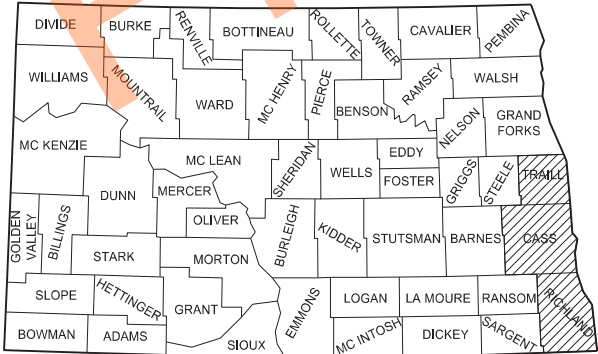


DESIGN DATA - ND 18 Str No. 18-045.621				
Traffic	Average Daily			
Current 2023	Pass: 115	Trucks: 400	Total: 515	
Preventive Maintenance				
DESIGN DATA - HWY 10 Str No. 10-006.642				
Traffic	Average Daily			
Current 2023	Pass: 245	Trucks: 40	Total: 285	
Preventive Maintenance				
DESIGN DATA - ND 18 Str No. 18-083.586				
Traffic	Average Daily			
Current 2023	Pass: 1175	Trucks: 295	Total: 1470	
Preventive Maintenance				
DESIGN DATA - ND 18 Str No. 18-106.082				
Traffic	Average Daily			
Current 2023	Pass: 530	Trucks: 220	Total: 750	
Preventive Maintenance				

DESIGNER Adam Kaye
DESIGNER Samuel Ihrke
DESIGNER



STATE COUNTY MAP

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

Richland, Cass & Traill County
5 Miles South of ND 46, 3.7 Miles East of ND 18,
0.6 Miles North of Amenia, and 0.3 Miles South of Blanchard

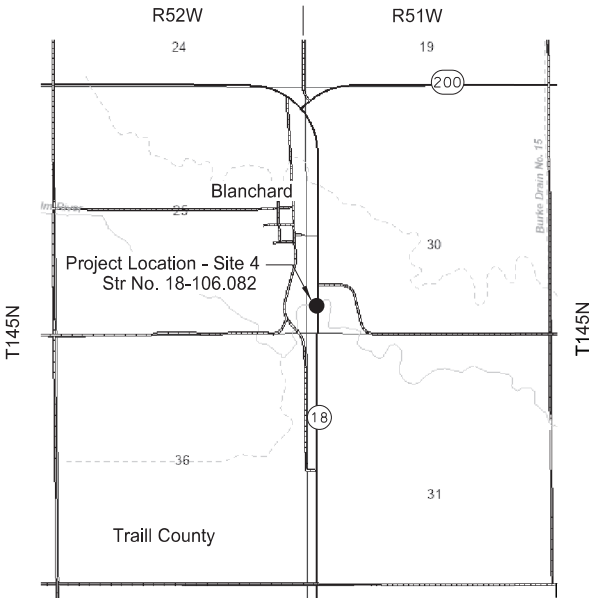
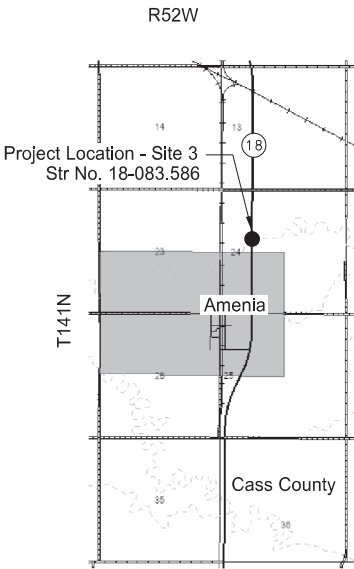
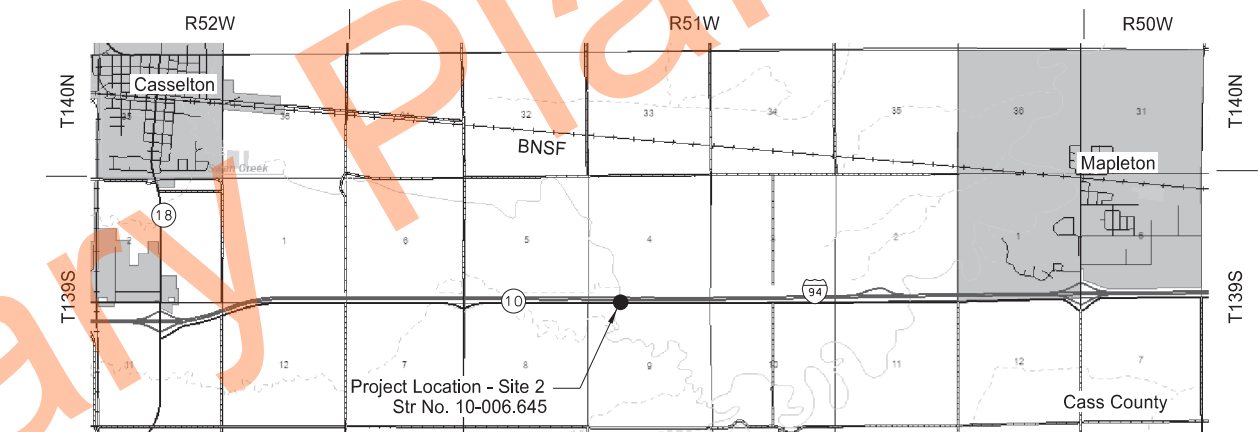
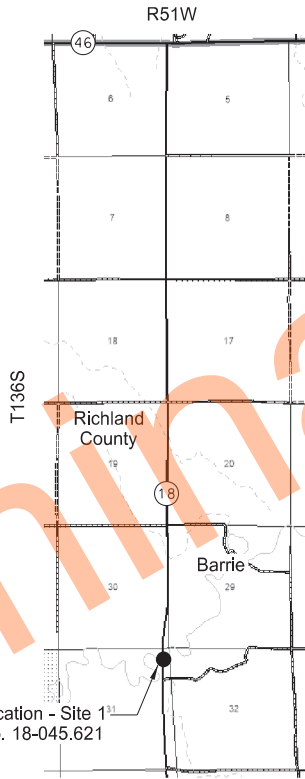
Structure Repairs, Mill and HMA Overlay, and Guardrail

SS-8-999(053)

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	23774	1	1

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2024
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-8-999(053)	0.457	
Site 1	0.111	
Site 2	0.090	
Site 3	0.124	
Site 4	0.131	



ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson

Thorenson, Jason R.
08/19/24

Houston Engineering, Inc.

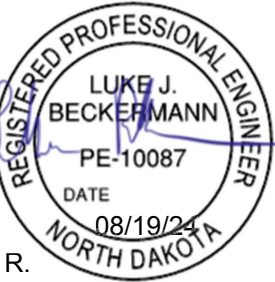
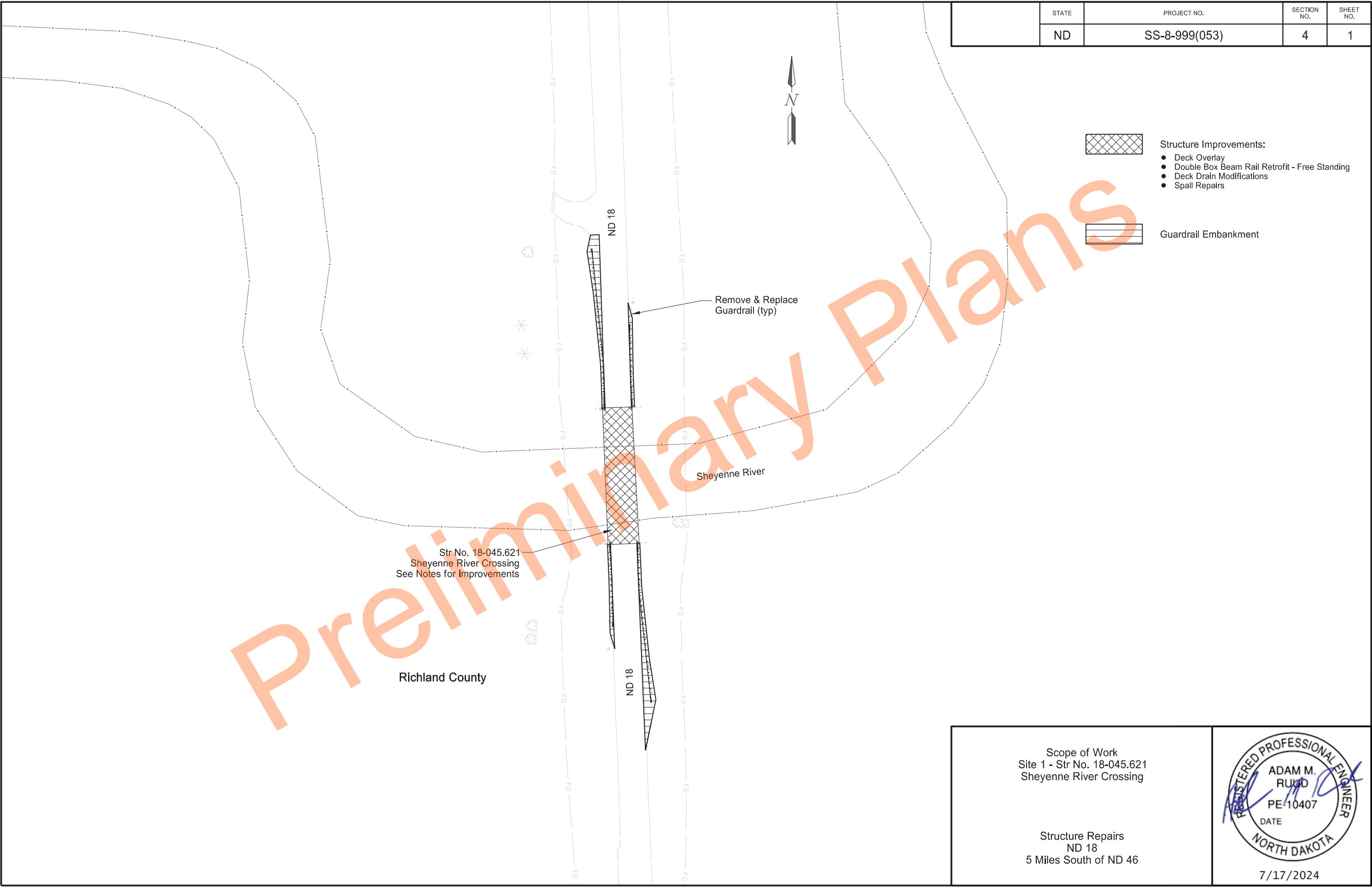


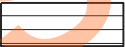
TABLE OF CONTENTS						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	SS-8-999(053)	2	1
PLAN SECTIONS			LIST OF STANDARD DRAWINGS						
Section	Page(s)	Description	Number	Description					
1	1	Title Sheet	D-101-1, 2, 3, 4	NDDOT Abbreviations					
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
4	1 - 4	Scope of Work	D-101-20, 21	Line Styles					
6	1 - 3	Notes	D-101-30, 31, 32, 33	Symbols					
6	4	Environmental Notes	D-258-1	Standard Slope Protection Under Bridges					
8	1 - 2	Quantities	D-261-1	Erosion Control - Fiber Roll Placement Details					
10	1 - 3	Basis of Estimate	D-704-1	Attenuation Device					
20	1	General Details	D-704-9	Construction Sign Details - Terminal And Guide Signs					
30	1 - 8	Typical Sections	D-704-10	Construction Sign Details - Regulatory Signs					
40	1 - 4	Removals	D-704-11, 11A	Construction Sign Details - Warning Signs					
76	1 - 4	Temporary Erosion Control	D-704-12	Shoulder Closure Tapers					
77	1 - 4	Permanent Erosion Control	D-704-13	Barricade And Channelizing Device Details					
82	1	Survey Data Layouts	D-704-14	Construction Sign Punching And Mounting Details					
90	1 - 4	Paving Layouts	D-704-15	Road Closure Layouts					
100	1 - 9	Work Zone Traffic Control	D-704-16	Lane Closure On A Two Lane Road Using Traffic Control Signals					
130	1 - 12	Guardrail	D-704-17	Sign Layout For One Lane Closure Two Lane Roadway					
170	1 - 25	Bridges	D-704-21	Detour And Roadway Diversion Sign Layouts					
			D-704-22	Construction Truck And Temporary Detour Layouts					
			D-704-24	Shoulder Closures And Bridge Painting Layouts					
			D-704-26	Miscellaneous Sign Layouts					
			D-704-27	Mobile Operation (Pavement Marking)					
			D-704-33	Two-Lane Roadway Portable Rumble Strips					
			D-704-34	Sign Layout For One Lane Closure					
			D-704-50	Portable Sign Support Assembly					
			D-704-51	Portable Precast Concrete Median Barrier (Temporary Usage)					
			D-762-4	Pavement Marking					
			D-762-11	Short-Term Pavement Marking					
			D-764-38	MGS Flared Energy Absorbing Terminal - Wood Post					
			D-764-40	MGS W-Beam Guardrail General Details					
			D-764-48	Typical Grading at Bridge Ends with MGS W-Beam Guardrail					
			D-764-51	MASH Sequential Kinking Terminal - Wood Post					
SPECIAL PROVISIONS									
Number	Description								
PSP 1	Permits and Environmental Considerations								
SSP 1	Temporary Erosion and Sediment Best Management Practices								
SSP 2	Federal Migratory Bird Treaty Act								
SP 28(24)	Spall Repair								
SP 29(24)	Commercial Grade Asphalt								
SP 30(24)	Temporary Water Diversion								
SP 31(24)	Hydrodemolition and Overlay of Concrete Bridge Decks								



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- Structure Improvements:
- Deck Overlay
 - Double Box Beam Rail Retrofit - Free Standing
 - Deck Drain Modifications
 - Spall Repairs



Guardrail Embankment

Remove & Replace
Guardrail (typ)

Str No. 18-045.621
Sheyenne River Crossing
See Notes for Improvements

Richland County

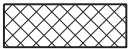
Scope of Work
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

Structure Repairs
ND 18
5 Miles South of ND 46



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	4	2



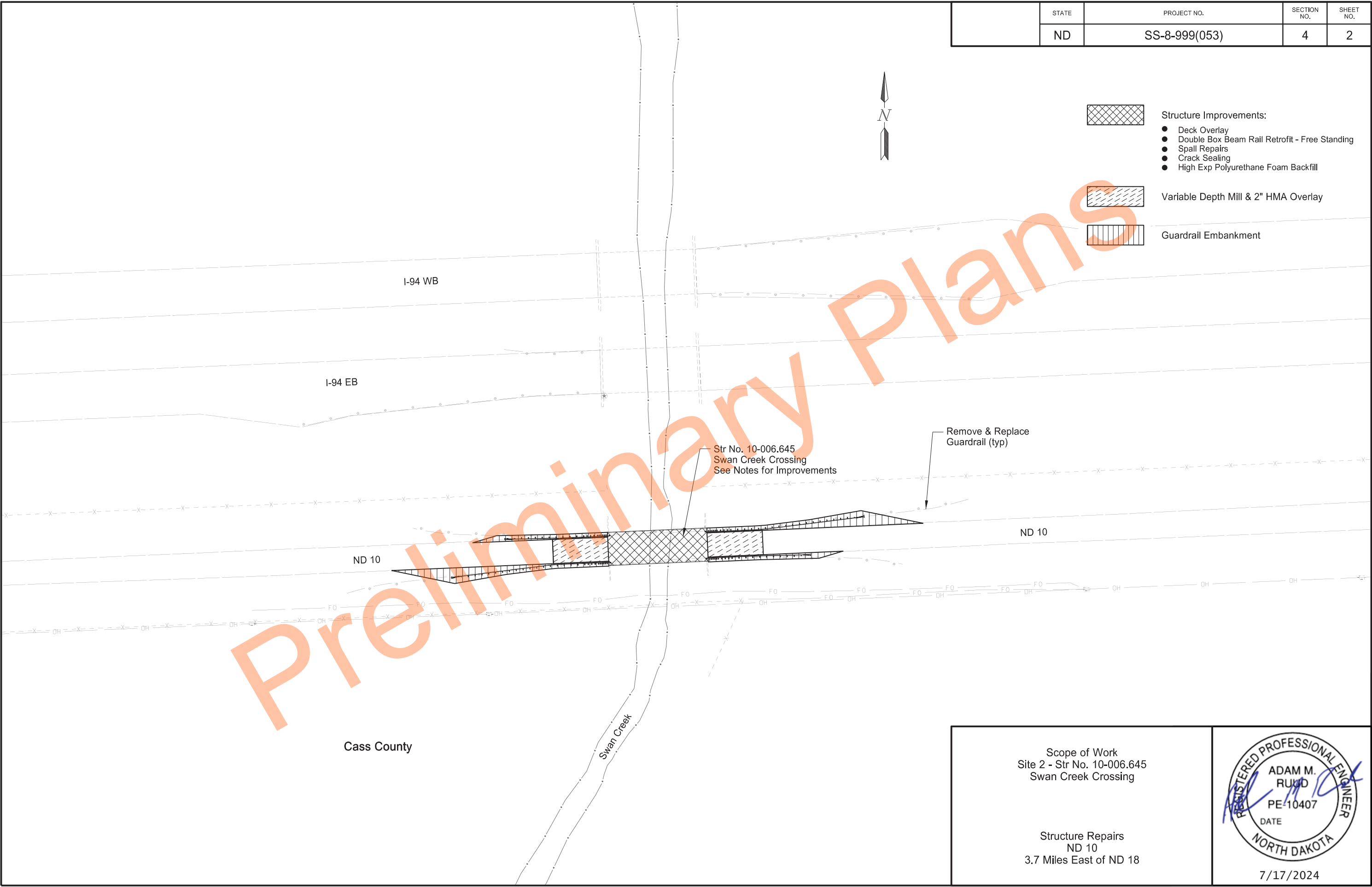
- Structure Improvements:
- Deck Overlay
 - Double Box Beam Rail Retrofit - Free Standing
 - Spall Repairs
 - Crack Sealing
 - High Exp Polyurethane Foam Backfill



Variable Depth Mill & 2" HMA Overlay



Guardrail Embankment



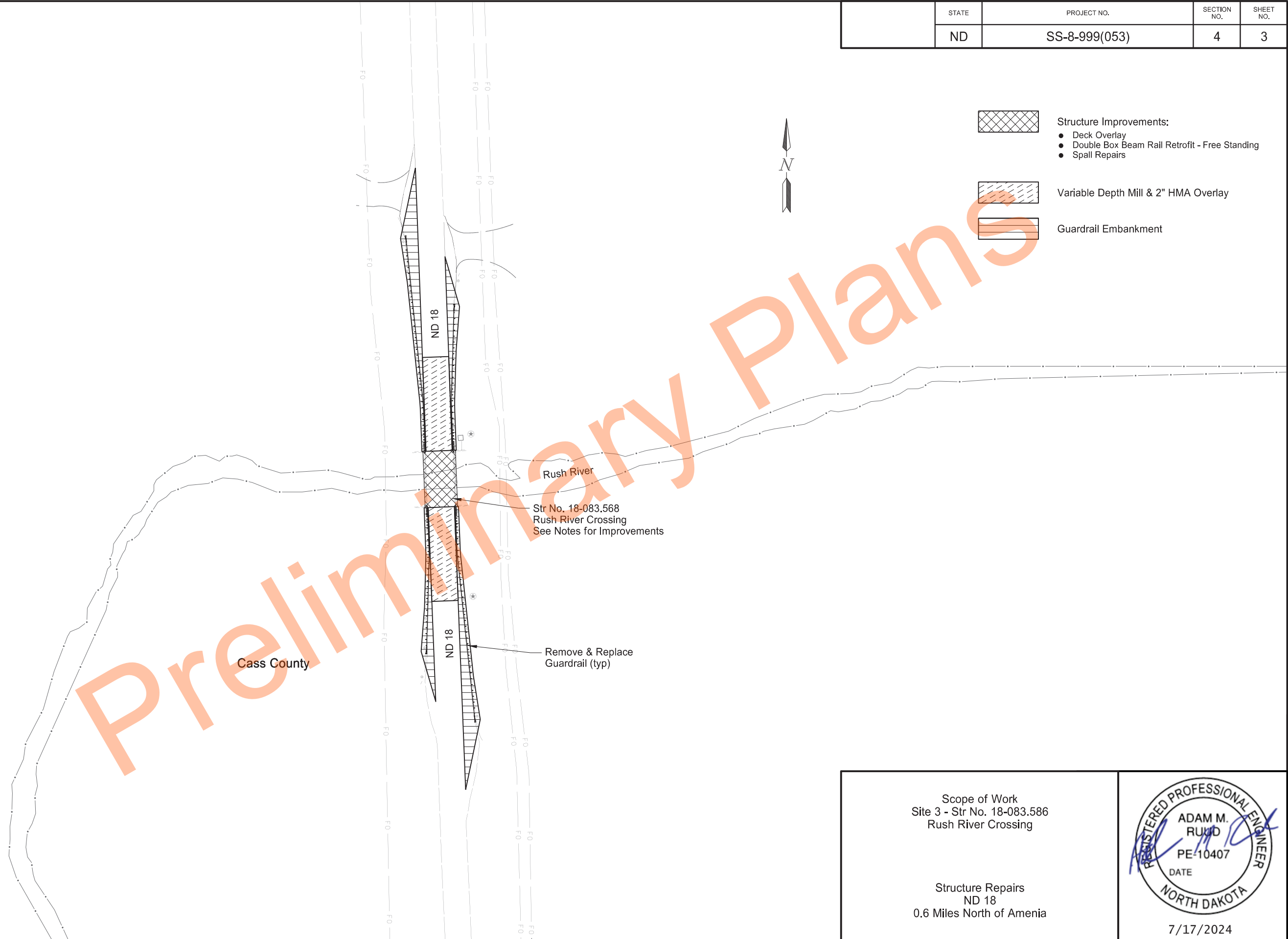
Scope of Work
Site 2 - Str No. 10-006.645
Swan Creek Crossing

Structure Repairs
ND 10
3.7 Miles East of ND 18



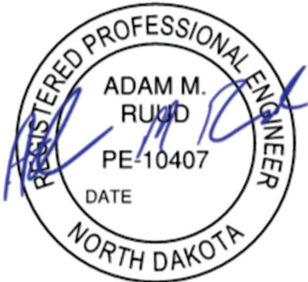
7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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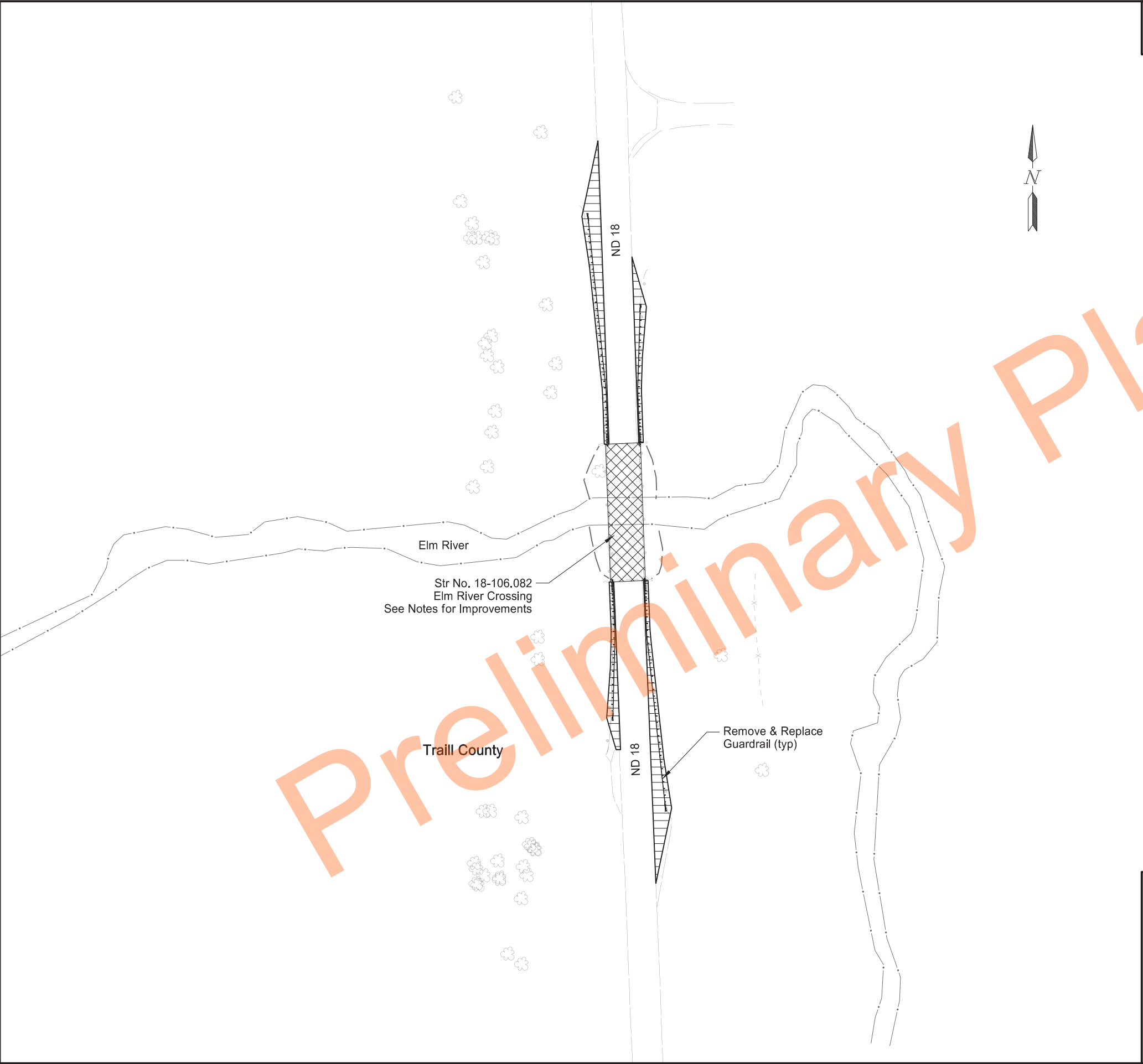
Scope of Work
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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- Structure Improvements:
- Deck Overlay
 - Double Box Beam Rail Retrofit - Free Standing
 - Curb Replacement
 - Crack Sealing
 - Spall Repairs



Guardrail Embankment

Scope of Work
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
ND 18
0.3 Miles South of Blanchard



7/17/2024

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	6	1

NOTES

- 100-P01 COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2025 construction season. This project is SS-8-018(115)025 Mill & Overlay and is located along ND 18 from Wyndmere to ND 46.
- 100-P02 COORDINATION OF PROJECTS: Coordinate with the Fargo Moorhead Area Flood Diversion project for traffic control and any other necessary project items. This project crosses I-94 near RP 342.
- 105-110 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic.

Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection.

Use a vacuum or pick-up type sweeper to perform this work.
- 202-P01 REMOVAL OF BITUMINOUS SURFACING: Remove surfacing and aggregate base at the new guardrail installation locations.

Remove topsoil. Excavate and dispose of existing embankment material to allow for placement of 6 inch Salvaged Base Course and 2 inch Commercial Grade Hot Mix Asphalt. Include the cost of labor, equipment and materials to remove surfacing, aggregate base, topsoil stripping, topsoil placement and excavated embankment material in the unit price bid for "Removal of Bituminous Surfacing".

Salvaging of the topsoil, reshaping of the topsoil and grading for the guardrail embankment to be incidental to Removal of Bituminous Surfacing.
- 251-P01 SEEDING CLASS II: Seeding Class II and Temporary Cover Crop to be paid for by plan quantity.
- 253-P01 HYDRAULIC MULCH: Section 253.04.B.2 Temporary Care Maintenance does not apply. Hydraulic Mulch to be paid for by plan quantity.
- 704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (91) 2' x 10' concrete barriers. They can be picked up and returned to the Casselton yard at 15482 37th St SE in Casselton ND 58012. The hardware can be picked up and returned to the Fargo District yard at 503 38th St S in Fargo ND 58103. Contact the Fargo District office at 701-239-8900 to facilitate the exchanges.

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.

Include all costs associated with median barriers in the contract unit price for "State Furnished Median Barrier".

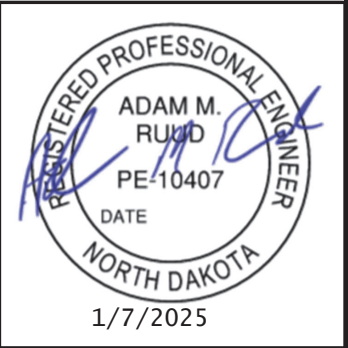
- 704-450 LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL: Install either the signal controlled lane closure on Standard D-704-16 or the flagging controlled lane closure on Standard D-704-17.

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".



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NOTES

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.

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 designated for obliteration is allowed. Choose to remove or mask marking as specified in Section 704.04 N, "Obliteration of Pavement Markings" or mask markings. Mask markings using removable, non-reflective preformed tape that is approximately the same color as the pavement surface and that overlaps the marking a minimum of 1 inch on each side.

704-P01 TEMPORARY TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using traffic control sign layouts (shown in Section 100 of the plans) and Standard Drawings listed below:

D-704-12 for shoulder closure tapers.

D-704-15, Layout Type A for temporary road closures.

D-704-16 for lane closures on a two-lane road using traffic control signals.

D-704-17 for one lane closure on a two-lane road using flaggers and portable median barrier.

D-704-21, Layout I for temporary detour.
D-704-22, Layouts Type K and L for trucks entering and crossing roadways.

D-704-24, Layout Type R for shoulder work.

D-704-26, Layout Type CC, EE, and GG for milling and paving operations.

D-704-33 for two-lane roadway portable rumble strips.

704-P02 TEMPORARY TRAFFIC CONTROL PHASING: Sites 1 and 2 may be completed concurrently and Sites 3 and 4 may be completed concurrently. No work will be allowed at Sites 3 and 4 while Sites 1 and 2 are ongoing. No work will be allowed at Sites 1 and 2 while Sites 3 and 4 are ongoing. The traffic control details, as indicated in the plans, have been developed based on the premise that this project will be constructed as noted below. Adequate traffic control signs and devices have been provided in the Traffic Control Devices List to allow concurrent work at all sites. Quantities listed in Section 8 are prorated by Site based on the overall quantity required for the project. See Section 100 for actual devices required per Phase.

If electing to utilize a different phasing plan, submit a detailed traffic control plan to the Engineer for approval a minimum of 14 days prior to installing traffic control device.

The construction phasing plan is listed below.

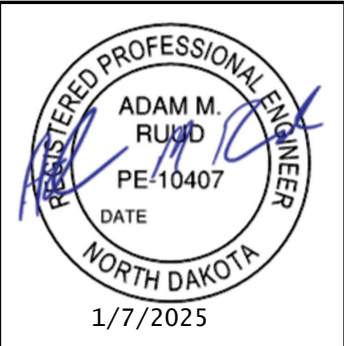
Site 1 – Structure No. 18-045.621 – Sheyenne River Crossing:

Use interim traffic signals and median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 or D-704-17 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-15 Layout Type A, D-704-17, and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for paving operations on the bridge ends.

Site 2 – Structure No. 10-006.645 – Swan Creek Crossing:

Close roadway and detour traffic to Interstate 94 for up to six consecutive weeks. Install signs and devices in accordance with Standard Drawing D-704-21 and the modifications shown on the traffic control layout sheet.



NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	6	3

Site 3 – Structure No. 18-083.586 – Rush River Crossing:

Use interim traffic signals and median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 or D-704-17 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-15 Layout Type A, D-704-17, and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations on the bridge ends.

Site 4 – Structure No. 18-106.082 – Elm River Crossing:

Use interim traffic signals and median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 or D-704-17 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for paving operations on the bridge ends.

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”.

764-P02 MGS W-BEAM GUARDRAIL: Use of composite blocks in lieu of wood blocks at posts 10+ as shown in “MGS Thrie Beam Transition to Double Box Beam Retrofit” detail is acceptable. Provide composite blocks that have been MASH tested and approved. Submit materials and documentation for approval prior to installation.

704-P03 PORTABLE CHANGEABLE MESSAGE SIGN: Install Portable Changeable Message Signs (PCMS) 2 weeks before work begins on the project. The Engineer will determine the locations for PCMS installation. Relocate the PCMS as directed by the Engineer.

A total of eight (4) PCMS have been provided for use on the project. Two (2) PCMS have been provided for each site.

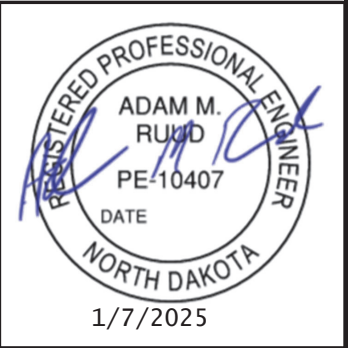
Provide an operator trained in the use of the PCMS.

The Engineer will determine the message to be displayed. Program the message within one hour of the Engineer’s request to change the message.

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

764-P01 REMOVED W-BEAM GUARDRAIL: Deliver the removed w-beam guardrail and end treatment materials from site 1 (Str No. 18-045.621) to the NDDOT Casselton Yard at 15482 37th St SE, Casselton and neatly stack at the location in the storage yard.

Deliver the removed w-beam guardrail and end treatment materials from sites 2, 3 and 4 (Str No. 10-006.645, 18-083.586, 18-106.082) to the NDDOT Leonard Yard at 5366 154th Ave SE, Leonard and neatly stack at the location in the storage yard.



ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	6	4

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

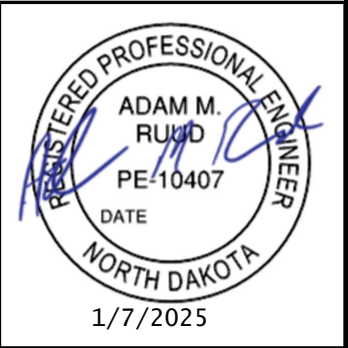
EN-1 SPAWNING RESTRICTION: Do not work within the Sheyenne River from April 15 to June 1.

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
Northern Long-Eared Bat	Forested/Wooded Areas/Bridges/Box Culverts/Caves/Mines	Active Season: April 15 - October 31* Inactive Season: Nov 1 – April 14*

*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).



Estimated Quantities

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	Site 1 - Str No 18-045.621	Site 2 - Str No 10-006.645	Site 3 - Str No 18-083.586	Site 4 - Str No 18-106.082	TOTAL
103	0100	CONTRACT BOND	L SUM	0.31	0.17	0.22	0.3	1
201	0330	CLEARING & GRUBBING	L SUM				1	1
202	0129	REMOVAL OF CURB	LF				140	140
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	33		789	310	1132
216	0100	WATER	M GAL	3.2	3.1	7.4	5.7	19.4
251	0200	SEEDING CLASS II	ACRE	0.18	0.22	0.55	0.49	1.44
251	2000	TEMPORARY COVER CROP	ACRE	0.18	0.22	0.55	0.49	1.44
253	0201	HYDRAULIC MULCH	ACRE	0.36	0.44	1.1	0.98	2.88
261	0112	FIBER ROLLS 12IN	LF	530	778	586	1636	3530
261	0113	REMOVE FIBER ROLLS 12IN	LF	265	389	293	818	1765
302	0100	SALVAGED BASE COURSE	TON	159	157	368	283	967
411	0105	MILLING PAVEMENT SURFACE	SY		244	622		866
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	52	82	180	96	410
602	0130	CLASS AAE-3 CONCRETE	CY				7	7
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	517	240	200	498	1455
602	7000	SPECIAL SURFACE FINISH	SF	1085	690	370		2145
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS				970	970
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	310	180	120	260	870
650	0704	OVERLAY CONCRETE	CY	36	14	12	25	87
650	0707	DECK CONCRETE	CY	3	2	2	5	12
650	0710	CLASS 1-H REMOVAL	SY	517	240	200	434	1391
650	0720	CLASS 1 REMOVAL	SY	517	240	200	434	1391
650	0723	CLASS 3 REMOVAL	SY	16	16	6	13	51
650	0724	CLASS 4 REMOVAL	SY	5	6	2	4	17
702	0100	MOBILIZATION	L SUM	0.31	0.17	0.22	0.3	1
704	0100	FLAGGING	MHR	75		75	75	225
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1753	1194	1491	1565	6003
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	0.6		0.7	0.7	2
704	1043	ATTENUATION DEVICE-TYPE B-65	EA	1		1	2	4
704	1048	PORTABLE RUMBLE STRIPS	EA	1		1	2	4
704	1052	TYPE III BARRICADE	EA	1	9	1	1	12
704	1060	DELINEATOR DRUMS	EA	6		7	7	20
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	235		222	231	688
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	331		267	312	910
704	4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1	1	1	1	4
762	0422	SHORT TERM 6IN LINE-TYPE R	LF	3552		3352	3492	10396
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	24		24	24	72
762	1106	PVMT MK PAINTED 6IN LINE	LF	4209	4720	3996	7384	20309
764	0131	W-BEAM GUARDRAIL	LF	360	284	586	510	1740
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	4	4	4	4	16
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	440	692	740	656	2528
764	2081	REMOVE END TREATMENT & TRANSITION	EA	4	4	4	4	16
900	1000	TEMPORARY STREAM DIVERSION	EA				1	1
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL		100			100
930	8644	SILICONE SEALANT	LF				121	121
930	9223	CRACK SEALING	LF		54		168	222
930	9534	MODIFY DECK DRAIN	EA	12				12

Estimated Quantities								STATE	PROJECT NO.	SECTION NO.	SHEET NO.
								ND	SS-8-999(053)	8	2
SPEC	CODE	ITEM DESCRIPTION	UNIT	Site 1 - Str No 18-045.621	Site 2 - Str No 10-006.645	Site 3 - Str No 18-083.586	Site 4 - Str No 18-106.082	TOTAL			
930	9612	SPALL REPAIR	SF	74	46	39	61	220			

Preliminary Plans

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	10	1

		Site 1 - Guardrail Area Reconstruction (Str No. 18-045.621)																	
		Lt Guardrail Paving: Sta 102+63.05 to Begin Bridge Sta 103+80.97 Rt Guardrail Paving: Sta 101+85.03 to Begin Bridge Sta 103+80.92									Lt Guardrail Paving: End Bridge Sta 105+35.80 to Sta 107+70.04 Rt Guardrail Paving: End Bridge Sta 105+35.86 to Sta 106+53.99								
Material	Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Site 1 Total
		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt	
Salvaged Base Course (1.875 TON/CY)	TON	404	1433	6	119	197	0.50	19	57	TON	1593	408	6	236	119	0.50	64	19	159
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	404	1433	2	119	197	0.056	6	19	TON	1593	408	2	236	119	0.056	21	6	52

		Site 2 - Guardrail Area Reconstruction (Str No. 10-006.645)																		
		Lt Guardrail Paving: Sta 202+49.14 to Begin Bridge Sta 203+71.33 Rt Guardrail Paving: Sta 201+74.71 to Begin Bridge Sta 203+71.38									Lt Guardrail Paving: End Bridge Sta 204+61.38 to Sta 206+57.21 Rt Guardrail Paving: End Bridge Sta 204+61.43 to Sta 205+83.64									
Material	Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Site 2 Total	
		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		
Salvaged Base Course (1.875 TON/CY)	TON	527	1403	6	123	199	0.50	23	56	TON	1379	527	6	199	123	0.50	55	23	157	
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	527	1403	2	123	199	0.056	8	19	TON	1379	527	2	199	123	0.056	19	8	54	



BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	10	2

		Site 3 - Guardrail Area Reconstruction (Str No. 18-083.586)																			
		Lt Guardrail Paving: Sta 302+02.06 to Begin Bridge Sta 304+08.29 Rt Guardrail Paving: Sta 301+06.27 to Begin Bridge Sta 304+08.27										Lt Guardrail Paving: End Bridge Sta 304+68.28 to Sta 307+69.83 Rt Guardrail Paving: End Bridge Sta 304+68.28 to Sta 306+74.92									
Material	Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Site 3 Total		
		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt			
Salvaged Base Course (1.875 TON/CY)	TON	1422	2803	6	209	304	0.50	58	108	TON	2782	1434	6	304	209	0.50	108	58	332		
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	1422	2803	2	209	304	0.056	19	36	TON	2782	1434	2	304	209	0.056	36	19	110		

		Site 4 - Guardrail Area Reconstruction (Str No. 18-106.082)																		
		Lt Guardrail Paving: Sta 402+23.37 to Begin Bridge Sta 403+98.33 Rt Guardrail Paving: Sta 401+12.78 to Begin Bridge Sta 403+98.63									Lt Guardrail Paving: End Bridge Sta 405+28.45 to Sta 408+13.89 Rt Guardrail Paving: End Bridge Sta 405+28.45 to Sta 406+86.50									
Material	Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Unit	Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal		Site 4 Total	
		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		
Salvaged Base Course (1.875 TON/CY)	TON	1092	2527	6	177	288	0.50	45	98	TON	2505	1056	6	288	159	0.50	97	43	283	
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	1092	2527	2	177	288	0.056	15	33	TON	2505	1056	2	288	159	0.056	33	15	96	



BASIS OF ESTIMATE

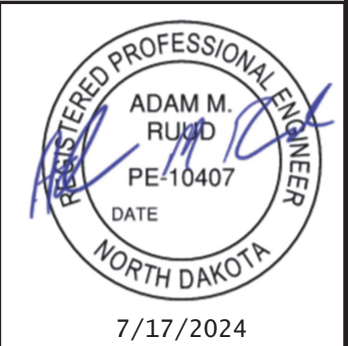
Site 2 - Mill and Overlay (Str No. 10-006.645)									
Sta 203+21.36 to Begin Bridge Sta 203+71.36					End Bridge Sta 204+61.42 to Sta 205+11.42				
Material	Unit	Area (SF)	Depth (In)	Subtotal	Unit	Area (SF)	Depth (In)	Subtotal	Site 2 Subtotal
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	1100	2	14	TON	1100	2	14	28

Site 3 - Mill and Overlay (Str No. 18-083.586)									
Sta 303+08.28 to Begin Bridge Sta 304+08.28					End Bridge Sta 304+68.28 to Sta 305+68.28				
Material	Unit	Area (SF)	Depth (In)	Subtotal	Unit	Area (SF)	Depth (In)	Subtotal	Site 3 Subtotal
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	2800	2	35	TON	2800	2	35	70

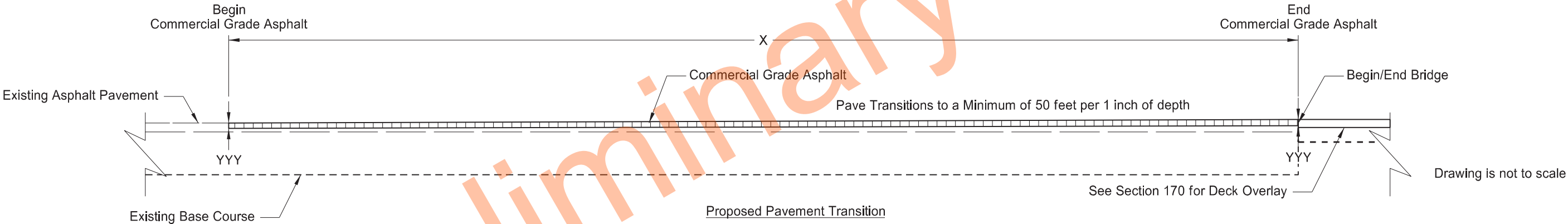
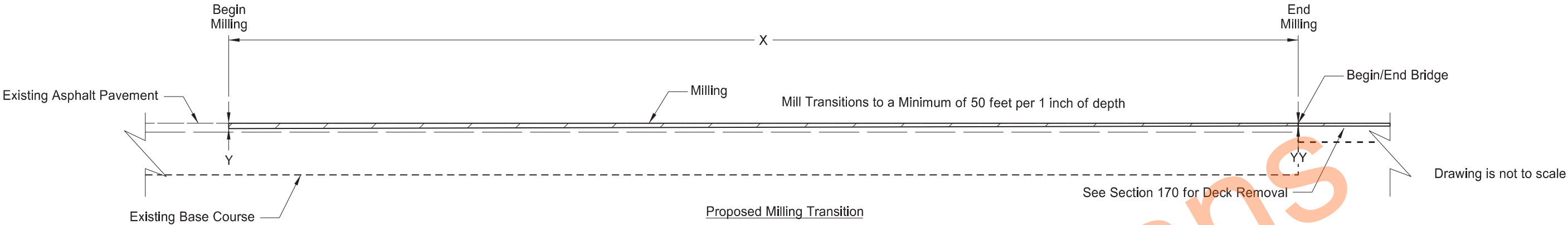
Permanent Pavement Markings			
Location - Type	Basis	Centerline Length	Quantity
Site 1 - Structure No. 18-045.621 - Sheyenne River Crossing			
Centerline Skip - Pvmt Mk Painted 6IN Line	1,320 LF/Mile	1870 LF	469 LF
Edge Line - Pvmt Mk Painted 6IN Line	5,280 LF/Mile	3740 LF	3740 LF
Site 2 - Structure No. 10-006.645 - Swan Creek Crossing			
Centerline Double Barrier - Pvmt Mk Painted Double 6IN Line	10,560 LF/Mile	1180 LF	2360 LF
Edge Line - Pvmt Mk Painted 6IN Line	5,280 LF/Mile	1180 LF	2360 LF
Site 3 - Structure No. 18-083.586 - Rush River Crossing			
Centerline Skip - Pvmt Mk Painted 6IN Line	1,320 LF/Mile	1776 LF	444 LF
Edge Line - Pvmt Mk Painted 6IN Line	5,280 LF/Mile	1776 LF	3552 LF
Site 4 - Structure No. 18-106.082 - Elm River Crossing			
Centerline Double Barrier - Pvmt Mk Painted Double 6IN Line	10,560 LF/Mile	1846 LF	3692 LF
Edge Line - Pvmt Mk Painted 6IN Line	5,280 LF/Mile	1846 LF	3692 LF

Note:
Refer to Section 100 of the plans for short term pavement markings.

Water
20 Gal/Ton for Aggregates



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	20	1



Milling and Paving Transitions

Location	X	Y	YY	YYY	Mill (SY)	Commercial Grade Asphalt (Ton)
Sta 203+21.36 to Begin Bridge (Str No. 10-006.642)	50 ft	2.0 in	1.5 in	2.0 in	122	14
End Bridge (Str No. 10-006.642) to Sta 205+11.42	50 ft	2.0 in	1.5 in	2.0 in	122	14
Sta 303+08.28 to Begin Bridge (Str No. 18-083.586)	100 ft	2.0 in	4.0 in	2.0 in	311	35
End Bridge (Str No. 18-083.586) to Sta 305+68.28	100 ft	2.0 in	4.0 in	2.0 in	311	35

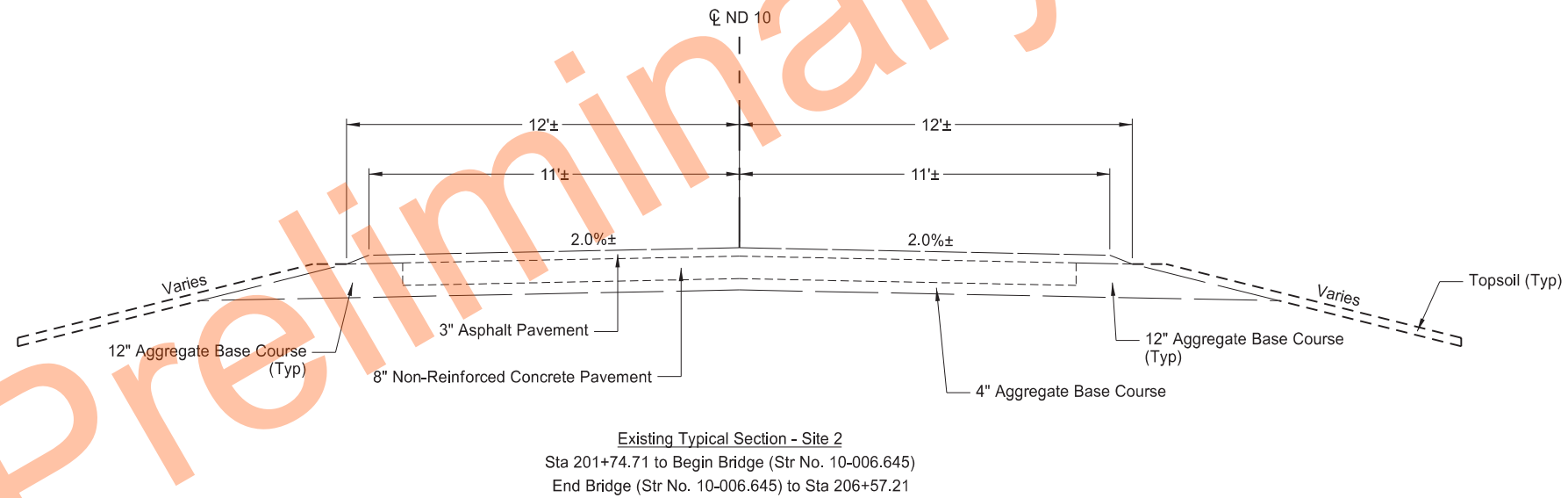
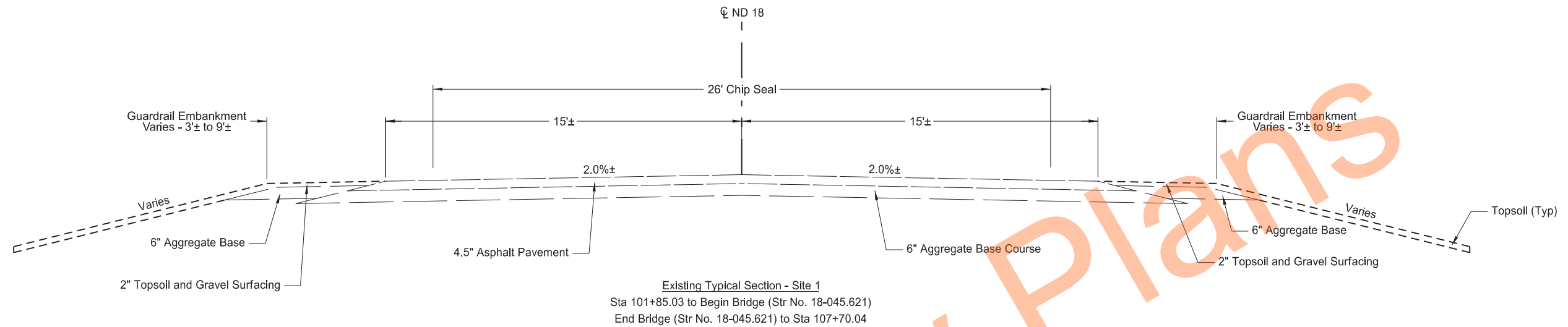
General Details
Milling and Paving End Transitions
Site 2 - Str No. 10-006.645
Swan Creek Crossing
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
Trail, Cass and Richland County



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	1

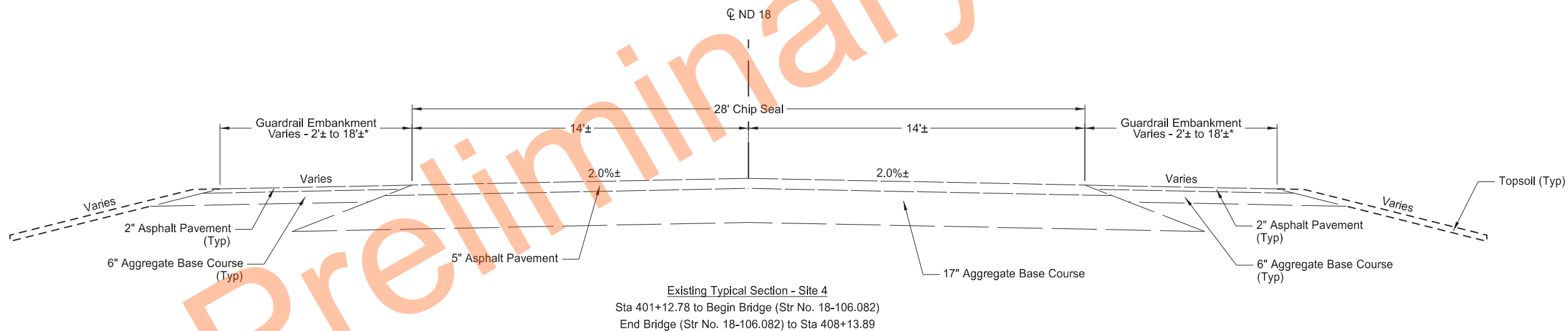
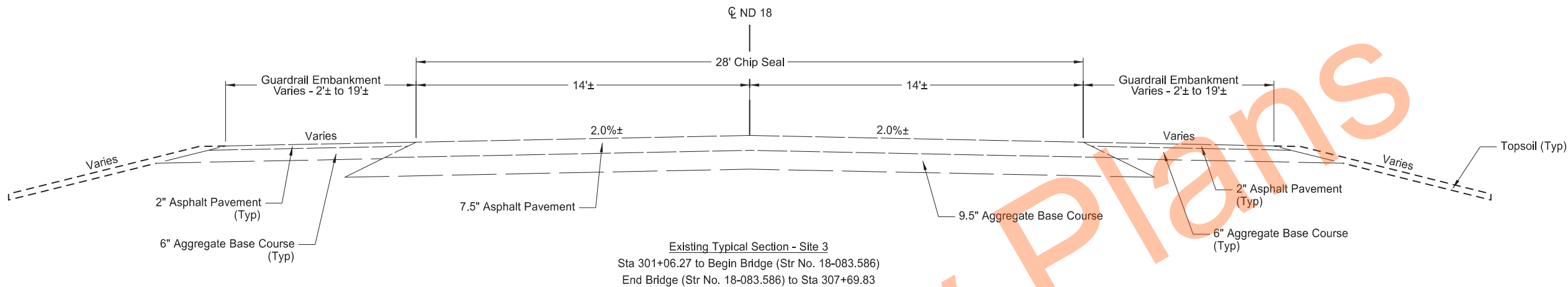


Existing Typical Section
Site 1 - Str No. 18-045.621
Sheyenne River Crossing
Site 2 - Str No. 10-006.645
Swan Creek Crossing
Structure Repairs
Trail, Cass and Richland County



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	2



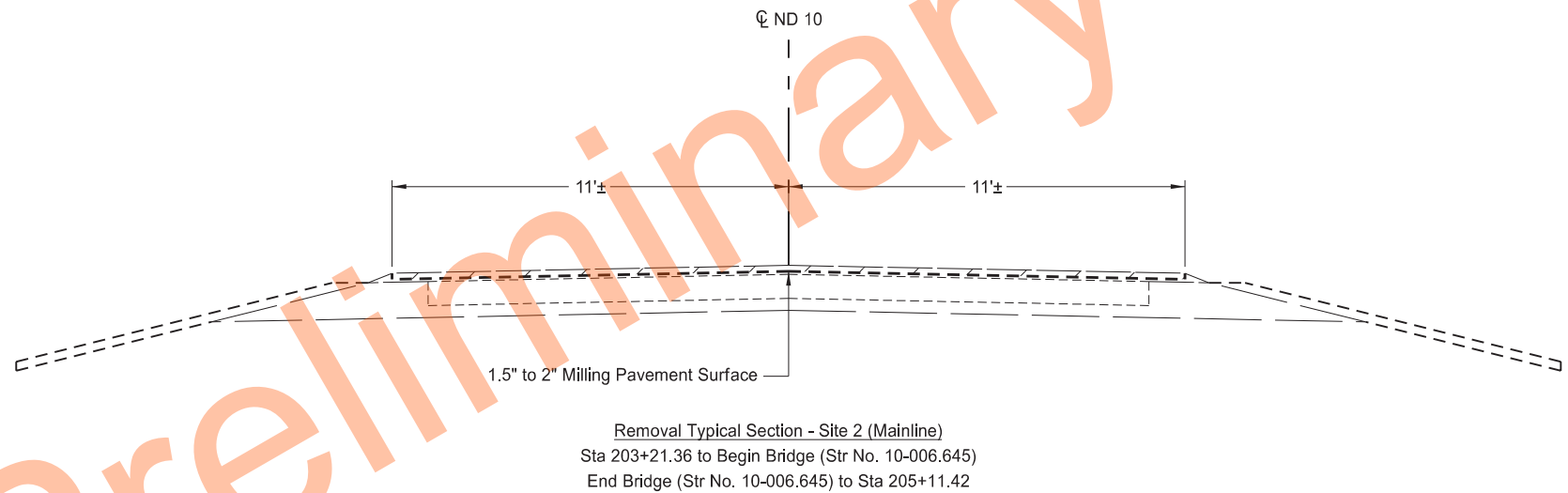
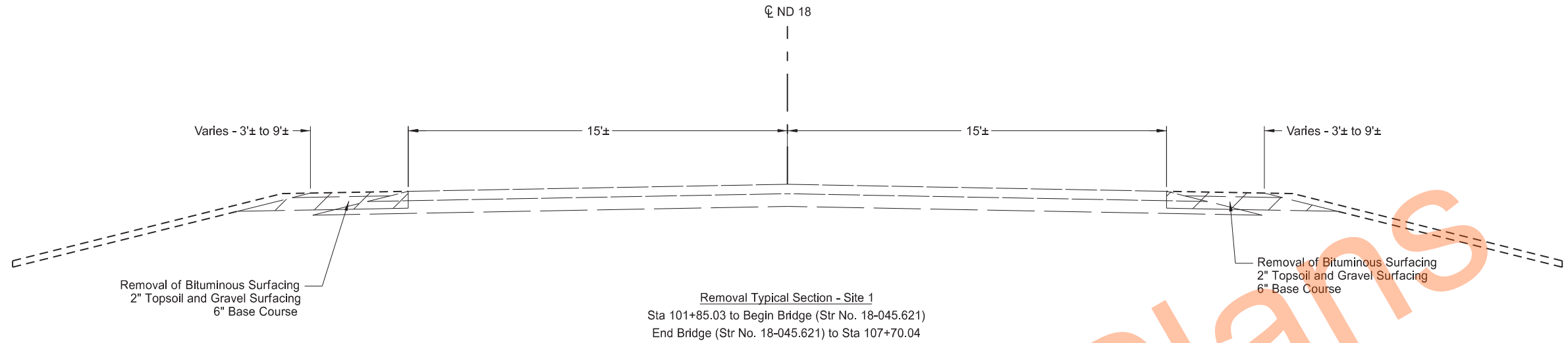
* Note: Represents Guardrail Embankment on south end of bridge.

Existing Typical Section
Site 3 - Str No. 18-083.586
Rush River Crossing
Site 4 - Str No. 18-106.082
Elm River Crossing
Structure Repairs
Traill, Cass and Richland County



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	3

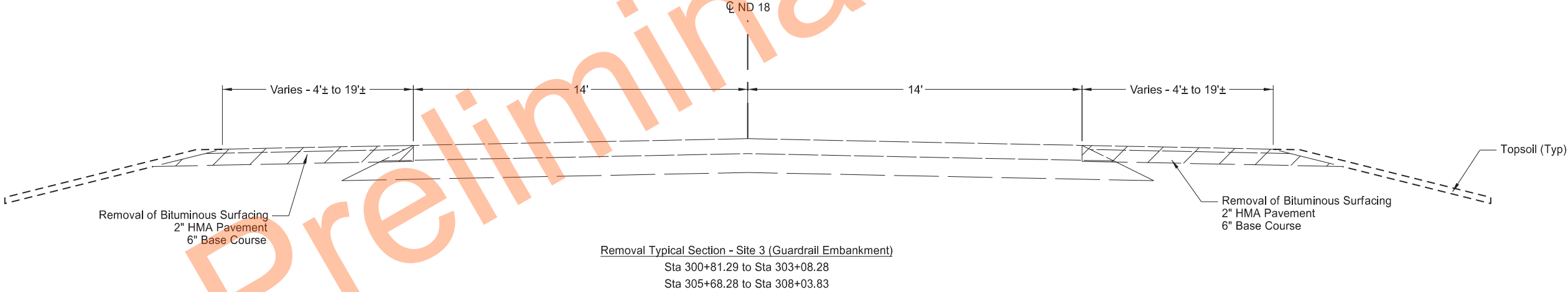
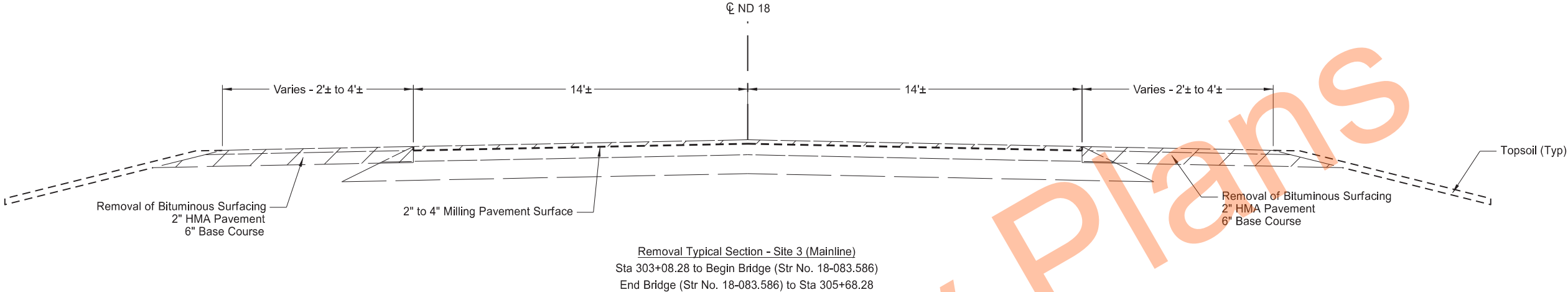


Removal Typical Section
Site 1 - Str No. 18-045.621
Sheyenne River Crossing
Site 2 - Str No. 10-006.645
Swan Creek Crossing
Structure Repairs
Trail, Cass and Richland County



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	4



Removal Typical Section

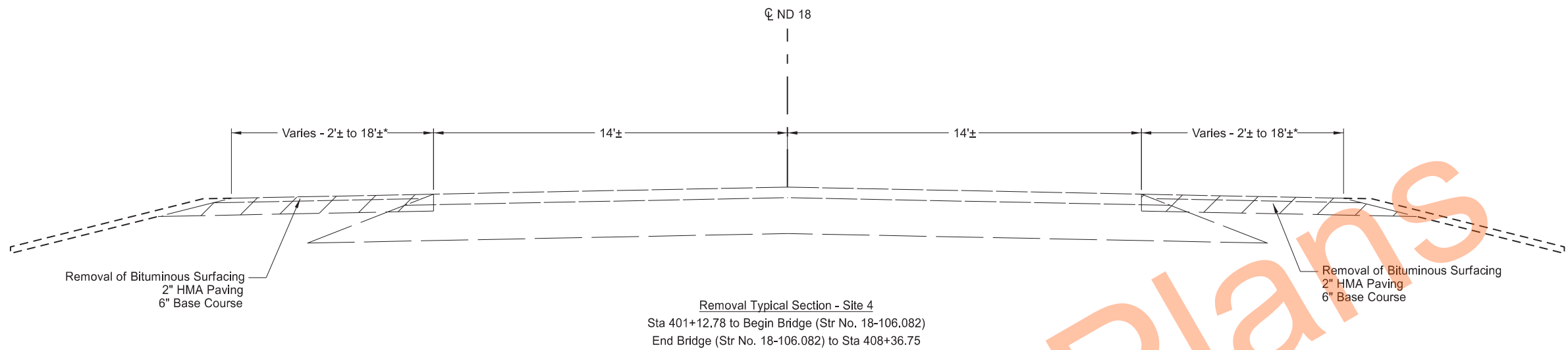
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
Trail, Cass and Richland County



7/17/2024

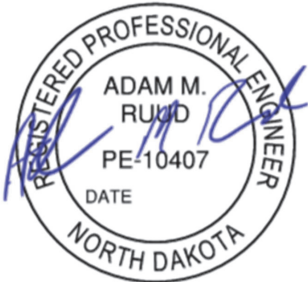
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	5



* Note: Represents Guardrail Embankment on south end of bridge.

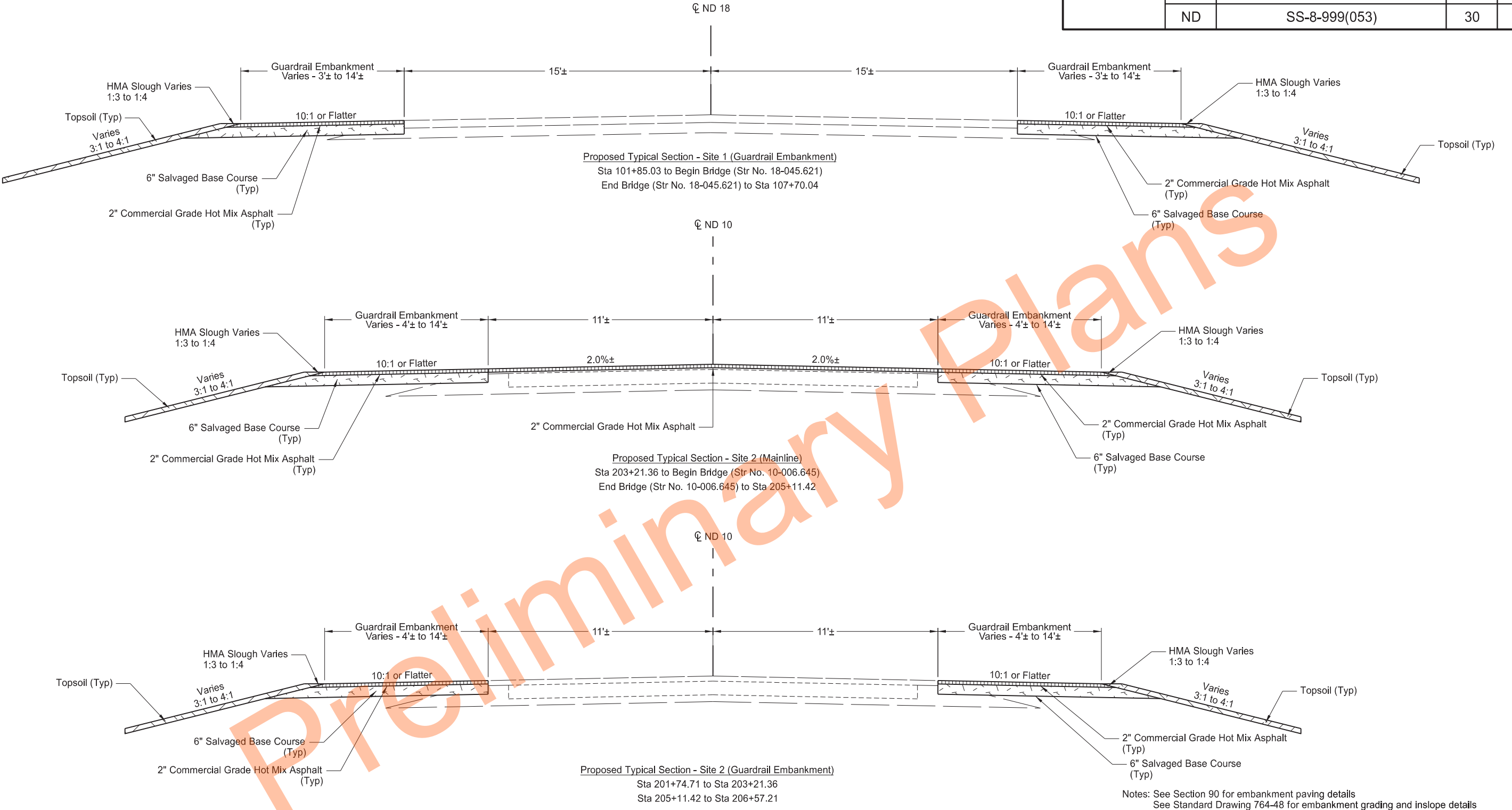
Removal Typical Section
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
Trail, Cass and Richland County



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	6



Notes: See Section 90 for embankment paving details
See Standard Drawing 764-48 for embankment grading and inslope details

Proposed Typical Section
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

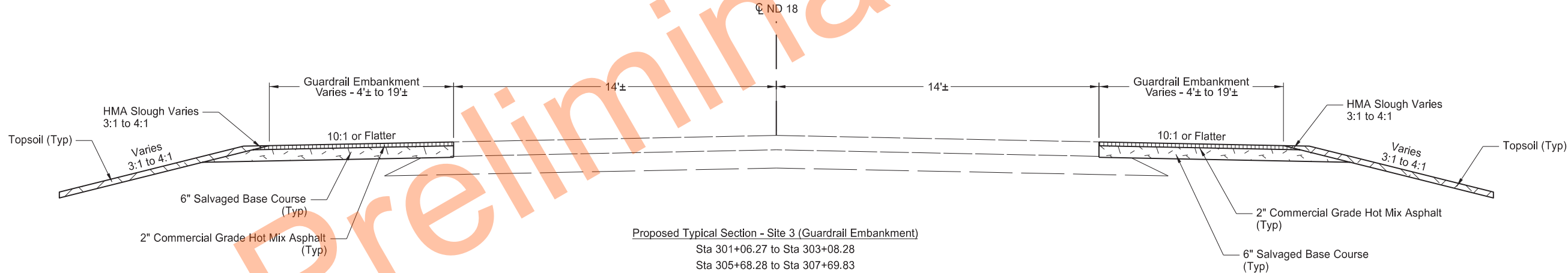
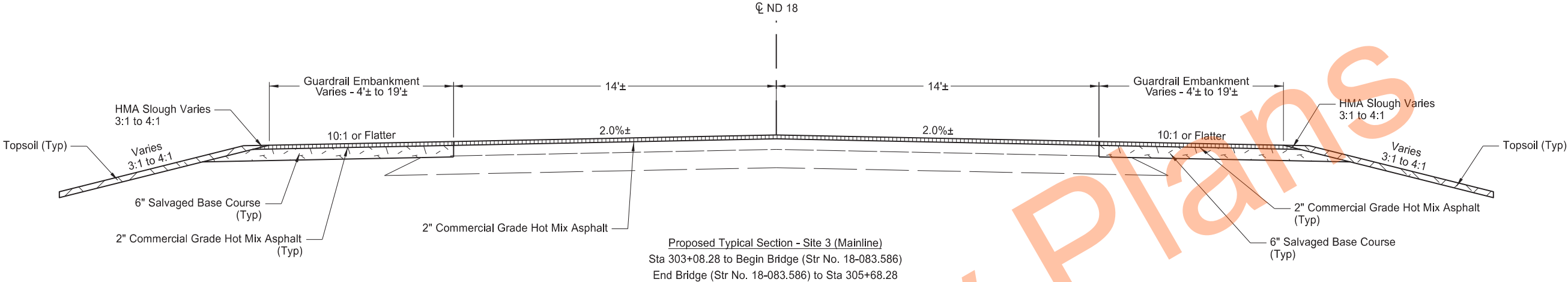
Site 2 - Str No. 10-006.645
Swan Creek Crossing

Structure Repairs
Traill, Cass and Richland County



7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	7



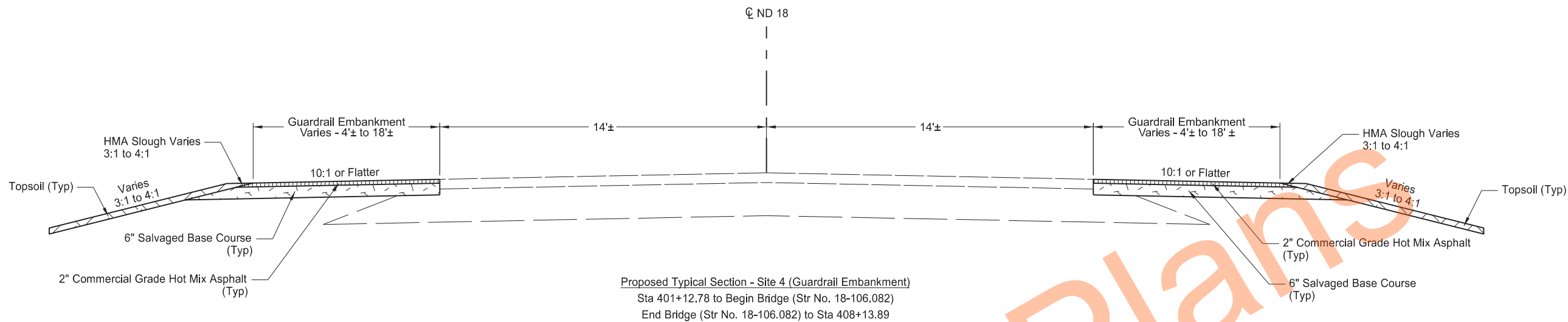
Notes: See Section 90 for embankment paving details
See Standard Drawing 764-48 for embankment grading and inslope details

Proposed Typical Section
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
Trail, Cass and Richland County

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA
7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	30	8



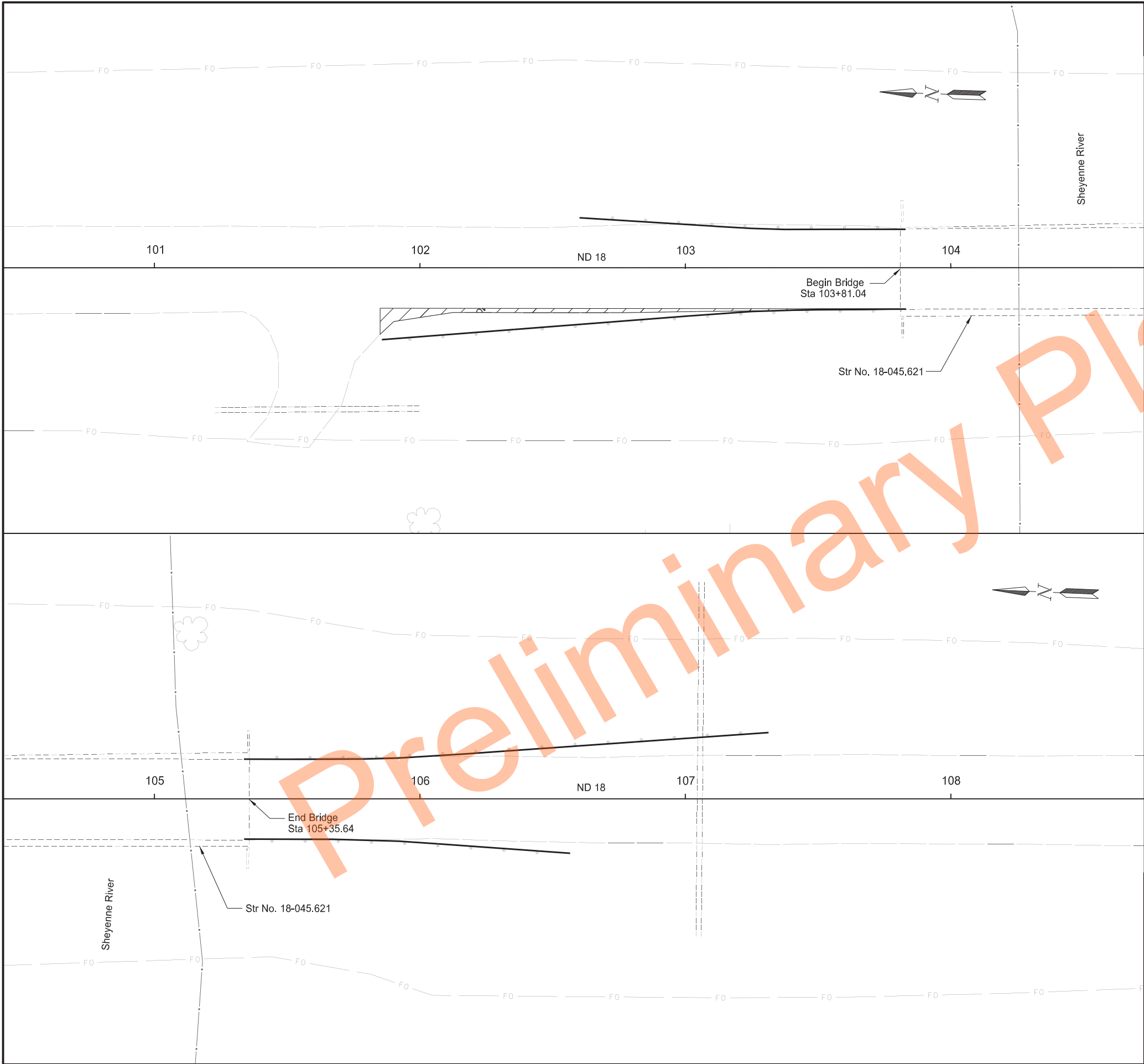
Notes: See Section 90 for embankment paving details
See Standard Drawing 764-48 for embankment grading and inslope details

Proposed Typical Section
Site 4 - Str No. 18-106.082
Elm River Crossing

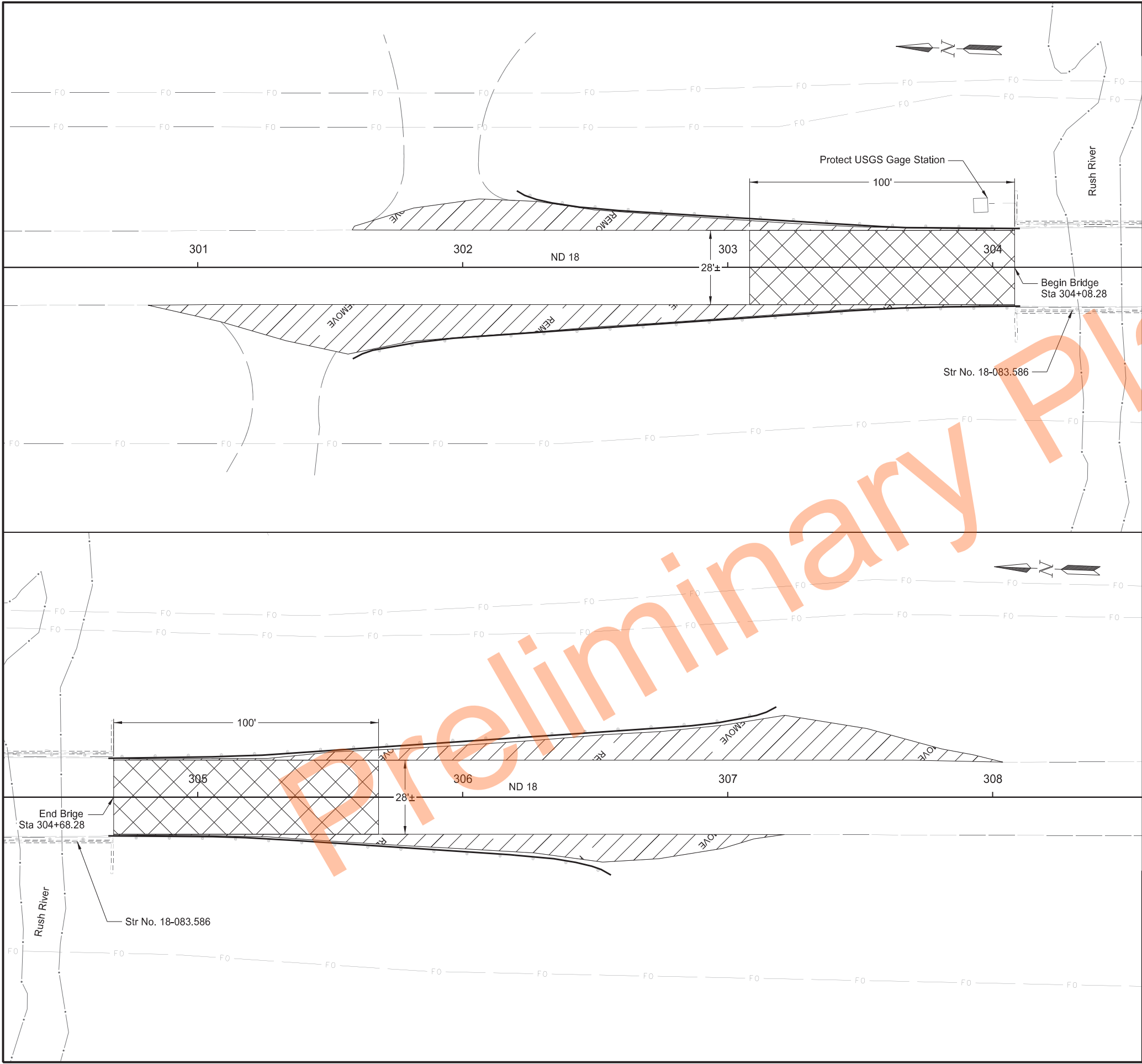
Structure Repairs
Trail, Cass and Richland County



7/17/2024



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	40	1
SPEC	CODE	BID ITEM	QTY UNIT	
202	0132	REMOVAL OF BITUMINOUS SURFACING Sta 101+85.03 Rt to Sta 103+80.94 Rt	33	SY
Note: See Section 130 for removal of guardrail and end terminals				
REMO Removal of Bituminous Surfacing Remove Guardrail & End Treatment				
Removals Site 1 - Str No. 18-045.621 Sheyenne River Crossing			REGISTERED PROFESSIONAL ENGINEER ADAM M. RUDD PE-10407 DATE 7/17/2024	
Structure Repairs ND 18 5 Miles South of ND 46				



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		SS-8-999(053)	40	3

SPEC	CODE	BID ITEM	QTY	UNIT
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 301+58.32 Lt to Sta 304+08.28 Lt	144	SY
		Sta 300+81.29 Rt to Sta 304+08.28 Rt	271	SY
		Sta 304+68.28 Lt to Sta 308+03.83 Lt	252	SY
		Sta 304+68.28 Rt to Sta 307+21.34 Rt	122	SY
411	0105	MILLING PAVEMENT SURFACE		
		Sta 303+08.28 to Sta 304+08.28	311	SY
		Sta 304+68.28 to Sta 305+68.28	311	SY

Note: See Section 130 for removal of guardrail and end terminals

Variable Depth Milling Pavement Surface

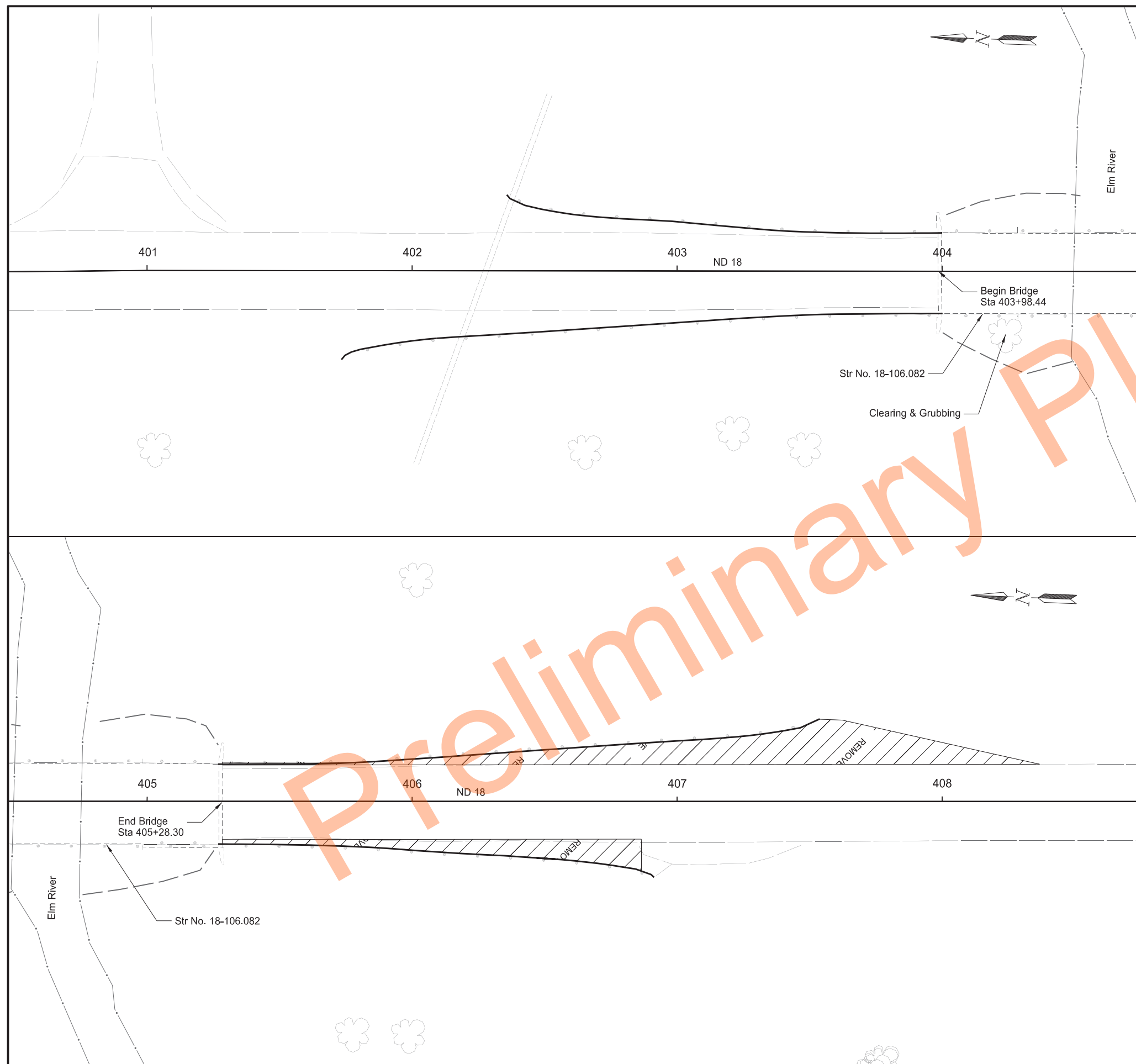
Removal of Bituminous Surfacing

Remove Guardrail & End Treatment

Removals
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia

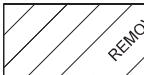
7/17/2024



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	40	4

SPEC	CODE	BID ITEM	QTY	UNIT
201	0330	CLEARING & GRUBBING		
		Sta 404+24.00 Rt to Sta 404+25.00 Rt	1	LSUM
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sa 405+28.44 Lt to Sta 408+36.75 Lt	224	SY
		Sta 405+28.37 Rt to Sta 406+86.50 Rt	86	SY

Notes: See Section 130 for removal of guardrail and end terminals



Removal of Bituminous Surfacing



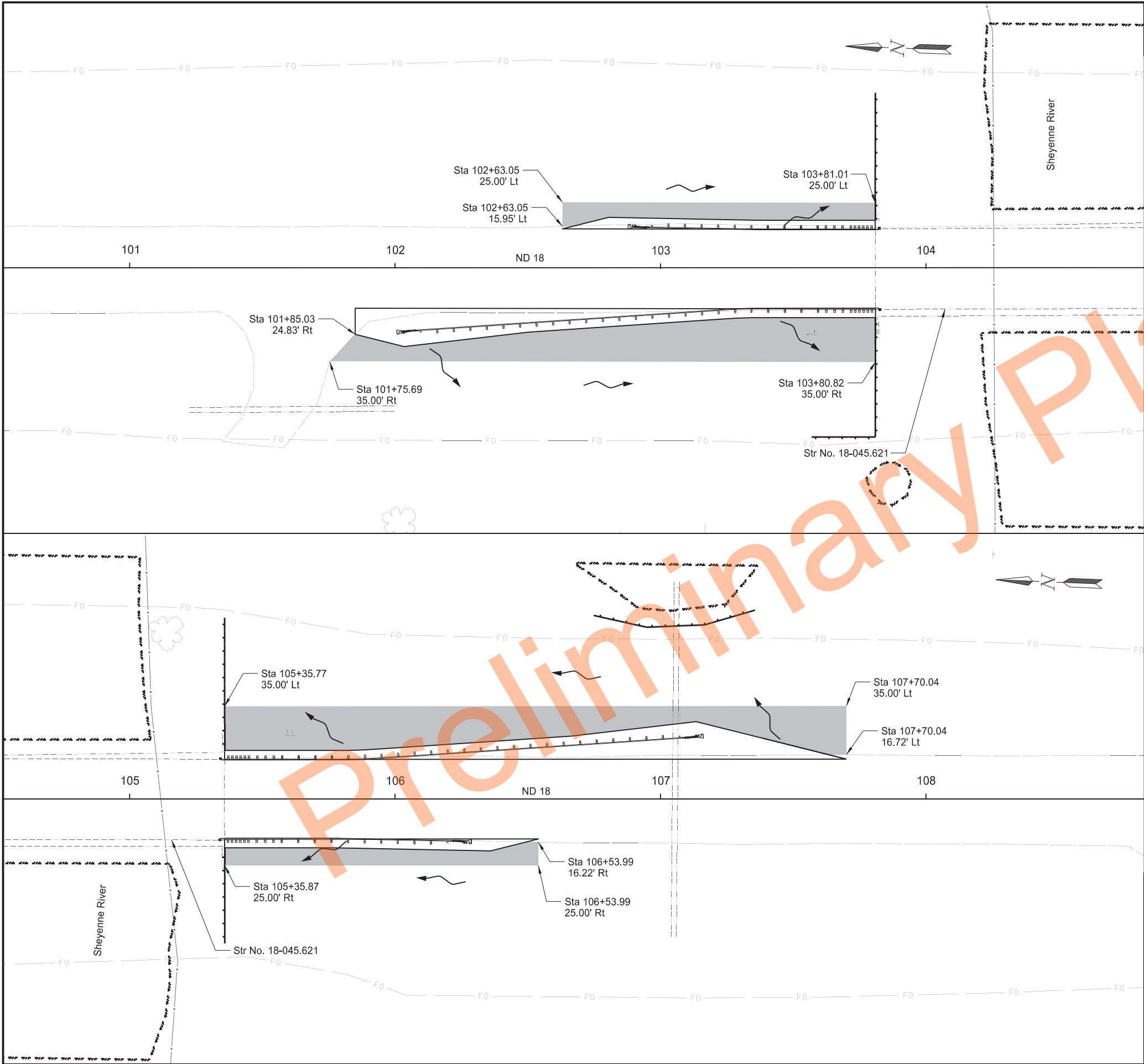
Remove Guardrail & End Treatment

Removals
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
ND 18
0.3 Miles South of Blanchard



7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 102+63.05 Lt to Sta 103+81.01 Lt	0.02	ACRE
		Sta 101+75.69 Rt to Sta 103+80.82 Rt	0.06	ACRE
		Sta 105+35.77 Lt to Sta 107+70.04 Lt	0.08	ACRE
		Sta 105+35.87 Rt to Sta 106+53.99 Rt	0.02	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 102+63.05 Lt to Sta 103+81.01 Lt	0.02	ACRE
		Sta 101+75.69 Rt to Sta 103+80.82 Rt	0.06	ACRE
		Sta 105+35.77 Lt to Sta 107+70.04 Lt	0.08	ACRE
		Sta 105+35.87 Rt to Sta 106+53.99 Rt	0.02	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 103+57.04 to Sta 103+80.92	117	LF
		Sta 105+35.71 to Sta 107+35.64	148	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 103+57.04 to Sta 103+80.92	117	LF
		Sta 105+35.71 to Sta 107+35.64	148	LF

Temporary 12IN Fiber Rolls				
Sheet 1: Site 1 - Str No. 18-045.621				
Start Sta	Offset	End Sta	Offset	Length (LF)
103+57	63' Rt	103+81	63' Rt	24
103+81	63' Rt	103+81	18' Rt	45
103+81	18' Lt	103+81	66' Rt	48
105+36	54' Rt	105+36	18' Rt	36
105+36	18' Lt	105+36	68' Lt	50
106+75	69' Lt	107+36	71' Lt	62
Total				265

Flow Line

Temporary Cover Crop

Hydraulic Mulch

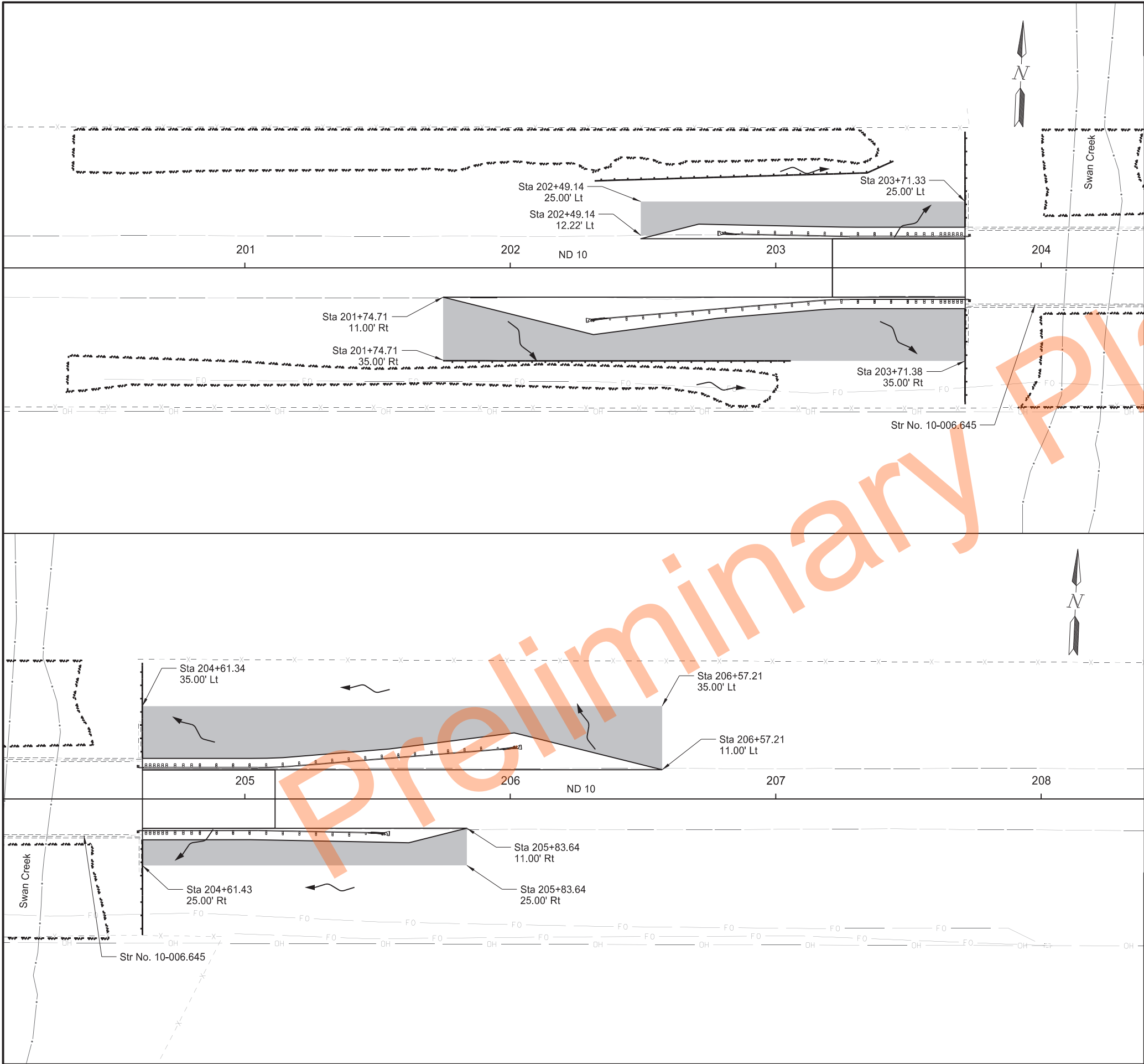
Fiber Rolls 12IN

Temporary Erosion Control
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

Structure Repairs
ND 18
5 Miles South of ND 46

7/17/2024

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	76	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 202+49.14 Lt to Sta 203+71.33 Lt	0.03	ACRE
		Sta 201+74.71 Rt to Sta 203+71.38 Rt	0.08	ACRE
		Sta 204+61.34 Lt to Sta 206+57.21 Lt	0.08	ACRE
		Sta 204+61.43 Rt to Sta 205+83.64 Rt	0.03	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 202+49.14 Lt to Sta 203+71.33 Lt	0.03	ACRE
		Sta 201+74.71 Rt to Sta 203+71.38 Rt	0.08	ACRE
		Sta 204+61.34 Lt to Sta 206+57.21 Lt	0.08	ACRE
		Sta 204+61.43 Rt to Sta 205+83.64 Rt	0.03	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 201+74.71 to Sta 203+71.38	317	LF
		Sta 204+61.31 to Sta 204+61.43	72	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 201+74.71 to Sta 203+71.38	317	LF
		Sta 204+61.31 to Sta 204+61.43	72	LF

Temporary 12IN Fiber Rolls				
Sheet 2: Site 2 - Str No. 10-006.642				
Start Sta	Offset	End Sta	Offset	Length (LF)
201+75	35' Rt	203+06	35' Rt	131
202+32	33' Lt	203+44	40' Lt	114
203+71	15' Lt	203+71	51' Lt	36
203+71	15' Rt	203+71	51' Rt	36
204+61	15' Lt	204+61	51' Lt	36
204+61	15' Rt	204+61	51' Rt	36
Total				389

Flow Line

Temporary Cover Crop
Hydraulic Mulch

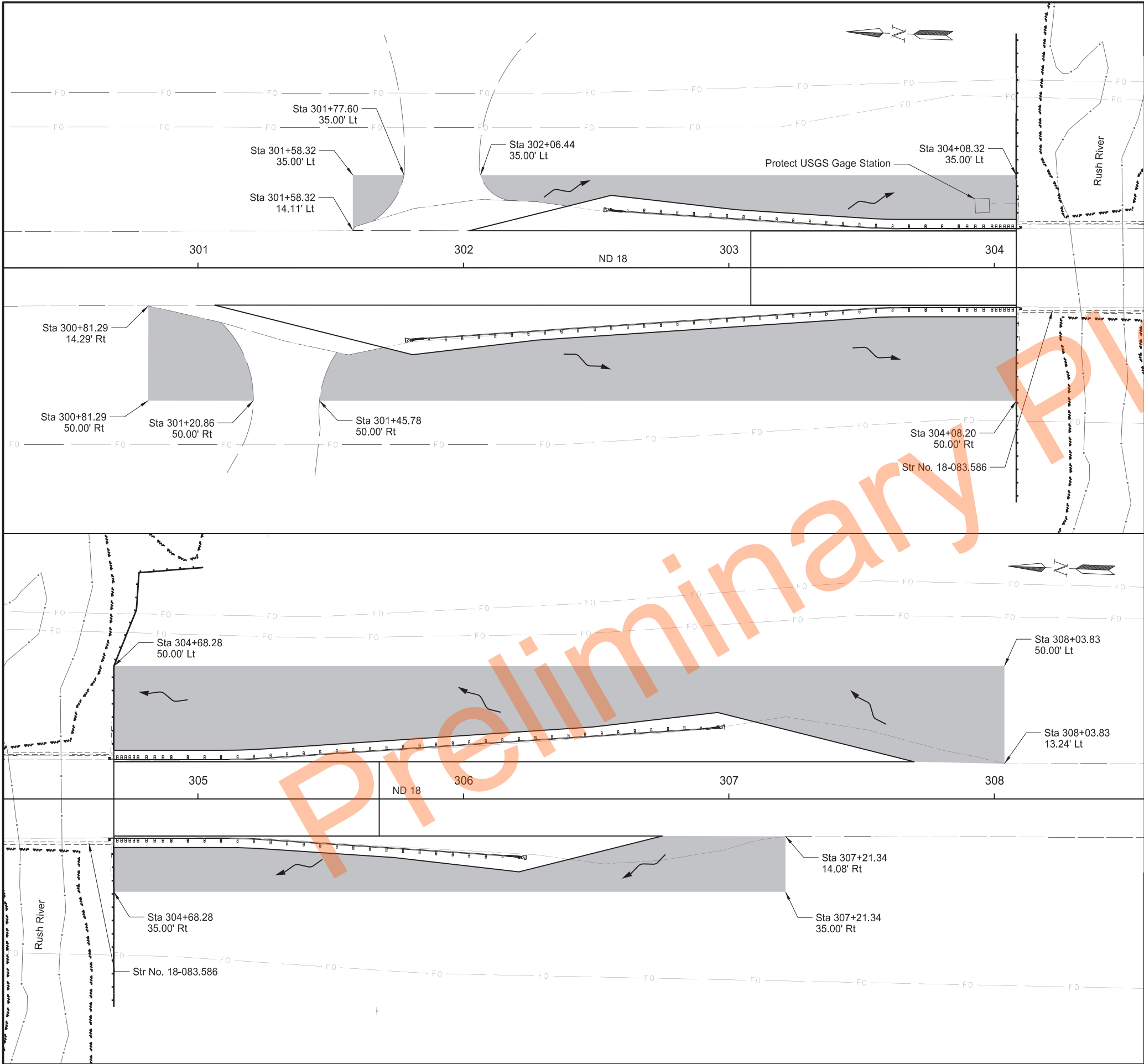
Fiber Rolls 12IN

Temporary Erosion Control
Site 2 - Str No. 10-006.645
Swan Creek Crossing

Structure Repairs
ND 10
3.7 Miles East of ND 18

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA

7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	76	3

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 301+58.32 Lt to Sta 301+77.60 Lt	0.01	ACRE
		Sta 302+06.44 Lt to Sta 304+08.32 Lt	0.06	ACRE
		Sta 300+81.29 Rt to Sta 301+20.86 Rt	0.03	ACRE
		Sta 301+45.78 rt to Sta 304+08.20 Rt	0.15	ACRE
		Sta 304+68.28 Lt to Sta 308+03.83 Lt	0.21	ACRE
		Sta 304+68.28 Rt to Sta 307+21.34 Rt	0.09	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 301+58.32 Lt to Sta 301+77.60 Lt	0.01	ACRE
		Sta 302+06.44 Lt to Sta 304+08.32 Lt	0.06	ACRE
		Sta 300+81.29 Rt to Sta 301+20.86 Rt	0.03	ACRE
		Sta 301+45.78 rt to Sta 304+08.20 Rt	0.15	ACRE
		Sta 304+68.28 Lt to Sta 308+03.83 Lt	0.21	ACRE
		Sta 304+68.28 Rt to Sta 307+21.34 Rt	0.09	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 304+08.11 to Sta 304+08.44	140	LF
		Sta 304+68.48 to Sta 305+01.96	153	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 304+08.11 to Sta 304+08.44	140	LF
		Sta 304+68.48 to Sta 305+01.96	153	LF

Sheet 3: Site 3 - Str No. 18-083.586				
Start Sta	Offset	End Sta	Offset	Length (LF)
304+08	88' Lt	304+08	18' Lt	70
304+09	18' Rt	304+09	88' Rt	70
304+68	78' Rt	304+68	18' Rt	60
304+68	18' Lt	304+68	50' Lt	32
304+68	50' Lt	305+02	87' Lt	61
Total				293

Flow Line

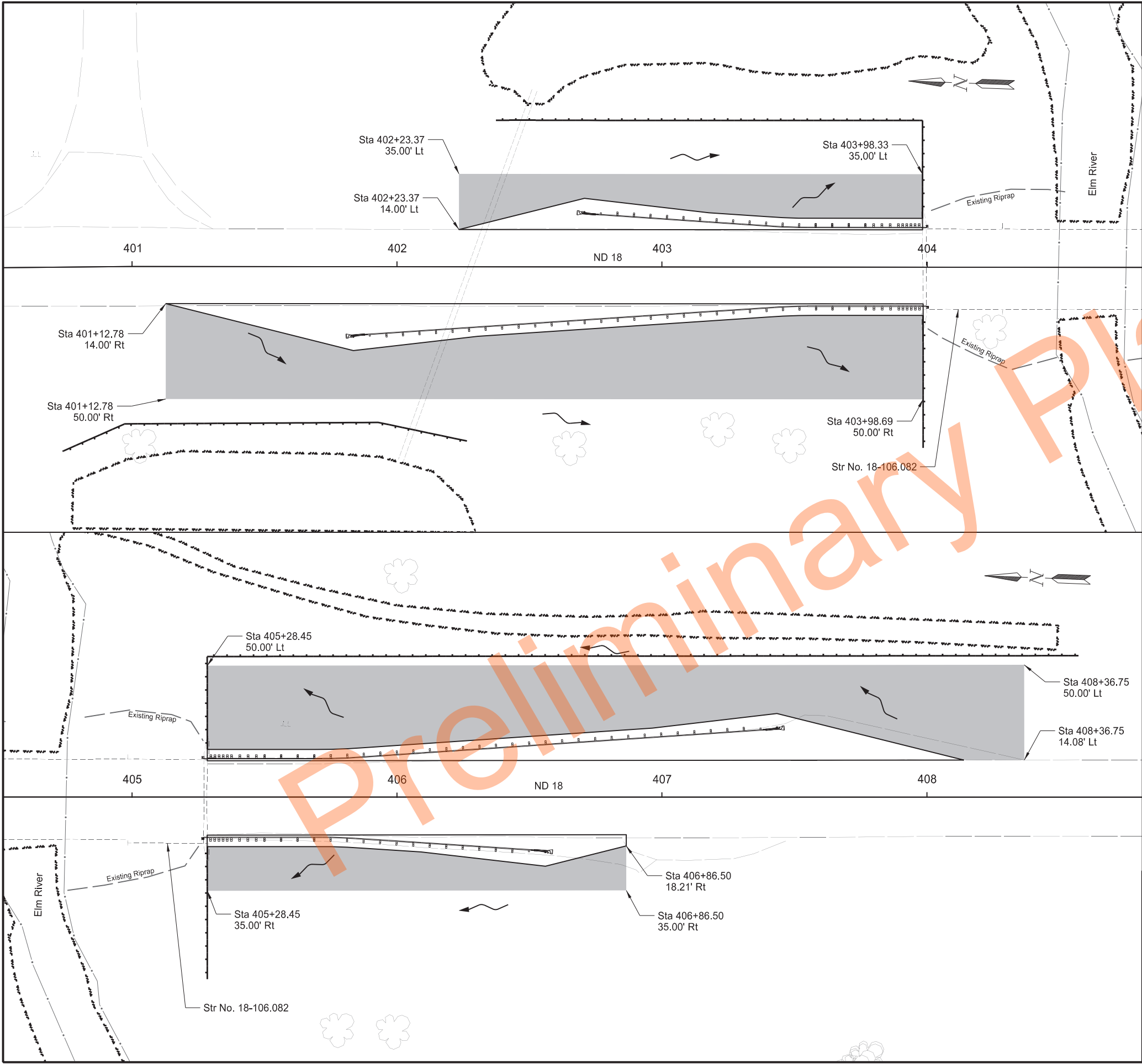
Temporary Cover Crop
Hydraulic Mulch

Fiber Rolls 12IN

Temporary Erosion Control
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA
7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	76	4

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 402+23.37 Lt to Sta 403+98.33 Lt	0.06	ACRE
		Sta 401+12.78 Rt to Sta 403+98.69 Rt	0.18	ACRE
		Sta 405+28.45 Lt to Sta 408+36.75 Lt	0.20	ACRE
		Sta 405+28.45 Rt to Sta 406+86.50 Rt	0.05	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 402+23.37 Lt to Sta 403+98.33 Lt	0.06	ACRE
		Sta 401+12.78 Rt to Sta 403+98.69 Rt	0.18	ACRE
		Sta 405+28.45 Lt to Sta 408+36.75 Lt	0.20	ACRE
		Sta 405+28.45 Rt to Sta 406+86.50 Rt	0.05	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 400+73.18 to Sta 403+98.72	404	LF
		Sta 405+28.45 to Sta 408+57.26	414	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 400+73.18 to Sta 403+98.72	404	LF
		Sta 405+28.45 to Sta 408+57.26	414	LF

Temporary 12IN Fiber Rolls				
Sheet 4: Site 4 - Str No. 18-106.082				
Start Sta	Offset	End Sta	Offset	Length (LF)
400+73	70' Rt	402+26	66' Rt	156
402+37	55' Lt	403+98	55' Lt	161
403+98	55' Lt	403+98	18' Lt	37
403+98	18' Rt	403+99	68' Rt	50
405+28	68' Rt	405+28	18' Rt	50
405+28	18' Lt	405+28	53' Lt	35
405+28	53' Lt	408+57	53' Lt	329
Total				818

Flow Line

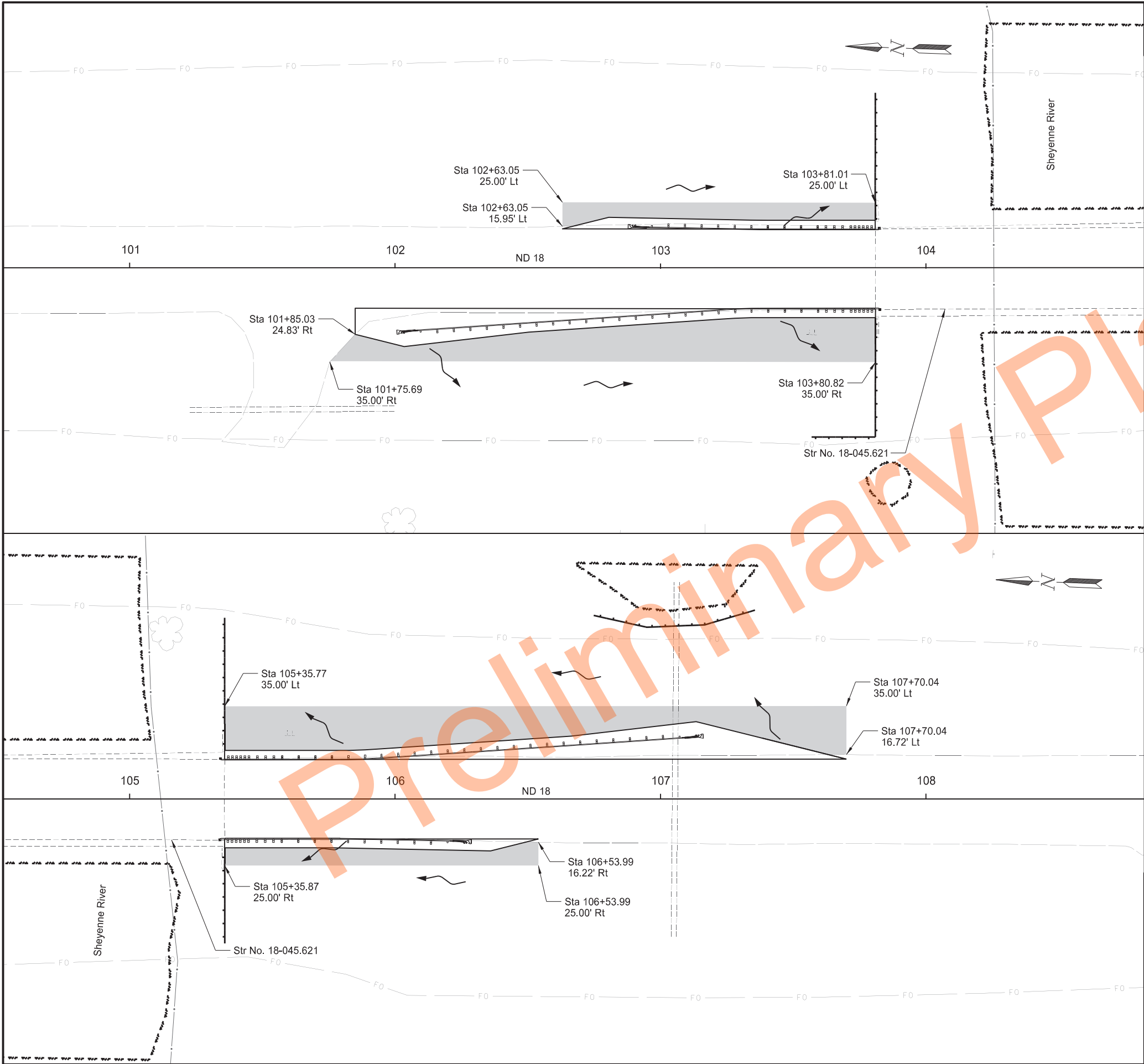
Temporary Cover Crop
Hydraulic Mulch

Fiber Rolls 12IN

Temporary Erosion Control
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
ND 18
0.3 Miles South of Blanchard

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA
7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 102+63.05 Lt to Sta 103+81.01 Lt	0.02	ACRE
		Sta 101+75.69 Rt to Sta 103+80.82 Rt	0.06	ACRE
		Sta 105+35.77 Lt to Sta 107+70.04 Lt	0.08	ACRE
		Sta 105+35.87 Rt to Sta 106+53.99 Rt	0.02	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 102+63.05 Lt to Sta 103+81.01 Lt	0.02	ACRE
		Sta 101+75.69 Rt to Sta 103+80.82 Rt	0.06	ACRE
		Sta 105+35.77 Lt to Sta 107+70.04 Lt	0.08	ACRE
		Sta 105+35.87 Rt to Sta 106+53.99 Rt	0.02	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 103+57.04 to Sta 103+80.92	117	LF
		Sta 105+35.71 to Sta 107+35.64	148	LF

Permanent 12IN Fiber Rolls				
Sheet 1: Site 1 - Str No. 18-045.621				
Start Sta	Offset	End Sta	Offset	Length (LF)
103+57	63' Rt	103+81	63' Rt	24
103+81	63' Rt	103+81	18' Rt	45
103+81	18' Lt	103+81	66' Rt	48
105+36	54' Rt	105+36	18' Rt	36
105+36	18' Lt	105+36	68' Lt	50
106+75	69' Lt	107+36	71' Lt	62
Total				265

Flow Line

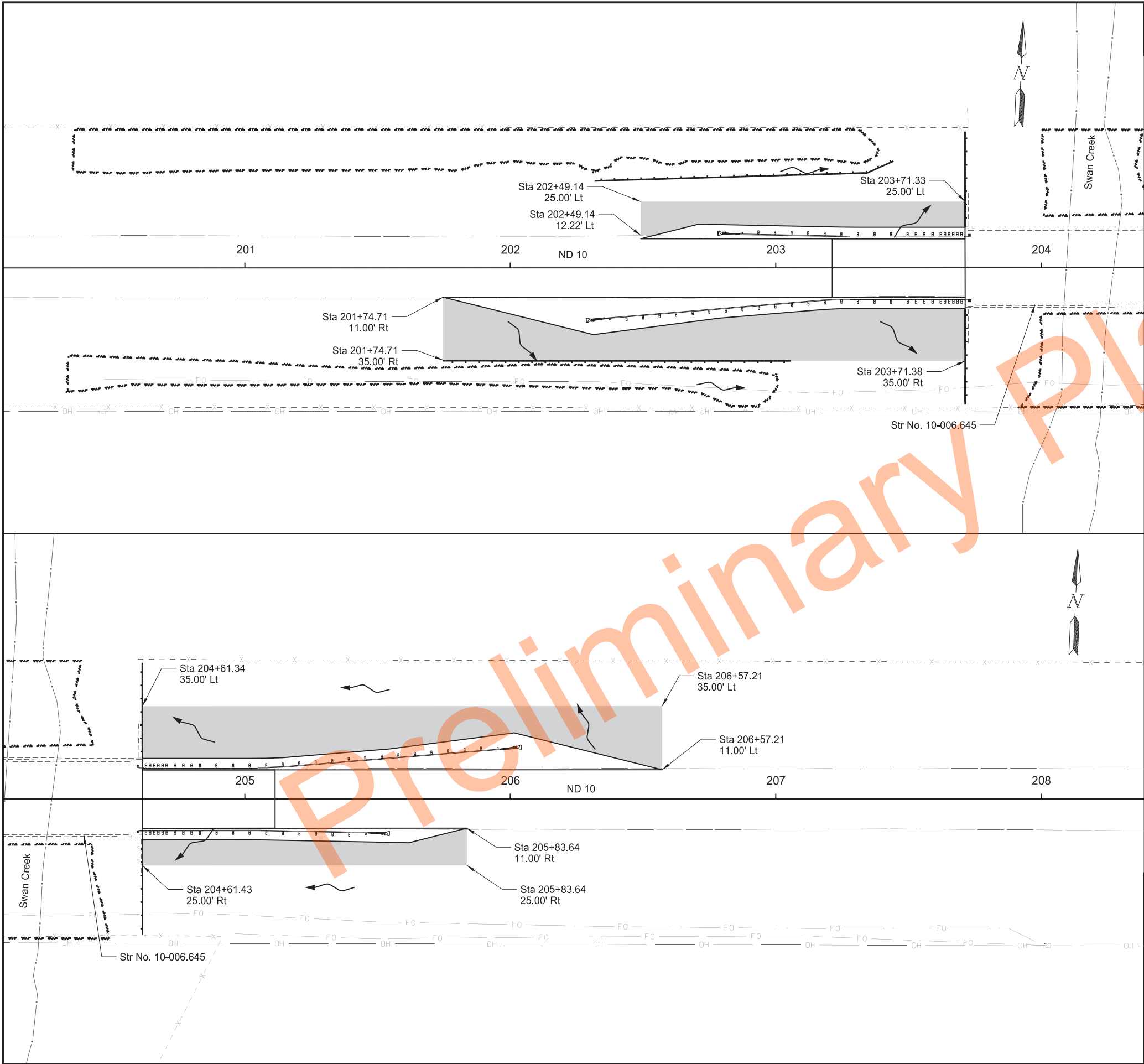
Seeding Class II Hydraulic Mulch

Fiber Rolls 12IN

Permanent Erosion Control
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

Structure Repairs
ND 18
5 Miles South of ND 46

7/17/2024



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		SS-8-999(053)	77	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 202+49.14 Lt to Sta 203+71.33 Lt	0.03	ACRE
		Sta 201+74.71 Rt to Sta 203+71.38 Rt	0.08	ACRE
		Sta 204+61.34 Lt to Sta 206+57.21 Lt	0.08	ACRE
		Sta 204+61.43 Rt to Sta 205+83.64 Rt	0.03	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 202+49.14 Lt to Sta 203+71.33 Lt	0.03	ACRE
		Sta 201+74.71 Rt to Sta 203+71.38 Rt	0.08	ACRE
		Sta 204+61.34 Lt to Sta 206+57.21 Lt	0.08	ACRE
		Sta 204+61.43 Rt to Sta 205+83.64 Rt	0.03	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 201+74.71 to Sta 203+71.38	317	LF
		Sta 204+61.31 to Sta 204+61.43	72	LF

Permanent 12IN Fiber Rolls				
Sheet 2: Site 2 - Str No. 10-006.642				
Start Sta	Offset	End Sta	Offset	Length (LF)
201+75	35' Rt	203+06	35' Rt	131
202+32	33' Lt	203+44	40' Lt	114
203+71	15' Lt	203+71	51' Lt	36
203+71	15' Rt	203+71	51' Rt	36
204+61	15' Lt	204+61	51' Lt	36
204+61	15' Rt	204+61	51' Rt	36
Total				389

Flow Line

Seeding Class II Hydraulic Mulch

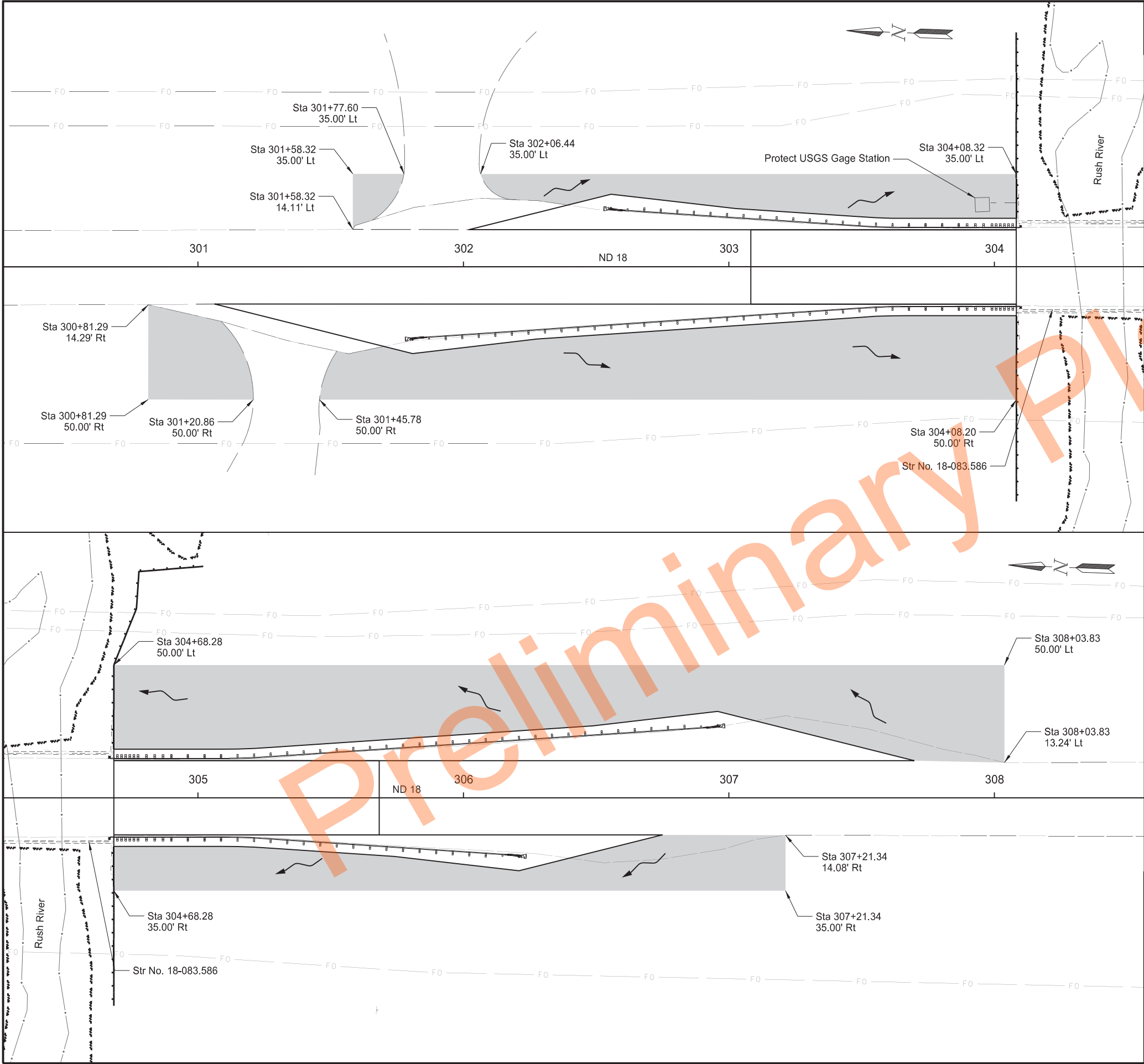
Fiber Rolls 12IN

Permanent Erosion Control
Site 2 - Str No. 10-006.645
Swan Creek Crossing

Structure Repairs
ND 10
3.7 Miles East of ND 18

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA

7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	77	3
SPEC	CODE	BID ITEM	QTY UNIT		
251	0200	SEEDING CLASS II			
		Sta 301+58.32 Lt to Sta 301+77.60 Lt	0.01	ACRE	
		Sta 302+06.44 Lt to Sta 304+08.32 Lt	0.06	ACRE	
		Sta 300+81.29 Rt to Sta 301+20.86 Rt	0.03	ACRE	
		Sta 301+45.78 rt to Sta 304+08.20 Rt	0.15	ACRE	
		Sta 304+68.28 Lt to Sta 308+03.83 Lt	0.21	ACRE	
		Sta 304+68.28 Rt to Sta 307+21.34 Rt	0.09	ACRE	
253	0201	HYDRAULIC MULCH			
		Sta 301+58.32 Lt to Sta 301+77.60 Lt	0.01	ACRE	
		Sta 302+06.44 Lt to Sta 304+08.32 Lt	0.06	ACRE	
		Sta 300+81.29 Rt to Sta 301+20.86 Rt	0.03	ACRE	
		Sta 301+45.78 rt to Sta 304+08.20 Rt	0.15	ACRE	
		Sta 304+68.28 Lt to Sta 308+03.83 Lt	0.21	ACRE	
		Sta 304+68.28 Rt to Sta 307+21.34 Rt	0.09	ACRE	
261	0112	FIBER ROLLS 12IN			
		Sta 304+08.11 to Sta 304+08.44	140	LF	
		Sta 304+68.48 to Sta 305+01.96	153	LF	

Permanent 12IN Fiber Rolls				
Sheet 3: Site 3 - Str No. 18-083.586				
Start Sta	Offset	End Sta	Offset	Length (LF)
304+08	88' Lt	304+08	18' Lt	70
304+09	18' Rt	304+09	88' Rt	70
304+68	78' Rt	304+68	18' Rt	60
304+68	18' Lt	304+68	50' Lt	32
304+68	50' Lt	305+02	87' Lt	61
Total				293

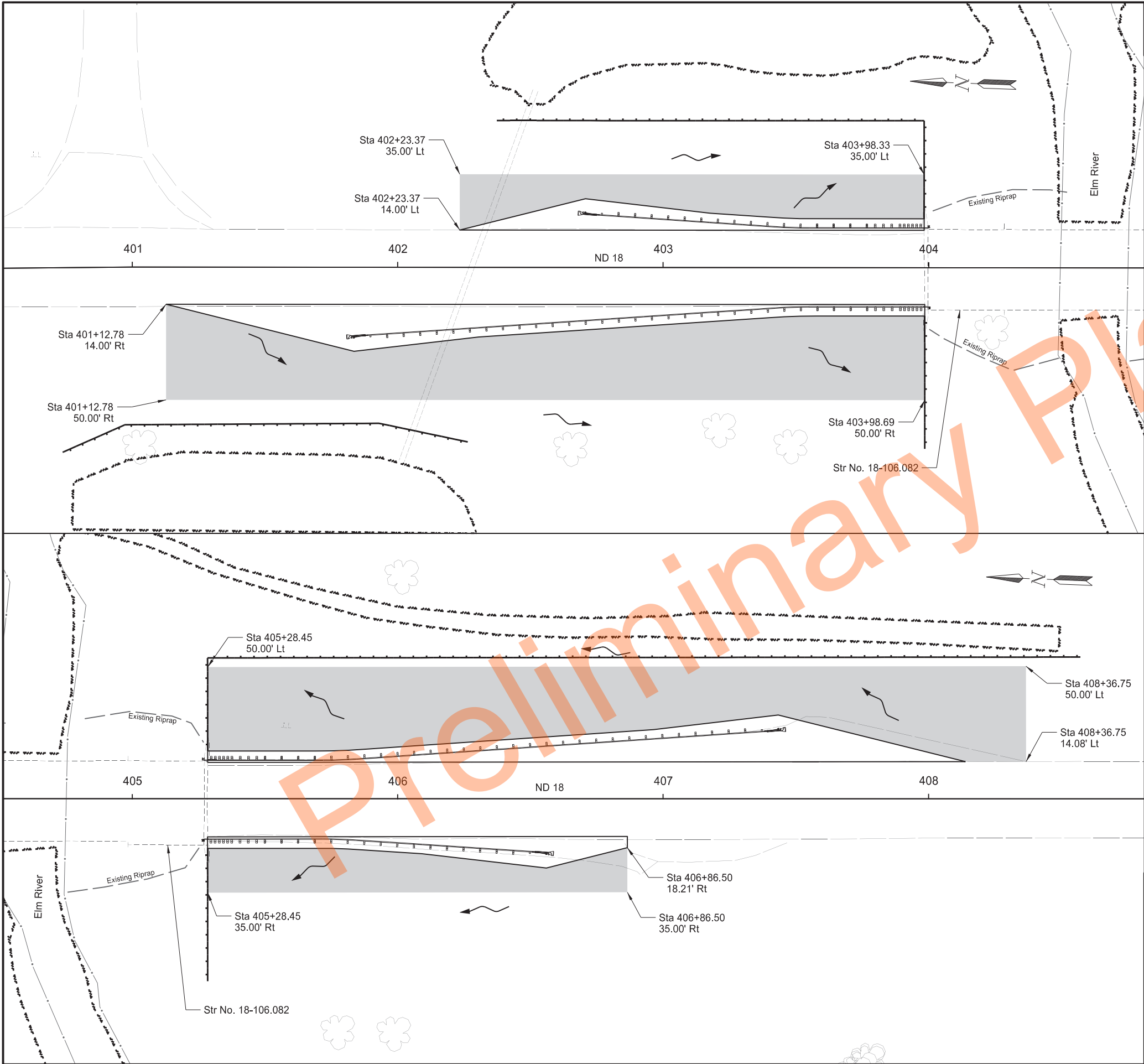
Flow Line

Seeding Class II
Hydraulic Mulch

Fiber Rolls 12IN

Permanent Erosion Control
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	77	4

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 402+23.37 Lt to Sta 403+98.33 Lt	0.06	ACRE
		Sta 401+12.78 Rt to Sta 403+98.69 Rt	0.18	ACRE
		Sta 405+28.45 Lt to Sta 408+36.75 Lt	0.20	ACRE
		Sta 405+28.45 Rt to Sta 406+86.50 Rt	0.05	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 402+23.37 Lt to Sta 403+98.33 Lt	0.06	ACRE
		Sta 401+12.78 Rt to Sta 403+98.69 Rt	0.18	ACRE
		Sta 405+28.45 Lt to Sta 408+36.75 Lt	0.20	ACRE
		Sta 405+28.45 Rt to Sta 406+86.50 Rt	0.05	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 400+73.18 to Sta 403+98.72	404	LF
		Sta 405+28.45 to Sta 408+57.26	414	LF

Permanent 12IN Fiber Rolls				
Sheet 4: Site 4 - Str No. 18-106.082				
Start Sta	Offset	End Sta	Offset	Length (LF)
400+73	70' Rt	402+26	66' Rt	156
402+37	55' Lt	403+98	55' Lt	161
403+98	55' Lt	403+98	18' Lt	37
403+98	18' Rt	403+99	68' Rt	50
405+28	68' Rt	405+28	18' Rt	50
405+28	18' Lt	405+28	53' Lt	35
405+28	53' Lt	408+57	53' Lt	329
Total				818

Flow Line

Seeding Class II Hydraulic Mulch

Fiber Rolls 12IN

Permanent Erosion Control
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
ND 18
0.3 Miles South of Blanchard

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUDD
PE-10407
DATE
NORTH DAKOTA
7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	82	1

Beginning chain OCL_SITE 1_ND 18 description				
Point 1	N	343,213.6060 E	2,814,291.4080 Sta	100+00.00
Course from 1 to 2 S 1° 54' 50.31" E Dist 367.0926				
Point 2	N	342,846.7182 E	2,814,303.6685 Sta	103+67.09
Course from 2 to 3 S 2° 15' 30.86" E Dist 175.1218				
Point 3	N	342,671.7325 E	2,814,310.5699 Sta	105+42.21
Course from 3 to 4 S 2° 22' 11.63" E Dist 359.2698				
Point 4	N	342,312.7700 E	2,814,325.4260 Sta	109+01.48
Ending chain OCL_SITE 1_ND 18 description				

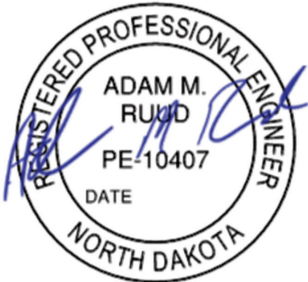
Beginning chain OCL_SITE 2_HIGHWAY 10 description				
Point OCLSITE21	N	459,150.9830 E	2,810,426.3020 Sta	200+00.00
Course from OCLSITE21 to OCLSITE23 N 87° 35' 43.11" E Dist 371.3614				
Point OCLSITE23	N	459,166.5644 E	2,810,797.3364 Sta	203+71.36
Course from OCLSITE23 to OCLSITE25 N 87° 34' 37.30" E Dist 90.0594				
Point OCLSITE25	N	459,170.3718 E	2,810,887.3152 Sta	204+61.42
Course from OCLSITE25 to OCLSITE26 N 87° 27' 41.16" E Dist 390.9124				
Point OCLSITE26	N	459,187.6860 E	2,811,277.8440 Sta	208+52.33
Ending chain OCL_SITE 2_HIGHWAY 10 description				

Beginning chain OCL_SITE 3_ND 18 description				
Point 9	N	509,438.2010 E	2,788,274.2970 Sta	300+00.00
Course from 9 to 10 S 2° 07' 20.08" E Dist 396.6321				
Point 10	N	509,041.8409 E	2,788,288.9849 Sta	303+96.63
Course from 10 to 11 S 2° 15' 04.91" E Dist 71.5289				
Point 11	N	508,970.3673 E	2,788,291.7949 Sta	304+68.16
Course from 11 to 12 S 2° 15' 16.04" E Dist 412.2564				
Point 12	N	508,558.4300 E	2,788,308.0120 Sta	308+80.42
Ending chain OCL_SITE 3_ND 18 description				

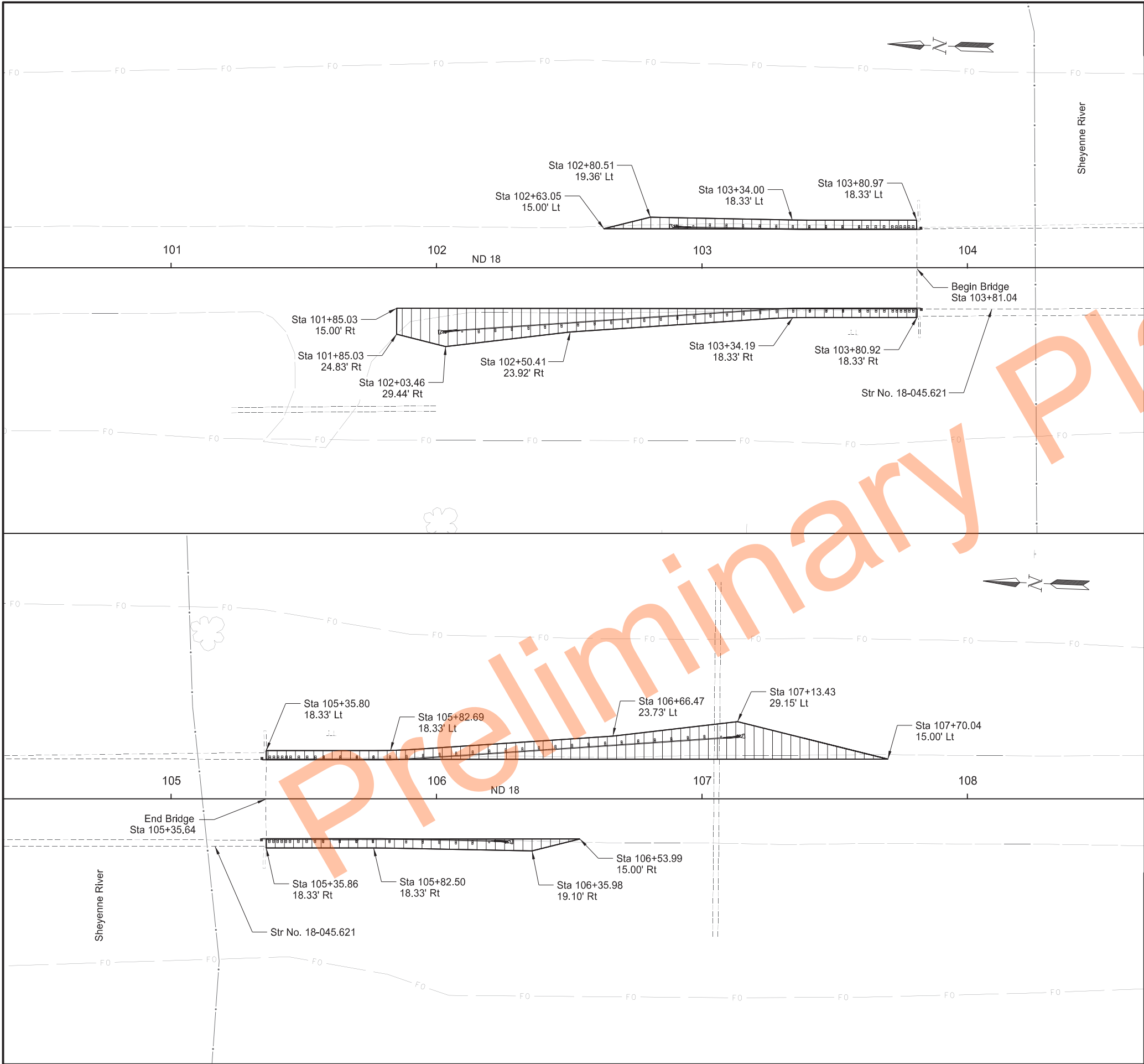
Beginning chain OCL_SITE 4_ND 18 description				
Point 13	N	627,910.6013 E	2,782,372.2312 Sta	400+00.00
Course from 13 to 14 S 2° 36' 58.55" E Dist 99.6395				
Point 14	N	627,811.0656 E	2,782,376.7794 Sta	400+99.64
Course from 14 to 15 S 2° 05' 32.17" E Dist 298.8015				
Point 15	N	627,512.4633 E	2,782,387.6883 Sta	403+98.44
Course from 15 to 16 S 1° 58' 32.54" E Dist 129.8553				
Point 16	N	627,382.6853 E	2,782,392.1651 Sta	405+28.30
Course from 16 to 17 S 2° 20' 01.86" E Dist 434.4739				
Point 17	N	626,948.5717 E	2,782,409.8578 Sta	409+62.77
Ending chain OCL_SITE 4_ND 18 description				

Survey Data

Structure Repairs
ND 18, ND 10
Traill, Cass and Richland County



7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	90	1
SPEC	CODE	BID ITEM	QTY UNIT		
302	0100	SALVAGED BASE COURSE			
		Sta 102+63.05 Lt to Sta 103+80.97 Lt	19	TON	
		Sta 101+85.03 Rt to Sta 103+80.92 Rt	57	TON	
		Sta 105+35.80 Lt to Sta 107+70.04 Lt	64	TON	
		Sta 105+35.86 Rt to Sta 106+53.99 Rt	19	TON	
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT			
		Sta 102+63.05 Lt to Sta 103+80.97 Lt	6	TON	
		Sta 101+85.03 Rt to Sta 103+80.92 Rt	19	TON	
		Sta 105+35.80 Lt to Sta 107+70.04 Lt	21	TON	
		Sta 105+35.86 Rt to Sta 106+53.99 Rt	6	TON	



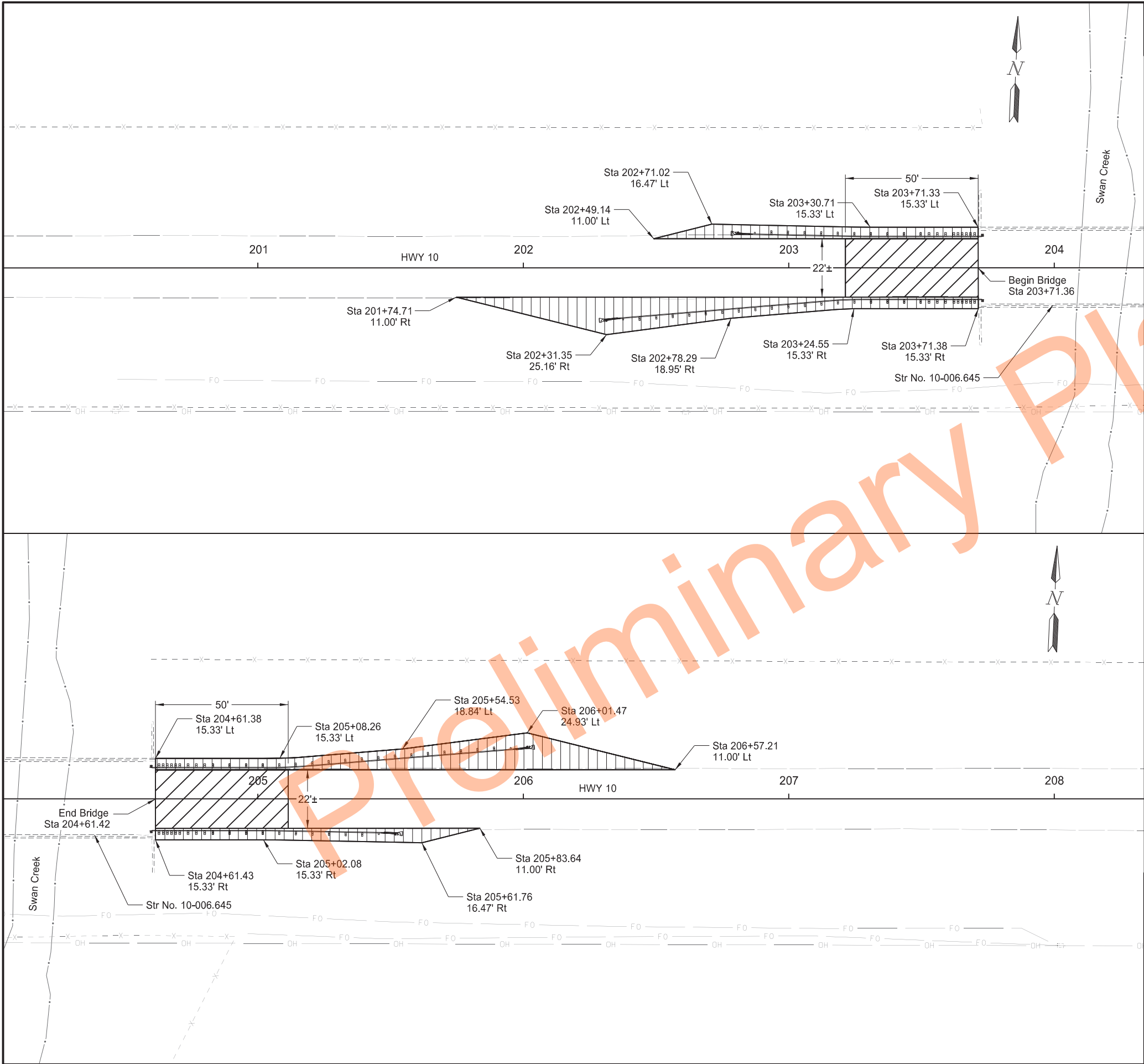
2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

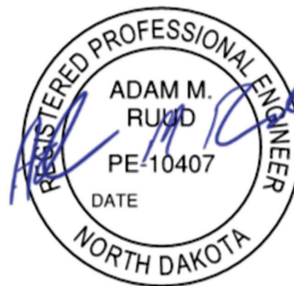
Paving Layouts
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

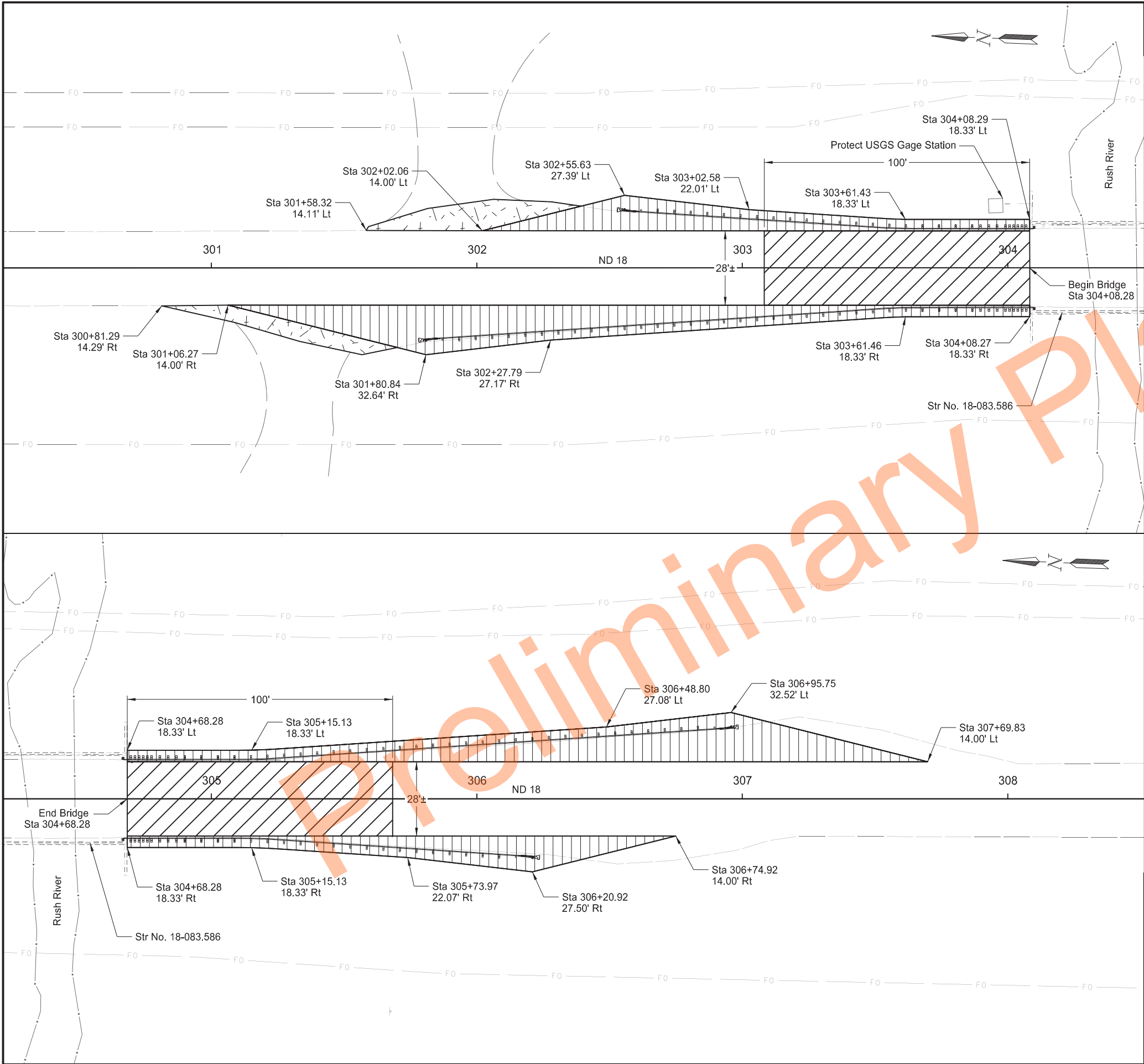
Structure Repairs
ND 18
5 Miles South of ND 46



7/17/2024

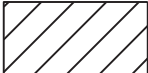


		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	90	2
SPEC	CODE	BID ITEM		QTY	UNIT
302	0100	SALVAGED BASE COURSE			
		Sta 202+49.14 Lt to Sta 203+71.34 Lt		23	TON
		Sta 201+74.71 Rt to Sta 203+71.38 Rt		56	TON
		Sta 204+61.40 Lt to Sta 206+57.21 Lt		55	TON
		Sta 204+61.43 Rt to Sta 205+83.64 Rt		23	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT			
		Sta 202+49.14 Lt to Sta 203+71.34 Lt		8	TON
		Sta 203+21.36 to Sta 203+71.36		14	TON
		Sta 201+74.71 Rt to Sta 203+71.38 Rt		19	TON
		Sta 204+61.40 Lt to Sta 206+57.21 Lt		19	TON
		Sta 204+61.42 to Sta 205+11.42		14	TON
		Sta 204+61.43 Rt to Sta 205+83.64 Rt		8	TON
 2" Commercial Grade Hot Mix Asphalt  2" Commercial Grade Hot Mix Asphalt 6" Salvaged Base Course					
Paving Layouts Site 2 - Str No. 10-006.645 Swan Creek Crossing					
Structure Repairs ND 10 3.7 Miles East of ND 18			7/17/2024		



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	90	3

SPEC	CODE	BID ITEM	QTY	UNIT
302	0100	SALVAGED BASE COURSE		
		Sta 301+58.32 Lt to Sta 302+39.21 Lt	20	TON
		Sta 302+02.06 Lt to Sta 304+08.29 Lt	58	TON
		Sta 300+81.29 Rt to Sta 301+70.15 Rt	16	TON
		Sta 301+06.27 Rt to Sta 304+08.27 Rt	108	TON
		Sta 304+68.28 Lt to Sta 307+69.83 Lt	108	TON
		Sta 304+68.28 Rt to Sta 306+74.92 Rt	58	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 302+02.06 Lt to Sta 304+08.29 Lt	19	TON
		Sta 303+08.28 to Sta 304+08.28	35	TON
		Sta 301+06.27 Rt to Sta 304+08.27 Rt	36	TON
		Sta 304+68.28 Lt to Sta 307+69.83 Lt	36	TON
		Sta 304+68.28 to Sta 305+68.28	35	TON
		Sta 304+68.28 Rt to Sta 306+74.92 Rt	19	TON



2" Commercial Grade Hot Mix Asphalt



2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course



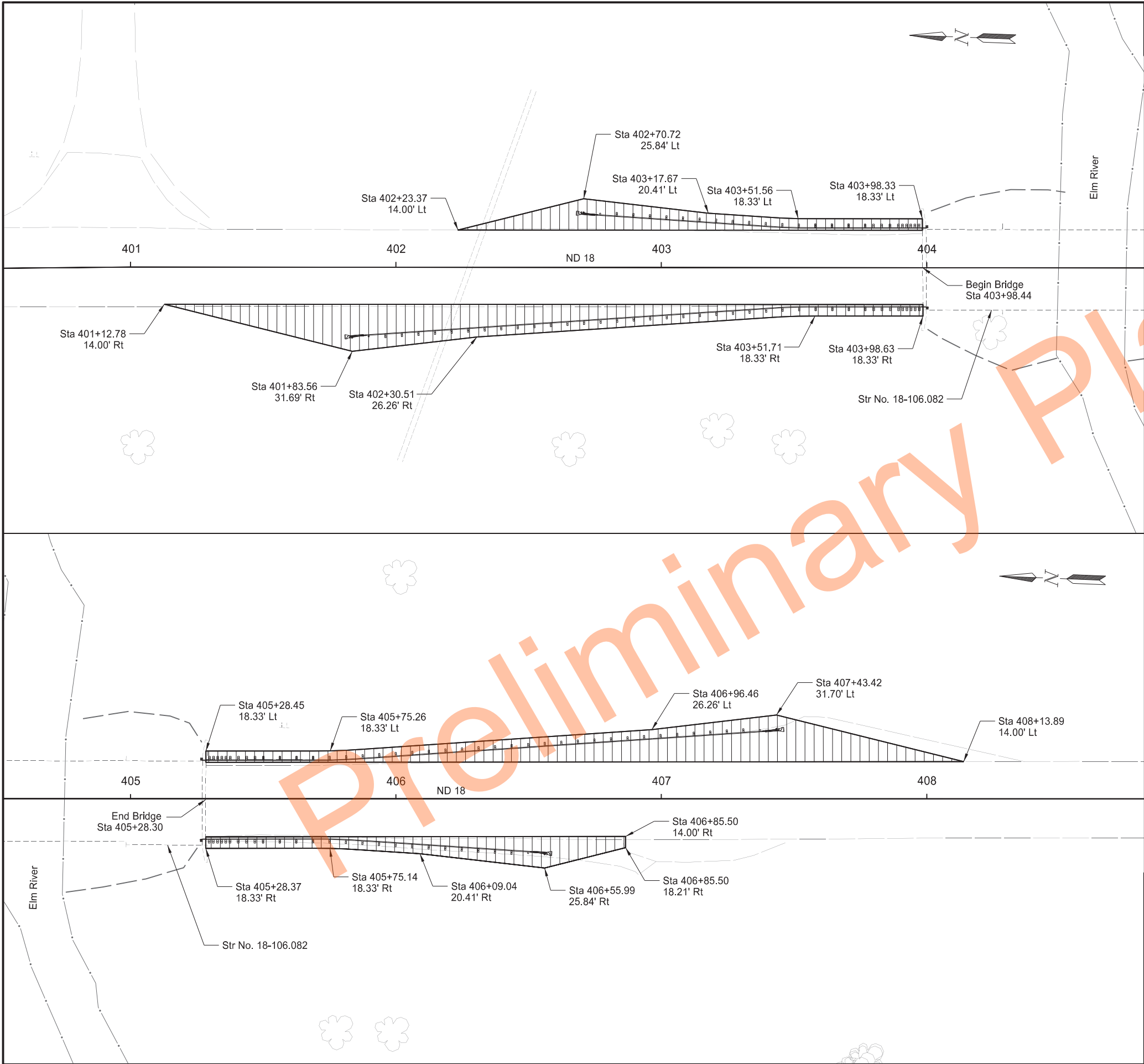
6" Salvaged Base Course

Paving Layouts
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia



7/17/2024



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-8-999(053)	90	4

SPEC	CODE	BID ITEM	QTY	UNIT
302	0100	SALVAGED BASE COURSE		
		Sa 402+23.37 Lt to Sta 403+98.33 Lt	44	TON
		Sta 401+12.78 Rt to Sta 403+98.63 Rt	98	TON
		Sta 405+28.45 Lt to Sta 408+13.89 Lt	97	TON
		Sta 405+28.37 Rt to Sta 406+85.50 Rt	44	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 402+23.37 Lt to Sta 403+98.33 Lt	15	TON
		Sta 401+12.78 Rt to Sta 403+98.63 Rt	33	TON
		Sta 405+28.45 Lt to Sta 408+13.89 Lt	33	TON
		Sta 405+28.37 Rt to Sta 406+85.50 Rt	15	TON

2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

Paving Layouts
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
ND 18
0.3 Miles South of Blanchard

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RULD
PE-10407
DATE
NORTH DAKOTA
7/17/2024

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	100	1

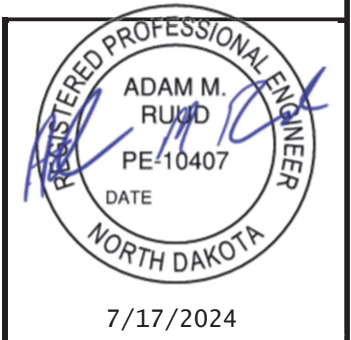
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED			TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.					
			1	2				
E5-1-48	48"x48"	EXIT GORE					35	
G20-1-60	60"x24"	ROAD WORK NEXT MILES					28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)					18	
G20-2-48	48"x24"	END ROAD WORK	2	4		4	26	104
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)					18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR					18	
G20-50a-72	72"x36"	ROAD WORK NEXT MILES RT & LT ARROWS					43	
G20-52a-72	72"x24"	ROAD WORK NEXT MILES RT or LT ARROW					36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	4		4	59	236
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)					11	
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)	22			22	10	220
M3-1-24	24"x12"	NORTH (Mounted on route marker post)					7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)	10			10	7	70
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)					7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)	9			9	7	63
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)	19			19	7	133
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)	6			6	7	42
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)	12			12	7	84
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	
R1-1-48	48"x48"	STOP	2	4		4	32	128
R1-2-60	60"x60"	YIELD					29	
R2-1-36	36"x48"	SPEED LIMIT ____ (Portable only)					30	
R2-1-48	48"x60"	SPEED LIMIT ____	4	8		8	39	312
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	2	4		4	10	40
R3-2-48	48"x48"	NO LEFT TURN					35	
R4-1-48	48"x60"	DO NOT PASS	2	4		4	39	156
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	
R10-6-24	24"x36"	STOP HERE ON RED	2	4		4	16	64
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)	2			2	12	24
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)	4			4	15	60
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	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT	1	2		2	35	70
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	
W3-4-36	36"x18"	WEST (Mounted on route marker post)	3			3	15	45
W3-3-48	48"x48"	SIGNAL AHEAD	2	4		4	35	140
W3-4-48	48"x48"	BE PREPARED TO STOP	2	4		4	35	140
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	2	4		4	35	140
M4-8-36	36"x18"	DETOUR (Mounted on route marker post)	6			6	15	90
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	
W8-1-48	48"x48"	BUMP	4	8		8	35	280
W8-3-48	48"x48"	PAVEMENT ENDS					35	
W8-7-48	48"x48"	LOOSE GRAVEL					35	
W8-11-48	48"x48"	UNEVEN LANES	2	4		4	35	140
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	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or FT or MILE	2	4		4	35	140
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or FT or MILE	2	4		4	35	140
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY					35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL					35	
W13-1P-30	30"x30"	____ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)	2	4		4	14	56
W14-3-64	64"x48"	NO PASSING ZONE					28	
W16-2P-30	30"x24"	____ FEET PLAQUE (Mounted on warning sign post)					10	
W20-1-48	48"x48"	ROAD WORK AHEAD or FT or MILE	2	4		4	35	140
W20-2-48	48"x48"	DETOUR AHEAD or FT or MILE	12			12	35	420
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or FT or MILE	6			6	35	210
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or FT or MILE	2	4		4	35	140
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or FT or MILE					35	
W20-7-48	48"x48"	FLAGGER	2	4		4	35	140
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	2	4		4	5	20
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		2		2	35	70
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or FT or MILE					35	
W21-5-48	48"x48"	SHOULDER WORK					35	

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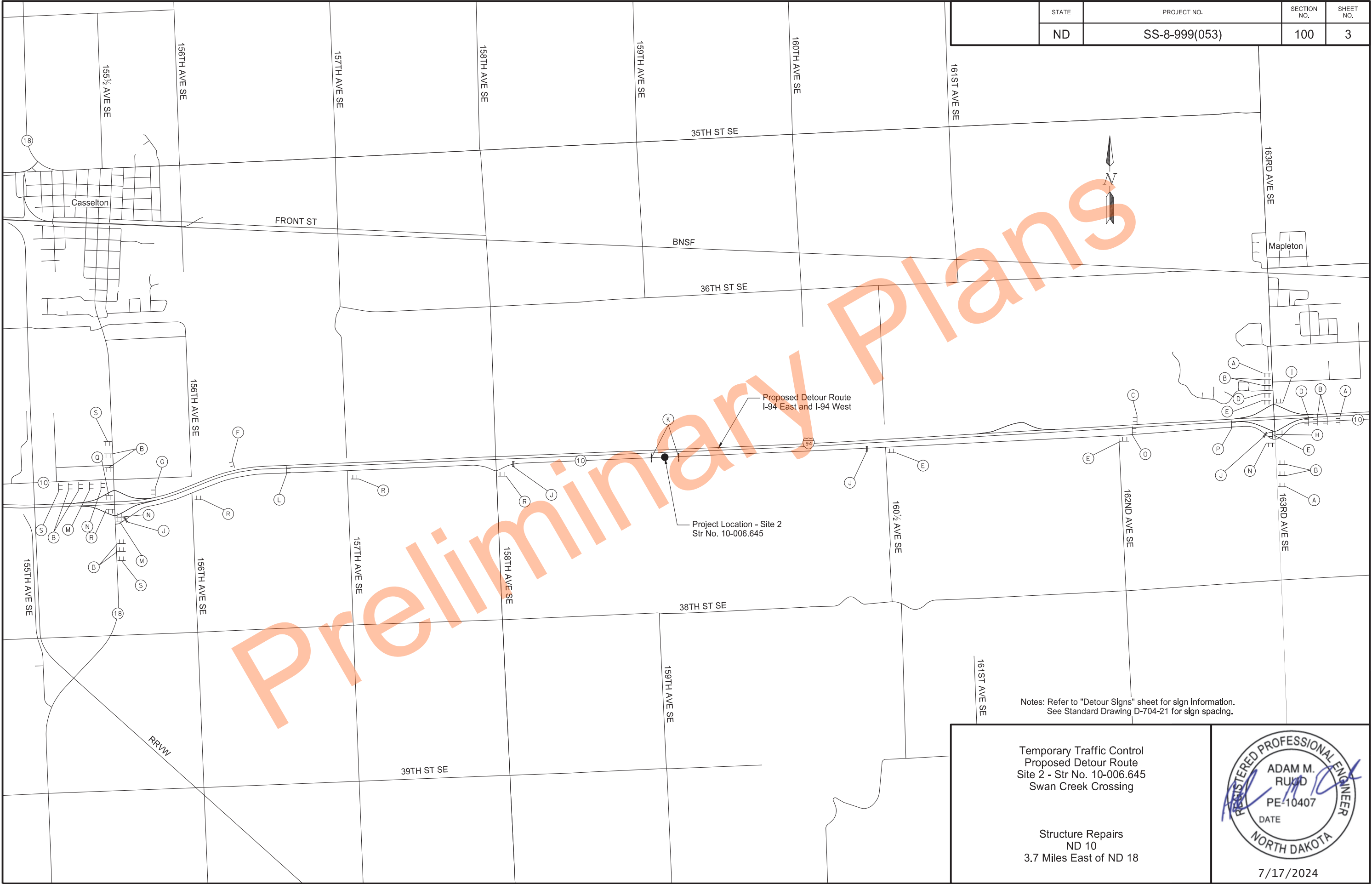
SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	6003

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY		TOTAL QUANTITY
			BY PHASE NO.		
			1	2	
704-0100	FLAGGING	MHR	75	150	225
704-1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EACH	1	2	2
704-1039	ATTENUATION DEVICE-TYPE B-45	EACH			
704-1041	ATTENUATION DEVICE-TYPE B-55	EA			
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	2	4	4
704-1048	PORTABLE RUMBLE STRIPS	EACH	2	4	4
704-1050	TYPE I BARRICADES	EACH			
704-1052	TYPE III BARRICADES	EACH	12	4	12
704-1060	DELINEATOR DRUMS	EACH	10	20	20
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	235	453	688
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF			
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH			
704-3511	STATE FURNISHED MEDIAN BARRIER	LF	520	910	910
704-4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4	4	4
762-0200	RAISED PAVEMENT MARKERS	EACH			
762-0420	SHORT TERM 4IN LINE - TYPE R	LF			
762-0422	SHORT TERM 6IN LINE-TYPE R	LF	3552	6844	10396
762-0426	SHORT TERM 24IN LINE-TYPE R	LF	24	48	72
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
 Sites 1, 2, 3 & 4
 Str No. 18-045.621 & 10-006.645
 Str No. 18-083.586 & 18-106.082
 State Highway 18 & State Highway 10



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	100	3

Notes: Refer to "Detour Signs" sheet for sign information.
See Standard Drawing D-704-21 for sign spacing.

Temporary Traffic Control
Proposed Detour Route
Site 2 - Str No. 10-006.645
Swan Creek Crossing

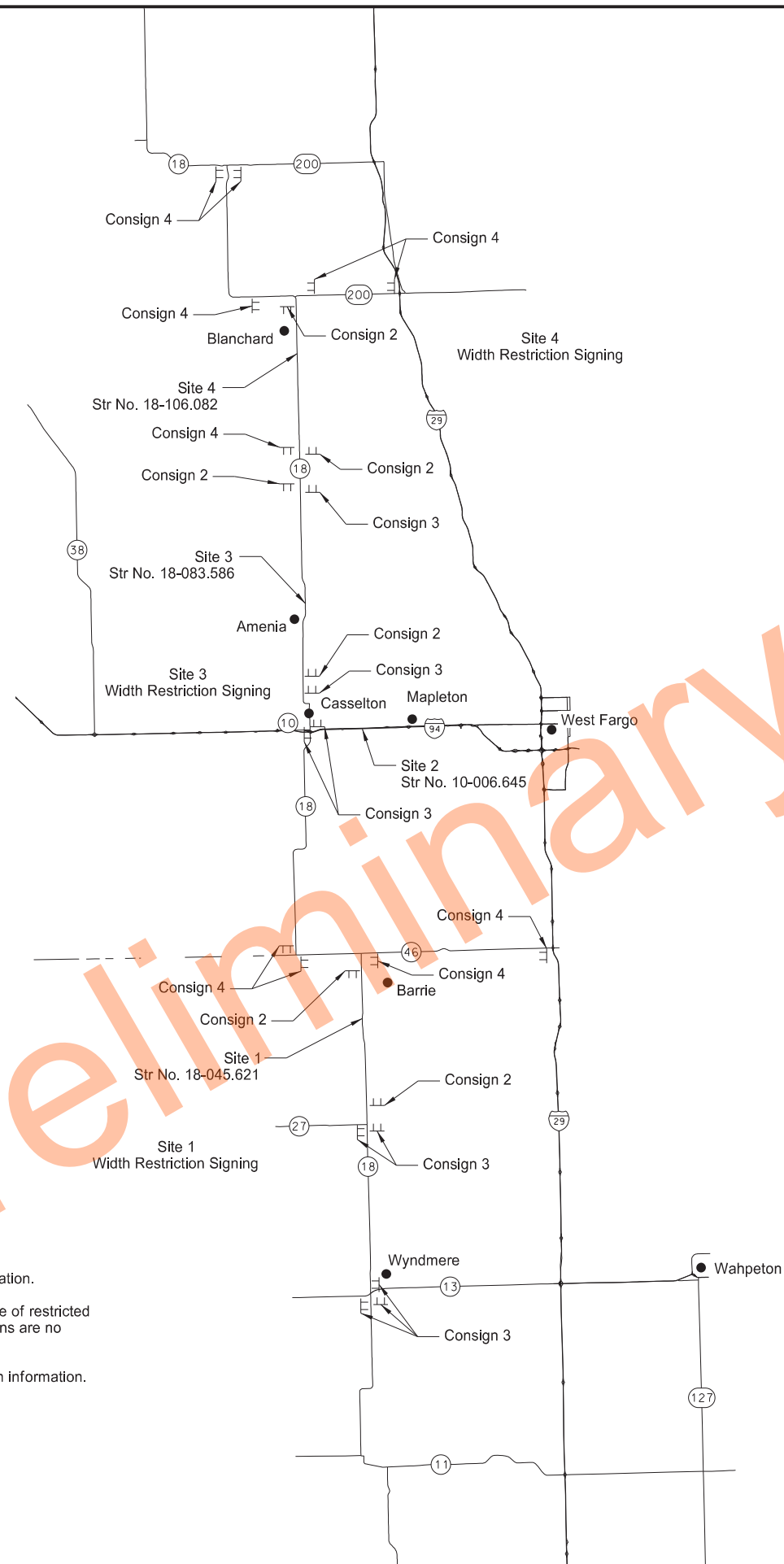
Structure Repairs
ND 10
3.7 Miles East of ND 18



7/17/2024

				STATE	PROJECT NO.	SECTION NO.	SHEET NO.
				ND	SS-8-999(053)	100	4
A ROAD CLOSED AHEAD W20-3-48 Post mounted	B DETOUR XXXX FT W20-2-48 Post mounted	C DETOUR WEST NORTH DAKOTA 10 M4-8-36 M3-4-36 M1-5-36 Post mounted	D DETOUR WEST NORTH DAKOTA 10 → M4-8-24 M3-4-24 M1-5-24 M5-1R-21 Post mounted	E DETOUR WEST NORTH DAKOTA 10 → M4-8-24 M3-4-24 M1-5-24 M6-1R-21 Post mounted	F DETOUR WEST NORTH DAKOTA 10 ↗ M4-8-36 M3-4-36 M1-5-36 M5-2R-30 Post mounted	G DETOUR WEST NORTH DAKOTA 10 ↗ M4-8-36 M3-4-36 M1-5-36 M6-2R-30 Post mounted	H DETOUR WEST NORTH DAKOTA 10 ↶ M4-8-24 M3-4-24 M1-5-24 M5-1L-21 Post mounted
I DETOUR WEST NORTH DAKOTA 10 ← M4-8-24 M3-4-24 M1-5-24 M6-1L-21 Post mounted	J ROAD CLOSED 00 MILES AHEAD LOCAL TRAFFIC ONLY R11-3a-60 Barricade mounted	K ROAD CLOSED R11-2-48 Barricade mounted	L DETOUR EAST NORTH DAKOTA 10 ↗ M4-8-36 M3-2-36 M1-5-36 Post mounted	M DETOUR EAST NORTH DAKOTA 10 ↗ M4-8-24 M3-2-24 M1-5-24 M5-1R-21 Post mounted	N DETOUR EAST NORTH DAKOTA 10 → M4-8-24 M3-2-24 M1-5-24 M6-1R-21 Post mounted	O DETOUR EAST NORTH DAKOTA 10 ↗ M4-8-36 M3-2-36 M1-5-36 M5-2R-30 Post mounted	P DETOUR EAST NORTH DAKOTA 10 ↗ M4-8-36 M3-2-36 M1-5-36 M6-2R-30 Post mounted
Q DETOUR EAST NORTH DAKOTA 10 ↶ M4-8-24 M3-2-24 M1-5-24 M5-1L-21 Post mounted	R DETOUR EAST NORTH DAKOTA 10 ← M4-8-24 M3-2-24 M1-5-24 M6-1L-21 Post mounted	S ROAD CLOSED AHEAD NORTH DAKOTA 10 W20-3-48 M1-5-24 Post mounted	Temporary Traffic Control Detour Signs Site 2 - Str No. 10-006.645 Swan Creek Crossing Structure Repairs ND 10 3.7 Mile East of ND 18				REGISTERED PROFESSIONAL ENGINEER ADAM M. RUDD PE-10407 DATE 7/17/2024

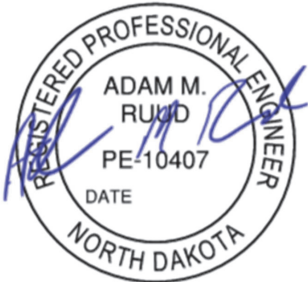
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	100	7



- Notes:
- 1. Sign locations to be verified in the field by the engineer prior to intallation.
 - 2. Signs to be in place prior to, but no more than seven days in advance of restricted width conditions. Immediately remove or cover when width restrictions are no longer present.
 - 3. Refer to "Width Restriction Construction Sign Details" sheets for sign information.

Temporary Traffic Control
Width Restriction Signing
Site 1 - Str No. 18-045.621
Site 3 - Str No. 18-083.586
Site 4 - Str No. 18-106.082

Structure Repairs
Trail, Cass and Richland County

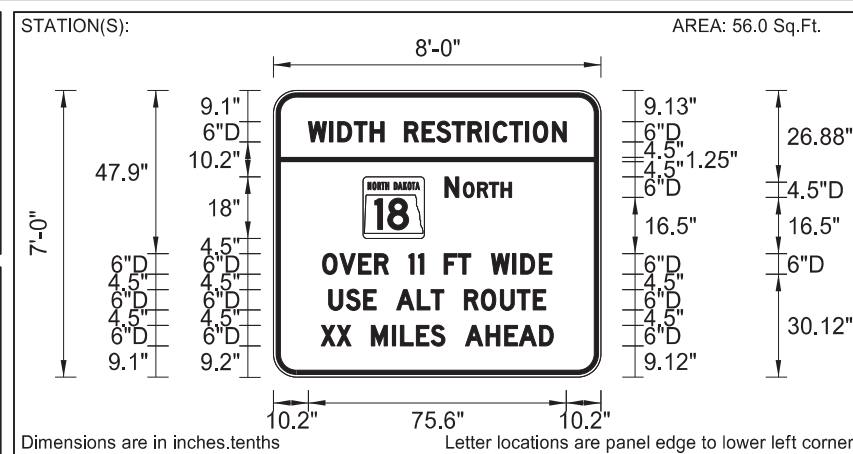


7/17/2024

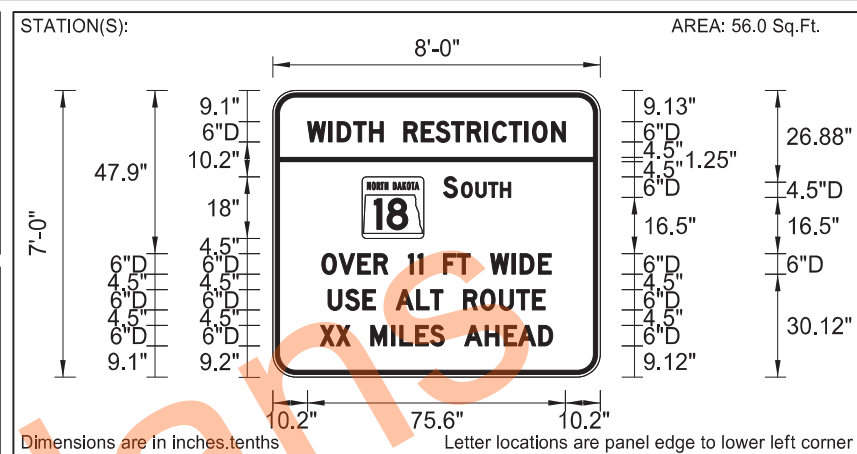
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	100	9

SIGN NUMBER	Consign 3
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGL
ND_M1-5_2	26.3	40.6	18	18	0

[illegible]

SIGN NUMBER	Consign 4
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

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Temporary Traffic Control
Width Restriction Construction Sign Details
Site 1 - Str No. 18-045.621
Site 3 - Str No. 18-083.586
Site 4 - Str No. 18-106.082

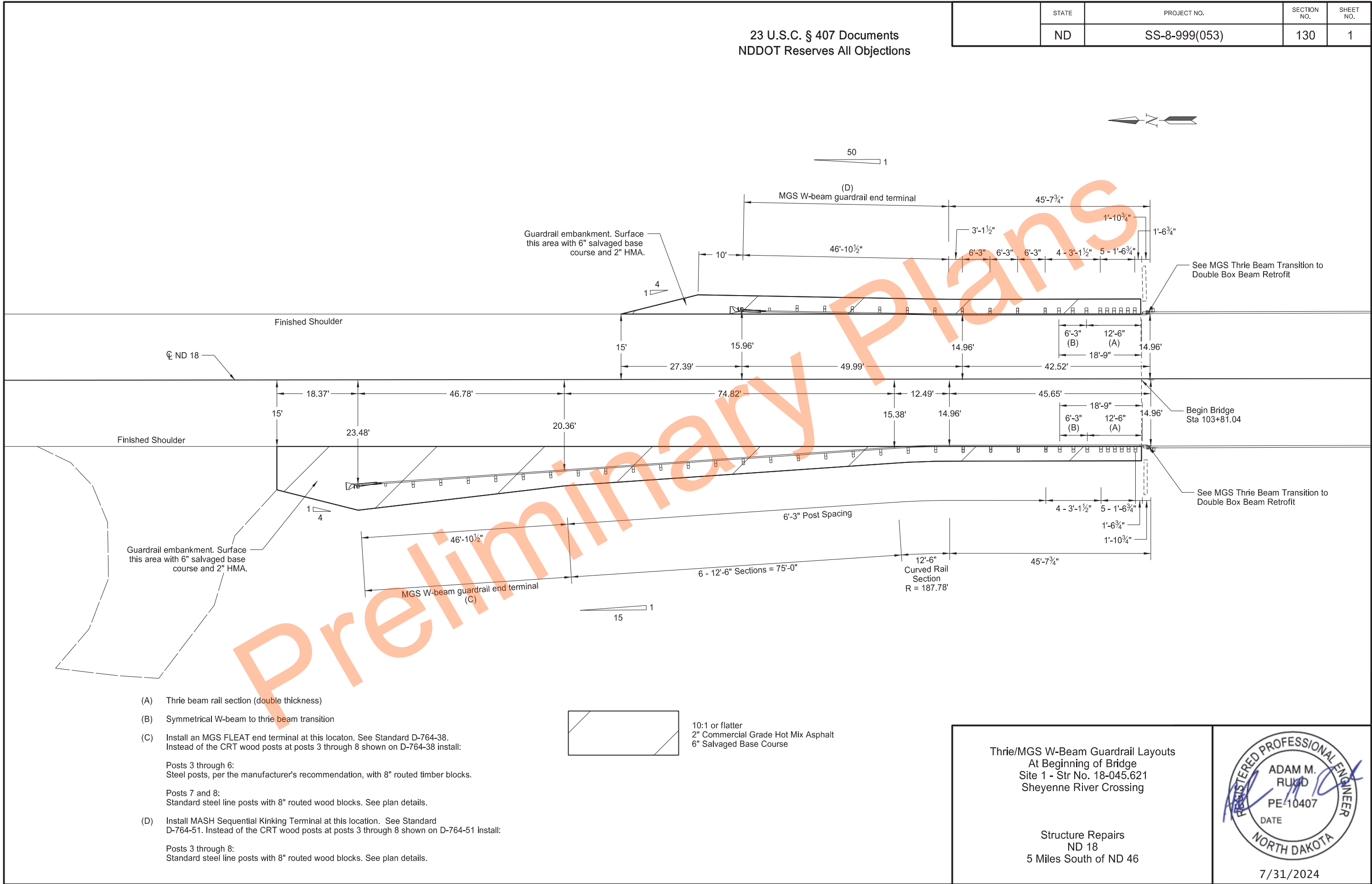
Structure Repairs

Trail, Cass, and Richland County

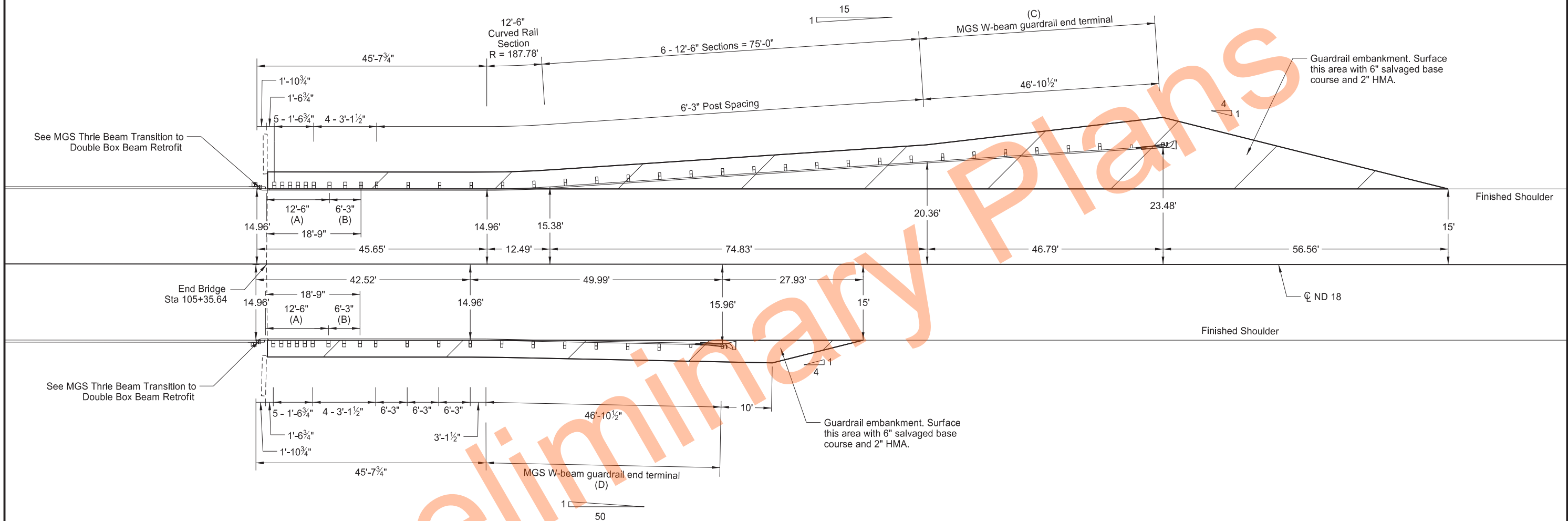


7/17/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	1



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	130	2



- (A) Thrie beam rail section (double thickness)
- (B) Symmetrical W-beam to thrie beam transition
- (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 timber blocks.
- Posts 7 and 8:
Standard steel line posts with 8" routed wood blocks. See plan details.
- (D) Install MASH Sequential Kinking Terminal at this location. See Standard D-764-51. Instead of the CRT wood posts at posts 3 through 8 shown on D-764-51 install:
- Posts 3 through 8:
Standard steel line posts with 8" routed wood blocks. See plan details.



10:1 or flatter
2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

Thrie/MGS W-Beam Guardrail Layouts
At End of Bridge
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

Structure Repairs
ND 18
5 Miles South of ND 46



7/31/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	3

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES																	
THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS																	
LOCATION	(A) 2'-6" THRIE- BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X 3/4" LONG BOLT	(A) 5/8" DIA X 2" LONG BOLT	(A) HSS12 X 6 X 1/4 X 1'-9 1/8" STEEL BLOCK	(A) HSS12 X 6 X 1/4 X 1'-2" STEEL BLOCK	(A) 6" X 8" X 14" ROUTED WOOD BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 6'-3" W-THRIE BEAM TRANSITION SECTION	(A) W6 X 9 X 6'-6" POST	(A) W6 X 9 X 6'-0" POST	(A) 5/8" DIA X 10" LONG GUARDRAIL BOLT	(A) 5/8" DIA X 14" LONG GUARDRAIL BOLT	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 5/8" DIA X 1-1/4" LONG W- BEAM GUARDRAIL SPLICE BOLT	(A) REFLECTOR- IZED PLATES	(B) EMBANK MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 103+37.32 Lt to Sta 103+83.06 Lt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	1
Sta 102+50.18 Rt to Sta 103+83.04 Rt	1	5	2	7	2	18	1	1	7	20	18	16	8	1	104	8	1
Sta 105+33.70 Lt to Sta 106+66.70 Lt	1	5	2	7	2	18	1	1	7	20	18	16	8	1	104	8	1
Sta 105+33.57 Rt to Sta 105+79.18 Rt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	1
Total	4	20	8	28	8	44	4	4	28	52	44	64	20	2	304	24	4

Note:
(A) Include these items in the price bid for "W-Beam Guardrail".
(B) Include guardrail embankment in the price bid for "Removal of Bituminous Surfacing".

SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 103+37.32 Lt to Sta 103+83.06 Lt	45.6	LF
		Sta 102+50.18 Rt to Sta 103+83.04 Rt	133.1	LF
		Sta 105+33.70 Lt to Sta 106+66.70 Lt	133.1	LF
		Sta 105+33.57 Rt to Sta 105+79.18 Rt	45.6	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 102+87.72 Lt to Sta 103+37.32 Lt	1	EA
		Sta 102+00.65 Rt to Sta 102+50.18 Rt	1	EA
		Sta 106+66.70 Lt to Sta 107+16.23 Lt	1	EA
		Sta 105+79.18 Rt to Sta 106+28.78 Rt	1	EA
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 103+10.01 Lt to Sta 103+83.01 Lt	72.9	LF
		Sta 102+35.57 Rt to Sta 103+83.07 Rt	147.9	LF
		Sta 105+33.67 Lt to Sta 106+81.44 Lt	147.9	LF
		Sta 105+33.80 Rt to Sta 106+06.71 Rt	72.9	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 102+60.11 Lt to Sta 103+10.01 Lt	1	EA
		Sta 101+85.73 Rt to Sta 102+35.57 Rt	1	EA
		Sta 106+81.44 Lt to Sta 107+31.32 Lt	1	EA
		Sta 106+06.71 Rt to Sta 106+56.57 Rt	1	EA

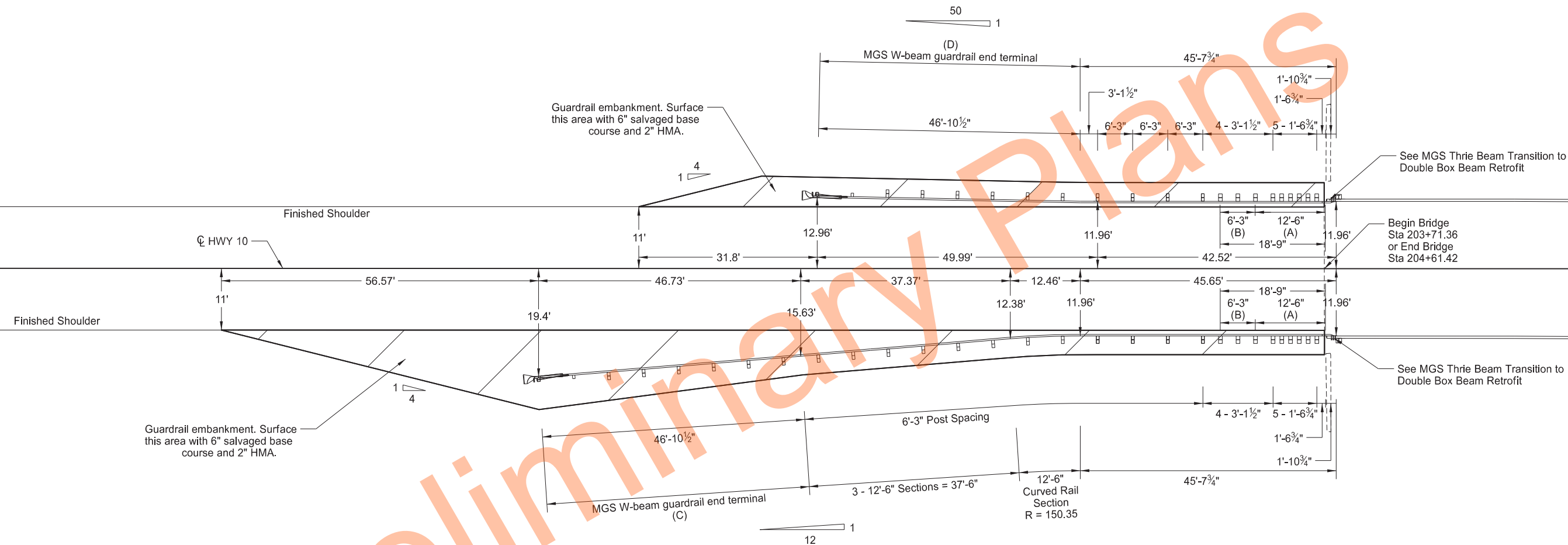
Thrie/MGS W-Beam Guardrail Quantities
At Both Ends of Bridge
Site 1 - Str No. 18-045.621
Sheyenne River Crossing

Structure Repairs
ND 18
5 Miles South of ND 46



7/31/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	4



- (A) Thrie beam rail section (double thickness)
- (B) Symmetrical W-beam to thrie beam transition
- (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 timber blocks.
- Posts 7 and 8:
Standard steel line posts with 8" routed wood blocks. See plan details.
- (D) Install MASH Sequential Kinking Terminal at this location. See Standard D-764-51. Instead of the CRT wood posts at posts 3 through 8 shown on D-764-51 install:
- Posts 3 through 8:
Standard steel line posts with 8" routed wood blocks. See plan details.



10:1 or flatter
2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

Thrie/MGS W-Beam Guardrail Layouts
At Both Ends of Bridge
Site 2 - Str No. 10-006.645
Swan Creek Crossing

Structure Repairs
ND 10
3.7 Miles East of ND 18



7/31/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	5

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES																	
THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS																	
LOCATION	(A) 2'-6" THRIE- BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X 3/4" LONG BOLT	(A) 5/8" DIA X 2" LONG BOLT	(A) HSS12 X 6 X 1/4 X 1'-9 1/8" STEEL BLOCK	(A) HSS12 X 6 X 1/4 X 1'-2" STEEL BLOCK	(A) 6" X 8" X 14" ROUTED WOOD BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 6'-3" W-THRIE BEAM TRANSITION SECTION	(A) W6 X 9 X 6'-6" POST	(A) W6 X 9 X 6'-0" POST	(A) 5/8" DIA X 10" LONG GUARDRAIL BOLT	(A) 5/8" DIA X 14" LONG GUARDRAIL BOLT	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 5/8" DIA X 1-1/4" LONG W- BEAM GUARDRAIL SPlice BOLT	(A) REFLECTOR- IZED PLATES	(B) EMBANK MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 203+27.82 Lt to Sta 203+73.47 Lt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	1
Sta 202+78.01 Rt to Sta 203+73.48 Rt	1	5	2	7	2	12	1	1	7	14	12	16	5	1	80	6	1
Sta 204+59.29 Lt to Sta 205+54.80 Lt	1	5	2	7	2	12	1	1	7	14	12	16	5	1	80	6	1
Sta 204+59.34 Rt to Sta 205+05.17 Rt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	1
Total	4	20	8	28	8	32	4	4	28	40	32	64	14	2	256	20	4

Note:
(A) Include these items in the price bid for "W-Beam Guardrail".
(B) Include guardrail embankment in the price bid for "Removal of Bituminous Surfacing".

SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 203+27.82 Lt to Sta 203+73.47 Lt	45.6	LF
		Sta 202+78.01 Rt to Sta 203+73.48 Rt	95.6	LF
		Sta 204+59.29 Lt to Sta 205+54.80 Lt	95.6	LF
		Sta 204+59.34 Rt to Sta 205+05.17 Rt	45.6	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 202+78.22 Lt to Sta 203+27.82 Lt	1	EA
		Sta 202+28.27 Rt To Sta 202+78.01 Rt	1	EA
		Sta 205+54.80 Lt to Sta 206+04.30 Lt	1	EA
		Sta 205+05.17 Rt to Sta 205+54.56 Rt	1	EA
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 202+32.48 Lt to Sta 203+73.44 Lt	141.2	LF
		Sta 201+70.21 Rt to Sta 203+73.44 Rt	203.6	LF
		Sta 204+59.22 Lt to Sta 206+62.40 Lt	203.6	LF
		Sta 204+59.15 Rt to Sta 206+00.11 Rt	141.2	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 201+95.67 Lt to Sta 202+32.48 Lt	1	EA
		Sta 201+33.42 Rt to Sta 201+70.21 Rt	1	EA
		Sta 206+62.40 Lt to Sta 206+99.18 Lt	1	EA
		Sta 206+00.11 Rt to Sta 206+36.92 Rt	1	EA

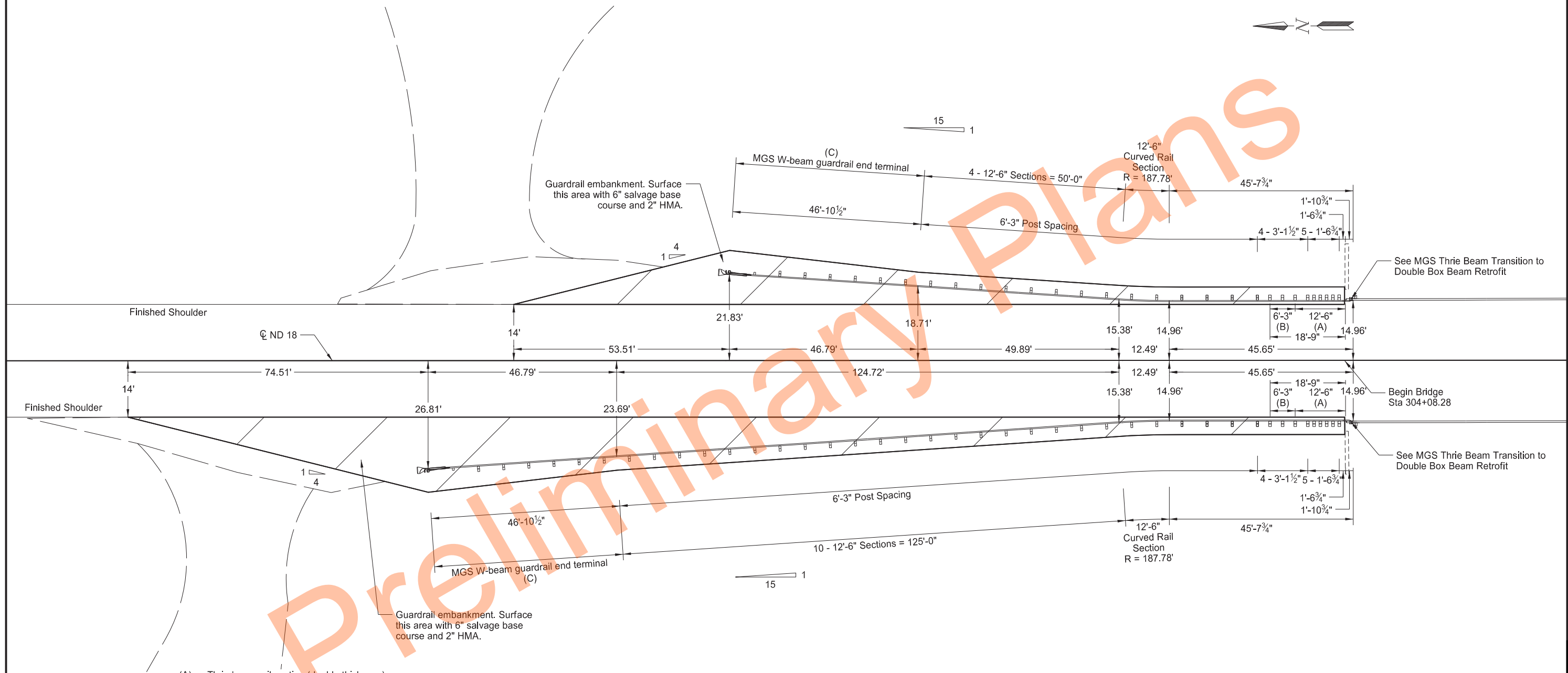
Thrie/MGS W-Beam Guardrail Quantities
At Both Ends of Bridge
Site 2 - Str No. 10-006.645
Swan Creek Crossing

Structure Repairs
ND 10
3.7 Miles East of ND 18



7/31/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	6



- (A) Thrie beam rail section (double thickness)
- (B) Symmetrical W-beam to thrie beam transition
- (C) Install an MGS FLEAT end terminal at this locaton. 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 timber blocks.
- Posts 7 and 8:
Standard steel line posts with 8" routed wood blocks. See plan details.

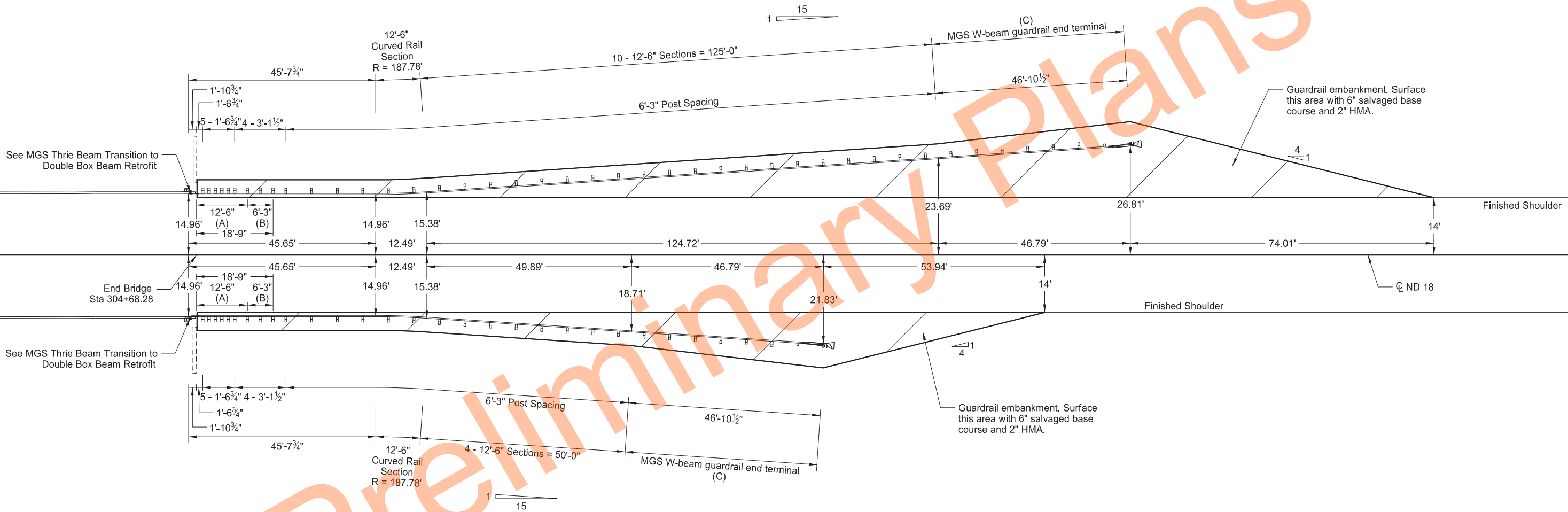
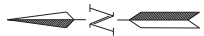
10:1 or flatter
2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

Thrie/MGS W-Beam Guardrail Layouts
At Beginning of Bridge
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia



7/31/2024



- (A) Thrie beam rail section (double thickness)
- (B) Symmetrical W-beam to thrie beam transition
- (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 timber blocks.
- Posts 7 and 8:
Standard steel line posts with 8" routed wood blocks. See plan details.



10:1 or flatter
2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

Thrie/MGS W-Beam Guardrail Layouts
At End of Bridge
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia



7/31/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	8

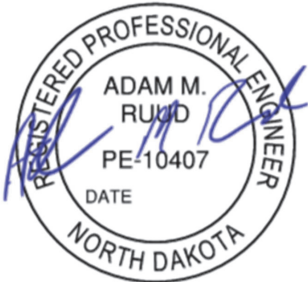
MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES																	
THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS																	
LOCATION	(A) 2'-6" THRIE- BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X 3/4" LONG BOLT	(A) 5/8" DIA X 2" LONG BOLT	(A) HSS12 X 6 X 1/4 X 1'-9 1/8" STEEL BLOCK	(A) HSS12 X 6 X 1/4 X 1'-2" STEEL BLOCK	(A) 6" X 8" X 14" ROUTED WOOD BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 6'-3" W-THRIE BEAM TRANSITION SECTION	(A) W6 X 9 X 6'-6" POST	(A) W6 X 9 X 6'-0" POST	(A) 5/8" DIA X 10" LONG GUARDRAIL BOLT	(A) 5/8" DIA X 14" LONG GUARDRAIL BOLT	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 5/8" DIA X 1-1/4" LONG W- BEAM GUARDRAIL SPLICE BOLT	(A) REFLECTOR- IZED PLATES	(B) EMBANK MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 303+02.36 Lt to Sta 304+10.42 Lt	1	5	2	7	2	14	1	1	7	16	14	16	6	1	88	7	1
Sta 302+27.57 Rt to Sta 304+10.38 Rt	1	5	2	7	2	26	1	1	7	28	26	16	12	1	136	10	1
Sta 304+66.17 Lt to Sta 306+49.02 Lt	1	5	2	7	2	26	1	1	7	28	26	16	12	1	136	10	1
Sta 304+66.18 Rt to Sta 305+74.19 Rt	1	5	2	7	2	14	1	1	7	16	14	16	6	1	88	7	1
Total	4	20	8	28	8	80	4	4	28	88	80	64	36	4	448	34	4

Note:
(A) Include these items in the price bid for "W-Beam Guardrail".
(B) Include guardrail embankment in the price bid for "Removal of Bituminous Surfacing".

SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 303+02.36 Lt to Sta 304+10.42 Lt	108.1	LF
		Sta 302+27.57 Rt to Sta 304+10.38 Rt	183.1	LF
		Sta 304+66.17 Lt to Sta 306+49.02 Lt	183.1	LF
		Sta 304+66.18 Rt to Sta 305+74.19 Rt	108.1	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 302+52.82 Lt to Sta 303+02.36 Lt	1	EA
		Sta 301+78.03 Rt to Sta 302+27.57 Rt	1	EA
		Sta 306+49.02 Lt to Sta 306+98.56 Lt	1	EA
		Sta 305+74.19 Rt to Sta 306+23.73 Rt	1	EA
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 302+56.88 Lt to Sta 304+10.29 Lt	153.5	LF
		Sta 301+94.98 Rt to Sta 304+10.34 Rt	216	LF
		Sta 304+66.30 Lt to Sta 306+81.87 Lt	216	LF
		Sta 304+66.30 Rt to Sta 306+19.58 Rt	153.5	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 302+20.43 Lt to Sta 302+56.88 Lt	1	EA
		Sta 301+58.52 Rt to Sta 301+94.98 Rt	1	EA
		Sta 306+81.87 Lt to Sta 307+18.34 Lt	1	EA
		Sta 306+19.58 Rt to Sta 306+55.96 Rt	1	EA

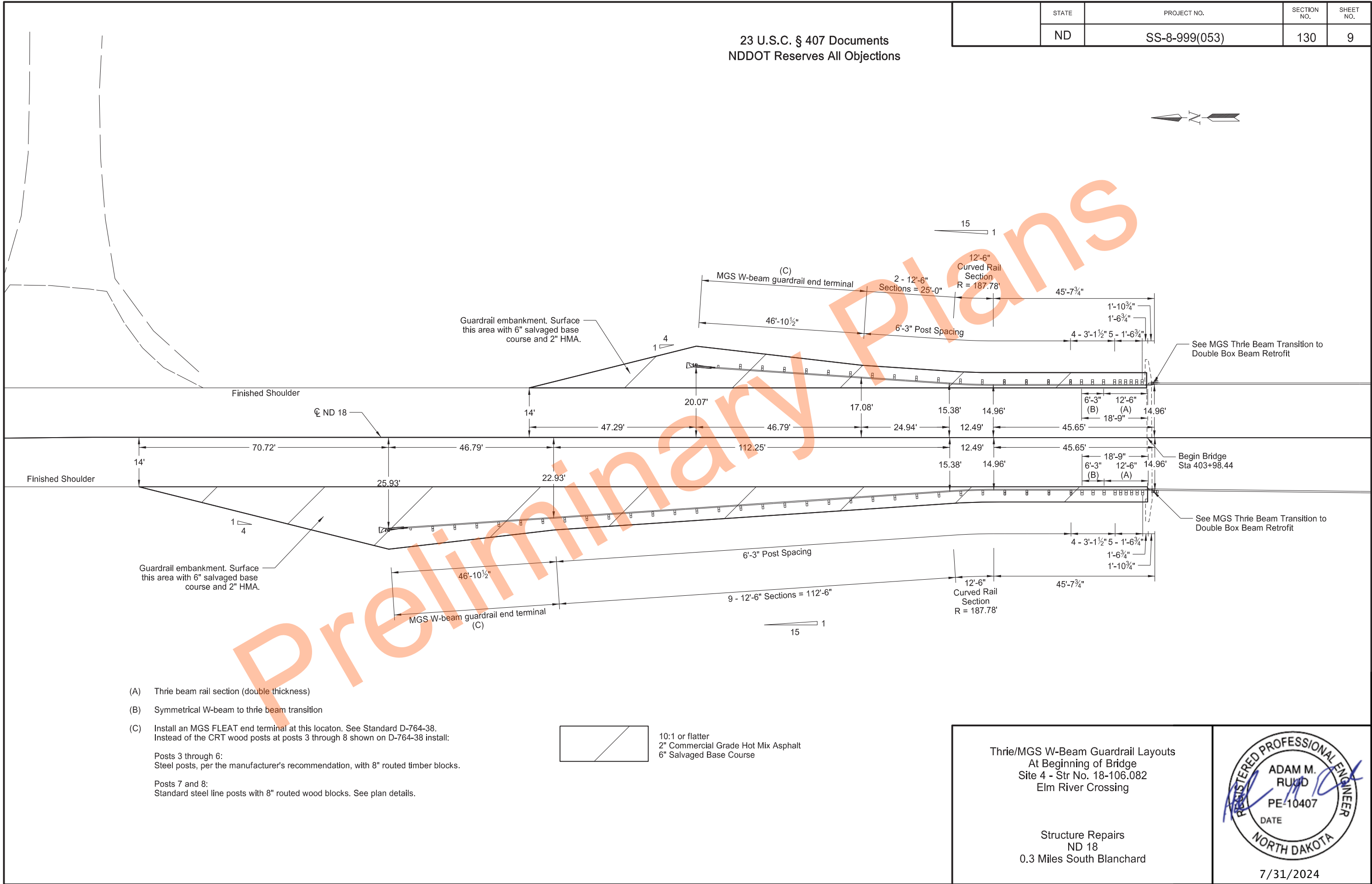
Thrie/MGS W-Beam Guardrail Quantities
At Both Ends of Bridge
Site 3 - Str No. 18-083.586
Rush River Crossing

Structure Repairs
ND 18
0.6 Miles North of Amenia

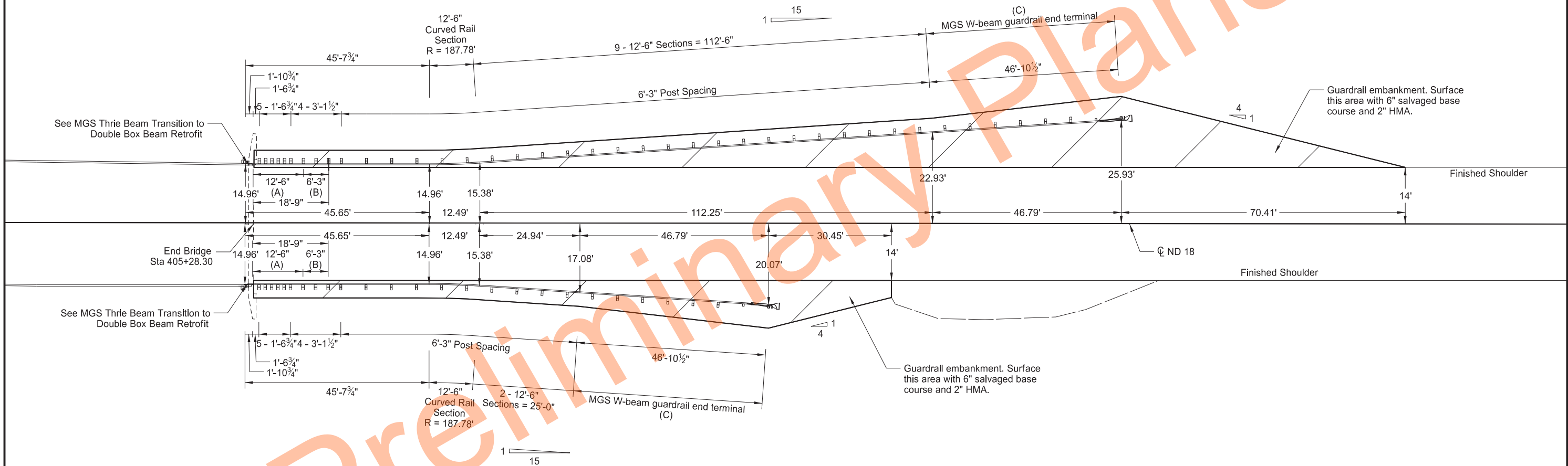
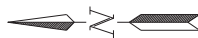


7/31/2024

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	130	9



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	10



- (A) Thrie beam rail section (double thickness)
- (B) Symmetrical W-beam to thrie beam transition
- (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 timber blocks.
- Posts 7 and 8:
Standard steel line posts with 8" routed wood blocks. See plan details.

10:1 or flatter
2" Commercial Grade Hot Mix Asphalt
6" Salvaged Base Course

Thrie/MGS W-Beam Guardrail Layouts
At End of Bridge
Site 4 - Str No. 18-106.082
Elm River Crossing

Structure Repairs
ND 18
0.3 Miles South Blanchard



7/31/2024

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	130	11

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES																	
THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS																	
LOCATION	(A) 2'-6" THRIE- BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X 3/4" LONG BOLT	(A) 5/8" DIA X 2" LONG BOLT	(A) HSS12 X 6 X 1/4 X 1'-9 1/8" STEEL BLOCK	(A) HSS12 X 6 X 1/4 X 1'-2" STEEL BLOCK	(A) 6" X 8" X 14" ROUTED WOOD BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 6'-3" W-THRIE BEAM TRANSITION SECTION	(A) W6 X 9 X 6'-6" POST	(A) W6 X 9 X 6'-0" POST	(A) 5/8" DIA X 10" LONG GUARDRAIL BOLT	(A) 5/8" DIA X 14" LONG GUARDRAIL BOLT	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 5/8" DIA X 1-1/4" LONG W- BEAM GUARDRAIL SPLICE BOLT	(A) REFLECTOR- IZED PLATES	(B) EMBANK MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 403+17.45 Lt to Sta 404+00.49 Lt	1	5	2	7	2	10	1	1	7	12	10	16	4	1	72	6	1
Sta 402+30.29 Rt to Sta 404+00.69 Rt	1	5	2	7	2	24	1	1	7	26	24	16	11	1	128	9	1
Sta 405+26.22 Lt to Sta 406+96.69 Lt	1	5	2	7	2	24	1	1	7	26	24	16	11	1	128	9	1
Sta 405+26.28 Rt to Sta 406+09.26 Rt	1	5	2	7	2	10	1	1	7	12	10	16	4	1	72	6	1
Total	4	20	8	28	8	68	4	4	28	76	68	64	30	4	400	30	4

Note:
(A) Include these items in the price bid for "W-Beam Guardrail".
(B) Include guardrail embankment in the price bid for "Removal of Bituminous Surfacing".

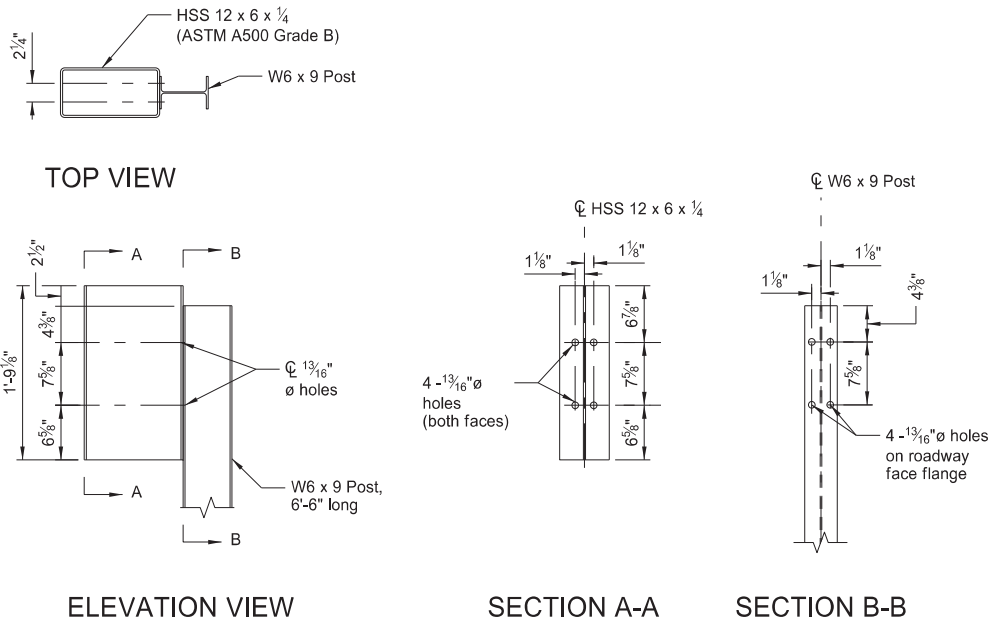
SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 403+17.45 Lt to Sta 404+00.49 Lt	83.1	LF
		Sta 402+30.29 Rt to Sta 404+00.69 Rt	170.6	LF
		Sta 405+26.22 Lt to Sta 406+96.69 Lt	170.6	LF
		Sta 405+26.28 Rt to Sta 406+09.26 Rt	83.1	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 402+67.91 Lt to Sta 403+17.45 Lt	1	EA
		Sta 401+80.75 Rt to Sta 402+30.29 Rt	1	EA
		Sta 406+96.69 Lt to Sta 407+46.22 Lt	1	EA
		Sta 406+09.26 Rt to Sta 406+58.80 Rt	1	EA
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 402+71.64 Lt to Sta 404+00.00 Lt	128.6	LF
		Sta 402+09.33 Rt to Sta 404+00.22 Rt	191.2	LF
		Sta 405+26.70 Lt to Sta 407+17.31 Lt	190.8	LF
		Sta 405+26.89 Rt to Sta 406+54.84 Rt	143.9	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 402+35.75 Lt to Sta 402+71.64 Lt	1	EA
		Sta 401+73.34 Rt to Sta 402+09.33 Rt	1	EA
		Sta 407+17.31 Lt to Sta 407+53.84 Lt	1	EA
		Sta 406+54.84 Rt to Sta 406+91.31 Rt	1	EA

Thrie/MGS W-Beam Guardrail Quantities
At Both Ends of Bridge
Site 4 - Str No. 18-106.082
Elm River Crossing

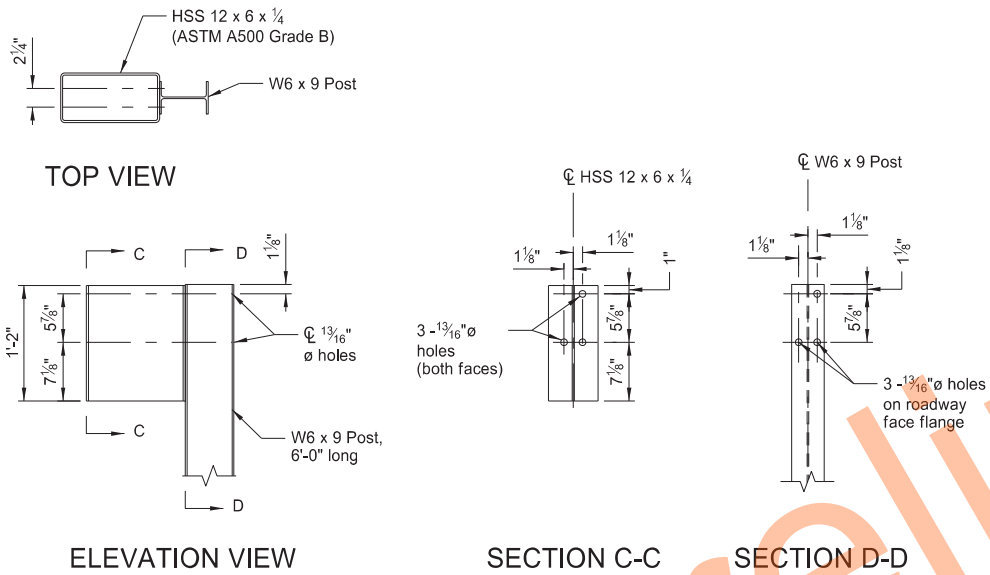
Structure Repairs
ND 18
0.3 Miles South of Blanchard



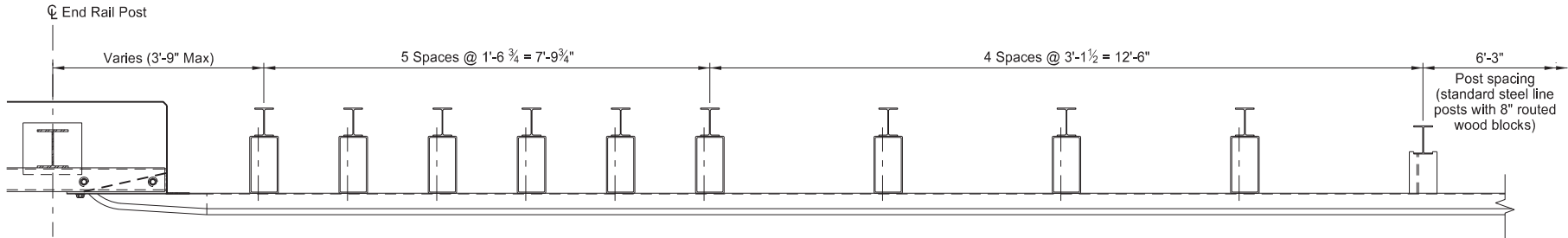
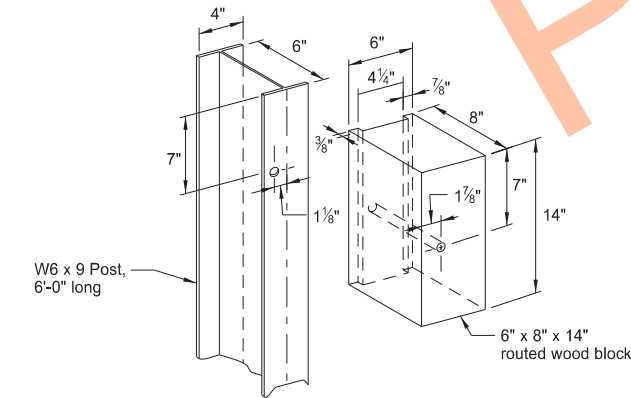
7/31/2024



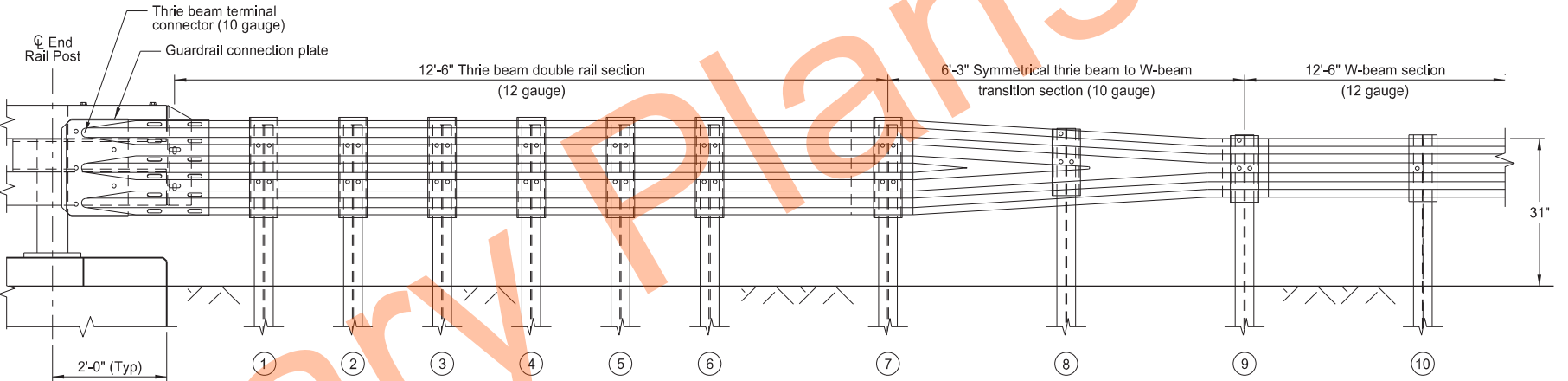
THRIE BEAM STEEL BLOCKOUT (POSTS 1-7)



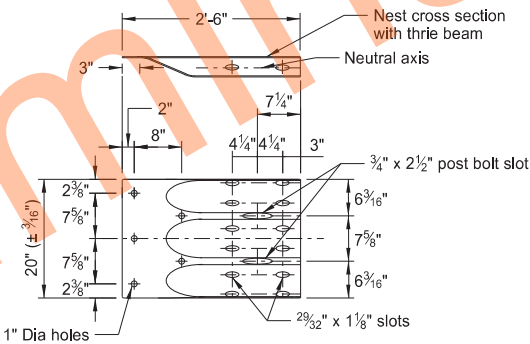
THRIE BEAM STEEL BLOCKOUT (POSTS 8-9)



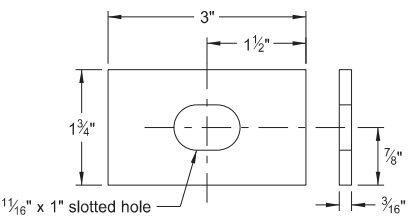
PLAN VIEW



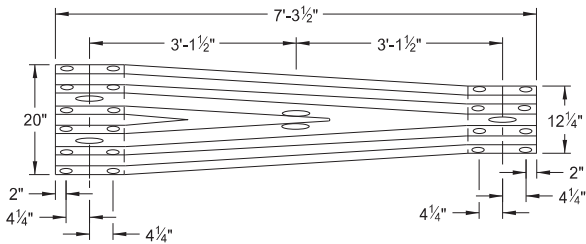
ELEVATION VIEW



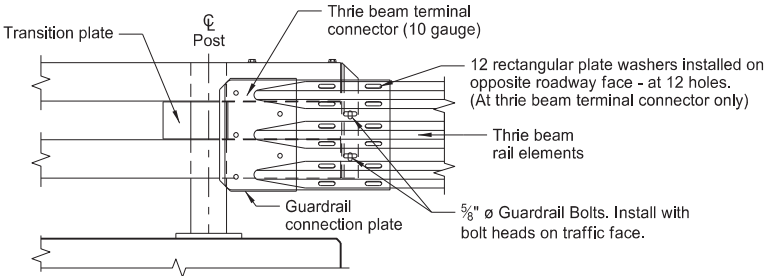
THRIE BEAM TERMINAL CONNECTOR



RECTANGULAR PLATE WASHER



SYMMETRICAL THRIE TO W-BEAM TRANSITION SECTION (10 GAUGE)



TRANSITION CONNECTION - ELEVATION

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 wood



7/31/2024

MGS Thrie Beam Transition to
Double Box Beam Retrofit Detail

Site 1 - ND 18 - Str No. 18-045.621
Site 2 - HWY 10 - Str No. 10-006.645
Site 3 - ND 18 - Str No. 18-083.586
Site 4 - ND 18 - Str No. 18-106.082

155'-0" ~ Overall Bridge Length

50'-3" Span 1

54'-6" Span 2

50'-3" Span 3

Begin Bridge

Abutment 1

30'-0" Clear Roadway

15'-0"

15'-0"

Pier 2

Centerline of Roadway & Bridge

Pier 3

Abutment 4

End Bridge

Deck Drain (Typ)

Existing Deck Drain Spacing

37'-6"

5 Spaces @ 16'-0" = 80'-0" ~ 3" Ø Deck Drain (Typ) To remain in place.

37'-6"

2'-0"

16 Spaces @ 9'-5 1/4" ~ New Post Spacing

Pay Length = 155'-0"

PLAN

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	517
602	7000	SPECIAL SURFACE FINISH	SF	1085
624	3001	DOUBLE BOX BEAM RAIL RETROFIT - FREE STANDING	LF	310
650	0704	OVERLAY CONCRETE	CY	36
650	0707	DECK CONCRETE	CY	3
650	0710	CLASS 1-H REMOVAL	SY	517
650	0720	CLASS 1 REMOVAL	SY	517
650	0723	CLASS 3 REMOVAL	SY	16
650	0724	CLASS 4 REMOVAL	SY	5
930	9534	MODIFY DECK DRAINS	EA	12
930	9612	SPALL REPAIR	SF	74



SPECIAL PROVISIONS	
28(24)	SPALL REPAIR
31(24)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS
SHEYENNE RIVER RICHLAND COUNTY SITE 1 BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION  Thorenson, Jason 08/19/24	
DRAWING NO.	18-045.621-1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	2

NOTES

- 100 SCOPE OF WORK: This project consists of placing a deck overlay, deck drain modifications, installing a free-standing double box beam rail retrofit, and spall repair. Complete superstructure work at this site half the bridge at a time to maintain traffic.
- 602 WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold-water pressure washer that provides a minimum nozzle pressure of 3000 psi may be used.
- 602 SPECIAL SURFACE FINISH: Clean the front face and top of the bridge curb using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.02" with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-Cote XL 70 Bridge Cote with Silane to the front face and top of the bridge curb. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium textured finish.
- 602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.
- 650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantity to account for the irregular surface profile from hydrodemolition.
- 650 OVERLAY CONCRETE CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck to determine the need for crack sealing.
- Mark and repair all visible cracks on the top surface measuring 0.02" 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 0.02" wide. The epoxy sealer may be 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 in the deck overlay crack sealing in the bid item "Overlay Concrete."

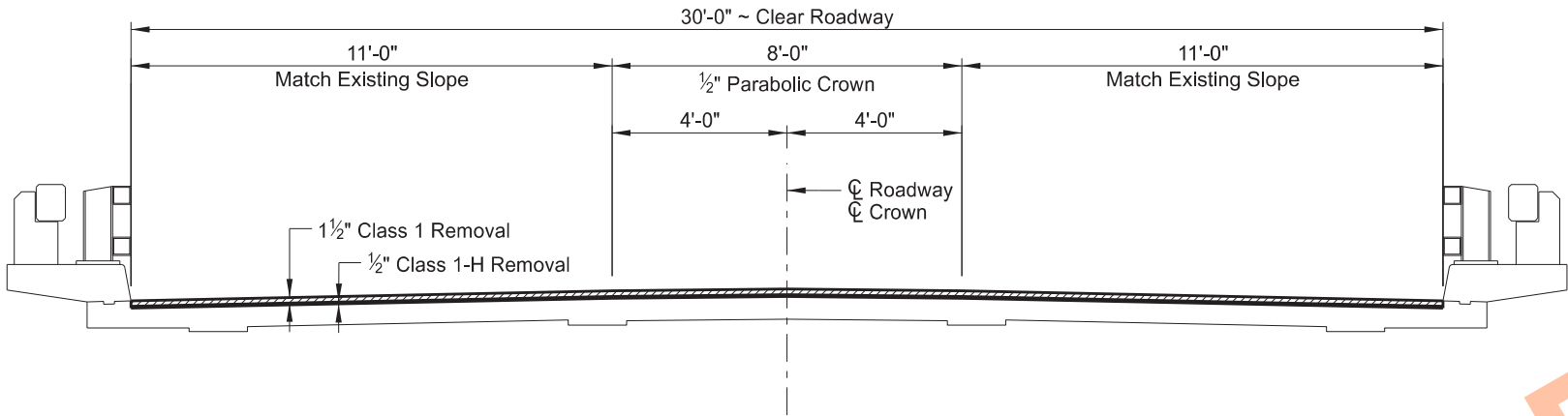
- 930 MODIFY DECK DRAIN: Provide structural bars for the deck drain extensions meeting Section 834.01 A, except the Charpy V-notch test is waived. The HSS deck drainpipe shall be ASTM A500 Grade B. Galvanize all structural bars and tubes according to Section 854. Provide the anchor bolts according to the manufacturer's recommendations with an expansive anchor bolt system capable of developing an allowable tensile load of 3,020 lb in 3,000 psi normal weight concrete.
- Include all labor, equipment, and materials to install the anchor bolts into the underside of the deck and extend the deck drains in the bid item "Modify Deck Drain."
- 930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table below. Follow the repair procedures in accordance with SP 28(24) Spall Repair.
- The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See Supplemental Data for photos.
- A minimum area of 1 SF will be paid at each spall repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
#1	West Underside Deck Drains	24
#2	East Underside Deck Drains	24
#3	Abutment 4	1
#4-#8	Abutment 1	25

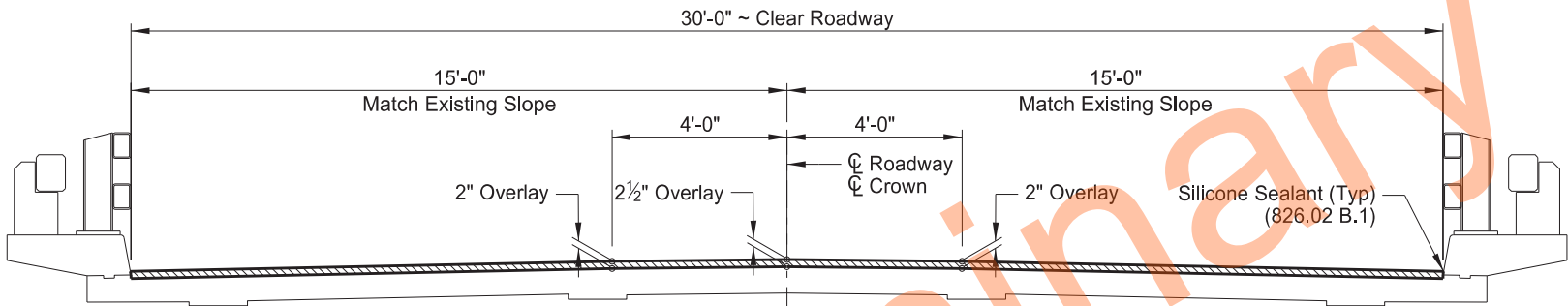


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

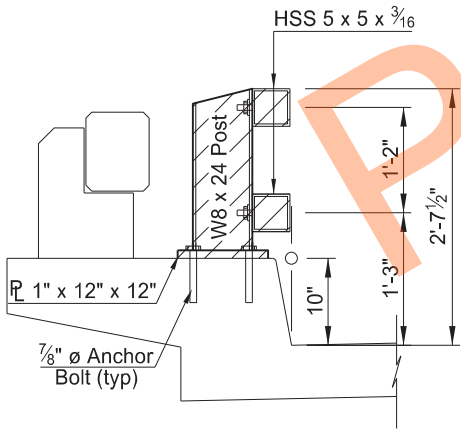
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	170	3



(SHOWING REMOVAL)
TYPICAL DECK SECTION



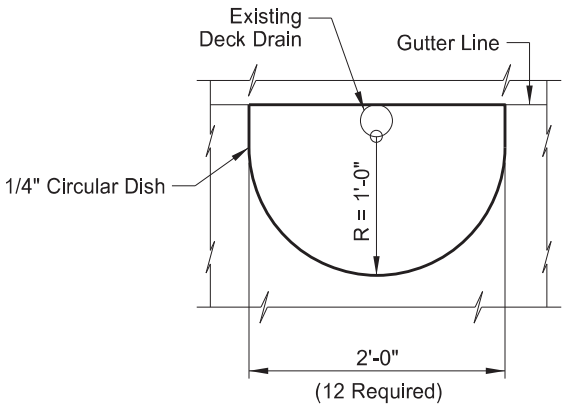
(SHOWING OVERLAY)
TYPICAL DECK SECTION



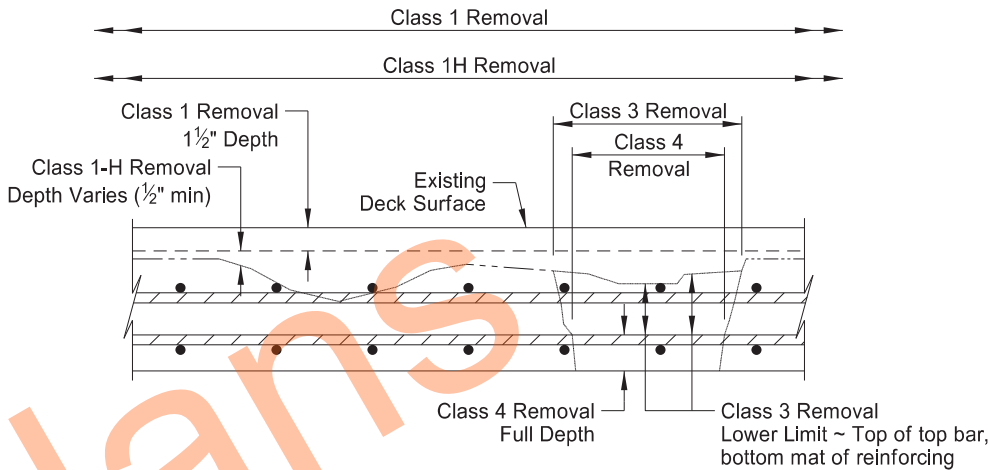
(SHOWING REMOVAL)
EXISTING RAIL RETROFIT

Hatched area indicates removals.

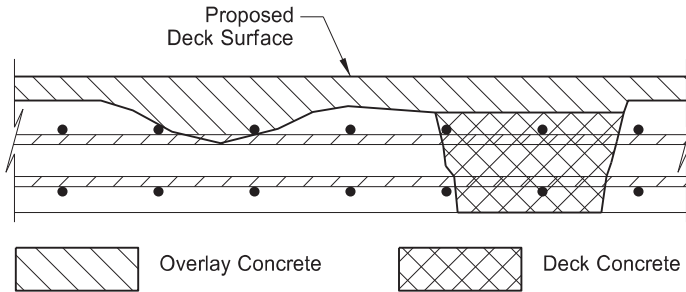
NOTE:
See Dwg 18-045.621-6 for details.



NEW DRAIN DISH



(SHOWING REMOVALS)
EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)
PROPOSED BRIDGE DECK SECTION

QUANTITIES	
OVERLAY CONCRETE	36 CY
DECK CONCRETE	3 CY
CLASS 1 REMOVAL	517 SY
CLASS 1H REMOVAL	517 SY
CLASS 3 REMOVAL	16 SY
CLASS 4 REMOVAL	5 SY

SHEYENNE RIVER
RICHLAND COUNTY

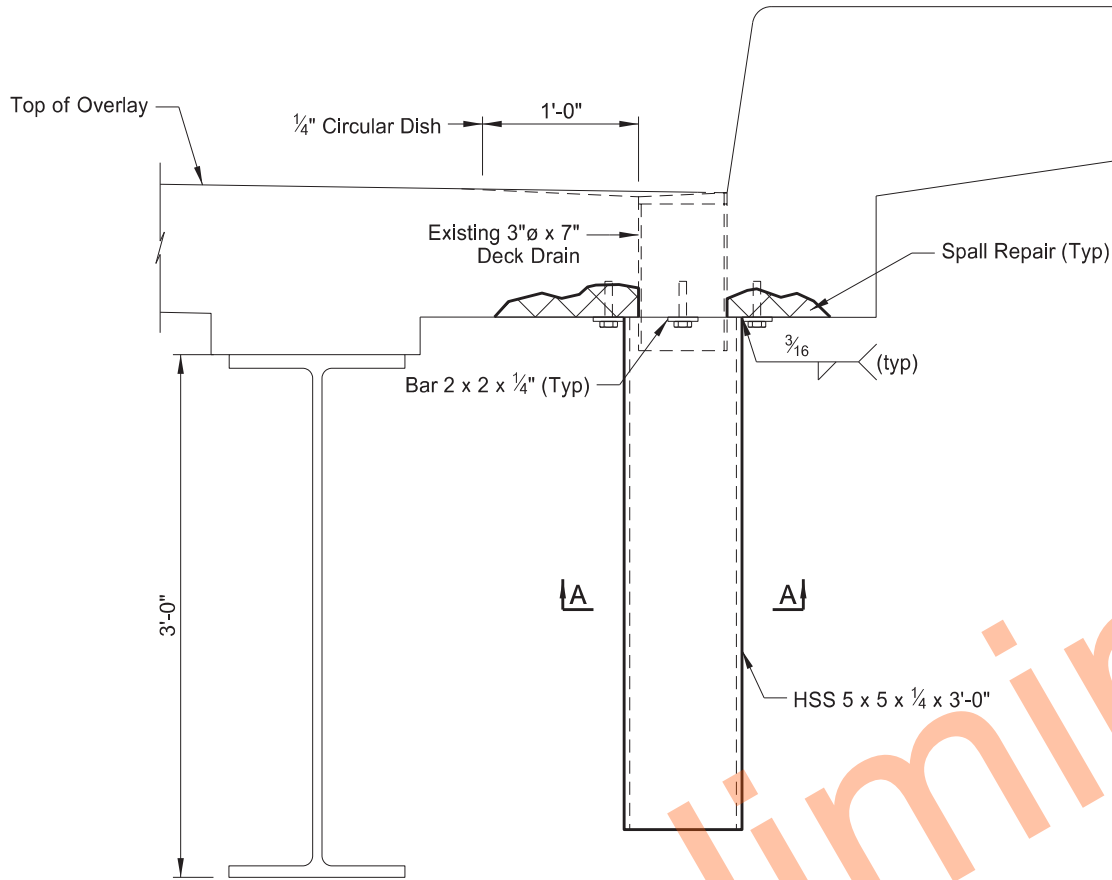
SITE 1

DECK OVERLAY DETAILS



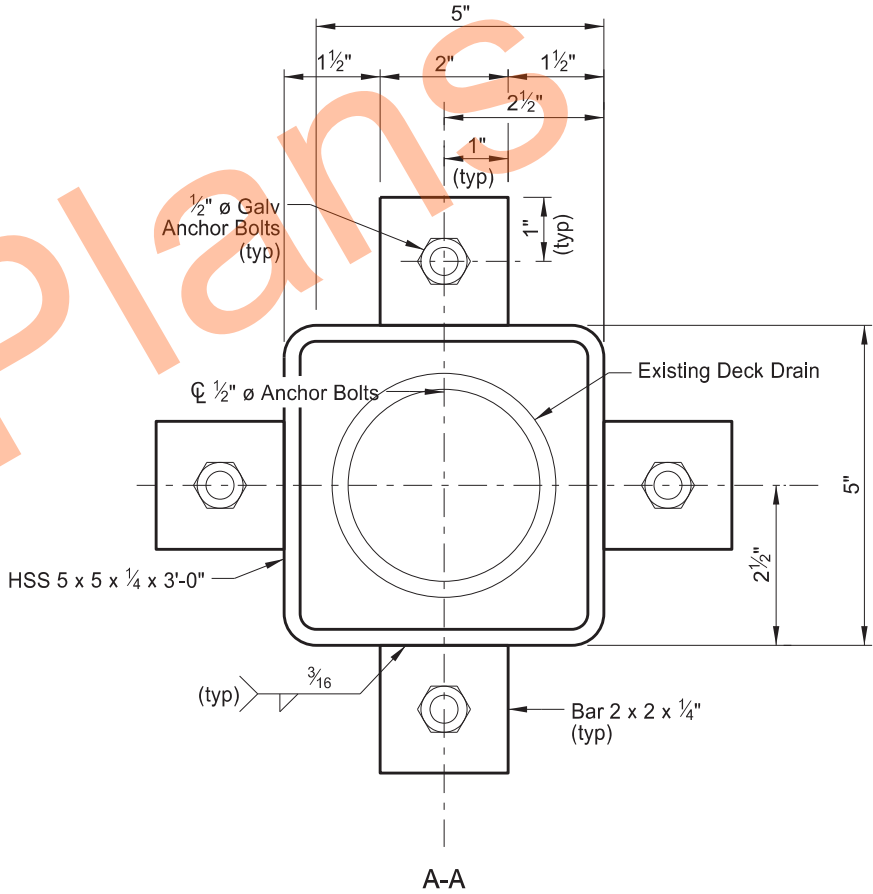
DRAWING NO.	18-045.621-3
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	170	4



Indicates spall repair area.

NOTES:
All areas to be verified by the Engineer in the field prior to removal.
See "Spall Repair" table on Dwg 18-045.621-2 for repair locations.
Complete spall repairs prior to deck drain modifications.
Deck drain modifications consist of installing HSS drainpipe extension tubes as shown in the plans.



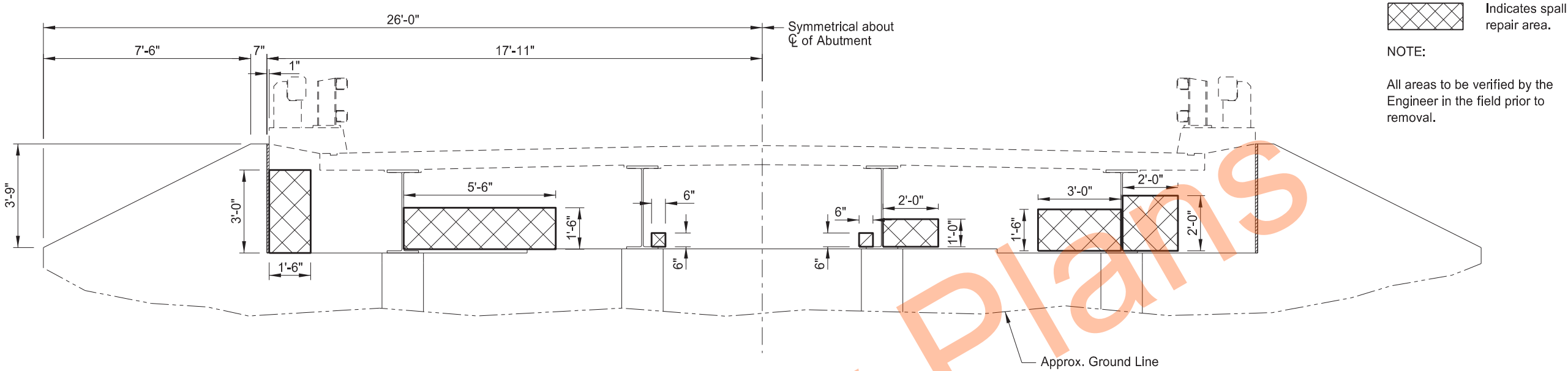
(12 Deck Drains)
DECK DRAIN DETAILS



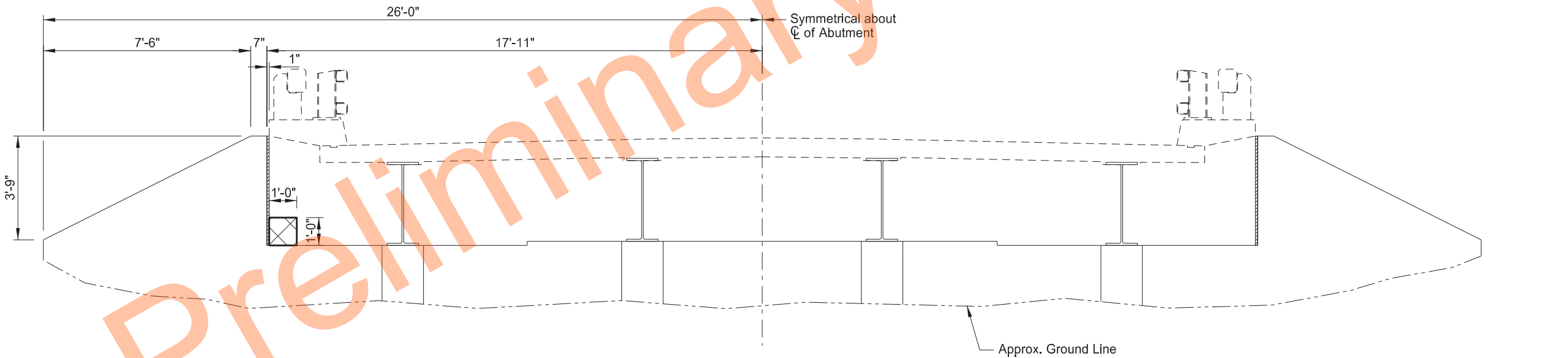
QUANTITIES	
MODIFY DECK DRAIN	12 EA
SPALL REPAIR	48 SF
SHEYENNE RIVER RICHLAND COUNTY SITE 1 DECK DRAIN DETAILS	
DRAWING NO.	18-045.621-4

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	5



ABUTMENT 1
(LOOKING NORTH)

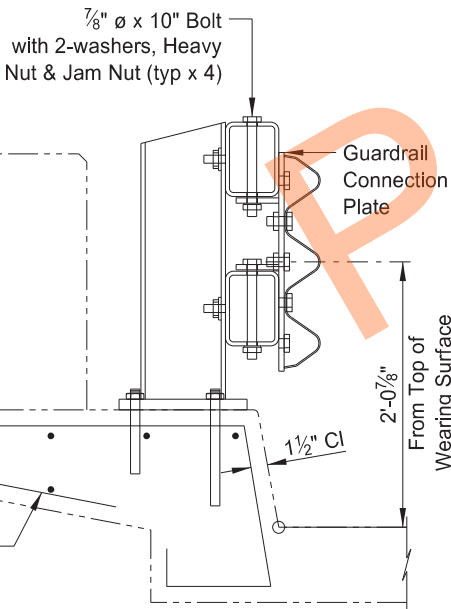


ABUTMENT 4
(LOOKING SOUTH)



QUANTITIES (BOTH ABUTMENTS)	
SPALL REPAIR	26 SF
SHEYENNE RIVER RICHLAND COUNTY SITE 1 ABUTMENT REPAIR DETAILS	
DRAWING NO.	18-045.621-5

QUANTITIES	
RAIL RETROFIT - FREE STANDING	310 LF
SHEYENNE RIVER RICHLAND COUNTY SITE 1 DOUBLE BOX BEAM RAIL RETROFIT DETAILS (FREE STANDING)	
DRAWING NO.	18-045.621-6



Technical drawing of a structural member with the following dimensions and specifications:

- Material: $P \frac{1}{2} \times 4 \times 2-8\frac{1}{4}$ ASTM A36
- Overall length: $1'-10"$
- Overall width: $10\frac{1}{4}"$
- End flange thickness: $1\frac{1}{2}"$
- End flange width: $1'-2\frac{1}{2}"$
- End flange height: $1\frac{1}{2}"$
- End flange radius: $4"$
- End flange hole diameter: $2 - 1" \text{ } \varnothing \text{ Hole (typ)}$
- End flange hole spacing: $8"$
- End flange hole offset: $1'-2"$
- End flange angle: $11"$

2 - Threaded $\frac{3}{4}$ " ϕ x 2" Reduced Base Weld Stud with 1 Bar Washer "C" and 1 Lock Washer and Nut

W8x24
ASTM A709 Grade 50

$\angle$ 1 x 12 x 1'-1"
ASTM A709 Grade 50

HSS 7 x 5 x $\frac{3}{8}$ "
Match front face to gutter line.

1
Slotted

From Top of Wearing Surface

Wearing Surface

2"

1'-2"

3'-2"

1'-8 $\frac{1}{2}$ "

2"

10"

$\frac{7}{8}$ " ϕ Anchor Bolt (typ)

Provide reduced base studs in accordance with ASTM A108 Grade 1010.

Provide 7/8" ø Anchor Bolts in accordance with ASTM F1554, Grade 105

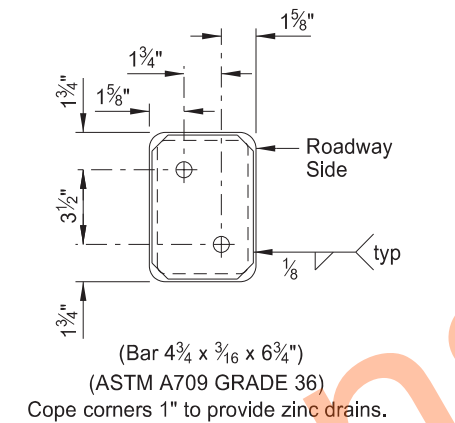
Provide 7/8" ø Anchor Bolts in accordance with ASTM F1554, Grade 105

Galvanize all steel components after fabrication according to Section 854.

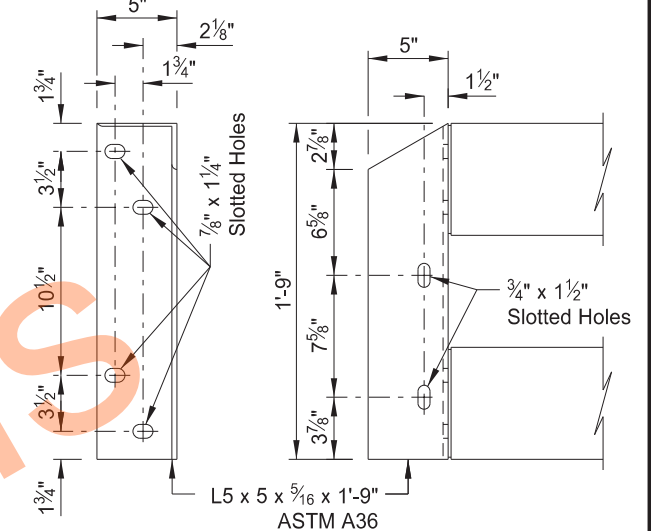
Remove existing double box beam retrofit railing, posts, and anchors. Cut the existing post anchors flush with the top of the concrete and coat exposed steel with epoxy.

Adjust interior post spacing as necessary to clear existing anchor bolts. Do not exceed 10'-0" post spacing.

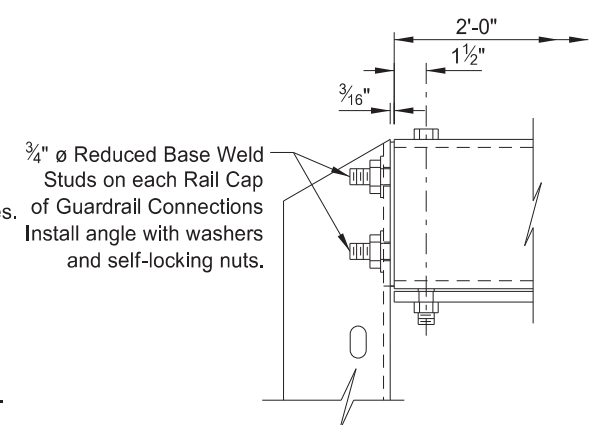
Include all labor, equipment, and materials needed to furnish and install the guardrail connection plates, saw and remove portions of the curb, and to remove the existing double box beam rail retrofit-freestanding in the bid item "DOUBLE BOX BEAM RAIL RETROFIT-FREESTANDING."



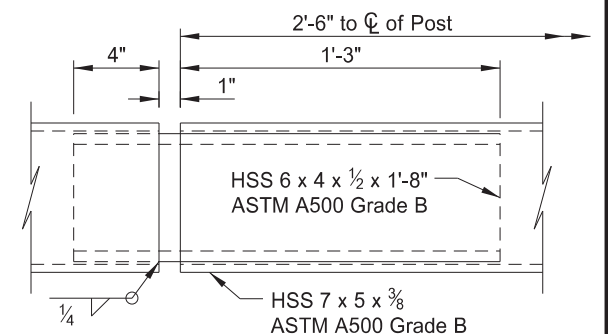
RAIL CAP END VIEW



CONNECTION ANGLE DETAILS



RAIL CAP DETAIL



RAIL SPLICE DETAIL

90'-0" ~ Overall Bridge Length

45'-0" Span 1

45'-0" Span 2

Begin Bridge

End Bridge

Abutment 1

Abutment 3

Pier 2

Deck Drain (Typ)

24'-0" Clear Roadway

12'-0"

12'-0"

CL Roadway & CL Bridge

Existing Deck Drain Spacing

2'-0"

22'-9"

44'-6" ~ 3" ø Deck Drain (Typ)
To remain in place

9 Spaces @ 9'-6⁵/₈" ~ New Post Spacing

2'-0"

Pay Length = 90'-0"

Hatched area indicates Special Repair Areas.

PLAN

SPECIAL PRO	
28(24)	SPALL REPAIR
31(24)	HYDRODEMOLI

SPECIAL PROVISIONS	
28(24)	SPALL REPAIR
31(24)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson Thorenson, Jason
08/19/24

DRAWING NO.	10-006.645-1
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REGISTERED PROFESSIONAL ENGINEER
LUKE J. BECKERMANN
PE-10087
DATE 08/19/24
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	8

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

NOTES

- 100
- SCOPE OF WORK: This project consists of placing a deck overlay, installing a free-standing double box beam rail retrofit, and abutment repairs. See Section 100 for traffic control and construction phasing.
- 602
- WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold-water pressure washer that provides a minimum nozzle pressure of 3000 psi may be used.
- 602
- SPECIAL SURFACE FINISH: Clean the front face and top of the bridge curb using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.02” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-Cote XL 70 Bridge Cote with Silane to the front face and top of the bridge curb. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium textured finish.
- 602
- PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.
- 650
- CLASS 1-H REMOVAL: Monitor the depth of concrete removal while operating the hydrodemolition equipment on the bridge. Stop operating the hydrodemolition equipment and consult with the Engineer if the Class 1-H removal depth extends deeper than the existing top mats of reinforcing steel over any single area larger than 4 square feet.
- 650
- OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from hydrodemolition.
- 650
- SPECIAL REPAIR AREAS: Special Repair Areas designated in the plans will be marked by the Engineer. Complete deck repairs within the Special Repair Areas as outlined below.

After completing Class 1 removal over the entire bridge deck, remove any remaining asphalt and all unsound concrete from within the Special Repair Areas using mechanical removal methods. Payment for removals located beneath the Class 1 removal depth and above the bottom mat of reinforcing steel will be made as Class 3 Removal. Additional payment for Class 4 Removal will be made in areas where full-depth removal is required. Replace the asphalt and concrete removed from within the Special Repair Areas by placing deck concrete to the bottom of the Class 1 removal depth. Cure the deck concrete per Section 650.04 E of the Special Provision. After the deck concrete has cured, complete Class 1-H removals over the entire surface of the bridge deck, including the Special Repair Areas. Take care to limit the Class 1-H removal depth to ½” of the newly placed deck concrete within the Special Repair Areas. Complete any remaining deck removals and repairs outside the Special Repair Areas, then place and cure the overlay concrete in accordance with the Special Provisions.

- 650
- OVERLAY CONCRETE CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck to determine the need for crack sealing.
- Mark and repair all visible cracks on the top surface measuring 0.02” 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 0.02” wide. The epoxy sealer may be 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 in the deck overlay crack sealing in the bid item “Overlay Concrete.”

- 930
- HIGH EXPANSION POLYURETHANE FOAM: Fill the voids under the abutment pile caps using polyurethane foam. Controlled density fill (CDF) exists along the length of the east abutment. Remove the CDF prior to replacing it with polyurethane foam. Expansive foam insulation must consist of a high expansion hydrophobic polyurethane foam that is nontoxic, nonflammable, and meets the following requirements below.

Test	Requirement	Method
Tensile Strength	50 psi	ASTM D 638
Compressive Strength	90 psi	ASTM D 1621
Shear Strength	25 psi	ASTM D 732
Water Absorption	< 2% by volume	ASTM D 2842

Include the costs for all labor, equipment, and materials needed to place the expansive foam to fill the voids under the abutment pile caps in the price bid for “High Expansion Polyurethane Foam.”

It is estimated that 100 gallons of foam (prior to expansion) will be required to fill the voids, assuming a 16x expansion rate. Do not exceed the estimated quantity of foam without the permission of the Engineer.



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NOTES

930 CRACK SEALING: The Engineer will perform a visual inspection of the abutments to determine the need for crack sealing in addition to those shown in the plans. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the abutments and mark all visible cracks appearing on the surface 0.02” 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 0.02” wide. The epoxy sealer may be Sikadur Crack Weld (Sika Corporation), Simpson Strong-Tie Crack-Pac (Euclid Chemical Co.), MasterFlow 647 (BASF Chemical Co.), or an approved equal.

Include all work and materials associated with the abutment crack sealing in the bid item “Crack Sealing.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the “Spall Repair” table below. Follow the repair procedures in accordance with SP 28(24) Spall Repair.

The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See Supplemental Data for photos.

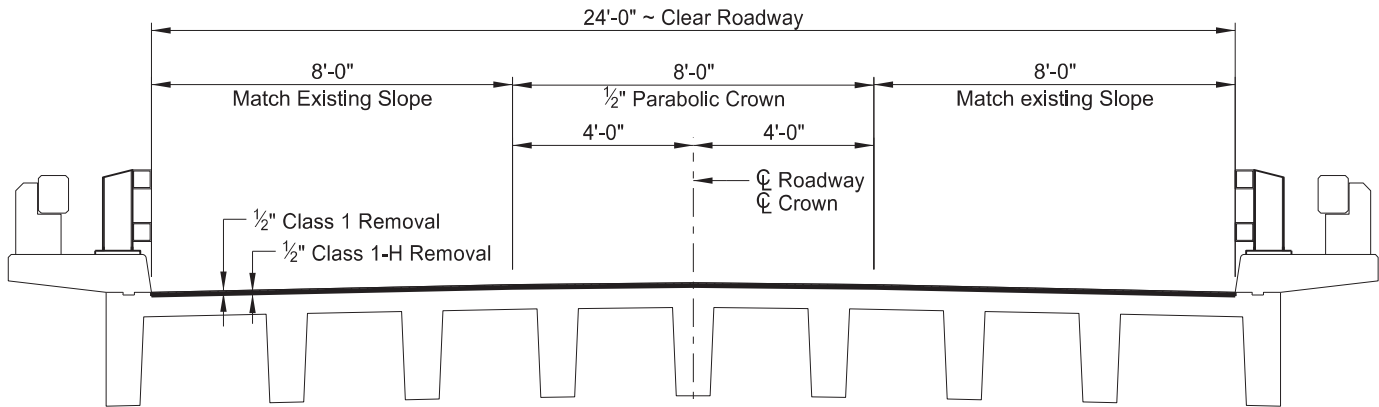
A minimum area of 1 SF will be paid at each spall repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item “Spall Repair.”

SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
#1	Underside North Deck Drain – Span 2	4
#2-#5	Abutment 1	21
#6-#8	Abutment 3	21

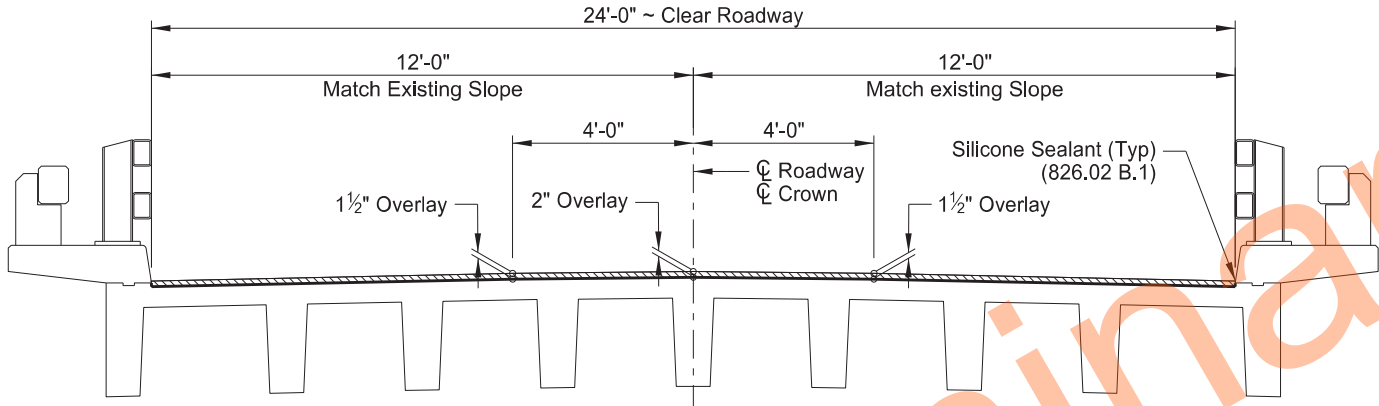


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

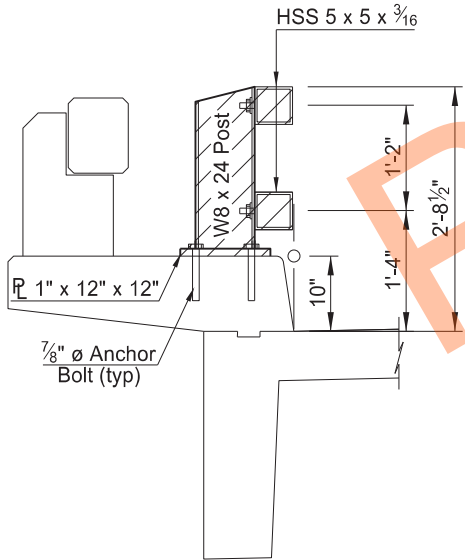
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	10



(SHOWING REMOVAL)
TYPICAL DECK SECTION

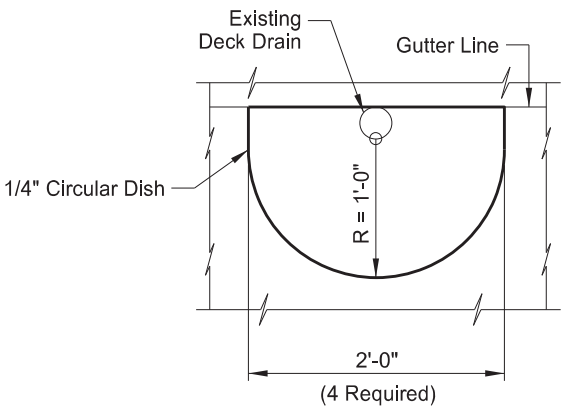


(SHOWING OVERLAY)
TYPICAL DECK SECTION

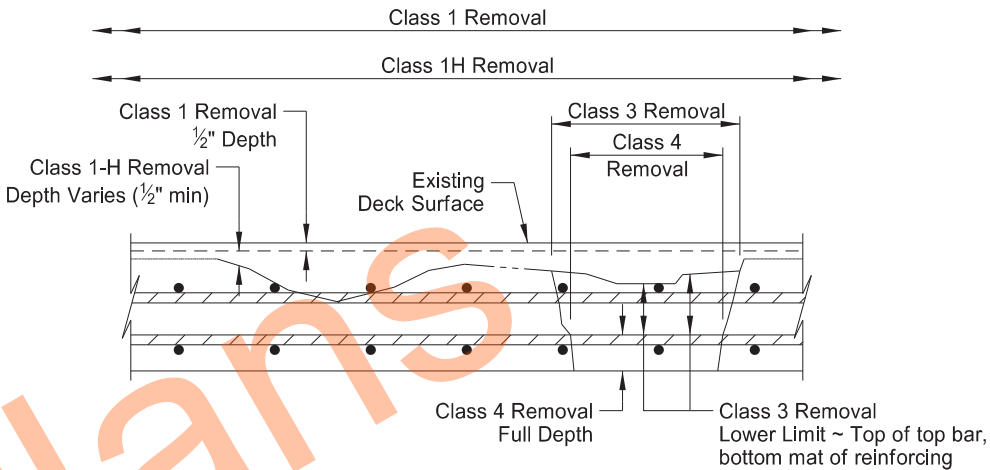


(SHOWING REMOVAL)
EXISTING RAIL RETROFIT

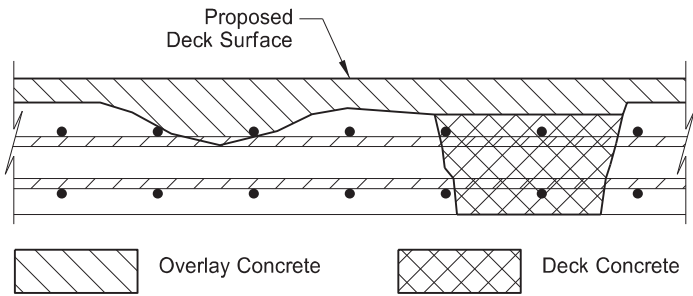
NOTE:
See Dwg 10-006.645-6 for details.



NEW DRAIN DISH



(SHOWING REMOVALS)
EXISTING BRIDGE DECK SECTION

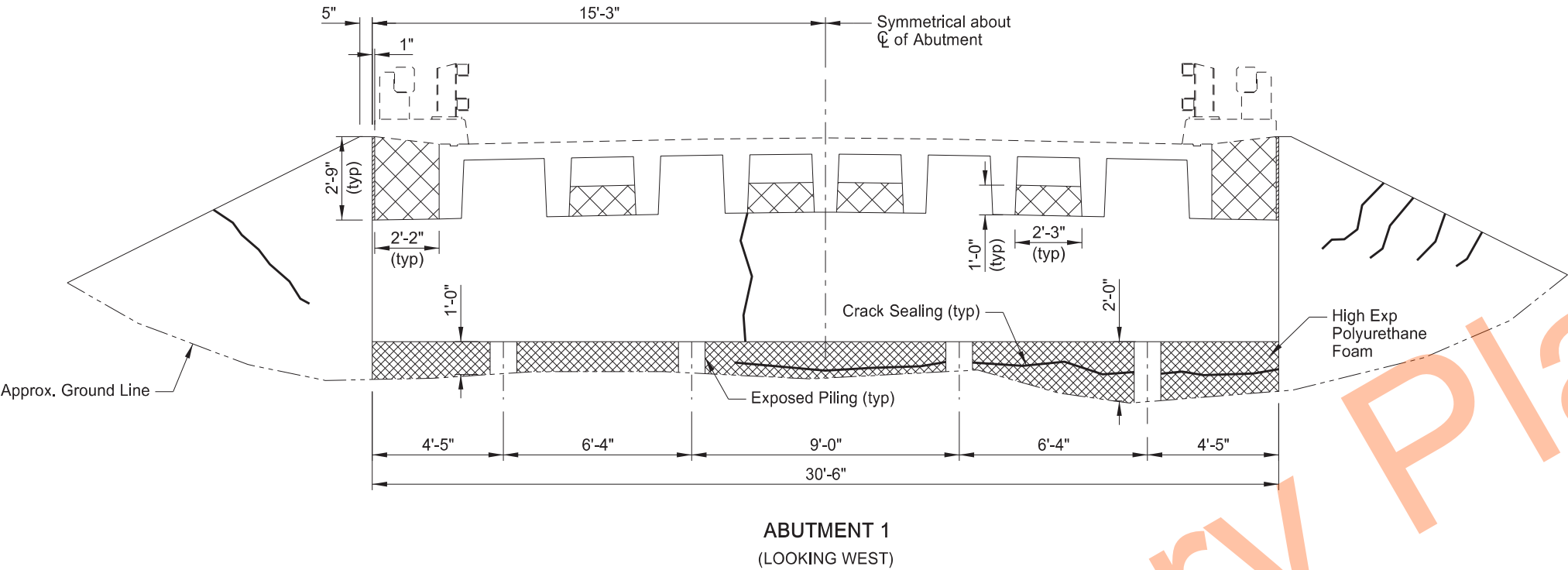


(SHOWING DECK & OVERLAY CONCRETE)
PROPOSED BRIDGE DECK SECTION



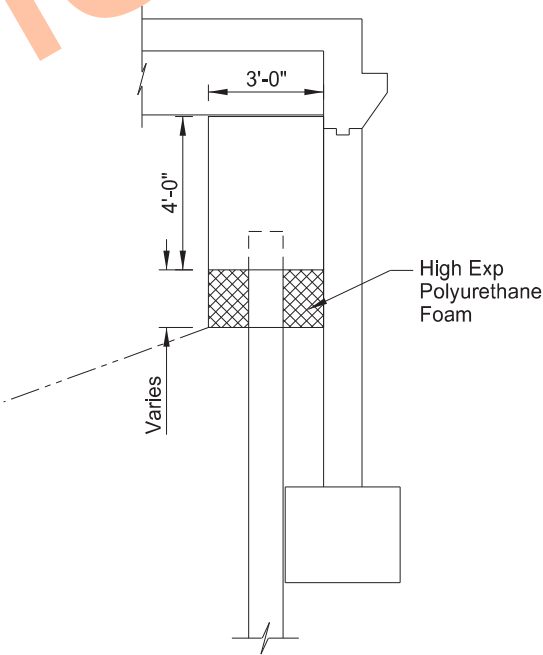
QUANTITIES	
OVERLAY CONCRETE	14 CY
DECK CONCRETE	2 CY
CLASS 1 REMOVAL	240 SY
CLASS 1H REMOVAL	240 SY
CLASS 3 REMOVAL	16 SY
CLASS 4 REMOVAL	6 SY
SWAN CREEK CASS COUNTY SITE 2 DECK OVERLAY DETAILS	
DRAWING NO.	10-006.645-4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	11

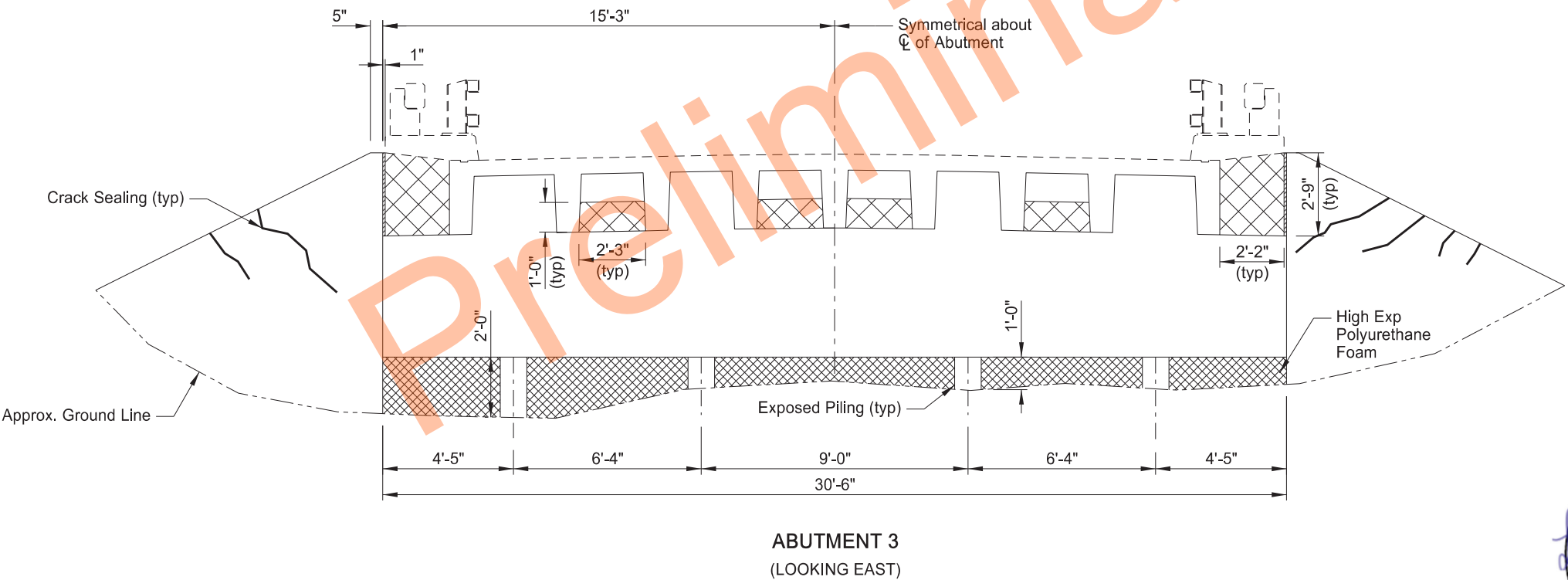


- Indicates spall repair area.
- Indicates area to be filled with High Expansion Polyurethane Foam.

NOTE:
All areas to be verified by Engineer in the field prior to removal.



SECTION THRU ABUTMENT



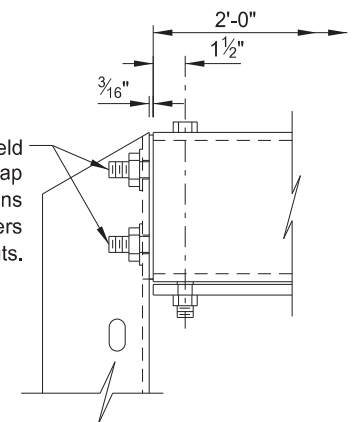
QUANTITIES (BOTH ABUTMENTS)	
HIGH EXPANSION POLYURETHANE FOAM	100 GAL
CRACK SEALING	54 LF
SPALL REPAIR	42 SF

SWAN CREEK
CASS COUNTY
SITE 2

ABUTMENT REPAIR DETAILS



QUANTITIES	
RAIL RETROFIT - FREE STANDING	180 LF
SWAN CREEK CASS COUNTY SITE 2 DOUBLE BOX BEAM RAIL RETROFIT DETAILS (FREE STANDING)	
DRAWING NO.	10-006.645-6

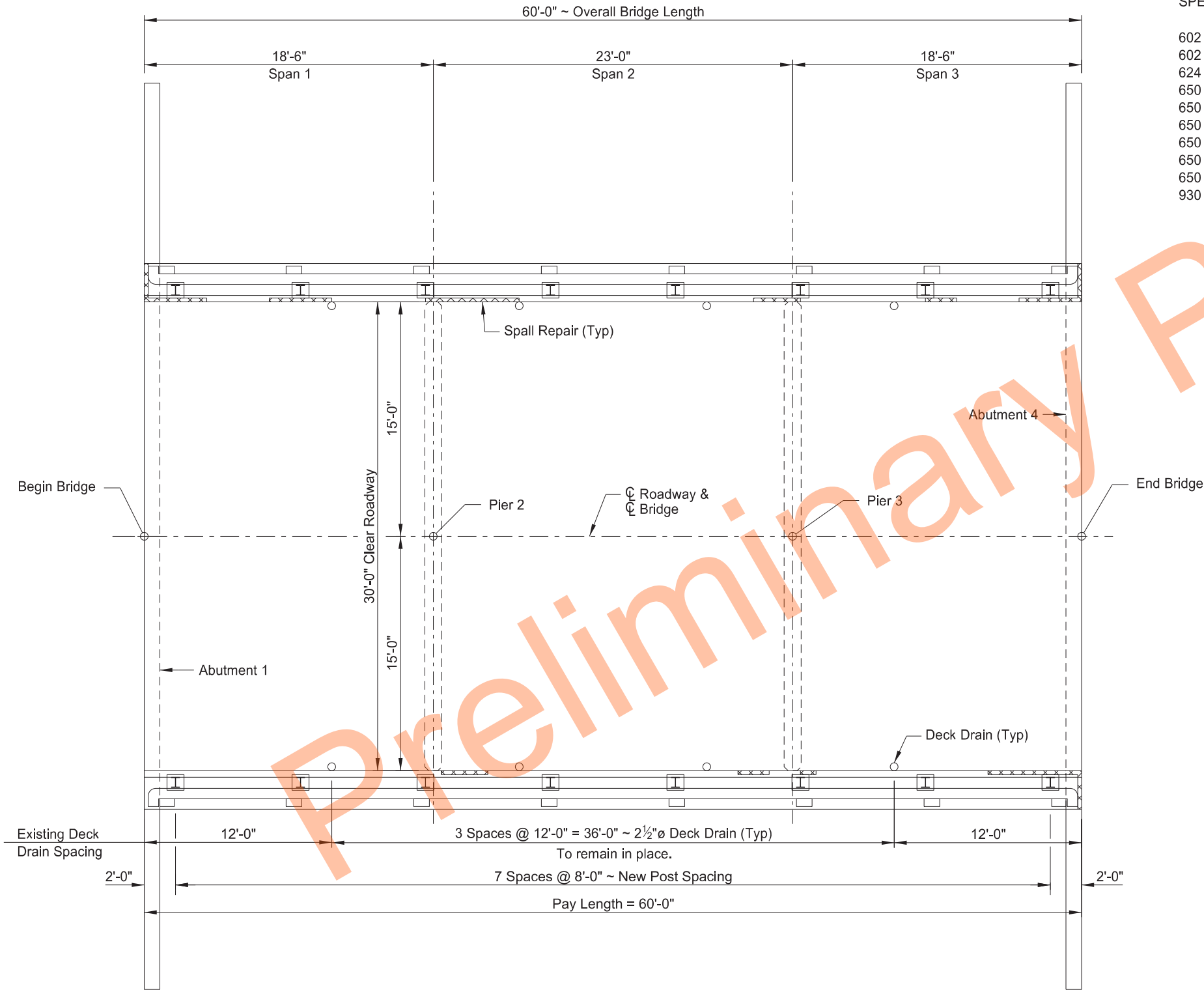


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	170	13

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	200
602	7000	SPECIAL SURFACE FINISH	SF	370
624	3001	DOUBLE BOX BEAM RAIL RETROFIT - FREE STANDING	LF	120
650	0704	OVERLAY CONCRETE	CY	12
650	0707	DECK CONCRETE	CY	2
650	0710	CLASS 1-H REMOVAL	SY	200
650	0720	CLASS 1 REMOVAL	SY	200
650	0723	CLASS 3 REMOVAL	SY	6
650	0724	CLASS 4 REMOVAL	SY	2
930	9612	SPALL REPAIR	SF	39



PLAN



SPECIAL PROVISIONS	
28(24)	SPALL REPAIR
31(24)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS
RUSH RIVER CASS COUNTY SITE 3 BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION Thorenson, Jason R. 08/19/24	
DRAWING NO.	18-083.586-1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	14

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

NOTES

- 100
- SCOPE OF WORK: This project consists of placing a deck overlay, installing a free-standing double box beam rail retrofit, and spall repairs. Complete superstructure work at this site half the bridge at a time to maintain traffic.
- 105
- CONSTRUCTION LOADING: Complete a load capacity analysis of the existing concrete slab bridge to determine the adequacy of the existing bridge slab to support the anticipated construction loads. Submit a copy of the analysis, including details of the equipment to be used on the structure, at least 14 calendar days prior to beginning work on the bridge.
- 602
- WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold-water pressure washer that provides a minimum nozzle pressure of 3000 psi may be used.
- 602
- SPECIAL SURFACE FINISH: Clean the front face and top of the bridge curb using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.02" with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-Cote XL 70 Bridge Cote with Silane to the front face and top of the bridge curb. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium textured finish.
- 602
- PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.
- 650
- CLASS 1 REMOVAL: A 3" bituminous overlay exists on the concrete bridge deck. Adjust the depth of Class 1 removal as needed to completely remove the existing asphalt overlay from the bridge deck and lightly scarify the concrete surface of the bridge deck. Include all labor, equipment, and materials needed to remove the bituminous overlay and scarify the concrete bridge deck in the bid item "Class 1 Removal."
- 650
- CLASS 1-H REMOVAL: Monitor the depth of concrete removal while operating the hydrodemolition equipment on the bridge. Stop operating the hydrodemolition equipment and consult with the Engineer if the Class 1-H removal depth extends deeper than the existing top mats of reinforcing steel over any single area larger than 4 square feet.
- 650
- OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from hydrodemolition.

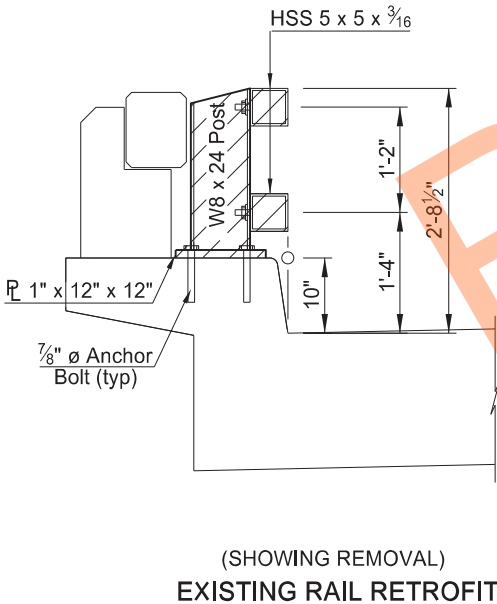
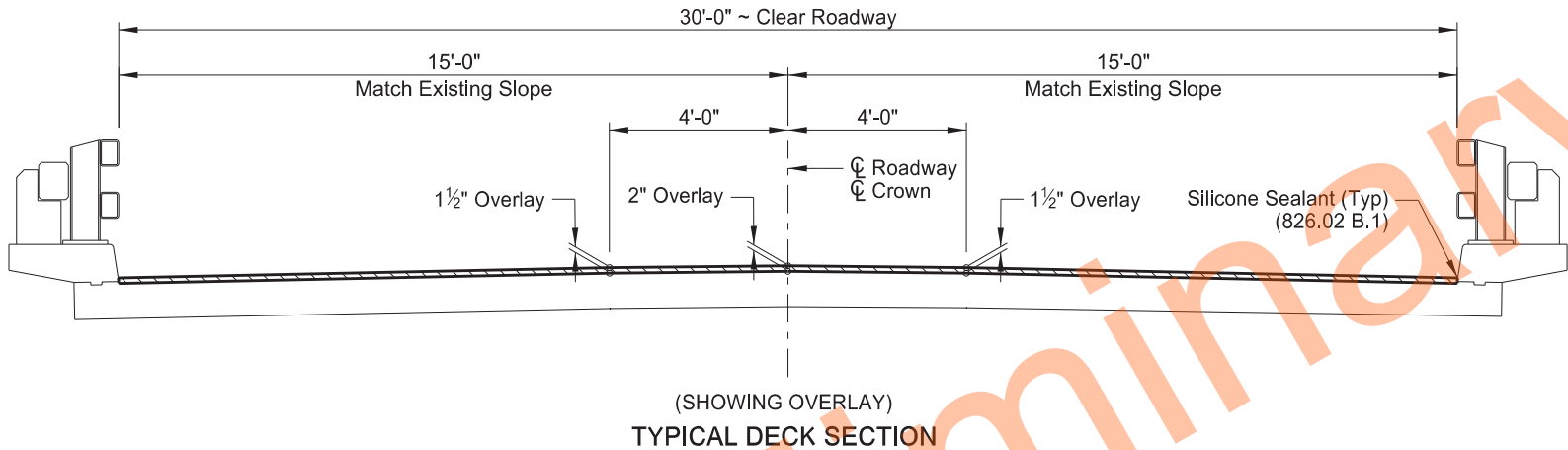
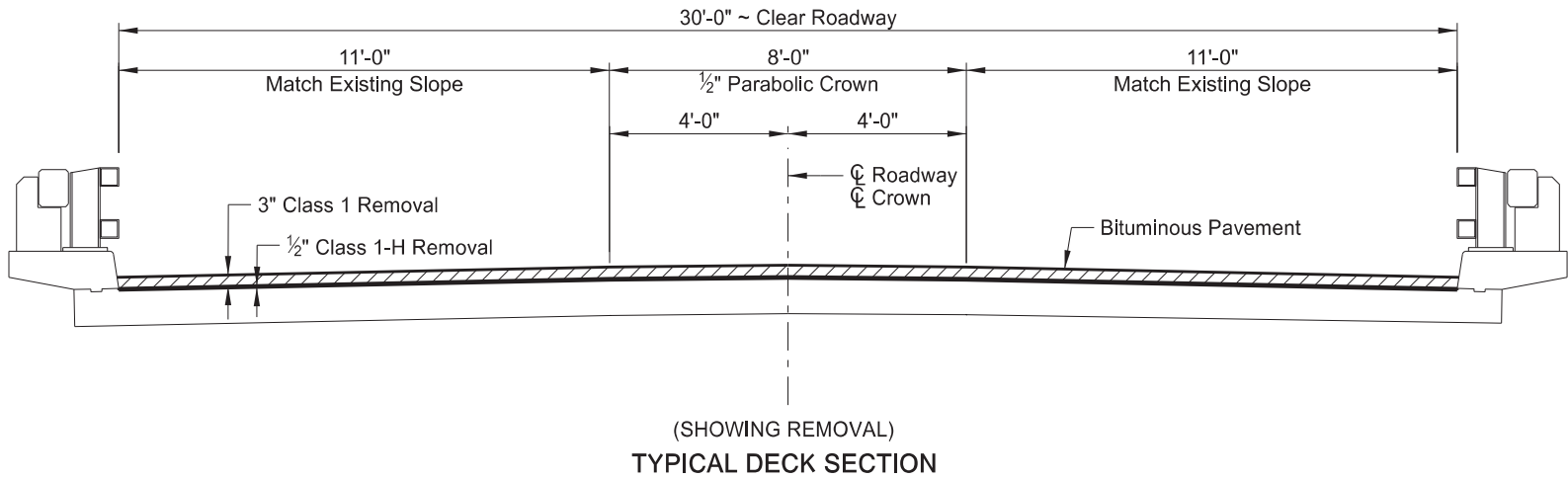
- 650
- OVERLAY CONCRETE CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck to determine the need for crack sealing.
- Mark and repair all visible cracks on the top surface measuring 0.02" or greater in width 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 0.02" wide. The epoxy sealer may be 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 in the deck overlay crack sealing in the bid item "Overlay Concrete."
- 930
- SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table below. Follow the repair procedures in accordance with SP 28(24) Spall Repair.
- The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See Supplemental Data for photos.
- A minimum area of 1 SF will be paid at each spall repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
#1	NE Corner of Curb & East Face	8
#2-#3	East Face & SE Corner of Curb	15
#4	SW Corner of Curb	6
#5-#6	West Face of Curb	6
#7	Underside East Deck Drain – Span 2	4



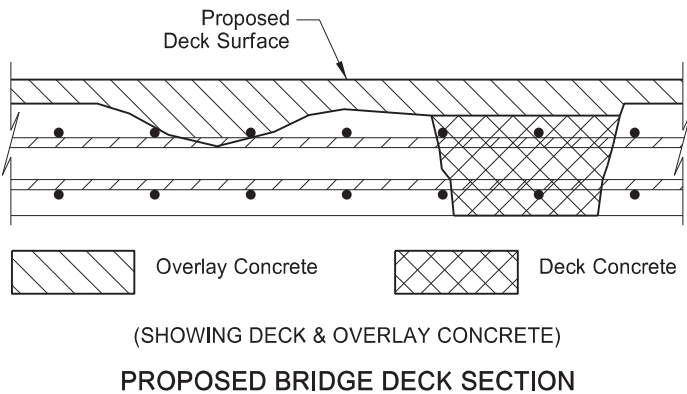
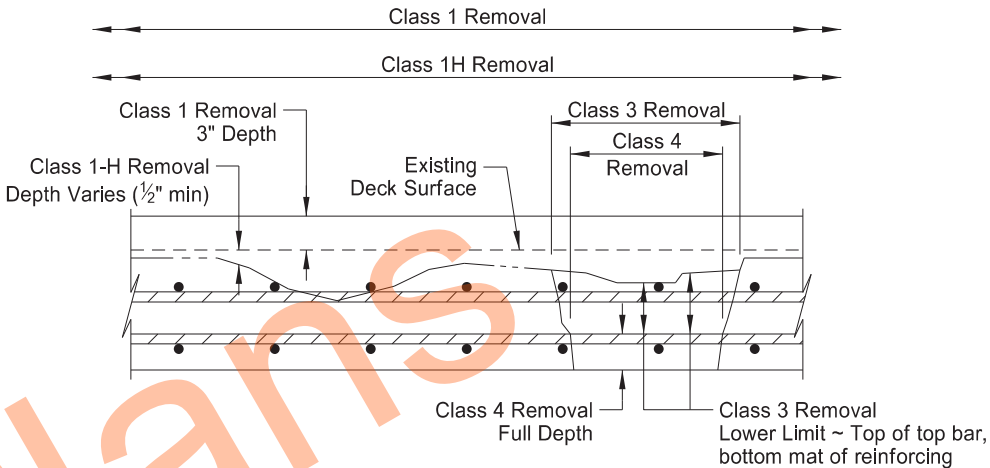
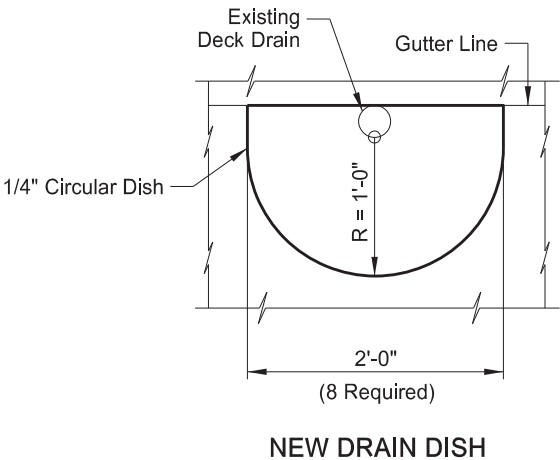
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	170	15



Hatched area indicates removals.

NOTE:
See Dwg 18-083.586-4 for details.



QUANTITIES	
OVERLAY CONCRETE	12 CY
DECK CONCRETE	2 CY
CLASS 1 REMOVAL	200 SY
CLASS 1H REMOVAL	200 SY
CLASS 3 REMOVAL	6 SY
CLASS 4 REMOVAL	2 SY

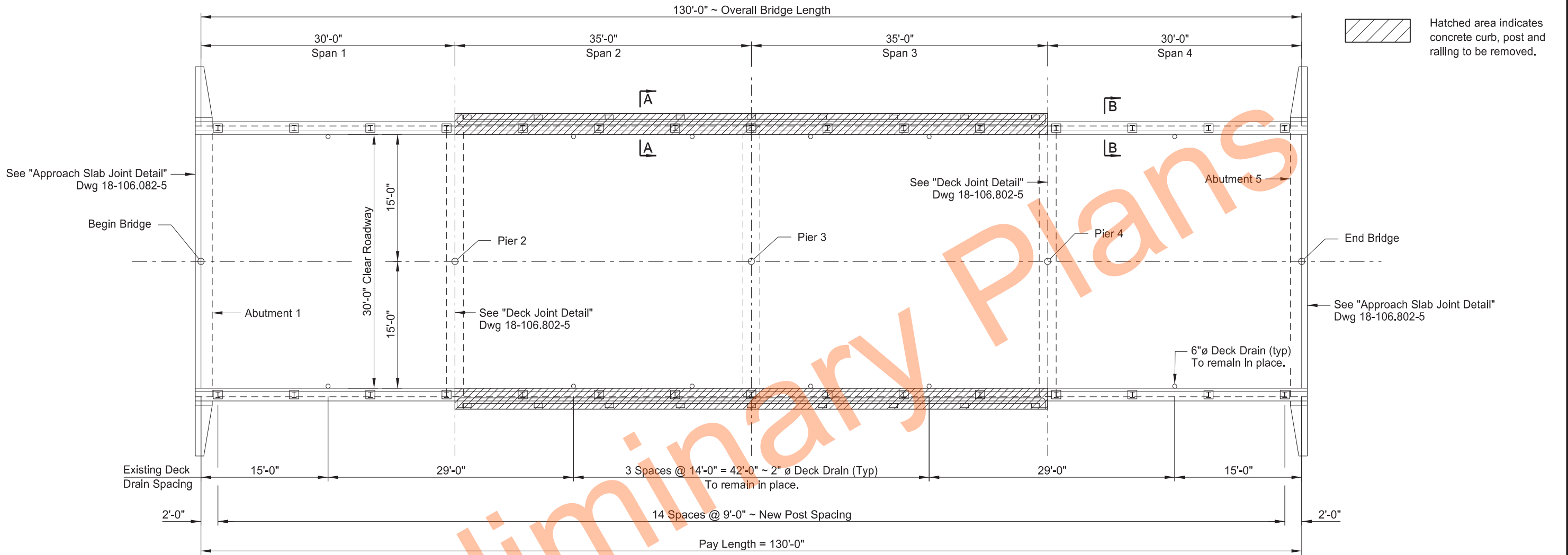


RUSH RIVER CASS COUNTY SITE 3 DECK OVERLAY DETAILS	
DRAWING NO.	18-083.586-3

DRAWING NO.	18-083.586-4
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23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	17



PLAN

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0129	REMOVAL OF CURB	LF	140
602	0130	CLASS AAE-3 CONCRETE	CY	7
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	498
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	970
624	3001	DOUBLE BOX BEAM RAIL RETROFIT - FREE STANDING	LF	260
650	0704	OVERLAY CONCRETE	CY	25
650	0707	DECK CONCRETE	CY	5
650	0710	CLASS 1-H REMOVAL	SY	434
650	0720	CLASS 1 REMOVAL	SY	434
650	0723	CLASS 3 REMOVAL	SY	13
650	0724	CLASS 4 REMOVAL	SY	4
900	1000	TEMPORARY STREAM DIVERSION	EA	1
930	8644	SILICONE SEALANT	LF	121
930	9223	CRACK SEALING	LF	168
930	9612	SPALL REPAIR	SF	61



SPECIAL PROVISIONS	
28(24)	SPALL REPAIR
30(24)	TEMPORARY WATER DIVERSION
31(24)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS
ELM RIVER TRAILL COUNTY SITE 4 BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION Thorenson, Jason R. 08/19/24	
DRAWING NO.	18-106.082-1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	18

NOTES

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

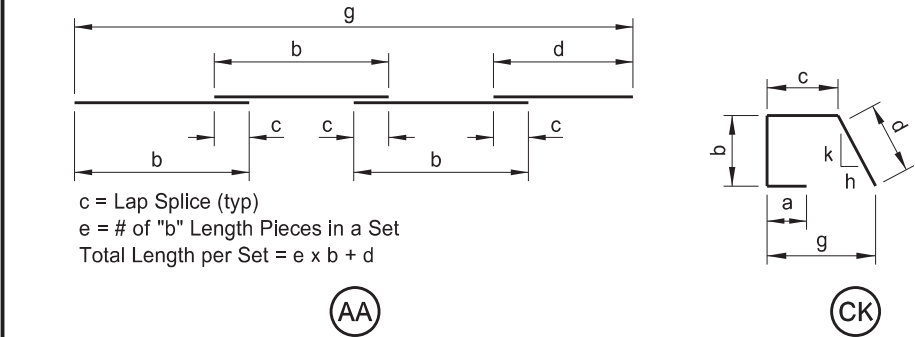
- 100
- SCOPE OF WORK: This project consists of placing a deck overlay, removing existing concrete curb, post, and railing, installing a free-standing double box beam rail retrofit, spall repairs and crack sealing. Complete superstructure work at this site half the bridge at a time to maintain traffic.
- 105
- CONSTRUCTION LOADING: Complete a load capacity analysis of the existing concrete slab bridge to determine the adequacy of the existing bridge slab to support the anticipated construction loads. Submit a copy of the analysis, including details of the equipment to be used on the structure, at least 14 calendar days prior to beginning work on the bridge.
- 602
- WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold-water pressure washer that provides a minimum nozzle pressure of 3000 psi may be used.
- 602
- PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck as well as the inside and top faces of the barrier curb. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.
- 650
- CLASS 1-H REMOVAL: Monitor the depth of concrete removal while operating the hydrodemolition equipment on the bridge. Stop operating the hydrodemolition equipment and consult with the Engineer if the Class 1-H removal depth extends deeper than the existing top mats of reinforcing steel over any single area larger than 4 square feet.
- 650
- OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from hydrodemolition.
- 650
- OVERLAY CONCRETE CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck to determine the need for crack sealing.
- Mark and repair all visible cracks on the top surface measuring 0.02" 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 0.02" wide. The epoxy sealer may be 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 in the deck overlay crack sealing in the bid item "Overlay Concrete."

- 900
- TEMPORARY STREAM DIVERSION: It is anticipated that a temporary stream diversion will be required to complete the work at this site. Construct, maintain, and remove the temporary stream diversion in accordance with the Special Provision for Temporary Water Diversion.
- Do not construct a temporary stream diversion if the Contractor and Engineer agree that no diversion is required at this site. No payment will be made for a temporary stream diversion at this site if the diversion is eliminated by agreement of the Contractor and Engineer.
- 930
- CRACK SEALING: The Engineer will perform a visual inspection of the piers and abutments to determine the need for crack sealing in addition to those shown in the plans. Repair all cracks designated by the Engineer at this time.
- Perform a visual inspection of the piers and abutments and mark all visible cracks appearing on the surface 0.02" 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 0.02" wide. The epoxy sealer may be Sikadur Crack Weld (Sika Corporation), Simpson Strong-Tie Crack-Pac (Euclid Chemical Co.), MasterFlow 647 (BASF Chemical Co.), or an approved equal.
- Include all work and materials associated with the pier and abutment crack sealing in the bid item "Crack Sealing."
- 930
- SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table below. Follow the repair procedures in accordance with SP 28(24) Spall Repair.
- The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See Supplemental Data for photos.
- A minimum area of 1 SF will be paid at each spall repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

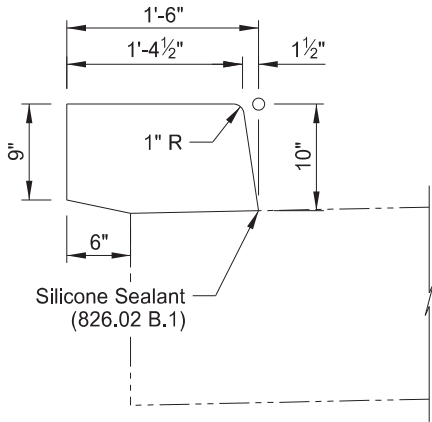
SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
#1	Abutment 5 SE Wing Wall	5
#2	Abutment 1 NW Wing Wall	2
#3-#5	Pier 4	22
#6-#7	Pier 2	18
#8	Underside Deck Drains Spans 2 & 3	14



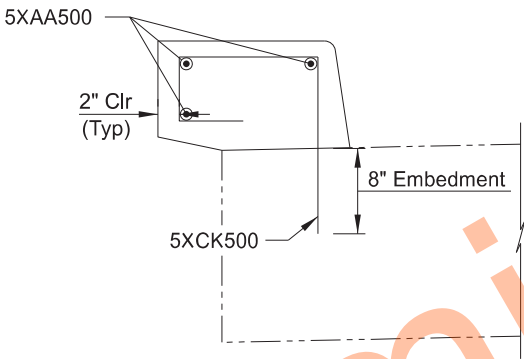
BILL OF REINFORCING STEEL, GRADE 60													
LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS													
LOCA-TION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS								
					a	b	c	d	e	f	g	h	k
CURBS	5	XAA500	12	36'-1"		36'-1"	2'-6"		2				
	5	XCK500	142	3'-6"	6"	6"	1'-1"	1'-5"			1'-1"	0	12



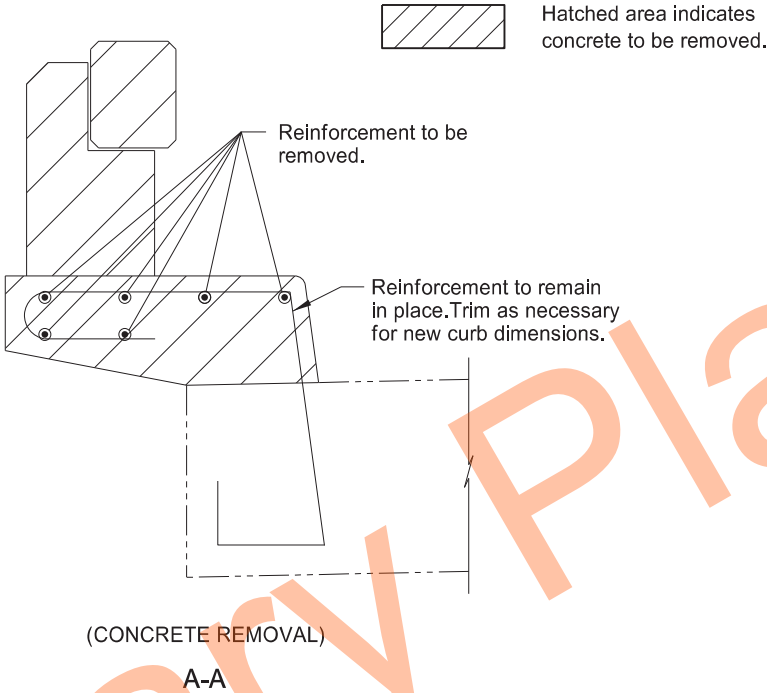
BENT BAR DETAILS



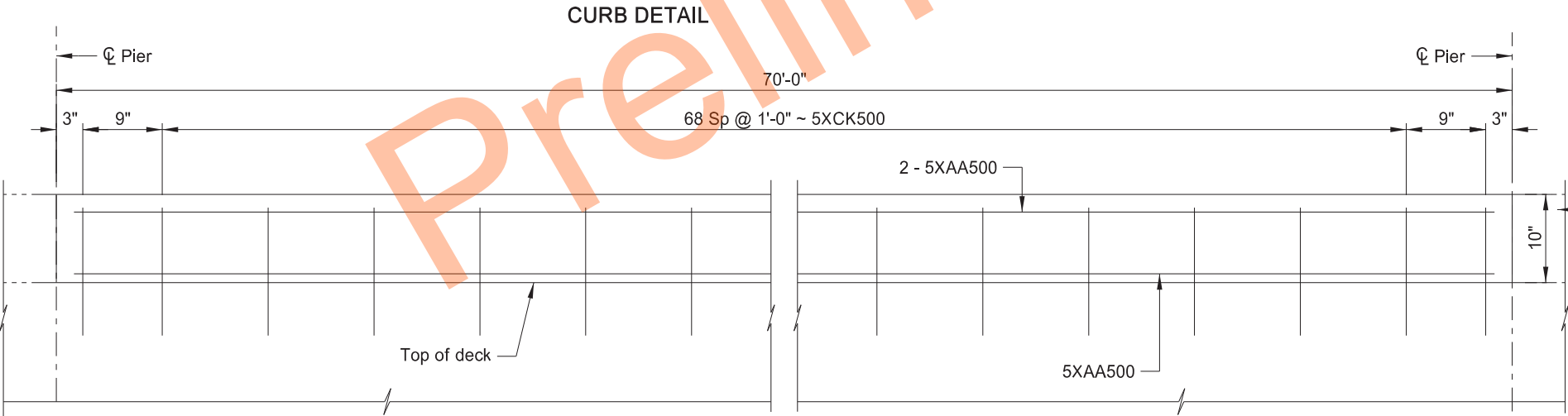
SHOWING DIMENSIONS



SHOWING REINFORCING



A-A



CURB ELEVATION

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	19

NOTES:

1. Remove the concrete in a manner that prevents damage to the parts of the structure to remain. Include concrete removals for new curb installation in the pay item "Removal of Curb".
2. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
3. All dimensions are out to out of bars.
4. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
5. An "X" preceding a bar designation indicates an epoxy coated bar.
6. Embed 5XCK500 into the concrete with a chemical adhesive system. The "d" dimension of the 5XCK500 is based on the embedment shown. The actual "d" dimension will be based on embedment according to the chemical adhesive manufacturer's recommendations.
7. The existing curb reinforcement to remain in place is omitted for clarity. Adjust the 5XCK500 spacing as required for installation. Contractor to verify final placement of reinforcement does not conflict with proposed Double Box Beam Rail Retrofit anchor bolts.
8. Place 1/2" preformed expansion joint filler at the joints between the existing and new curb sections. Use silicone sealant meeting 826.02 B.1 on the front face and top of curb.

QUANTITIES (ONE CURB)	
REMOVAL OF CURB	70 LF
CLASS AAE-3 CONCRETE	3.5 CY
REINFORCING STEEL (EPOXY)	485 LBS
ELM RIVER TRAILL COUNTY SITE 4 CURB DETAILS	
DRAWING NO.	18-106.082-3



30'-0" ~ Clear Roadway

15'-0" Match Existing Slope

Sym about ϕ of bridge

ϕ Roadway
 ϕ Crown

1" Class 1 Removal

$\frac{1}{2}$ " Class 1-H Removal

1" Class 1 Removal

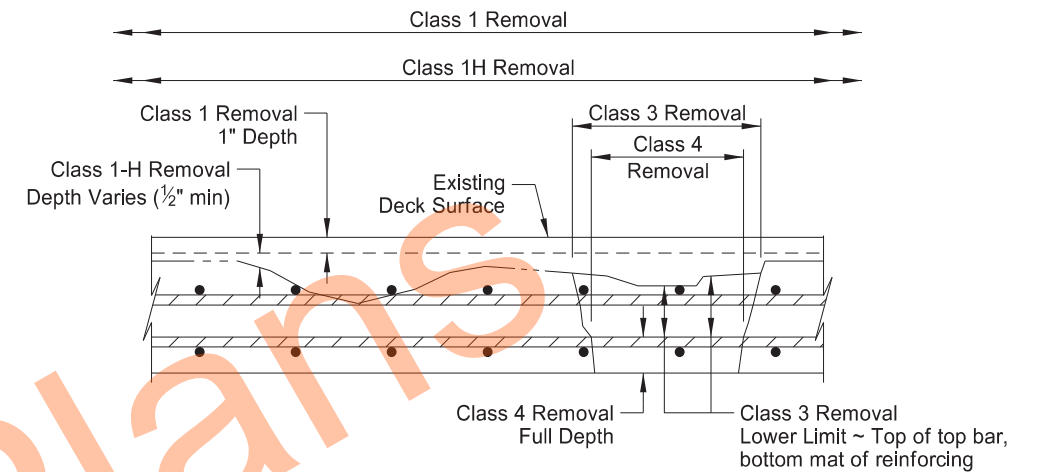
$\frac{1}{2}$ " Class 1-H Removal

(SPAN 2 & 3)

(SPAN 1 & 4)

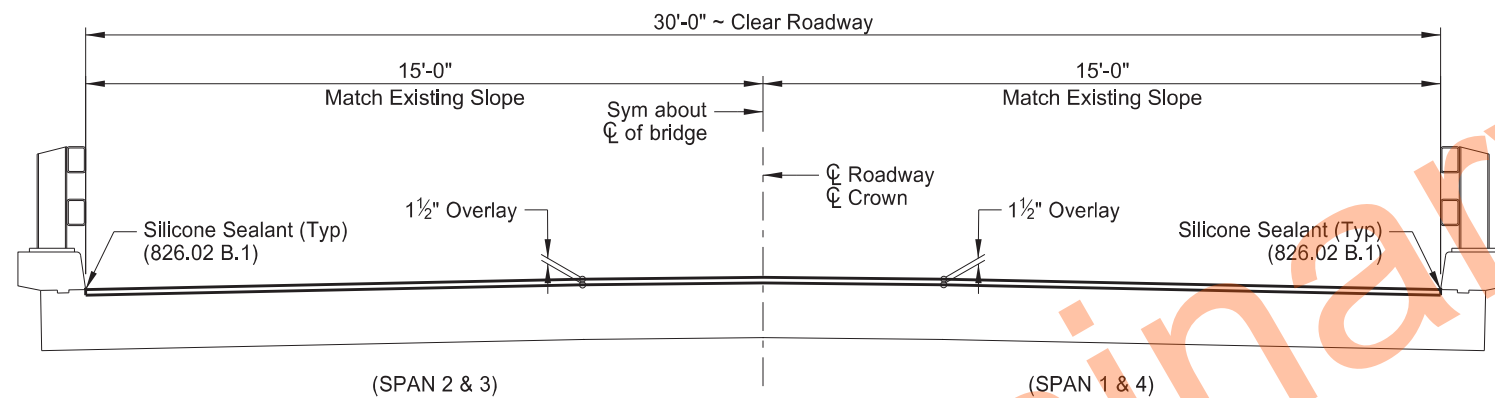
(SHOWING REMOVAL)

TYPICAL DECK SECTION

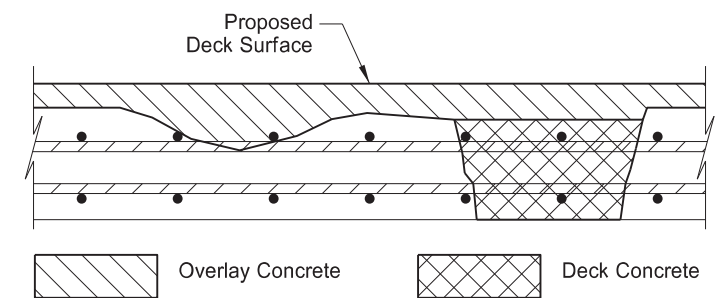


(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION

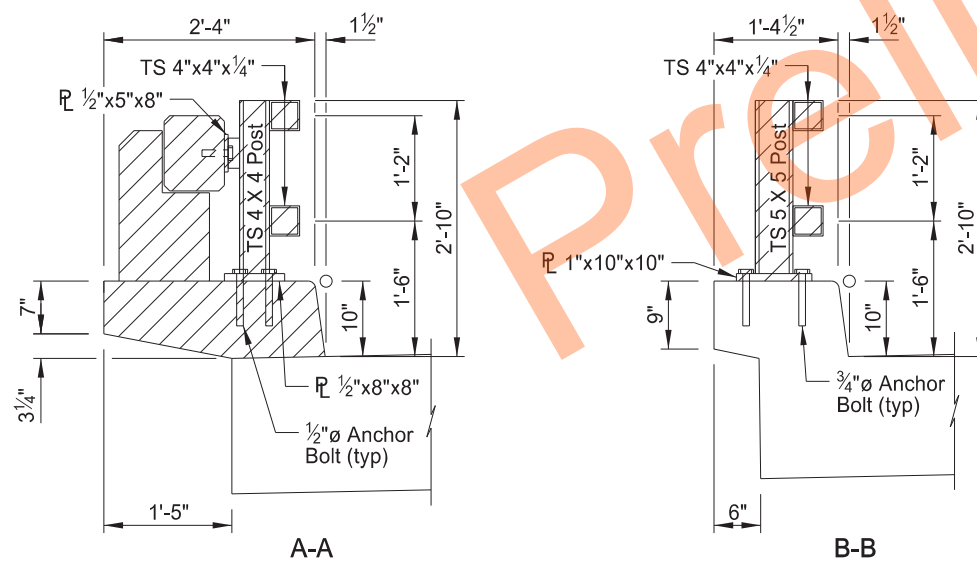


(SHOWING OVERLAY)
TYPICAL DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

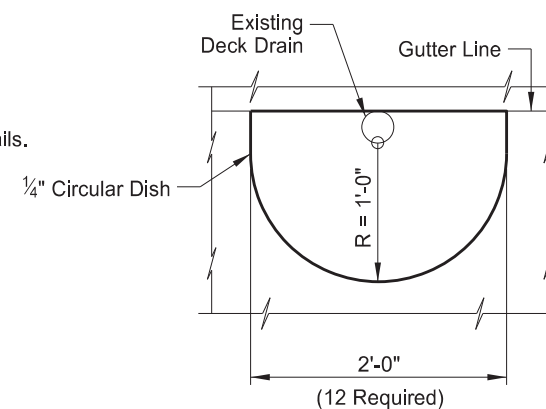


(SHOWING REMOVAL)

EXISTING RAIL RETROFIT

 Hatched area indicates removals.

NOTE:
See Dwg 18-106.082-9 for details.



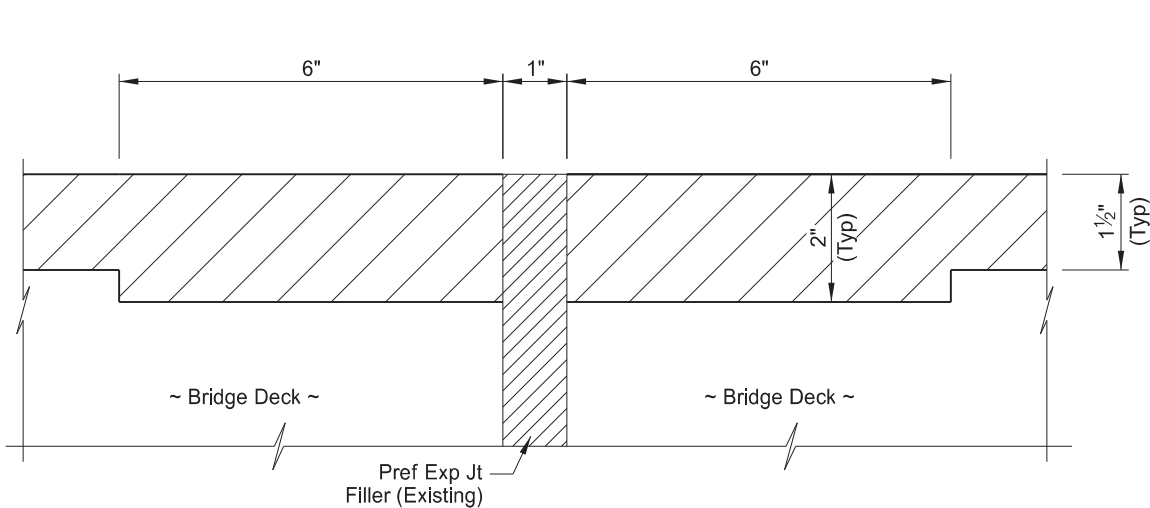
NEW DRAIN DISH

YYY XXX

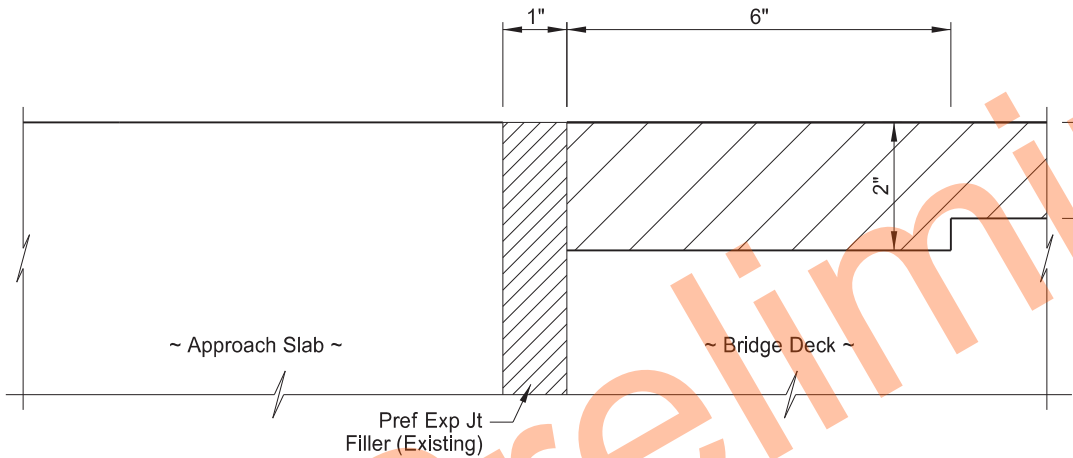
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	21

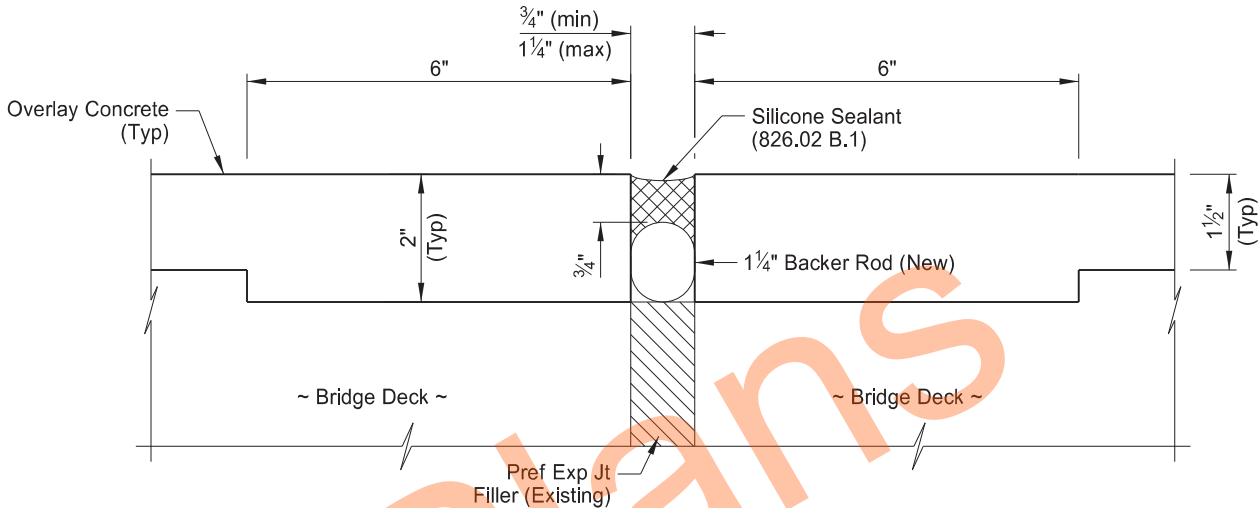
Hatched area indicates
concrete to be removed.



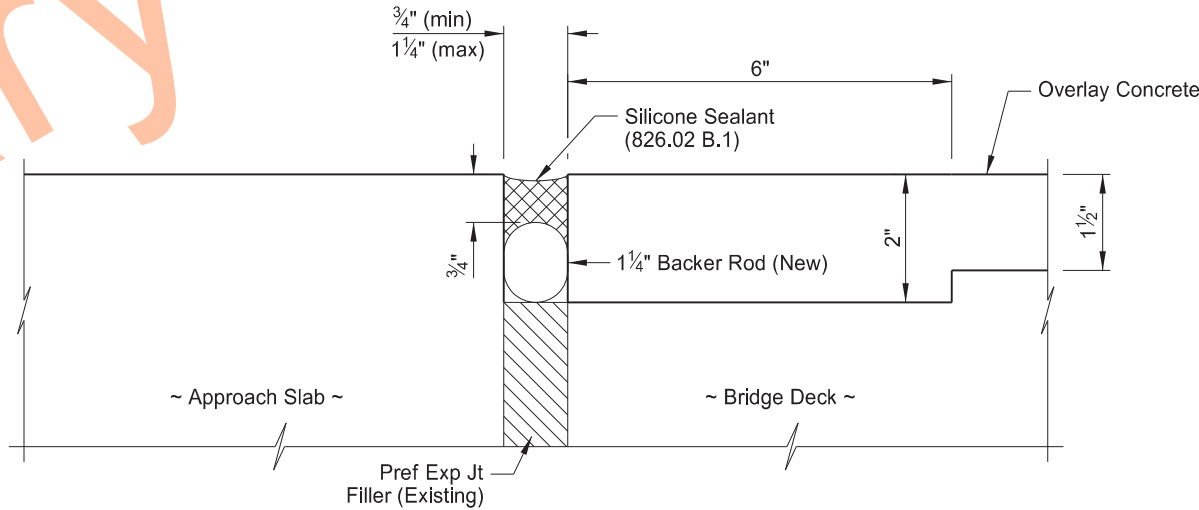
(SHOWING CONCRETE REMOVAL)
**DECK
JOINT DETAIL**



(SHOWING CONCRETE REMOVAL)
**APPROACH SLAB
JOINT DETAIL**



(SHOWING OVERLAY CONCRETE)
**DECK
JOINT DETAIL**



(SHOWING OVERLAY CONCRETE)
**APPROACH SLAB
JOINT DETAIL**

NOTE:

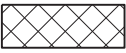
Remove the existing pourable joint sealant and preformed joint filler to the limits shown. Clean the joints of all foreign materials and sand blast clean before placing the new backer rod and joint sealant. The quantity of joint sealant includes an additional 3" at each end to be turned up vertically matching the inside face of curbs.



QUANTITIES	
SILICONE SEALANT	121 LF
ELM RIVER TRAILL COUNTY SITE 4 JOINT DETAILS	
DRAWING NO.	18-106.082-5

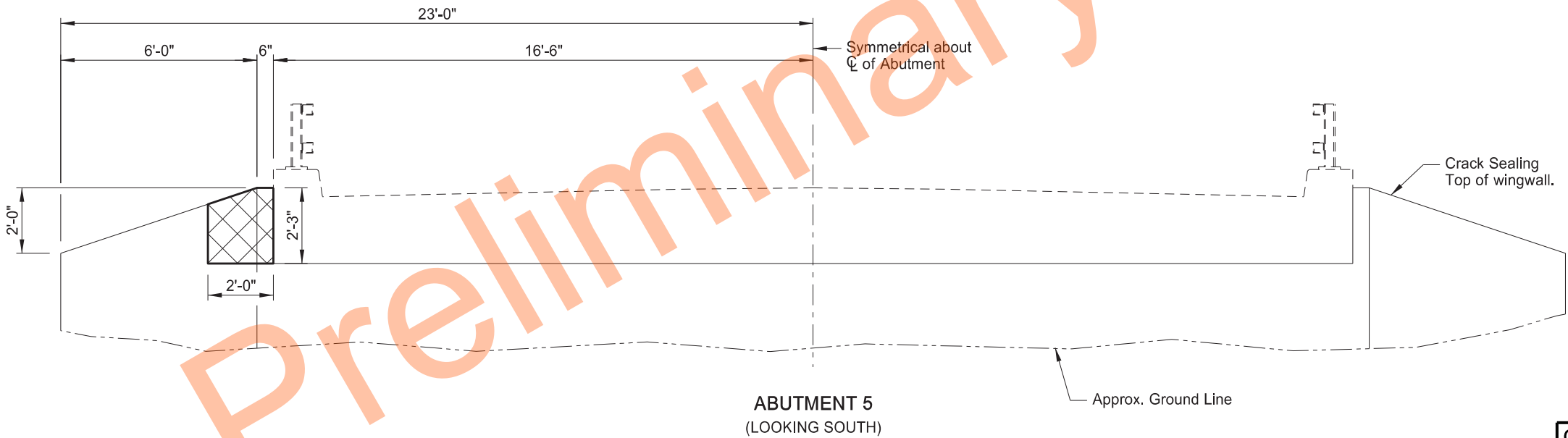
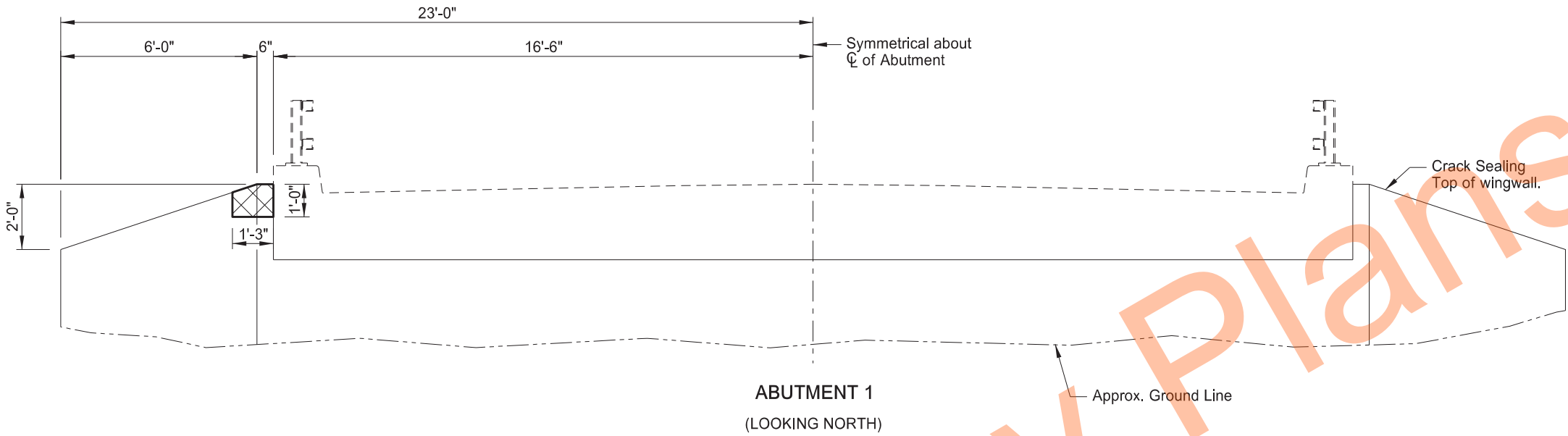
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-8-999(053)	170	22

 Indicates spall repair area.

NOTE:

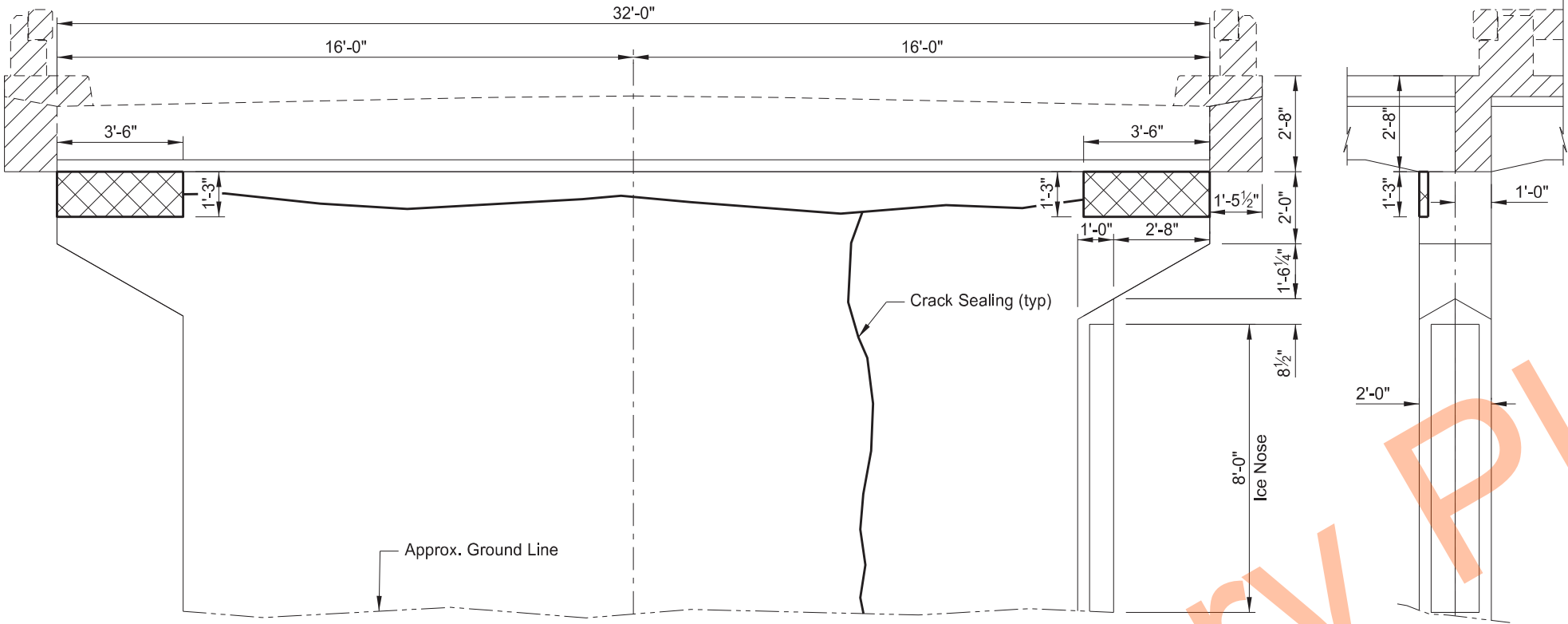
All areas to be verified by the Engineer in the field prior to removal.



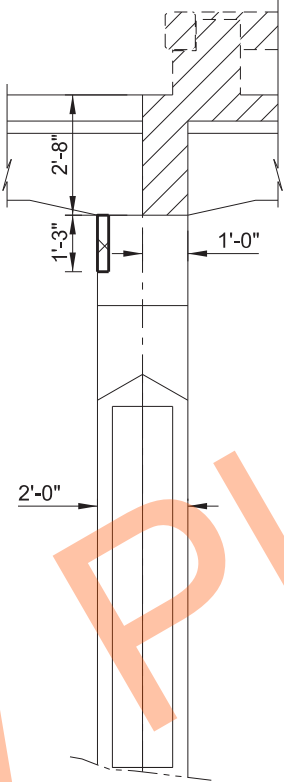
QUANTITIES (BOTH ABUTMENTS)	
CRACK SEALING	6 LF
SPALL REPAIR	7 SF
ELM RIVER TRAIL COUNTY SITE 4 ABUTMENT REPAIR DETAILS	
DRAWING NO.	18-106.082-6

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

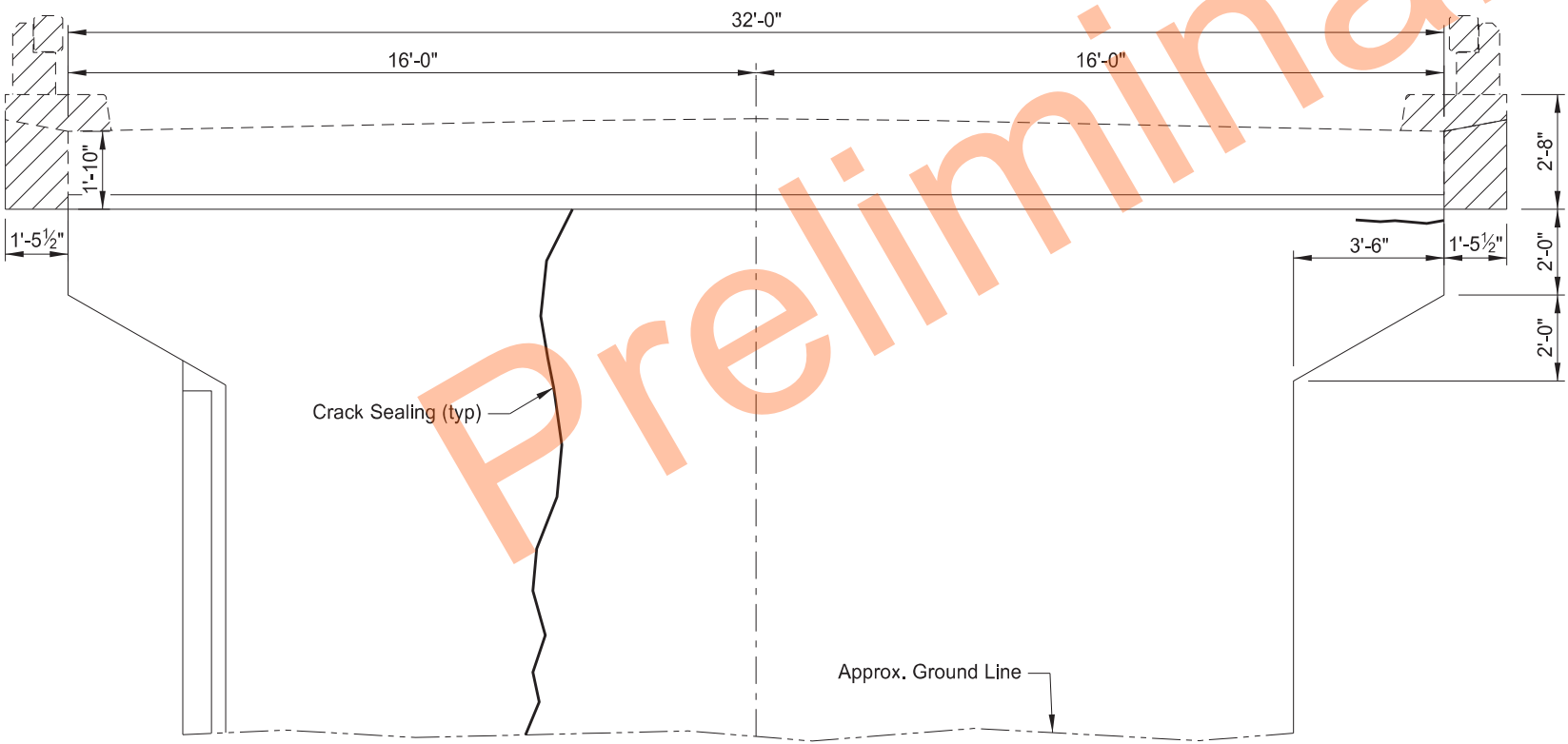
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	23



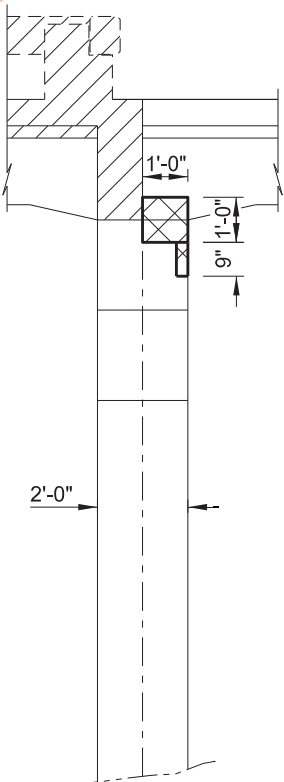
NORTH FACE
ELEVATION



WEST FACE
ELEVATION



SOUTH FACE
ELEVATION



EAST FACE
ELEVATION

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

NOTES:

Remove concrete and reinforcing to the limits shown. Treat the outside edge of deck to remain as a spall repair area.

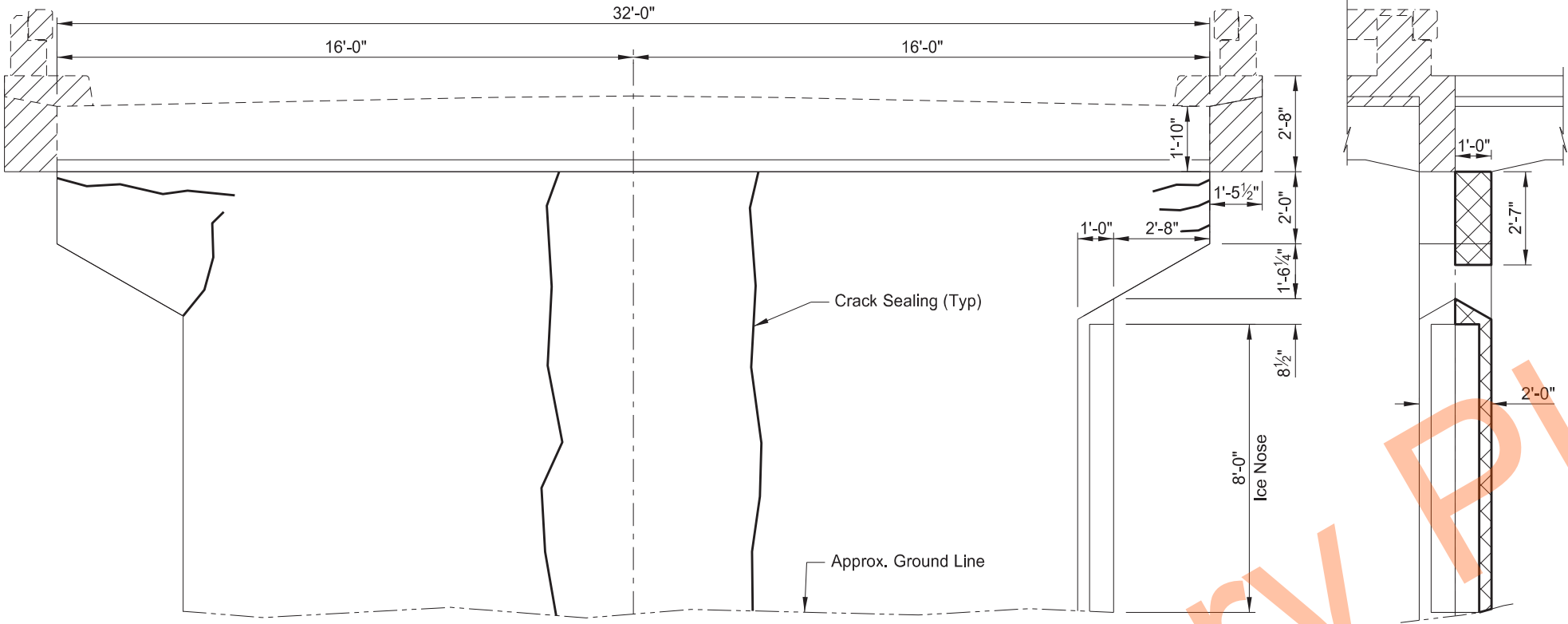
All areas to be verified by the Engineer in the field prior to removal.

QUANTITIES	
CRACK SEALING	57 LF
SPALL REPAIR	18 SF
ELM RIVER TRAILL COUNTY SITE 4 PIER 2 REPAIRS	
DRAWING NO.	18-106.082-7



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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-999(053)	170	24

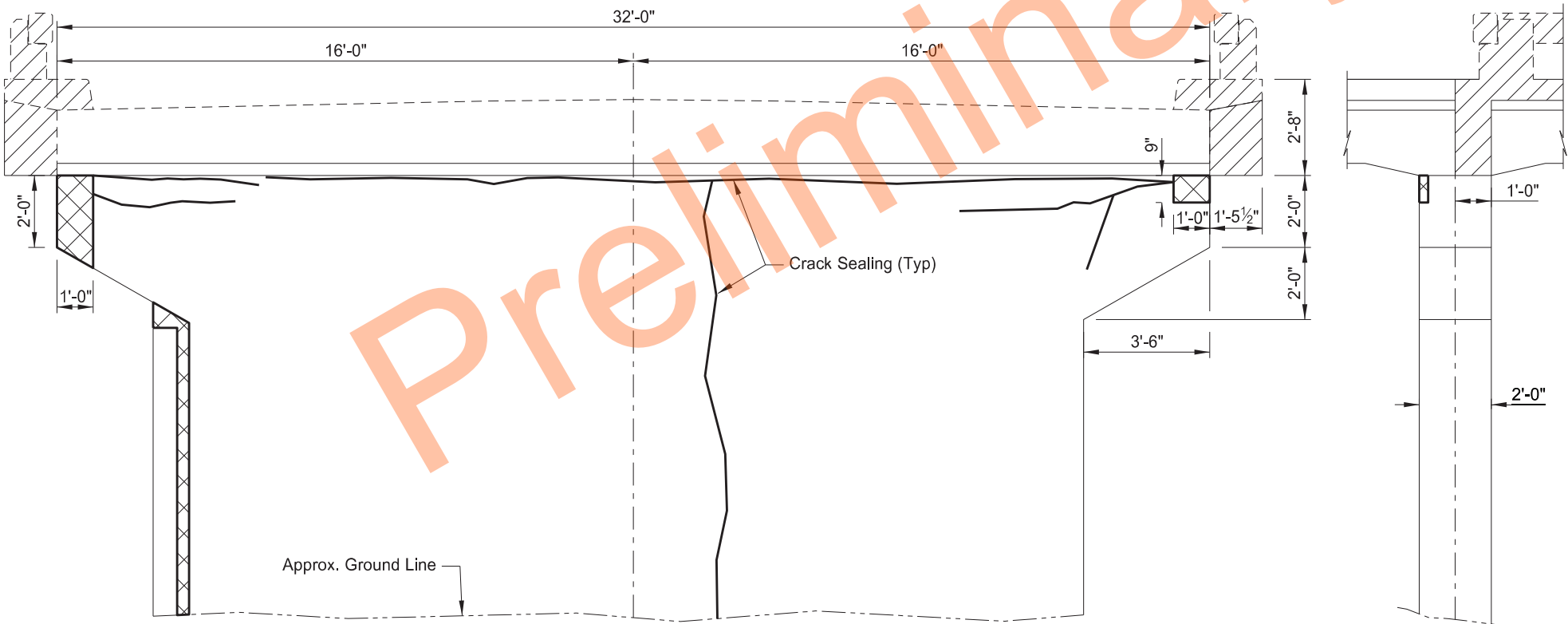


- Hatched area indicates concrete to be removed.
- Indicates spall repair area.

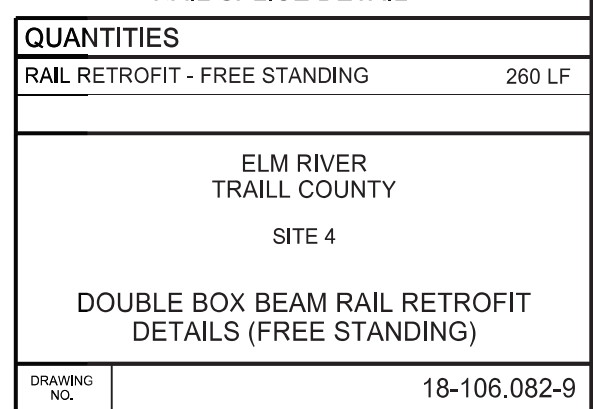
NOTES:

Remove concrete and reinforcing to the limits shown. Treat the outside edge of deck to remain as a spall repair area.

All areas to be verified by the Engineer in the field prior to removal.



QUANTITIES	
CRACK SEALING	105 LF
SPALL REPAIR	22 SF
ELM RIVER TRAILL COUNTY SITE 4 PIER 4 REPAIRS	
DRAWING NO.	18-106.082-8



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	C Gdrl	cable guardrail	Culv	culvert
Abut	abutment	Calc	calculate	C&G	curb & gutter
Adj	adjusted	CIP	cast iron pipe	CI	curb inlet
Aggr	aggregate	CB	catch basin	CR	curb ramp
Ahd	ahead	CRS	cationic rapid setting	C	cut
ARV	air release valve	C Gd	cattle guard		
Align	alignment	C To C	center to center	Dd Ld	dead load
Al	alley	CL or $\varnothing$	centerline	Defl	deflection
Alt	alternate	Ch	chain	Defm	deformed
Alum	aluminum	Chnlk	chain-link	DInt	delineate
ADA	Americans with Disabilities Act	Ch Blk	channel block	DIntr	delineator
&	and	Ch Ch	channel change	Depr	depression
Appr	approach	Chk	check	Desc	description
Approx	approximate	Chsld	chiseled	Det	detail
ACP	asbestos cement pipe	Cir	circle	DWP	detectable warning panel
Asph	asphalt	Cl	class	Dtr	detour
AC	asphalt cement	Clnt	clean-out	Dia or $\varnothing$	diameter
Assmd	assumed	Clr	clear	Dir	direction
@	at	Cl&gr	clearing & grubbing	Dist	distance
Atten	attenuation	Comb.	combination	DM	disturbed material
ATR	automatic traffic recorder	Coml	commercial	DB	ditch block
Ave	Avenue	Compr	compression	DG	ditch grade
Avg	average	CADD	computer aided drafting & design	Dbl	double
ADT	average daily traffic	Conc	concrete	Dn	down
		CECB	concrete erosion control blanket	Dwg	drawing
		Cond	conductor	Dr	drive
		Const	construction	Drwy	driveway
		Cont	continuous	DI	drop inlet
		CSB	continuous split barrel sample	D	dry density
		Contr	contraction		
		Contr	contractor	Ea	each
		CP	control point	Esmt	easement
		Coord	coordinate	E	East
Bk	back	Cor	corner	EB	Eastbound
BF	back face	Corr	corrected	Elast	elastomeric
Balc	balcony	CAES	corrugated aluminum end section	EL	electric locker
B Wire	barbed wire	CAP	corrugated aluminum pipe	E Mtr	electric meter
Barr	barricade	CMES	corrugated metal end section	Elec	electric/al
Btry	battery	CMP	corrugated metal pipe	EDM	electronic distance meter
BI	beehive inlet	CPVCP	corrugated poly-vinyl chloride pipe	Elev or El	elevation
Beg	begin	CSES	corrugated steel end section	Ellipt	elliptical
BG	below grade	CSFES	corrugated steel flared end section	Emb	embankment
BM	bench mark	CSP	corrugated steel pipe	Emuls	emulsion/emulsified
Bkwy	bikeway	CSTES	corrugated steel traversable end section	ES	end section
Bit	bituminous	Co	County	Engr	engineer
Blk	block	Crse	course	ESS	environmental sensor station
BH	bore hole	Ct	Court	Eq	equal
Bot	bottom	Xarm	cross arm	Evgr	evergreen
Blvd	Boulevard	Xbuck	cross buck	Exc	excavation
Bndry	boundary	Xsec	cross sections	Exst	existing
Brkwy	breakaway	Xing	crossing	Exp	expansion
Br	bridge	Xrd	crossroad	Expy	Expressway
Bldg	building	Crn	crown	E	external of curve
Bus.	business			Extru	extruded
BV	butterfly valve				
Byp	bypass				
				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
				FI	flange
				Fld	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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-10-20	General Revisions
08-16-22	General Revisions

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

08/16/22

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	Rcy	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
				Pk	park	RCB	reinforced concrete box
H Plg	H piling			PSD	passing sight distance	RCES	reinforced concrete end section
Hdwl	headwall	Mb	mailbox	Pvmt	pavement	RCFES	reinforced concrete flared end section
Ht	height	ML	main line	Ped	pedestal	RCP	reinforced concrete pipe
Hel	helical	MH	manhole	Ped	pedestrian	RCPS	reinforced concrete pipe sewer
HDPE	high density polyethylene	Mkd	marked	PPP	pedestrian pushbutton post	RCTES	reinforced concrete traversable end section
HM	high mast	Mkr	marker	Pen.	penetration	Reinf	reinforcement
HP	high pressure	Mkg	marking	Perf	perforated	Res	reservation
HPS	high pressure sodium	MA	mast arm	Per.	perimeter	Res	residence
HTCG	high tension cable guardrail	Matl	material	Perm	permanent	Ret	retaining
Hwy	highway	Max	maximum	PL	pipeline	Rev	reverse
Hor	horizontal	MC	meander corner	PI	place	Rt	right
HBP	hot bituminous pavement	Meas	measure	P&P	plan & profile	R/W	right of way
HMA	hot mix asphalt	Mdn	median	PL	plastic limit	Riv	river
Hyd	hydrant	MD	median drain	PI or P _L	plate	Rd	road
Ph	hydrogen ion content	MC	medium curing	Pt	point	Rdbd	road bed
		MGS	Midwest Guardrail System	PE	polyethylene	Rdwy	roadway
		MM	mile marker	PVC	polyvinyl chloride	RWIS	roadway weather information system
Id	identification	MP	mile post	PCC	Portland Cement concrete	Rk	rock
Incl	inclinometer tube	Min	minimum	PP	power pole	Rt	route
IMH	inlet manhole	Misc	miscellaneous	Preempt	preemption		
ID	inside diameter	Mon	monument	Prefab	prefabricated		
Inst	instrument	Mnd	mound	Prfmd or Pref	preformed		
Intchg	interchange	Mtbl	mountable	Prep	preperation		
Intmdt	intermediate	Mtd	mounted	Press.	pressure		
Intscn	intersection	Mtg	mounting	PRV	pressure relief valve		
Inv	invert	Mk	muck	Prestr	prestressed		
IP	iron pipe			Pvt	private		
				PD	private drive		
				Prod.	production/produce		
				Prog	programmed		
				Prop.	property		
				Prop Ln	property line		
				Ppsd	proposed		
				PB	pull box		
Jt	joint	Neop	neoprene				
Jct	junction	Ntwk	network				
		N	North				
		NE	North East				
		NW	North West				
		NB	Northbound				
		No. or #	number				

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08-16-22	General Revisions



08/16/22

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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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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	Sheet Added - Continued from D-101-3

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12 18 2020

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 HGH 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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04-23-18	General Revisions
09-28-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

LINE STYLES

D-101-20

Existing Topography

	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
	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

Proposed Topography

	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
	3-Cable w Posts
	Flow
	Fence
	Remove Line
	Wall
	Retaining Wall (Plan View)
	W-Beam w Posts
	High Tension Cable Guardrail with Posts

Existing Utilities

	Existing Electrical
	Existing Fiber Optic Line
	Existing TV Fiber Optic
	Existing Gas Pipe
	Existing Overhead Utility Line
	Existing Power
	Existing Fuel Pipeline
	Existing Undefined Above Ground Pipe Line
	Existing Sanitary Sewer
	Existing Sanitary Force Main
	Existing Storm Drain
	Existing Storm Drain Force Main
	Existing Culvert
	Existing Telephone Line
	Existing TV Line
	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	
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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 Typicals

	Existing Ground
	Existing Topsoil (Cross Section View)
	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

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	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
	Floating Silt Curtain
	Silt Fence
	Excavation Limits
	Fiber Rolls

Environmental

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

NORTH DAKOTA
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SYMBOLS

D-101-30

	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				

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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
				Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)				Existing RR Profile Spot
				Attenuation Device				Existing Railroad Crossbuck
				Truck Mounted Attenuator				Existing Railroad Frog
				Delineator Drums				Existing Mailbox (Private, Federal)
				Flagger				
				Tubular Marker				
				Traffic Cone				
				Back to Back Vertical Panel Sign				

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12 18 2020

SYMBOLS

D-101-32

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

NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

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

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12 18 2020

STANDARD SLOPE PROTECTION UNDER BRIDGES

D-258-1

NOTES:

Construct the toe wall before concrete is placed on the slope.

Construct 5'-6" square interior panels. Vary the width of the outside panels from 5'-0" min to 8'-0" max to achieve the width shown in the plans. Vary the length of the bottom panel from 3'-0" min to 8'-0" max to achieve the length shown in the plans.

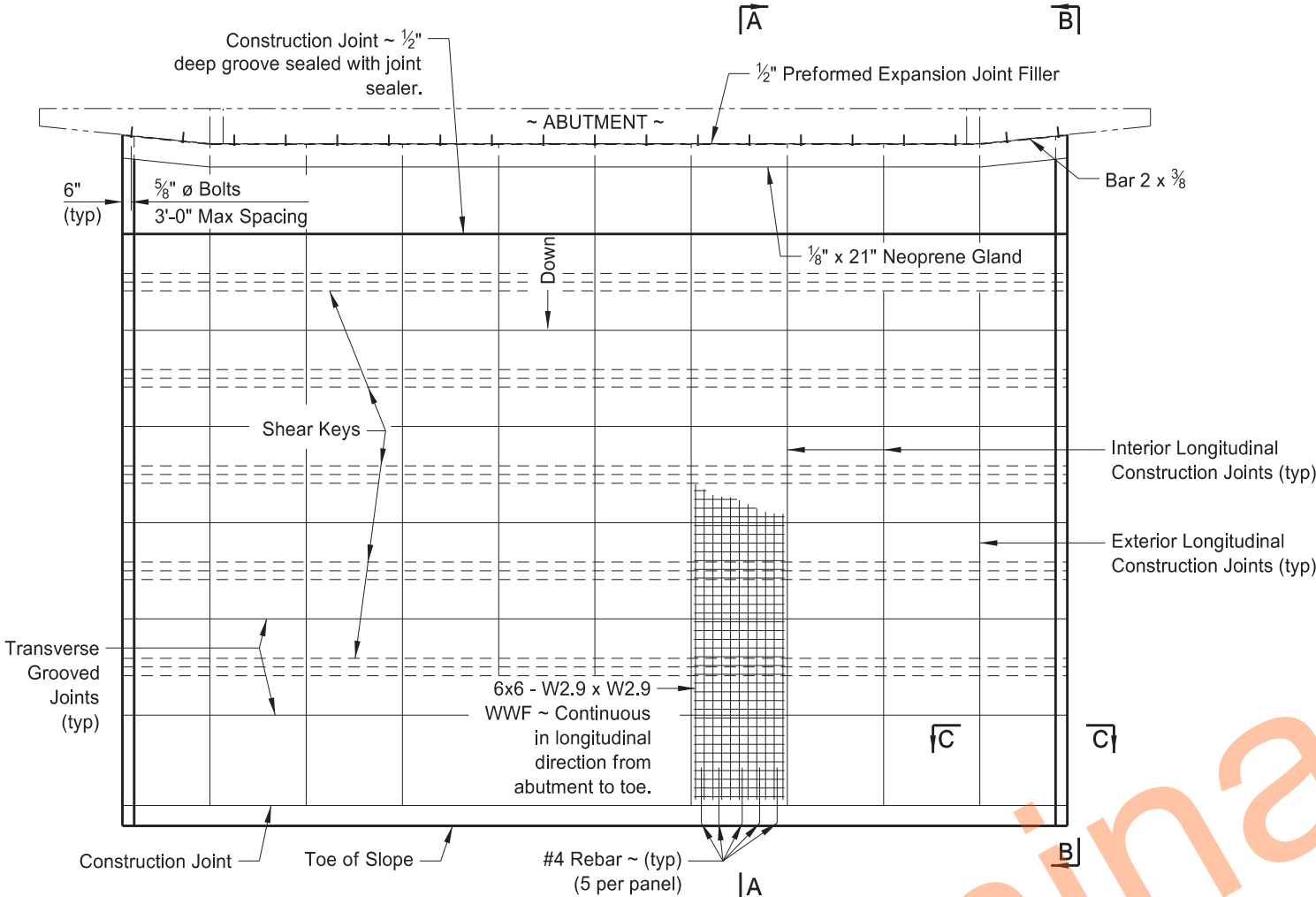
Construct 1/2" deep grooves in transverse and longitudinal joints. Seal the joints with a concrete joint sealant meeting 826.02 or ASTM C-920, Class 25.

Install 1/2" thick preformed expansion joint filler around pier columns or other obstructions projecting through the concrete slope protection.

Place shear keys in every panel on the slope, as shown.

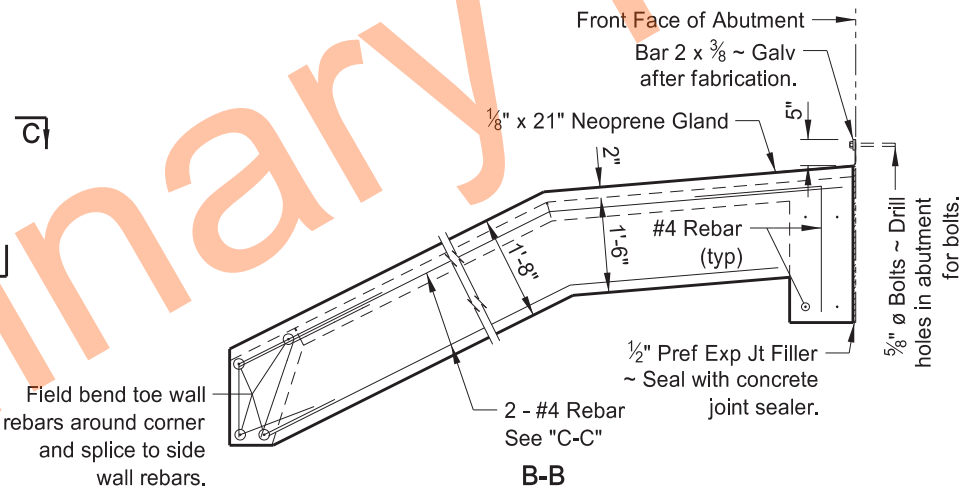
Supply the welded wire fabric (WWF) in sheets. Use a lap splice at least 8" long when it is necessary to make the WWF continuous.

Fasten the neoprene gland to the front face of abutment using 5/8" diameter bolts passing through a 2" wide x 3/8" thick steel bar. Provide a continuous steel bar, or a series of shorter bars, each with a length sufficient to hold a minimum of 3 bolts and extend a minimum distance of 6" past the centerline of outer bolts. Install the bolts into the front face of abutment using chemical or mechanical anchors. Galvanize the bolts and steel bars per Section 854.



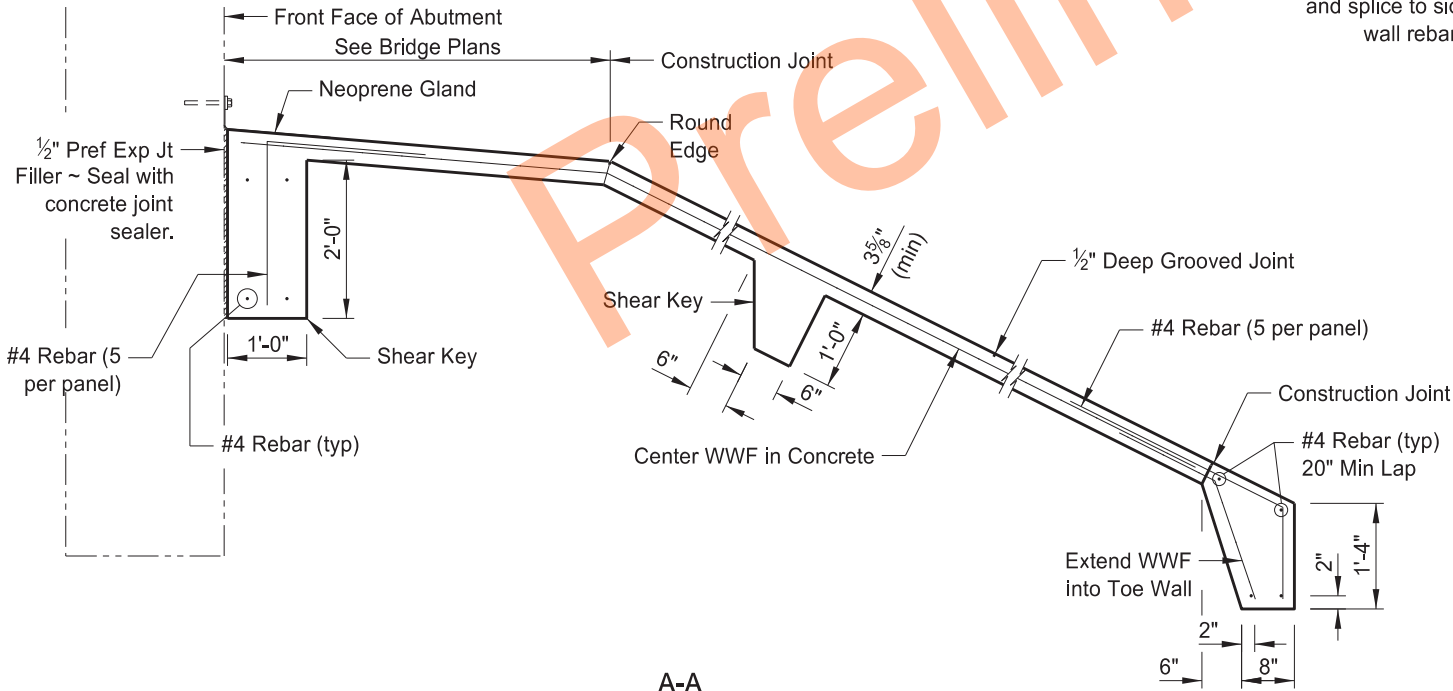
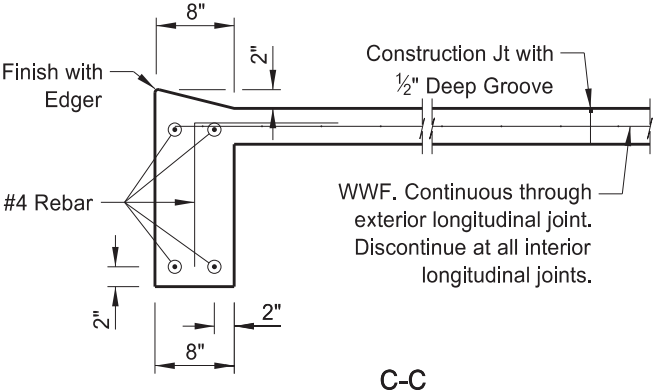
SLOPE PROTECTION LAYOUT

SKEWED SLOPE PROTECTION LAYOUT

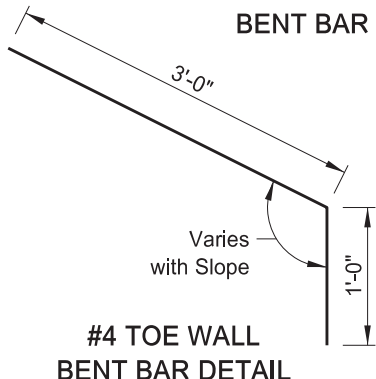


#4 SHEAR KEY BENT BAR DETAIL

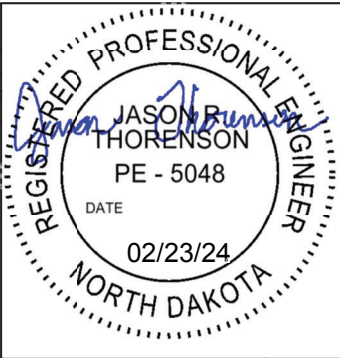
#4 SIDE WALL BENT BAR DETAIL



A-A

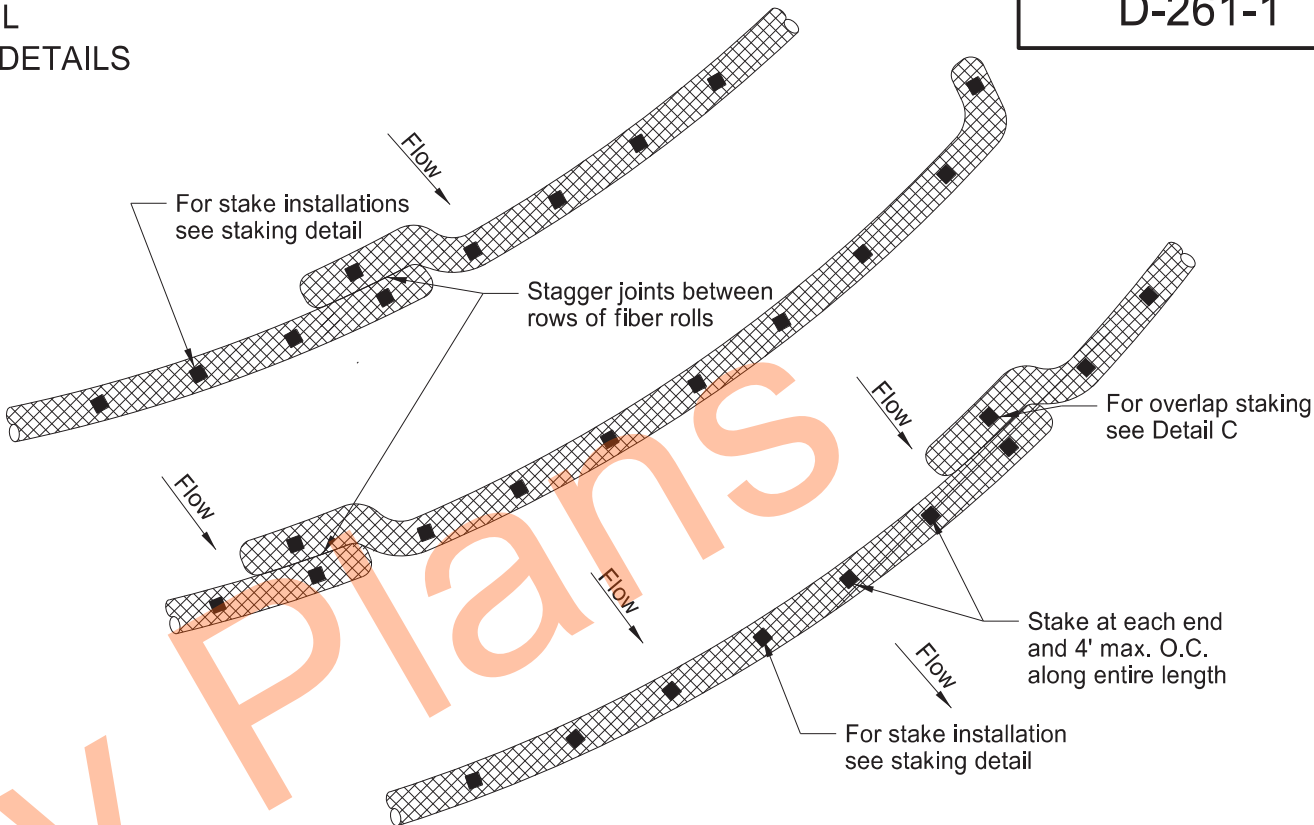
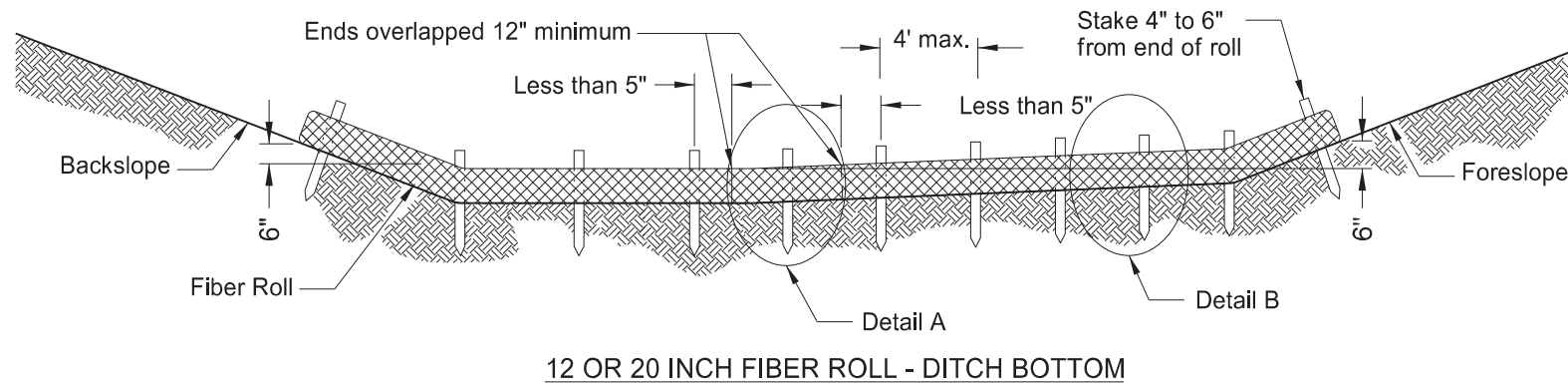


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07/10/14	CHANGED FROM D-708-1
09/03/19	UPDATED SIGNATURE
02/23/24	Updated Signature Revised notes & updated to active voice

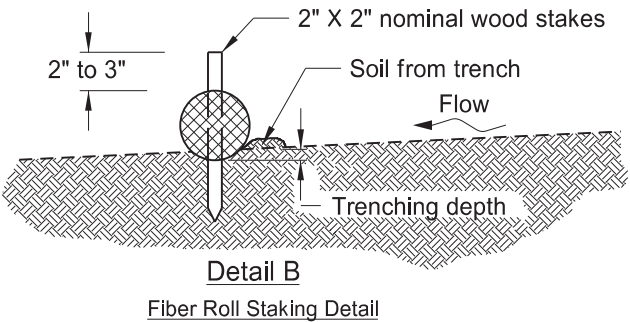
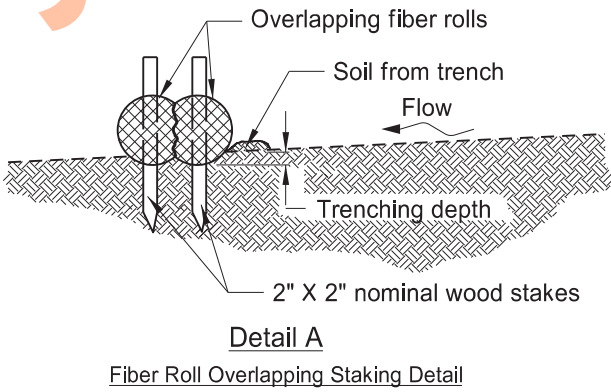
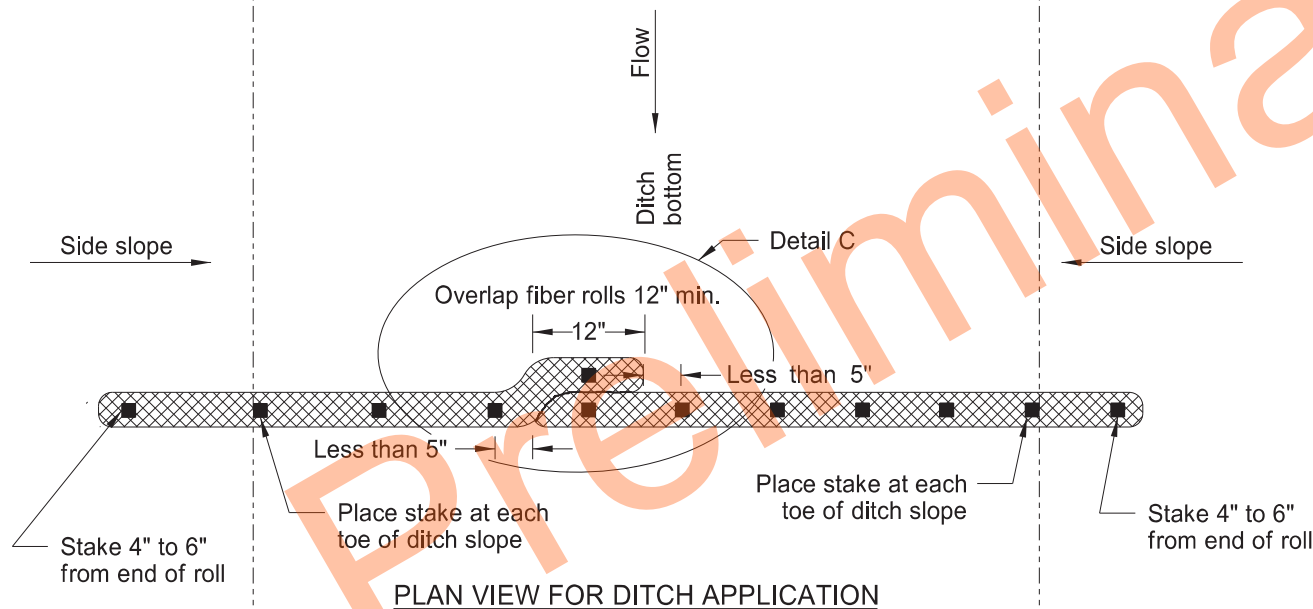


EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1



PLAN VIEW FOR SLOPE APPLICATION
Ensure fiber rolls are placed along the contours of the slope.



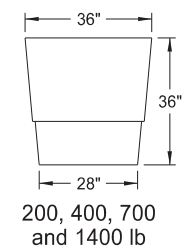
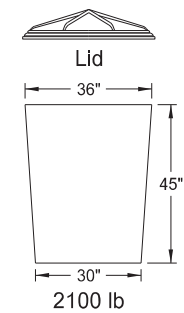
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

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
04-22-24	Slope Plan View-Overlap Change.



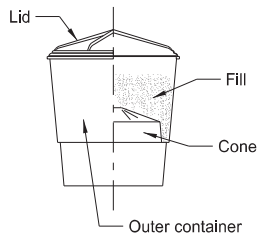
04/22/24



Outer Containers

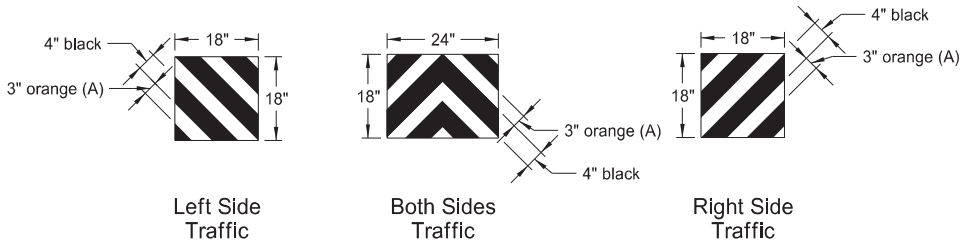


Cones



Typical Assembly

Typical Module Construction Detail

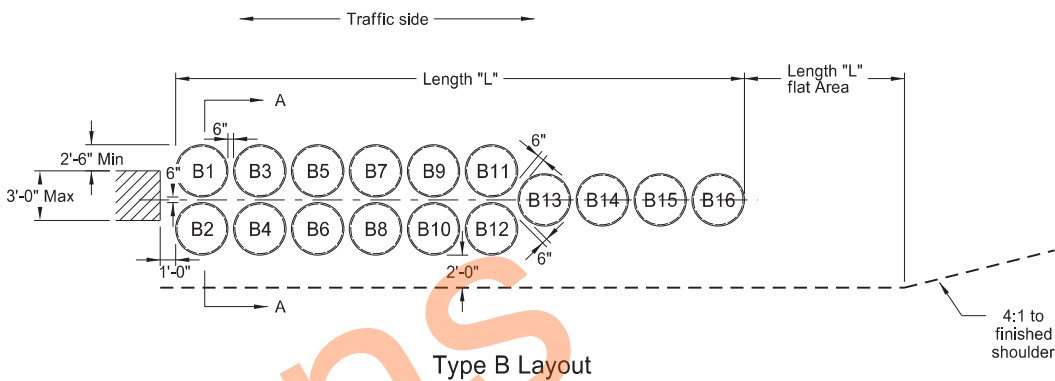


Reflective Sheet Detail

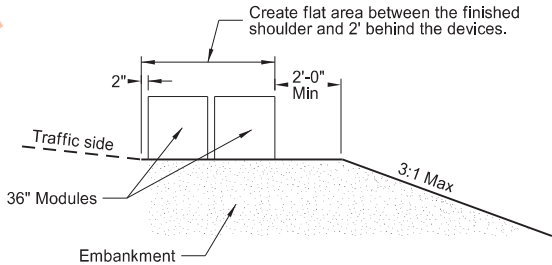
Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above.
Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

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

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



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
2100	1	1	1	1	1	1	1	1	1	1	1
1400	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	1	1	1	1	1	1	1	1

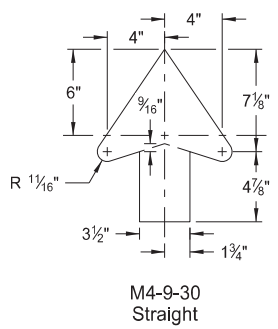
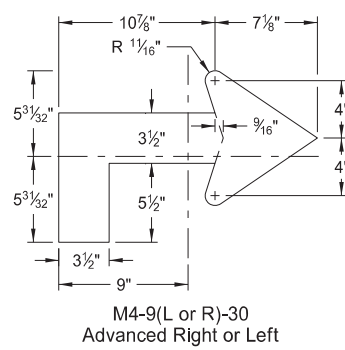
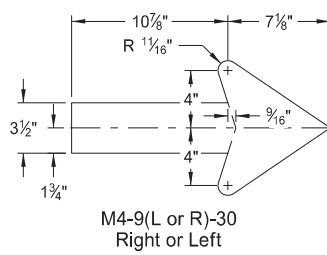
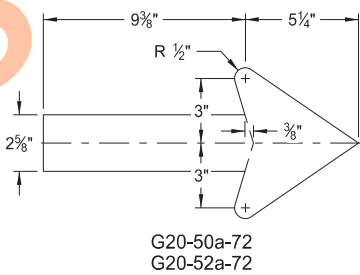
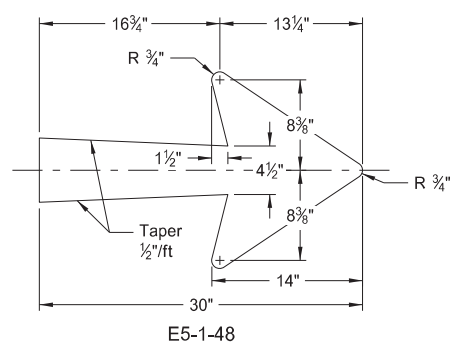
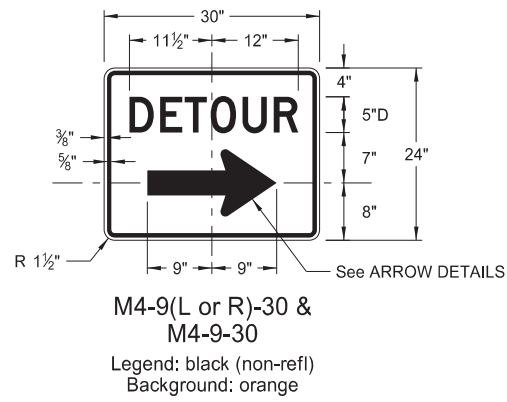
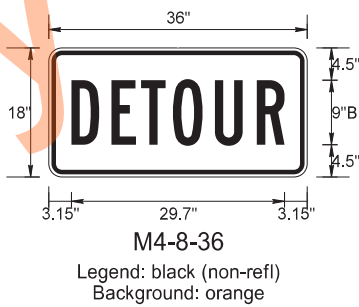
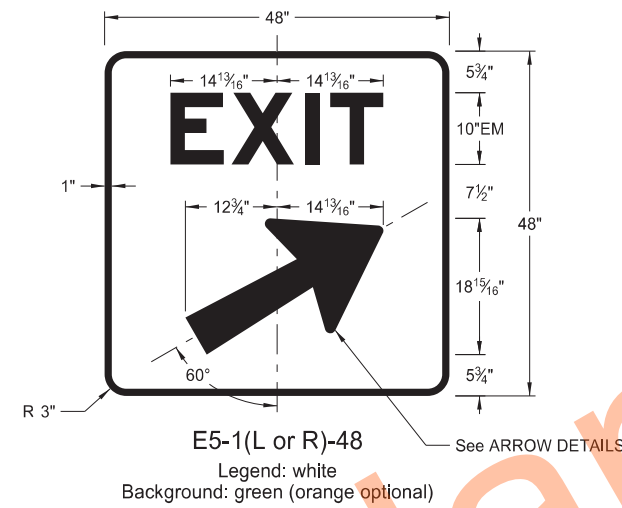
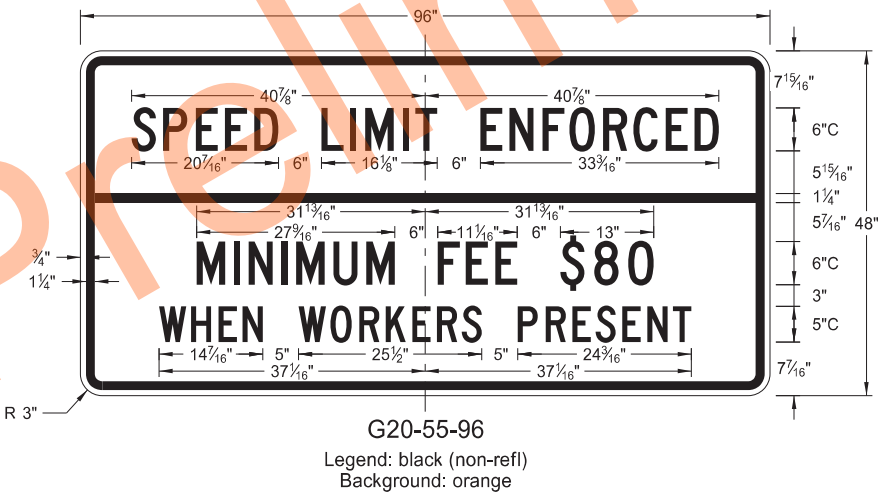
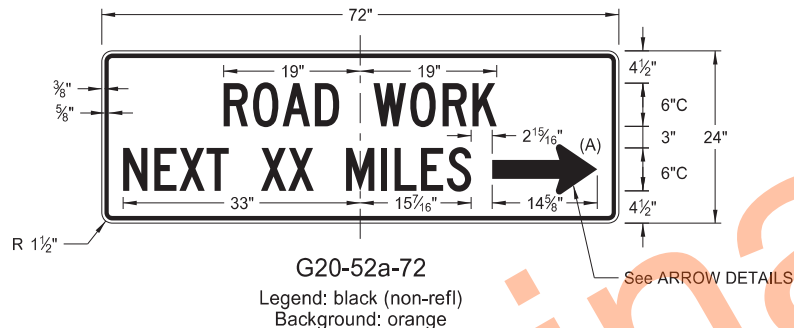
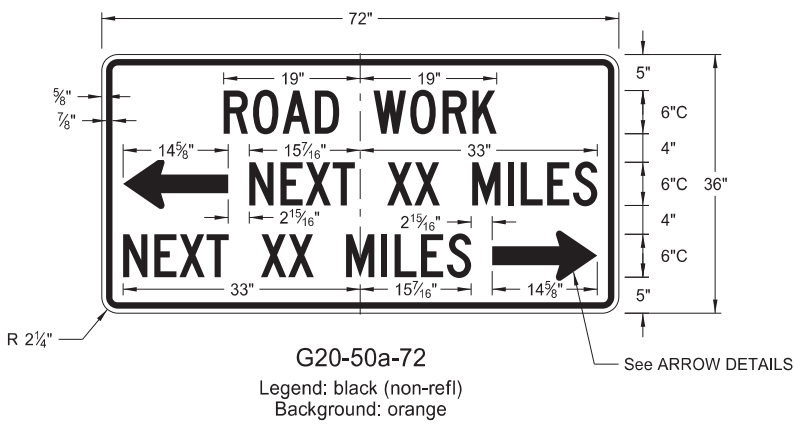
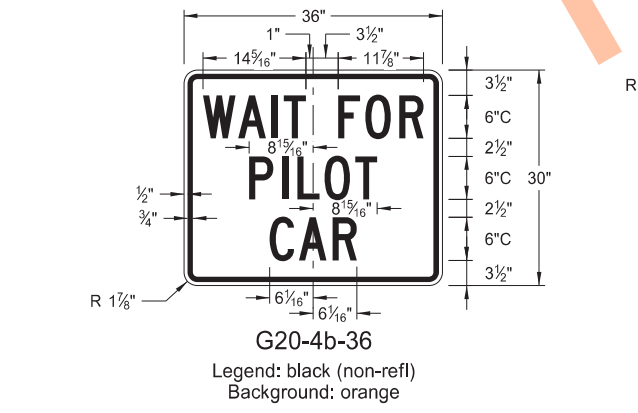
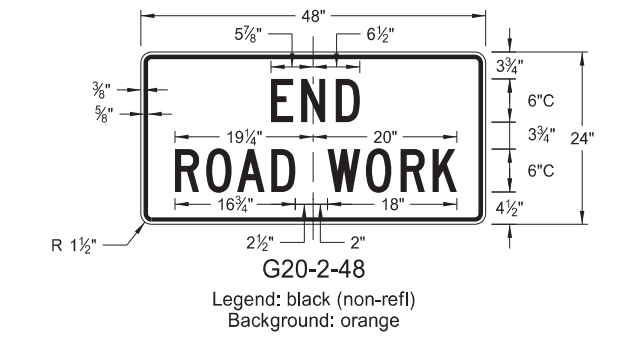
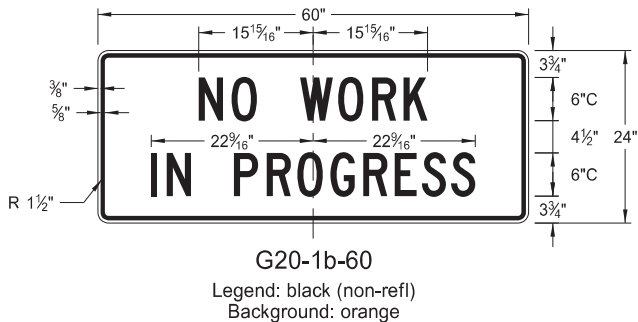
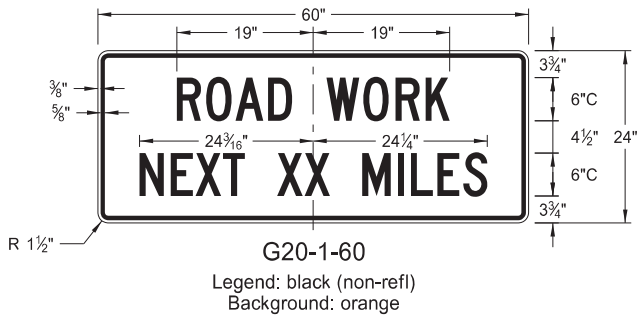
- Notes:
- Materials
 - Use modules manufactured from frangible polyethylene material which shatters upon impact.
 - Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture 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 3½" 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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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

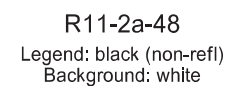
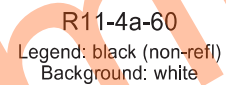
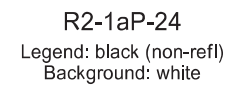
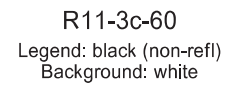
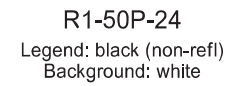
D-704-9



ARROW DETAILS

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

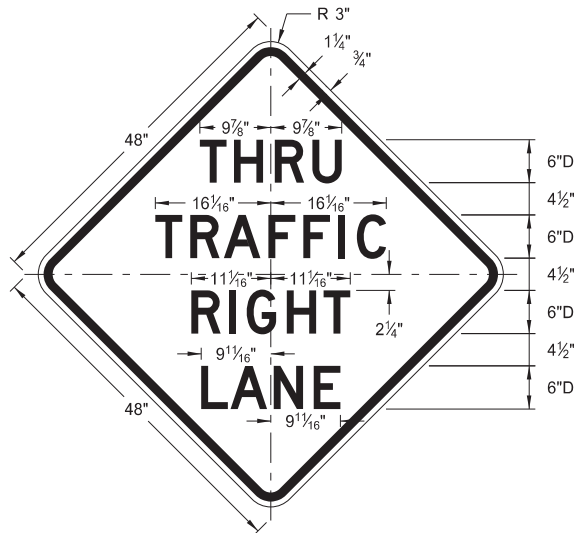
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation
8-13-13		
REVISIONS		
DATE	CHANGE	
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp	



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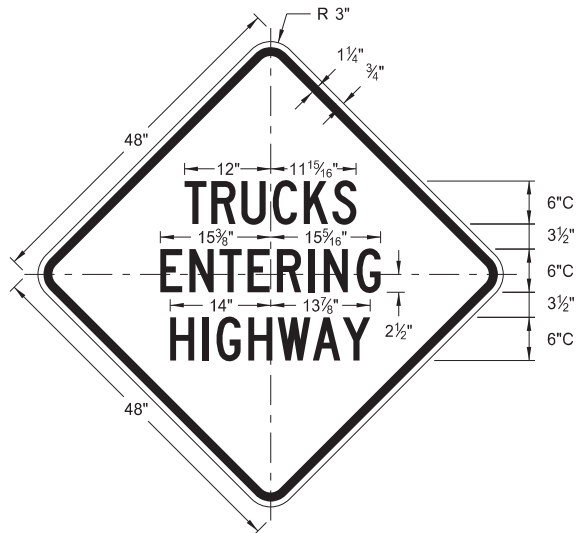
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

D-704-11



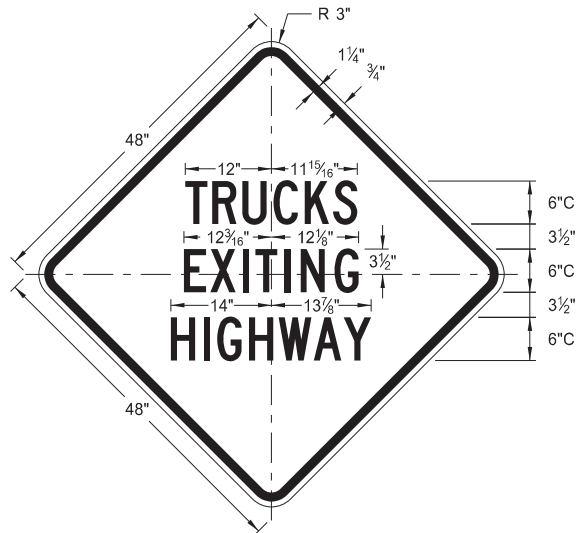
W5-8-48

Legend: black (non-refl)
Background: orange



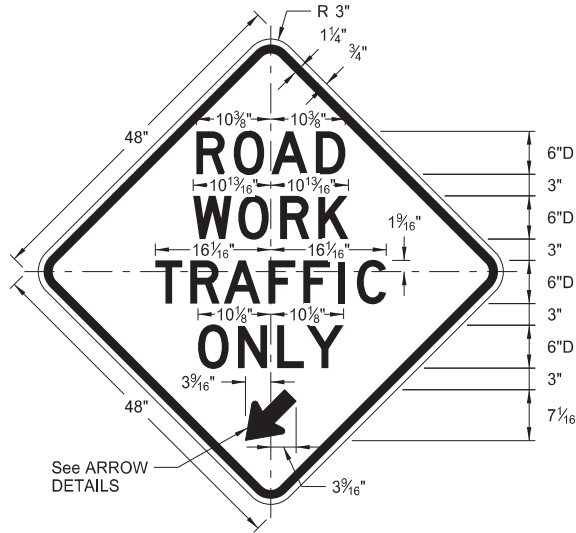
W8-53-48

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Background: orange



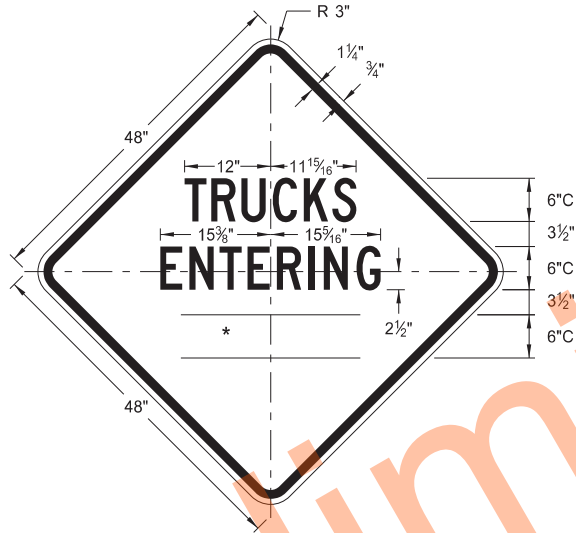
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Background: orange



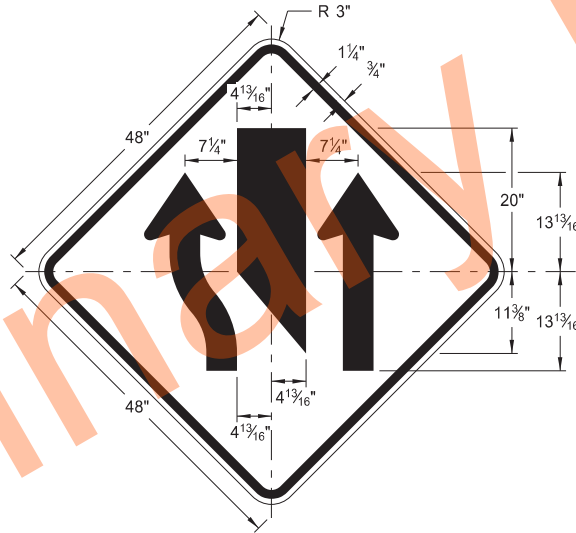
W5-9-48

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Background: orange



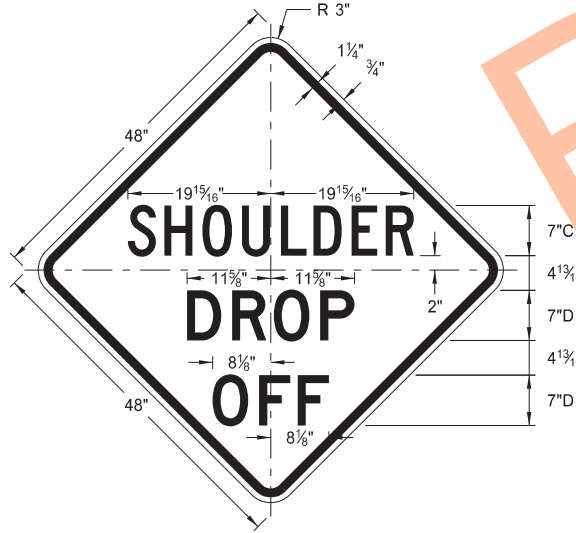
W8-54-48

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Background: orange



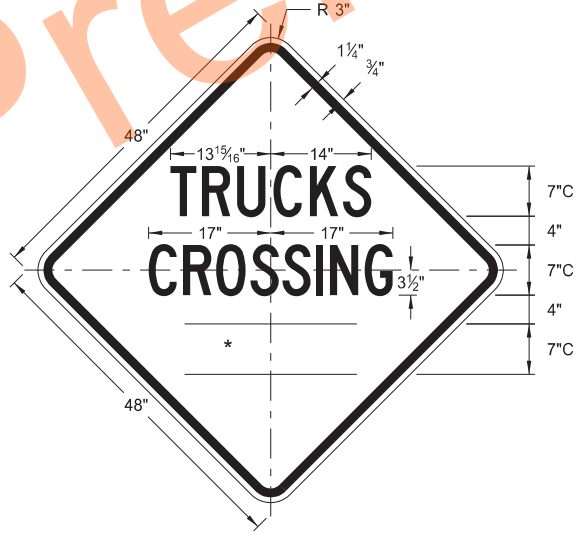
W9-3a-48

Legend: black (non-refl)
Background: orange



W8-9a-48

Legend: black (non-refl)
Background: orange

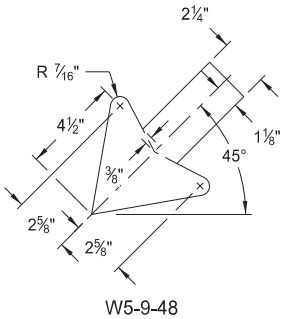


W8-55-48

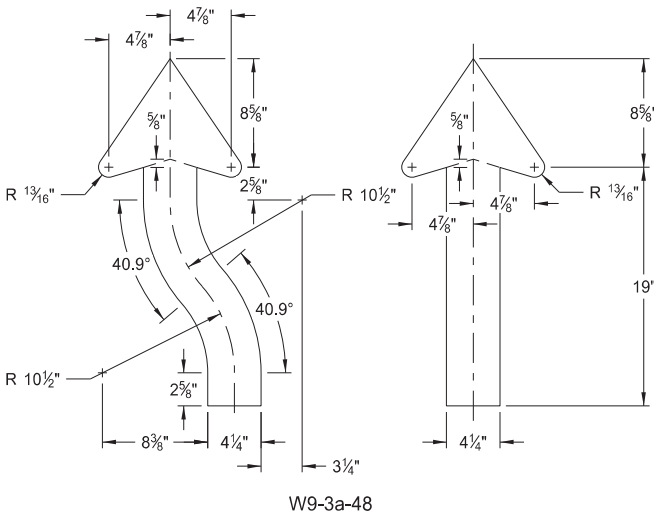
Legend: black (non-refl)
Background: orange

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

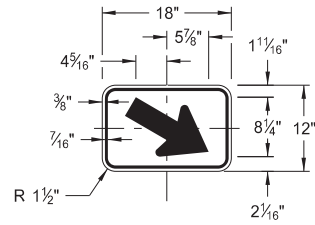
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

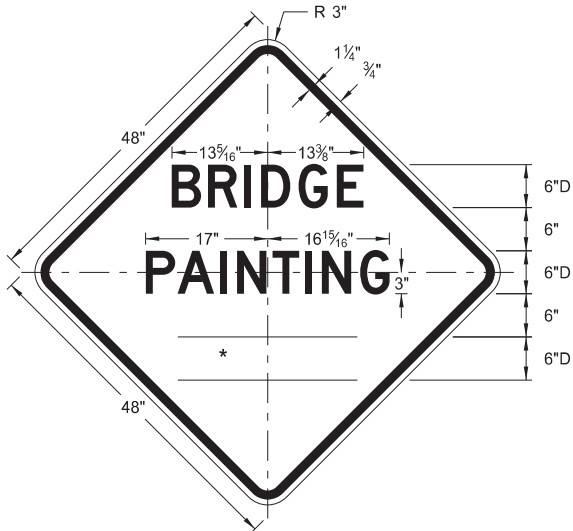
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



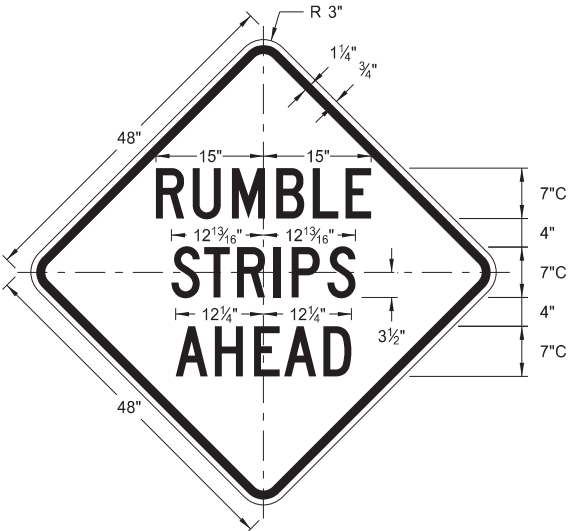
W16-7aP-18

Legend: black (non-refl)
Background: orange



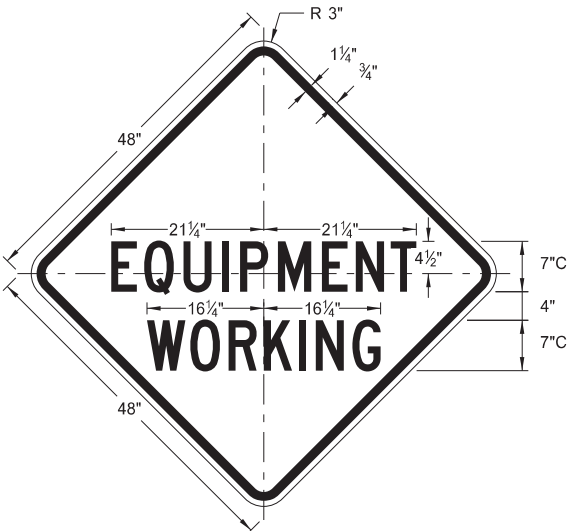
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Legend: black (non-refl)
Background: orange



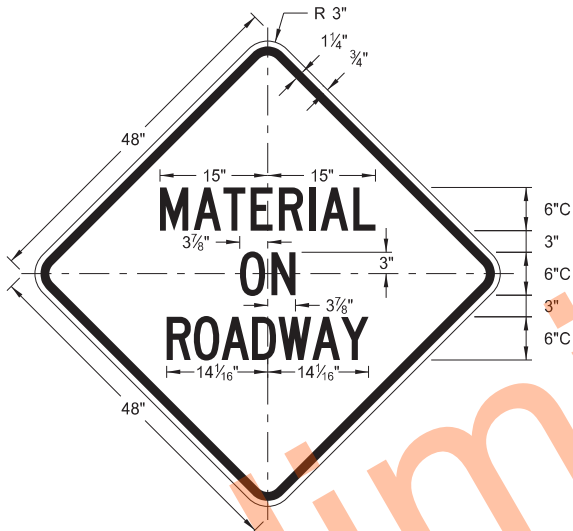
W21-53-48

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Background: orange



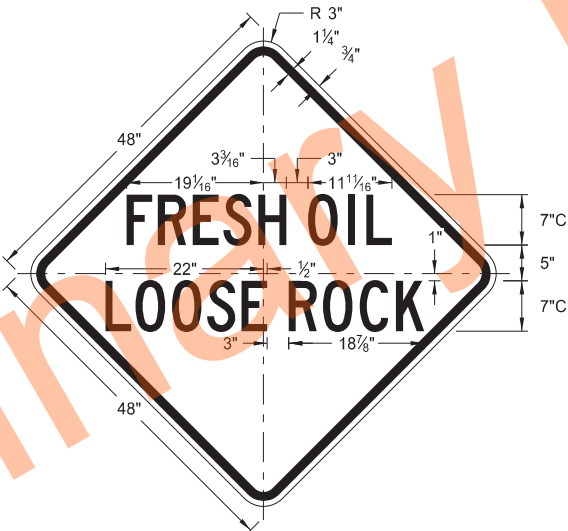
W20-51-48

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Background: orange



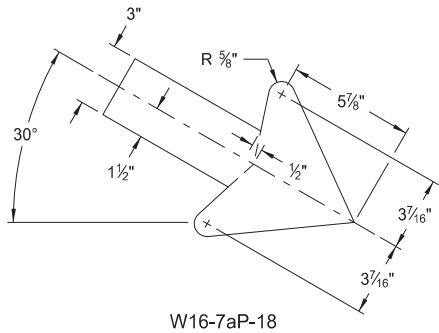
W21-51-48

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Background: orange

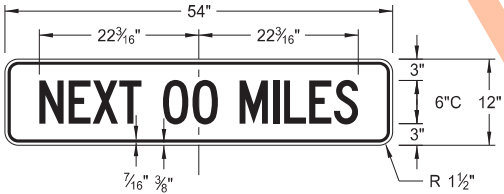


W22-8-48

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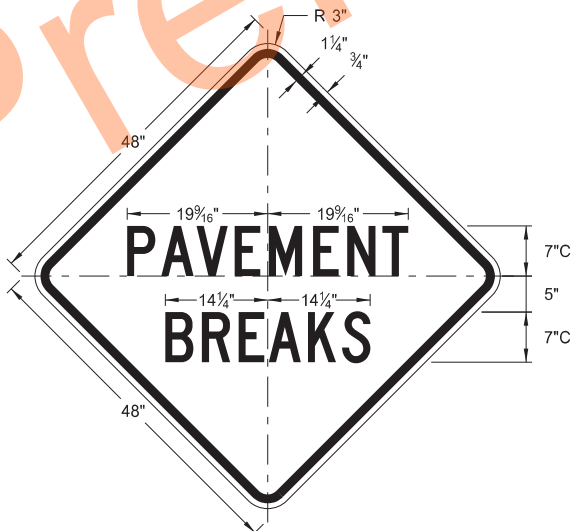


W16-7aP-18



W20-52P-54

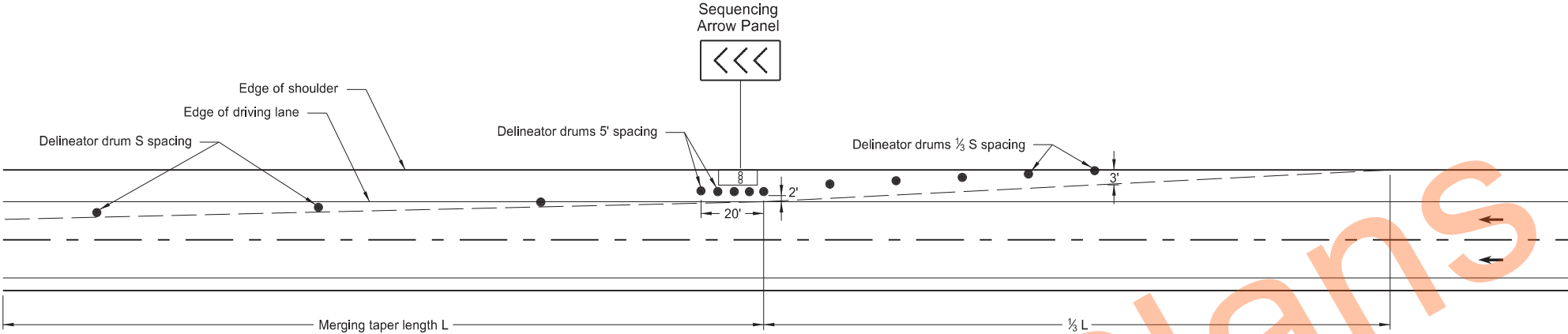
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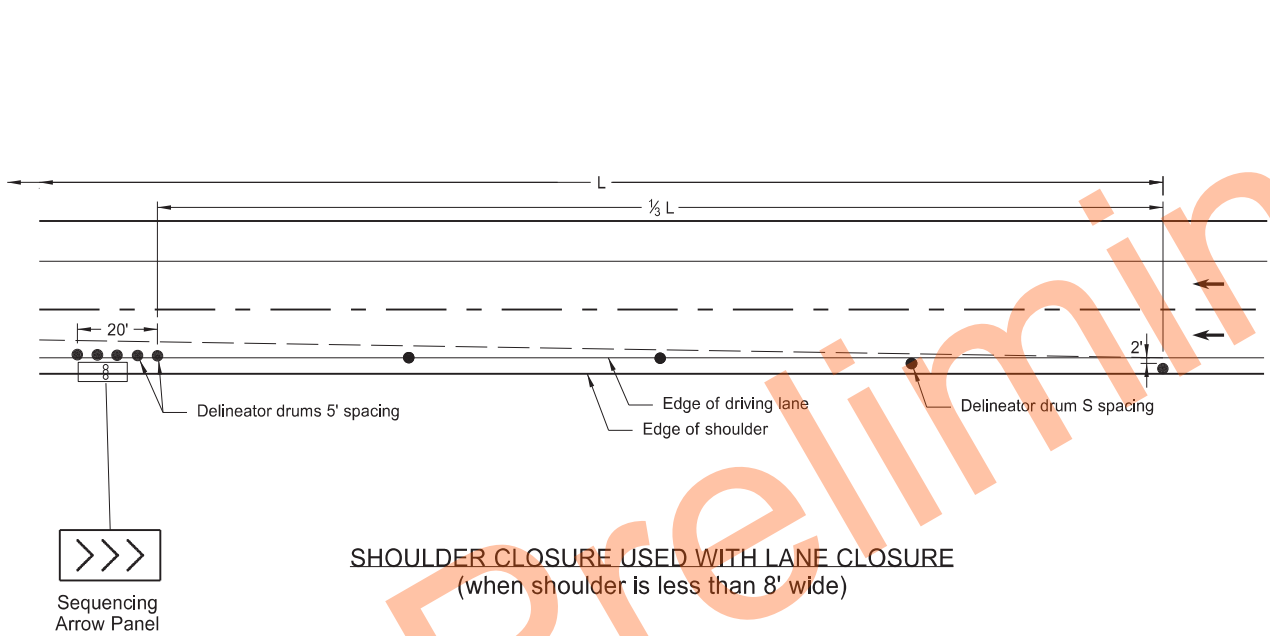
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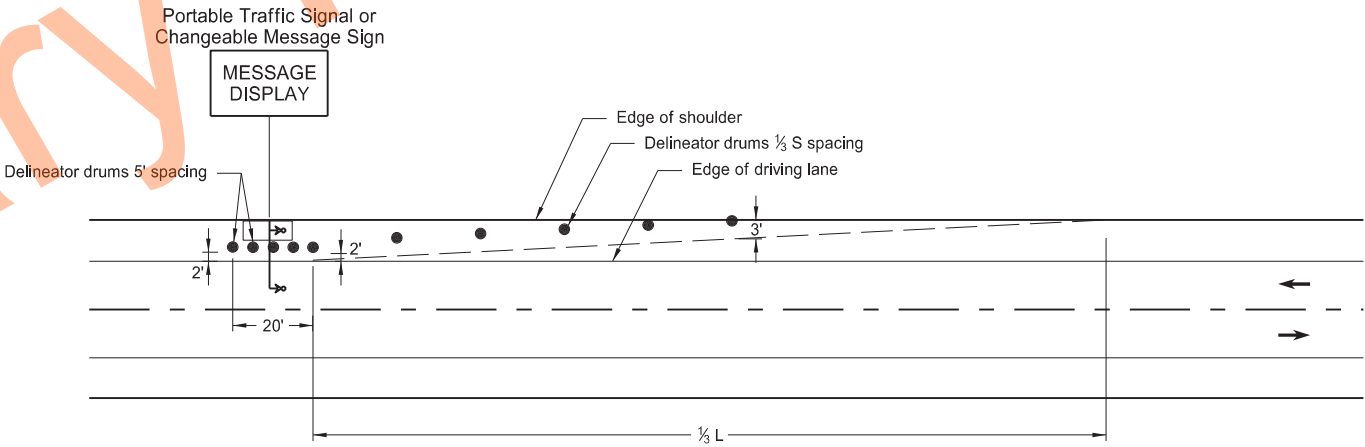
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation
5-31-18		
REVISIONS		
DATE	CHANGE	
11-01-19	Added details for sign W16-7aP-18.	



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

- Delineator Drum
- Message Display
- ∞ Sequencing Arrow Panel
- ↳ Portable Traffic Signal

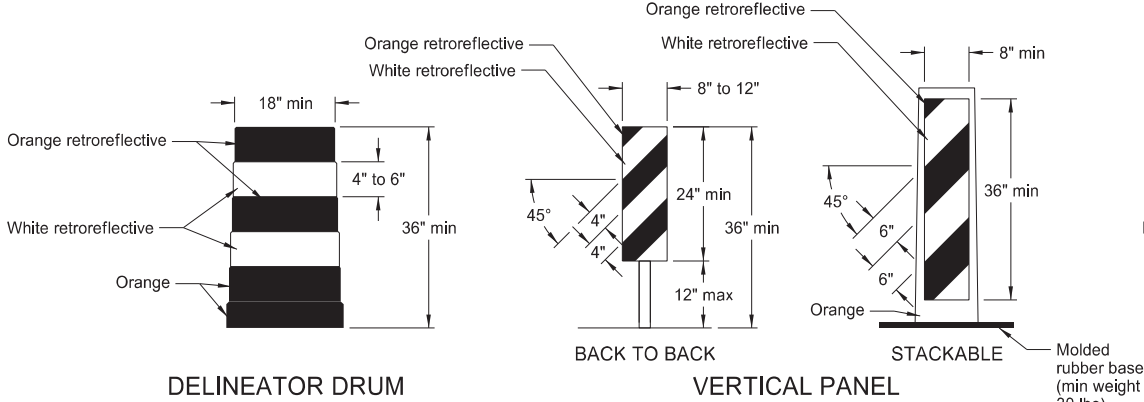
Notes:

- S = Posted Speed Limit in mph
 W = Width of offset in feet
 L = Taper length in feet
 $L = WS^2/60$ (40mph or less)
 $L = WS$ (45mph or more)
- If a shoulder taper is used, use a length of approximately $\frac{1}{3}L$. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
- When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-25-19	Added L dimension to detail

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BARRICADE AND CHANNELIZING DEVICE DETAILS

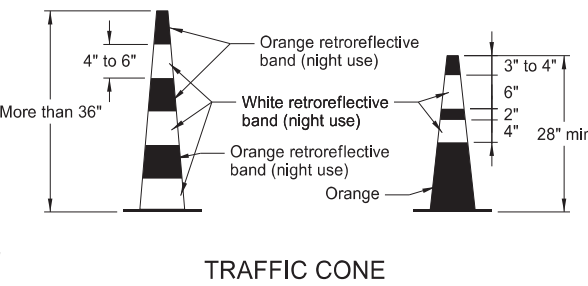


DELINEATOR DRUM

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.

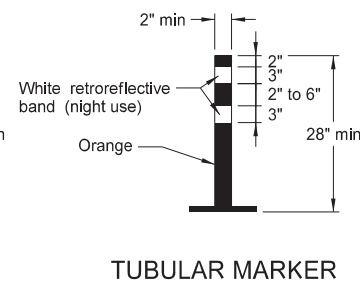
VERTICAL PANEL

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.



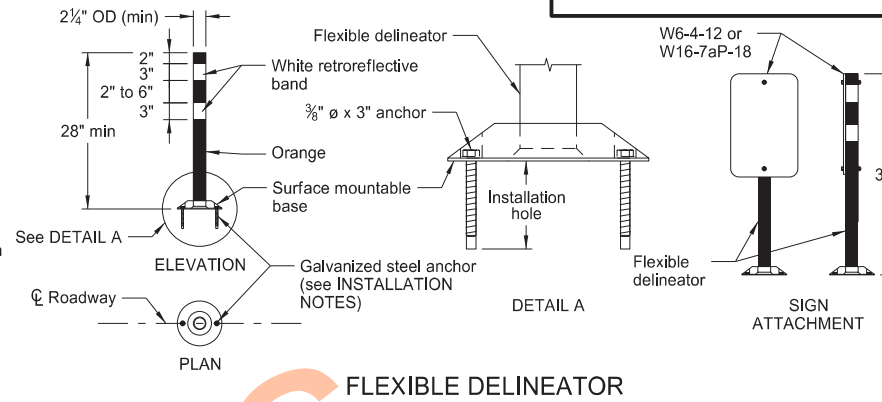
TRAFFIC CONE

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

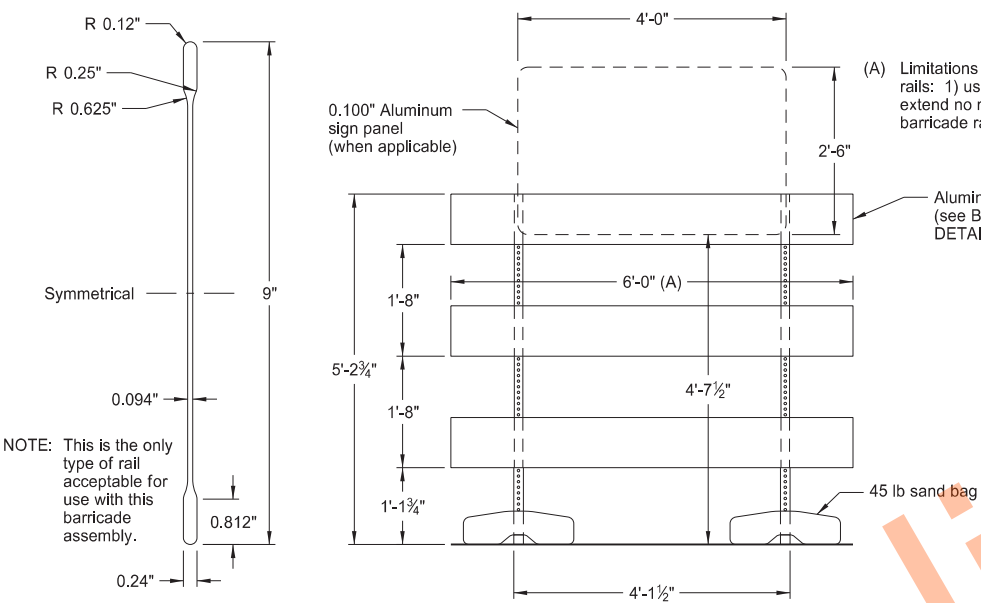
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



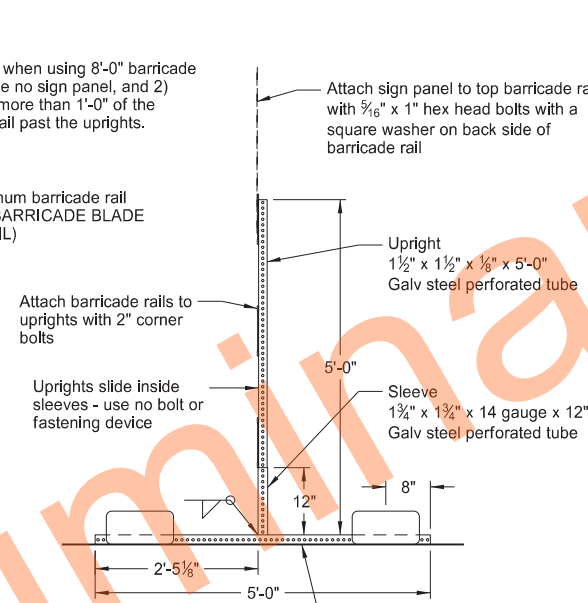
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

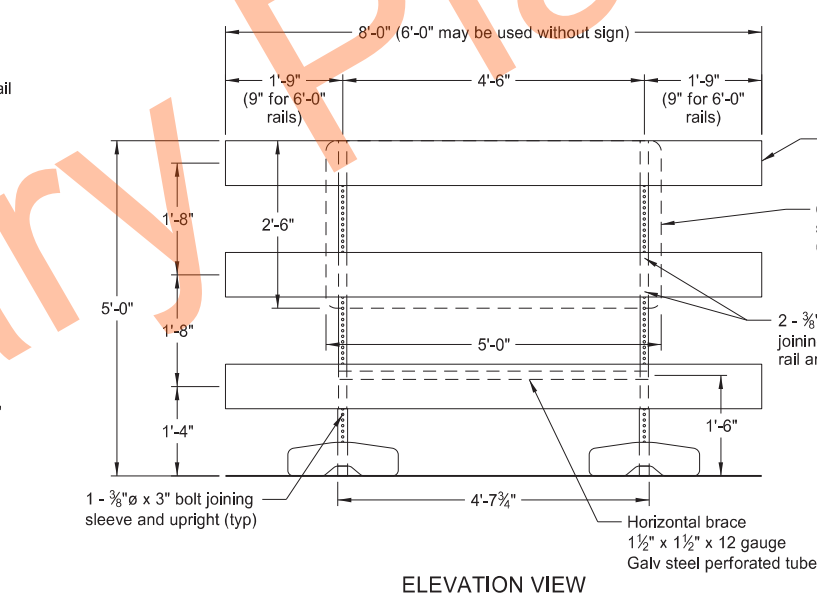
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close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



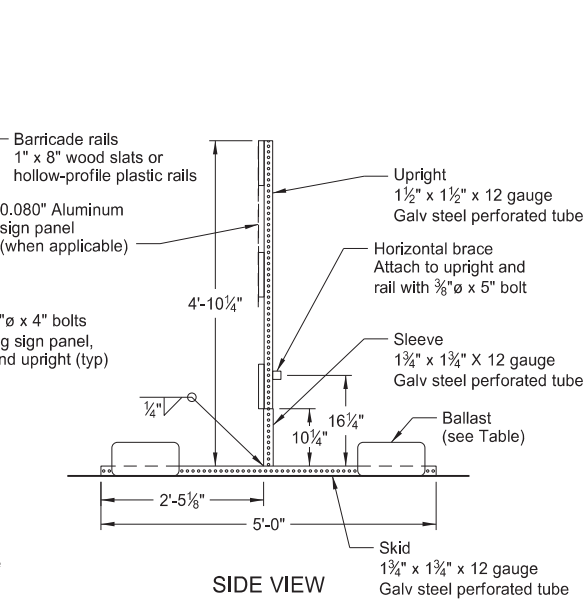
BARRICADE BLADE DETAIL



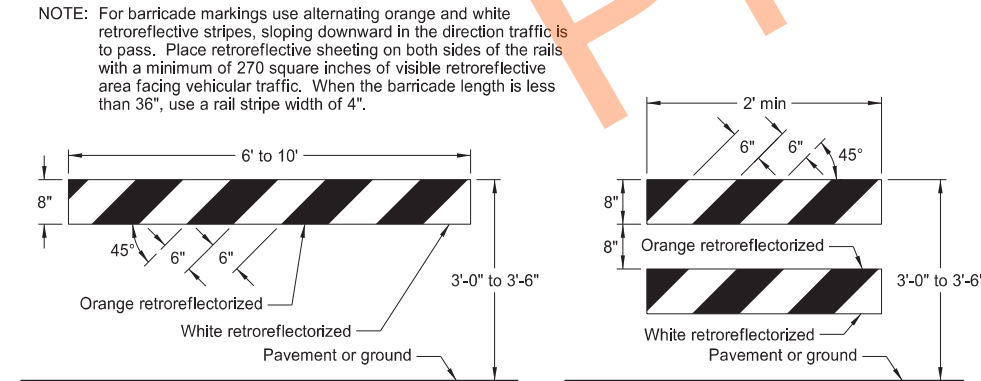
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

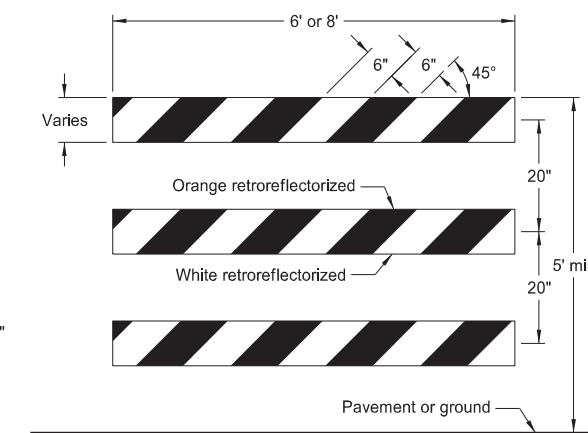


MINIMUM BALLAST (For each side of barricade support)

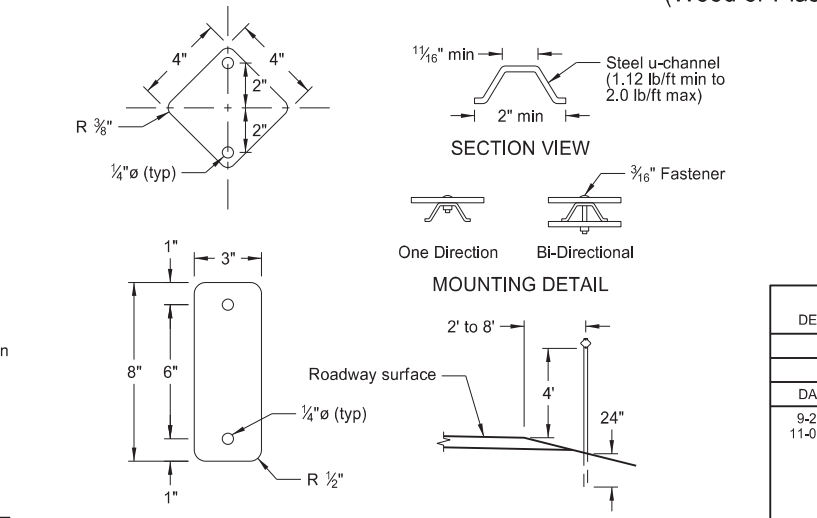


TYPE I BARRICADE

TYPE II BARRICADE



TYPE III BARRICADE



REFLECTOR DETAIL

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)	
Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

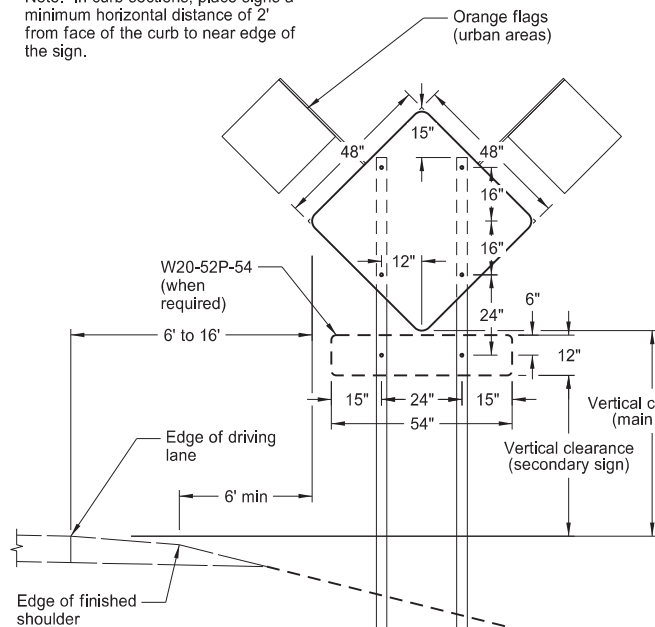
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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

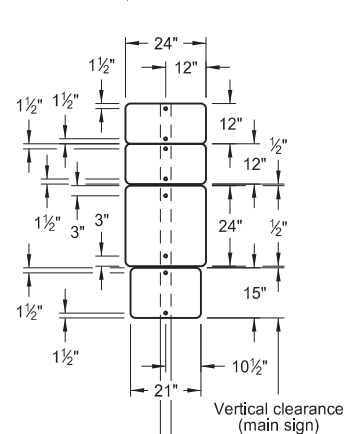
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE-4683,
on 11/1/19 and the original document is stored at the
North Dakota Department
of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

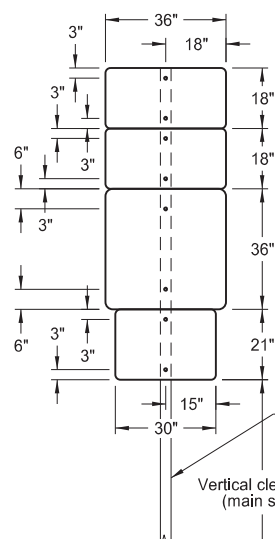
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



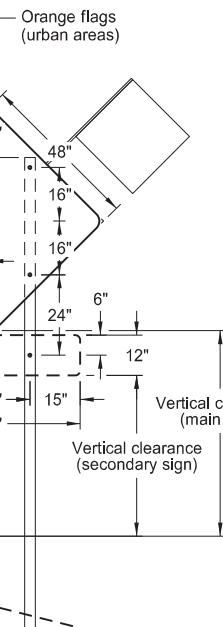
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



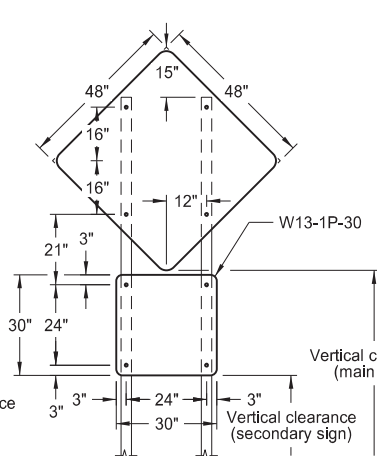
24" x 24"
ROUTE MARKER
ASSEMBLY



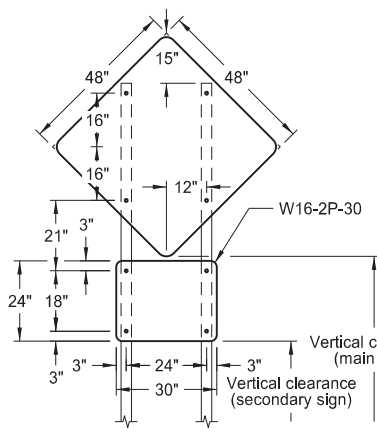
36" x 36"
ROUTE MARKER
ASSEMBLY



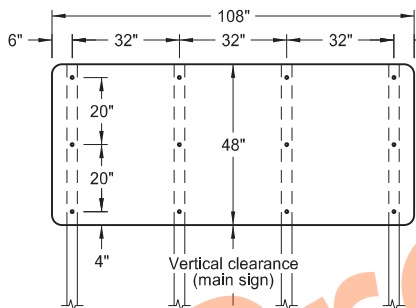
18" x 18"
DIAMOND SIGN



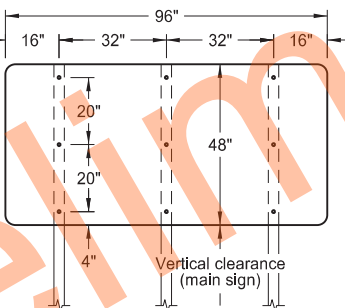
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



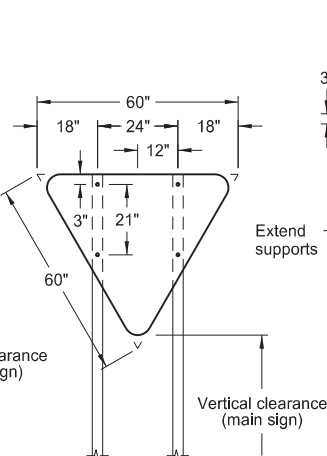
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



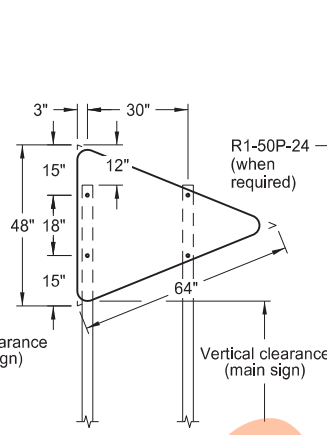
108" x 48" SIGN



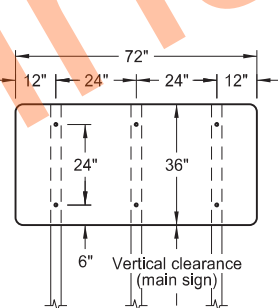
96" x 48" SIGN



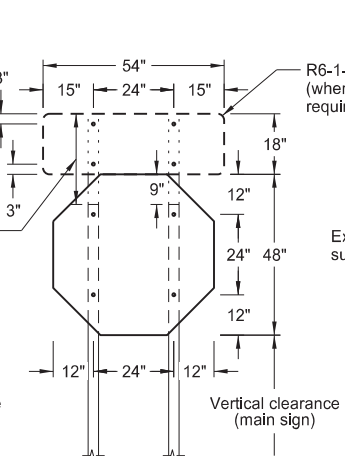
R1-2-60 - YIELD SIGN



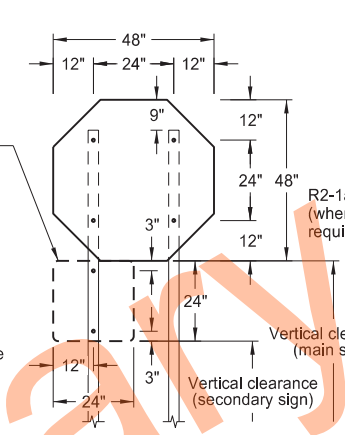
W14-3-64 - PENNANT SIGN



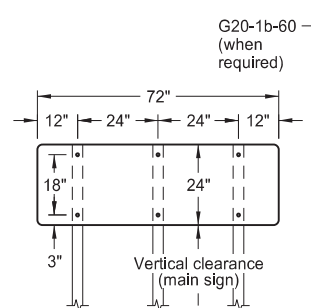
72" x 36" SIGN



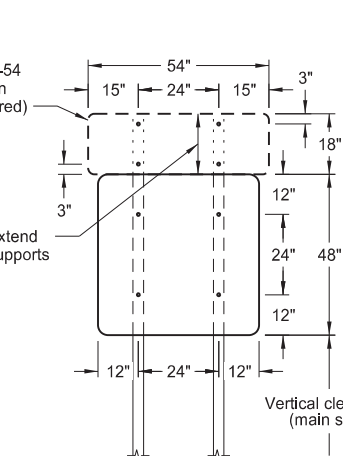
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



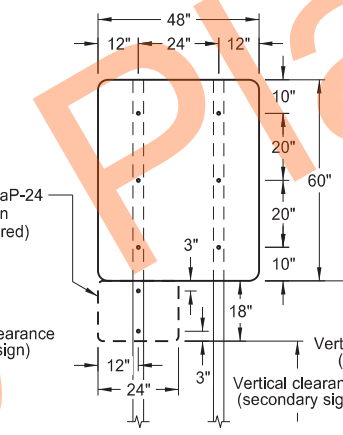
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



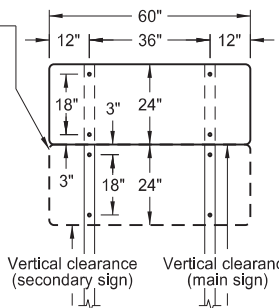
72" x 24" SIGN



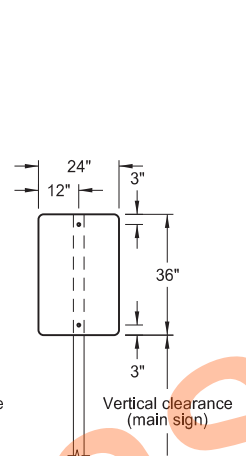
48" x 48" SIGN
(with R6-1-54 sign as required)



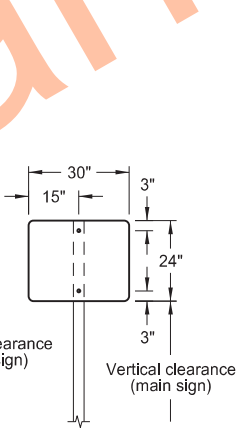
48" x 48" SIGN
(with R2-1aP-24 sign as required)



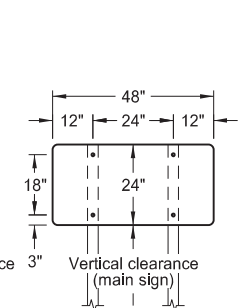
60" x 24" SIGN



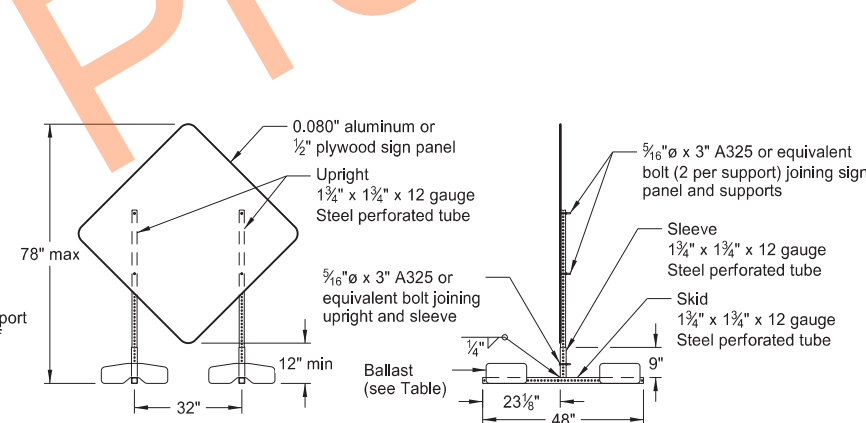
24" x 36" SIGN



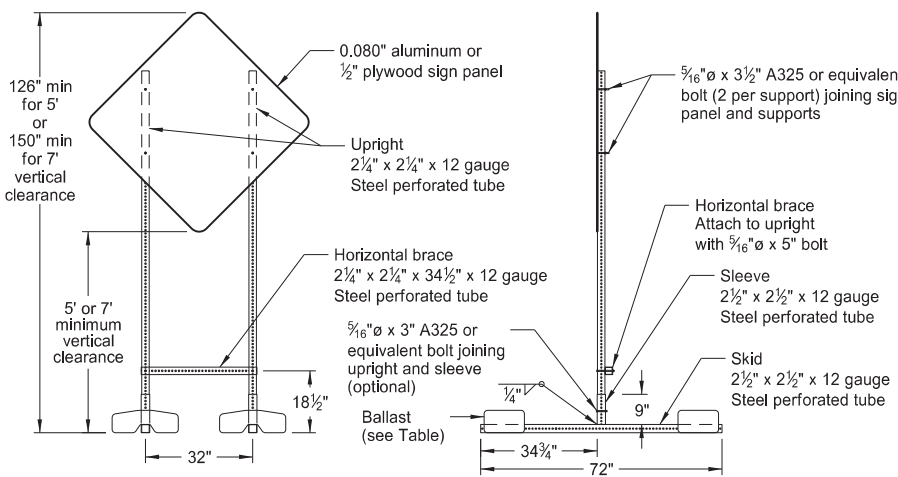
30" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. 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 2½" x 2½" 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.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. 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)
4. 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

5. 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.

6. 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 breakdown, 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

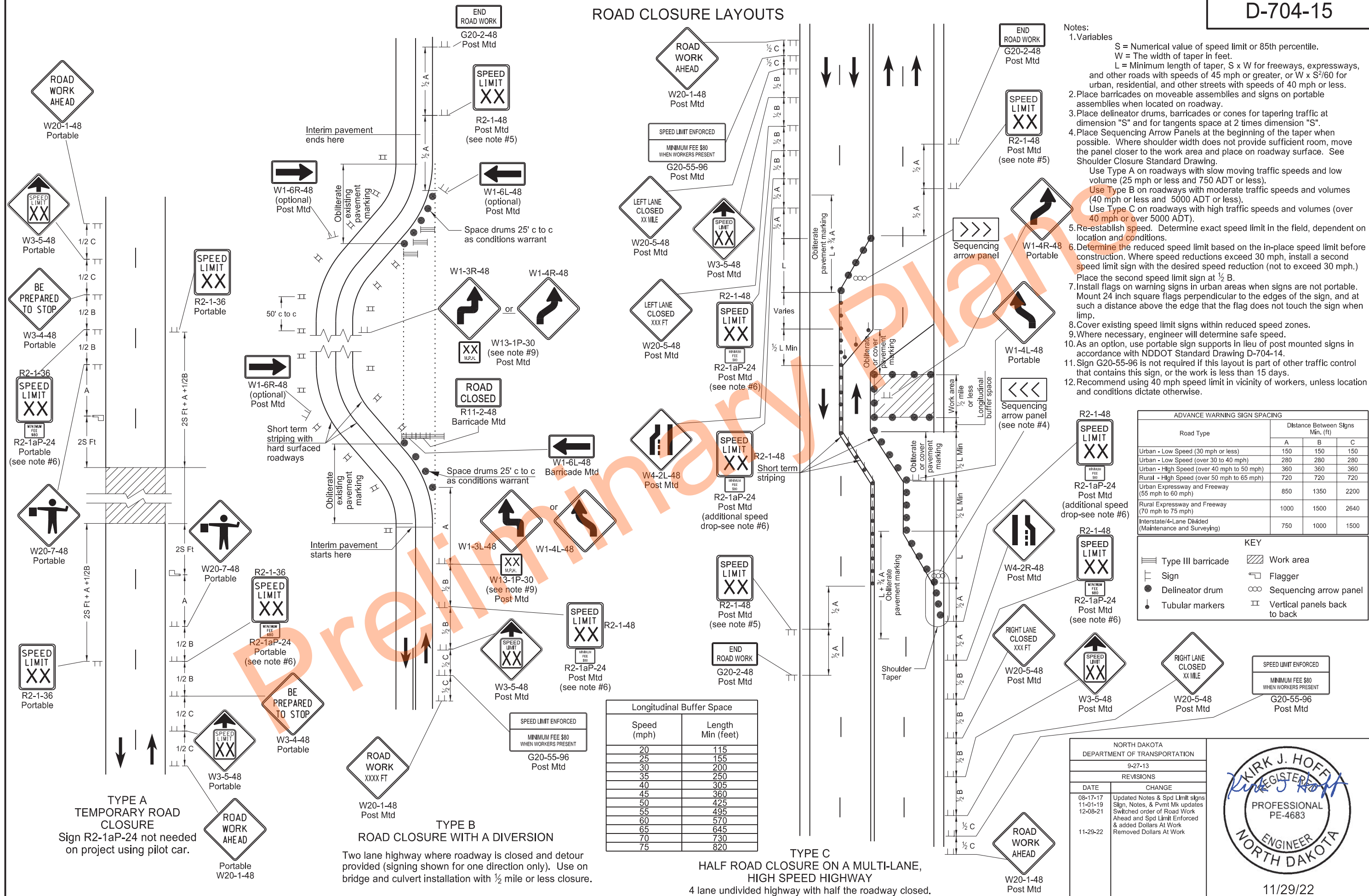
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

ROAD CLOSURE LAYOUTS



NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

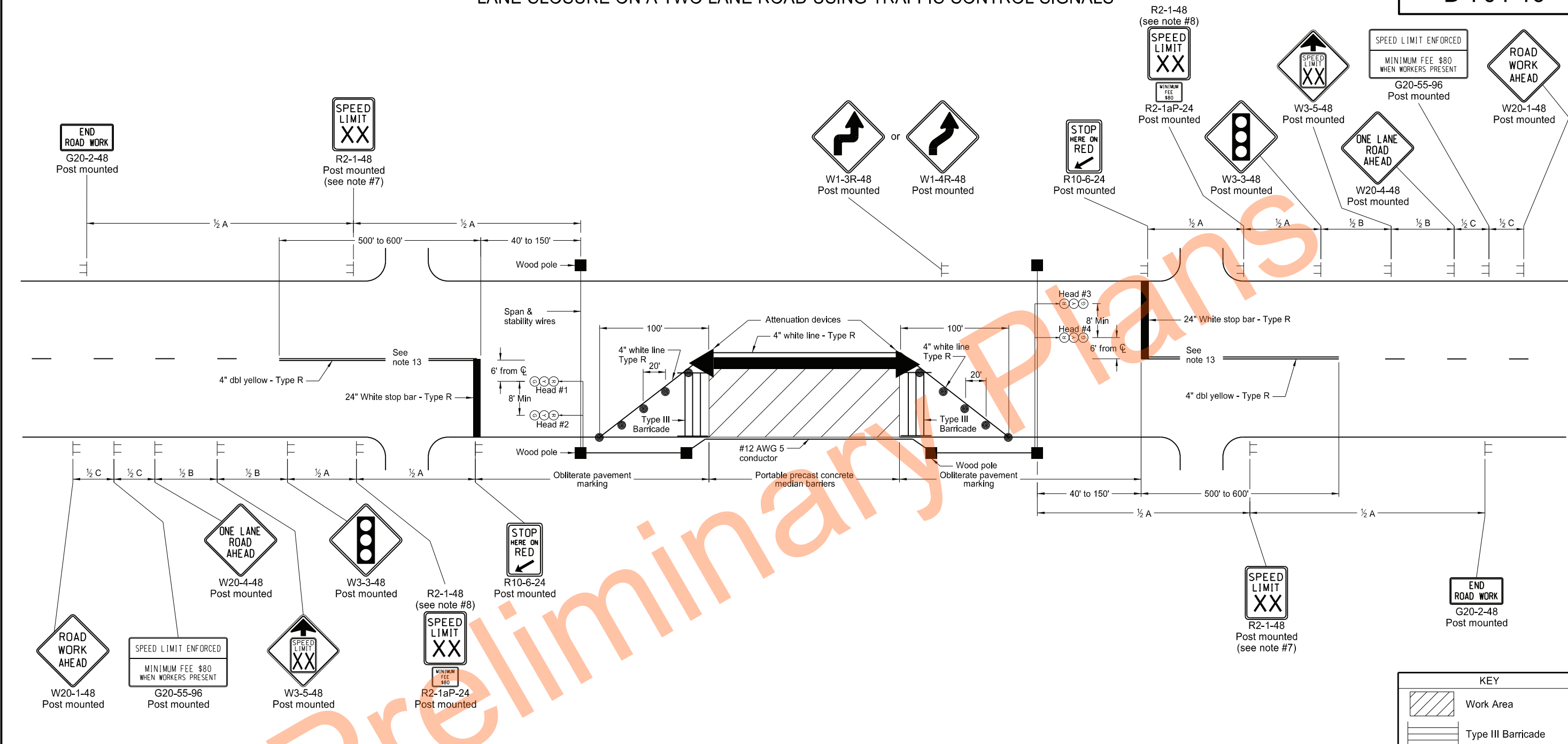
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work



11/29/22

LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



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 Time Cycle = 90 seconds Percent of Cycle	Green	Yellow	Red			
			Green	Yellow	Red	
	18.0	4.5	22.5	18.0	4.5	22.5
	20	5	25	20	5	25

Notes:

- 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.
- Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
- The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
- 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.
- Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
- See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
- 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.
- Cover existing speed limit signs within a reduced speed zone.
- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Continue double yellow centerline thru private drives.
- 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.
- As an option, use solar powered signals instead of wood pole signal system.

KEY	
	Work Area
	Type III Barricade
	Sign
	Delineator Drum
	Wood Pole

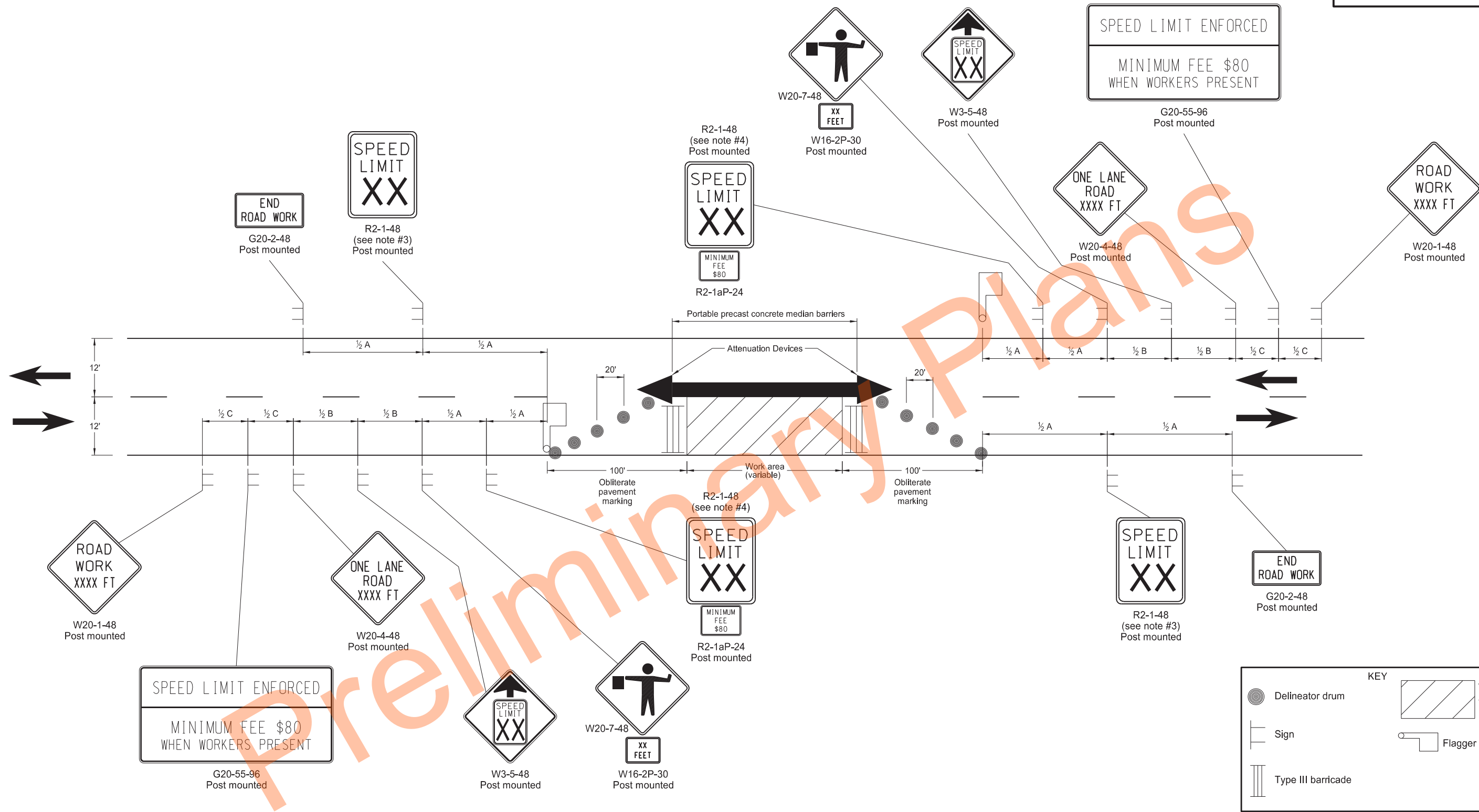
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered Minimum Fee plaque.
08-17-17	Revised notes & added note.
11-01-19	Revised sign #s & pvtmt mk type.
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work.
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:

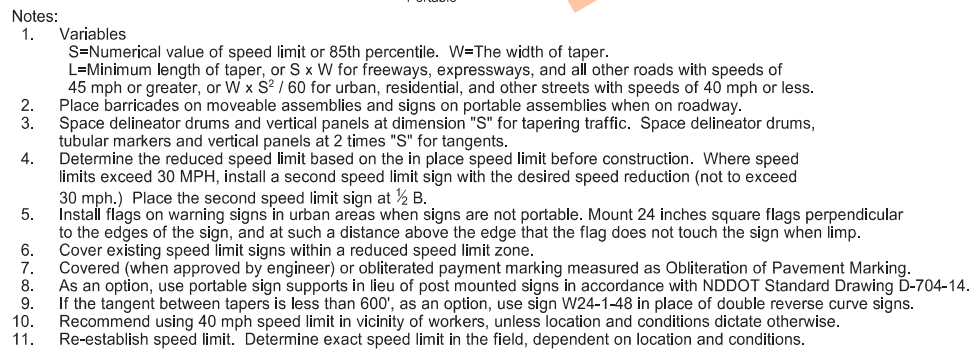
1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. 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.
5. 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.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Cover existing speed limit signs within a reduced speed zone.
8. 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.
9. 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



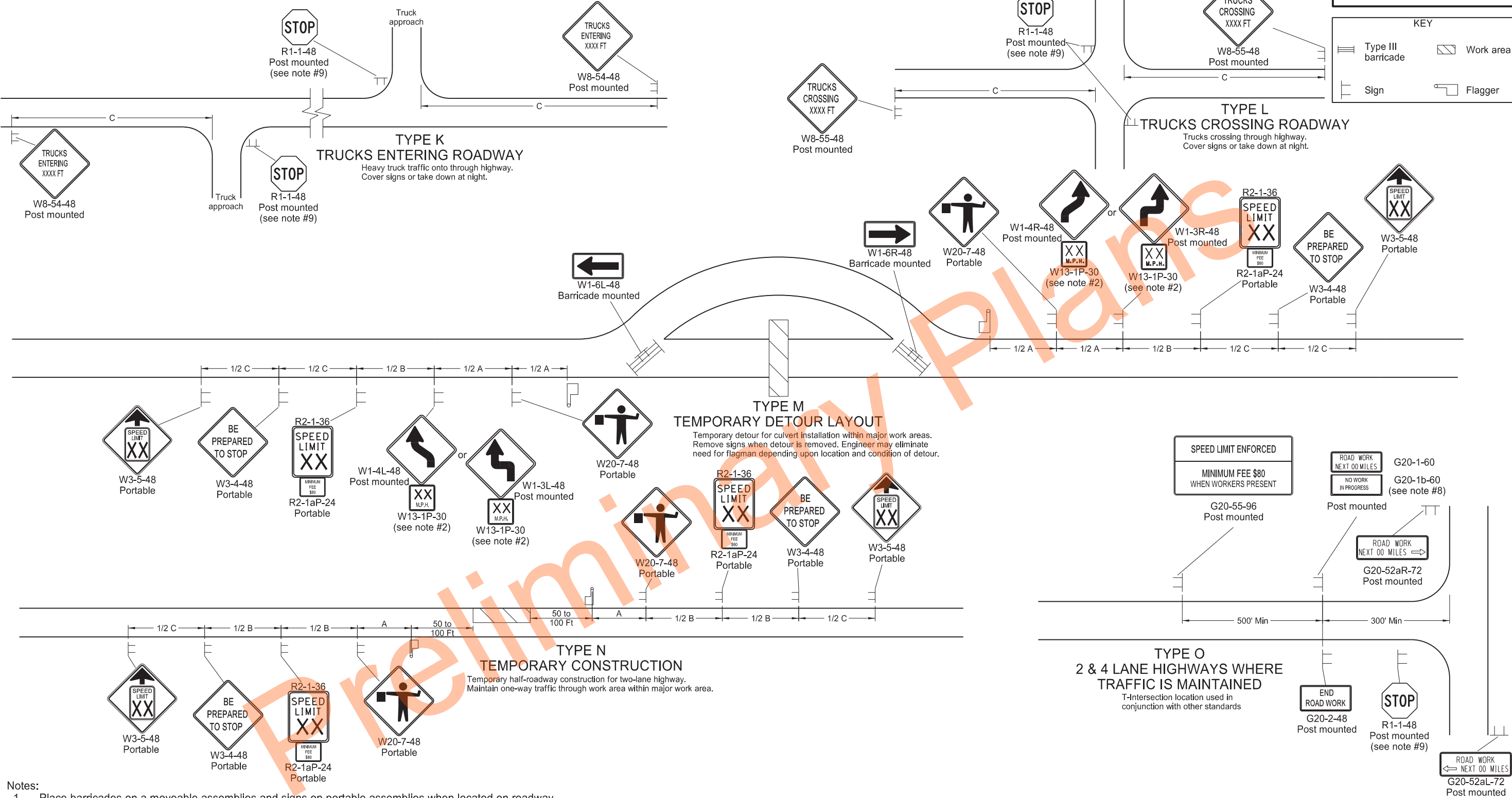
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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	Updated notes & added spd limit
11-01-19	Revised sign #s and note 8
12-08-21	Added Dollars At Work sign
11-29-22	Removed Dollars At Work

11/29/22

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



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.

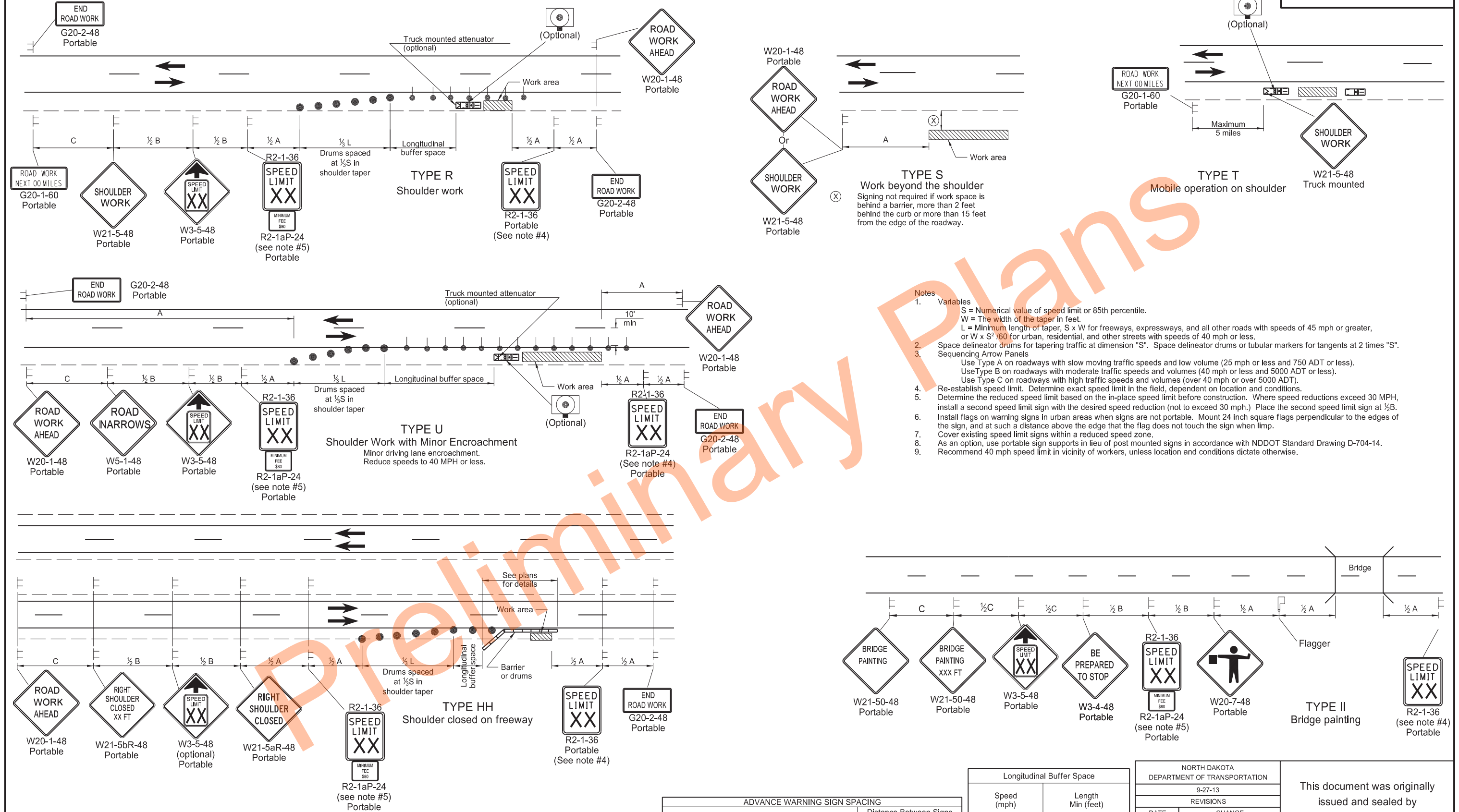
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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

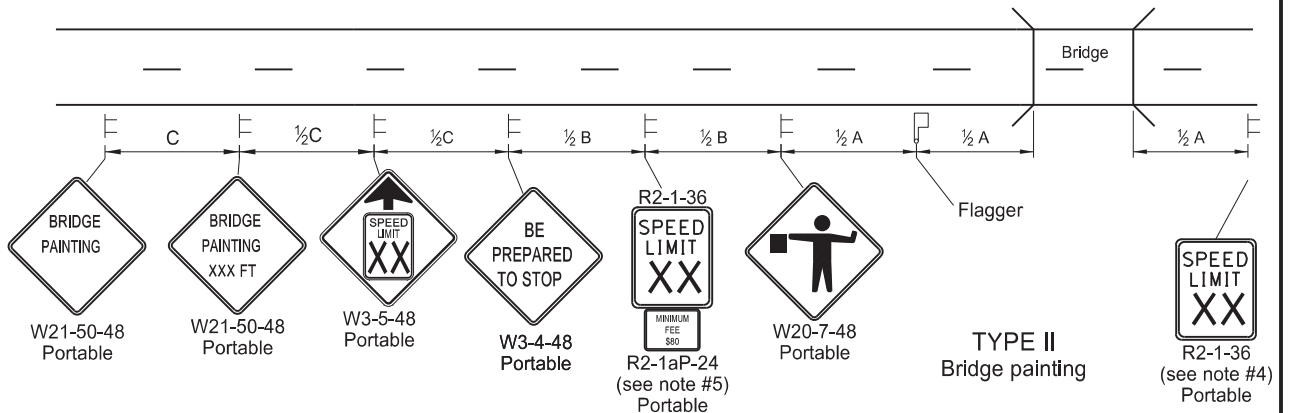


11/29/22

SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS



- Notes
- Variables
S = Numerical value of speed limit or 85th percentile.
W = The width of the taper in feet.
L = Minimum length of taper, $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2 / 60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
3. Sequencing Arrow Panels
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).
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. 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 $\frac{1}{2}B$.
6. 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.
7. Cover existing speed limit signs within a reduced speed zone.
8. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
9. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.



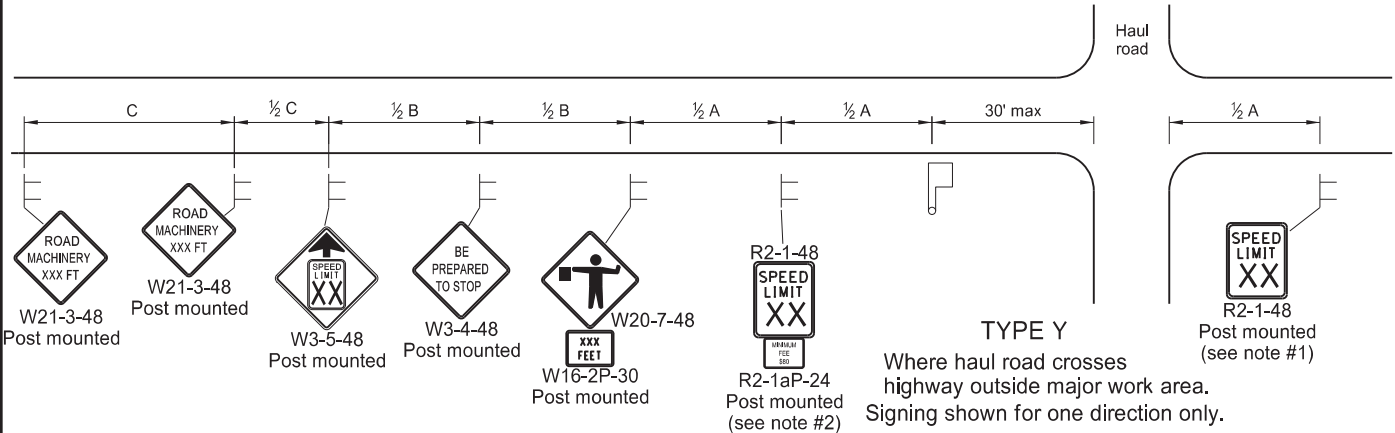
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17 11-01-19	Updated notes & revised signs Revised drum spacing & signs nos.

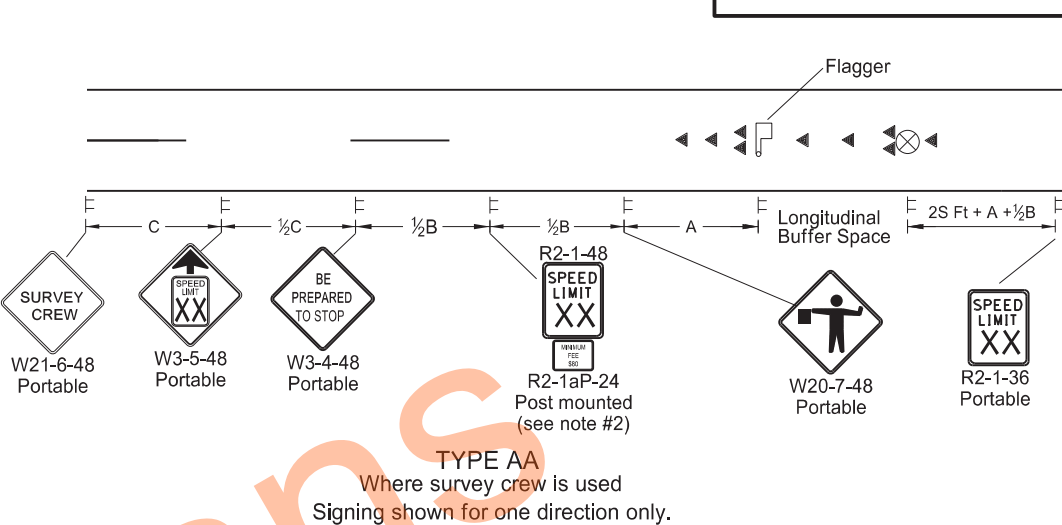
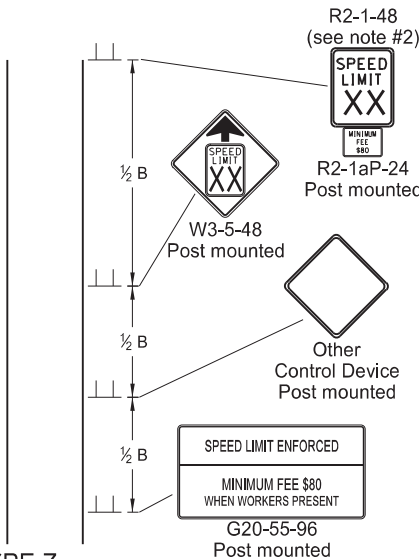
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the
North Dakota Department
of Transportation

MISCELLANEOUS SIGN LAYOUTS

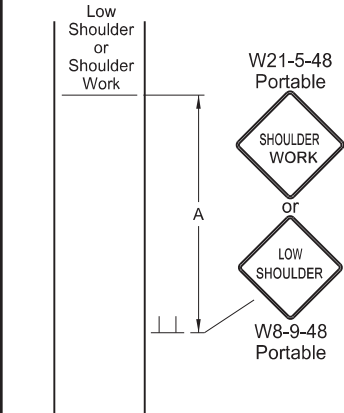


TYPE Y
Where haul road crosses highway outside major work area. Signing shown for one direction only.

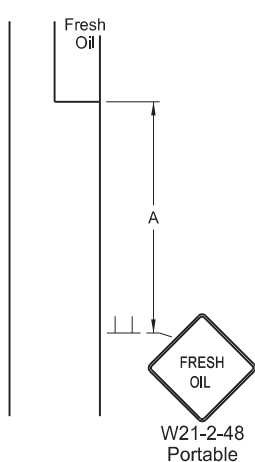
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



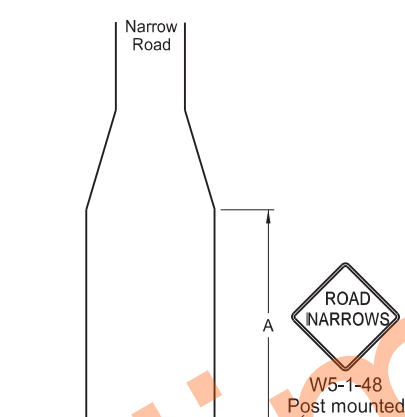
TYPE AA
Where survey crew is used
Signing shown for one direction only.



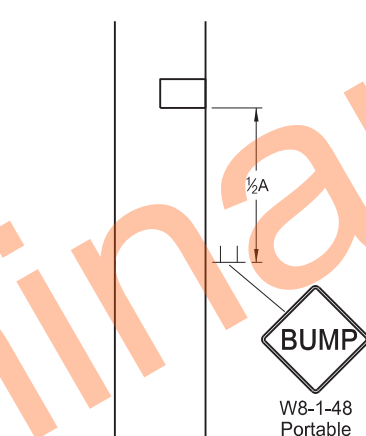
TYPE BB
Within major work area where sign conditions exist



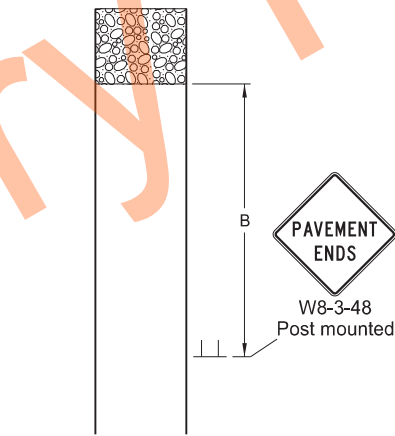
TYPE CC
Where sign conditions exist



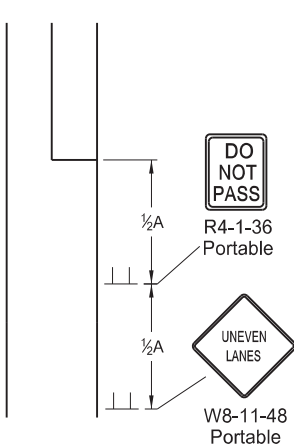
TYPE DD
Where sign conditions exist



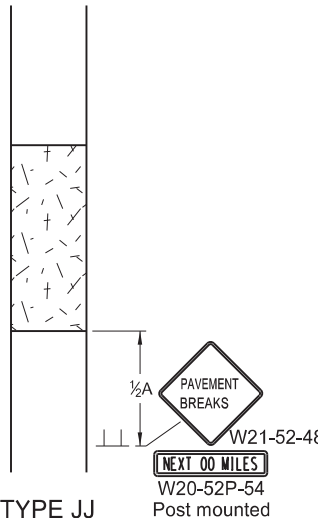
TYPE EE
Where sign conditions exist



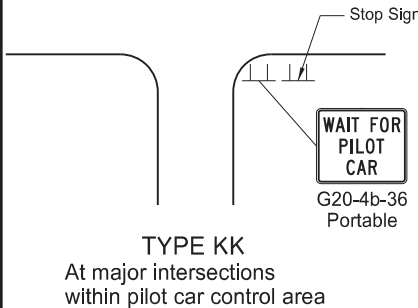
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



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.



TYPE KK
At major intersections within pilot car control area

- Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 2. 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.
 3. 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.
 4. Cover existing speed limit signs within reduced speed zones.
 5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
 7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
 8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 9. 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.

KEY

Flagger Sign

Cones Survey Equipment

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

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.

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

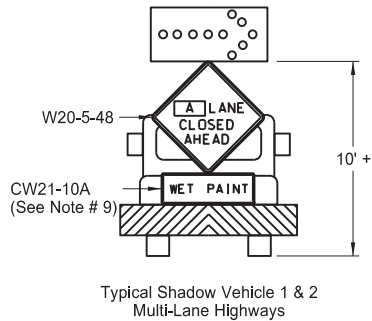
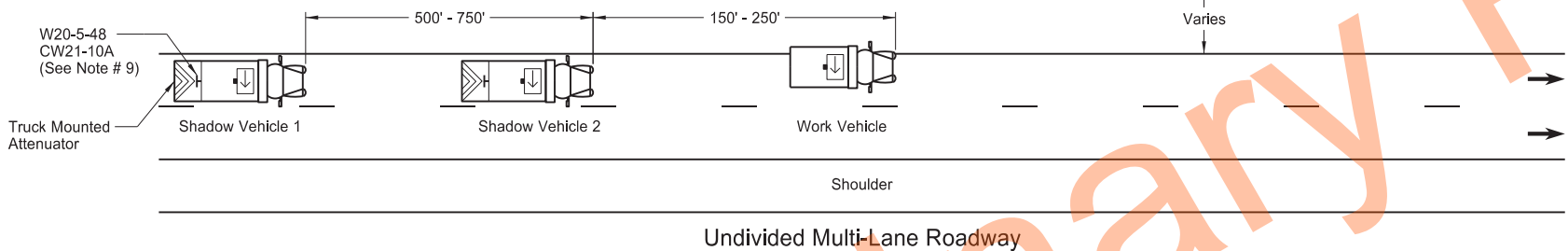
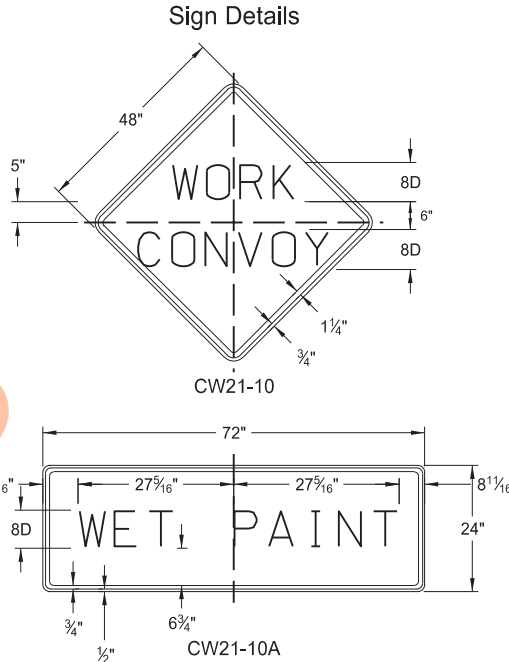
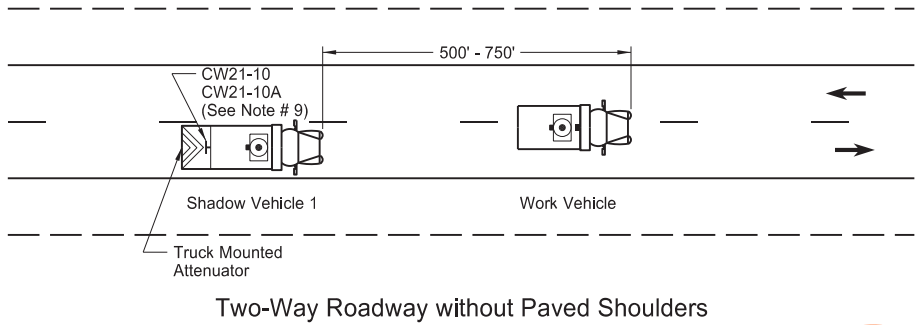
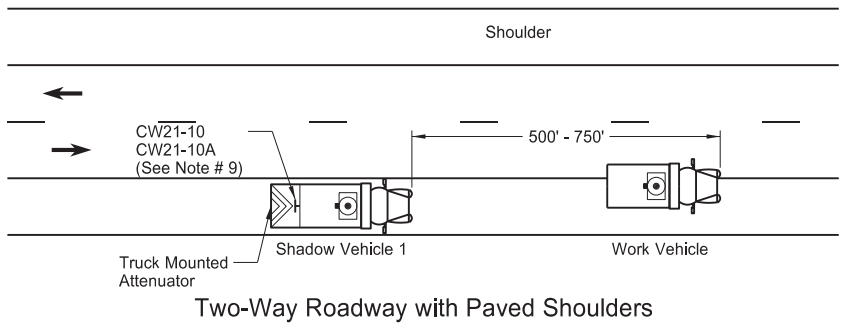
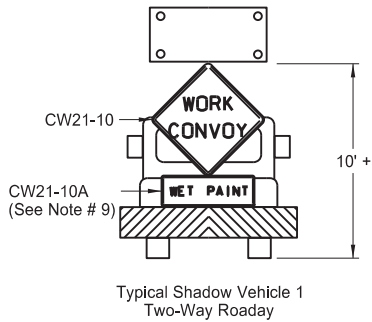
ENGINEER

NORTH DAKOTA

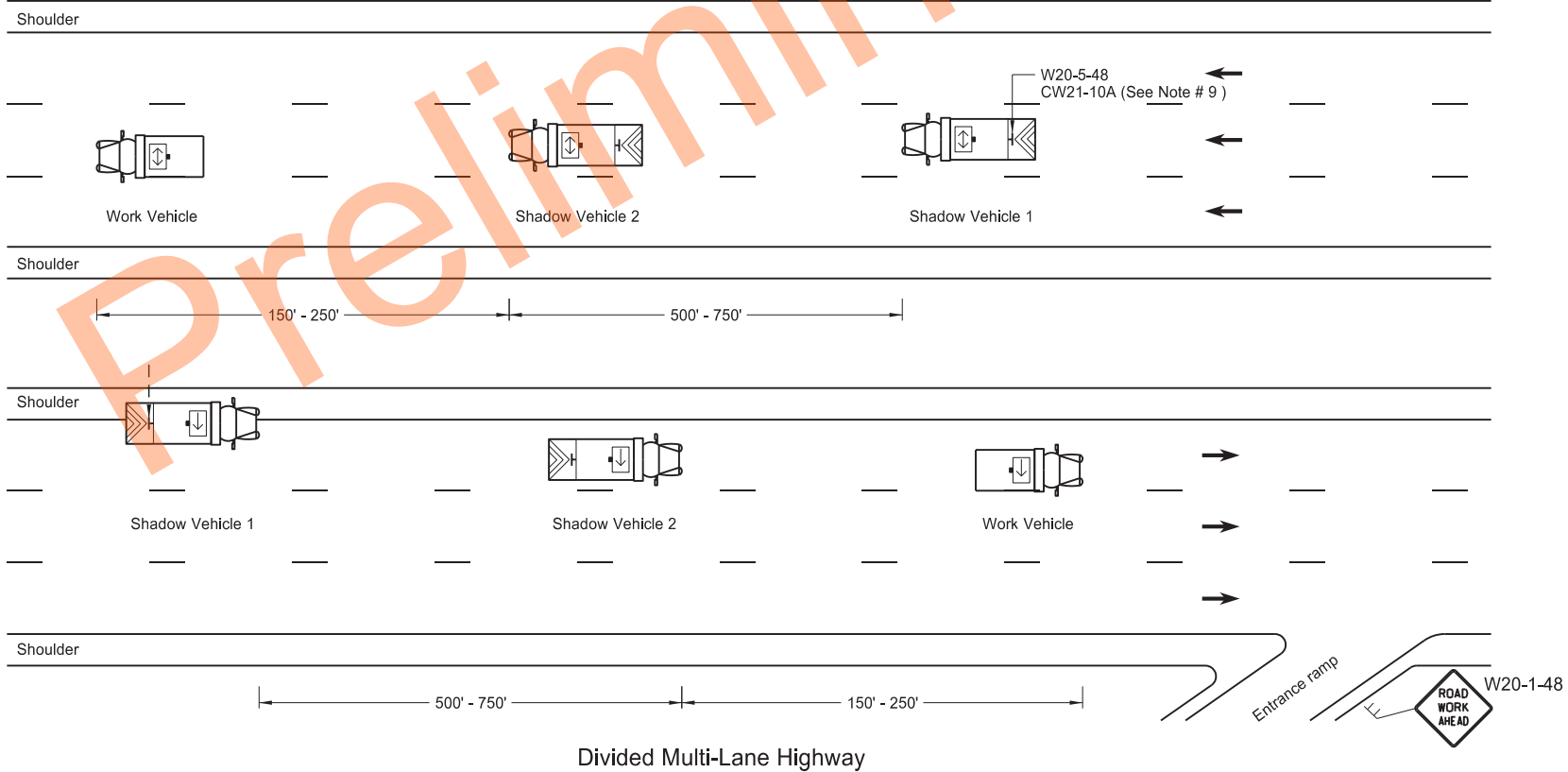
02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)

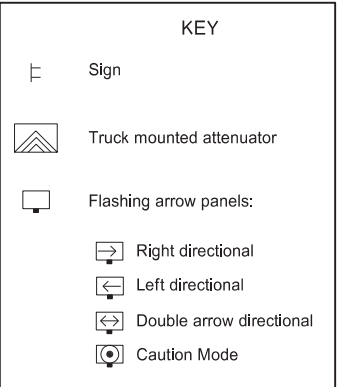
D-704-27



A = Left Right Center



- Notes
1. Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
 2. Display yellow rotating beacons or strobe lights on shadow and work vehicles, unless otherwise stated in the plans.
 3. Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
 4. Provide each vehicle with two-way electronic communication capability.
 5. Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
 6. Vary vehicle spacing between shadow vehicle 1 and shadow vehicle 2 based on sight distance restrictions. Motorists approaching the work convoy need to see trail vehicle in time to slow down and/or change lanes as they approach shadow vehicle.
 7. Sign Colors
Letters = Black
Border = Black
Background = Orange
 8. As an option, use shadow vehicle 2 the paint tender vehicle.
 9. Use sign CW21-10A only during painting operation.
 10. Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.

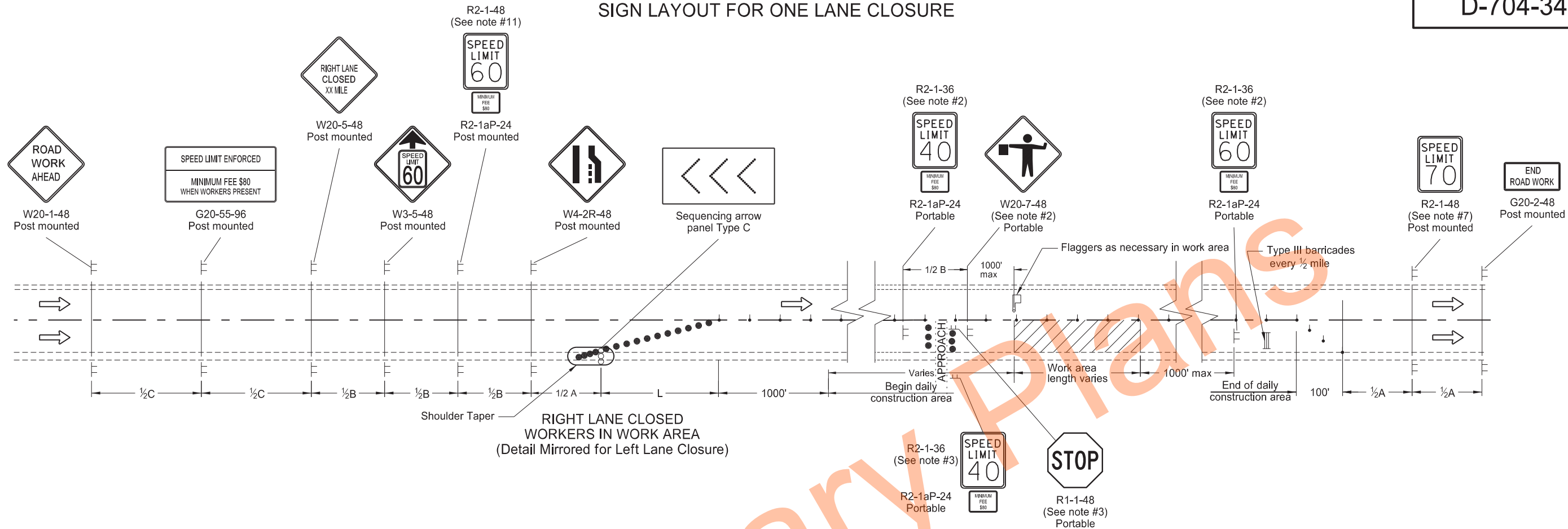


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/08/19 and the original document is stored at the
North Dakota Department
of Transportation

SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



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 $\frac{1}{2}A$ 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 $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $(W \times S \times S)/60$ 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 $\frac{1}{2}B$.
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

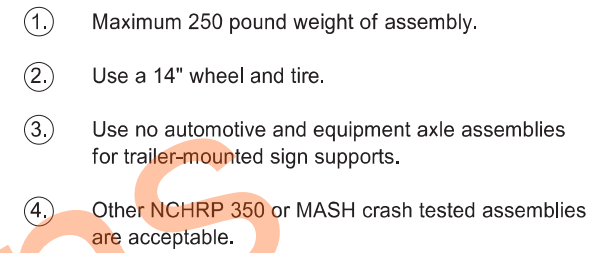
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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	
9-26-2012	
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

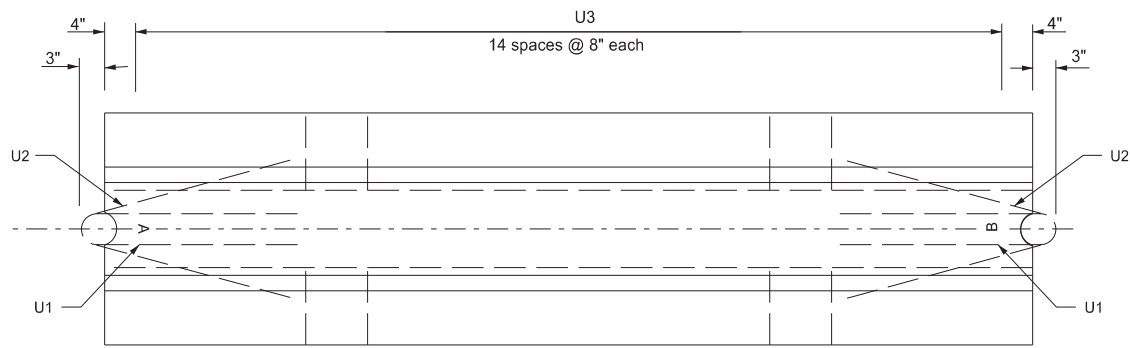
D-704-50



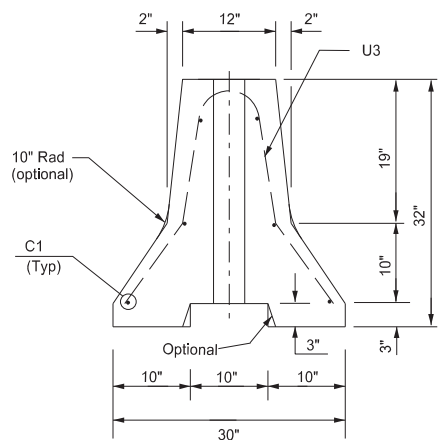
A circular professional engineer seal for Kirk J. Hoff, North Dakota, PE-4683. The seal features the text "KIRK J. HOFF" at the top, "REGISTERED" in the center, "PROFESSIONAL" below it, "PE-4683" below that, "ENGINEER" below that, and "NORTH DAKOTA" at the bottom. A blue ink signature "Kirk J Hoff" is written across the seal. Below the seal, the date "12.02.2020" is printed.

PORTABLE PRECAST CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

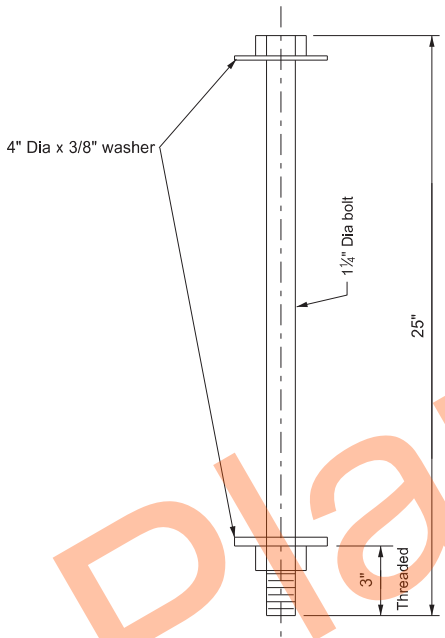
D-704-51



Plan View

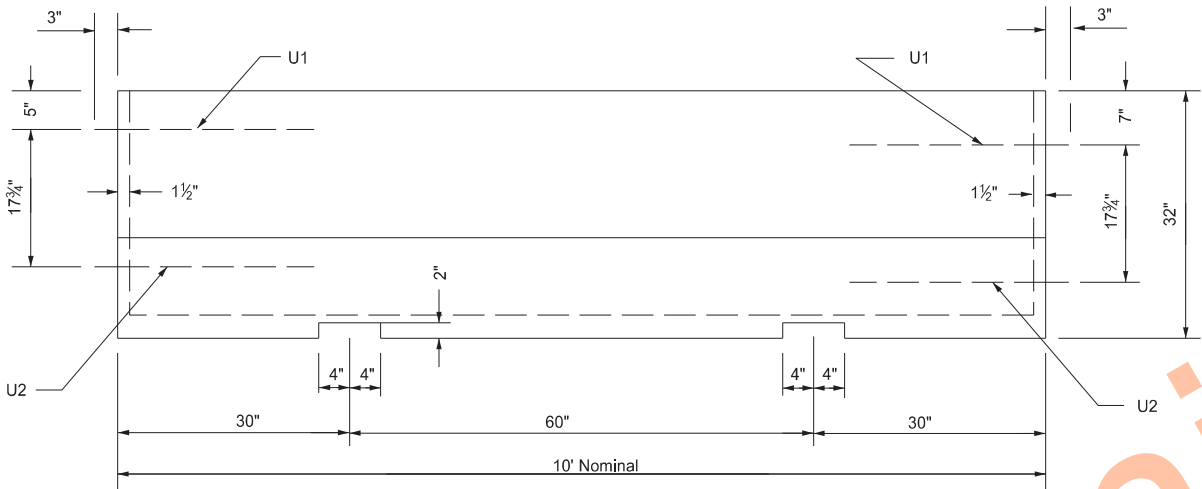


End View

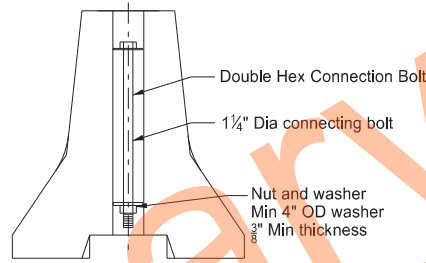


Connecting Bolt Detail
(One per 10 Ft section)

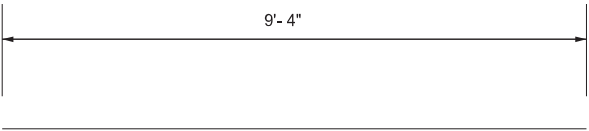
- Notes:
1. Galvanize all exposed hardware as per ASTM A153, except for the loop inserts.
 2. Use AAE-3 Concrete.
 3. Provide steel in accordance with Section 612 of NDDOT Standard Specifications.
 4. Imprint barrier ends A and B as shown with 4 inch letters. Field match A end with B end.
 5. Place barrier markers at the center of the barrier at 20' centers.
 6. 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.
 7. Place barrier to minimize openings between individual sections.



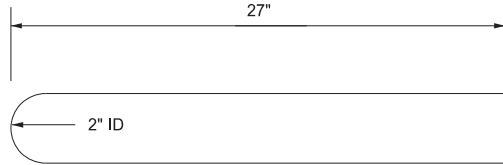
Side View



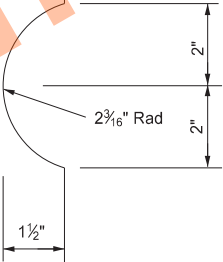
Bolt Connection Detail



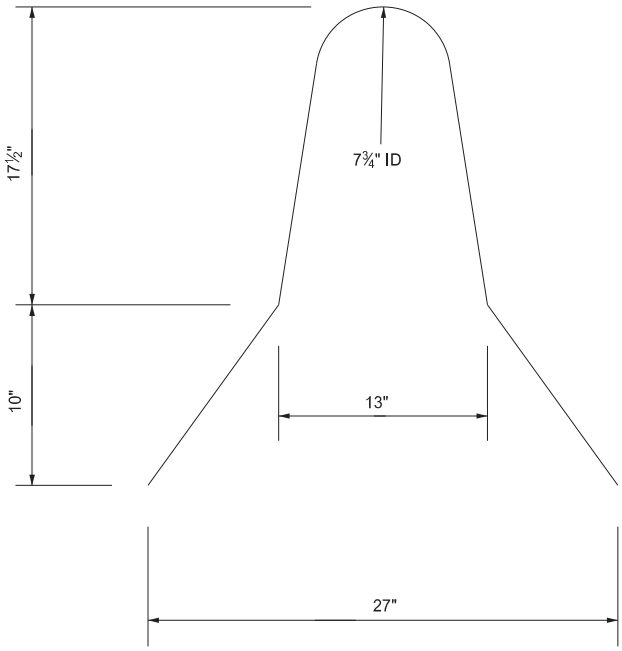
C1 Bar Detail



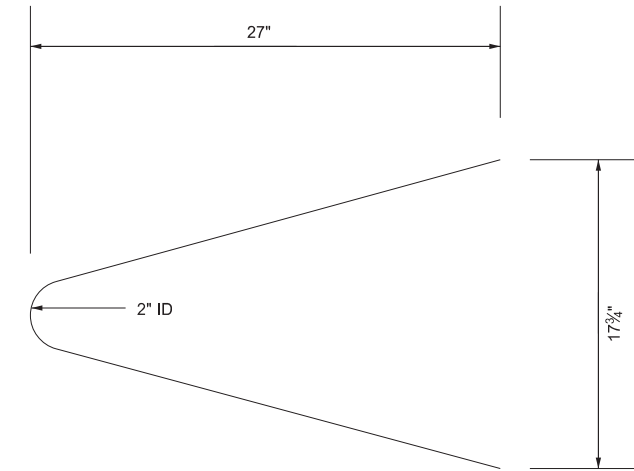
U1 Bar Detail



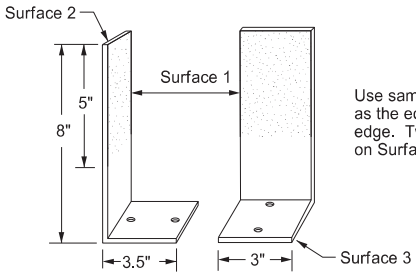
Dap Detail



U3 Bar Detail



U2 Bar Detail



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.

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

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

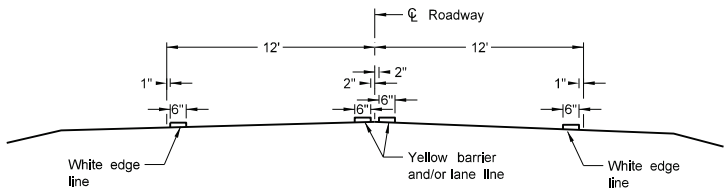
Property	Result	ASTM Test Method
Thickness (min)	.090"	—
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI 1/4" @ 73°F	8,000	D790
Flexural modulus, PSI 1/4"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

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

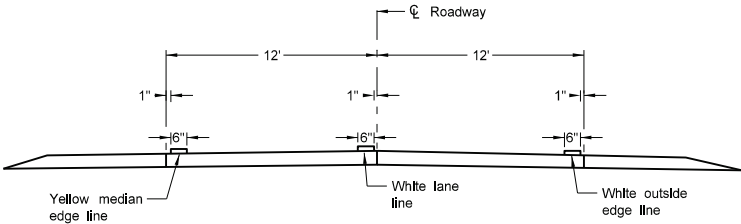
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the
North Dakota Department
of Transportation

PAVEMENT MARKING

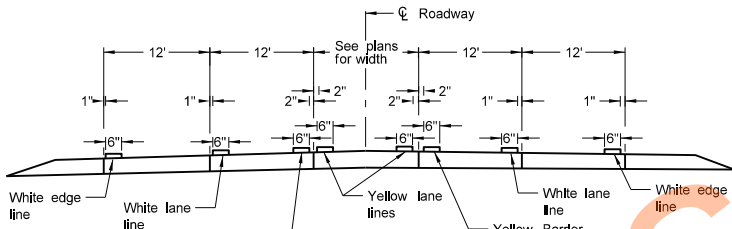
D-762-4



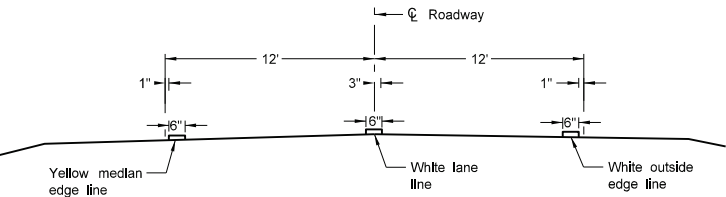
Two Lane Two Way
RURAL ROADWAY



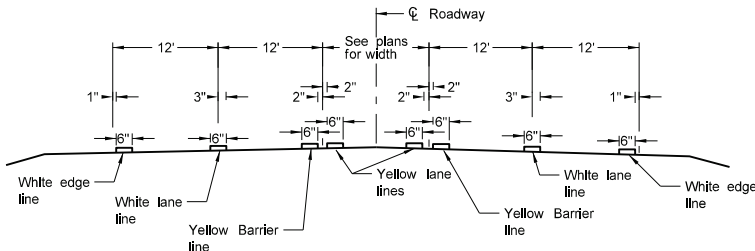
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



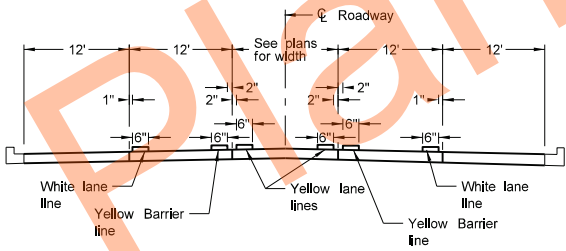
RURAL FIVE LANE ROADWAY
Concrete Section



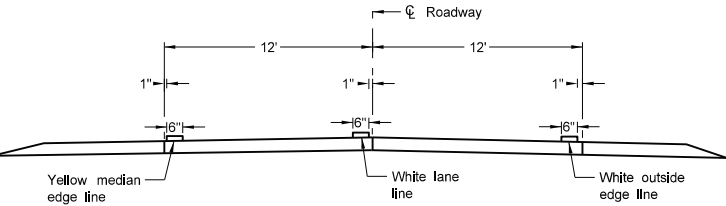
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



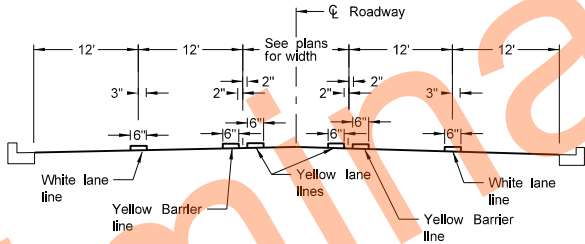
RURAL FIVE LANE ROADWAY
Asphalt Section



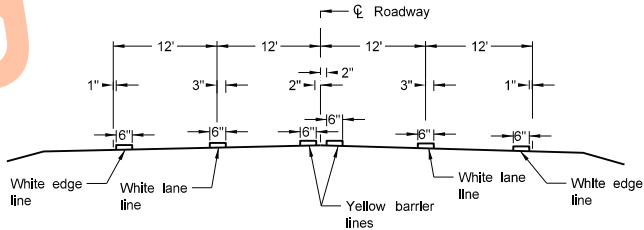
URBAN FIVE LANE SECTION
Concrete Section



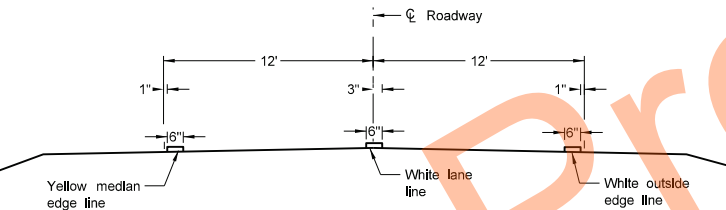
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



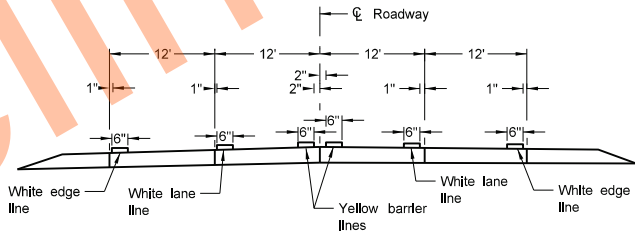
URBAN FIVE LANE SECTION
Asphalt Section



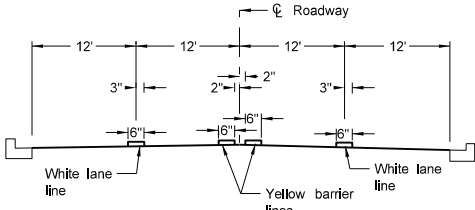
RURAL FOUR LANE ROADWAY
Asphalt Section



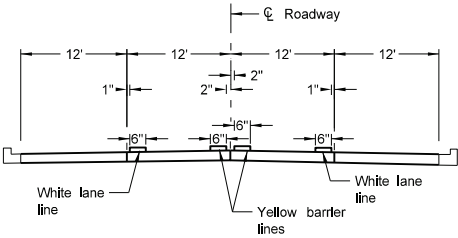
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



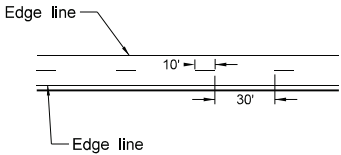
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

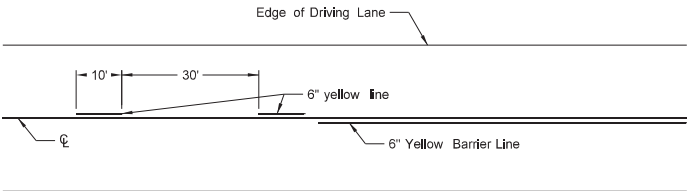
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

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.
11-22-23	Revised pavement marking widths.

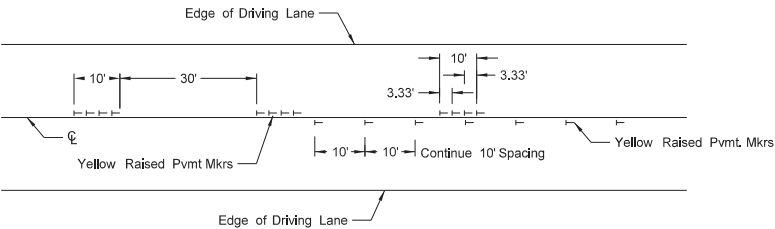


SHORT-TERM PAVEMENT MARKING

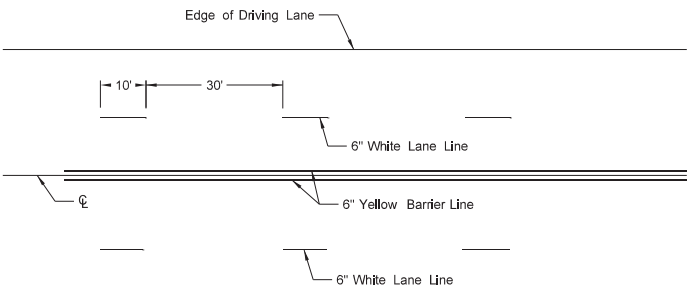
D-762-11



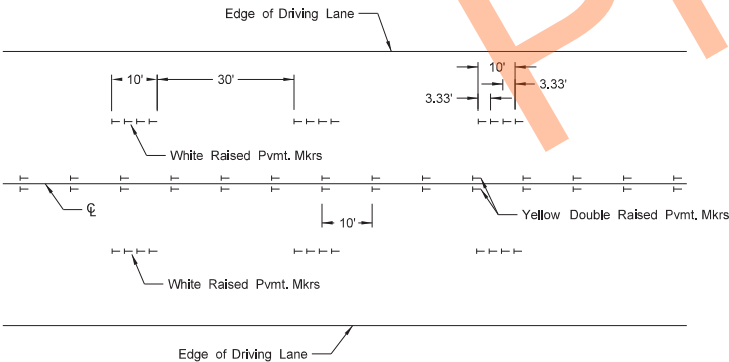
Painted or Tape Lines



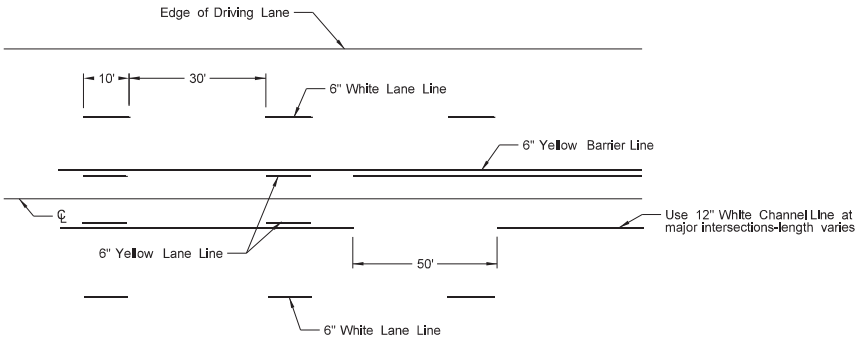
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



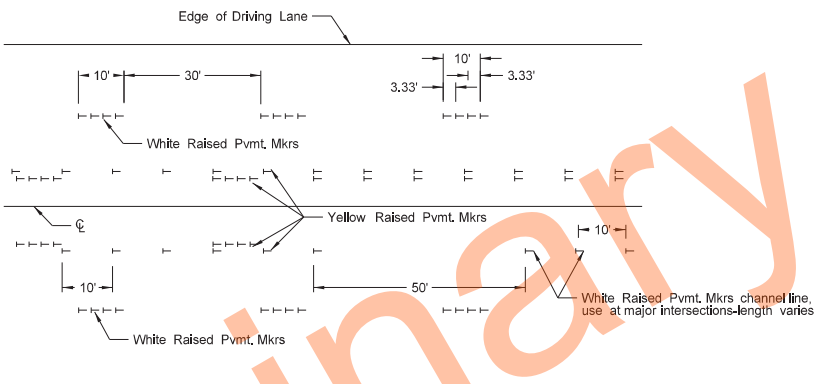
Painted or Tape Lines



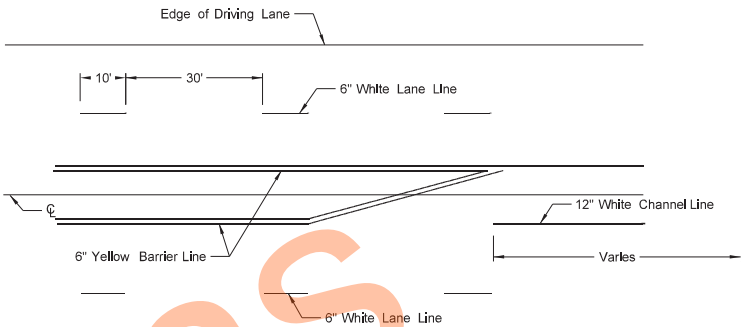
Raised Pavement Markers
FOUR LANE ROADWAY



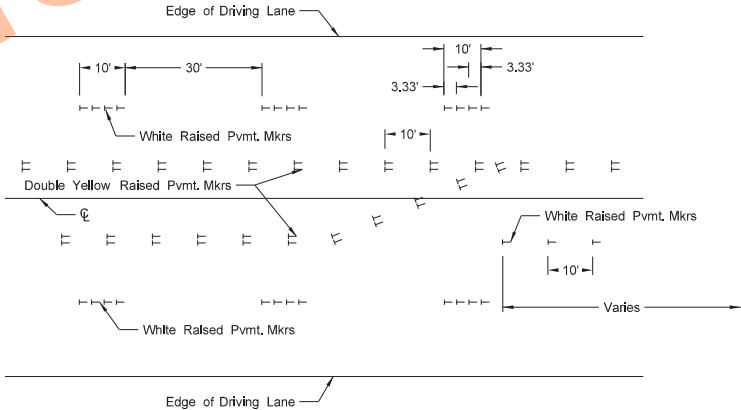
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps;
6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and
12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths
1-17-24	Revised wide pvmt marking width.



D-764-38



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

1. Wood posts are required with the Flared Energy Absorbing Terminal except posts 1 and 2.
2. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. 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.
4. 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).
5. 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.
6. Install the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent cable from twisting when tightening nuts.
7. "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.

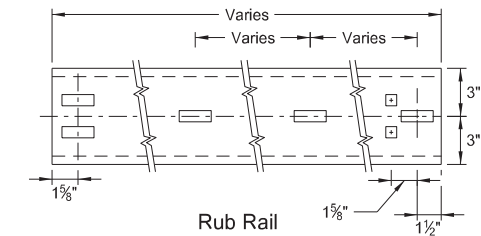
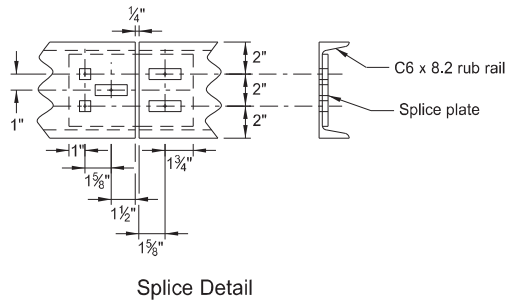
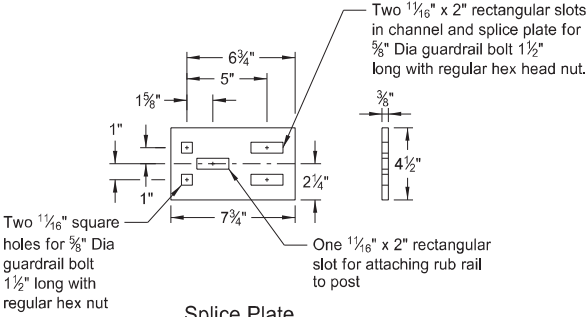
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

MGS W-BEAM GUARDRAIL GENERAL DETAILS

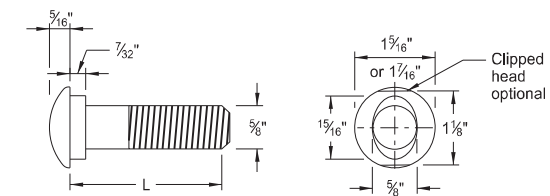
D-764-40

NOTES:

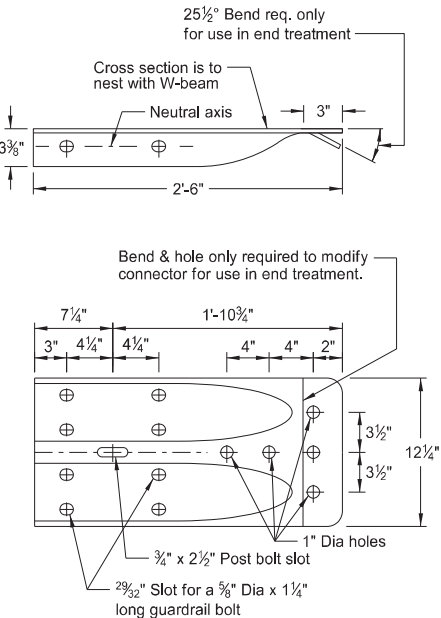
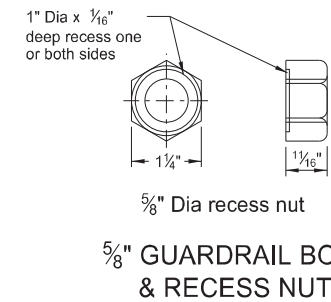
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material 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 = $\pm 1"$.



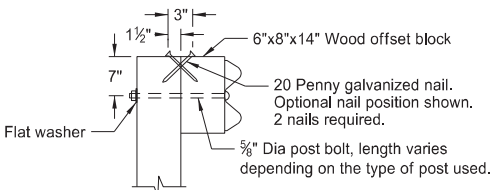
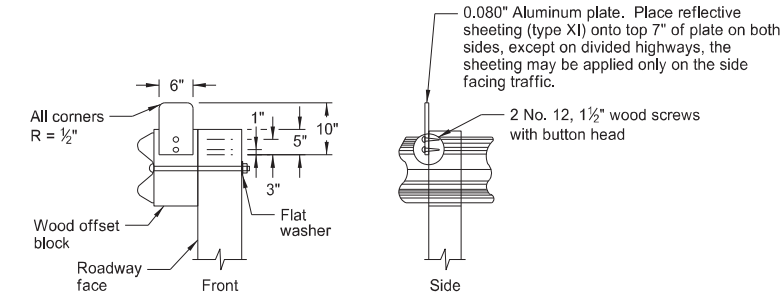
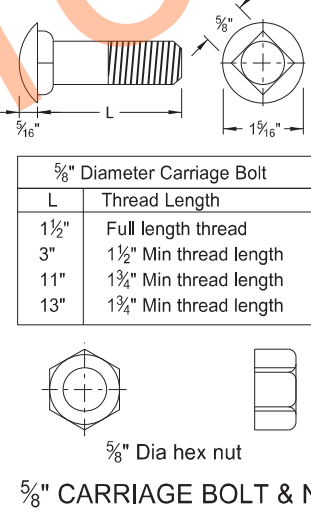
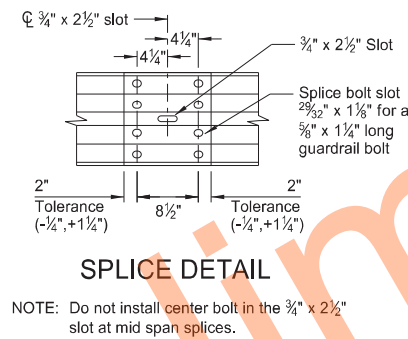
C6x8.2 RUB RAIL AND SPLICE PLATE



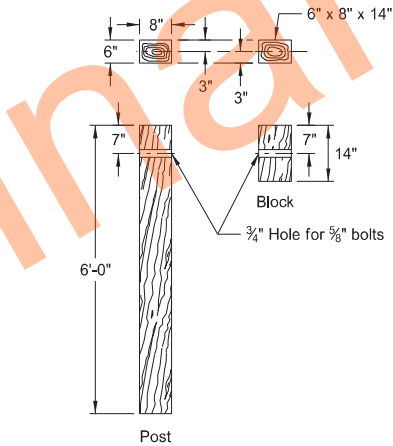
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 $\frac{1}{4}"$	Full length thread
2"	1 $\frac{3}{4}"$ Min thread length
9 $\frac{1}{2}"$	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



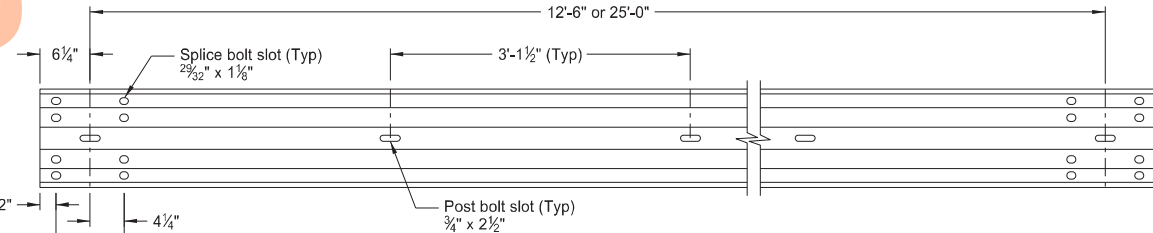
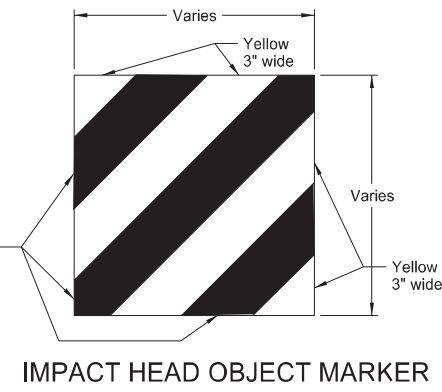
W BEAM TERMINAL CONNECTOR



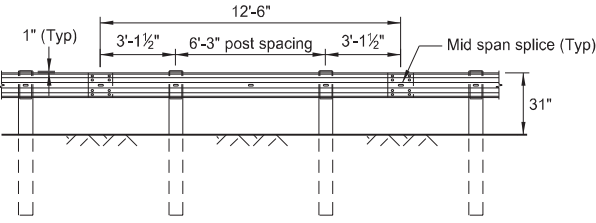
TYPICAL WOOD POST ATTACHMENT DETAIL



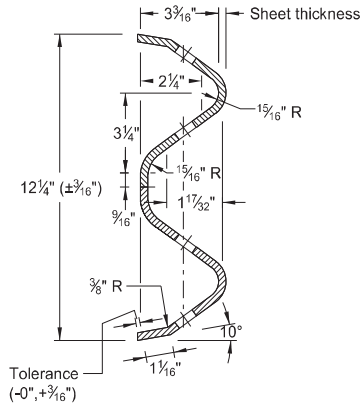
6" x 8" WOOD POST & BLOCK



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM

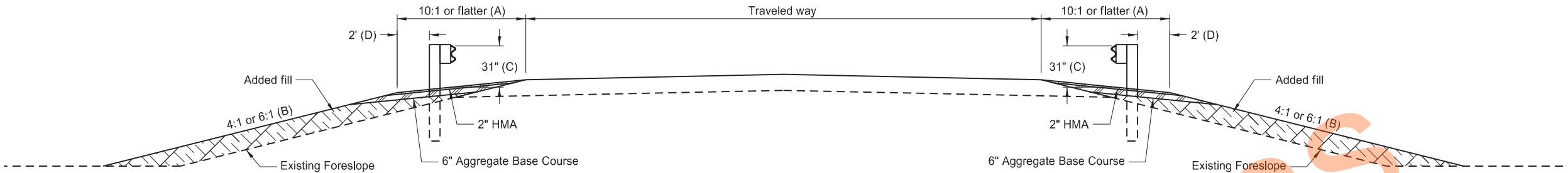


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated clipped head to optional

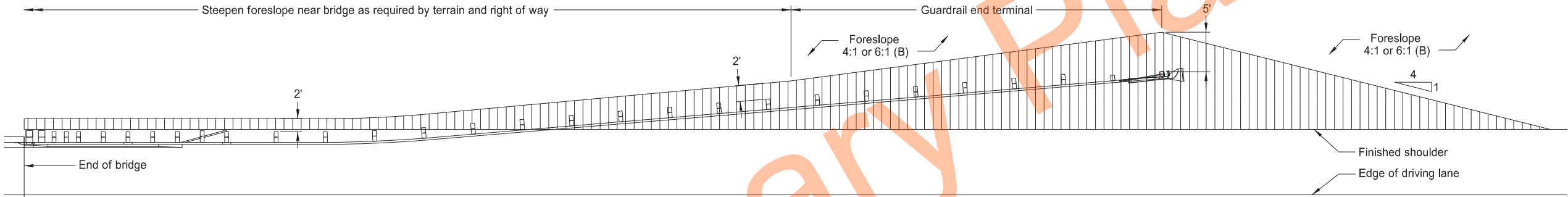


TYPICAL GRADING AT BRIDGE ENDS
WITH MGS W-BEAM GUARDRAIL

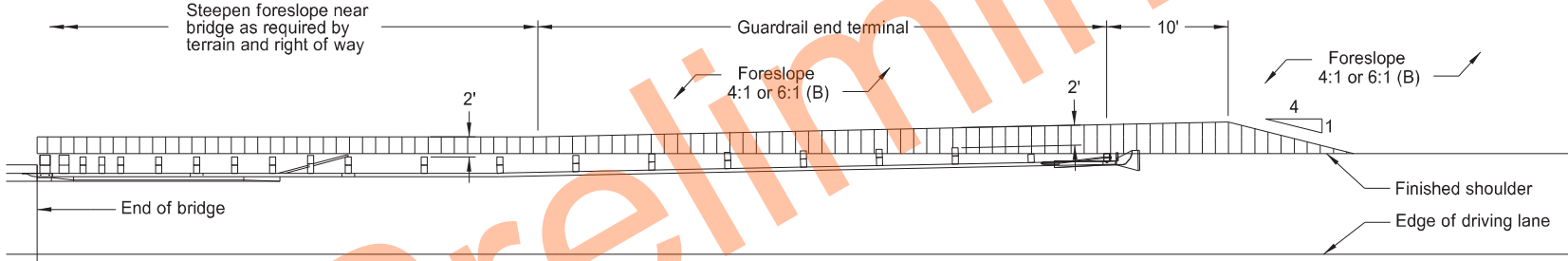
D-764-48



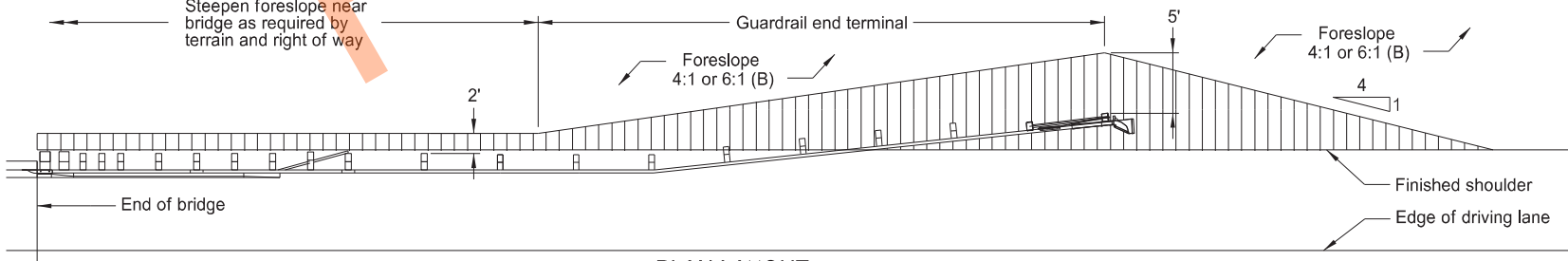
TYPICAL SECTION



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.

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

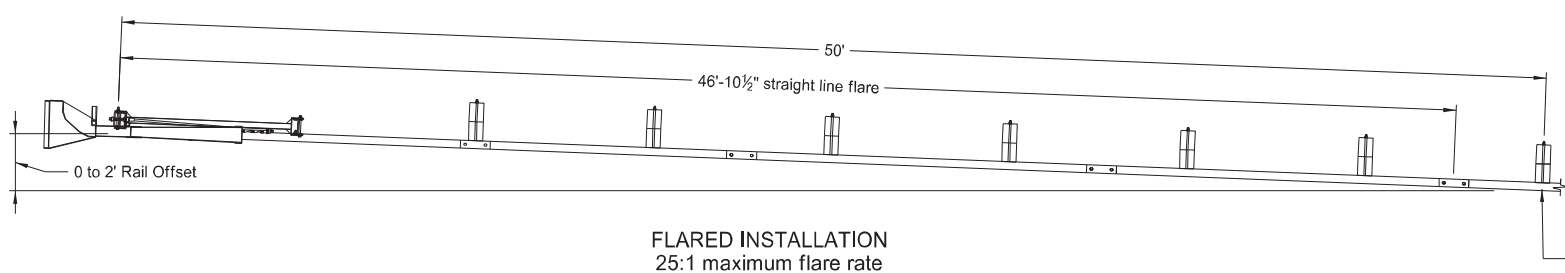
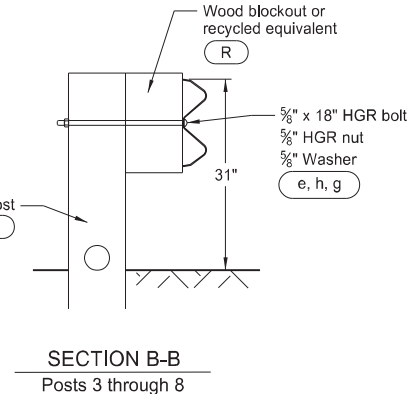
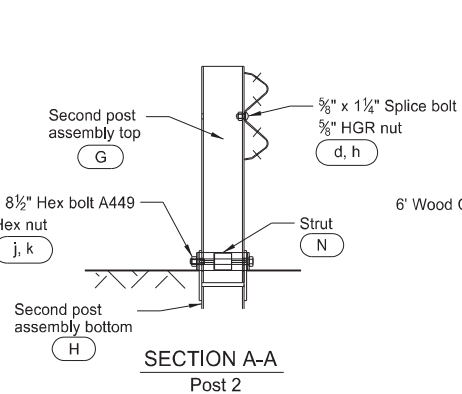
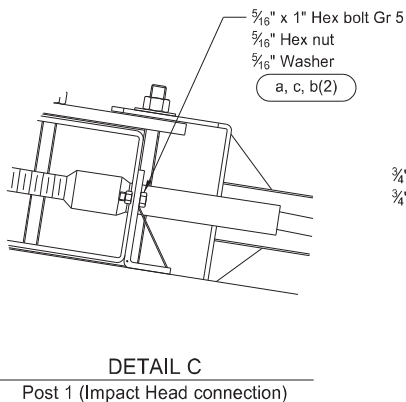
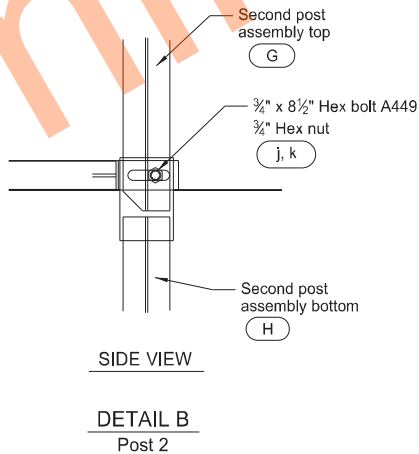
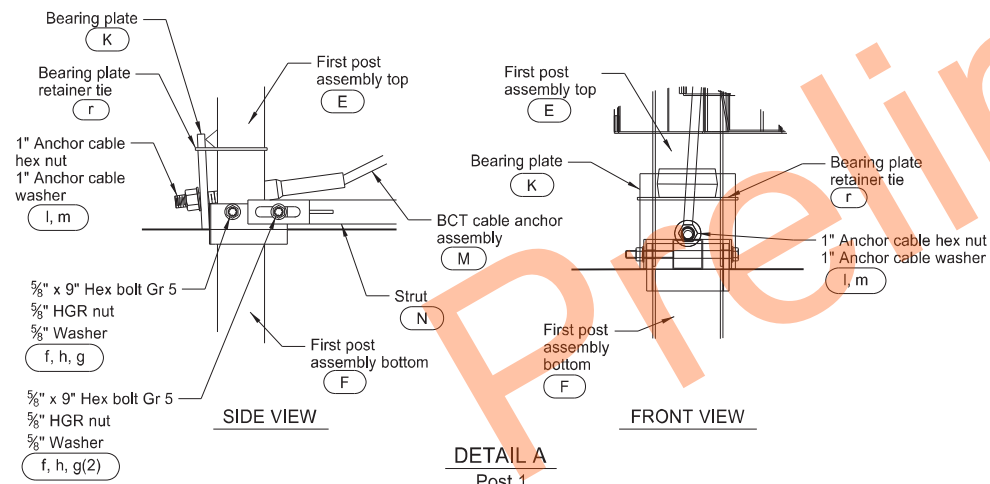
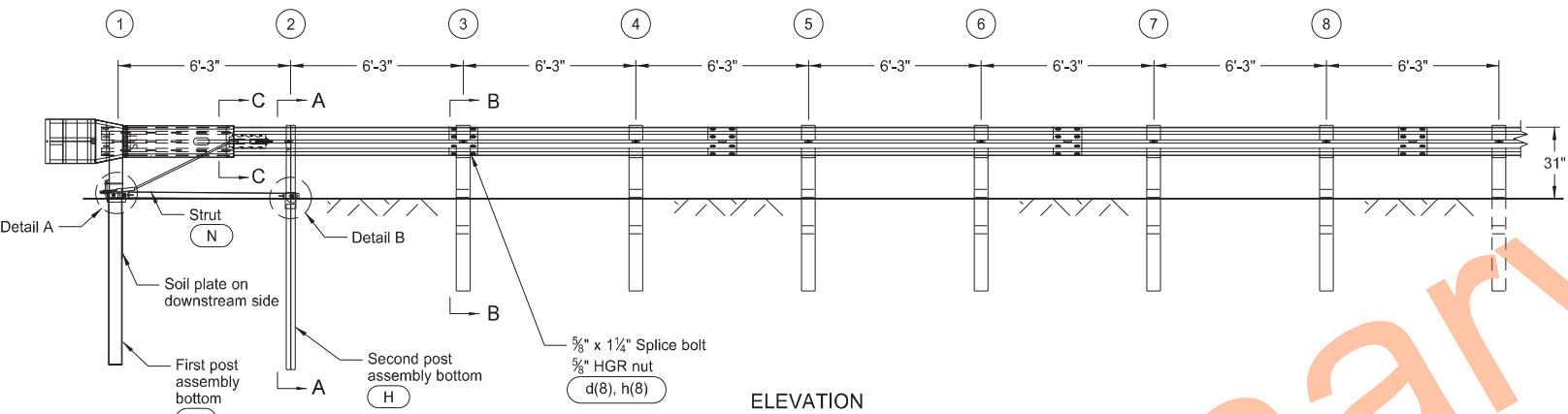
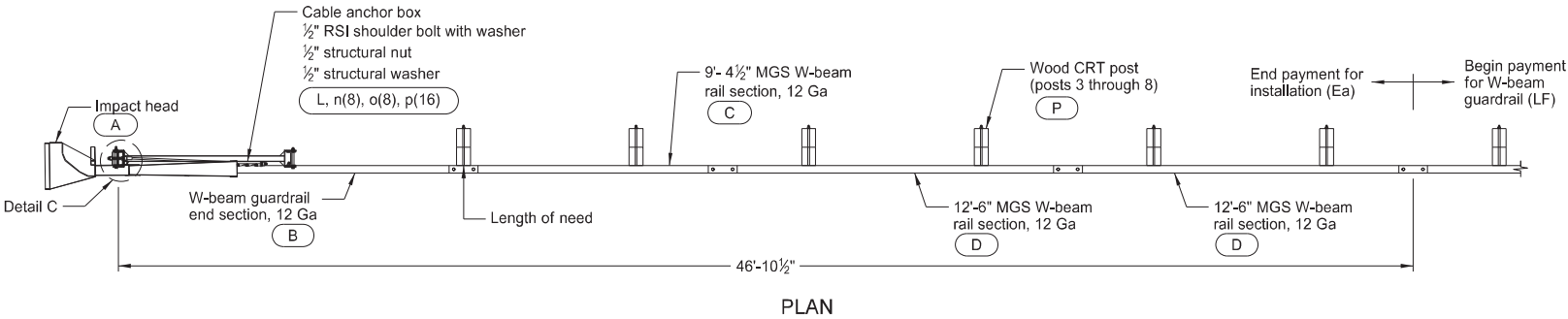
ENGINEER

NORTH DAKOTA

12 02 2020

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 1/8" 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

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

