Sta 10+14.38 to Sta 10+24.63	LF	91

Edge of Wetland (typ)

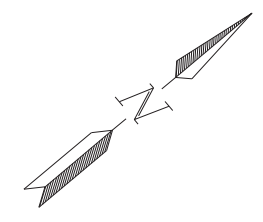
Temporary Erosion Control

Bridge 0014-144.188  
ND 14 Stone Creek

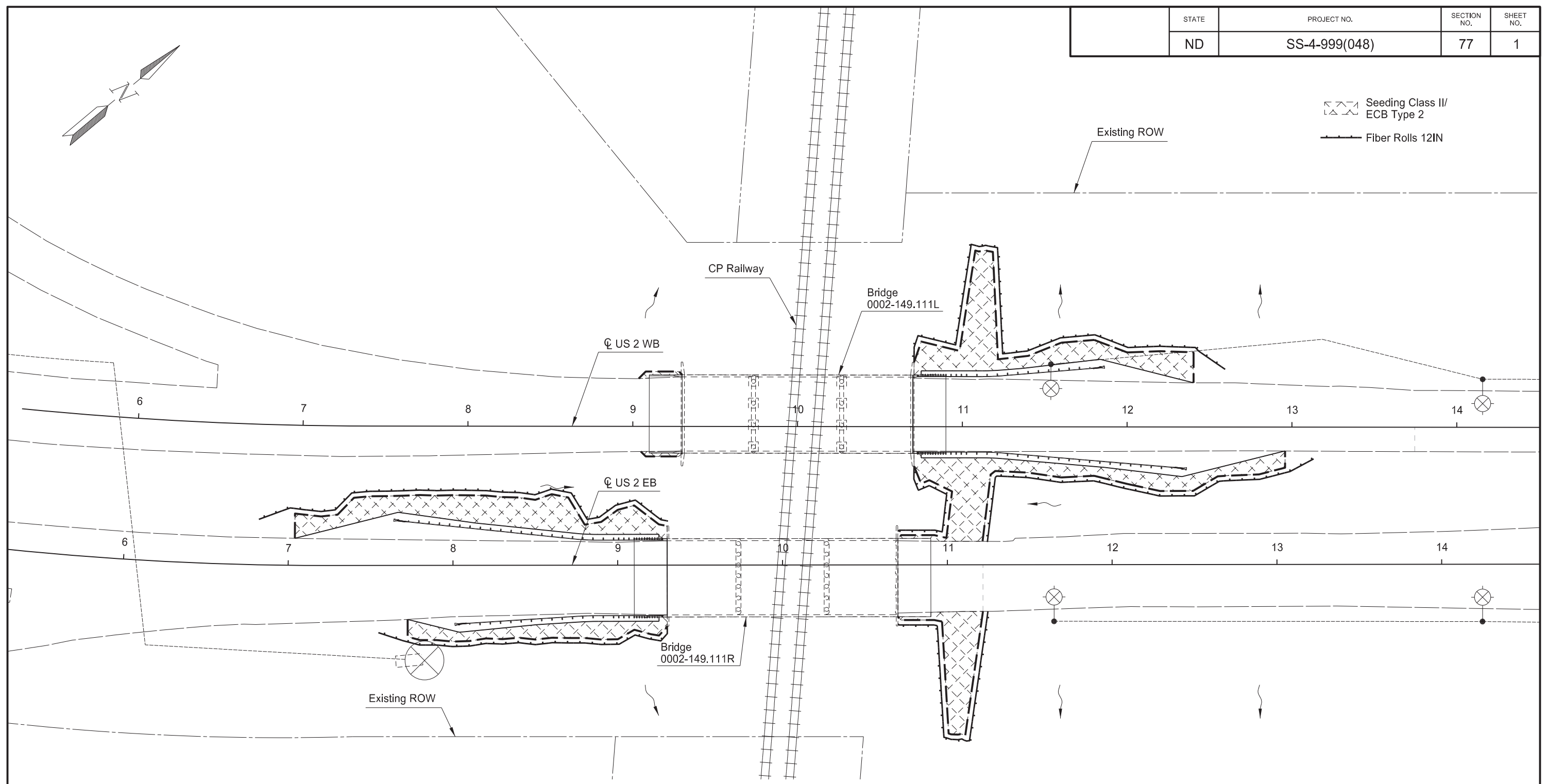
Bottineau County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	77	1



- Seeding Class II/  
ECB Type 2
- Fiber Rolls 12IN



Bridge 0002-149.111L

Bridge 0002-149.111R

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	SEEDING CLASS II		
		Sta 9+02.31 to Sta 9+29.33	ACRE	0.01
		Sta 10+70.00 to Sta 12+95.90	ACRE	0.12
255	0102	ECB TYPE 2		
		Sta 9+02.31 to Sta 9+29.33	SY	12
		Sta 10+70.00 to Sta 12+95.90	SY	580
261	0112	FIBER ROLLS 12IN		
		Sta 8+99.35 to Sta 9+29.31	LF	65
		Sta 10+70.70 to Sta 13+13.22	LF	560

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	SEEDING CLASS II		
		Sta 7+03.82 to Sta 9+30.00	ACRE	0.11
		Sta 10+70.70 to Sta 11+28.04	ACRE	0.06
255	0102	ECB TYPE 2		
		Sta 7+03.88 to Sta 9+30.00	SY	492
		Sta 10+70.00 to Sta 11+26.34	SY	249
261	0112	FIBER ROLLS 12IN		
		Sta 6+81.65 to Sta 9+30.00	LF	457
		Sta 10+70.70 to Sta 11+31.04	LF	278

Existing ROW

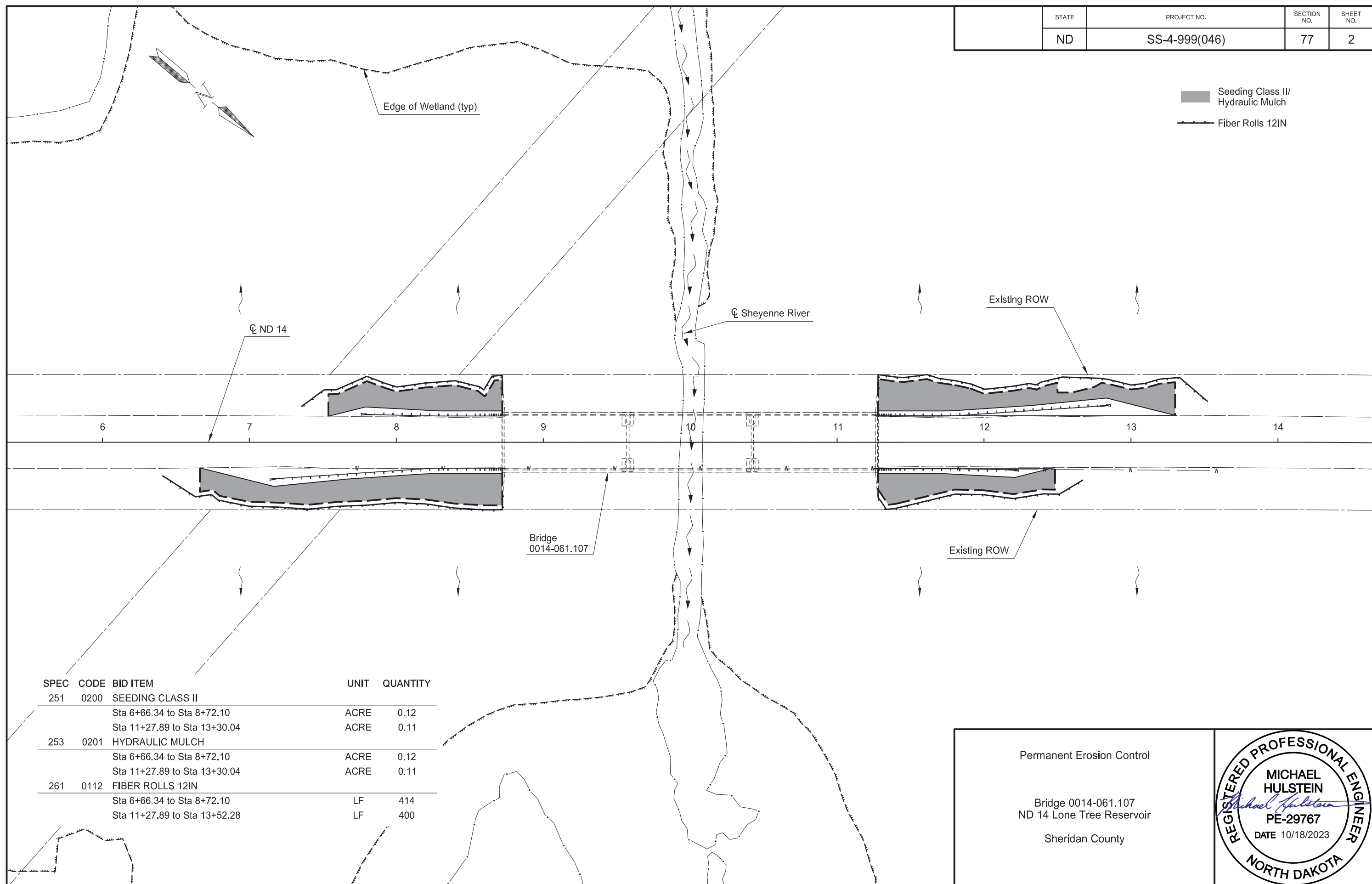
Permanent Erosion Control

Bridge 0002-149.111 L/R  
US 2 Soo Line Separation

Ward County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(046)	77	2



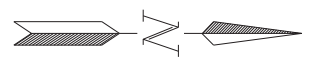
SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	0200	SEEDING CLASS II		
		Sta 6+66.34 to Sta 8+72.10	ACRE	0.12
		Sta 11+27.89 to Sta 13+30.04	ACRE	0.11
253	0201	HYDRAULIC MULCH		
		Sta 6+66.34 to Sta 8+72.10	ACRE	0.12
		Sta 11+27.89 to Sta 13+30.04	ACRE	0.11
261	0112	FIBER ROLLS 12IN		
		Sta 6+66.34 to Sta 8+72.10	LF	414
		Sta 11+27.89 to Sta 13+52.28	LF	400




Permanent Erosion Control

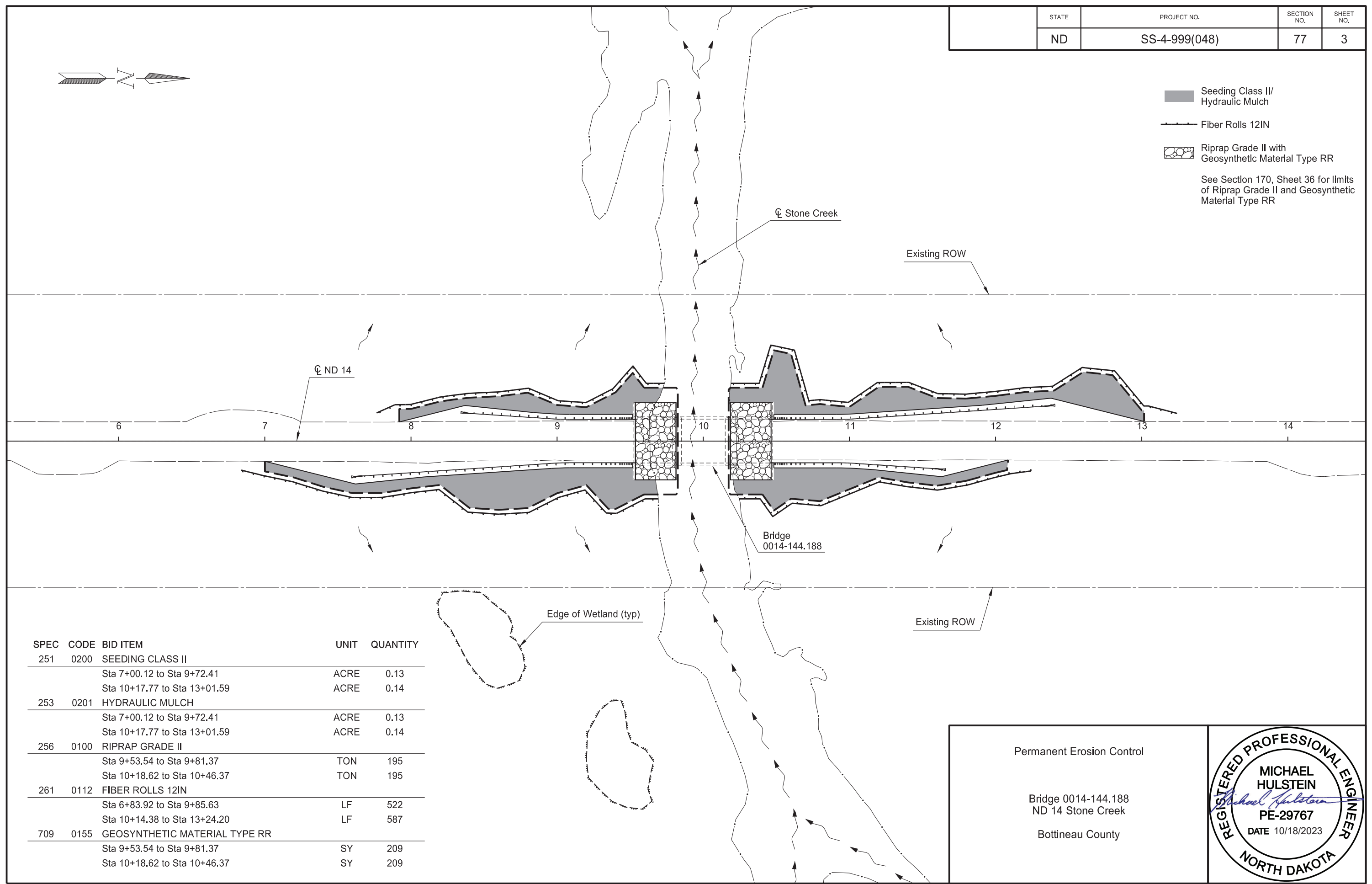
Bridge 0014-061.107  
ND 14 Lone Tree Reservoir  
Sheridan County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	77	3



-  Seeding Class II/  
Hydraulic Mulch
  -  Fiber Rolls 12IN
  -  Riprap Grade II with  
Geosynthetic Material Type RR
- See Section 170, Sheet 36 for limits  
of Riprap Grade II and Geosynthetic  
Material Type RR

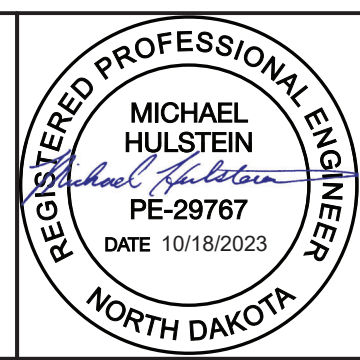


SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	0200	SEEDING CLASS II		
		Sta 7+00.12 to Sta 9+72.41	ACRE	0.13
		Sta 10+17.77 to Sta 13+01.59	ACRE	0.14
253	0201	HYDRAULIC MULCH		
		Sta 7+00.12 to Sta 9+72.41	ACRE	0.13
		Sta 10+17.77 to Sta 13+01.59	ACRE	0.14
256	0100	RIPRAP GRADE II		
		Sta 9+53.54 to Sta 9+81.37	TON	195
		Sta 10+18.62 to Sta 10+46.37	TON	195
261	0112	FIBER ROLLS 12IN		
		Sta 6+83.92 to Sta 9+85.63	LF	522
		Sta 10+14.38 to Sta 13+24.20	LF	587
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Sta 9+53.54 to Sta 9+81.37	SY	209
		Sta 10+18.62 to Sta 10+46.37	SY	209

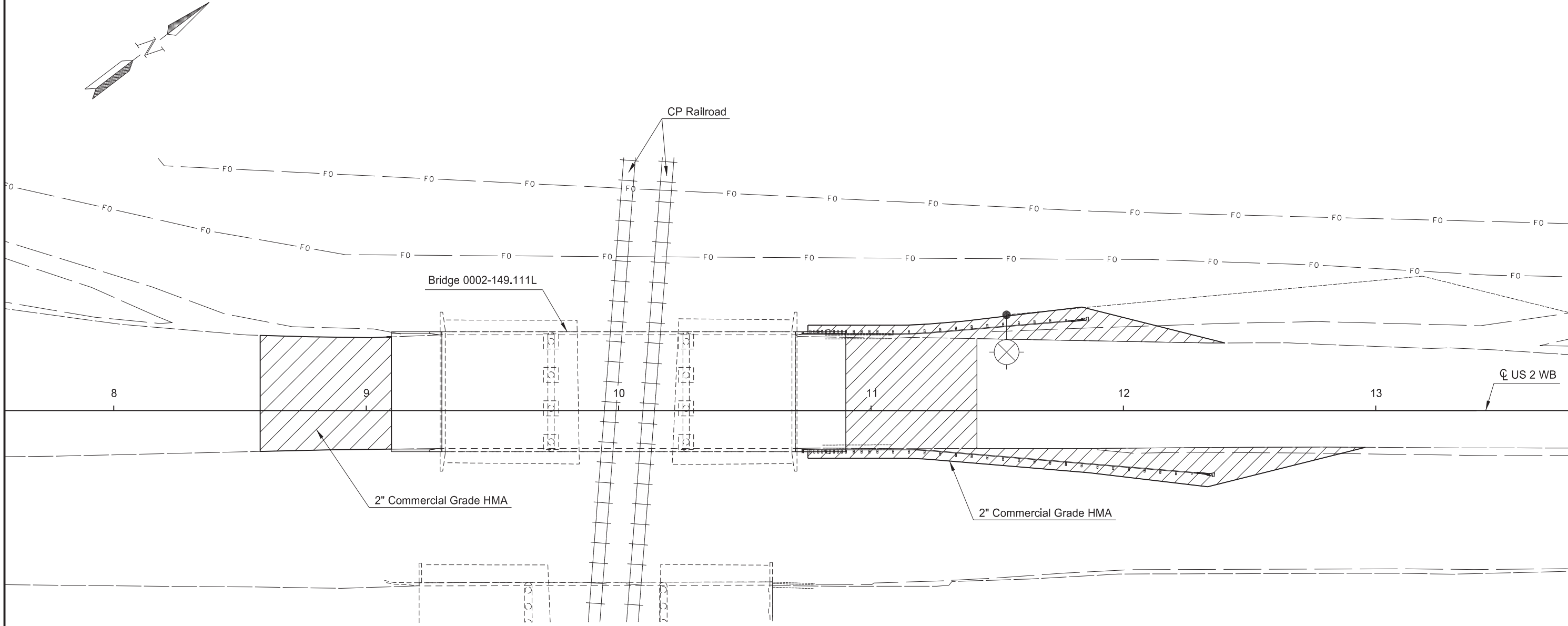
Permanent Erosion Control

Bridge 0014-144.188  
ND 14 Stone Creek


Bottineau County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	90	1



SPEC	CODE	BID ITEM	UNIT	QUANTITY
401	0060	PRIME COAT		
		Sta 8+57.99 to Sta 9+10.00	GAL	13
		Sta 10+75.01 to Sta 12+95.85	GAL	29
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 8+57.99 to Sta 9+10.00	TON	31
		Sta 10+75.01 to Sta 12+95.85	TON	64

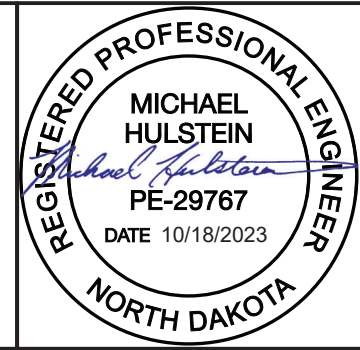
 2" Commercial Grade HMA

Existing ROW out of view

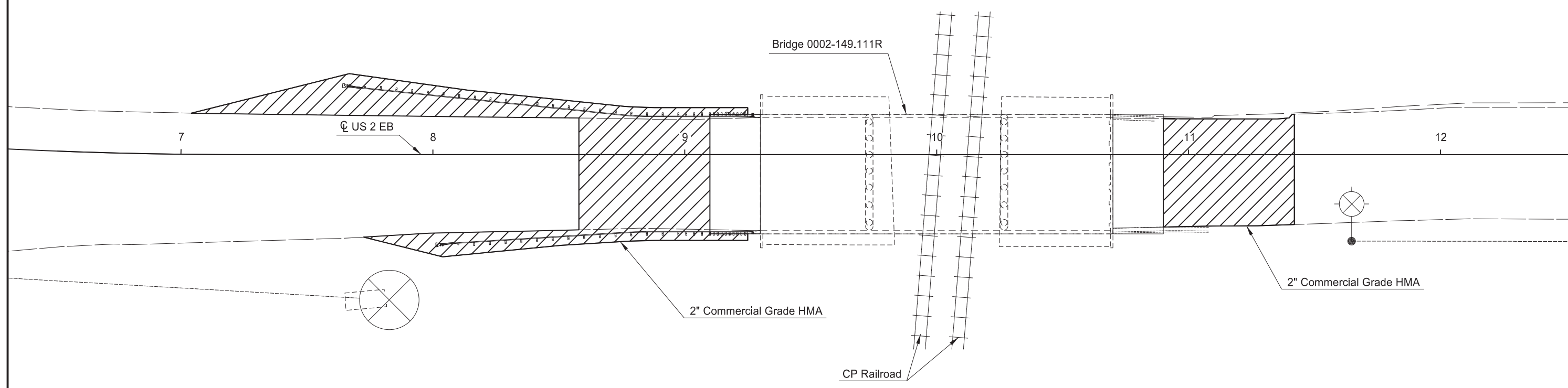
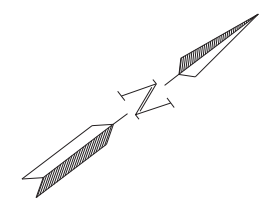
Paving Details


Bridge 0002-149.111L  
US 2 Soo Line Separation

Ward County



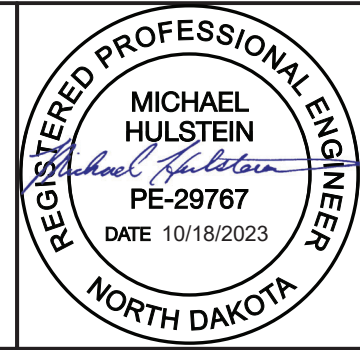
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	90	2



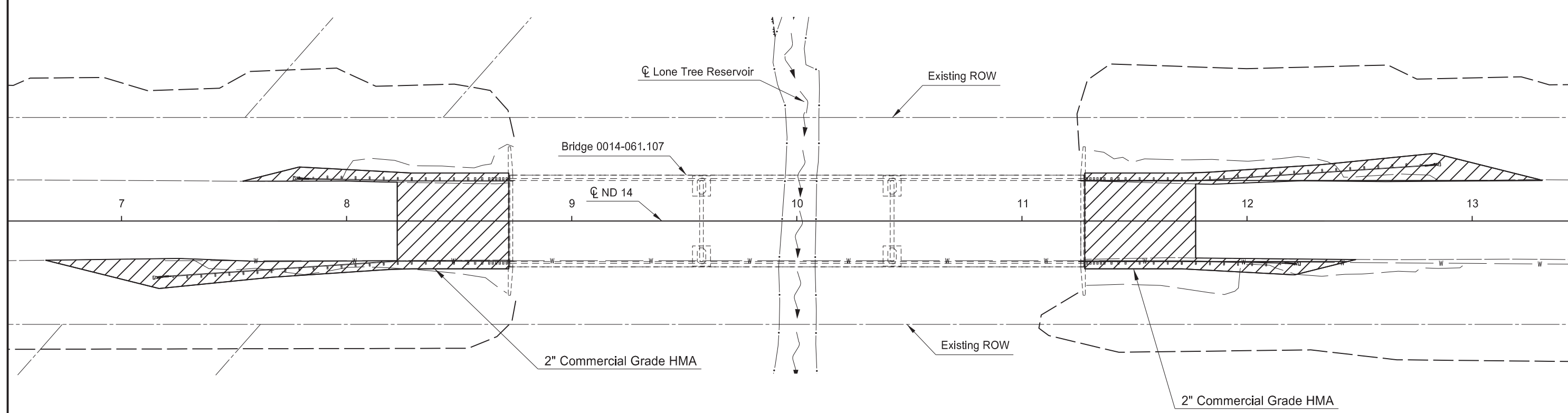
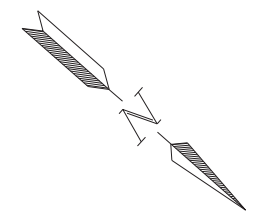
 2" Commercial Grade HMA  
 Existing ROW out of view

SPEC	CODE	BID ITEM	UNIT	QUANTITY
401	0060	PRIME COAT		
		Sta 7+03.88 to Sta 9+24.99	GAL	28
		Sta 10+90.00 to Sta 11+41.38	GAL	13
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 7+03.88 to Sta 9+24.99	TON	63
		Sta 10+90.00 to Sta 11+41.38	TON	30

Paving Details  
  
 Bridge 0002-149.111R  
 US 2 Soo Line Separation  
  
 Ward County



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	90	3



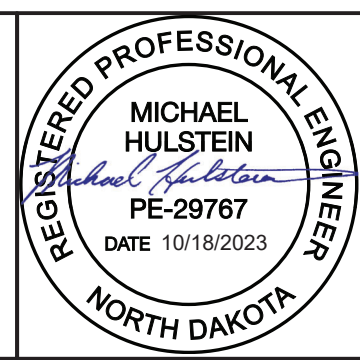
SPEC	CODE	BID ITEM	UNIT	QUANTITY
401	0060	PRIME COAT		
		Sta 6+66.34 to Sta 8+72.10	GAL	20
		Sta 11+27.89 to Sta 13+31.18	GAL	20
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 6+66.34 to Sta 8+72.10	TON	44
		Sta 11+27.89 to Sta 13+31.18	TON	44

 2" Commercial Grade HMA

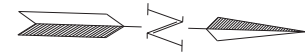
Paving Details

Bridge 0014-061.107  
ND 14 Lone Tree Reservoir

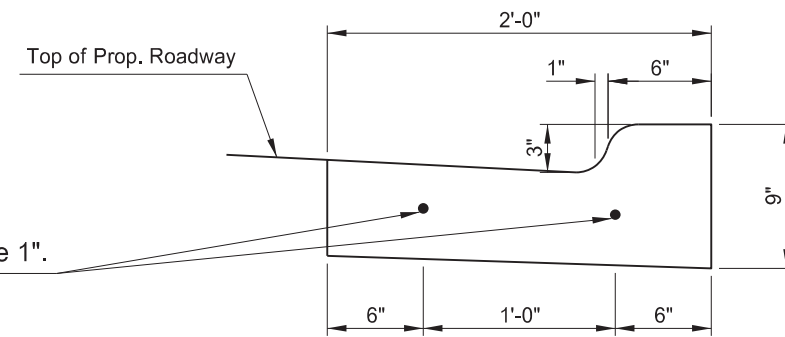
Sheridan County



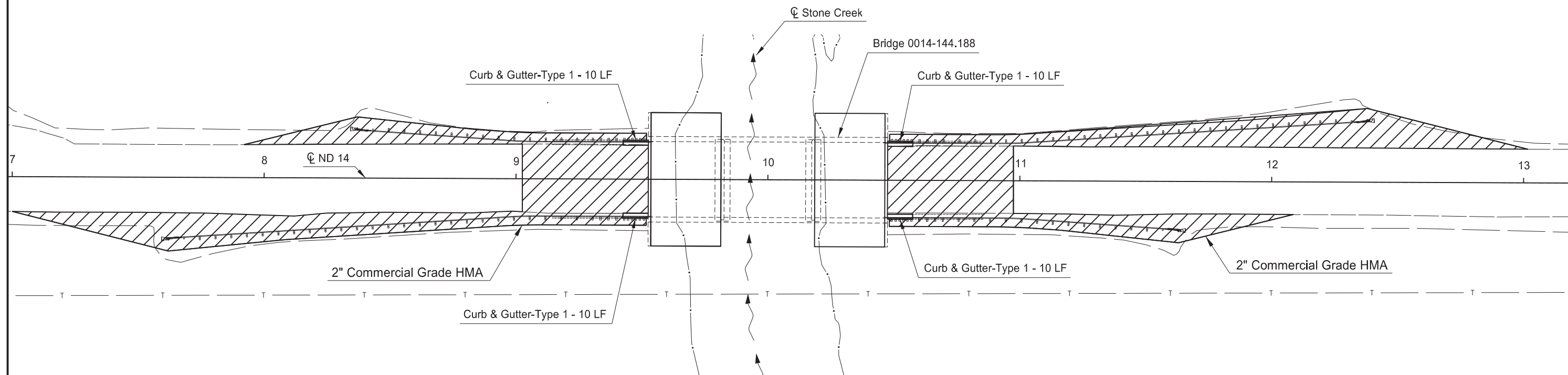
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	90	4



Install 2 - #5 bars (3'-0" long) into the bridge deck at each corner of the bridge as shown. Drill and epoxy the bars into place using a high strength adhesive meeting Section 806.02 with a minimum ultimate pullout strength of 16,000 lbs. Embed the bars 12" into the bridge deck. Include all costs to furnish and install the bars in the price bid for "Curb and Gutter - Type 1".



CURB & GUTTER-TYPE 1



SPEC	CODE	BID ITEM	UNIT	QUANTITY
401	0060	PRIME COAT		
		Sta 7+00.12 to Sta 9+52.50	GAL	24
		Sta 10+47.50 to Sta 13+01.59	GAL	25
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 7+00.12 to Sta 9+52.50	TON	53
		Sta 10+47.50 to Sta 13+01.59	TON	56
748	0140	CURB & GUTTER-TYPE 1		
		Sta 9+42.50 to Sta 9+52.50 Rt	LF	10
		Sta 9+42.50 to Sta 9+52.50 Lt	LF	10
		Sta 10+47.50 to Sta 10+57.50 Rt	LF	10
		Sta 10+47.50 to Sta 10+57.50 Lt	LF	10

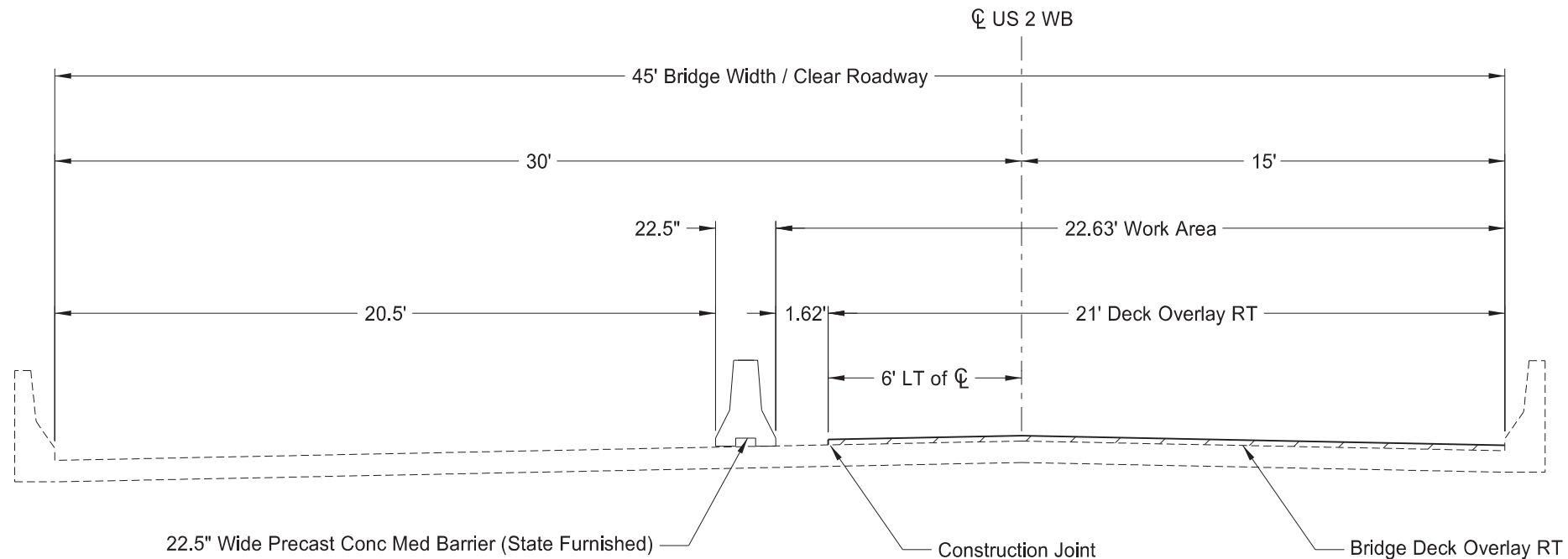
2" Commercial Grade HMA

Existing ROW out of view

<p>Paving Details</p> <p>Bridge 0014-144.188 ND 14 Stone Creek</p> <p>Bottineau County</p>	
------------------------------------------------------------------------------------------------	--

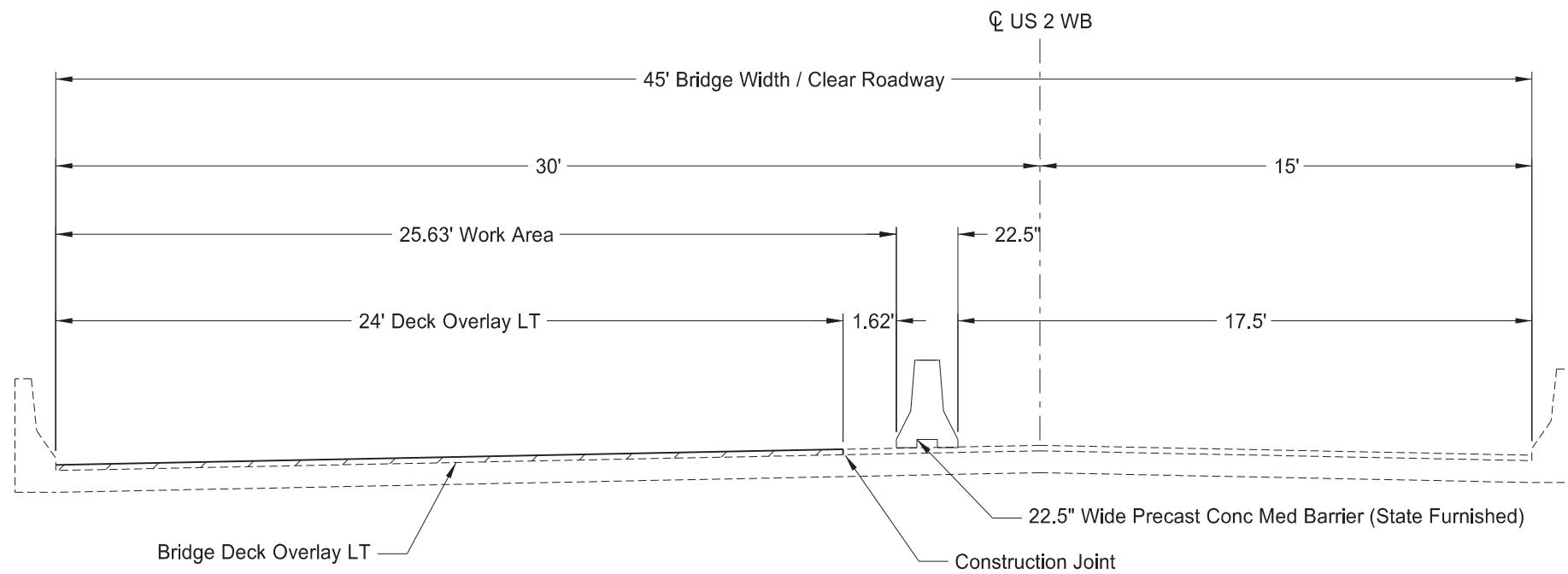


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	2



22.5" Wide Precast Conc Med Barrier (State Furnished)      Construction Joint      Bridge Deck Overlay RT

Structure 0002-149.111 L - Phase 1a



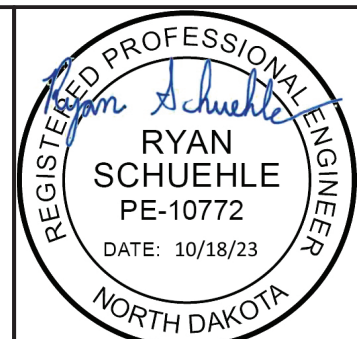
Bridge Deck Overlay LT      22.5" Wide Precast Conc Med Barrier (State Furnished)      Construction Joint

Structure 0002-149.111 L - Phase 1b

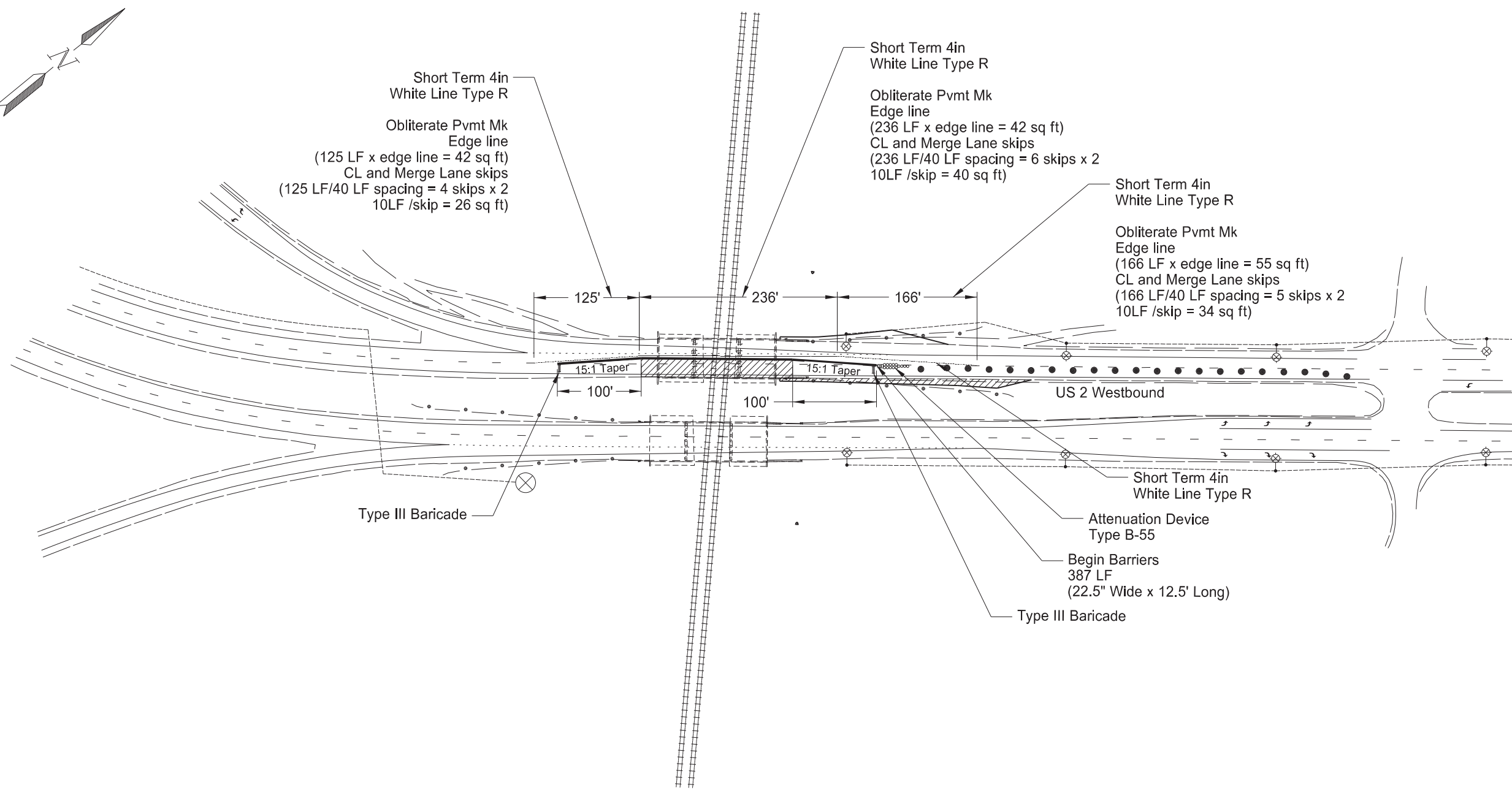
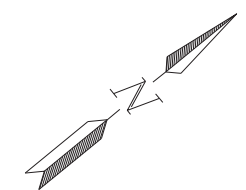
Work Zone Traffic Control  
Typical Sections for Phase 1  
Westbound US 2

Bridge 0002-149.111 L  
US 2 Soo Line Separation

Ward County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	3



Legend	
	Work Area
	Delineator Drums

Note:  
Layout shows Phase 1a for 0002-149.111 L.

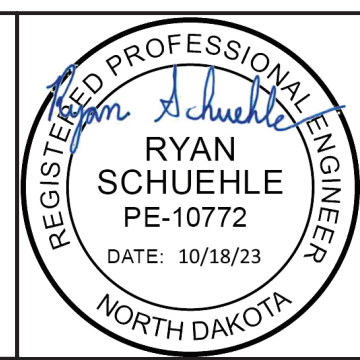
Phase 1b is similar to phase 1a except layout is relocated to phase 1a work area. See work zone traffic control typical sections for Phase 1a and 1b for Bridge 0002-149.111 L (Section 100 sheet 2).

Install signs in accordance with D-704-34 with a reduced speed limit of 40 MPH.

Work Zone Traffic Control  
Phasing Layout for Phase 1

Bridge 0002-149.111 L  
US 2 Soo Line Separation

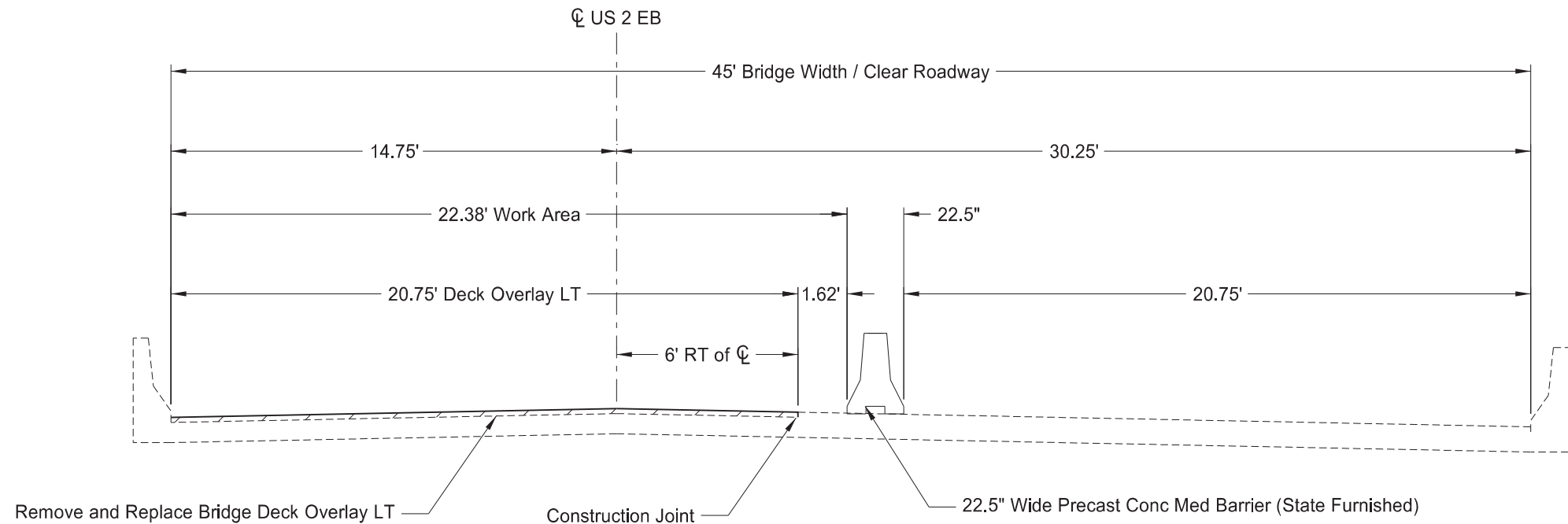
Ward County



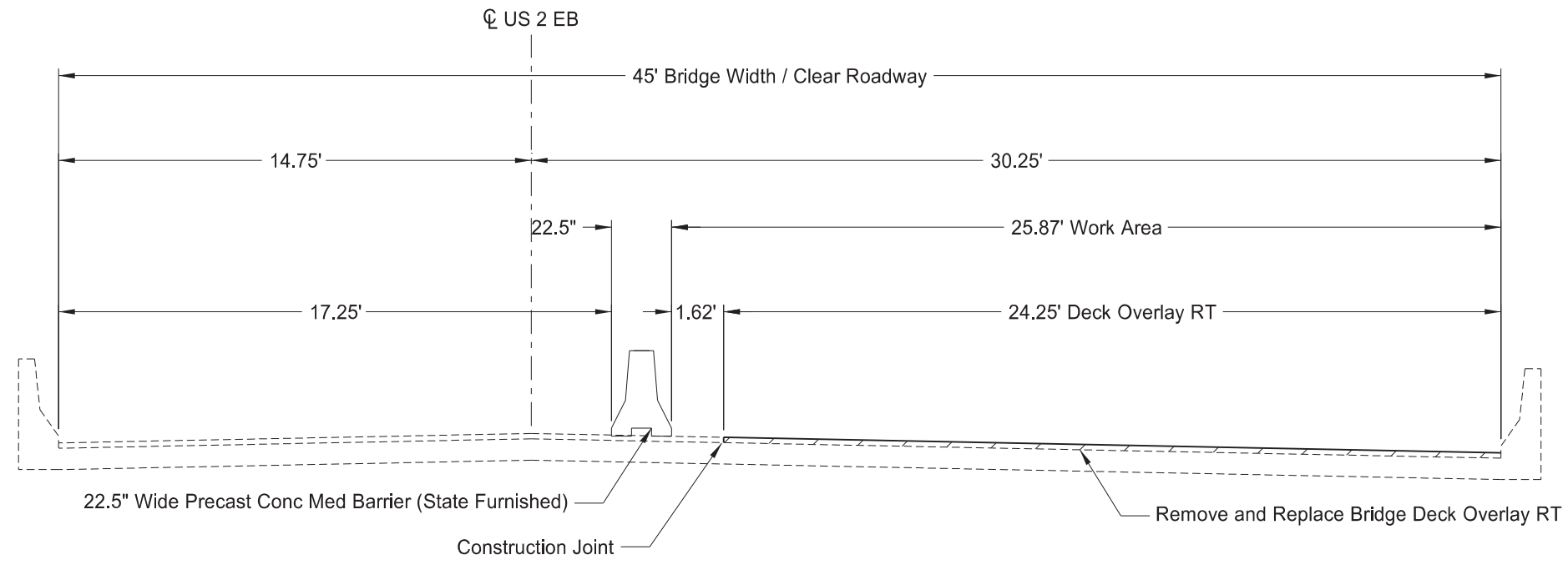




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	100	5



Structure 0002-149.111 R - Phase 2a

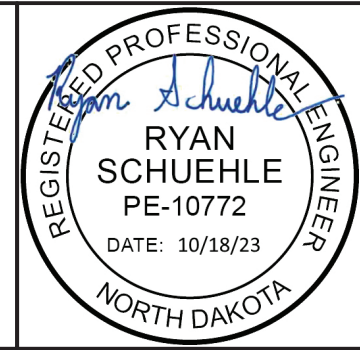


Structure 0002-149.111 R - Phase 2b

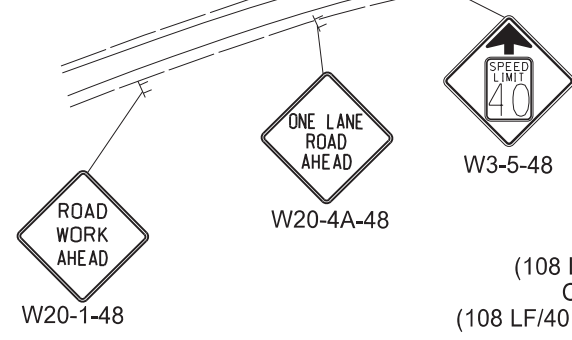
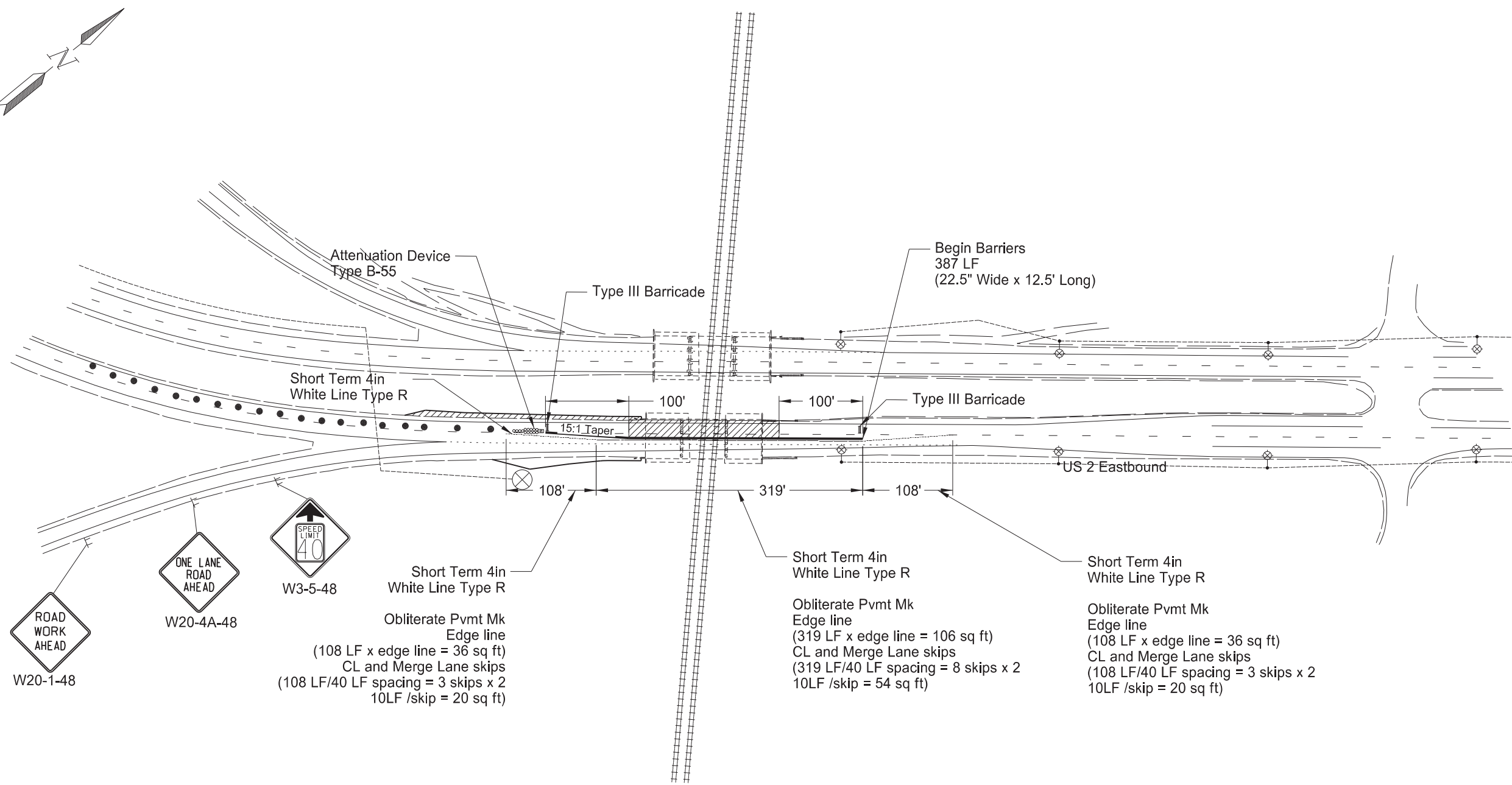
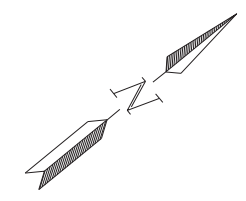
Work Zone Traffic Control  
 Typical Sections for Phase 2  
 Eastbound US 2

Bridge 0002-149.111 R  
 US 2 Soo Line Separation

Ward County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	6



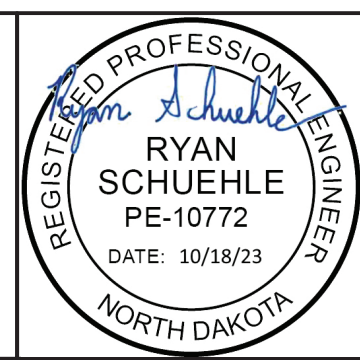
Legend	
	Work Area
	Delineator Drums

Note:  
 Layout shows Phase 2a for 0002-149.111 R.  
 Phase 2b is similar to phase 2a except layout is relocated to phase 2a work area. See work zone traffic control typical sections for Phase 2a and 2b for Bridge 0002-149.111 R (Section 100 sheet 4).  
 Install signs in accordance with D-704-34 with a reduced speed limit of 40 MPH.

Work Zone Traffic Control  
 Phasing Layout for Phase 2

Bridge 0002-149.111 R  
 US 2 Soo Line Separation

Ward County



SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
<b>G20-2-48</b>	<b>48"x24"</b>	<b>END ROAD WORK</b>	<b>2</b>	<b>26</b>	<b>52</b>
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		70	
G20-50a-72	72"x36"	ROAD WORK NEXT MILES RT & LT ARROWS		43	
<b>G20-52a-72</b>	<b>72"x24"</b>	<b>ROAD WORK NEXT MILES RT or LT ARROW</b>	<b>4</b>	<b>36</b>	<b>144</b>
<b>G20-55-96</b>	<b>96"x48"</b>	<b>SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT</b>	<b>2</b>	<b>59</b>	<b>118</b>
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
<b>R1-1-48</b>	<b>48"x48"</b>	<b>STOP</b>	<b>2</b>	<b>32</b>	<b>64</b>
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT (Portable only)		30	
<b>R2-1-48</b>	<b>48"x60"</b>	<b>SPEED LIMIT</b>	<b>4</b>	<b>39</b>	<b>156</b>
<b>R2-1aP-24</b>	<b>24"x18"</b>	<b>MINIMUM FEE \$80 (Mounted on Speed Limit post)</b>	<b>2</b>	<b>10</b>	<b>20</b>
R3-2-48	48"x48"	NO LEFT TURN		35	
<b>R4-1-36</b>	<b>36"x48"</b>	<b>DO NOT PASS (Portable only)</b>	<b>2</b>	<b>30</b>	<b>60</b>
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
<b>R10-6-24</b>	<b>24"x36"</b>	<b>STOP HERE ON RED</b>	<b>2</b>	<b>16</b>	<b>32</b>
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
<b>W1-4-48</b>	<b>48"x48"</b>	<b>REVERSE CURVE RIGHT or LEFT</b>	<b>1</b>	<b>35</b>	<b>35</b>
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
<b>W3-3-48</b>	<b>48"x48"</b>	<b>SIGNAL AHEAD</b>	<b>2</b>	<b>35</b>	<b>70</b>
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
<b>W3-5-48</b>	<b>48"x48"</b>	<b>SPEED REDUCTION AHEAD</b>	<b>2</b>	<b>35</b>	<b>70</b>
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
<b>W8-1-48</b>	<b>48"x48"</b>	<b>BUMP</b>	<b>1</b>	<b>35</b>	<b>35</b>
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
<b>W8-11-48</b>	<b>48"x48"</b>	<b>UNEVEN LANES</b>	<b>2</b>	<b>35</b>	<b>70</b>
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
<b>W8-54-48</b>	<b>48"x48"</b>	<b>TRUCKS ENTERING AHEAD or FT or MILE</b>	<b>2</b>	<b>35</b>	<b>70</b>
<b>W8-55-48</b>	<b>48"x48"</b>	<b>TRUCKS CROSSING AHEAD or FT or MILE</b>	<b>2</b>	<b>35</b>	<b>70</b>
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE		35	
W13-1P-30	30"x30"	MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	FEET PLAQUE (Mounted on warning sign post)		10	
<b>W20-1-48</b>	<b>48"x48"</b>	<b>ROAD WORK AHEAD or FT or MILE</b>	<b>8</b>	<b>35</b>	<b>280</b>
W20-2-48	48"x48"	DETOUR AHEAD or FT or MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or FT or MILE		35	
<b>W20-4-48</b>	<b>48"x48"</b>	<b>ONE LANE ROAD AHEAD or FT or MILE</b>	<b>2</b>	<b>35</b>	<b>70</b>
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or FT or MILE		35	
<b>W20-7-48</b>	<b>48"x48"</b>	<b>FLAGGER</b>	<b>2</b>	<b>35</b>	<b>70</b>
<b>W20-8-18</b>	<b>18"x18"</b>	<b>STOP - SLOW PADDLE Back to Back</b>	<b>2</b>	<b>5</b>	<b>10</b>
W20-52P-54	54"x12"	NEXT MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or FT or MILE		35	
<b>W21-5-48</b>	<b>48"x48"</b>	<b>SHOULDER WORK</b>	<b>1</b>	<b>35</b>	<b>35</b>

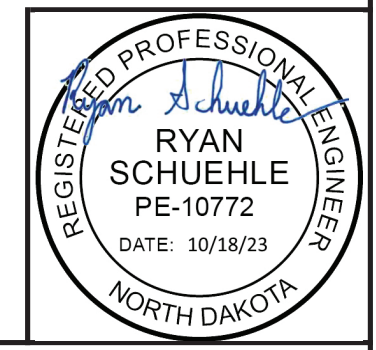
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or FT or MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
<b>W21-53-48</b>	<b>48"x48"</b>	<b>RUMBLE STRIPS AHEAD</b>	<b>2</b>	<b>35</b>	<b>70</b>
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	

SPECIAL SIGNS	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
Consign 1 48 XX Width Ahead	6	35	210

SPEC & CODE	DESCRIPTION	TOTAL UNITS
704-1000	TRAFFIC CONTROL SIGNS	1811

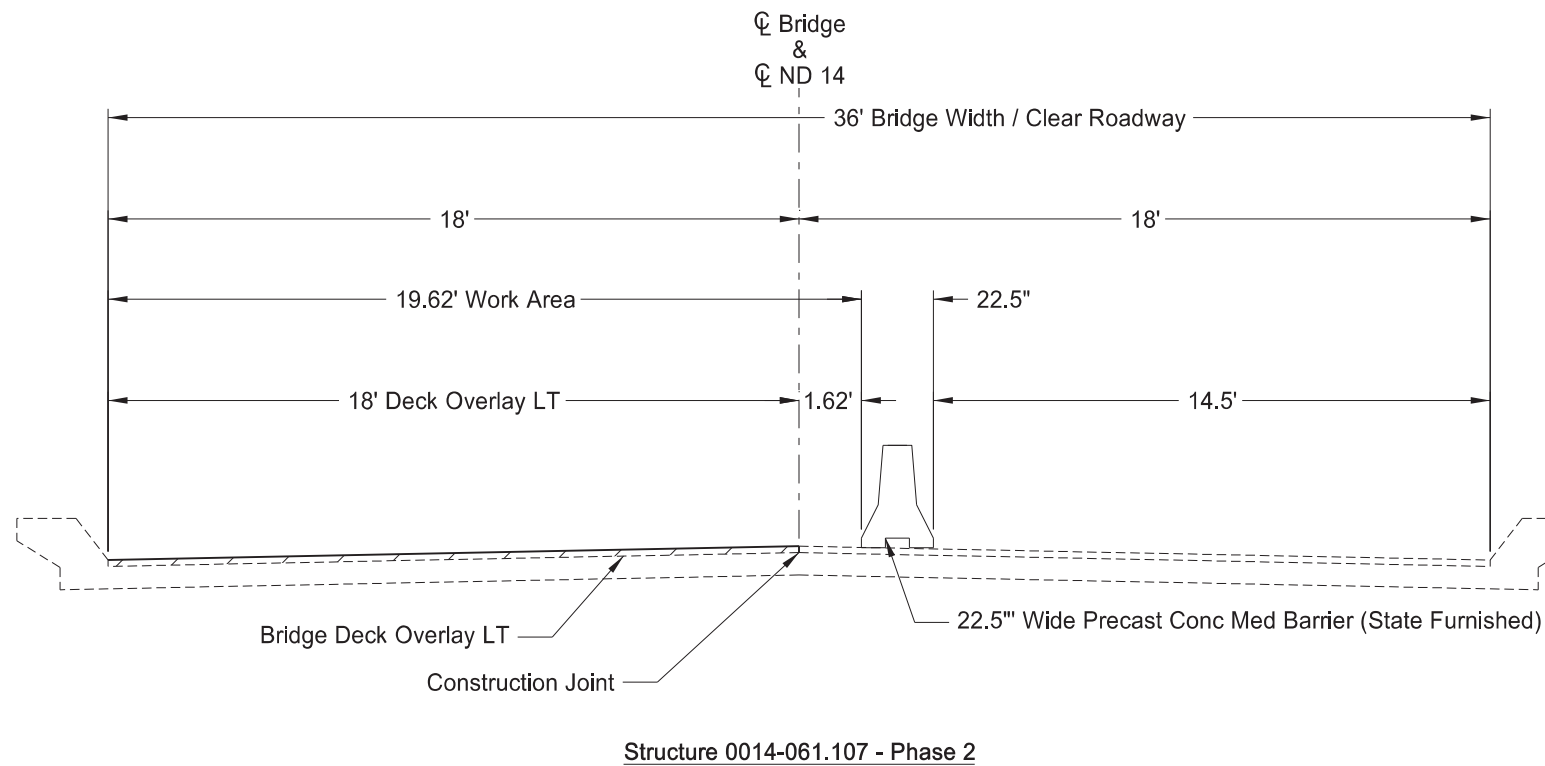
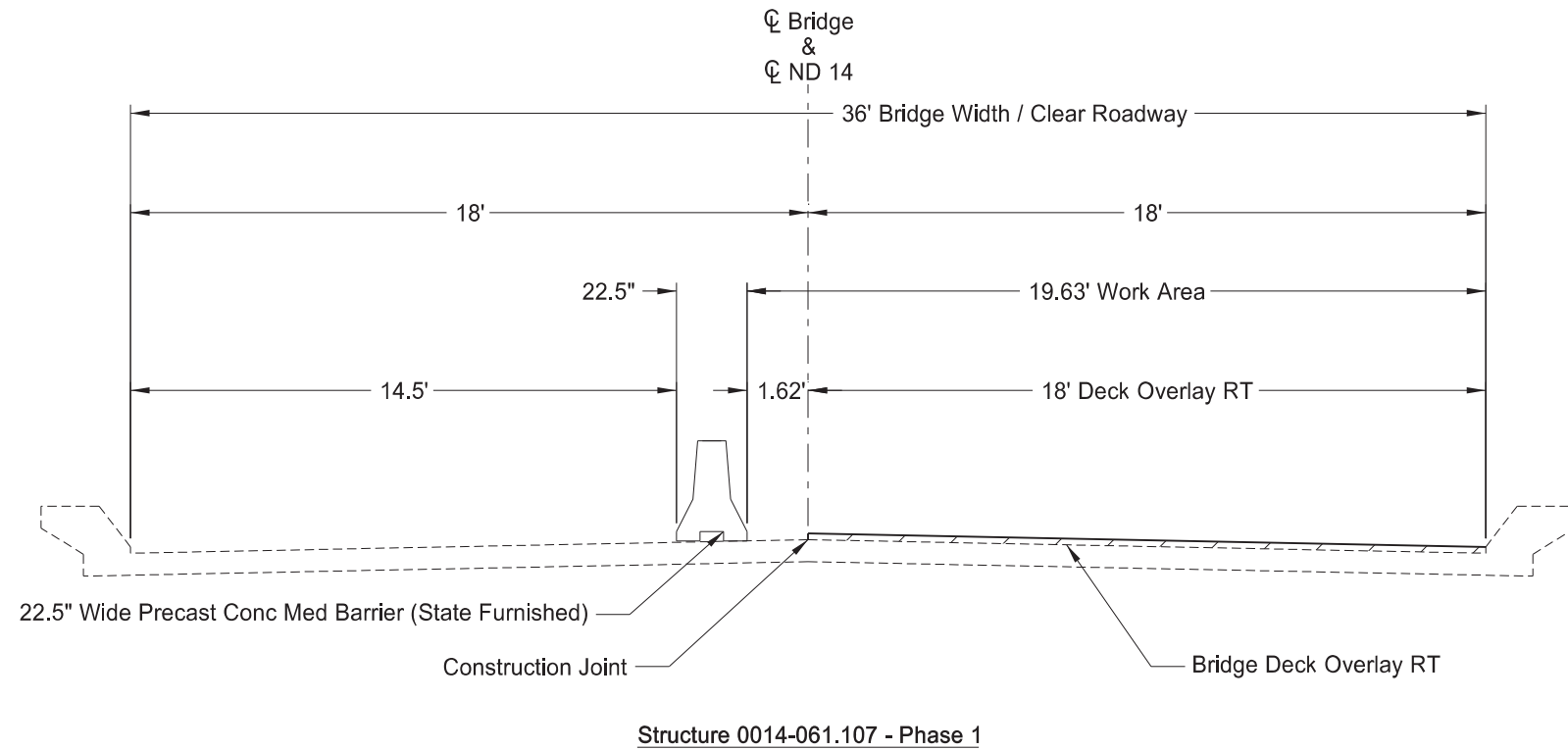
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	30
704-1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EACH	1
704-1035	ATTENUATION DEVICE-TYPE B-25	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	2
704-1048	PORTABLE RUMBLE STRIPS	EACH	2
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	4
704-1060	DELINEATOR DRUMS	EACH	10
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	730
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	STATE FURNISHED MEDIAN BARRIER	LF	500
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	1018
762-0426	SHORT TERM 24IN LINE-TYPE R	LF	24
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

NOTE:  
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.  
<http://www.dot.nd.gov/>



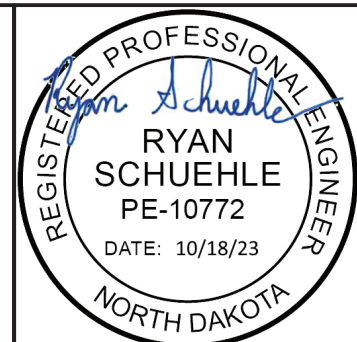
Traffic Control Devices List  
0014-061.107  
ND Hwy 14  
Lone Tree Reservoir

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	100	8

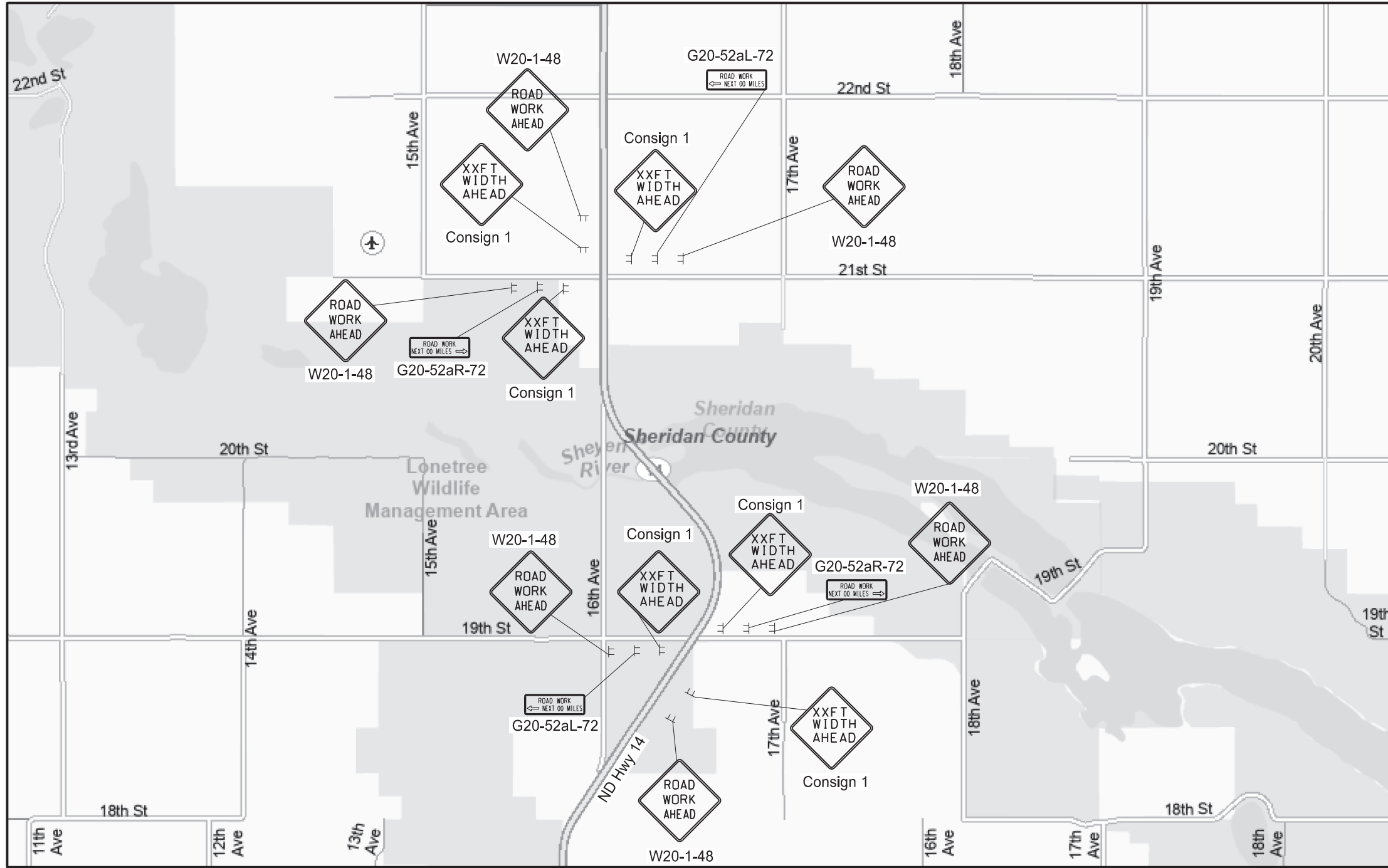


Work Zone Traffic Control  
 Typical Sections for Phase 1 and Phase 2

Bridge 0014-061.107  
 ND 14 Lone Tree Reservoir  
 Sheridan County

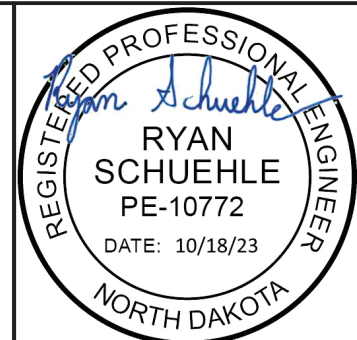


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	100	9

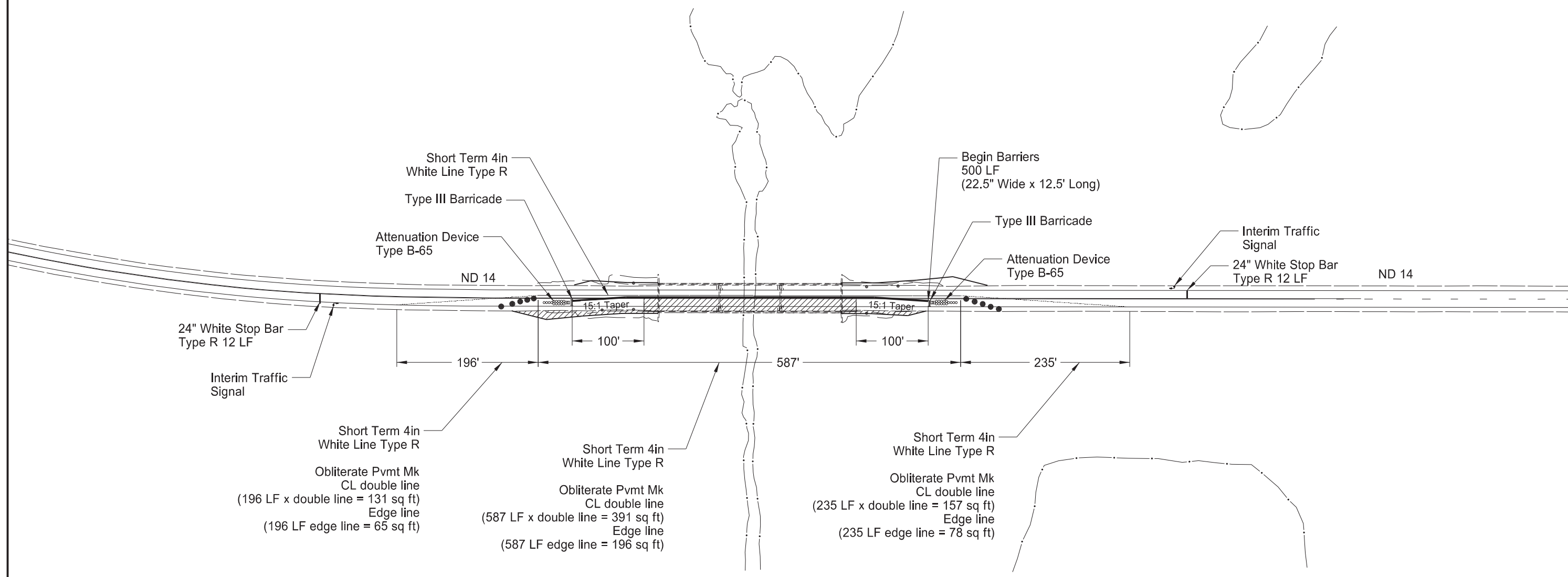
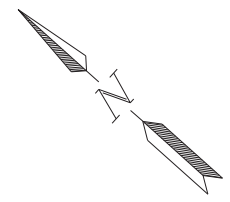


Work Zone Traffic Control  
Construction Sign Layout

Bridge 0014-061.107  
ND 14 Lone Tree Reservoir  
Sheridan County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	10



Legend	
	Work Area
	Delineator Drums

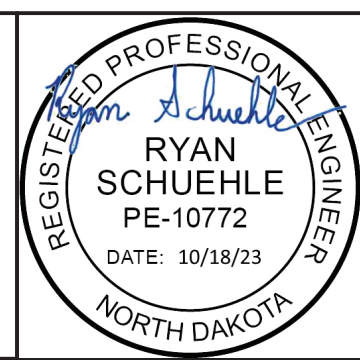
Note:  
Layout shows Phase 1 for 0014-061.107.

Phase 2 similar as Phase 1 except layout is relocated to Phase 1 work area. See work zone Traffic Control Typical Sections Phase 1 and 2 for Bridge 0014-061.107 (Section 100 sheet 7).

Install signs in accordance to D-704-16 with a reduced speed limit of 25 MPH.

Work Zone Traffic Control  
Phasing Layout for Phase 1 and Phase 2

Bridge 0014-061.107  
ND 14 Lone Tree Reservoir  
Sheridan County



SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
<b>G20-2-48</b>	<b>48"x24"</b>	<b>END ROAD WORK</b>	<b>2</b>	<b>26</b>	<b>52</b>
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		70	
G20-50a-72	72"x36"	ROAD WORK NEXT MILES RT & LT ARROWS		43	
<b>G20-52a-72</b>	<b>72"x24"</b>	<b>ROAD WORK NEXT MILES RT or LT ARROW</b>	<b>4</b>	<b>36</b>	<b>144</b>
<b>G20-55-96</b>	<b>96"x48"</b>	<b>SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT</b>	<b>2</b>	<b>59</b>	<b>118</b>
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
<b>R1-1-48</b>	<b>48"x48"</b>	<b>STOP</b>	<b>2</b>	<b>32</b>	<b>64</b>
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT (Portable only)		30	
<b>R2-1-48</b>	<b>48"x60"</b>	<b>SPEED LIMIT</b>	<b>4</b>	<b>39</b>	<b>156</b>
<b>R2-1aP-24</b>	<b>24"x18"</b>	<b>MINIMUM FEE \$80 (Mounted on Speed Limit post)</b>	<b>2</b>	<b>10</b>	<b>20</b>
R3-2-48	48"x48"	NO LEFT TURN		35	
<b>R4-1-36</b>	<b>36"x48"</b>	<b>DO NOT PASS (Portable only)</b>	<b>2</b>	<b>30</b>	<b>60</b>
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
<b>R10-6-24</b>	<b>24"x36"</b>	<b>STOP HERE ON RED</b>	<b>2</b>	<b>16</b>	<b>32</b>
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
<b>W1-4-48</b>	<b>48"x48"</b>	<b>REVERSE CURVE RIGHT or LEFT</b>	<b>1</b>	<b>35</b>	<b>35</b>
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
<b>W3-3-48</b>	<b>48"x48"</b>	<b>SIGNAL AHEAD</b>	<b>2</b>	<b>35</b>	<b>70</b>
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
<b>W3-5-48</b>	<b>48"x48"</b>	<b>SPEED REDUCTION AHEAD</b>	<b>2</b>	<b>35</b>	<b>70</b>
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
<b>W8-1-48</b>	<b>48"x48"</b>	<b>BUMP</b>	<b>1</b>	<b>35</b>	<b>35</b>
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
<b>W8-11-48</b>	<b>48"x48"</b>	<b>UNEVEN LANES</b>	<b>2</b>	<b>35</b>	<b>70</b>
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
<b>W8-54-48</b>	<b>48"x48"</b>	<b>TRUCKS ENTERING AHEAD or FT or MILE</b>	<b>2</b>	<b>35</b>	<b>70</b>
<b>W8-55-48</b>	<b>48"x48"</b>	<b>TRUCKS CROSSING AHEAD or FT or MILE</b>	<b>2</b>	<b>35</b>	<b>70</b>
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE		35	
W13-1P-30	30"x30"	MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	FEET PLAQUE (Mounted on warning sign post)		10	
<b>W20-1-48</b>	<b>48"x48"</b>	<b>ROAD WORK AHEAD or FT or MILE</b>	<b>8</b>	<b>35</b>	<b>280</b>
W20-2-48	48"x48"	DETOUR AHEAD or FT or MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or FT or MILE		35	
<b>W20-4-48</b>	<b>48"x48"</b>	<b>ONE LANE ROAD AHEAD or FT or MILE</b>	<b>2</b>	<b>35</b>	<b>70</b>
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or FT or MILE		35	
<b>W20-7-48</b>	<b>48"x48"</b>	<b>FLAGGER</b>	<b>2</b>	<b>35</b>	<b>70</b>
<b>W20-8-18</b>	<b>18"x18"</b>	<b>STOP - SLOW PADDLE Back to Back</b>	<b>2</b>	<b>5</b>	<b>10</b>
W20-52P-54	54"x12"	NEXT MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or FT or MILE		35	
<b>W21-5-48</b>	<b>48"x48"</b>	<b>SHOULDER WORK</b>	<b>1</b>	<b>35</b>	<b>35</b>

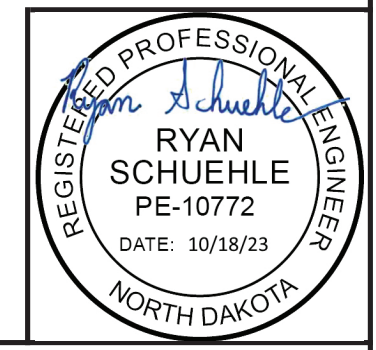
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or FT or MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
<b>W21-53-48</b>	<b>48"x48"</b>	<b>RUMBLE STRIPS AHEAD</b>	<b>2</b>	<b>35</b>	<b>70</b>
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
<b>SPECIAL SIGNS</b>					
Consign 1	48	XX Width Ahead	6	35	210

SPEC & CODE	DESCRIPTION	TOTAL UNITS
704-1000	TRAFFIC CONTROL SIGNS	1811

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	30
704-1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EACH	1
704-1035	ATTENUATION DEVICE-TYPE B-25	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	2
704-1048	PORTABLE RUMBLE STRIPS	EACH	2
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	4
704-1060	DELINEATOR DRUMS	EACH	10
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	630
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	STATE FURNISHED MEDIAN BARRIER	LF	350
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	855
762-0426	SHORT TERM 24IN LINE-TYPE R	LF	24
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

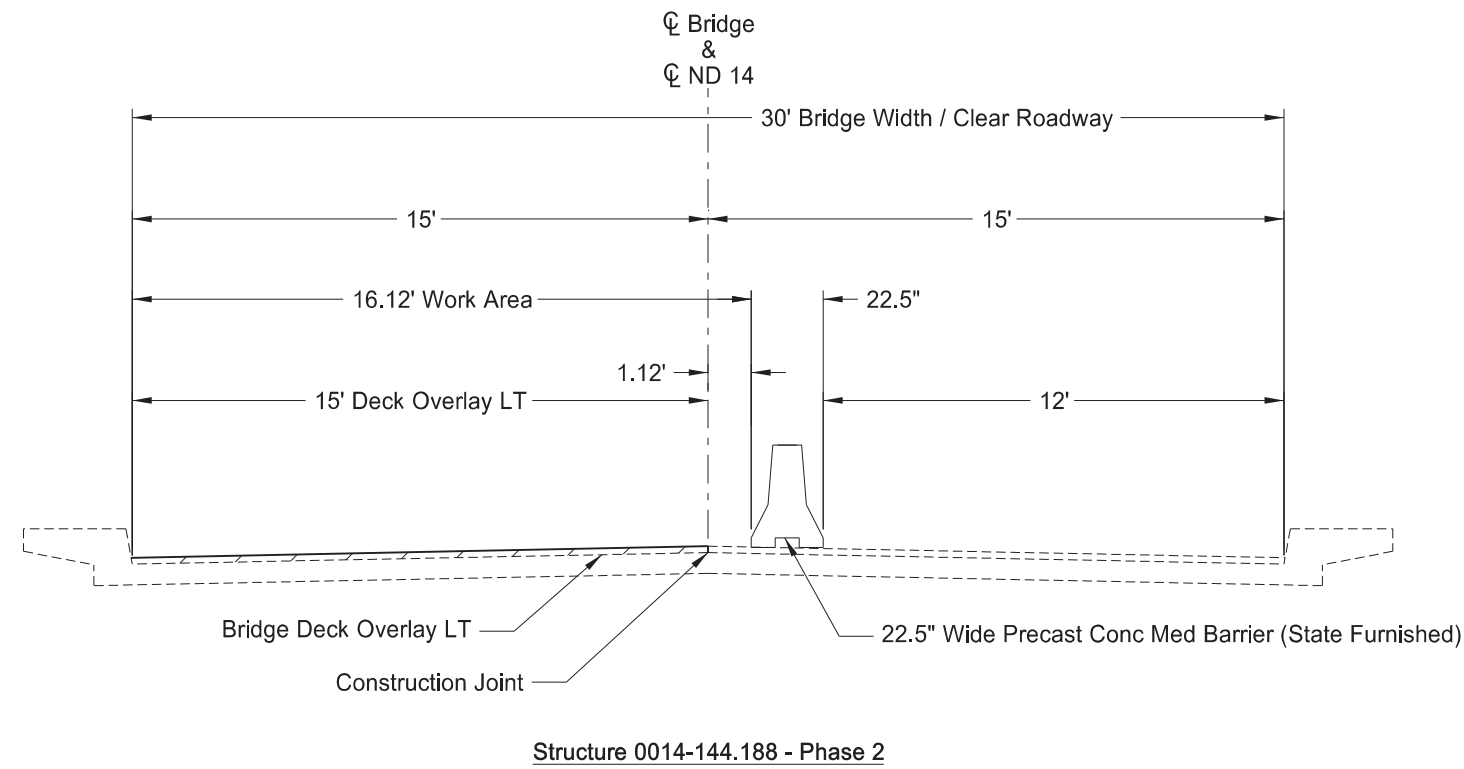
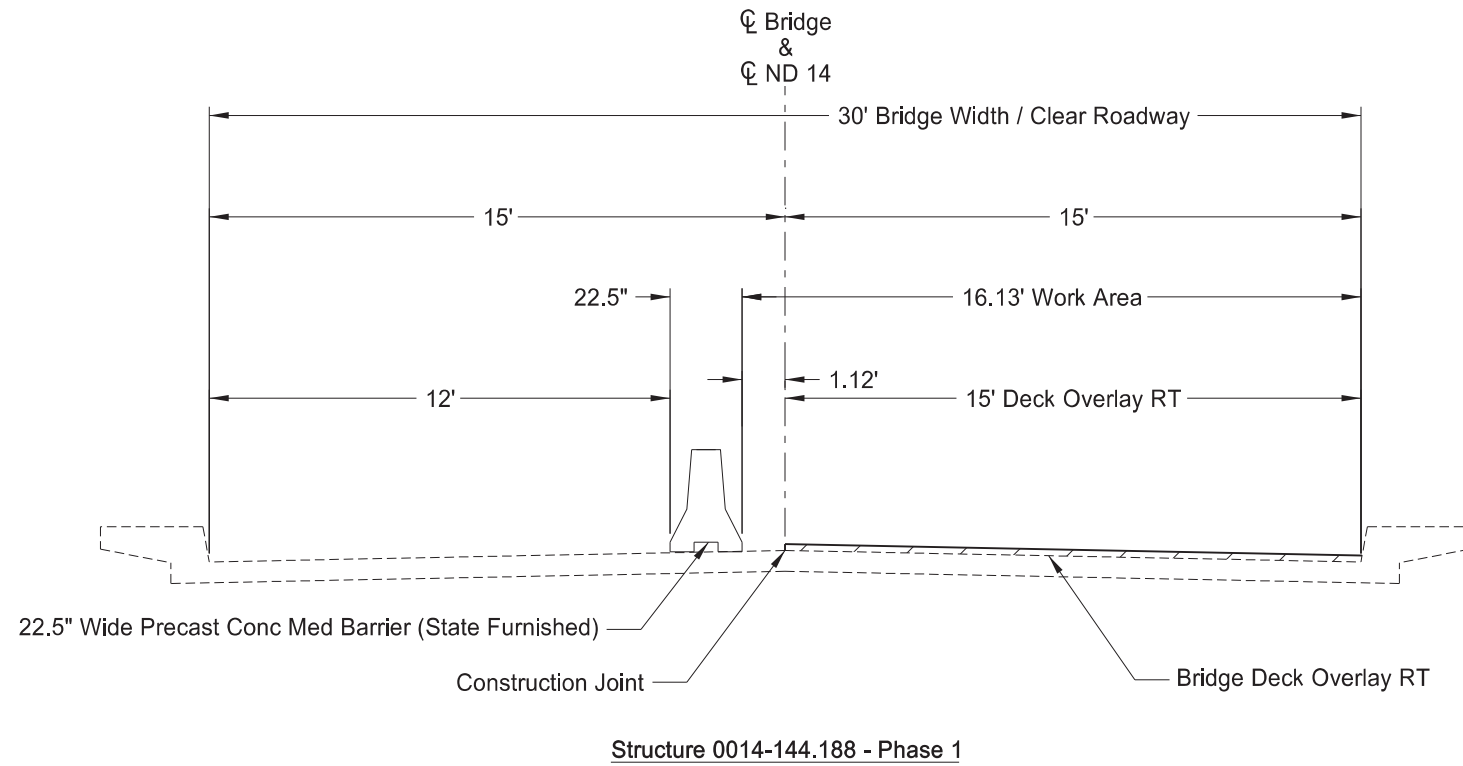
NOTE:  
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.  
<http://www.dot.nd.gov/>



Traffic Control Devices List  
0014-144.188  
ND Hwy 14  
Stone Creek



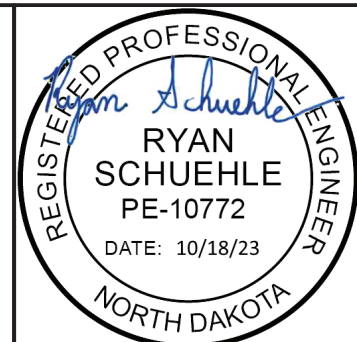
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	12



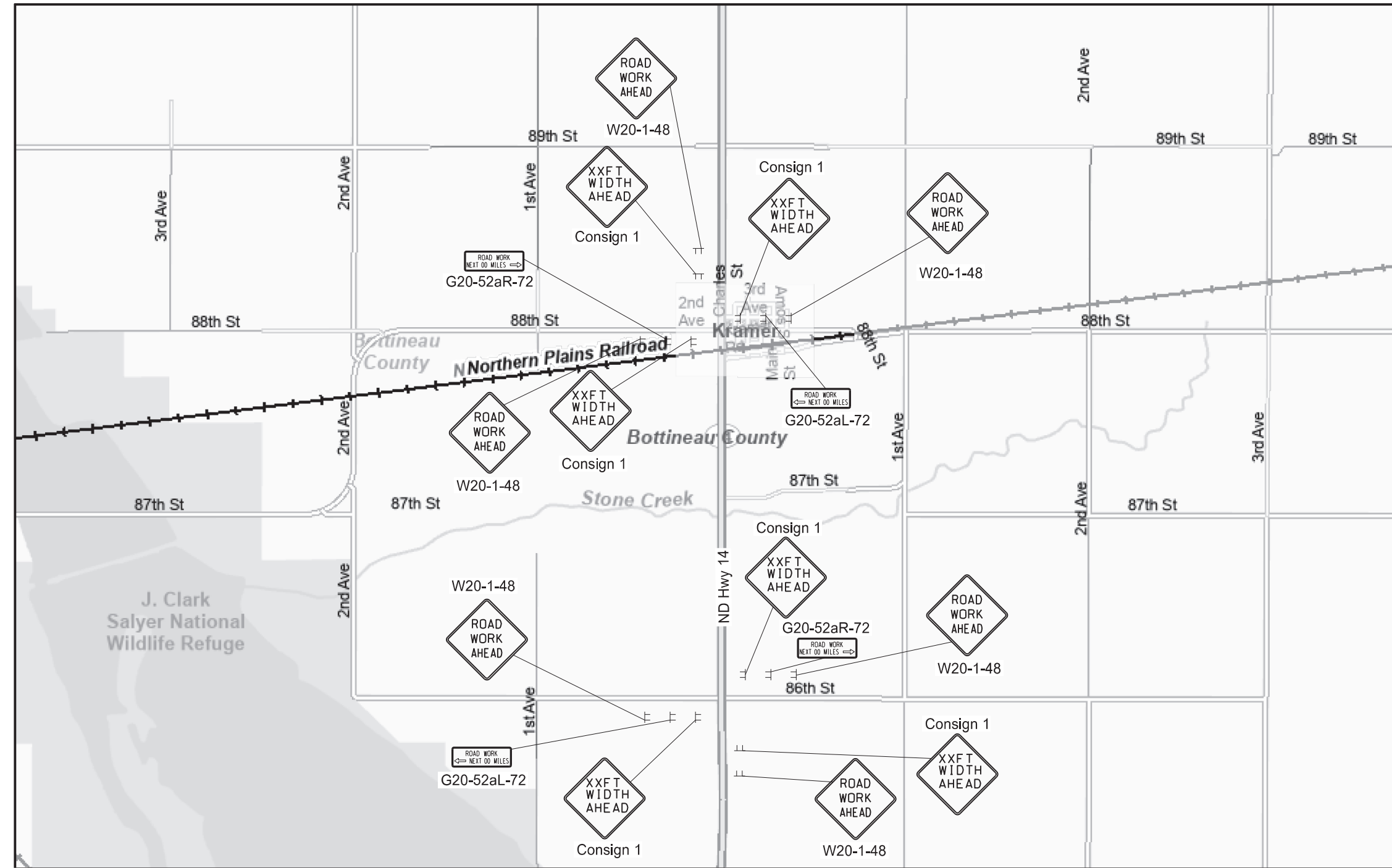
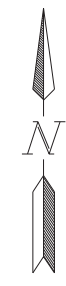
Work Zone Traffic Control  
Typical Sections for Phase 1 and Phase 2

Bridge 0014-144.188  
ND 14 Stone Creek

Bottineau County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	13

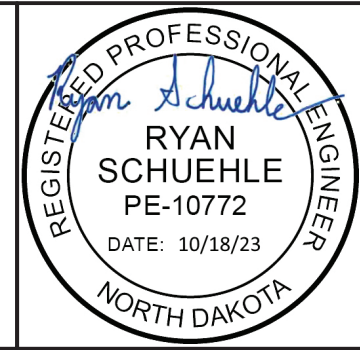


J. Clark Salyer National Wildlife Refuge

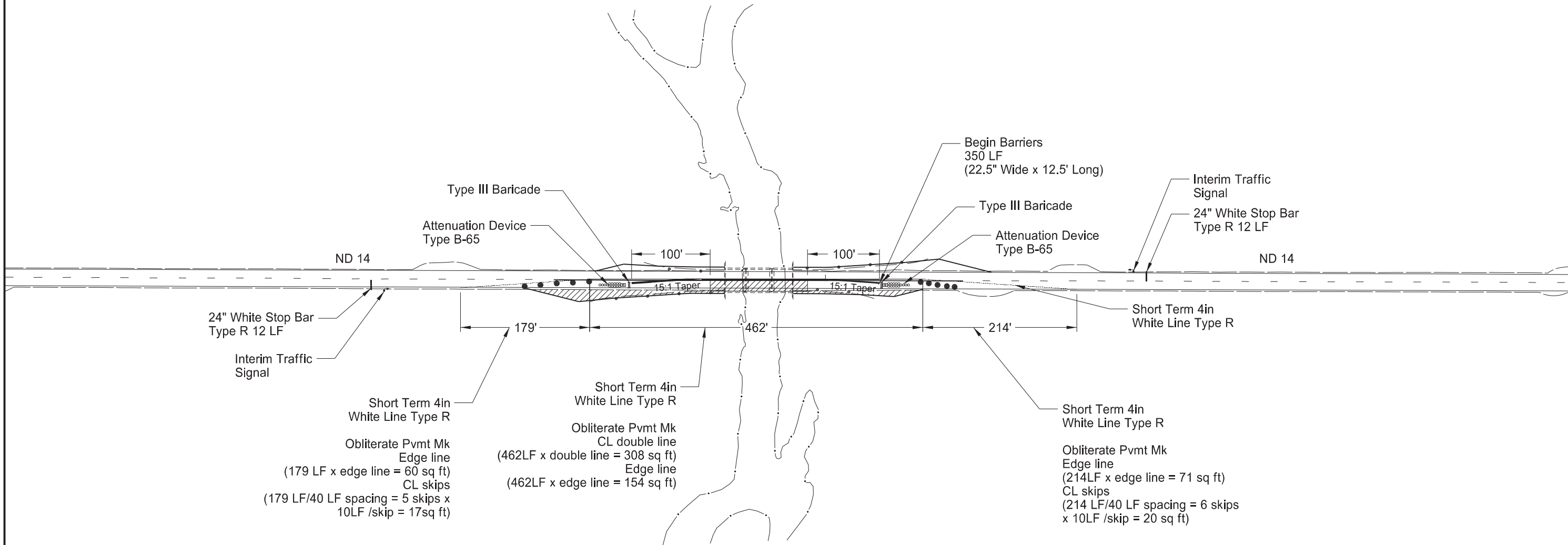
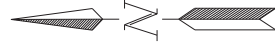
Work Zone Traffic Control  
Construction Sign Layout

Bridge 0014-144.188  
ND 14 Stone Creek

Bottineau County



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	100	14



Legend	
	Work Area
	Delineator Drums

Note:  
Layout shows Phase 1 for 0014-144.188.

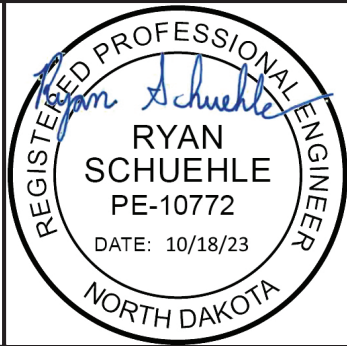
Phase 2 similar as Phase 1 except layout is relocated to Phase 1 work area. See work zone Traffic Control Typical Sections Phase 1 and 2 for Bridge 0014-144.188 (Section 100 sheet 10).

Install signs in accordance to D-704-16 with a reduced speed limit of 25 MPH.

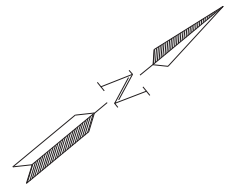
Work Zone Traffic Control  
Phasing Layout for Phase 1 and Phase 2

Bridge 0014-144.188  
ND 14 Stone Creek

Bottineau County

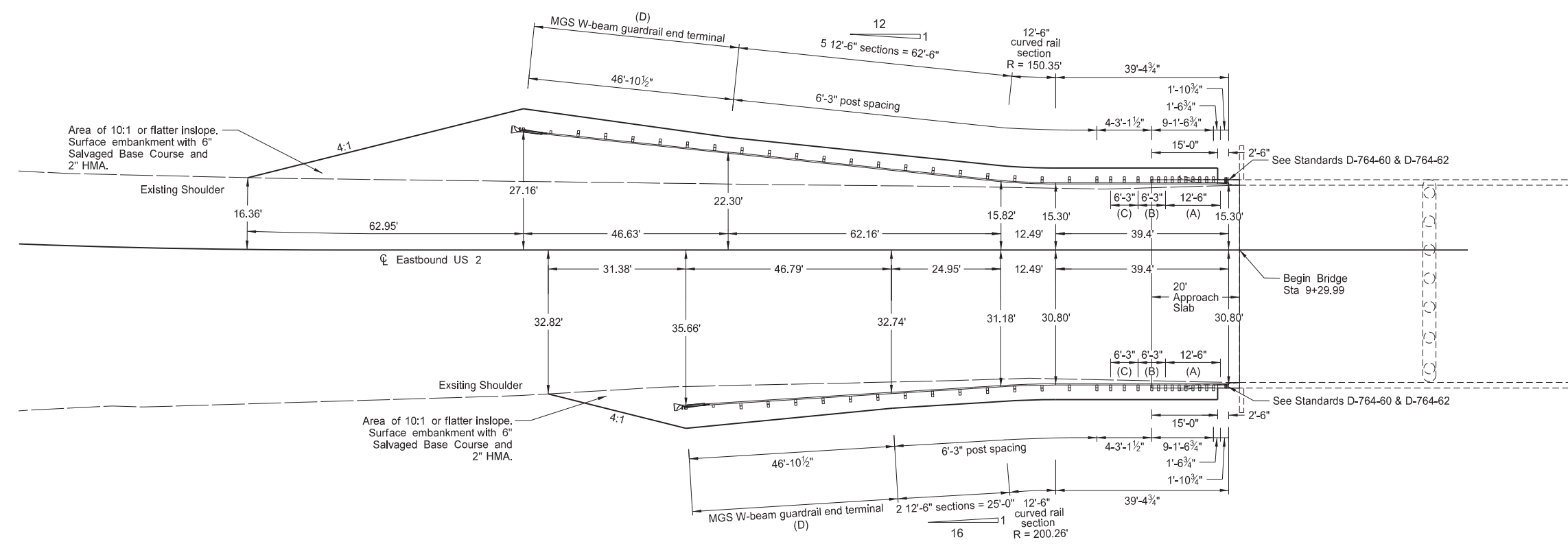






23 USC § 407 Documents  
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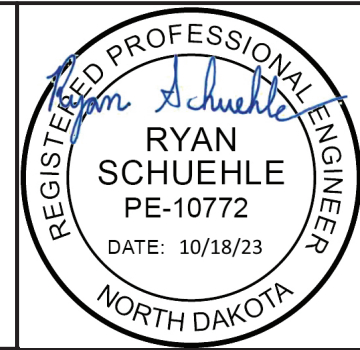
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	130	1

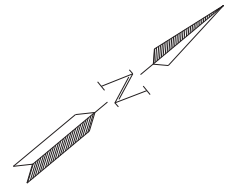


- (A) Thrie beam rail section (double thickness)
- (B) Thrie beam rail section
- (C) Asymmetrical W-Thrie beam transition section
- (D) Install an MGS FLEAT end terminal at this location. See Standard D-764-38.

Thrie/MGS W-beam Guardrail Layout

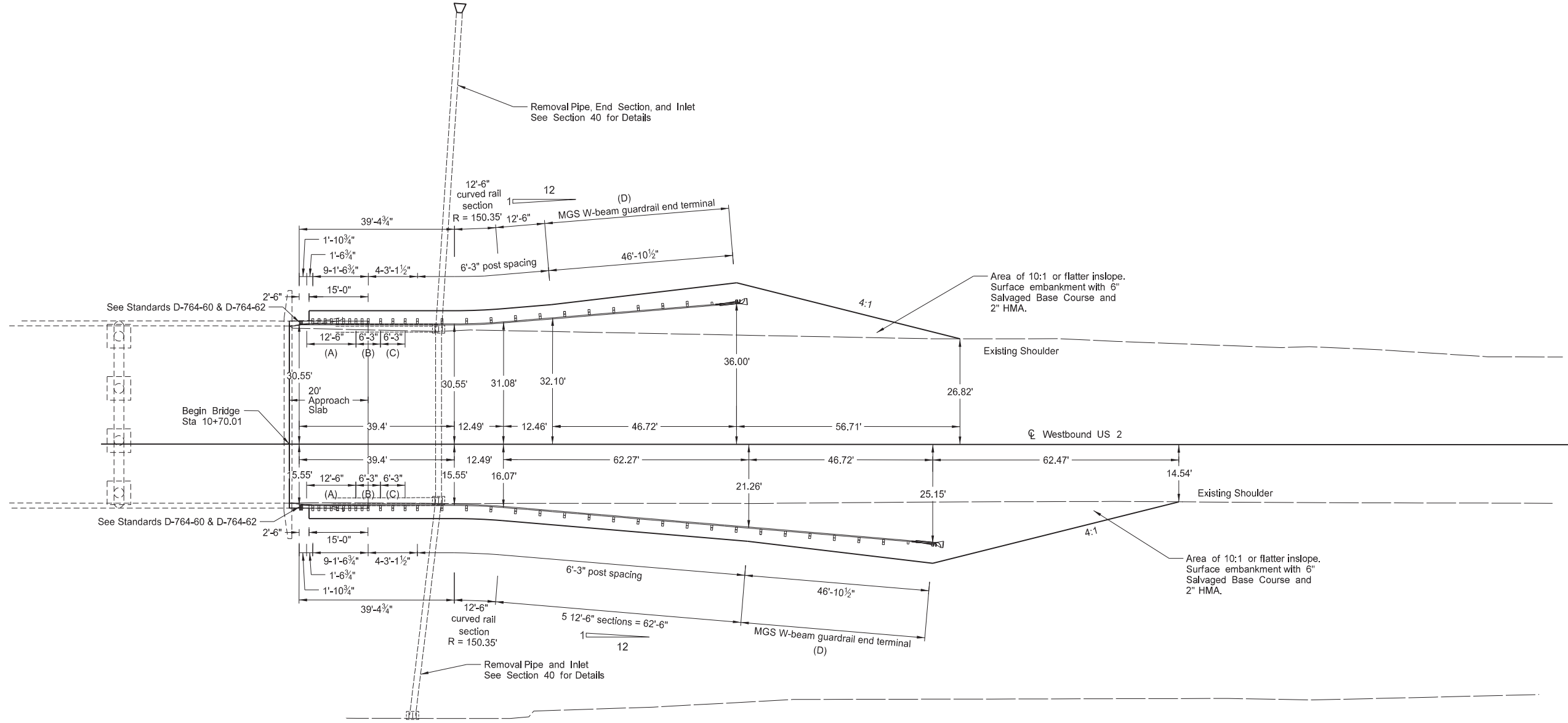
Bridge 0002-149.111 R  
US 2 Soo Line Separation  
Ward County





23 USC § 407 Documents  
 NDDOT Reserves All Objections

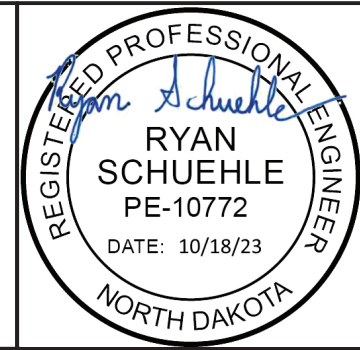
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	130	2



- (A) Thrie beam rail section (double thickness)
- (B) Thrie beam rail section
- (C) Asymmetrical W-Thrie beam transition section
- (D) Install an MGS FLEAT end terminal at this location. See Standard D-764-38.

Thrie/MGS W-beam Guardrail Layout

Bridge 0002-149.111 L  
 US 2 Soo Line Separation  
 Ward County



**23 USC § 407 Documents**  
**NDDOT Reserves All Objections**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	130	3

**MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES**

**THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS**

LOCATION	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(B)
	5/8" DIA. x 18" LONG GUARDRAIL BOLT	6" x 8" x 6'-0" TIMBER POST	6" x 8" x 14" TIMBER OFFSET BLOCK	5/8" DIA. x 1 1/4" LONG GUARDRAIL BOLT	12'-6" STRAIGHT W-BEAM RAIL SECTION	12'-6" CURVED W-BEAM RAIL SECTION	REFLECTORIZED PLATES	6" x 8" x 7'-0" TIMBER POST	6" x 8" x 19" TIMBER OFFSET BLOCK	6" x 12" x 19" TIMBER OFFSET BLOCK	5/8" DIA. x 22" LONG GUARDRAIL BOLT	6'-3" W-THRIE BEAM TRANSITION SECTION	12'-6" DOUBLE THRIE BEAM SECTION	2'-6" THRIE BEAM TERMINAL CONNECTOR	7/8" DIA. x 15" LONG HEX HEAD BOLT	5/8" DIA. x 2" LONG POST BOLT	JERSEY BARRIER TO THRIE BEAM CONNECTOR	EMBANKMENT
LOCATION	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 8+03.86 to Sta 9+27.49 Rt (EB US 2)	12	15	9	32	2	1	7	6	2	10	20	1	1	1	5	36	1	-30
Sta 7+66.83 to Sta 9+27.49 Lt (EB US 2)	18	21	15	56	5	1	8	6	2	10	20	1	1	1	5	36	1	-7
Sta 10+72.51 to Sta 12+33.38 Rt (EB US 2)	18	21	15	56	5	1	8	6	2	10	20	1	1	1	5	36	1	-27
Sta 10+72.51 to Sta 11+83.55 Lt (EB US 2)	10	13	7	24	1	1	6	6	2	10	20	1	1	1	5	36	1	-128
<b>TOTAL</b>	<b>58</b>	<b>70</b>	<b>46</b>	<b>168</b>	<b>13</b>	<b>4</b>	<b>29</b>	<b>24</b>	<b>8</b>	<b>40</b>	<b>80</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>144</b>	<b>4</b>	<b>-191</b>

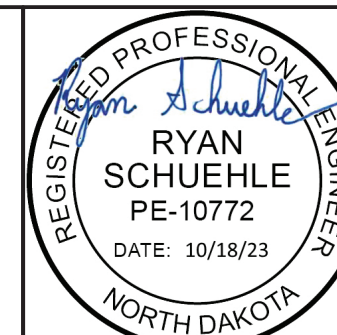
SPEC CODE BID ITEM	QTY	UNIT	SPEC CODE BID ITEM	QTY	UNIT
<u>203 0218 GUARDRAIL EMBANKMENT</u>			<u>764 0151 REMOVE W-BEAM GUARDRAIL &amp; POSTS</u>		
Sta 7+72.49 to Sta 9+24.99 Rt	1	EA	Sta 7+21.30 to Sta 9+22.43 Rt	201.1	LF
Sta 7+03.88 to Sta 9+24.99 Lt	1	EA	Sta 6+82.90 to Sta 9+22.32 Lt	239.4	LF
Sta 10+75.01 to Sta 12+95.85 Rt	1	EA	Sta 10+78.29 to Sta 13+16.44 Rt	238.2	LF
Sta 10+75.01 to Sta 12+40.26 Lt	1	EA	Sta 10+77.53 to Sta 12+78.67 Lt	201.1	LF
Total	4	EA	Total	477.6	LF
<u>764 0131 W-BEAM GUARDRAIL</u>			<u>764 2081 REMOVE END TREATMENT &amp; TRANSITION</u>		
Sta 8+50.65 to Sta 9+27.49 Rt	76.9	LF	Sta 6+85.22 to Sta 7+21.30 Rt	1	EA
Sta 8+13.46 to Sta 9+27.49 Lt	114.4	LF	Sta 6+45.04 to Sta 6+82.90 Lt	1	EA
Sta 10+72.51 to Sta 11+86.66 Rt	114.4	LF	Sta 13+16.44 to Sta 13+53.51 Rt	1	EA
Sta 10+72.51 to Sta 11+36.84 Lt	64.4	LF	Sta 12+78.67 to Sta 13+15.74 Lt	1	EA
Total	370.1	LF	Total	4	EA
<u>764 0145 W-BEAM GUARDRAIL END TERMINAL</u>					
Sta 8+03.86 to Sta 8+50.65 Rt	1	EA			
Sta 7+66.83 to Sta 8+13.46 Lt	1	EA			
Sta 11+86.66 to Sta 12+33.38 Rt	1	EA			
Sta 11+36.84 to Sta 11+83.55 Lt	1	EA			
Total	4	EA			

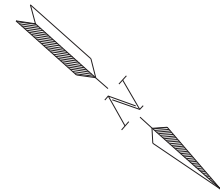
- (A) Include these items in the contract unit price bid for "W-Beam Guardrail".
- (B) The volume balance of embankment (cubic yards) is for informational purposes only.
- (C) Use 6"x12"x19" blocks for posts 1-10 shown on Standard D-764-60 to allow installation outside approach panel.

Thrie/MGS W-beam Guardrail Quantities

Bridge 0002-149.111  
US 2 Soo Line Separation

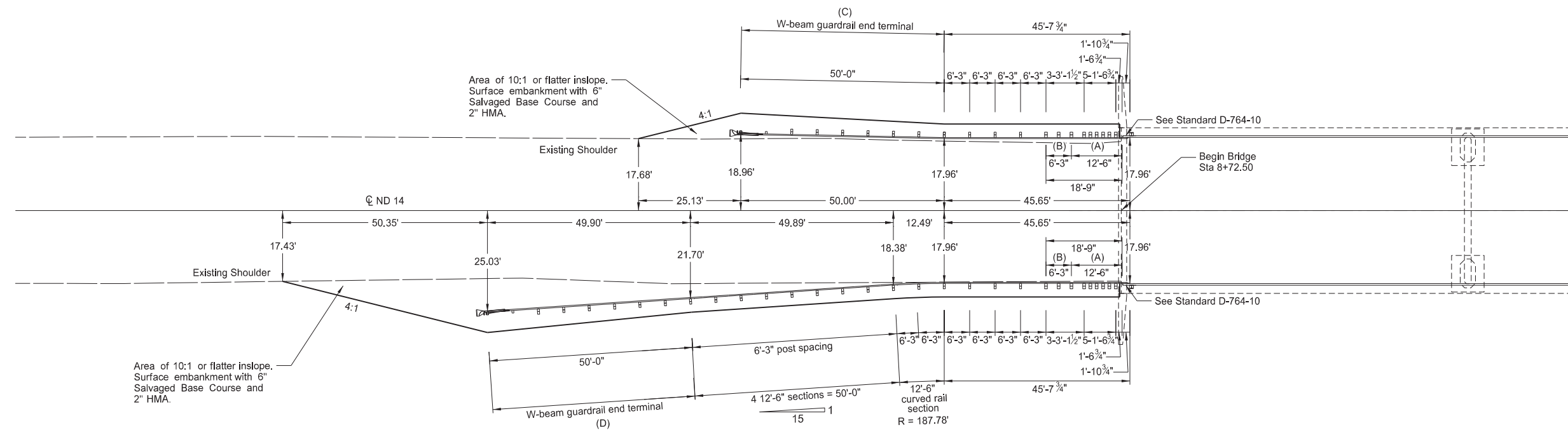
Ward County





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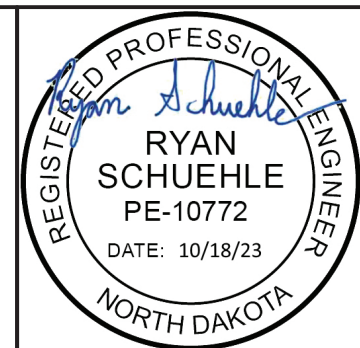
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	130	4



- (A) Thrie beam rail section (double thickness)
- (B) Symmetrical W-Thrie beam transition section (double thickness)
- (C) Install a SKT End Terminal at this location. See Standard D-764-5.
- (D) Install a FLEAT end terminal at this location. See Standard D-764-6.

Thrie/W-beam Guardrail Layout

Bridge 0014-061.107  
ND 14 Lone Tree Reservoir  
Sheridan County







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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	130	6

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS

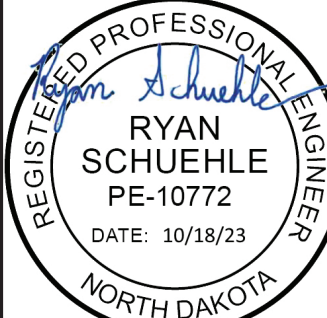
LOCATION	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(B)
	5/8" DIA. x 18" LONG GUARDRAIL BOLT	6" x 8" x 6'-0" TIMBER POST	6" x 8" x 14" ROUTED TIMBER BLOCK	5/8" DIA. x 1 1/4" LONG GUARDRAIL BOLT	12'-6" STRAIGHT W-BEAM RAIL SECTION	12'-6" CURVED W-BEAM RAIL SECTION	REFLECTORIZED PLATES	8" x 8" x 6'-0" TIMBER POST	8" x 8" x 22" OFFSET BLOCK	8" x 8" x 18" OFFSET BLOCK	8" x 8" x 14" OFFSET BLOCK	6'-3" DOUBLE W-THRIE BEAM TRANSITION SECTION	12'-6" DOUBLE THRIE BEAM SECTION	2'-6" THRIE BEAM TERMINAL CONNECTOR	7/8" DIA. x 3/4" LONG HEX HEAD BOLT	5/8" DIA. x 2" LONG POST BOLT	EMBANKMENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 7+16.68 to Sta 8+74.06 Rt	31	14	14	64	6	1	8	9	7	1	1	1	1	1	5	24	9
Sta 7+78.96 to Sta 8+74.60 Lt	21	4	4	24	2		5	9	7	1	1	1	1	1	5	24	-15
Sta 11+25.39 to Sta 12+21.03 Rt	21	4	4	24	2		5	9	7	1	1	1	1	1	5	24	-2
Sta 11+25.39 to Sta 12+83.31 Lt	31	14	14	64	6	1	8	9	7	1	1	1	1	1	5	24	-47
<b>TOTAL</b>	<b>104</b>	<b>36</b>	<b>36</b>	<b>176</b>	<b>16</b>	<b>2</b>	<b>26</b>	<b>36</b>	<b>28</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>96</b>	<b>-55</b>

SPEC CODE BID ITEM	QTY	UNIT	SPEC CODE BID ITEM	QTY	UNIT
<u>203 0218 GUARDRAIL EMBANKMENT</u>			<u>764 0151 REMOVE W-BEAM GUARDRAIL &amp; POSTS</u>		
Sta 6+66.34 to Sta 8+72.10 Rt	1	EA	Sta 8+11.18 to Sta 8+74.84 Rt	63.7	LF
Sta 7+53.83 to Sta 8+72.10 Lt	1	EA	Sta 8+49.04 to Sta 8+74.90 Lt	25.9	LF
Sta 11+27.89 to Sta 12+48.34 Rt	1	EA	Sta 11+25.28 to Sta 11+51.34 Rt	26.1	LF
Sta 11+27.89 to Sta 13+30.04 Lt	1	EA	Sta 11+25.27 to Sta 11+88.98 Lt	63.7	LF
Total	4	EA	Total	179.3	LF
<u>764 0131 W-BEAM GUARDRAIL</u>			<u>764 2081 REMOVE END TREATMENT &amp; TRANSITION</u>		
Sta 7+66.58 to Sta 8+74.60 Rt	108.2	LF	Sta 7+73.78 to Sta 8+11.18 Rt	1	EA
Sta 8+28.96 to Sta 8+74.60 Lt	45.7	LF	Sta 8+11.61 to Sta 8+49.04 Lt	1	EA
Sta 11+25.39 to Sta 11+71.03 Rt	45.7	LF	Sta 11+51.34 to Sta 11+88.79 Rt	1	EA
Sta 11+25.39 to Sta 12+33.41 Lt	108.2	LF	Sta 11+88.98 to Sta 12+26.39 Lt	1	EA
Total	307.6	LF	Total	4	EA
<u>764 0145 W-BEAM GUARDRAIL END TERMINAL</u>					
Sta 7+16.68 to Sta 7+66.58 Rt	1	EA			
Sta 7+78.96 to Sta 8+28.96 Lt	1	EA			
Sta 11+71.03 to Sta 12+21.03 Rt	1	EA			
Sta 12+33.41 to Sta 12+83.31 Lt	1	EA			
Total	4	EA			

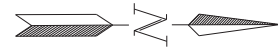
- (A) Include these items in the contract unit price bid for "W-Beam Guardrail".
- (B) The volume balance of embankment (cubic yards) is for informational purposes only.

Thrie/W-beam Guardrail Quantities

Bridge 0014-061.107  
ND 14 Lone Tree Reservoir  
Sheridan County

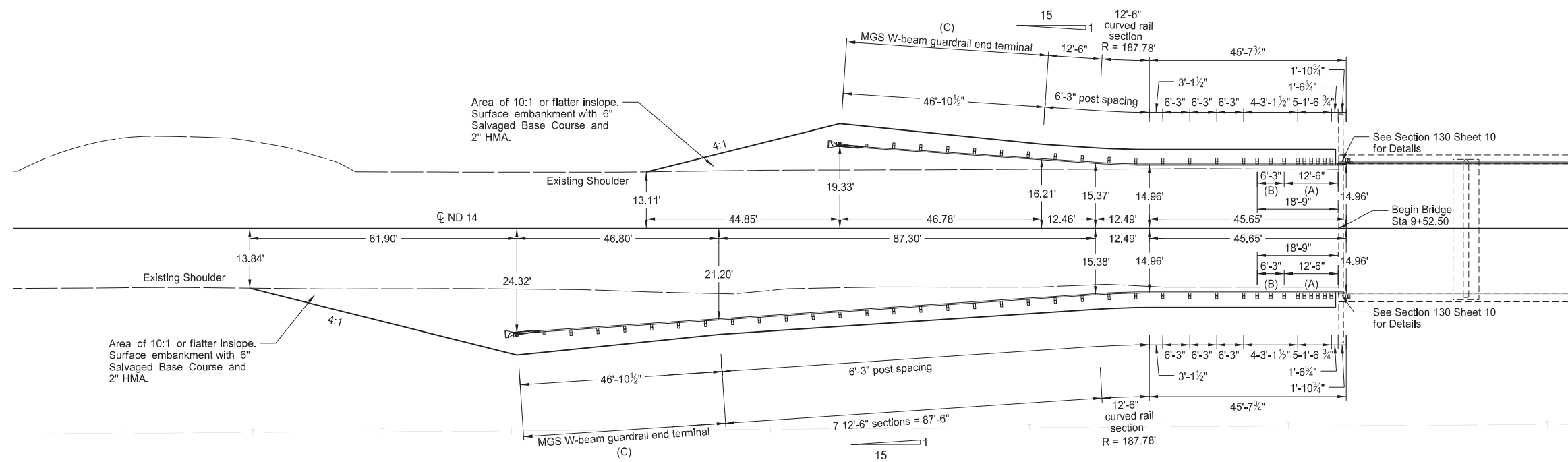


**RYAN SCHUEHLE**  
PE-10772  
DATE: 10/18/23



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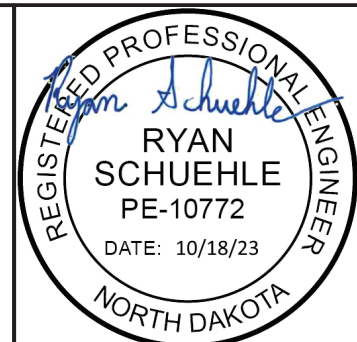
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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- (A) Thrie beam rail section (double thickness)
  - (B) Symmetrical W-Thrie beam transition section
  - (C) Install an MGS FLEAT end terminal at this location. See Standard D-764-38. Instead of the CRT wood posts at posts 3 through 8 shown on D-764-38 install;
- Posts 3 through 6:  
Steel posts, per the manufacturer's recommendation, with 8" routed composite blocks.
- Posts 7 and 8:  
Standard steel line posts with 8" routed composite blocks. See plan details.

Thrie/MGS W-beam Guardrail Layout

Bridge 0014-144.188  
ND 14 Stone Creek  
Bottineau County





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MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS

	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(B)
LOCATION	5/8" DIA. x 10" LONG GUARDRAIL BOLT	W6 x 9 x 6'-0" POST	6" x 8" x 14" ROUTED TIMBER BLOCK	5/8" DIA. x 1 1/4" LONG GUARDRAIL BOLT	12'-6" STRAIGHT W-BEAM RAIL SECTION	12'-6" CURVED W-BEAM RAIL SECTION	REFLECTORIZED PLATES	W6 x 9 x 6'-6" POST	HSS12 x 6 x 1/4 x 1'-9 1/8" STEEL BLOCK	HSS12 x 6 x 1/4 x 1'-2" STEEL BLOCK	5/8" DIA. x 14" LONG GUARDRAIL BOLT	6'-3" W-THRIE BEAM TRANSITION SECTION	12'-6" DOUBLE THRIE BEAM SECTION	2'-6" THRIE BEAM TERMINAL CONNECTOR	7/8" DIA. x 3/4" LONG BOLT	5/8" DIA. x 2" LONG POST BOLT	EMBANKMENT	
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 7+62.02 to Sta 9+54.25 Rt	20	22	20	88	9	1	9	7	7	2	16	1	1	1	5	24	-20	
Sta 8+36.87 to Sta 9+54.25 Lt	8	10	8	40	3	1	6	7	7	2	16	1	1	1	5	24	35	
Sta 10+45.75 to Sta 11+63.13 Rt	8	10	8	40	3	1	6	7	7	2	16	1	1	1	5	24	7	
Sta 10+45.75 to Sta 12+37.96 Lt	20	22	20	88	9	1	9	7	7	2	16	1	1	1	5	24	23	
<b>TOTAL</b>	<b>56</b>	<b>64</b>	<b>56</b>	<b>256</b>	<b>24</b>	<b>4</b>	<b>30</b>	<b>28</b>	<b>28</b>	<b>8</b>	<b>64</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>96</b>	<b>45</b>	

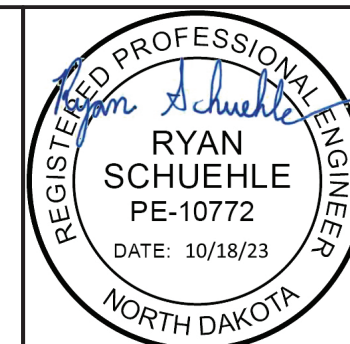
SPEC CODE BID ITEM	QTY	UNIT	SPEC CODE BID ITEM	QTY	UNIT
<u>203 0218 GUARDRAIL EMBANKMENT</u>			<u>764 0151 REMOVE W-BEAM GUARDRAIL &amp; POSTS</u>		
Sta 7+00.12 to Sta 9+51.75 Rt	1	EA	Sta 8+02.23 to Sta 9+53.04 Rt	150.8	LF
Sta 7+92.02 to Sta 9+51.75 Lt	1	EA	Sta 8+77.06 to Sta 9+53.11 Lt	76.1	LF
Sta 10+48.25 to Sta 12+08.62 Rt	1	EA	Sta 10+46.49 to Sta 11+22.51 Rt	76.0	LF
Sta 10+48.25 to Sta 13+01.59 Lt	1	EA	Sta 10+46.96 to Sta 11+97.42 Lt	150.5	LF
Total	4	EA	Total	453.3	LF
<u>764 0131 W-BEAM GUARDRAIL</u>			<u>764 2081 REMOVE END TREATMENT &amp; TRANSITION</u>		
Sta 8+08.82 to Sta 9+54.25 Rt	145.7	LF	Sta 7+65.25 to Sta 8+02.23 Rt	1	EA
Sta 8+83.65 to Sta 9+54.25 Lt	70.7	LF	Sta 8+40.06 to Sta 8+77.06 Lt	1	EA
Sta 10+45.75 to Sta 11+16.35 Rt	70.7	LF	Sta 11+22.51 to Sta 11+59.51 Rt	1	EA
Sta 10+45.75 to Sta 11+91.18 Lt	145.7	LF	Sta 11+97.42 to Sta 12+34.43 Lt	1	EA
Total	287.0	LF	Total	4	EA
<u>764 0145 W-BEAM GUARDRAIL END TERMINAL</u>					
Sta 7+62.02 to Sta 8+08.82 Rt	1	EA			
Sta 8+36.87 to Sta 8+83.65 Lt	1	EA			
Sta 11+16.35 to Sta 11+63.13 Rt	1	EA			
Sta 11+91.18 to Sta 12+37.96 Lt	1	EA			
Total	4	EA			

- (A) Include these items in the contract unit price bid for "W-Beam Guardrail".
- (B) The volume balance of embankment (cubic yards) is for informational purposes only.

Thrie/MGS W-beam Guardrail Quantities

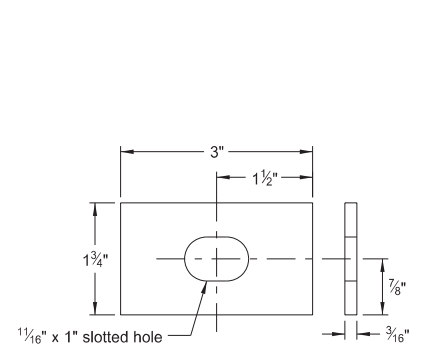
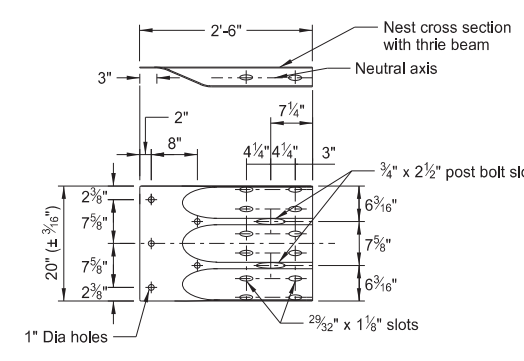
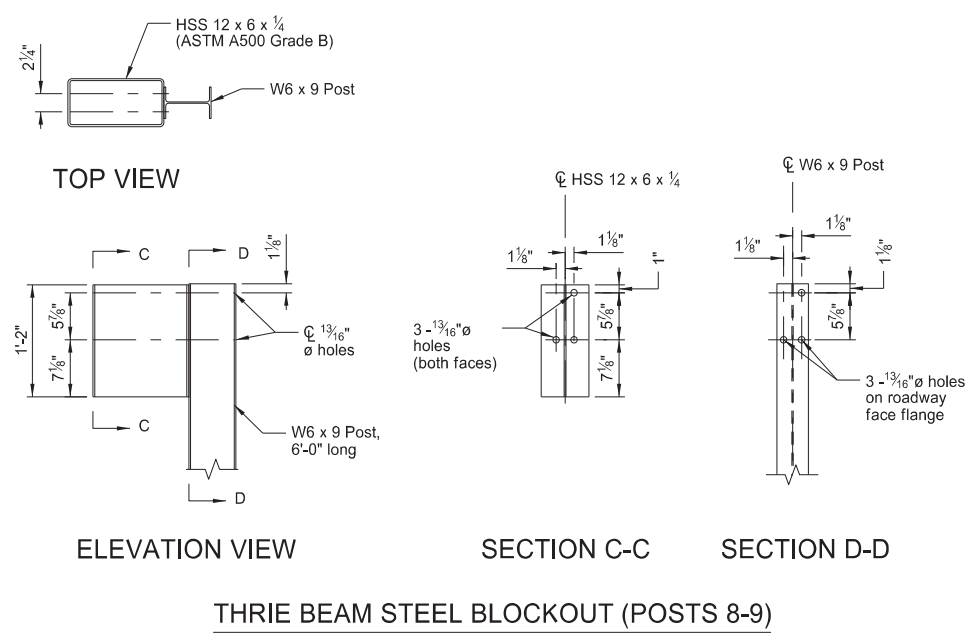
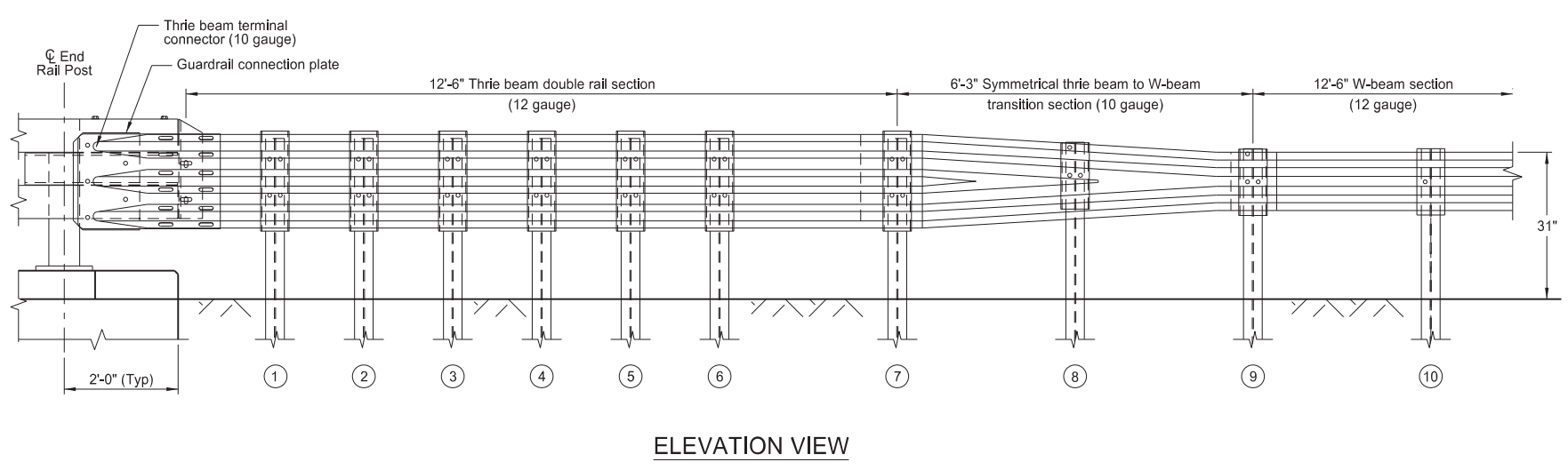
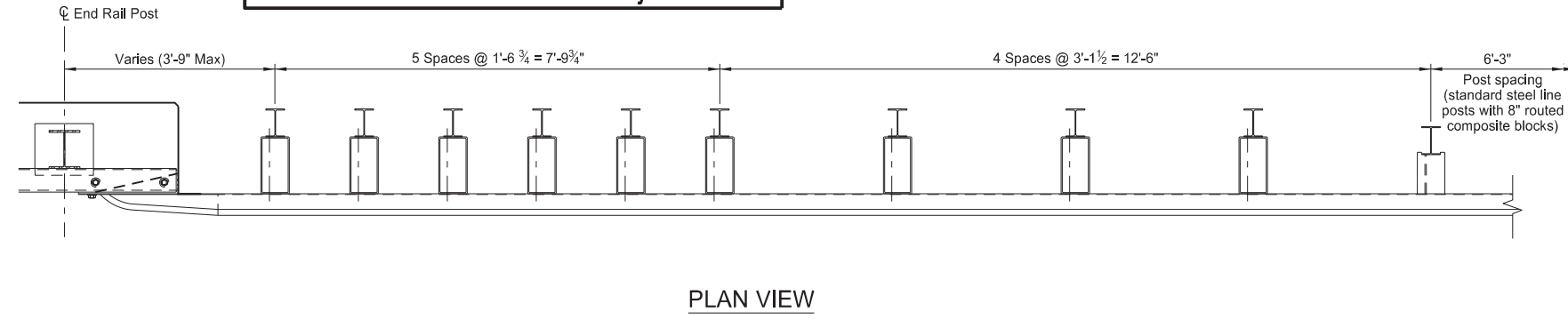
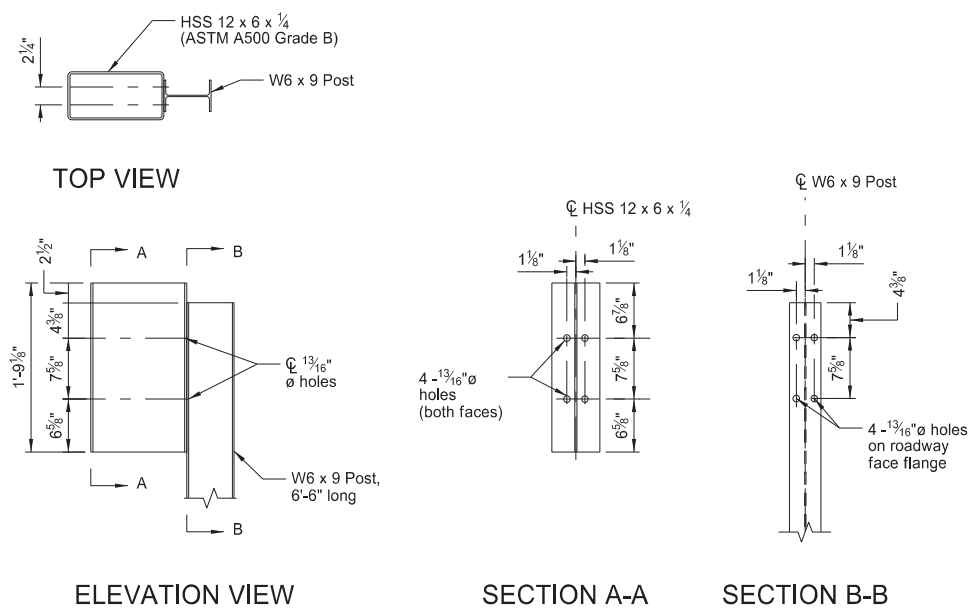
Bridge 0014-144.188  
ND 14 Stone Creek

Bottineau County

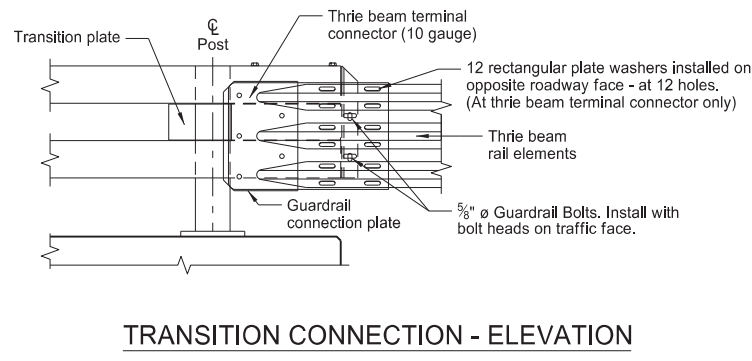
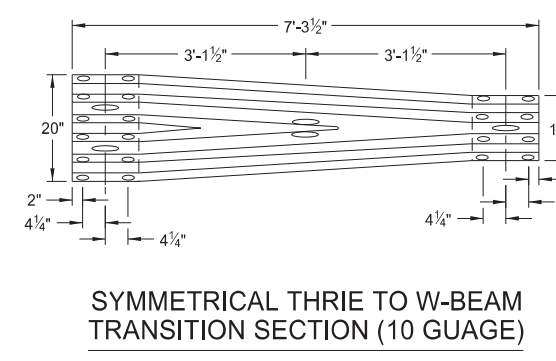
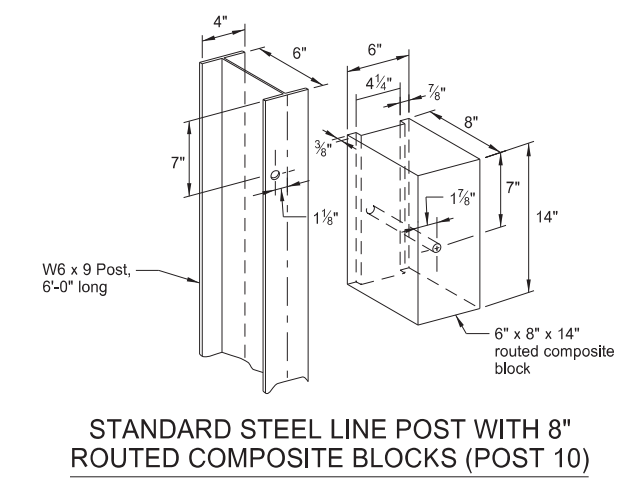


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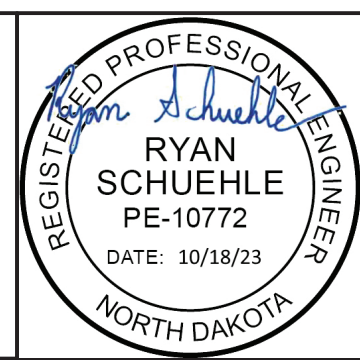
TRANSITION POST AND BLOCKOUT SIZING		
POST NO.	POST SIZE	BLOCKOUT SIZE
1-7	W6 x 9 x 6'-6" long	HSS 12 x 6 x 1/4 x 1'-9 1/8" long
8-9	W6 x 9 x 6'-0" long	HSS 12 x 6 x 1/4 x 1'-2" long
10	W6 x 9 x 6'-0" long	6" x 8" x 14" routed composite



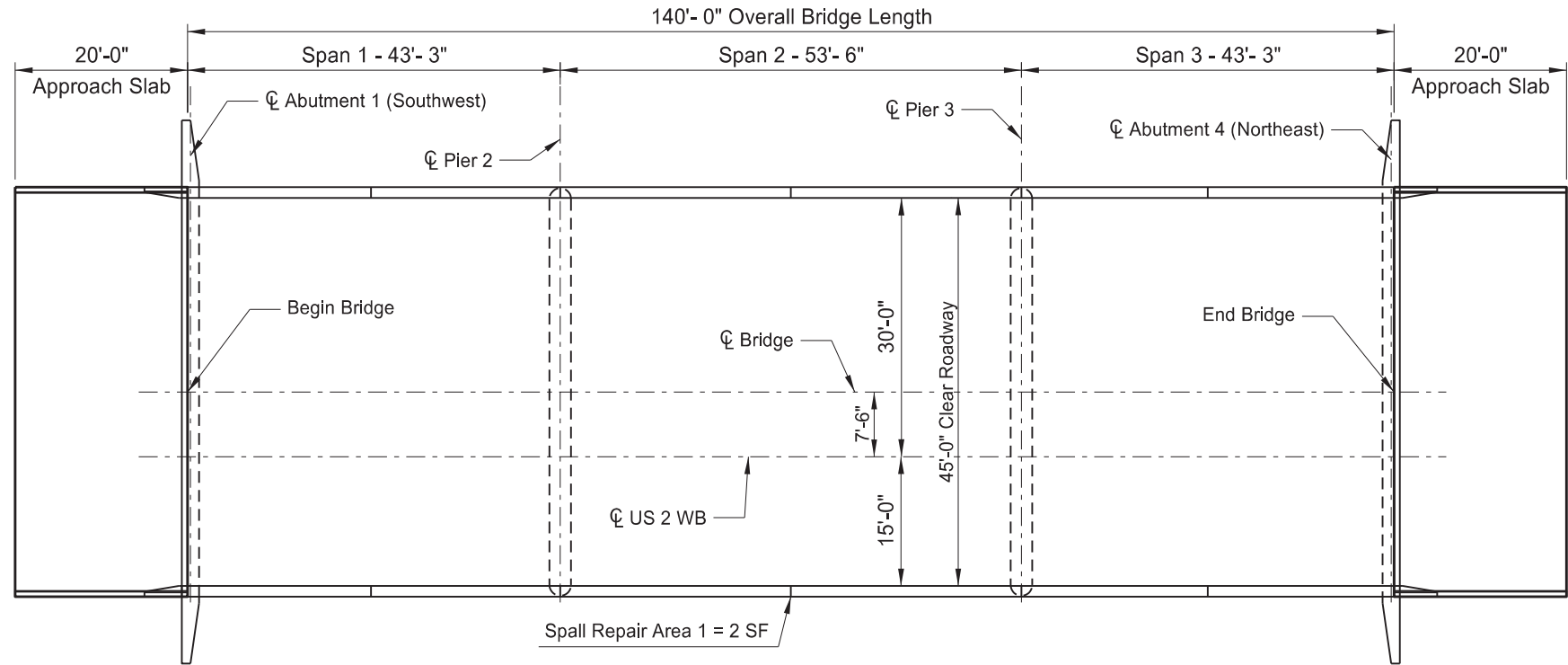
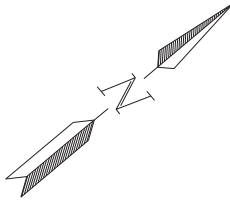
MGS Thrie Beam Transition to Double Box Beam Retrofit Detail

Bridge 0014-144.188  
ND 14 Stone Creek

Bottineau County

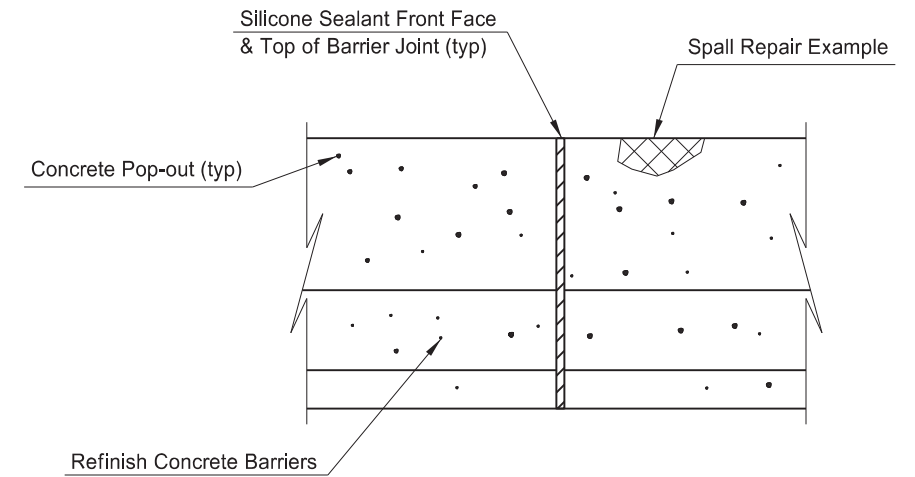


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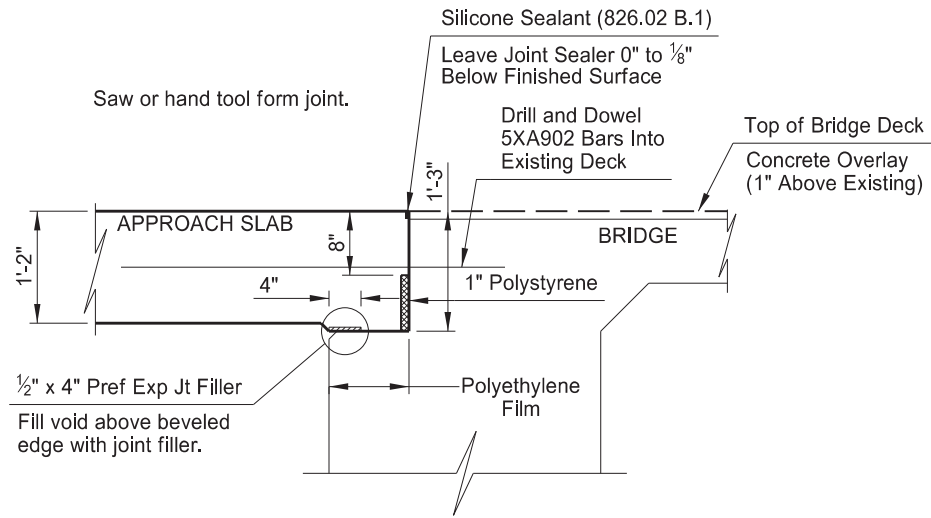


PLAN

Indicates spall repair area.



BARRIER REPAIR DETAIL



APPROACH SLAB JOINT DETAIL

SPEC	CODE	BID ITEM	UNIT	QUANTITY
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	212
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	900
602	7000	SPECIAL SURFACE FINISH	SF	2150
650	0704	OVERLAY CONCRETE	CY	35
650	0707	DECK CONCRETE	CY	13
650	0720	CLASS 1 REMOVAL	SY	700
650	0721	CLASS 2 REMOVAL	SY	140
650	0722	CLASS 2-A REMOVAL	LF	252
650	0723	CLASS 3 REMOVAL	SY	35
930	9612	SPALL REPAIR	SF	20
930	9696	BEAM END REPAIR	EA	2



ND DEPARTMENT OF TRANSPORTATION  
BRIDGE DIVISION

*Jason Thorenson* Jason Thorenson  
10/19/23

Bridge Layout

0.2 mi. NE of US 2/52 Interchange

Bridge 0002-149.111L  
US 2 Soo Line Separation

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**NOTES**

- 100 SCOPE OF WORK: This project as it pertains to Bridge 0002-149.111L consists of placing a deck overlay, installation of approach slabs, repairing concrete spall areas on the abutment surfaces and along the faces of both barriers, repair of beam ends at abutments, refinishing of the barrier surfaces, joint sealing, and installation of new guardrail.
- 100 GENERAL: Include the cost of furnishing and placing silicone sealant as shown in the plans in the price for the Overlay Concrete.
- 602 SPECIAL SURFACE FINISH: Apply TexCote XL 70 BridgeCote with Silane to the exposed outside edges of the bridge deck, and to all surfaces of the new and existing barriers on the bridge deck and approach slabs. Use gray surface finish color 36424 meeting AMS-STD-595 with a medium textured finish.
- Prior to applying the TexCote surface finish, remove the existing surface finish, seal cracks in the new and existing barriers, and prep the surfaces in accordance with the manufacturer's recommendations
- 602 PENETRATING WATER REPELLENT TREATMENT: Apply the penetrating water repellent solution to the top of the bridge deck overlay and approach slabs. Do not apply pavement marking or allow traffic onto the driving surface until the solution has completely penetrated and the entire driving surface is dry.
- 650 REMOVALS: The Contractor may complete the removals designated in the plans as "Class 1 Removal", "Class 2 Removal", and "Class 3 Removal" in accordance with Section 650.04 C. If the Contractor elects to complete the removals with Hydrodemolition Equipment the following provisions shall apply:
- Complete areas designated for Class 1 Removal in accordance with Section 650.04 C.2.
  - Complete areas designated for Class 2 Removal in accordance with Section 650.04 C.3.
  - Complete areas designated for Class 3 Removal in accordance with Section 650.04 C.4.
  - Class 2-A Removal will not be measured or paid for.
- No additional compensation will be made if the Contractor elects to complete the removals with Hydrodemolition Equipment. Removals will be paid for at the Contract unit price bid for "Class 1 Removal", "Class 2 Removal", and "Class 3 Removal".
- 650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck overlay and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks appearing on the top surface 0.007 inches or greater in width at its widest segment or as directed by the Engineer. Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.0007 inches wide. Use Paulco TE-2501 (Viking Paints, Inc), Dural 50 LM (Euclid Chemical

Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer. Include all work and materials associated with the crack sealing in the bid item "Overlay Concrete."

- 650 OVERLAY CONCRETE: An additional 1/4" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling. The Engineer measure overlay concrete based on the mobile mixer count and the yield box. The Engineer will determine the quantity of concrete placed by taking counter readings from the mixer before and after each placement and multiplying the readings by the meter count determined by the yield test. The Engineer will deduct waste concrete from the measured quantity. The Contractor and Engineer will agree upon the amount of waste, including the material used in the yield test, at the end of each day.

- 930 SPALL REPAIR: The abutment and bridge barriers have spall shown in the elevation, plan, and section views.

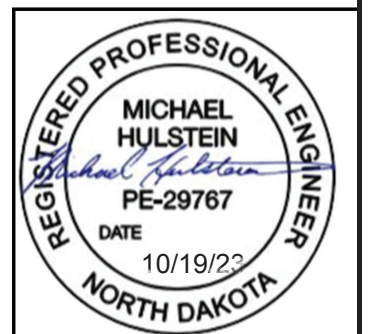
Remove the conduit and connection hardware attached to the bridge and along the abutment. Cut the conduit level with the ground and cap ends of conduit left in place. Any damage to the bridge beams or abutment concrete will be repaired at no cost to the Department. Include all materials, labor, and equipment required to remove the conduit in the bid item "Spall Repair".

Remove all unsound concrete and replace it to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of 1/4" plus or minus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sand blast clean the existing concrete and exposed reinforcing steel. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before patching material is placed, coat the surface with an epoxy bonding agent.

Use a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Co.), MasterEmaco N 400 (BASF Corporation) or an approved equal repair mortar. Cure the materials as recommended by the manufacturer.

The abutment and barrier spall repair quantities are based on the assumption that the area to be repaired are as shown on the plan, elevation, and section views. The actual limits of the spall repairs are to be determined by the Engineer in the field. All labor, equipment, and materials needed to repair the spall areas to be included in the bid item "Spall Repair".





**NOTES**

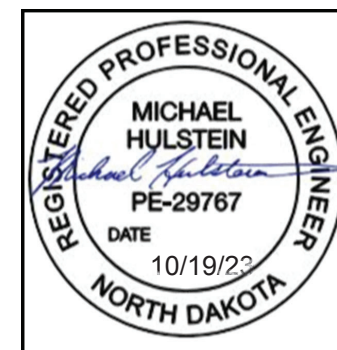
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930 BEAM END REPAIR: Remove all unsound concrete and replace it with new concrete material. Use a 15 pound maximum size chipping hammer on any unsound concrete.

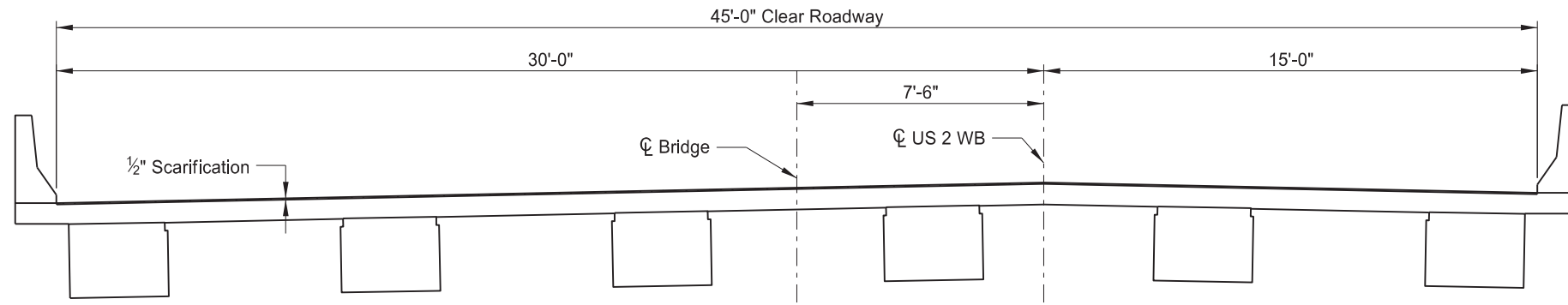
Sand blast clean the existing concrete and exposed reinforcing steel. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before patching material is placed, coat the surface with an epoxy bonding agent.

Use a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Co.), MasterEmaco N 400 (BASF Corporation) or an approved equal repair mortar. Cure the materials as recommended by the manufacturer.

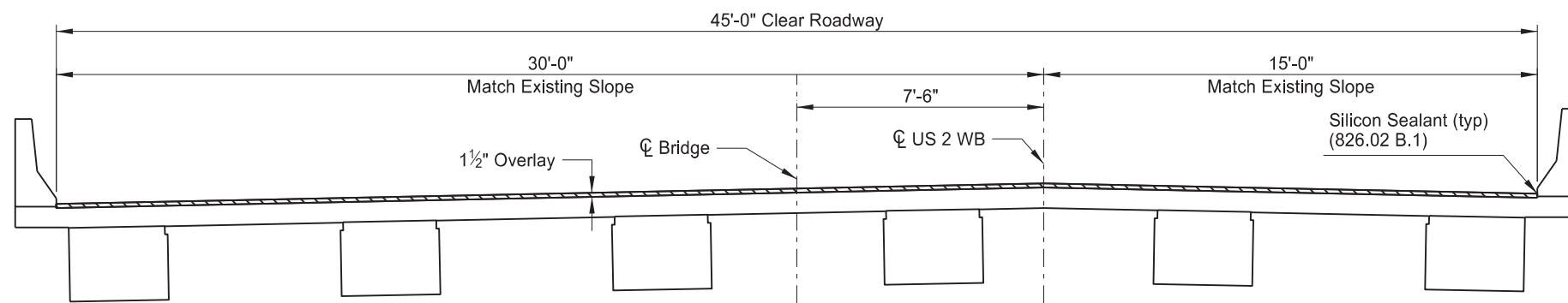
The limits of the beam end repairs are to be determined by the Engineer in the field. All labor, equipment, and materials needed to repair the spall areas to be included in the bid item "Beam End Repair".



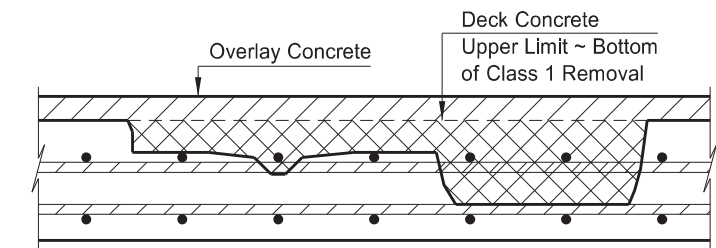
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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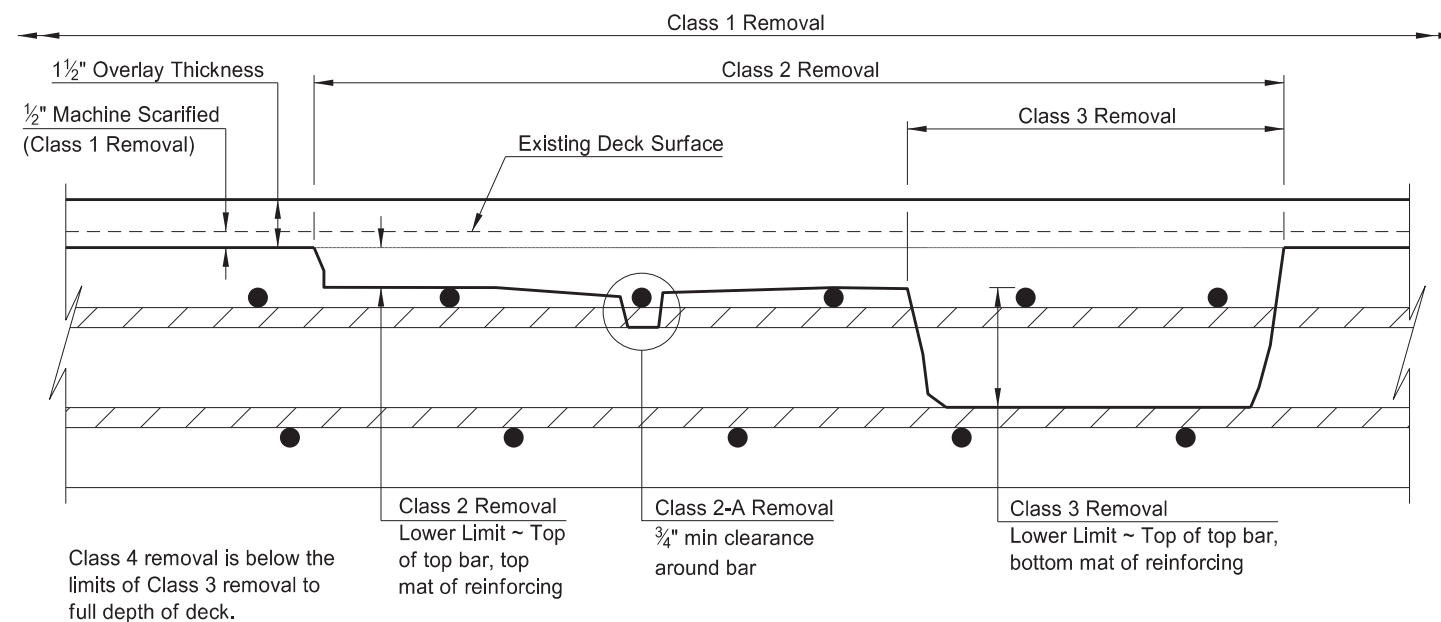
(SHOWING REMOVAL)  
TYPICAL DECK SECTION



(SHOWING OVERLAY)  
TYPICAL DECK SECTION

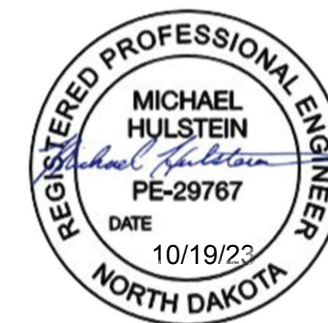


(DECK CONCRETE)  
BRIDGE DECK SECTION



(REMOVAL CLASSIFICATIONS)  
BRIDGE DECK SECTION

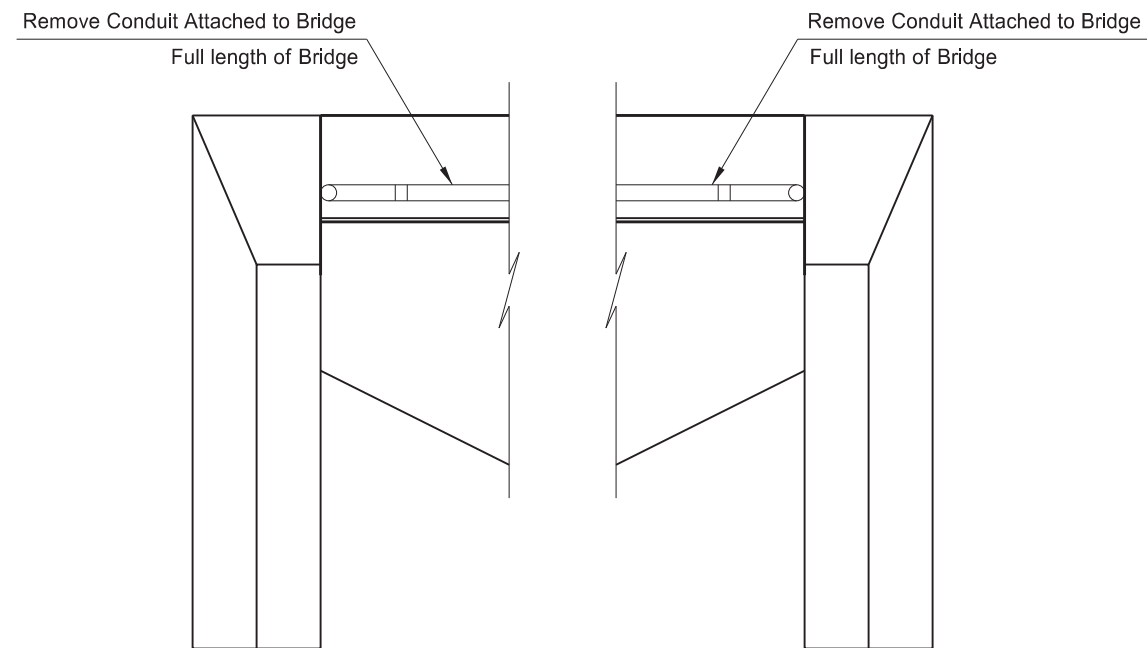
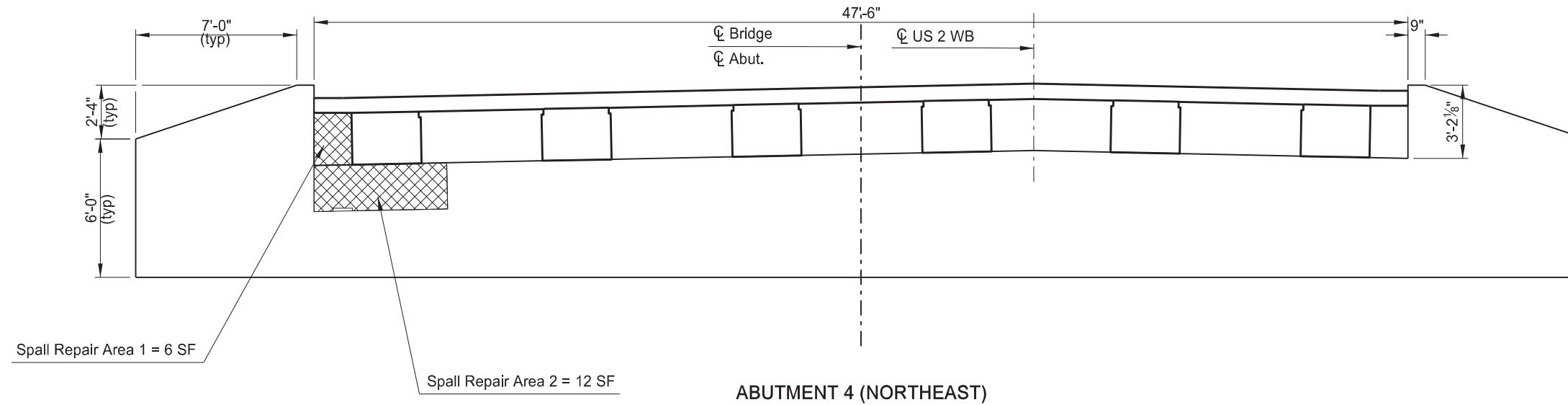
QUANTITIES	
OVERLAY CONCRETE	35 CY
DECK CONCRETE	13 CY
CLASS 1 REMOVAL	700 SY
CLASS 2 REMOVAL	140 SY
CLASS 2-A REMOVAL	252 LF
CLASS 3 REMOVAL	35 SY



Deck Section  
Deck Removal/Overlay  
0.2 mi. NE of US 2/52 Interchange  
  
Bridge 0002-149.111L  
US 2 Soo Line Separation

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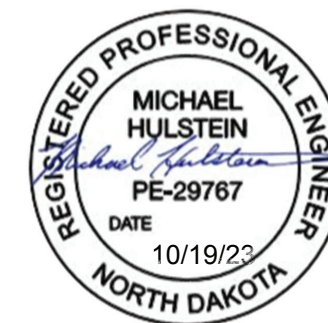
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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REMOVE CONDUIT DETAIL

Indicates spall repair area

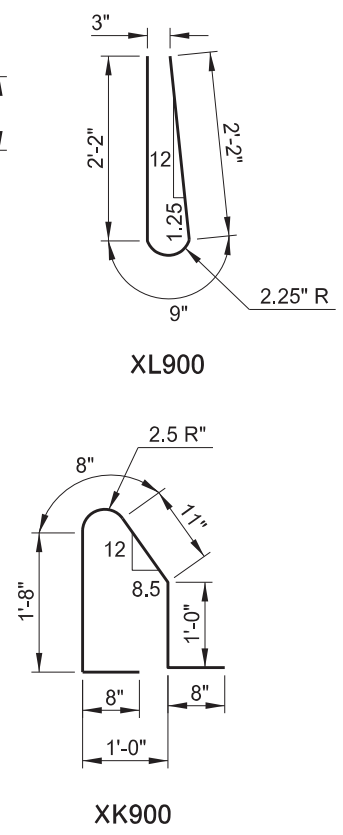
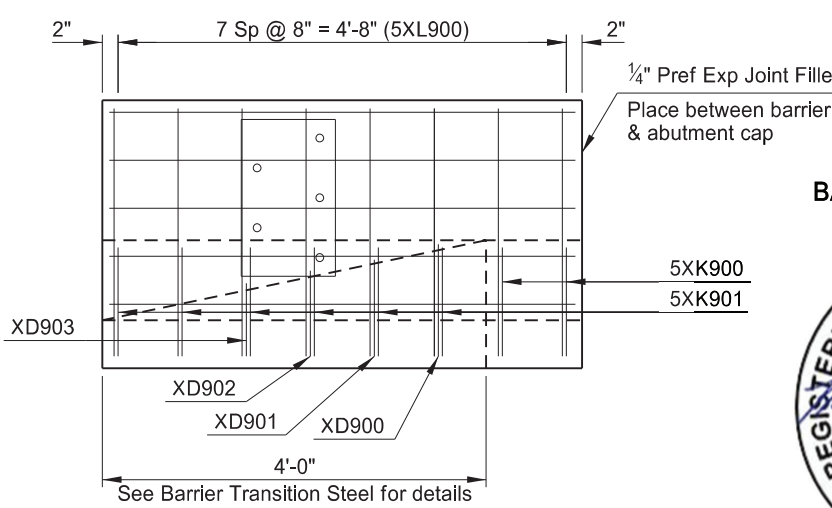
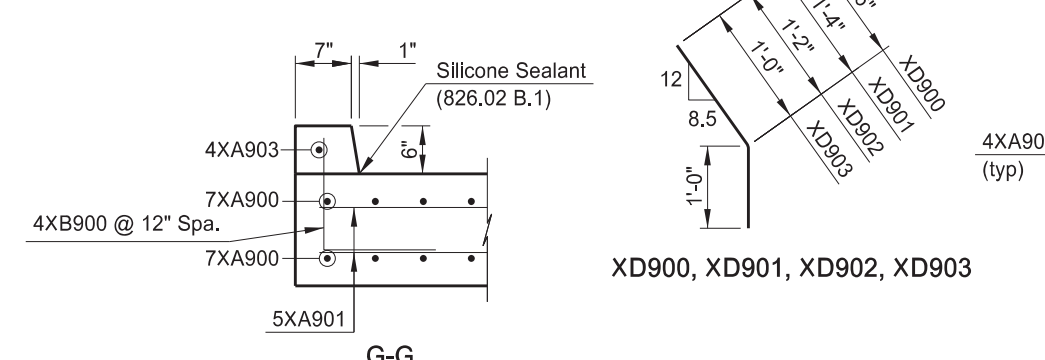
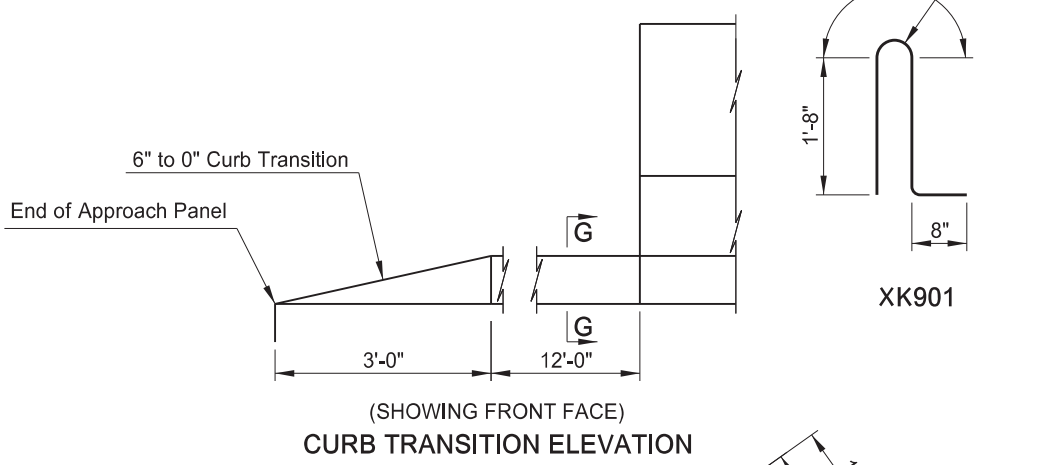
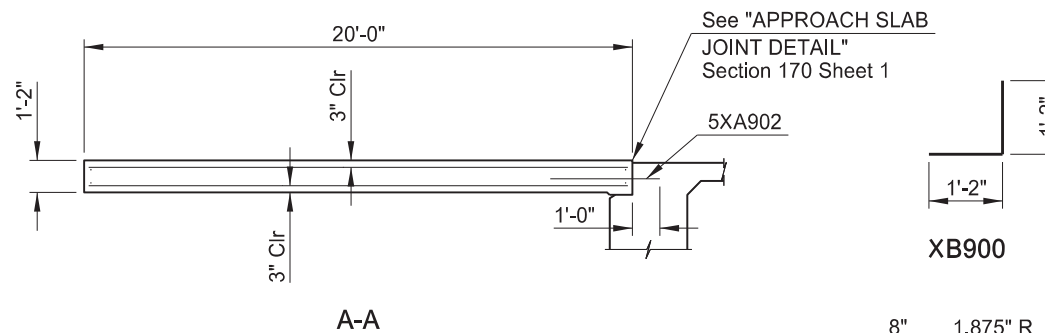
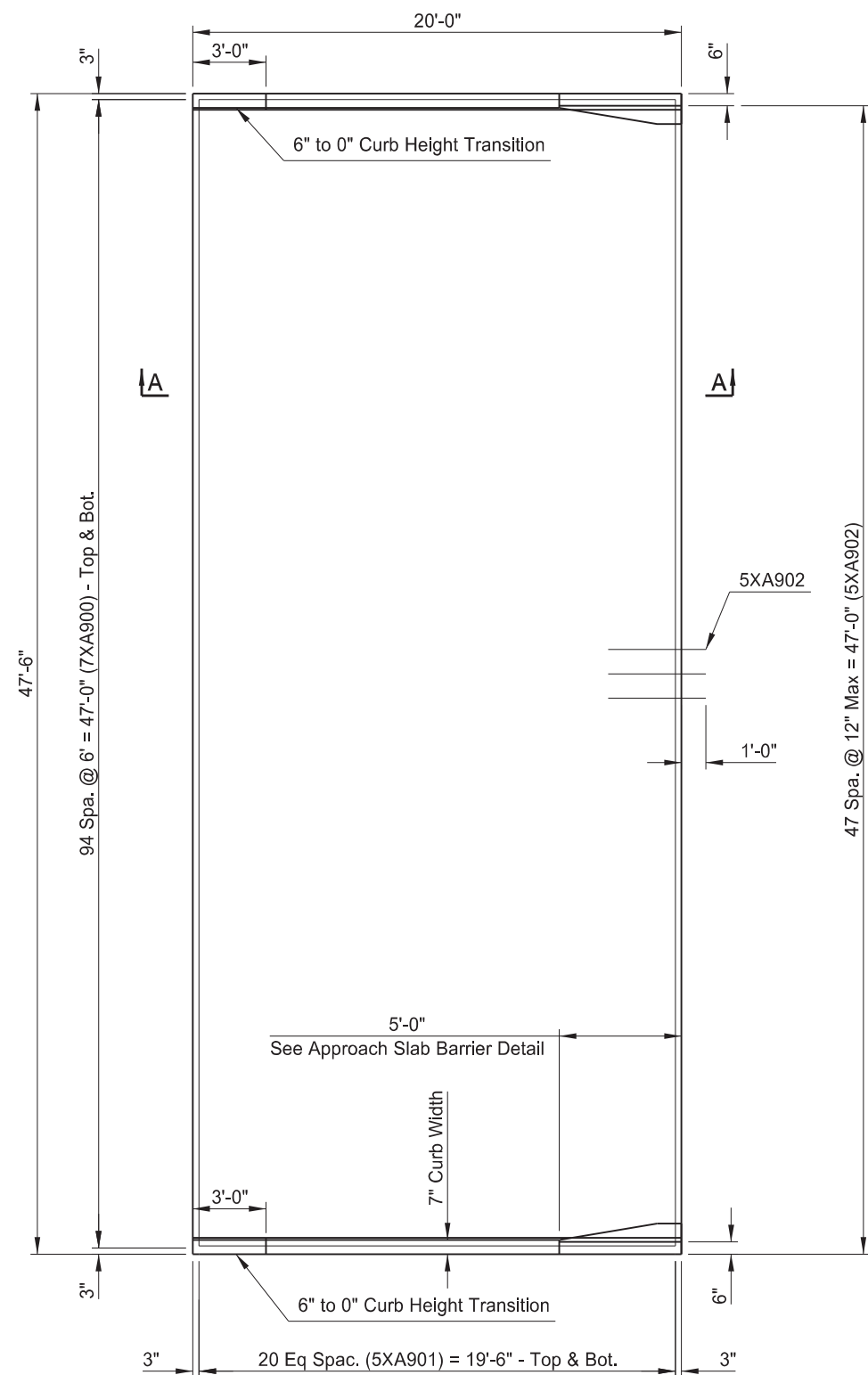
QUANTITIES	
SPALL REPAIR	18 SF
BEAM END REPAIR	2 EA



Abutment/Beam Repairs  
 0.2 mi. NE of US 2/52 Interchange  
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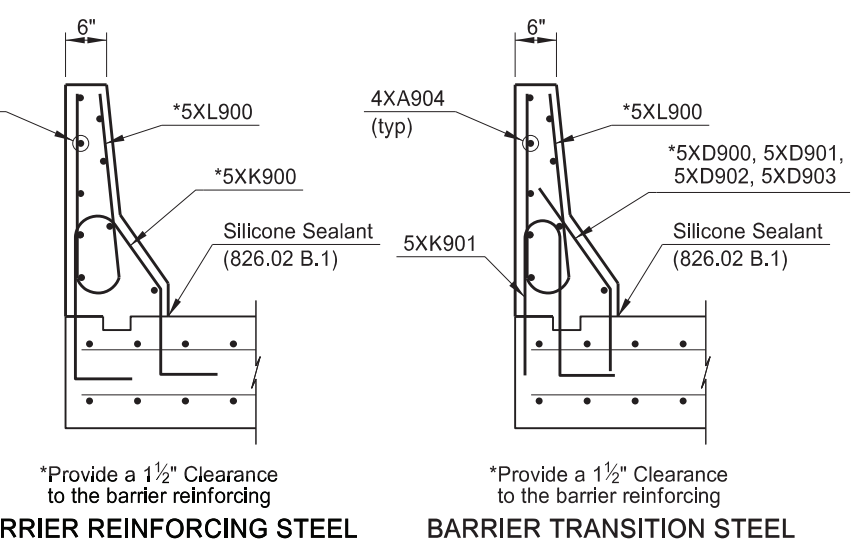
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SKEW ANGLE = 0°

BAR LIST - ONE SLAB			
SIZE	MARK	NO.	LENGTH
7	XA900	190	19'-8"
5	XA901	42	47'-0"
5	XA902	48	4'-0"
4	XA903	2	12'-2"
4	XA904	18	4'-10"
4	XB900	32	2'-4"
5	XD900	2	2'-6"
5	XD901	2	2'-4"
5	XD902	2	2'-2"
5	XD903	2	2'-0"
5	XK900	4	5'-7"
5	XK901	12	4'-8"
5	XL900	16	5'-1"

ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS)	CONCRETE (CY)
10360	42.5



**NOTES:**

602 CONCRETE BRIDGE APPROACH SLABS: The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs and barriers in the pay item "Concrete Bridge Approach Slab". Use Class AAE-3 concrete and Grade 60 reinforcing steel. Provide reinforcing steel that meets the requirements of Section 612. Use polyethylene film that meets the requirements of ASTM C171.

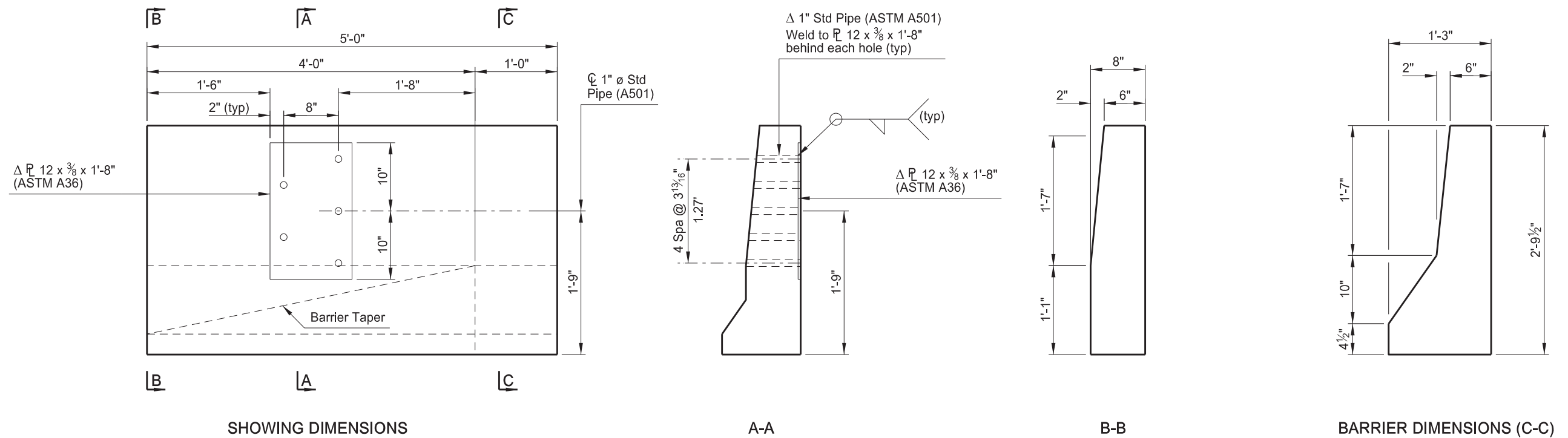
The bar marks beginning with an "X" indicate and epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out. Radius values shown indicate the inside bend radius.

Install the 5XA902 bars using a high strength epoxy adhesive meeting Section 806.02 with a minimum ultimate pullout strength of 16,000 lbs. Embed the bars a minimum of 9" into the slab.



QUANTITIES (BOTH APPROACHES)	
CONCRETE BRIDGE APPROACH SLAB	212 SY
Approach Slab Details	
0.2 mi. NE of US 2/52 Interchange	
Bridge 0002-149.111L	
US 2 Soo Line Separation	

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SHOWING DIMENSIONS

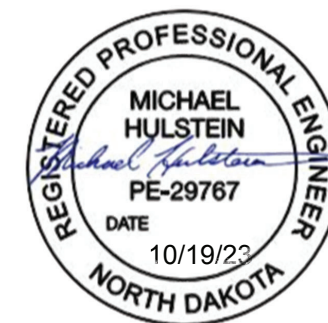
A-A

B-B

BARRIER DIMENSIONS (C-C)

(SHOWING BACK FACE & JERSEY BARRIER TRANSITION)

CONNECTION PLATE DETAILS

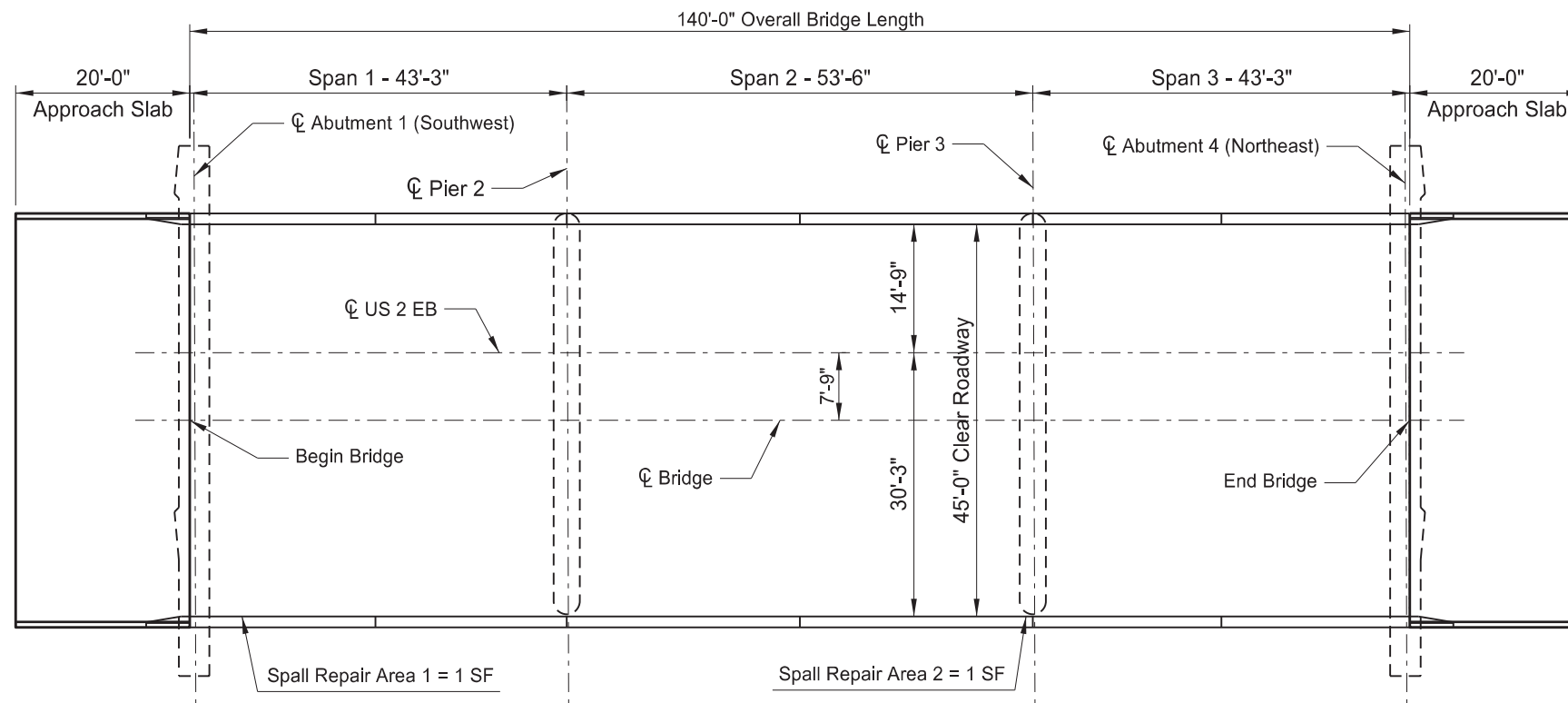
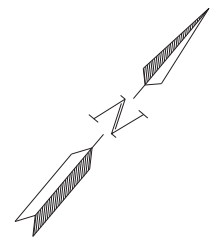


Approach Slab Details

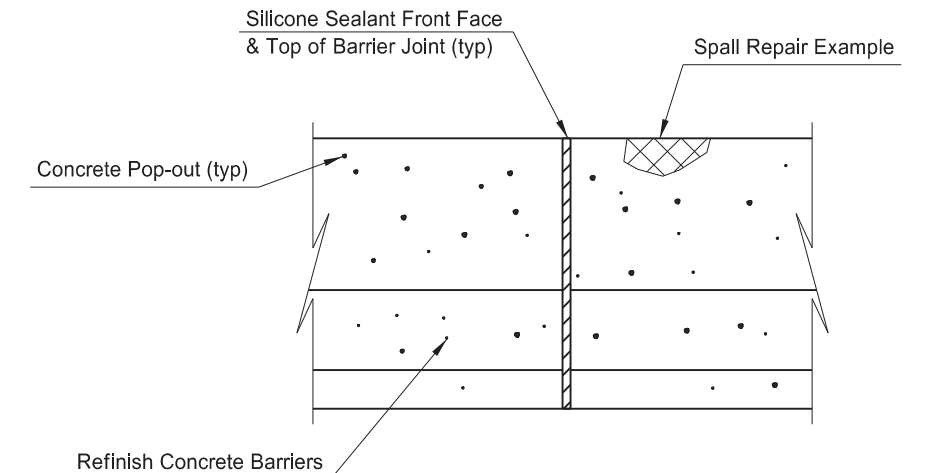
0.2 mi. NE of US 2/52 Interchange

Bridge 0002-149.111L  
US 2 Soo Line Separation

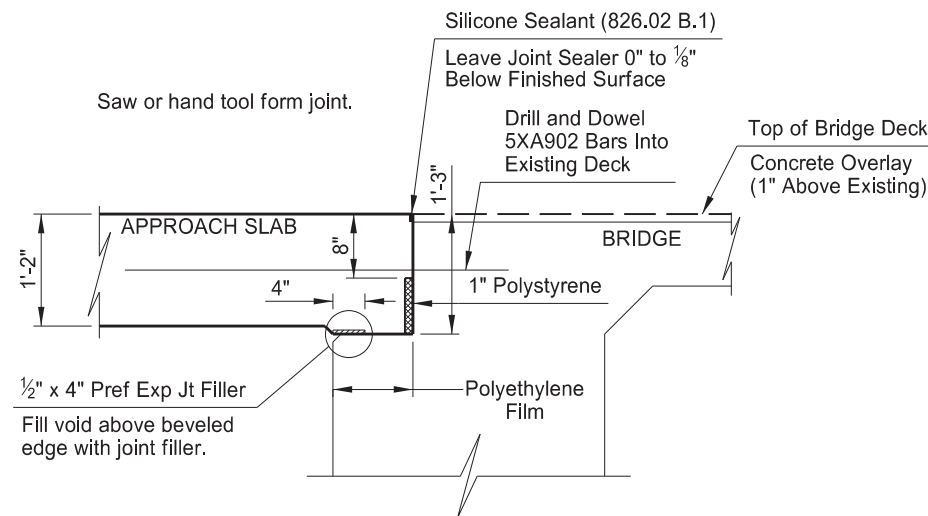
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	8



PLAN

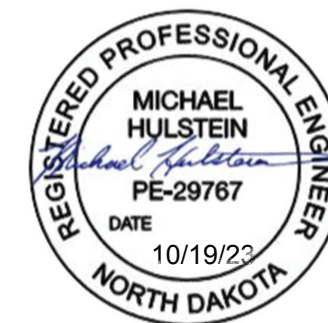


BARRIER REPAIR DETAIL



APPROACH SLAB JOINT DETAIL

SPEC	CODE	BID ITEM	UNIT	QUANTITY
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	212
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	900
602	7000	SPECIAL SURFACE FINISH	SF	2150
650	0704	OVERLAY CONCRETE	CY	39
650	0707	DECK CONCRETE	CY	13
650	0720	CLASS 1 REMOVAL	SY	700
650	0721	CLASS 2 REMOVAL	SY	140
650	0722	CLASS 2-A REMOVAL	LF	252
650	0723	CLASS 3 REMOVAL	SY	35
930	9612	SPALL REPAIR	SF	31



ND DEPARTMENT OF TRANSPORTATION  
 BRIDGE DIVISION

*Jason Thorenson* Jason Thorenson  
 10/19/23

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Bridge Layout

0.2 mi. NE of US 2/52 Interchange

Bridge 0002-149.111R  
 US 2 Soo Line Separation

**NOTES**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	9

100 SCOPE OF WORK: This project as it pertains to Bridge 0002-149.111R consists of placing a deck overlay, installation of approach slabs, repairing concrete spall areas on the abutment surfaces and along the faces of both barriers, repair of beam ends at abutments, refinishing of the barrier surfaces, joint sealing, and installation of new guardrail.

100 GENERAL: Include the cost of furnishing and placing silicone sealant as shown in the plans in the price for the Overlay Concrete.

602 SPECIAL SURFACE FINISH: Apply TexCote XL 70 BridgeCote with Silane to the exposed outside edges of the bridge deck, and to all surfaces of the new and existing barriers on the bridge deck and approach slabs. Use gray surface finish color 36424 meeting AMS-STD-595 with a medium textured finish.

Prior to applying the TexCote surface finish, remove the existing surface finish, seal cracks in the new and existing barriers, and prep the surfaces in accordance with the manufacturer's recommendations.

602 PENETRATING WATER REPELLENT TREATMENT: Apply the penetrating water repellent solution to the top of the bridge deck overlay and approach slabs. Do not apply pavement marking or allow traffic onto the driving surface until the solution has completely penetrated and the entire driving surface is dry.

650 REMOVALS: The Contractor may complete the removals designated in the plans as "Class 2 Removal", and "Class 3 Removal" in accordance with Section 650.04 C. If the Contractor elects to complete the removals with Hydrodemolition Equipment the following provisions shall apply:

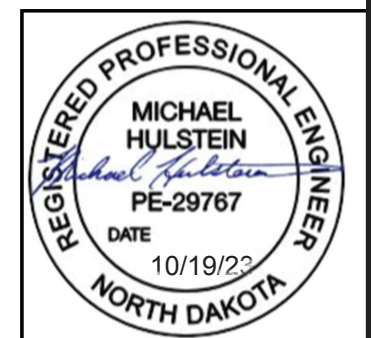
- Complete Class 1 Removals with Mechanical Equipment in accordance with Section 650.04 B.
- Calibrate the Hydrodemolition Equipment in accordance with Section 650.04 C.2 prior to completing Class 2 Removals.
- Complete areas designated for Class 2 Removal in accordance with Section 650.04 C.3, except that the areas designated by the Engineer for Class 2 Removal will receive the first pass from the Hydrodemolition Equipment.
- Complete areas designated for Class 3 Removal in accordance with Section 650.04 C.4, except that the areas designated by the Engineer for Class 3 Removal will receive a second pass from the Hydrodemolition Equipment.
- Class 2-A Removal will not be measured or paid for.

No additional compensation will be made if the Contractor elects to complete the removals with Hydrodemolition Equipment. Removals will be paid for at the Contract unit price bid for "Class 1 Removal", "Class 2 Removal", and "Class 3 Removal".

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck overlay and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks appearing on the top surface 0.007 inches or greater in width at its widest segment or as directed by the Engineer. Immediately before applying the sealer, clean the cracks by removing all

dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.0007 inches wide. Use Paulco TE-2501 (Viking Paints, Inc), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer. Include all work and materials associated with the crack sealing in the bid item "Overlay Concrete."

650 OVERLAY CONCRETE: An additional 1/4" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling. The Engineer measure overlay concrete based on the mobile mixer count and the yield box. The Engineer will determine the quantity of concrete placed by taking counter readings from the mixer before and after each placement and multiplying the readings by the meter count determined by the yield test. The Engineer will deduct waste concrete from the measured quantity. The Contractor and Engineer will agree upon the amount of waste, including the material used in the yield test, at the end of each day.



**NOTES**

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930 SPALL REPAIR: The abutment and bridge barriers have spall shown in the elevation, plan, and section views.

Remove the conduit and connection hardware attached to the bridge and along the abutment. Cut the conduit level with the ground and cap ends of conduit left in place. Any damage to the bridge beams or abutment concrete will be repaired at no cost to the Department. Include all materials, labor, and equipment required to remove the conduit in the bid item "Spall Repair".

Remove all unsound concrete and replace it to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of 1/4" plus or minus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sand blast clean the existing concrete and exposed reinforcing steel. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before patching material is placed, coat the surface with an epoxy bonding agent.

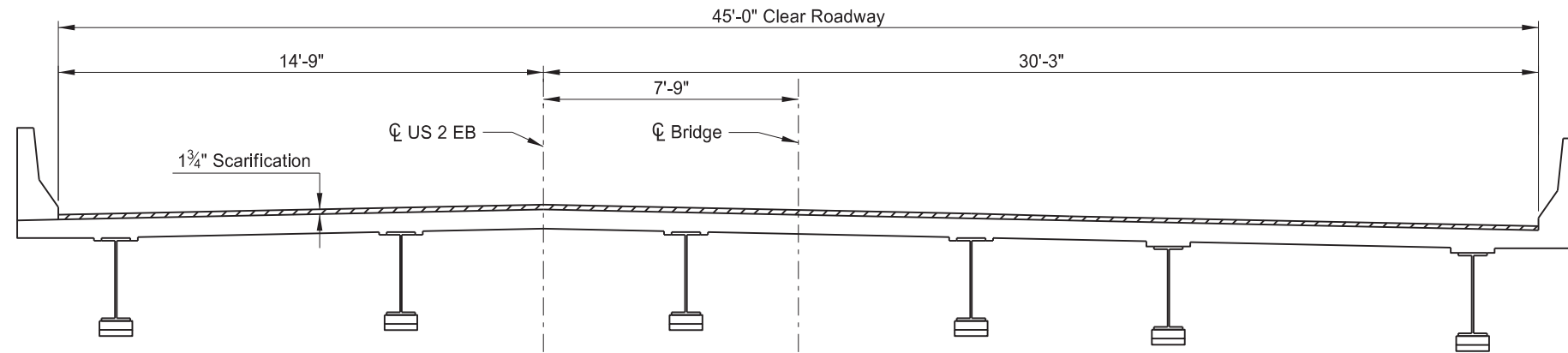
Use a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Co.), MasterEmaco N 400 (BASF Corporation) or an approved equal repair mortar. Cure the materials as recommended by the manufacturer.

The abutment and barrier spall repair quantities are based on the assumption that the limits of the spall repairs are to be determined by the Engineer in the field. All labor, equipment, and materials needed to repair the spall areas to be included in the bid item "Spall Repair".

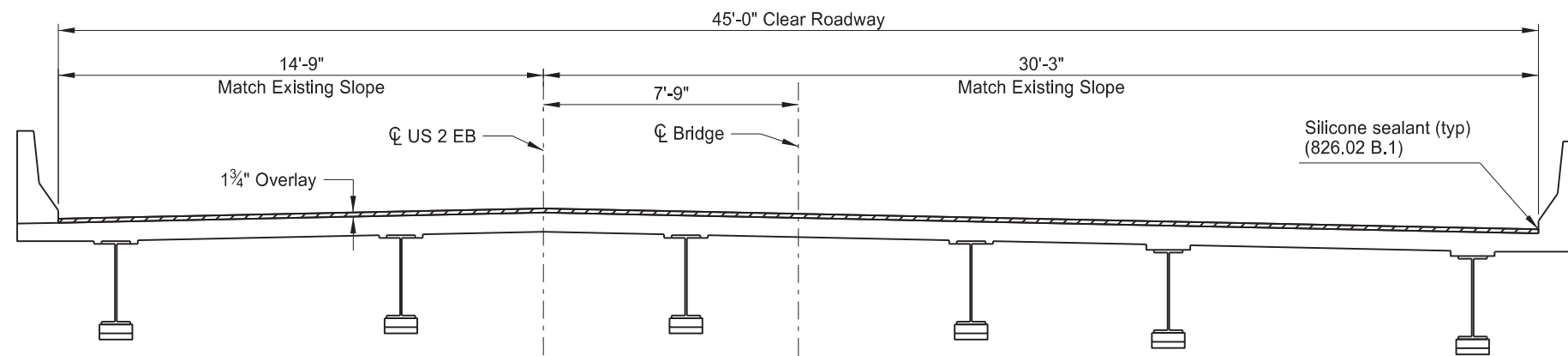




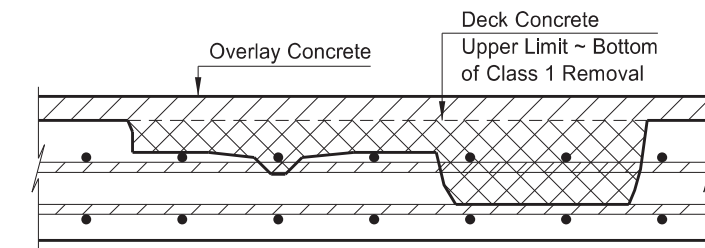
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	11



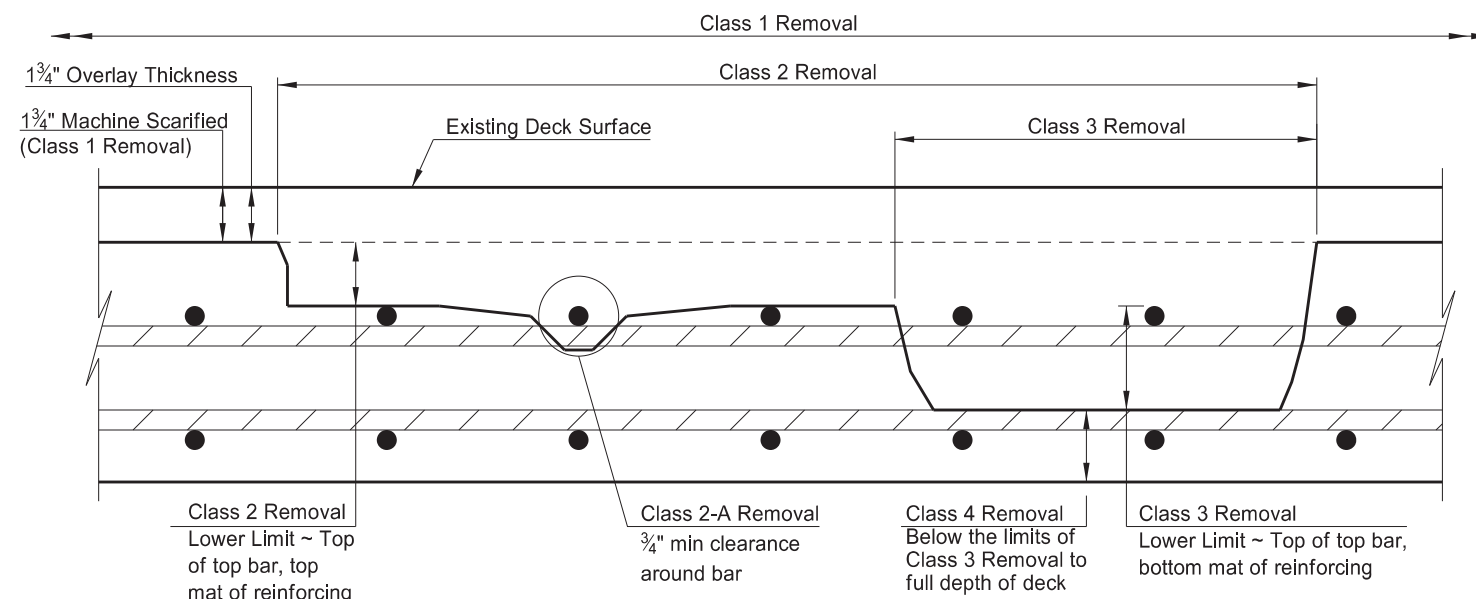
(SHOWING REMOVAL)  
TYPICAL DECK SECTION



(SHOWING OVERLAY)  
TYPICAL DECK SECTION



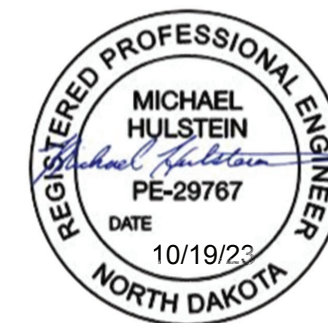
(DECK CONCRETE)  
BRIDGE DECK SECTION



(REMOVAL CLASSIFICATIONS)

BRIDGE DECK SECTION

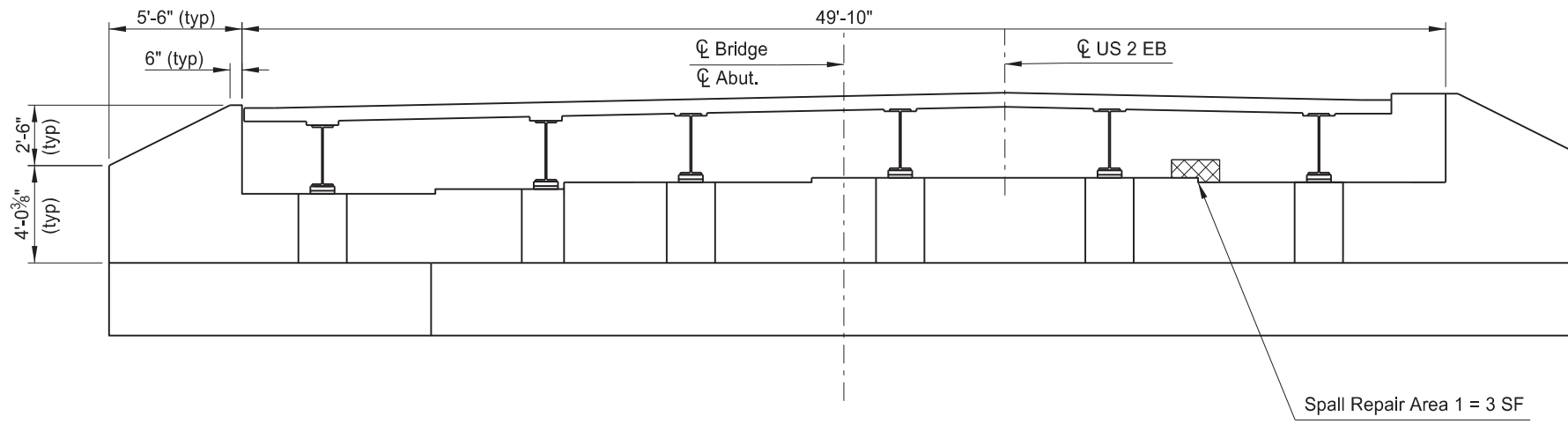
QUANTITIES	
OVERLAY CONCRETE	39 CY
DECK CONCRETE	13 CY
CLASS 1 REMOVAL	700 SY
CLASS 2 REMOVAL	140 SY
CLASS 2-A REMOVAL	252 LF
CLASS 3 REMOVAL	35 SY



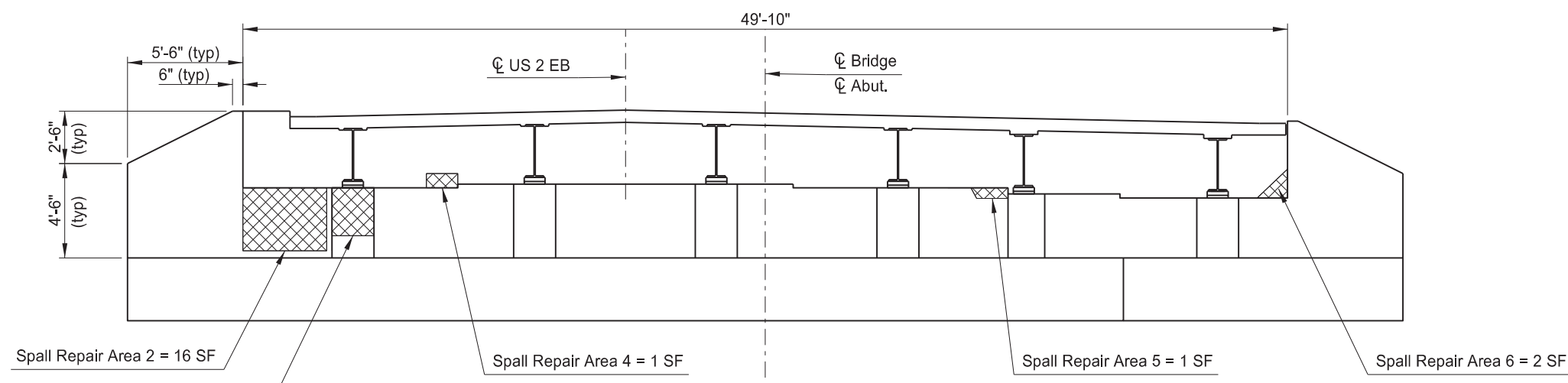
Deck Section  
Deck Removal/Overlay  
0.2 mi. NE of US 2/52 Interchange  
  
Bridge 0002-149.111R  
US 2 Soo Line Overlay

23 U.S.C. § 407 Documents  
 NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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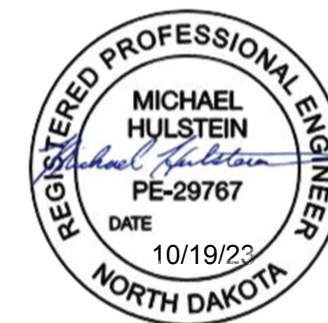
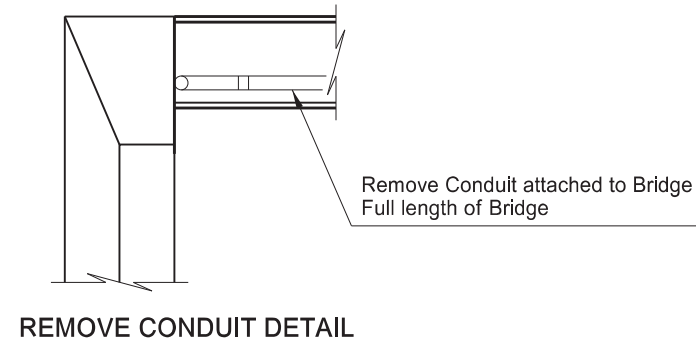


ABUTMENT 1 (SOUTHWEST)



ABUTMENT 4 (NORTHEAST)

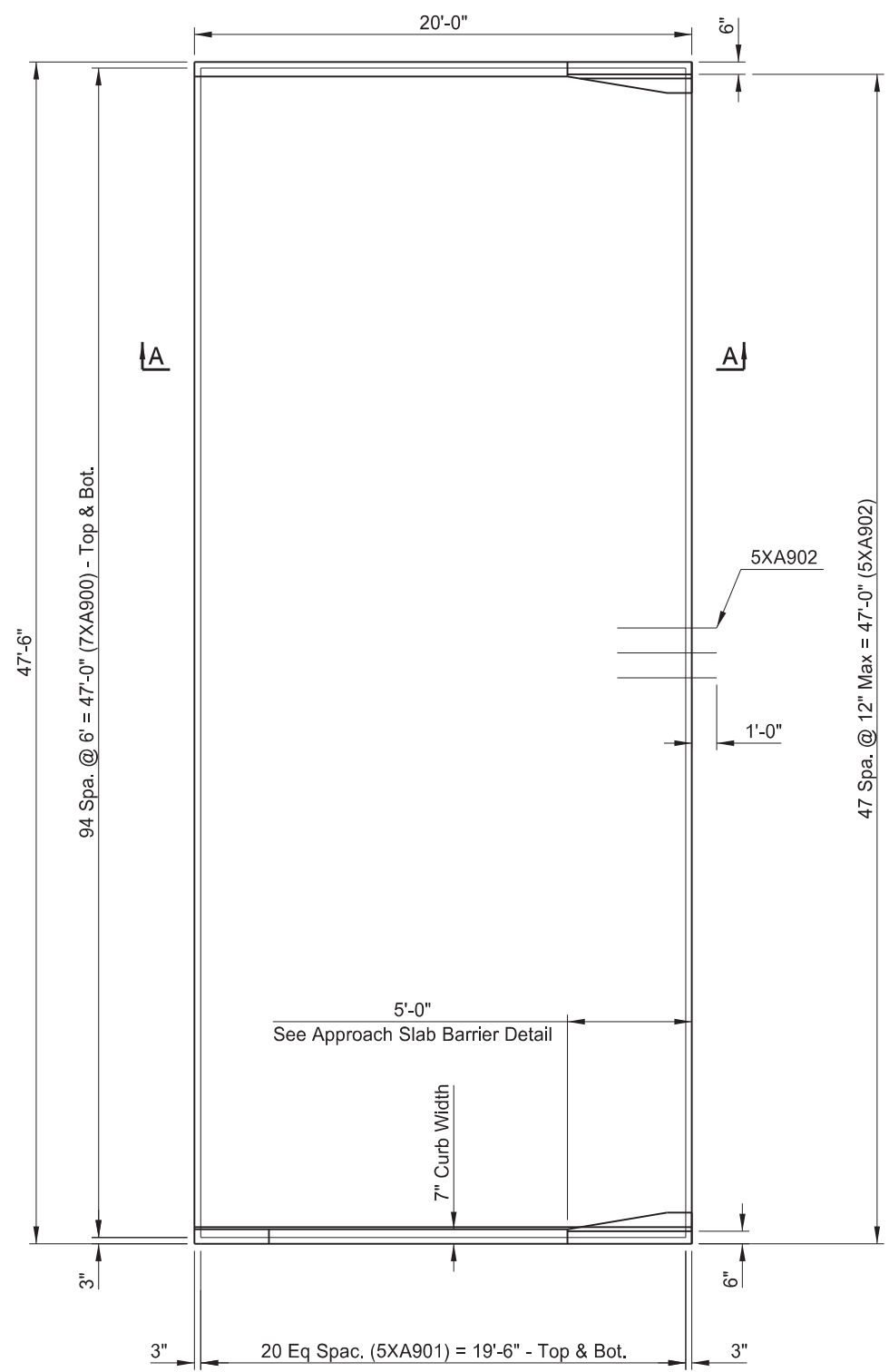
 Indicates spall repair area.



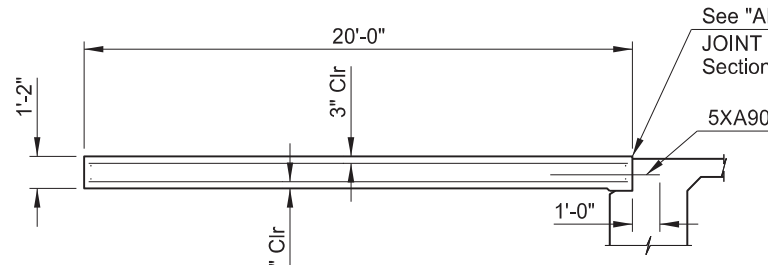
QUANTITIES	
SPALL REPAIR	29 SF
Abutment Repairs	
0.2 mi. NE of US 2/52 Interchange	
Bridge 0002-149.111R US 2 Soo Line Separation	

23 U.S.C. § 407 Documents  
 NDDOT Reserves All Objections

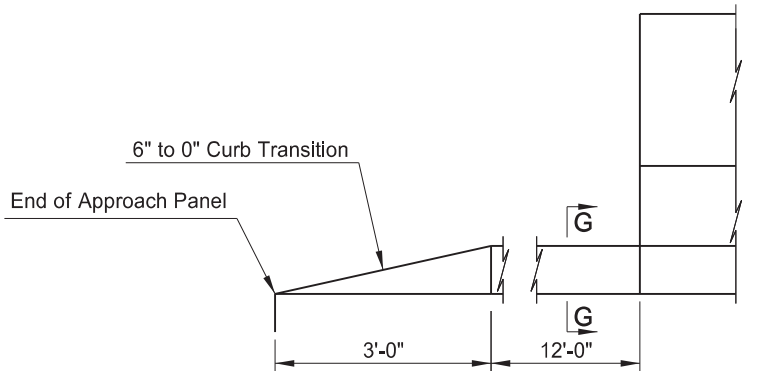
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	13



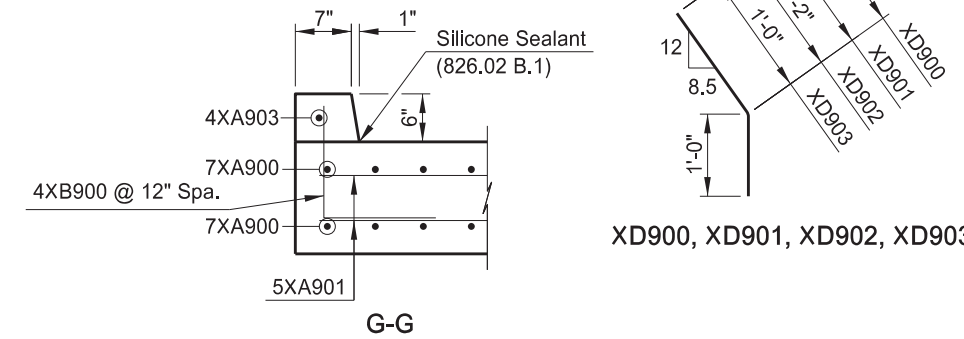
PLAN



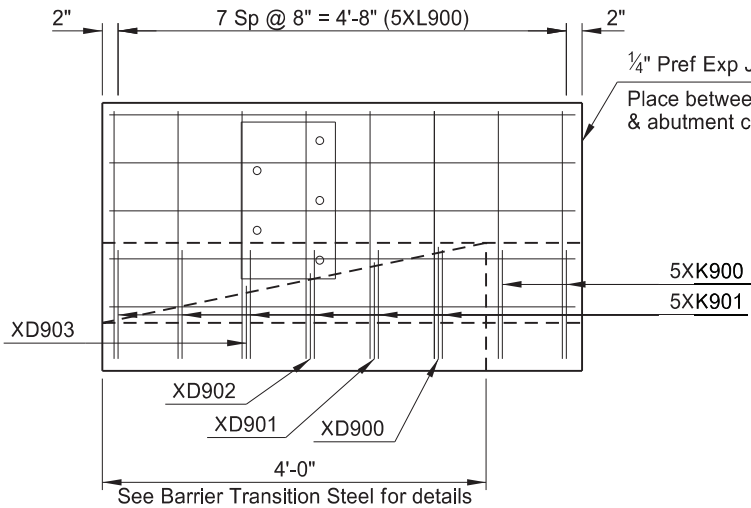
A-A



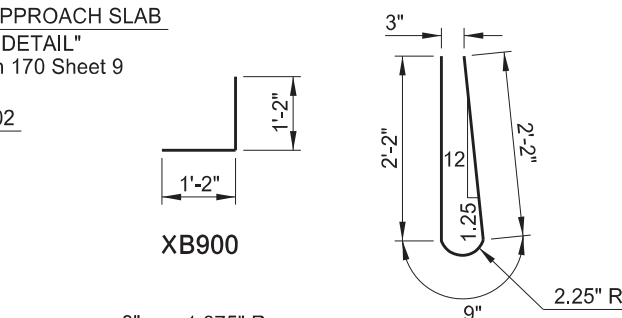
(SHOWING FRONT FACE)  
 CURB TRANSITION ELEVATION



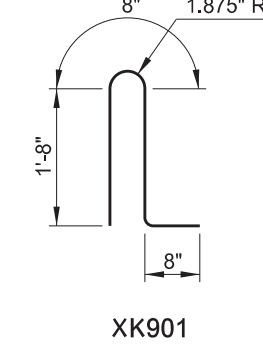
G-G



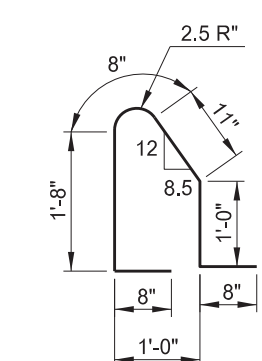
APPROACH SLAB BARRIER DETAIL



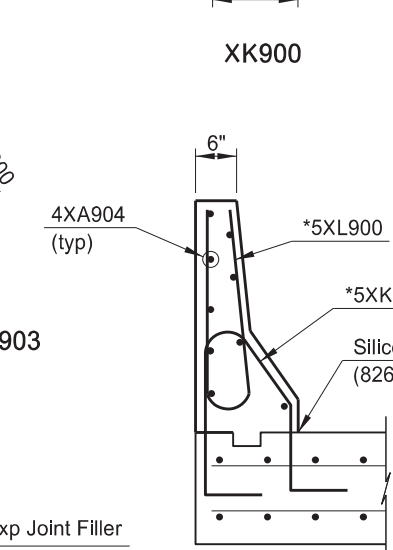
XL900



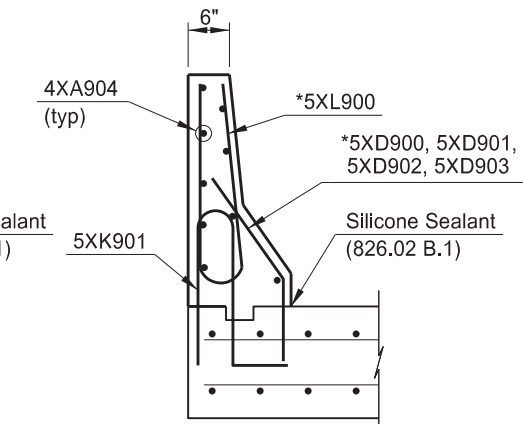
XK901



XK900



BARRIER REINFORCING STEEL



BARRIER TRANSITION STEEL

SKEW ANGLE = 0°			
BAR LIST - ONE SLAB			
SIZE	MARK	NO.	LENGTH
7	XA900	190	19'-8"
5	XA901	42	47'-0"
5	XA902	48	4'-0"
4	XA903	2	12'-2"
4	XA904	18	4'-10"
4	XB900	32	2'-4"
5	XD900	2	2'-6"
5	XD901	2	2'-4"
5	XD902	2	2'-2"
5	XD903	2	2'-0"
5	XK900	4	5'-7"
5	XK901	12	4'-8"
5	XL900	16	5'-1"

ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS)	CONCRETE (CY)
10360	42.5

**NOTES:**

602 CONCRETE BRIDGE APPROACH SLABS: The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs and barriers in the pay item "Concrete Bridge Approach Slab". Use Class AAE-3 concrete and Grade 60 reinforcing steel. Provide reinforcing steel that meets the requirements of Section 612. Use polyethylene film that meets the requirements of ASTM C171.

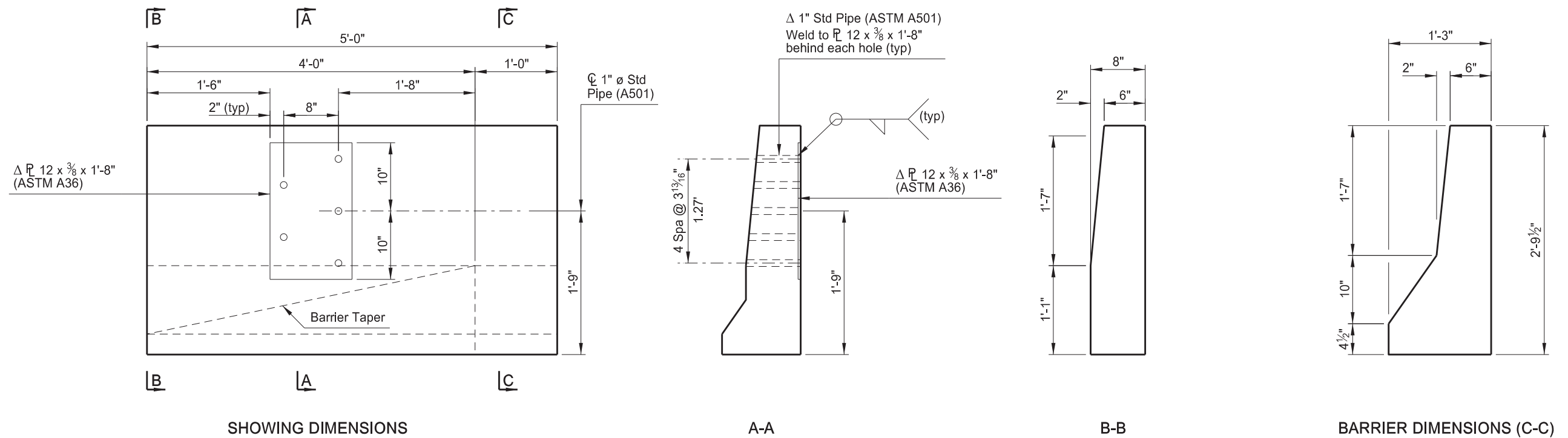
The bar marks beginning with an "X" indicate and epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out. Radius values shown indicate the inside bend radius.

Install the 5XA902 bars using a high strength epoxy adhesive meeting Section 806.02 with a minimum ultimate pullout strength of 16,000 lbs. Embed the bars a minimum of 9" into the slab.



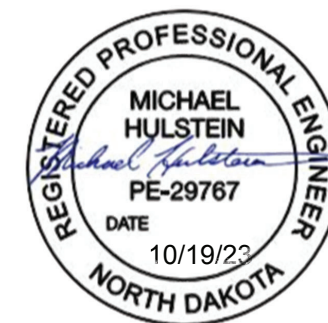
QUANTITIES (BOTH APPROACHES)	
CONCRETE BRIDGE APPROACH SLAB	212 SY
Approach Slab Details	
0.2 mi. NE of US 2/52 Interchange	
Bridge 0002-149.111R US 2 Soo Line Separation	

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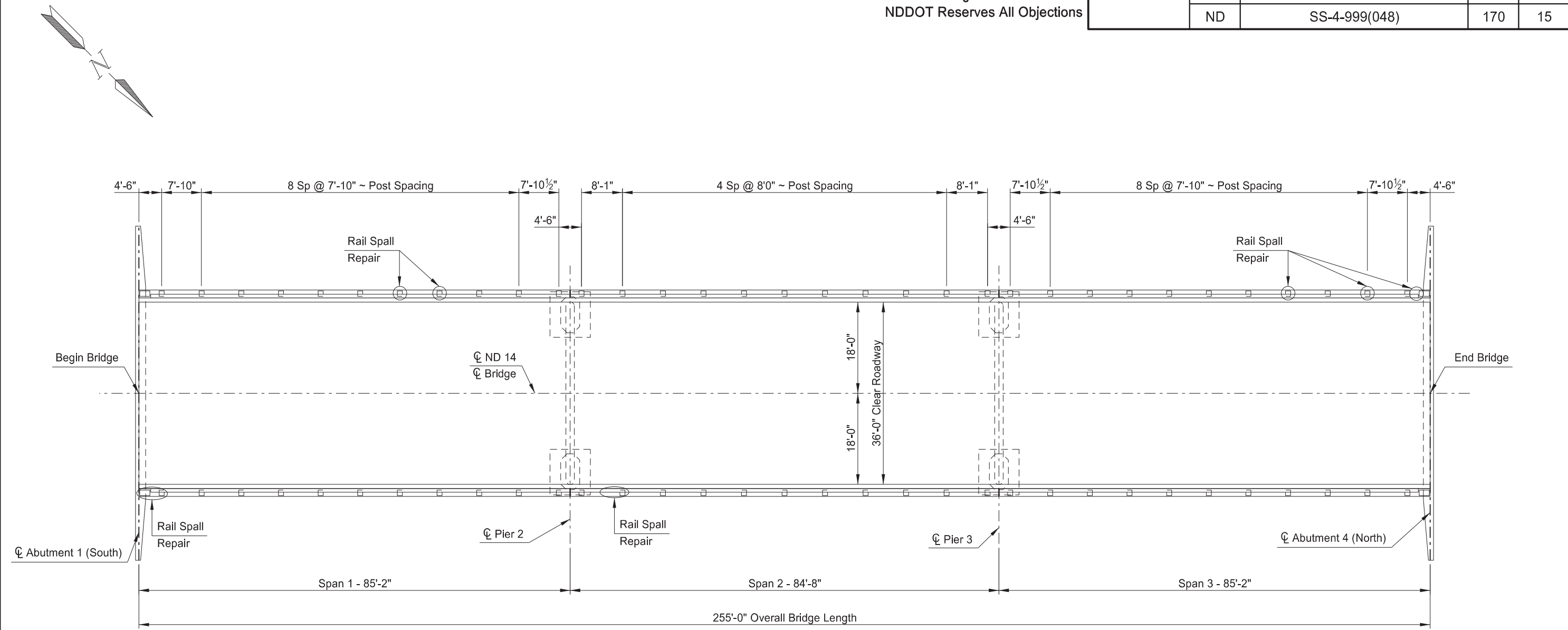
(SHOWING BACK FACE & JERSEY BARRIER TRANSITION)

CONNECTION PLATE DETAILS



Approach Slab Details  
0.2 mi. NE of US 2/52 Interchange  
Bridge 0002-149.111R  
US 2 Soo Line Separation

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	15



PLAN

SPEC	CODE	BID ITEM	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1020
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	510
650	0704	OVERLAY CONCRETE	CY	50
650	0707	DECK CONCRETE	CY	5
650	0710	CLASS 1-H REMOVAL	SY	1020
650	0711	CLASS 2-H REMOVAL	SY	51
650	0712	CLASS 3-H REMOVAL	SY	11
930	9612	SPALL REPAIR	SF	11



ND DEPARTMENT OF TRANSPORTATION  
 BRIDGE DIVISION

*Jason Thorenson* Jason Thorenson  
 10/19/23

Bridge Layout

12.0 mi. S of Anamoose, ND

Bridge 0014-061.107  
 ND 14 Lone Tree Reservoir

**NOTES**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	16

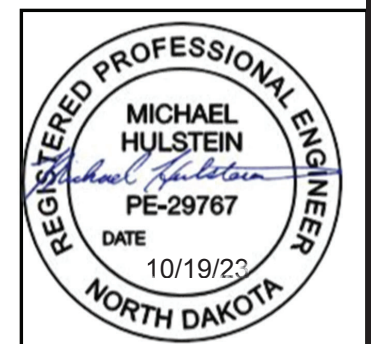
- 100 SCOPE OF WORK: This project as it pertains to Bridge 0014-061.107 consists of placing a deck overlay, installation of approach slabs, repairing concrete spall areas on the beams and barriers, repair of beam ends at abutments, barrier retrofit, and installation of new guardrail.
- 100 GENERAL: Include the cost of furnishing and placing silicone sealant as shown in the plans in the price for the Overlay Concrete.
- 602 PENETRATING WATER REPELLENT TREATMENT: Apply the penetrating water repellent solution to the top of the bridge deck overlay. Do not apply pavement marking or allow traffic onto the driving surface until the solution has completely penetrated and the entire driving surface is dry.
- 650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck overlay and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks appearing on the top surface 0.007 inches or greater in width at its widest segment or as directed by the Engineer. Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.0007 inches wide. Use Paulco TE-2501 (Viking Paints, Inc), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer. Include all work and materials associated with the crack sealing in the bid item "Overlay Concrete."
- 650 OVERLAY CONCRETE: An additional 1/4" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling. The Engineer measure overlay concrete based on the mobile mixer count and the yield box. The Engineer will determine the quantity of concrete placed by taking counter readings from the mixer before and after each placement and multiplying the readings by the meter count determined by the yield test. The Engineer will deduct waste concrete from the measured quantity. The Contractor and Engineer will agree upon the amount of waste, including the material used in the yield test, at the end of each day.
- 930 SPALL REPAIR: The abutment and bridge barriers have spall shown in the elevation, plan, and section views.

Remove all unsound concrete and replace it to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of 1/4" plus or minus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

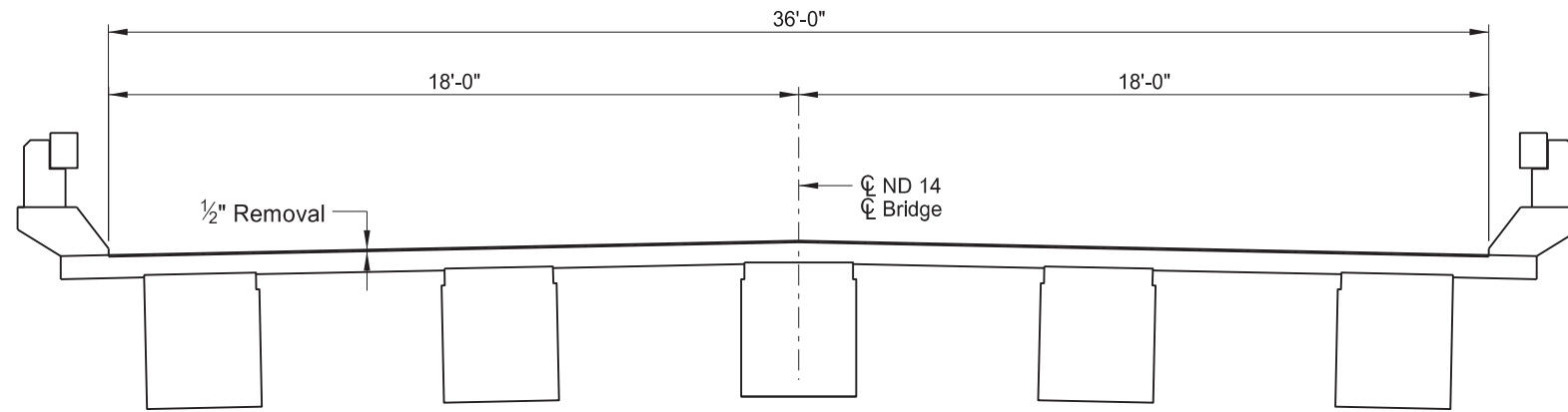
Sand blast clean the existing concrete and exposed reinforcing steel. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before patching material is placed, coat the surface with an epoxy bonding agent.

Use a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Co.), MasterEmaco N 400 (BASF Corporation) or an approved equal repair mortar. Cure the materials as recommended by the manufacturer.

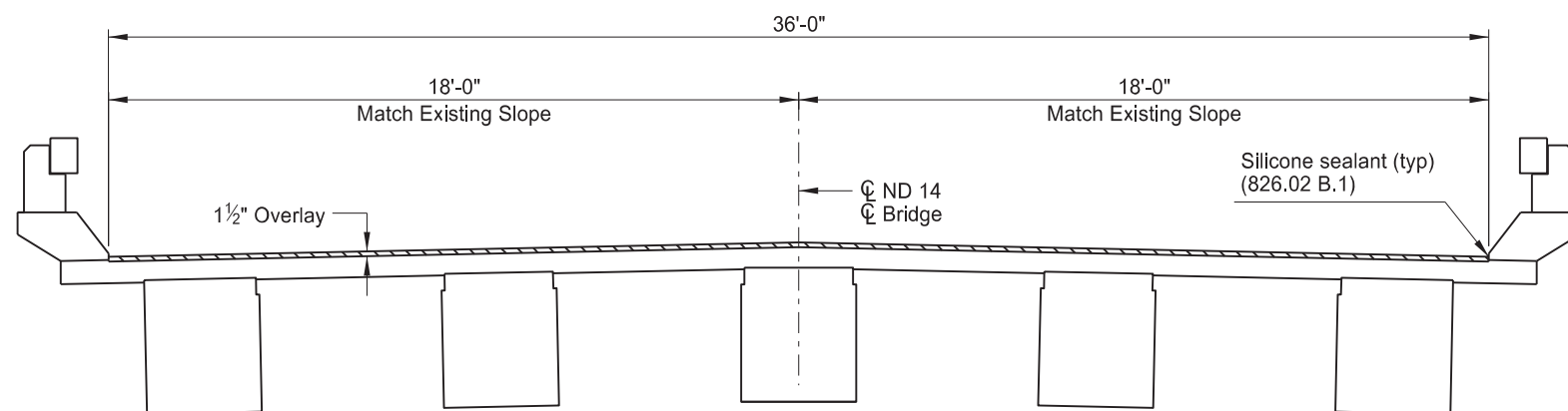
The beam and barrier spall repair quantities are based on the assumption that the area to be repaired are as shown on the plan, elevation, and section views. The actual limits of the spall repairs are to be determined by the Engineer in the field. All labor, equipment, and materials needed to repair the spall areas to be included in the bid item "Spall Repair".



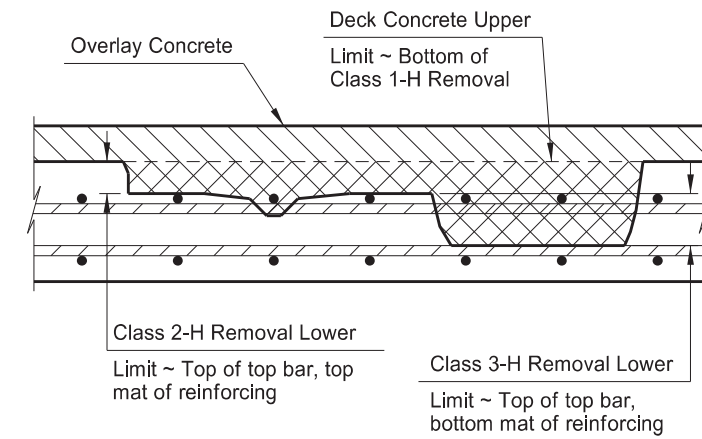
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	17



(SHOWING REMOVAL)  
 TYPICAL DECK SECTION



(SHOWING OVERLAY)  
 TYPICAL DECK SECTION



(DECK CONCRETE)  
 BRIDGE DECK SECTION

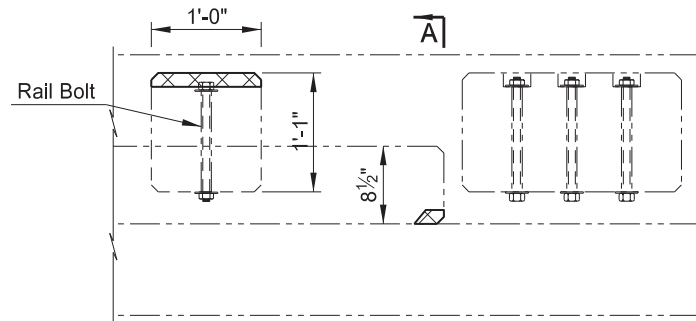
QUANTITIES	
OVERLAY CONCRETE	50 CY
DECK CONCRETE	5 CY
CLASS 1-H REMOVAL	1020 SY
CLASS 2-H REMOVAL	51 SY
CLASS 3-H REMOVAL	11 SY



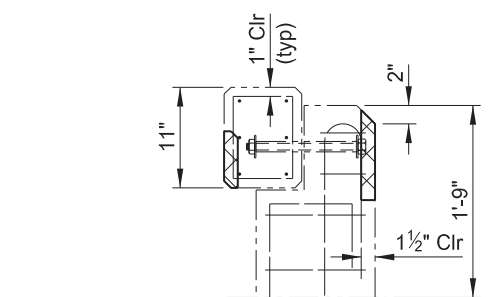
Deck Section  
 Deck Removal/Overlay  
 12.0 mi. S of Anamoose, ND  
 Bridge 0014-061.107  
 ND 14 Lone Tree Reservoir

23 U.S.C. § 407 Documents  
 NDDOT Reserves All Objections

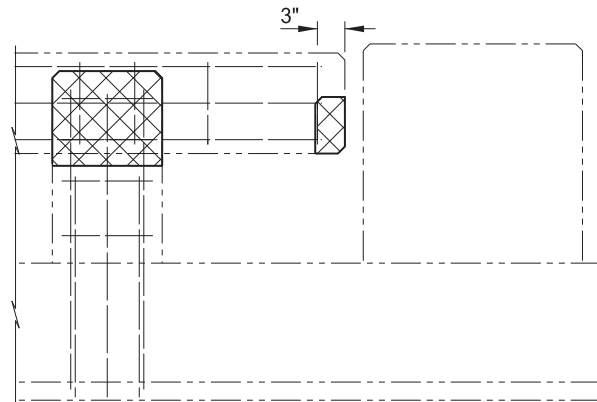
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	18



PLAN

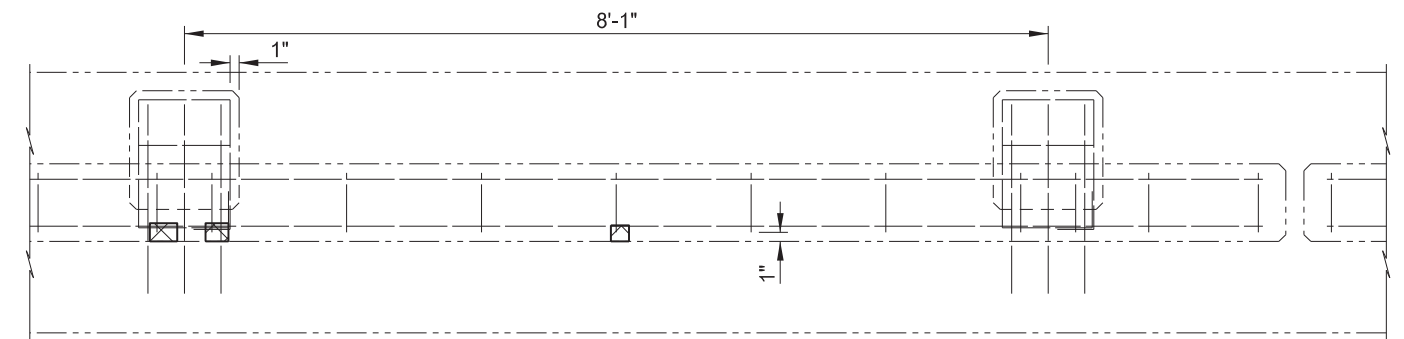


(SHOWING REINFORCEMENT)  
A-A

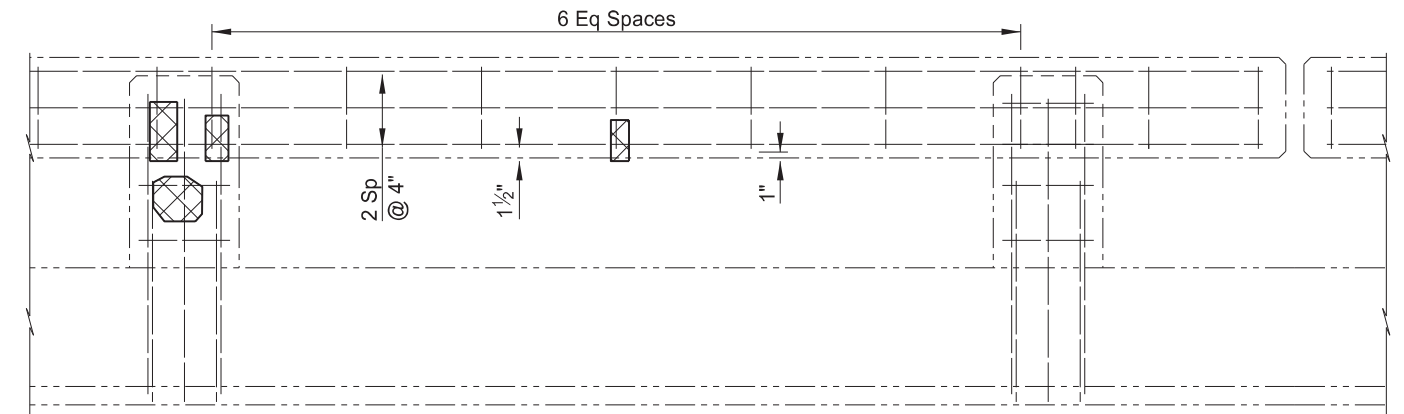


(SHOWING REINFORCEMENT)  
ELEVATION

SOUTHEAST RAIL POST SPALL REPAIR

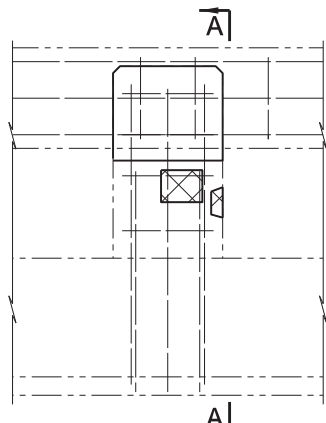


(SHOWING REINFORCEMENT)  
PLAN

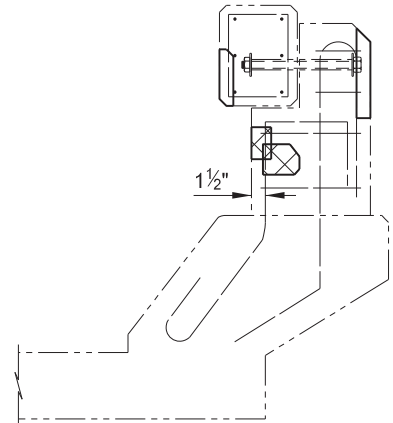


(SHOWING REINFORCEMENT)  
ELEVATION

EAST RAIL PIER 2 SPALL REPAIR

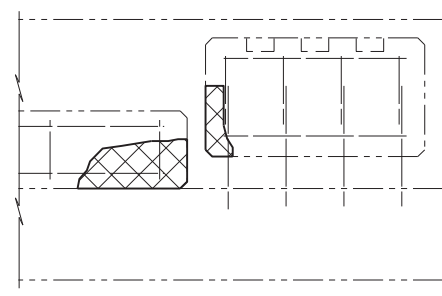


(SHOWING REINFORCEMENT)  
ELEVATION

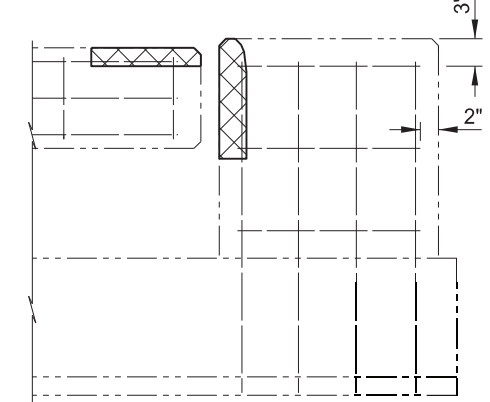


(SHOWING REINFORCEMENT)  
A-A

TYPICAL WEST RAIL SPALL REPAIR



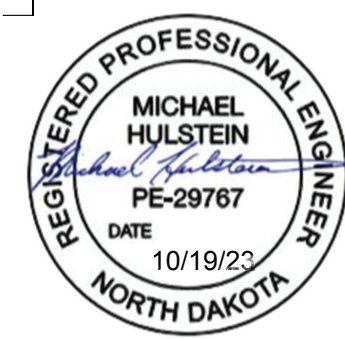
(SHOWING REINFORCEMENT)  
PLAN



(SHOWING REINFORCEMENT)  
ELEVATION

NORTHWEST RAIL POST SPALL REPAIR

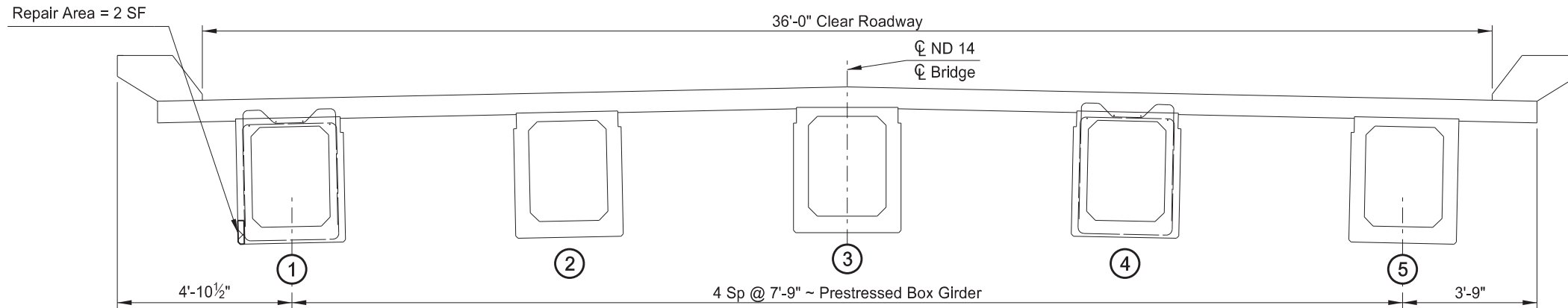
Indicates spall repair area



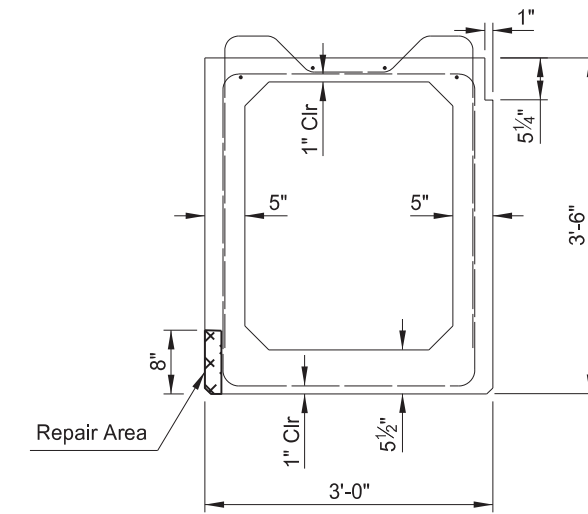
QUANTITIES	
SPALL REPAIR	8 SF
Rail Repair Details	
12.0 mi. S of Anamoose, ND	
Bridge 0014-061.107 ND 14 Lone Tree Reservoir	



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	19

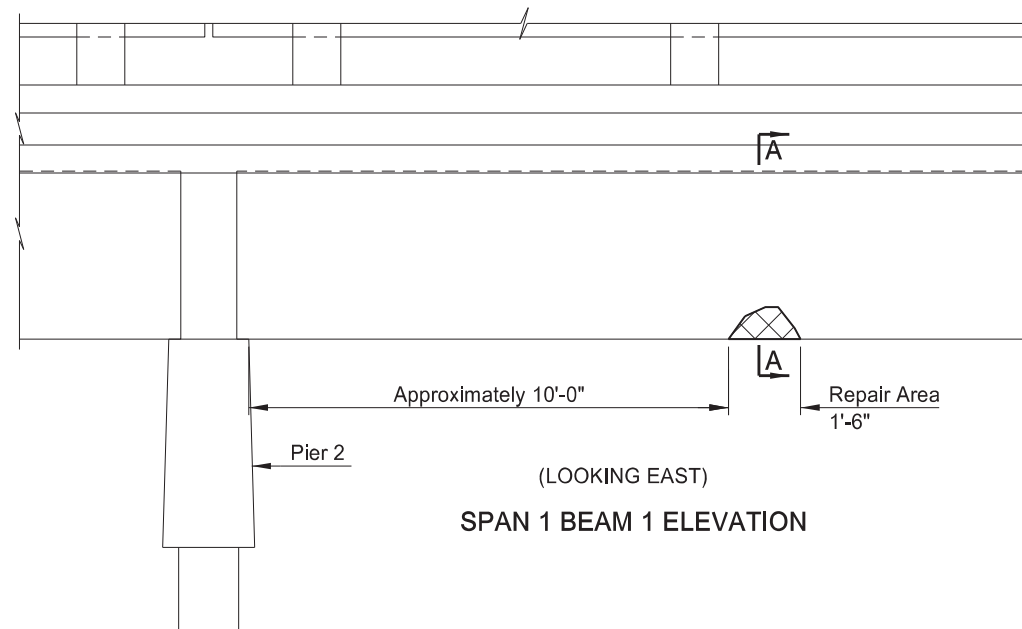


TYPICAL DECK SECTION



(SHOWING DIMENSIONS)

A-A

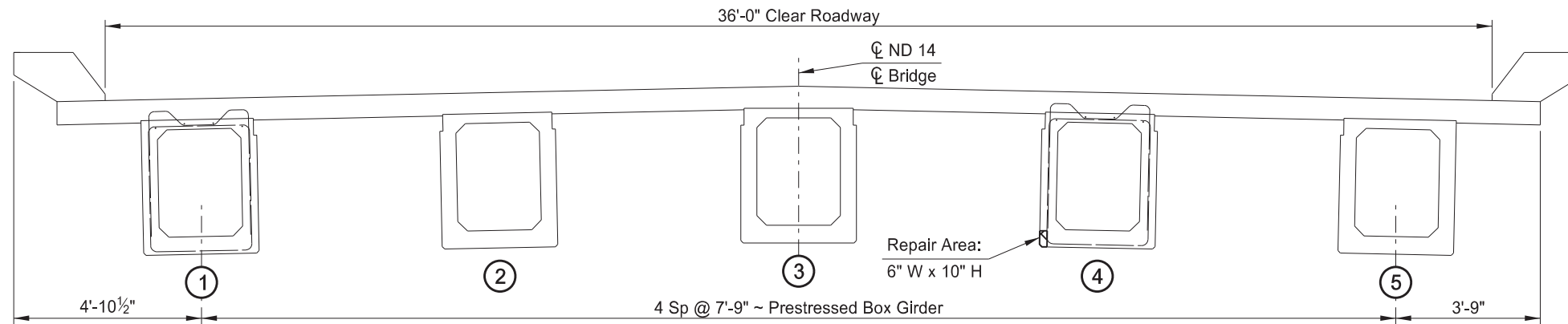


Indicates spall repair area

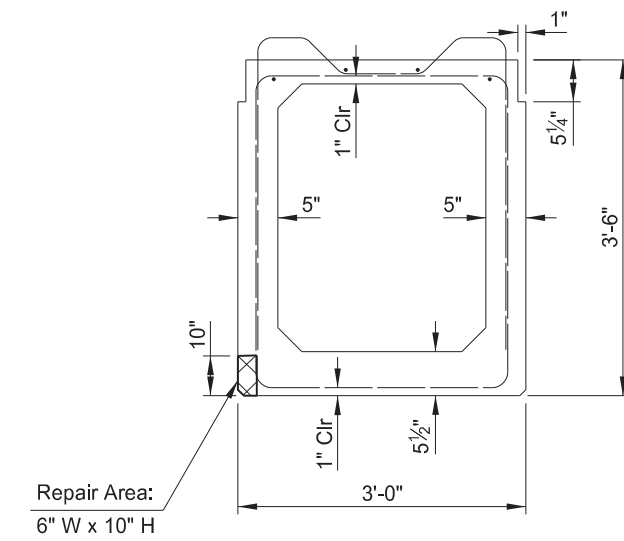


QUANTITIES	
SPALL REPAIR	2 SF
Patching Details Beam 1 12.0 mi. S of Anamoose, ND Bridge 0014-061.107 ND 14 Lone Tree Reservoir	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	20

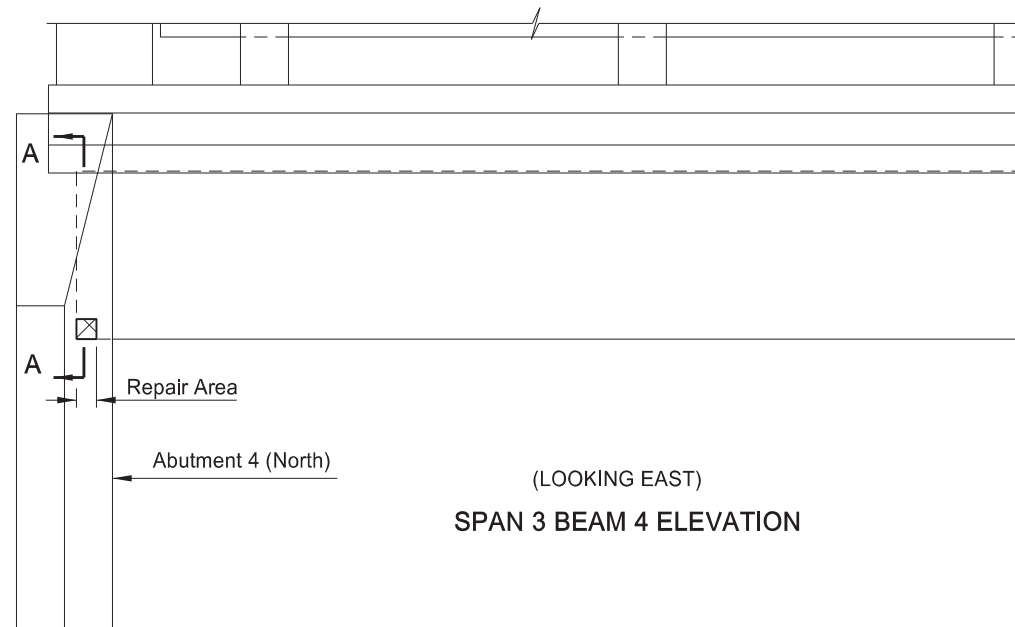


TYPICAL DECK SECTION

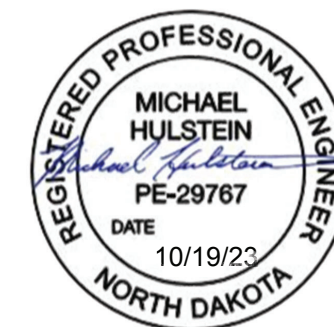


(SHOWING DIMENSIONS)  
A-A

 Indicates spall repair area

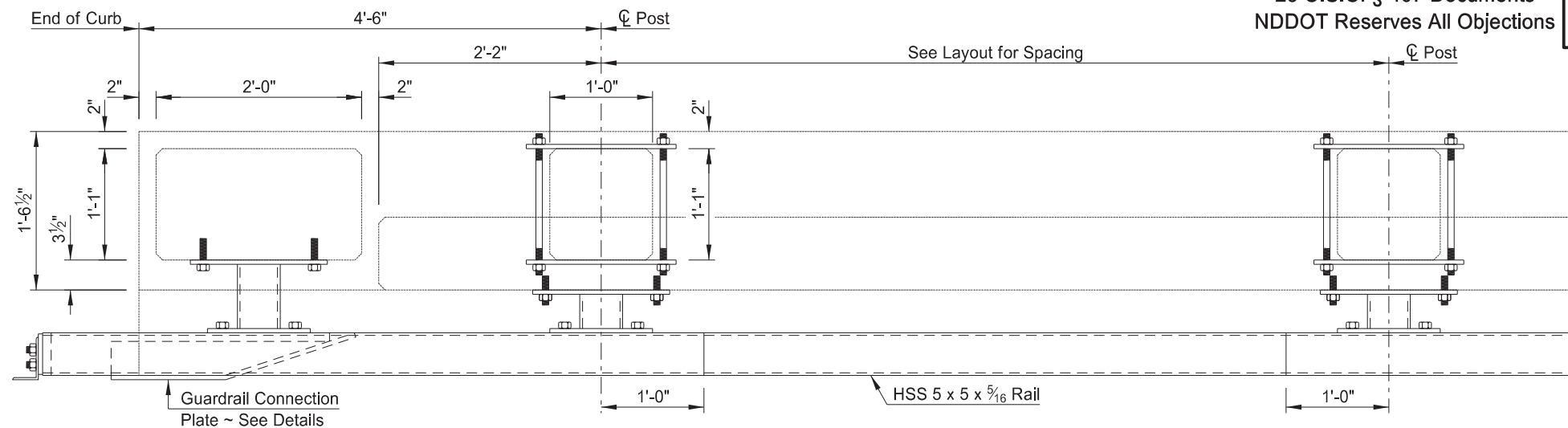


(LOOKING EAST)  
SPAN 3 BEAM 4 ELEVATION

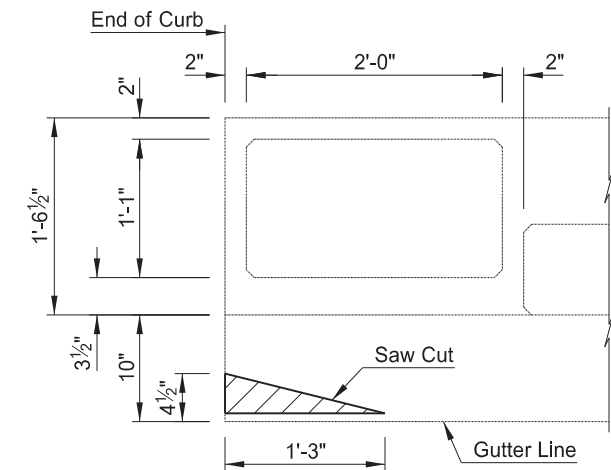


QUANTITIES	
SPALL REPAIR	1 SF
Patching Details Beam 4 12.0 mi. S of Anamoose, ND Bridge 0014-061.107 ND 14 Lone Tree Reservoir	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	21

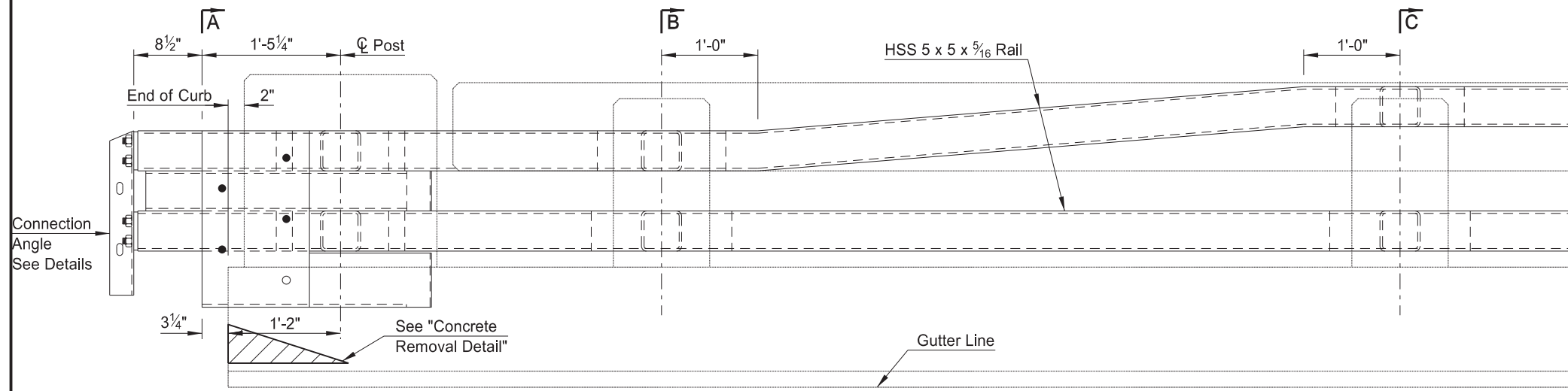


PART RAIL RETROFIT PLAN

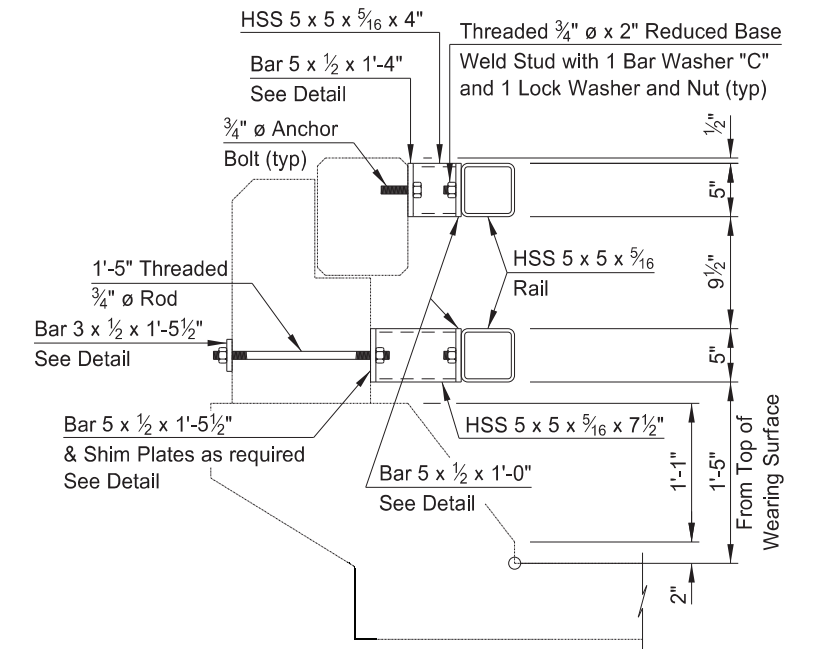


CONCRETE REMOVAL DETAIL PLAN

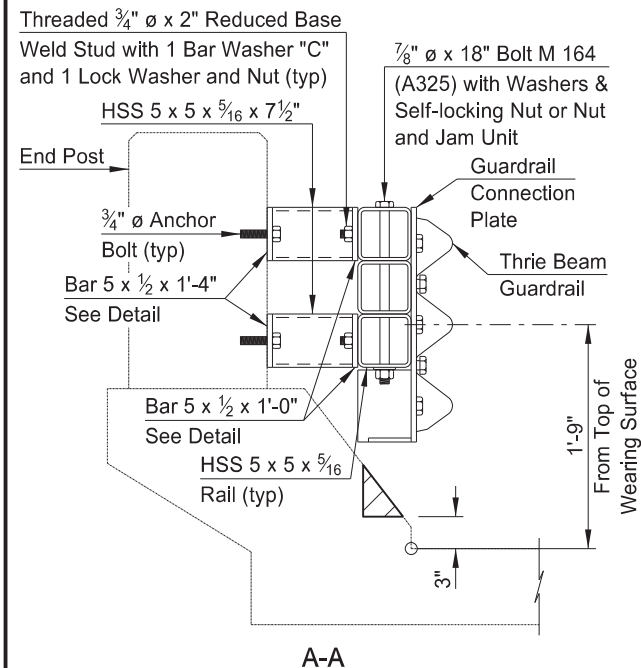
Indicates Concrete Removal



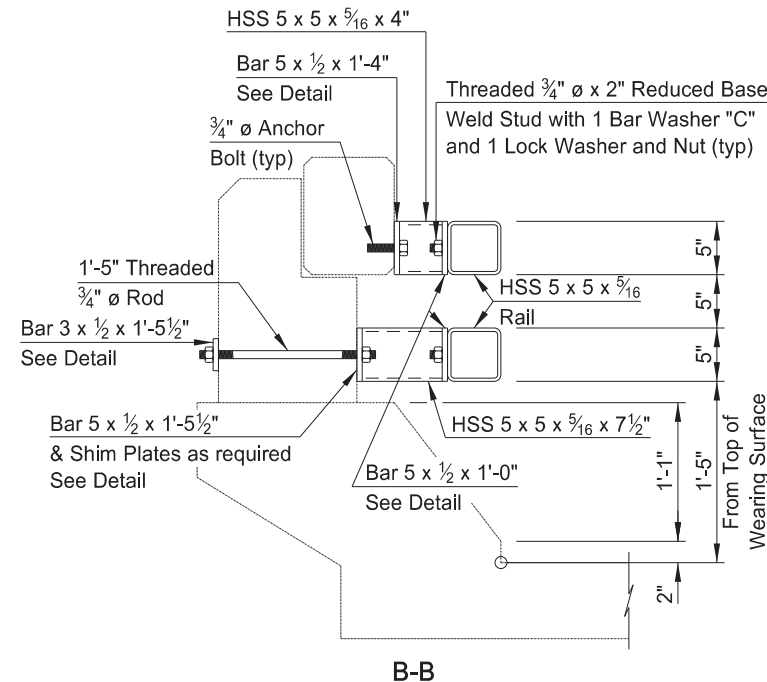
PART RAIL RETROFIT ELEVATION



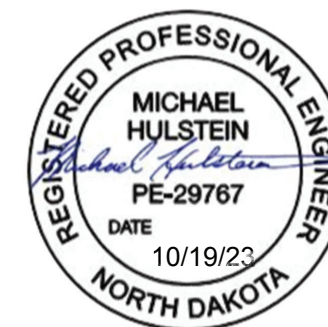
C-C



A-A

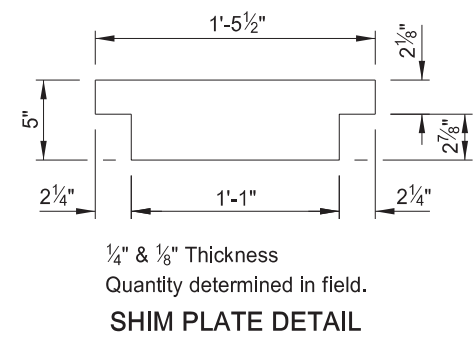
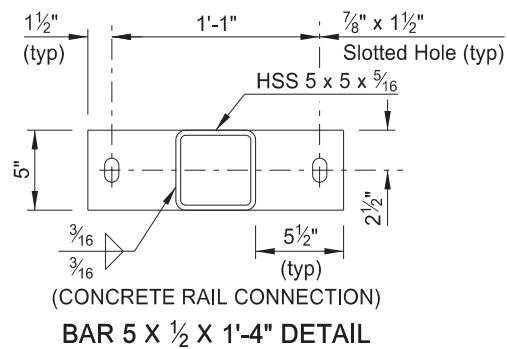


B-B

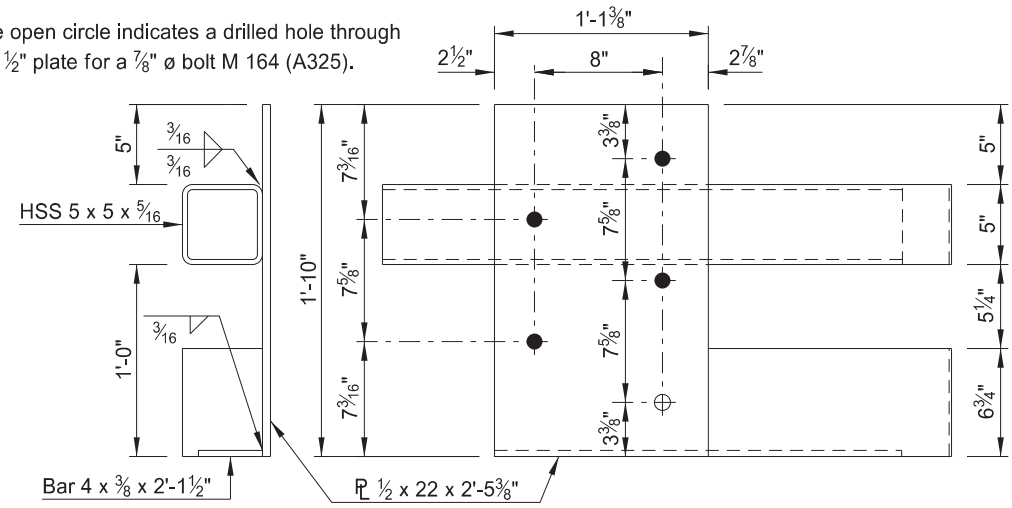


Double Box Beam  
E-Rail Retrofit Details  
12.0 mi. S of Anamoose, ND  
  
Bridge 0014-061.107  
ND 14 Lone Tree Reservoir

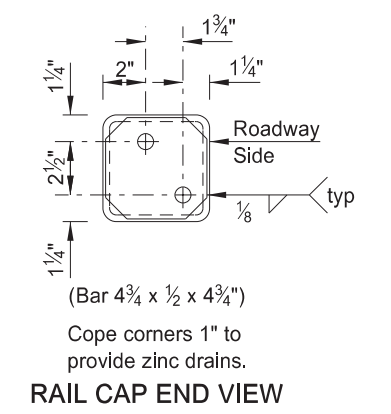
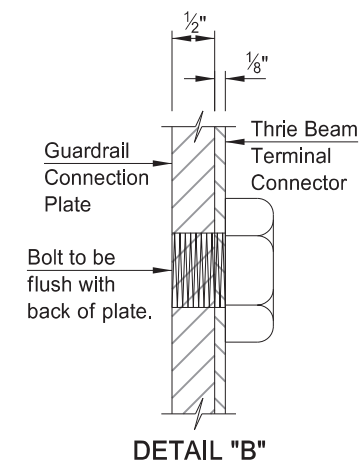
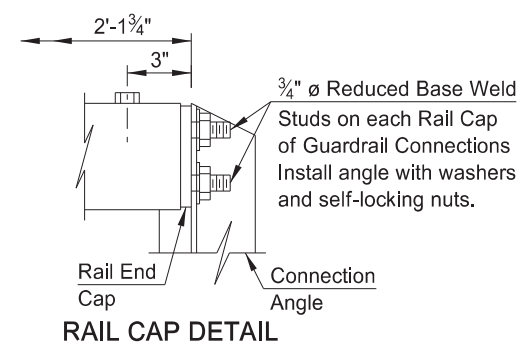
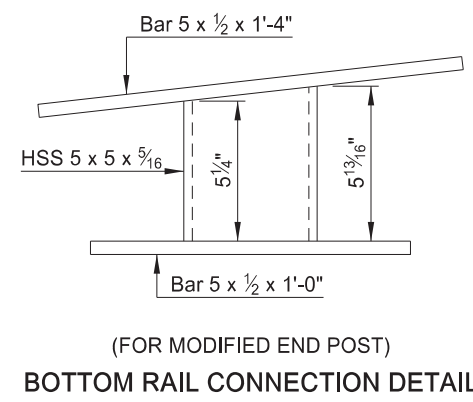
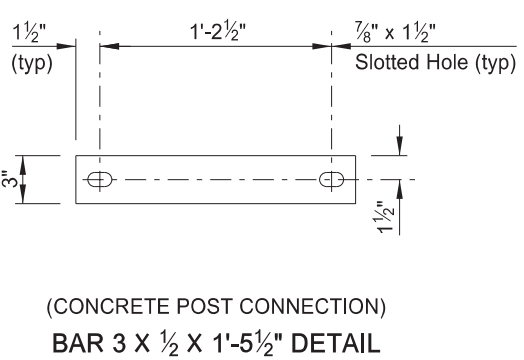
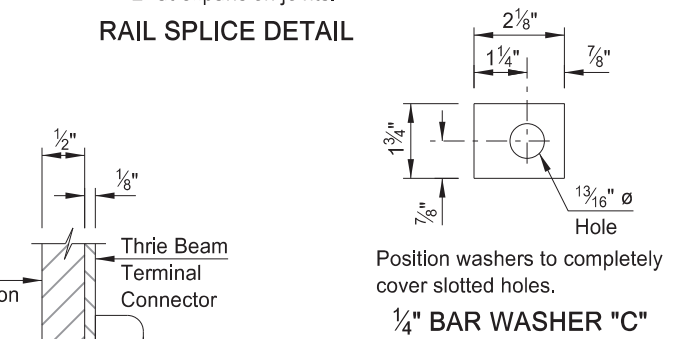
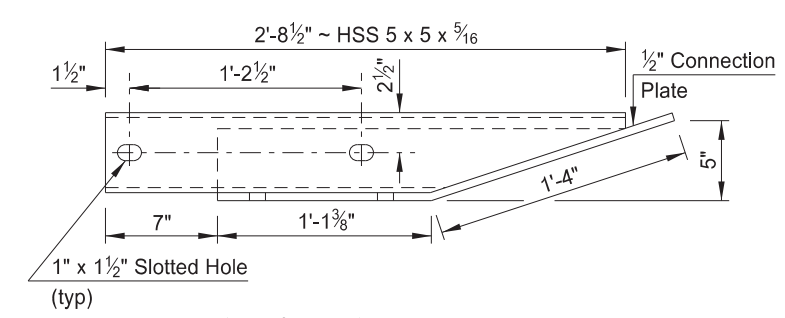
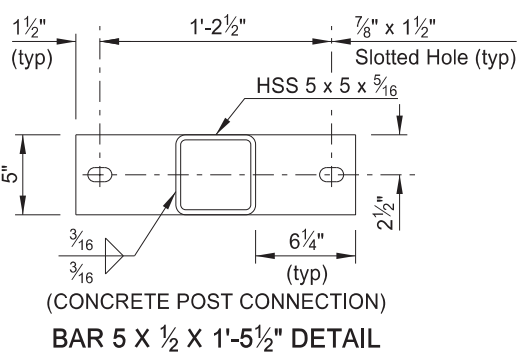
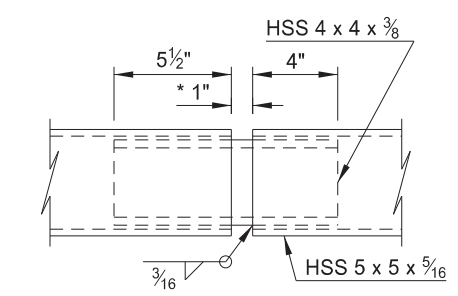
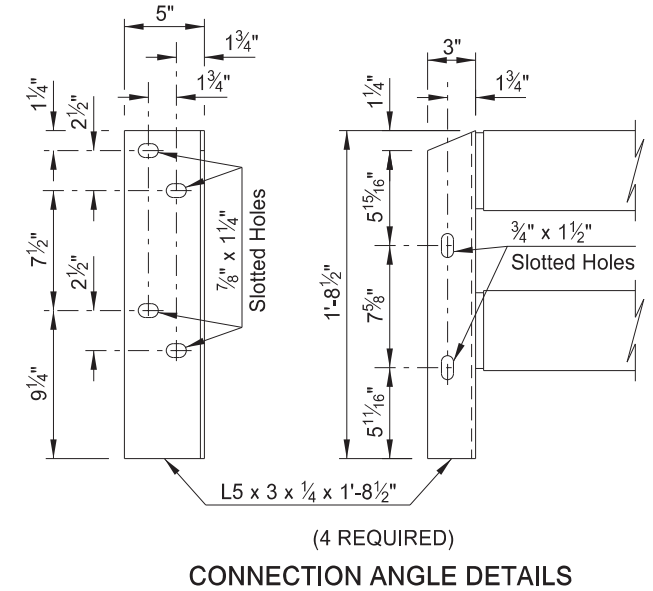
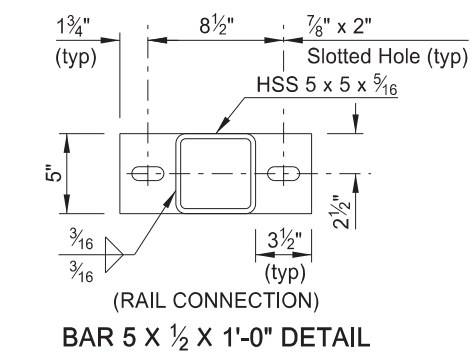
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	22



The filled circles indicate drilled and tapped holes for 7/8" ø bolts M 164 (A325). See Detail "B."  
The open circle indicates a drilled hole through the 1/2" plate for a 7/8" ø bolt M 164 (A325).

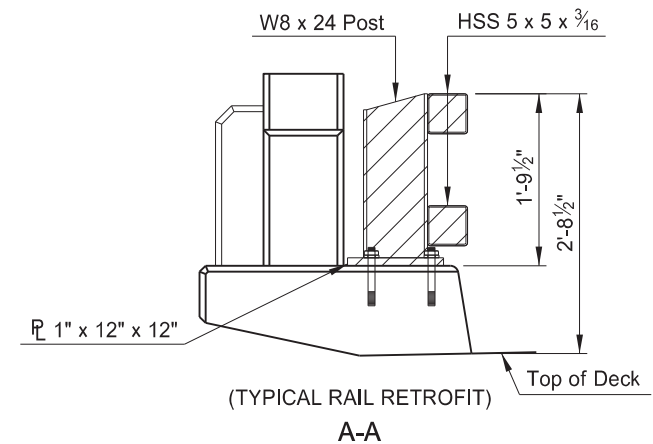
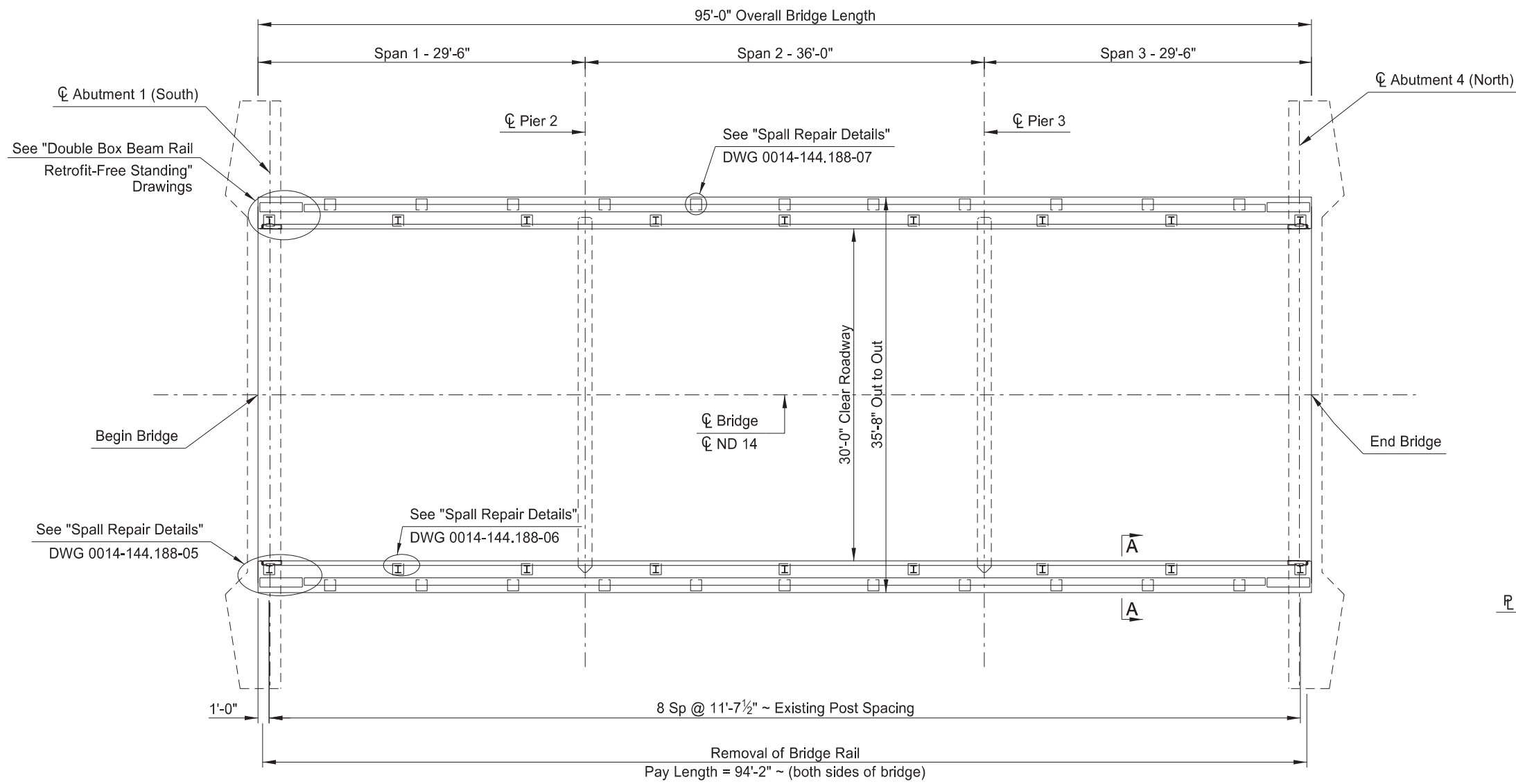
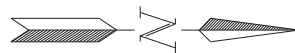


**NOTES:**  
Galvanize all steel components after fabrication according to Section 854.  
Provide reduced base studs in accordance with ASTM A108.  
Tighten the threaded rods to provide a minimum tensile force of 2,500 lbs and a maximum tensile force of 2,700 lbs.  
Embed anchor bolts into the concrete using a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.



Double Box Beam  
E-Rail Retrofit Details  
12.0 mi. S of Anamoose, ND  
Bridge 0014-061.107  
ND 14 Lone Tree Reservoir

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	23



Hatched area indicates existing double box beam steel rail retrofit to be removed

PLAN

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0152	REMOVAL OF BRIDGE RAIL	L SUM	1
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	317
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	190
650	0704	OVERLAY CONCRETE	CY	16
650	0707	DECK CONCRETE	CY	2
650	0710	CLASS 1-H REMOVAL	SY	317
650	0711	CLASS 2-H REMOVAL	SY	16
650	0712	CLASS 3-H REMOVAL	SY	4
930	9534	MODIFY DECK DRAIN	EA	14
930	9612	SPALL REPAIR	SF	22

QUANTITIES	(ONE ABUTMENT PIER)
REMOVAL OF BRIDGE RAIL	1 L SUM

ND DEPARTMENT OF TRANSPORTATION  
BRIDGE DIVISION

*Jason Thorenson* Jason Thorenson  
10/19/23



Bridge Layout

1.0 mi. S of Kramer, ND

Bridge 0014-144.188  
ND 14 Stone Creek

**NOTES**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	24

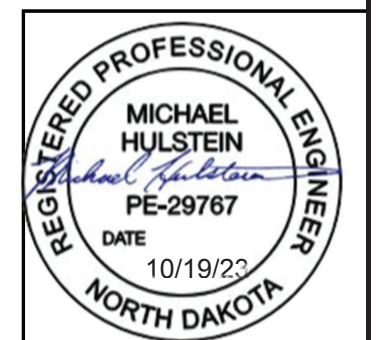
- 100 SCOPE OF WORK: This project as it pertains to Bridge 0014-144.188 consists of placing a deck overlay, installation of approach slabs, repairing concrete spall areas on the underside of the deck, barriers, abutments, and piers; modification of the deck drains, scour repairs, barrier retrofit, and installation of new guardrail.
- 100 GENERAL: Include the cost of furnishing and placing silicone sealant as shown in the plans in the price for the Overlay Concrete.
- 602 PENETRATING WATER REPELLENT TREATMENT: Apply the penetrating water repellent solution to the top of the bridge deck overlay and approach slabs. Do not apply pavement marking or allow traffic onto the driving surface until the solution has completely penetrated and the entire driving surface is dry.
- 650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck overlay and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks appearing on the top surface 0.007 inches or greater in width at its widest segment or as directed by the Engineer. Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.0007 inches wide. Use Paulco TE-2501 (Viking Paints, Inc), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer. Include all work and materials associated with the crack sealing in the bid item "Overlay Concrete."
- 650 OVERLAY CONCRETE: An additional 1/4" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling. The Engineer measure overlay concrete based on the mobile mixer count and the yield box. The Engineer will determine the quantity of concrete placed by taking counter readings from the mixer before and after each placement and multiplying the readings by the meter count determined by the yield test. The Engineer will deduct waste concrete from the measured quantity. The Contractor and Engineer will agree upon the amount of waste, including the material used in the yield test, at the end of each day.
- 930 SPALL REPAIR: The abutment and bridge barriers have spall shown in the elevation, plan, and section views.

Remove all unsound concrete and replace it to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of 1/4" plus or minus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

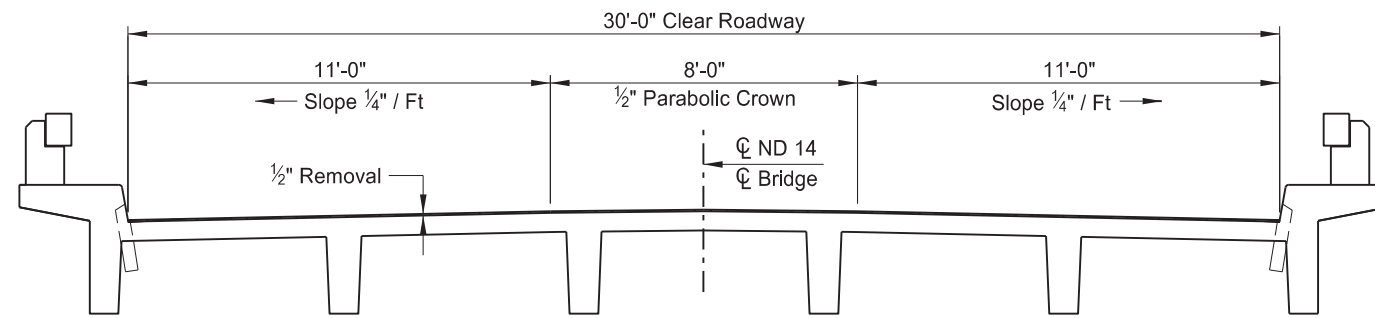
Sand blast clean the existing concrete and exposed reinforcing steel. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before patching material is placed, coat the surface with an epoxy bonding agent.

Use a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Co.), MasterEmaco N 400 (BASF Corporation) or an approved equal repair mortar. Cure the materials as recommended by the manufacturer.

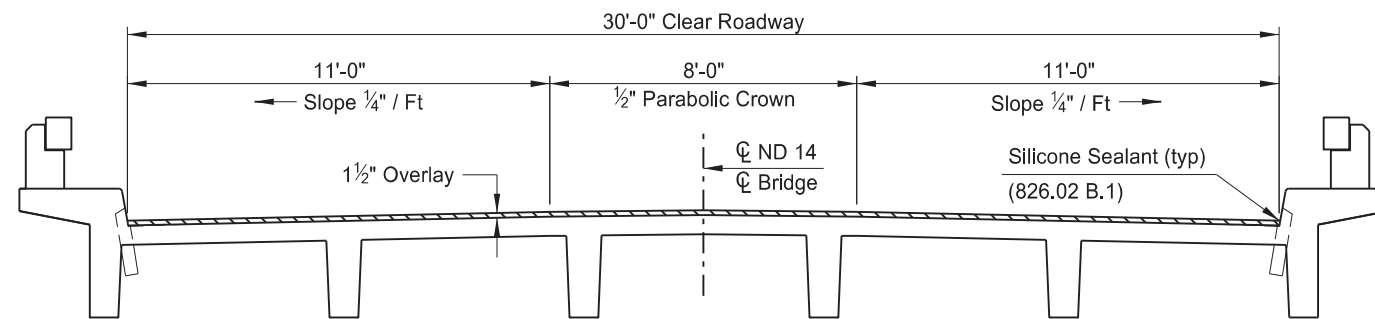
The beam and barrier spall repair quantities are based on the assumption that the area to be repaired are as shown on the plan, elevation, and section views. The actual limits of the spall repairs are to be determined by the Engineer in the field. All labor, equipment, and materials needed to repair the spall areas to be included in the bid item "Spall Repair".



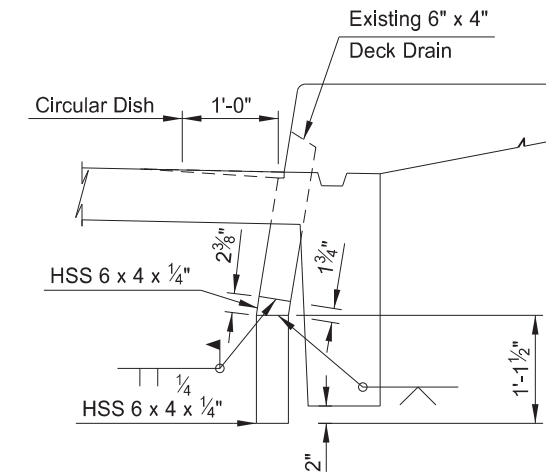
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	25



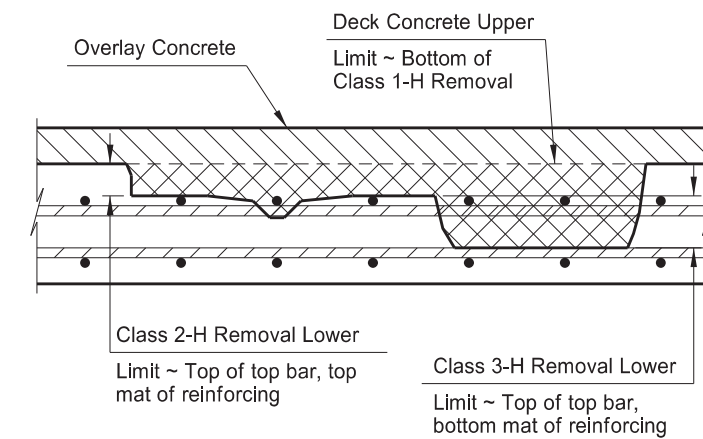
(SHOWING REMOVAL)  
 TYPICAL DECK SECTION



(SHOWING OVERLAY)  
 TYPICAL DECK SECTION

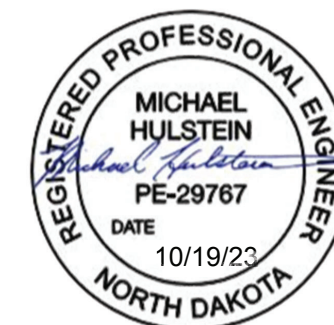


DECK DRAIN EXTENSION DETAILS



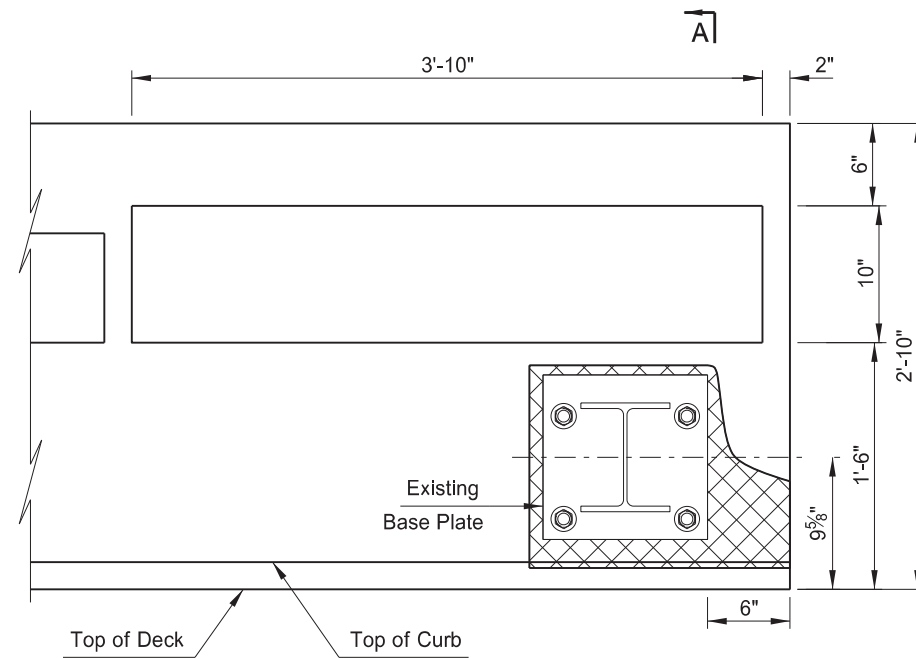
(DECK CONCRETE)  
 BRIDGE DECK SECTION

QUANTITIES	
OVERLAY CONCRETE	16 CY
DECK CONCRETE	2 CY
CLASS 1-H REMOVAL	317 SY
CLASS 2-H REMOVAL	16 SY
CLASS 3-H REMOVAL	4 SY
MODIFY DECK DRAIN	14 EA

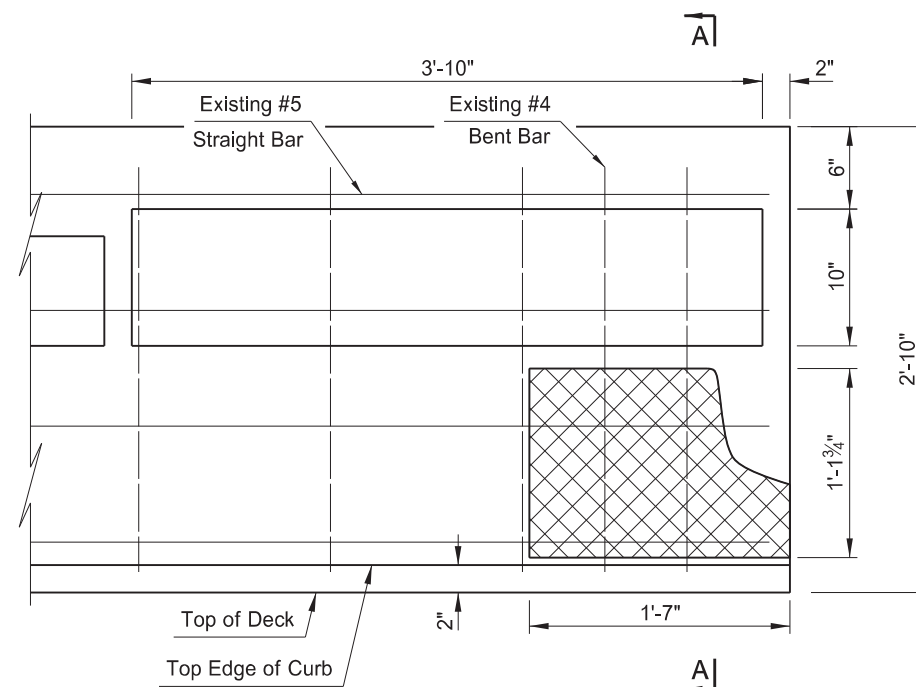


Deck Section  
 Deck Removal/Overlay  
 1.0 mi. S of Kramer, ND  
 Bridge 0014-144.188  
 ND 14 Stone Creek

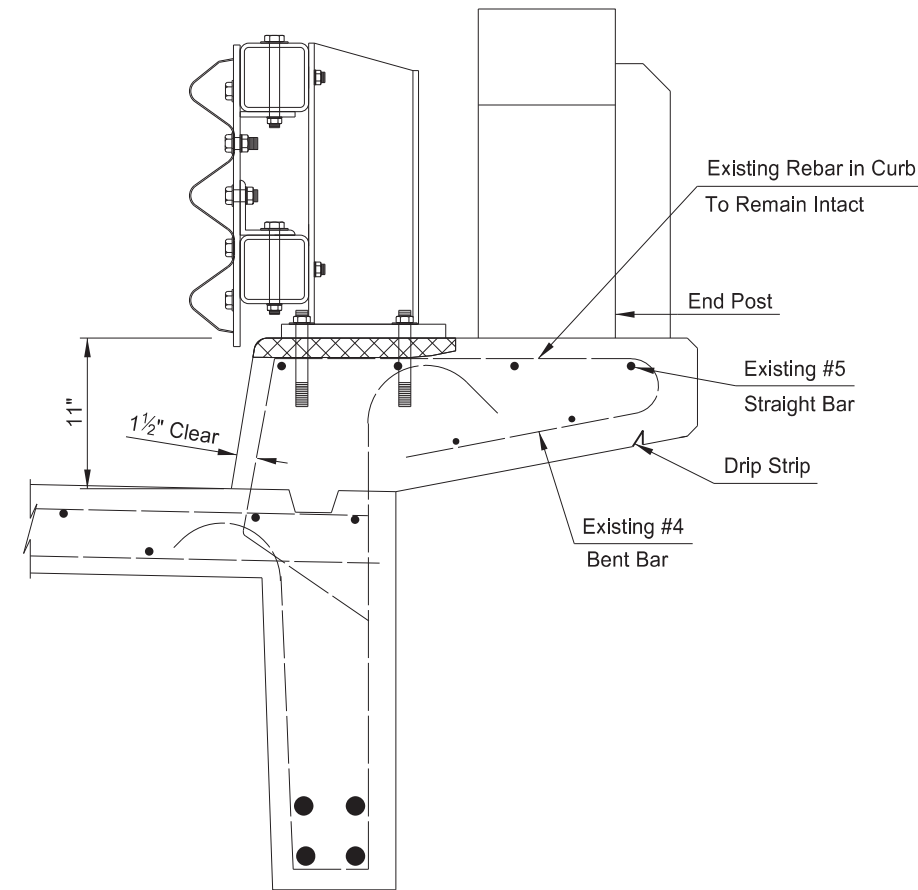
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	26



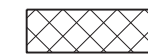
(SHOWING EXISTING BASE PLATE)  
SOUTHEAST CURB SPALL PLAN

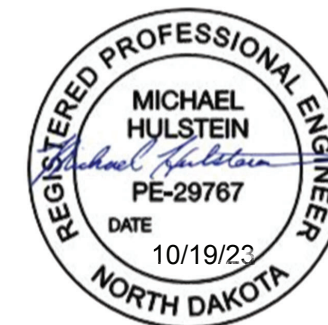


(SHOWING REINFORCING)  
SOUTHEAST CURB SPALL PLAN



(SHOWING REINFORCING)  
A-A

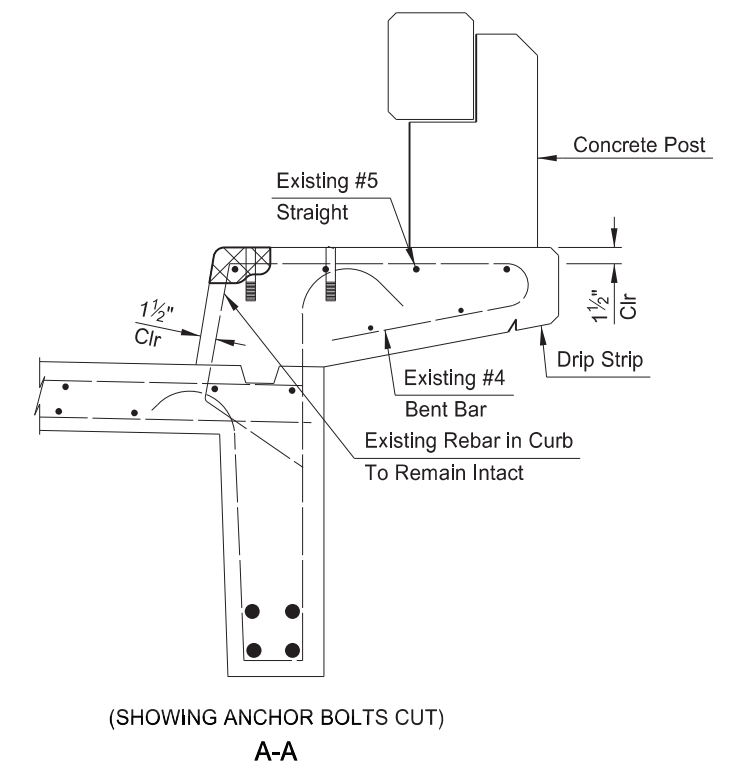
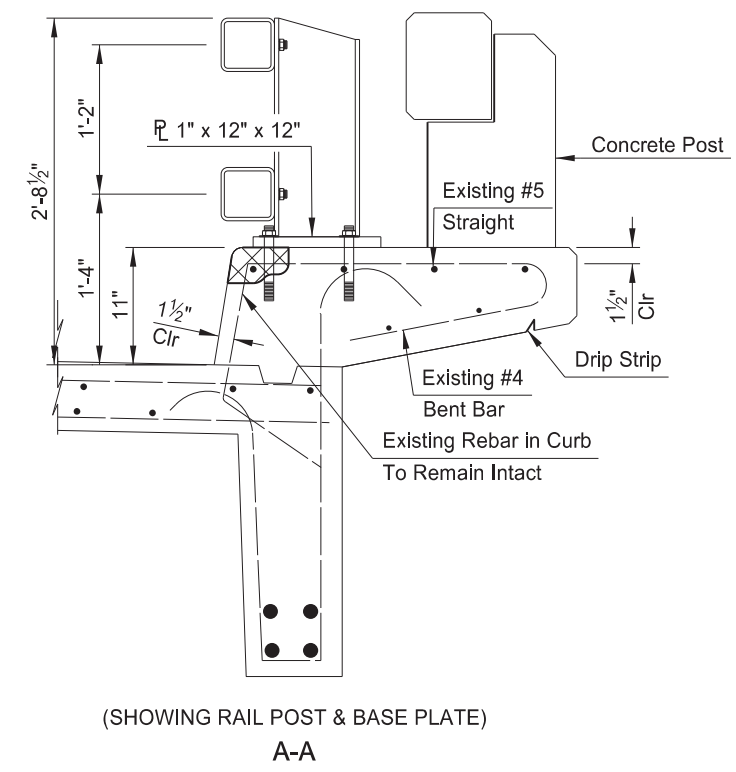
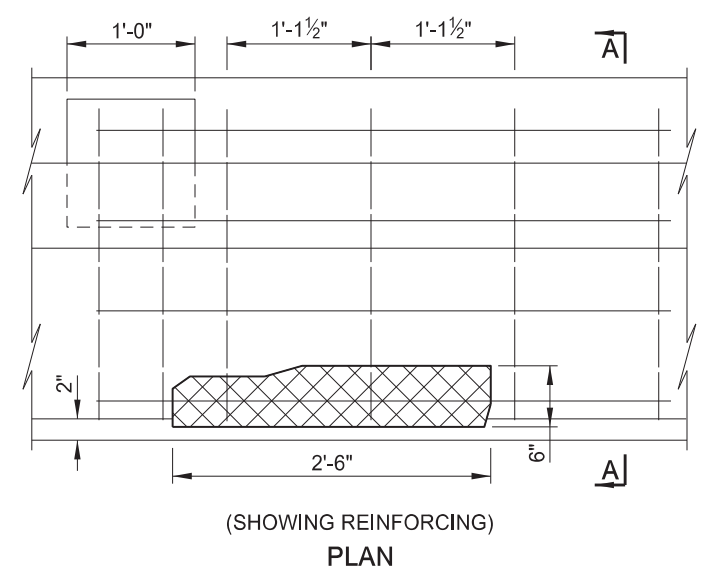
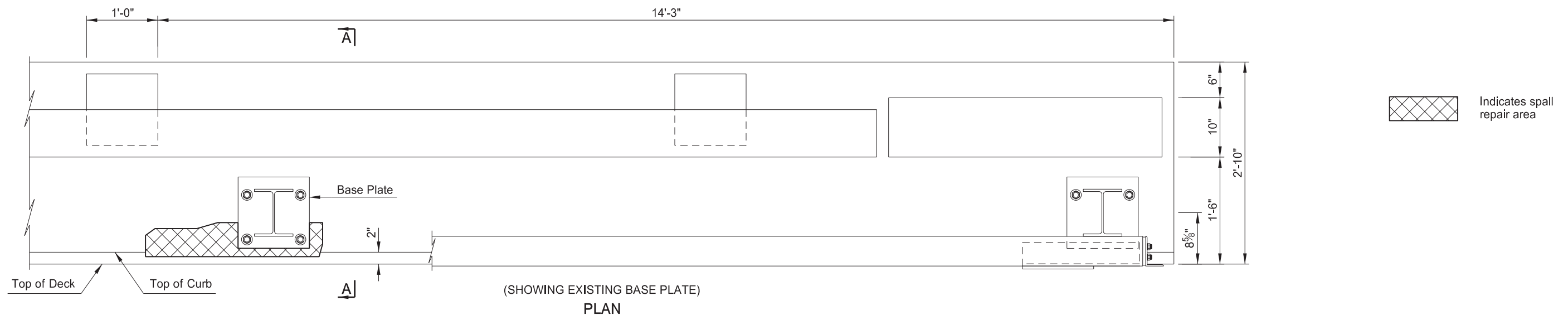
 Indicates spall repair area



QUANTITIES	
SPALL REPAIR	3 SF
Spall Repair Details SE Curb	
1.0 mi. S of Kramer, ND	
Bridge 0014-144.188 ND 14 Stone Creek	

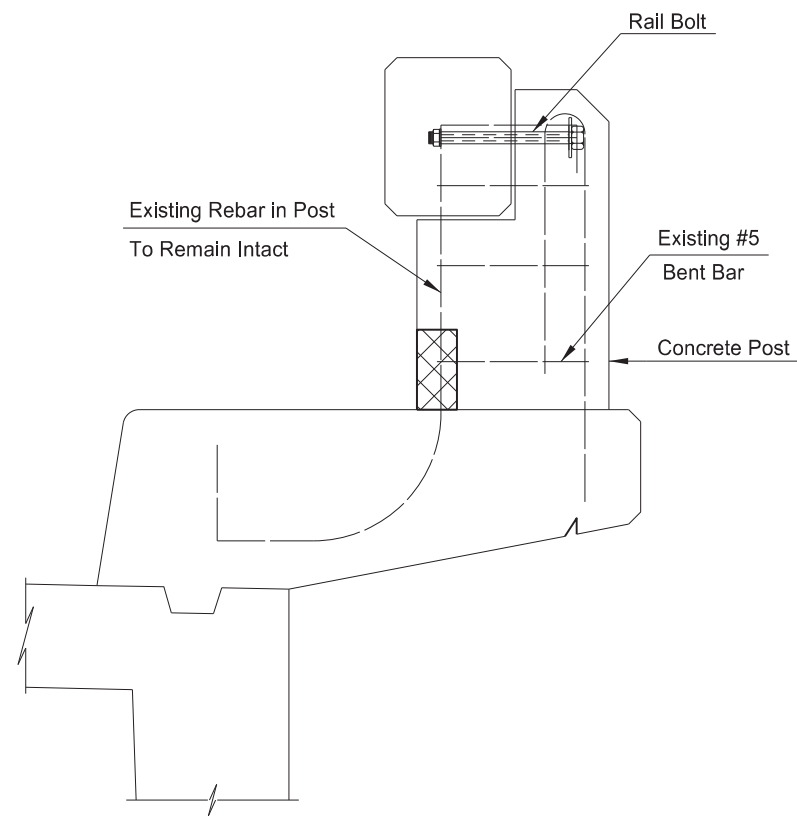


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	27

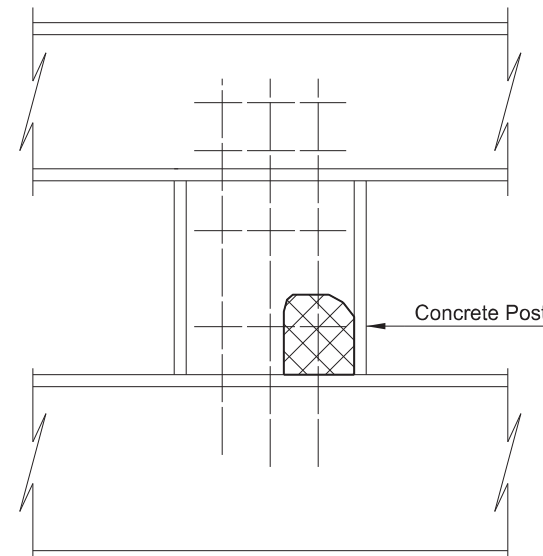


QUANTITIES	
SPALL REPAIR	2 SF
Spall Repair Details SE Curb - Edge	
1.0 mi. S of Kramer, ND	
Bridge 0014-144.188 ND 14 Stone Creek	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	28

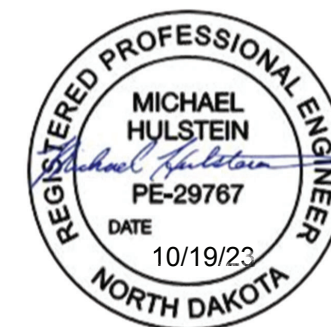


CURB POST SECTION VIEW



CURB POST ELEVATION VIEW

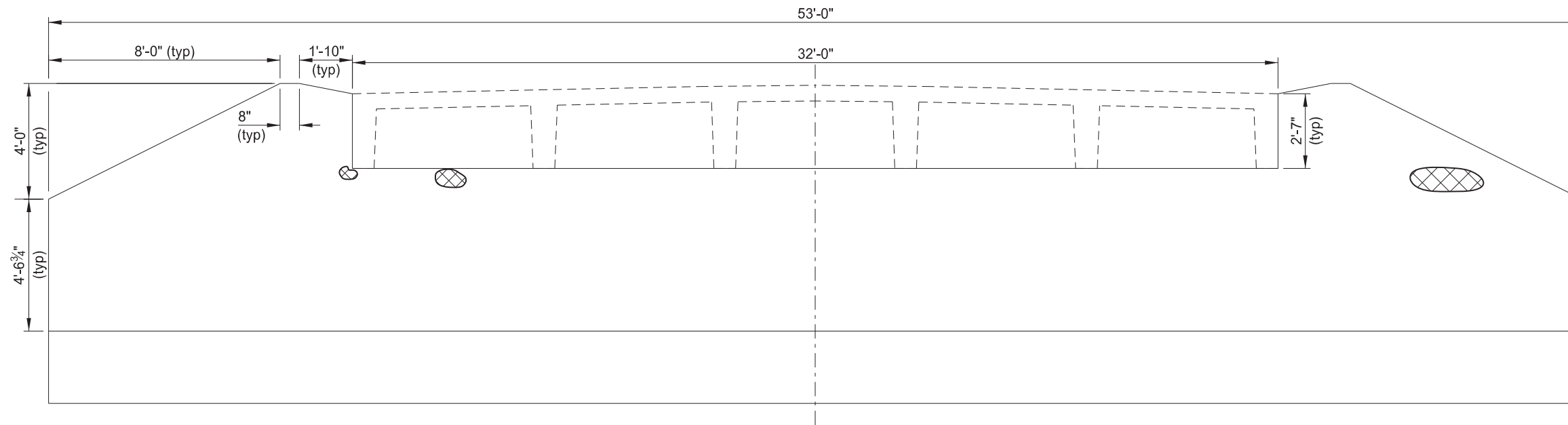
 Indicates spall repair area



QUANTITIES	
SPALL REPAIR	1 SF
Spall Repair Details Rail Post 1.0 mi. S of Kramer, ND Bridge 0014-144.188 ND 14 Stone Creek	

23 U.S.C. § 407 Documents  
 NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-4-999(048)	170	29



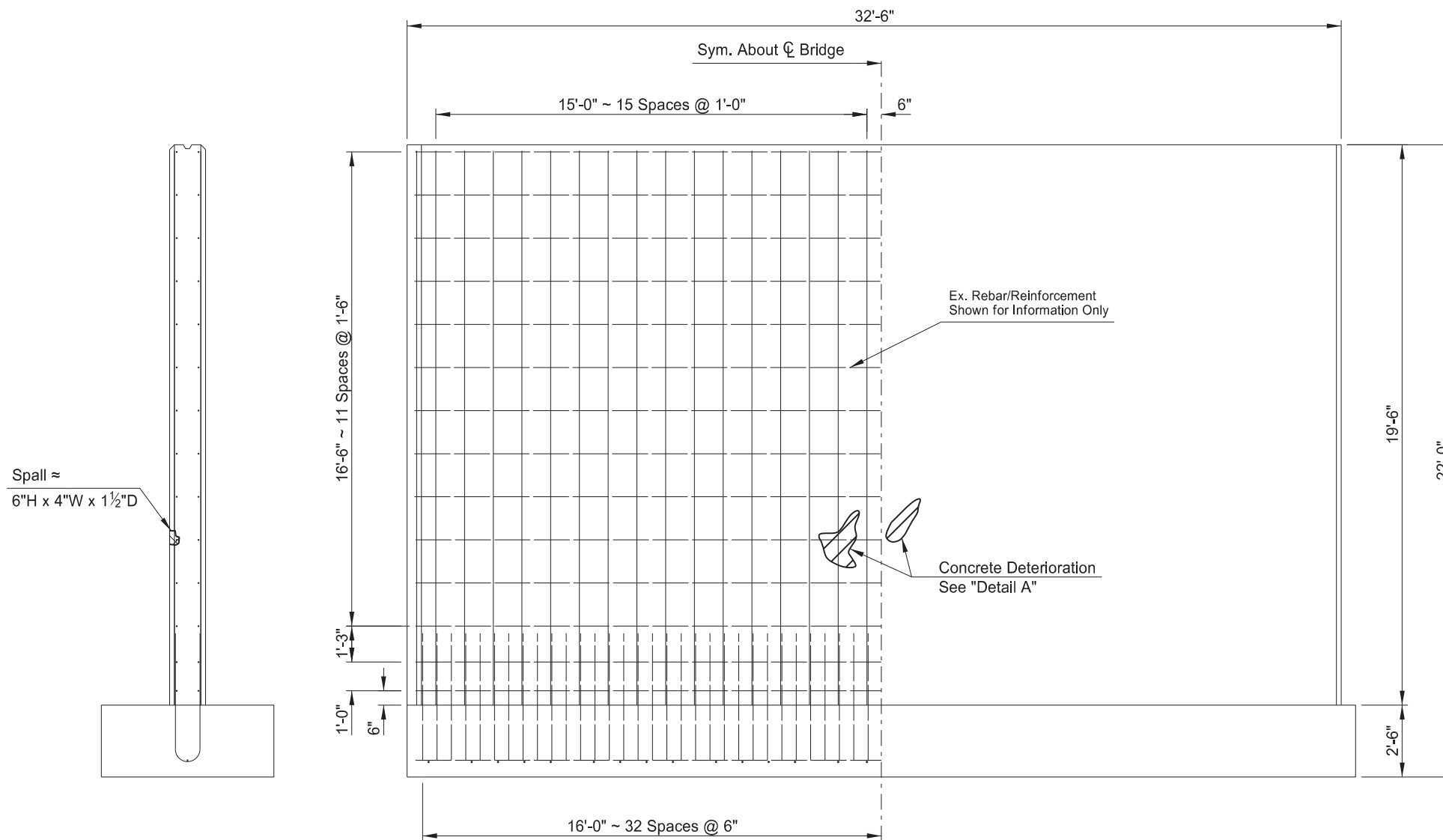
ABUTMENT 1 (SOUTH)

 Indicates spall repair area



QUANTITIES	
SPALL REPAIR	4 SF
Spall Repair Details Abutment 1 1.0 mi. S of Kramer, ND Bridge 0014-144.188 ND 14 Stone Creek	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	30

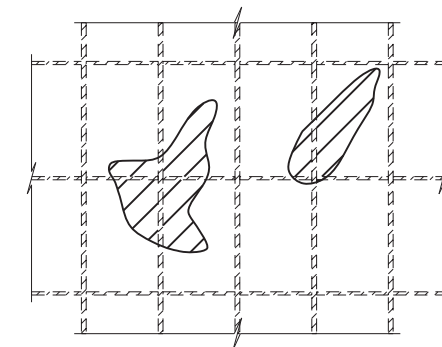


Spall ≈  
6"H x 4"W x 1½"D

Ex. Rebar/Reinforcement  
Shown for Information Only

Concrete Deterioration  
See "Detail A"

Spall ≈  
7"H x 6"W x 1¼"D



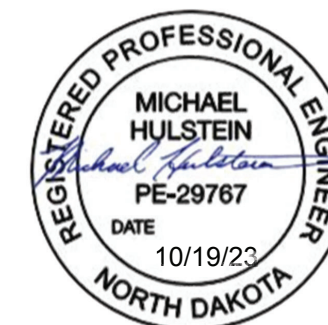
DETAIL A

- Hatched area indicates concrete to be removed and spall repair area
- Indicates spall repair area

WEST END VIEW

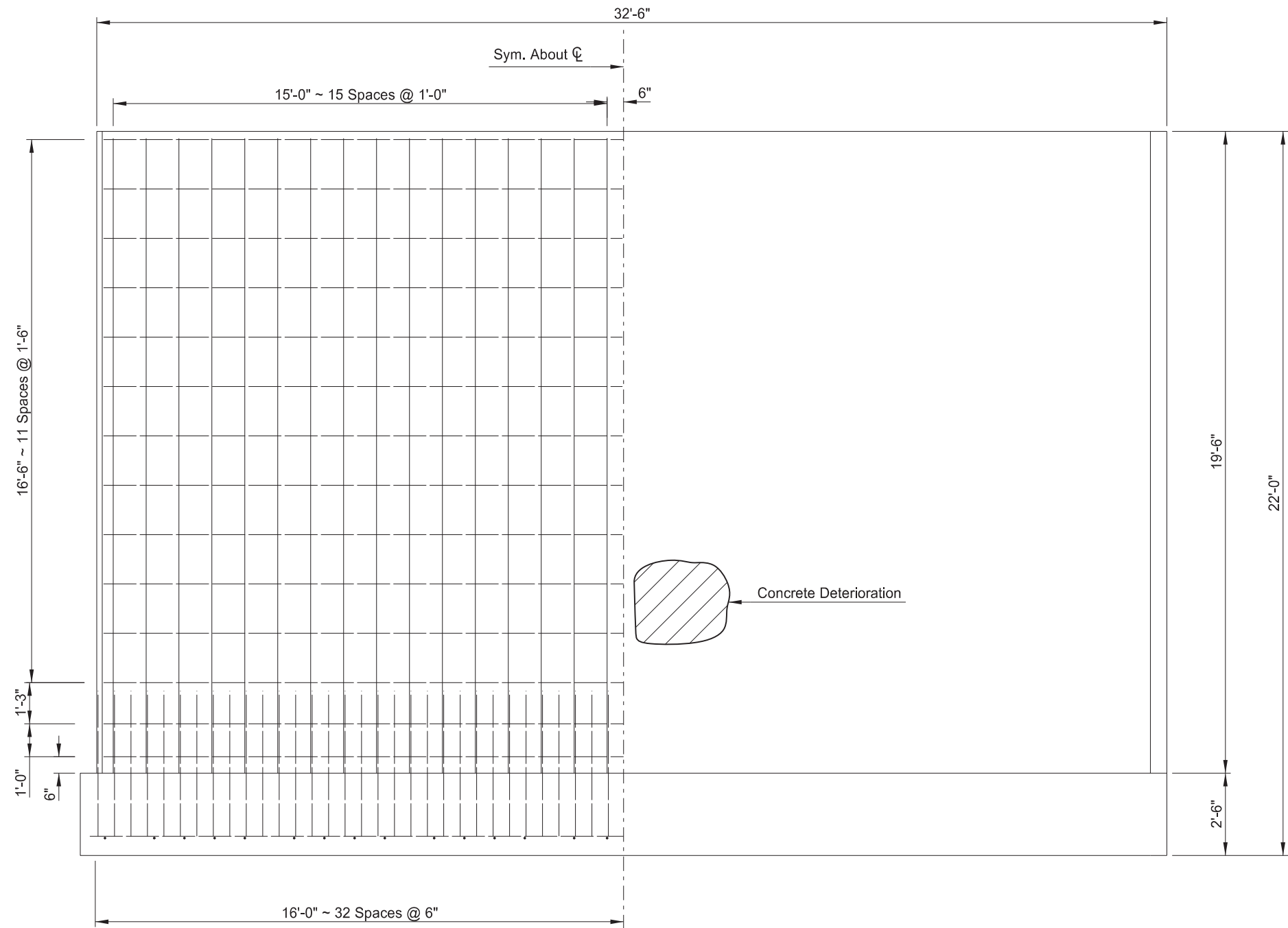
NORTH FACE ELEVATION

EAST END VIEW




QUANTITIES	
SPALL REPAIR	6 SF
Spall Repair Details Pier 2 1.0 mi. S of Kramer, ND Bridge 0014-144.188 ND 14 Stone Creek	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	31



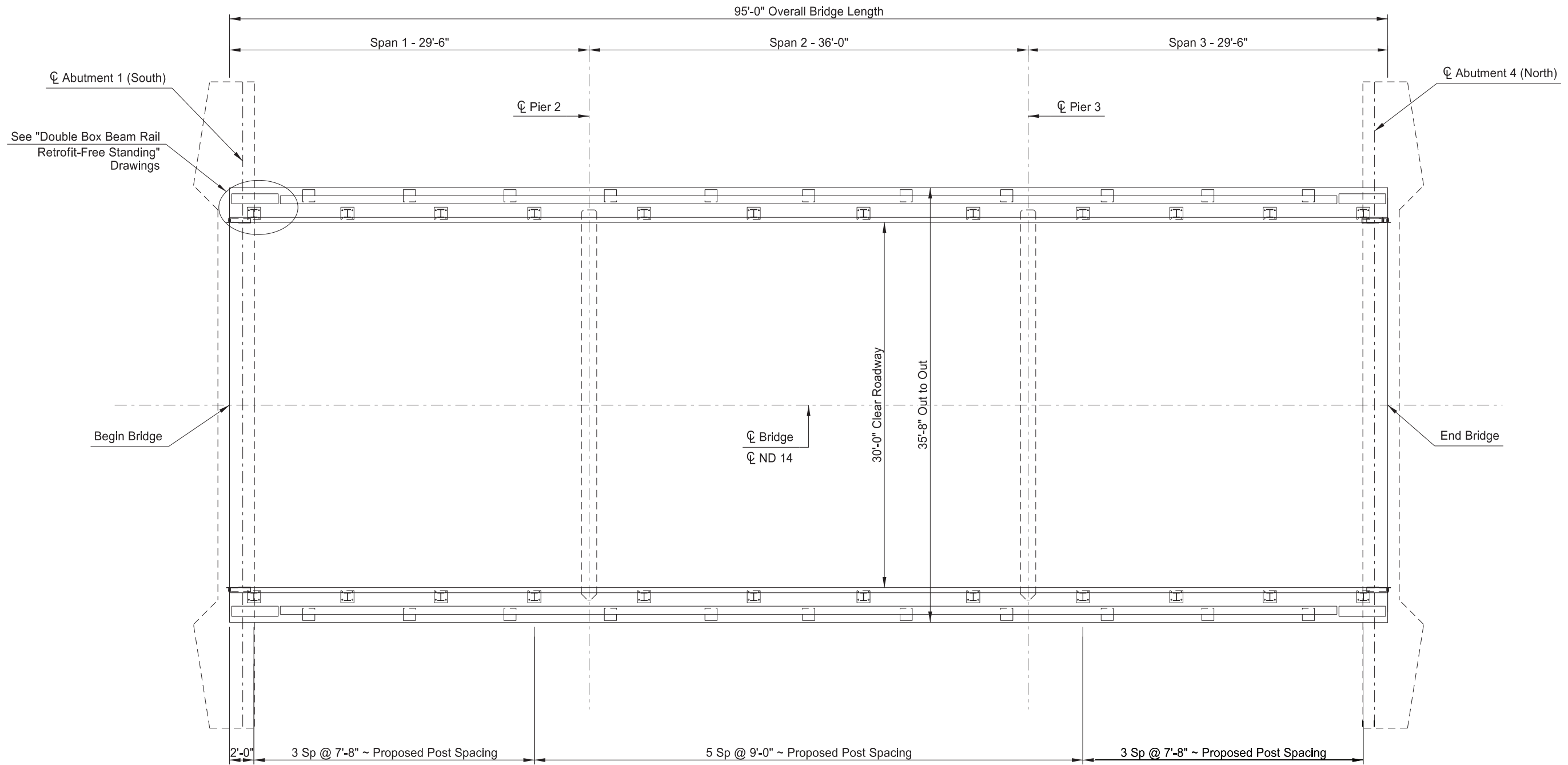
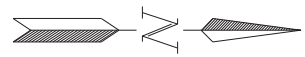
SOUTH FACE ELEVATION

 Hatched area indicates concrete to be removed and spall repair area



QUANTITIES	
SPALL REPAIR	6 SF
Spall Repair Details Pier 3 1.0 mi. S of Kramer, ND Bridge 0014-144.188 ND 14 Stone Creek	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	32

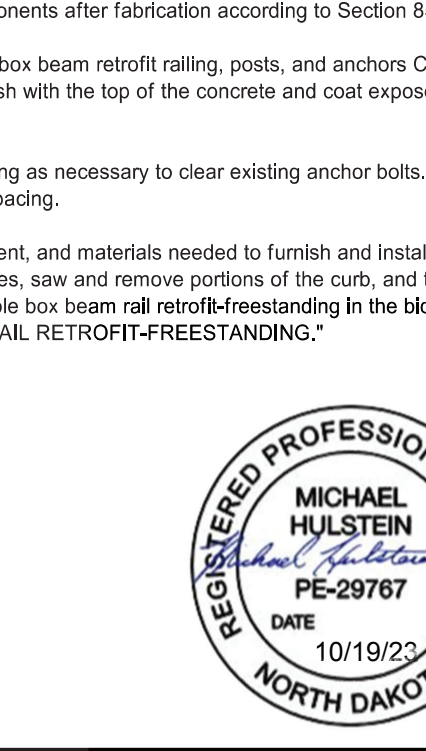
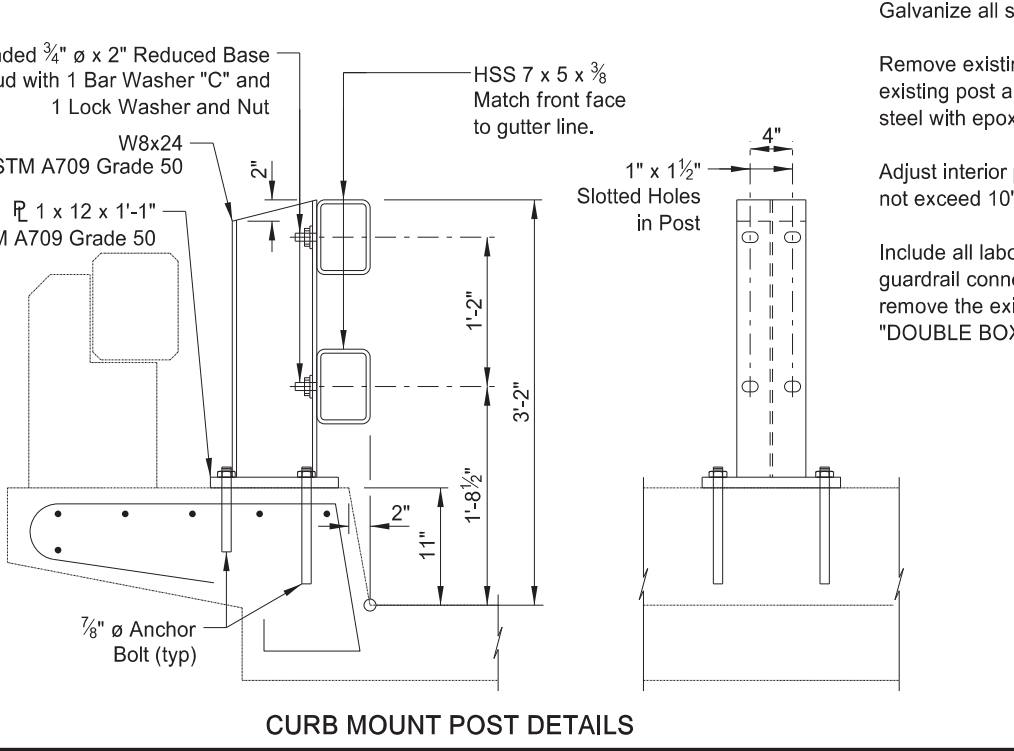
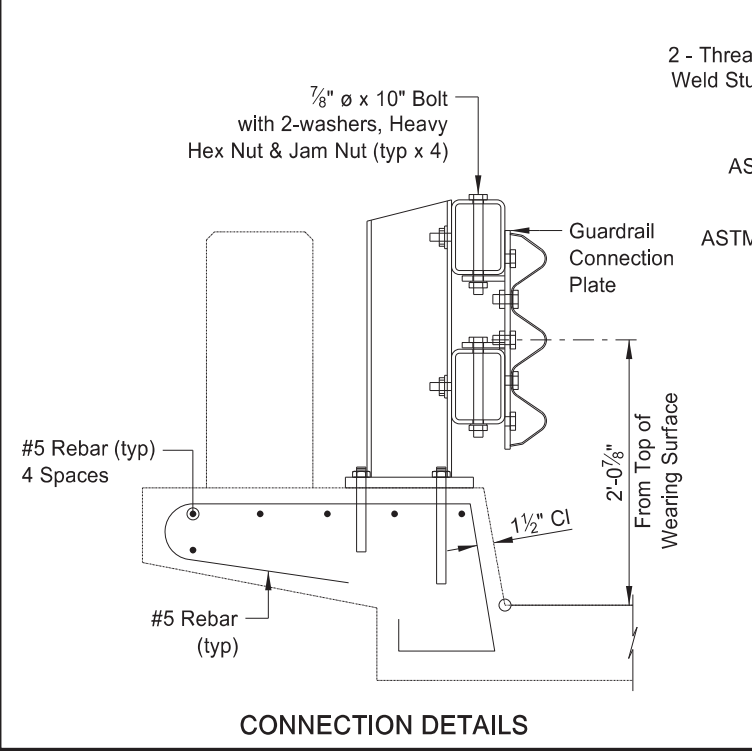
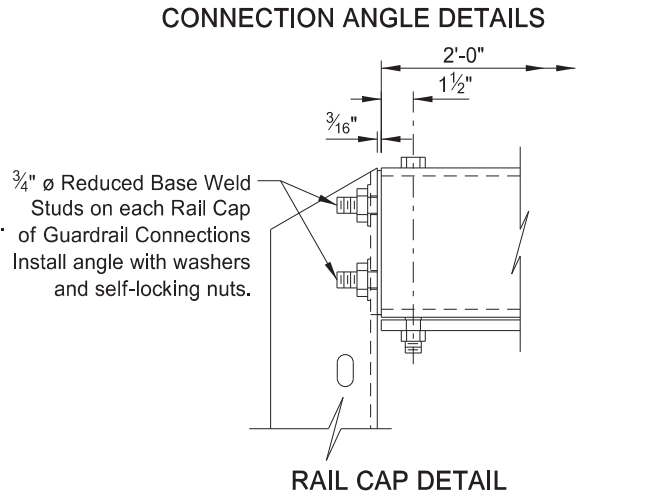
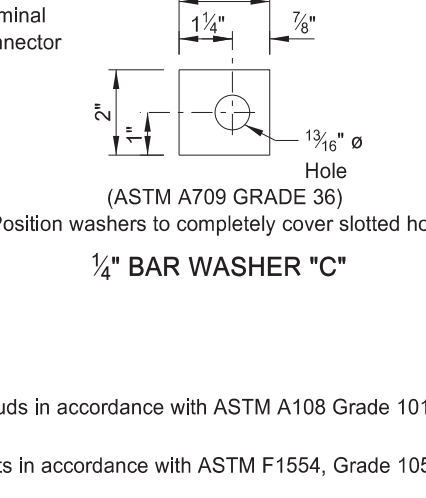
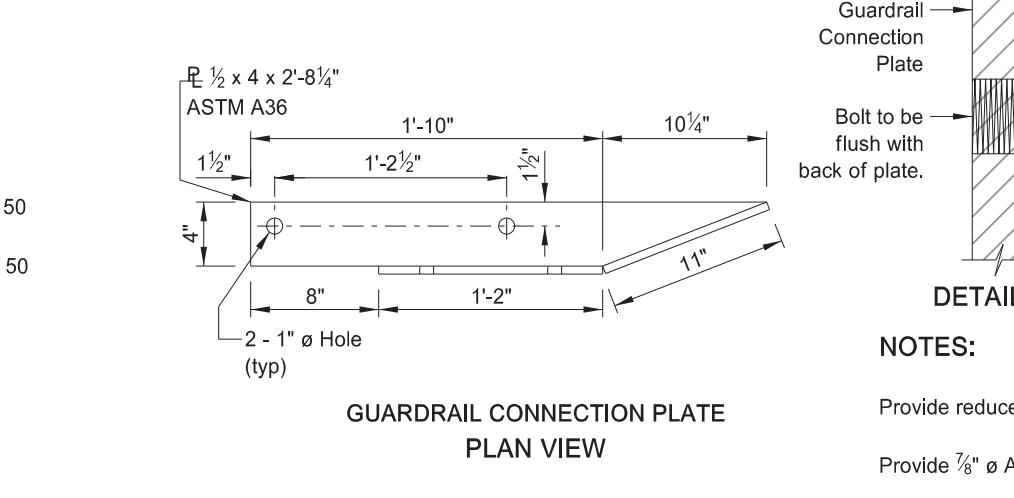
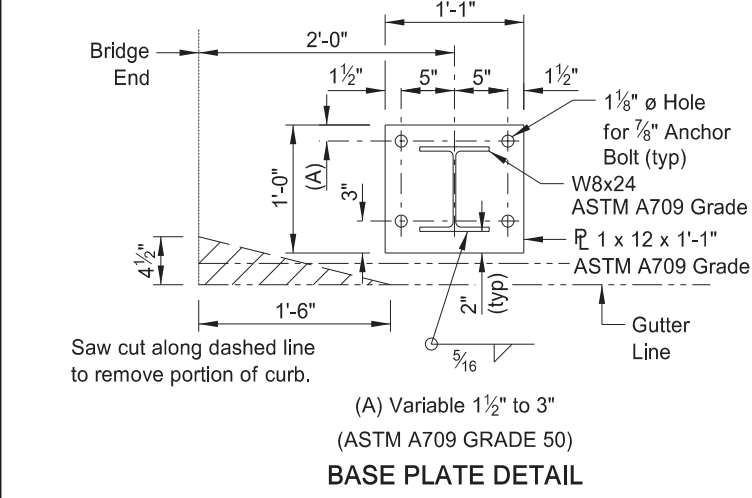
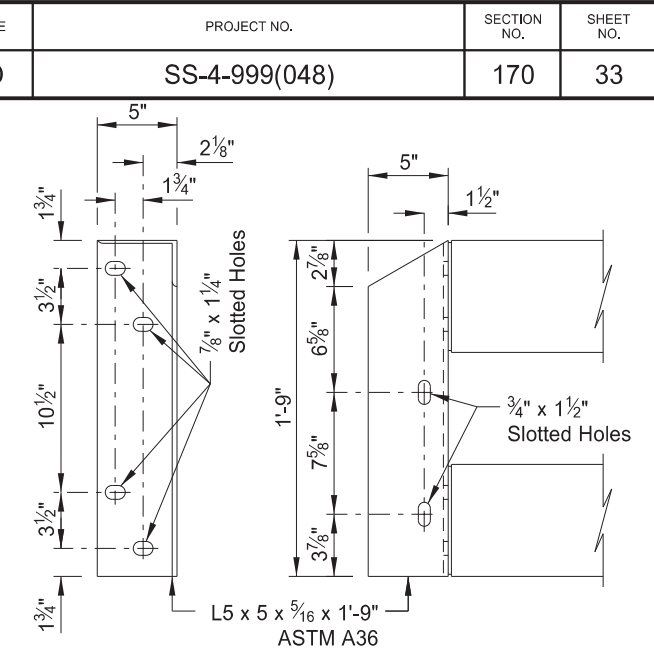
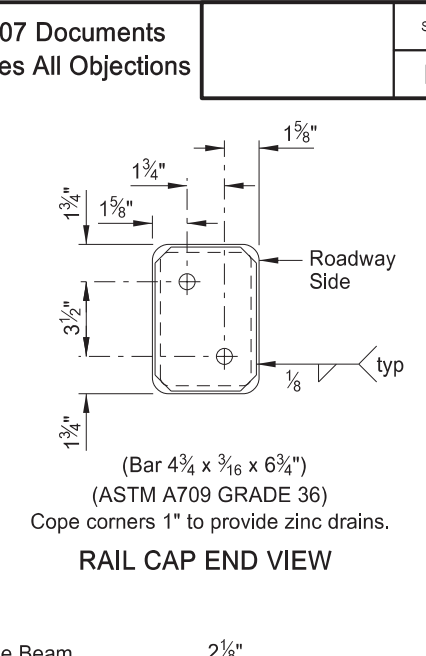
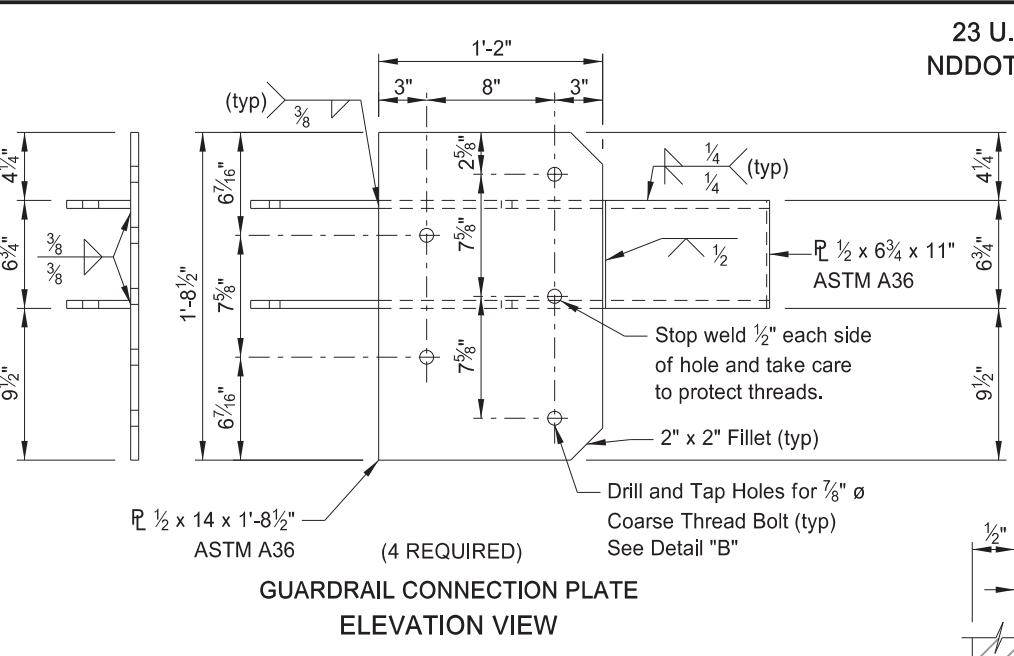
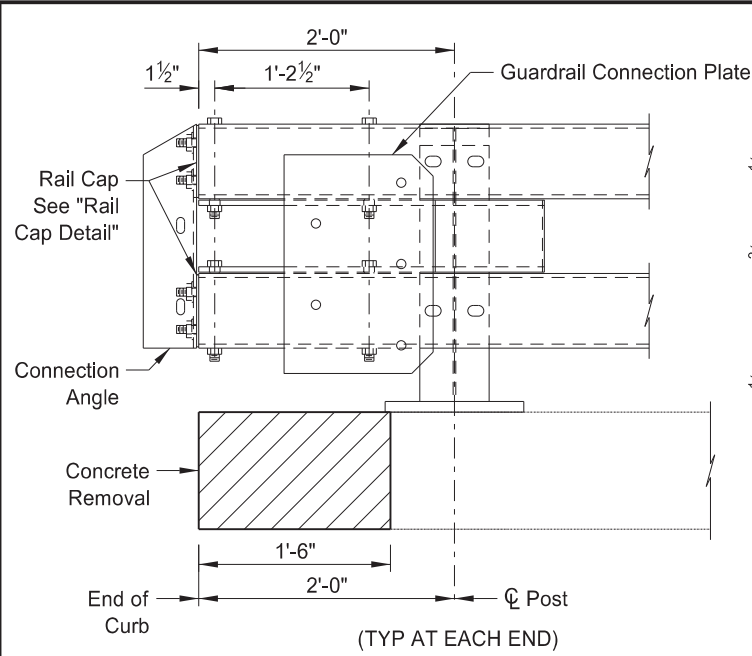


PLAN



Double Box Beam Rail  
 Retrofit-Free Standing Post Spacing  
 1.0 mi. S of Kramer, ND  
 Bridge 0014-144.188  
 ND 14 Stone Creek

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	33



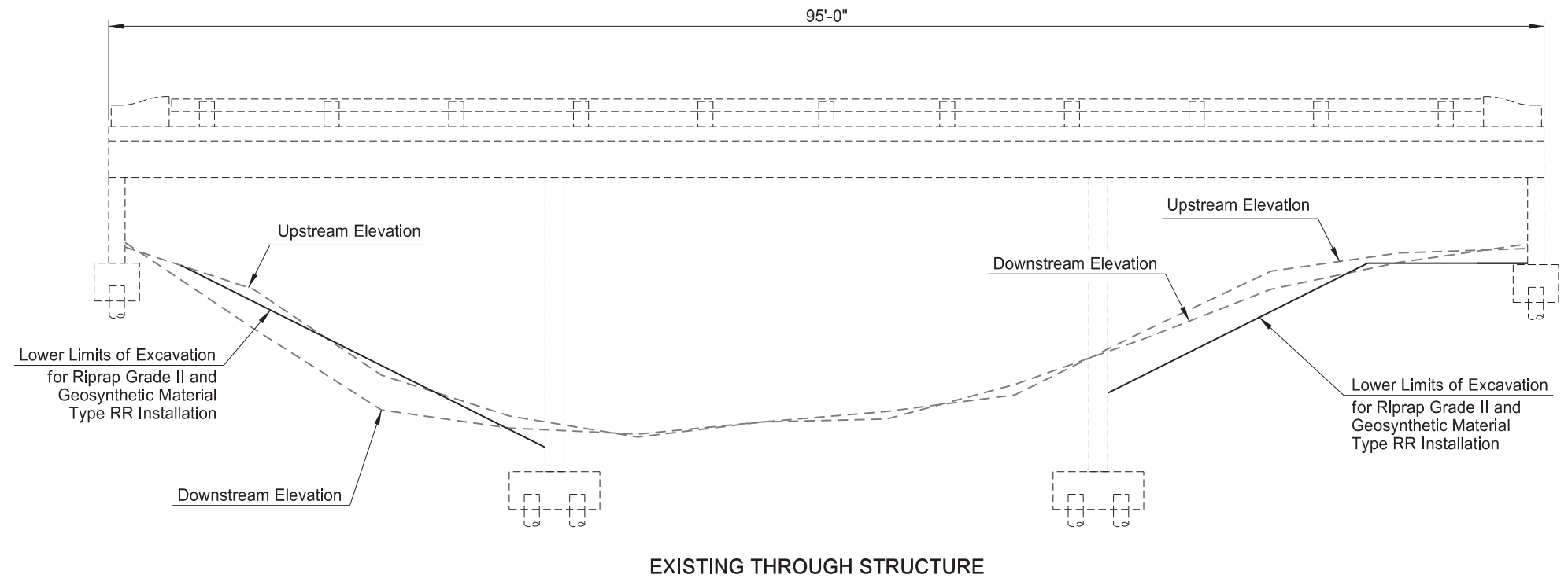
**NOTES:**

- Provide reduced base studs in accordance with ASTM A108 Grade 1010.
- Provide 7/8" Anchor Bolts in accordance with ASTM F1554, Grade 105
- Galvanize all steel components after fabrication according to Section 854.
- Remove existing double box beam retrofit railing, posts, and anchors Cut the existing post anchors flush with the top of the concrete and coat exposed steel with epoxy.
- Adjust interior post spacing as necessary to clear existing anchor bolts. Do not exceed 10'-0" post spacing.
- Include all labor, equipment, and materials needed to furnish and install the guardrail connection plates, saw and remove portions of the curb, and to remove the existing double box beam rail retrofit-free-standing in the bid item "DOUBLE BOX BEAM RAIL RETROFIT-FREESTANDING."

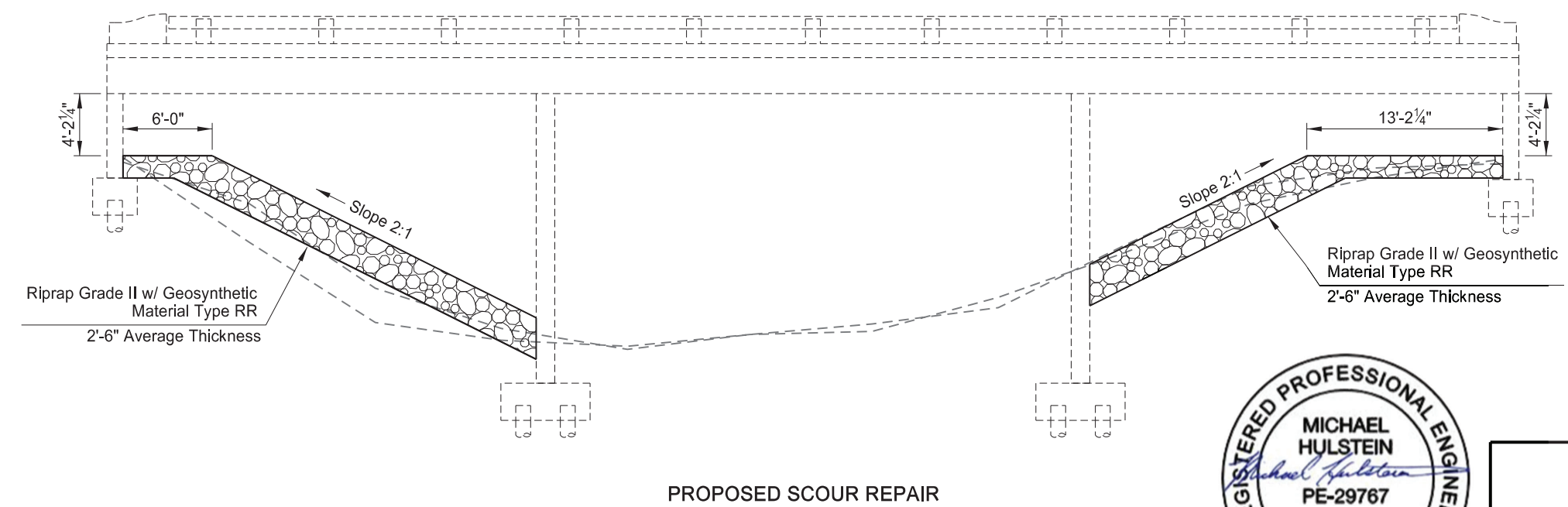


QUANTITIES	
DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	190 LF
Double Box Beam Rail Retrofit-Free Standing	
1.0 mi. S of Kramer, ND	
Bridge 0014-144.188 ND 14 Stone Creek	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-4-999(048)	170	34



**NOTE**  
 Excavation required for placement of riprap to be included in the price bid for "Riprap Grade II".



Scour Repair

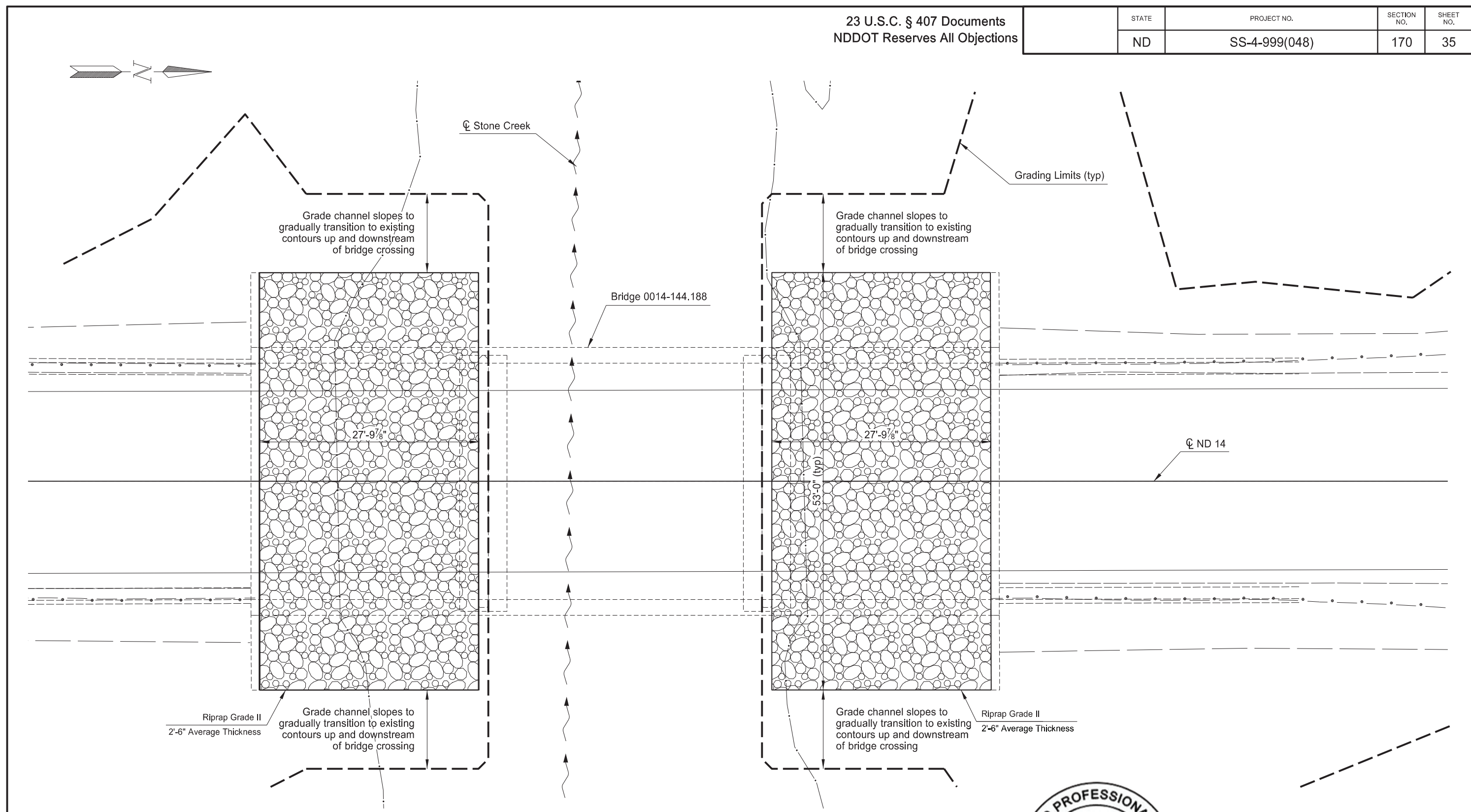
1.0 mi. S of Kramer, ND

Bridge 0014-144.188  
 ND 14 Stone Creek



23 U.S.C. § 407 Documents  
 NDDOT Reserves All Objections

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PROPOSED SCOUR REPAIR



Scour Repair  
 1.0 mi. S of Kramer, ND  
 Bridge 0014-144.188  
 ND 14 Stone Creek

NDDOT ABBREVIATIONS

D-101-1

? This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.

Abn abandoned  
 Abut abutment  
 Adj adjusted  
 Aggr aggregate  
 Ahd ahead  
 ARV air release valve  
 Align alignment  
 Al alley  
 Alt alternate  
 Alum aluminum  
 ADA Americans with Disabilities Act  
 & and  
 Appr approach  
 Approx approximate  
 ACP asbestos cement pipe  
 Asph asphalt  
 AC asphalt cement  
 Assmd assumed  
 @ at  
 Atten attenuation  
 ATR automatic traffic recorder  
 Ave Avenue  
 Avg average  
 ADT average daily traffic

Bk back  
 BF back face  
 Balc balcony  
 B Wire barbed wire  
 Barr barricade  
 Btry battery  
 BI beehive inlet  
 Beg begin  
 BG below grade  
 BM bench mark  
 Bkwy bikeway  
 Bit bituminous  
 Blk block  
 BH bore hole  
 Bot bottom  
 Blvd Boulevard  
 Bndry boundary  
 Brkwy breakaway  
 Br bridge  
 Bldg building  
 Bus. business  
 BV butterfly valve  
 Byp bypass

C Gdrl cable guardrail  
 Calc calculate  
 CIP cast iron pipe  
 CB catch basin  
 CRS cationic rapid setting  
 C Gd cattle guard  
 C To C center to center  
 CL or  $\text{C}$  centerline  
 Ch chain  
 Chnlk chain-link  
 Ch Blk channel block  
 Ch Ch channel change  
 Chk check  
 Chsld chiseled  
 Cir circle  
 Cl class  
 Clnt clean-out  
 Clr clear  
 Cl&gr clearing & grubbing  
 Comb. combination  
 Coml commercial  
 Compr compression  
 CADD computer aided drafting & design  
 Conc concrete  
 CECB concrete erosion control blanket  
 Cond conductor  
 Const construction  
 Cont continuous  
 CSB continuous split barrel sample  
 Contr contraction  
 Contr contractor  
 CP control point  
 Coord coordinate  
 Cor corner  
 Corr corrected  
 CAES corrugated aluminum end section  
 CAP corrugated aluminum pipe  
 CMES corrugated metal end section  
 CMP corrugated metal pipe  
 CPVCP corrugated poly-vinyl chloride pipe  
 CSES corrugated steel end section  
 CSFES corrugated steel flared end section  
 CSP corrugated steel pipe  
 CSTES corrugated steel traversable end section  
 Co County  
 Crse course  
 Ct Court  
 Xarm cross arm  
 Xbuck cross buck  
 Xsec cross sections  
 Xing crossing  
 Xrd crossroad  
 Crn crown

Culv culvert  
 C&G curb & gutter  
 CI curb inlet  
 CR curb ramp  
 C cut  
 Dd Ld dead load  
 Defl deflection  
 Defm deformed  
 DInt delineate  
 DIntr delineator  
 Depr depression  
 Desc description  
 Det detail  
 DWP detectable warning panel  
 Dtr detour  
 Dia or  $\emptyset$  diameter  
 Dir direction  
 Dist distance  
 DM disturbed material  
 DB ditch block  
 DG ditch grade  
 Dbl double  
 Dn down  
 Dwg drawing  
 Dr drive  
 Drwy driveway  
 DI drop inlet  
 D dry density

Ea each  
 Esmt easement  
 E East  
 EB Eastbound  
 Elast elastomeric  
 EL electric locker  
 E Mtr electric meter  
 Elec electric/al  
 EDM electronic distance meter  
 Elev or El elevation  
 Ellipt elliptical  
 Emb embankment  
 Emuls emulsion/emulsified  
 ES end section  
 Engr engineer  
 ESS environmental sensor station  
 Eq equal  
 Evgr evergreen  
 Exc excavation  
 Exst existing  
 Exp expansion  
 Expy Expressway  
 E external of curve  
 Extru extruded

FOS factor of safety  
 Fed Federal  
 FP feed point  
 Fn fence  
 Fn P fence post  
 FO fiber optic  
 FD field drive  
 F fill  
 FAA fine aggregate angularity  
 FH fire hydrant  
 Fl flange  
 Flrd flared  
 FES flared end section  
 F Bcn flashing beacon  
 FA flight auger sample  
 FL flow line  
 Ftg footing  
 FM force main  
 Fnd found  
 Fdn foundation  
 Frac fractional  
 Frwy freeway  
 Frt front  
 FF front face  
 F Disp fuel dispenser  
 FFP fuel filler pipes  
 FLS fuel leak sensor  
 Furn furnish/ed

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12-10-20	General Revisions
08-16-22	General Revisions



NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized	Ln	lane	Obsc	obscure(d)	Qty	quantity
Gar	garage	Lg	large	Ocpd	occupied	Qtr	quarter
Gs L	gas line	Lat	latitude	Ocpy	occupy		
G Reg	gas line regulator	Lt	left	O/s	offset		
GMV	gas main valve	Lens	lenses	OC	on center	Rad or R	radius
G Mtr	gas meter	Lvl	level	C	one dimensional consolidation	RR	railroad
GSV	gas service valve	Lvng	leveling	OC	organic content	Rlwy	railway
GVP	gas vent pipe	Lht	light	Orig	original	Rsd	raised
GV	gate valve	LP	light pole	O To O	out to out	RC	rapid curing
Ga	gauge	Ltg	lighting	OD	outside diameter	Rec	record
Gov	government	Liq	liquid	OH	overhead	Recy	recycle
Grd	graded/grade	LL	liquid limit			RAP	recycled asphalt pavement
Grnd	ground	Loc	location			RPCC	recycled portland cement concrete
GWM	ground water monitor	Long.	longitude	PMT	pad mounted transformer	Ref	reference
Gdrl	guardrail	Lp	loop	Pg	pages	R Mkr	reference marker
Gtr	gutter	LD	loop detector	Pntd	painted	RM	reference monument
		Lum	luminaire	Pr	pair	RP	reference point
				Pnl	panel	Refl	reflectorized
H Plg	H piling			Pk	park	RCB	reinforced concrete box
Hdwl	headwall	Mb	mailbox	PSD	passing sight distance	RCES	reinforced concrete end section
Ht	height	ML	main line	Pvmt	pavement	RCFES	reinforced concrete flared end section
Hel	helical	MH	manhole	Ped	pedestal	RCP	reinforced concrete pipe
HDPE	high density polyethylene	Mkd	marked	Ped	pedestrian	RCPS	reinforced concrete pipe sewer
HM	high mast	Mkr	marker	PPP	pedestrian pushbutton post	RCTES	reinforced concrete traversable end section
HP	high pressure	Mkg	marking	Pen.	penetration	Reinf	reinforcement
HPS	high pressure sodium	MA	mast arm	Perf	perforated	Res	reservation
HTCG	high tension cable guardrail	Matl	material	Per.	perimeter	Res	residence
Hwy	highway	Max	maximum	Perm	permanent	Ret	retaining
Hor	horizontal	MC	meander corner	PL	pipeline	Rev	reverse
HBP	hot bituminous pavement	Meas	measure	PI	place	Rt	right
HMA	hot mix asphalt	Mdn	median	P&P	plan & profile	R/W	right of way
Hyd	hydrant	MD	median drain	PL	plastic limit	Riv	river
Ph	hydrogen ion content	MC	medium curing	Pl or $\bar{P}$	plate	Rd	road
		MGS	Midwest Guardrail System	Pt	point	Rdbd	road bed
		MM	mile marker	PE	polyethylene	Rdwy	roadway
Id	identification	MP	mile post	PVC	polyvinyl chloride	RWIS	roadway weather information system
Incl	inclinometer tube	Min	minimum	PCC	Portland Cement concrete	Rk	rock
IMH	inlet manhole	Misc	miscellaneous	PP	power pole	Rt	route
ID	inside diameter	Mon	monument	Preempt	preemption		
Inst	instrument	Mnd	mound	Prefab	prefabricated		
Intchg	interchange	Mtbl	mountable	Prfmd or Pref	performed		
Intmdt	intermediate	Mtd	mounted	Prep	preparation		
Intscn	intersection	Mtg	mounting	Press.	pressure		
Inv	invert	Mk	muck	PRV	pressure relief valve		
IP	iron pipe			Prestr	prestressed		
				Pvt	private		
				PD	private drive		
Jt	joint	Neop	neoprene	Prod.	production/produce		
Jct	junction	Ntwk	network	Prog	programmed		
		N	North	Prop.	property		
		NE	North East	Prop Ln	property line		
		NW	North West	Ppsd	proposed		
		NB	Northbound	PB	pull box		
		No. or #	number				

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NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	South East	TERO	tribal employment rights ordinance
SW	South West	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike	VG	valley gutter
SB	split barrel sample	Vap	vapor
SH	sprinkler head	Vert	vertical
SV	sprinkler valve	VCP	vitrified clay pipe
Sq	square	Vol	volume
Stk	stake	VSFS	vehicle speed feedback sign
Std	standard		
N	standard penetration test	Wkwy	walkway
Std Specs	standard specifications	W	water content
Stm L	steam line	WGV	water gate valve
SEC	steel encased concrete	WL	water line
SMA	stone matrix asphalt	WM	water main
SSD	stopping sight distance	WMV	water main valve
SD	storm drain	W Mtr	water meter
St	street	WSV	water service valve
SPP	structural plate pipe	WW	water well
SPPA	structural plate pipe arch	Wrng	wearing
Str	structure	WIM	weigh in motion
Subd	subdivision	W	west
Sub	subgrade	WB	westbound
Sub Prep	subgrade preparation	Wrng	wiring
Ss	subsoil	W/	with
SS	supplement specification	W/o	without
Supp	supplemental	WC	witness corner
Surf	surfacing		
Surv	survey		
Sym	symmetrical		

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NDDOT ABBREVIATIONS

MEASUREMENTS

ac acres  
 A ampere  
 Bd Ft board feet  
 Cd candela  
 cm centimeter  
 C coulomb  
 CF cubic feet  
 m3 cubic meter  
 m3/s cubic meters per second  
 CY cubic yard  
 CY/mi cubic yards per mile  
 D or Deg degree  
 F Fahrenheit  
 F farad  
 ft feet/foot  
 Gal gallon  
 G giga  
 Ha hectare  
 H henry  
 Hz hertz  
 hr hour(s)  
 in inch  
 J joule  
 K kelvin  
 kN kilo newton  
 kPa kilo pascal  
 kg kilogram  
 kg/m3 kilogram per cubic meter  
 km kilometer  
 K Kip(s)  
 LF linear foot  
 L litre  
 Lm lumen  
 L sum lump sum  
 Lx lux  
 M Hr man hour  
 M mega  
 m meter  
 m/s meters per second  
 mi mile  
 mL milliliter  
 mm millimeter  
 mm/hr millimeters per hour  
 n nano  
 N newton  
 Pa pascal  
 lb pounds  
 sec seconds  
 S siemens  
 SF square feet  
 km2 square kilometer  
 m2 square meter  
 SY square yard  
 Sta Yd station yards  
 SI Systems International

T tesla  
 T/mi tons per mile  
 V volt  
 W watt  
 Wb weber

SURVEY DESCRIPTIONS

Az azimuth  
 Bs backsight  
 Brg bearing  
 BP Cap blue plastic cap  
 BS both sides  
 BC brass cap  
 CS curve to spiral  
 Eq equation  
 E external of curve  
 FS far side  
 FB field book  
 Fs foresight  
 Geod geodetic  
 GIS Geographical Information System  
 GPS Global Positioning System  
 HI height of instrument  
 IM iron monument  
 I Pn iron pin  
 LS Land Surveyor (licensed)  
 LSIT Land Surveyor In Training  
 L length of curve  
 LC long chord  
 LB level book  
 Mer meridian  
 M mid ordinate of curve  
 NGS National Geodetic Survey  
 NS near side  
 Obsn observation  
 Off Loc office location  
 OP Cap orange plastic cap  
 PK Parker-Kalon nail  
 P Cap plastic cap  
 PP Cap pink plastic cap  
 PCC point of compound curve  
 PC point of curve  
 PI point of intersection  
 PRC point of reverse curvature  
 PT point of tangent  
 POC point on curve  
 POT point on tangent  
 RTP random traverse point  
 Rge range  
 RP Cap red plastic cap  
 SC spiral to curve  
 ST spiral to tangent  
 Sta station  
 SE superelevation  
 Tan tangent  
 T tangent (semi)  
 TS tangent to spiral  
 Twp township  
 TB transit book  
 TP traverse point  
 TP turning point  
 USC&G US Coast & Geodetic Survey  
 USGS US Geologic Survey  
 VC vertical curve  
 WGS World Geodetic System  
 YP Cap yellow plastic cap  
 Z zenith

SOIL TYPES

Cl clay  
 Cl F clay fill  
 Cl Hvy clay heavy  
 Cl Lm clay loam  
 Co S coal slack  
 C Gr coarse gravel  
 CS coarse sand  
 FS fine sand  
 Gr gravel  
 Lig Co lignite coal  
 Lig Sl lignite slack  
 Lm loam  
 Rk rock  
 Sd sand  
 Sdy Cl sandy clay  
 Sdy Cl Lm sandy clay loam  
 Sdy Fl sandy fill  
 Sdy Lm sandy loam  
 Sc scoria  
 Sh shale  
 Si Cl silt clay  
 Si Cl Lm silty clay loam  
 Si Lm silty loam

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications	GT PLNS NAT GAS	Great Plains Natural Gas Company	RED RIV COMM	Red River Rural Communications
ACCENT	Accent Communications	HALS TEL	Halstad Telephone Company	RESVTN TEL	Reservation Telephone
AGASSIZ WU	Agassiz Water Users Incorporated	IDEA1	Idea1	ROBRTS TEL	Roberts Company Telephone
AGC	Associated General Contractors of America	INT-COMM TEL	Inter-Community Telephone Company	R-RIDER ELEC	Roughrider Electric Cooperative
ALL PL	Alliance Pipeline	KANEB PL	Kaneb Pipeline Company	RRVW	Red River Valley & Western Railroad
ALL SEAS WU	All Seasons Water Users Association	KEM ELEC	Kem Electric Cooperative Incorporated	S CENT REG WD	South Central Regional Water District
AMOCO PI	Amoco Pipeline Company	KOCH GATH SYS	Koch Gathering Systems Incorporated	S E W U	South East Water Users Incorporated
AMRDA HESS	Amerada Hess Corporation	LKHD PL	Lakehead Pipeline Company	SCOTT CABLE	Scott Cable Television Dickinson
AT&T	AT&T Corporation	LNGDN RWU	Langdon Rural Water Users Incorporated	SHERDN ELEC	Sheridan Electric Cooperative
B PAW	Bear Paw Energy Incorporated	LWR YELL R ELEC	Lower Yellowstone Rural Electric	SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
BAKER ELEC	Baker Electric	MCKNZ CON	McKenzie Consolidated Telcom	SKYTECH	Skyland Technologies Incorporated
BASIN ELEC	Basin Electric Cooperative Incorporated	MCKNZ ELEC	McKenzie Electric Cooperative	SLOPE ELEC	Slope Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative	MCKNZ WRD	McKenzie County Water Resource District	SOURIS RIV TELCOM	Souris River Telecommunications
BELLE PL	Belle Fourche Pipeline Company	MCLEOD	McLeod USA	ST WAT COMM	State Water Commission
BLM	Bureau of Land Management	MCLN ELEC	McLean Electric Cooperative	STATE LN WATER	State Line Water Cooperative
BNSF	Burlington Northern Santa Fe Railway	MCLN-SHRDN R WAT	McLean-Sheridan Rural Water	STER ENG	Sterling Energy
BOEING	Boeing	MDU	Montana-dakota Utilities	STUT RWU	Stutsman Rural Water Users
BRNS RWD	Barnes Rural Water District	MIDCO	MidContinent Communications	SW PL PRJ	Southwest Pipeline Project
BURK-DIV ELEC	Burke-Divide Electric Cooperative	MIDSTATE TEL	Midstate Telephone Company	T M C	Turtle Mountain Communications
BURL WU	Burleigh Water Users	MINOT CABLE	Minot Cable Television	TCI	TCI of North Dakota
CABLE ONE	Cable One	MINOT TEL	Minot Telephone Company	TESORO GHG PLNS PL	Tesoro High Plains Pipeline
CABLE SERV	Cable Services	MISS VALL COMM	Missouri Valley Communications	TRI-CNTY WU	Tri-County Water Users Incorporated
CAP ELEC	Capital Electric Cooperative Incorporat	MISS W W S	Missouri West Water System	TRL CO RWU	Traill County Rural Water Users
CASS CO ELEC	Cass County Electric Cooperative	MNKOTA PWR	Minnkota Power	UNTD TEL	United Telephone
CASS RWU	Cass Rural Water Users Incorporated	MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative	UPPR SOUR WUA	Upper Souris Water Users Association
CAV ELEC	Cavalier Rural Electric Cooperative	MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative	US SPRINT	U.S. Sprint
CBLCOM	Cablecom Of Fargo	MRE LBTY TEL	Moore & Liberty Telephone	USAF MSL CABLE	U.S.A.F. Missile Cable
CENEX PL	Cenex Pipeline	MUNICIPAL	City Water And Sewer	USFWS	US Fish and Wildlife Service
CENT PL WATER DIST	Central Pipe Line Water District	MUNICIPAL	City Of '.....'	USW COMM	U.S. West Communications
CENT PWR ELEC	Central Power Electric Cooperative	N CENT ELEC	North Central Electric Cooperative	VRNDRY ELEC	Verendrye Electric Cooperative
CENTURYLINK	CenturyLink	N VALL W DIST	North Valley Water District	W RIV TEL	West River Telephone Incorporated
COE	Corps of Engineers	ND PKS & REC	North Dakota Parks And Recreation	WAPA	Western Area Power Administration
CONS TEL	Consolidated Telephone	ND TEL	North Dakota Telephone Company	WAWSA	Western Area Water Supply Authority
CONT RES	Continental Resource Inc	NDDOT	North Dakota Department of Transportation	WEB	W. E. B. Water Development Association
CPR	Canadian Pacific Railway	NDSU SOIL SCI DEPT	NDSU Soil Science Department	WILLI RWA	Williams Rural Water Association
D O E	Department Of Energy	NEMONT TEL	Nemont Telephone	WILSTN BAS PL	Williston Basin Interstate Pipeline Company
DAK CARR	Dakota Carrier Network	NODAK R ELEC	Nodak Rural Electric Cooperative	WLSH RWD	Walsh Water Rural Water District
DAK CENT TEL	Dakota Central Telephone	NOON FRMS TEL	Noonan Farmers Telephone Company	WOLVRTN TEL	Wolverton Telephone
DAK RWD	Dakota Rural Water District	NPR	Northern Plains Railroad	XLENER	Xcel Energy
DGC	Dakota Gasification Company	NSP	Northern States Power	YSVR	Yellowstone Valley Railroad
DICKEY R NET	Dickey Rural Networks	NTH PRAIR RW	Northern Prairie Rural Water Association		
DICKEY RWU	Dickey Rural Water Users Association	NTHN BRDR PL	Northern Border Pipeline		
DICKEY TEL	Dickey Telephone	NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated		
DNRR	Dakota Northern Railroad	NTHWSTRN REF	Northwestern Refinery Company		
DOME PL	Dome Pipeline Company	NW COMM	Northwest Communication Cooperation		
DVELEC	Dakota Valley Electric Cooperative	NWRWD	Northwest Rural Water District		
DVMW	Dakota, Missouri Valley & Western	ONEOK	Oneok gas		
ENBRDG	Enbridge Pipelines Incorporated	OSHA	Occupational Safety and Health Administration		
ENVENTIS	Enventis Telephone	OTTR TL PWR	Otter Tail Power Company		
EQUINOR	Equinor Pipeline	PAAP	Plains All American Pipeline		
FALK MNG	Falkirk Mining Company	P L E M	Prairielands Energy Marketing		
FHWA	Federal Highway Administration	POLAR COM	Polar Communications		
G FKS-TRL WD	Grand Forks-traill Water District	PVT ELEC	Private Electric		
GETTY TRD & TRAN	Getty Trading & Transportation	QWEST	Qwest Communications		
GLDN W ELEC	Golden West Electric Cooperative	R&T W SUPPLY	R & T Water Supply Association		
GRGS CO TEL	Griggs County Telephone				
GTR RAMSEY WD	Greater Ramsey Water District				

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DATE	CHANGE
04-23-18	General Revisions
05-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



# LINE STYLES

D-101-20

## Existing Topography

- Void — Void — Void — V Existing Ground Void
- + — + — Existing Cemetary Boundary
- - - - - Existing Box Culvert Bridge
- - - - - Existing Concrete Surface
- - - - - Existing Drainage Structure
- — — — — Existing Gravel Surface
- — — — — Existing Riprap
- — — — — Existing Dirt Surface
- — — — — Existing Asphalt Surface
- — — — — Existing Tie Point Line
- - - - - Existing Railroad Centerline
- . - . - . Existing Guardrail Cable
- • — • — • Existing Guardrail Metal
- . — . — . Existing Edge of Water
- - - - -x- - - - -x- Existing Fence
- | | | | | Existing Railroad
- ..... Existing Field Line
- ~ ~ ~ ~ ~ Exst Flow
- ===== Existing Curb
- - - - - Existing Valley Gutter
- - - - - Existing Driveway Gutter
- ===== Existing Curb and Gutter
- ===== Existing Mountable Curb and Gutter

- - - - - Existing 3-Cable w Posts
- - - - - Site Boundary
- ..... Existing Berm, Dike, Pit, or Earth Dam
- ..... Existing Ditch Block
- ~ ~ ~ ~ ~ Existing Tree Boundary
- ===== Existing Brush or Shrub Boundary
- ..... Existing Retaining Wall
- ===== Existing Planter or Wall
- ~ ~ ~ ~ ~ Existing W-Beam Guardrail with Posts
- — — — — Existing Railroad Switch
- ~ ~ ~ ~ ~ Gravel Pit - Borrow Area
- - - - - Existing Wet Area-Vegetation Break
- - - - - Existing High Tension Cable Guardrail
- • - • - • Existing High Tension Cable Guardrail with Posts

## Proposed Topography

- — — — — 3-Cable w Posts
- ~ ~ ~ ~ ~ Flow
- x- - - -x- - - -x- Fence
- REMOVE — REMOVE — Remove Line
- ===== Wall
- ~ ~ ~ ~ ~ Retaining Wall (Plan View)
- ~ ~ ~ ~ ~ W-Beam w Posts
- — • — • High Tension Cable Guardrail with Posts

## Existing Utilities

- — — — — E — Existing Electrical
- — — — — FO — Existing Fiber Optic Line
- — — — — FO — Existing TV Fiber Optic
- — — — — G — Existing Gas Pipe
- — — — — OH — Existing Overhead Utility Line
- — — — — P — Existing Power
- — — — — PL — Existing Fuel Pipeline
- — — — — PL — Existing Undefined Above Ground Pipe Line
- - - - - SAN - - - - - Existing Sanitary Sewer
- - - - - SAN FM - - - - - Existing Sanitary Force Main
- - - - - SD - - - - - Existing Storm Drain
- - - - - SD FM - - - - - Existing Storm Drain Force Main
- - - - - Existing Culvert
- — — — — T — Existing Telephone Line
- — — — — TV — Existing TV Line
- — — — — W — Existing Water or Steam Line
- ===== Existing Under Drain
- ===== Existing Slotted Drain
- — — — — Existing Conduit
- - - - - Existing Conductor
- — — — — Existing Down Guy Wire Down Guy
- — — — — Existing Underground Vault or Lift Station

## Proposed Utilities

- ===== 24 Inch Pipe
- ===== Reinforced Concrete Pipe
- ===== Under Drain
- - - - - Edge Drain

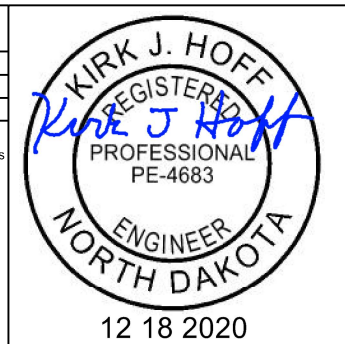
## Traffic Utilities

- - - - - Conductor
- - - - - Fiber Optic
- - - - - Existing Loop Detector
- — — — — Existing Double Micro Loop Detector
- — — — — Micro Loop Detector Double
- — — — — Existing Micro Loop Detector
- — — — — Micro Loop Detector
- ↓ — — — — Signal Head with Mast Arm
- ↓ - - - - Existing Signal Head with Mast Arm

## Sign Structures

- — — — — Existing Overhead Sign Structure
- — — — — Existing Overhead Sign Structure Cantilever
- — — — — Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups
12-18-20	General Revisions



# LINE STYLES

D-101-21

### Right Of Way

- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines
- Sight Distance Triangle Line
- Dimension Leader

### Boundary Control

- ////// Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centerline
- Tangent Line

### Cross Sections and Typical

- Existing Ground
- Existing Topsoil (Cross Section View)
- void - void - void - v Existing Ground Void (Not Surveyed)
- Existing Concrete
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar

### Geotechnical

- D ----- D ----- Geotextile Fabric Type D
- **Geo** ----- **Geo** ----- Geogrid
- R ----- R ----- Geotextile Fabric Type R
- R ----- R ----- Geotextile Fabric Type R1
- RR ----- RR ----- Geotextile Fabric Type RR
- S ----- S ----- Geotextile Fabric Type S

### Countours

- Depression Contours
- Supplemental Contour

### Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

### Striping

- Centerline Pavement Marking
- ===== Barrier with Centerline Pavement Marking
- ===== Barrier Pavement Marking
- - - - - Stripe 4 IN Dotted Extension White
- - - - - Stripe 8 IN Dotted Extension White
- - - - - Stripe 8 IN Lane Drop

### Pavement Joints

- ===== Doweled Joint
- +++++ Tie Bar 30 Inch 4 Foot Center to Center
- +++++ Tie Bar 18 Inch 3 Foot Center to Center
- +++++ Tie Bar at Random Spacing

### Bridge Details

- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Existing Conditions Object
- Centerline Main
- Centerline Secondary
- Excavation Limits
- Proposed Ground
- Sheet Piling

### Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- s ----- s ----- Floating Silt Curtain
- SF ----- SF ----- Silt Fence
- Excavation Limits
- Fiber Rolls

### Environmental

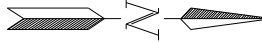





































- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland
- Tree Row

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups General Revisions
12-18-20	






SYMBOLS

	North Arrow (Half Scale)		Existing Bush or Shrub		Continuous Split Barrel Sample
	Alignment Data Point		Existing Large Evergreen Tree		Flight Auger Sample
	Alignment Monument		Existing Small Evergreen Tree		Split Barrel Sample
	Spot Elevation		Existing Large Tree		Thinwall Tube Sample
	Existing Miscellaneous Spot		Existing Small Tree		Standard Penetration Test
	Existing Access Control Arrow		Existing Tree Trunk		Inclinometer Tube
	Existing Benchmark		Cairn or Stone Circle		Excavation Unit
	Reset USGS Marker		Existing Artifact		Existing Ground Water Well Bore Hole
	Iron Monument Found		Existing Satellite Dish		
	Iron Pin R/W Monument		Existing Weather Station		
	Property Corner		Existing Windmill or Tower		
	Iron Pin Reference Monument		Reinforced Pavement		
	Right of Way Marker (Exst, Ppsd, Reset)				
	Existing Federal Reference Corner				
	Existing Section Corner (Full, Quarter, Sixteenth, Meander)				
	Existing Witness Corner				
	Existing Control Point (CP, GPS-RTK, TRI)				
	Existing Traverse PI Aerial Panel				
	Existing Reference Marker Point NGS				
	Existing EFB Misc				

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions

  
 KIRK J. HOFF  
 REGISTERED  
 PROFESSIONAL  
 PE-4683  
 ENGINEER  
 NORTH DAKOTA  
 12 18 2020

# SYMBOLS

















































































D-101-31

	■			Flexible Delineator				Highway Sign (Exst, Ppsd)	
	□	□		Flexible Delineator Type A (Exst, Ppsd)				Mile Post Type A (Exst-Ppsd-Reset)	
	▤	▤		Flexible Delineator Type B (Exst, Ppsd)				Mile Post Type B (Exst, Ppsd)	
	▥	▥		Flexible Delineator Type C (Exst, Ppsd)				Mile Post Type C (Exst, Ppsd)	
	○	○		Flexible Delineator Type D (Exst, Ppsd)				Object Marker Type I (Exst, Ppsd)	
	⊙	⊙		Flexible Delineator Type E (Exst, Ppsd)				Object Marker Type II (Exst, Ppsd)	
	├	├	├	├	Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)			Object Marker Type III (Exst, Ppsd)	
	├	├	├	├	Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)		°	Existing Reference Marker	
	├	├	├	├	Delineator Type C (Exst, Ppsd, Diamond Grade)		○—○	Road Closure Gate 18 Ft (Exst, Ppsd)	
	○	○	○	○	Delineator Type D (Exst, Ppsd, Diamond Grade)		○—○	Road Closure Gate 28 Ft (Exst, Ppsd)	
	⊙	⊙	⊙	⊙	Delineator Type E (Exst, Ppsd, Diamond Grade)		○—○	Road Closure Gate 40 Ft (Exst, Ppsd)	
					Barricade (Type I, Type II, Type III)		□	Existing Railroad Battery Box	
◉	↔	←	→	∞	◻		×	Existing RR Profile Spot	
					△	Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)		⊥	Existing Railroad Crossbuck
					▤	Attenuation Device		×	Existing Railroad Frog
					▤	Truck Mounted Attenuator		=	Existing Mailbox (Private, Federal)
					●	Delineator Drums			
					☞	Flagger			
					•	Tubular Marker			
					▲	Traffic Cone			
						Back to Back Vertical Panel Sign			

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions	12 18 2020

# SYMBOLS

D-101-32

 Existing Luminaire  Luminaire LED  Existing Light Standard Luminaire  Relocate Light Standard  Light Standard Light LED Luminaire  Light Standard 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 50 Watt High Pressure Sodium Vapor Luminaire  Light Standard 70 Watt High Pressure Sodium Vapor Luminaire  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Emergency Vehicle Detector  Video Detection Camera	  High Mast Light Standard 3 Luminaire (Exst, Ppsd)   High Mast Light Standard 4 Luminaire (Exst, Ppsd)   High Mast Light Standard 5 Luminaire (Exst, Ppsd)   High Mast Light Standard 6 Luminaire (Exst, Ppsd)   High Mast Light Standard 7 Luminaire (Exst, Ppsd)   High Mast Light Standard 8 Luminaire (Exst, Ppsd)   High Mast Light Standard 9 Luminaire (Exst, Ppsd)   High Mast Light Standard 10 Luminaire (Exst, Ppsd)   Overhead Sign Structure Load Center (Exst, Ppsd)   Traffic Signal Controller (Exst, Ppsd)   Pad Mounted Traffic Signal Controller (Exst, Ppsd)   Flashing Beacon (Exst, Ppsd)   Concrete Foundation (Exst, Ppsd)   Pipe Mounted Flasher (Exst, Ppsd)   Pad Mounted Feed Point (Exst, Ppsd)   Pipe Mounted Feed Point with Pad (Exst, Ppsd)   Pole Mounted Feed Point (Exst, Ppsd)   Junction Box (Exst, Ppsd)  Existing Pedestrian Head with Number  Existing Signal Head  Pole Mounted Head  Existing Lighting Standard Pole	 Existing Traffic Signal Standard    Pull Box (Exst-Ppsd-Undefined)   Intelligent Transportation Pull Box (Exst, Ppsd)   Transformer (Exst, Ppsd)    Power Pole (Exst-Ppsd-with Transformer)   Wood Pole (Exst, Ppsd)   Pedestrian Push Button Post (Exst, Ppsd)  Existing Pole  Existing Telephone Pole  Existing Post     Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions



**KIRK J. HOFF**  
REGISTERED  
PROFESSIONAL  
ENGINEER  
NORTH DAKOTA  
PE-4683

12 18 2020

# SYMBOLS

D-101-33

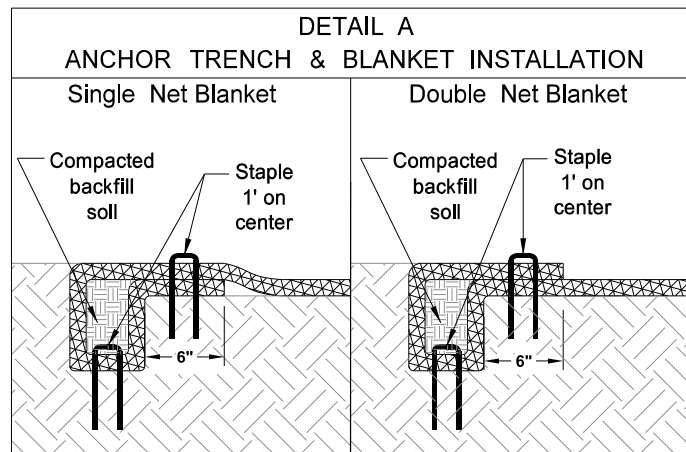
			Existing Manhole (Electrical, Gas, Telephone)			Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water	
			Water Manhole (Exst, Exst with Valve)				
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined		
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)				
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined		
			Force Main Storm Drain Manhole (Exst, Exst with Valve)				
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined		
			Existing Water Appurtenance				
			Sprinkler Head (Exst, Ppsd)		Pump Sanitary, Storm Drain, Exst Water		
			Fire Hydrant (Exst, Ppsd)				
			Cleanout (Exst Sanitary, Underdrain)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)		
			Existing Catch Basin Inlet (Round, Square)				
			Existing Curb Inlet (Round, Square)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)		
			Existing Slotted Reinforced Concrete Pipe				
			Catch Basin (Riser 30 Inch, Beehive, Type A)		Existing Utility Marker		
			Inlet Mountable Curb (Type A, Type B)		Existing Meter		
			Inlet Saddle Base (Type 1, Type 2)		Existing Fuel Dispensers		
			Inlet Special (Catch Basin, Type 1, Type A)		Existing Fuel Filler Pipes		
			Inlet (Tee, Type 1, Type 2, Type 2 Double)		Existing Fuel Leak Sensors		
			Median Drain				
			Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier, Ppsd Double with Vegetation Barrier)				

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

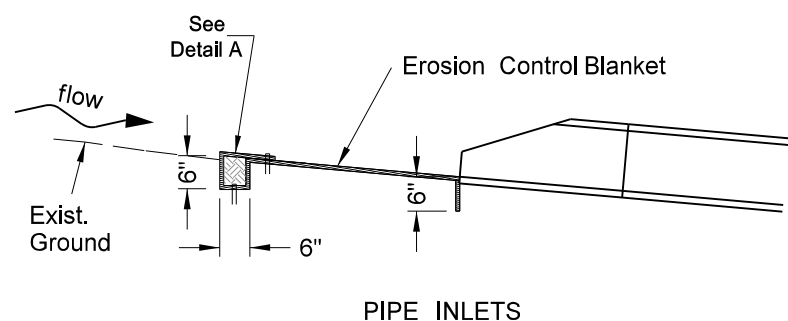
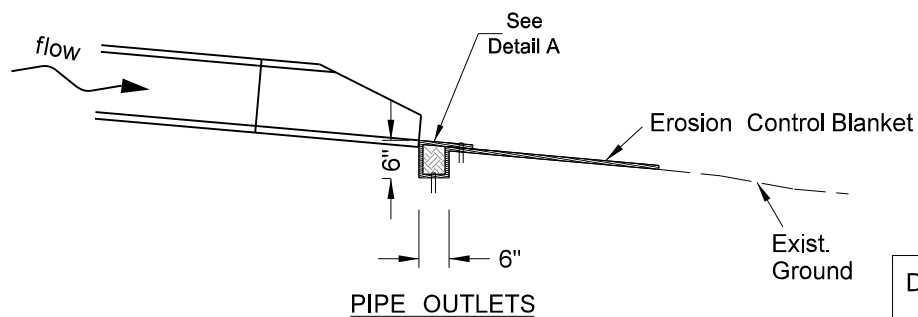


12 18 2020

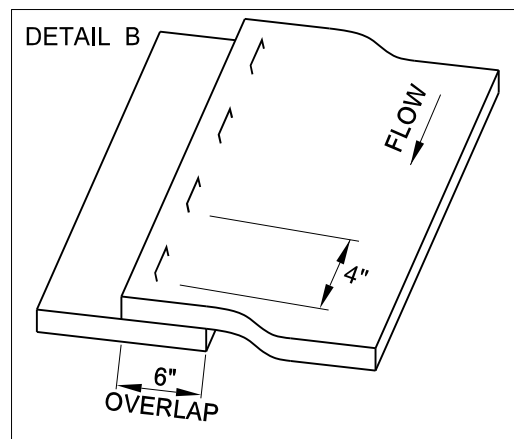
EROSION AND SILTATION CONTROL  
EROSION CONTROL BLANKET INSTALLATION



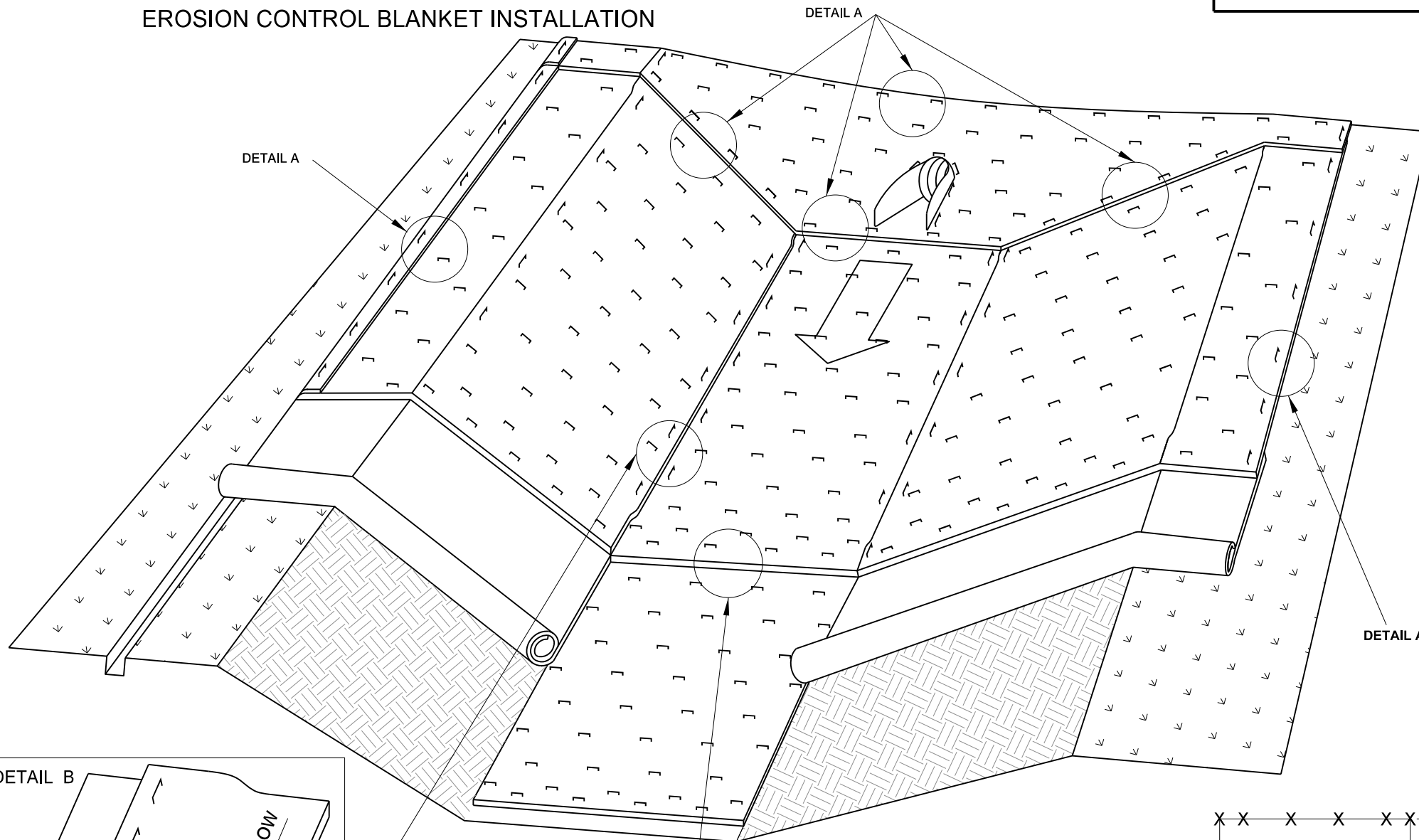
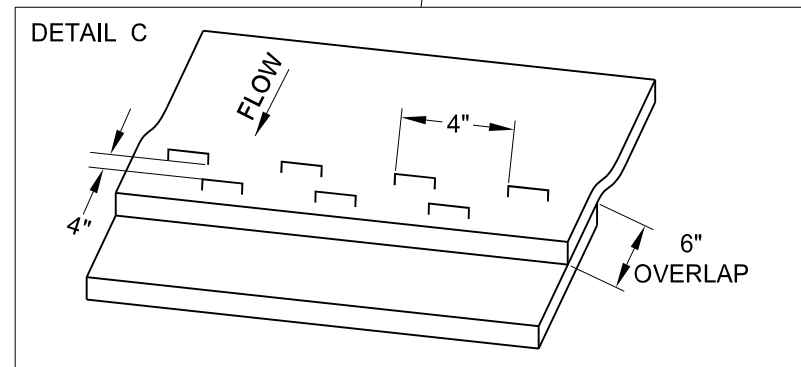
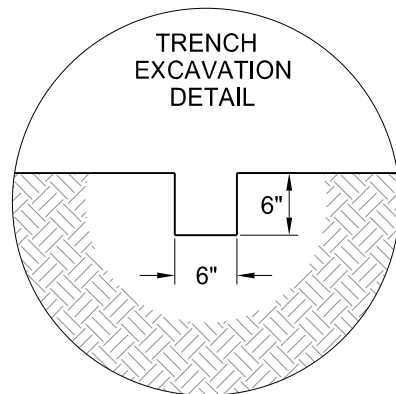
**NOTE:**  
If a Single Net Blanket is used the side with the netting should be on the top once the blanket is installed.



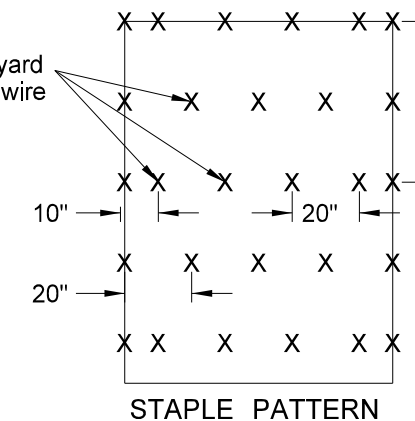
**INSTALLATION AT PIPE ENDS**



**BLANKET LAYOUT  
CHANNEL OR SLOPE INSTALLATION**

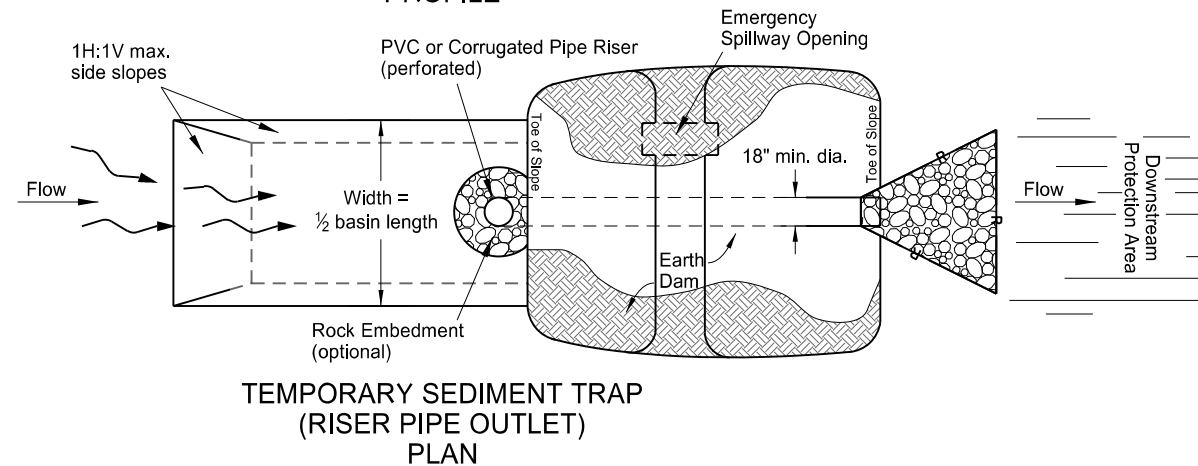
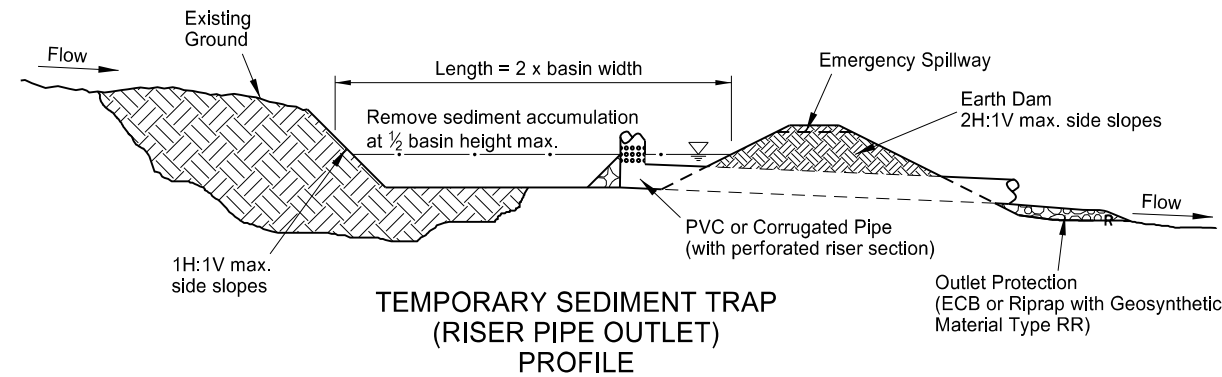
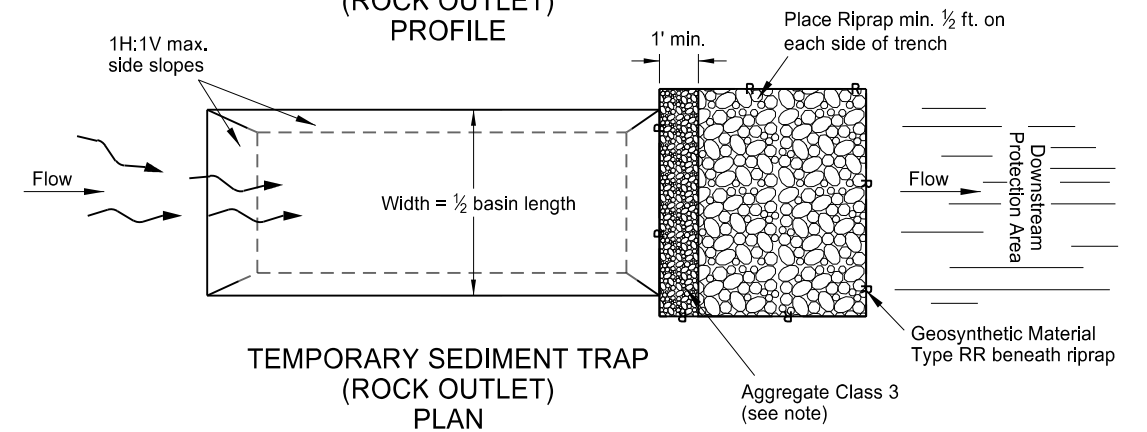
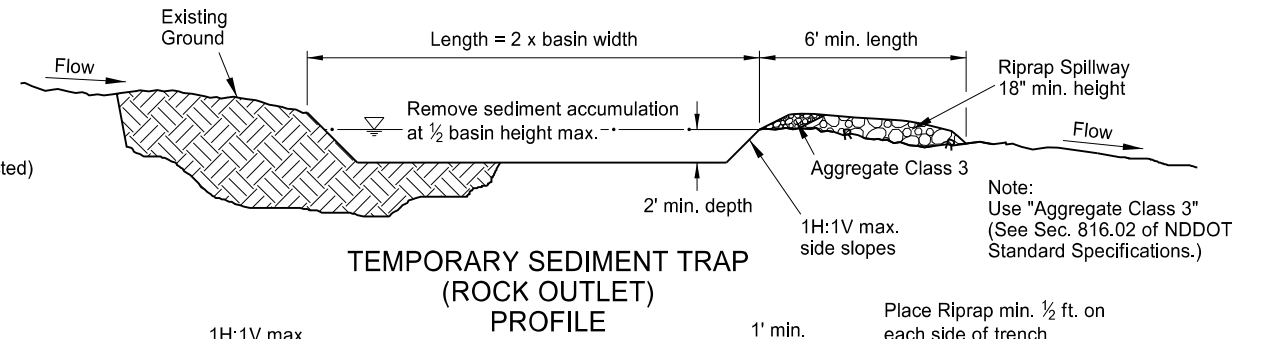
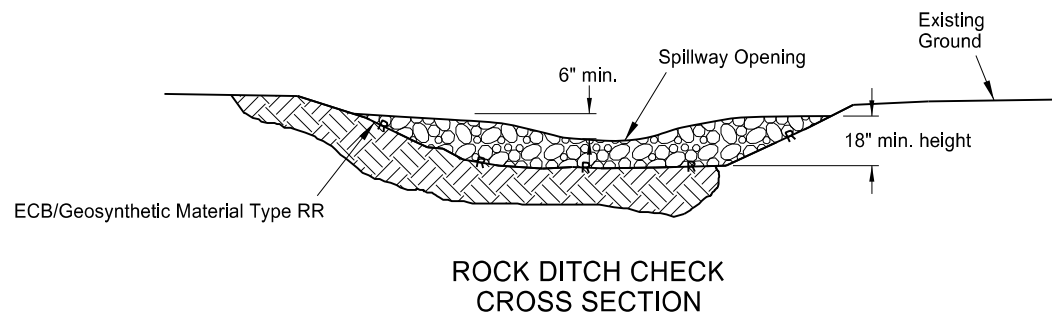
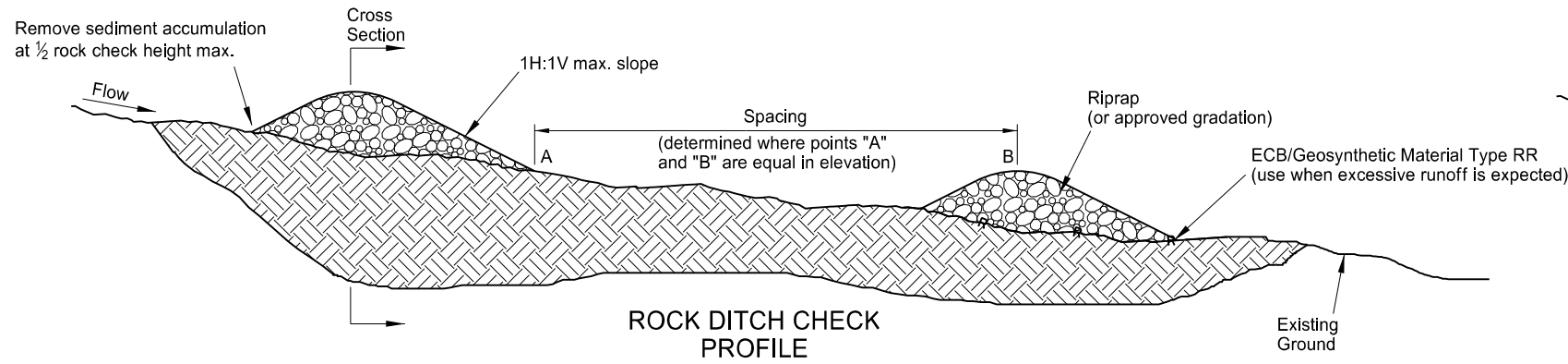


3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-5 to D-255-2.
07-27-15	Changed Installation details such as trench depth and overlap dimensions.
08-27-19	New Design Engineer PE Stamp.

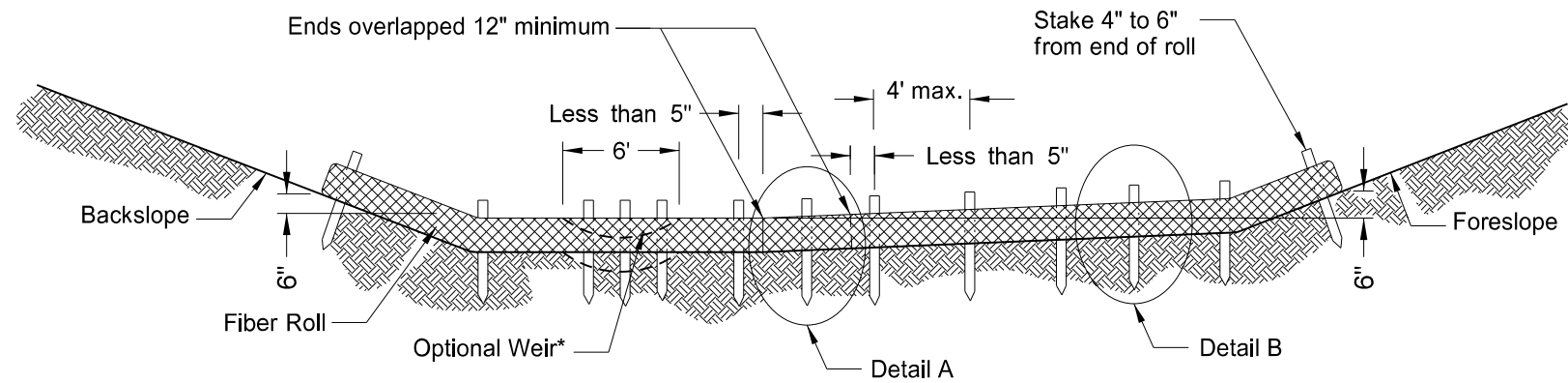
This document was originally issued and sealed by  
Kirk J Hoff,  
Registration Number  
PE- 4683,  
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-2 to D-256-1. Deleted silt fence details.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp

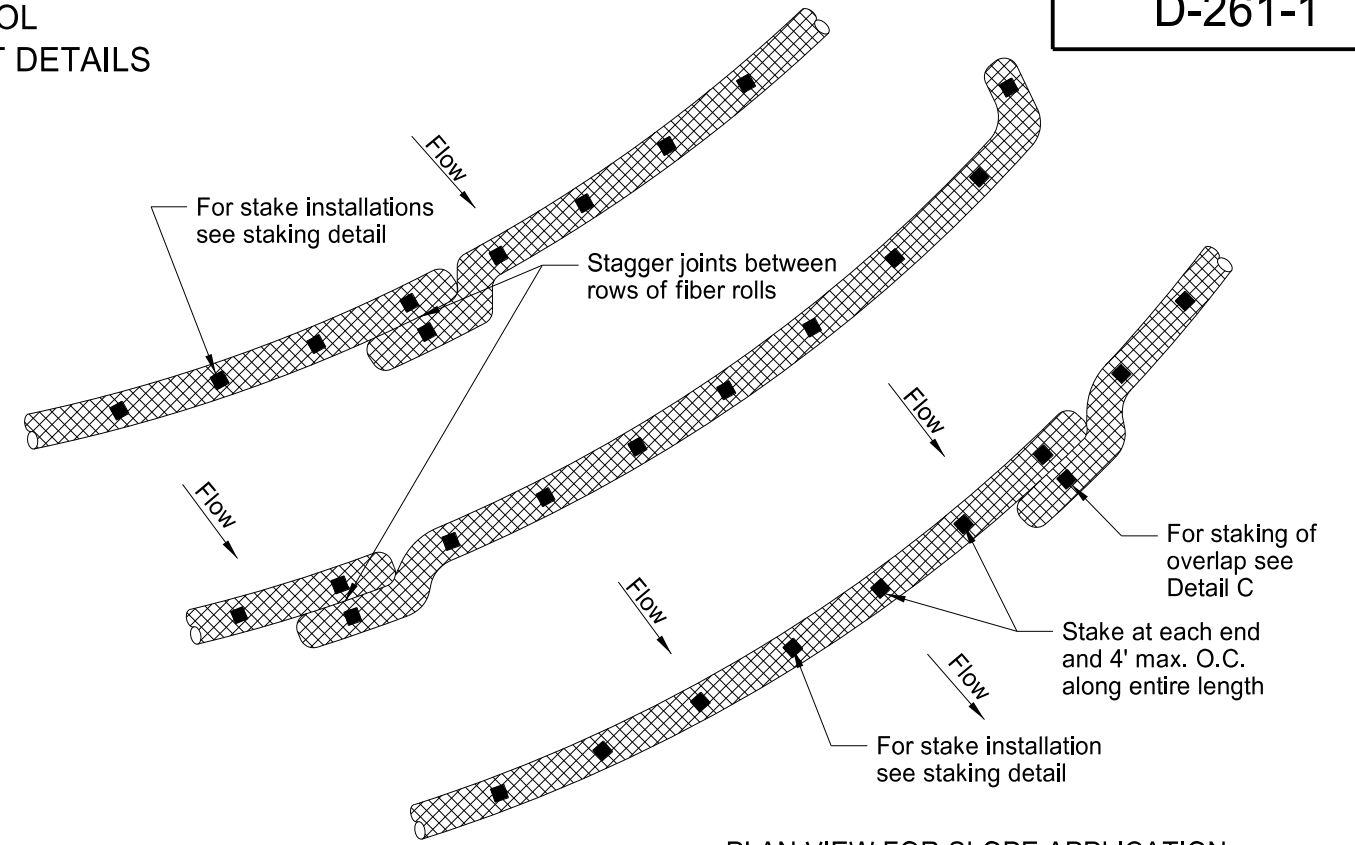
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 Registration Number  
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 North Dakota Department  
 of Transportation

EROSION CONTROL  
FIBER ROLL PLACEMENT DETAILS

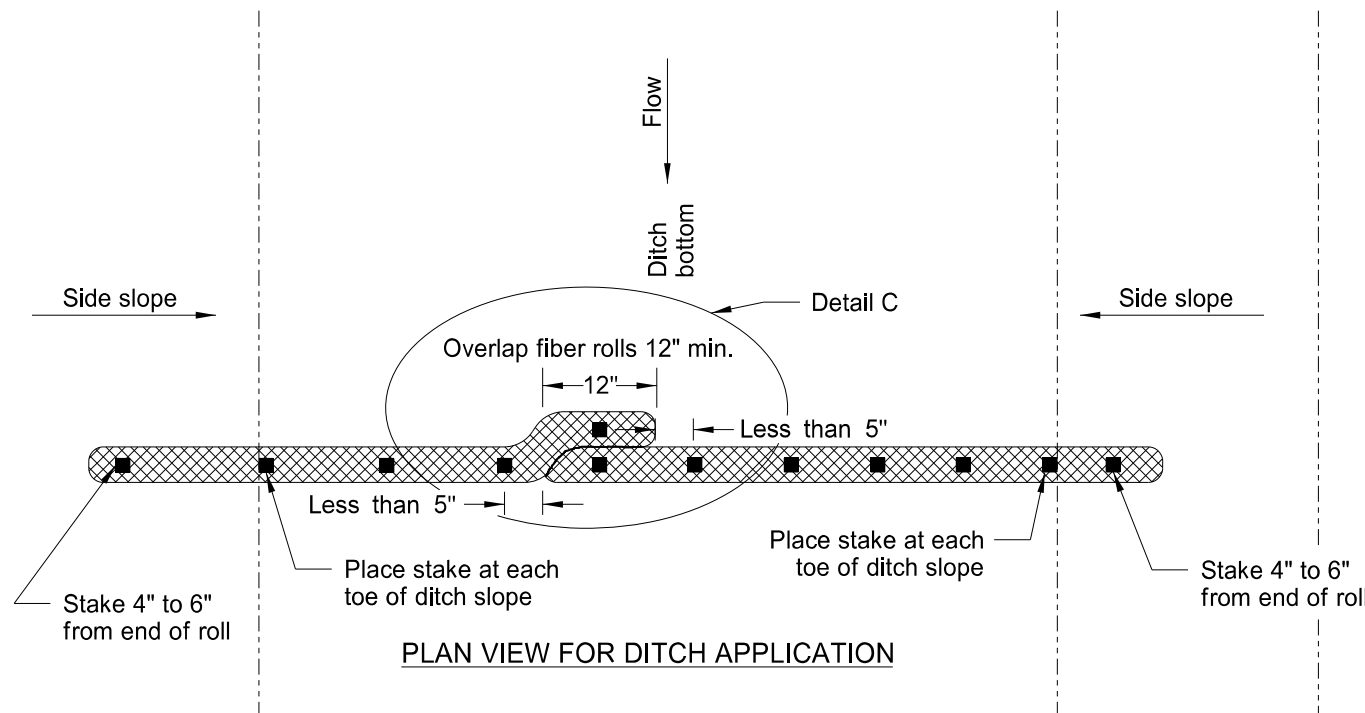


\*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

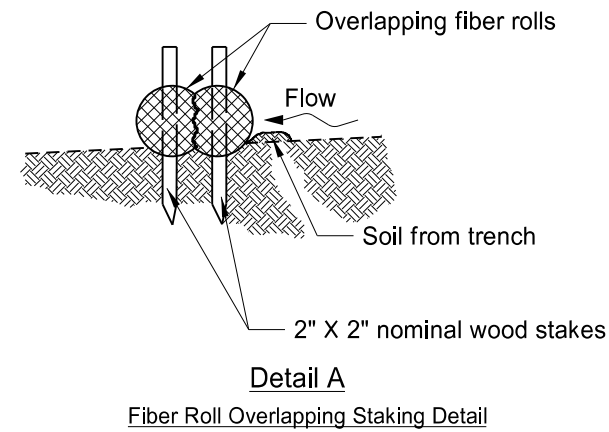
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



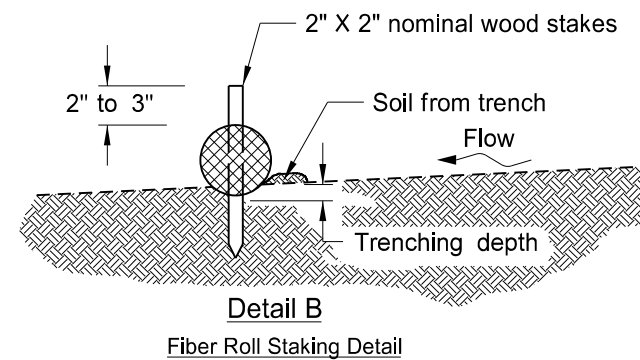
PLAN VIEW FOR SLOPE APPLICATION



PLAN VIEW FOR DITCH APPLICATION



Detail A  
Fiber Roll Overlapping Staking Detail



Detail B  
Fiber Roll Staking Detail

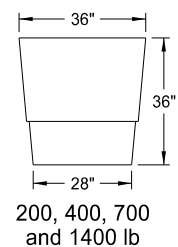
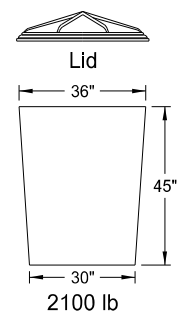
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp

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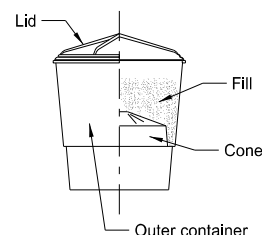
ATTENUATION DEVICE



Outer Containers

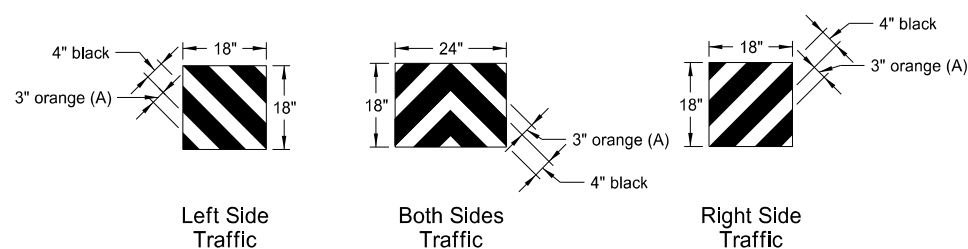


Cones



Typical Assembly

Typical Module Construction Detail

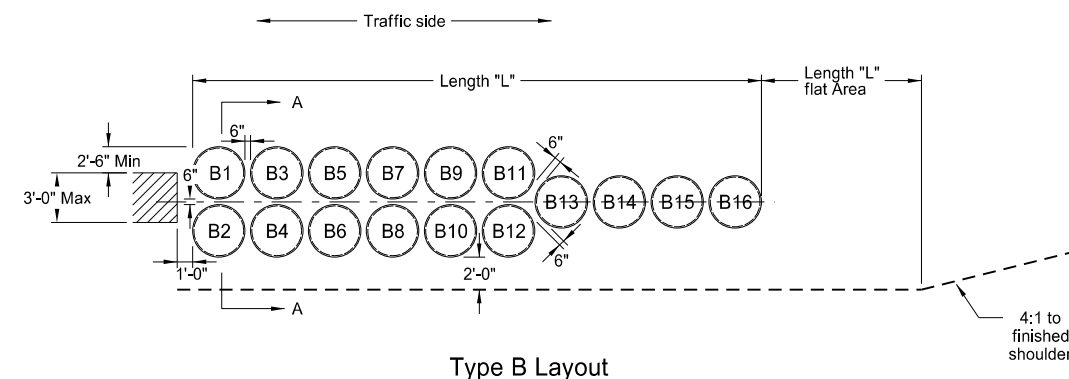


Reflective Sheet Detail

Note:  
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above. Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

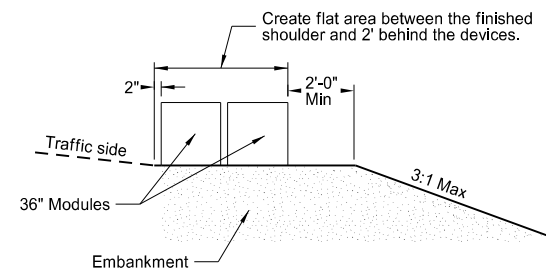
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

	Fill Chart				
	Module Weights (LBS)				
Distance from top edge	8 1/2"	5"	4"	3"	0"



Type B Layout

Note:  
Angle attenuation devices 10 degrees towards traffic when placed at piers offset from roadway.



Section A-A (Type B Layout)

Type B Attenuation Device												
Module Number	Dash Number											
	75	70	65	60	55	50	45	40	35	30	25	
Module Weights (LBS)												
B1	2100											
B2	2100											
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100			
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100			
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	
B9	700	700	700	700	700	700	700	700	700	700	700	
B10	700	700	700	700	700	700	700	700	700	700	700	
B11	700	700	700	700	700	700	700	700	700	700	700	
B12	700	700	700	700	700	700	700	700	700	700	700	
B13	700	700	700	700	700	700	700	700	700	700	700	
B14	400	400	400	400	400	400	400	400	400	400	400	
B15	400	400	400	400	400	400	400	400	400	400	400	
B16	200	200	200	200	200	200	200	200	200	200	200	
Length (L)	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'	
Module Weights (LBS)	Replacement Module											
	1	1	1	1	1	1	1	1	1	1	1	1
2100	1	1	1	1	1	1	1	1	1	1	1	1
1400	1	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	1	1	1	1	1	1	1	1	1

Notes:

- Materials
  - Use modules manufactured from frangible polyethylene material which shatters upon impact.
  - Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.
- Modules
 

Provide modules in two sizes containing volumes of either 2, 4, 7, 14, or 21 cubic feet minimum.

  - Provide three components for 2, 4, or 7 cubic foot module containers:
    - A 14 C.F., yellow outer container.
    - A black lid securely locking over the top lip of the container.
    - A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
  - Provide two components for the 14 cubic foot module container:
    - A 14 C.F., yellow outer container.
    - A black lid securely locking over the top lip of the container.
  - Provide two components for the 21 cubic foot module container:
    - A 36" height X 36" width yellow outer container.
    - A black lid which locks securely over the top of the container.
- For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3 1/2" maximum thickness pallets to facilitate maintenance.
- For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.
- The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

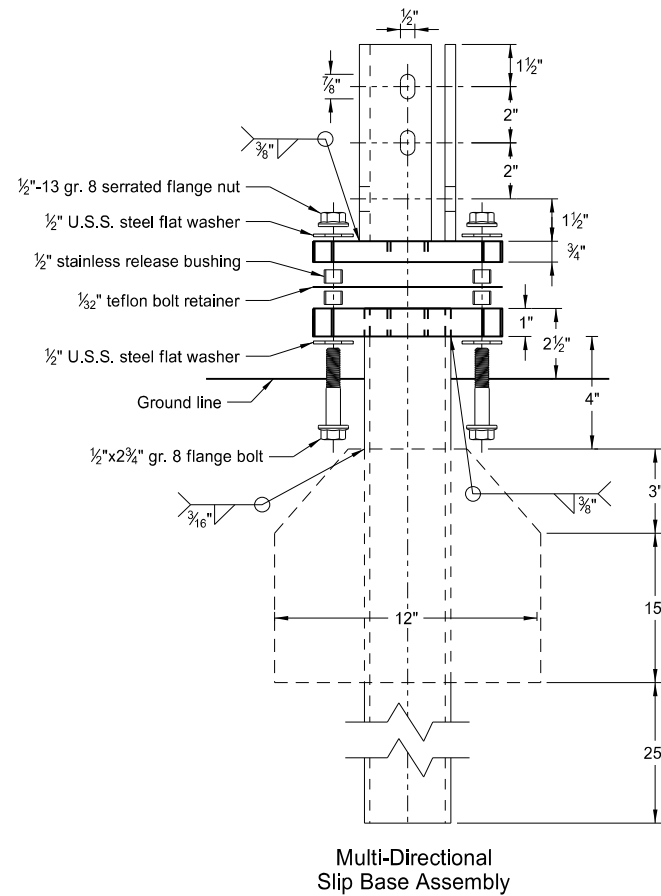
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revised sheeting in reflective sheet detail
9-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp

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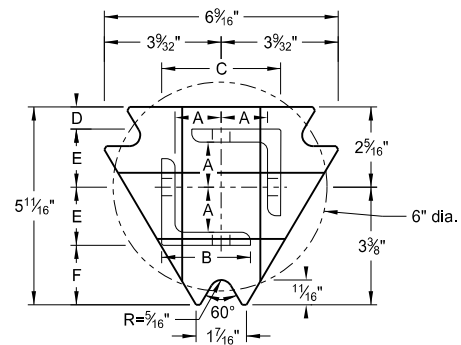
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

Perforated Tube



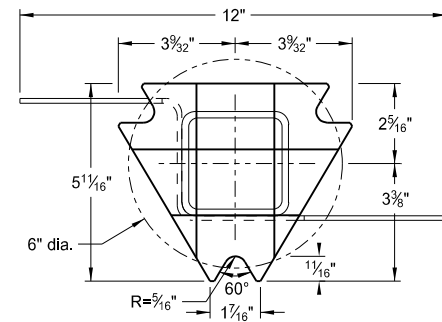
Multi-Directional Slip Base Assembly

Traffic Flow

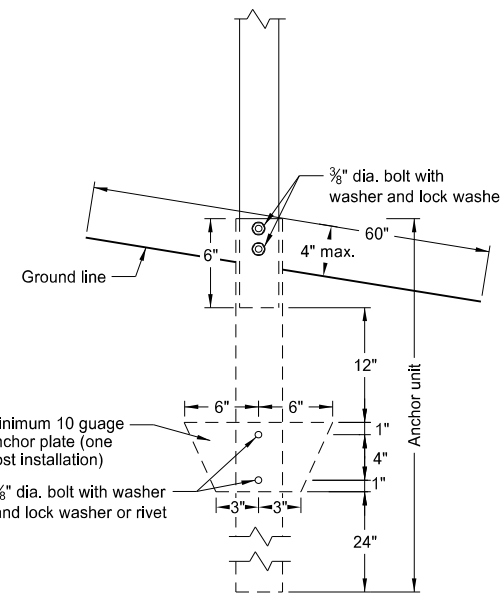


Top Post Receiver  
Plate - ASTM A572 grade 50  
Angle Receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle

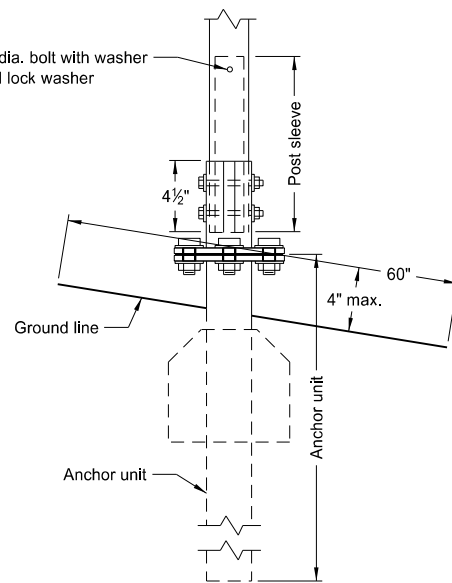
Traffic Flow



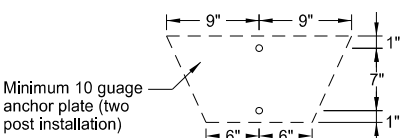
Bottom Soil Stub  
Tube - 3"x3"x7 gauge ASTM A500 grade B tube  
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011  
Plate - ASTM A572 grade 50



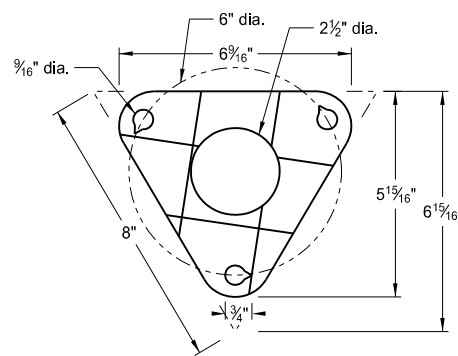
Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



Minimum 10 gauge anchor plate (two post installation)



Bolt Retainer for Base Connection  
Bolt Retainer - 1/2" Reprocessed Teflon

Notes:

1. Torque slip base bolts as specified by manufacturer.
2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
4. In concrete sidewalk, use same anchor without wings.
5. Provide more than 7' between the first and fourth posts of a four post sign.

Telescoping Perforated Tube

Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/2	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube

Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. <sup>4</sup>	Cross Sec. Area in. <sup>2</sup>	Section Modulus in. <sup>3</sup>
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table

Square Post Sizes (B)	A	B	C	D	E	F
2 3/16" x 10 ga.	1 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2" x 10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

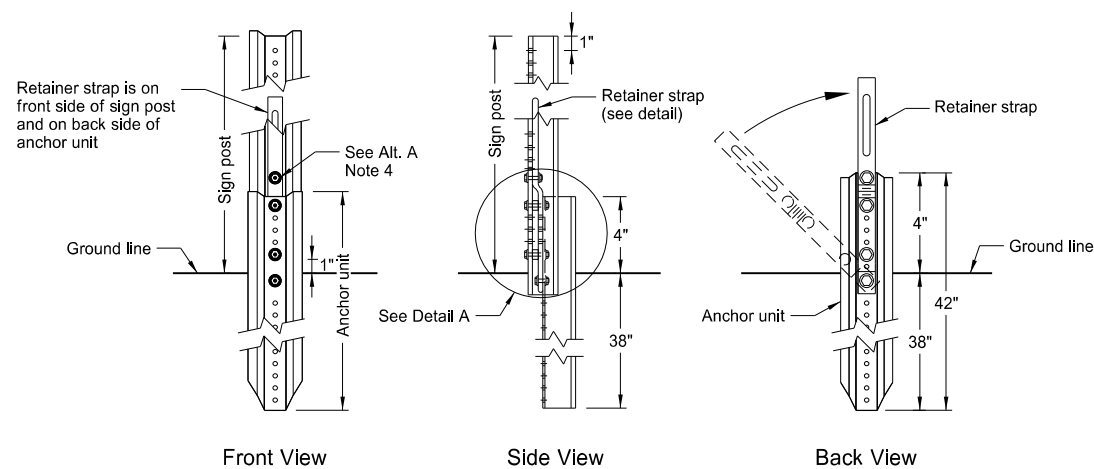
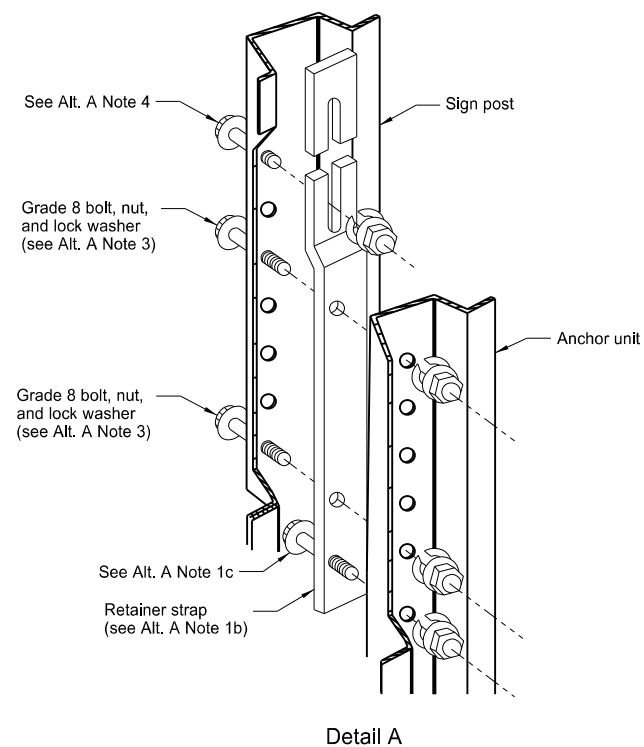
(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

(B) For additional wind load, insert the 2 3/16" x 10 ga. into 2 1/2" x 10 ga.

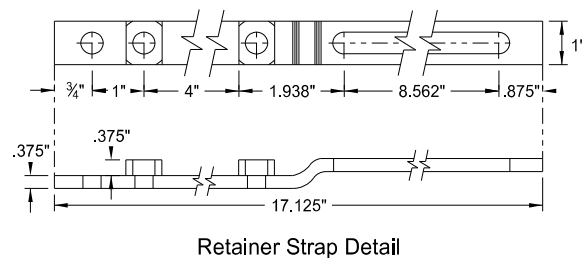
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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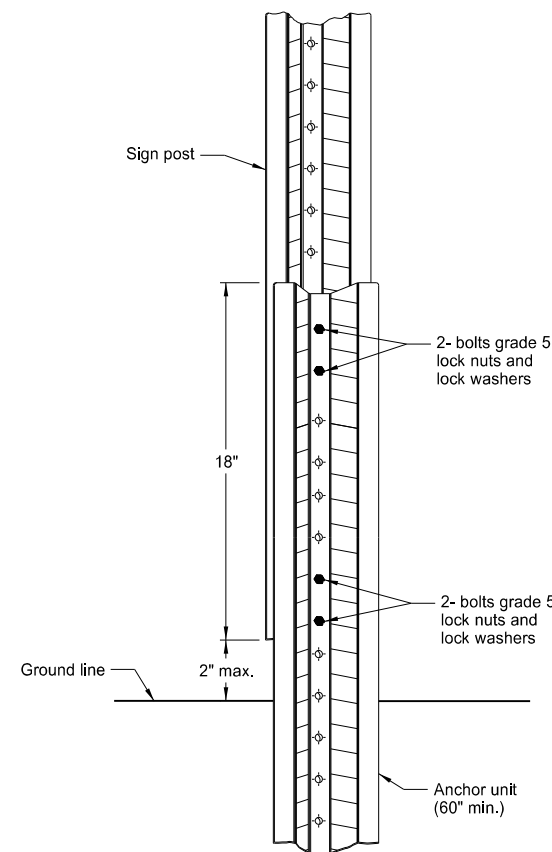
U-Channel Post



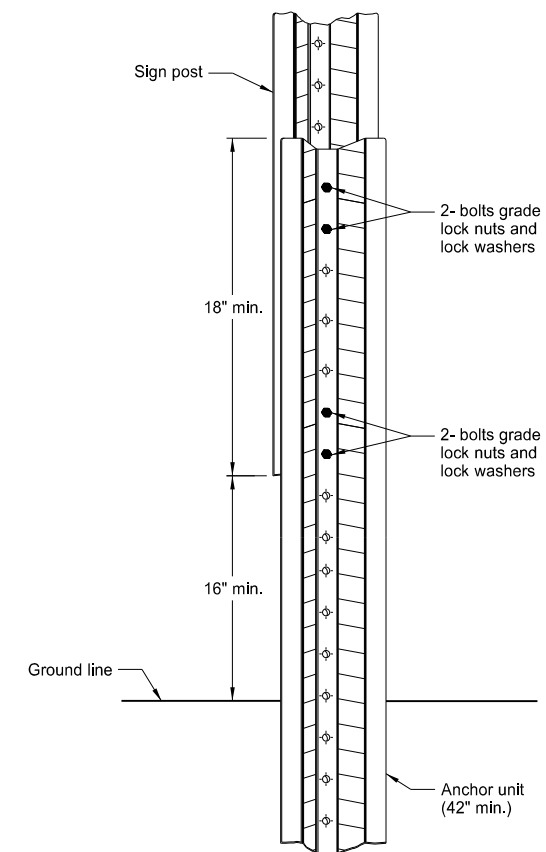
Breakaway U-Channel Detail Alternate A  
Install a maximum of 2 posts within 7'.



Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B  
(2.5 and 3 lb/ft)  
Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail Alternate C  
(2.5 and 3 lb/ft)  
Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

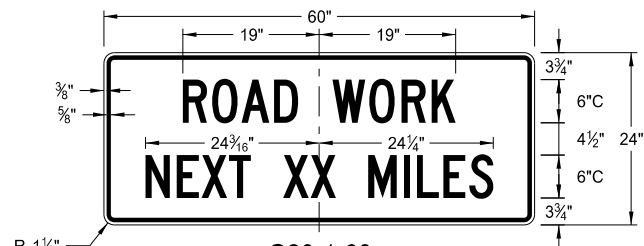
1. a) Drive anchor unit to within 12" of ground level.  
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.  
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.  
d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.  
b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.  
b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17 10-03-19	Updated to active voice New Design Engr PE Stamp

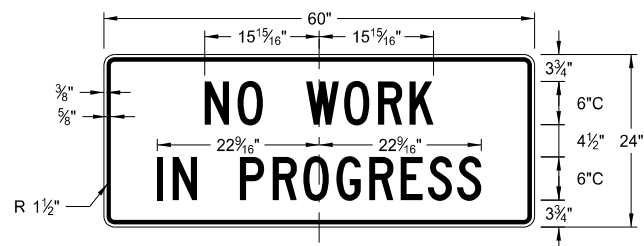
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Registration Number  
PE- 4683,  
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CONSTRUCTION SIGN DETAILS  
 TERMINAL AND GUIDE SIGNS

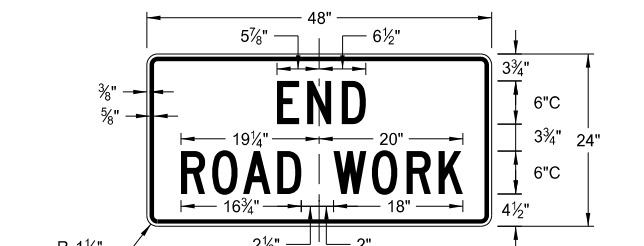
D-704-9



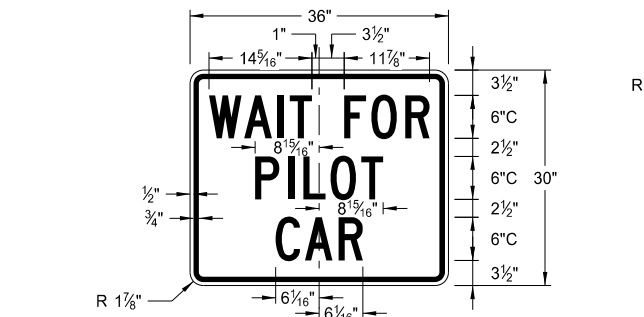
G20-1-60  
 Legend: black (non-refl)  
 Background: orange



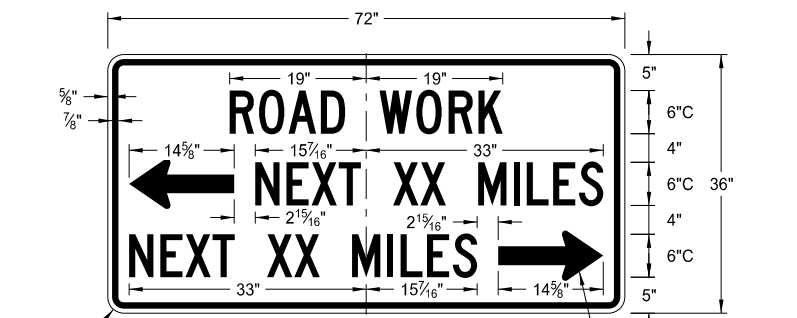
G20-1b-60  
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 Background: orange



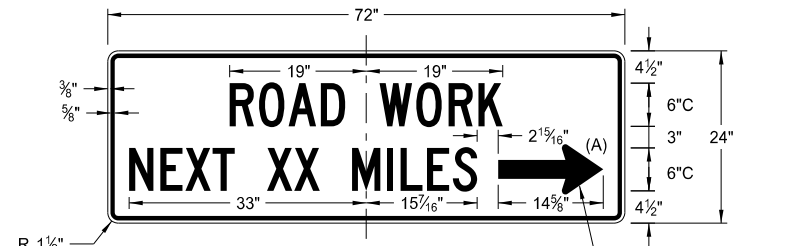
G20-2-48  
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 Background: orange



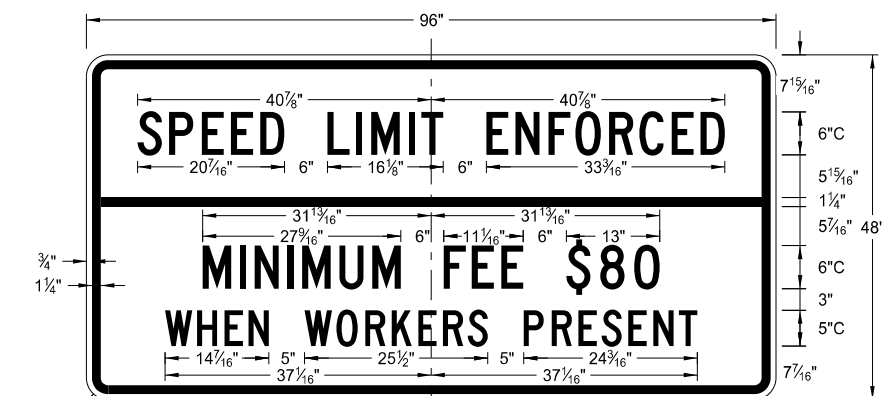
G20-4b-36  
 Legend: black (non-refl)  
 Background: orange



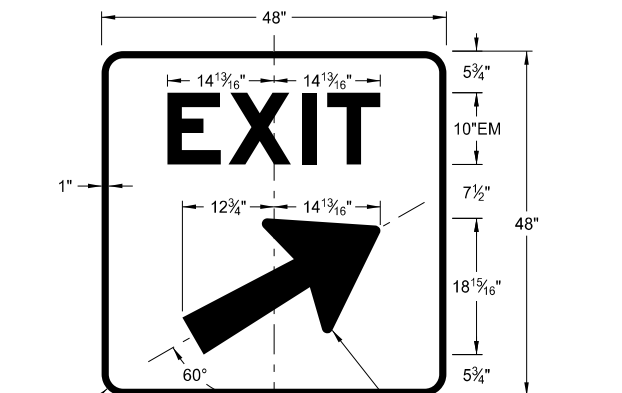
G20-50a-72  
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 Background: orange



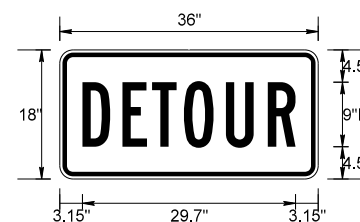
G20-52a-72  
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 Background: orange



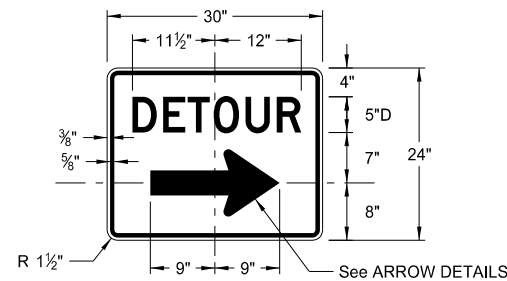
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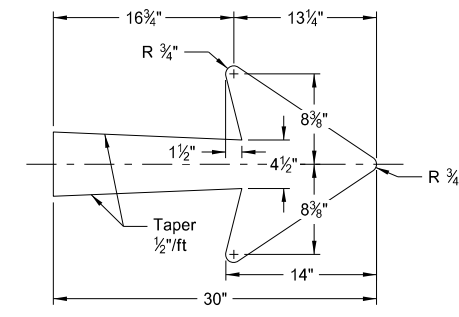
E5-1(L or R)-48  
 Legend: white  
 Background: green (orange optional)



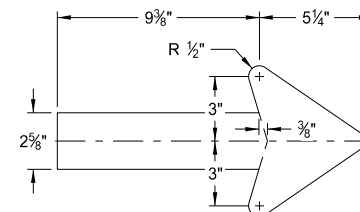
M4-8-36  
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 Background: orange



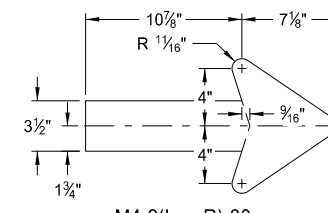
M4-9(L or R)-30 &  
 M4-9-30  
 Legend: black (non-refl)  
 Background: orange



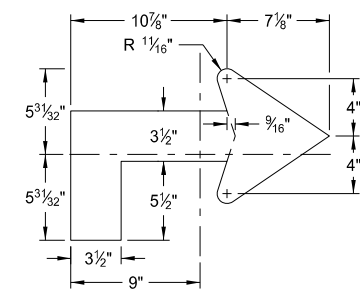
E5-1-48



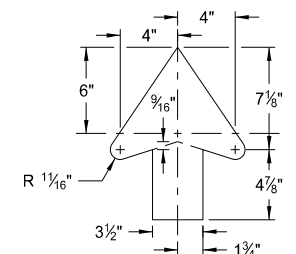
G20-50a-72  
 G20-52a-72



M4-9(L or R)-30  
 Right or Left



M4-9(L or R)-30  
 Advanced Right or Left



M4-9-30  
 Straight

ARROW DETAILS

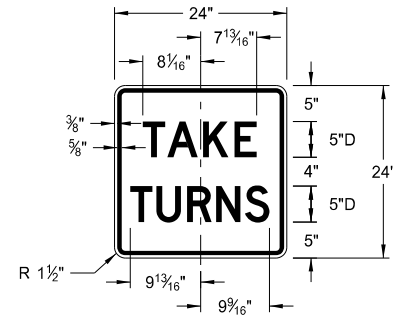
NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

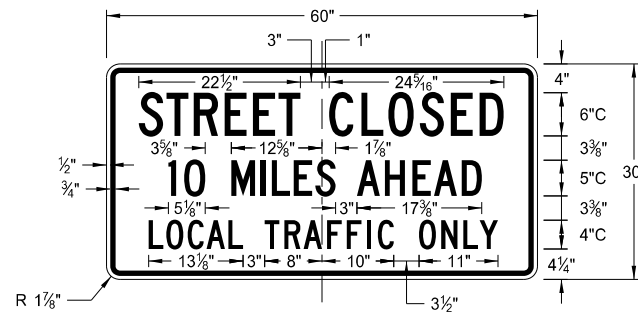
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp

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 Registration Number  
 PE- 4683,  
 on 10/03/19 and the original document is stored at the  
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 of Transportation

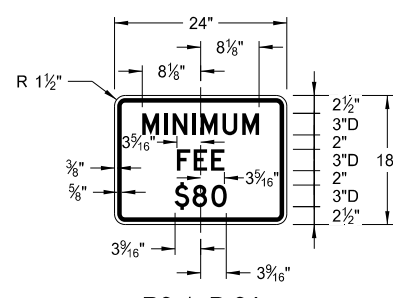
CONSTRUCTION SIGN DETAILS  
REGULATORY SIGNS



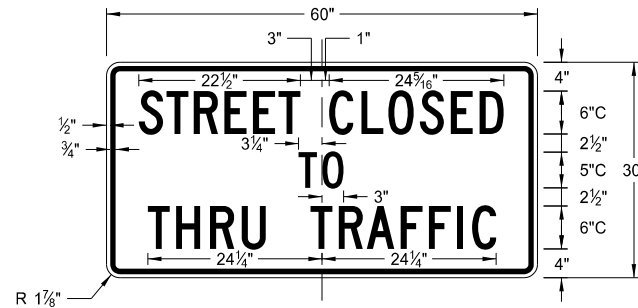
R1-50P-24  
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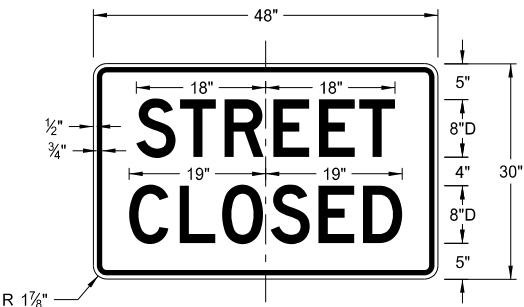
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R2-1aP-24  
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Background: white



R11-4a-60  
Legend: black (non-refl)  
Background: white

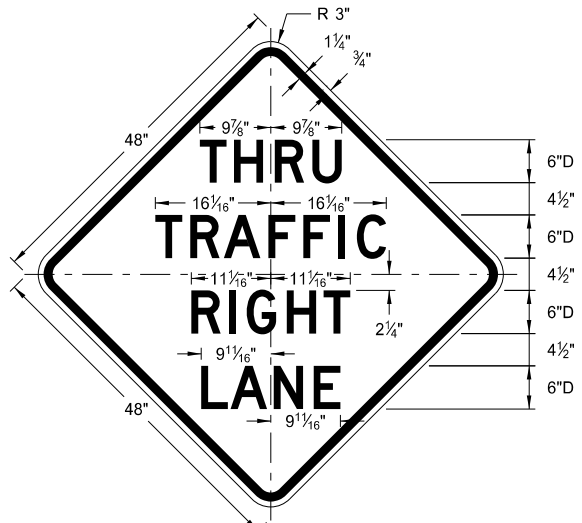


R11-2a-48  
Legend: black (non-refl)  
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

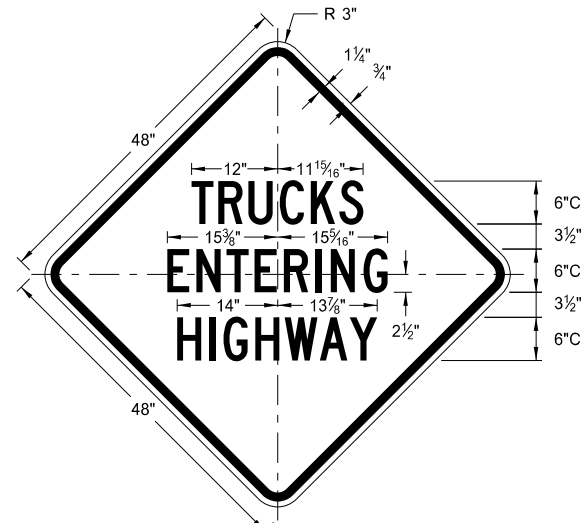
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Registration Number  
PE- 4683,  
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North Dakota Department  
of Transportation

CONSTRUCTION SIGN DETAILS  
WARNING SIGNS



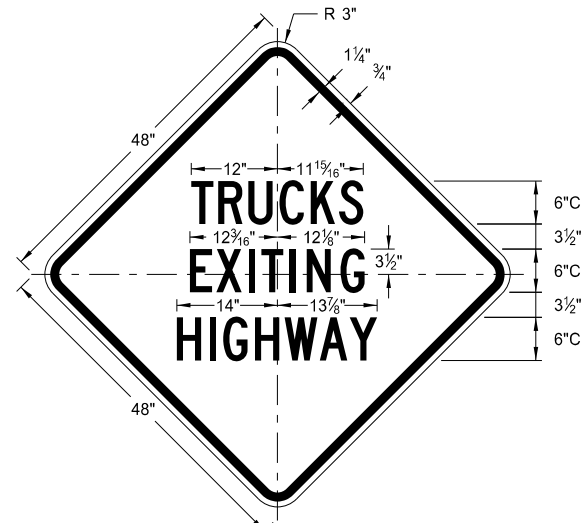
W5-8-48

Legend: black (non-refl)  
Background: orange



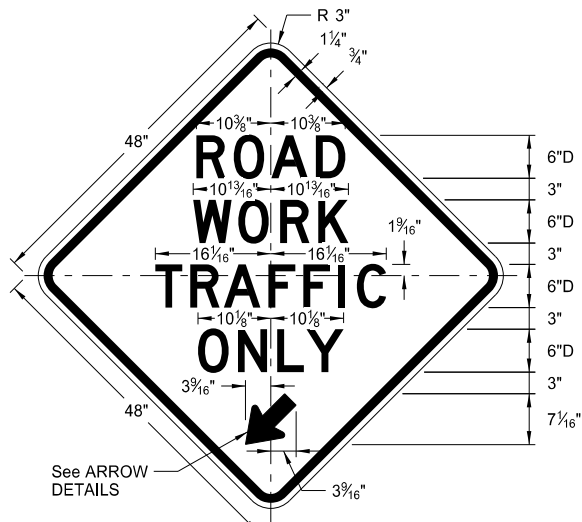
W8-53-48

Legend: black (non-refl)  
Background: orange



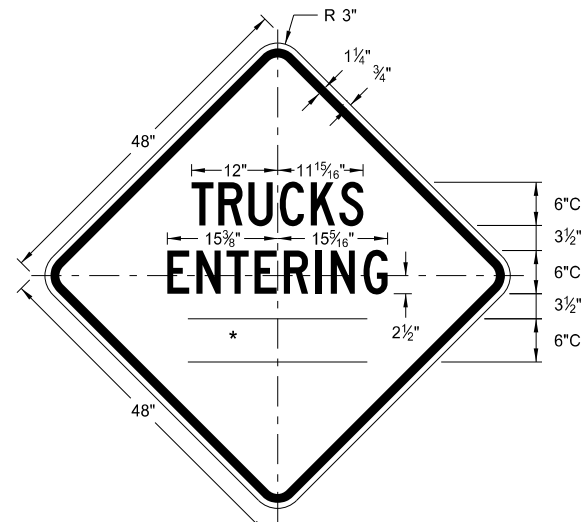
W8-56-48

Legend: black (non-refl)  
Background: orange



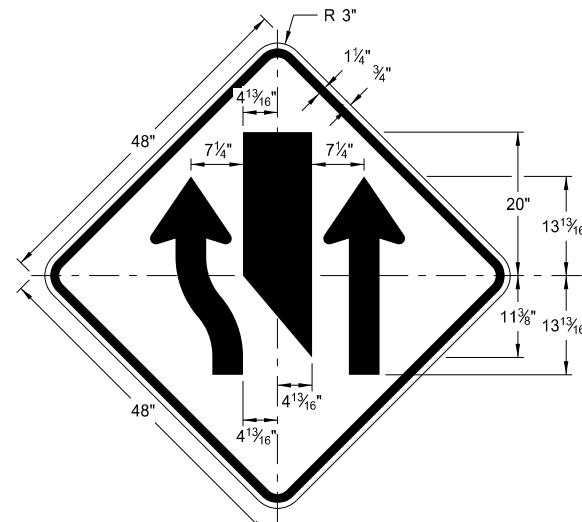
W5-9-48

Legend: black (non-refl)  
Background: orange



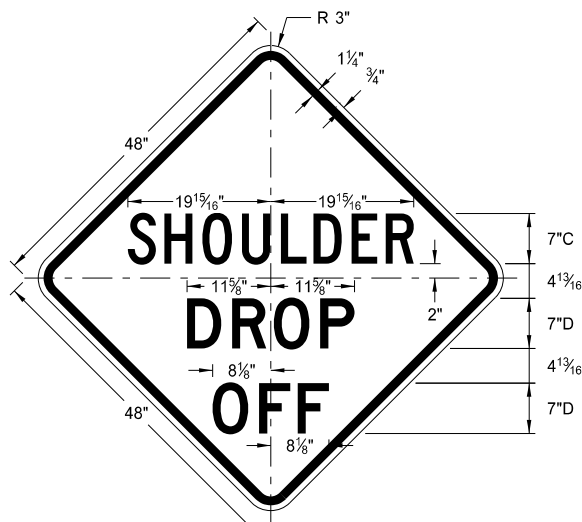
W8-54-48

Legend: black (non-refl)  
Background: orange



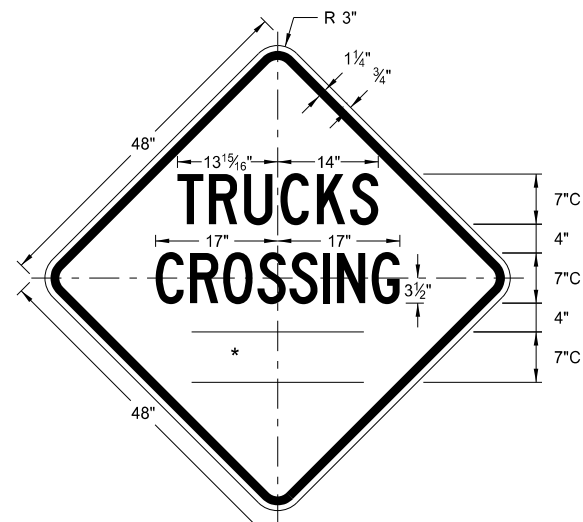
W9-3a-48

Legend: black (non-refl)  
Background: orange



W8-9a-48

Legend: black (non-refl)  
Background: orange

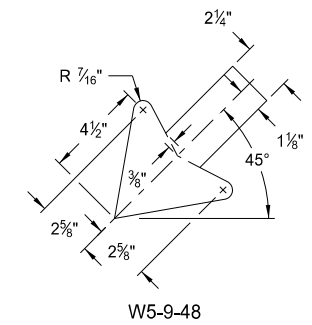


W8-55-48

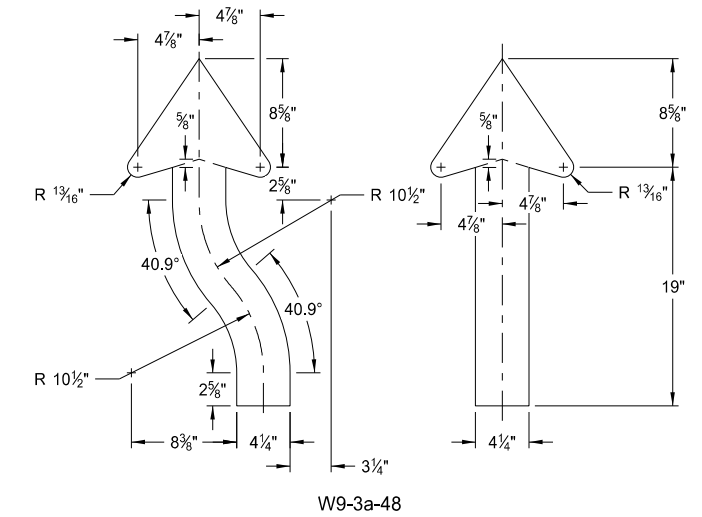
Legend: black (non-refl)  
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
1/2 MILE	Reduce 50%
1 MILE	Standard

\* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

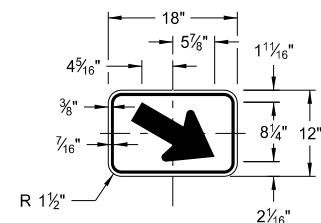
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

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CONSTRUCTION SIGN DETAILS  
WARNING SIGNS

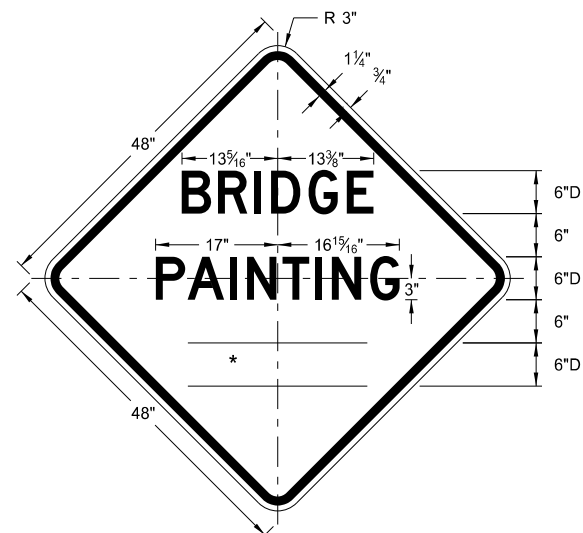
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

\* DISTANCE MESSAGES



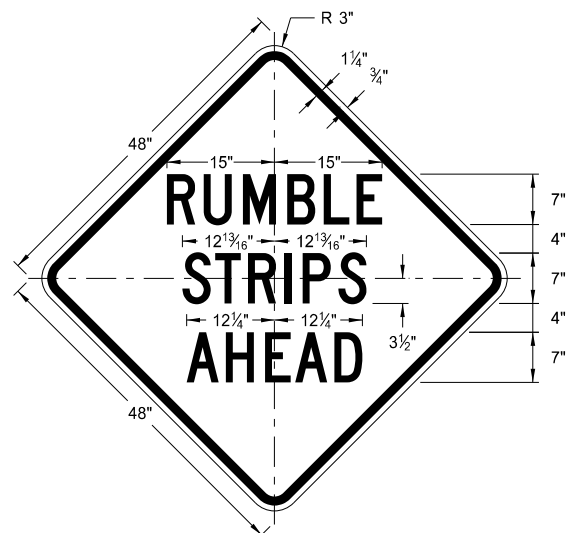
W16-7aP-18

Legend: black (non-refl)  
Background: orange



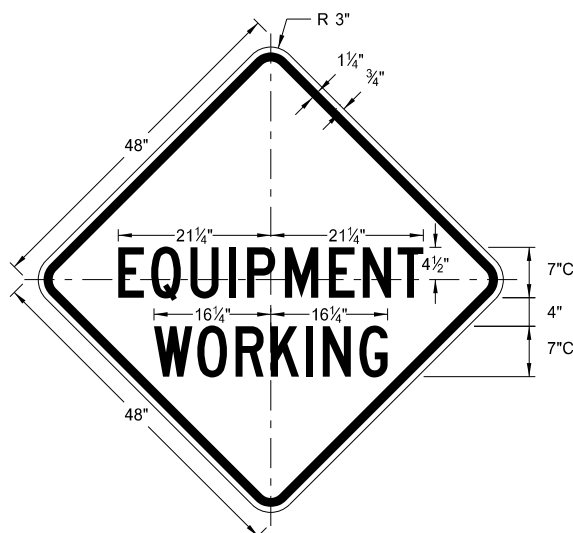
W21-50-48

Legend: black (non-refl)  
Background: orange



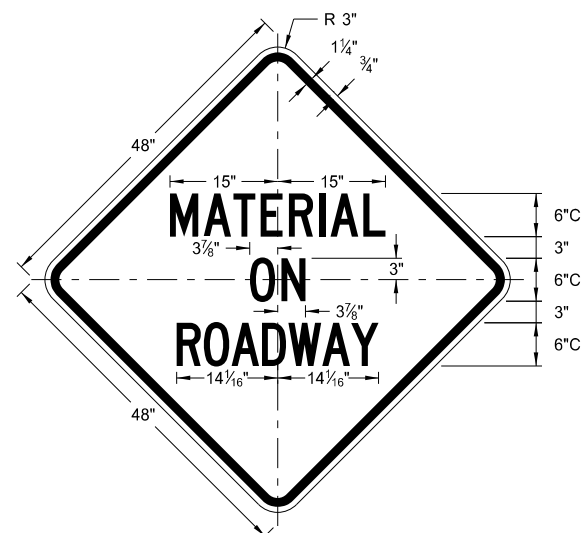
W21-53-48

Legend: black (non-refl)  
Background: orange



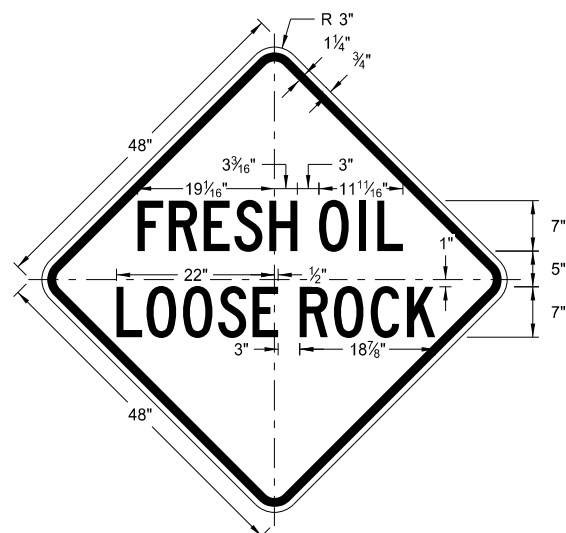
W20-51-48

Legend: black (non-refl)  
Background: orange



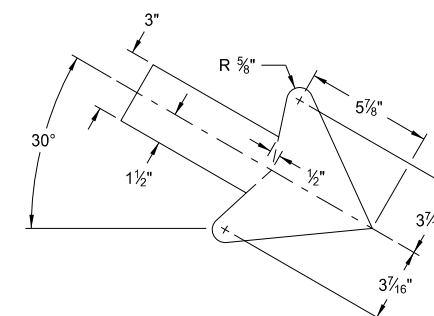
W21-51-48

Legend: black (non-refl)  
Background: orange

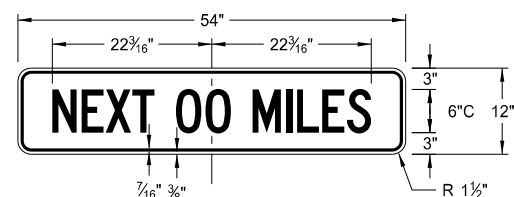


W22-8-48

Legend: black (non-refl)  
Background: orange

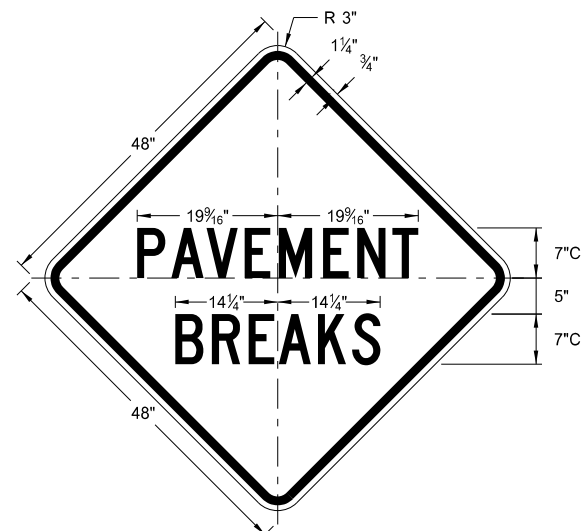


W16-7aP-18



W20-52P-54

Legend: black (non-refl)  
Background: orange



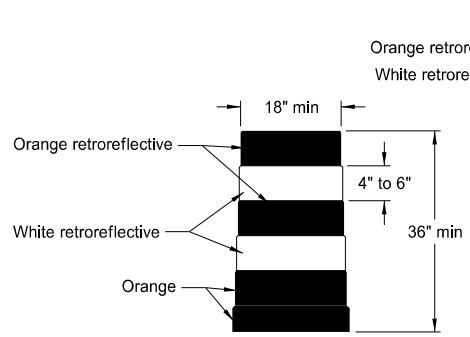
W21-52-48

Legend: black (non-refl)  
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.

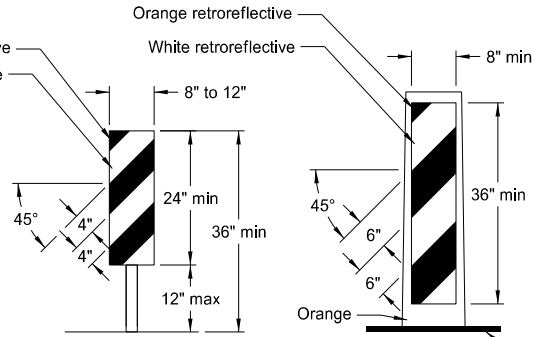
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BARRICADE AND CHANNELIZING DEVICE DETAILS



DELINEATOR DRUM

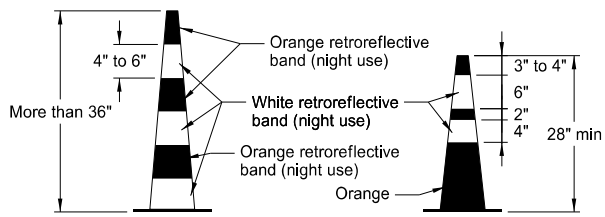
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.



BACK TO BACK VERTICAL PANEL STACKABLE

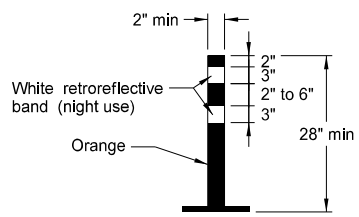
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.

Molded rubber base (min weight 30 lbs)



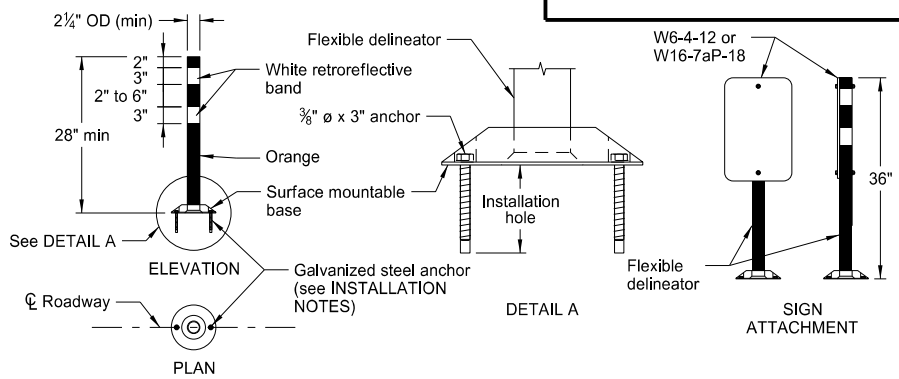
TRAFFIC CONE

Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.



TUBULAR MARKER

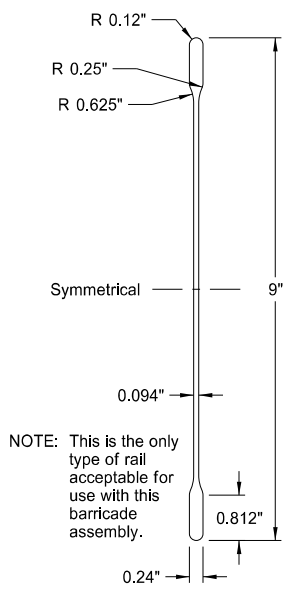
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

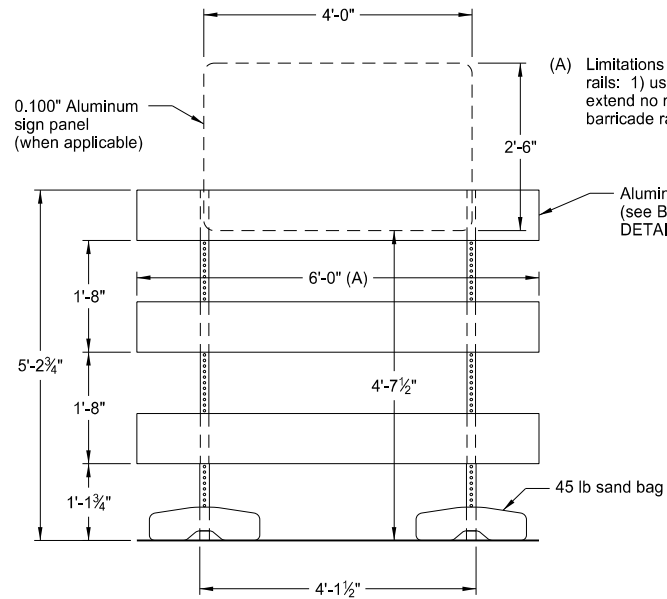
INSTALLATION NOTES:

1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close as possible to pavement surface.



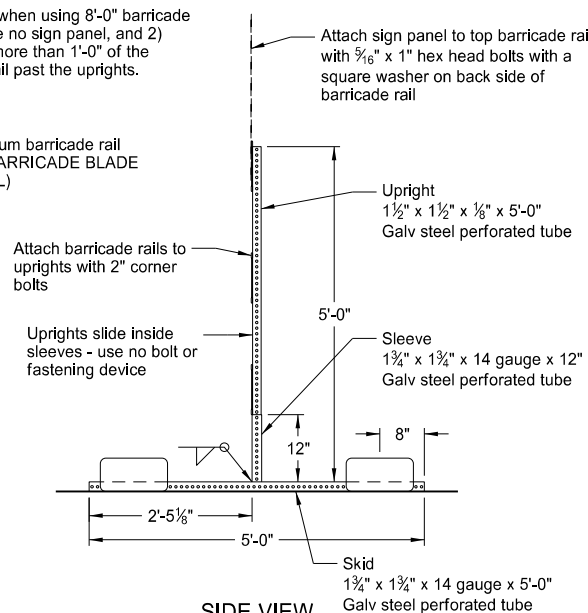
BARRICADE BLADE DETAIL

NOTE: This is the only type of rail acceptable for use with this barricade assembly.

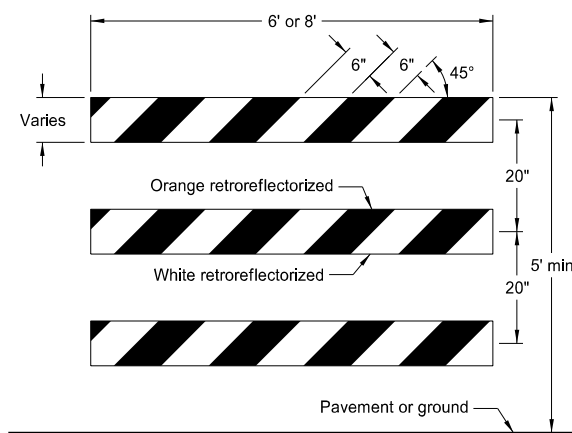


ELEVATION VIEW

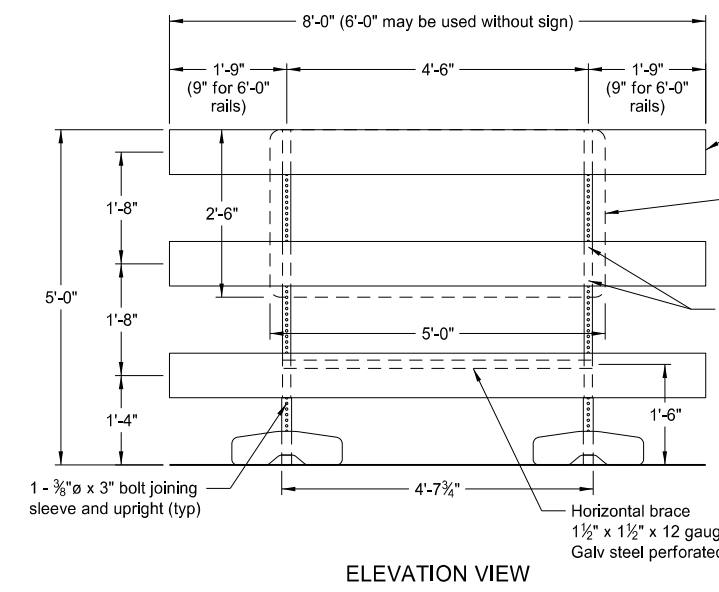
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



SIDE VIEW

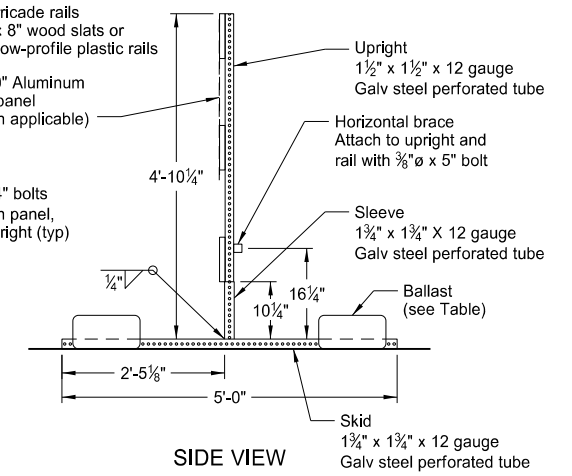


BARRICADE RAIL DETAILS



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

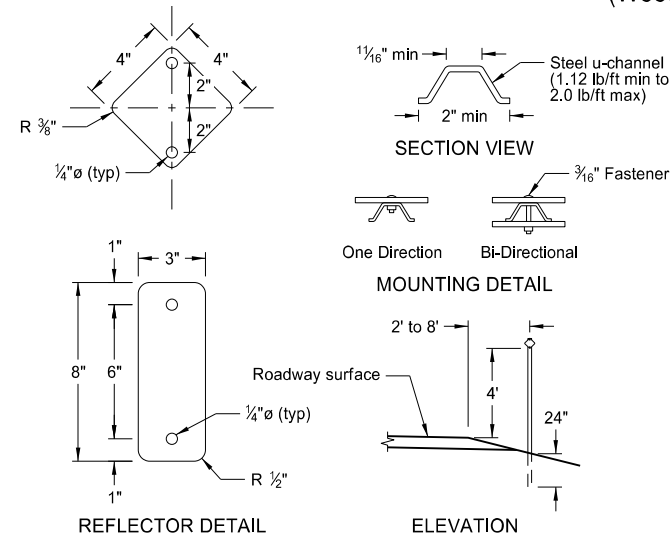


SIDE VIEW

MINIMUM BALLAST (For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.



REFLECTOR DETAIL

ELEVATION

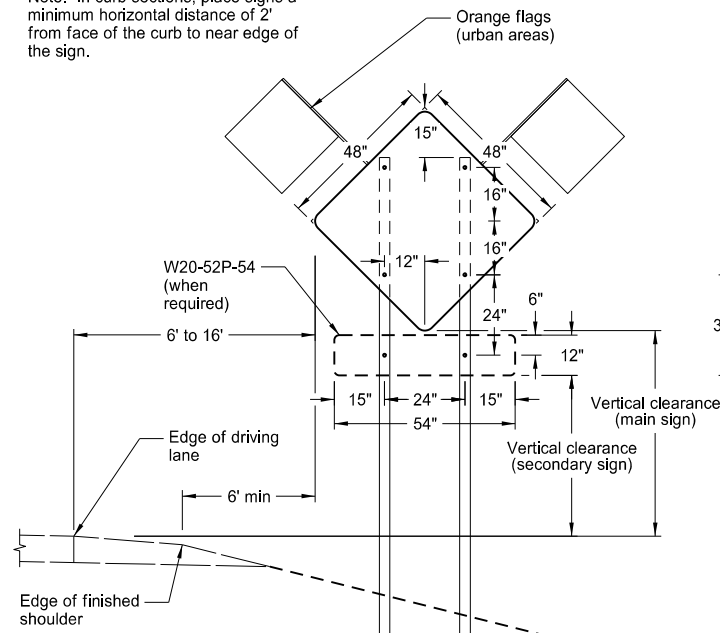
DELINEATORS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator

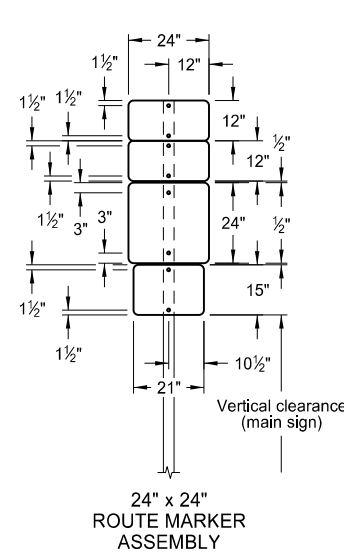
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

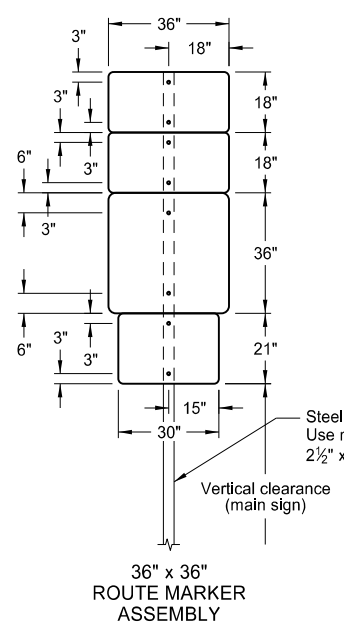
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



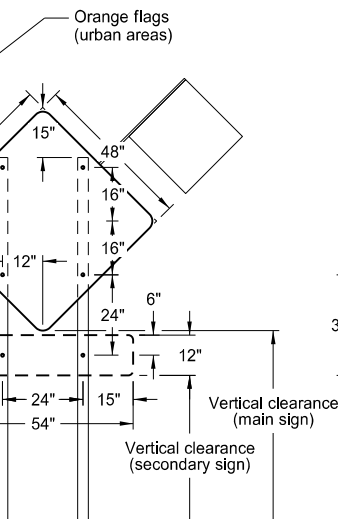
TYPICAL SECTION  
(48" x 48" diamond warning sign shown)



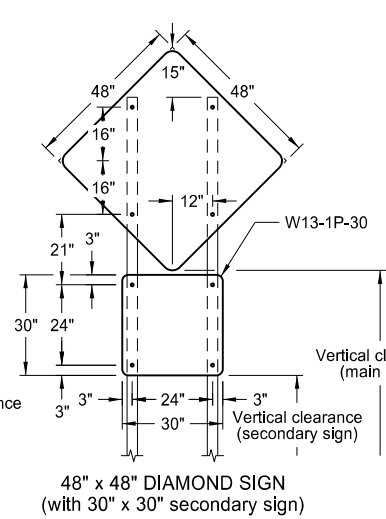
24" x 24" ROUTE MARKER ASSEMBLY



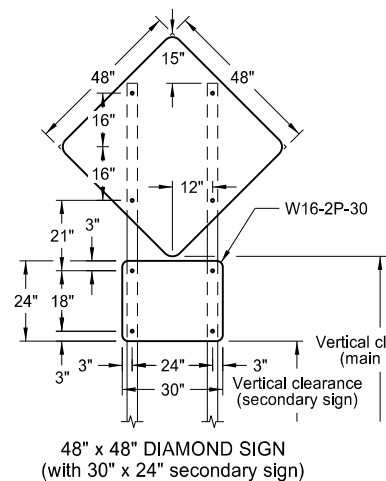
36" x 36" ROUTE MARKER ASSEMBLY



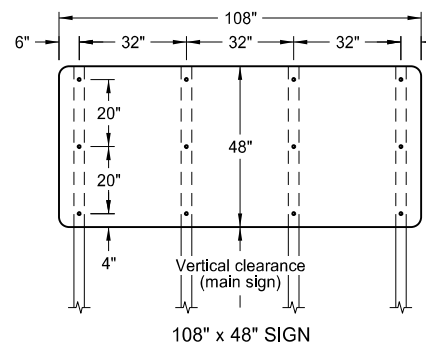
18" x 18" DIAMOND SIGN



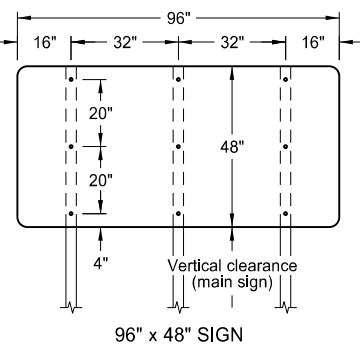
48" x 48" DIAMOND SIGN  
(with 30" x 30" secondary sign)



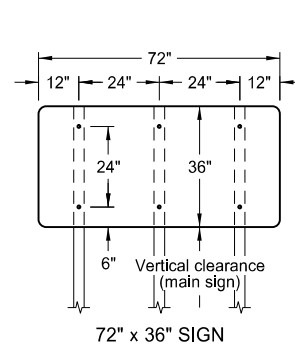
48" x 48" DIAMOND SIGN  
(with 30" x 24" secondary sign)



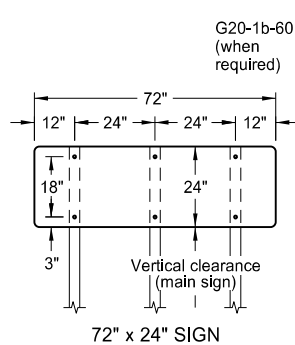
108" x 48" SIGN



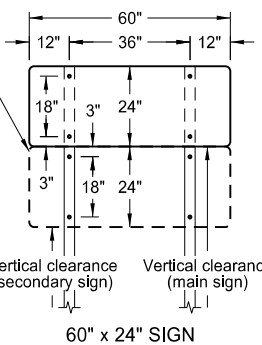
96" x 48" SIGN



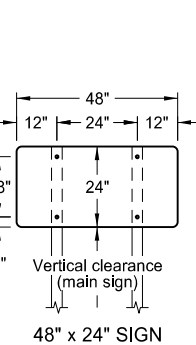
72" x 36" SIGN



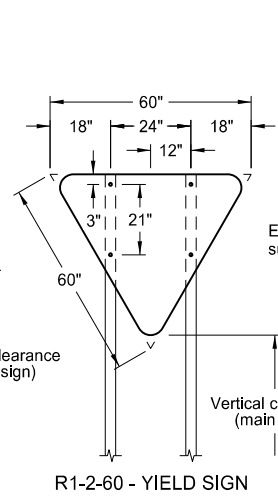
72" x 24" SIGN



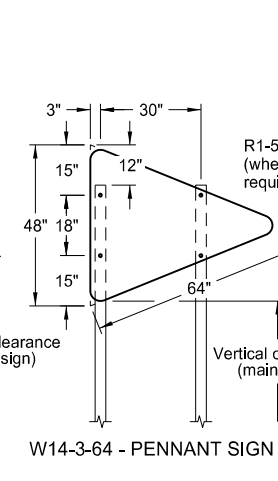
60" x 24" SIGN



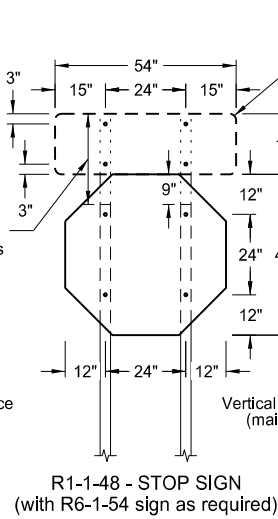
48" x 24" SIGN



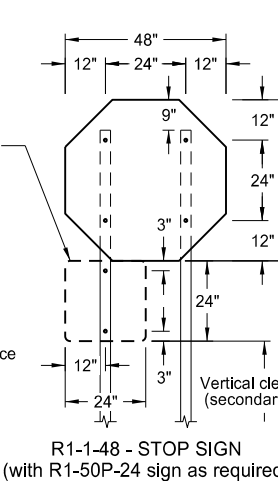
R1-2-60 - YIELD SIGN



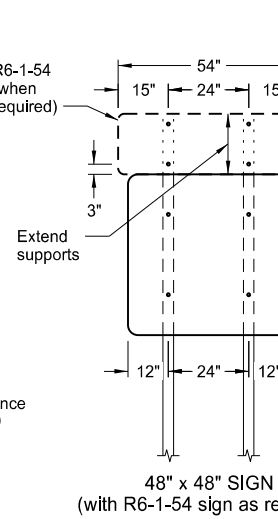
R1-50P-24 (when required)



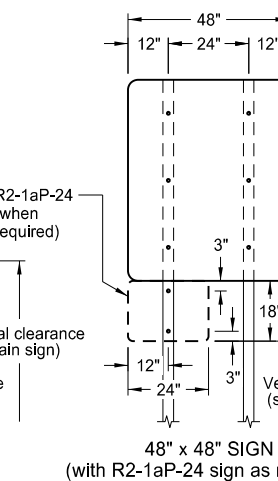
R1-1-48 - STOP SIGN  
(with R6-1-54 sign as required)



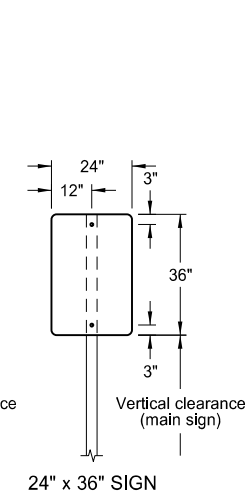
R1-1-48 - STOP SIGN  
(with R1-50P-24 sign as required)



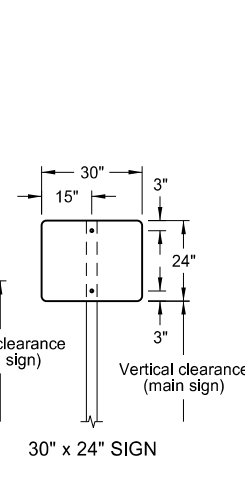
48" x 48" SIGN  
(with R6-1-54 sign as required)



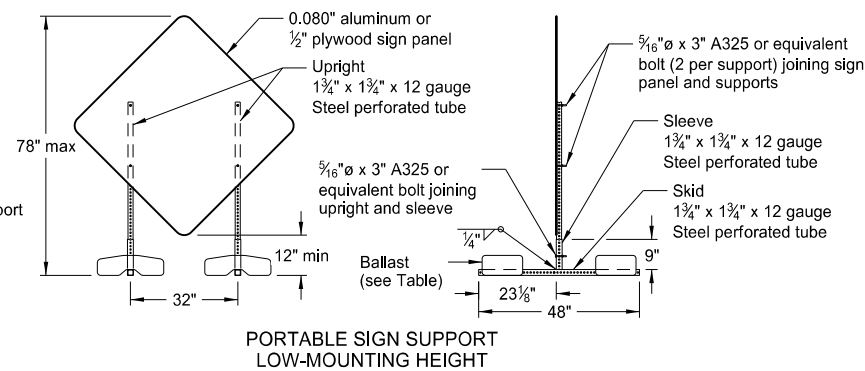
48" x 48" SIGN  
(with R2-1aP-24 sign as required)



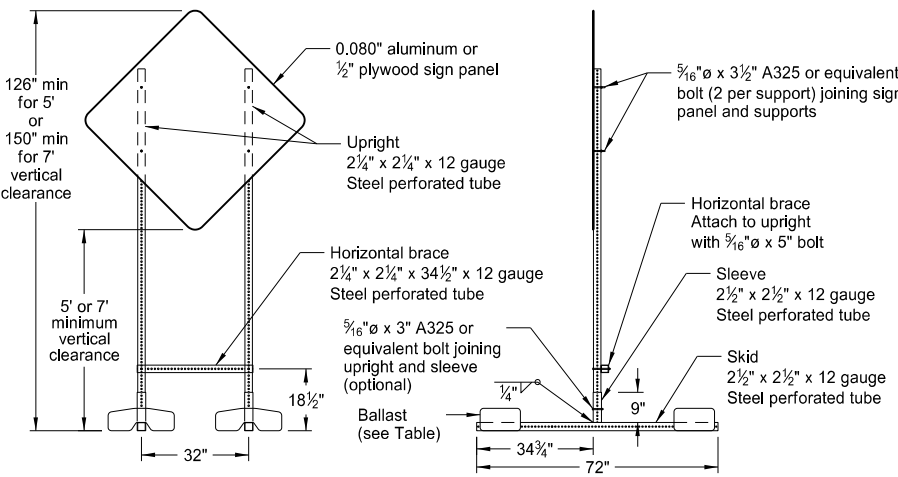
24" x 36" SIGN



30" x 24" SIGN



PORTABLE SIGN SUPPORT  
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT  
HIGH-MOUNTING HEIGHT

NOTES:

- Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.  
  
Place signs over 50 square feet on 2 1/2" x 2 1/2" perforated tube supports as a minimum.  
  
Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
- Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 5/16" bolts.
- Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
- Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background  
Interstate Business Loop - white legend on green background  
US and State - black legend on white background  
County - yellow legend on blue background

- Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION). In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance stated above.

Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

- Portable Signs: Provide portable signs that meet the vertical clearance stated above when it is necessary to place signs within the pavement surface.

Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdowns, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

MINIMUM BALLAST  
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

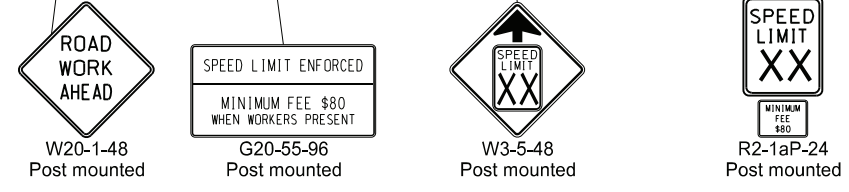
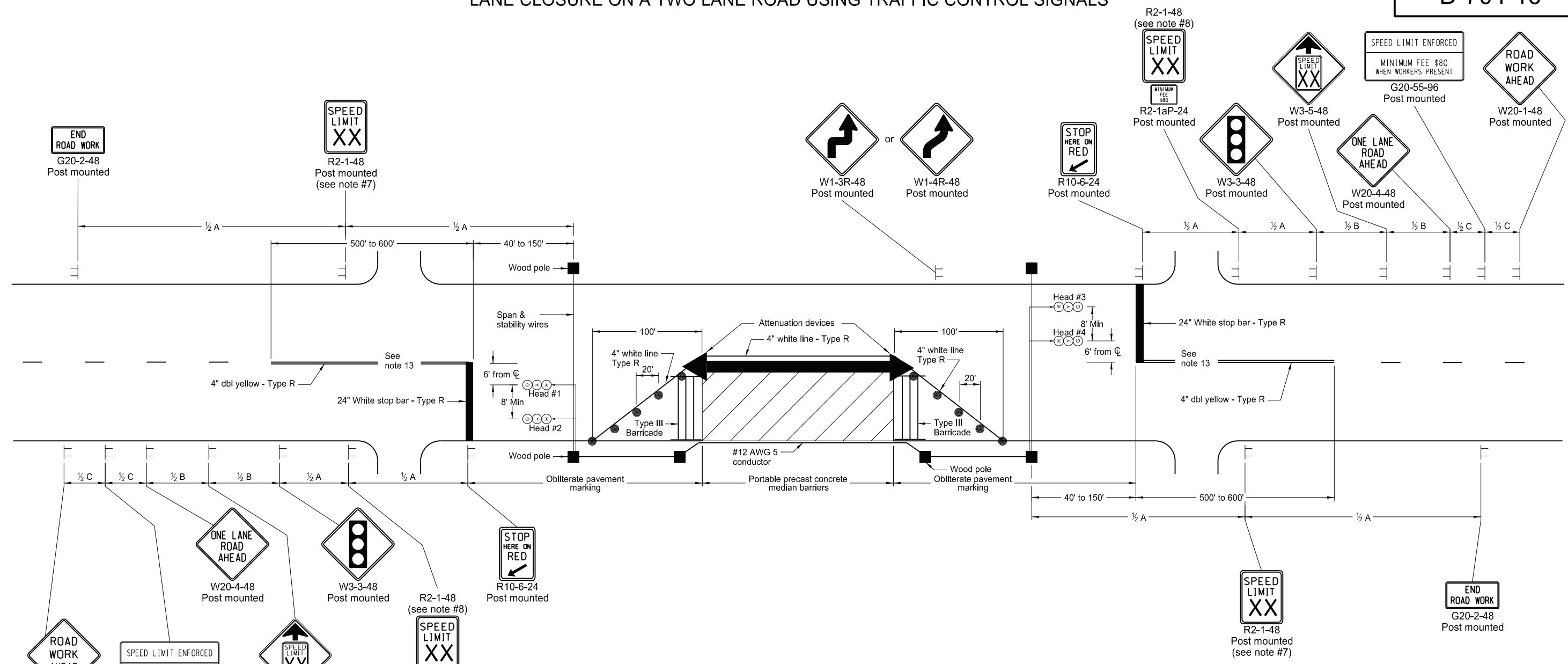
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

This document was originally issued and sealed by  
**Kirk J Hoff,**  
Registration Number  
**PE-4683,**  
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation



# LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

**D-704-16**



KEY	
	Work Area
	Type III Barricade
	Sign
	Delineator Drum
	Wood Pole

**Notes:**

1. Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
2. Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
4. Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
6. See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
7. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
8. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 1/2 B. and at such a distance above the edge that the flag does not touch the sign when limp.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Cover existing speed limit signs within a reduced speed zone.
11. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Continue double yellow centerline thru private drives.
14. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
15. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
16. As an option, use solar powered signals instead of wood pole signal system.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

SUGGESTED TIMING AND SIGNAL SEQUENCE						
Heads 1 & 2 Heads 3 & 4	Green		Yellow		Red	
	Time	Percent of Cycle	Time	Percent of Cycle	Time	Percent of Cycle
Time	18.0	4.5	22.5	18.0	4.5	22.5
Cycle = 90 seconds	20	5	25	20	5	25

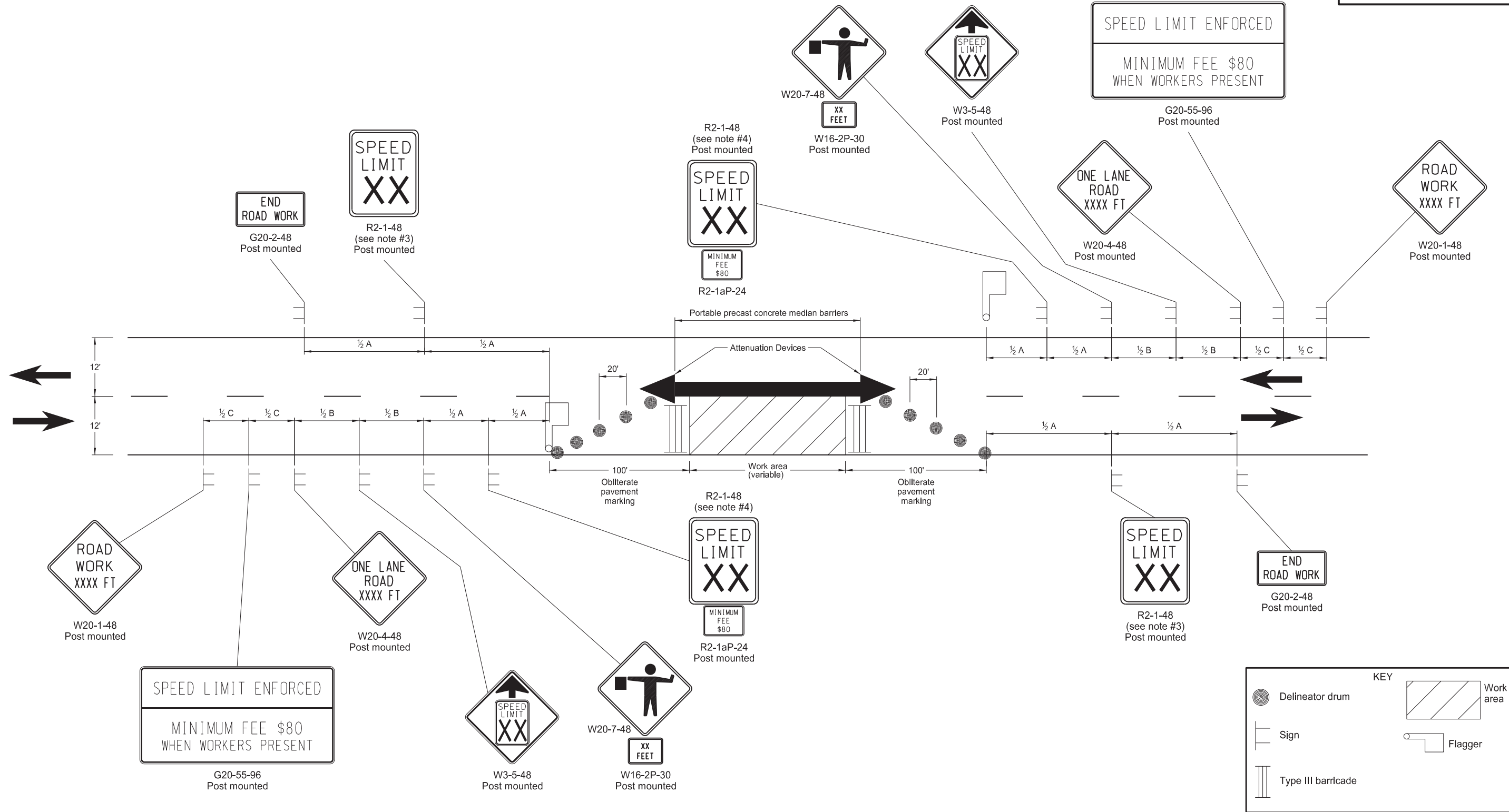
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered Minimum Fee plaque.
08-17-17	Revised notes & added note.
11-01-19	Revised sign #s & p/mt mk type.
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work.
11-29-22	Removed Dollars At Work.
08-31-23	Corrected Note 14 grammar.



08/31/23

# SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



**Notes:**

- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Cover existing speed limit signs within a reduced speed zone.
- Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work



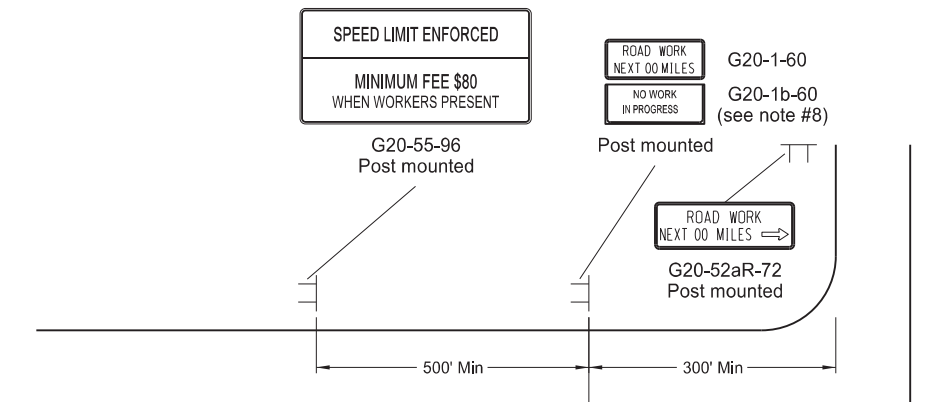
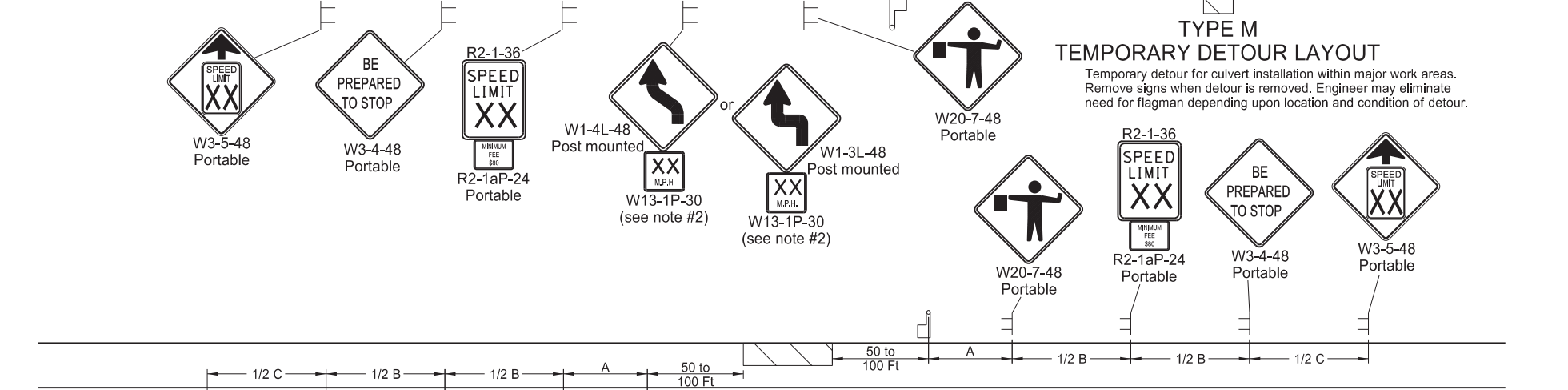
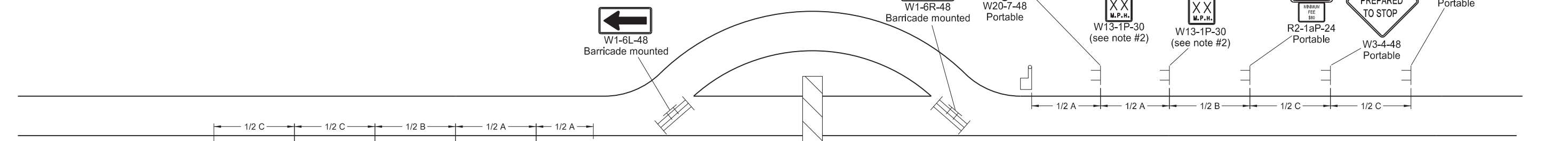
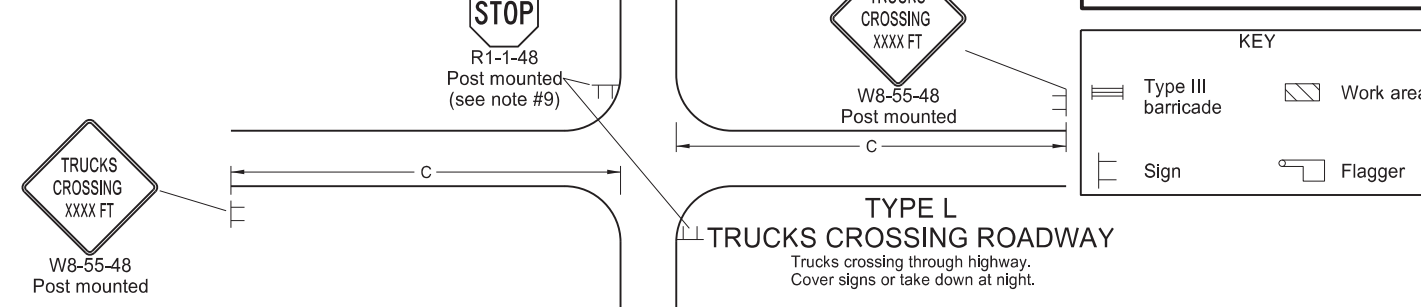
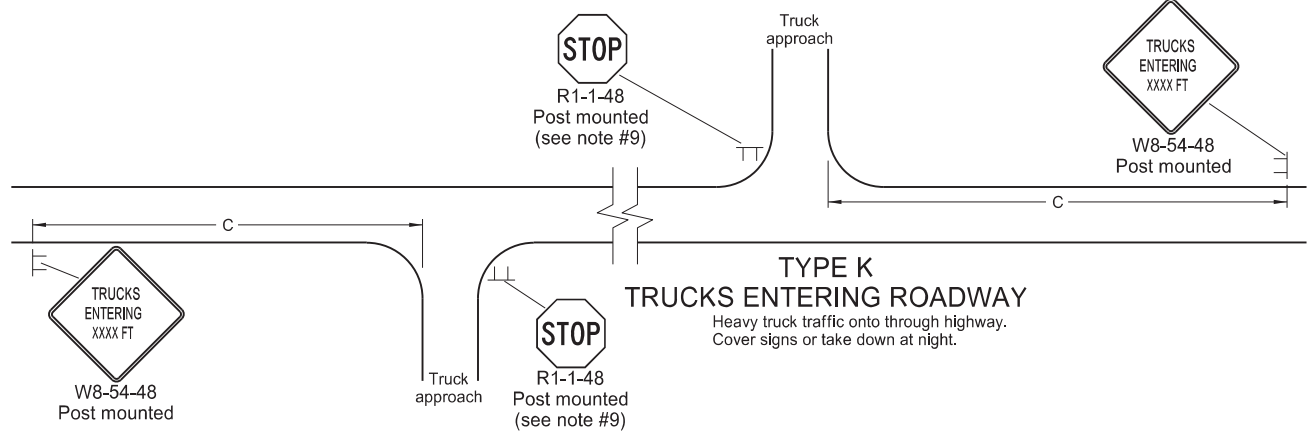
11/29/22

# CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

**KEY**

- Type III barricade
- Sign
- Work area
- Flagger



- Notes:**
- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
  - Where necessary, safe speed to be determined by the Engineer.
  - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
  - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
  - Cover existing speed limit signs within a reduced speed zone.
  - Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
  - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
  - Install sign G20-1b-60 when work is suspended for winter.
  - If existing stop sign is in place, a 48" stop sign is not required.
  - Sign G20-55-96 is not required if layout is part of other traffic control that contains this sign, or if work is less than 15 days.
  - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

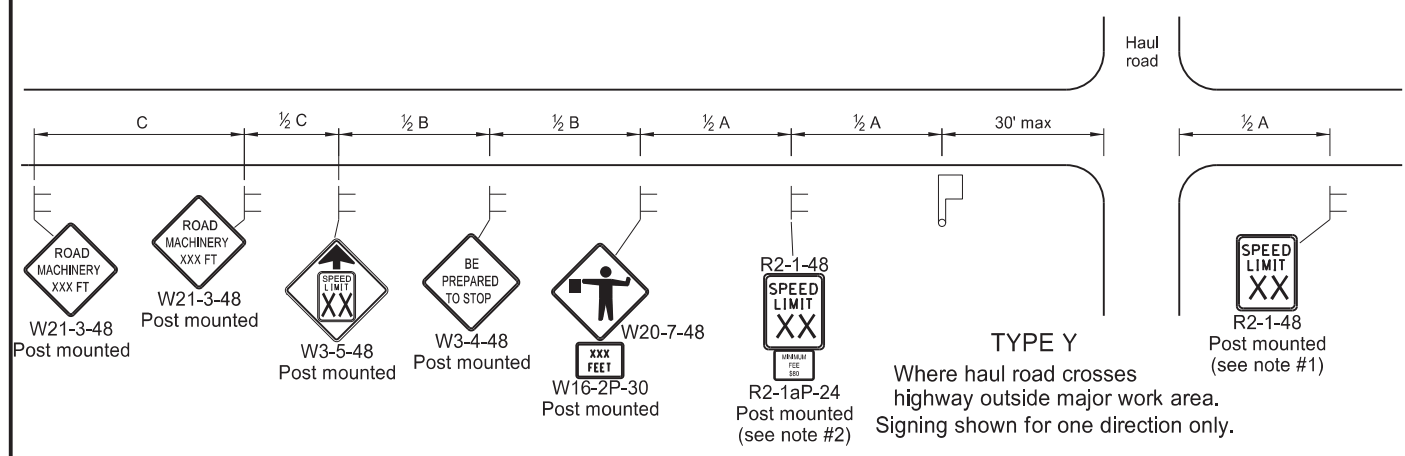
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work

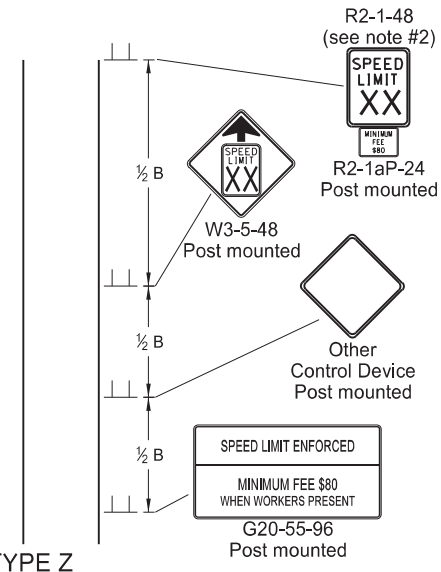


11/29/22

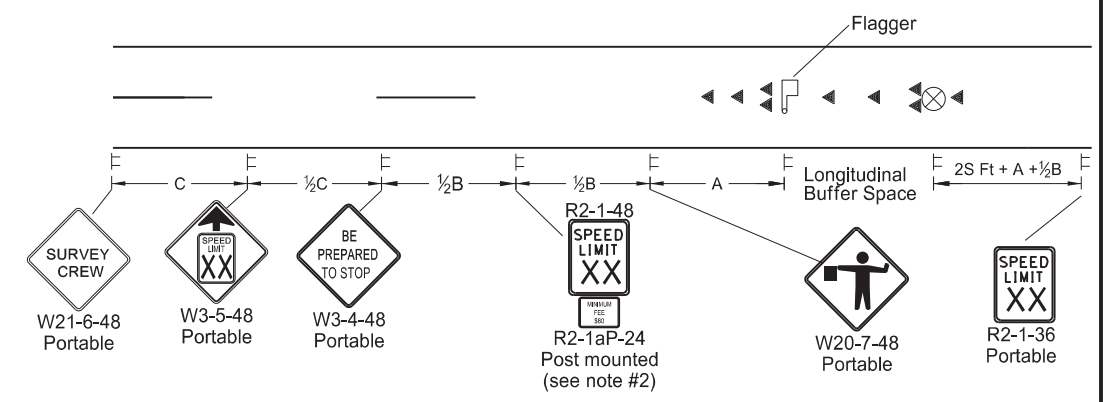
MISCELLANEOUS SIGN LAYOUTS



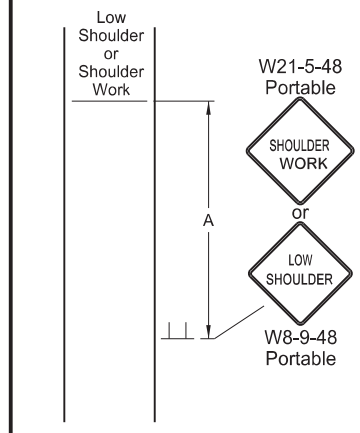
**TYPE Y**  
Where haul road crosses highway outside major work area. Signing shown for one direction only.



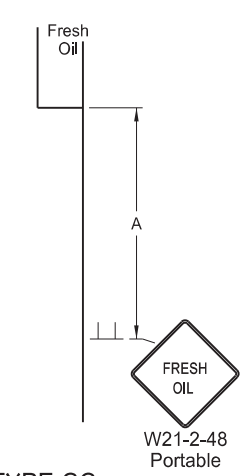
**TYPE Z**  
Where speed zone is needed. Signing shown for one direction only.



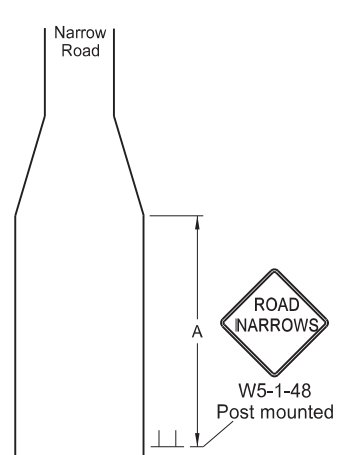
**TYPE AA**  
Where survey crew is used. Signing shown for one direction only.



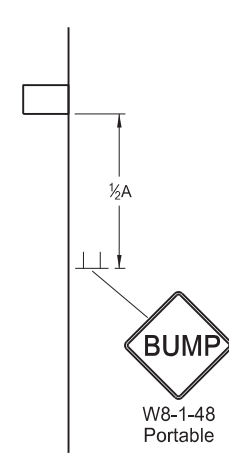
**TYPE BB**  
Within major work area where sign conditions exist



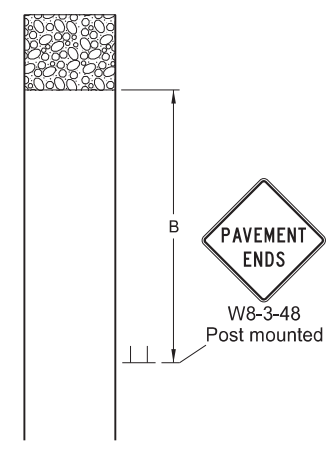
**TYPE CC**  
Where sign conditions exist



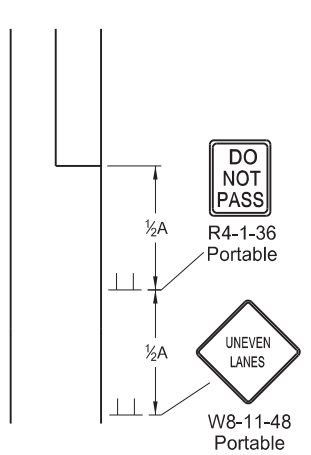
**TYPE DD**  
Where sign conditions exist



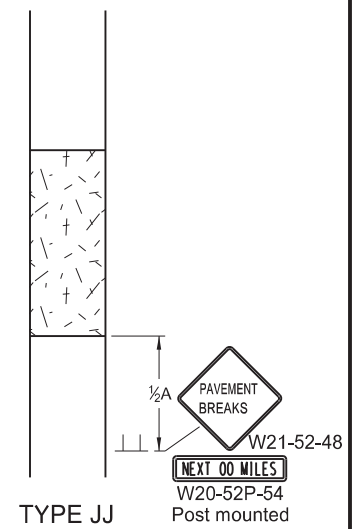
**TYPE EE**  
Where sign conditions exist



**TYPE FF**  
Where sign conditions exist. Signing shown for one direction only.



**TYPE GG**  
Where elevation difference exists between lanes

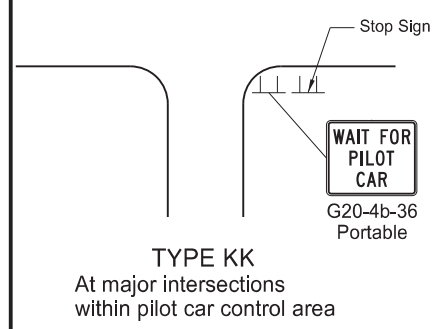


**TYPE JJ**  
For break in pavement. Install signs when conditions exist and remove when not applicable. Signing shown for one direction only.

**KEY**

- Flagger
- Sign
- Cones
- Survey Equipment

S = Numerical value of speed limit or 85th percentile.



**TYPE KK**  
At major intersections within pilot car control area

- Notes**
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
  - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
  - Cover existing speed limit signs within reduced speed zones.
  - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
  - Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
  - When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
  - Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
  - Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

\* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.
2-23-23	Revised distance & removed signs.



02/23/23

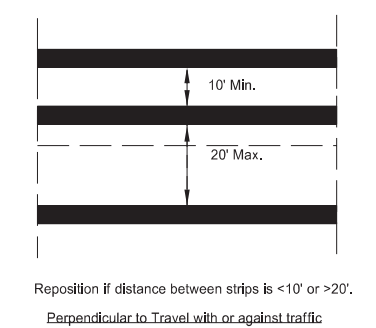
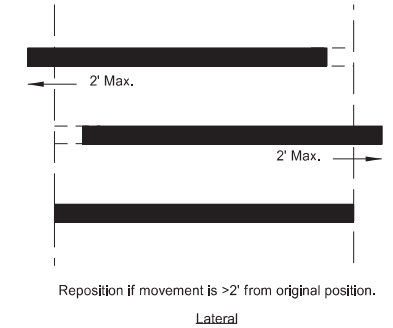
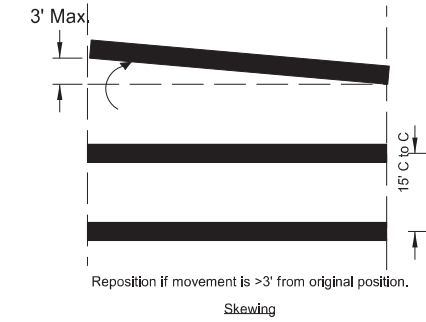
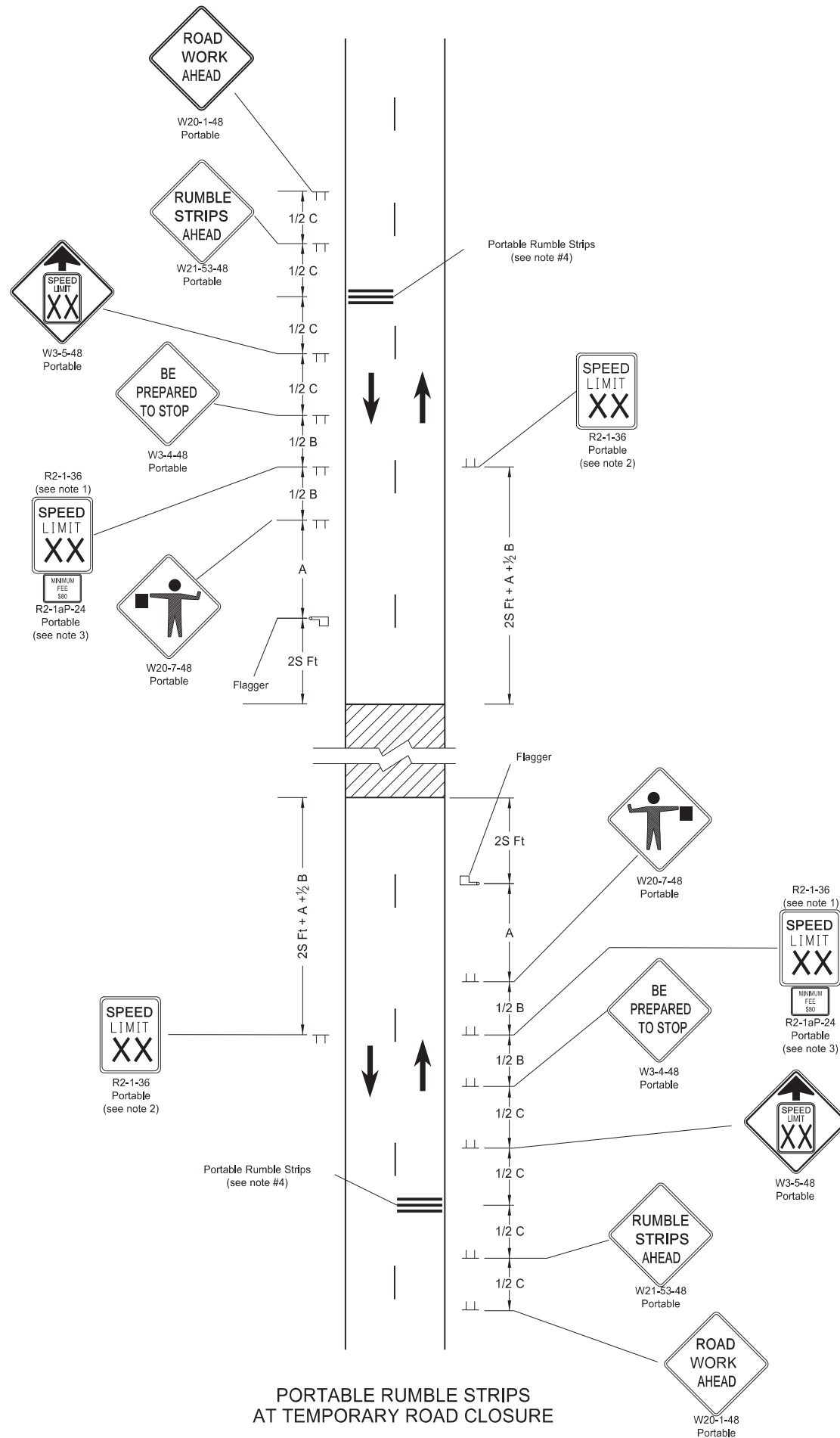
Two-Lane Roadway Portable Rumble Strips

KEY

- Work area
- Flagger
- Sign

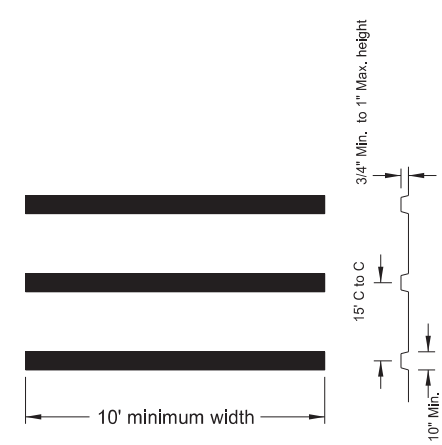
S = Numerical value of speed limit or 85th percentile.

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

- Notes:
- Determine speed in the field based on location and conditions.
  - Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
  - Sign R2-1aP-24 is not required when pilot car operation is used.
  - Do not use rumble strips on a non paved surface or in a pre-construction speed zone of 45 mph or less.



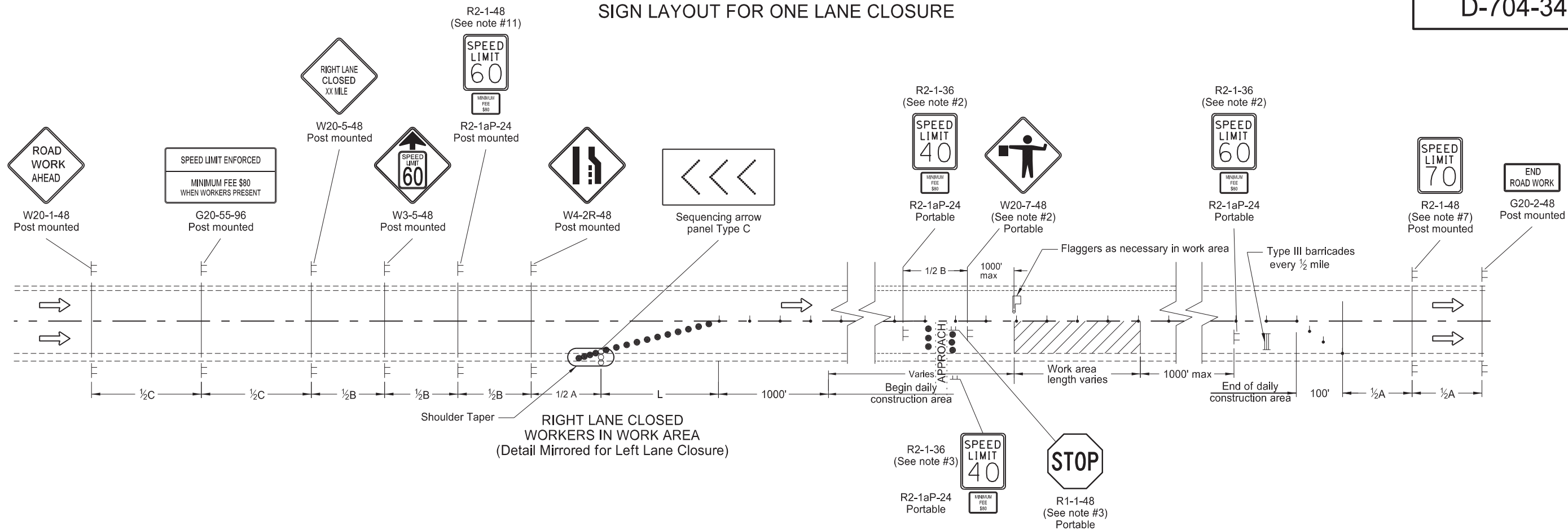
PORTABLE RUMBLE STRIPS ARRAY DETAIL

PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
02-22-22 REVISIONS		
DATE	CHANGE	<p>03/07/23 Use changed to min 45 mph.</p>
03/07/23		

03/07/23

SIGN LAYOUT FOR ONE LANE CLOSURE



Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/2 A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee \$80 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:  
 S=Numerical value of speed limit or 85th percentile  
 W=The width of taper.  
 L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.  
 Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).  
 Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).  
 Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
12. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.

KEY	
	Type I barricade
	Type II barricade
	Type III barricade
	Sign
	Delineator drum
	Work area
	Flagger
	Sequencing arrow panel
	Tubular markers

Road Type	ADVANCE WARNING SIGN SPACING		
	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

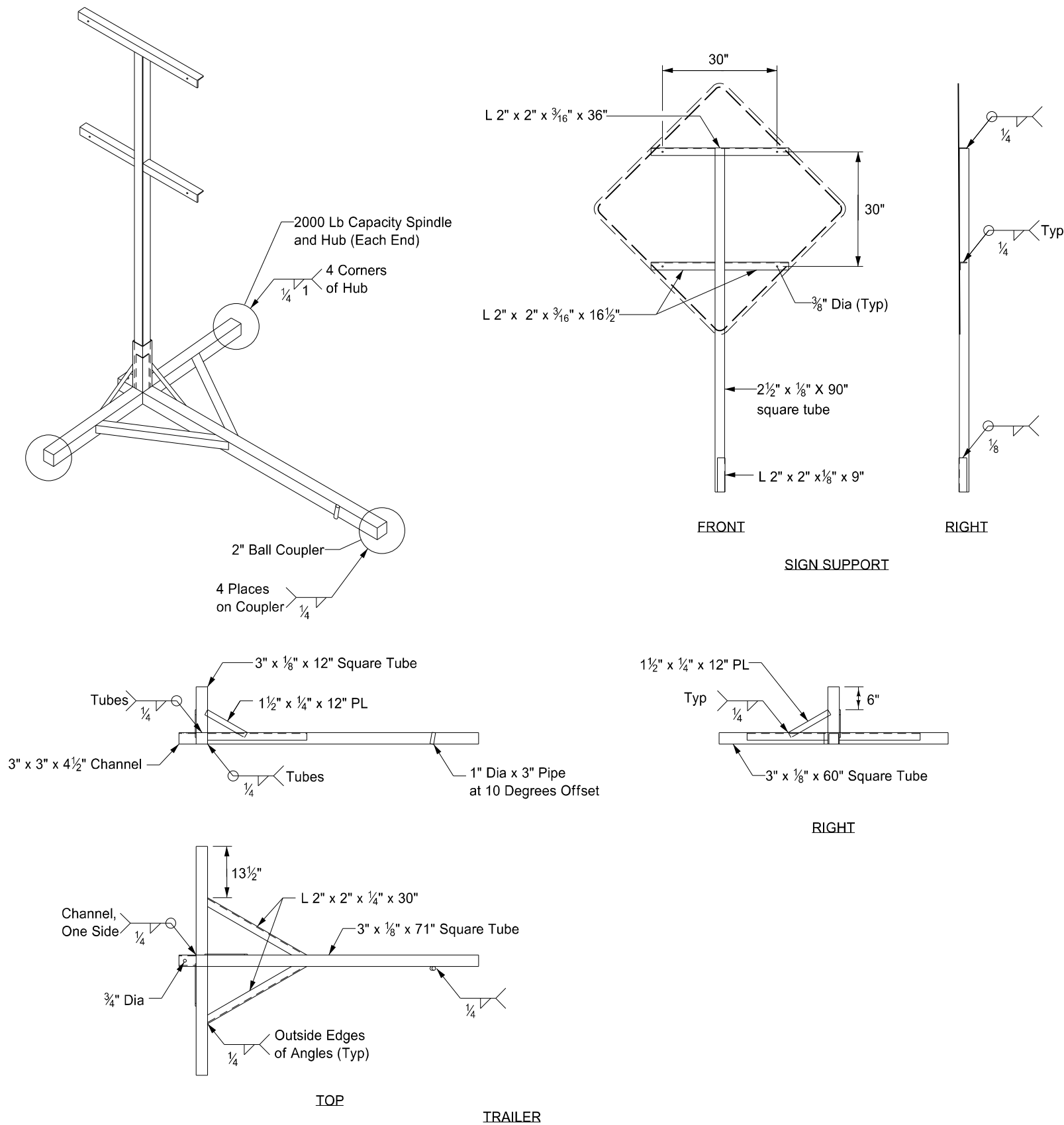
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd Limit Enforced, removed table, & added Dollars At Work
11-29-22	Removed Dollars At Work



11/29/22

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



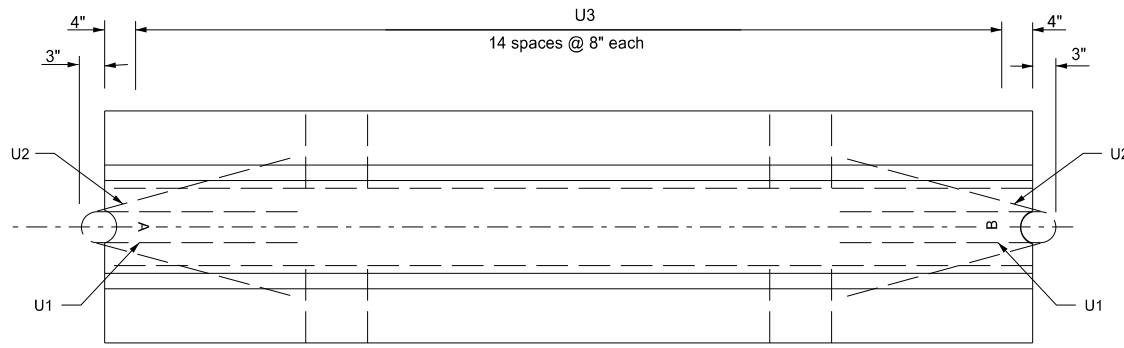
Notes:

- ① Maximum 250 pound weight of assembly.
- ② Use a 14" wheel and tire.
- ③ Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
- ④ Other NCHRP 350 or MASH crash tested assemblies are acceptable.

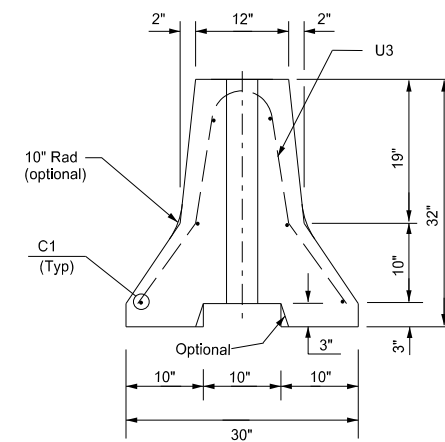
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

KIRK J. HOFF  
 REGISTERED  
 PROFESSIONAL  
 PE-4683  
 ENGINEER  
 NORTH DAKOTA  
 12 02 2020

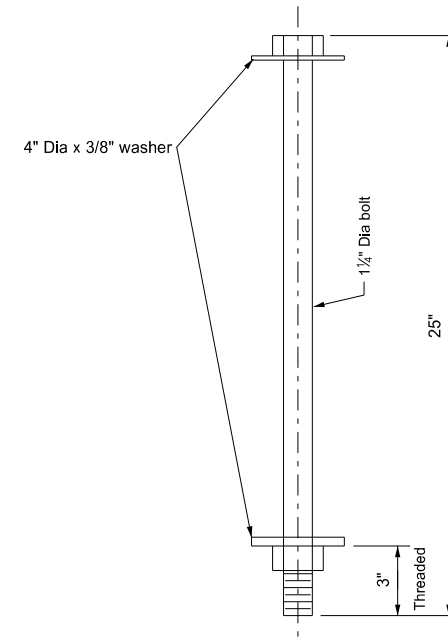
PORTABLE PRECAST CONCRETE MEDIAN BARRIER  
(TEMPORARY USAGE)



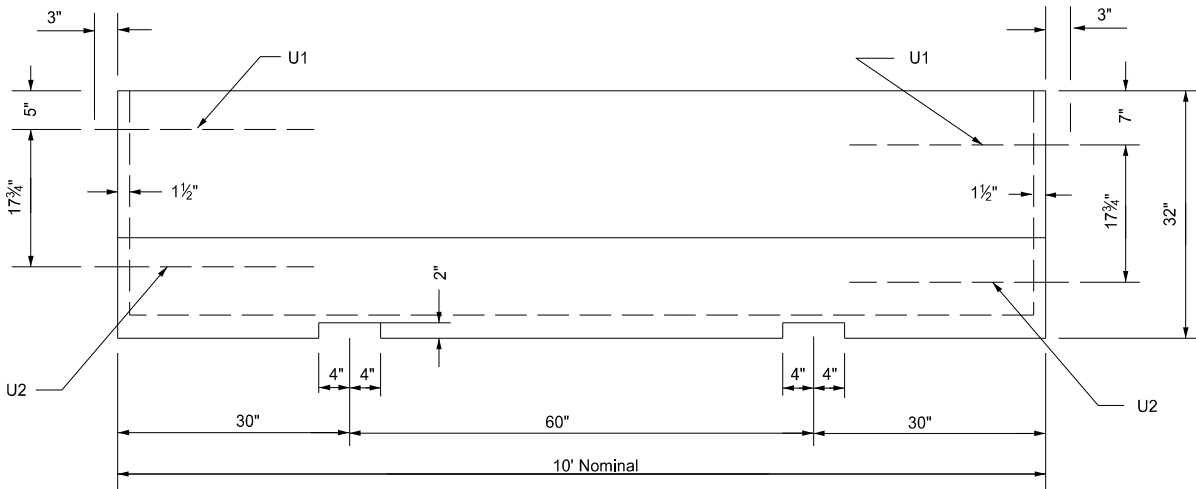
Plan View



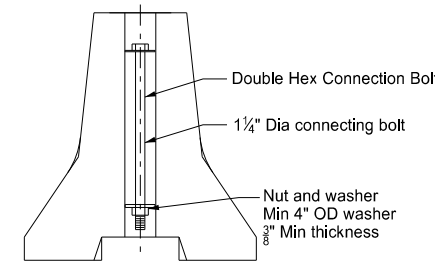
End View



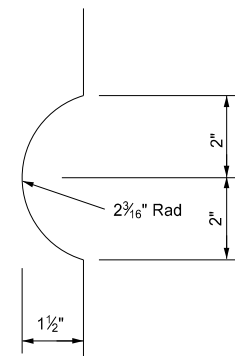
Connecting Bolt Detail  
(One per 10 Ft section)



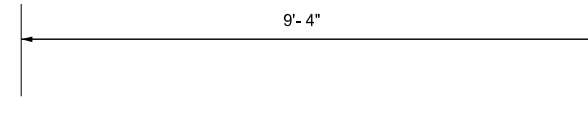
Side View



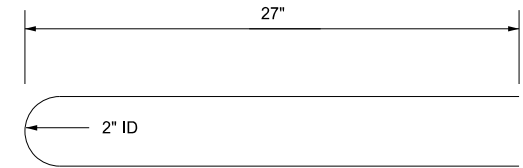
Bolt Connection Detail



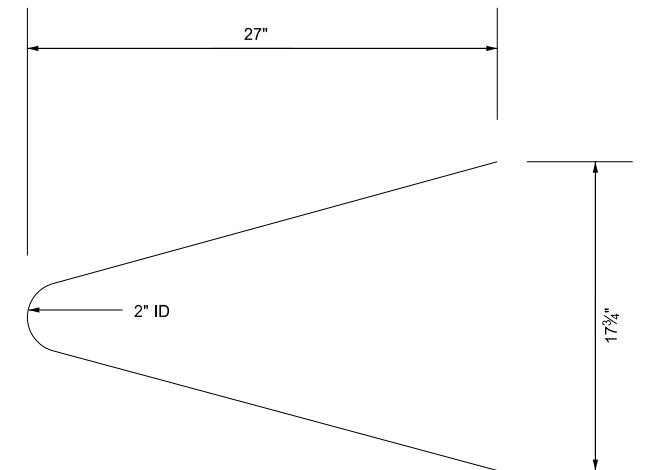
Dap Detail



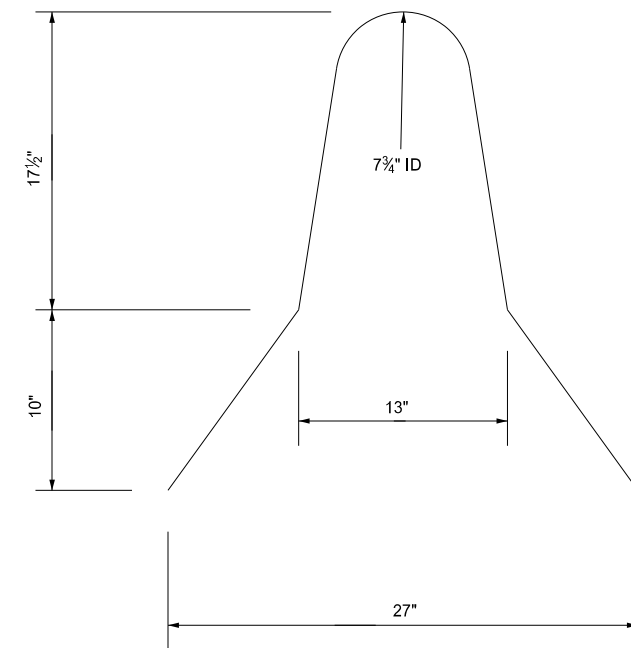
C1 Bar Detail



U1 Bar Detail



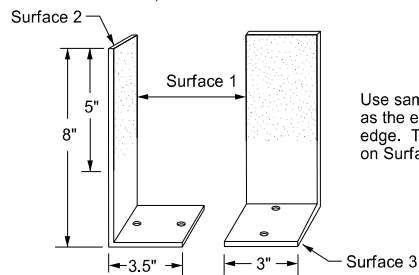
U2 Bar Detail



U3 Bar Detail

Notes:

- Galvanize all exposed hardware as per ASTM A153, except for the loop inserts.
- Use AAE-3 Concrete.
- Provide steel in accordance with Section 612 of NDDOT Standard Specifications.
- Imprint barrier ends A and B as shown with 4 inch letters. Field match A end with B end.
- Place barrier markers at the center of the barrier at 20' centers.
- Connect barrier sections with 1 1/4" Dia A-307 double hex connecting bolt. Maintain bottom nut and washer connection for duration of barrier installation.
- Place barrier to minimize openings between individual sections.



Barrier Marker Detail

Use same color reflective faces as the edge line along barrier edge. Two way reflective on Surface 1 & 2.

**Reflective Tape**  
Use retroreflective, acrylic microprism material with acrylic backing, 3" wide, providing the following minimum optical performance with an observation angle of 0.1° measured in candlepower for the reflector:

Entrance Angle	Specific Intensity
Yellow - 4"	136
White - 4"	200

**Adhesive**  
Use factory applied solid butyl rubber 1/8" thick, 2" wide on 2 1/4" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.

**Marker Body**  
Use high impact, weatherable engineering thermo-plastic material conforming to the following:

Property	Result	ASTM Test Method
Thickness (min)	.090"	—
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI 1/4" @ 73°F	8,000	D790
Flexural modulus, PSI 1/4" @ 73°F	300,000	D790
Elongation @ yield	30%	D638

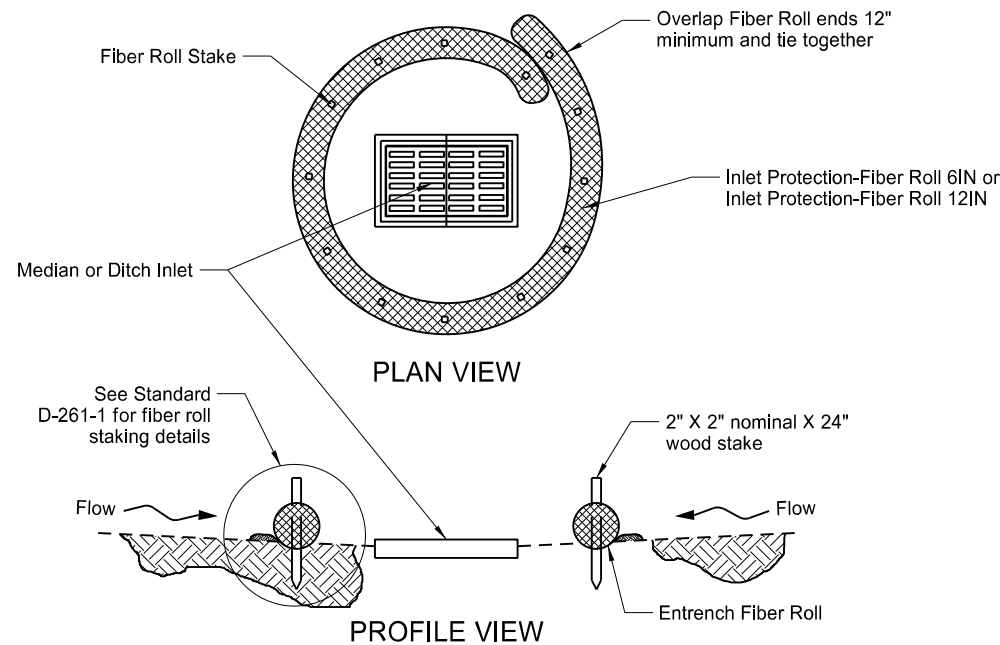
Bar List				
Mark	Size	No.	Length	Shape
C1	4	6	9'- 4"	Straight
U1	4	2	4'- 8"	Bent
U2	4	2	4'- 10 1/4"	Bent
U3	4	15	5'- 4"	Bent

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-20-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	New Design Engr PE Stamp

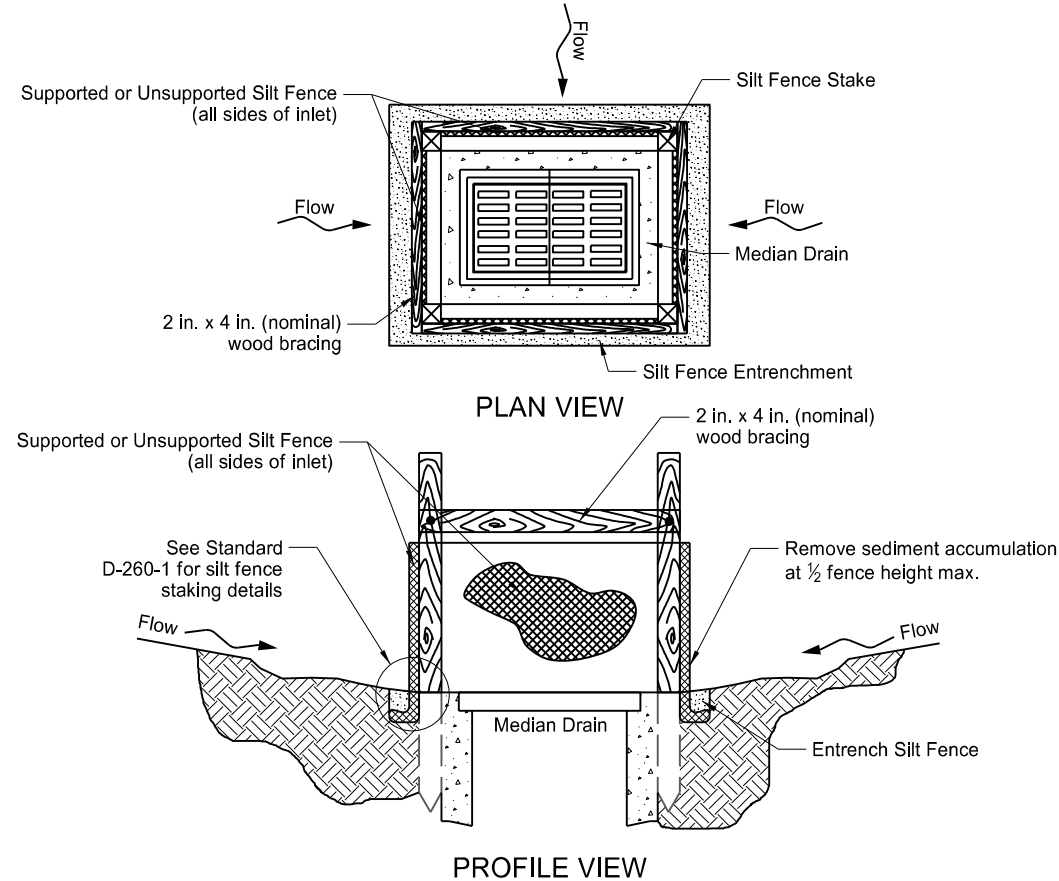
This document was originally issued and sealed by  
Kirk J Hoff,  
Registration Number  
PE- 4683,  
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation



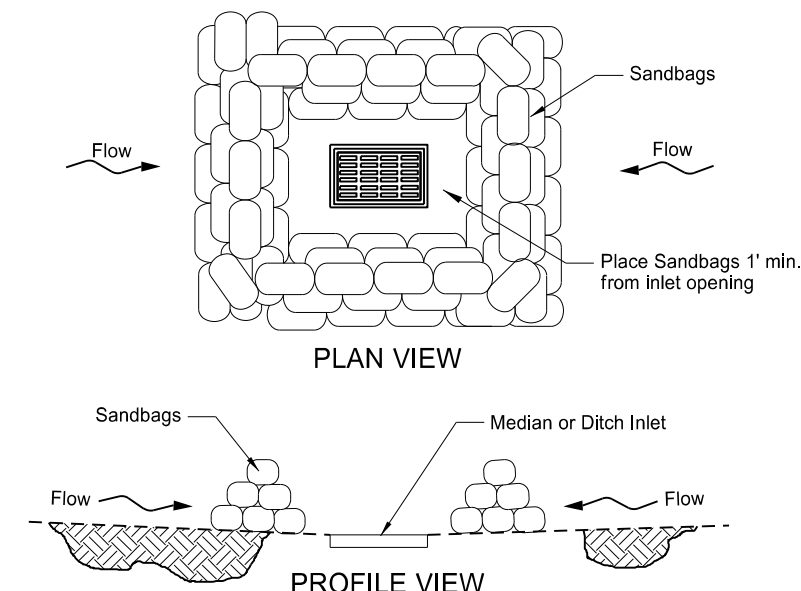
EROSION AND SILTATION CONTROLS  
MEDIAN OR DITCH INLET PROTECTION



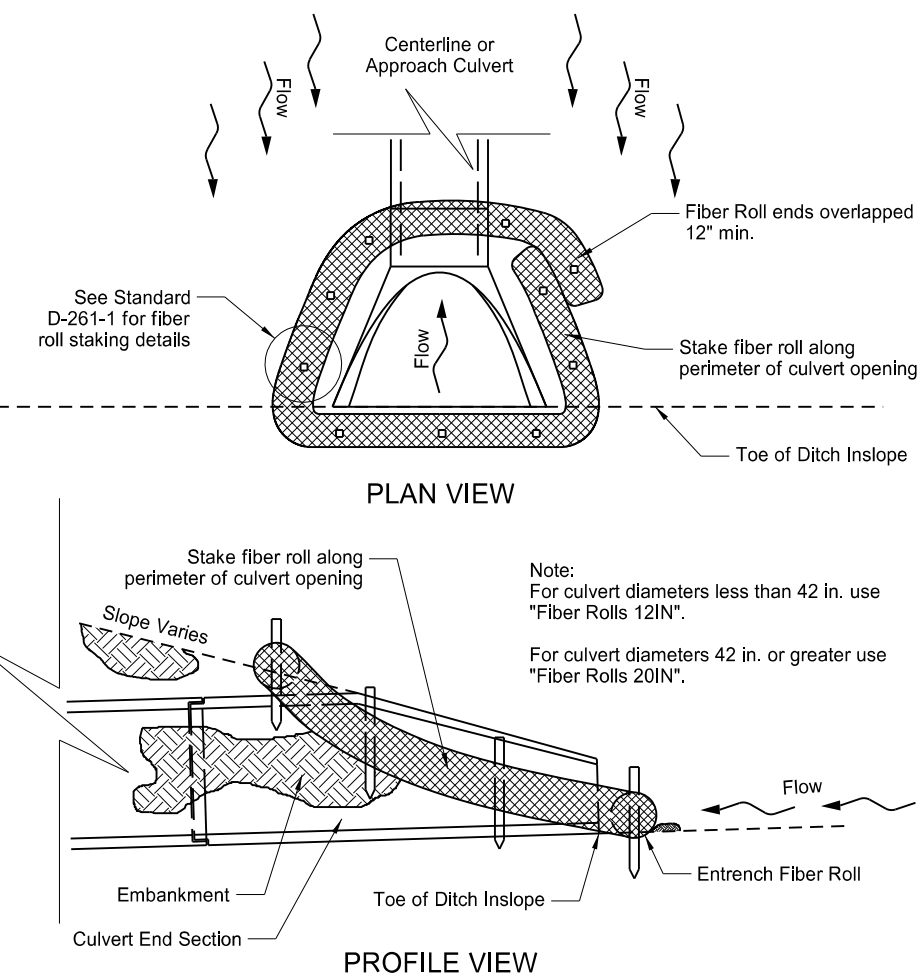
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



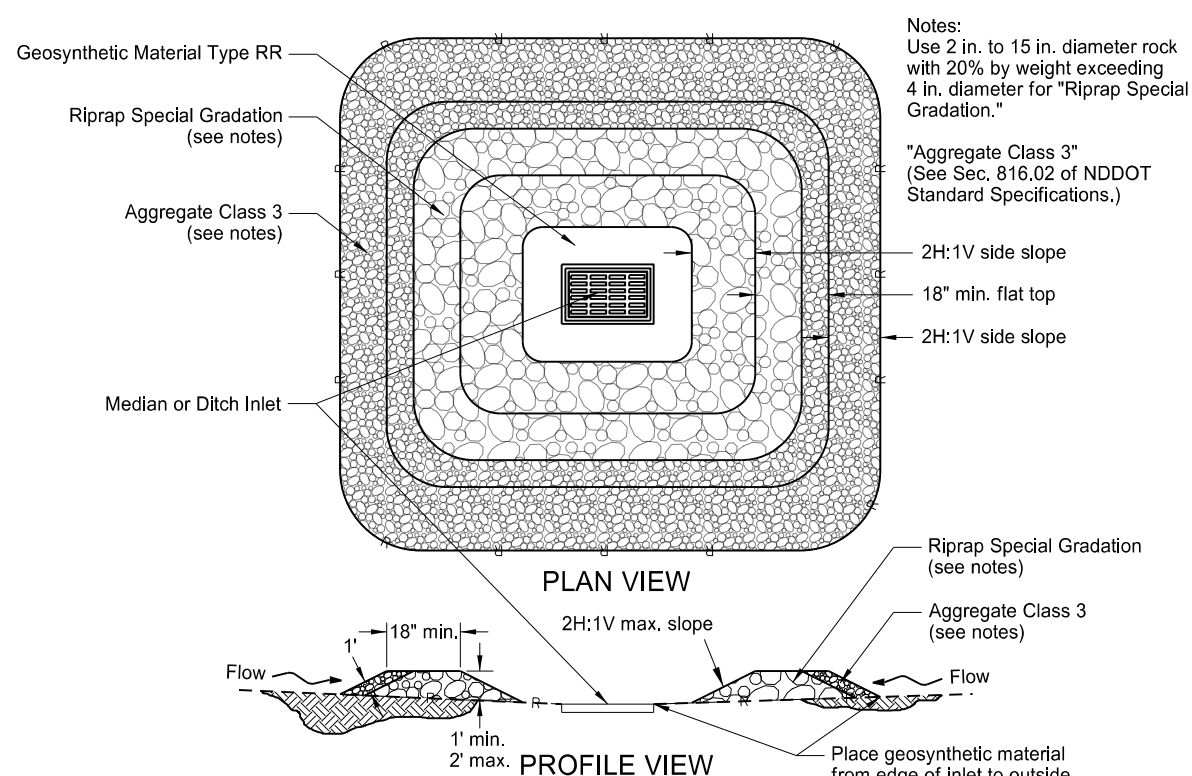
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



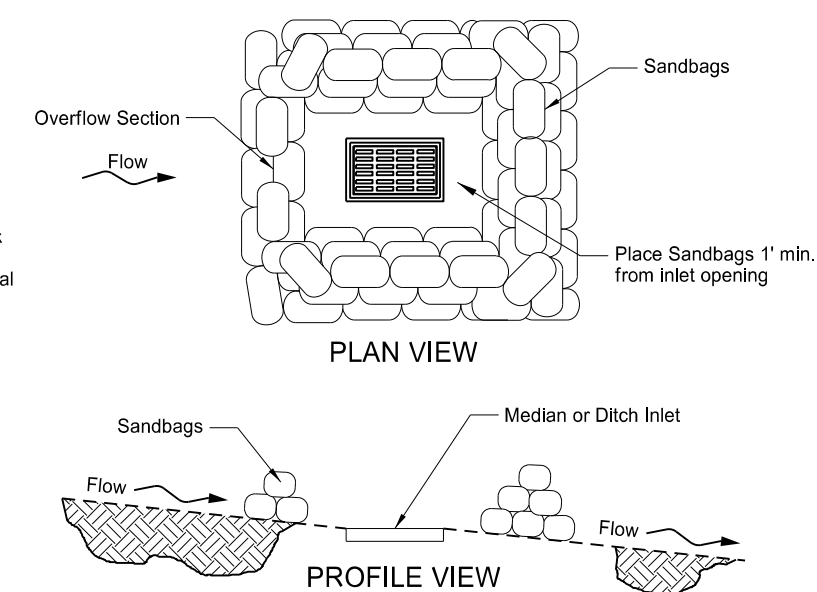
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)



SANDBAG PROTECTION (ON SLOPE)

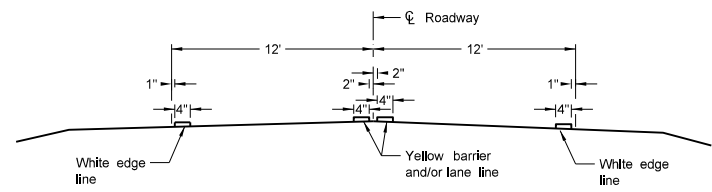
Notes:  
 Use 2 in. to 15 in. diameter rock with 20% by weight exceeding 4 in. diameter for "Riprap Special Gradation."  
 "Aggregate Class 3"  
 (See Sec. 816.02 of NDDOT Standard Specifications.)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

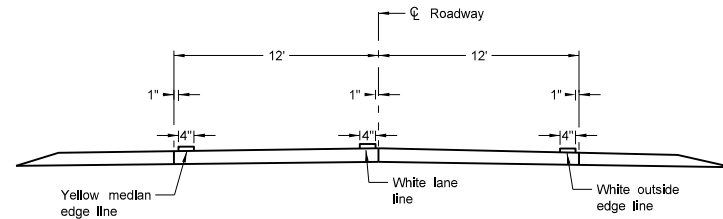
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 Kirk J Hoff,  
 Registration Number  
 PE- 4683,  
 on 8-27-19 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

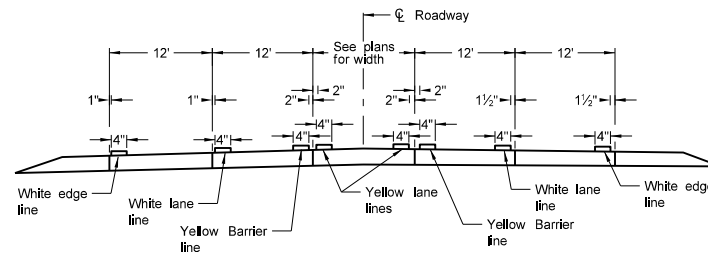
D-762-4



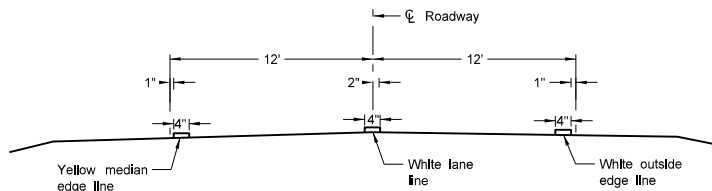
Two Lane Two Way  
RURAL ROADWAY



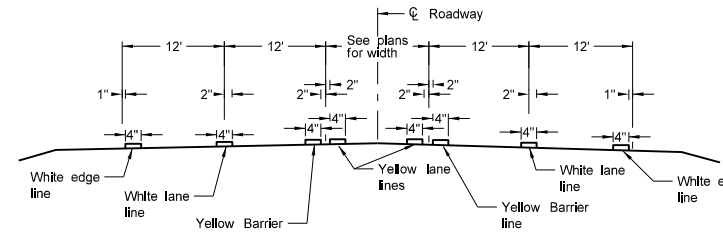
Two Lane Roadway  
INTERSTATE HIGHWAY  
Concrete Section



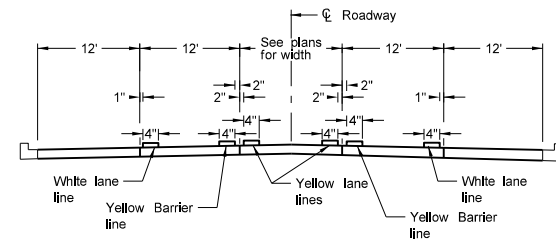
RURAL FIVE LANE ROADWAY  
Concrete Section



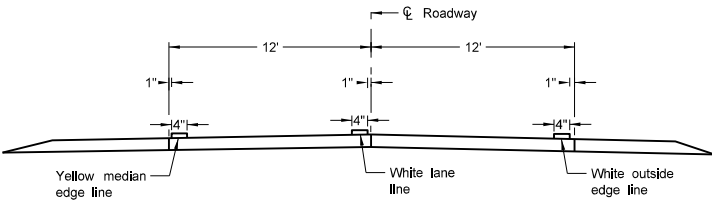
Two Lane Divided  
Rural Roadway  
PRIMARY HIGHWAY  
Asphalt Section



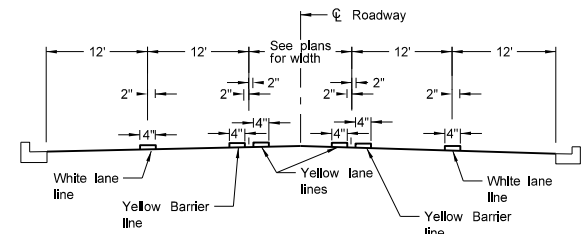
RURAL FIVE LANE ROADWAY  
Asphalt Section



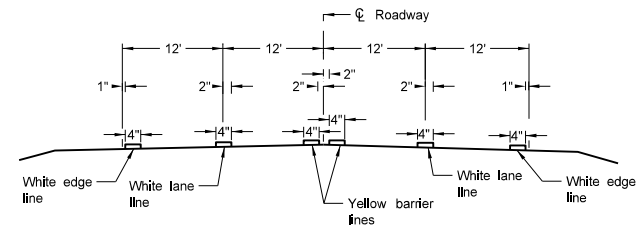
URBAN FIVE LANE SECTION  
Concrete Section



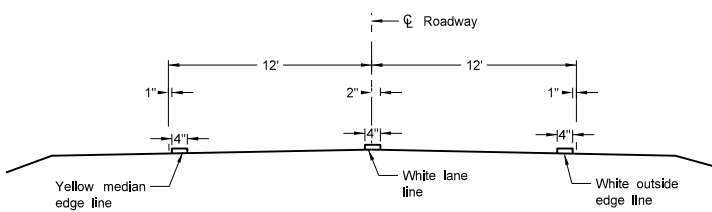
Two Lane Roadway  
PRIMARY HIGHWAY  
Concrete Section



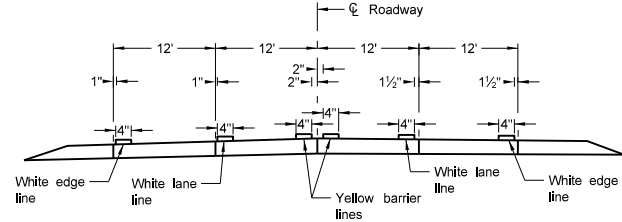
URBAN FIVE LANE SECTION  
Asphalt Section



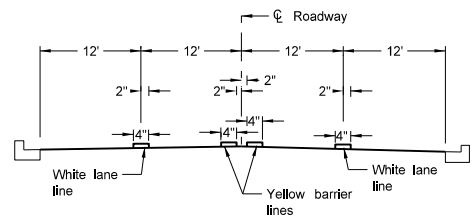
RURAL FOUR LANE ROADWAY  
Asphalt Section



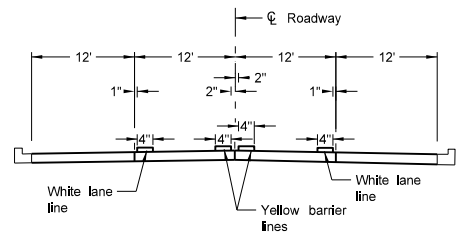
Two Lane Roadway  
INTERSTATE HIGHWAY  
Asphalt Section



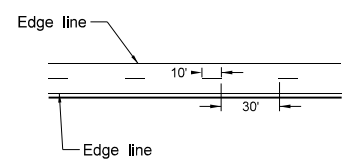
RURAL FOUR LANE ROADWAY  
Concrete Section



URBAN FOUR LANE SECTION  
Asphalt Section



URBAN FOUR LANE SECTION  
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:  
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

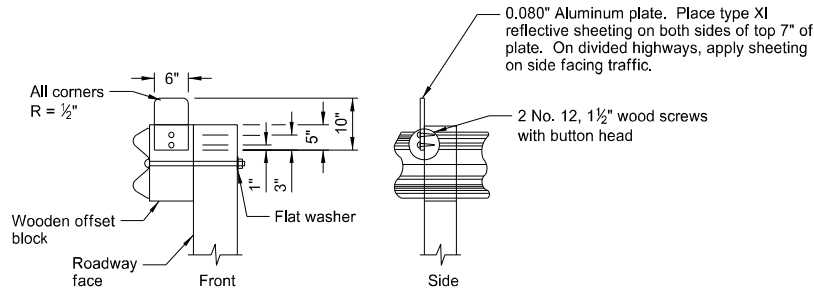
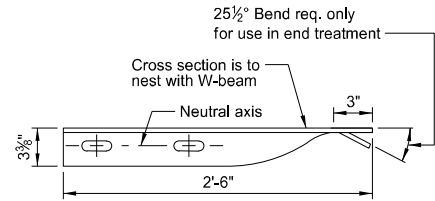
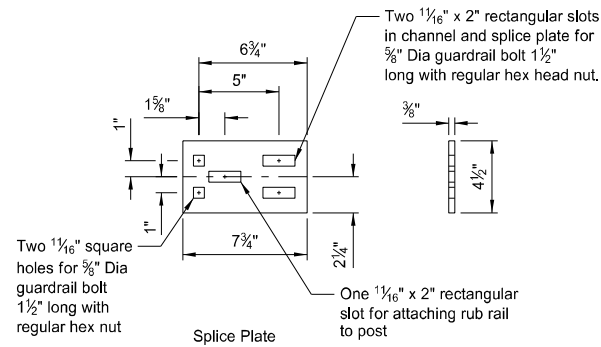
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

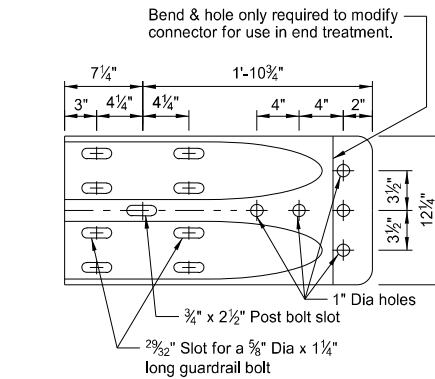
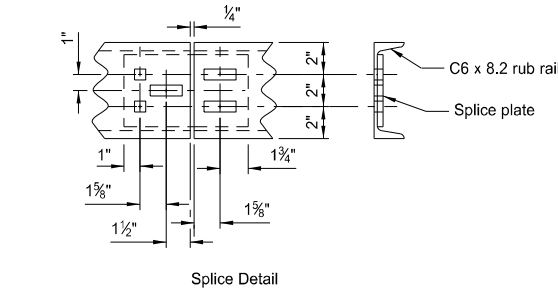
W-BEAM GUARDRAIL GENERAL DETAILS

NOTES:

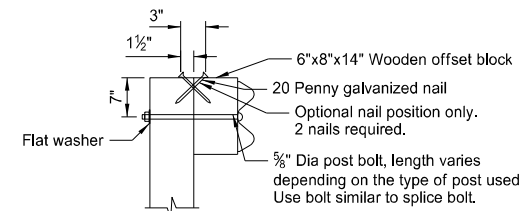
- Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
- Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
- Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
- Guardrail installation height tolerance =  $- \frac{1}{4}"$ ,  $+ 1"$ .
- Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1 1/2" is acceptable.



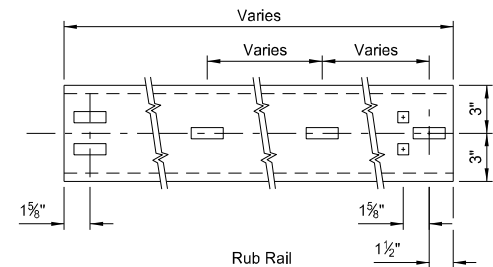
REFLECTORIZED PLATE DETAIL  
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



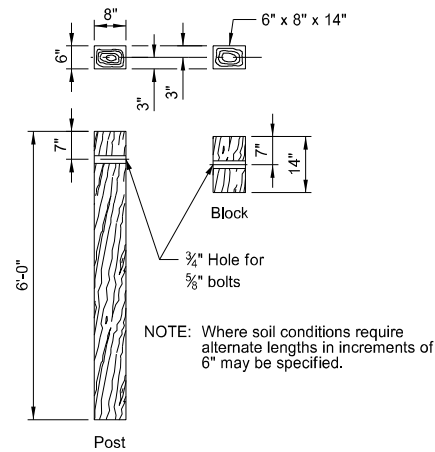
W BEAM TERMINAL CONNECTOR



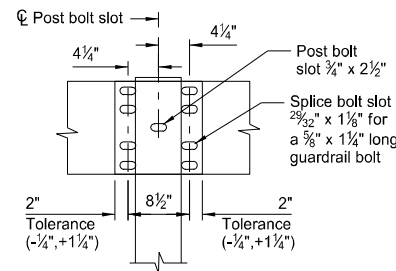
TYPICAL POST ATTACHMENT DETAIL



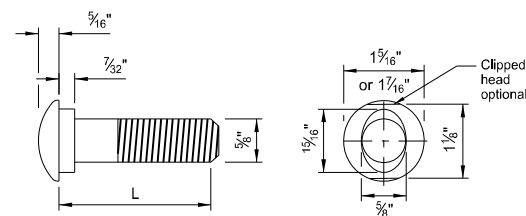
C6x8 RUB RAIL AND SPLICE PLATE



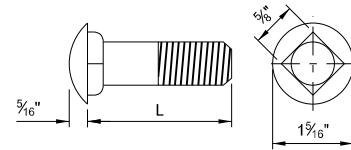
6"x8" TIMBER POST & BLOCK



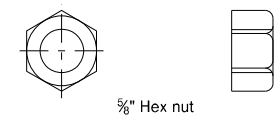
SPLICE DETAIL



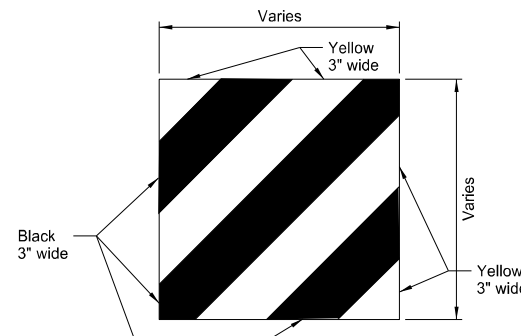
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 1/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



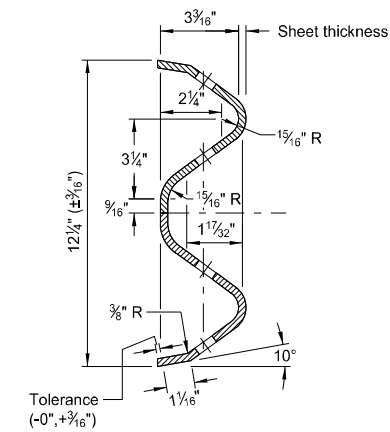
5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length



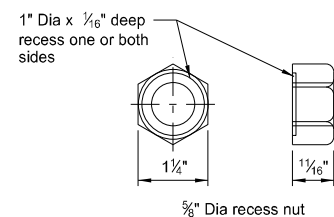
5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

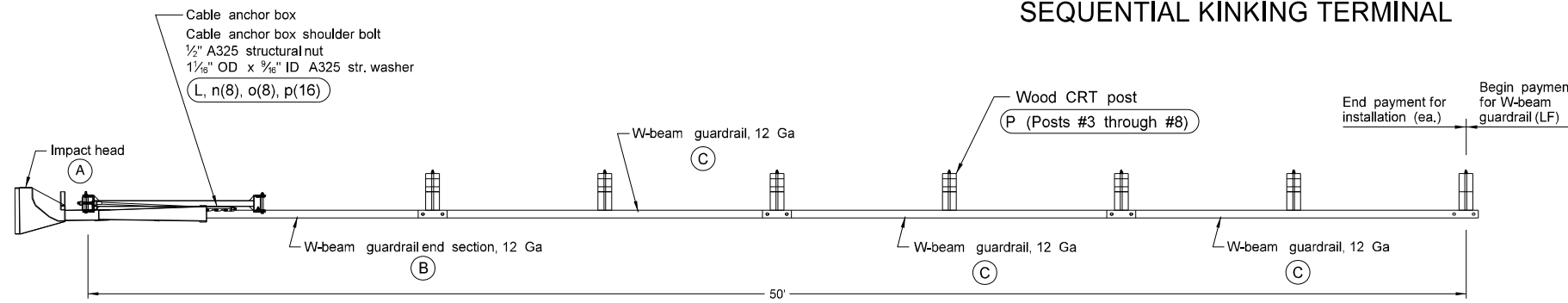


5/8" GUARDRAIL BOLT & RECESS NUT

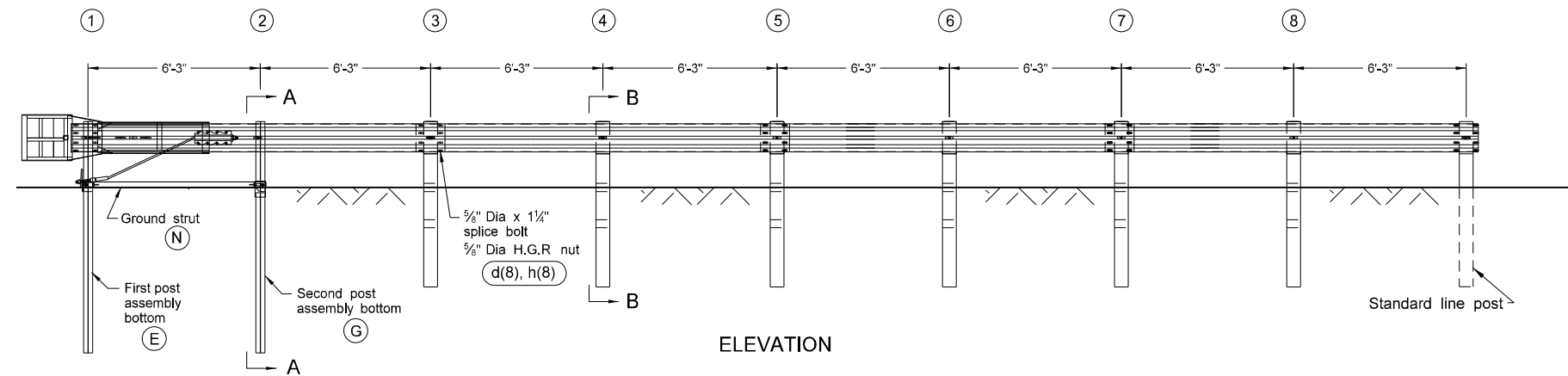
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.
12-02-20	Updated clipped head to optional

KIRK J. HOFF  
REGISTERED  
PROFESSIONAL  
ENGINEER  
NORTH DAKOTA  
12 02 2020

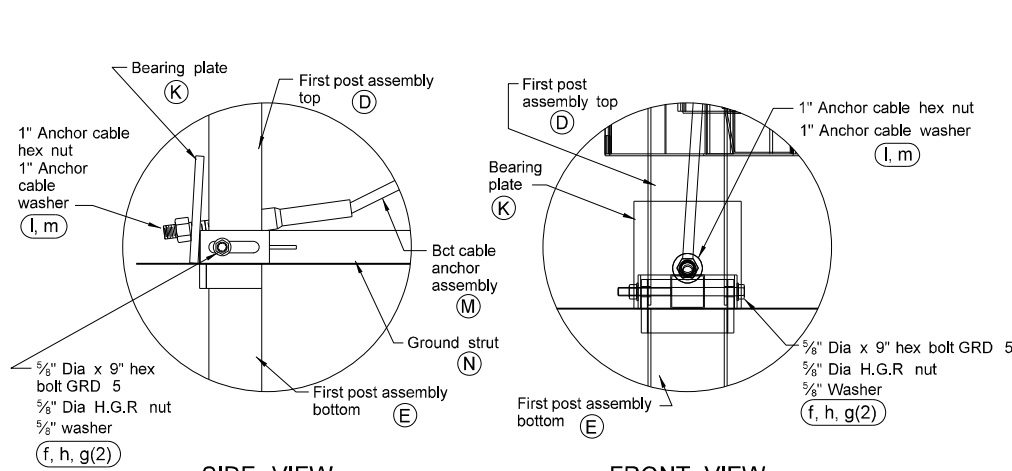
SEQUENTIAL KINKING TERMINAL



PLAN



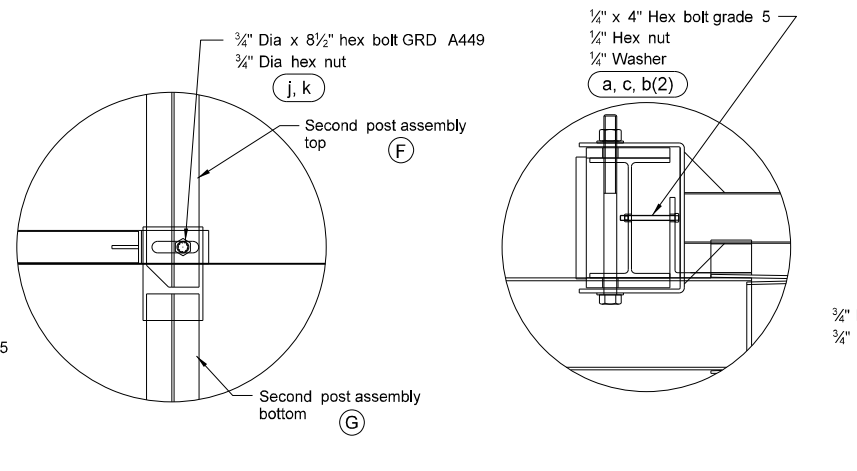
ELEVATION



SIDE VIEW

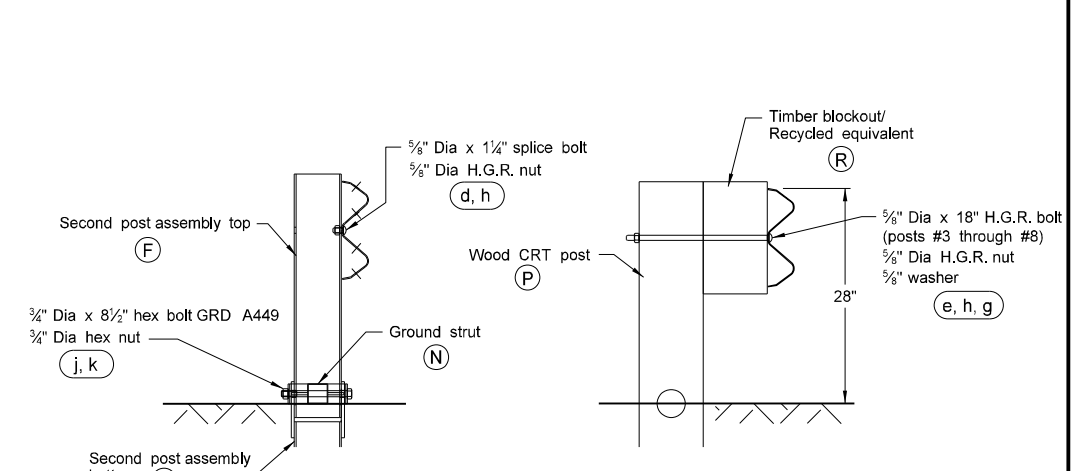
FRONT VIEW

POST #1 CONNECTION DETAILS



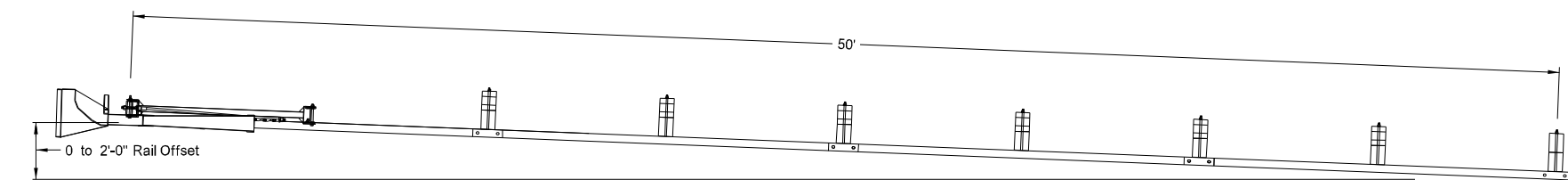
SIDE VIEW DETAIL OF POST #2

IMPACT HEAD CONNECTION DETAIL



SECTION A-A  
Post #2

SECTION B-B  
Posts #3 through #8



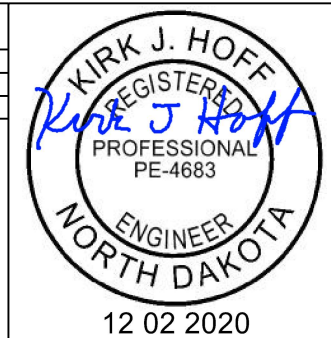
FLARED INSTALLATION  
25:1 maximum flare rate

GENERAL NOTES:

1. Use breakaway posts with the SKT.
2. Use galvanized bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Flare the SKT at a rate of up to 25:1 to prevent shoulder encroachment by the impact head.
4. Grade site as needed to prevent lower sections of the posts from protruding more than 4" above ground (measured along a 5' cord).
5. Drive the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material satisfactorily to prevent settlement.
6. When rock is encountered during excavation, use a 10" diameter post hole, 20" into the rock surface, if approved by the engineer. Place granular material in the bottom of the hole, approximately 2 1/2" deep to provide drainage. Field cut posts 1 & 2 to length, place in the hole, and backfill with adequately compacted material excavated from the hole.
7. Place the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
8. "Toe nail" the wood blockouts on post #3 through post #8 with two 20 penny galvanized nails in each rectangular post, to prevent them from turning when the wood shrinks.

BILL OF MATERIALS		
ITEM	QTY	
A	1	IMPACT HEAD
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga
C	3	W-BEAM GUARDRAIL, 12 Ga
D	1	FIRST POST ASSEMBLY TOP
E	1	FIRST POST ASSEMBLY BOTTOM
F	1	SECOND POST ASSEMBLY TOP
G	1	SECOND POST ASSEMBLY BOTTOM
K	1	BEARING PLATE
L	1	CABLE ANCHOR BOX
M	1	BCT CABLE ANCHOR ASSEMBLY
N	1	GROUND STRUT HINGED POST
P	6	WOOD CRT POST
R	6	TIMBER BLOCKOUT/RCY EQUIVALENT
HARDWARE		
a	2	1/4 " x 4" HEX BOLT Grade 5
b	4	1/2" WASHER
c	2	1/4" HEX NUT
d	25	5/8" Dia X 1 1/4" SPLICE BOLT, POST #2
e	6	5/8" Dia X 18" H.G.R. BOLT (POSTS 3 THRU 8)
f	1	5/8" Dia X 9" HEX BOLT GRD 5
g	8	5/8" WASHER
h	32	5/8" Dia H.G.R. NUT
j	1	3/4" Dia X 8 1/2" HEX BOLT GRD A449
k	1	3/4" Dia HEX NUT
l	2	1" ANCHOR CABLE HEX NUT
m	2	1" ANCHOR CABLE WASHER
n	8	GROUND STRUT HINGED POST
o	8	1/2" A325 STRUCTURAL NUT
p	16	1 1/8" OD X 5/8" ID A325 STR. WASHER

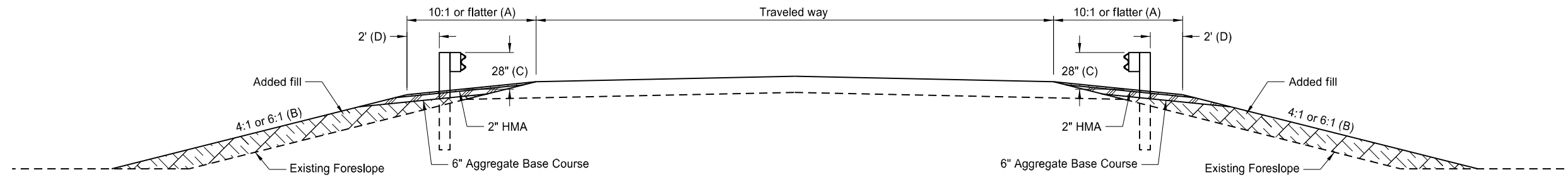
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.



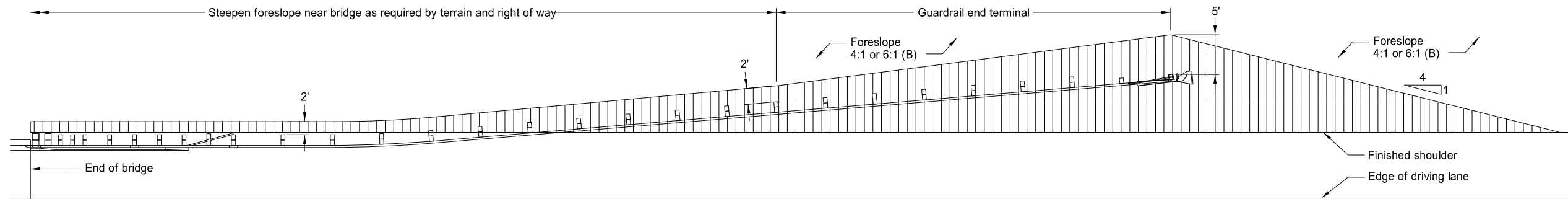


TYPICAL GRADING AT BRIDGE ENDS  
WITH W-BEAM GUARDRAIL

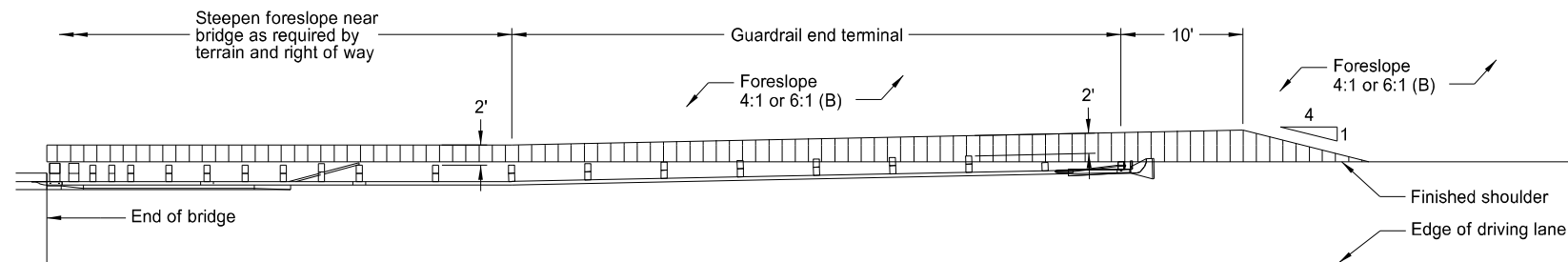
D-764-22



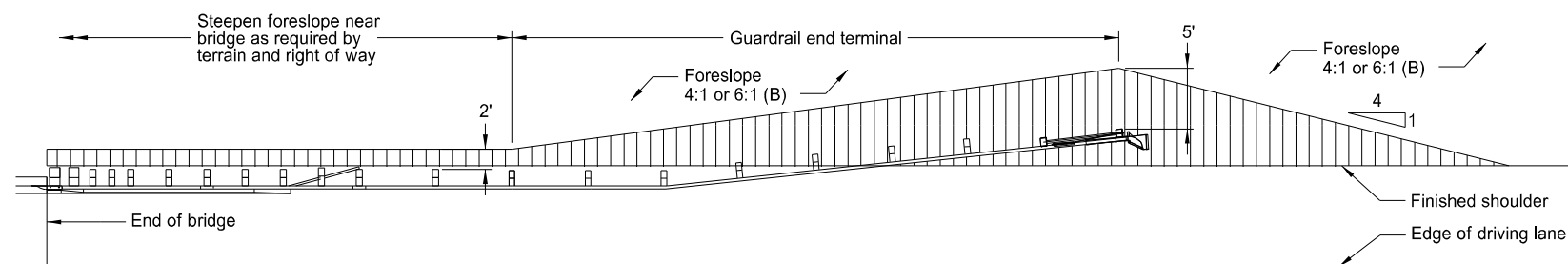
TYPICAL SECTION



PLAN LAYOUT  
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT  
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT  
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

- (A) Use slope flatter than 10:1 when necessary to provide proper guardrail height.
- (B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.
- (C) Measure from top of guardrail to top of surfacing at front face of guardrail.
- (D) Dimension at end terminals vary per Plan Layouts shown on this sheet.

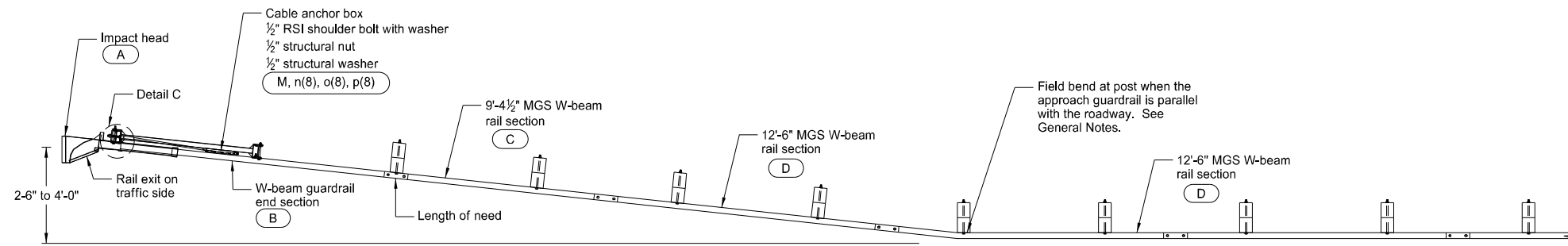
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.



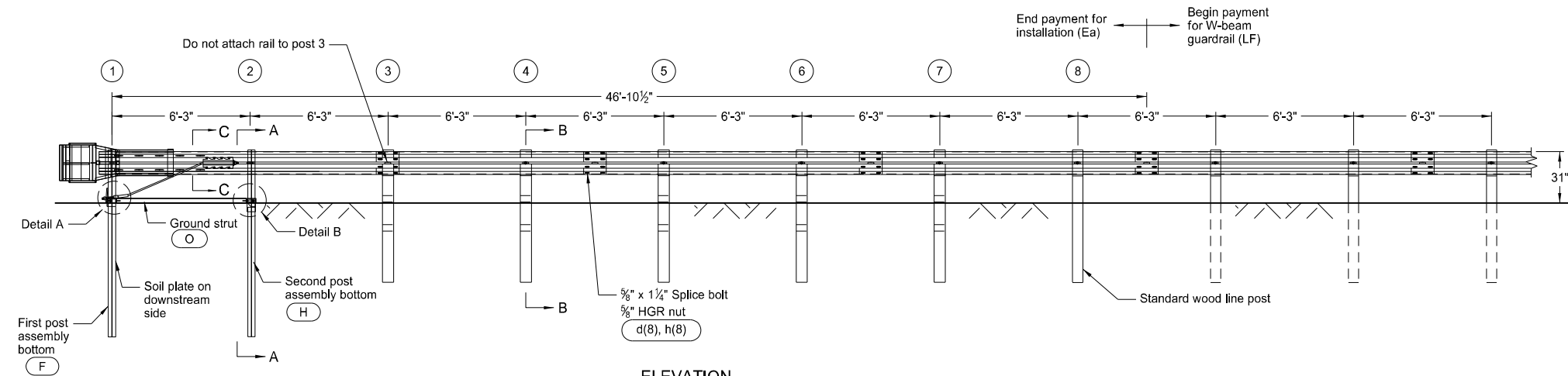
12 02 2020

# MGS FLARED ENERGY ABSORBING TERMINAL - WOOD POST

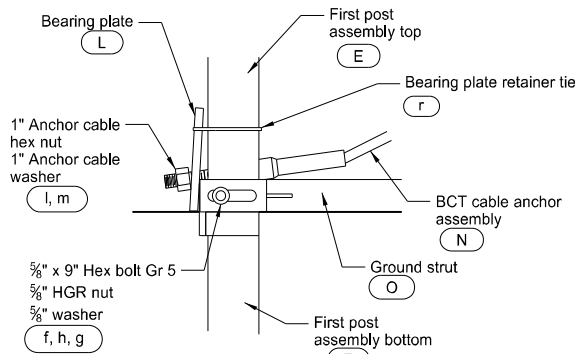
D-764-38



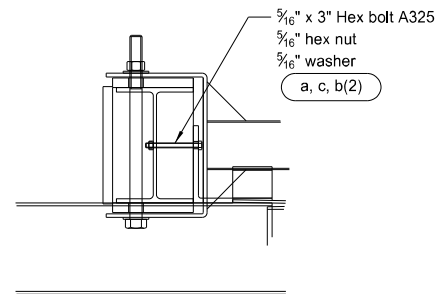
PLAN



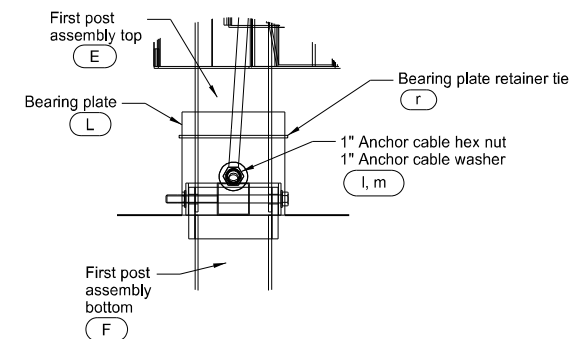
ELEVATION



SIDE VIEW

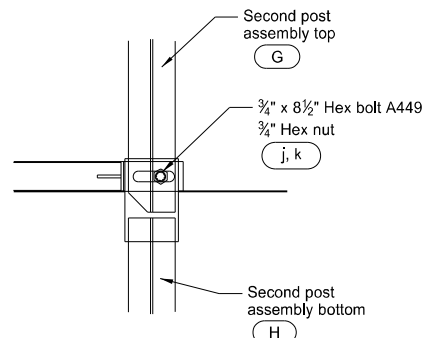


DETAIL C  
Post 1 (Impact Head connection)

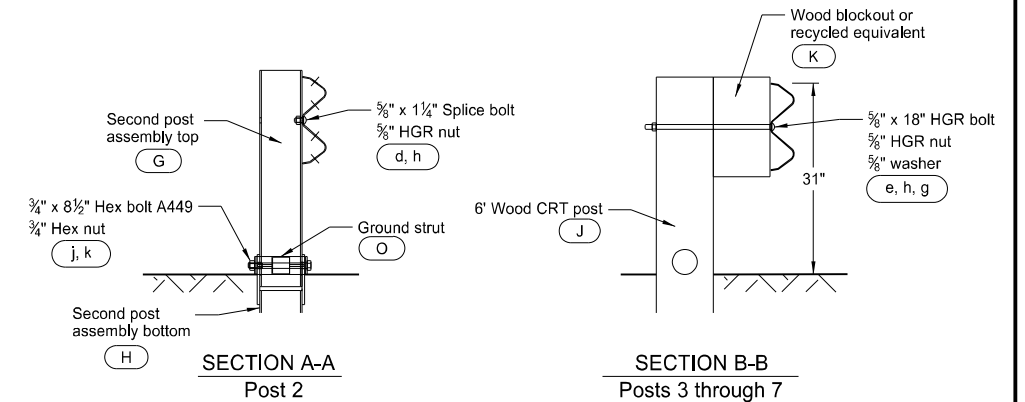


FRONT VIEW

DETAIL A  
Post 1

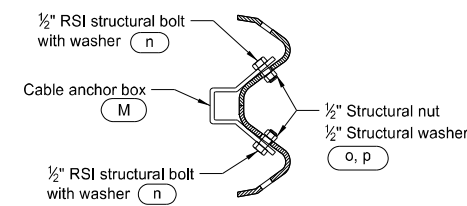


DETAIL B  
Post 2



SECTION A-A  
Post 2

SECTION B-B  
Posts 3 through 7



SECTION C-C

**GENERAL NOTES:**

- Wood posts are required with the Flared Energy Absorbing Terminal except posts 1 and 2.
- Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
- Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, ensure the Flared Energy Absorbing Terminal has only the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, ensure the Flared Energy Absorbing Terminal is turned parallel to the roadway.
- Site grade as necessary to ensure the lower sections of the posts do not protrude more than 4" above the ground (measured along a 5' cord).
- Install the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material to prevent settlement.
- Install the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent cable from twisting when tightening nuts.
- "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails to prevent them from turning when the wood shrinks.

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	F3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4 1/2" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	UHP1A	FIRST POST ASSEMBLY TOP	1
F	HP1B	FIRST POST ASSEMBLY BOTTOM	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
J	UP671	WOOD CRT POST	5
K	P675	WOOD BLOCKOUT OR RECYCLE EQUIVALENT	5
L	E750	BEARING PLATE	1
M	S760	CABLE ANCHOR BOX	1
N	E770	BCT CABLE ANCHOR ASSEMBLY	1
O	S785	GROUND STRUT HINGED POST	1
HARDWARE			
a	B5160304A	5/16" x 3" HEX BOLT A325	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	5/8" Dia x 1 1/4" SPLICE BOLT	33
e	B581802	5/8" Dia X 18" HGR BOLT	5
f	B580904A	5/8" Dia x 9" HEX BOLT GRD 5	1
g	W050	5/8" WASHER	7
h	N050	5/8" Dia HGR NUT	39
j	B340854A	3/4" Dia x 8 1/2" HEX BOLT GRD A449	1
k	N030	3/4" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	1/2" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	1/2" STRUCTURAL NUT	8
p	W012A	1/2" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

NOTE: Standard wood line post, block, and associated hardware not included in Bill of Materials Table.

NORTH DAKOTA  
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7-14-17

REVISIONS  
DATE CHANGE  
12-02-20 Updated notes to active voice.

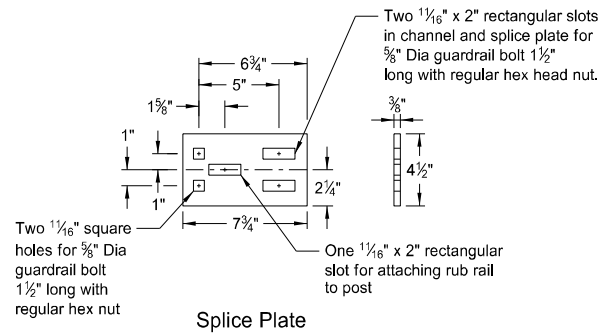


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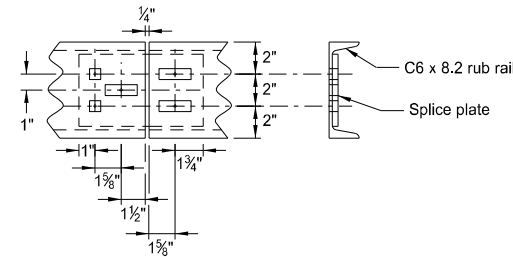
MGS W-BEAM GUARDRAIL GENERAL DETAILS

NOTES:

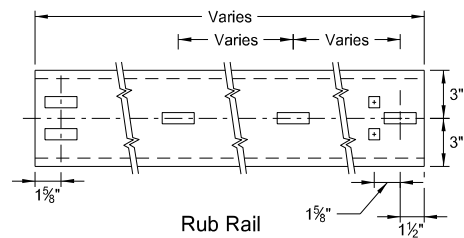
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material at guardrail post: Dispose all excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. Fit the Object Marker within the vertical edges of the Impact Plate. Provide type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply the sheeting to 0.100 Aluminum sheeting meeting the requirements of Section 894.01.A. Attach the Object Marker to the Impact Head Plate with rivets or other attachment device. Ensure the rivets or attachment device are non-rust. Slope the stripes downward toward the roadway side.
4. Guardrail installation height tolerance = ±1".



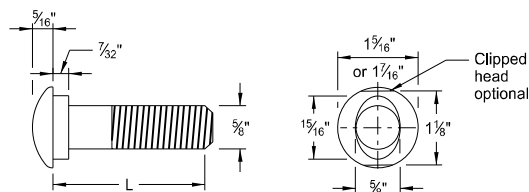
Splice Plate



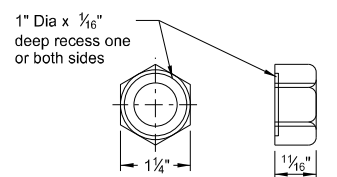
Splice Detail



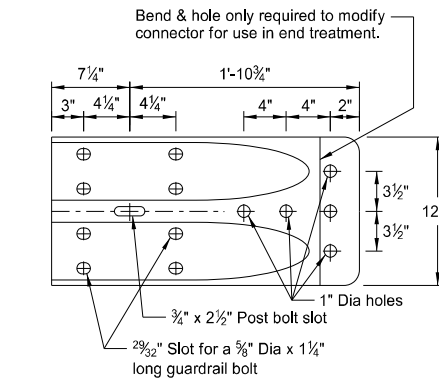
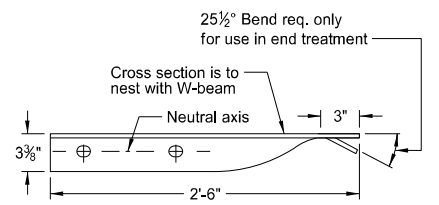
C6x8.2 RUB RAIL AND SPLICE PLATE



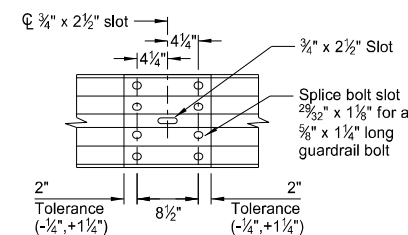
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



5/8" GUARDRAIL BOLT & RECESS NUT

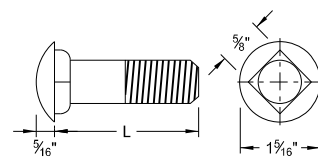


W BEAM TERMINAL CONNECTOR

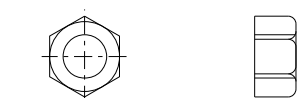


SPLICE DETAIL

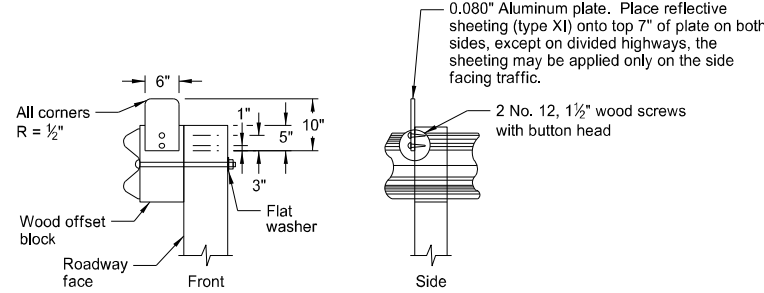
NOTE: Do not install center bolt in the 3/4" x 2 1/2" slot at mid span splices.



5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

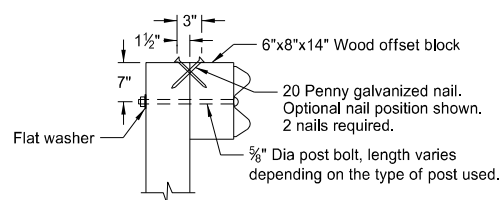


5/8" CARRIAGE BOLT & NUT

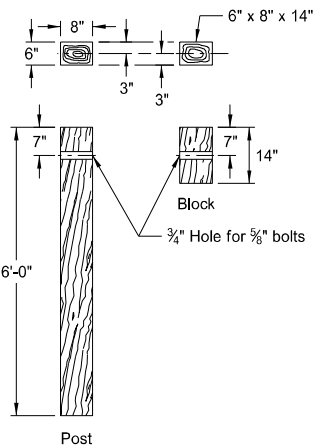


REFLECTORIZED PLATE DETAIL

NOTE: Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.

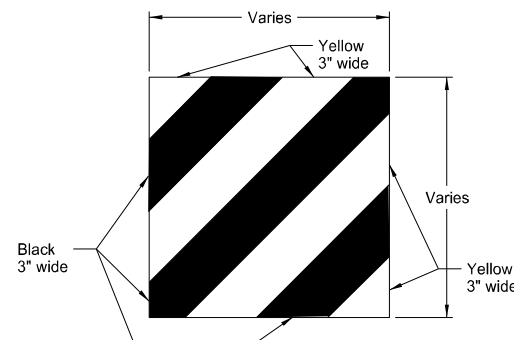


TYPICAL WOOD POST ATTACHMENT DETAIL

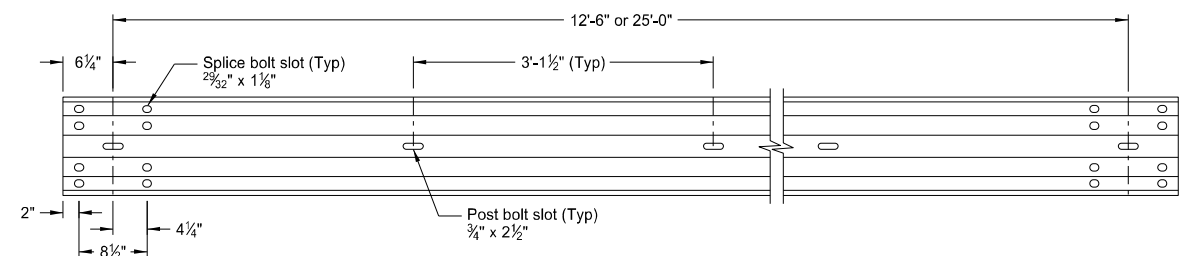


6" x 8" WOOD POST & BLOCK

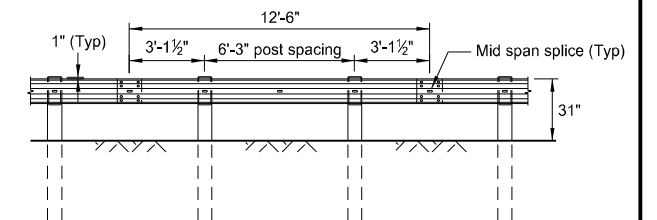
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



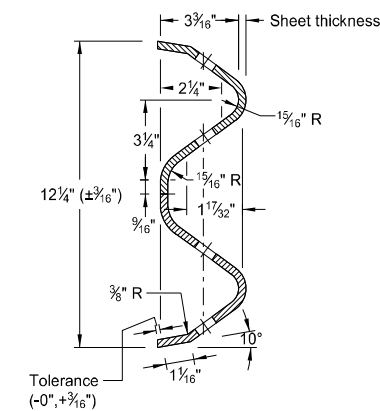
IMPACT HEAD OBJECT MARKER



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM



W-BEAM CROSS SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated clipped head to optional

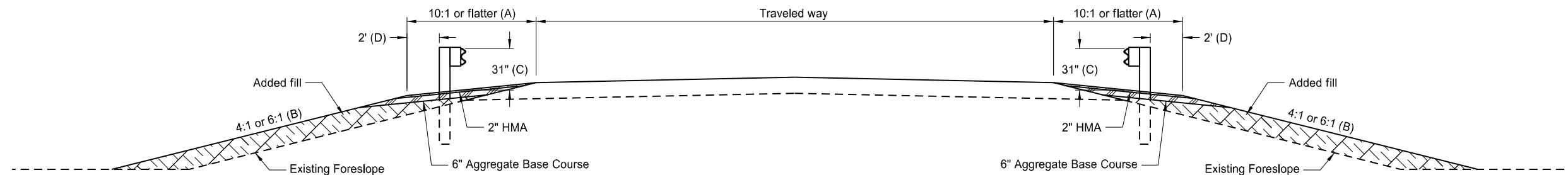


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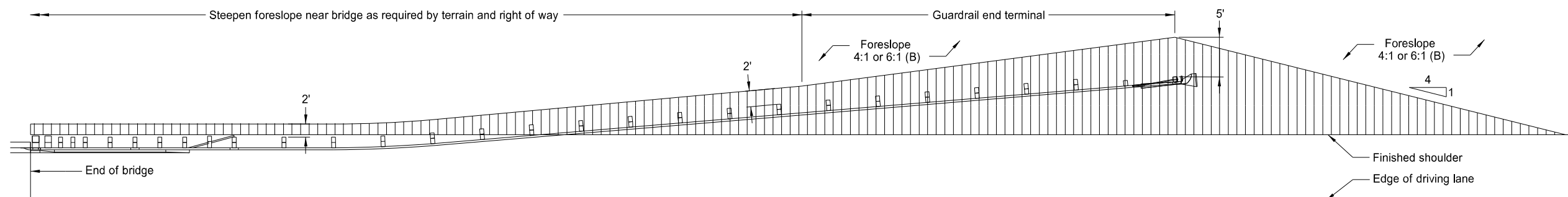


TYPICAL GRADING AT BRIDGE ENDS  
WITH MGS W-BEAM GUARDRAIL

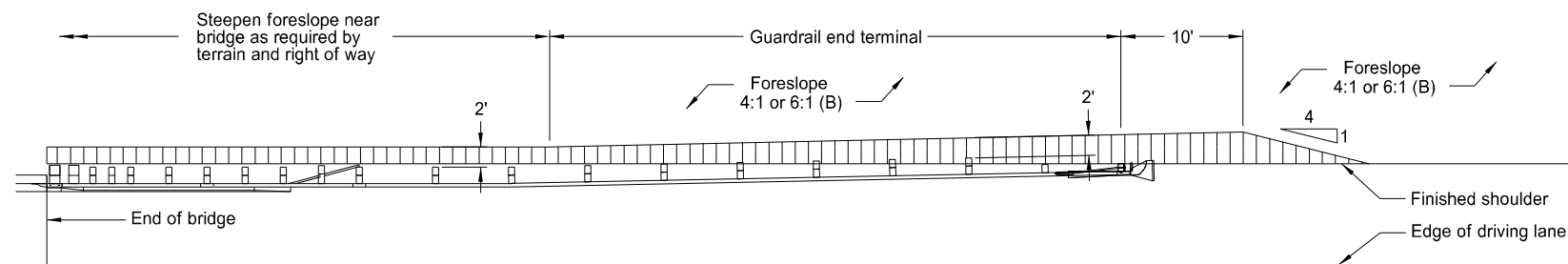
D-764-48



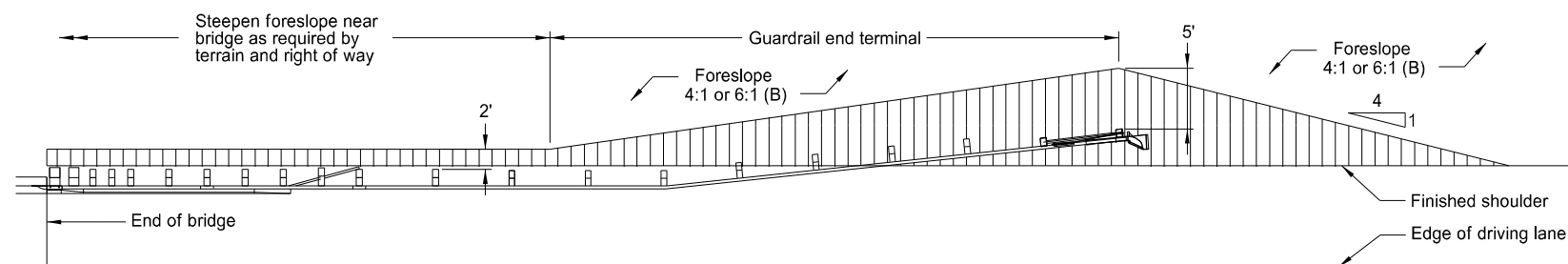
TYPICAL SECTION



PLAN LAYOUT  
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT  
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL

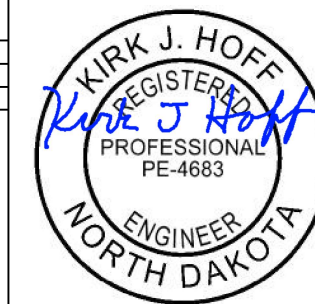


PLAN LAYOUT  
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

- (A) Use slope flatter than 10:1 when required to provide proper guardrail height.
- (B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.
- (C) Measure from top of guardrail to top of surfacing at front face of guardrail.
- (D) Vary dimension at end terminals per Plan Layouts shown on this sheet.

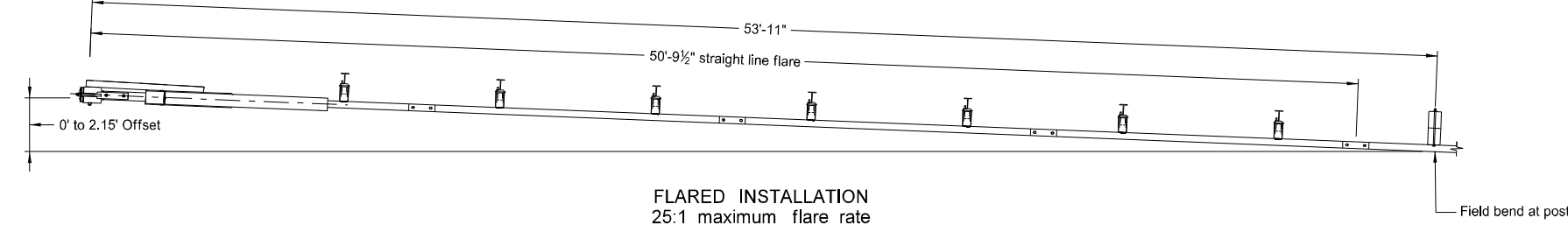
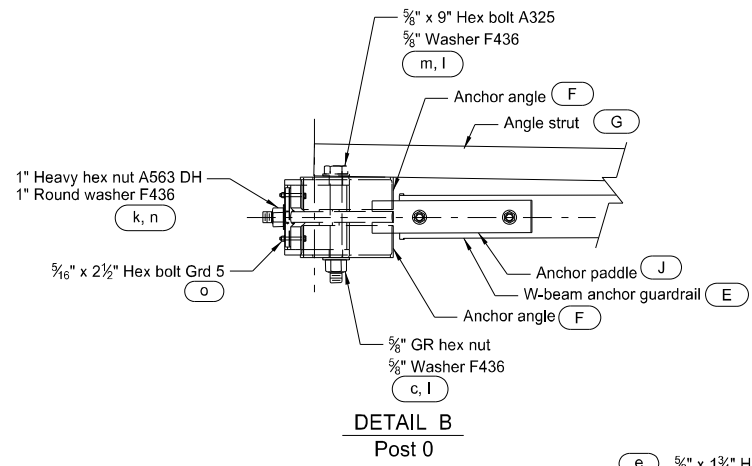
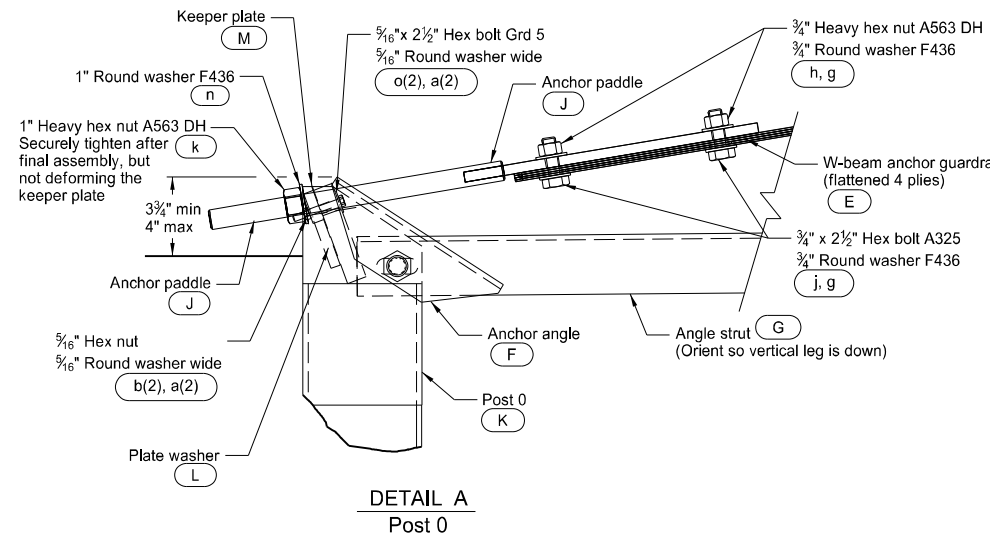
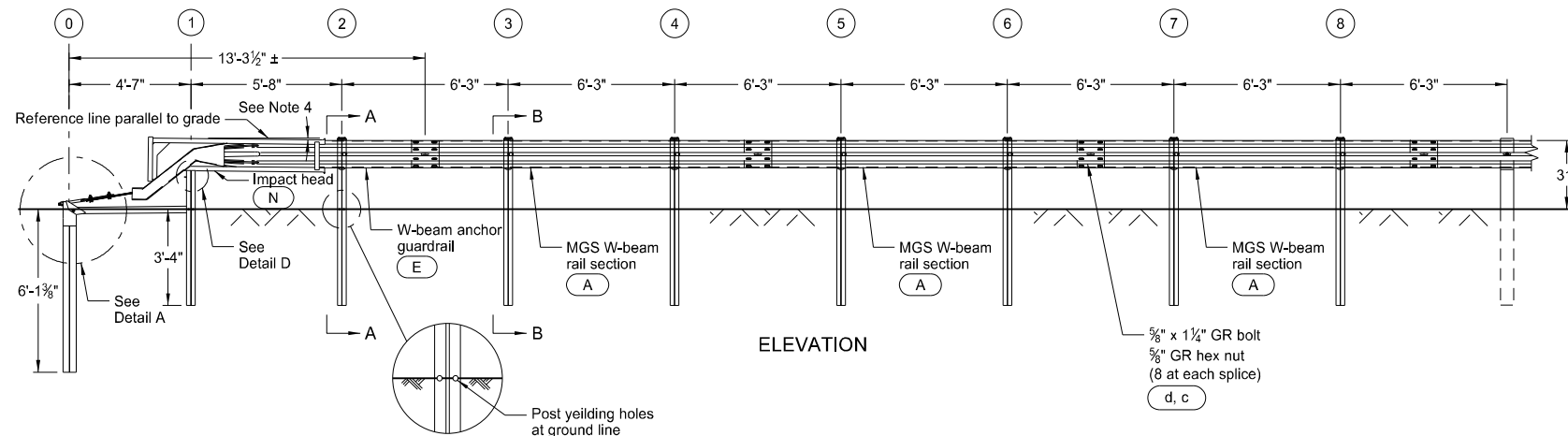
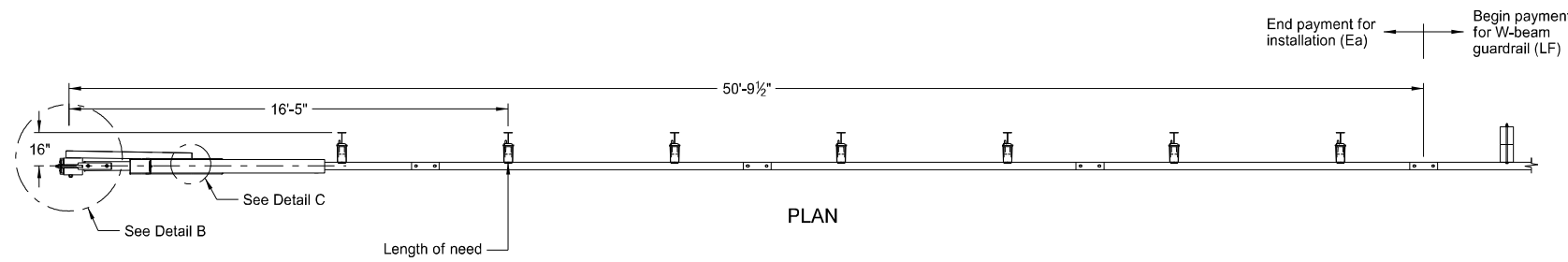
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12/02/20	Updated notes to active voice.



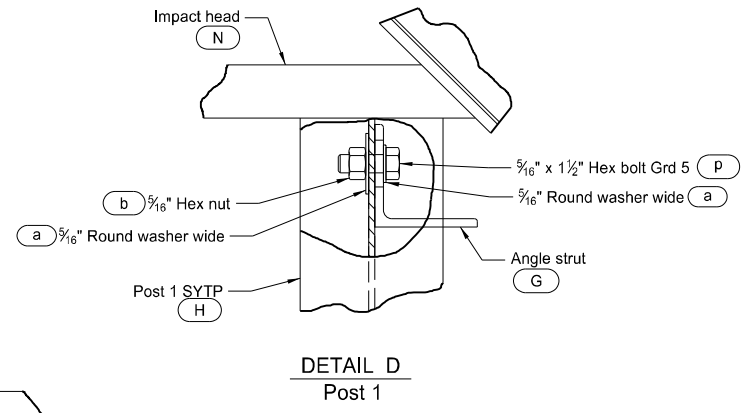
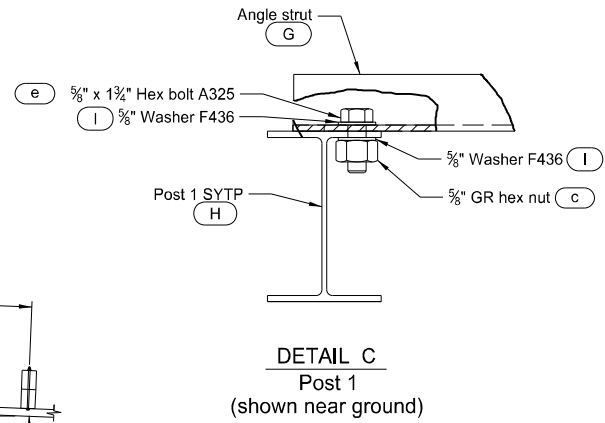
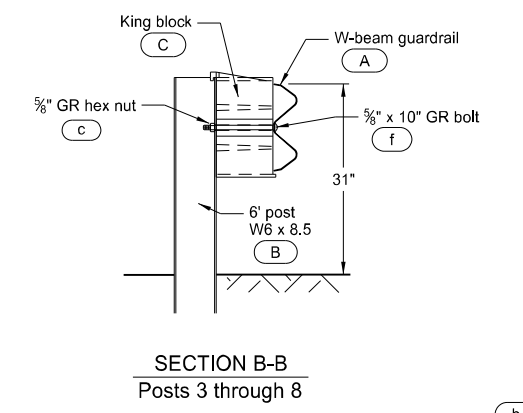
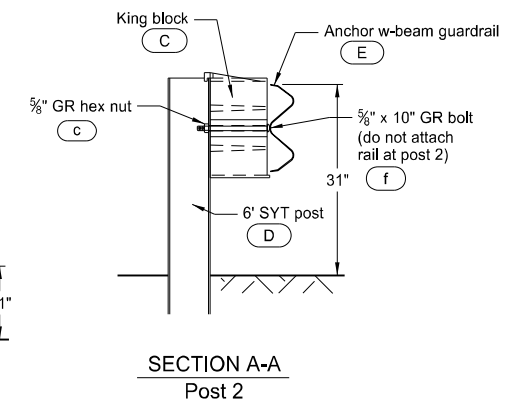
12 02 2020

# MASH SOFTSTOP END TERMINAL - STEEL POST

D-764-50



- GENERAL NOTES:
- Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
  - Flare the SoftStop at a rate of 25:1 or flatter.
  - Do not curve the guardrail within the SoftStop under any circumstances.
  - If necessary, install the SoftStop impact head parallel to the grade line or with an upward tilt. See softstop assembly manual for specific details.



ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	000011	12 / 12'-6" / 3-1/2" / S MGS W-BEAM RAIL SECTION	3
B	000533	6'-0" STEEL POST W6 x 8.5	6
C	006777	KING BLOCK 4" X 7 1/2" X 1'-2"	7
D	015000	6'-0" SYT POST / 8.5 / 31" GR HT	1
E	015200	SFST - ANCHOR GUARDRAIL 12'-6"	1
F	015201	SFST - ANCHOR ANGLE	2
G	015202	SFST - ANGLE STRUT	1
H	015203	SFST - POST #1 SYTP	1
J	015204	SFST - ANCHOR PADDLE	1
K	015205	SFST - POST #0	1
L	015206	SFST - PLATE WASHER	1
M	015207	SFST - KEEPER PLATE	1
N	015208	SFST - IMPACT HEAD	1

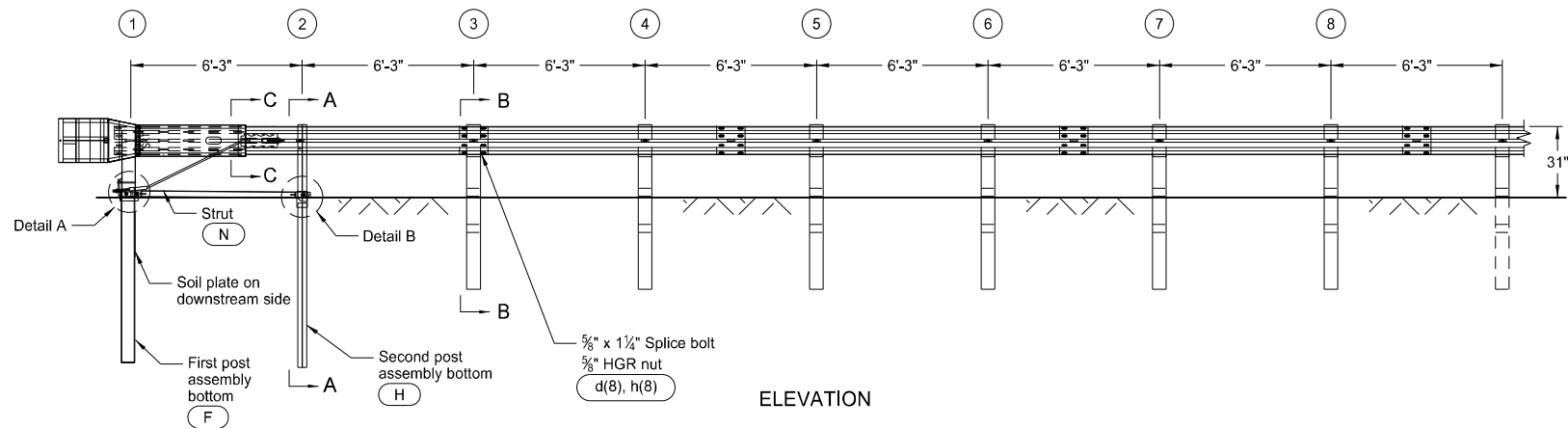
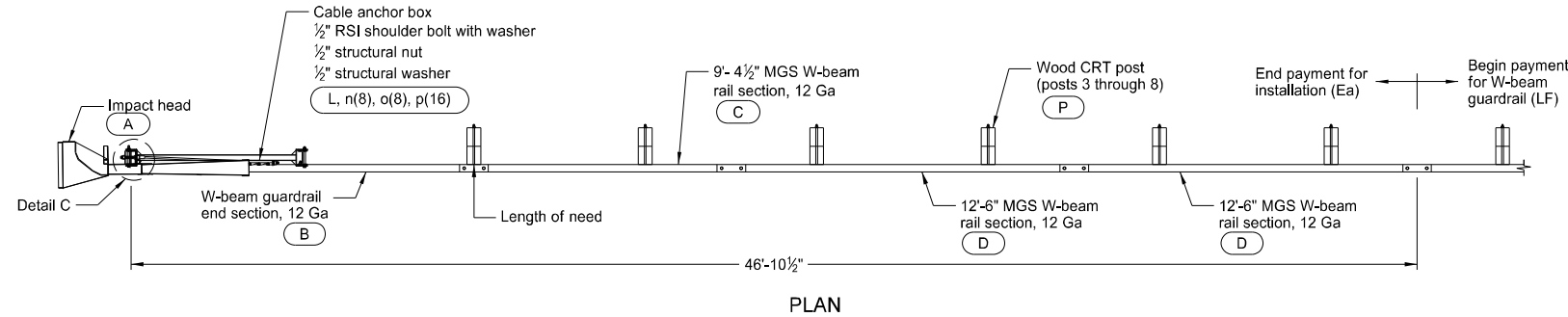
HARDWARE			
a	003240	5/16" ROUND WASHER WIDE	6
b	003245	5/16" HEX NUT	3
c	003340	5/8" GR HEX NUT	41
d	003360	5/8" x 1 1/4" GR BOLT	32
e	003391	5/8" x 1 3/4" HEX BOLT A325	1
f	003500	5/8" x 10" GR BOLT A307	7
g	003701	3/4" ROUND WASHER F436	4
h	003704	3/4" HVY HEX NUT A563 DH	2
j	003717	3/4" x 2 1/2" HEX BOLT A325	2
k	003908	1" HVY HEX NUT A563 DH	1
l	004372	5/8" WASHER F436	4
m	004489	5/8" x 9" HEX BOLT A325	1
n	004902	1" ROUND WASHER F436	1
o	105285	5/16" x 2 1/2" HEX BOLT GRD 5	2
p	105286	5/16" x 1 1/2" HEX BOLT GRD 5	1

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DATE	CHANGE
12-02-20	Updated notes to active voice.



# MASH SEQUENTIAL KINKING TERMINAL - WOOD POST

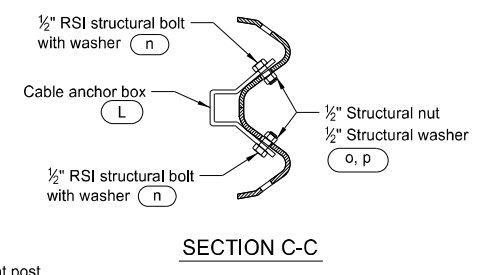
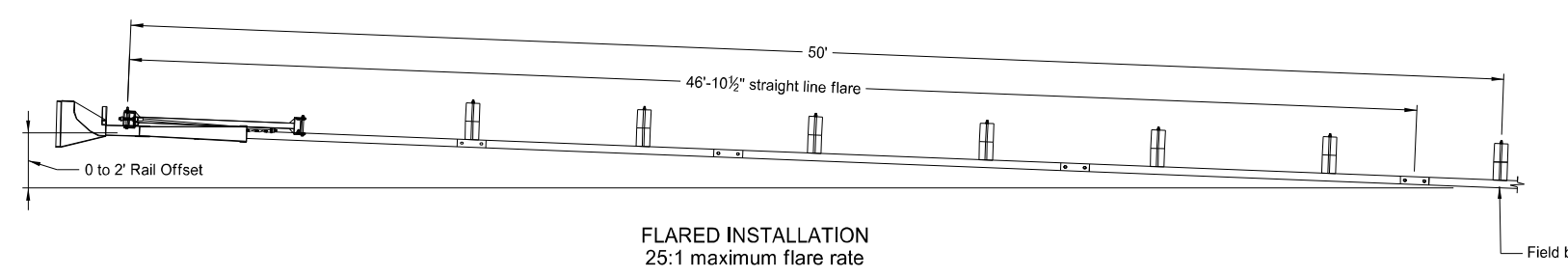
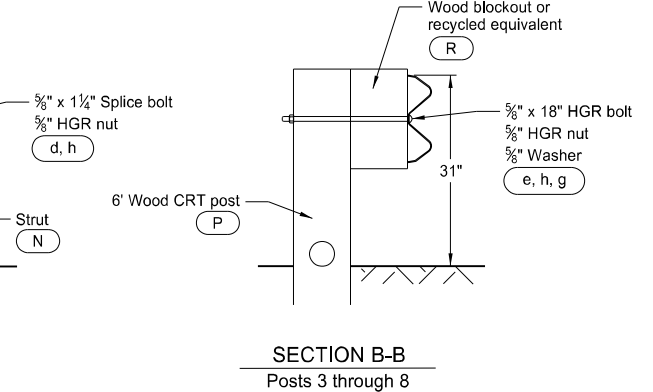
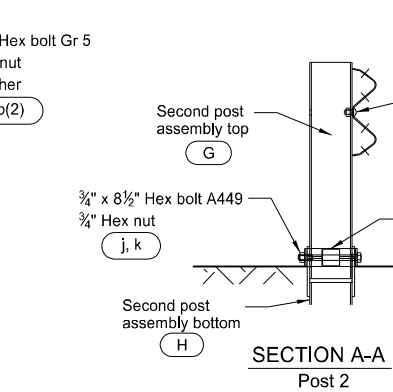
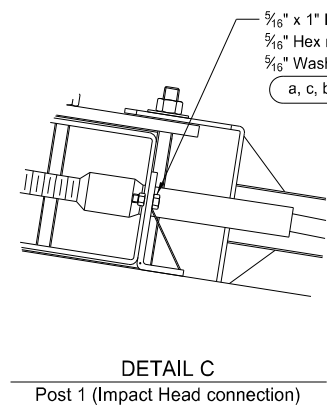
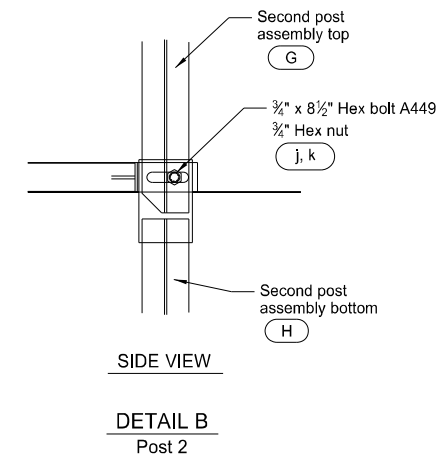
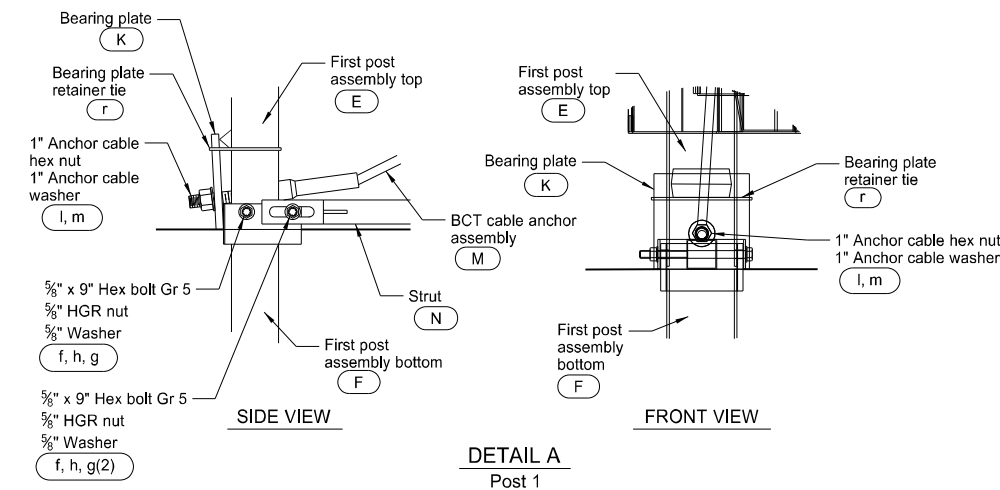
D-764-51



**GENERAL NOTES:**

- Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
- Flare the MSKT at a rate of up to 25:1, as needed to prevent the impact head from encroaching on the shoulder.
- Site grade as necessary to ensure the lower sections of posts do not protrude more than 4" above the ground (measured along a 5' cord).
- Install the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material to prevent settlement.
- Install breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
- "Toe nail" the wood blockouts to the rectangular wood posts at post 3 through post 8 with two 20 penny galvanized nails to prevent them from turning when the wood warps.

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	MS3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4 1/2" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	MTPHP1A	FIRST POST ASSEMBLY TOP (6" X 6" X 1/2" Tube)	1
F	MTPHP1B	FIRST POST ASSEMBLY BOTTOM (6" W6X15)	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
K	E750	BEARING PLATE	1
L	S760	CABLE ANCHOR BOX	1
M	E770	BCT CABLE ANCHOR ASSEMBLY	1
N	MS785	STRUT	1
P	UP671	6" WOOD CRT POST	6
R	P675	WOOD BLOCKOUT OR RECYCLED EQUIVALENT	6
HARDWARE			
a	B5160104A	5/16" x 1" HEX BOLT GR 5	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	5/8" Dia x 1 1/4" SPLICE BOLT	33
e	B581802	5/8" Dia x 18" HGR BOLT (POSTS 3 THRU 8)	6
f	B580904A	5/8" x 9" HEX BOLT GR 5	2
g	W050	5/8" WASHER	9
h	N050	5/8" Dia HGR NUT	35
j	B340854A	3/4" Dia x 8 1/2" HEX BOLT GRD A449	1
k	N030	3/4" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	1/2" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	1/2" STRUCTURAL NUT	8
p	W012A	1/2" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

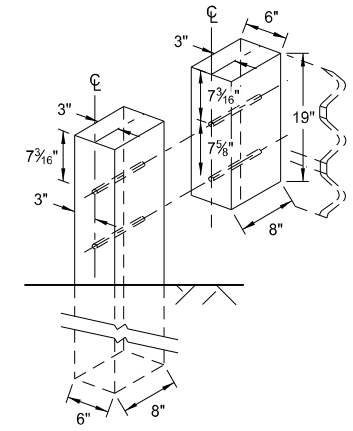
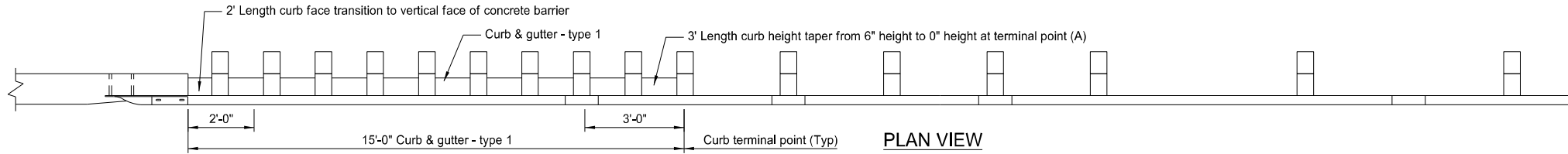


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12-02-20	Updated notes to active voice.

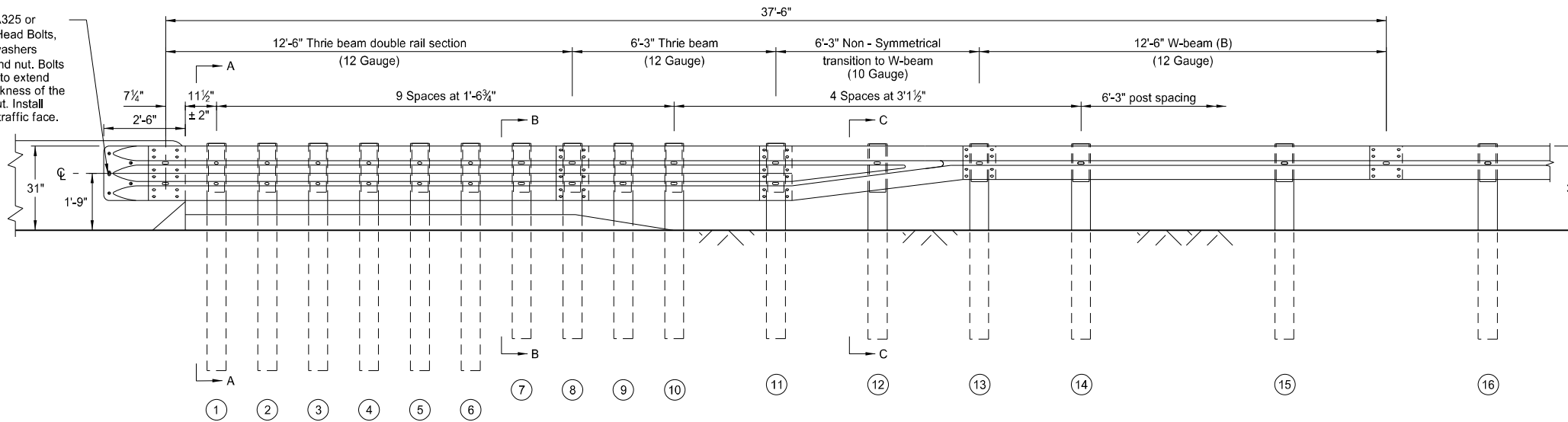
**KIRK J. HOFF**  
REGISTERED  
*Kirk J Hoff*  
PROFESSIONAL  
PE-4683  
ENGINEER  
NORTH DAKOTA  
12 02 2020

# MGS W-BEAM TRANSITION WITH APPROACH CURB TO CONCRETE SINGLE SLOPE OR JERSEY BARRIER

D-764-60

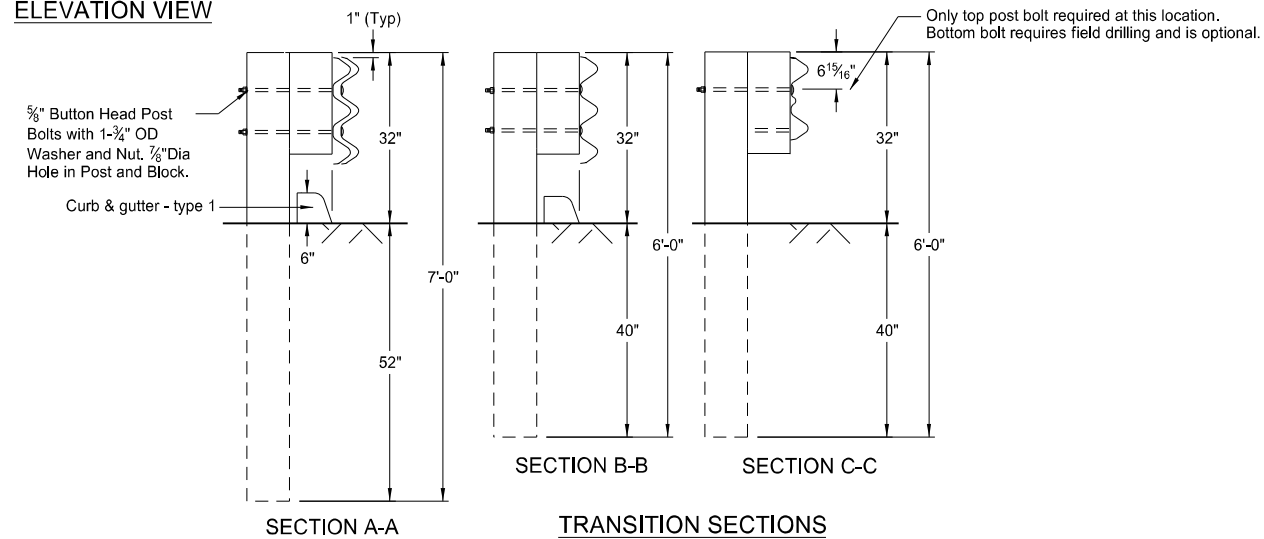
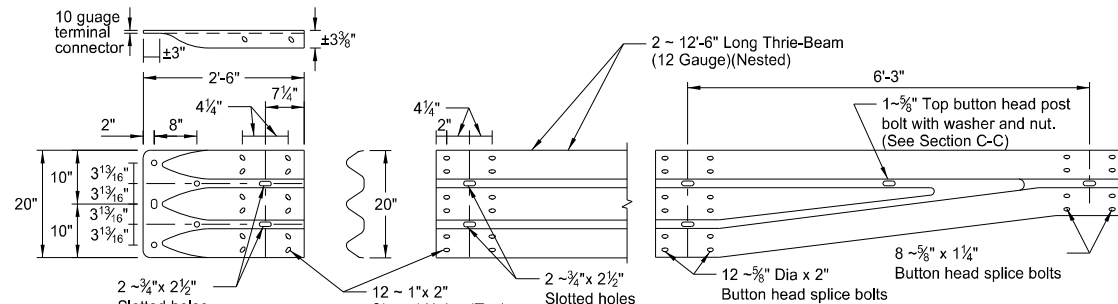


5 - 5/8" Dia. (ASTM A325 or A449) Heavy Hex Head Bolts, with two 1 3/4" O.D. washers under each head and nut. Bolts of sufficient length to extend through the full thickness of the rail, washer, and nut. Install with bolt heads on traffic face.



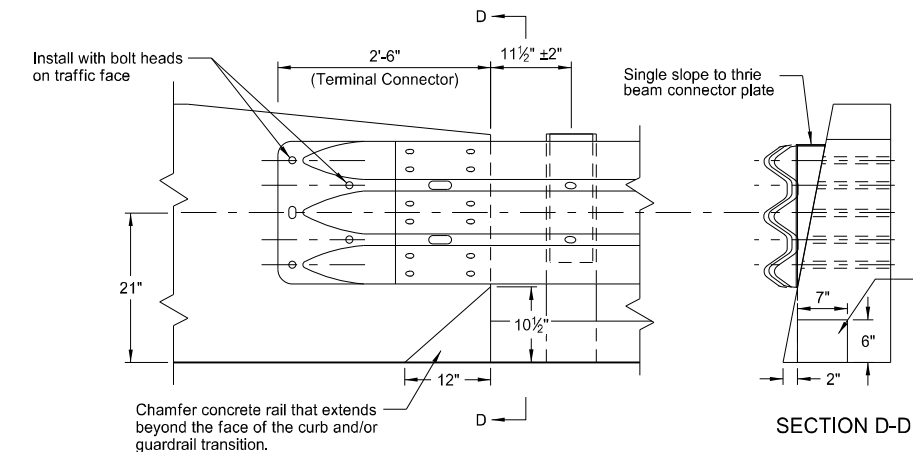
TRANSITION POST AND TIMBER BLOCKOUT SIZING		
POST NO.	POST SIZE	BLOCKOUT SIZE
1-6	6" X 8" X 7'-0" long	6" X 8" X 19"
7-12	6" X 8" X 6'-0" long	6" X 8" X 19"
13-16	6" X 8" X 6'-0" long	6" X 8" X 14"

## ELEVATION VIEW

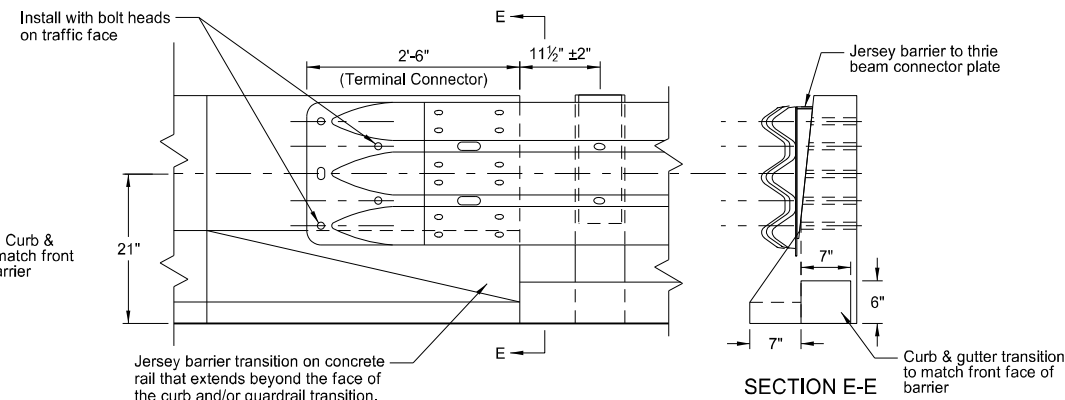


## THRIE-BEAM TERMINAL CONNECTION

## NON-SYMMETRICAL TRANSITION TO W-BEAM (10 GAUGE)



## CONNECTION TO CONCRETE SINGLE SLOPE BRIDGE RAIL AND TRAFFIC BARRIERS



## CONNECTION TO CONCRETE JERSEY BARRIER BRIDGE RAIL AND TRAFFIC BARRIERS

- (A) Where curb is required to continue past 15' length, taper the curb down to 3" height at the terminal point shown above, instead of 0" height. Use 3" height curb between posts 10 and 16.
- (B) Install 12'-6" length W-beam double rail section at location where curb extends past 15' length.

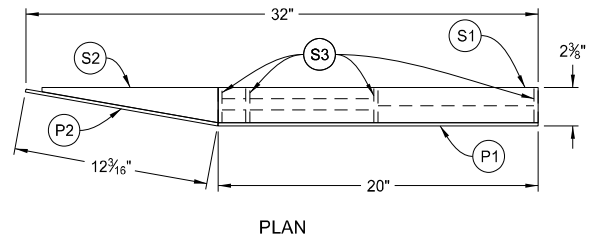
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.



12 02 2020

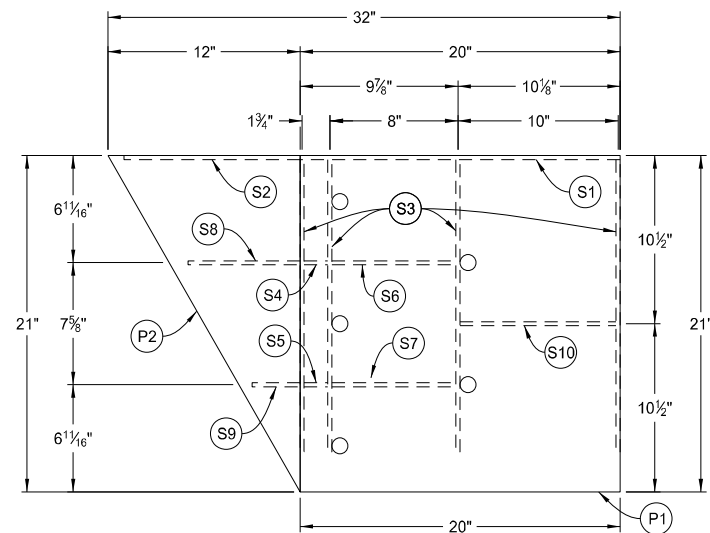
# JERSEY BARRIER TO THRIE BEAM CONNECTOR PLATE DETAILS

D-764-62



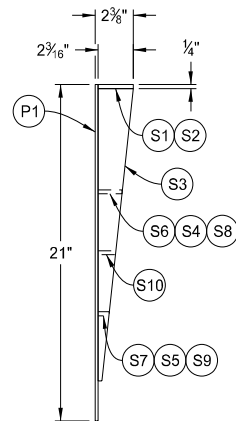
PLAN

NOTE: Assembly Detail is shown for guardrail installation on right hand side of entrance end of bridge barrier. Mirror for opposite side installation.

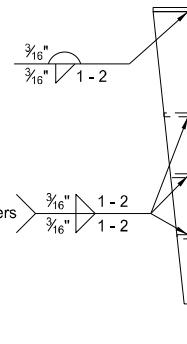


ELEVATION

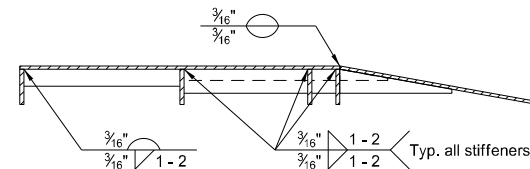
ASSEMBLY DETAIL (Front View)



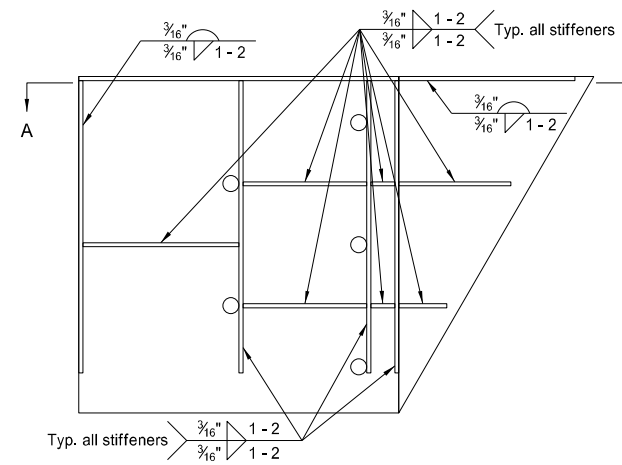
END



END

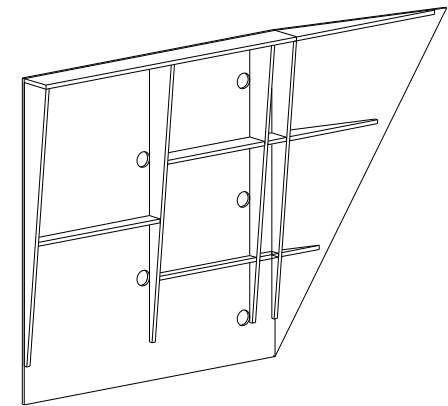


SECTION A-A



ELEVATION

WELDING DETAIL (Back View)



PICTORIAL DRAWING (Showing Back of Connector Plate)

WELDING INSTRUCTIONS:

- (A) Weld stiffeners located on the outside edges of the cover plates as follows:  $\frac{3}{16}$ " continuous back weld on exterior sides and  $\frac{3}{16}$ " fillet weld 1" long spaced at 2" center-to-center on interior sides.
- (B) Weld stiffeners located on the inside of the cover plates as follows:  $\frac{3}{16}$ " fillet weld 1" long spaced at 2" center-to-center.
- (C) Weld cover plates P1 and P2 together with a  $\frac{3}{16}$ " continuous back weld on both sides.
- (D) Weld components with E60 rod.

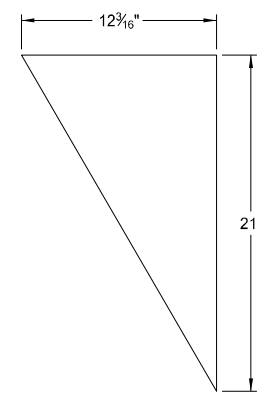


PLATE P2  
Quantity: 1

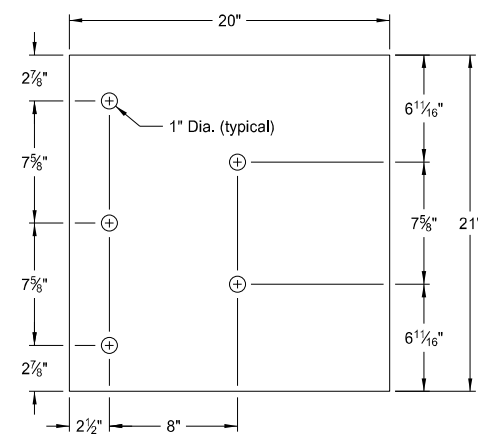
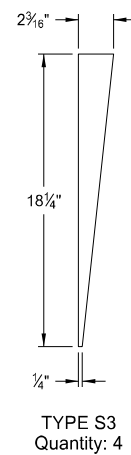


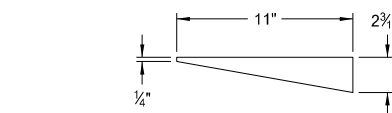
PLATE P1  
Quantity: 1

COVER PLATES

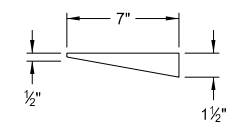


TYPE S3  
Quantity: 4

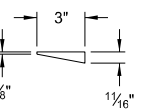
VERTICAL PLATES



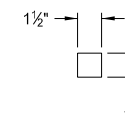
TYPE S2  
Quantity: 1



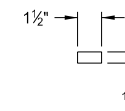
TYPE S8  
Quantity: 1



TYPE S9  
Quantity: 1

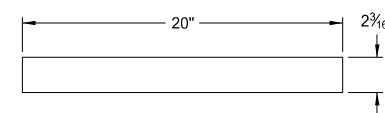


TYPE S4  
Quantity: 1

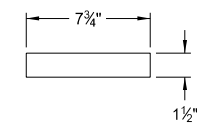


TYPE S5  
Quantity: 1

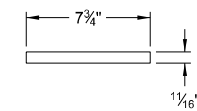
HORIZONTAL PLATES



TYPE S1  
Quantity: 1

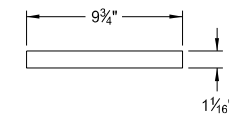


TYPE S6  
Quantity: 1



TYPE S7  
Quantity: 1

STIFFENER PLATES



TYPE S10  
Quantity: 1

NOTES:

1. Fabricate cover plates P1 and P2 from  $\frac{3}{16}$ " thick ASTM A36 Grade structural steel.
2. Fabricate stiffener plates from  $\frac{1}{4}$ " thick ASTM A36 Grade structural steel.
3. Galvanize connector plate in accordance with AASHTO M111.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.



12 02 2020