DESIGN DATA: CR 15					
Traffic	Average Daily				
Current 2023	Pass: 259	Trucks: N/A	Total: 259		
Forcast 2043	Pass: 286	Trucks: N/A	Total: 286		
Clear Zone Distance: 4:1 - 14 FT / 6:1 - 12 FT			Design Speed: 55 MPH		
Minimum Sight Dist. for Stopping: N/A			Bridges: #53-137-37.0		
Limited Access Control					
Pavement Design Life:					
Design Accumulated One-Way Flexible ESAL's: N/A					

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JOB #23567
WILLIAMS COUNTY
NORTH DAKOTA

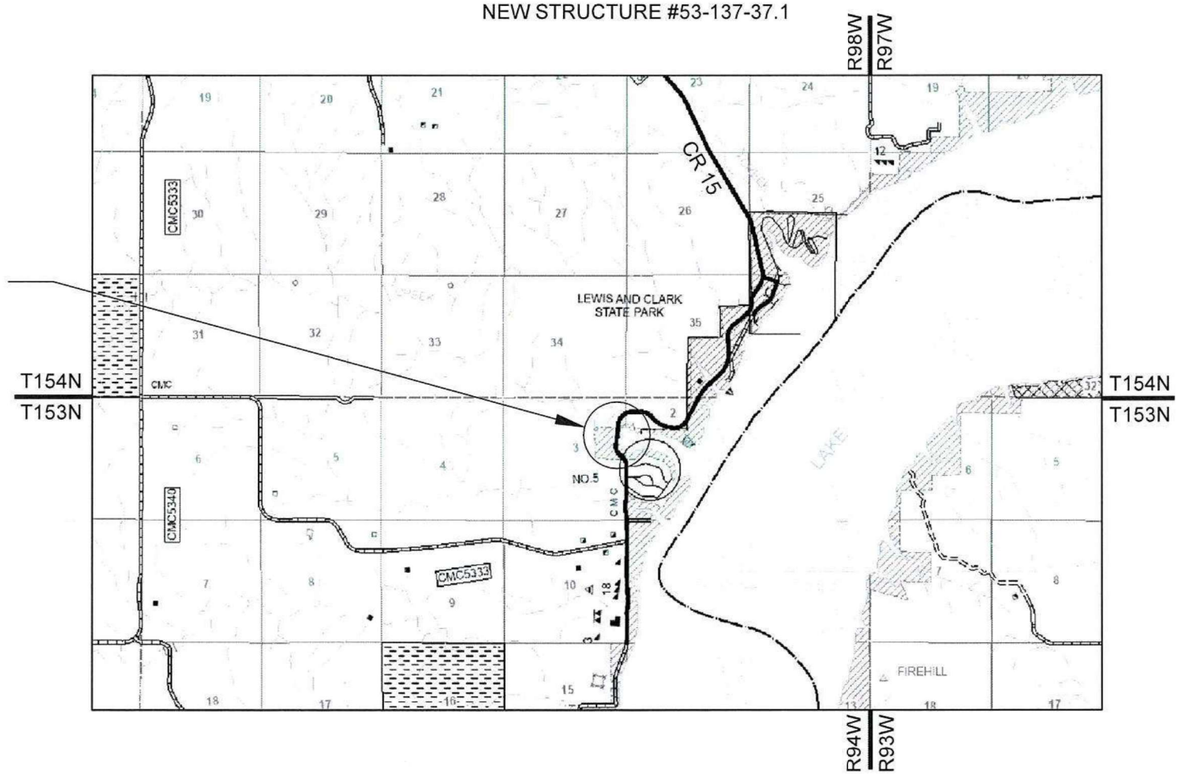
FEDERAL AID PROJECT BRP-BRC-5300(018)
COUNTY PROJECT 21-2-21A
WILLIAMS COUNTY
BRIDGE REPLACEMENT PROJECT

CR 15 OVER LONG CREEK, WILLIAMS COUNTY
12 MI S OF WHEELOCK
EXISTING STRUCTURE #53-137-37.0
NEW STRUCTURE #53-137-37.1

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

PROJECT DESCRIPTION	Net Miles	Gross Miles
Williams County Bridge Replacement Project	0.13	0.13

Existing Structure No. 53-137-37.0
New Structure No. 53-137-37.1
Beginning of Project Sta: 78+00.00
End of Project Sta: 85+00.00
Sec 3 of T153N-R98W



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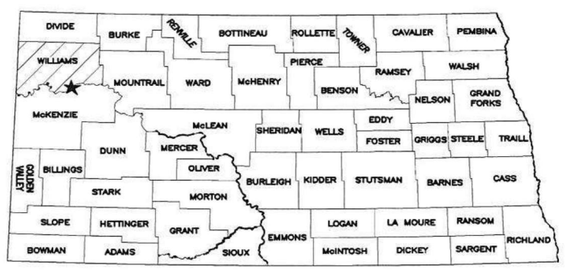

SKETCH MAP OF NORTH DAKOTA

Williams COUNTY

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DESIGNERS
Austin Becker, PE
Austin Alexander, PE

APPROVED DATE 2/27/2025
COUNTY HIGHWAY ENGINEER
WILLIAMS COUNTY, NORTH DAKOTA

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered Professional Engineer under the laws of the State of North Dakota.
02/27/2025
APPROVED DATE
Ackerman-Estvold Engineering & Management Consulting, Inc.

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 02/27/2025
NORTH DAKOTA

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PLAN SECTIONS

LIST OF STANDARD DRAWINGS

Number	Description
D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation
D-256-1	Erosion And Siltation Controls
D-260-1	Erosion And Siltation Controls - Silt Fence
D-261-1	Erosion Control - Fiber Roll Placement Details
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-50	Portable Sign Support Assembly
D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties
D-752-1	Standard Barbed Wire Fence
D-754-23	Perforated Tube Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-29	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-82	Object Markers
D-762-4	Pavement Marking

SPECIAL PROVISIONS

Number	Description
PSP 101(23)	Permits and Environmental Considerations
SP 469(23)	Temporary Water Diversion
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 2	Federal Migratory Bird Treaty Act
SSP 3	Local Agency Contracts
SP 470(23)	Commercial Grade Asphalt

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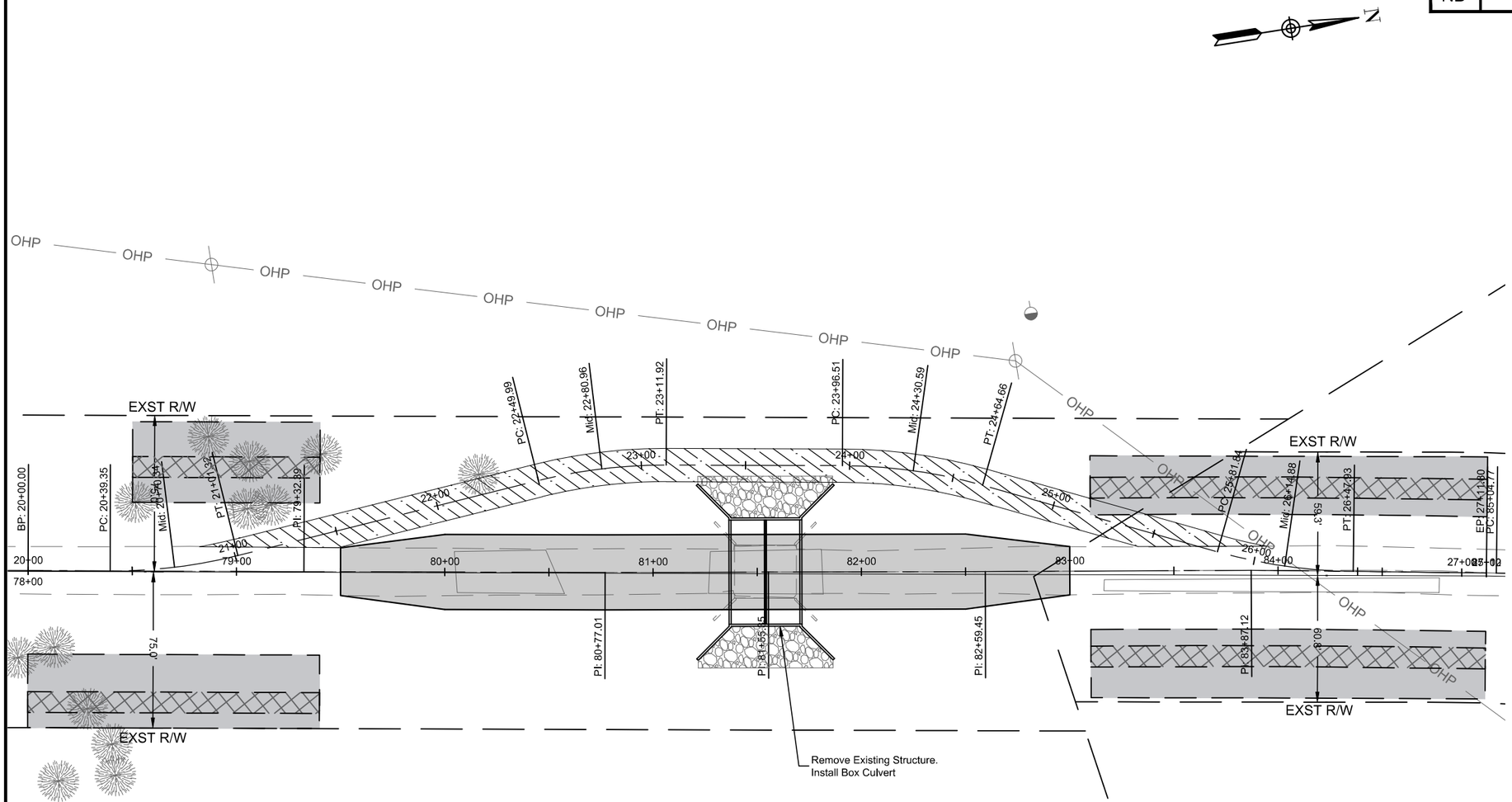

Scope

Structure Removal, Box Culvert Installation, Grading, Aggregate Base Course CL 5, Asphalt Paving, and Incidentals.

Legend

- Roadway Widening & Asphalt Paving
- Temporary Road Bypass Installation
- Ditch Regrading
- Right of Way / Road Easement

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SCALE (H): 1"=60'
SCALE (V): NA

30 15 0 30 60

Bridge Replacement
CR 15 over Long Creek, Williams County

Scope of Work

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NOTES

100-P01 WORK SCHEDULE:
In order to minimize interference with traffic operations, a detailed schedule shall be agreed to prior to beginning work between:

Engineer
Affected Utilities
Williams County, ND
Contractor
Subcontractors

Construction shall be limited to thirty minutes prior to sunrise and thirty minutes after sunset. Any work to be performed on Sundays or holidays shall be authorized by the Engineer. Contractor shall notify and request any non-standard workdays 72 hours prior to the first requested workday.

100-P02 EXISTING ROADS: The Contractor shall protect the existing roads from damage. The Contractor shall repair any damage to the existing roads caused by construction and related operations. The Contractor shall remove all material tracking and debris from the roadway immediately or at the direction of the Engineer.

100-P03 PLANNING/REPORTING MEETING: A planning/reporting meeting is to be held weekly with the Engineer to coordinate the efforts between the Contractor, subcontractors, local authorities, and others.

The Contractor shall send a knowledgeable representative to the weekly reporting/planning meeting and provide a written schedule of the next week's work and a tentative schedule of the following week.

The Engineer will prepare the meeting agenda, record the meeting minutes, distribute the meeting minutes and organize the meetings by contacting interested agencies. These agencies may include, but are not limited to, the following:

Affected Utilities
Williams County
Police, Sheriff and Highway Patrol Departments
Fire Departments
Ambulance Service
Subcontractors
Engineer

105-P01 UTILITIES: The vertical and horizontal utility locations shown in the plans are approximate. Plan locations should not be interpreted as exact for bidding or construction purposes.

105-P02 UTILITIES: Notify all utility owners of the project schedule as specified in Section 105.03, "Cooperation with Utility Owners".

Impact to utilities has been communicated with Utility Owners during design phase of the project by the Engineer. Adjustment to the impacted utilities may have been completed by the Utility Owners prior to the start of the project. Coordinate and perform construction activities in a manner that accommodates the utility coordination requirements included in the Utility Coordination Tables.

Protect utilities not listed in the Utility Coordination Table in their existing locations.

Contact information for Utilities with Conflicts:

Northwestern Rural Water: Weston McGruber, (701) 774-3080
Weston.mcgruber@ae2s.com

Northwest Communication Cooperative: Garth Vaagene, (701) 568-3331
garthv@nccray.com

Utility Cooridnation Table

Sta			Offset	Approx. Qty	Comments	Utility Company	Type of Facility	Approx Max Cut/Fill
78+50	to	79+78	Left	128 LF	Coordinate w ith Northw est Rural Water District	NWRWD	Water	1.06' C
79+78	to	81+10	Left	132 LF	Coordinate w ith Northw est Rural Water District	NWRWD	Water	3.19' F
81+10	to	81+95	Left	85 LF	Coordinate w ith Northw est Rural Water District	NWRWD	Water	2.66' C
81+95	to	83+00	Left	105 LF	Coordinate w ith Northw est Rural Water District	NWRWD	Water	2.56' F
83+00	to	85+00	Left	200 LF	Coordinate w ith Northw est Rural Water District	NWRWD	Water	1.58' C
79+50	to	83+00	Left	350 LF	Unknow n location of line. 25'-50' from Road Centerline. Coordinate w ith Northw est Communication Cooperative.	NCC	Comm Line	Varies

105-P03 CONSTRUCTION STAKING: Construction staking will be provided by the Owner/Engineer. Electronic design information will NOT be provided for use in automated machine control. The Owner/Engineer will provide the following with regard to construction staking:

1. Horizontal and Vertical Control (1 point every ½ mile)
2. Center Line Offset & Grade / Right-of-Way (100' interval both sides)
3. Slope Staking (100' interval both sides)
4. Box Culvert Center Line & End Section Offsets
5. Subgrade Bluetopping Centerline & Shoulders (100' Interval)
6. Gravel Base Bluetopping Centerline & Shoulders (100' Interval)
7. Center Line Poppy Line for Paving (200' intervals on second lift)

Staking of these items will be provided to the Contractor one time. Contractor shall protect all stakes. Damaged stakes and/or re-staking requests will be the Contractor's responsibility and all related costs shall be incidental to the other Project costs. If the contractor requires additional staking outside of what is listed within this item, a DEM or related electronic design file, or any other related survey or design information to facilitate their operations, it is the contractor's responsibility to subcontract those items within their contracted services as needed. Related costs for any additional survey or electronic file requirements by the contractor shall be incidental to other project costs.

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106-P01 SUBGRADE COMPACTION AND CONTROL: Placement of embankment shall be in accordance with Section 203.04 G.3 of the NDDOT Standard Specifications. Finished subgrade shall be test rolled using a Tandem Truck with a gross weight of 45,000 pounds. Yielding and rutting of 1/2" or greater indicates a failed test. Finished subgrade elevation shall not vary by more than 0.04 feet.

107-P01 HAUL ROAD INSPECTION: Before hauling over a designated haul road, the Engineer, the Contractor, and the agency charged with control and maintenance of the route will make a joint inspection of the haul road. The contractor will be responsible for video or photographic evidence of the pre-construction roadway conditions in the event that haul road repairs are directed.

150-P01 CONTRACTOR FURNISHED SCALE, SCALE PERSON AND DUMP PERSON: A Contractor furnished scale, scale person, and dump person will be required on this project. All related costs shall be incidental to the price bid for the items requiring a scale, scale person, and dump person.

202-P01 REMOVAL OF TEMPORARY BYPASS: Include the removal and disposal of aggregate surfacing, temporary embankment, and removal and salvage of pipe culverts in the unit price bid for "REMOVAL OF TEMPORARY BYPASS". Refer to Note 704-P01 for traffic control phasing for the construction of the temporary bypass and utilization of temporary embankment for construction purposes. Temporary bypass pipe culverts will become the property of Williams County after the temporary bypass is removed. Deliver salvaged bypass pipe culverts to the Williams County Highway Department located at 5218 141st Ave NW, Williston, ND 58801. Contact Dennis Nelson, Williams County Highway Superintendent (701-557-4521), at least 48 hours prior to delivery. Restore all disturbed ground outside of the permanent grading limits to preconstruction contours.

202-P02 REMOVAL OF EXISTING FENCE: If the existing fence is removed prior to the installation of the permanent fence, the Contractor shall be responsible for a temporary fence to maintain closure of the pasture lands unless an agreement is made with the landowner to install permanent fence after the removal of the existing fence. All costs to install and maintain the temporary fence will not be paid for separately but to be included in the price bid for "Remove Existing Fence" and "Fence Barbed Wire 3 Strand – Steel Post".

203-P01 COMMON EXCAVATION: "Common Excavation – Type B" will be paid at plan quantity provided the project is constructed to the lines and grades shown on the plans. Item includes the removal of existing aggregate.

203-P02 COMMON EXCAVATION – SUBCUT: If unsuitable material is encountered in the roadway subgrade or box culvert subgrade, subcut to a depth determined by the Engineer and replace with suitable material at the approval of the Engineer. An estimated 200 CY total subcut quantity has been included for potential areas of roadway subcut (at 2' depth) and for potential areas of subcut around the box culvert installations. All costs to remove and dispose of the material shall be included in the price bid for "Common Excavation – Subcut". "Borrow Excavation" to be used to replace subcut material in road bed and "Foundation Fill – Type I" under the proposed box location. Subcut material to be removed and disposed of from site in accordance to specification 107.17.

203-P03 CONTRACTOR FURNISHED BORROW: Furnish the Borrow Excavation material necessary to complete the project.

203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

253-P01 HYDRAULIC MULCH: Hydraulic mulch shall be applied in a single application with the permanent class II seed. The seed required for "Seeding Class II" will be paid for separately. All costs for labor, equipment, and materials necessary to complete the hydraulic mulch application shall be included in the price bid for "Hydraulic Mulch".

253-P02 ECB TYPE 2: Erosion control blanket to be installed where slopes are equal to or steeper than 3H:1V, as shown in Section 77. Additional areas may be designated as determined by the Engineer.

256-P01 RIPRAP – GRADE II: Excavation required to place the riprap is included in the quantities for "Common Excavation – Type B".

261-P01 PERMANENT FIBER ROLLS: For fiber rolls remaining on the project, use fiber rolls that are composed of netting that meets either of the following:

- Bio- or photo-degradable plastic netting that has a life expectancy between 6 and 24 months.
- 100 percent biodegradable natural netting that has a life expectancy between 6 and 24 months.

302-P01 TRAFFIC SERVICE AGGREGATE: Traffic Service Aggregate will consist of class 13 aggregate as defined in Section 816.02.

302-P02 TRAFFIC SERVICE AGGREGATE MAINTENANCE: Use a blade to maintain a smooth and compacted surface on the temporary bypass at all times. Provide dust control as necessary utilizing water or similar methods. Include all costs for maintenance in the contract unit price for "Traffic Service Aggregate".

704-P01 TRAFFIC CONTROL PHASING: Construct the structure replacement in the following phases:

Phase 1: Construct the temporary bypass. Utilize D-704-15 Type A as the required traffic control set up to construct the temporary bypass.

Phase 2: Close the road for a maximum of 3 days to install temporary stream diversion to divert flow of Long Creek. Place temporary traffic signal, traffic control signs and devices as shown on Section 100 sheet 2.

Phase 3: Shift traffic onto temporary bypass. Remove the existing structure and pavement, and install the proposed box culvert from downstream to upstream. Do not install any sections and/or headwall on the upstream end that will interfere with the temporary bypass. Install these sections as a part of phase 4. Complete the roadway grading on the right side of centerline. Complete roadway grading on the left side of centerline that doesn't interfere with the temporary

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NOTES

bypass. Install all roadway aggregate, paving, and pavement markings.

Phase 4: Shift traffic onto new pavement and structure. Remove the temporary bypass. Utilize any temporary bypass earthwork to complete the roadway grading not completed in phase 2 on the left side of centerline. Complete roadway grading on left side of centerline. Install the remaining box culvert sections and headwall. Install all permanent erosion control. Utilize D-704-15 Type A to complete the construction after the temporary bypass is removed.

709-P01 GEOSYNTHETIC MATERIAL TYPE RR: Separation material shall be installed under the rock riprap.

709-P02 GEOSYNTHETIC MATERIAL TYPE R1: Reinforcement material shall be placed parallel to the roadway centerline. If more than one piece of fabric is used to meet the required length, then the joint must be pinned. Adjacent strips of fabric shall be overlapped. All fabric must be taut and pinned with a 6” (min) pin, peg, or staple every 15’ along all edges and on all corners prior to placing fill on the fabric.

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

722-P01 TEMPORARY TRAFFIC SIGNALS: Install a signal-controlled lane closure for two lane roadways as shown in Section 100 and Standard D-704-16. Submit any modifications to the Engineer prior to the preconstruction conference for approval. Coordinate with the utility company to obtain an electrical source to operate the signals or provide generators for electrical service. Solar powered traffic signals may be used. Include all costs associated with installing, operating, and maintaining the traffic signals in the unit price bid for “LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL”.

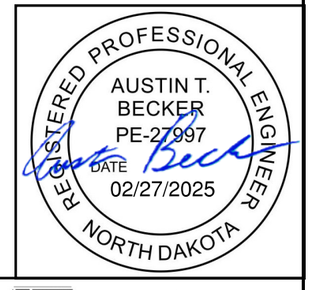
Place the generator outside the taper, unless the generator and signals are part of a trailer mounted unit.

Place any poles and all equipment outside the roadway. Place the power conductors a minimum of 6 inches below the ground. Upon completion of the project and after the traffic is returned to the roadway, remove all equipment, and restore all disturbed ground. Include all costs, equipment, labor and materials necessary to install, operate, and remove a wood pole/span wire signal system or portable signal system in the price bid for “LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL”.

Calibrate timing plan to actual traffic behavior. This may require adjustments during peak traffic periods and for harvest season in the fall. Notify the Engineer upon operation of the system and for approval of any signal timing adjustments.

Set the initial signal timing as shown below:

N - Bound	Green	Yellow	Red			
S - Bound	Red			Green	Yellow	Red
Time (Sec)	27	3	30	27	3	30



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ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): Williams County, 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 Long Creek from April 15 to June 1.

EN-2 AVOIDANCE AREAS: One avoidance area was identified near the project limits. The site is located outside of right-of-way between station 75+63 to 79+43 Lt. This avoidance area outside of the right-of-way must not be disturbed and will be fenced prior to commencement of any construction. Provide the fence and fence posts, install the fence in the location designated in the field with the station range indicated above at the right-of-way, maintain the fence, and remove the fence upon completion of the project. A quantity of 380 LF of temporary safety fence has been included for this purpose. All costs to provide, place, maintain, and remove the fence shall be included in the price bid for "TEMPORARY SAFETY FENCE."

EN-3 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - bholen@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-4 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

EN-5 WETLAND MITIGATION: : Prior to beginning any work on the project, purchase exactly 0.221 acres of wetland mitigation credits from Ducks Unlimited to satisfy the Environmental Commitments shown in Section 75 of the plans. No work can begin on the project until a Credit Sales Letter from Ducks Unlimited is submitted to and accepted by the project engineer. Reference Project Number NWO-2023-00937-BIS when contacting Ducks Unlimited. Purchase the wetland mitigation credits from the Missouri River Basin Northern Zone service area. The details are:

Missouri River Basin Northern Zone 0.221 Credits @ $78,000/credit = $17,238.00

The contact information to purchase the wetland mitigation credits from Ducks Unlimited is

Trenton Hieb
Regional Biologist - Ecosystem Services - Mitigation
Ducks Unlimited (Great Plains Region)
2525 River Road
Bismarck. ND 58503
Phone: 701-355-3573
Email: thieb@ducks.org

EN-6 AQUATIC ORGANISM PASSAGE: The inverts of box culverts shall be set one foot below the existing grade of the stream channel to accommodate aquatic organism movements through the box culvert.

PERMITS REQUIRED:

United States Army Corp of Engineers – Section 404 permit
STATUS: Obtained

ND Department of Health – NDPDES Permit
Status: To be obtained by contractor prior to construction. Owner to be listed as Williams County on permit.

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Mainline:				TOTAL
103	100	CONTRACT BOND	L SUM	1				1
201	330	CLEARING & GRUBBING	L SUM	1				1
202	105	REMOVAL OF STRUCTURE	L SUM	1				1
202	132	REMOVAL OF BITUMINOUS SURFACING	SY	863				863
202	312	REMOVE EXISTING FENCE	LF	821				821
202	350	REMOVAL OF TEMPORARY BYPASS	EA	1				1
203	102	COMMON EXCAVATION-TYPE B	CY	1045				1045
203	109	TOPSOIL	CY	882				882
203	113	COMMON EXCAVATION-WASTE	CY	1518				1518
203	138	COMMON EXCAVATION-SUBCUT	CY	200				200
203	140	BORROW-EXCAVATION	CY	1468				1468
210	50	BOX CULVERT EXCAVATION	EA	1				1
210	209	FOUNDATION FILL	TON	878				878
210	225	FOUNDATION FILL-TYPE 1	CY	329				329
210	405	FOUNDATION PREPARATION-BOX CULVERT	EA	1				1
216	100	WATER	M GAL	70				70
230	300	SUBGRADE PREPARATION-TYPE A	STA	3.5				3.5
251	200	SEEDING CLASS II	ACRE	1.49				1.49
251	2000	TEMPORARY COVER CROP	ACRE	1.38				1.38
253	101	STRAW MULCH	ACRE	1.38				1.38
253	201	HYDRAULIC MULCH	ACRE	1.49				1.49
255	102	ECB TYPE 2	SY	1350				1350
256	201	RIPRAP GRADE II	TON	260				260
260	200	SILT FENCE SUPPORTED	LF	733				733
260	201	REMOVE SILT FENCE SUPPORTED	LF	733				733
261	112	FIBER ROLLS 12IN	LF	825				825
261	113	REMOVE FIBER ROLLS 12IN	LF	60				60
262	100	FLOTATION SILT CURTAIN	LF	100				100
262	101	REMOVE FLOTATION SILT CURTAIN	LF	100				100
302	50	TRAFFIC SERVICE AGGREGATE	TON	254				254
302	120	AGGREGATE BASE COURSE CL 5	TON	748				748
430	500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	382				382
606	3610	DBL 16FT X 10FT PRECAST RCB CULVERT	LF	52				52
606	7610	DBL 16FT X 10FT PRECAST RCB END SECTION	LF	2				2
702	100	MOBILIZATION	L SUM	1				1
704	100	FLAGGING	MHR	200				200
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1074				1074
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	1				1
704	1052	TYPE III BARRICADE	EA	4				4
704	1060	DELINEATOR DRUMS	EA	10				10
704	1080	STACKABLE VERTICAL PANELS	EA	50				50
709	151	GEOSYNTHETIC MATERIAL TYPE R1	SY	388				388
709	155	GEOSYNTHETIC MATERIAL TYPE RR	SY	296				296
714	4115	PIPE CONDUIT 36IN	LF	184				184
752	100	FENCE BARBED WIRE 3 STRAND	LF	827				827
752	911	TEMPORARY SAFETY FENCE	LF	380				380
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA	2				2

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Mainline:				TOTAL
752	3995	DOUBLE BRACE ASSEMBLY-WOOD POST	EA	6				6
754	110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	7				7
754	206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	18				18
754	803	OBJECT MARKERS - TYPE III	EA	4				4
762	1104	PVMT MK PAINTED 4IN LINE	LF	1500				1500
900	1000	TEMPORARY STREAM DIVERSION	EA	1				1
900	2001	WETLAND MITIGATION SITE 1	ACRE	0.221				0.221

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BASIS OF ESTIMATE

Mainline Pavement Quantities:

		CR 15 (Full Width)				CR 15 (Begin and End Transitions)		CR 15
		80+00 to 82+50 Length (ft) = 250				79+50 to 80+00 & 82+50 to 83+00 Length (ft) = 50' per End		
Material	**Unit**	**Width (ft)**	**Area (sf)**	**Area (sy)**	**Subtotal Quantity**	**Width (ft)**	**Subtotal Quantity**	**Project Total**
Aggregate Base Course CL 5 @ 1.875 Ton/CY	Ton	46.1	28.81		501	41.1 to 46.1	85	**671**
Aggregate Shoulder CL 5 @ 1.875 Ton/CY Per Side	Ton	4	2.00		35 per Side	0 to 4	3.5 per Side	**77**
							Aggregate Base Course CL 5 Total (671+77)	**748**
Commercial Grade Hot Mix Asphalt @2.0 Ton/CY	Ton	32.3	15.07		280	27.3 to 32.3	51	**382**
**Prime Coat @ 0.25 Gal/SY	Gal	40.32		1120	280	Varies	46	**372**
**Tack Coat @0.05 Gal/SY 1st Lift	Gal	30.3		842	42	Varies	8	**58**
**Tack Coat @0.05 Gal/SY 2nd Lift	Gal	29.44		818	41	Varies	8	**57**
**PG 58S-28 Asphalt Cement @ 6.0%	Ton				17		3	**23**

**Quantities for Estimation Purposes

Traffic Service Aggregate / Temporary Bypass:

		Temporary Bypass (Full Width)			Temporary Bypass (Begin Transition)		Temporary Bypass (End Transition)		**Temporary Bypass**
		21+49.11 to 25+44.48 Length (ft) = 395.37			21+17.94 to 21+49.11 Length (ft) = 31.2'		25+44.48 to 25+72.38 Length (ft) = 27.9'		
Material	**Unit**	**Width (ft)**	**Area (sf)**	**Subtotal Quantity (Tons)**	**Width (ft)**	**Subtotal Quantity (Tons)**	**Width (ft)**	**Subtotal Quantity (Tons)**	**Project Total**
Traffic Service Aggregate @ 1.875 Ton/CY	Ton	16	8.01	220	Varies	18	Varies	16	**254**

Water:

10 Gal/CY for Embankment
20 Gal/Ton for Aggregates

Pavement:

Aggregate Base Course CL 5 @ 1.875 Ton/CY
Commercial Grade Hot Mix Asphalt @ 2.000 Ton/CY
PG 58S-28 Asphalt Cement @ 6.0%
Prime Coat @ 0.25 Gal/SY
Tack Coat @ 0.05 Gal/SY (1st Lift)
Tack Coat @ 0.05 Gal/SY (2nd Lift)

Subgrade Preparation-Type A:

Sta 79+50 to 83+00 = 3.5 Stations

Riprap Grade II:

Riprap Grade II @ 1.7 Ton/CY

Topsoil:

4" Removal & Placement Depth

Flotation Silt Curtain:

100 LF discretionary Flotation Silt Curtain included in the project to be used in substitution of silt fence in the case of high water events in Long Creek Channel.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	10	2

BASIS OF ESTIMATE

Earthwork Summary:

				Pay Items		
	A1	A2	B	=B	C	=(A1+A2)-B
Location	**Road Total Excavation (CY)**	****Rirpap Total Excavation (CY)**	**Embankment Required* (CY)**	**Common Excavation – Type B (CY)**	**Common Excavation – Subcut** (CY)**	**Common Excavation Waste (CY)**
CR 15	2410	153	1045	1045	200	1518

*25% additional quantity is included in Embankment required to account for shrinkage.
**Riprap Excavation Material & Subcut material to be removed from the project.

			Pay Items	
	A	B	=B	=(B-A)+C
Location	**Road Total Excavation (CY)**	**Embankment Required* (CY)**	**Common Excavation – Type B (CY)**	**Borrow Excavation (CY)**
Temp Bypass	0	1,468	0	1,468

*25% additional quantity is included in Embankment required to account for shrinkage.

Topsoil:

			Pay Items	
	A	B	(=A)	C=B-A
Location	**Topsoil Stripping (CY)**	**Topsoil Proposed (CY)**	**Topsoil (CY)***	**Excess Topsoil (CY)**
Temp Bypass	182	92	182	90
CR 15	700	622	700	78
Total	882	714	882	168

*Topsoil based on 4” stripping and 4” respreading. Spread excess topsoil within ROW.

Foundation Fill:

Foundation Fill @ 1.875 Ton/CY

	Foundation Fill	**Foundation Fill – Type I**	
Location	**Plan Quantity (TON)**	**Plan Quantity (CY)**	***Additional Quantity (CY)**
CR 15	878	183	146

*Additional quantity for Foundation Fill – Type I assuming 2’ depth of Subcut is required during proposed excavations under box culvert. Subcut at discretion of the Engineer.

Permanent Pavement Marking:

Permanent Pavement Marking				
Description			**Unit**	**Quantity**
4” Yellow No Passing Zone (Double Solid Line)				
Sta 79+50	To	Sta 83+00	LF	350
Total (Yellow)			**LF**	**350 x 2 = 750**
4” White Edge Lines (Solid Line)				
Sta 79+50	To	Sta 83+00	LF	350
Total (White)			**LF**	**350 x 2 = 750**
Total Pavement Marking Paint			**LF**	**750 + 750 = 1,500**

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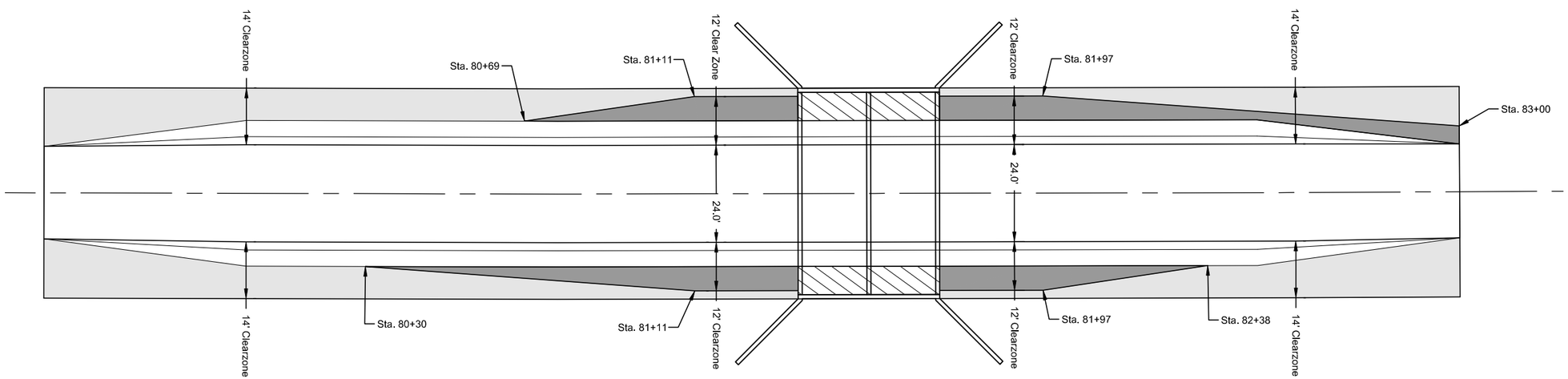
ND	BRP-BRC-5300(018)	20	1



Legend

- 4:1 Foreslope
- 6:1 Foreslope
- 6:1 or Flatter

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SCALE (H): 1"=60'
SCALE (V): NA

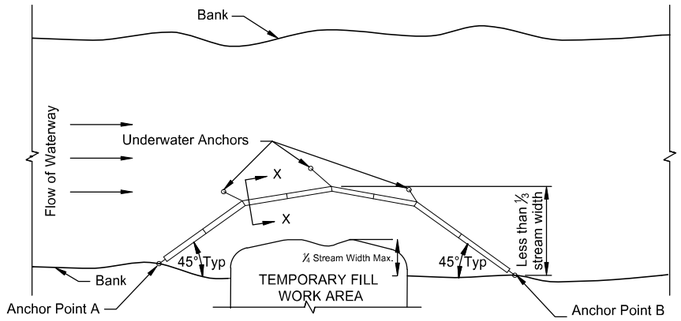
15 7.5 0 15 30

Bridge Replacement
CR 15 over Long Creek, Williams County

Slope Transition Detail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	20	2

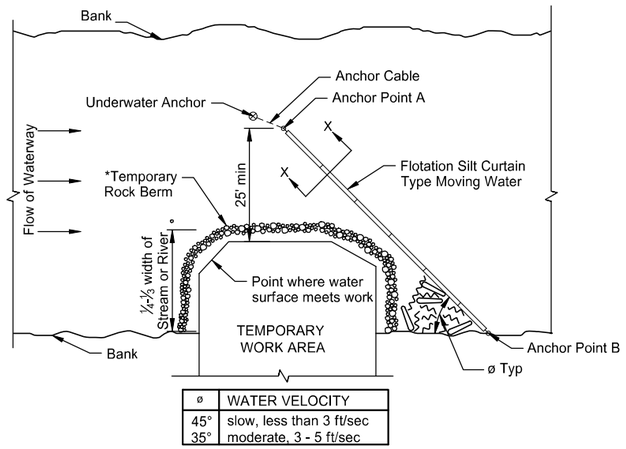
TYPICAL INSTALLATIONS
May vary with conditions



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE WORK AREA

DESIGN GUIDELINES:
When temporary work encroaches less than ¼ of the width of stream.



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

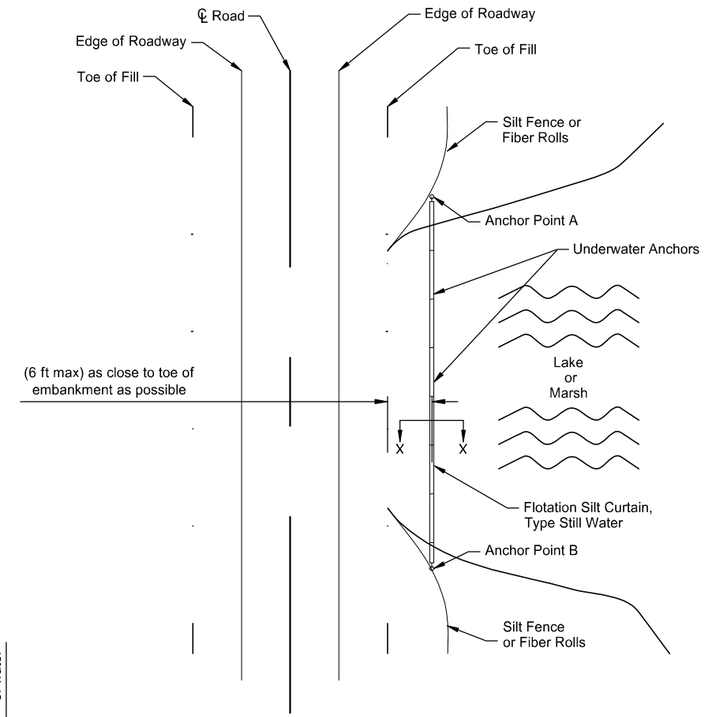
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE MOVING WATER

DESIGN GUIDELINES:
When temporary work encroaches more than ¼ but less than ⅓ width of the stream.

For narrow waterways, the curtain may be placed 1 foot above the bottom of waterway to allow water flow.

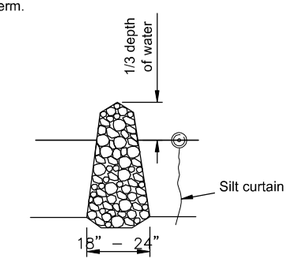
*In areas where the plans call for riprap at the bridge, provide a temporary rock berm. Include all costs for the temporary rock berm in price bid for the "Riprap".



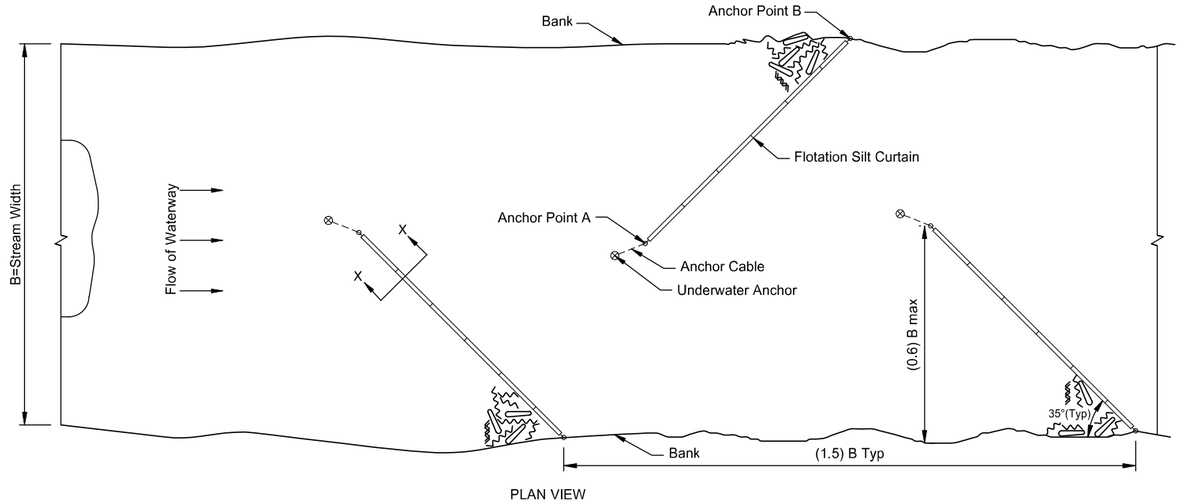
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE STILL WATER

Extend silt curtain onto shore and anchor there also.



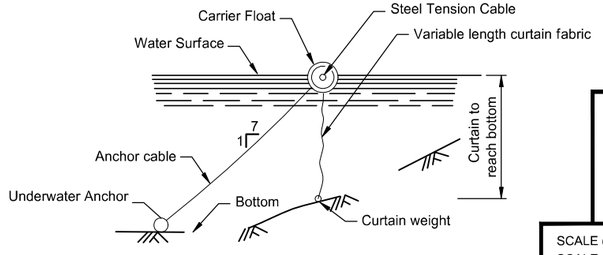
TEMPORARY ROCK BERM



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:
When temporary work encroaches more than ½ width of the stream
Or where stream width doesn't allow use of Type Moving Water



SECTION X-X
FLOTATION SILT CURTAINS

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

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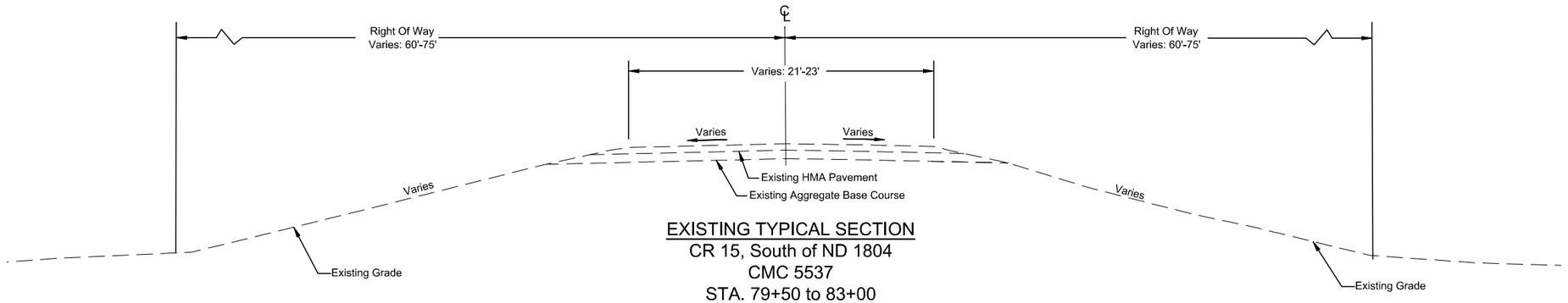
SCALE (H): 1"=100'
SCALE (V): NA
25 12.5 0 25 50

Bridge Replacement
CR 15 over Long Creek, Williams County

Temporary Erosion Control
Flotation Silt Curtain

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	30	1



EXISTING TYPICAL SECTION
CR 15, South of ND 1804
CMC 5537
STA. 79+50 to 83+00
(Excluding Existing Bridge)

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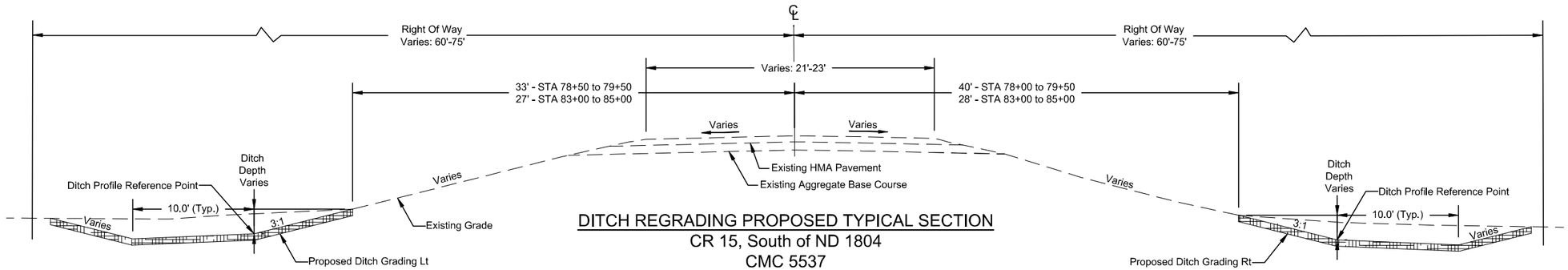
SCALE (H): NA
SCALE (V): NA
0 0 0 0 0

Bridge Replacement
CR 15 over Long Creek, Williams County

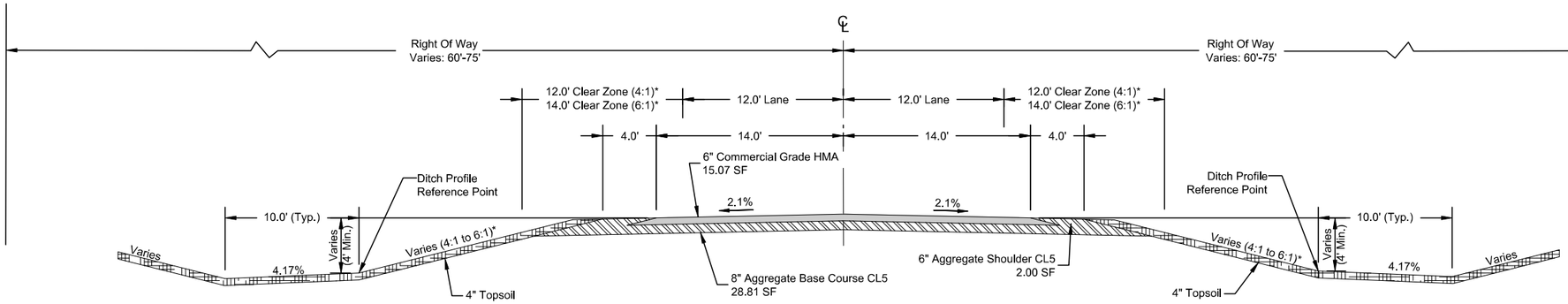
Existing Typical Section

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-5300(018)	30	2



DITCH REGRADING PROPOSED TYPICAL SECTION

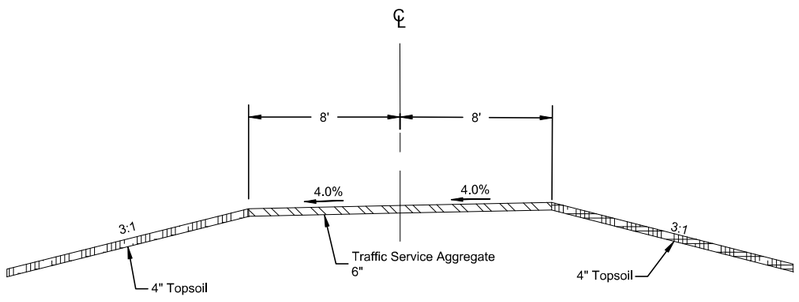
CR 15, South of ND 1804
CMC 5537
Ditch Regrading Areas
STA. 78+00 to 79+50 Rt
STA. 78+50 to 79+50 Lt
STA. 83+00 to 85+00 RT/LT



PROPOSED ROAD TYPICAL SECTION

CR 15, South of ND 1804
CMC 5537
STA. 80+00 to 82+50

Note: Station range does not include 50' width transition at beginning and end.



TEMPORARY BYPASS TYPICAL SECTION

CR 15, South of ND 1804
CMC 5537
STA. 20+39.35 to 26+47.93 (Temporary Bypass Alignment)

*See Section 20 Sheet 1 for slope transition details.

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SCALE (H): NA
SCALE (V): NA
0 0 0 0 0

Bridge Replacement
CR 15 over Long Creek, Williams County

Proposed Typical Sections

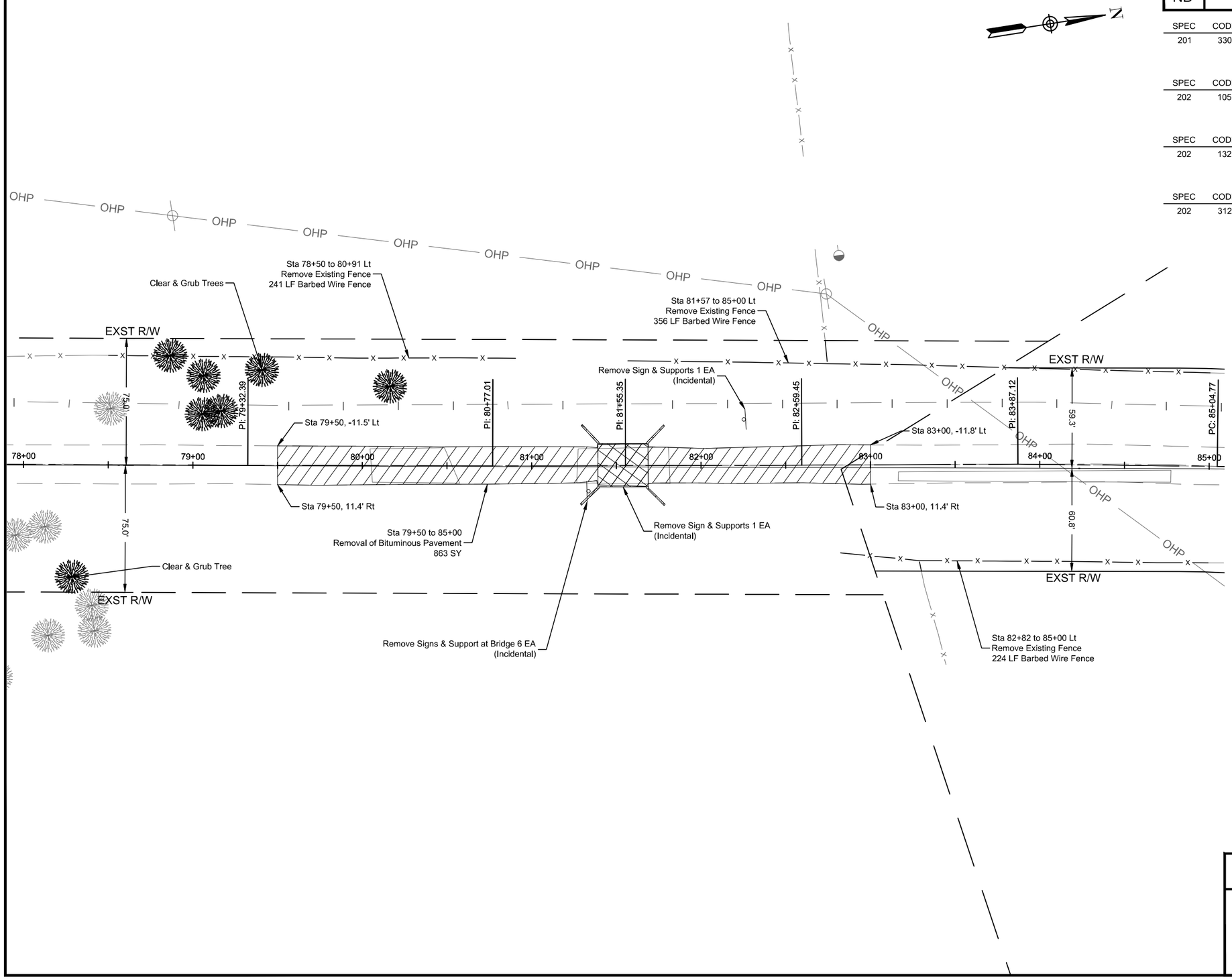
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	40	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
201	330	CLEARING & GRUBBING	L SUM	
		STA 78+00 to STA 85+00 LT/RT		1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	105	REMOVAL OF STRUCTURE	L SUM	
		STA 81+55.35		1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	132	REMOVAL OF BITUMINOUS SURFACING	SY	
		STA 79+50 to STA 83+00 Lt/Rt		863

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	312	REMOVE EXISTING FENCE	LF	
		STA 78+50 to STA 80+91 Lt		241
		STA 81+57 to STA 85+00 Lt		356
		STA 82+82 to STA 85+00 Lt		224



Legend

- Bituminous Removal
- Structure Removal

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AUSTIN T. BECKER
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SCALE (H): 1"=60'
SCALE (V): NA

30 15 0 30 60

Bridge Replacement
CR 15 over Long Creek, Williams County

Removals

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosythetic Material - Type G (Pay Item)	(*) End Sections		Applicable Backfill
				In	Bid Item	LF		In	Type		In	SY	Begin EA	End EA	
80+88	23.7' Lt	81+02	75.2' Lt	36	Pipe Conduit	46'	Corrugated Steel Pipe	36	Z, A, P	2	0.064	N/A	None	None	Specification 714.04 A
80+93	23.7' Lt	81+07	75.2' Lt	36	Pipe Conduit	46'	Corrugated Steel Pipe	36	Z, A, P	2	0.064	N/A	None	None	Specification 714.04 A
80+99	23.7' Lt	81+13	75.2' Lt	36	Pipe Conduit	46'	Corrugated Steel Pipe	36	Z, A, P	2	0.064	N/A	None	None	Specification 714.04 A
81+04	23.7' Lt	81+18	75.2' Lt	36	Pipe Conduit	46'	Corrugated Steel Pipe	36	Z, A, P	2	0.064	N/A	None	None	Specification 714.04 A

Corrugations: **2** = 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

Coatings: **Z** = Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

Spiral Ribs: **3/4** = 3/4"x3/4"@7-1/2"
1 = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

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Bridge Replacement
CR 15 over Long Creek, Williams County

Allowable Pipe List

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	60	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
752	100	FENCE BARBED WIRE 3 STRAND	LF	
		STA 78+50 to 80+91 Lt		241
		STA 81+57 to 85+00 Lt		359
		STA 82+82 to 85+00 Rt		227

SPEC	CODE	BID ITEM	UNIT	QUANTITY
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA	
		STA 82+75, 59.1' Lt		1
		STA 83+29', 53.4 Rt		1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
752	3995	DOUBLE BRACE ASSEMBLY-WOOD POST	EA	
		STA 78+50, 64.7' Lt		1
		STA 80+91, 63.5' Lt		1
		STA 81+57, 61.8' Lt		1
		STA 85+00, 55.2' Lt		1
		STA 82+82, 51.9' Rt		1
		STA 85+00, 57.0' Rt		1

Cultural Avoidance Area

Sta 78+50.00, -64.7' Lt
Install Double Brace Assembly
Barbed Wire

Sta 80+90.66, -63.5' Lt
Install Double Brace Assembly
Barbed Wire

Sta 81+53.93 - 26.0' LT
Proposed Double 16' x 10' RCB
Inv. In: 1846.34

Sta 81+56.88, -61.8' Lt
Install Double Brace Assembly
Barbed Wire

Sta 82+74.9, 59.1' Lt
Install Corner Assembly
Barbed Wire

Sta 85+00.00, -55.2' Lt
Install Double Brace Assembly
Barbed Wire

Edge of Bituminous
Sta 79+50.00, -11.5' Lt

Edge of Shoulder
Sta 80+00.00, -18.0' Lt

Edge of Bituminous
Sta 80+00.00, -14.0' Lt

Edge of Shoulder
Sta 80+00.00, -18.0' Rt

Edge of Bituminous
Sta 80+00.00, 14.0' Rt

Edge of Bituminous
Sta 79+50.00, 11.4' Rt

Edge of Shoulder
Sta 82+50.00, -18.0' Lt

Edge of Bituminous
Sta 82+50.00, -14.0' Lt

Edge of Bituminous
Sta 83+00.00, -11.8' Lt

PI: 81+55.35
PI: 80+77.01
PI: 82+59.45
PI: 79+32.39
PI: 83+87.12
PC: 85+04.77

Edge of Bituminous
Sta 82+50.00, 14.0' Rt

Edge of Shoulder
Sta 82+50.00, 18.0' Rt

Edge of Bituminous
Sta 83+00.00, 11.4' Rt

Sta 81+53.93 - 26.0' RT
Proposed Double 16' x 10' RCB
Inv. In: 1846.24

Sta 82+82.15, 51.9' Rt
Install Double Brace Assembly
Barbed Wire

Sta 83+28.64, 53.4' Rt
Install Double Brace Assembly
Barbed Wire

Sta 85+00.00, 57.0' Rt
Install Double Brace Assembly
Barbed Wire

R/W
75.0'
40.0'
33.0'
36.0'
28.0'
59.3'
60.8'
27.0'

OHP
dHO

Low Point STA 80+83.47
Low Point ELEV 1859.90
PVI STA 80+23.47
PVI ELEV 1860.07
K = 30.98
A.D. = 3.87%
L = 120.00

Low Point STA 82+33.37
Low Point ELEV 1859.47
PVI STA 82+52.69
PVI ELEV 1859.40
K = 36.27
A.D. = 1.65%
L = 60.00

Grade Break STA = 79+50.00
ELEV: 1863.14
VPCS: 79+63.47
VPCE: 1862.58

VPTS: 80+83.47
VPTE: 1859.90

VPCS: 82+22.69
VPCE: 1859.49

VPTS: 82+82.69
VPTE: 1859.81

Grade Break STA = 83+00.00
ELEV: 1860.04

Existing Grade
Proposed Grade

STA = 78+50.00
ELEV = 1858.82
STA = 78+00.00
ELEV = 1857.35
STA = 78+72.55
ELEV = 1853.61
STA = 79+02.47
ELEV = 1852.96
STA = 78+94.65
ELEV = 1857.17
STA = 79+16.13
ELEV = 1857.11
STA = 79+40.00
ELEV = 1854.96
STA = 79+50.00
ELEV = 1854.96
STA = 79+40.00
ELEV = 1851.71
STA = 80+24.59
ELEV = 1851.59
STA = 80+26.64
ELEV = 1850.24
STA = 81+05.04
ELEV = 1849.87
Proposed
Sta 81+53.93
Double 16' x 10' RCB
With Wing Walls
W Inv. 1846.34
E Inv. 1846.24
STA = 83+00.00
ELEV = 1852.32
STA = 83+10.00
ELEV = 1853.22
STA = 83+10.00
ELEV = 1853.15
STA = 83+49.49
ELEV = 1853.67
STA = 83+25.00
ELEV = 1853.43
STA = 83+96.28
ELEV = 1854.62
STA = 84+15.33
ELEV = 1855.47
STA = 85+00.00
ELEV = 1857.98
STA = 85+00.00
ELEV = 1858.35

-5.17%
-3.70%
-0.29%
-9.02%
0.00%
-6.15%
-0.14%
-2.16%
-3.32%
-0.48%
-2.24%
-3.94%
-4.17%
2.41%
-0.29%
1.80%
8.94%
1.45%
5.28%
1.33%
2.25%
2.01%
3.41%
3.25%
.36%

1900
1890
1880
1870
1860
1850
1840

1874.08
1870.70
1865.28
1861.14
1861.27
1859.83
1859.85
1859.59
1859.55
1860.04
1860.04
1862.15
1864.85
1865.97

77+50
78+00
79+00
80+00
81+00
82+00
83+00
84+00
85+00
85+50

Legend

Plan

Ditch Regrading Areas

Profile

Right Ditch Profile
Left Ditch Profile
Right/Left Ditch Profile

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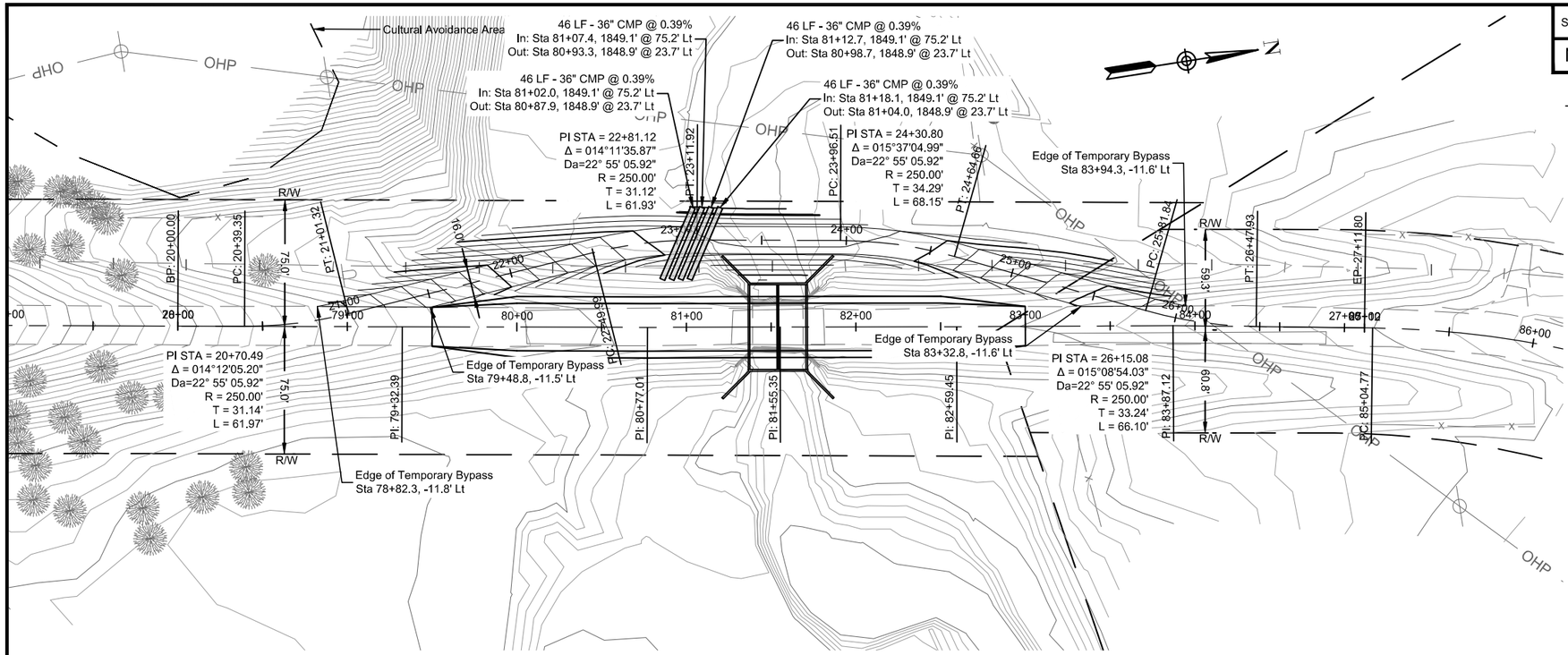
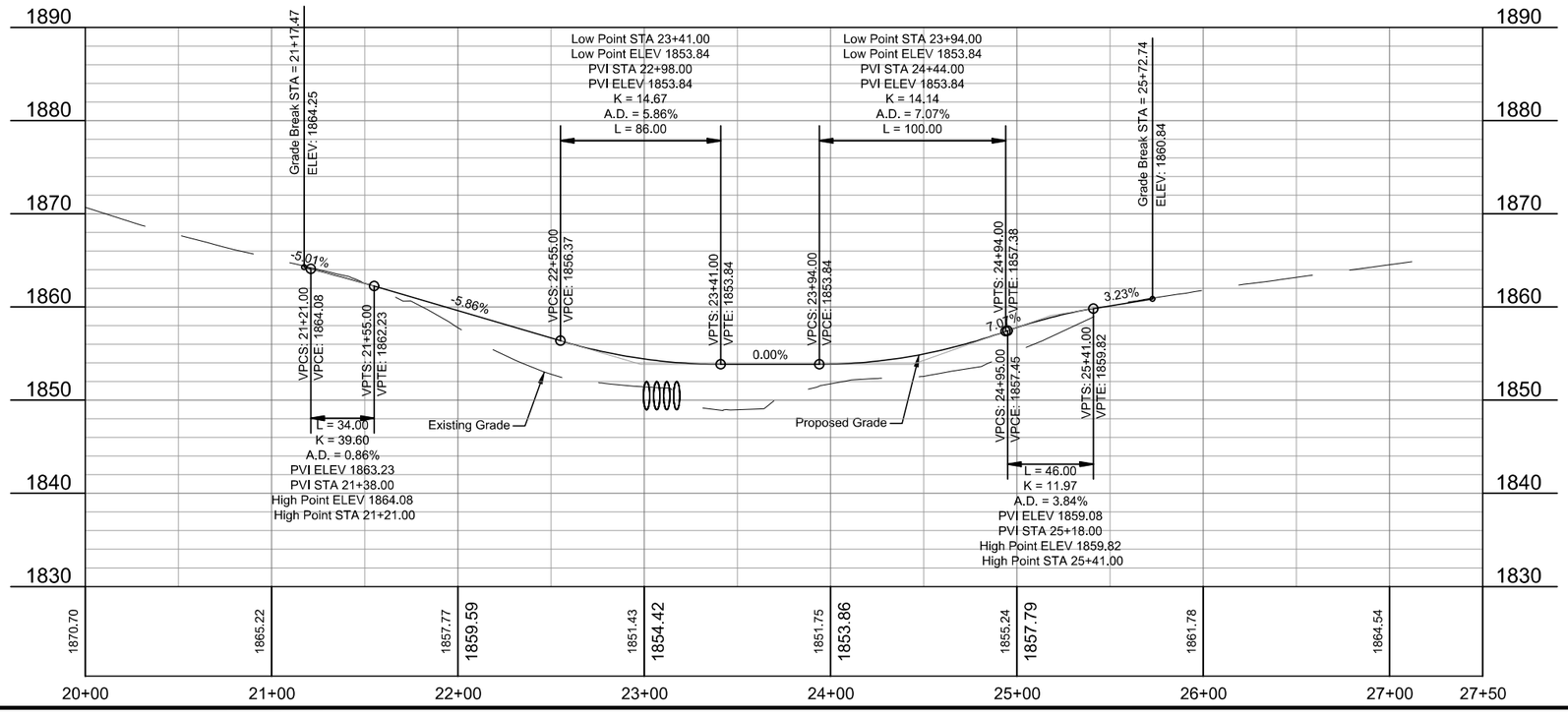
SCALE (H): 1"=80'
SCALE (V): 1"=16'

40 20 0 40 80

Bridge Replacement
CR 15 over Long Creek, Williams County

Plan & Profile





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	60	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
714	4115	PIPE CONDUIT 36IN	LF	
		STA 80+87.9 to 81+02.0 Lt		46
		STA 80+93.3 to 81+07.4 Lt		46
		STA 80+98.7 to 81+12.7 Lt		46
		STA 81+04.0 to 81+18.1 Lt		46

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 02/27/2025
NORTH DAKOTA

ACKERMAN ESTVOLD
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SCALE (H): 1"=80'
SCALE (V): 1"=16'
40 20 0 40 80

Bridge Replacement
CR 15 over Long Creek, Williams County

Plan & Profile
Temporary Road Bypass

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impacts Acre(s)			Wetland Mitigation											
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
					Temp.	Perm. (Fill/ Drain)	Perm (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
1	Sec. 3, T153N, R98W	Ditch	Modified Natural	Yes	0.016	0.023	0.017	Y	Y	N/A	Ducks Unlimited 1:1 Ratio	0.023	N/A	0	N/A	0	N/A	0	N/A	N/A
2	Sec. 3, T153N, R98W	Slope	Natural	Yes				N/A	N/A	N/A	Ducks Unlimited 1:1 Ratio	0	N/A	0	N/A	0	N/A	0	N/A	N/A
3	Sec. 3, T153N, R98W	Ditch	Modified Natural	No		0.028	0.037	Y	Y	N/A	Ducks Unlimited 1:1 Ratio	0.028	N/A	0	N/A	0	N/A	0	N/A	N/A
4	Sec. 3, T153N, R98W	Slope	Natural	No			0.005	Y	Y	N/A	Ducks Unlimited 1:1 Ratio	0	N/A	0	N/A	0	N/A	0	N/A	N/A
					0.016	**0.051**	**0.059**					**0.051**		**0**		**0**		**0**		

Other Waters Impact Table

Other Waters							Impacts to Other Waters						Other Water Mitigation					
			Size					Acre(s)			Linear Feet			Mitigation Required					
Number	Location	Type	Acre(s)	Linear Feet	Feature	USACE Jurisdictional[1]	Temp	Perm Loss	Perm No Loss	Temp	Perm Loss	Perm No Loss	EO 11990	USACE	USFWS	Mitigation Location; ratio	Method	Acres
OW 1	Sec.3, T153N, R98W	Stream	0.21	177	Natural	Yes	0.052	0.085	0.041	49	61	40	N	Y	N/A	N/A	Ducks Unlimited 2:1 Ratio	0.085
		Totals	**0.21**	**177**			**0.052**	**0.085**	**0.041**	**49**	**61**	40						

[1] A wetland Preliminary Jurisdictional Determination was issued by the USACE on 7/11/2023; NWO-2023-00937-BIS.

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD (Fill/Drain)	0.051	Temporary JD	0.016
Natural/Non-JD (Fill/Drain)	0.0	Non-JD Temporary	
Artificial/JD (Fill/Drain)	0.0	Permanent JD > 0.10	
Artificial /Non-JD (Fill/Drain)	0.0	Total	0.016
Total Mitigation Amount (1:1 Ratio)	**0.051**	Permanent OW Perm Loss	0.085ac/61 ft.
Natural/JD (Cut)	**0.059**	Permanent OW Perm No Loss	0.041ac/40 ft.
Natural/Non-JD (Cut)	**0.0**	Temporary OW	0.052ac/49 ft.
Artificial/JD (Cut)	**0.0**	Permanent OW-d	
Artificial /Non-JD (Cut)	**0.0**	Temporary OW-d	
Total	**0.059**	Total Mitigation Amount (2:1 Ratio)	**0.085 @ 2:1. Total = 0.170**

Mitigation Summary Table

	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	Ducks Unlimited	N/A		0.221	
EO 11990 Only					
USACE/11990					
USFWS	N/A				
		Total	**0**	**0.221**	**0**

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AUSTIN T. BECKER
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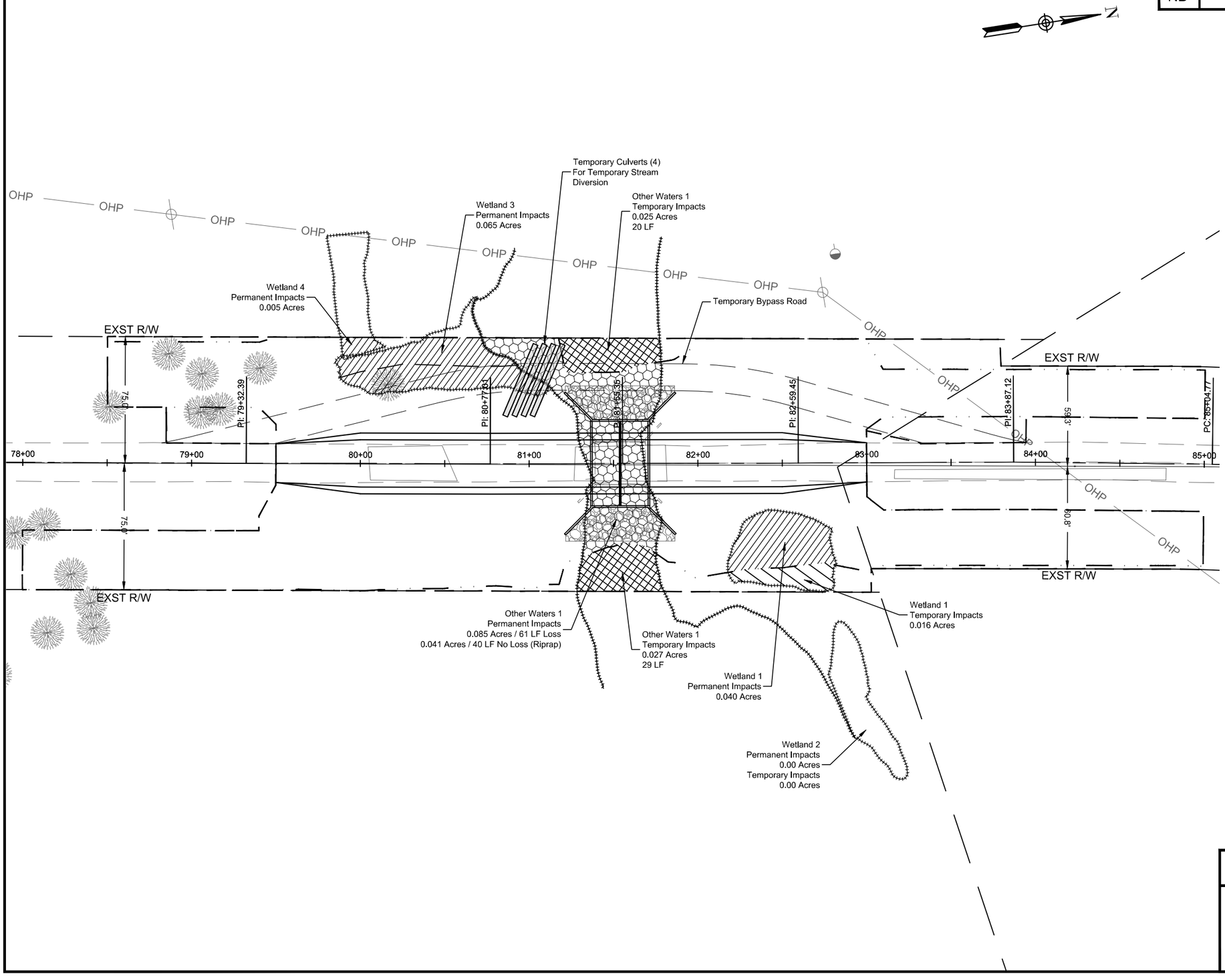
Bridge Replacement
CR 15 over Long Creek, Williams County

Wetlands Mitigation and Environmental

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	75	2



Legend

- Temporary Wetland Impacts
- Permanent Wetland Impacts
- Temporary Other Waters Impacts
- Permanent Other Waters Impacts
- Grading Limits
- Grading Tie Road/Structure Improvement
- Delineated Aquatic Resource

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SCALE (H): 1"=60'
SCALE (V): NA

30 15 0 30 60

Bridge Replacement
CR 15 over Long Creek, Williams County

Wetland Impacts

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	76	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP	ACRE	
		STA 78+50 to STA 85+00 Lt		0.62
		STA 78+00 to STA 85+00 Rt		0.76

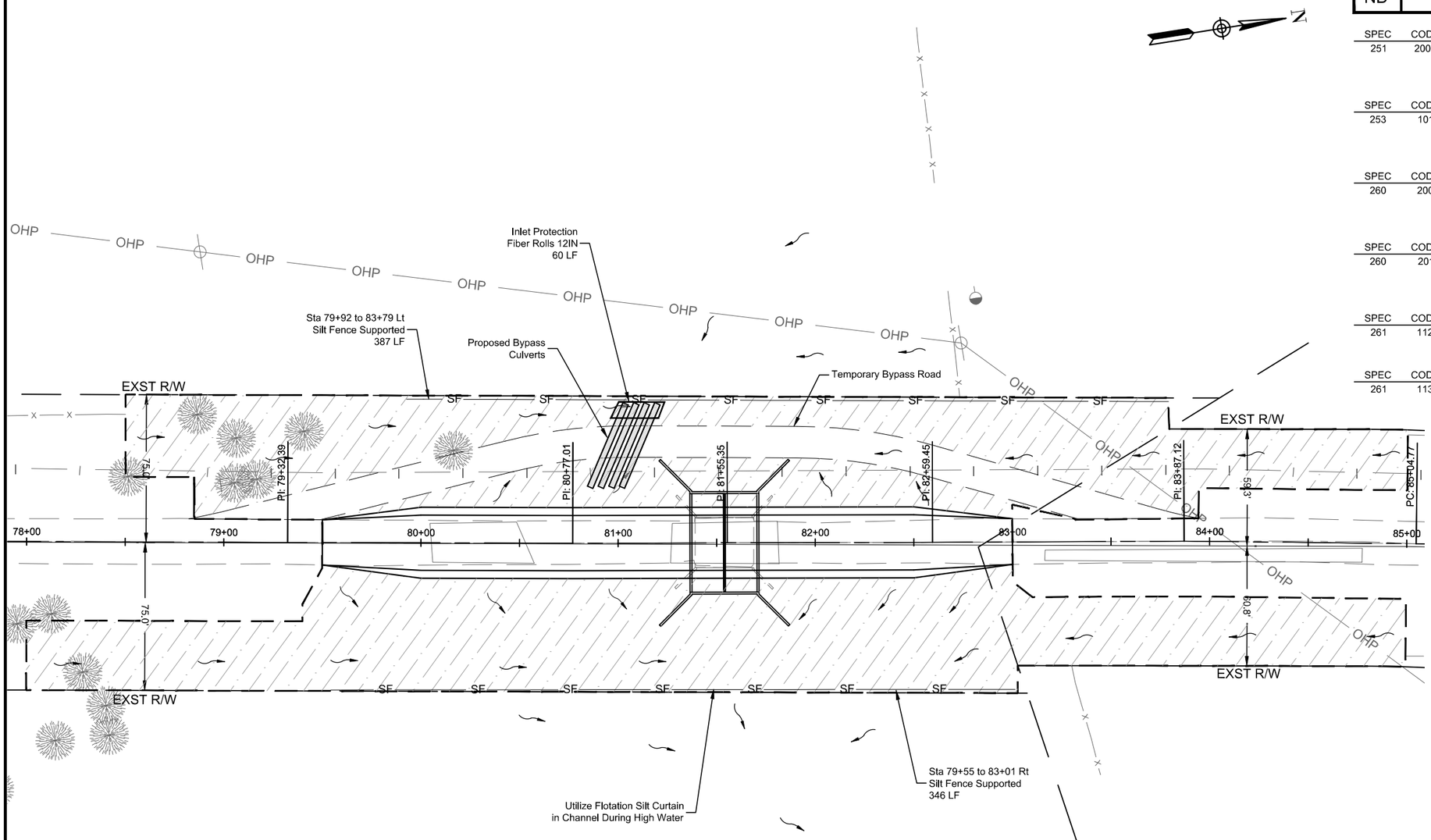
SPEC	CODE	BID ITEM	UNIT	QUANTITY
253	101	STRAW MULCH	ACRE	
		STA 78+82 to STA 83+95 Lt		0.62
		STA 79+50 to STA 83+00 Rt		0.76

SPEC	CODE	BID ITEM	UNIT	QUANTITY
260	200	SILT FENCE SUPPORTED	LF	
		STA 79+92 to STA 83+79 Lt		387
		STA 79+55 to STA 83+01 Rt		346

SPEC	CODE	BID ITEM	UNIT	QUANTITY
260	201	REMOVE SILT FENCE SUPPORTED	LF	
		STA 79+92 to STA 83+79 Lt		387
		STA 79+55 to STA 83+01 Rt		346

SPEC	CODE	BID ITEM	UNIT	QUANTITY
261	112	FIBER ROLLS 12IN	LF	
		Inlet Protetion		60

SPEC	CODE	BID ITEM	UNIT	QUANTITY
261	113	REMOVE FIBER ROLLS 12IN	LF	
		Inlet Protetion		60



Legend

- Temporary Cover Crop & Straw Mulch
- Grading Limits
- SF — Silt Fence Supported
- Fiber Rolls 12IN
- Flow Direction

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SCALE (V): NA

30 15 0 30 60

Bridge Replacement
CR 15 over Long Creek, Williams County

Temporary Erosion Control

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	77	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II	ACRE	
		STA 78+50 to STA 85+00 Lt		0.76
		STA 78+00 to STA 85+00 Rt		0.73

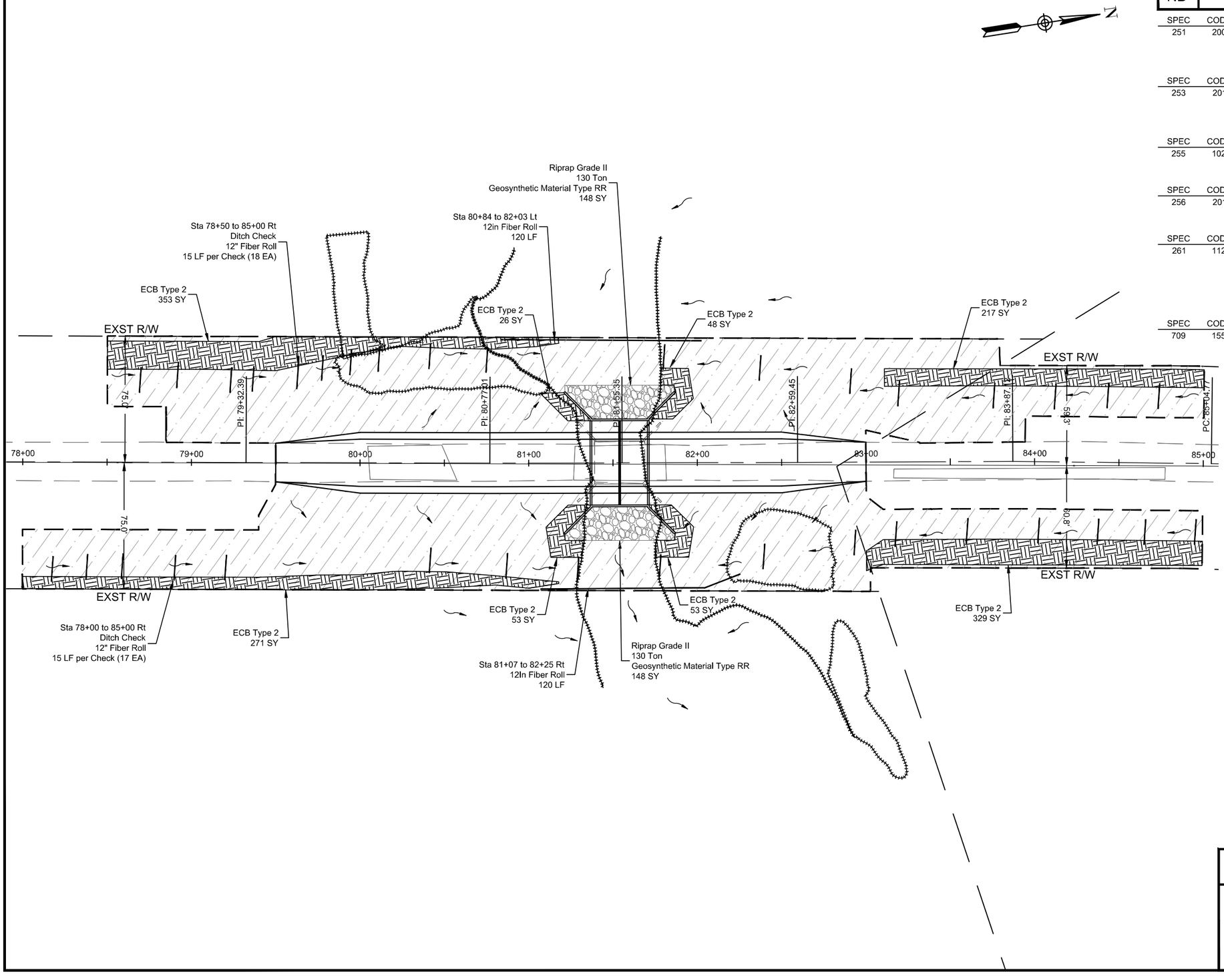
SPEC	CODE	BID ITEM	UNIT	QUANTITY
253	201	HYDRAULIC MULCH	ACRE	
		STA 78+50 to STA 85+00 Lt		0.76
		STA 78+00 to STA 85+00 Rt		0.73

SPEC	CODE	BID ITEM	UNIT	QUANTITY
255	102	ECB TYPE 2	SY	
		Sheet Quantity		1350

SPEC	CODE	BID ITEM	UNIT	QUANTITY
256	201	RIPRAP GRADE II	TON	
		Sheet Quantity		260

SPEC	CODE	BID ITEM	UNIT	QUANTITY
261	112	FIBER ROLLS 12IN	LF	
		STA 80+84 to STA 82+03 Lt		120
		STA 81+07 to STA 82+25 Rt		120
		STA 78+50 to STA 85+00 Lt Ditch Checks		270
		STA 78+00 to STA 85+00 Rt Ditch Checks		255

SPEC	CODE	BID ITEM	UNIT	QUANTITY
709	155	GEOSYNTHETIC MATERIAL TYPE RR	SY	
		Sheet Quantity		296



Legend

- Seeding Class II & Hydraulic Mulch
- ECB Type 2
- Riprap Grade II
- Grading Limits
- 12" Fiber Roll
- Flow Direction

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SCALE (V): NA
30 15 0 30 60

Bridge Replacement
CR 15 over Long Creek, Williams County

Permanent Erosion Control

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - CR 15 William County Bridge Replacement

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
EX CR 15 Align			
BOP	75+61.70	415313.14	1293932.49
PI	76+01.83	415352.86	1293938.15
PI	79+32.39	415679.19	1293990.85
PI	80+77.01	415821.99	1294013.76
PI	81+55.35	415899.40	1294025.83
PI	82+59.45	416002.25	1294041.88
PI	83+87.12	416128.46	1294061.17
PC1	85+04.77	416147.72	1294080.86
PI	90+10.98	416743.52	1294165.59
PT1	93+36.20	416725.20	1294671.47
EOP	94+20.10	416722.17	1294755.31
PRCR15_TBypass_W			
BOP	20+00.00	415548.50	1293969.74
PC1	20+39.35	415587.35	1293976.02
PI	20+70.49	415618.09	1293980.98
PT1	21+01.32	415649.11	1293978.25
PC2	22+49.99	415797.22	1293965.22
PI	22+81.12	415828.22	1293962.49
PT2	23+11.92	415858.95	1293967.45
PC3	23+96.51	415942.46	1293980.93
PI	24+30.80	415976.31	1293986.38
PT3	24+64.66	416007.44	1294000.76
PC4	25+81.84	416113.82	1294049.87
PI	26+15.08	416144.00	1294063.81
PT4	26+47.93	416176.77	1294069.37
EOP	27+11.80	416239.74	1294080.06

CURVE DATA

ARC DEFINITION

EX CR 15 Align		
	Curve 1	
PI STA	= 90+10.98	
Delta	= 82° 26' 17" (RT)	
D_a	= 9° 54' 54.6"	
R	= 577.86'	
T	= 506.22'	
L	= 831.43'	

PRCR15_TBypass_W			
	Curve 1		Curve 2
PI STA	= 20+70.49	PI STA	= 22+81.12
Delta	= 14° 12' 05" (LT)	Delta	= 14° 11' 36" (RT)
D_a	= 22° 55' 5.92"	D_a	= 22° 55' 5.92"
R	= 250.00'	R	= 250.00'
T	= 31.14'	T	= 31.12'
L	= 61.97'	L	= 61.93'
	Curve 3		Curve 4
PI STA	= 24+30.80	PI STA	= 26+15.08
Delta	= 15° 37' 05" (RT)	Delta	= 15° 08' 54" (LT)
D_a	= 22° 55' 5.92"	D_a	= 22° 55' 5.92"
R	= 250.00'	R	= 250.00'
T	= 34.29'	T	= 33.24'
L	= 68.15'	L	= 66.10'

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
NW Sec Cor	Sec 3 T-154-N R-98-W	417529.29	1289191.43
SW Sec Cor	Sec 35 T-154-N R-98-W	417331.73	1294460.45
S Sec Cor	Sec 35 T-154-N R-98-W	417231.68	1297094.62
W Sec Cor	Sec 3 T-153-N R-98-W	414898.89	1289097.55
Sec Cor	Sec 3 T-153-N R-98-W	414795.43	1291733.12
E Sec Cor	Sec 3 T-153-N R-98-W	414692.11	1294368.56
NE Sec Cor	Sec 9 T-153-N R-98-W	412260.47	1289006.69
N Sec Cor	Sec 10 T-153-N R-98-W	412157.05	1291640.14
SE Sec Cor	Sec 3 T-153-N R-98-W	412055.01	1294276.36

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
CONTROL POINT DESCRIPTION					
PRIMARY CONTROL					
1	435679.34	1295138.819	2150.19		
119	415942.01	1296233.53	1938.73		

NOTES:

Date Survey Completed: 2022

☐ Assumed Coordinates

☒ All coordinates on this sheet are Williams County Ground Coordinates. They are derived from the "North Dakota Coordinate System of 1983", NAD83(Conus), North Zone. Combination Factor (cf) = 0.9998462

All coordinates and measurements on this document derived from the International Foot Definition

INITALIZING BENCH MARK
Grid North

☒ NAVD-88
☐ NGVD-29

☐ GEOID12B
☒ GEOID18B

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 02/27/2025
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE						35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES						28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)						18	
G20-2-48	**48"x24"**	**END ROAD WORK**			**2**		**2**	**26**	**52**
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**		**2**	**59**	**118**
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)						10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)						7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)						7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)						7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)						7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)						7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT						15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)						7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)						7	
R1-1-48	48"x48"	STOP						32	
R1-2-60	60"x60"	YIELD						29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**4**				**4**	**30**	**120**
R2-1-48	**48"x60"**	**SPEED LIMIT __**			**4**		**4**	**39**	**156**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**		**2**		**2**	**10**	**20**
R3-2-48	48"x48"	NO LEFT TURN						35	
R4-1-48	48"x60"	DO NOT PASS						39	
R4-7-48	48"x60"	KEEP RIGHT						39	
R5-1-48	48"x48"	DO NOT ENTER						35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)						14	
R7-1-12	12"x18"	NO PARKING ANY TIME						11	
R10-6-24	**24"x36"**	**STOP HERE ON RED**			**2**		**2**	**16**	**32**
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)						15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)						15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT						35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**			**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**			**2**		**2**	**26**	**52**
W3-1-48	48"x48"	STOP AHEAD						35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**			**2**		**2**	**35**	**70**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**				**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**		**2**		**2**	**35**	**70**
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						35	
W8-3-48	48"x48"	PAVEMENT ENDS						35	
W8-7-48	48"x48"	LOOSE GRAVEL						35	
W8-11-48	48"x48"	UNEVEN LANES						35	
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						35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE						35	
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)						14	
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**		**2**		**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __FT or _ MILE						35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE						35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**			**2**		**2**	**35**	**70**
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**				**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**				**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)						12	
W21-1-48	48"x48"	WORKERS						35	
W21-2-48	48"x48"	FRESH OIL						35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE						35	
W21-5-48	48"x48"	SHOULDER WORK						35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED						35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE						35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-6-48	48"x48"	SURVEY CREW						35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT						35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY						35	
W21-52-48	48"x48"	PAVEMENT BREAKS						35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD						35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK						35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE						35	

SPECIAL SIGNS

SPEC & CODE	DESCRIPTION	TOTAL UNITS
704-1000	**TRAFFIC CONTROL SIGNS**	**1074**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1	2	3		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**200**				**200**
704-1048	PORTABLE RUMBLE STRIPS	EACH					
704-1050	TYPE I BARRICADES	EACH					
704-1052	**TYPE III BARRICADES**	EACH		**4**			**4**
704-1060	**DELINEATOR DRUMS**	EACH		**10**			**10**
704-1065	TRAFFIC CONES	EACH					
704-1067	TUBULAR MARKERS	EACH					
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	STACKABLE VERTICAL PANELS	EACH					
704-1081	**VERTICAL PANELS - BACK TO BACK**	EACH			**50**		**50**
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					
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF					
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH					
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	SHORT TERM 4IN LINE - TYPE R	LF					
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/

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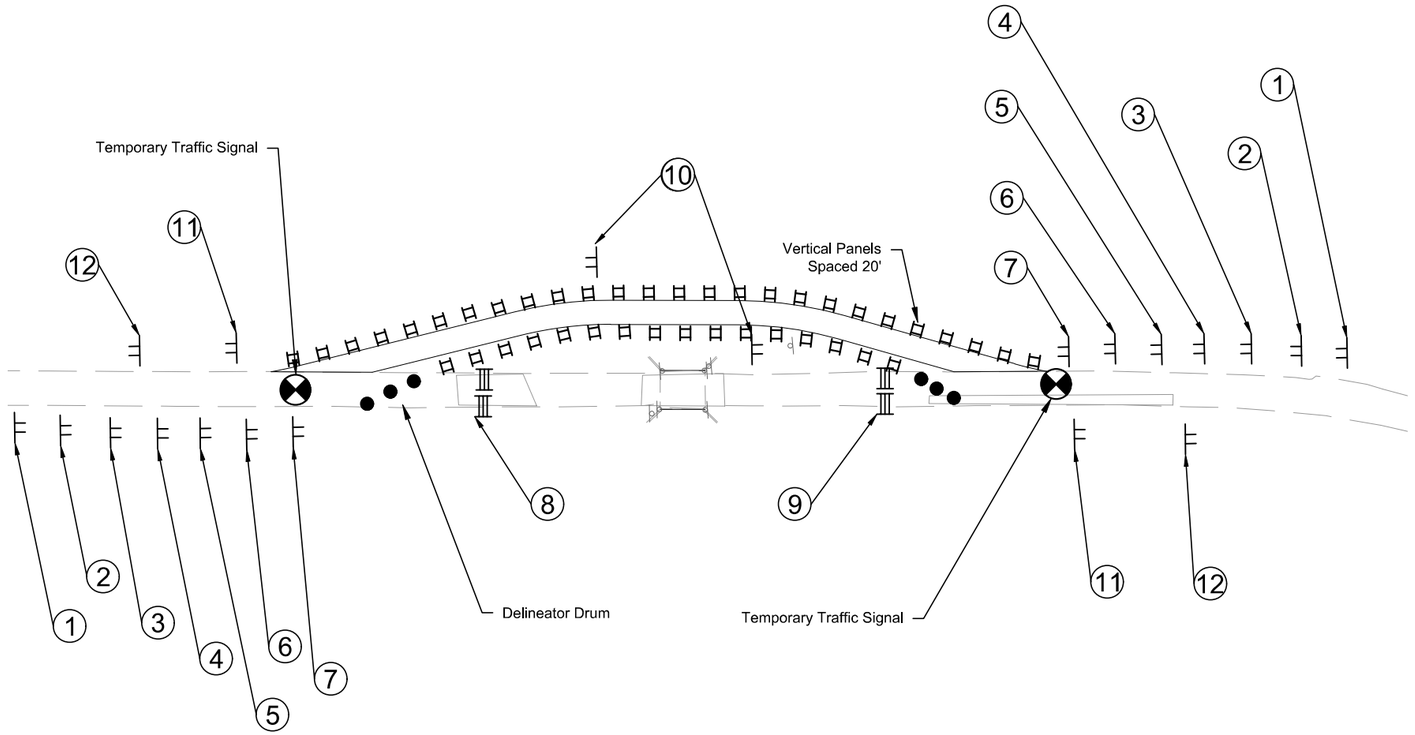
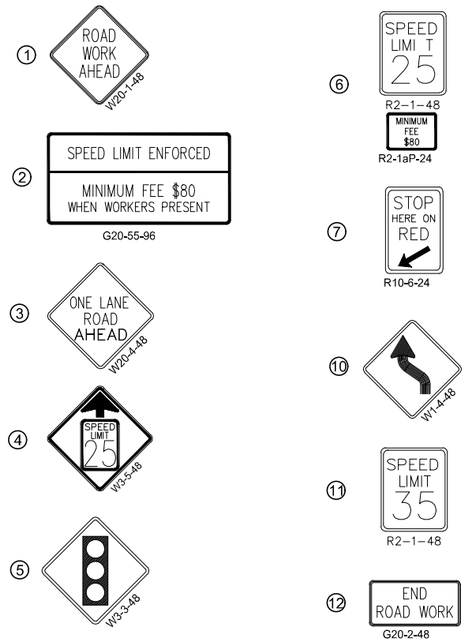
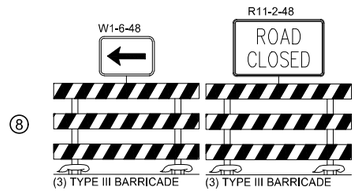
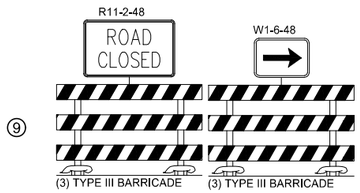
Traffic Control Devices List
Bridge Replacement
CR 15 over Long Creek, Williams County

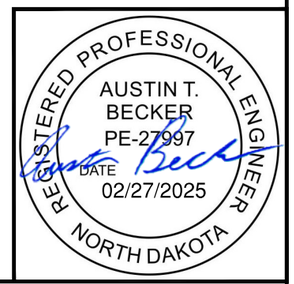
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	100	2











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SCALE (H): NA
SCALE (V): NA

0 0 0 0 0

Bridge Replacement
CR 15 over Long Creek, Williams County

Work Zone Traffic Control
Temporary Bypass

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	N.D.	BRP-BRC-5300(018)	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
CR 15																							
82+26 Lt	W1-4-30L	19		6.3	13.3				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
Sub Total			0.0	6.3		**Total**	13.3										**Total**	4.0		0	0	0	
Grand Total			**0.0**	**6.3**		**Total**	**13.3**										**Total**	**4**	**0**	**0**	**0**	**0**	

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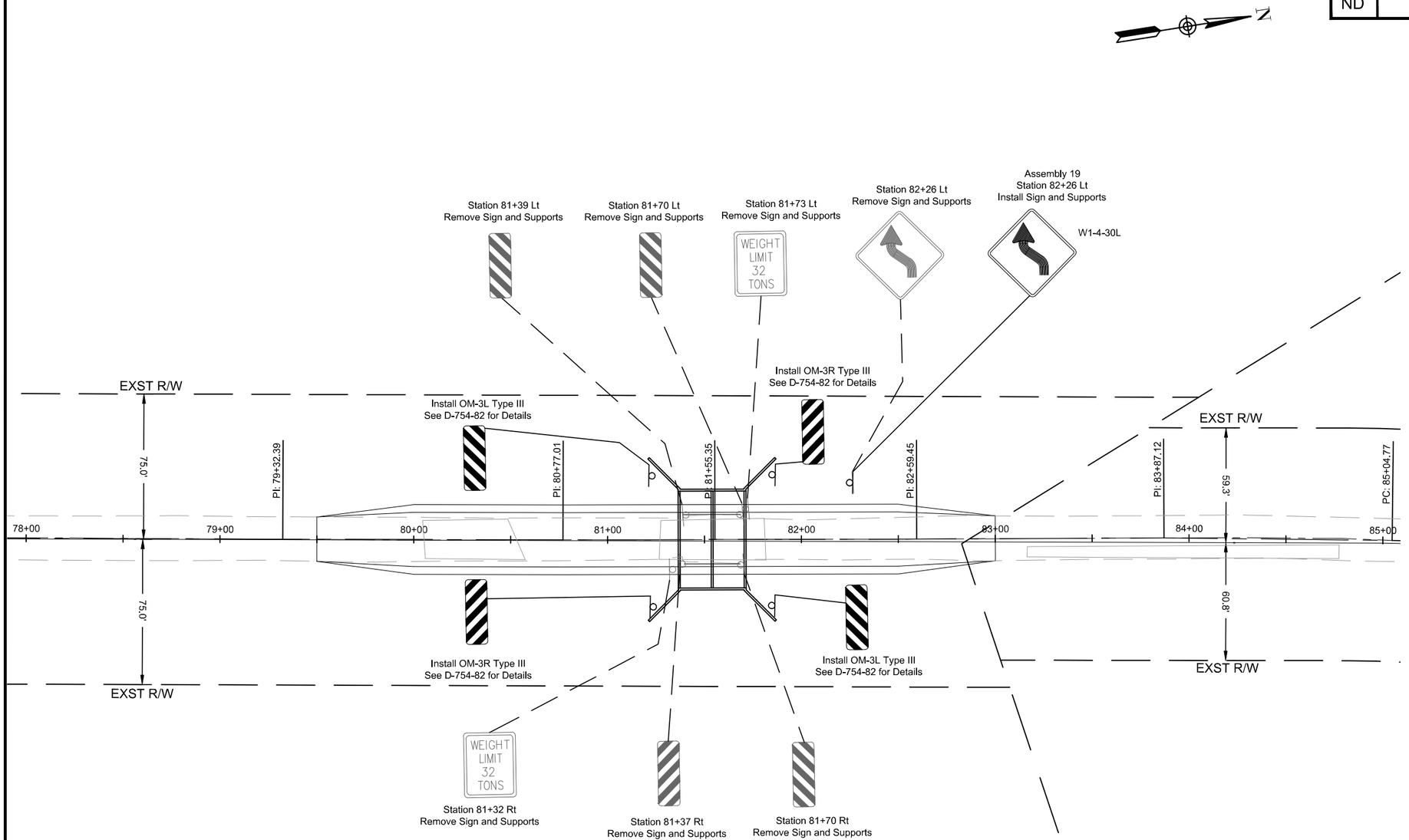
Sign Summary
Perforated Tube

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	110	2



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NORTH DAKOTA
AUSTIN T. BECKER
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SCALE (H): 1"=100'
SCALE (V): NA

30 15 0 30 60

Bridge Replacement
CR 15 over Long Creek, Williams County

Sign Layout

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	170	1

PRECAST CONCRETE BOX CULVERT NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and Installing a double 16' x '10 x 52'-0" precast concrete box culvert.

202 REMOVAL OF STRUCTURE: The existing structure is an 30’ long by 26’ wide single-span bridge. The existing structure consists of a concrete deck overlaid with aggregate and asphalt on a steel superstructure and concrete substructure. Any pilings not fully removed to be cut off at a minimum of one foot below the box culvert excavation limits. The Contractor shall arrange for and secure a suitable disposal site including any permits and site releases for the disposal site. Include all work required to remove the single-span bridge in the contract unit price for “Removal of Structure.”

210 FOUNDATION FILL – TYPE I: A minimum of 30” of material shall be placed underneath the proposed box culverts. This material shall consist of free draining rock with 100 percent passing the 2-inch sieve and no more than 5 percent passing the #4 sieve. The rock shall be compacted in maximum 12” lifts using a vibratory compactor.

FOUNDATION PREPARATION: The Bidder shall be aware of the possible inundated conditions at this site before the bid letting including springs. If a spring is discovered that impacts the intended work, notify the Engineer immediately to determine a course of action. Any extra costs or delays caused by the spring shall not be justification for additional time. The cost of any cofferdams, dewatering the excavation and all measures required to maintain a stable foundation shall be included in the price bid for “Foundation Preparation”.

STRUCTURAL EXCAVATION: Excavation required to construct the box culvert and place surrounding foundation fill material shall be included in the price bid for “Box Culvert Excavation”. If unsuitable material is encountered in the subgrade underneath the proposed box culvert location, subcut to a depth determined by the Engineer and replace with additional Foundation Fill – Type 1 material. A subcut depth of 2’ is included in the quantity for Common Excavation – Subcut. The additional Foundation Fill - Type I and Common Excavation - Subcut will be paid at the unit bid price.

606 PRECAST REINFORCED CONCRETE BOX CULVERT AND WINGWALLS:

1. The Contractor is responsible for the design of the precast box culvert and end sections. Shop drawings submitted to the Engineer to be stamped by a professional engineer licensed in the state of North Dakota.
2. Box sections shall be secured to one another by use of tie bolts. The last precast section shall include a 1’ by 1’ parapet extending to the outside edge of the box. A cutoff wall shall be installed as shown on the plans. The joints shall be sealed with a flexible, watertight, preformed mastic meeting AASHTO M 220. In addition to the joint sealant, geosynthetic material shall be placed per Section 606.04 E.3 of the NDDOT Standard Specifications.
3. Separate single cell precast units may be used as alternatives to multi cell culvert. Provide a minimum distance of 6” between separate precast units and maximum distance of 1’-0”. Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. The Contractor shall provide a mix design and compression strength test results of the material to the Engineer for approval 5 days prior to placement.
4. If single cell precast units are used cap the controlled density backfill with a 12” thick cap. The 12” thick cap to consist of weatherproof and freeze/thaw resistant material such as Sikagrout 212. EVA-POX Epoxy Past No. 22, Speed Crete Red Line, or an approved equal.
5. Each end section shall consist of two wingwalls, anchors, and footing. The wingwalls shall be flush with the top of the precast box culvert and extend below the invert elevation of the box. The wingwalls shall be attached to the last box section by use of tie bolts, steel-bolted plates or another approved method so the inside corner surface is smooth. All costs for material and installation shall be included in the price bid for “DBL 16FT X 10FT Precast RCB End Section.”
6. Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer’s recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.
7. All costs associated with the items shall be included in the price bid for the precast units.

Design Loads

HL-93 Loading
Fill Height = 0’ to 3’

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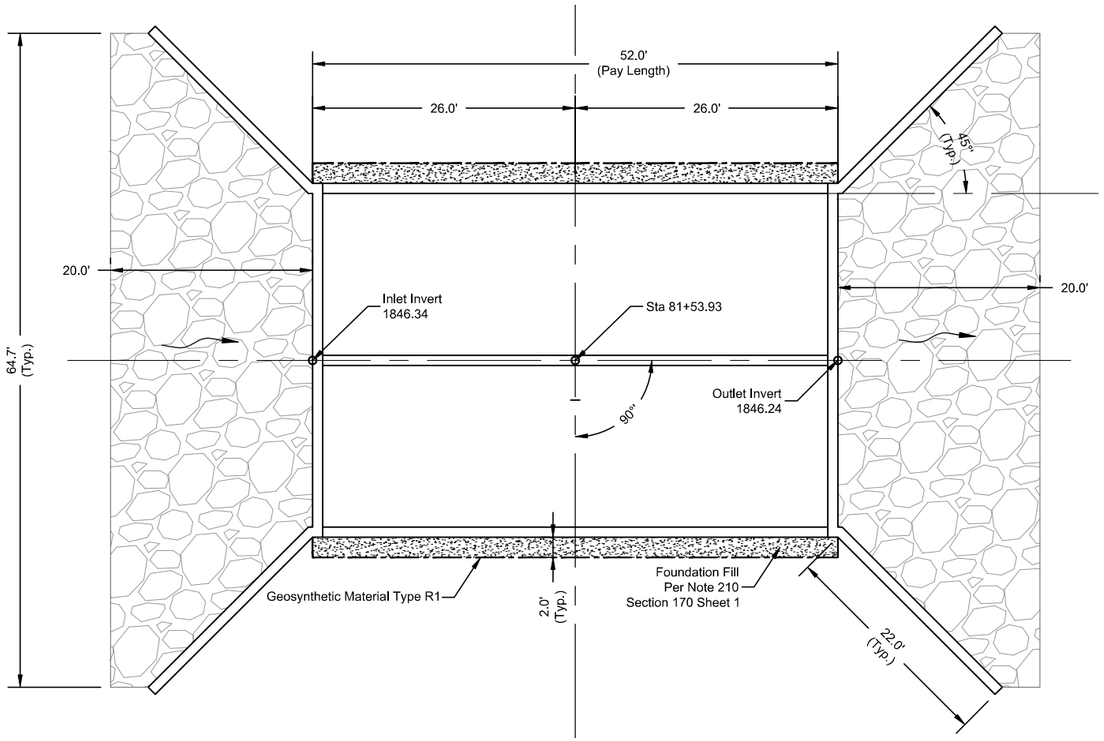
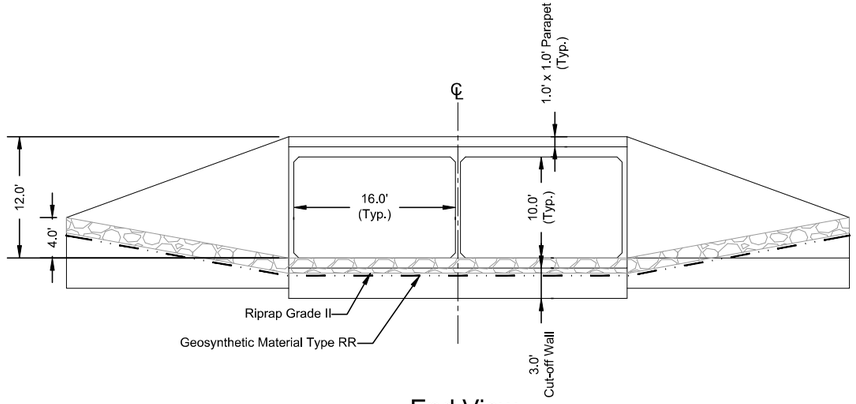
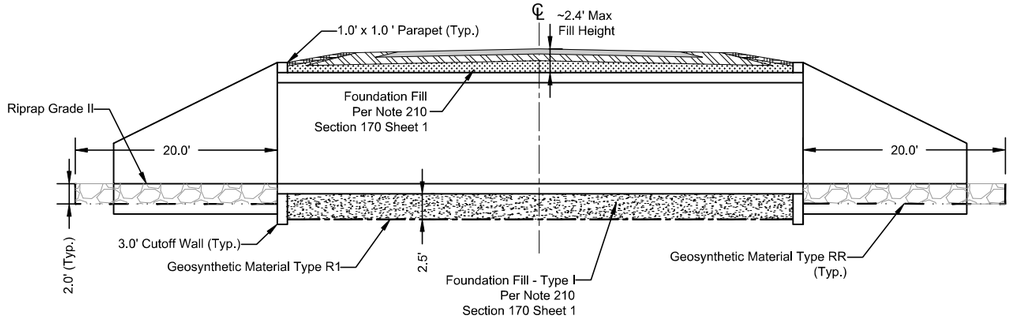
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRP-BRC-5300(018)	170	2



Plan



End View



Elevation

HYDRAULIC DATA

Drainage Area: 20.13 mi^2
Design Frequency: 25 year
Design Discharge: 1,686 cfs
Design Headwater Stage: 1,854.61 ft.
Design Tailwater Stage: 1,852.75 ft.
Velocity Through Culvert: 9.56 fps
100-yr Frequency Discharge: 2,689 cfs
100-yr Frequency Headwater: 1,858.91 ft.
Overtopping Stage: 1,858.91 ft.
Overtopping Discharge: 3,350 cfs

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0050	Box Culvert Excavation	EA	1
210	0209	Foundation Fill	TON	878
210	0225	Foundation Fill-Type I	CY	183
210	0405	Foundation Preparation-Box Culvert	EA	1
256	0200	Riprap Grade II	TON	260
606	3610	DBL 16FT X 10FT Precast RCB Culvert	LF	52
606	7610	DBL 16FT X 10FT Precast RCB End Section	EA	2
709	0151	Geosynthetic Material Type R1	SY	388
709	0155	Geosynthetic Material Type RR	SY	296

Notes:
1. Foundation Fill quantity based on conversion rate of 1.875 TON/CY.
2. Additional quantity added to "Foundation Fill - Type 1" for potential Subcut fill, see Section 10 Basis of Estimate for additional details.

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AUSTIN T. BECKER
PE-27997
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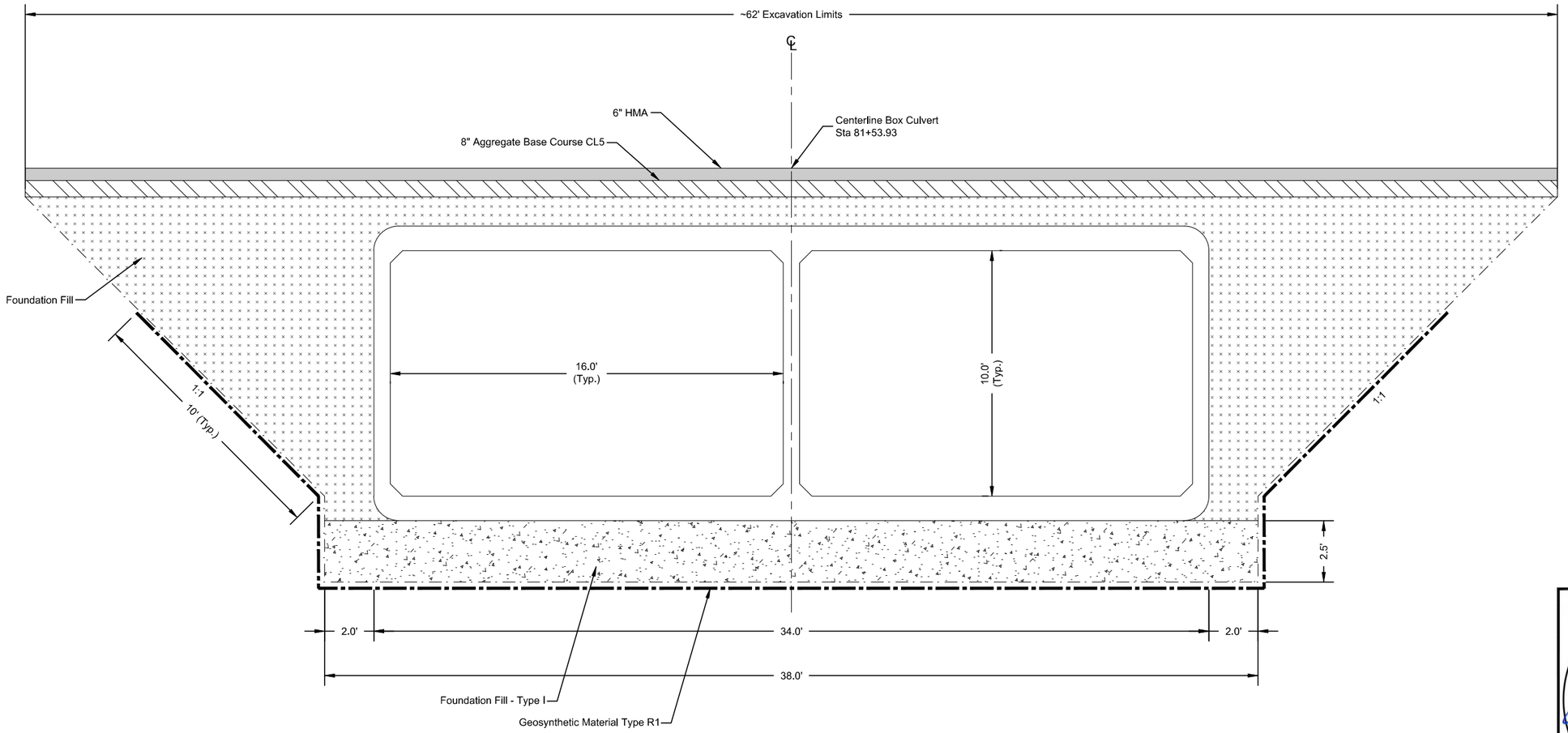
SCALE (H): NA
SCALE (V): NA
0 0 0 0 0

Bridge Replacement
CR 15 over Long Creek, Williams County
Structure #53-137-37.1
Box Culvert Detail
Precast RCBC

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRP-BRC-5300(018)	170	3



Box Culvert Excavation and Backfill

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SCALE (H): NA
SCALE (V): NA

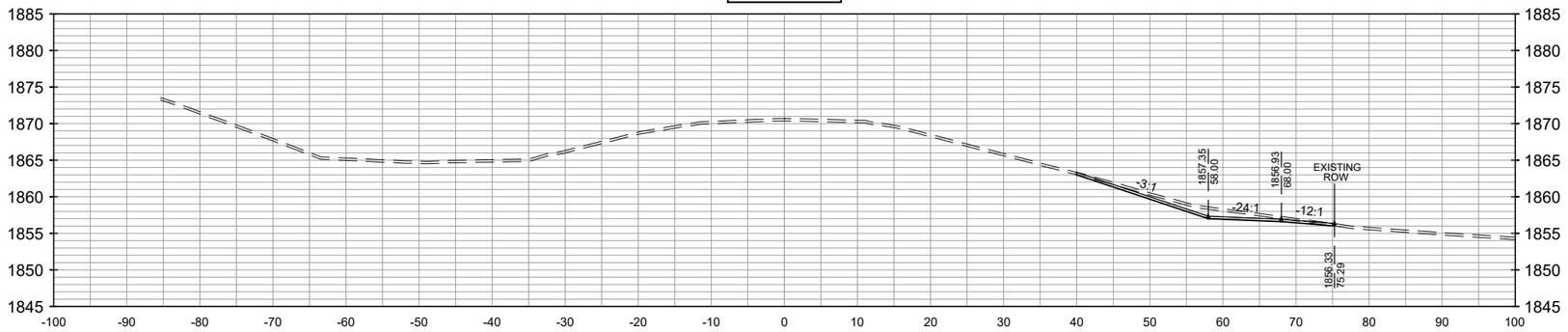
0 0 0 0 0

Bridge Replacement
CR 15 over Long Creek, Williams County
Structure #53-137-37.1
Box Culvert Detail
Precast RCBC

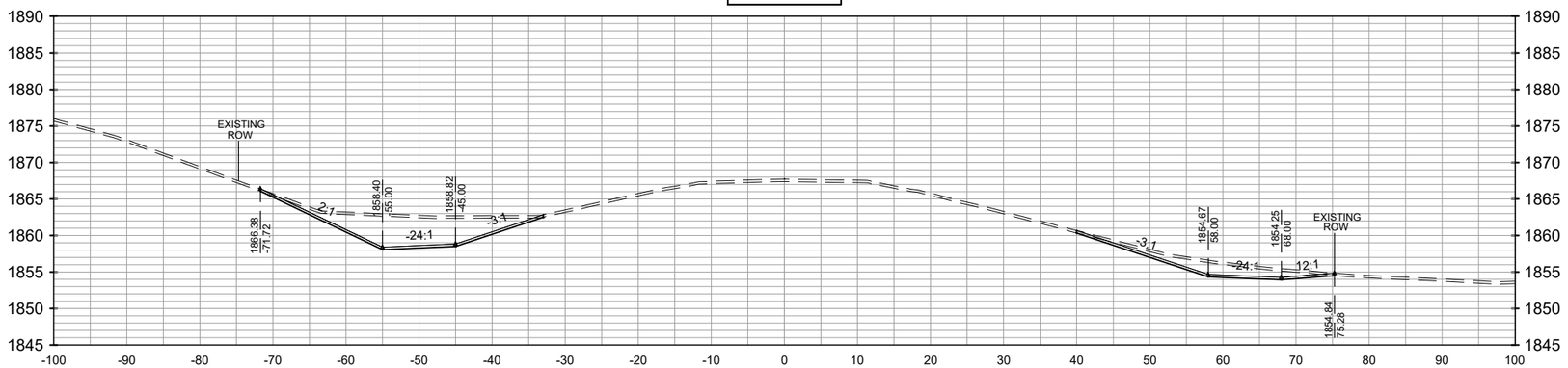
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	1

CR 15 - RCBC

78+00.00



78+50.00



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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

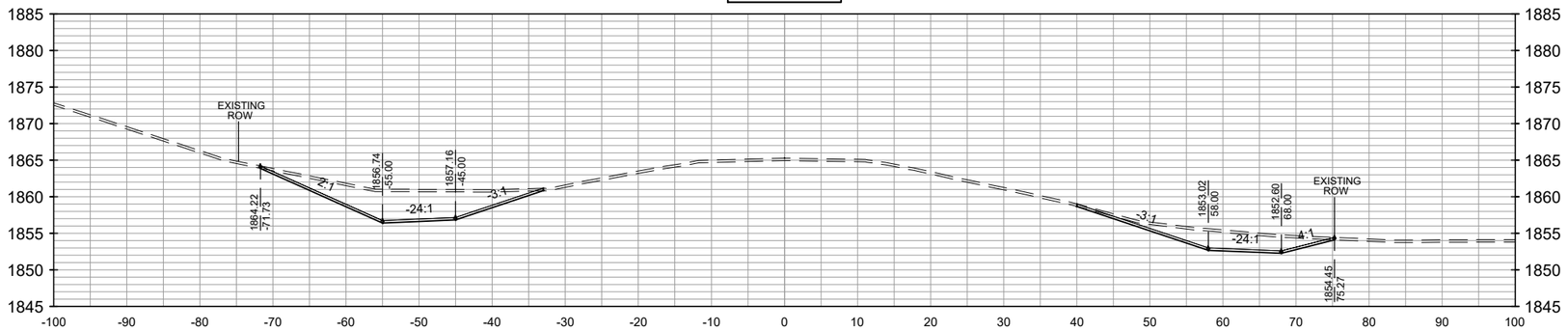
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	2

CR 15 - RCBC

79+00.00



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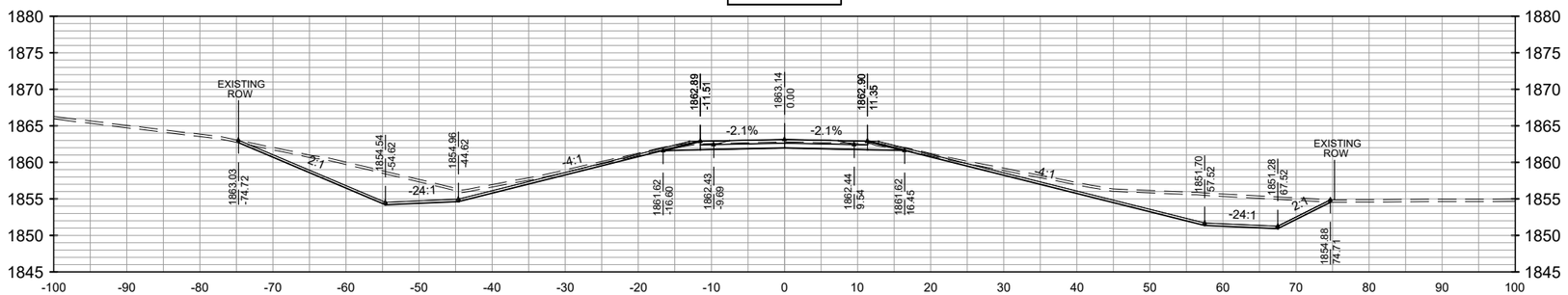

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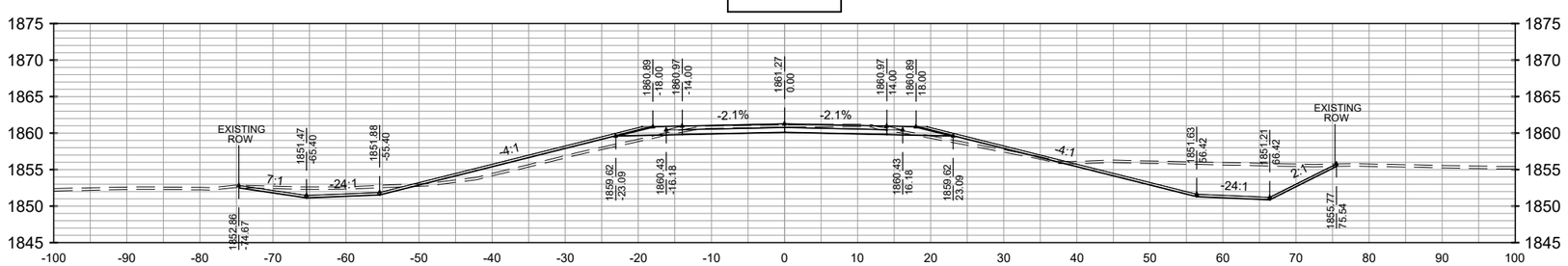

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SCALE (V): 1"=20'

10 5 0 10 20

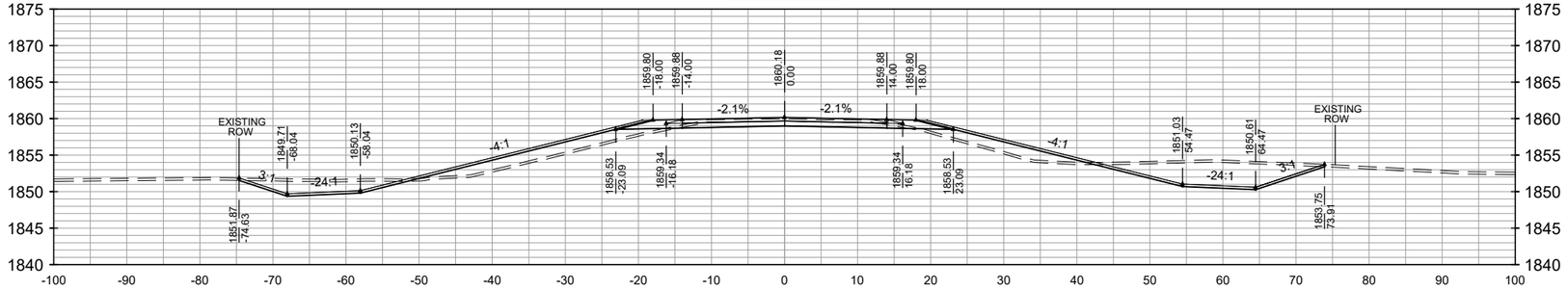
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	3

CR 15 - RCBC

80+50.00



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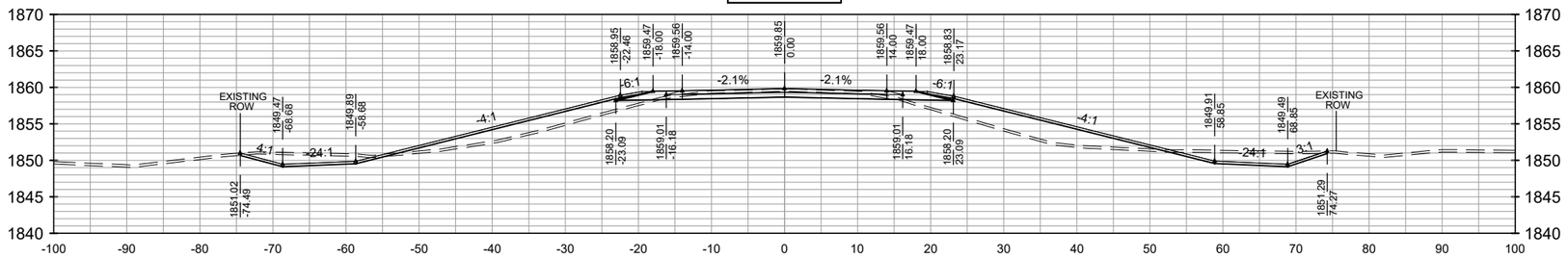

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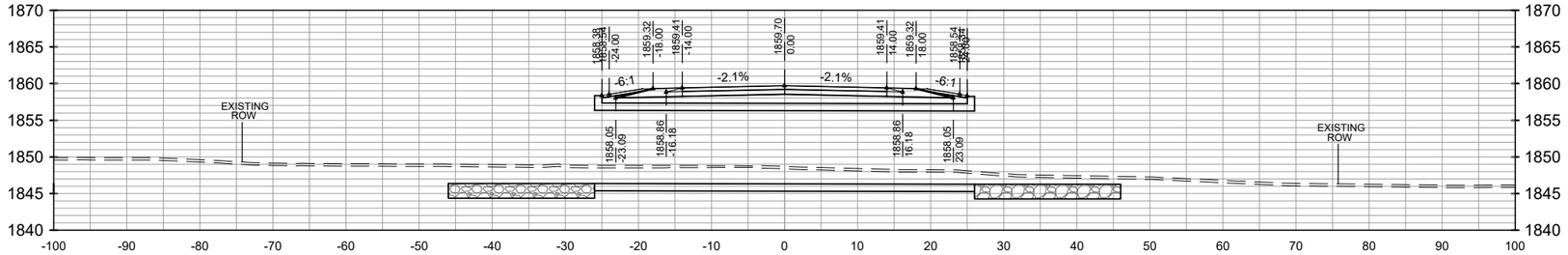

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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

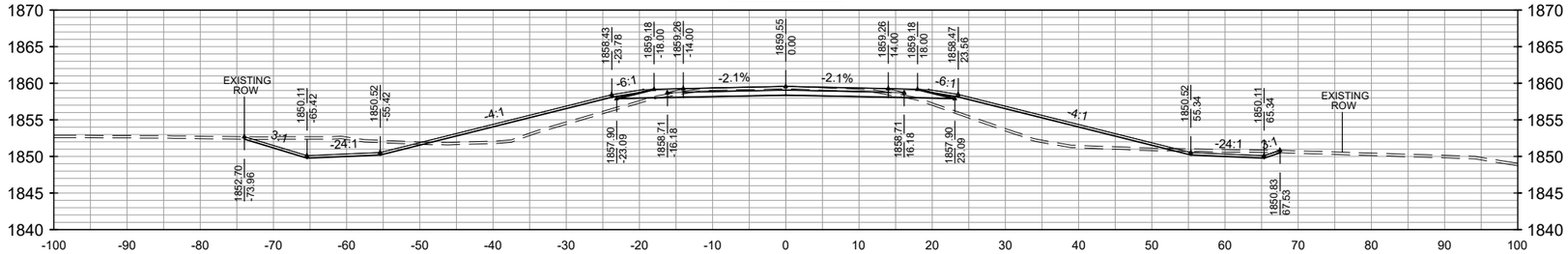
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	4

CR 15 - RCBC

82+00.00



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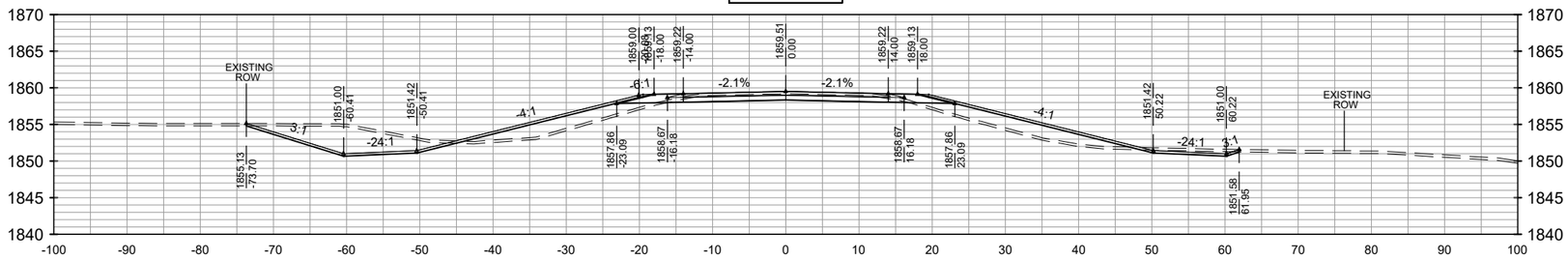
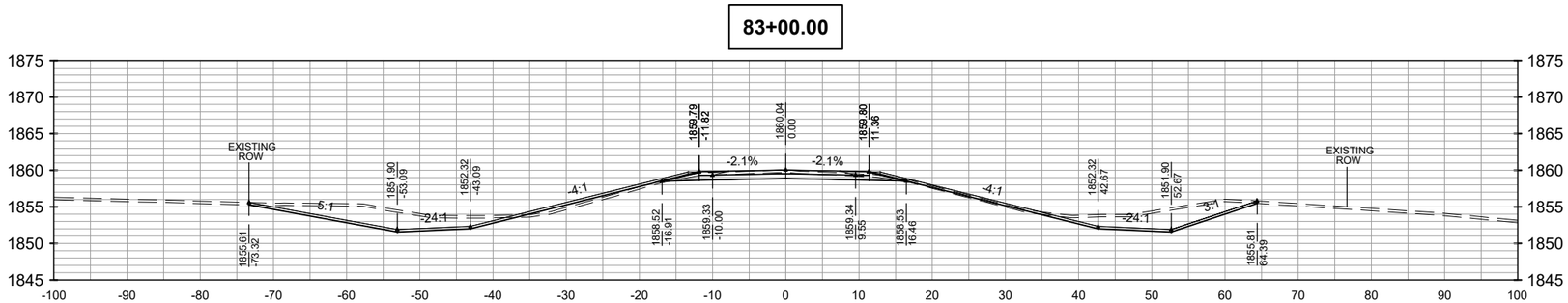


83+00.00



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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

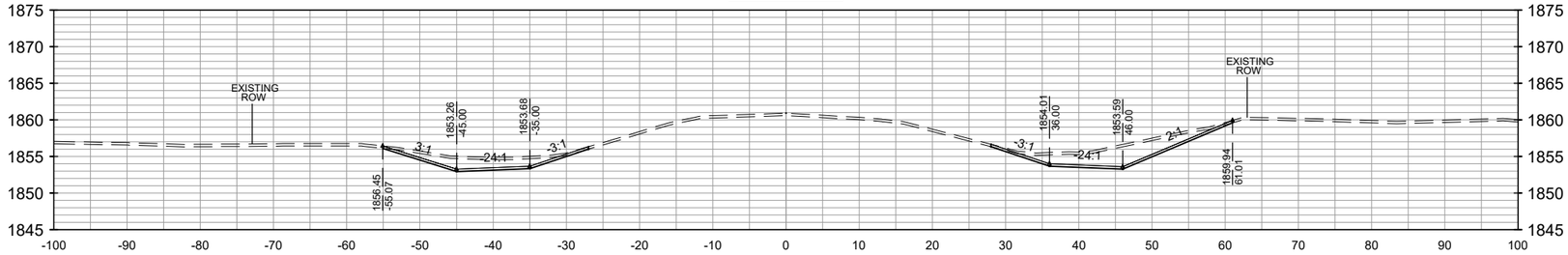
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	5

CR 15 - RCBC

83+50.00



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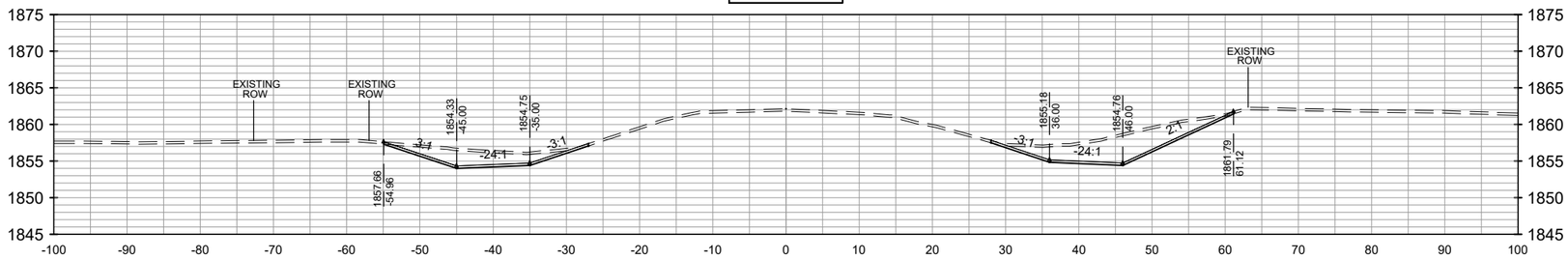

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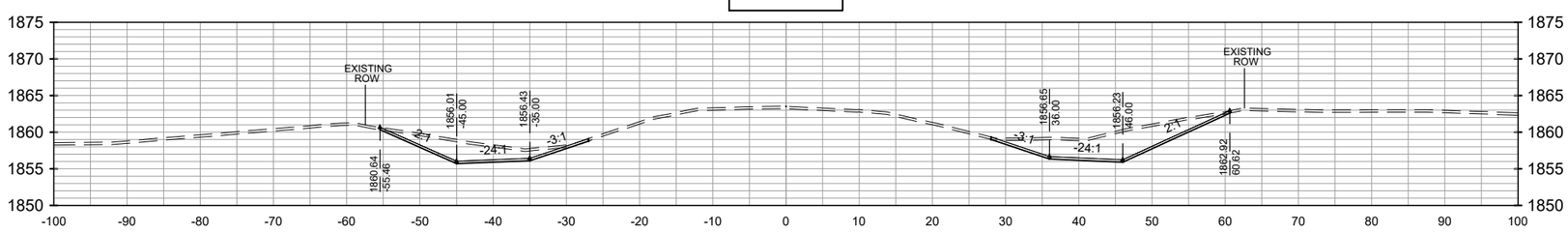

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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

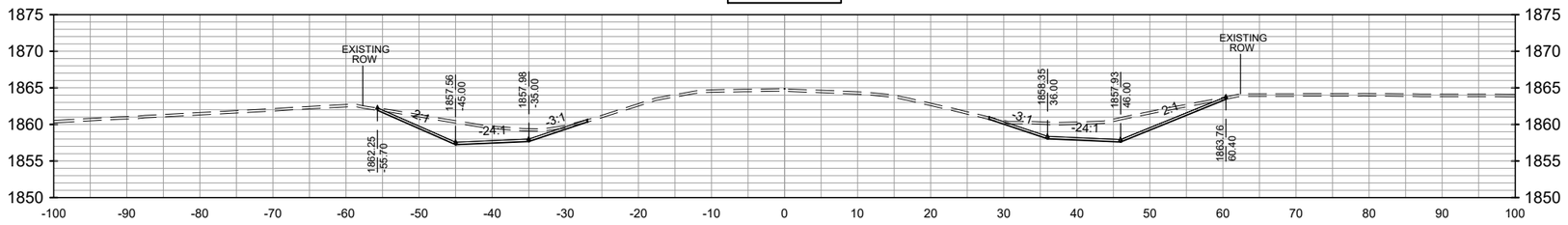
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

CR 15 - RCBC

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	6

85+00.00



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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

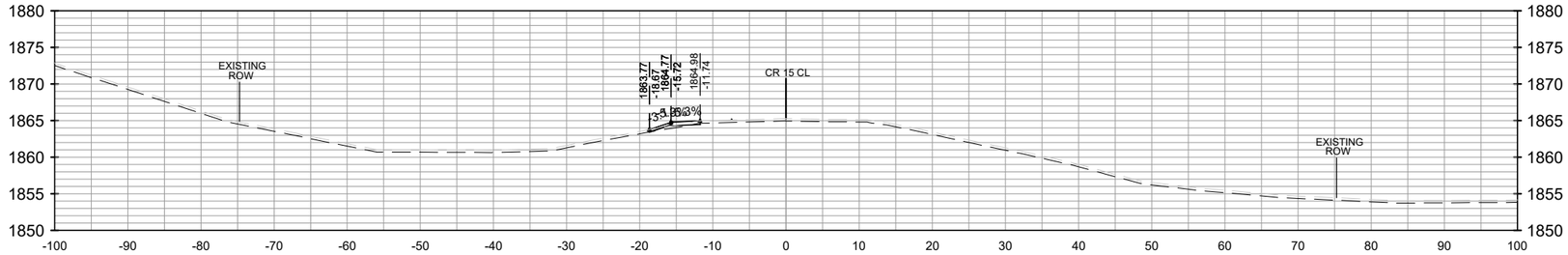
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

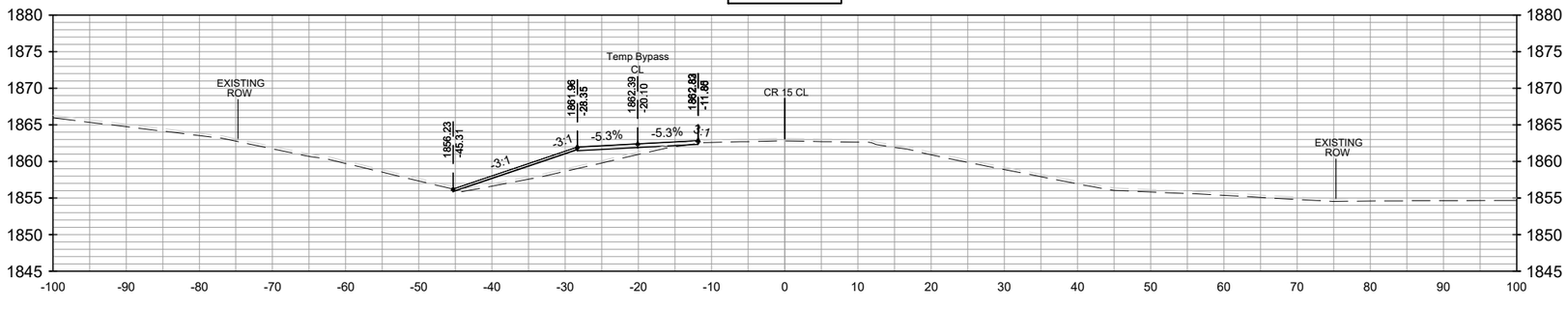
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	7

Temporary Bypass

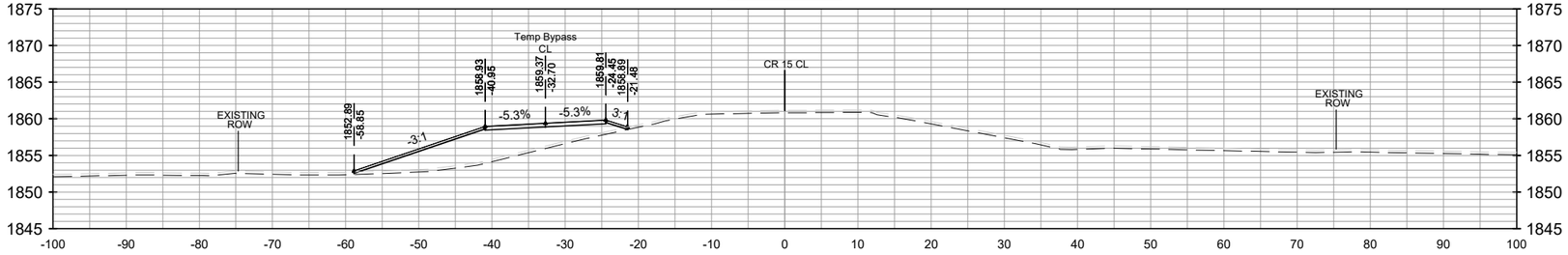
79+00.00



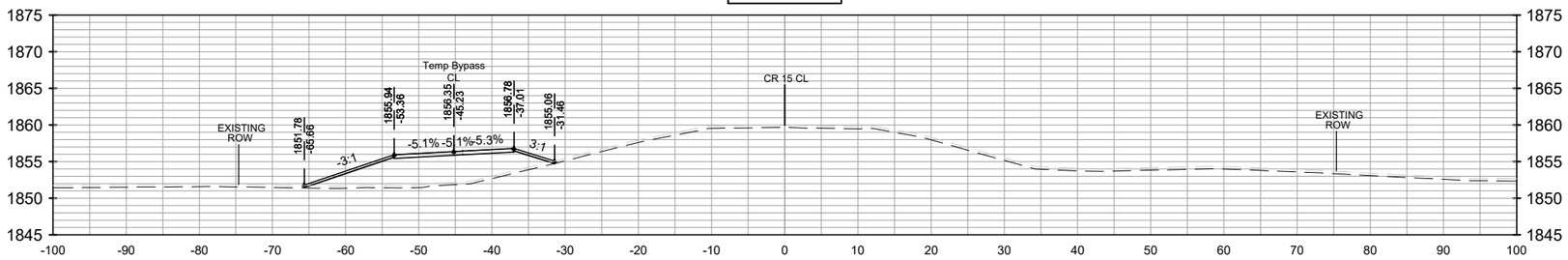
79+50.00



80+00.00



80+50.00



ACKERMAN ESTVOLD
1907 17th St SE · Minot, ND 58701
701.837.8737 · www.ackerman-estvold.com
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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

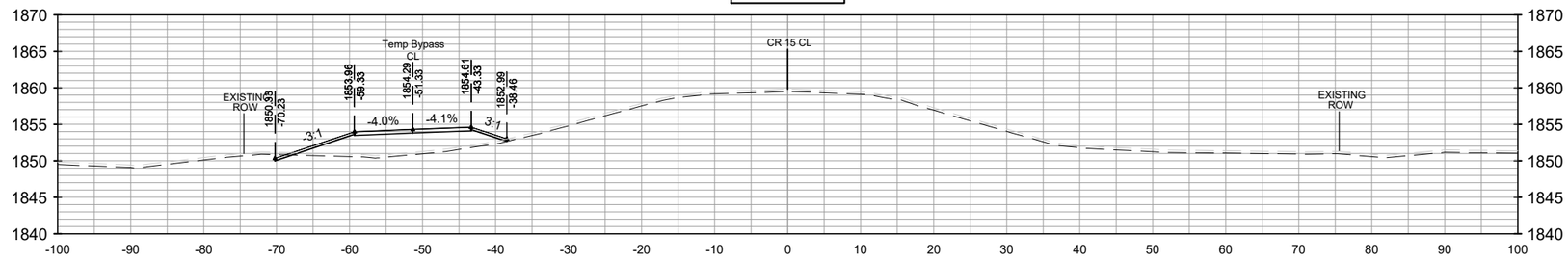
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

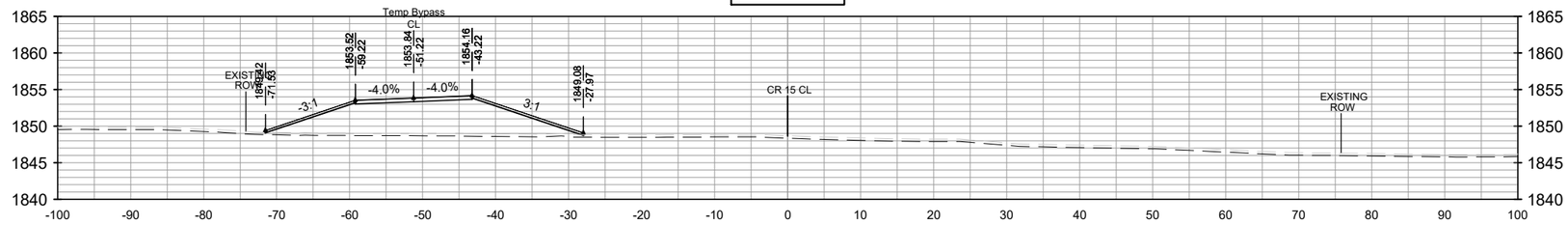
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	8

Temporary Bypass

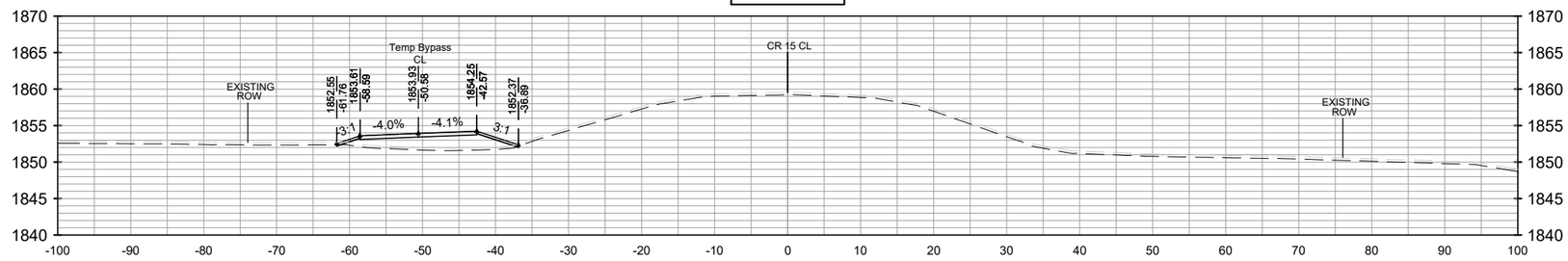
81+00.00



81+50.00



82+00.00



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SCALE (H): 1"=20'
SCALE (V): 1"=20'

10 5 0 10 20

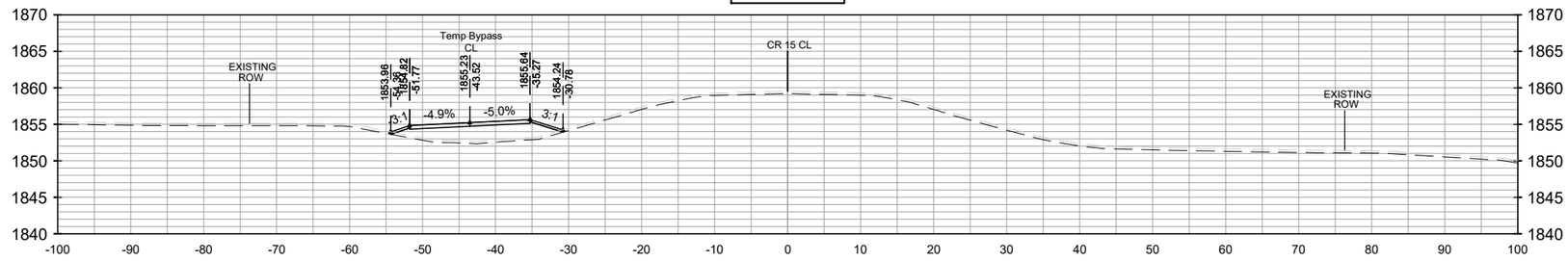
Bridge Replacement
CR 15 over Long Creek, Williams County

Cross Sections

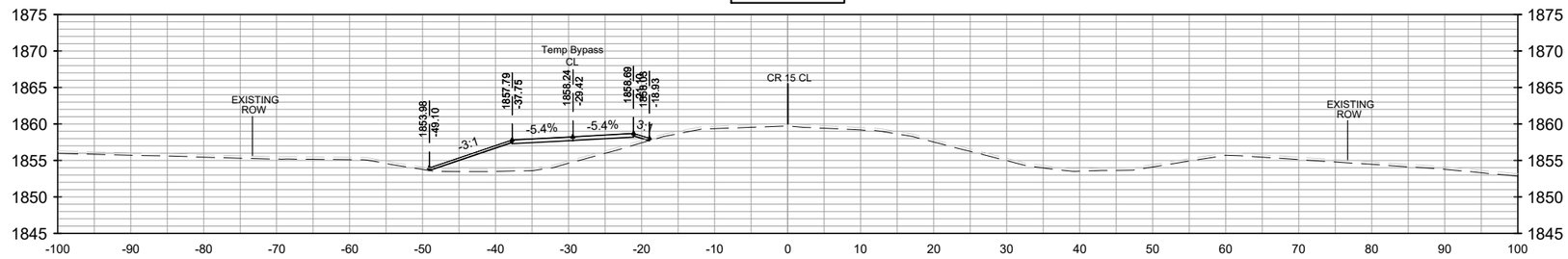
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRP-BRC-5300(018)	200	9

Temporary Bypass

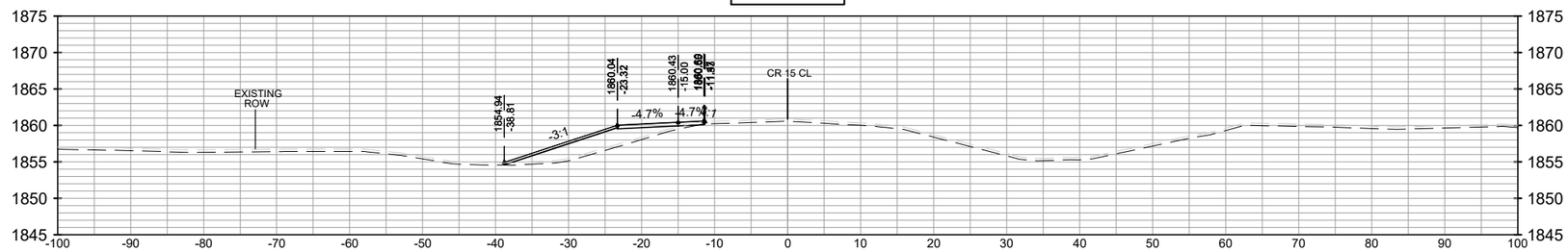
82+50.00



83+00.00



83+50.00



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SCALE (H): 1"=20'
SCALE (V): 1"=20'

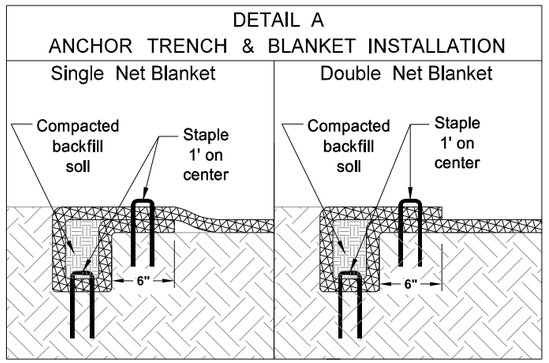
10 5 0 10 20

Bridge Replacement
CR 15 over Long Creek, Williams County

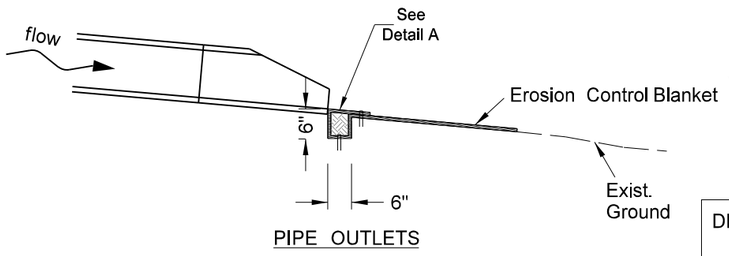
Cross Sections

D-255-2

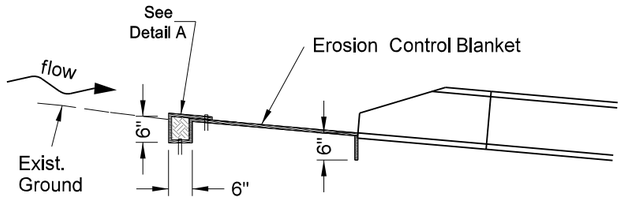
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



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

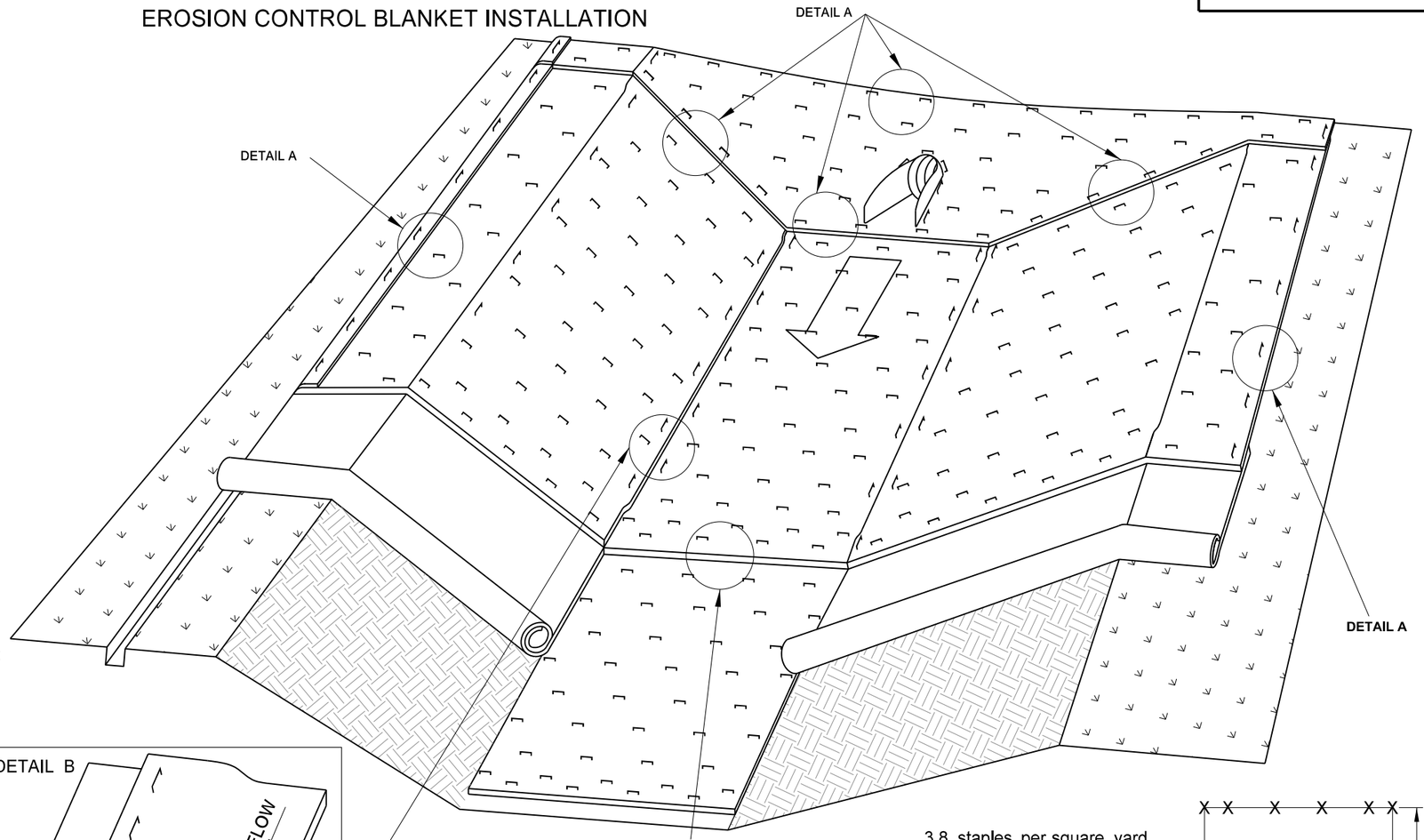


PIPE OUTLETS

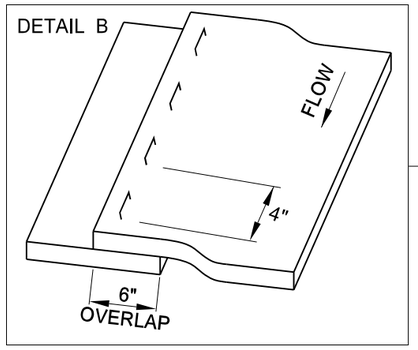


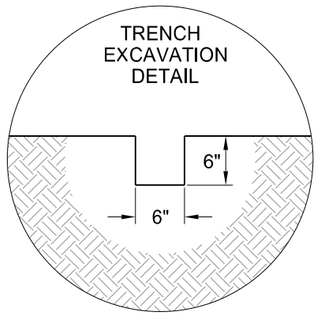
PIPE INLETS

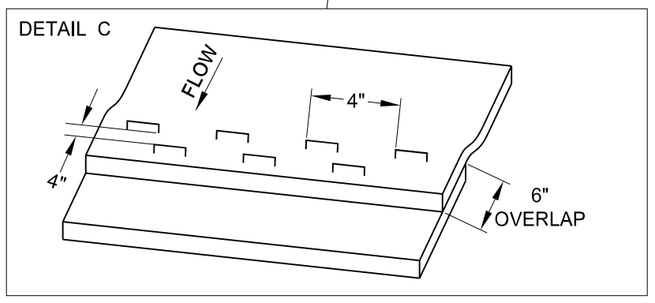
INSTALLATION AT PIPE ENDS



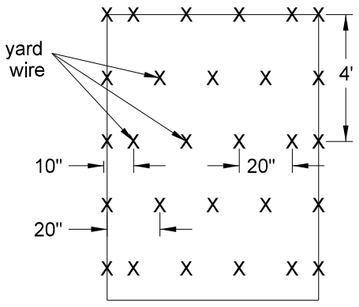
BLANKET LAYOUT
CHANNEL OR SLOPE INSTALLATION







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

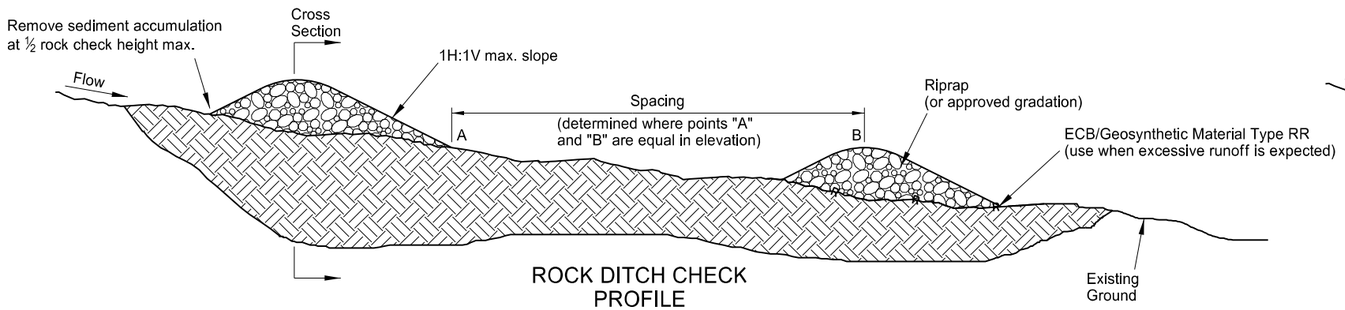


STAPLE PATTERN

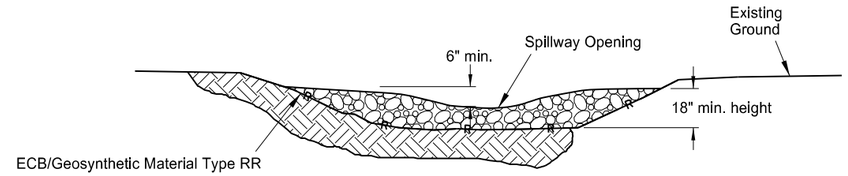
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-5 to D-255-2.
07-27-15	Changed Installation details such as trench depth and overlap dimensions.
08-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

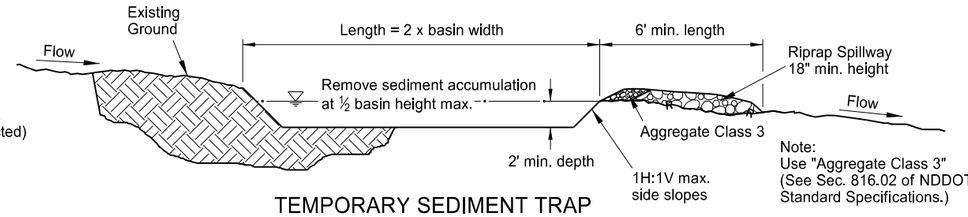
EROSION AND SILTATION CONTROLS



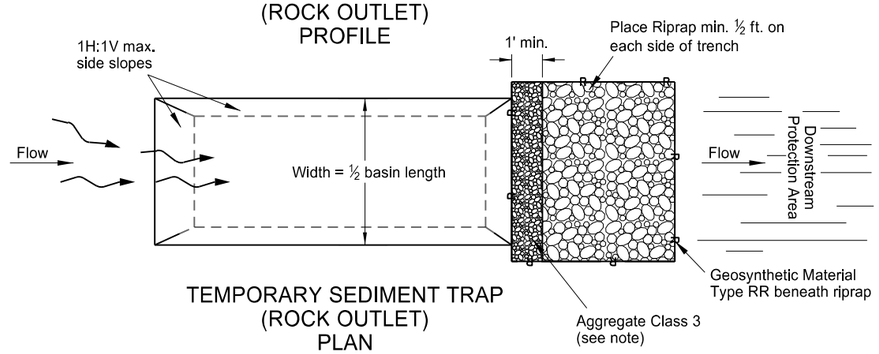
ROCK DITCH CHECK
PROFILE



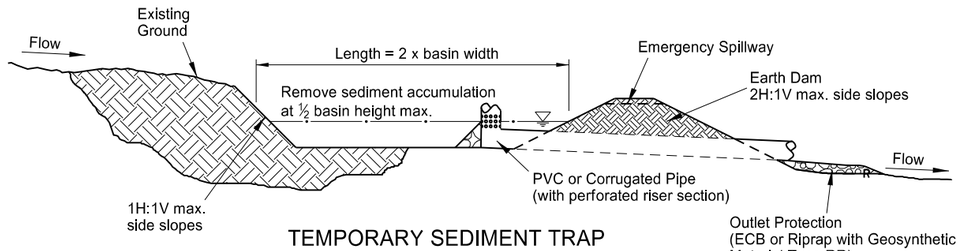
ROCK DITCH CHECK
CROSS SECTION



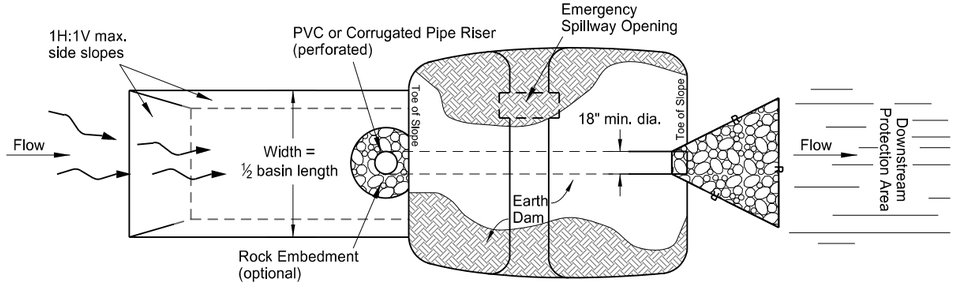
TEMPORARY SEDIMENT TRAP
(ROCK OUTLET)
PROFILE



TEMPORARY SEDIMENT TRAP
(ROCK OUTLET)
PLAN



TEMPORARY SEDIMENT TRAP
(RISER PIPE OUTLET)
PROFILE



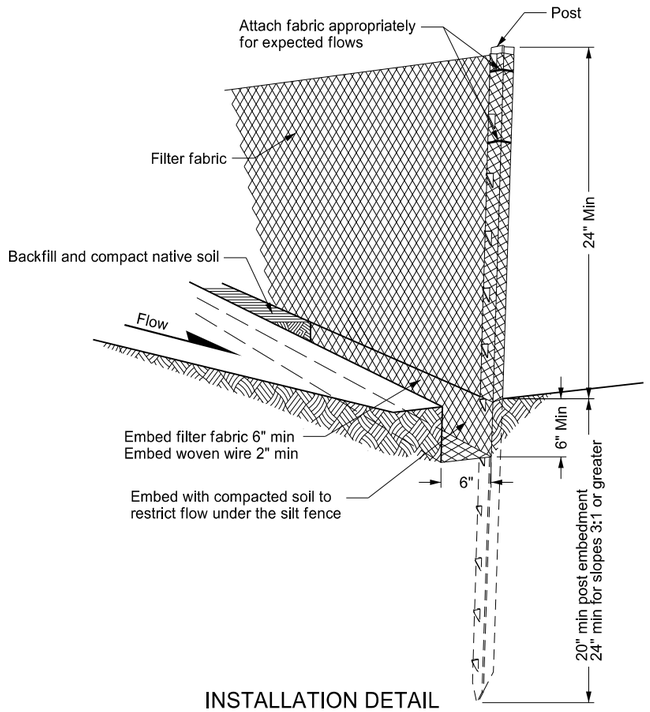
TEMPORARY SEDIMENT TRAP
(RISER PIPE OUTLET)
PLAN

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-2 to D-256-1. Deleted silt fence details.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8-27-2019 and the original document is stored at the North Dakota Department of Transportation

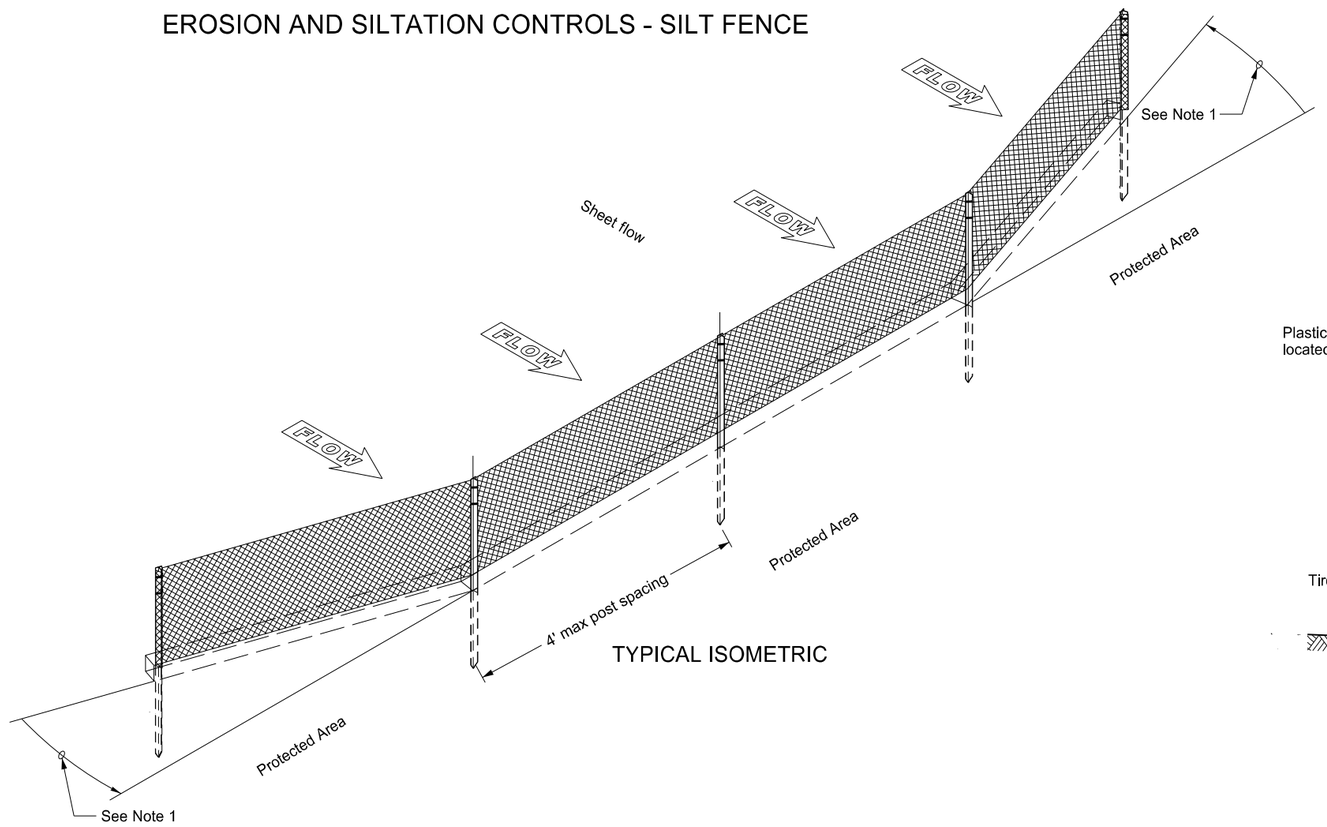
EROSION AND SILTATION CONTROLS - SILT FENCE

D-260-1

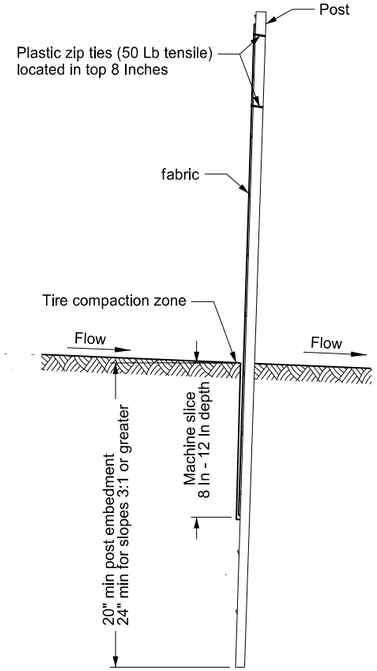


INSTALLATION DETAIL

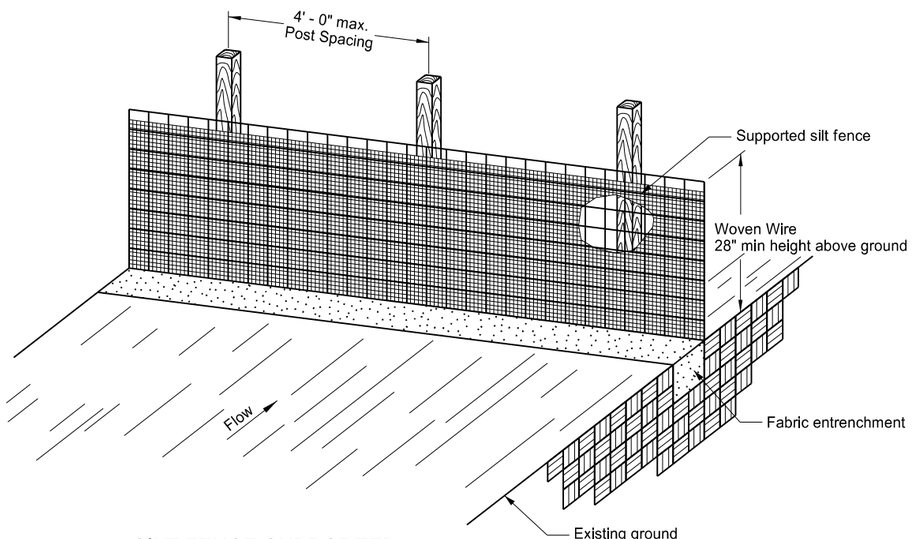
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



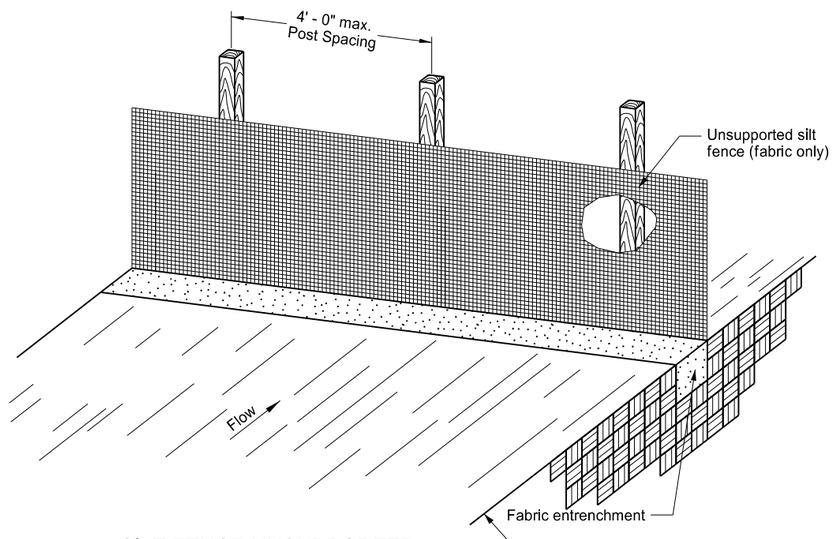
TYPICAL ISOMETRIC



MACHINE SLICED SILT FENCE



SILT FENCE SUPPORTED



SILT FENCE UNSUPPORTED

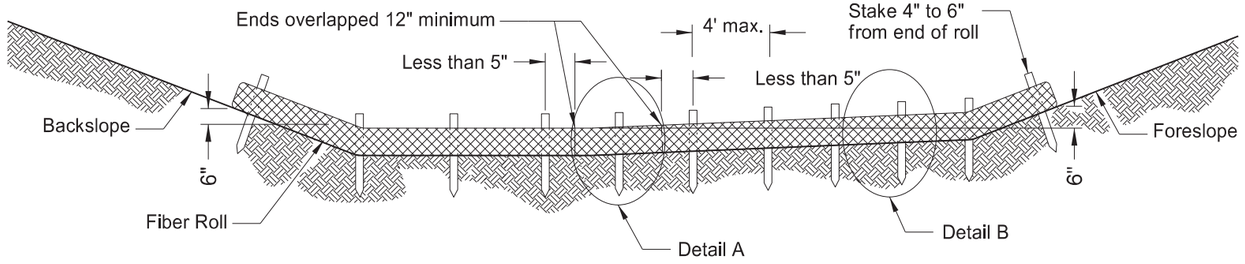
NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
2. Place splices outside low spots.
3. Install silt fencing parallel to contour lines.
4. Do not embed silt fence when placed in standing water.
5. Silt fence material does not need to reach the top of woven wire support.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.
06-27-16 08-27-19	Revised details & added new ones. New Design Engineer PE Stamp.

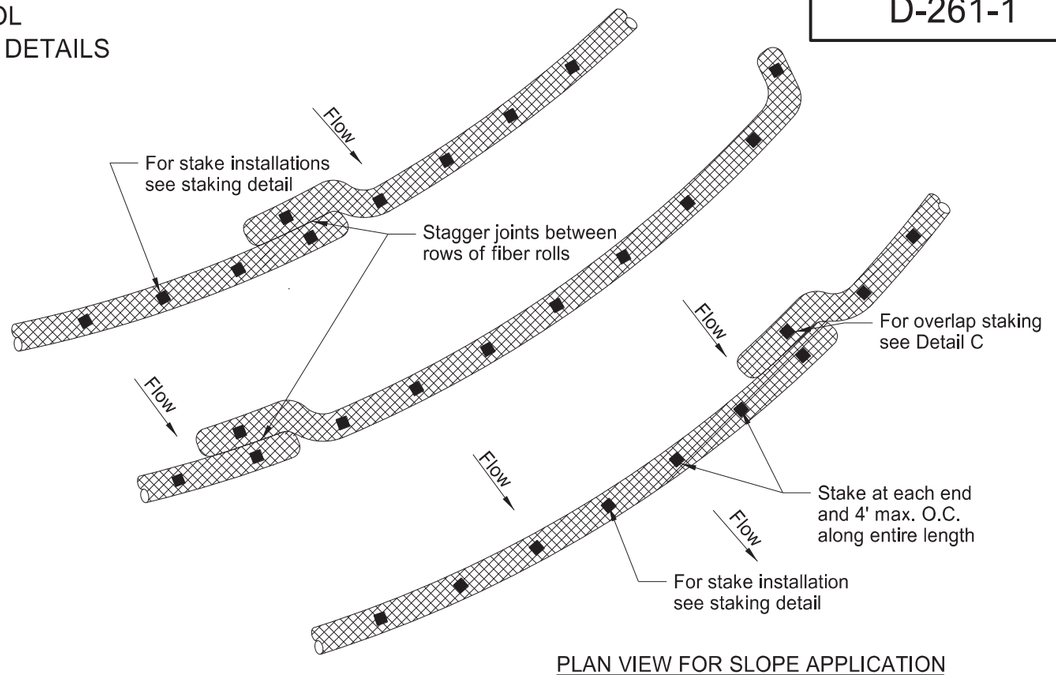
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1

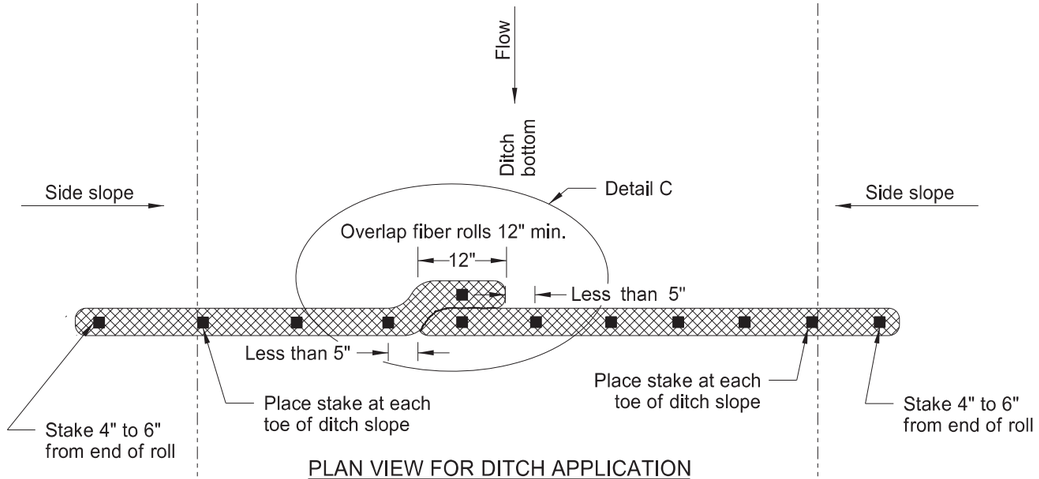


12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



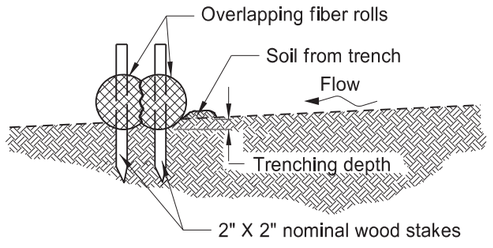
PLAN VIEW FOR SLOPE APPLICATION

Ensure fiber rolls are placed along the contours of the slope.



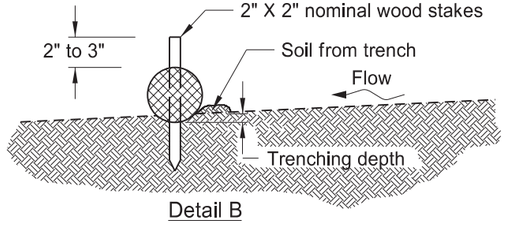
PLAN VIEW FOR DITCH APPLICATION

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"



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

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

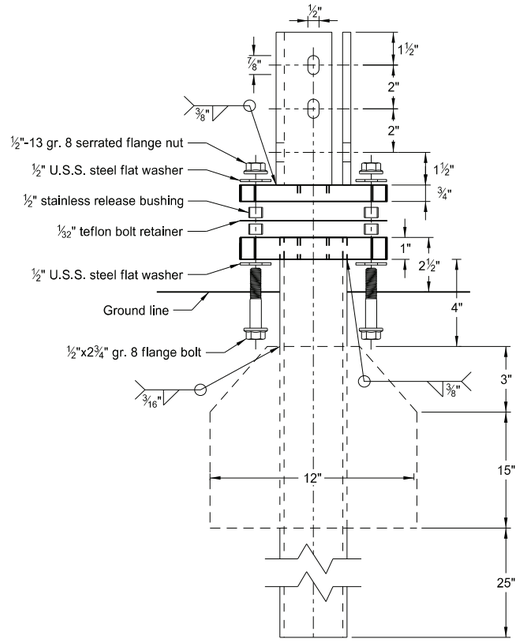
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp
04-22-24	Slope Plan View-Overlap Change.

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

04/22/24

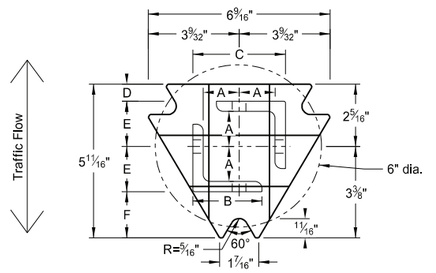
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

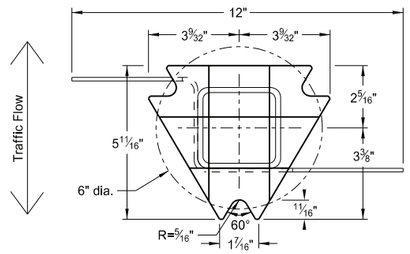


Multi-Directional
Slip Base Assembly

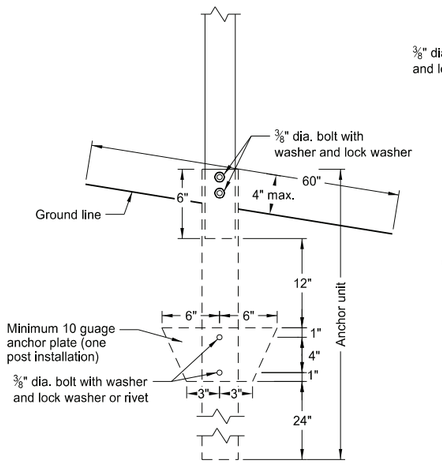
Perforated Tube



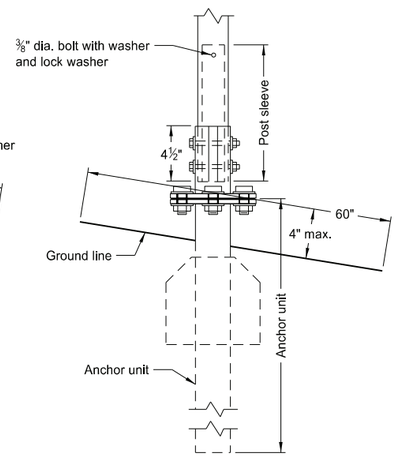
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



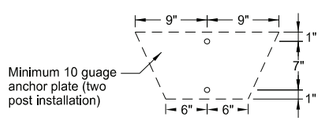
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

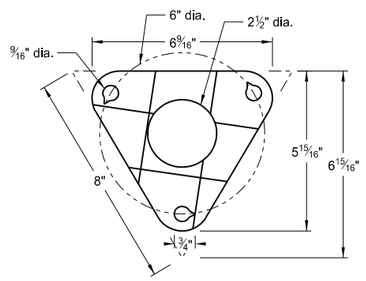


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon

Notes:

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

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus in.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

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

(B) For additional wind load, insert the 2 3/16"x10 ga. into 2½"x10 ga.

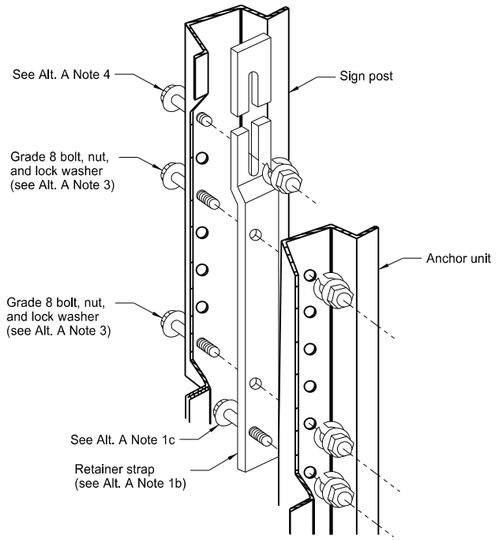
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/01/24

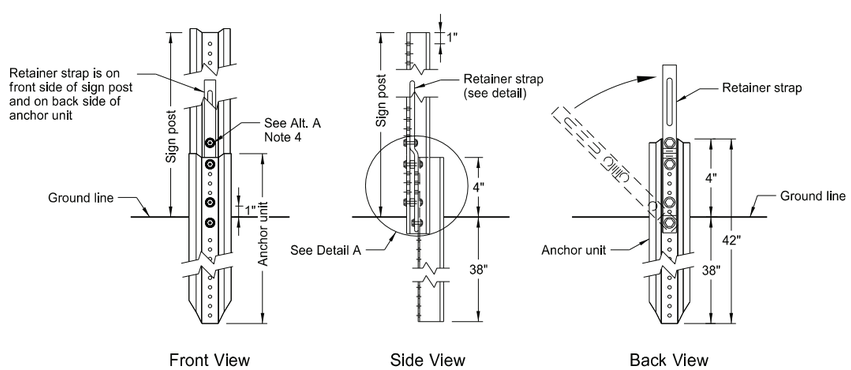
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



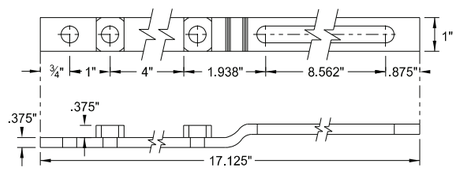
Detail A



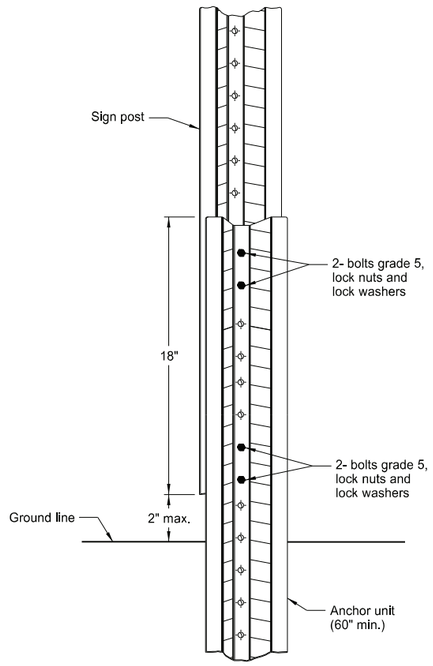
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

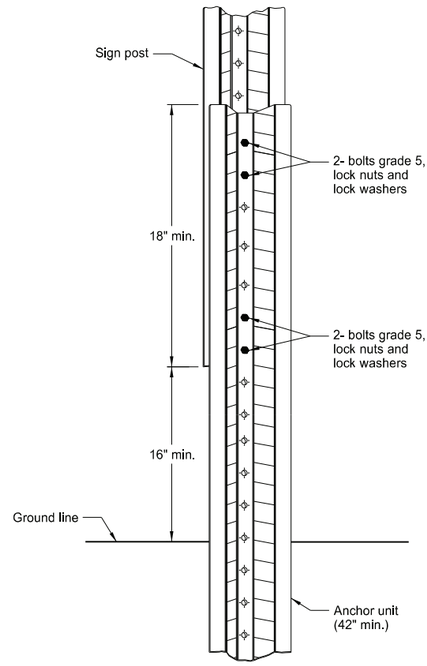


Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B (2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail Alternate C (2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

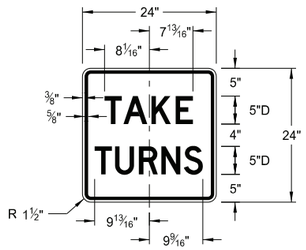
1. a) Drive anchor unit to within 12" of ground level.
   b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
   d) Rotate strap 90° to left.
2. a)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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

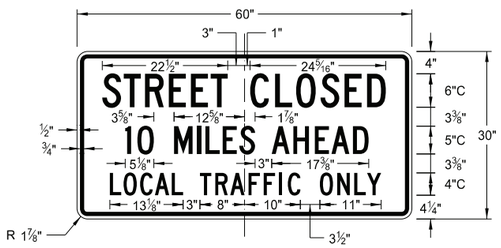
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

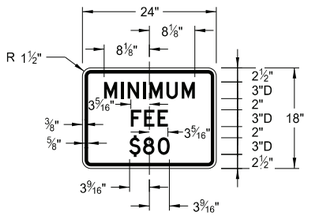
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



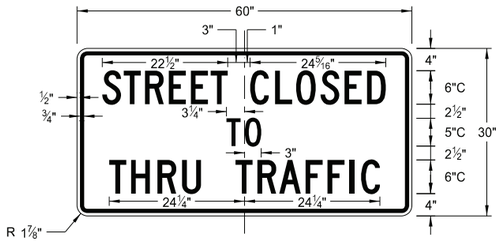
R1-50P-24
Legend: black (non-refl)
Background: white



R11-3c-60
Legend: black (non-refl)
Background: white



R2-1aP-24
Legend: black (non-refl)
Background: white



R11-4a-60
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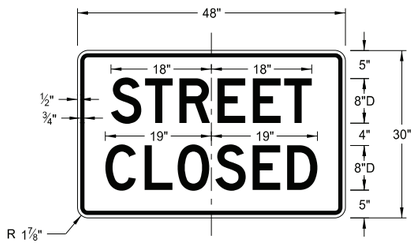
Background: white



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

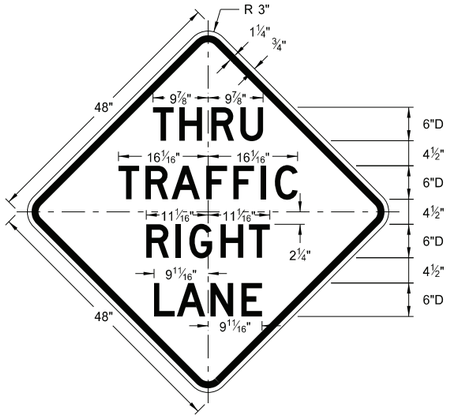
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

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

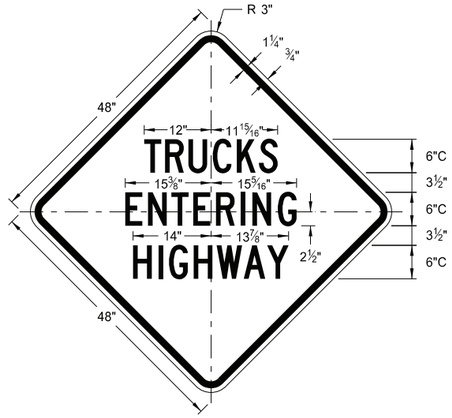
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

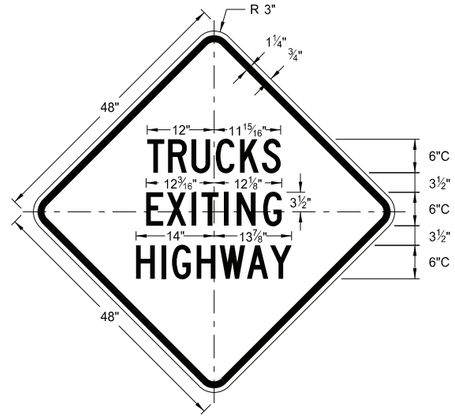
D-704-11



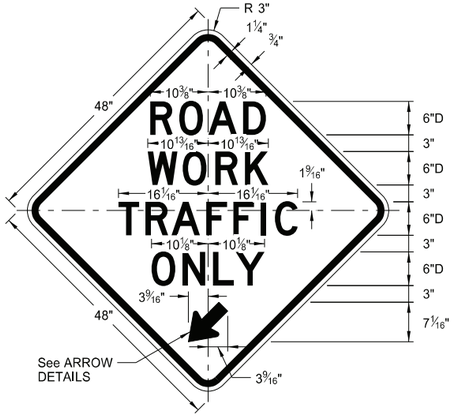
W5-8-48
Legend: black (non-refl)
Background: orange



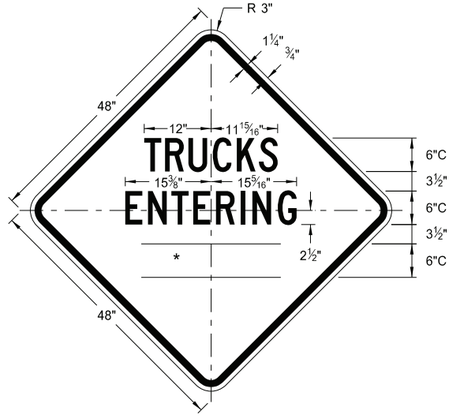
W8-53-48
Legend: black (non-refl)
Background: orange



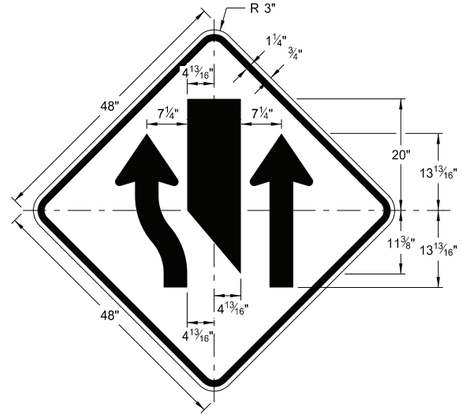
W8-56-48
Legend: black (non-refl)
Background: orange



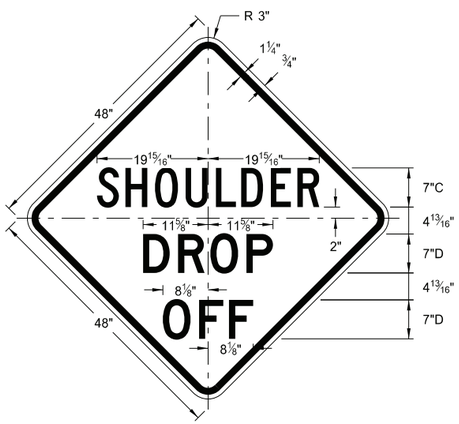
W5-9-48
Legend; black (non-refl)
Background: orange



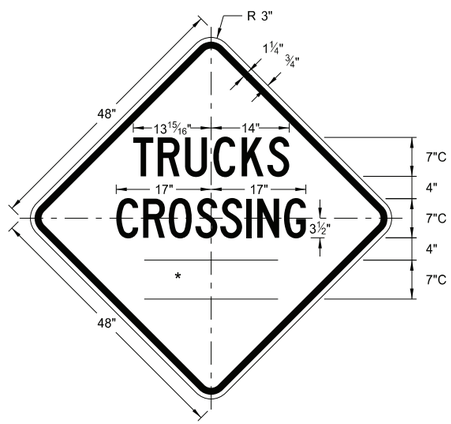
W8-54-48
Legend; black (non-refl)
Background: orange



W9-3a-48
Legend; black (non-refl)
Background: orange



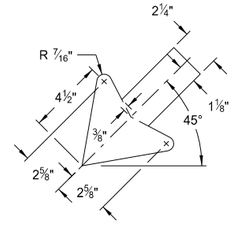
W8-9a-48
Legend: black (non-refl)
Background: orange



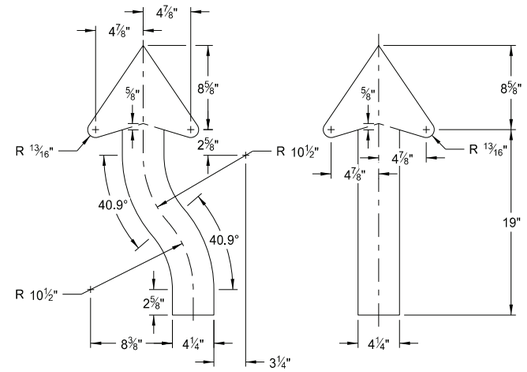
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

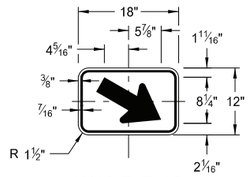
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

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

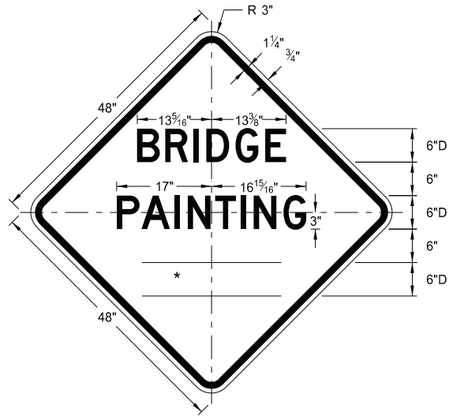
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

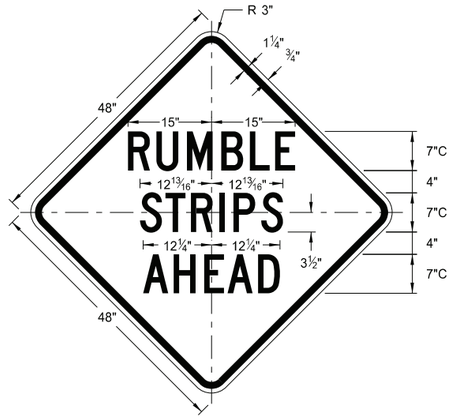
D-704-11A



W16-7aP-18
Legend: black (non-refl)
Background: orange



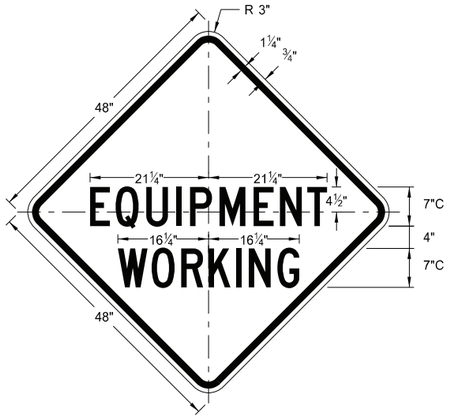
W21-50-48
Legend: black (non-refl)
Background: orange



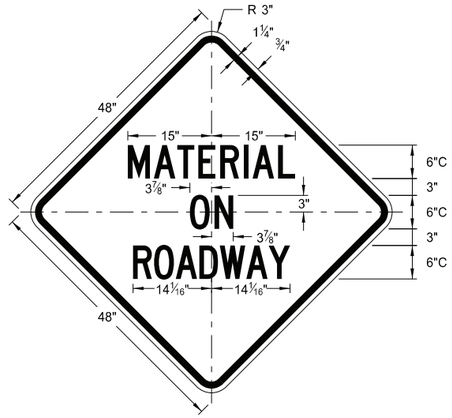
W21-53-48
Legend: black (non-refl)
Background: orange

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

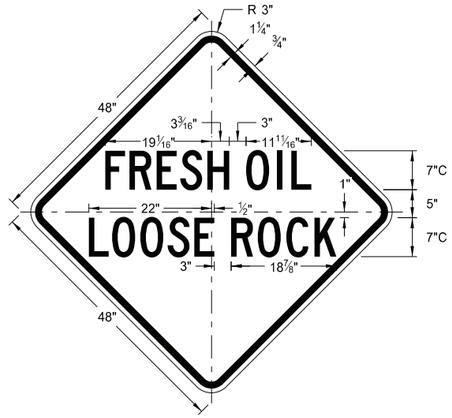
* DISTANCE MESSAGES



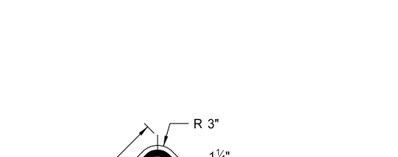
W20-51-48
Legend: black (non-refl)
Background: orange



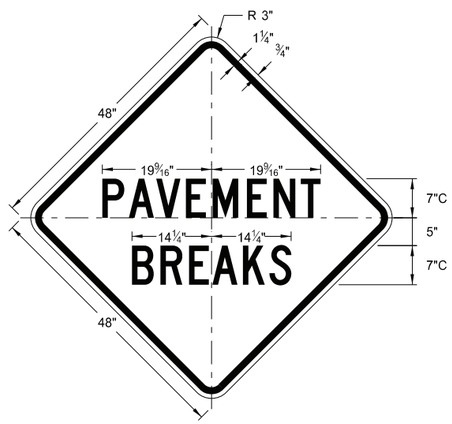
W21-51-48
Legend: black (non-refl)
Background: orange



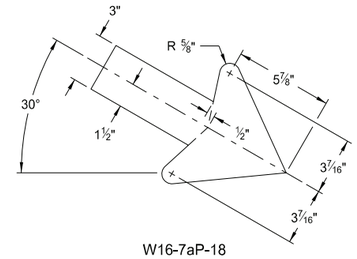
W22-8-48
Legend: black (non-refl)
Background: orange



W20-52P-54
Legend: black (non-refl)
Background: orange



W21-52-48
Legend: black (non-refl)
Background: orange



W16-7aP-18

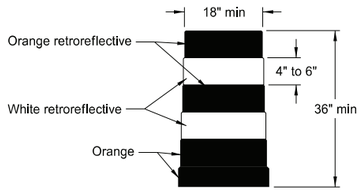
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.

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

08/01/24

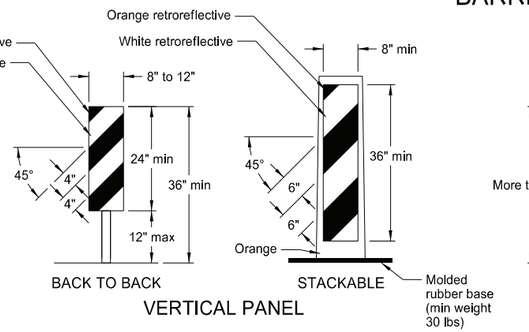
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



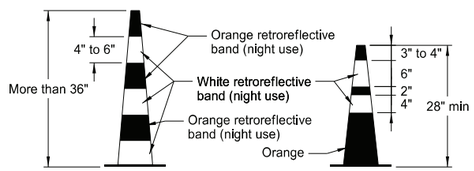
DELINEATOR DRUM

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.



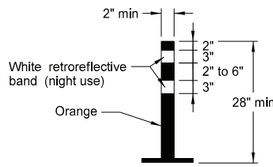
VERTICAL PANEL

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.



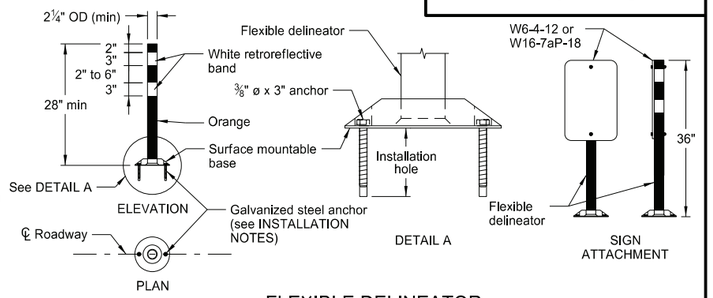
TRAFFIC CONE

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

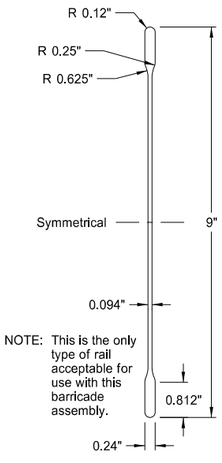
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



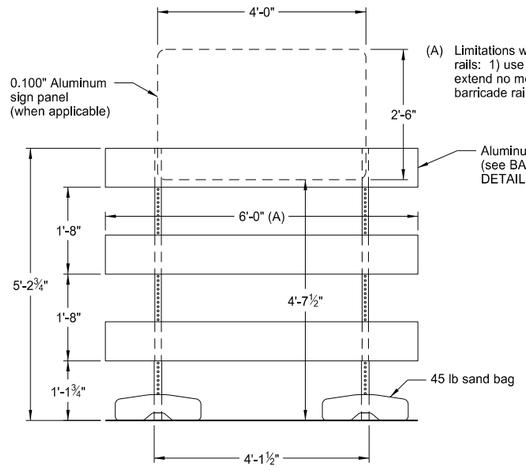
FLEXIBLE DELINEATOR

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.

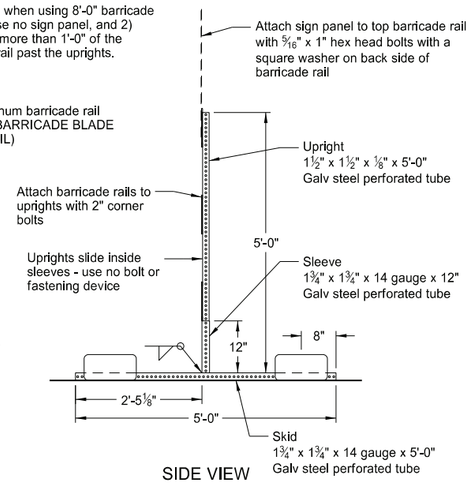


BARRICADE BLADE DETAIL



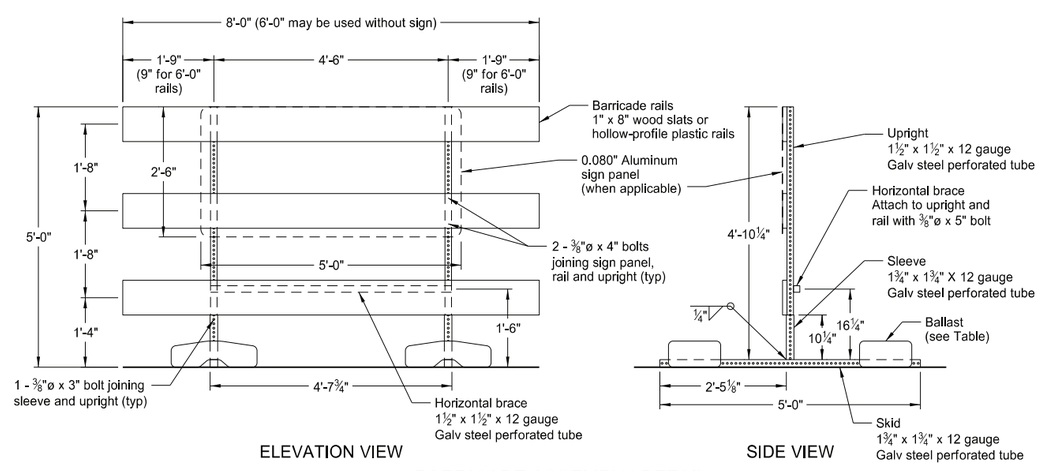
ELEVATION VIEW

(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.



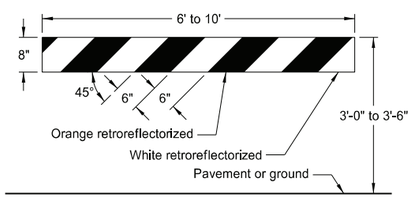
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

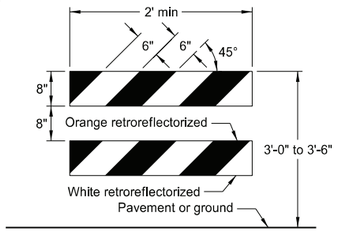


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

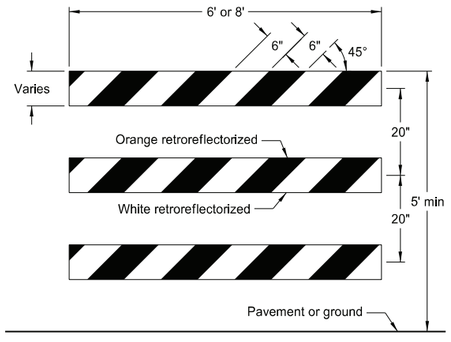
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".



TYPE I BARRICADE

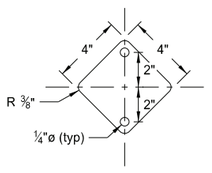


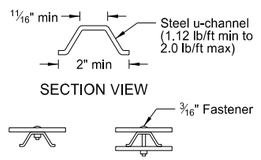
TYPE II BARRICADE

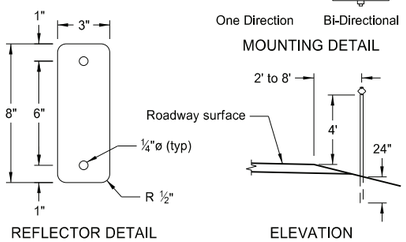


TYPE III BARRICADE

BARRICADE RAIL DETAILS







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	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature

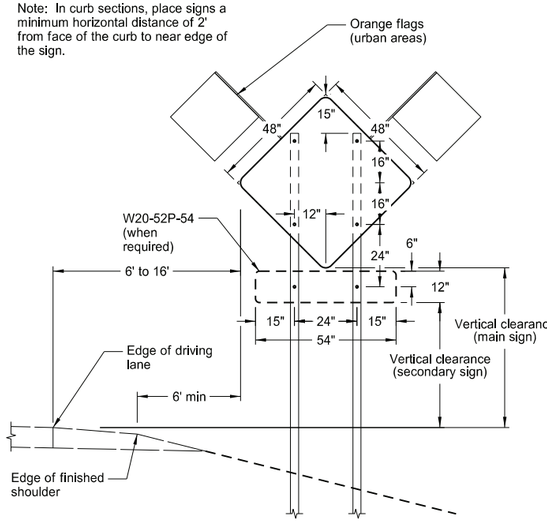
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

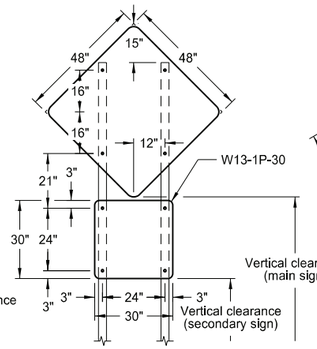
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

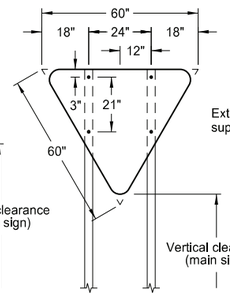
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



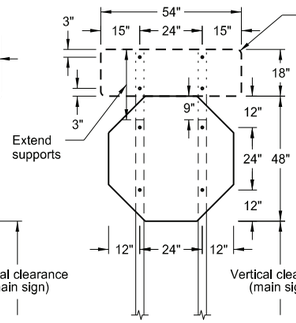
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



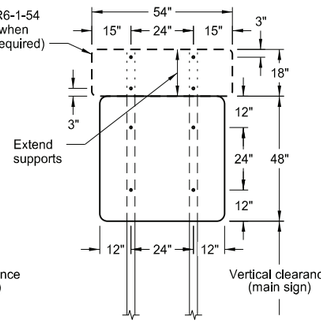
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



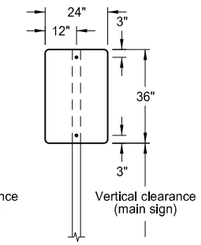
R1-2-60 - YIELD SIGN



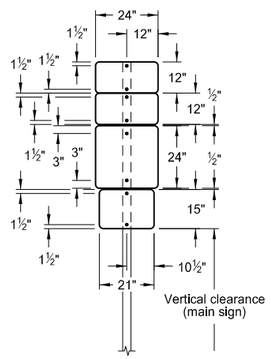
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



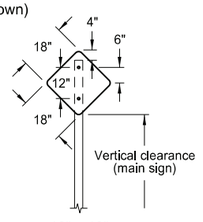
48" x 48" SIGN
(with R6-1-54 sign as required)



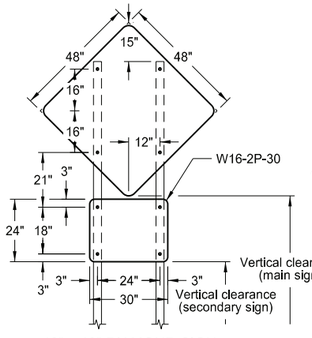
24" x 36" SIGN



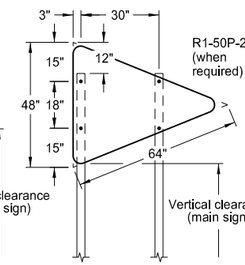
24" x 24"
ROUTE MARKER
ASSEMBLY



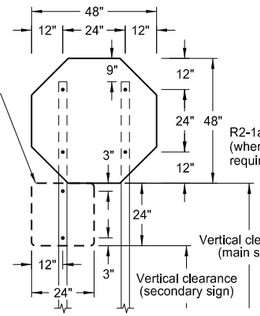
18" x 18"
DIAMOND SIGN



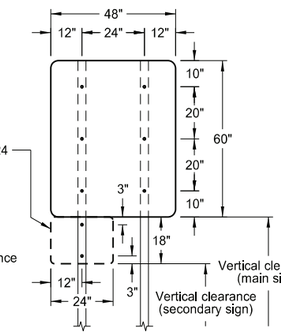
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



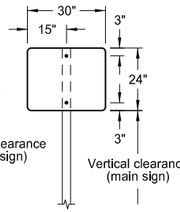
W14-3-64 - PENNANT SIGN



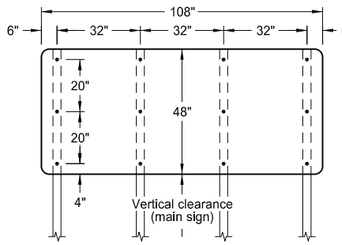
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



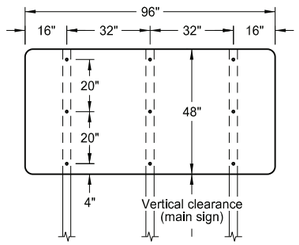
48" x 48" SIGN
(with R2-1aP-24 sign as required)



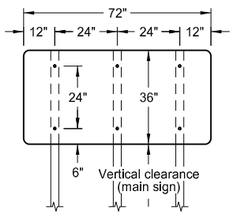
30" x 24" SIGN



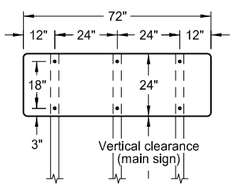
108" x 48" SIGN



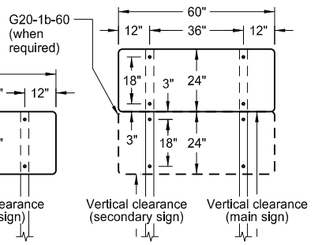
96" x 48" SIGN



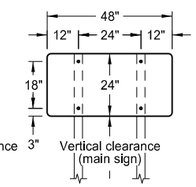
72" x 36" SIGN



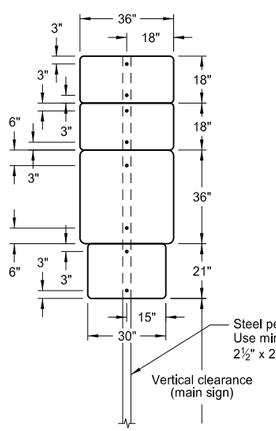
72" x 24" SIGN



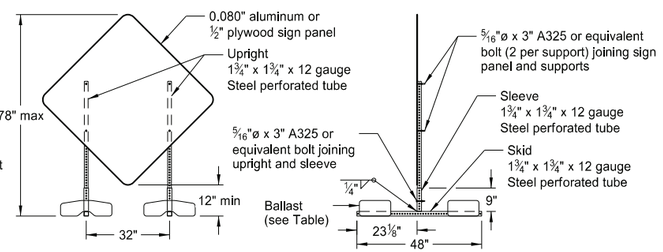
60" x 24" SIGN



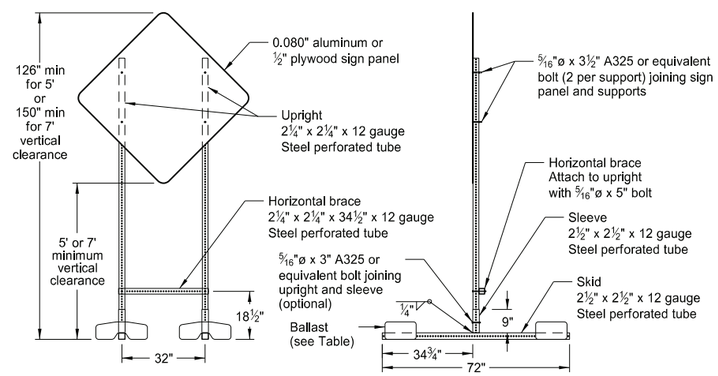
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



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 ⅜" 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 unforseen 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

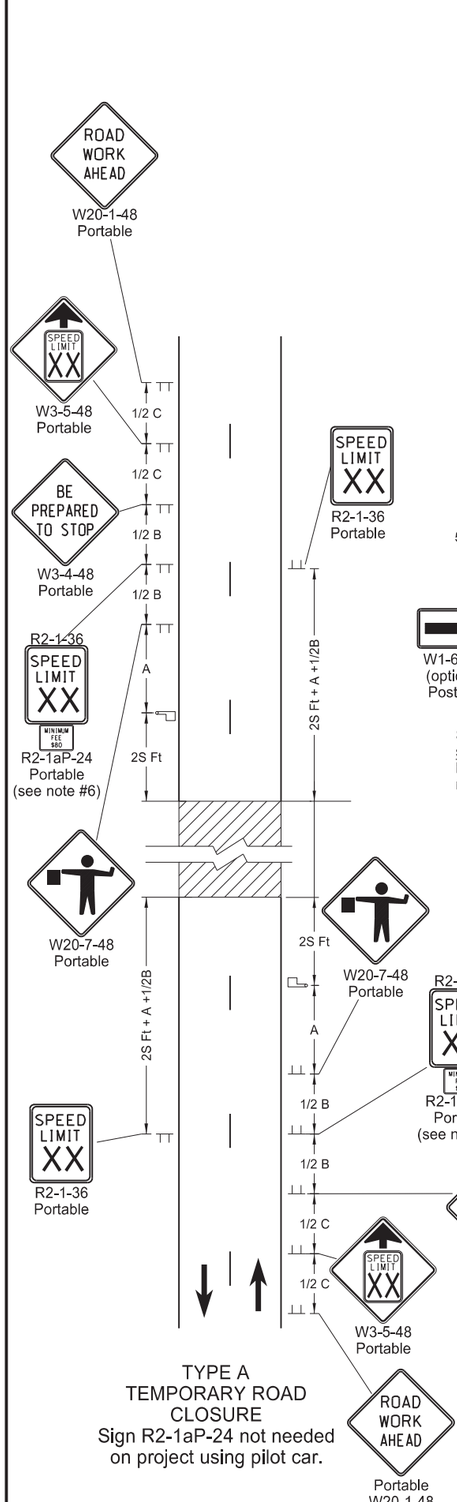
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature

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

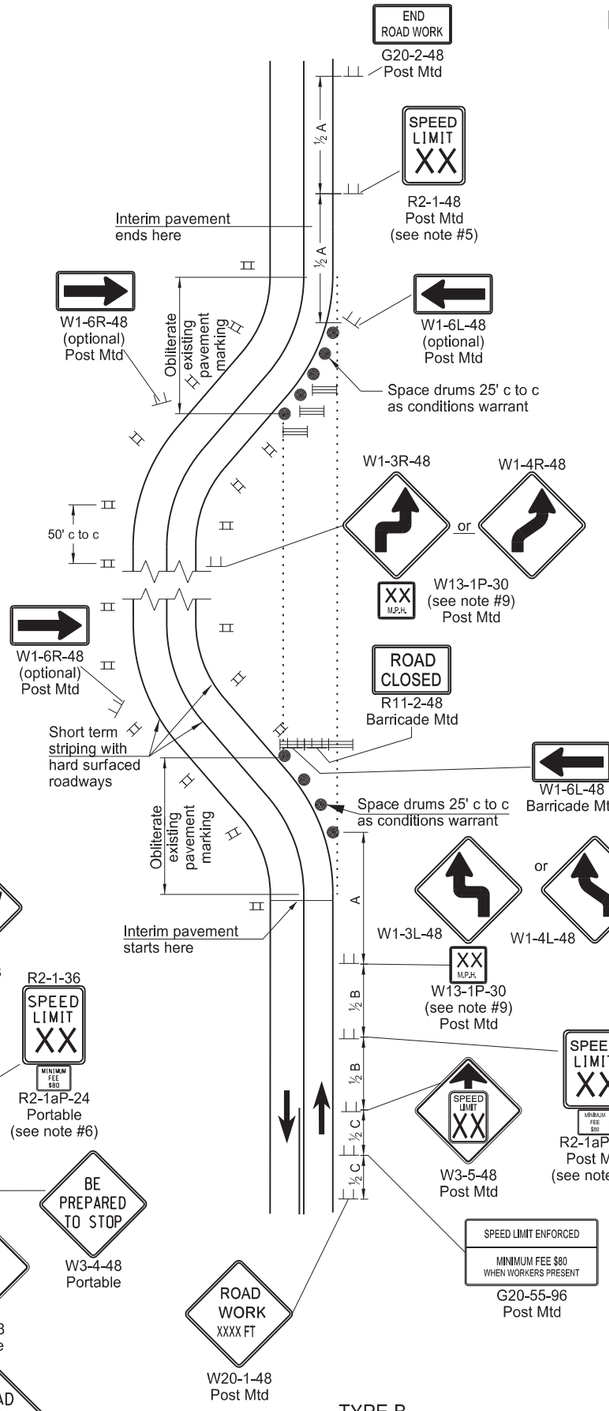
08/01/24

ROAD CLOSURE LAYOUTS

D-704-15

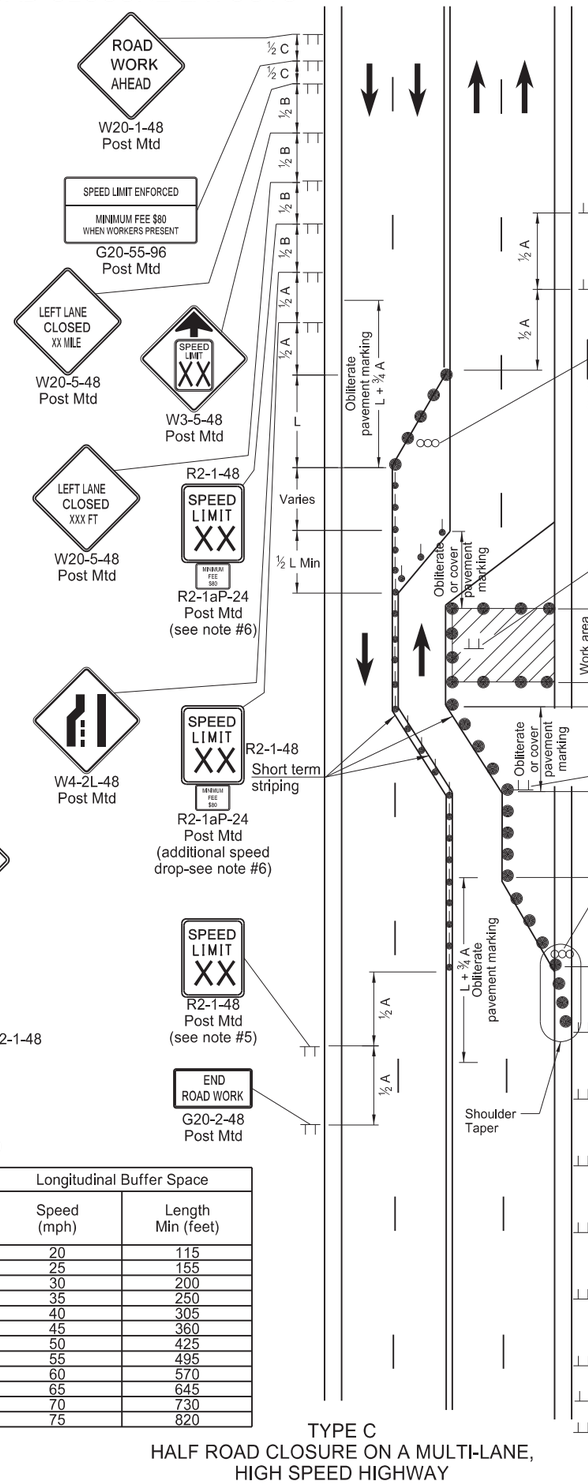


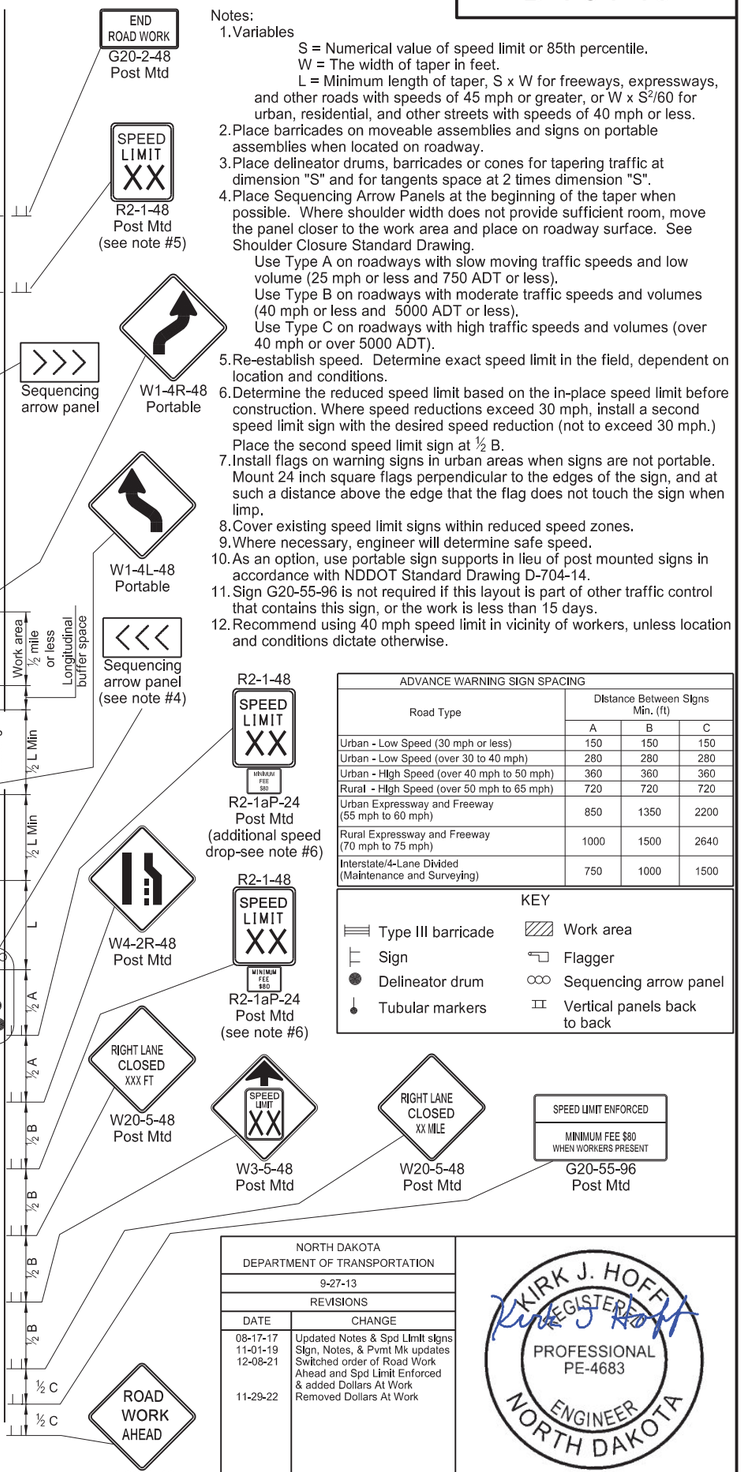
TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.



TYPE B
ROAD CLOSURE WITH A DIVERSION
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

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





TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
4 lane undivided highway with half the roadway closed.

Notes:
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x S^2/60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. 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 roadway surface. See Shoulder Closure Standard Drawing.
   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).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. 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 ½ B.
7. 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.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. 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.
12. 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

KEY
- Type III barricade
- Sign
- Delineator drum
- Tubular markers
- Work area
- Flagger
- Sequencing arrow panel
- Vertical panels back to back

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

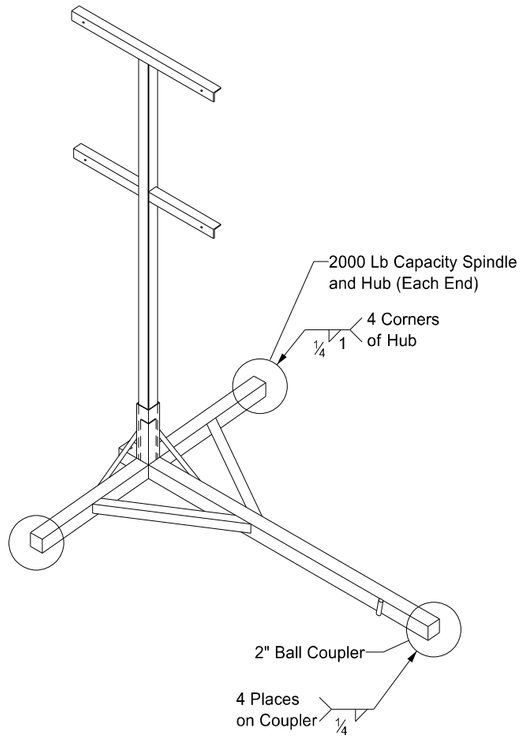
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pvmt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work

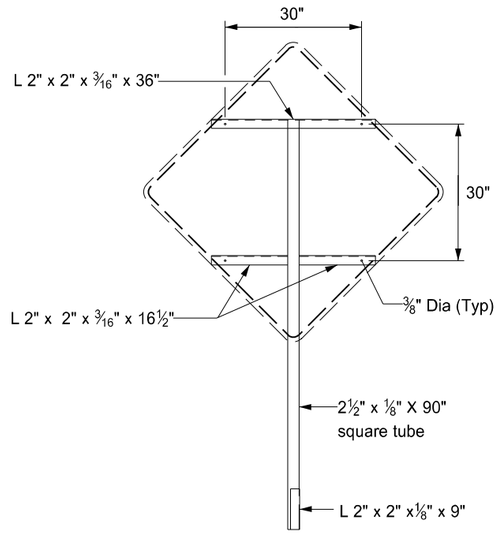
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

11/29/22

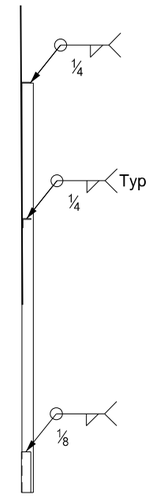
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

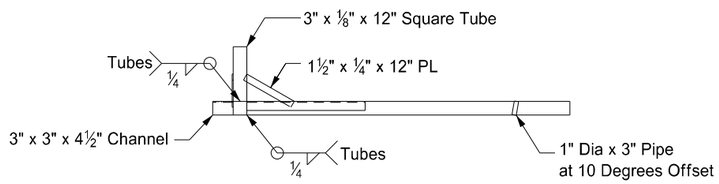


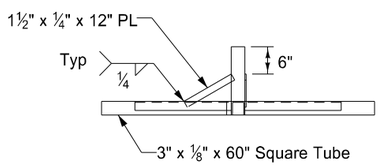
RIGHT

SIGN SUPPORT

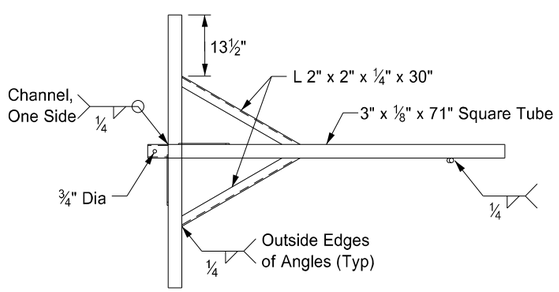
Notes:

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





RIGHT



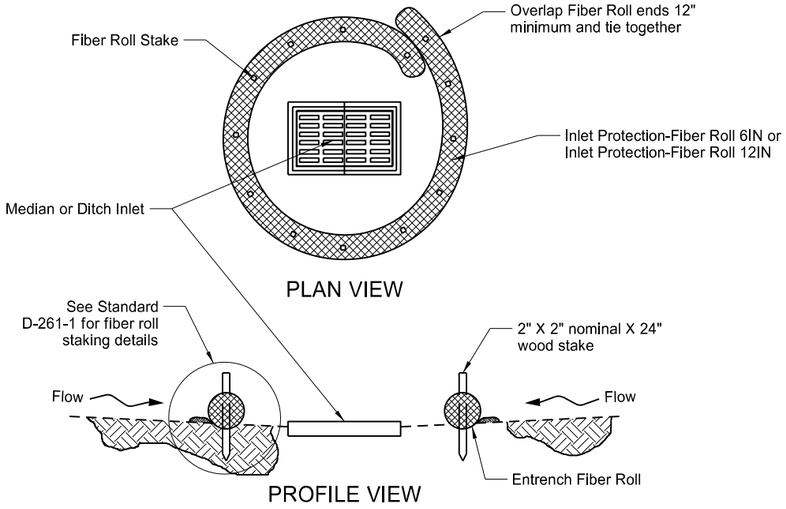
TOP

TRAILER

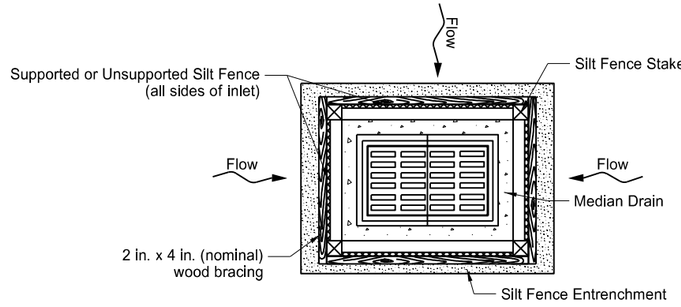
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

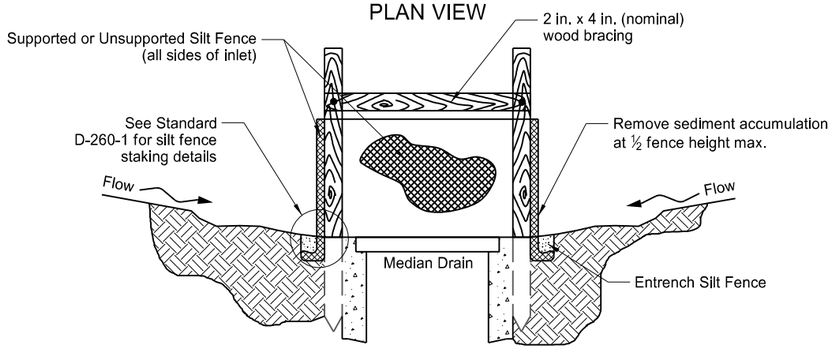
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
Kirk J Hoff
12 02 2020

EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION

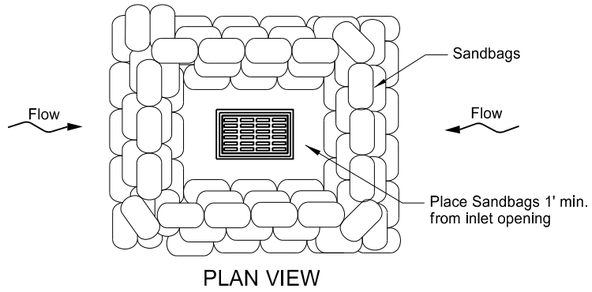


FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)

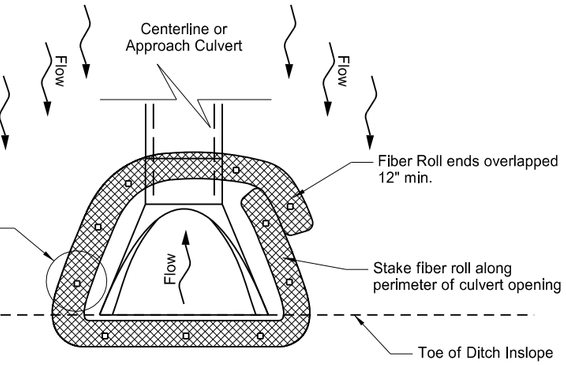




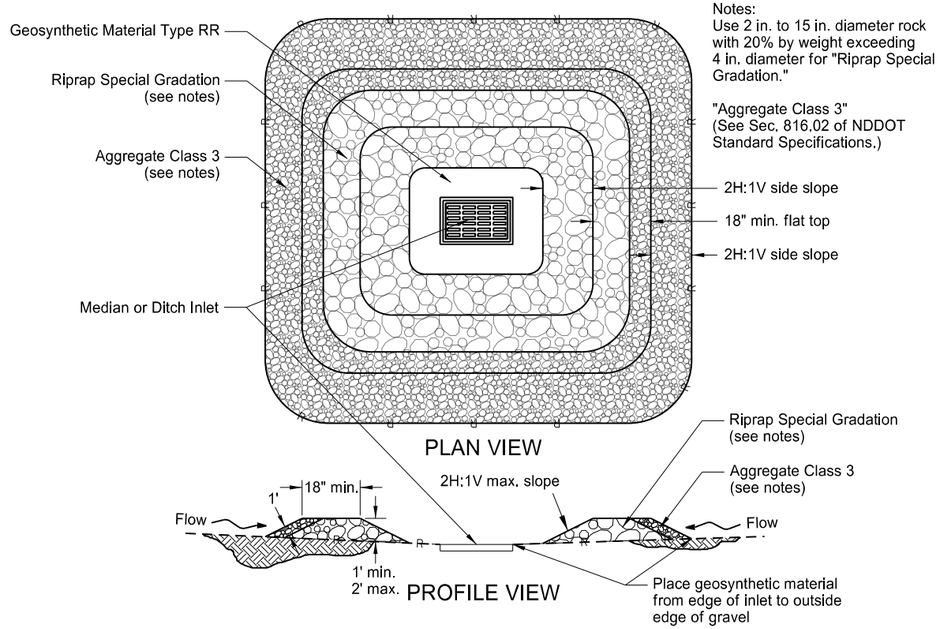
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



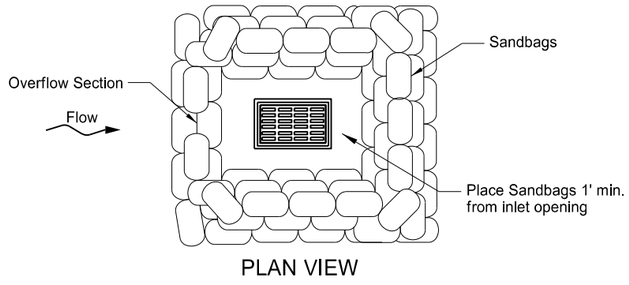
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)



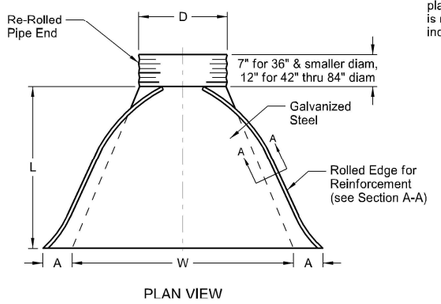
SANDBAG PROTECTION (ON SLOPE)

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

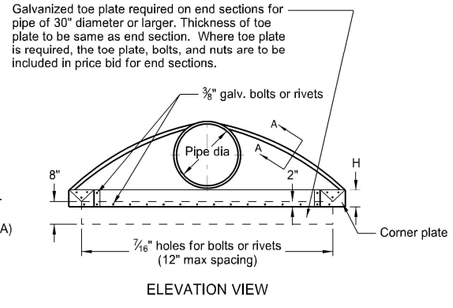
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8-27-19 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

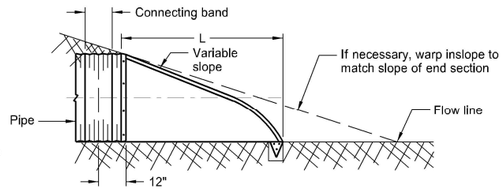
D-714-4



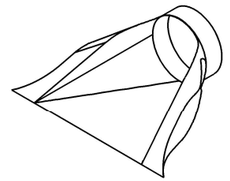
PLAN VIEW



ELEVATION VIEW



TYPICAL CROSS SECTION
(showing connector section)



PERSPECTIVE VIEW

** PIPE DIA.	GALVANIZED THICKNESS	END SECTION DIMENSIONS A	B	H	L	W	APPROX. SLOPE	BODY
IN	IN	IN	IN	IN	IN	IN	RATE	PIECE
15	0.064 - 0.079	7	8	6	26	30	2½:1	1
18	0.064 - 0.109	8	10	6	31	36	2½:1	1
24	0.064 - 0.109	10	13	6	41	48	2½:1	1
30	0.064 - 0.109	12	16	8	51	60	2½:1	1 or 2
36	0.064 - 0.109	14	19	9	60	72	2½:1	2
42	0.064 - 0.138	16	22	11	69	84	2½:1	2
48	0.064 - 0.168	18	27	12	78	90	2¼:1	2
54	0.064 - 0.168	18	30	12	84	102	2:1	2
*60	0.064 - 0.168	18	33	12	87	114	1¾:1	3
*66	0.064 - 0.168	18	36	12	87	120	1½:1	3
*72	0.064 - 0.168	18	39	12	87	126	1½:1	3
*78	0.064 - 0.168	18	42	12	87	132	1¼:1	3
*84	0.064 - 0.168	18	45	12	87	138	1⅛:1	3

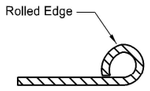
* These sizes have 0.109" sides and 0.138" center panels.

** Pipe diameter is equal to dimension "D" of end section.

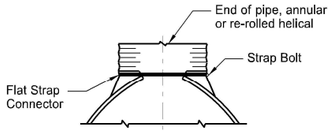
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

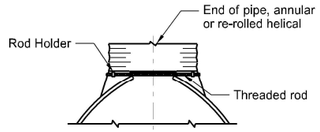
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



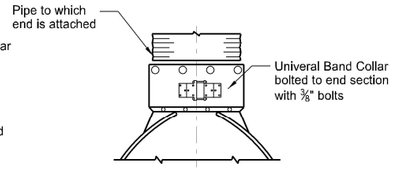
SECTION A-A



TYPE #1
For circular pipes with diameter 24" & smaller



TYPE #2
For circular pipes with diameter 30" through 36"

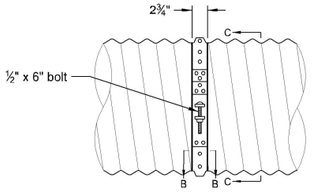


TYPE #3
For all pipe sizes

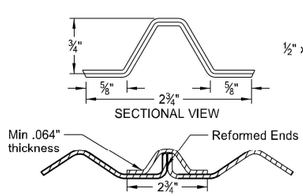
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"	.052"
		78" - 84"	10½"	.079"
	3" x 1" Rerolled End	48" - 120"	10½"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

NOTES:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x ¼" galv. angle for 60" through 72" dia. and 2½" x 2½" x ¼" galv. angle for 78" and 84" dia.. Angles to be attached by galv. ⅜" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
3. Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
4. Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
5. ½" x 8" bolts may be used as a substitute for the ½" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four ½" bolts with maximum spacing of 5½" are used for the connection.
7. Length of spot welds shall be minimum ½".



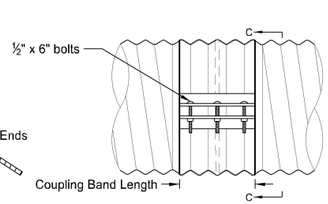
SIDE VIEW



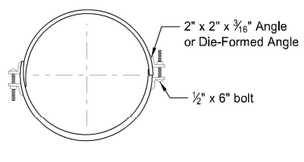
SECTIONAL VIEW

SECTION B-B

HAT BAND FOR FLANGED END PIPE

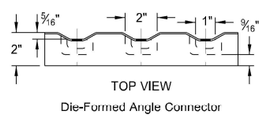


SIDE VIEW

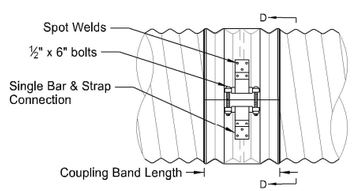


SECTION C-C
Angle Connection

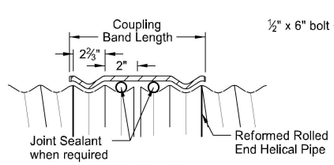
ANNULAR BAND



TOP VIEW
Die-Formed Angle Connector

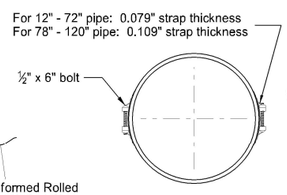


SIDE VIEW

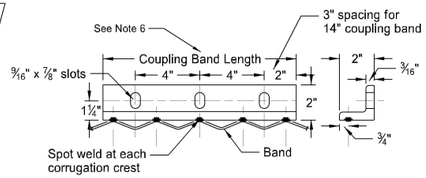


SECTIONAL VIEW

HUGGER COUPLING BAND



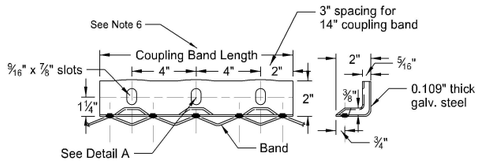
SECTION D-D
Bar & Strap Connection



SIDE VIEW

END VIEW

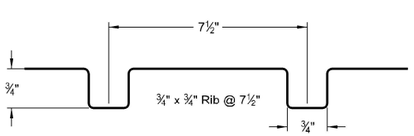
2" x 2" x 3/16" Angle Connector

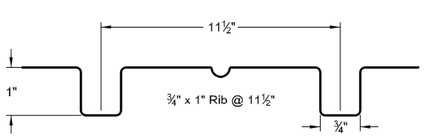


SIDE VIEW

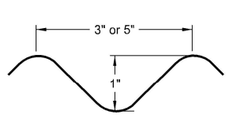
END VIEW

Die-Formed Angle Connector

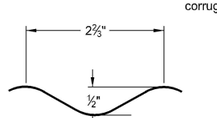




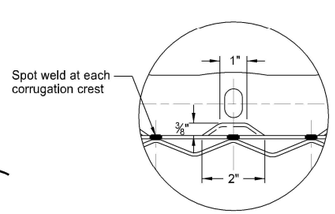
SPIRAL RIB CORRUGATIONS



3" x 1" CORRUGATIONS or
5" x 1" CORRUGATIONS



2⅔" x ½" CORRUGATIONS



Detail A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail
09-23-22	Galvanized Thickness Table

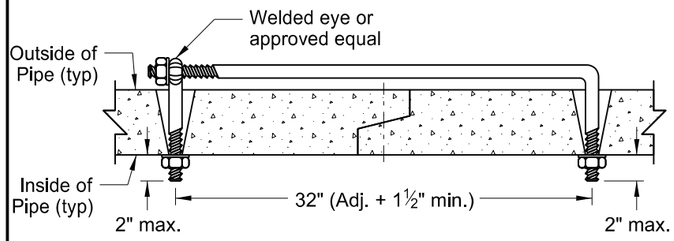
JONATHAN D KETTERLING
REGISTERED
PROFESSIONAL
PE-4684
ENGINEER
NORTH DAKOTA

09/23/22

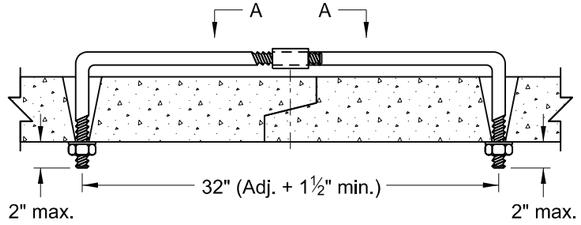
DocuSign

CONCRETE PIPE, CATTLE PASS, OR PRECAST CONCRETE BOX CULVERT TIES

D-714-22

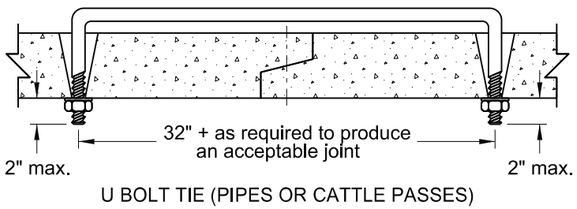


EYE BOLT TIE (PIPES ONLY)

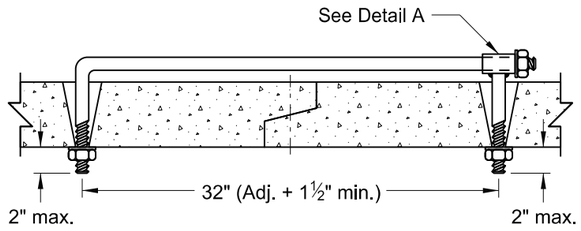


ADJUSTABLE TIE (PIPES ONLY)

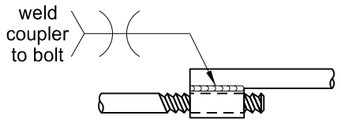
REQUIRED SIZE OF TIE BOLTS		
PIPE SIZE	THREAD ø	XXS PIPE SLEEVE INNER ø
18" - 24"	⅝" SEE NOTE 3	¾"
30" - 66"	¾"	1"
72" - 120"	1"	1¼"
RCB/CATTLE PASS		



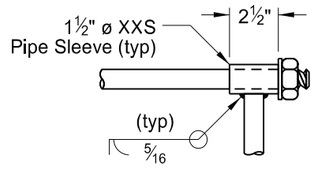
U BOLT TIE (PIPES OR CATTLE PASSES)



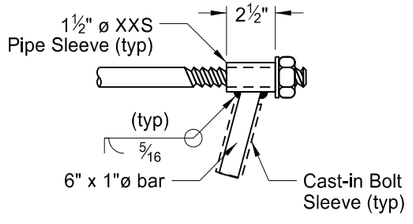
WELDED TIE (PIPES ONLY)



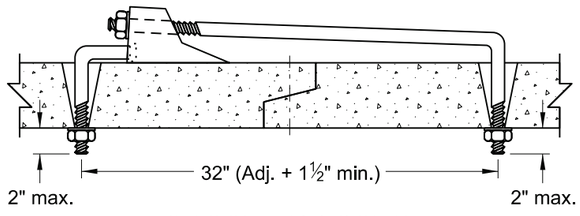
SECTION A-A



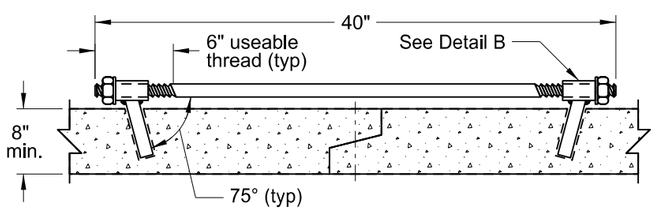
DETAIL A



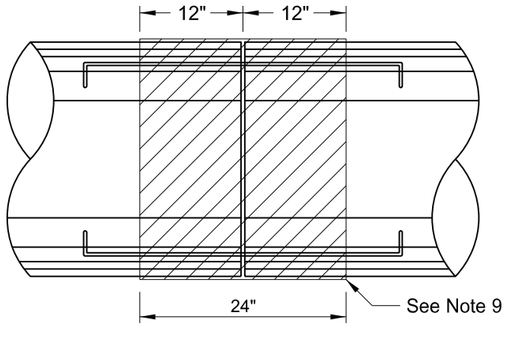
DETAIL B



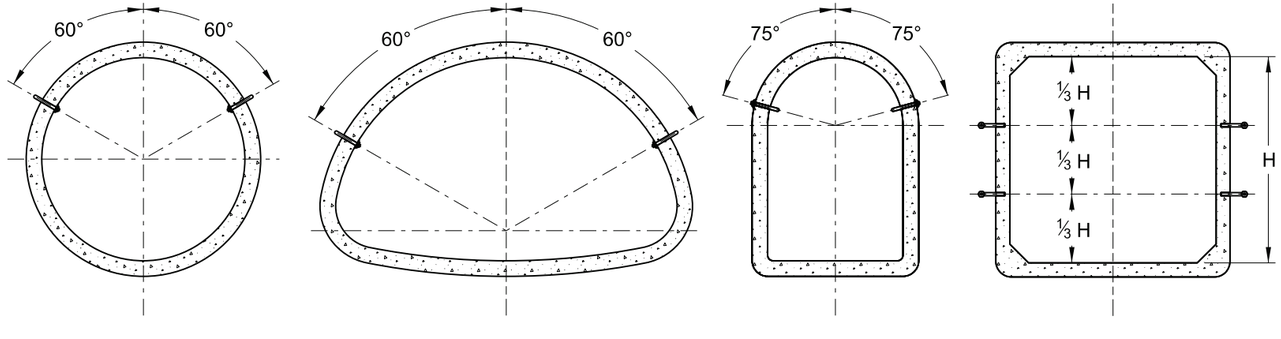
CANOPY TIE (PIPES ONLY)



HIDDEN TIE (RCB ONLY)



PLAN VIEW (PIPES ONLY)



END VIEW

NOTES:

1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
4. Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
5. Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
6. Holes in pipes to accommodate tie bolts will be precast. Tapered holes are permitted. Use holes that have a diameter ¼" larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1¼".
7. Include the cost of precasting the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
8. Tie all centerline and approach RCP culvert joints. Tie all joints including the end sections of all free ends of storm drain systems. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
9. Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, use Type S2 geotextile fabric and overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C990. Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
10. Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
11. Provide lock washers or burr threads of concrete box ties after installation and tightening to prevent nut rotation.
12. Tie RCB's as noted in the plans.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

3-18-14

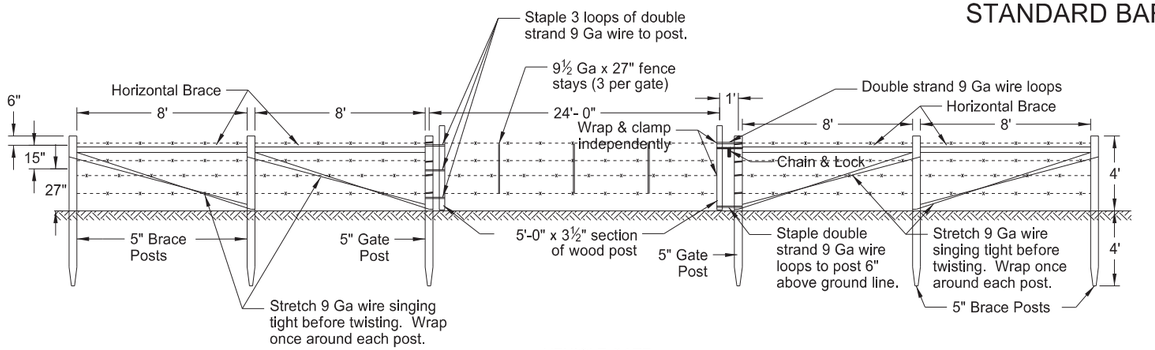
REVISIONS

DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A, End View

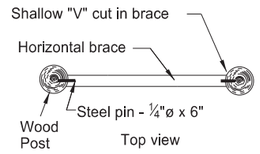
REGISTERED PROFESSIONAL ENGINEER
JASON R. THORENSON
PE - 5048
DATE 01/17/25
NORTH DAKOTA

STANDARD BARBED WIRE FENCE

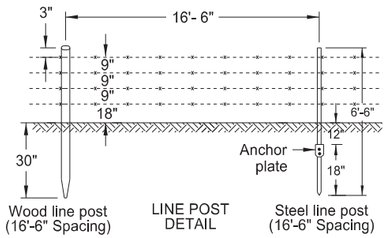
D-752-1



VEHICLE GATE



HORIZONTAL BRACE DETAIL



NOTES

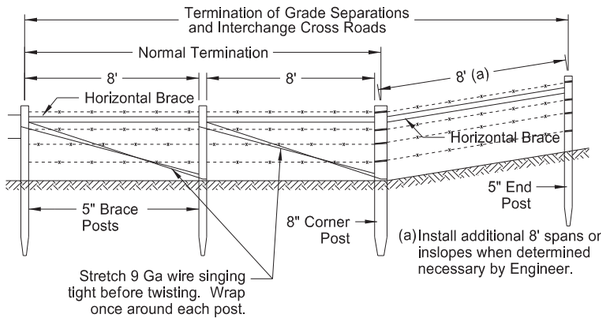
1. No deduction in measured pay length of fence made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.

2. Install double brace assemblies at locations shown on the plans or established by the Engineer. Place adjacent fence terminals, corner assemblies, or double brace assemblies at a maximum spacing of 1,320 feet.

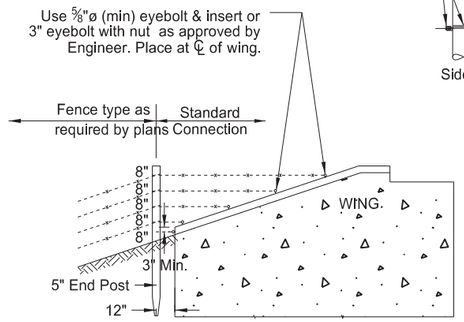
3. Include all costs of furnishing and installing inserts and eyebolts in the unit price bid for fencing bid items. Use eyebolts galvanized according to AASHTO designation M-30; inserts of corrosion resistant material do not require galvanization. Use concrete inserts capable of developing the full strength of the ⅝" diameter threaded eyebolt, when installed in concrete.

4. Determine post type used, either wood or steel, unless otherwise specified in the plans.

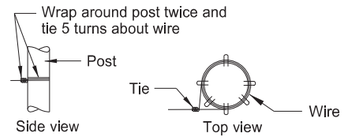
5. Include the cost of bracing at vehicle gates in the price bid for "Vehicle Gate."



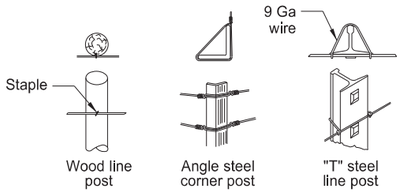
FENCE TERMINAL



DETAIL FOR TYING FENCE TO WINGS OF ABUTMENTS

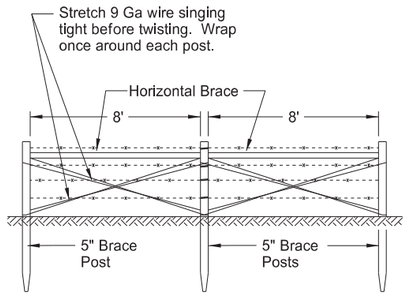


WRAP-AROUND DETAIL

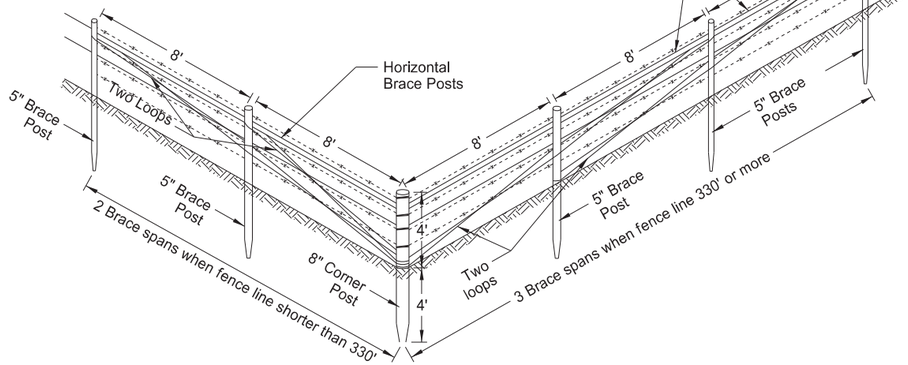


FASTENING TO POSTS

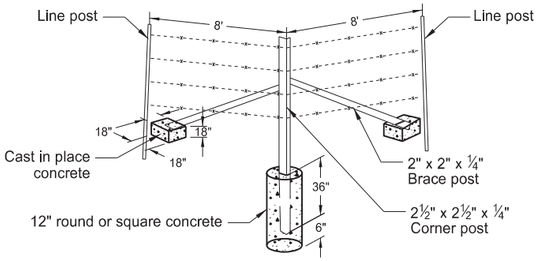
POST SIZES					
	TREATED WOOD		STEEL		
USE OF POST	Post dia.	Post length	Post length	Post wt. Lbs/Ft	Anchor wt. Lbs.
Line post	3½"	6'-6"	6'-6"	1.33	0.67
Corner post	8"	8'	7'	4.10	(Conc.)
End post	5"	8'			
Brace post	5"	8'	7'	3.19	(Conc.)
Gate post	5"	8'			
Horizontal brace	4"	8'	As appoved by the Engineer		



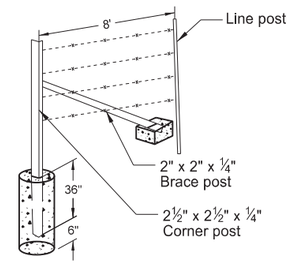
DOUBLE BRACE ASSEMBLY



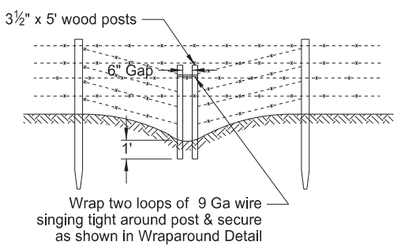
CORNER ASSEMBLY



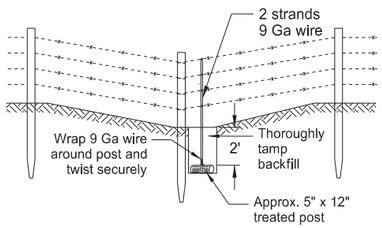
CORNER AND DOUBLE BRACE ASSEMBLY STEEL POSTS



FENCE TERMINAL STEEL POSTS

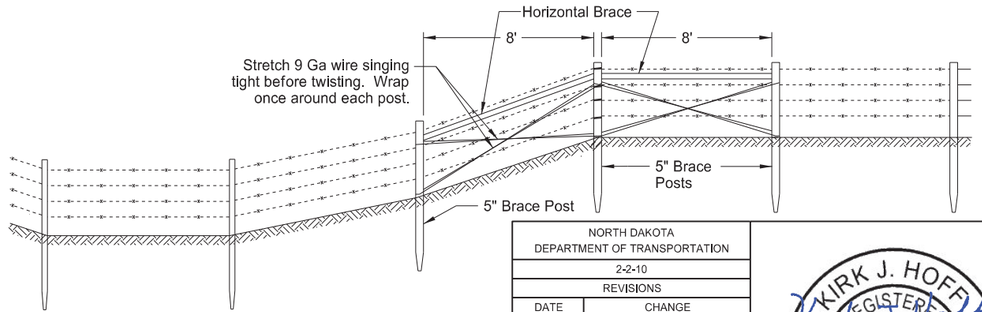


BREAK-AWAY FENCE FOR NARROW DEPRESSIONS SUBJECT TO FLOODING



DETAIL FOR ANCHORING FENCES IN DEPRESSIONS*

*Determine locations in the field and include in price bid for fencing. Use other methods of anchoring fence if approved by the Engineer.



FENCING FOR WIDE DEPRESSIONS

Use double brace installation, as shown, on opposite side of depression.

Decrease line post spacing as needed due to terrain.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-2-10	
REVISIONS	
DATE	CHANGE
10-02-12	Notes, steel assemblies/posts.
11-25-13	Revised Vehicle Gate.
10-17-17	Updated to active voice.
02-23-23	Revised post spacing/brace size.

KIRK J. HOFFMANN
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

02/23/23

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.

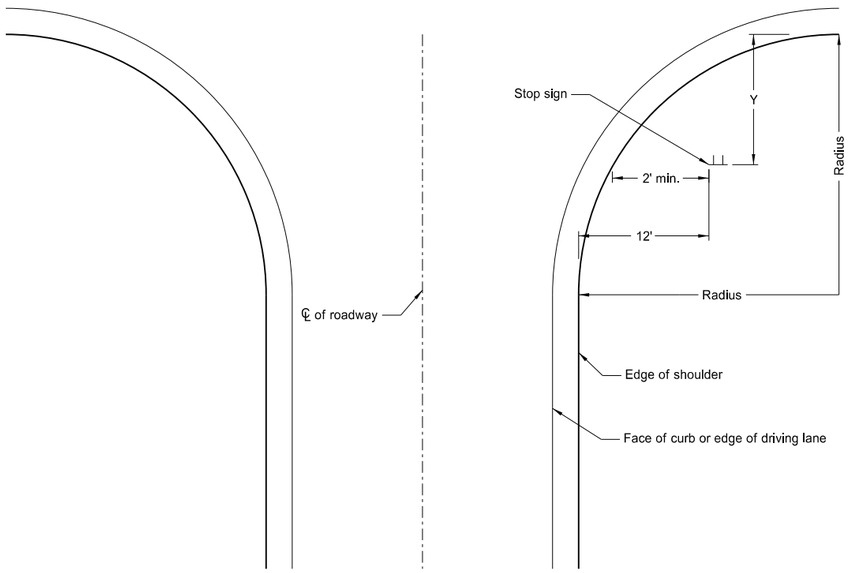
   Install signs on expressways a minimum height of 7'.

   Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.

   Maximum vertical clearance is 6" greater than the minimum vertical clearance.

3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.

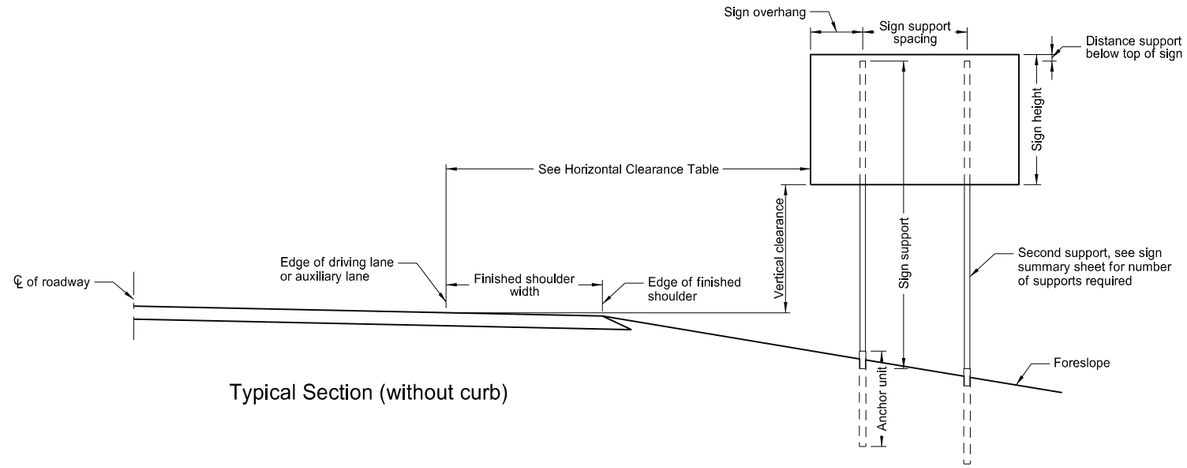
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

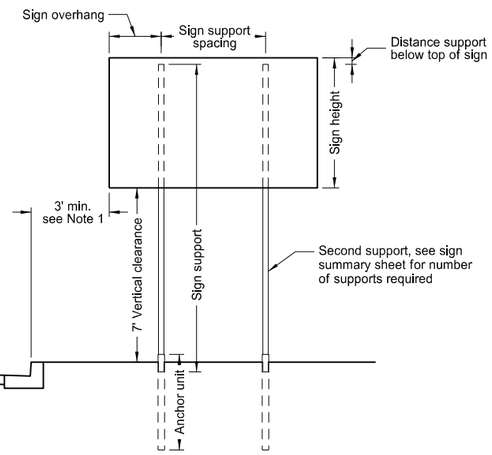
Use layout for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



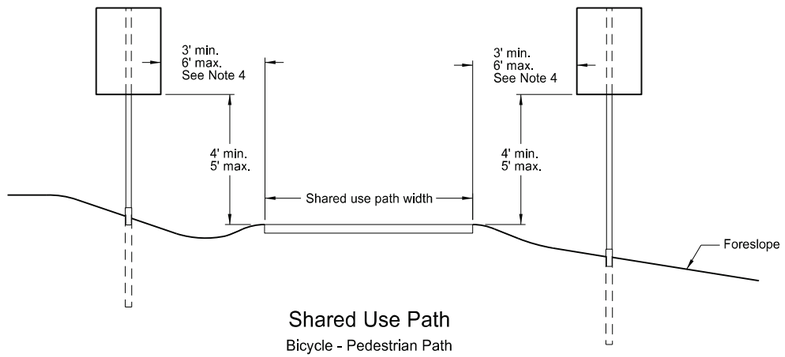
Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

Kirk J. Hoff

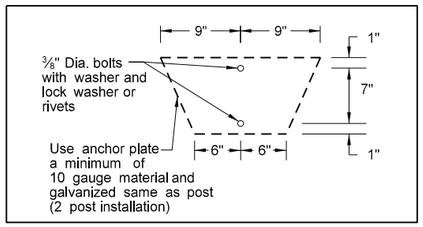
08/05/24

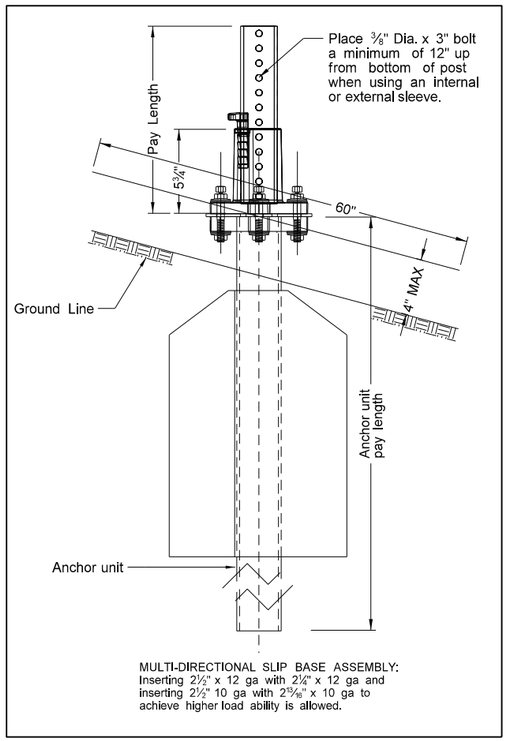
Mounting Details Perforated Tube

D-754-24

Number of Posts	Telescoping Perforated Tube: Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2½", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

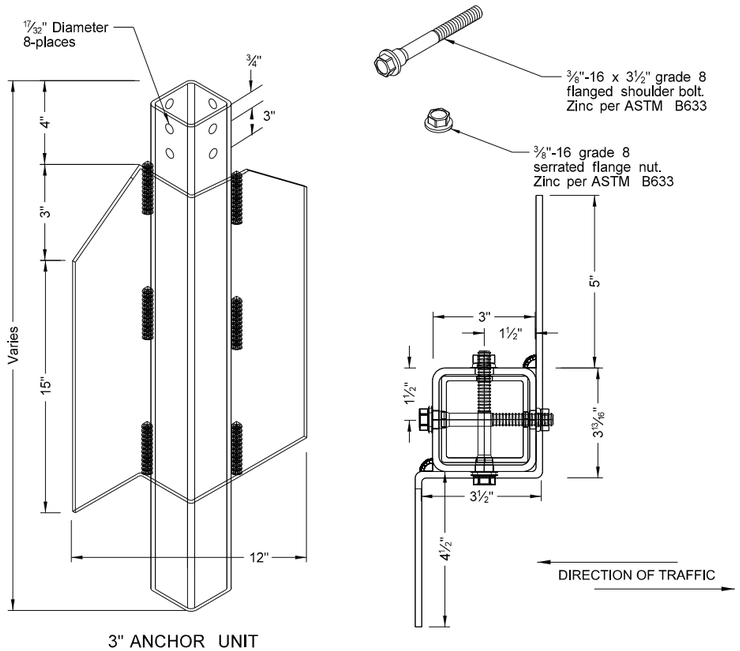




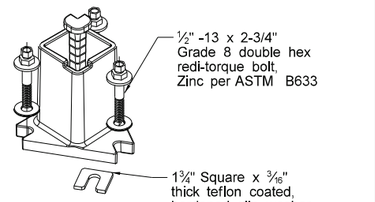
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2 15/16" x 10 ga to achieve higher load ability is allowed.

SHOULDER BOLT

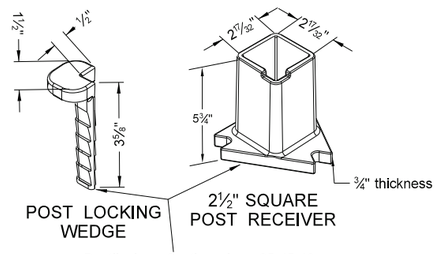
Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)

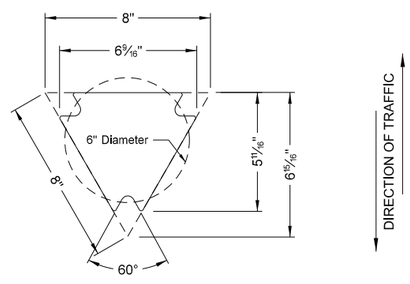


3" ANCHOR UNIT



SLIP BASE FOR 2½" POST





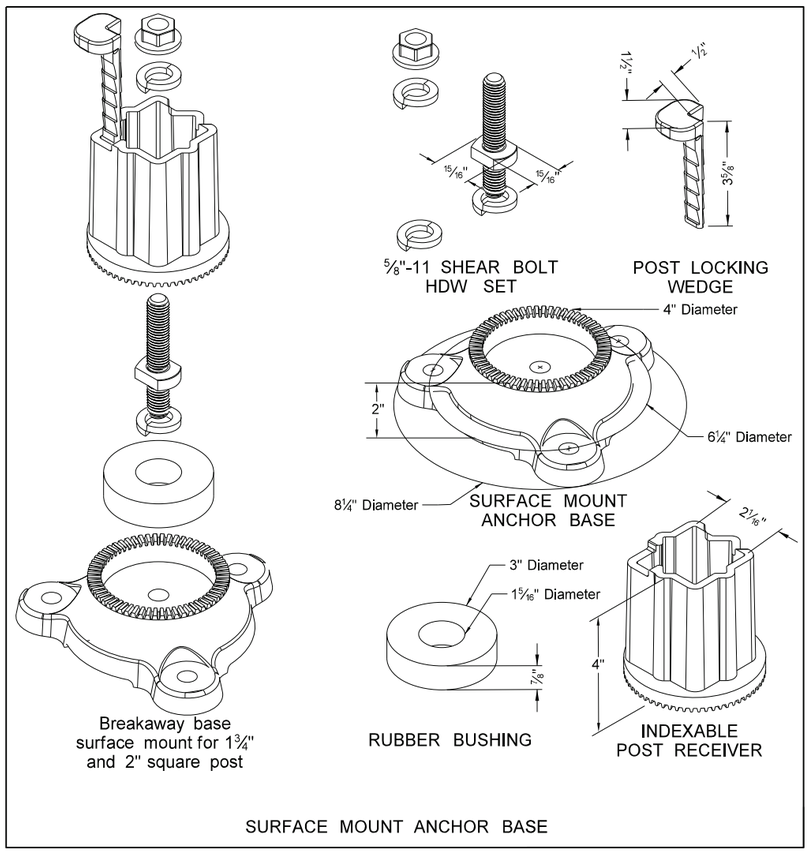
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes: Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulud In.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

NOTE:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. Eliminate wings when anchor is used in concrete sidewalk.
4. Provide a minimum 8' distance between the first and fourth post on four post signs.
5. Install in accordance with manufacturers recommendation.
6. Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



SURFACE MOUNT ANCHOR BASE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-6-09

REVISIONS

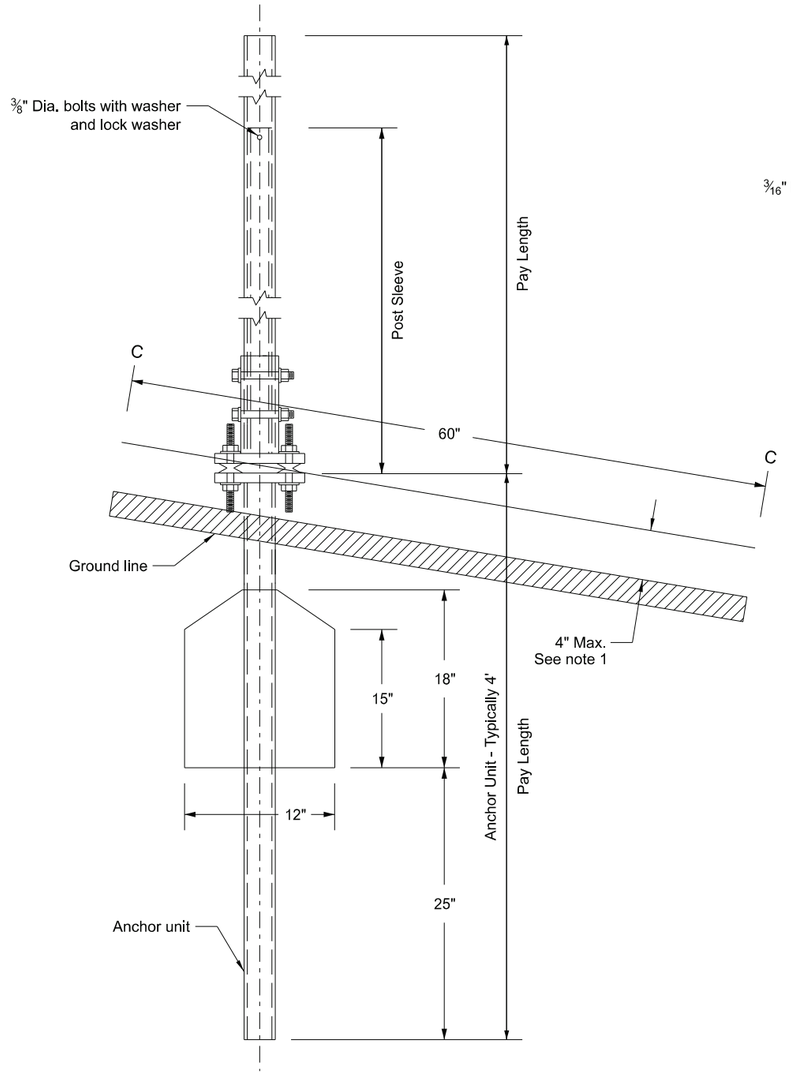
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

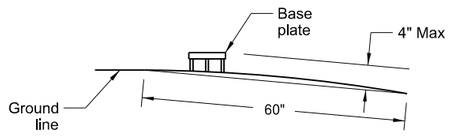
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/05/24

Breakaway Coupler System for Perforated Tubes

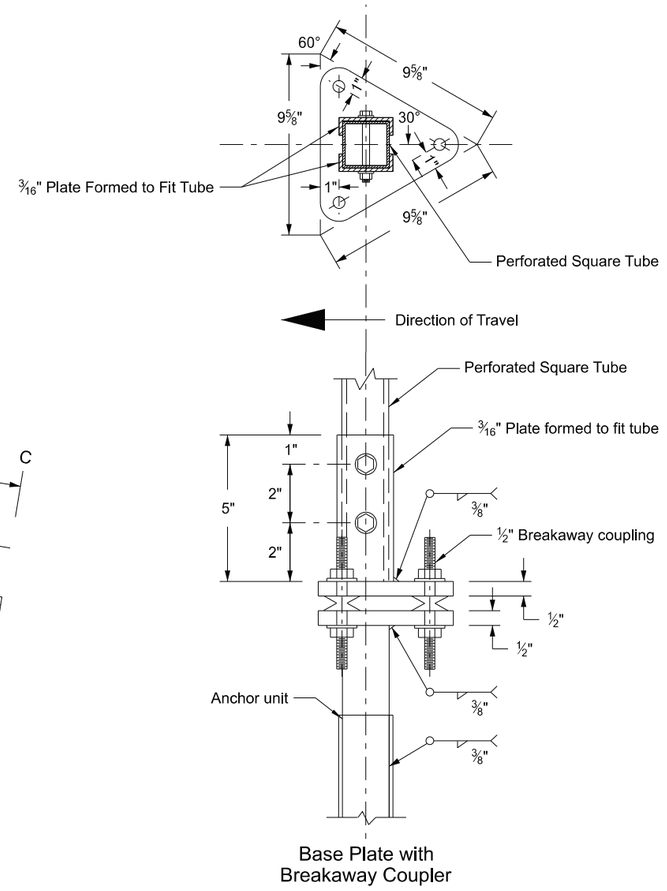
D-754-24A



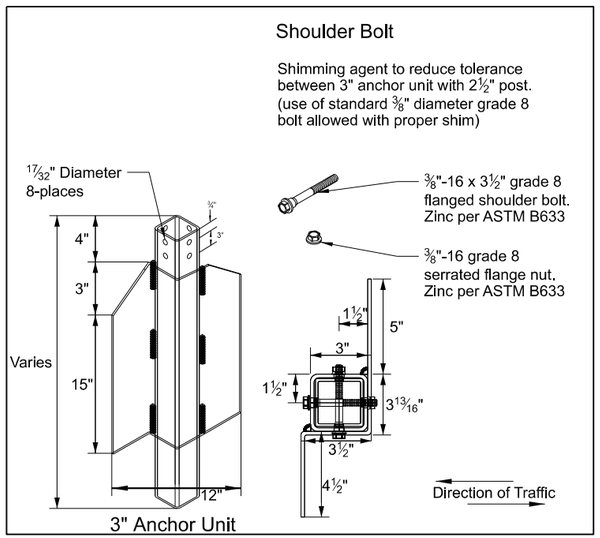


Section C-C

Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



Base Plate with Breakaway Coupler



3" Anchor Unit

Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Guage
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-3-2013

REVISIONS

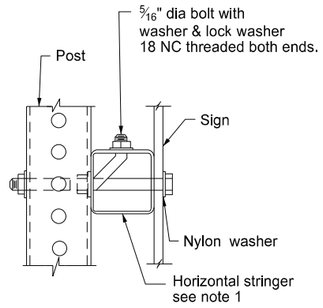
DATE	CHANGE
8-30-18	Updated notes to active volce.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

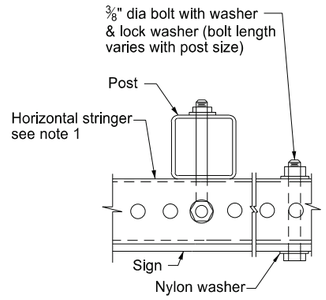
08/05/24

Mounting Details Perforated Tube

D-754-25

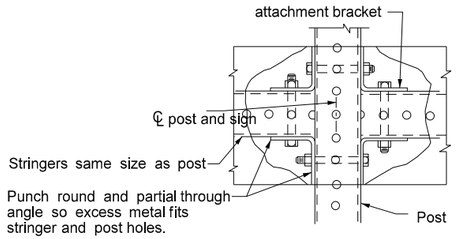


Side View



Top View

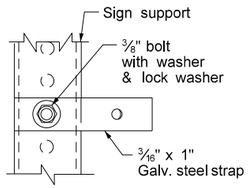
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



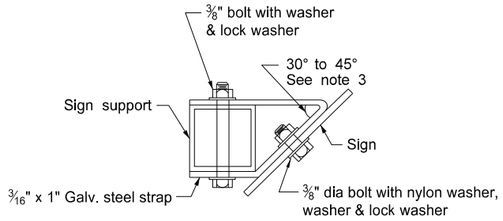
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - Use perforated tubes or 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 15/16" ±1/16" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

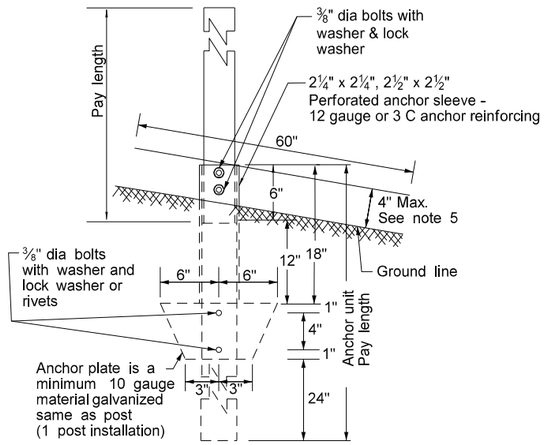


Side View



Top View

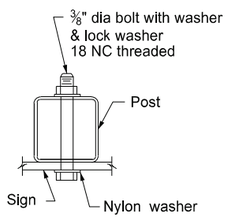
STRAP DETAIL



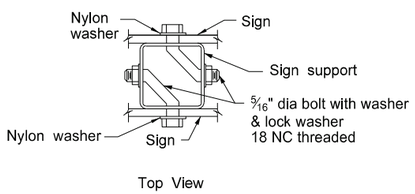
ANCHOR UNIT AND POST ASSEMBLY

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - When placing 2½", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

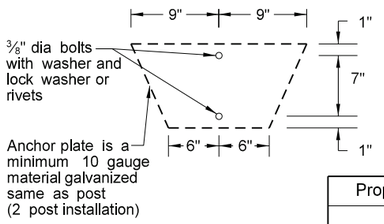


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia $In.^4$	Cross Sect. area $In.^2$	Section Modulus $In.^3$
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.
The 2½" size is shown as 2.51" size on the plans.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

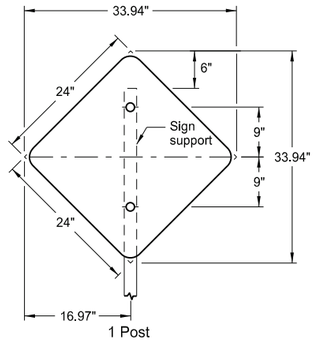
REVISIONS

DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

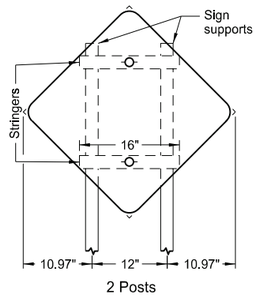
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

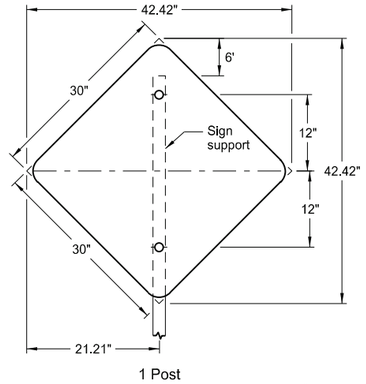


1 Post

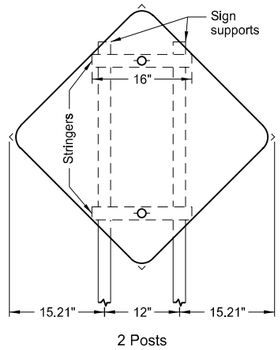


2 Posts

Assembly No. 18

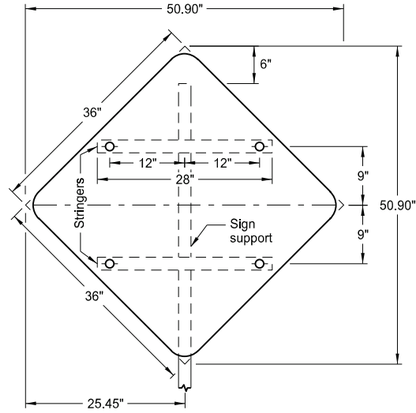


1 Post

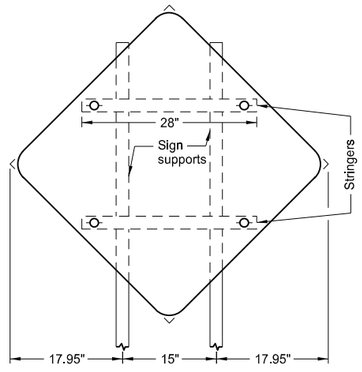


2 Posts

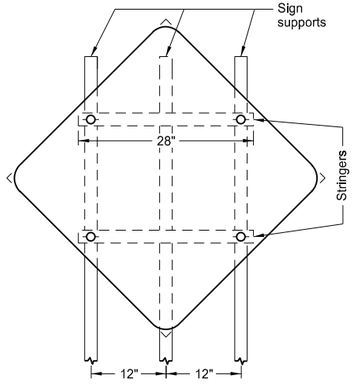
Assembly No. 19



1 Post

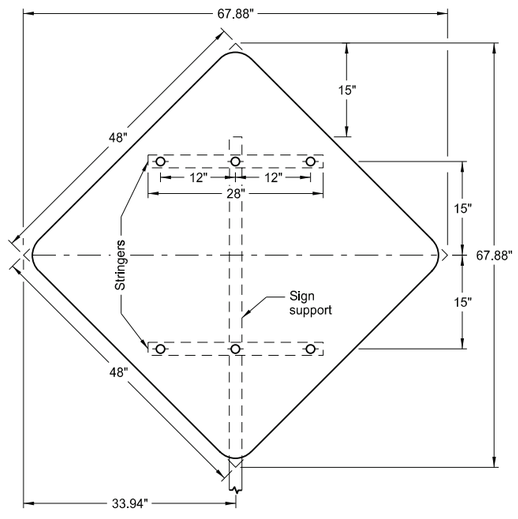


2 Posts

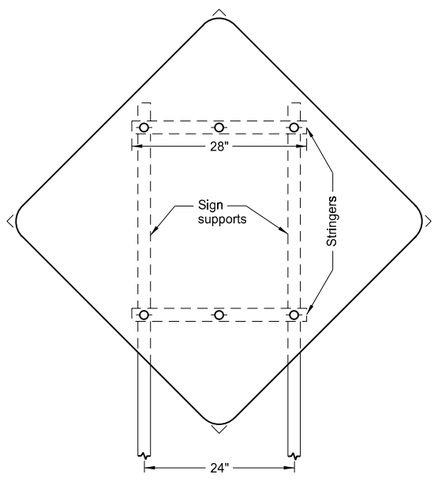


3 Posts

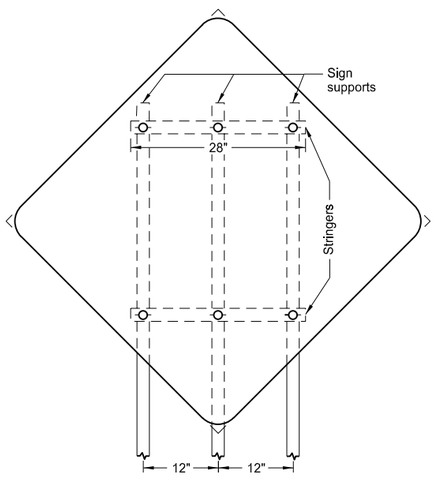
Assembly No. 20



1 Post



2 Posts



3 Posts

Assembly No. 21

Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

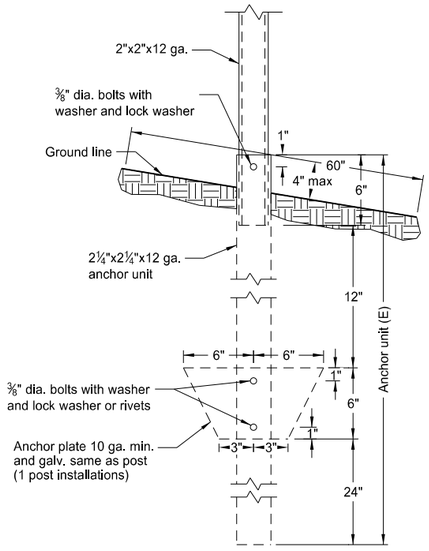
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

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

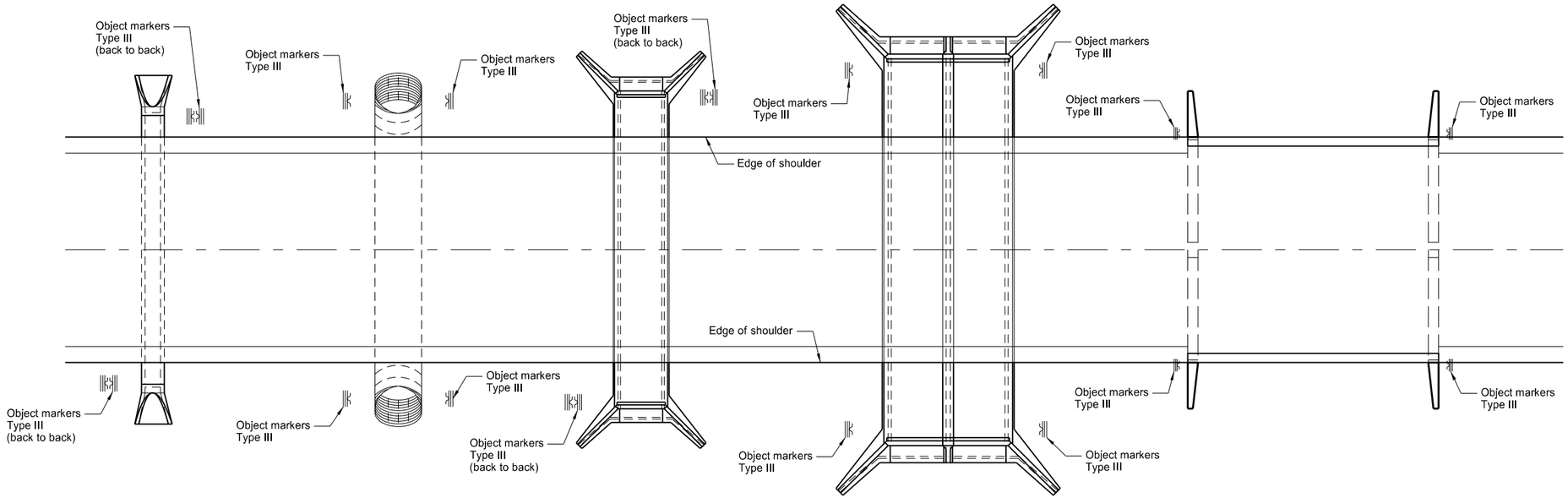
08/06/24

OBJECT MARKERS

D-754-82



Perforated Tube Anchor Unit Assembly



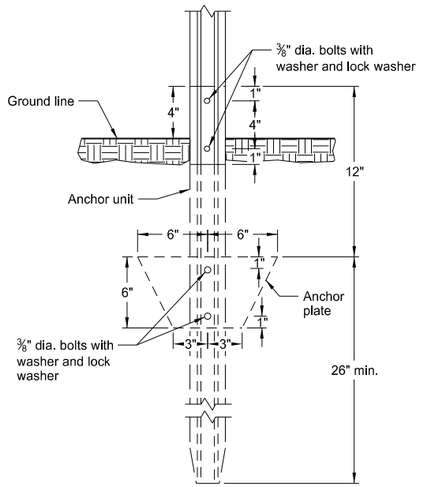
Pipe Culverts
10' max

Pipe Culverts
greater than 10'

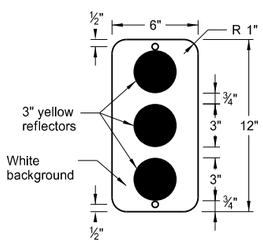
Box Culverts
10' max

Box Culverts
greater than 10'

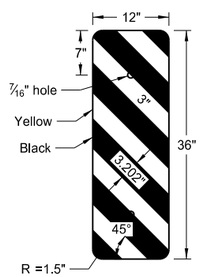
Bridges (B)



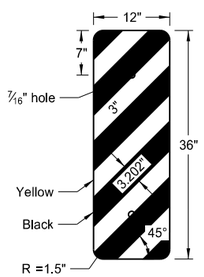
U-Channel Anchor Unit Assembly



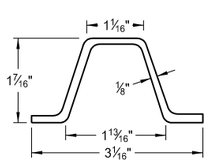
Object Marker
OM2-1V (C)
Type II



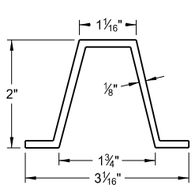
Object Marker Left
OM-3L (C)
Type III



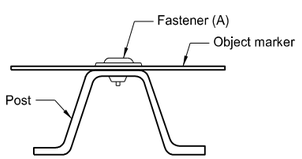
Object Marker Right
OM-3R (C)
Type III



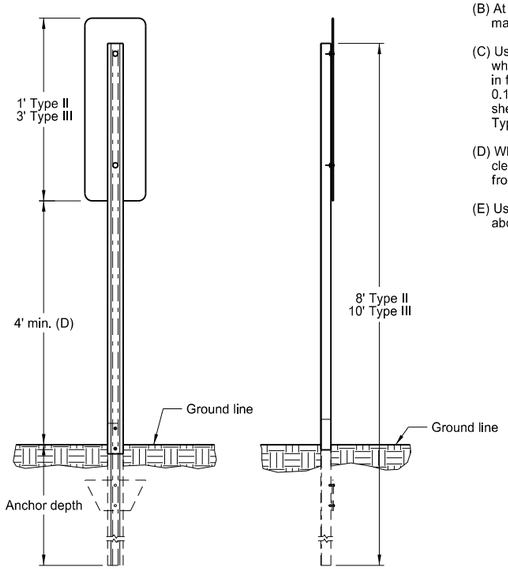
Steel Post Detail
Approx. 2 lb/ft



Aluminum Post Detail
Approx. 0.88 lb/ft



Fastener Detail



Object Marker
Installation Detail

Notes:

(A) Use ⅜" dia. tension pin type or other non-rust vandal resistant fastener with min. outside dia. 13/16" flat washer.

(B) At locations of approach guardrail with reflectors and end terminal with impact head object markers, do not install object markers.

(C) Use two object markers for back to back mountings. On bridges where the distance between wheel guards is less than the approach width, mount object markers vertically on steel posts in front of the bridge railing on each side of highway to mark the horizontal clearance. Use 0.100" minimum thickness sheet aluminum for sign backing material. Use ASTM Type XI sheeting for Type III object markers and ASTM Type IV background sheeting with ASTM Type XI reflectors for Type II object markers.

(D) When object marker is located 8' or less from shoulder or curb, provide 4' minimum vertical clearance from near edge of traveled way to bottom of sign. When located more than 8' from shoulder or curb provide 4' minimum vertical clearance from ground to bottom of sign.

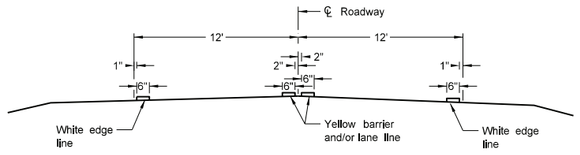
(E) Use 4" vertical clearance for anchor or breakaway base. Provide 4"x60" measurement above and below post location and back and ahead of post.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-18-14	Revised Note C
8-30-18	Updated notes to active voice and removed note.
9-05-19	New Design Engineer PE Stamp.

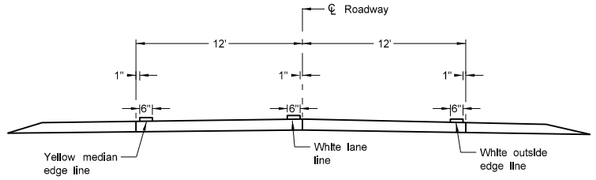
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 9/05/19 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

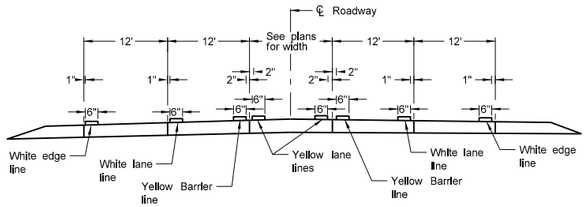
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

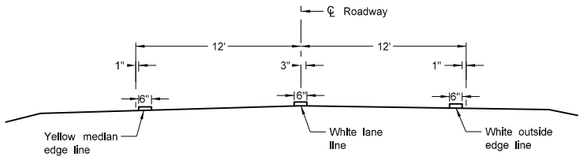
NOTES:

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

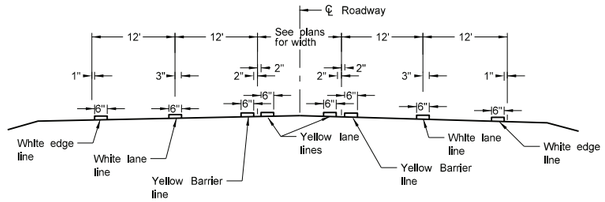
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,

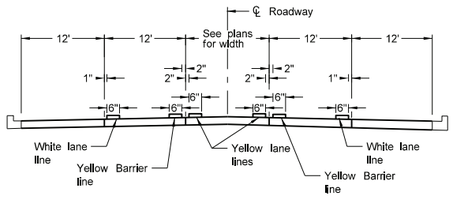
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



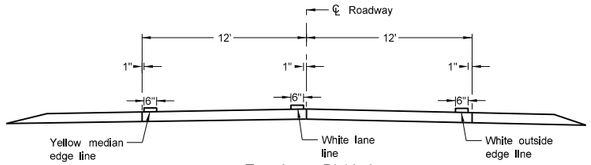
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



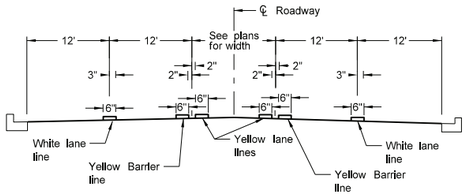
RURAL FIVE LANE ROADWAY
Asphalt Section



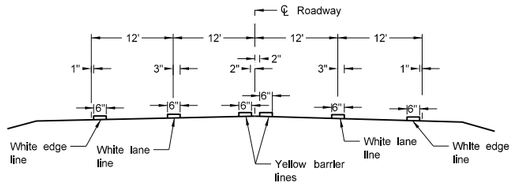
URBAN FIVE LANE SECTION
Concrete Section



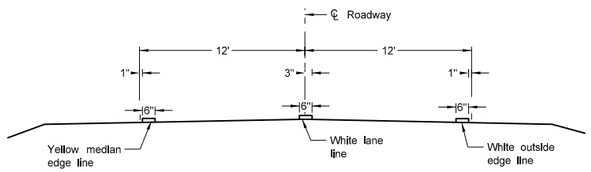
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



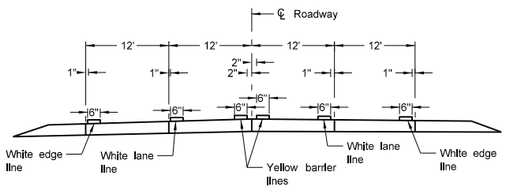
URBAN FIVE LANE SECTION
Asphalt Section



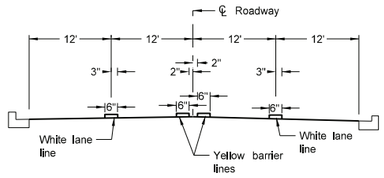
RURAL FOUR LANE ROADWAY
Asphalt Section



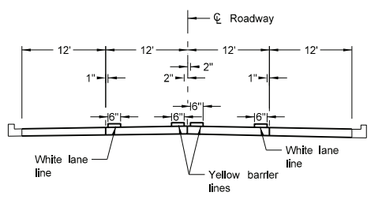
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



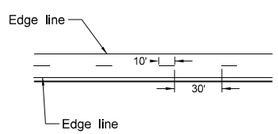
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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.
07-09-24	Modified Note 1.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA