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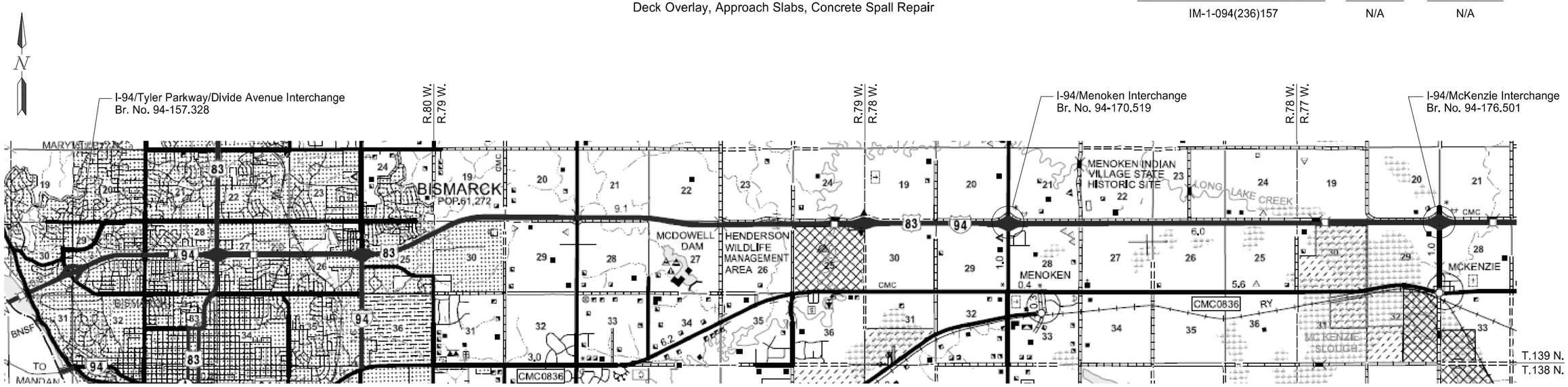
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

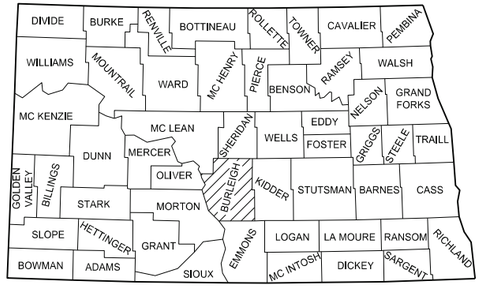
IM-1-094(236)157

Burleigh County
I-94/Tyler Parkway/Divide Avenue Interchange
I-94/Menoken Interchange, I-94/McKenzie Interchange
Deck Overlay, Approach Slabs, Concrete Spall Repair

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-1-094(236)157	N/A	N/A





STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson
07/17/25

BRIDGE DIVISION

REGISTERED PROFESSIONAL ENGINEER
JASON R. THORENSON
PE - 5048
DATE
07/14/25
NORTH DAKOTA

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PLAN SECTIONS

SPECIAL PROVISIONS

LIST OF STANDARD DRAWINGS

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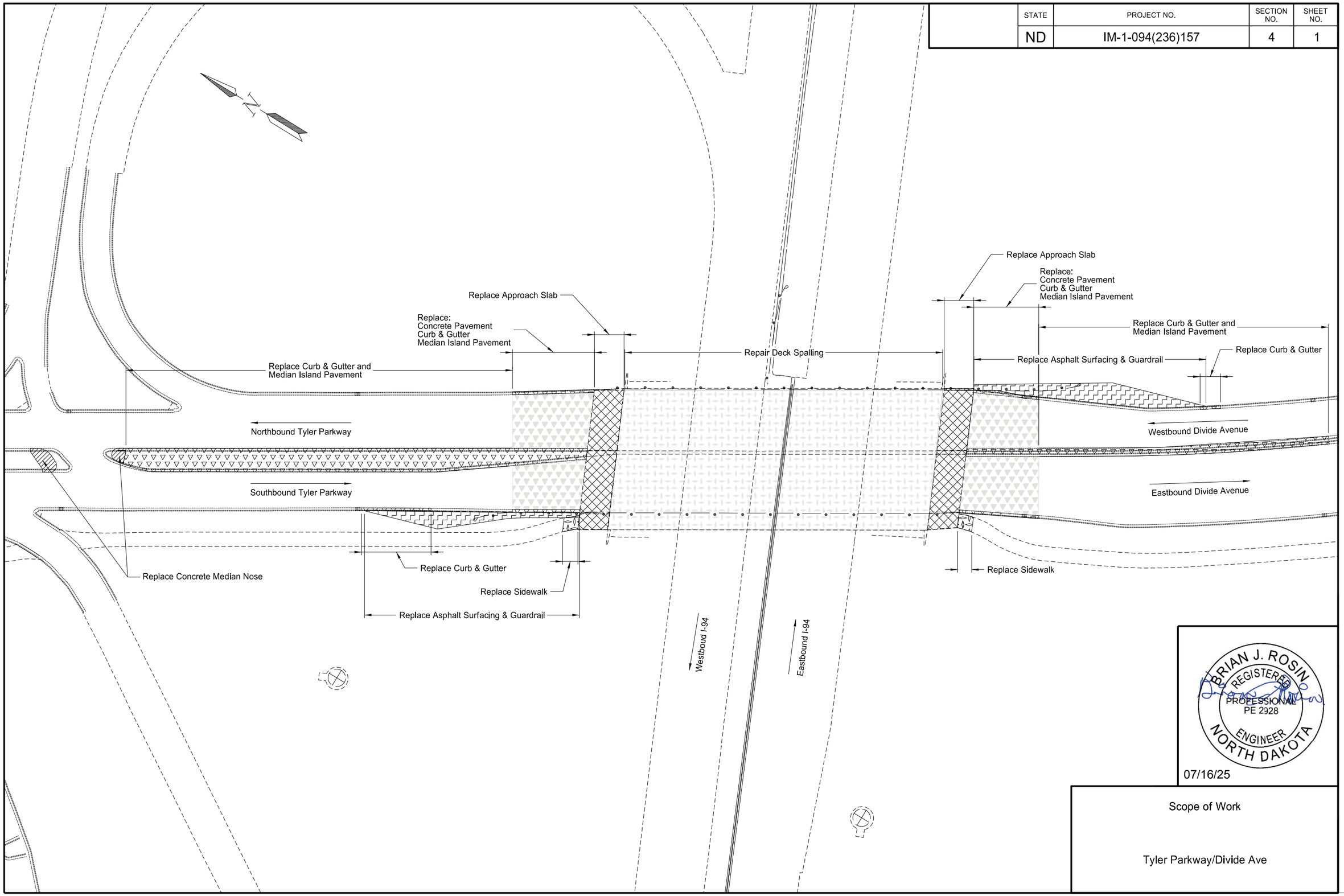

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Scope of Work

Tyler Parkway/Divide Ave

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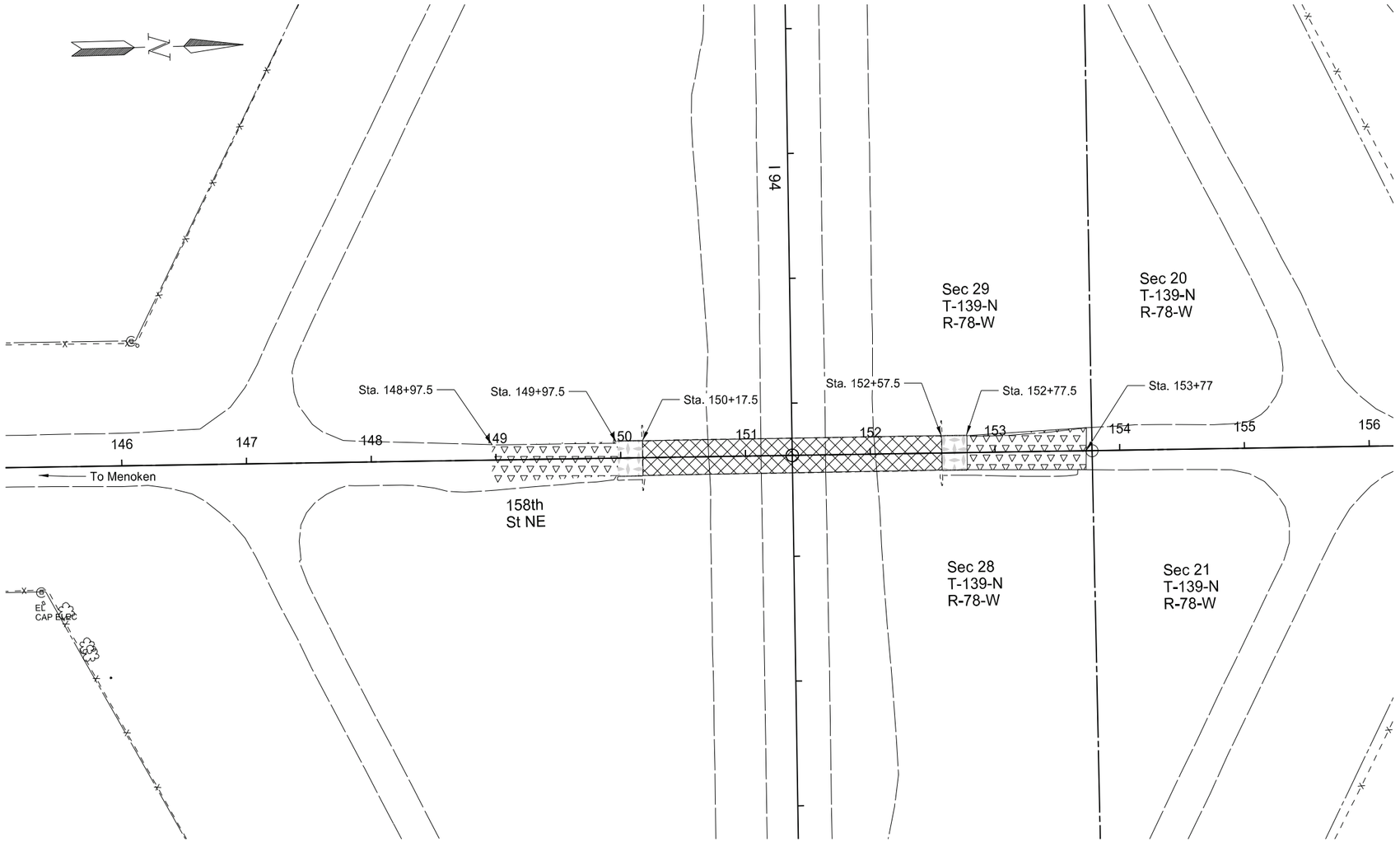

Bridge Deck Overlay

HMA Mill And Overlay

Bridge Approach
Slab Replacement

Scope of Work
Menoken Interchange
RP 170

Bridge Deck Overlay

Tyler Parkway Int. to Menoken Int.

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Docusign Envelope ID: 2D950D5C-B376-48B8-8803-82DE17D3A03D

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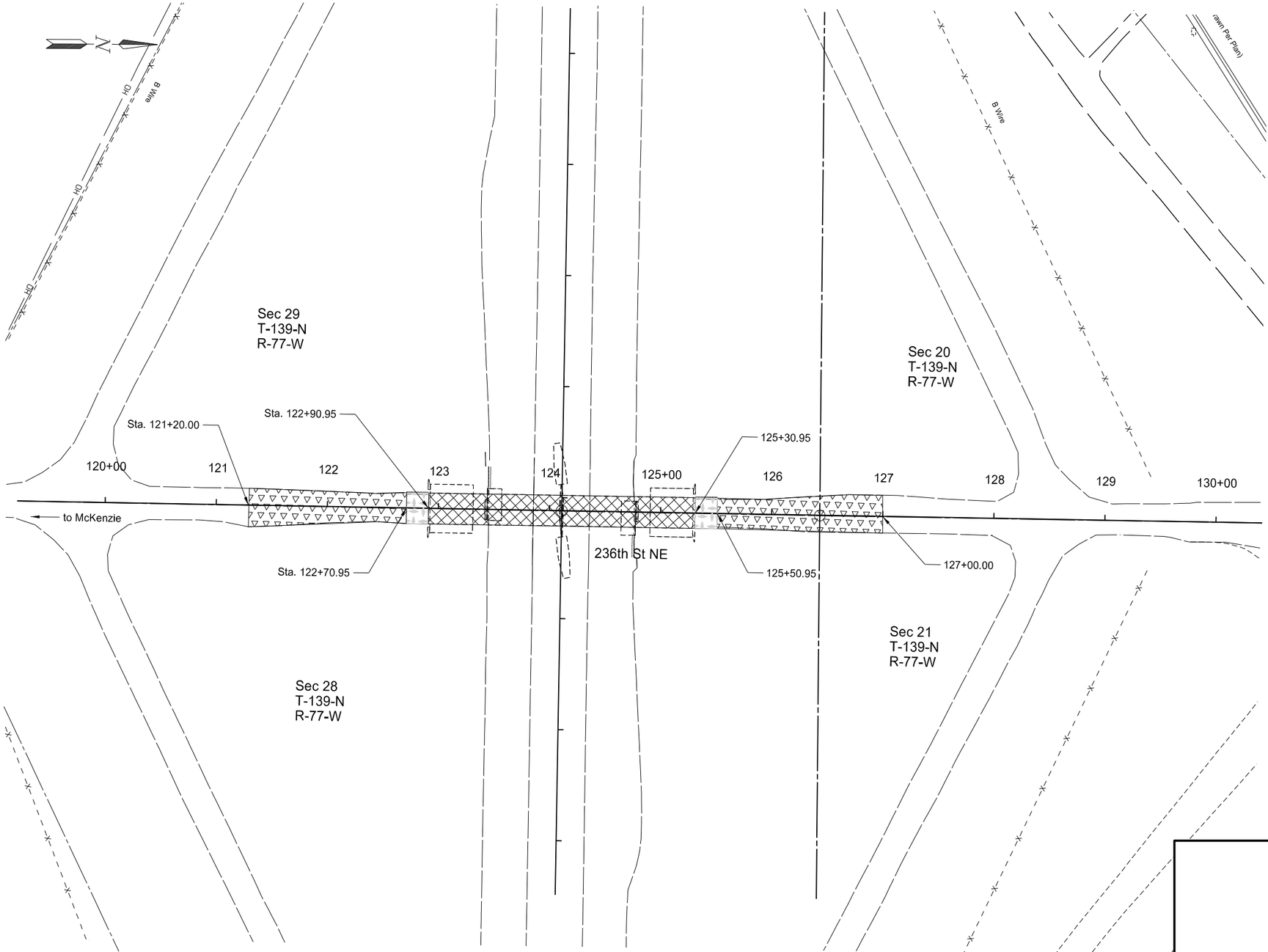

Bridge Deck Overlay

HMA Mill And Overlay

Bridge Approach
Slab Replacement

Scope of Work
McKenzie Interchange
RP 176

Bridge Deck Overlay

Tyler Parkway Int. to Menoken Int.

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NOTES

100-P01 COORDINATION OF PROJECTS: Other projects will be occurring in the vicinity of this project during the 2026 construction season. Coordinate scheduling, work activities and traffic control devices to minimize confusion and delay to the public.

The projects are as follows:

- I-94 Interstate Reconstruction, Westbound lanes east of Bismarck

105-P01 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic. Sweep paved surfaces due to construction vehicle tracking of sediment from site. Use a vacuum or pick-up type sweeper to perform this work.

108-P01 BIWEEKLY PLANNING & REPORTING MEETING: A biweekly planning (every other week) and reporting meeting is required.

202-P01 REMOVE AGGREGATE BASE & SURFACING: Removal of Aggregate Base & Surfacing at the Tyler Parkway/Divide Avenue temporary median crossovers includes the following:

- Remove the bituminous pavement and portion of the underlying aggregate base. Leave enough aggregate base in place to accommodate the replacement of curb & gutter and concrete median paving colored w/brick pattern.

Include all costs for removing the bituminous surfacing and the aggregate base course in the contract price for “Remove Aggregate Base & Surfacing.”

550-P01 3IN EXPANSION JOINT: On Tyler Parkway (RP 157), install expansion joints consisting of a pre-compressed polymer impregnated self-expanding polyurethane foam joint seal coated with a silicone surface providing a permanent weather tight seal. The joint seal may be:

1. Wabo FS Bridge Seal (Watson Bowman Acme);
2. BEJS Bridge Expansion Joint System (EMSEAL);
3. Iso-Flex Silfast XL (LymTal International),

Prepare the joint opening and install the joint seal according to the manufacturer's recommendations.

Follow the manufacturer's recommendation for attaching the expansion joint seal to the concrete and for splicing foam together. Install the membrane sealant material into the joint, positioning it with the manufacturer's recommended recess from the top surface of the concrete. Do not stretch or compress the membrane sealant material.

Fabricate and install protection armor angles on each side of the expansion joint as shown in the Sec 20 Details. Galvanize the armor angles according to Section 854.01, "Galvanizing". Splices are permitted. Weld spliced ends. Coat weld splices or damaged coating areas with galvanizing paint according to Section 854.02, "Damaged Galvanized Coatings".

Include all work and materials associated with the expansion joint seal and protection armor angles in the contract unit price of "3 IN Expansion Joint."

550-P02 CONCRETE SLEEPER SLAB: This work consists of constructing a concrete sleeper slab at the location of an expansion joint in the PCC pavement on Tyler Parkway (RP 157).

Finish the surface of the sleeper slab smooth. Allow the sleeper slab to cure for 24 hours before performing additional work on or adjacent to the slab. Cover the sleeper slab with a double layer of 4 or 6 mil polyethylene sheeting before covering the slab with the concrete roadway.

Include all costs for any excavation, removal of existing sleeper slab, aggregate base, reinforcing steel, labor, and equipment in the contract unit price of "Concrete Sleeper Slab".

570-P01 CONCRETE PAVEMENT REPAIR: Re-establish tie bars around the edges of the concrete pavement repairs. Include all cost in the price bid for “11 IN Concrete Pavement Repair – Full-Depth – Doweled”.

Concrete pavement repair at the concrete median nose on Tyler Parkway consists of the removal of existing concrete and subbase to allow for the placement of 11 inches of concrete over 12 inches of Aggregate Base Course Class 5. An additional 15 tons has been included in the quantities for this Class 5 Aggregate. Include the cost of the placement of concrete pavement (placed simultaneously with the median nose) in the price bid for “11 IN Concrete Pavement Repair – Full Depth – Doweled”. Tie concrete pavement as shown on Paving Layout Sheet.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (75) 2.5' x 10' concrete barriers They can be picked up and returned to the New Salem yard. Contact the Bismarck District office at 701-328-6950 to facilitate the exchanges. Plan to use these barriers for the Menoken Interchange (RP 170) for I-94 work.

Obtain (46) 22.5" x 12.5' concrete barriers. They can be picked up and returned to the New Salem yard. Contact the Bismarck District office at 701-328-6950 to facilitate the exchanges. Plan to use these barriers at Menoken Interchange (RP 170) then McKenzie Interchange (RP 176) for crossover bridge work (or vice versa).

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

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

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

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

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

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

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

704-P01 Maintain a minimum traffic lane width of 11' across the Menoken (RP170) and McKenzie (RP176) interchanges crossroad during construction.

704-P02 TRAFFIC CONTROL: Provide traffic control consisting of temporary lane closures and flagging. The traffic control device list has been developed using the layouts shown in the plans and the following layouts shown on the Standard Drawings.

D-704-15 Layout Type C: Use for replacing the bridge approach slabs, construction of expansion joints and CPR at Tyler Parkway/Divide Avenue.

D-704-16 & 17, Sign Layout for Lane Closure on a Two Lane Road Using Traffic Control Signals (Two Instances)

Use two additional interim traffic signal controlled/flagging controlled lane closures at each location. One for the NE Ramp and one for the SW Ramp. Include the cost for all signal systems in the contract unit price for "Lane Closure – Signal Control/Flagging Control".

D-704-18, Right & Left Lane Closure: Use for girder repair work on I-94 beneath Menoken Interchange (RP 170)

704-P03 TRAFFIC CONTROL PHASING: The traffic control details, as indicated on the plans, have been developed on the basis that this project will be constructed in phases as described below. The work zone traffic control summary lists include the required number of devices for each phase of each described work area. The devices for the first phase will be moved as required for the second phase through the last phase. Traffic control devices and signing have been provided as shown for each phase on the traffic control layout sheets.

<u>Tyler Parkway/Divide Ave Phasing:</u>
Phasing on Tyler Parkway can be performed independently and is not required to be concurrent with any other phasing.

Phase 1: Close the inside (median) lanes of NB and SB Tyler Parkway/Divide Ave.

- Remove of the raised concrete median island each end of the bridge.
- Pave the temporary median crossovers at each end of the bridge.
- Remove and replace raised concrete median north of north entrance loop.

Phase 2: Shift NB traffic to the west side of the bridge and maintain head-to-head traffic by using crossovers. Close NB lanes between crossovers.

- Construct approach slabs and CPR on the east side.

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Phase 3: Shift head-to-head traffic to the east side of the bridge by using crossovers. Close SB lanes between crossovers.

- Construct approach slabs and CPR on the west side.

Phase 4: Close the inside lanes of NB and SB Tyler Parkway/Divide Ave.

- Remove the temporary median crossover surfacing at each end of the bridge.
- Replace the raised concrete median islands (excluding median north of entrance loop).

Menoken and McKenzie Interchange Phasing:
The bridges at Menoken and McKenzie shall not be constructed concurrently in order to keep one of the bridges available for oversized traffic. Perform construction on one bound of the bridge then flip traffic control to perform construction on the other bound.

I-94 Single Lane Closure Phasing
Perform single lane closures on I-94 at Menoken for girder concrete patching and spall repair on the underside of the bridge deck overhang. Coordinate with contractor for I-94 WB lane reconstruction.

704-P04 PORTABLE CHANGEABLE MESSAGE SIGN: Install Portable Changeable Message Signs (PCMS) before work begins on Tyler Parkway. The Engineer will determine the locations for PCMS installation. Relocate the PCMS as directed by the Engineer.

Provide an operator trained in the use of the PCMS.

The Engineer will determine the message to be displayed. The operator shall program the message within one hour of the Engineer's request to change the message.

704-P05 OBLITERATION OF PAVEMENT MARKINGS: Masking of pavement markings designated for obliteration is allowed. Choose to remove marking as specified in Section 704.04 N, "Obliteration of Pavement Markings" or mask markings. Mask markings using removable, non-reflective preformed tape that is approximately the same color as the pavement surface and that overlaps the marking a minimum of 1 inch on each side.

Include the cost of all equipment, material, and labor, including the removal of tape, if used, in the unit price bid for "Obliteration of Pavement Marking".

Perform the obliteration of the SB stop bar on Tyler Parkway at Sta 31+79 during the placement of the new SB stop bar on Tyler Parkway at Sta 31+77. Masking of the stop bar is not permitted.

Mask the I-94 pavement marking for the single lane closure, obliteration is not permitted.

722-P01 ADJUST INLET: Remove, salvage and reset the existing storm sewer inlet casting frame, curb box and grate. Furnish new adjustment rings to ensure proper drainage to meet finished grade. Include all costs associated with this work in the unit price bid for “Adjust Inlet”.

750-P01 SIDEWALK CONCRETE: Include all costs for excavation and aggregate base necessary to replace sidewalk/shared use path to line and grade established by the Engineer in the contract unit price for “Sidewalk Concrete”. Dispose of excess excavation material off site.

Saw all longitudinal and transverse joints on the sidewalk/shared use path. Saw joints in a timely manner to prevent any uncontrolled random cracking. If random cracking occurs, remove and replace all damaged panels.

Replace topsoil and seed areas disturbed by construction of sidewalk/shared use path. Seed these urban areas with Class I Seed Mixture or a seed mixture approved by the Engineer. Include all cost in the price bid for the “Sidewalk Concrete”.

750-P02 CONCRETE MEDIAN PAVING COLORED W/BRICK PATTERN: Color and pattern the raised island median paving to a close approximation of existing brick red colored paving and brick patterning within project areas of Tyler Parkway/Divide Avenue.

Provide a color and pattern sample to the Engineer for approval, prior to construction.

Add pigment at the ratio recommended by the manufacturer directly into the mixer along with the aggregate, cement, and water. Add pigment while the mixer is operating at mixing speed.

Align stamped pattern to match the existing pattern. Stamp concrete to the same approximate depth as the adjacent stamped colored concrete. Saw all longitudinal and transverse joints. Clean any colored concrete from the adjacent pavements or curb and gutter by sandblasting.

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Cure concrete using clear, all resin-based curing compound prior to initial set. Seal concrete after 14 days with a maximum of 30 days.

Include all costs for the labor, equipment, and material necessary to construct the colored concrete patterned median paving in the price bid for “Concrete Median Paving Colored w/Brick Pattern”.

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

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

SECTION 130

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

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

748-P01 CURB & GUTTER – TYPE 1 SPECIAL: Install curb and gutter at the Tyler Parkway/Divide Avenue Interchange Crossroad, RP 157.328, in accordance with Standard Drawing D-748-1, except for curb heights and transitions as shown in Section 130.

At the lengths of curb and gutter that is adjacent to existing pavement that will remain in place, include all costs to install def tie bars in the contract unit price bid for "Curb & Gutter – Type 1 Special."

Include all costs for constructing the curb and gutter as described above in the contract unit price bid for "Curb & Gutter – Type 1 Special."

764-P01 REMOVED W-BEAM GUARDRAIL MATERIALS: Deliver the removed guardrail materials, that are not reset or damaged, to the NDDOT Maintenance Storage Yard in Bismarck, and neatly stack them at a location designated by the Engineer. The address of the NDDOT Maintenance Storage Yard is:

BISMARCK NDDOT
218 S Airport Rd
Bismarck, ND 58504-6003

Include all costs for delivery of the removed guardrail materials in the contract unit prices bid for the items "Remove W-Beam Guardrail & Posts," and "Remove End Treatment & Transition."

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 07/16/25
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL NOTES

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

EN-1 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following table.

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

*Time frames can differ slightly, depending on the year

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

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ESTIMATE OF QUANTITIES

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SPEC	CODE	ITEM DESCRIPTION	UNIT	TYLER PKWY/ DIVIDE AVE 94-157.328	MENOK/MCKENZ 94-170.519 94-176.501	TOTAL
103	0100	CONTRACT BOND	L SUM	0.4	0.6	1
202	0021	REMOVE AGGREGATE BASE & SURFACING	TON	205	29	234
202	0113	REMOVAL OF CONCRETE	CY	123		123
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	500		500
202	0130	REMOVAL OF CURB & GUTTER	LF	1,454		1,454
203	0113	COMMON EXCAVATION-WASTE	CY	550		550
203	0218	GUARDRAIL EMBANKMENT	EA	1		1
302	0120	AGGREGATE BASE COURSE CL 5	TON	1,150	23.2	1,173.2
411	0105	MILLING PAVEMENT SURFACE	SY		1,618	1,618
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	187	185.4	372.4
550	1013	3IN EXPANSION JOINT	LF	146		146
550	1031	CONCRETE SLEEPER SLAB	SY	95		95
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	286		286
570	0709	11IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	811		811
602	1135	BRIDGE APPROACH SLAB-REMOVE & REPLACE	SY	423.4	257.6	681
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	2,546	2,552	5,098
602	1260	BRIDGE DECK CRACK SEALING	LF	250		250
602	7000	SPECIAL SURFACE FINISH	SF	1,576		1,576
650	0704	OVERLAY CONCRETE	CY		82	82
650	0707	DECK CONCRETE	CY		50	50
650	0720	CLASS 1 REMOVAL	SY		1,494	1,494
650	0721	CLASS 2 REMOVAL	SY		298	298
650	0722	CLASS 2-A REMOVAL	LF		538	538
650	0723	CLASS 3 REMOVAL	SY		150	150
650	0724	CLASS 4 REMOVAL	SY		44	44
650	0805	DECK SPALL REPAIR	SF	224		224
702	0100	MOBILIZATION	L SUM	0.4	0.6	1
704	0100	FLAGGING	MHR	200	160	360
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,037	984	3,021
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA		1	1
704	1041	ATTENUATION DEVICE-TYPE B-55	EA		2	2
704	1045	ATTENUATION DEVICE-TYPE B-75	EA		2	2

ESTIMATE NUMBER: 24694 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 11/04/2025 TIME: 13:58:44

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SPEC	CODE	ITEM DESCRIPTION	UNIT	TYLER PKWY/ DIVIDE AVE 94-157.328	MENOK/MCKENZ 94-170.519 94-176.501	TOTAL
704	1052	TYPE III BARRICADE	EA	19	2	21
704	1054	SIDEWALK BARRICADE	EA	2		2
704	1058	PEDESTRIAN WALKWAY	LF	1,335		1,335
704	1060	DELINEATOR DRUMS	EA	255	14	269
704	1086	SEQUENCING ARROW PANEL-TYPE B	EA	2		2
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2		2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	494	520	1,014
704	2108	TEMPORARY CURB RAMP	EA	2		2
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	750	575	1,325
704	4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2		2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	1,422		1,422
714	9696	EDGEDRAIN NON PERMEABLE BASE	LF	193		193
722	6160	ADJUST INLET	EA	2		2
748	0140	CURB & GUTTER-TYPE I	LF	1,143		1,143
748	0141	CURB & GUTTER-TYPE 1 SPECIAL	LF	142		142
750	0100	SIDEWALK CONCRETE	SY	21		21
750	0200	CONCRETE MEDIAN PAVING	SY	13.1		13.1
750	0210	CONCRETE MEDIAN NOSE PAVING	SY	28		28
750	0250	CONCRETE MEDIAN PAVING COLORED W/BRICK PATTERN	SY	400		400
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	5		5
754	0193	FLEXIBLE DELINEATORS-TYPE D	EA	4		4
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	14		14
754	0592	RESET SIGN PANEL	EA	1		1
754	0593	RESET SIGN SUPPORT	EA	3		3
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	LF	107		107
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED	LF	701		701
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED	LF	24		24
762	0136	EPOXY PVMT MK MESSAGE-GROOVED	SF	80		80
762	0420	SHORT TERM 4IN LINE-TYPE R	LF	3,544		3,544
762	0422	SHORT TERM 6IN LINE-TYPE R	LF		16,100	16,100
762	0426	SHORT TERM 24IN LINE-TYPE R	LF		64	64
762	1106	PVMT MK PAINTED 6IN LINE	LF		6,660	6,660

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ESTIMATE OF QUANTITIES

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SPEC	CODE	ITEM DESCRIPTION	UNIT	TYLER PKWY/ DIVIDE AVE 94-157.328	MENOK/MCKENZ 94-170.519 94-176.501	TOTAL
764	0131	W-BEAM GUARDRAIL	LF	92		92
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	2		2
764	0150	REMOVE & RESET GUARDRAIL	LF		266	266
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	79		79
764	2081	REMOVE END TREATMENT & TRANSITION	EA	2		2
930	9612	SPALL REPAIR	SF		35	35
930	9639	APPROACH SLAB LIP REPAIR	LF		134.6	134.6
930	9694	GIRDER PATCHING	L SUM		1	1

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ESTIMATED QUANTITIES FOR GUARDRAIL EMBANKMENT SURFACING

				Menoken Interchange Crossroad, RP 170.519				McKenzie Interchange Crossroad, RP 176.501				
				Begin Bridge		End Bridge		Begin Bridge		End Bridge		
Spec	Code	Bid Item	UNIT	RT	LT	RT	LT	RT	LT	RT	LT	Total
202	0021	REMOVE AGGREGATE BASE & SURFACING	TON	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	28.8
		2" Bituminous with 6" Aggregate Base										
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 Ton/CY	TON	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	23.2
*	*	TACK COAT @ 0.05 Gal/SY	GAL	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.2
*	*	PRIME COAT @ 0.25 Gal/SY	GAL	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	14.4
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT @ 2 Ton/C	TON	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.6
*	*	PG ASPHALT CEMENT @ 6%	TON	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8

* Not a pay item. Included in the contract unit price bid for 430 0500 Commercial Grade Hot Mix Asphalt.
See Section 130 and Standard Drawing D-764-22 for details

Pavement Markings

Permanent Pavement Marking (RP 170 Roadway)			
spec-code	Location-Type	Basis	Quantity
762-1106	PVMT MK PAINTED 6IN LINE (Yellow) -Dbl Centerline	Barrier Line - 10,560 LF/Mile	1530 LF
	PVMT MK PAINTED 6IN LINE (White) - Edge Line	Barrier Line - 10,560 LF/Mile	1730 LF
Temporary Pavement Marking (RP 170 Roadway)			
762-0426	SHORT TERM 24IN LINE-TYPE R	24" White	32 LF
762-0422	SHORT TERM 6IN LINE-TYPE R (Yellow) Dbl Centerline	Barrier Line - 10,560 LF/Mile	2400 LF
762-0422	SHORT TERM 6IN LINE-TYPE R (White) Interim Edge Lin	Barrier Line - 10,560 LF/Mile 800 LF/setup - 2 setups	1600 LF
Temporary Pavement Marking (RP 170 - Mainline I-94 Roadway)			
762-0422	SHORT TERM 6IN LINE-TYPE R (White) Interim Edge Lin	Barrier Line - 10,560 LF/Mile 2200 LF/setup - 2 setups	4400 LF
762-0422	SHORT TERM 6IN LINE-TYPE R (Yellow) Interim Edge Lin	Barrier Line - 10,560 LF/Mile 2200 LF/setup - 2 setups	4400 LF

Permanent Pavement Marking (RP 176 Roadway)			
spec-code	Location-Type	Basis	Quantity
762-1106	PVMT MK PAINTED 6IN LINE (Yellow) -Dbl Centerline	Barrier Line - 10,560 LF/Mile	1600 LF
	PVMT MK PAINTED 6IN LINE (White) - Edge Line	Barrier Line - 10,560 LF/Mile	1800 LF
Temporary Pavement Marking (RP 176 Roadway)			
762-0426	SHORT TERM 24IN LINE-TYPE R	24" White	32 LF
762-0422	SHORT TERM 6IN LINE-TYPE R (Yellow) Dbl Centerline	Barrier Line - 10,560 LF/Mile	1700 LF
762-0422	SHORT TERM 6IN LINE-TYPE R (White) Interim Edge Lin	Barrier Line - 10,560 LF/Mile 800 LF/setup - 2 setups	1600 LF

Basis of Estimate

Bridge Deck Overlay

Tyler Parkway Int. to Menoken Int.

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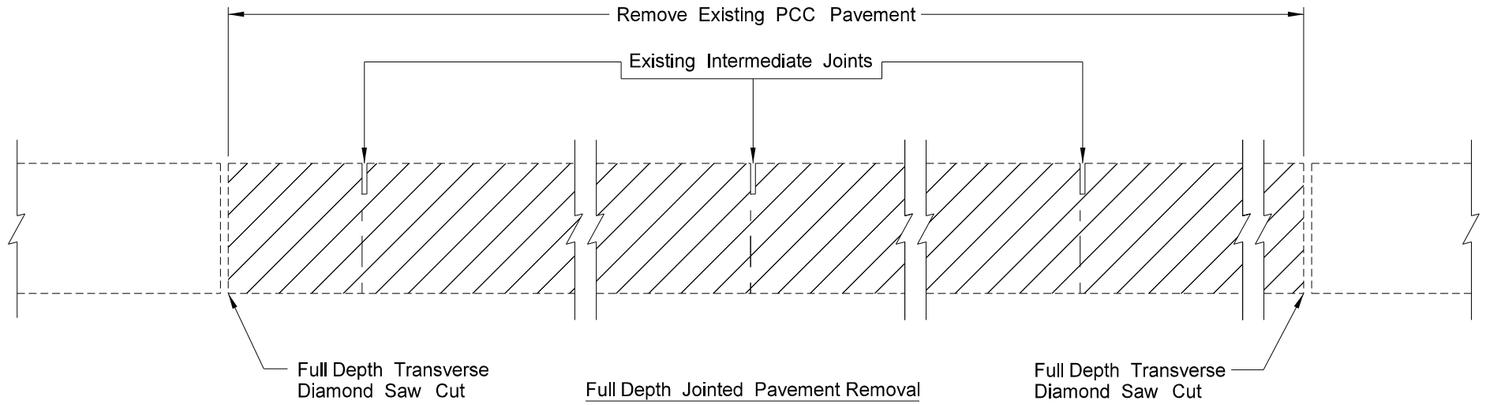
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	1

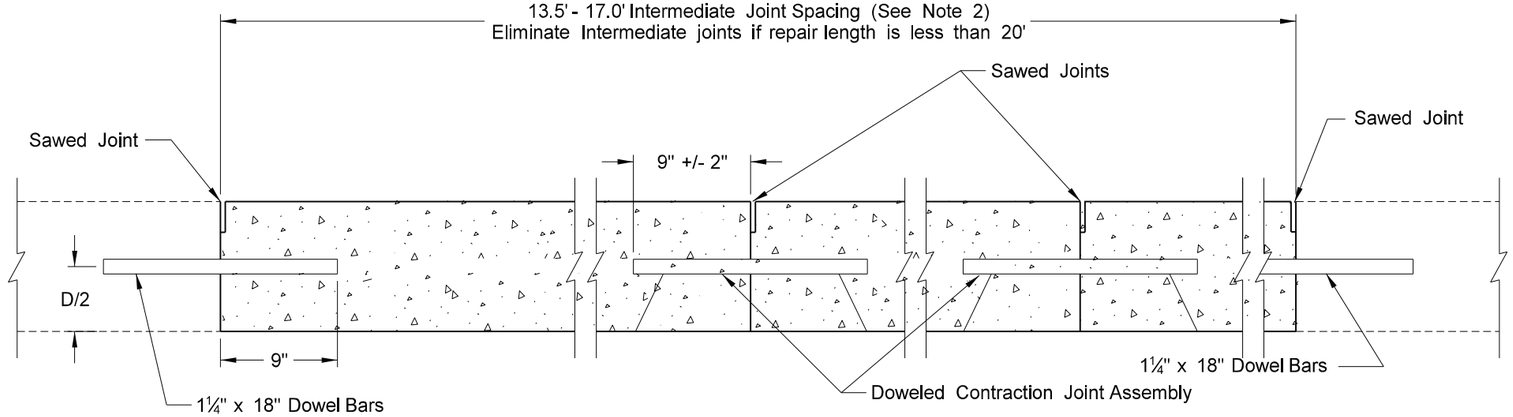


Full Depth Jointed Pavement Removal

PCC Removal

Notes:

1. Variables: D = Pavement Depth
2. Space joints 13.5' to 17.0'. Use a 10 foot minimum spacing when repair length requires.
3. Place new joints to match existing joints when repair widths are less than PCC pavement width.



Full Depth Jointed Pavement Replacement

PCC Placement

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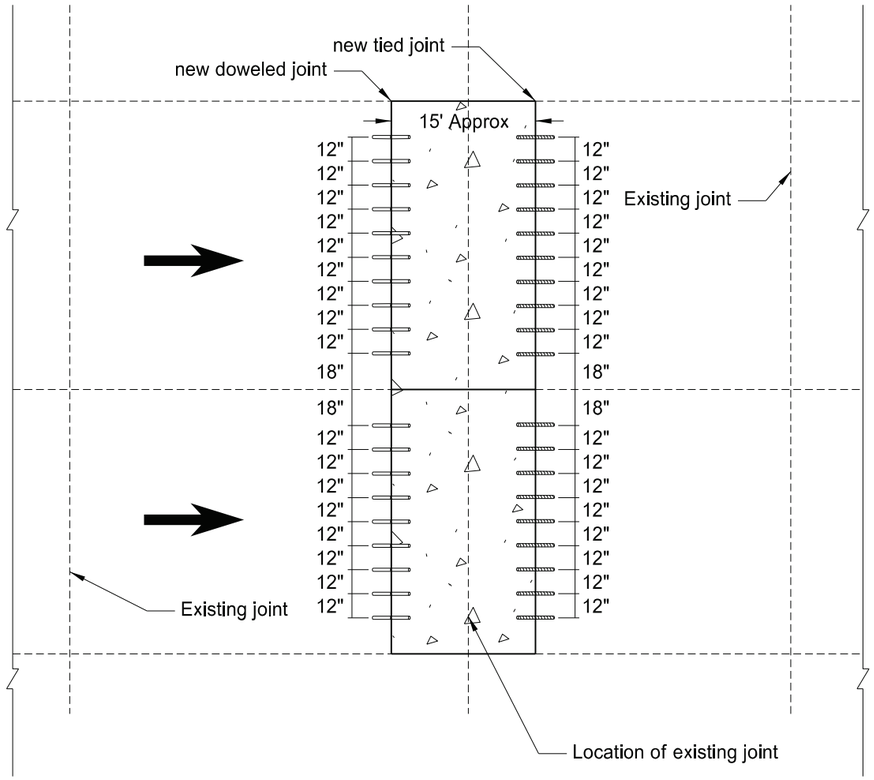
Jointed Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement

(Longitudinal Length One Panel or Longer)

Tyler Parkway/Divide Ave

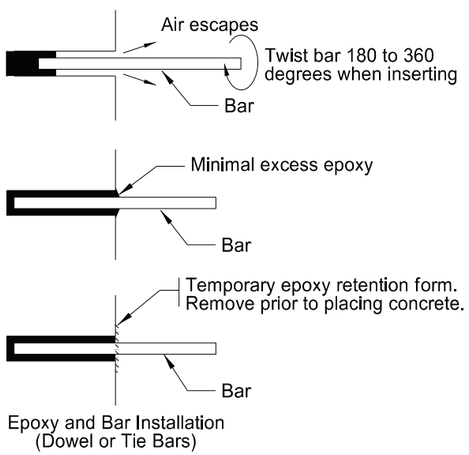
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	2



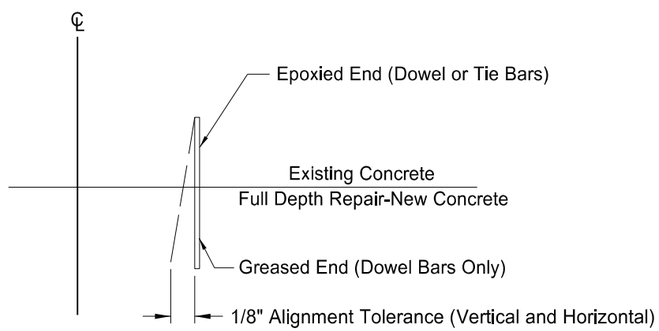
Perpendicular Transverse Joints

NOTES:

1. Align tie bars parallel to the roadway surface and perpendicular to the joint face.
2. Align dowel bars parallel to the roadway centerline and pavement surface (at vertical midpoint of slab.)
3. Existing tie bar spacing is 3'-9".
4. Place no tie bar within 15" of a transverse joint.



Epoxy and Bar Installation (Dowel or Tie Bars)



Bar Alignment Tolerance

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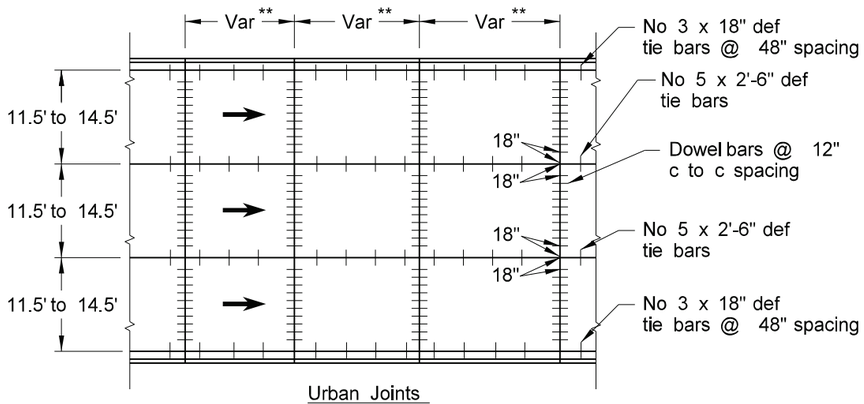
Transverse Joint Dowel and Tie Bar Placement
Full Depth Concrete Pavement Repair

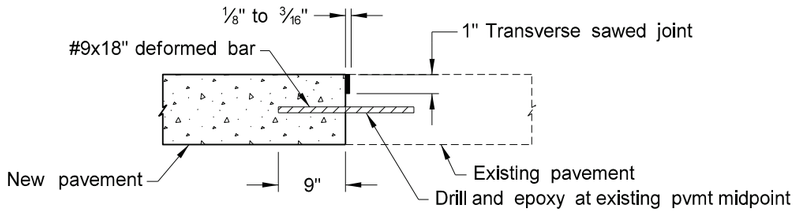
Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	3

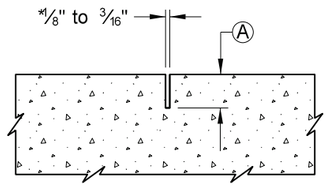


Urban Joints

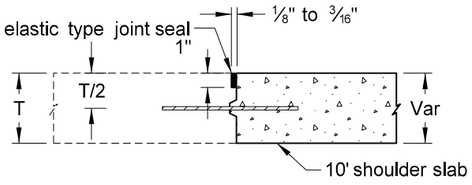
** Joint Spacing to match existing (Varies from 15' to 16')



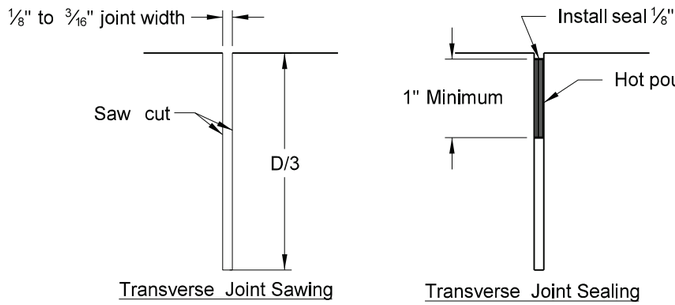
Deformed Bar Installation
(Spaced at 2'-0" C to C)



Sawed, Tied Longitudinal Joints
(Mainline)

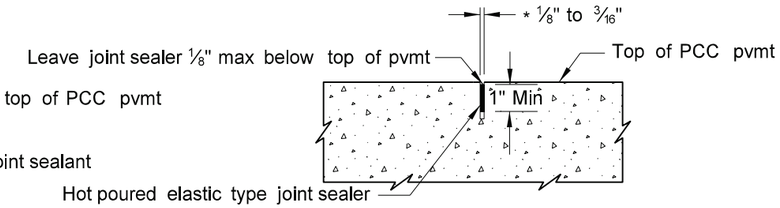


Longitudinal Construction Joint
(keyed & tied)



Transverse Joint Sawing

Transverse Joint Sealing

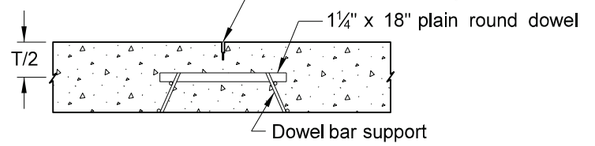


(All sawed and tied joints)
Joint Sealing Detail

T = Thickness of PCC Pvmt

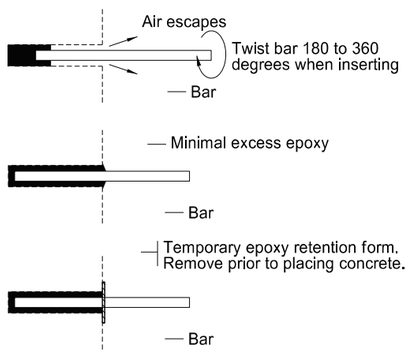
Ⓐ = One-Third thickness of PCC Pavement

*Width requirement for top 1" only, bottom portion of sawcut may be narrower.

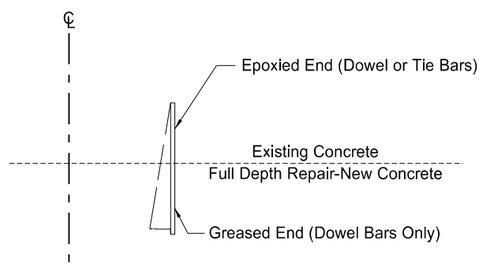


Doweled Transverse Joint

Perpendicular Transverse Joints



Epoxy and Bar Installation
(Dowel or Tie Bars)



Bar Alignment Tolerance

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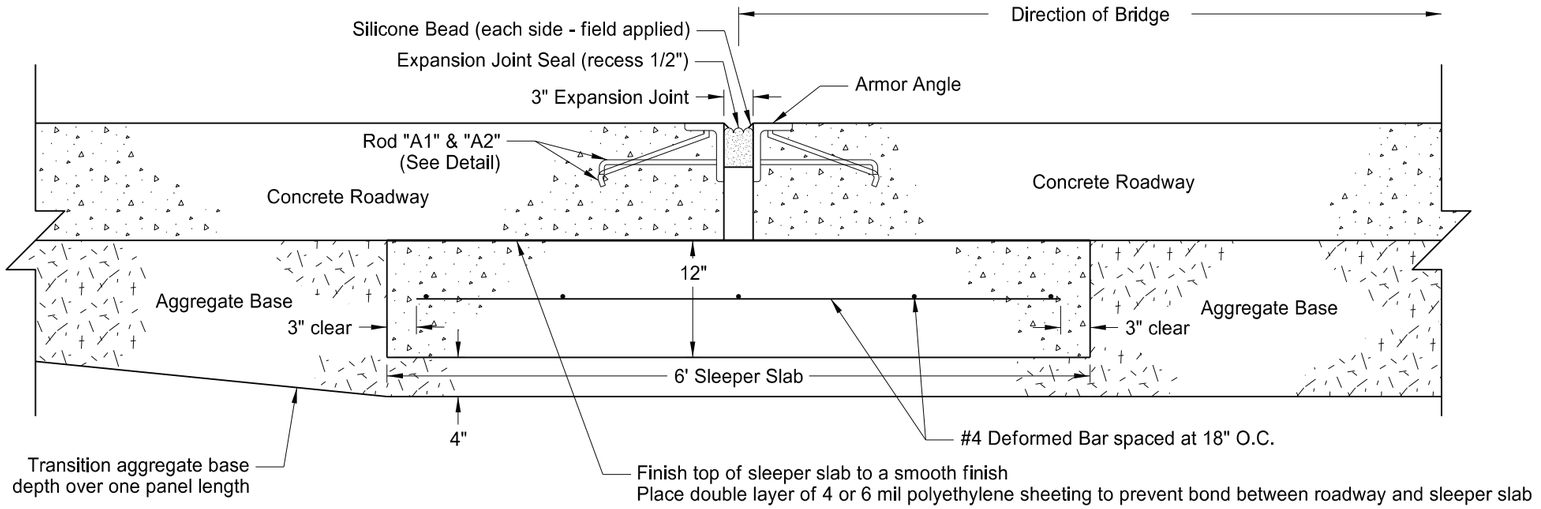
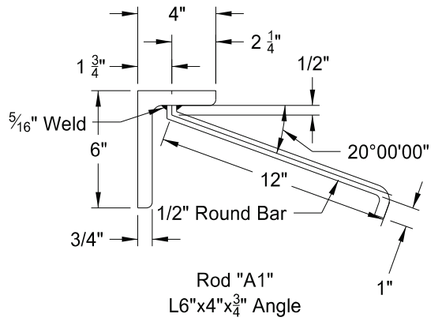
Joint Details for Repairs 1 Panel or More in Length Concrete Pavement Repair

Tyler Parkway/Divide Ave

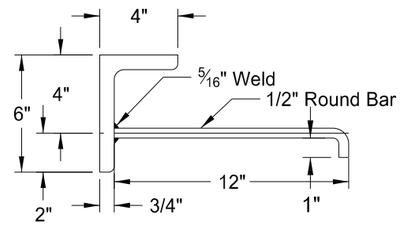
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	4



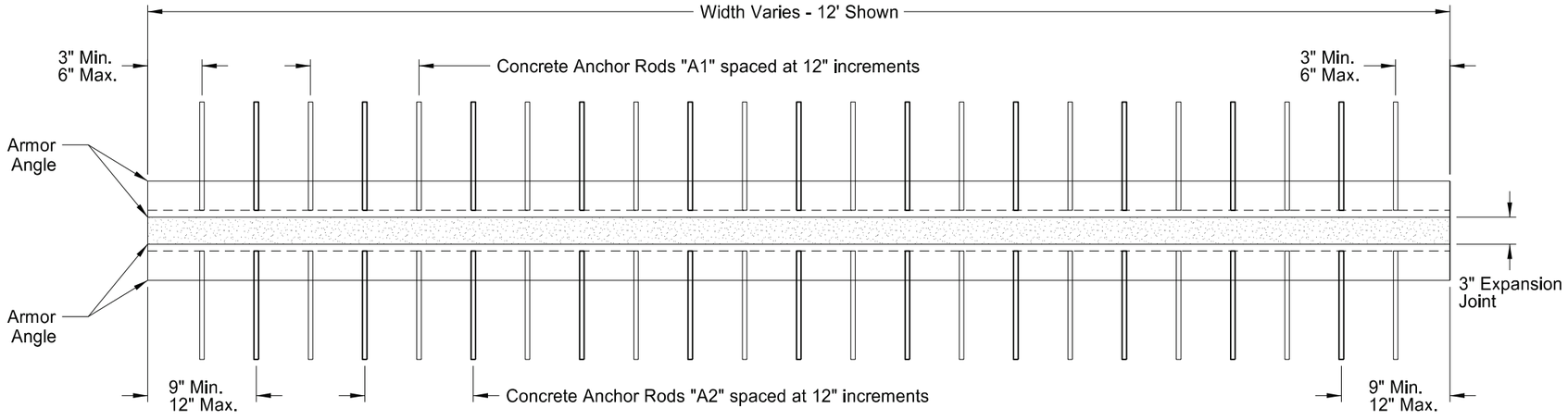
Profile View



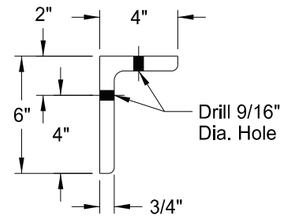
Rod "A1"
L6"x4"x$\frac{3}{4}$" Angle



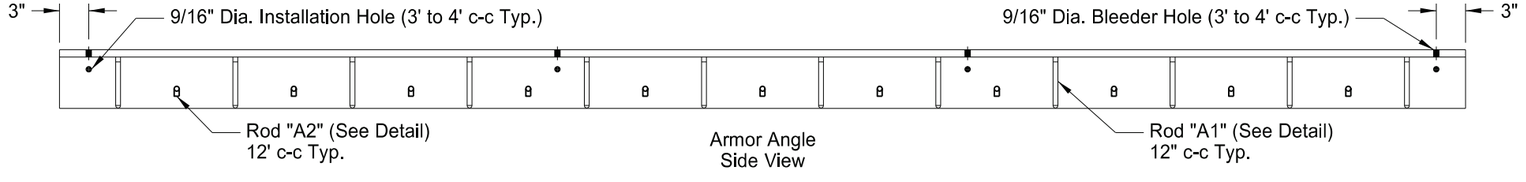
Rod "A2"
L6"x4"x$\frac{3}{4}$" Angle



Armor Angle
Top View



$\frac{9}{16}$" Drilled Holes
L6"x4"x$\frac{3}{4}$" Angle



Armor Angle
Side View

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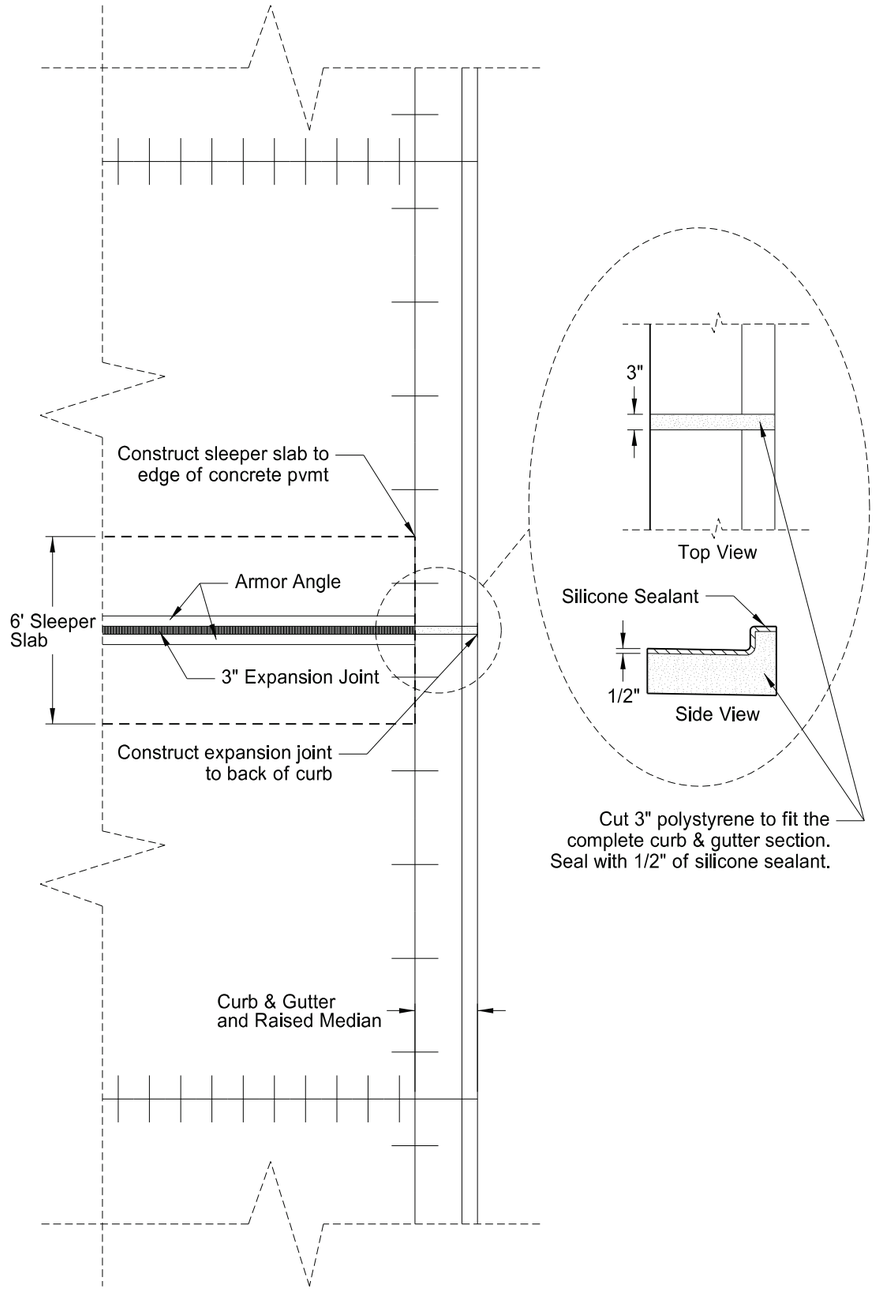
3 Inch Expansion Joint Detail

Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	5



Top View
Roadway w/Curb & Gutter and Raised Median
(Tyler Parkway)

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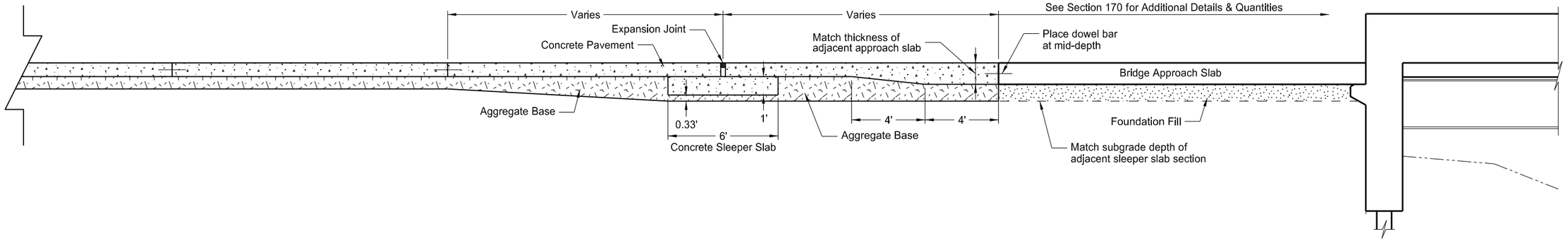
Expansion Joint Detail

Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	6



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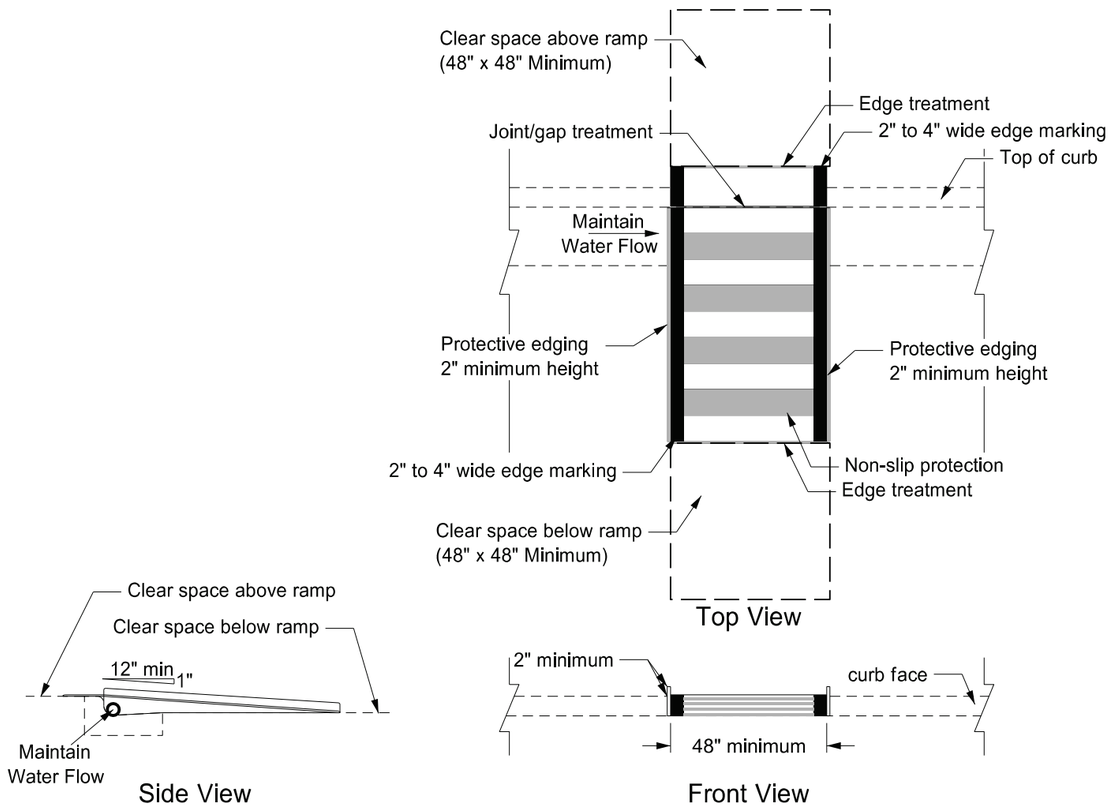
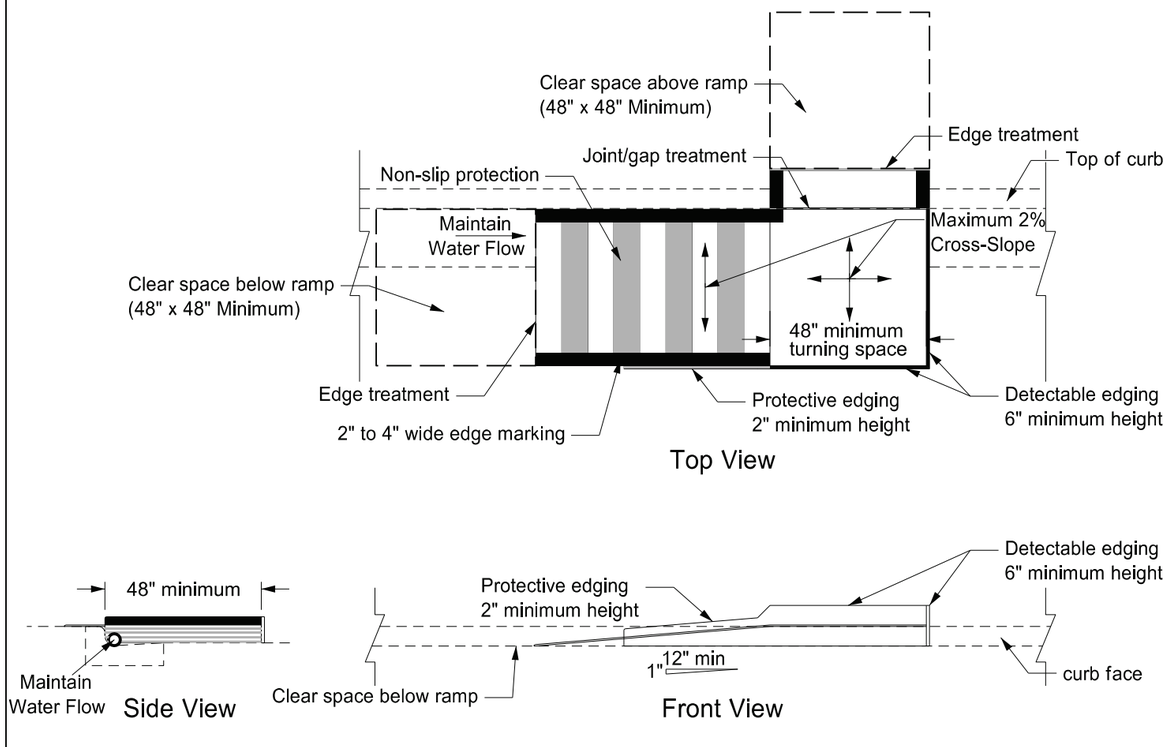
Concrete Pavement to Bridge Approach Panel Transition Detail

Tyler Parkway/Divide Ave

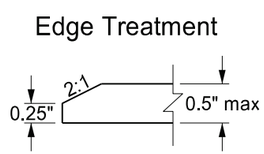
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	7



Temporary Perpendicular Curb Ramp

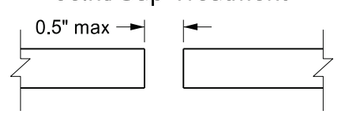


Temporary Parallel Curb Ramp



Edge Treatment

Maximum Surface
Height Change Detail



Joint/Gap Treatment

Maximum Width
Lateral Joints or Gaps

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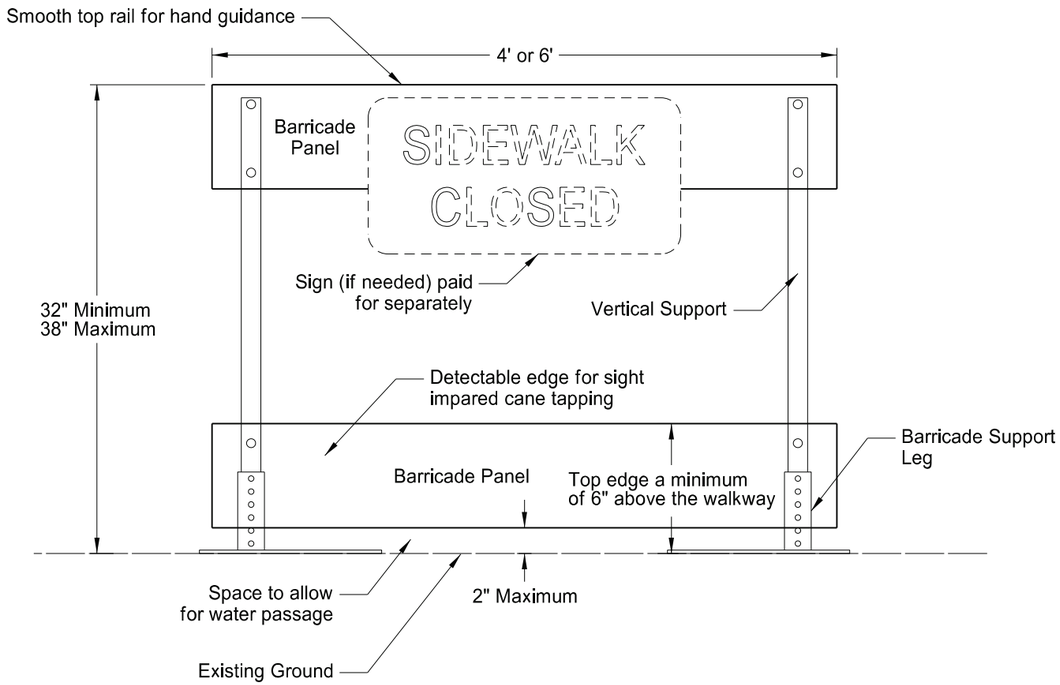
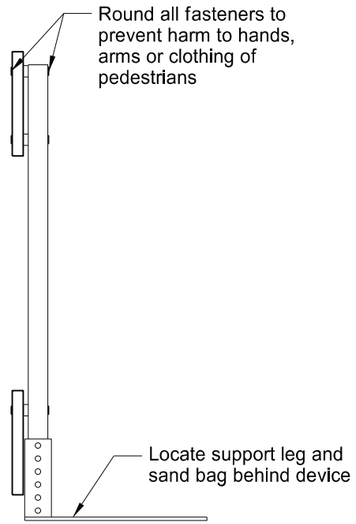
Temporary Pedestrian Curb Ramp Details

Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	8



Front View

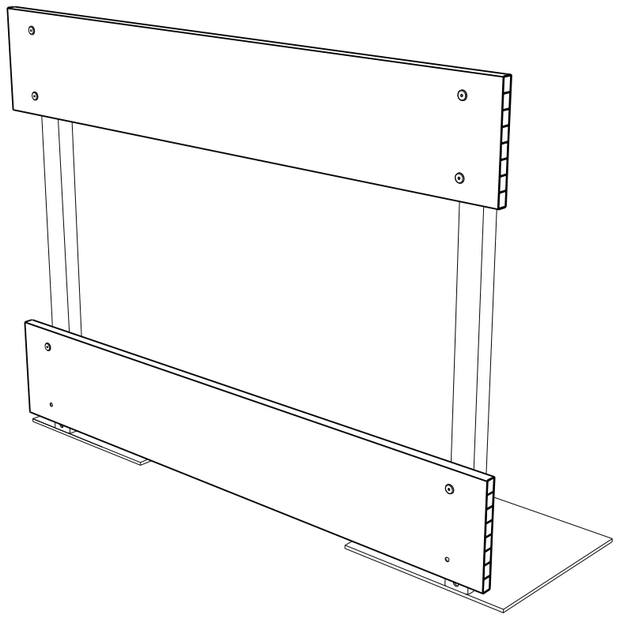


End View

NOTES:

Sidewalk Barricades

1. Provide self standing sidewalk barricade with no supports extending into the pedestrians path.
2. Use orange or orange and white diagonal striped barricade panels contrasting with the walkway surface.
3. Provide ADA compliant and NCHRP 350 or Mash Test Level 3 (TL3) approved sidewalk barricades.
4. Include all costs to furnish, maintain and remove sidewalk barricades in the price bid for "Sidewalk Barricade".



Perspective View

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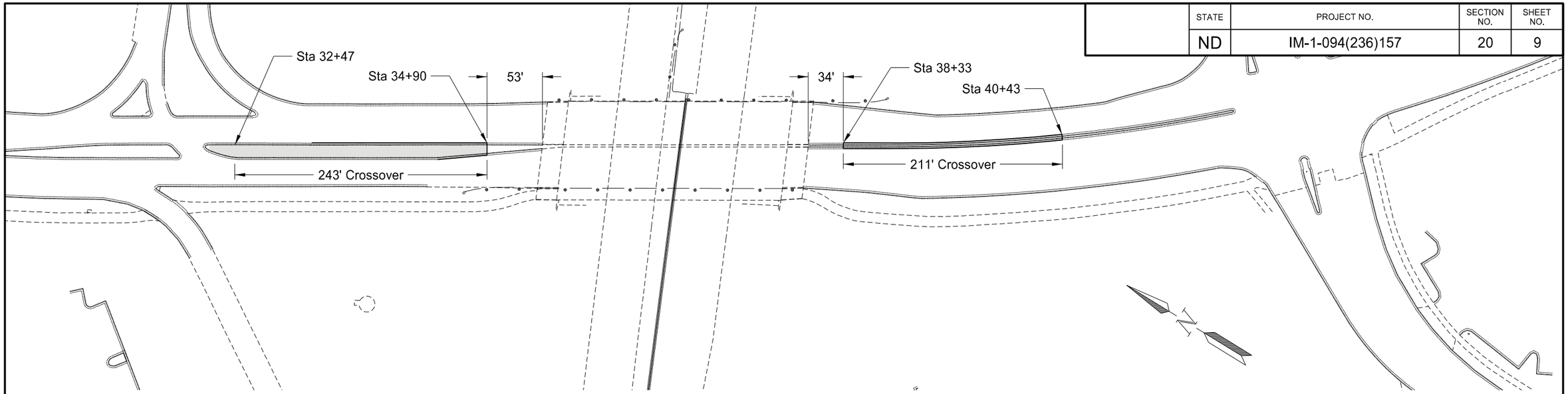
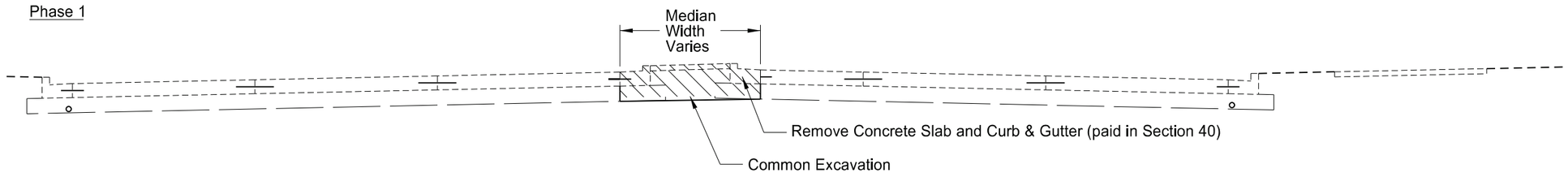
Sidewalk Barricade

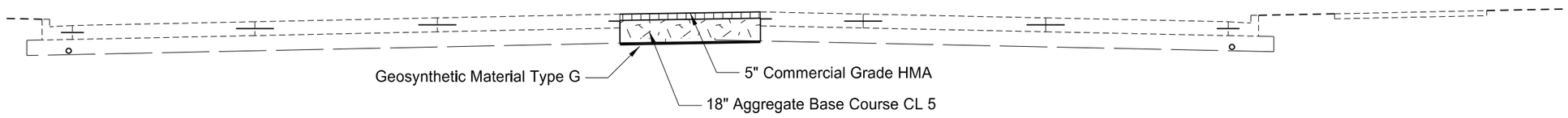
Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	20	9

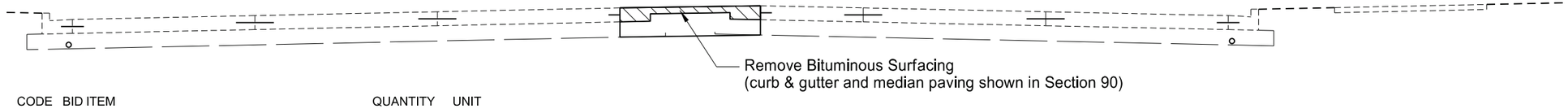


Phase 1





Phase 4



SPEC	CODE	BID ITEM	QUANTITY	UNIT
203	113	COMMON EXCAVATION-WASTE		CY
		North Approach Median	225	
		South Approach Median	63	
302	120	AGGREGATE BASE COURSE CL 5		TON
		North Approach Median 18"	423	
		South Approach Median 18"	119	
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		TON
		North Approach Median 5"	125	
		South Approach Median 5"	35	
709	100	GEOSYNTHETIC MATERIAL TYPE G		SY
		North Approach Median	404	
		South Approach Median	127	

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	21	REMOVE AGGREGATE BASE & SURFACING		TON
		North Approach Median	143	
		South Approach Median	62	
		(5" Bituminous & 6" Aggregate for Curb & Gutter)		

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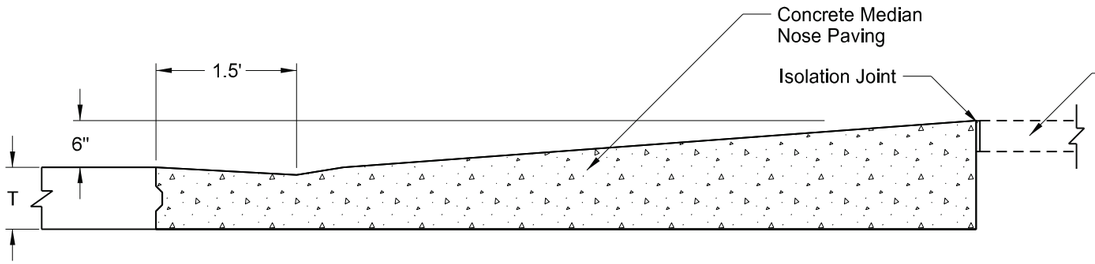
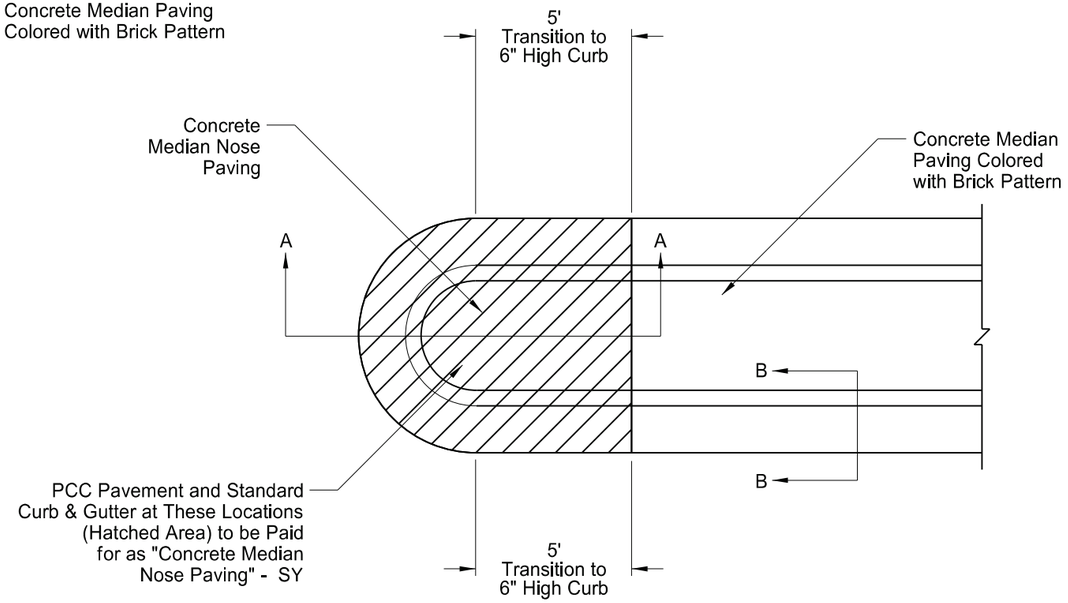
Temporary Connections

Tyler Parkway/Divide Ave

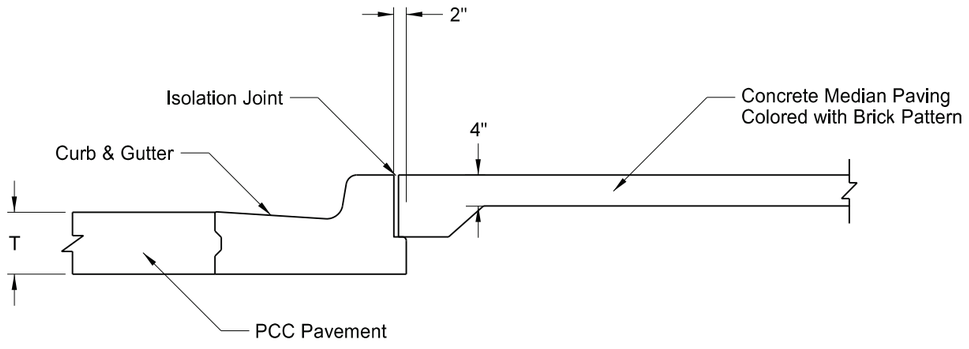
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	10



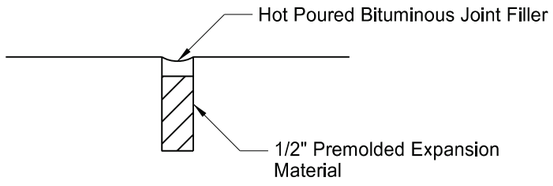
Section A - A



Median Plan View



Section B - B



Isolation Joint

T = PCC Pavement Thickness Shown on the Plans

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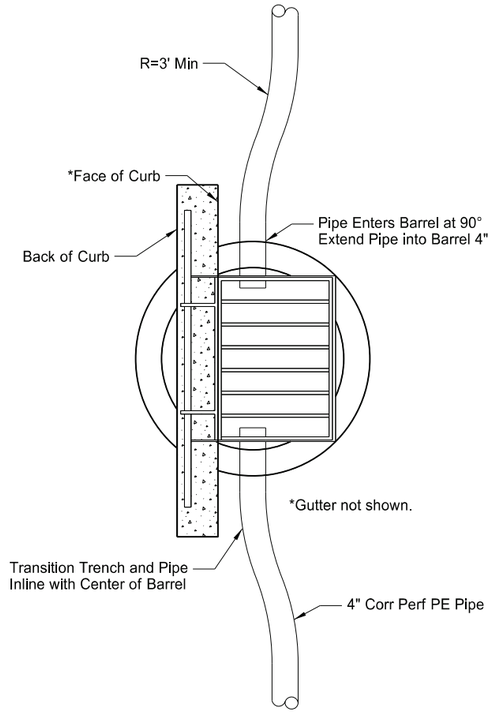
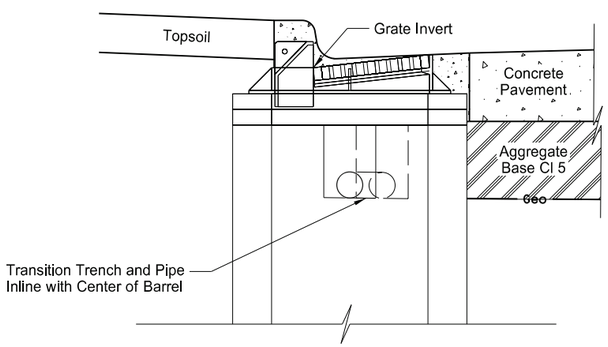
Concrete Median Nose

Tyler Parkway/Divide Ave

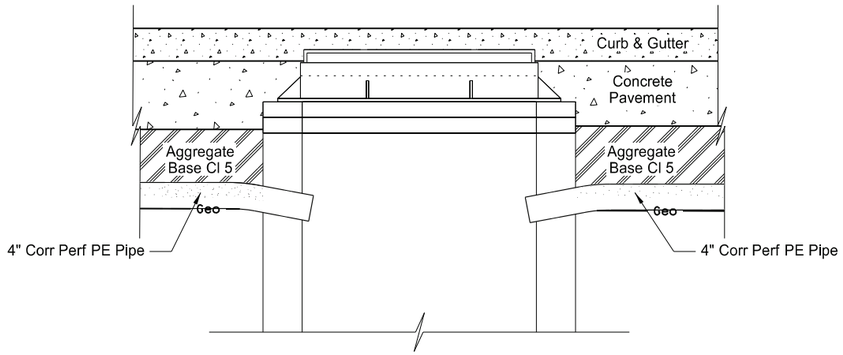
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	20	11



Manhole / Inlet Connection
Top View



Manhole / Inlet Connection
Side View



Manhole / Inlet Connection
Front View

Notes:
1. Use existing knockouts in inlets to accomodate 4" corregated perforated PE pipe.
2. Wrap edge drain pipe with geotextile sock.
3. Maintain a minimum edge drain trench width of 8".

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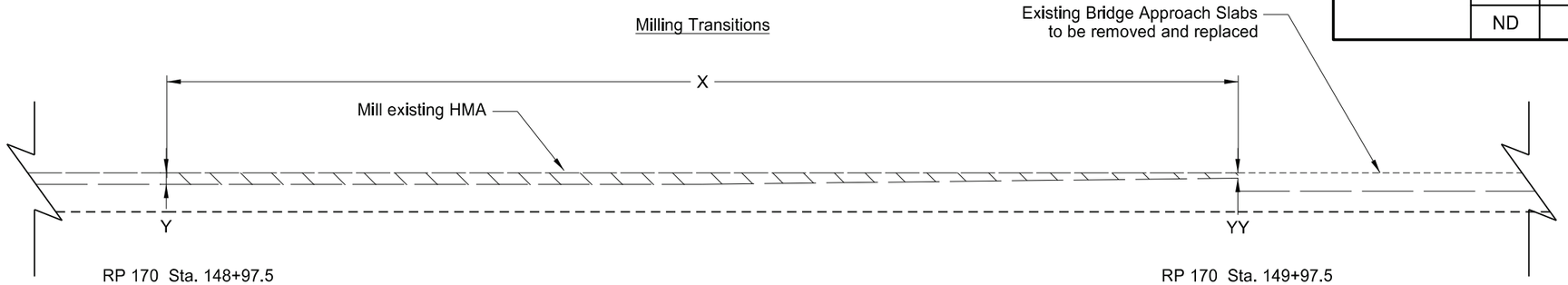
Edge Drain to Inlet Connection

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	20	12

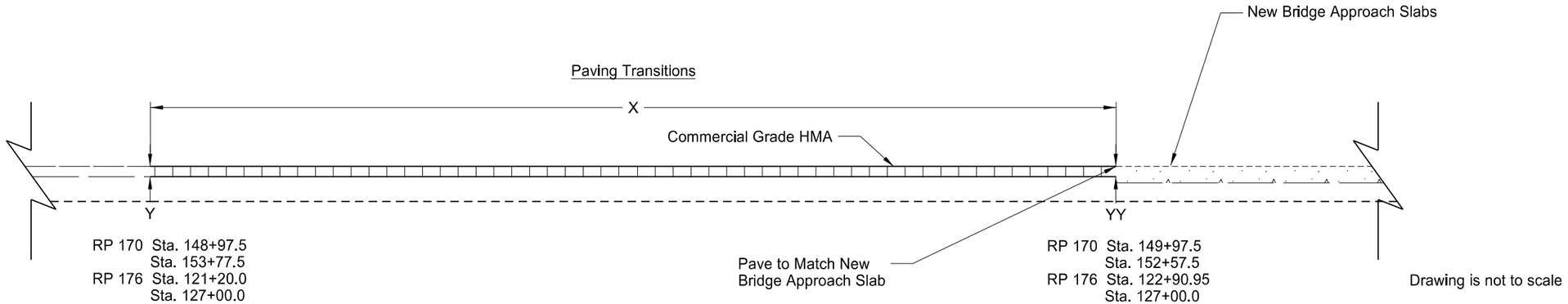
Milling Transitions



Drawing is not to scale

Milling Transitions						
X (FT)	Station	Y (IN)	Station	YY (IN)	Width	Milling (SY)
RP 170						
100	148+97.5	2	149+97.5	2	28	311
100	152+77.5	2	153+77.5	2	28	311
RP 176						
170.95	121+20.0	2	122+90.95	2	28	532
149.05	125+50.95	2	127+00.0	2	28	464
			Totals			**1618**

Paving Transitions



Drawing is not to scale

Paving Transitions								
X (FT)	Station	Y (IN)	Station	YY (IN)	Width	*Tack Coat (GAL)	*PG Asphalt Cement (TON)	Commercial Grade HMA (TON)
RP 170								
100	148+97.5	2	149+97.5	2	28	15.6	2.1	34.6
100	152+77.5	2	153+77.5	2	28	15.6	2.1	34.6
RP 176								
170.95	121+20.0	2	122+90.95	2	28	26.6	3.5	59.1
149.05	125+50.95	2	127+00.0	2	28	23.2	3.1	51.5
			Totals			**80.9**	**10.8**	**179.8**

* Not a Pay Item. Include in the Contract unit price bid for 430-0500 Commerical Grade Hot Mix Asphalt

Milling & Paving Transitions
Menoken & KcKenzie Interchanges
RP 170 & RP 176

Bridge Deck Overlay

Tyler Parkway Int. to Menoken Int.

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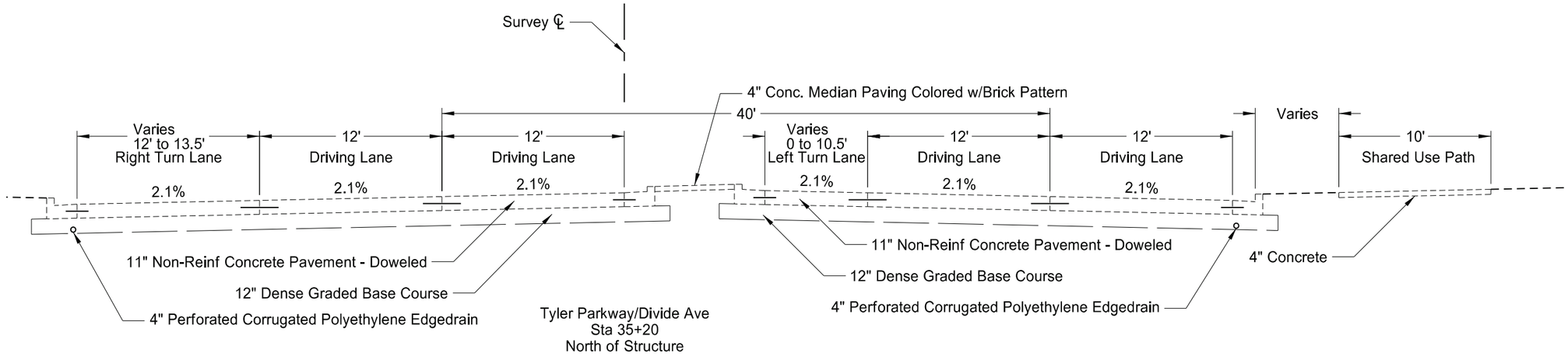
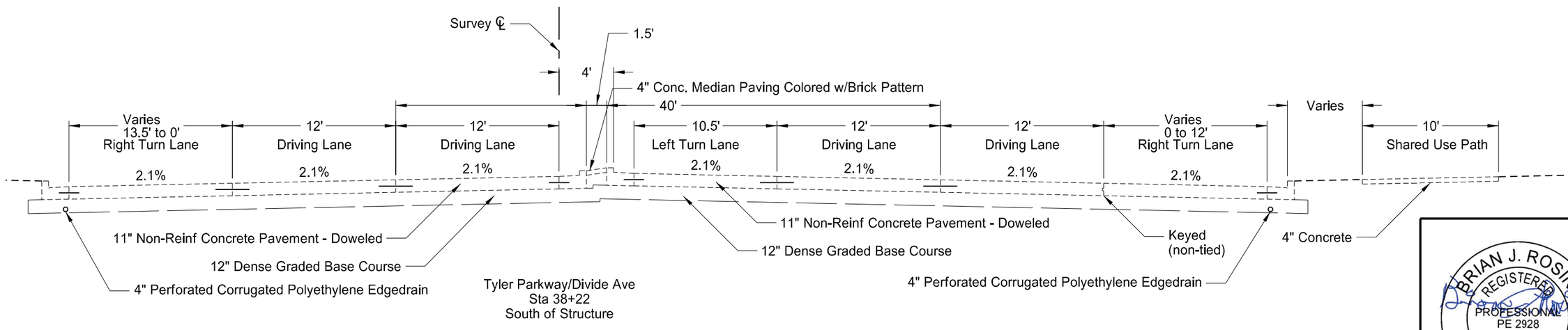
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	30	1





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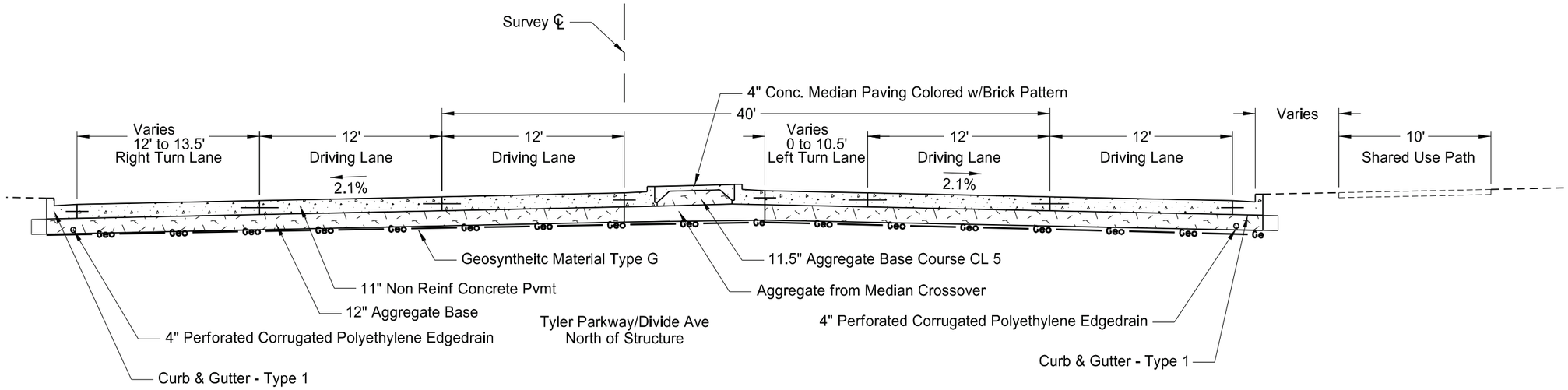
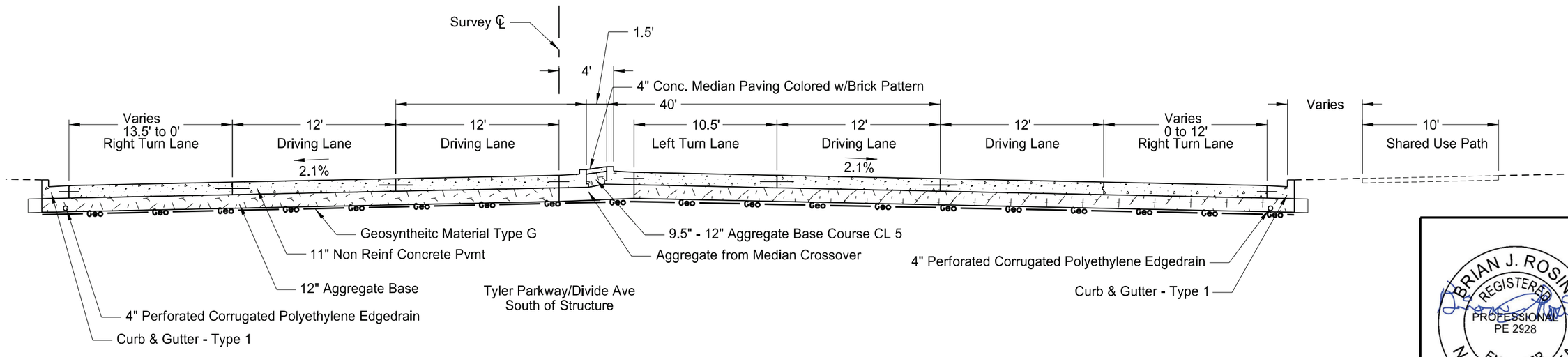
Existing Typical Sections

Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	30	2





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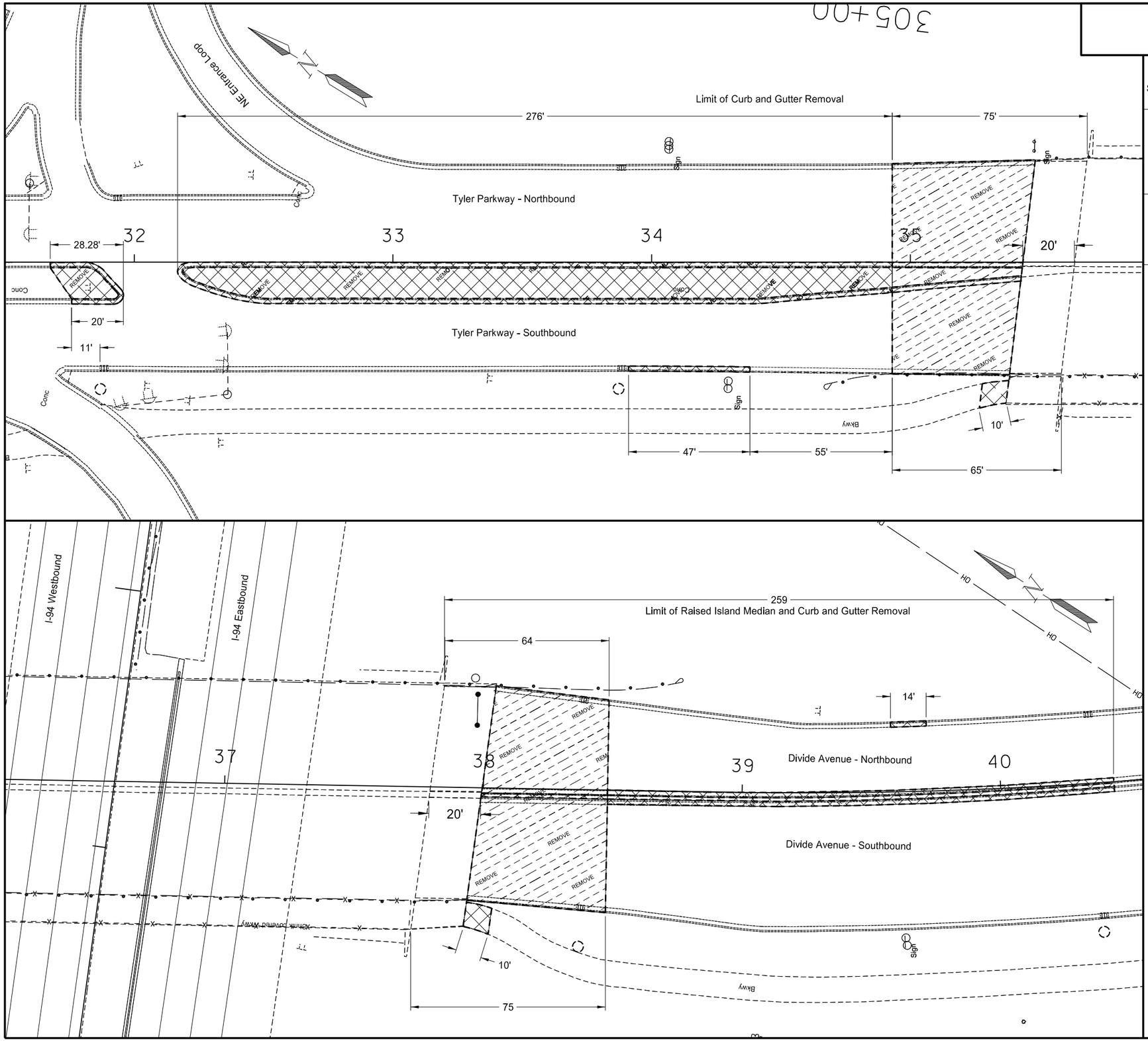
Proposed Typical Section

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	40	1



SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	114	REMOVAL OF CONCRETE PAVEMENT		SY
		North Ramp Island	36	
		North Raised Island	404	
		South Raised Island	39	
		North & South Sidewalk (10' length)	21	
202	130	REMOVAL OF CURB & GUTTER		LF
		North Ramp Island	52	
		North Approach	800	
		South Approach	602	
203	113	COMMON EXCAVATION-WASTE		CY
		North Approach 12" Aggregate	128	
		South Approach 12" Aggregate	134	

Note: Removal of concrete roadway pavement is included in the price bid for "11 IN Concrete Pavement Repair Full Depth Doweled"

Removal of concrete pavement and aggregate to a depth of 23 inches within the additional paving area at the concrete median nose is included in the price bid for "Concrete Pavement Repair Full Depth Doweled".

Removal of existing edge drain included in the price bid for "Common Excavation - Waste"

REMOVE Removal of Concrete Pavement and Aggregate

REMOVE Removal of Concrete Median and Curb and Gutter

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07/16/25

Pavement Removal

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	90	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	120	AGGREGATE BASE COURSE CL 5		TON
		Additional Paving at Concrete Median Noses (12")	15	
		North Concrete Median Nose (12")	12	
		South Concrete Median Nose (12")	53	
		North Approaches	240	
		North Approach Median	33	
		South Approaches	252	
		South Approach Median	3	
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		TON
		North Approaches	11	
		South Approaches	16	
550	1031	CONCRETE SLEEPER SLAB		SY
		Sta 35+20 - Rt (32' x 6')	21	
		Sta 35+20 - Lt (36.75' x 6')	25	
		Sta 38+22 - Lt (37.5' x 6')	25	
		Sta 38+22 - Rt (38' x 6')	24	
550	1013	3 IN EXPANSION JOINT		LF
		Sta 35+20	70	
		Sta 38+22	76	
570	240	DOWELED CONTRACTION JOINT ASSEMBLY		LF
		North Approaches	138	
		South Approaches	148	
570	709	11IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED		SY
		Additional Paving at Concrete Median Noses	24	
		Northeast Approach	216	
		Northwest Approach	168	
		Southeast Approach	186	
		Southwest Approach	217	
709	100	GEOSYNTHETIC MATERIAL TYPE G		SY
		North Approaches	384	
		South Approaches	403	
		Additional Paving at Concrete Median Noses	104	
714	9696	EDGEDRAIN NON PERMEABLE BASE		LF
		North and South Approaches	193	
722	6160	ADJUST INLET		EA
		Sta 38+38 - 34' Lt & 45' Rt	2	
748	140	CURB & GUTTER-TYPE I		LF
		North Approach	600	
		South Approach	543	
748	141	CURB & GUTTER-TYPE 1 SPECIAL		LF
		North Approaches	93	
		South Approaches	49	
750	100	SIDEWALK CONCRETE		SY
		North & South Approach (10' length)	21	
750	210	CONCRETE MEDIAN NOSE PAVING		SY
		North Concrete Median Nose	19.5	
		South Concrete Median Nose	8.4	
750	250	CONCRETE MEDIAN PAVING COLORED W/BRICK PATTERN		SY
		North Raised Island	361	
		South Raised Island	39	

Concrete Median Nose Paving

Concrete Median Island Pavement

2" Commercial Grade Hot Mix Asphalt

Concrete Pavement Repair - Full Depth Doweled

Sidewalk Concrete

Tied Joint

Doweled Contraction Joint

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07/16/25

Paving Limits

Tyler Parkway/Divide Ave

Note: Aggregate at Median Crossovers Paid in Sec. 30

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1&4	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**	**2**		**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)						18	
G20-10-108	108"x48"	CONTRACTOR SIGN						70	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS						43	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**5**	**5**	**5**		**5**	**36**	**180**
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT						59	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT						59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)						10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)						10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)						10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)						7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)						7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)						7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)						7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)						7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT						15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)						7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)						7	
R1-1-48	48"x48"	STOP						32	
R1-2-60	60"x60"	YIELD						29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)						30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**4**	**4**	**4**		**4**	**39**	**156**
R2-1aP-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)						10	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**4**	**4**	**4**		**4**	**10**	**40**
R3-2-48	48"x48"	NO LEFT TURN						35	
R3-7-30	30"x30"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT						17	
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	
R9-9-30	**30"x18"**	**SIDEWALK CLOSED (Mounted on barricade)**			**2**		**2**	**3**	**6**
R10-6-24	24"x36"	STOP HERE ON RED						16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)						12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)						12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)						15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT						35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**		**2**	**2**		**2**	**35**	**70**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT						35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW						26	
W1-6R-48	**48"x24"**	**ONE DIRECTION LARGE ARROW (Mtd on Barricade)**		**1**	**1**		**1**	**26**	**26**
W3-1-48	48"x48"	STOP AHEAD						35	
W3-3-48	48"x48"	SIGNAL AHEAD						35	
W3-4-48	48"x48"	BE PREPARED TO STOP						35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD						35	
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**2**	**2**	**2**		**2**	**35**	**70**
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	
W12-2-48	48"x48"	LOW CLEARANCE						35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)						14	
W14-3-64	64"x48"	NO PASSING ZONE						28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)						10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**3**	**3**	**3**		**3**	**35**	**105**
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						35	
W20-5-48	**48"x48"**	**RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE**	**2**	**2**	**2**		**2**	**35**	**70**
W20-7-48	48"x48"	FLAGGER						35	
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**2**	**2**		**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)						12	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1&4	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
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	
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	

SPECIAL SIGNS

SPEC & CODE

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1&4	2	3		TOTAL QUANTITY
704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**					**785**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1&4	2	3		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**100**	**50**	**50**		**200**
704-1042	ATTENUATION DEVICE-TYPE B-60	EACH					
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH					
704-1048	PORTABLE RUMBLE STRIPS	EACH					
704-1050	TYPE I BARRICADES	EACH					
704-1052	**TYPE III BARRICADES**	EACH	**14**	**19**	**19**		**19**
704-1054	**SIDEWALK BARRICADE**	EA			**2**		**2**
704-1058	**PEDESTRIAN WALKWAY**	LF			**1335**		**1335**
704-1060	**DELINEATOR DRUMS**	EACH	**172**	**140**	**193**		**193**
704-1065	TRAFFIC CONES	EACH					
704-1067	TUBULAR MARKERS	EACH					
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	STACKABLE VERTICAL PANELS	EACH					
704-1081	VERTICAL PANELS - BACK TO BACK	EACH					
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH					
704-1086	**SEQUENCING ARROW PANEL - TYPE B**	EACH	**1**	**2**	**1**		**2**
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH					
704-1500	**OBLITERATION OF PVMT MK**	SF		**133**	**361**		**494**
704-2108	**TEMPORARY CURB RAMP**	EA			**2**		**2**
704-2200	TEMPORARY PEDESTRIAN SUFACING	SF					
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF					
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH					
704-4011	**PORTABLE CHANGEABLE MESSAGE SIGN**	EA	**2**	**2**	**2**		**2**
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	**SHORT TERM 4IN LINE - TYPE R**	LF		**1475**	**2069**		**3544**
762-0422	SHORT TERM 6IN 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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PE-4876
7/03/25
ENGINEER
NORTH DAKOTA

Traffic Control Devices List

Tyler Parkway (RP 157)

Phases 1-4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	2

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2		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**		**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					59	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**2**	**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)					30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**4**	**4**		**4**	**39**	**156**
R2-1aP-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)					10	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (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**		**2**	**16**	**32**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)					12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)					12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)					15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)					15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)					15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT					35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**1**	**1**		**1**	**35**	**35**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT					35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW					26	
W3-1-48	48"x48"	STOP AHEAD					35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**	**2**	**2**		**2**	**35**	**70**
W3-4-48	48"x48"	BE PREPARED TO STOP					35	
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**		**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					35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back					5	
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	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
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	
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

CONSIGN 1	**114"X 48'**	**11FT LANE ON BRIDGE WIDE VEHICLES USE ALTERNATE ROUTE**	**4**	**4**		**4**	**72**	**288**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS 981**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1	2		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**80**	**80**		**160**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	EACH	**1**	**1**		**1**
704-1041	**ATTENUATION DEVICE-TYPE B-55**	EACH	**2**	**2**		**2**
704-1045	ATTENUATION DEVICE-TYPE B-75	EACH				
704-1048	PORTABLE RUMBLE STRIPS	EACH				
704-1050	TYPE I BARRICADES	EACH				
704-1052	**TYPE III BARRICADES**	EACH	**2**	**2**		**2**
704-1060	**DELINEATOR DRUMS**	EACH	**14**	**14**		**14**
704-1065	TRAFFIC CONES	EACH				
704-1067	TUBULAR MARKERS	EACH				
704-1070	DELINEATOR	EACH				
704-1072	FLEXIBLE DELINEATORS	EACH				
704-1080	STACKABLE VERTICAL PANELS	EACH				
704-1081	VERTICAL PANELS - BACK TO BACK	EACH				
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH				
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH				
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH				
704-1104	PVMT MK PAINTED 4IN LINE	LF				
704-1500	**OBLITERATION OF PVMT MK**	SF	**30**	**30**		**60**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF				
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH				
704-3511	**STATE FURNISHED MEDIAN BARRIER**	LF	**575**	**575**		**575**
762-0200	RAISED PAVEMENT MARKERS	EACH				
762-0420	SHORT TERM 4IN LINE - TYPE R	LF				
762-0422	**SHORT TERM 6IN LINE-TYPE R**	LF	**4000**	**3300**		**7300**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	LF	**32**	**32**		**64**
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.
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Traffic Control Devices List

Bridge Deck Work

Phase 1 - Menoken Interchange (RP 170)

Phase 2 - McKenzie Interchange (RP176)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	3

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**4**	**26**	**104**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**4**	**59**	**236**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		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)		30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**8**	**39**	**312**
R2-1aP-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**4**	**10**	**40**
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		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**4**	**35**	**140**
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**	**4**	**35**	**140**
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		35	
W20-5-48	**48"x48"**	**RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE**	**4**	**35**	**140**
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back		5	
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	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
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

SPEC & CODE			
704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1252**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1042	ATTENUATION DEVICE-TYPE B-60	EACH	
704-1045	**ATTENUATION DEVICE-TYPE B-75**	**EACH**	**2**
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	
704-1060	**DELINEATOR DRUMS**	**EACH**	**62**
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	**EACH**	**2**
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**460**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**1000**
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0422	**SHORT TERM 6IN LINE-TYPE R**	**LF**	**8800**
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.
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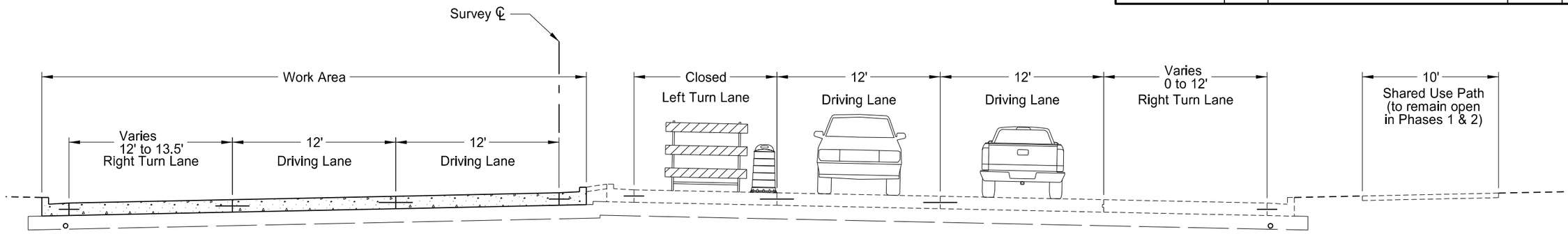
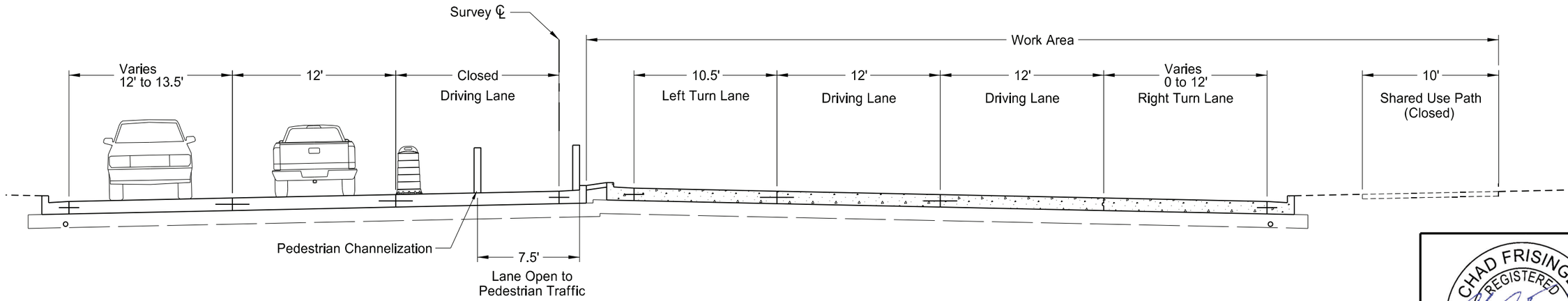
Traffic Control Devices List
I-94 Single Lane Closures
Menoken Interchange (RP 170)

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	100	4



Tyler Parkway/Divide Ave
Sta 38+22
South of Structure
Phase 2



Tyler Parkway/Divide Ave
Sta 38+22
South of Structure
Phase 3

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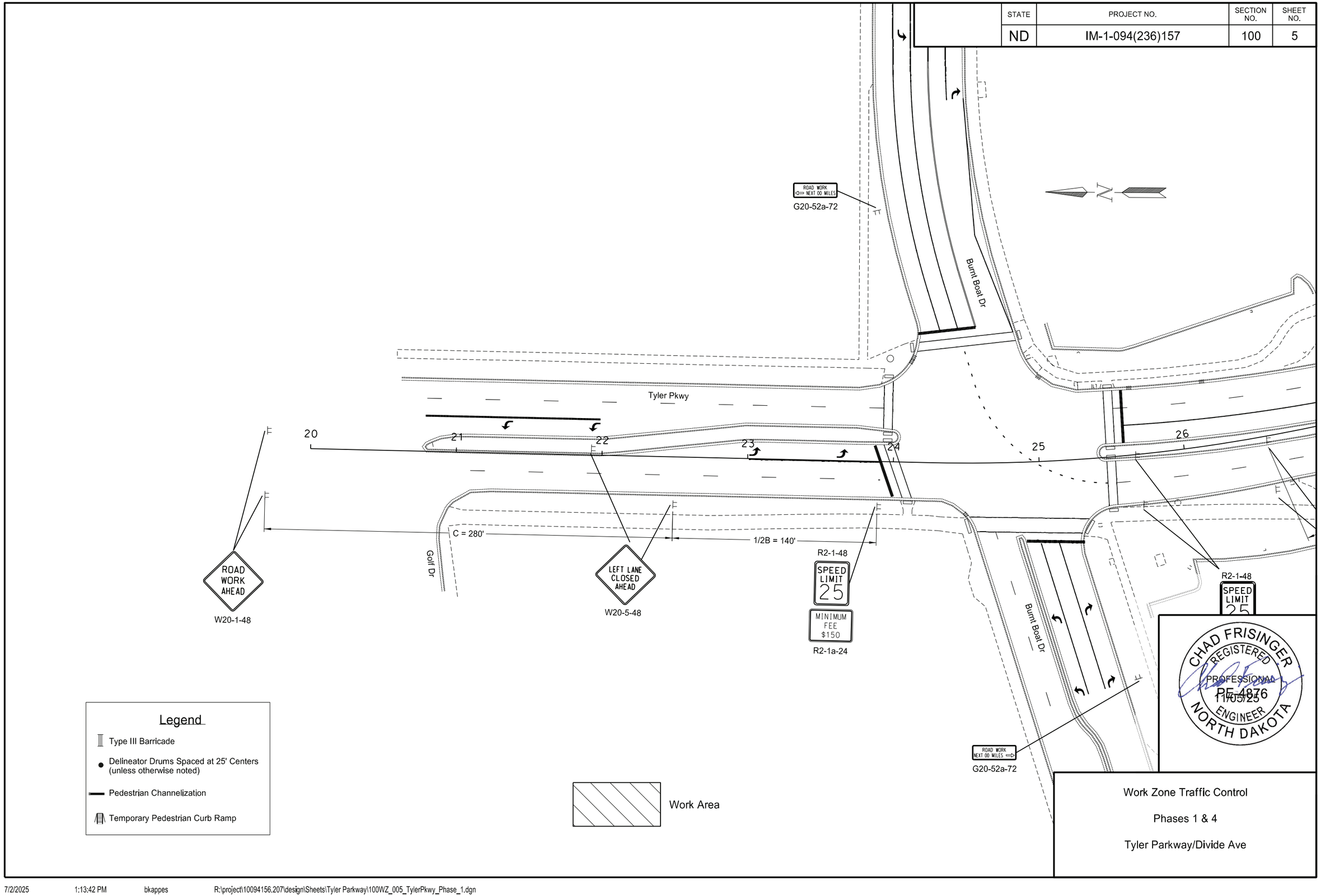
Work Zone Traffic Control Typical Sections

Phases 2 and 3

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	5



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Work Zone Traffic Control

Phases 1 & 4

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	6

ROAD WORK
⇦ NEXT 00 MILES
G20-52a-72

NE Exit Ramp

NE Entrance Loop

END
ROAD WORK
G20-2a-48

Tyler Pkwy

26 27 28 29 30 31 32 33 34

Lane Closed

Lane Closed

Lane Closed

100' Taper

A=280'

Obliterate Pvmt Marking
24 IN White Stop Bar
24 LF = 48 SF

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24

W4-2L-48

Sequencing Arrow Panel - Type B

NW Entrance Ramp

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Channelization
- Temporary Pedestrian Curb Ramp

Work Area

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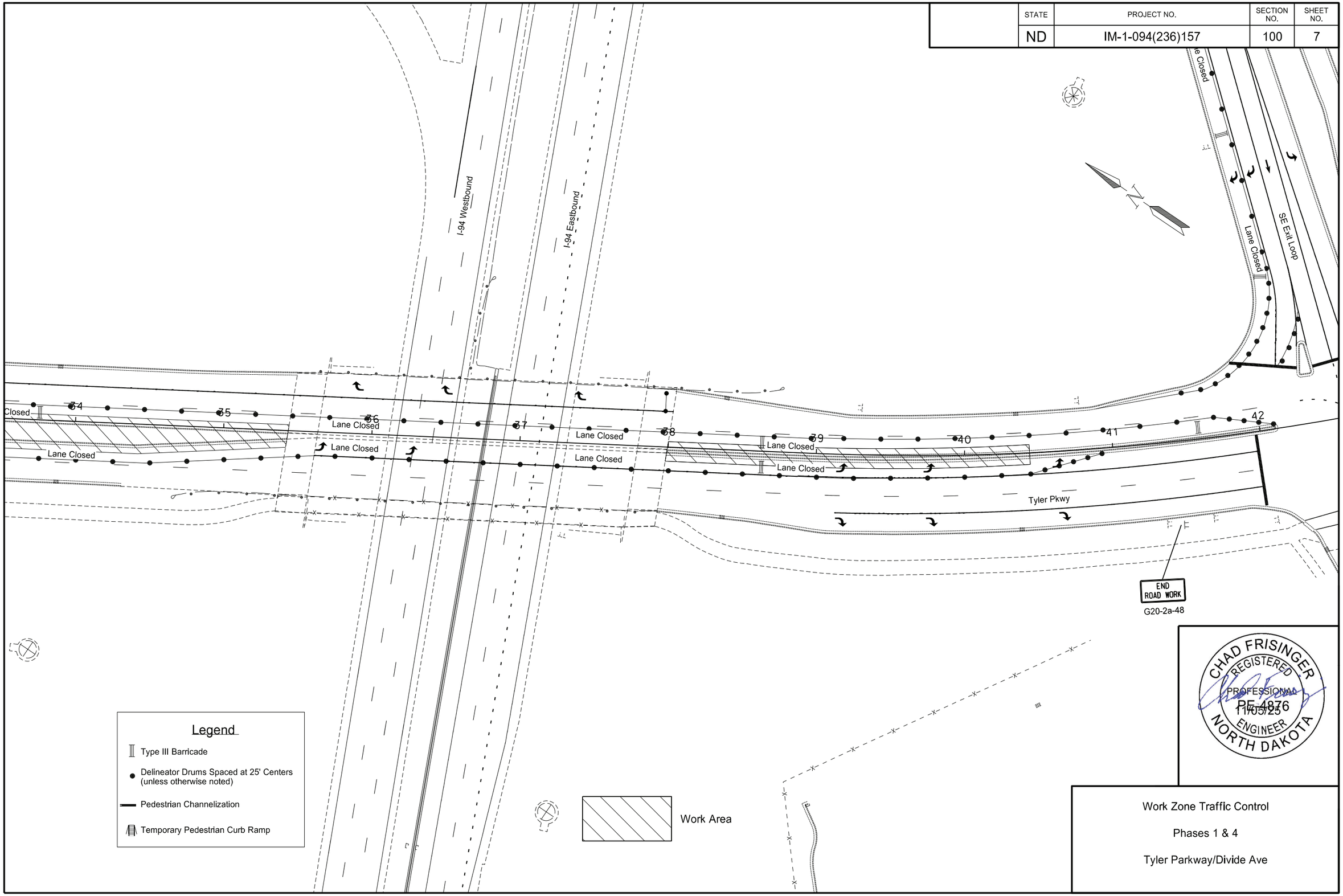
Work Zone Traffic Control

Phases 1 & 4

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	7



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Work Zone Traffic Control

Phases 1 & 4

Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	100	8

ROAD WORK NEXT 00 MILES

G20-52aR-72

Lane Closed

SE Exit Loop

Lane Closed

SE Entrance Ramp

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Channelization
- Temporary Pedestrian Curb Ramp

42 43 44 45 46 47

100' Taper

A = 280'

C = 280'

Divide Ave

Schafer St

Work Area

R2-1-48

SPEED LIMIT 25

MINIMUM FEE $150

R2-1aP-24

W20-1-48

ROAD WORK AHEAD

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE 4876
11/03/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phases 1 & 4

Tyler Parkway/Divide Ave

7/2/2025 1:13:43 PM bkappes R:\project\10094156.207\design\Sheets\Tyler Parkway\100WZ_008_TylerPkwy_Phase_1.dgn

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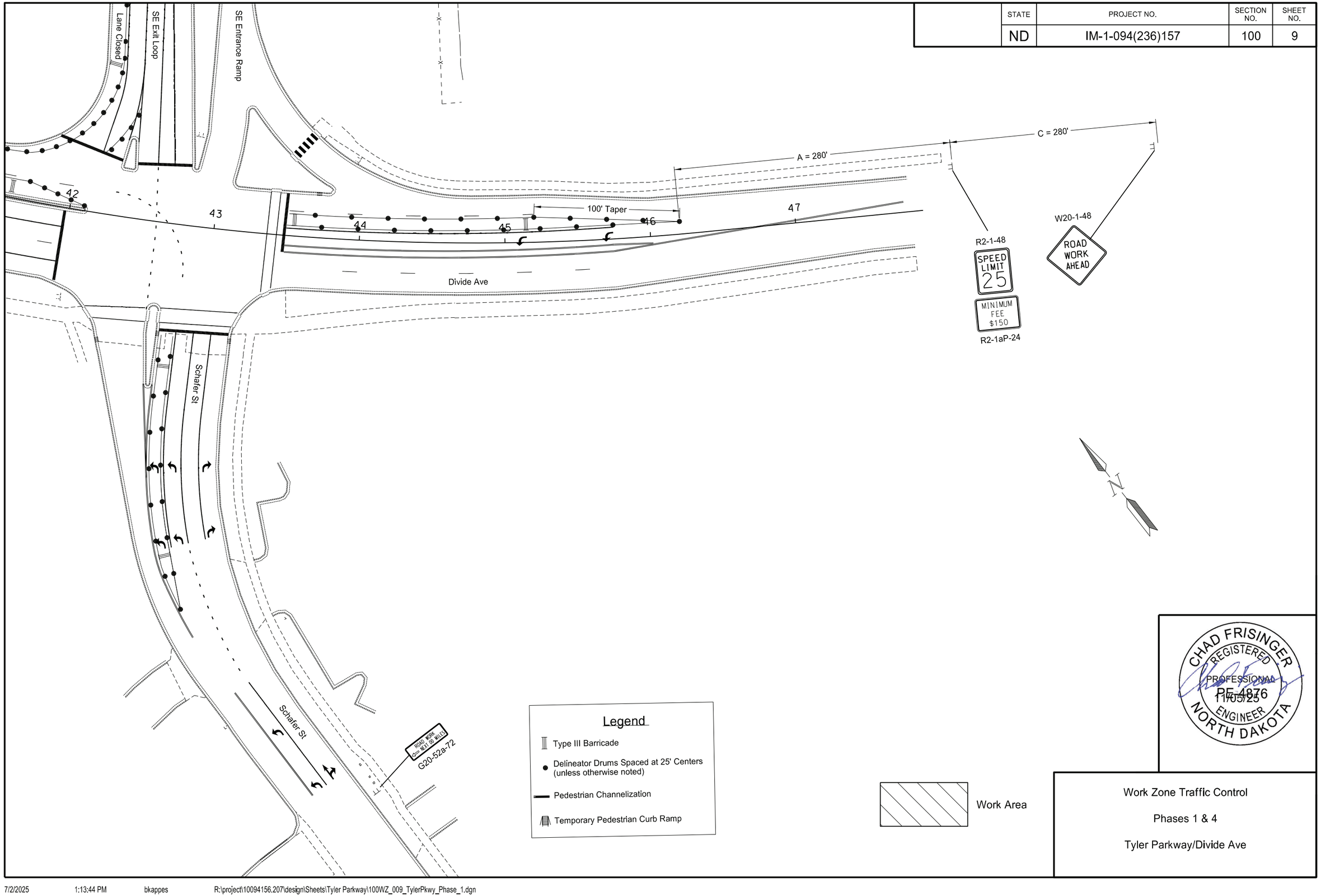
	ND	IM-1-094(236)157	100	9



CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
7/03/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phases 1 & 4

Tyler Parkway/Divide Ave

Docusign Envelope ID: C20C82CC-2142-473B-9C8E-621460DBF876

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	10

ROAD WORK
⇦ NEXT 00 MILES
G20-52a-72

Burnt Boat Dr

Tyler Pkwy

20 21 22 23 24 25 26

C = 280'

1/2B = 140'

Golf Dr

ROAD WORK AHEAD
W20-1-48

LEFT LANE CLOSED AHEAD
W20-5-48

R2-1-48
SPEED LIMIT 25

MINIMUM FEE $150
R2-1a-24

Burnt Boat Dr

R2-1-48
SPEED LIMIT 25

ROAD WORK
NEXT 00 MILES ⇨
G20-52a-72

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/03/25
ENGINEER
NORTH DAKOTA

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Channelization
- Temporary Pedestrian Curb Ramp

Paved Temporary Connection

Work Area

Work Zone Traffic Control

Phase 2

Tyler Parkway/Divide Ave

7/2/2025 1:13:44 PM bkappes R:\project\10094156.207\design\Sheets\Tyler Parkway\100WZ_010_TylerPkwy_Phase_2.dgn

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	100	11

ROAD WORK NEXT 00 MILES
G20-52a-72

NE Exit Ramp

NE Entrance Loop

END ROAD WORK
G20-2a-48

Tyler Pkwy

26 27 28 29 30 31 32 33 34

Obliterate Pvmt Marking
8IN White
81 LF = 54 SF

Short Term 4 IN
White Line - Type R

Lane Closed

Lane Closed

100' Taper

A=280'

Short Term 4 IN
Yellow Line - Type R

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24

W4-2L-48

Sequencing Arrow Panel - Type B

NW Entrance Ramp

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Channelization
- Temporary Pedestrian Curb Ramp

Paved Temporary Connection

Work Area

CHAD FRISINGER
REGISTERED
PROFESSIONAL
ENGINEER
NORTH DAKOTA
PE-4876
11/05/25

Work Zone Traffic Control

Phase 2

Tyler Parkway/Divide Ave

7/2/2025 1:13:45 PM bkappes R:\project\10094156.207\design\Sheets\Tyler Parkway\100WZ_011_TylerPkwy_Phase_2.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	12

I-94 Westbound

I-94 Eastbound

SE Exit Loop

Lane Closed

W1-4L-48

Sequencing Arrow Panel - Type B

Short Term 4 IN White Line - Type R

Obliterate Pvmt Marking 2 Arrows 16 SF * 2 = 32 SF

Lane Closed

Tyler Pkwy

Short Term 4 IN White Line - Type R

Short Term 4 IN Double Yellow Line - Type R

W1-6R-48 Barricade Mtd

W1-4R-48

Short Term 4 IN Double Yellow Line - Type R

Obliterate Pvmt Marking 8 IN White 71 LF = 47 SF

Short Term 4 IN Yellow Line - Type R

END ROAD WORK

G20-2a-48

34 35 36 37 38 39 40 41 42

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Channelization
- Temporary Pedestrian Curb Ramp

Paved Temporary Connection

Work Area

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/05/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phase 2

Tyler Parkway/Divide Ave

7/2/2025 1:13:45 PM bkappes R:\project\10094156.207\design\Sheets\Tyler Parkway\100WZ_012_TylerPkwy_Phase_2.dgn

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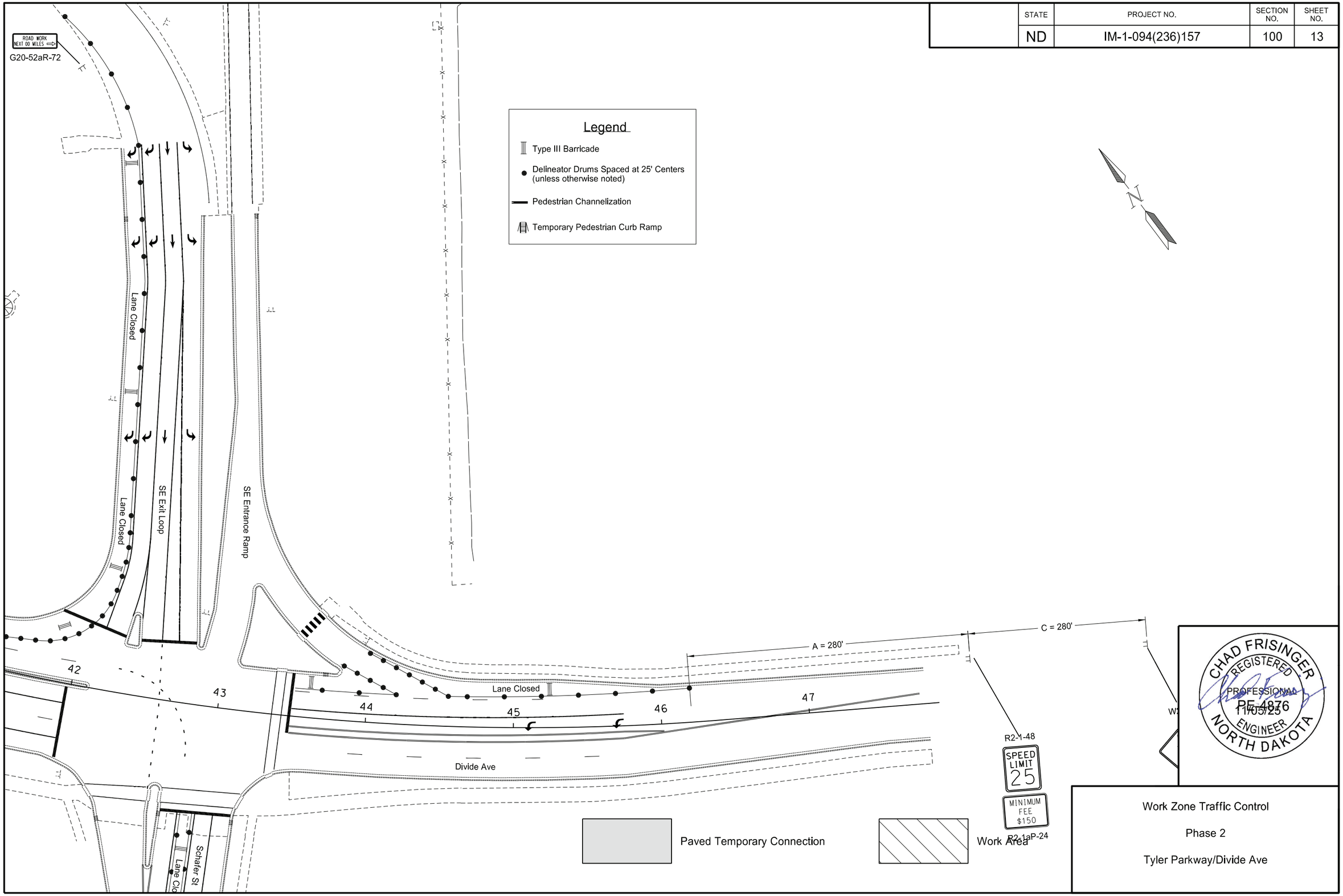

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Channelization
- Temporary Pedestrian Curb Ramp

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
ENGINEER
NORTH DAKOTA
11/03/25

Work Zone Traffic Control

Phase 2

Tyler Parkway/Divide Ave

7/2/2025 1:13:46 PM bkappes R:\project\10094156.207\design\Sheets\Tyler Parkway\100WZ_013_TylerPkwy_Phase_2.dgn

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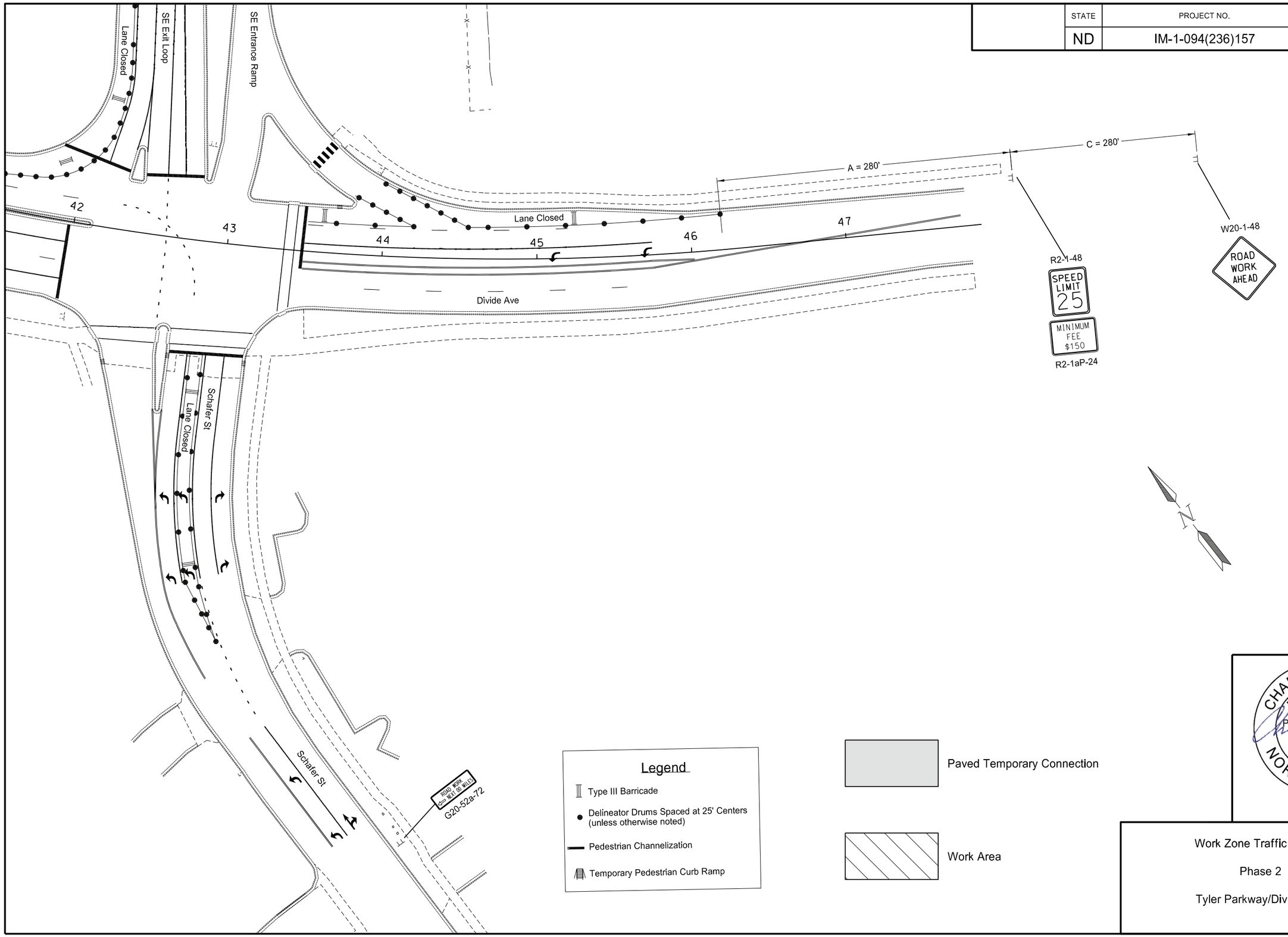

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/03/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phase 2

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	15

Paved Temporary Connection

Work Area

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Walkway
- Temporary Pedestrian Curb Ramp

ROAD WORK ⇦ NEXT 00 MILES
G20-52a-72

Burnt Boat Dr

Tyler Pkwy

20 21 22 23 24 25 26 27

C = 280 1/2B = 140'

Golf Dr

ROAD WORK AHEAD
W20-1-48

RIGHT LANE CLOSED AHEAD
W20-5-48

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24

Burnt Boat Dr

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24

G20-52a-72
ROAD WORK NEXT 00 MILES ⇨

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/05/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phase 3

Tyler Parkway/Divide Ave

Docusign Envelope ID: C20C82CC-2142-473B-9C8E-621460DBF876

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	16

ROAD WORK NEXT 00 MILES
G20-52a-72

NE Exit Ramp

NE Entrance Loop

END ROAD WORK
G20-2a-48

Tyler Pkwy

26 27 28 29 30 31 32 33 34

Short Term 4 IN Yellow Line - Type R

Obliterate P
4 IN White
20 LF = 7

Lane Closed

Lane Closed

10:1 Taper

Lane Closed

Pedestrian Walkw

SIDEWALK CLOSED
R9-9-30
Ped Long. Barricade Mounted

Short Term 4 IN White Line - Type R

Temporary Curb Ramp

Temporary Pedestrian Surfacing
(Paid for as Pedestrian Wa

R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1a-24

A=280'

W4-2R-48

100' Taper

Sequencing Arrow Panel - Type B

Delineator Drums spaced @ 5' centers

W1-4L-48

NW Entrance Ramp

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Walkway
- Temporary Pedestrian Curb Ramp

Paved Temporary Connection

Work Area

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/05/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phase 3

Tyler Parkway/Divide Ave

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	100	17

I-94 Westbound

I-94 Eastbound

SE Exit Loop

Lane Closed

W1-4R-48

Obliterate Pvmt Marking
8 IN White
444 LF = 296 SF

Short Term 4 IN
Yellow Line - Type R

Obliterate Pvmt Marking
4 IN White Skips
20 LF = 7 SF

Obliterate Pvmt Marking
3 Arrows
16 SF * 3 = 48 SF

Obliterate Pvmt Marking
4 IN White Skips
30 LF = 10 SF

Short Term 4 IN Double
Yellow Line - Type R

Short Term 4 IN
Yellow Line - Type R

Delineator Drums
spaced @ 10' centers

34 35 36 37 38 39 40 41 42

Lane Closed

Tyler Pkwy

Pedestrian Walkway

SIDEWALK CLOSED
R9-9-30
Ped Long. Barricade
Mounted

Short Term 4 IN
White Line - Type R

Short Term 4 IN
White Line - Type R

Pedestrian Walkway

Temporary Curb Ramp

SIDEWALK CLOSED
R9-9-30
Ped Long. Barricade
Mounted

Temporary Pedestrian Surfacing
(Paid for as Pedestrian Walkway)

W1-6R-48
Barricade Mounted

END ROAD WORK
G20-2a-48

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Walkway
- Temporary Pedestrian Curb Ramp

Paved Temporary Connection

Work Area

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/03/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phase 3

Tyler Parkway/Divide Ave

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	100	18

ROAD WORK NEXT 00 MILES
G20-52aR-72

Lane Closed
SE Exit Loop
Lane Closed
SE Entrance Ramp
Delineator Drums spaced @ 10' centers
42
43
44
45
46
47
100' Taper
A = 280'
C = 280'
R2-1-48
SPEED LIMIT 25
MINIMUM FEE $150
R2-1aP-24
W20-1-48
ROAD WORK AHEAD
Divide Ave
Schafer St

Legend

- Type III Barricade
- Delineator Drums Spaced at 25' Centers (unless otherwise noted)
- Pedestrian Walkway
- Temporary Pedestrian Curb Ramp

Paved Temporary Connection

Work Area

CHAD FRISINGER
REGISTERED
PROFESSIONAL
ENGINEER
NORTH DAKOTA
PE-4876
11/03/25

Work Zone Traffic Control

Phase 3

Tyler Parkway/Divide Ave

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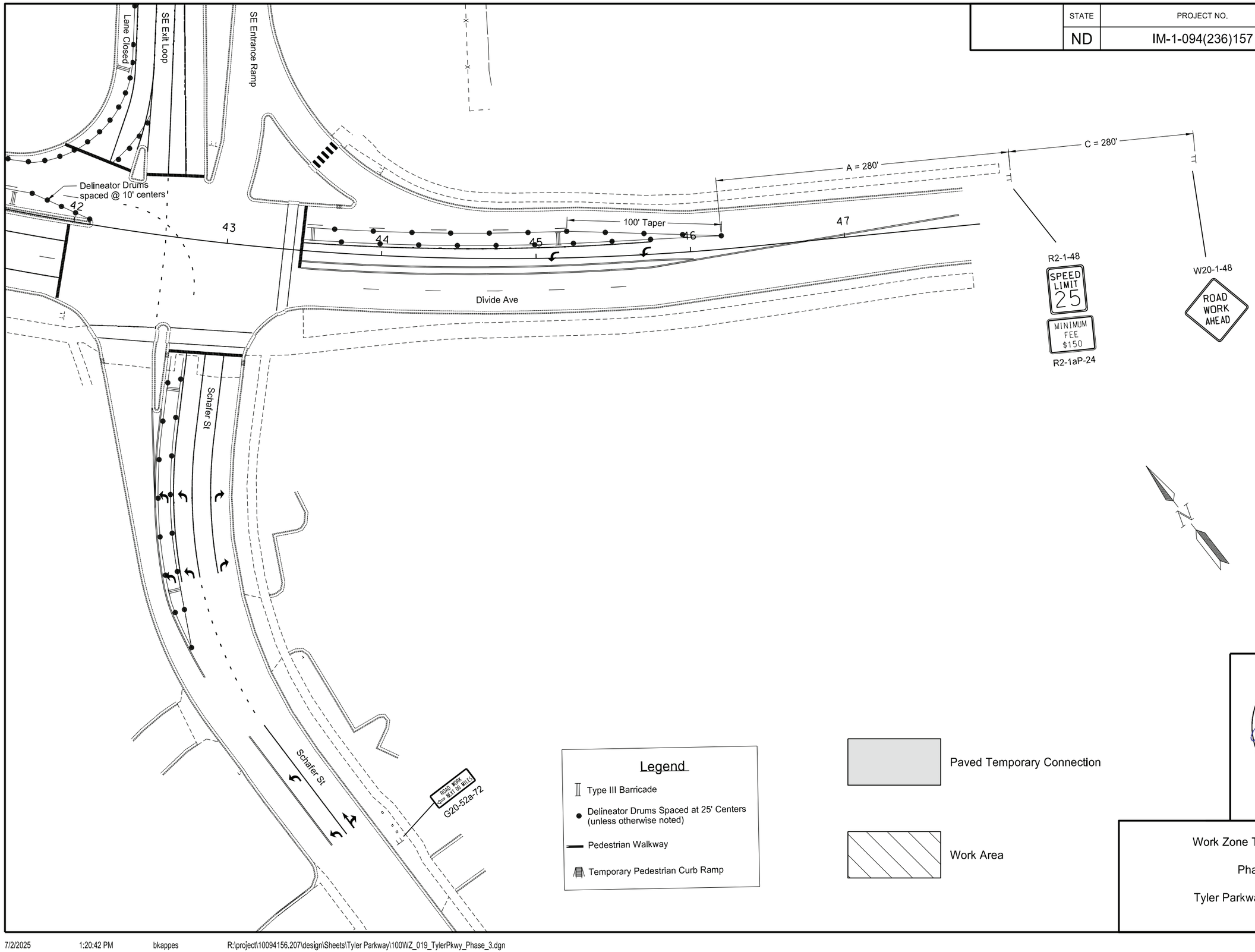

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PE-4876
7/03/25
ENGINEER
NORTH DAKOTA

Work Zone Traffic Control

Phase 3

Tyler Parkway/Divide Ave

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	100	20

N

Sec 29
T-139-N
R-78-W

11 FT LANE
ON BRIDGE
WIDE VEHICLES USE
ALTERNATE ROUTE
Consign 1
Post Mounted

ONE LANE
ROAD
AHEAD
W20-4-48
Post Mounted

ROAD
WORK
AHEAD
W20-1-48
Post Mounted

W3-3-48
Post Mounted

Use Standard D-704-18
for lane closures on
I-94 Mainline when work
is being performed under the bridge.

Sec 20
T-139-N
R-78-W

Interim Traffic Signal

24" White Stop Bar
- Type R
16 LF

6" White line
- Type R

140+00
145+00
150+00
155+00
160+00

I 94

24" White Stop Bar
(Existing)

6" Dbl Yellow
-Type R
Restripe 600 LF

END
ROAD WORK
G20-2-48

Oblit
Pvmt Mk

28'
Bridge
Width

11'
Driving
Lane

Oblit
Pvmt Mk

6" Dbl Yellow
-Type R
Restripe 600 LF

11 FT LANE
ON BRIDGE
WIDE VEHICLES USE
ALTERNATE ROUTE
Consign 1
Post Mounted
Install sign after
W20-4-48
Shown on D-704-16

To Menoken

158th St NE

14.5'
Work
Area

158th St NE

END
ROAD WORK
G20-2-48

11 FT LANE
ON BRIDGE
WIDE VEHICLES USE
ALTERNATE ROUTE
Consign 1
Post Mounted
Install sign after
W20-4-48
Shown on D-704-16

24" White Stop Bar
- Type R
16 LF

Interim Traffic Signal

20' Approach
Slab

Median Barrier

20' Approach
Slab

24" White Stop Bar
(Existing)

W3-3-48
Post Mounted

11 FT LANE
ON BRIDGE
WIDE VEHICLES USE
ALTERNATE ROUTE
Consign 1
Post Mounted

Sec 21
T-139-N
R-78-W

ONE LANE
ROAD
AHEAD
W20-4-48
Post Mounted

ROAD
WORK
AHEAD
W20-1-48
Post Mounted

Sec 28
T-139-N
R-78-W

Note: Mirror layout in work area for second half of deck overlay.
See D-704-16 for all other information.

KEY	
⊢	Type III Barricade
⊨	Sign
●	Delineator Drum
∞	Interim Traffic Signal
	Tubular markers

WZTC
Menoken Interchange
RP 170

Bridge Deck Overlay

Menoken Interchange

CHAD FRISINGER
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PROFESSIONAL
PE-4876
11/05/25
ENGINEER
NORTH DAKOTA

7/14/2025 1:52:45 PM leckroth R:\project\10094170.236\Design\Sheets\100WZ_020_ConSign_RP 170.dgn

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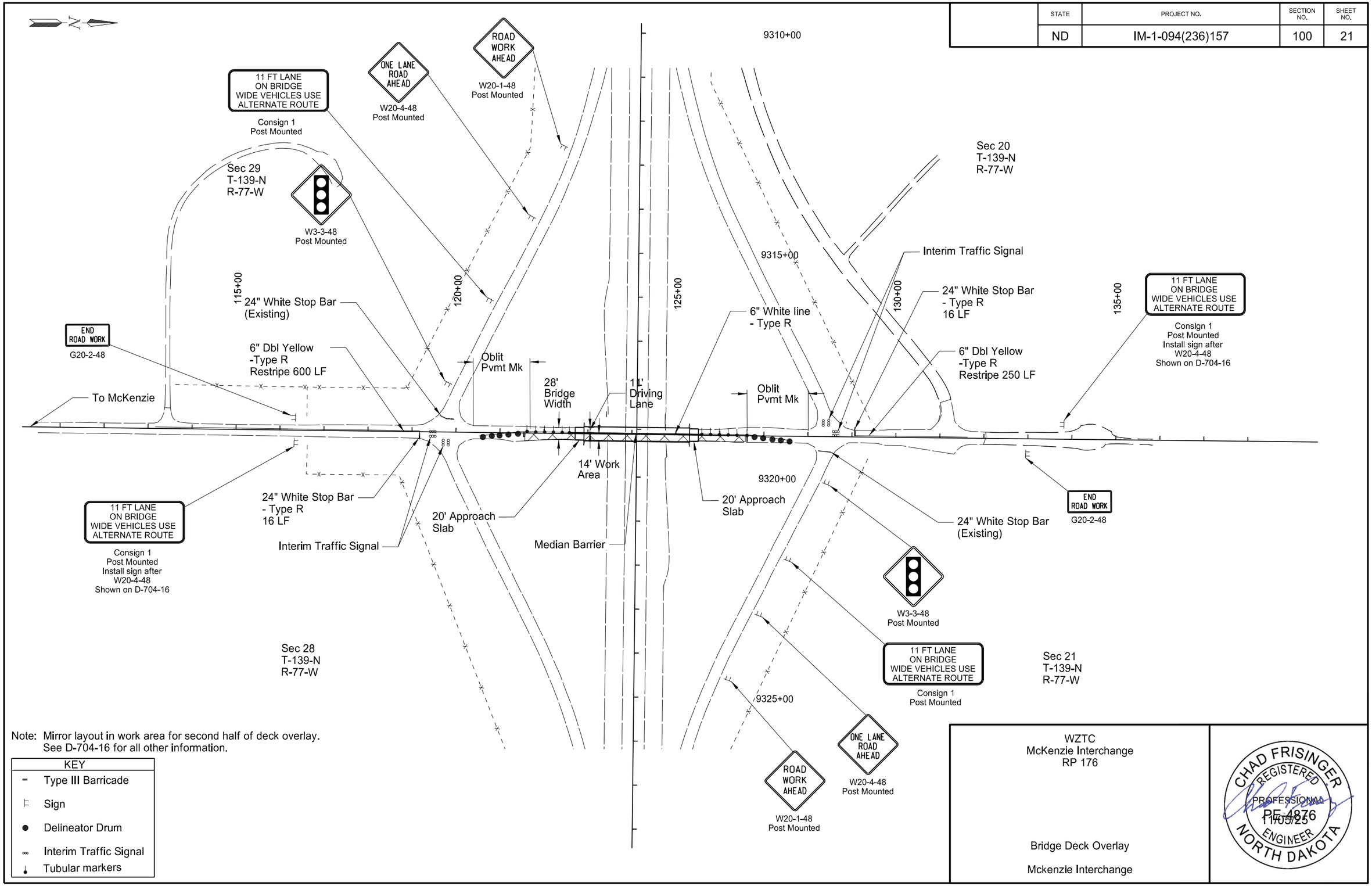

Note: Mirror layout in work area for second half of deck overlay. See D-704-16 for all other information.

KEY	
▬	Type III Barricade
⊢	Sign
●	Delineator Drum
∞	Interim Traffic Signal
↓	Tubular markers

WZTC
McKenzie Interchange
RP 176

Bridge Deck Overlay

Mckenzie Interchange

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/05/25
ENGINEER
NORTH DAKOTA

7/14/2025 1:52:47 PM leckroth R:\project\10094170.236\Design\Sheets\100WZ_021_ConSign_RP176.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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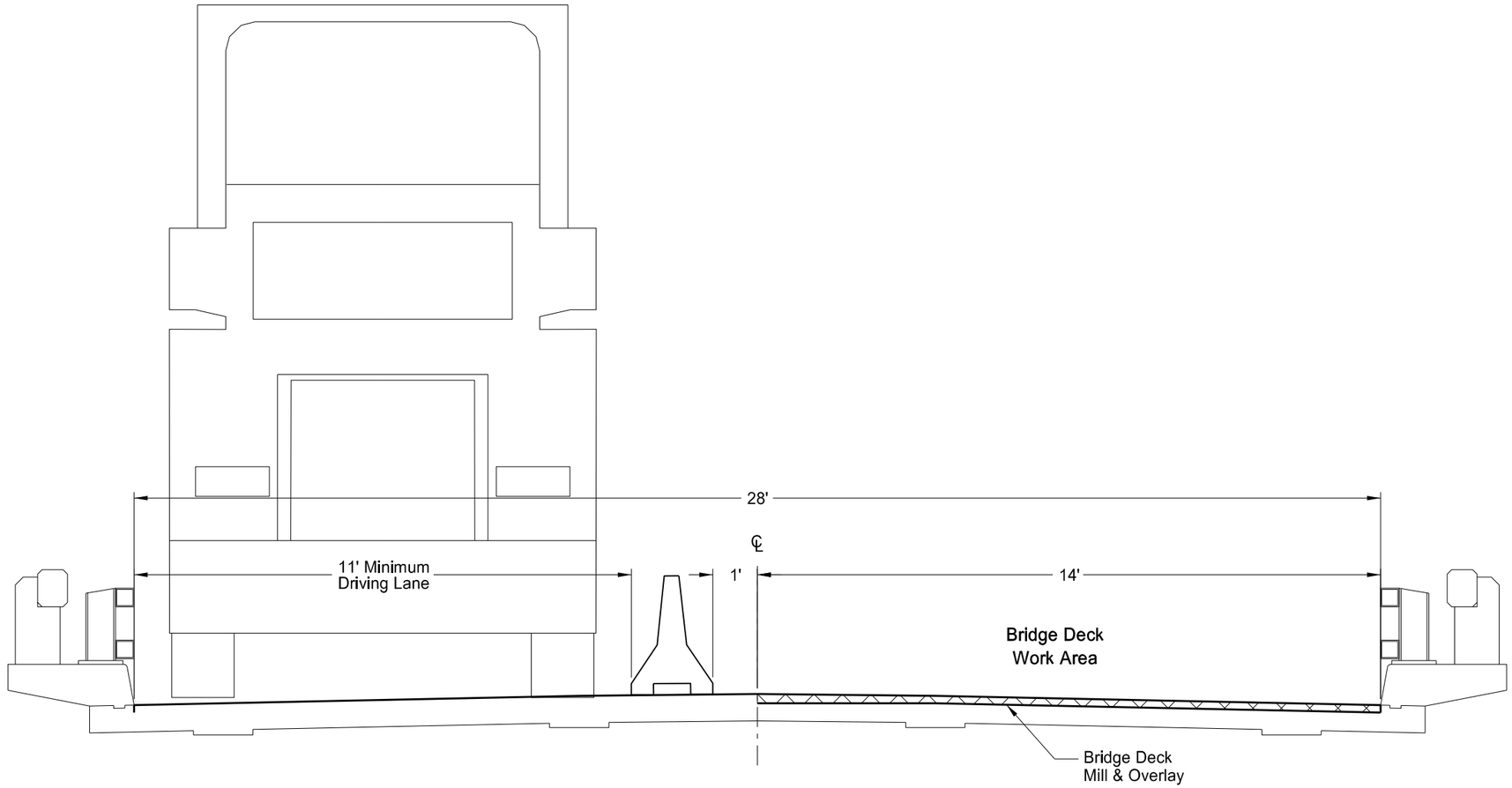


Traffic Control Lane Layout
for Deck Work at RP 170 & RP 176
(Mirror for work on other side of roadway)

WZTC

Deck Layout

Bridge Deck Overlay

Menoken Interchange & McKenzie Interchange

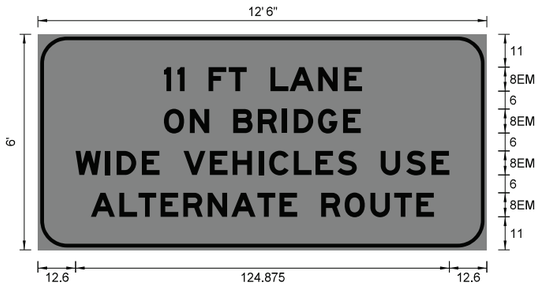
CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
11/03/25
ENGINEER
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-1-094(236)157	100	23

SIGN NUMBER	ConSign 1
WIDTH X HEIGHT	12'-6" x 6'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	9"
MOUNTING	Ground
BACKGROUND	**TYPE:** XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	**TYPE:** Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): AREA: 75.0 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Const_Detour.sst

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
1	1		F	T		L	A	N	E										66.2	8.0	EM 2000
42.1	46.6	49.0	57.0	63.8	69.7	77.7	84.1	93.6	102.4												
O	N		B	R	I	D	G	E											65.8	8.0	EM 2000
42.1	50.8	57.2	65.2	73.5	81.6	85.5	93.6	102.0													
W	I	D	E		V	E	H	I	C	L	E	S		U	S	E			124.9	8.0	EM 2000
12.6	22.5	26.3	34.7	40.6	48.6	57.4	65.0	73.8	77.3	85.5	92.7	100.1	106.6	114.6	123.0	131.5					
A	L	T	E	R	N	A	T	E		R	O	U	T	E					114.6	8.0	EM 2000
17.7	27.2	33.6	41.0	48.6	56.7	64.6	73.4	80.7	86.6	94.6	102.5	111.1	119.0	126.4							

Construction Sign Details

RP 170
Menoken Interchange

RP 176
McKenzie Interchange

I-94

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 07/16/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	IM-1-094(236)157	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
Tyler Parkway																							
33+96 Rt									7.0	2 x 2 12 ga										1	3		
39+77 Lt		9		5.0	9.7				7.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
Sub Total			0.0	5.0		**Total**	9.7										**Total**	4.0		1	3	0	
Grand Total			**0.0**	**5.0**		**Total**	**9.7**										**Total**	**4**	**0**	**1**	**3**	**0**	

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 07/16/25
NORTH DAKOTA

Sign Summary
Perforated Tube

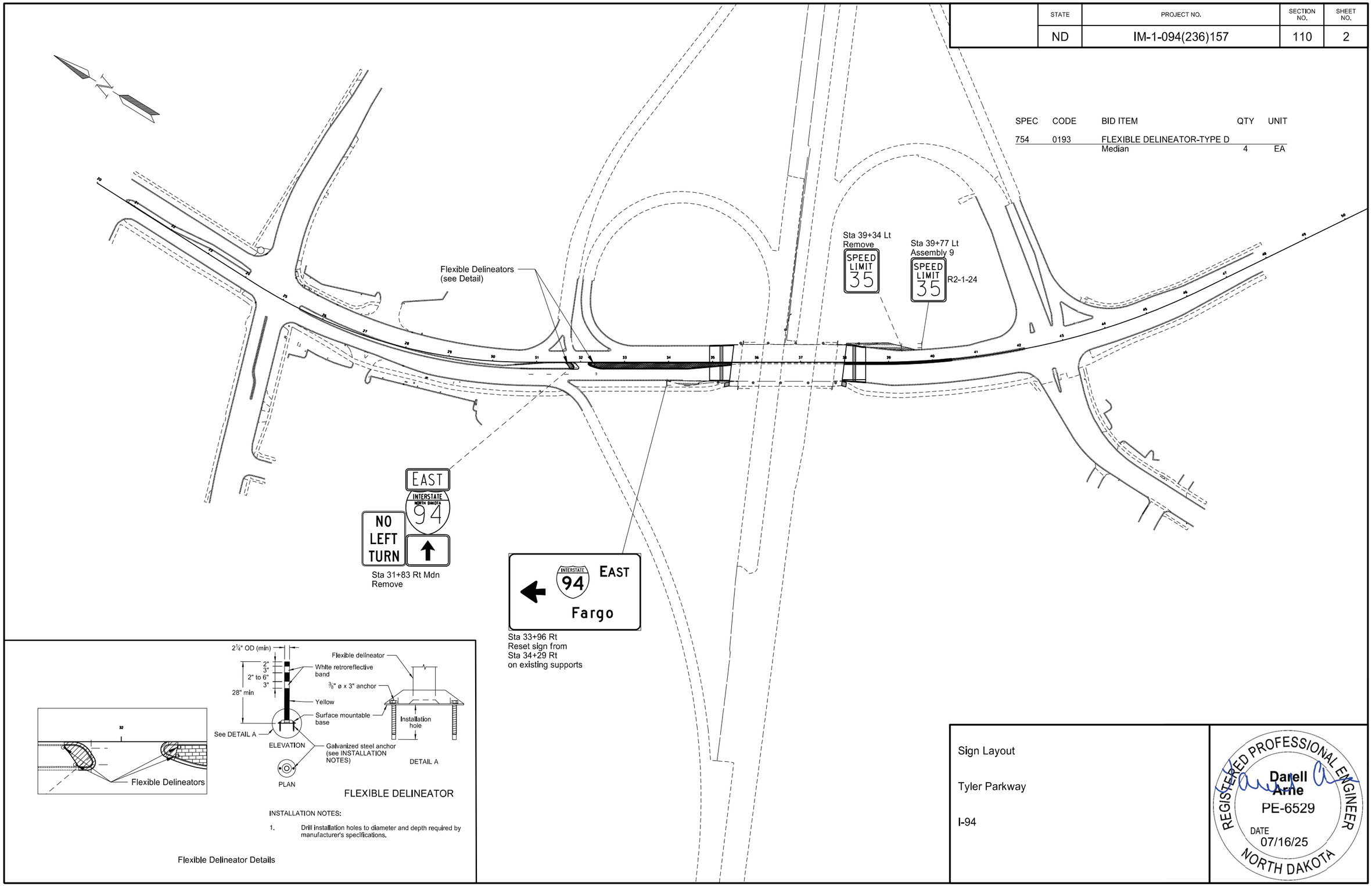
Tyler Parkway

I-94

7/15/25 1:19:56PM

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	110	2

SPEC	CODE	BID ITEM	QTY	UNIT
754	0193	FLEXIBLE DELINEATOR-TYPE D Median	4	EA



FLEXIBLE DELINEATOR

INSTALLATION NOTES:

1. Drill installation holes to diameter and depth required by manufacturer's specifications.

Flexible Delineator Details

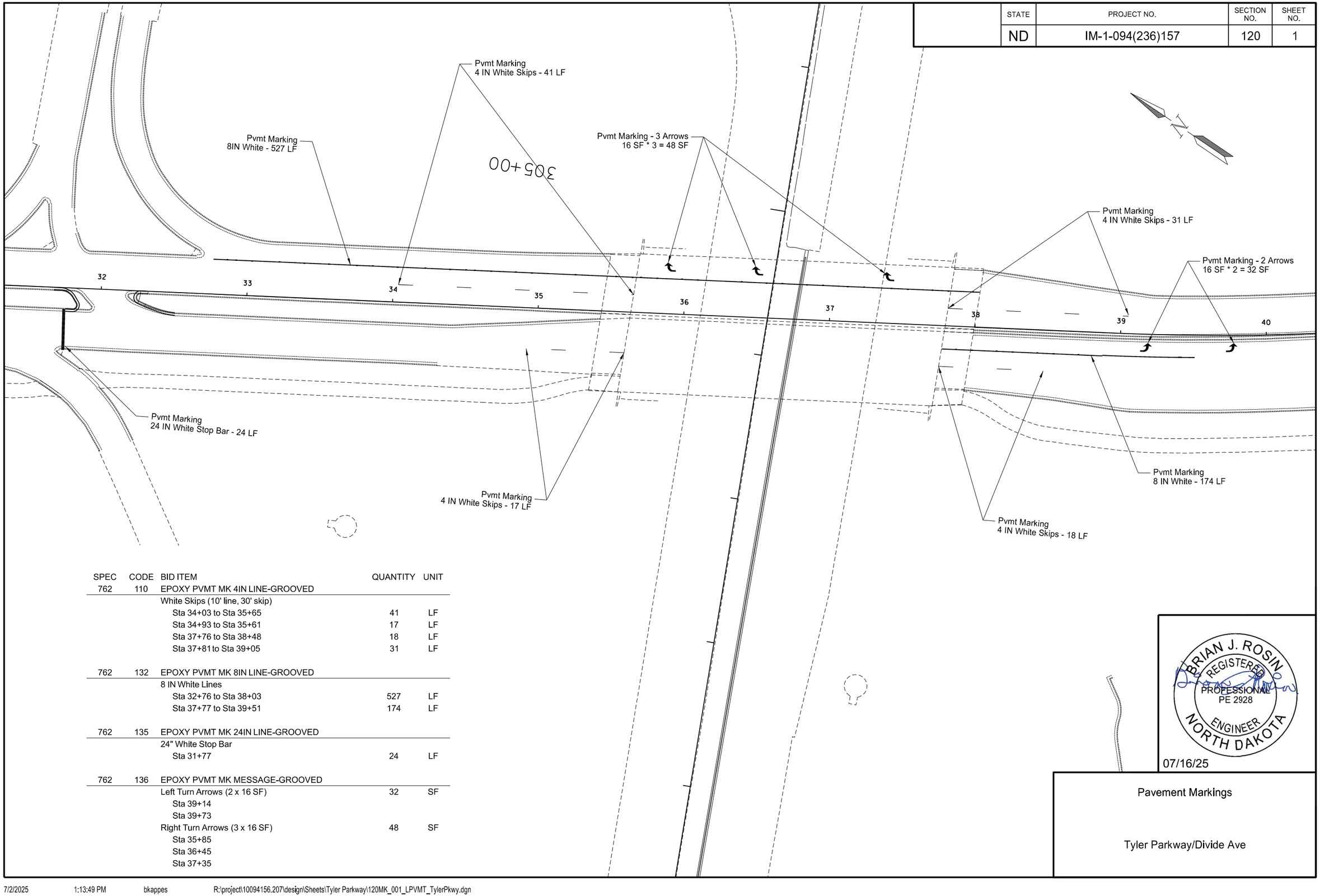
Sign Layout

Tyler Parkway

I-94

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 07/16/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	120	1



SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	110	EPOXY PVMT MK 4IN LINE-GROOVED		
		White Skips (10' line, 30' skip)		
		Sta 34+03 to Sta 35+65	41	LF
		Sta 34+93 to Sta 35+61	17	LF
		Sta 37+76 to Sta 38+48	18	LF
		Sta 37+81 to Sta 39+05	31	LF
762	132	EPOXY PVMT MK 8IN LINE-GROOVED		
		8 IN White Lines		
		Sta 32+76 to Sta 38+03	527	LF
		Sta 37+77 to Sta 39+51	174	LF
762	135	EPOXY PVMT MK 24IN LINE-GROOVED		
		24" White Stop Bar		
		Sta 31+77	24	LF
762	136	EPOXY PVMT MK MESSAGE-GROOVED		
		Left Turn Arrows (2 x 16 SF)	32	SF
		Sta 39+14		
		Sta 39+73		
		Right Turn Arrows (3 x 16 SF)	48	SF
		Sta 35+85		
		Sta 36+45		
		Sta 37+35		

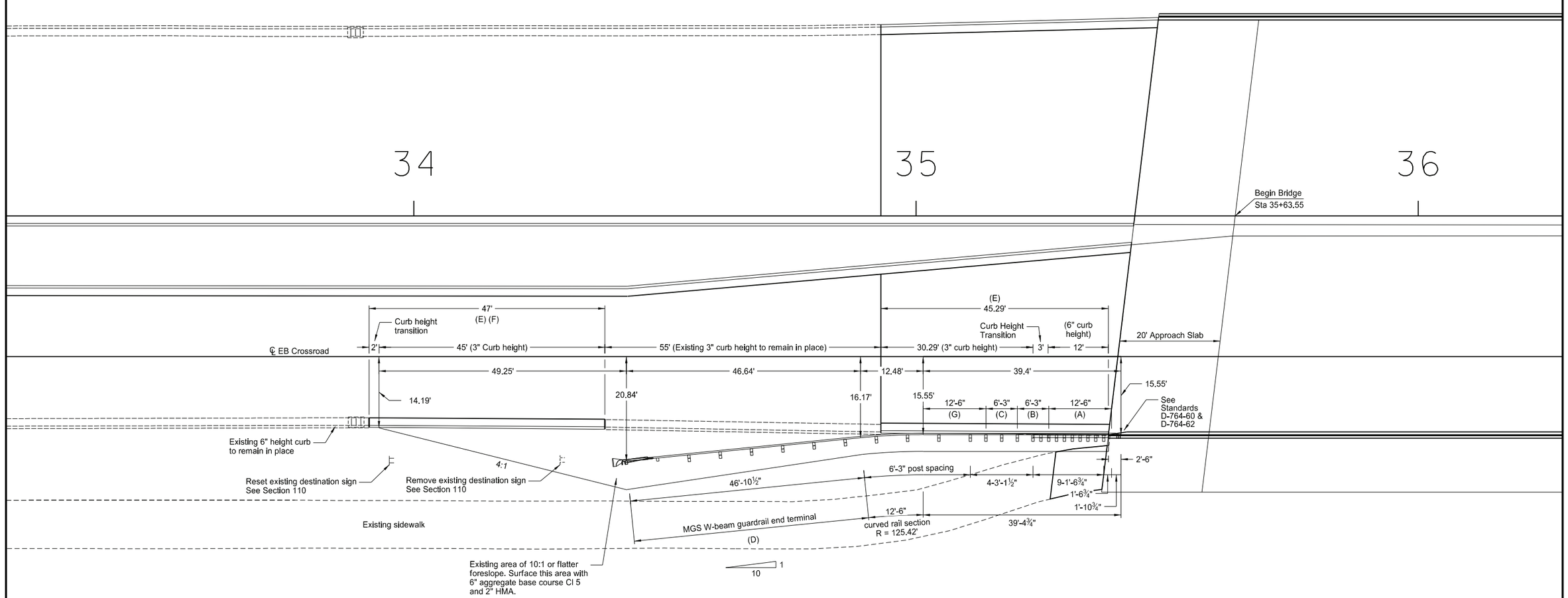
BRIAN J. ROSIN
REGISTERED
PROFESSIONAL
PE 2928
ENGINEER
NORTH DAKOTA

07/16/25

Pavement Markings

Tyler Parkway/Divide Ave

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	130	1



(A) Thrie beam rail section (double thickness)

(B) Thrie beam rail section

(C) Asymmetrical W-Thrie beam transition section

(D) Install an MGS FLEAT end terminal at this location.See Standard D-764-38.

(E) Remove and install west curb & gutter in accordance with Standard Drawing D-748-1, except for curb heights and curb height transitions as shown in this layout and on Standard Drawing D-764-60. See Section 40 and Section 90 for quantities.

(F) At the length of curb & gutter that is adjacent to the existing pavement that will remain in place, include all costs to install def tie bars in the contract unit price bid for "Curb & Gutter - Type 1 Special."

(G) W-beam rail section (double thickness)

Thrie/MGS W-Beam Guardrail Layout
At Beginning of Bridge

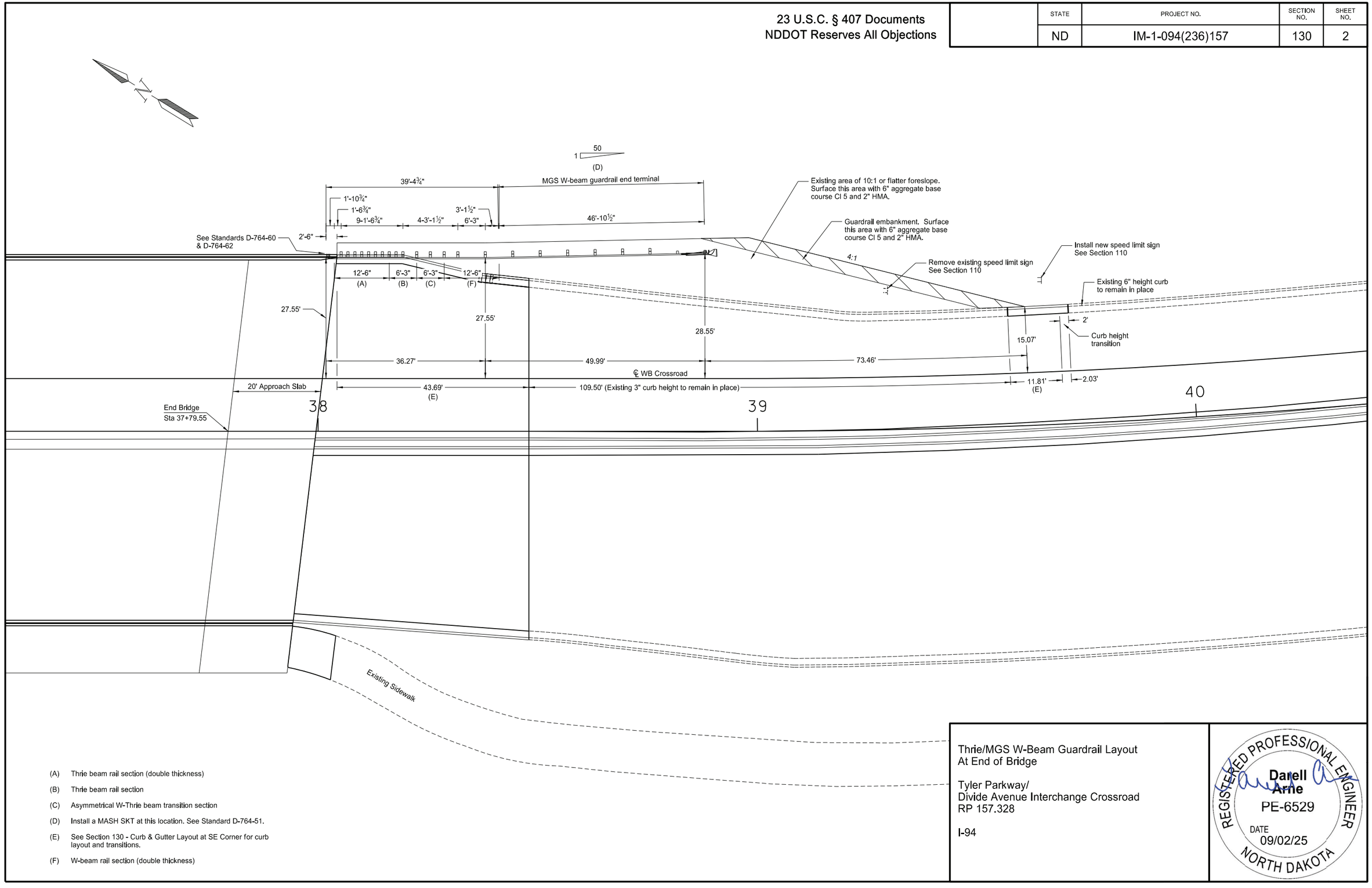
Tyler Parkway/
Divide Avenue Interchange Crossroad
RP 157.328

I-94

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 09/02/25
NORTH DAKOTA

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	130	2



(A) Thrie beam rail section (double thickness)

(B) Thrie beam rail section

(C) Asymmetrical W-Thrie beam transition section

(D) Install a MASH SKT at this location. See Standard D-764-51.

(E) See Section 130 - Curb & Gutter Layout at SE Corner for curb layout and transitions.

(F) W-beam rail section (double thickness)

Thrie/MGS W-Beam Guardrail Layout
At End of Bridge

Tyler Parkway/
Divide Avenue Interchange Crossroad
RP 157.328

I-94

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
09/02/25
NORTH DAKOTA

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	130	3

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'- 6" STRAIGHT DOUBLE W-BEAM RAIL SECTION	(A) 12'- 6" CURVED W-BEAM RAIL SECTION	(A) REFL-ECTOR-IZED PLATES	(A) 6" x 8" x 7' WOOD POST	(A) 6" x 8" x 19" WOOD OFF-SET BLOCK	(A) 6'-3" W-THRIE BEAM TRANS-ITION SECTION	(A) 6'-3" THRIE BEAM SECTION	(A) 12'-6" DOUBLE THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERM-INAL CON-NECTOR	(A) 7/8" Ø x 15" LONG HEX HEAD BOLT	(A) JERSEY BARRIER TO THRIE BEAM CONN-ECTOR PLATE	(B) EMBANK-MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 34+88.93 to 35+40.81 Rt	28	11	5	60	1	1	6	6	12	1	1	1	1	5	1	
Sta 38+00.36 to 38+39.76 Lt	26	9	3	52	1		5	6	12	1	1	1	1	5	1	25
TOTAL	54	20	8	112	2	1	11	12	24	2	2	2	2	10	2	25

(A) Include these items in the contract unit price bid for "W-Beam Guardrail".

(B) The volume of embankment (cubic yards) is for informational purposes only.

SPEC	CODE	BID ITEM	QTY	UNIT
203	0218	GUARDRAIL EMBANKMENT		
		Sta 38+87.14 to 39+62.01 Lt	1	Ea
764	0131	W-BEAM GUARDRAIL		
		Sta 34+88.93 to 35+40.81 Rt	51.9	LF
		Sta 38+00.36 to 38+39.76 Lt	39.4	LF
		Total	91.3	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 34+42.29 to 34+88.93 Rt	1	Ea
		Sta 38+39.76 to 38+86.61 Lt	1	Ea
		Total	2	Ea

SPEC	CODE	BID ITEM	QTY	UNIT
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 35+05.06 to 35+44.46 Rt.	39.4	LF
		Sta 37+97.92 to 38+37.32 Lt	39.4	LF
		Total	78.8	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 34+67.84 to 35+05.06 Rt	1	Ea
		Sta 38+37.32 to 38+74.54 Lt	1	Ea
		Total	2	Ea

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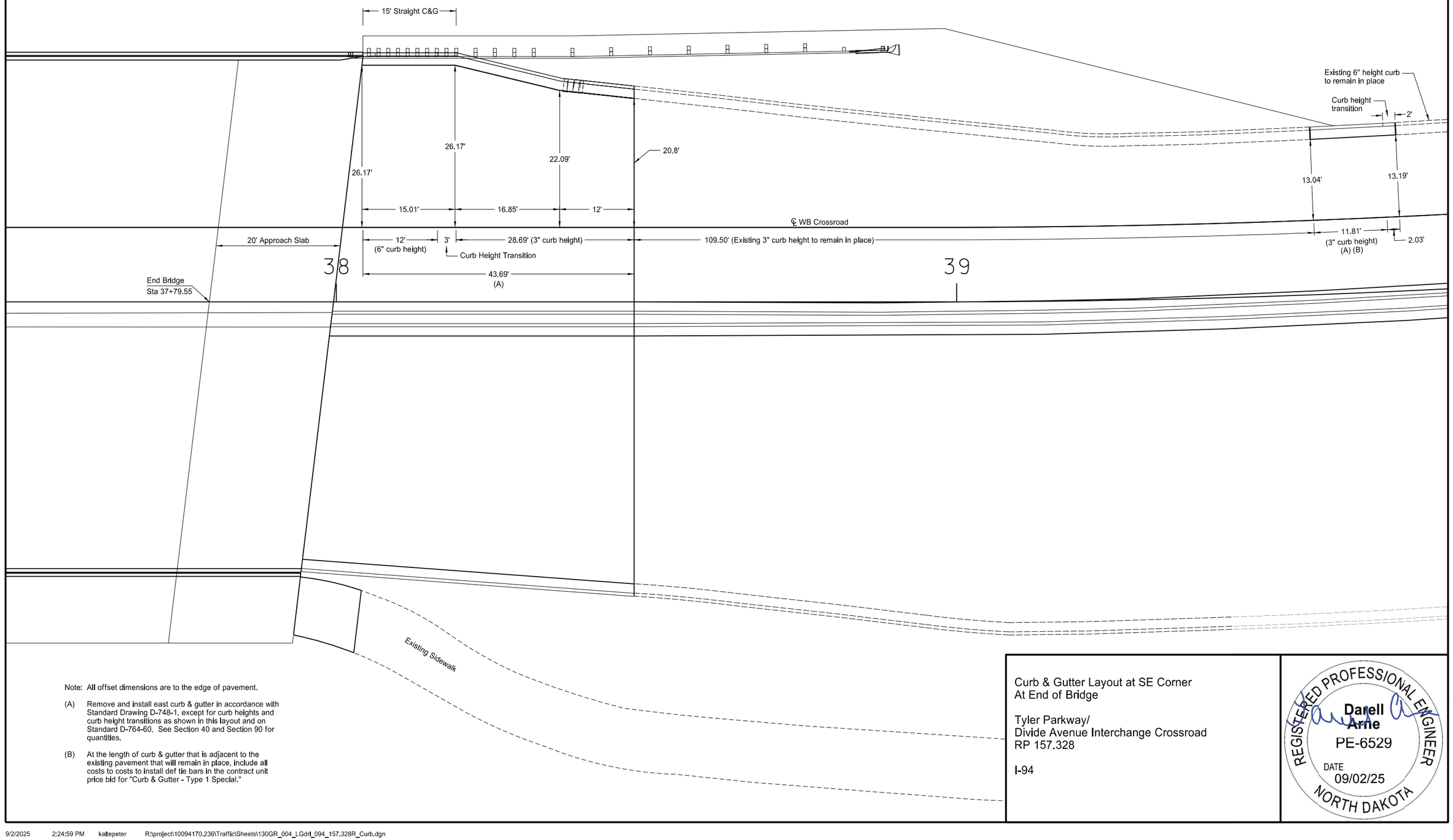
DATE 09/02/25
NORTH DAKOTA

Thrie/MGS W-Beam Guardrail Quantities

Tyler Parkway/
Divide Avenue Interchange Crossroad
RP 157.328

I-94

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	130	4



Note: All offset dimensions are to the edge of pavement.

(A) Remove and install east curb & gutter in accordance with Standard Drawing D-748-1, except for curb heights and curb height transitions as shown in this layout and on Standard D-764-60. See Section 40 and Section 90 for quantities.

(B) At the length of curb & gutter that is adjacent to the existing pavement that will remain in place, include all costs to costs to install def tie bars in the contract unit price bid for "Curb & Gutter - Type 1 Special."

Curb & Gutter Layout at SE Corner
At End of Bridge

Tyler Parkway/
Divide Avenue Interchange Crossroad
RP 157.328

I-94

REGISTERED PROFESSIONAL ENGINEER
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DATE 09/02/25
NORTH DAKOTA

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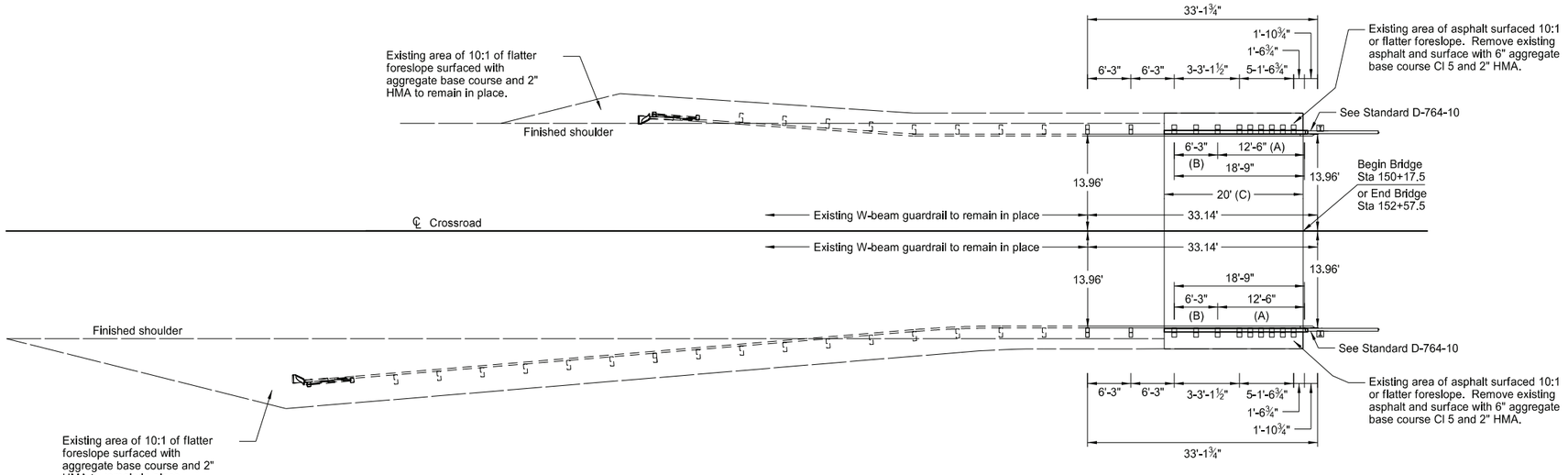
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	130	5



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 149+86.46 to 150+19.60 Rt	33.2	LF
		Sta 149+86.46 to 150+19.60 Lt	33.2	LF
		Sta 152+55.40 to 152+88.54 Rt	33.2	LF
		Sta 152+55.40 to 152+88.54 Lt	33.2	LF
		Total	132.8	LF

(A) Thrie beam rail section (double thickness)

(B) W-Thrie beam transition section (double thickness)

(C) Approach slab

Thrie/W-Beam Guardrail Layout
At Both Ends of Bridge

Menoken Interchange Crossroad
RP 170.519

I-94

REGISTERED PROFESSIONAL ENGINEER
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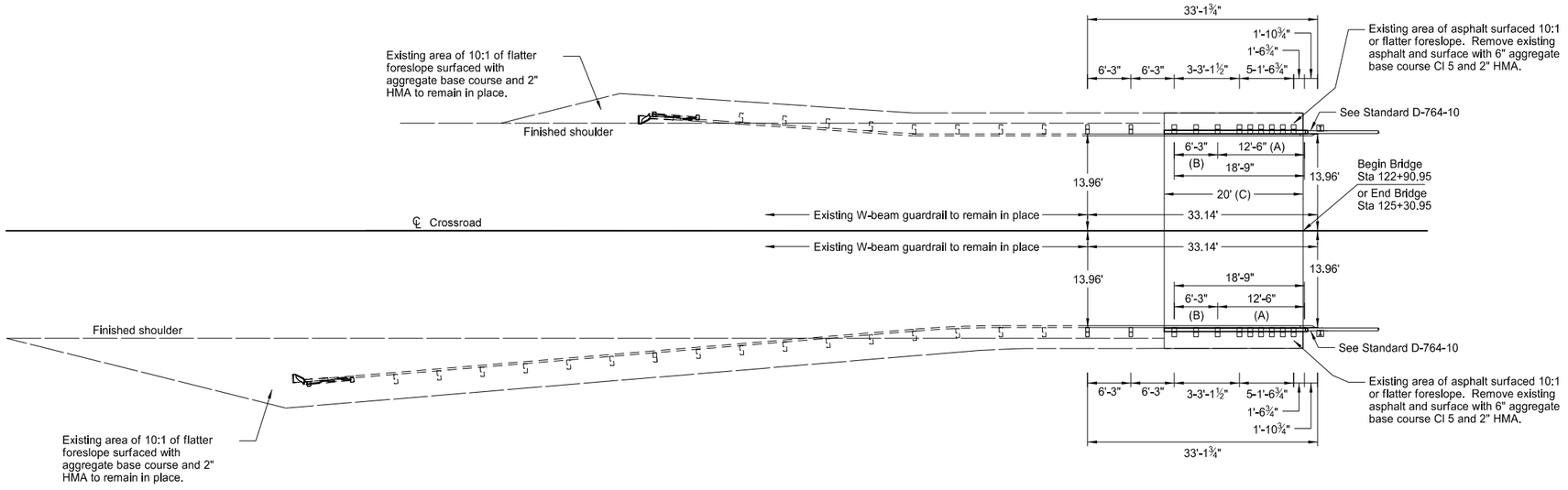
PE-6529
DATE 09/02/25
NORTH DAKOTA

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	130	6



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 122+59.91 to 122+93.05 Rt	33.2	LF
		Sta 122+59.91 to 122+93.05 Lt	33.2	LF
		Sta 125+28.85 to 152+61.99 Rt	33.2	LF
		Sta 125+28.85 to 152+61.99 Lt	33.2	LF
		Total	132.8	LF

(A) Thrie beam rail section (double thickness)

(B) W-Thrie beam transition section (double thickness)

(C) Approach slab

Thrie/W-Beam Guardrail Layout
At Both Ends of Bridge

McKenzie Interchange Crossroad
RP 176.501

I-94

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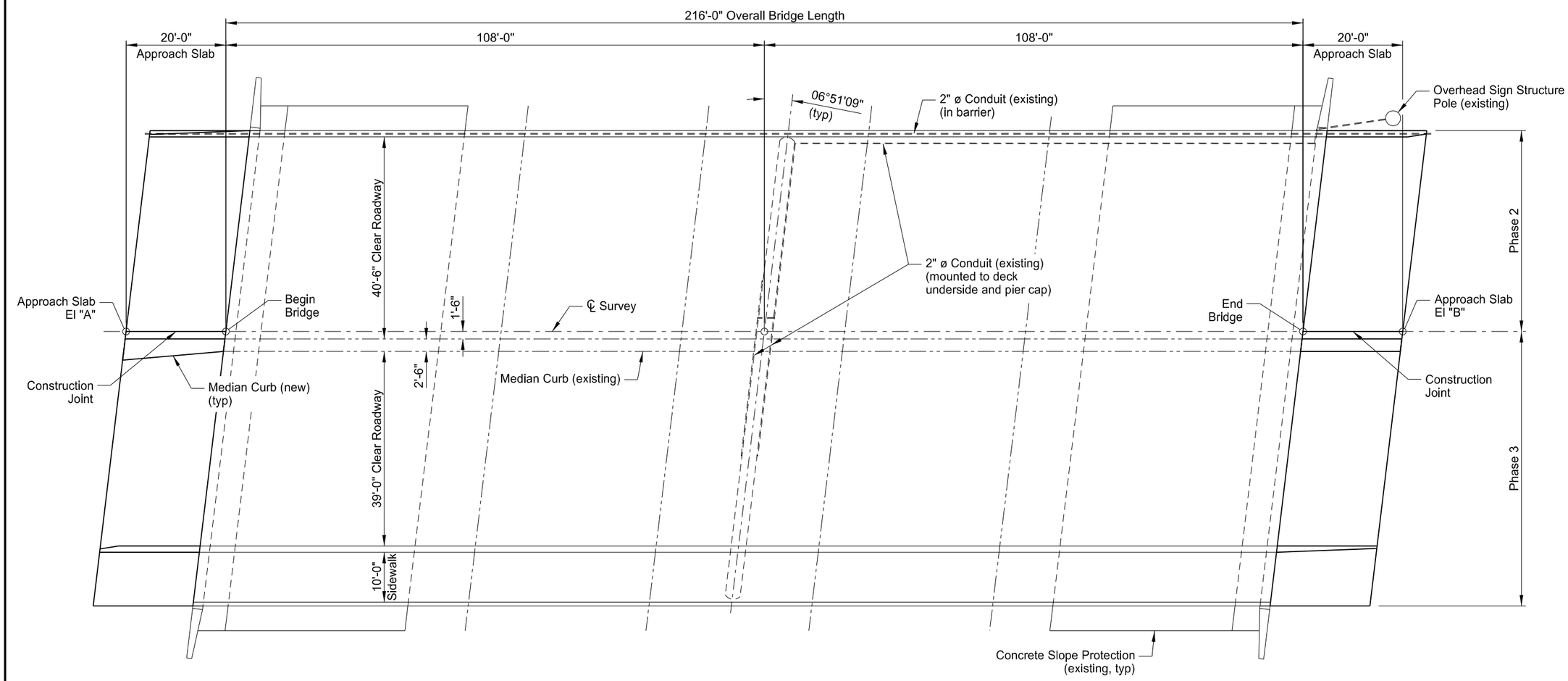
DATE 09/02/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	1



PLAN

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1135	BRIDGE APPROACH SLAB-REMOVE & REPLACE	SY	423.4
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	2,546
602	1260	BRIDGE DECK CRACK SEALING	LF	250
602	7000	SPECIAL SURFACE FINISH	SF	1,576
650	0805	DECK SPALL REPAIR	SF	224
750	0200	CONCRETE MEDIAN PAVING	SY	13.1

NOTE:

Field verify approach slab elevations prior to removal. Adjust approach slab elevations as necessary to match approach roadway elevations and to provide drainage.

APPROACH SLAB ELEVATIONS	
El "A"	0.18' lower than Begin Bridge
El "B"	0.11' higher than End Bridge

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TYLER PARKWAY/
DIVIDE AVENUE INTERCHANGE

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
11/04/25

DRAWING NO. 94-157.328-1

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EAJ BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	2

NOTES

100 SCOPE OF WORK: Work at this site consists of repairing concrete spall areas on the bridge deck surface, removing and replacing approach slabs, applying penetrating water repellent treatment to the bridge deck and approach slab surfaces including the sidewalk area, sealing cracks on the bridge deck, and applying a surface finish to the existing bridge barriers and new approach slab barriers.

105 CONTROL OF WORK: Protect all utility conduits mounted on the bridge and exiting thru abutment endwalls on east side during work activities.

602 BRIDGE APPROACH SLAB–REMOVE & REPLACE: Remove the existing approach slab barriers, median curb, and approach slabs. Excavate the existing subgrade material beneath the approach slabs to the lower limits of foundation fill shown in the plans. Place and compact foundation fill beneath the approach slabs in accordance with Section 210.

Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use a curing period of at least five days. Use Grade 60 reinforcing steel that meets the requirements of Section 612. Provide polystyrene meeting AASHTO M230, preformed joint filler meeting Section 826.02 C or 826.02 F, and polyethylene film that meets ASTM C171.

Include all labor, equipment, and material described above, as well as furnishing and installing silicone sealant and connection plates & pipes in the bid item “Bridge Approach Slab–Remove & Replace.” Include the costs to furnish and install the dowel bars extending into the concrete pavement in the bid item provided for concrete pavement.

602 WATER-WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D., a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: In addition to the top of new approach slab surfaces, apply the penetrating water repellent solution to the top of the bridge deck including the sidewalk area. Apply penetrating water repellent solution prior to sealing any approach slab cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

602 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer’s recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all work and materials associated with the bridge deck crack sealing in the bid item “Bridge Deck Crack Sealing.” Include all work and materials associated with the approach slab crack sealing in the bid item “Bridge Approach Slab-Remove & Replace.”

602 SPECIAL SURFACE FINISH: Clean the surfaces that are to receive the Tex-Cote surface finish using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, and laitance. Ensure any curing compounds and release agents have been completely removed from the surfaces to receive the Tex-Cote surface finish.

Apply Tex-Cote XL 70 Bridge Cote with Silane to the areas listed below. Apply the surface finish in accordance with the manufacturer’s recommended application procedures to attain a dry film thickness of 15 mils.

- Barrier inside and top surfaces
- Barrier outside surface (sidewalk side only)

Finish the surface with a uniform texture, color, and appearance free from fins, projections, cavities, and porous areas. Use a “sand” textured finish. Use gray surface finish color number 36424 meeting AMS-STD-595.

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NOTES

650 DECK SPALL REPAIR: The bridge deck has areas of surface spalling. The actual limits of deck spall areas to be repaired will be determined by the Engineer in the field by sounding areas with visible surface spalls and/or locations designated in the plans for deck spall repairs.

- Saw cut the perimeter of the repair area to a depth of 1". Remove all concrete to a depth of 2" or to sound concrete, whichever is greater.
- Complete removals using mechanical equipment, with the exception that a milling machine specified for Class 1 removals will not be required.
- Use Class AE concrete meeting 602.03 B to restore the full depth of the repair area. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days.
- Concrete placement using a buggy or pump is not required.
- Section 650.04 E “Mixing of Materials” is waived. Use of a mobile mixer is not required.
- Perform grooving according to Section 602.04 D.2 “Approach Slab Tining”

See supplemental bid information for photos of deck concrete spalling. Include all labor, equipment, and materials required to remove and replace the deck concrete in the bid item “Deck Spall Repair.”

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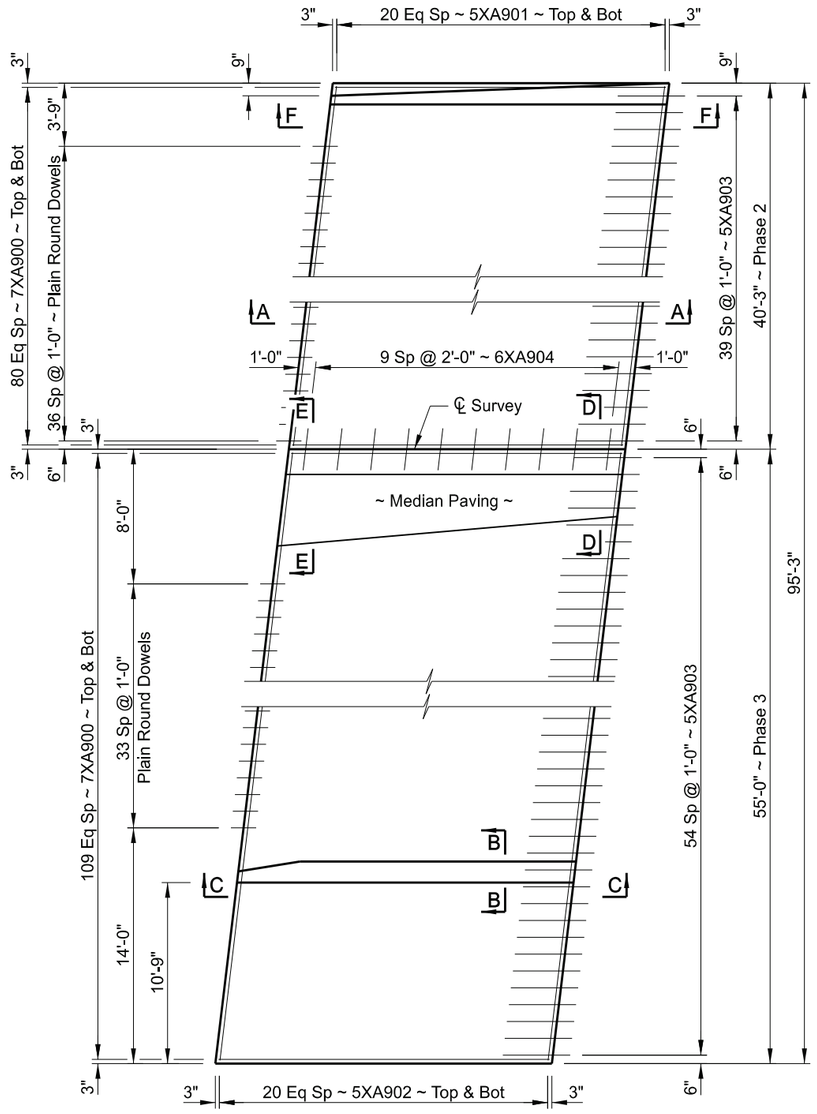
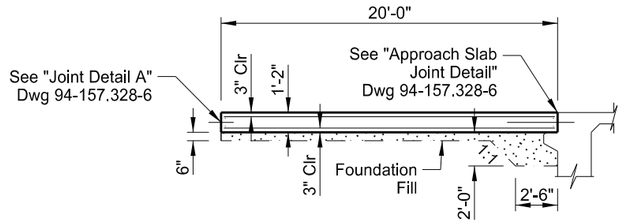
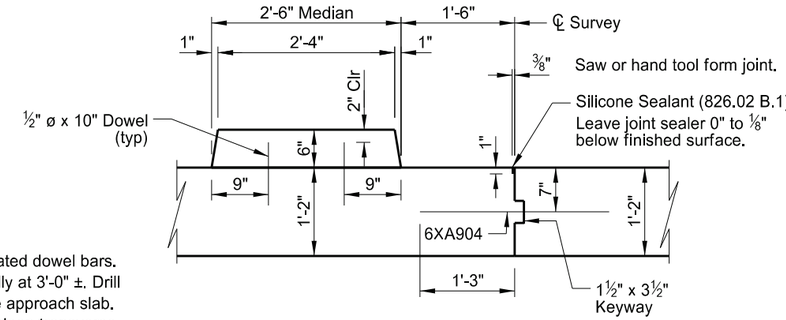
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	4



PLAN



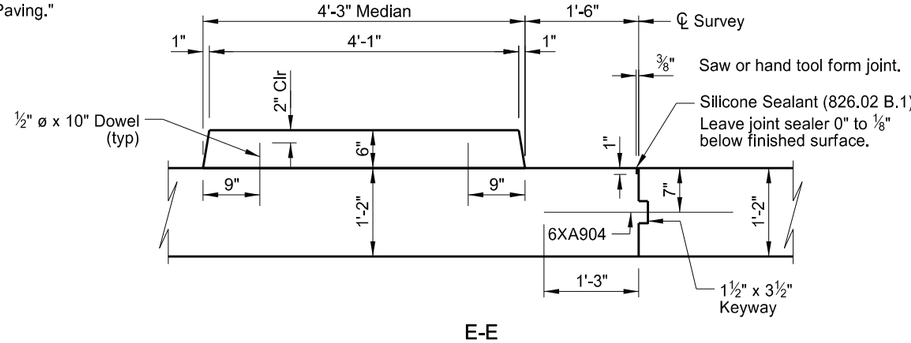
A-A



D-D

NOTE:

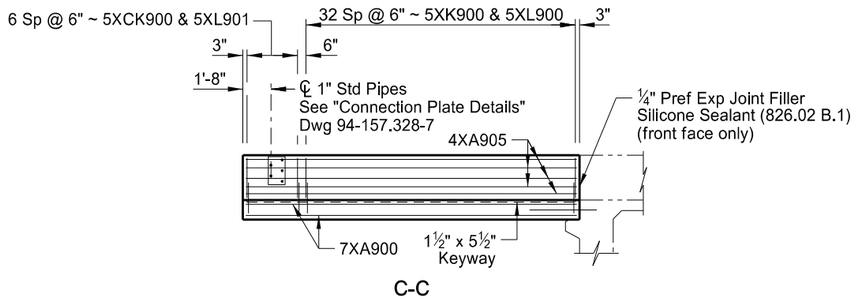
Provide smooth epoxy coated dowel bars. Space dowels longitudinally at 3'-0" ±. Drill and epoxy dowels into the approach slab. Saw or hand tool form 1" deep transverse joints in the median concrete at 10'-0" maximum spacing. Include dowels and joint installation in the pay item "Concrete Median Paving."



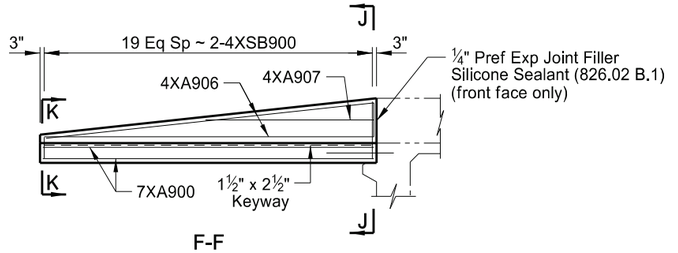
E-E

NOTE:

See Dwg 94-157.328-7 for Sections B-B, J-J, and K-K.



C-C



F-F

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QUANTITIES	
APPROACH SLAB	211.7 SY
CONCRETE MEDIAN PAVING	7.5 SY

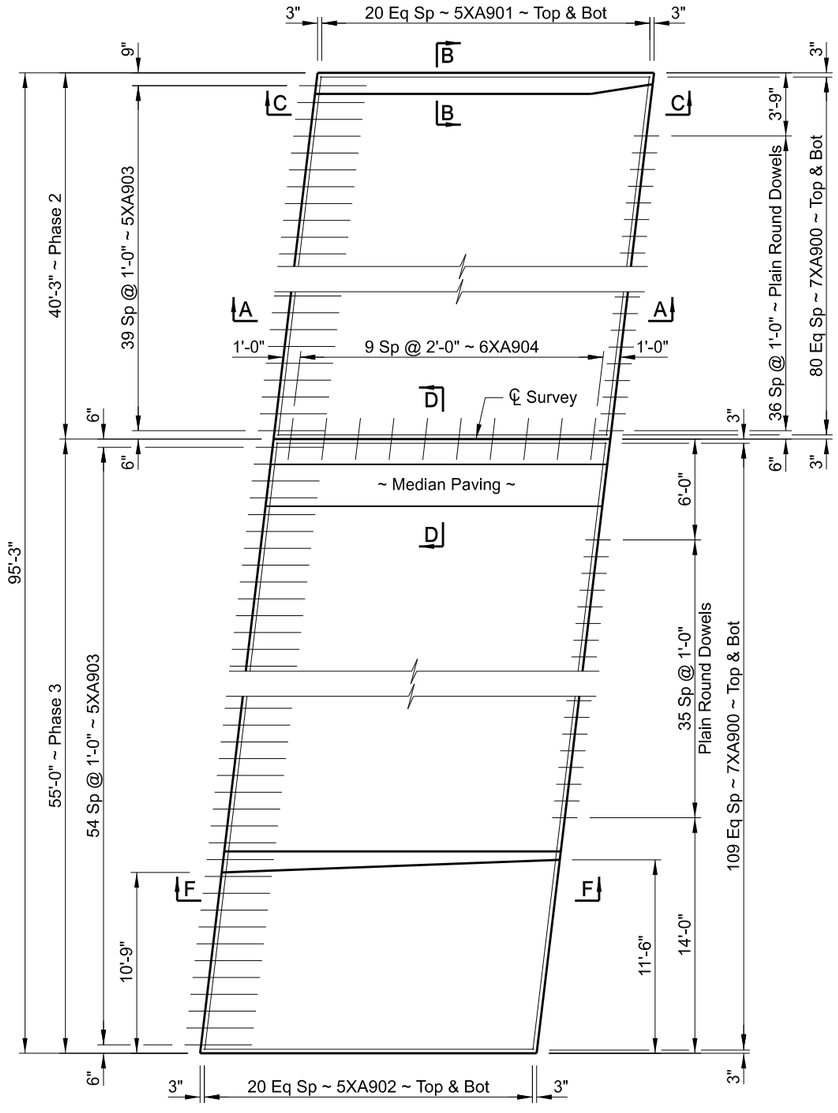
TYLER PARKWAY/
DIVIDE AVENUE INTERCHANGE

(NORTH SLAB)
(AT BEGIN BRIDGE)

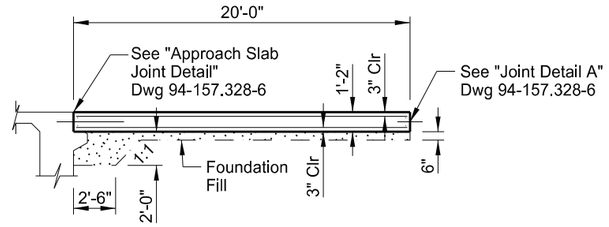
APPROACH SLAB DETAILS

DRAWING NO. 94-157.328-4

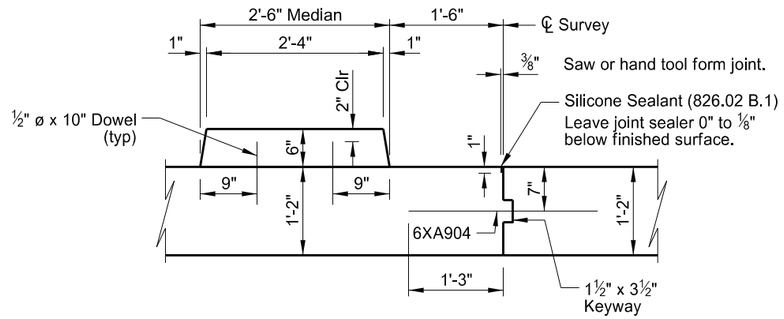
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	5



PLAN



A-A



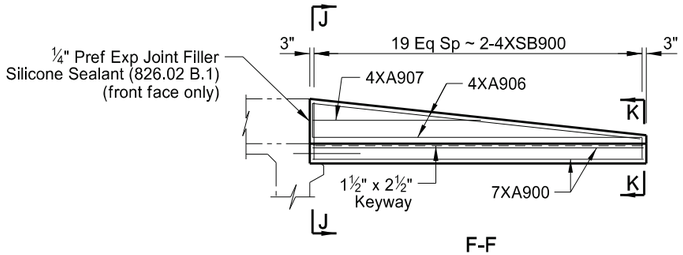
D-D

NOTE:

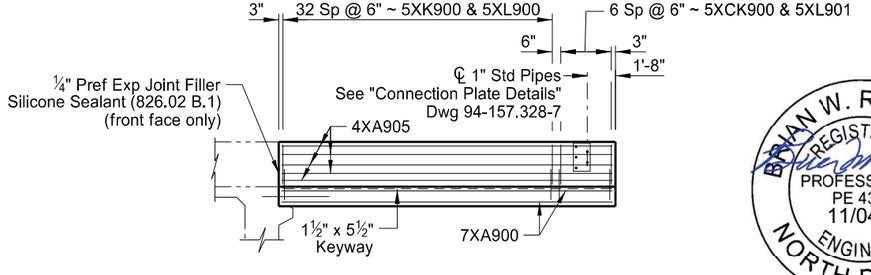
Provide smooth epoxy coated dowel bars. Space dowels longitudinally at 3'-0" ±. Drill and epoxy dowels into the approach slab. Saw or hand tool form 1" deep transverse joints in the median concrete at 10'-0" maximum spacing. Include dowels and joint installation in the pay item "Concrete Median Paving."

NOTE:

See Dwg 94-157.328-6 for Sections B-B, J-J, and K-K.



F-F



C-C

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QUANTITIES	
APPROACH SLAB	211.7 SY
CONCRETE MEDIAN PAVING	5.6 SY

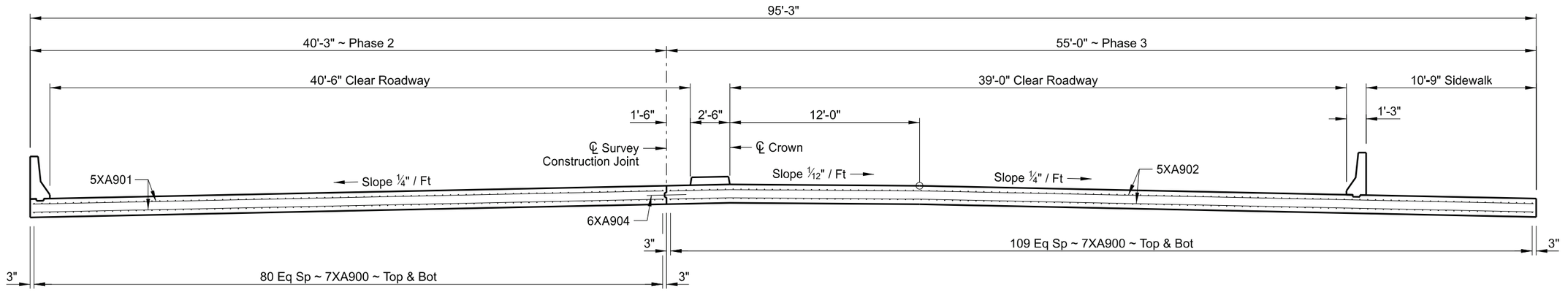
TYLER PARKWAY/
DIVIDE AVENUE INTERCHANGE

(SOUTH SLAB)
(AT END BRIDGE)

APPROACH SLAB DETAILS

DRAWING NO. 94-157.328-5

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	6

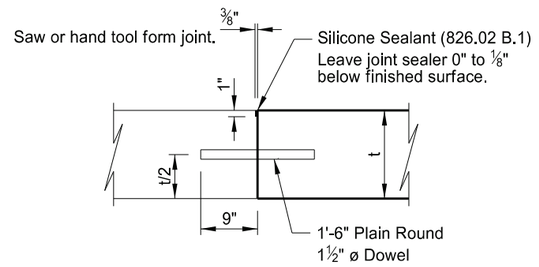


(NORTH AND SOUTH SLABS)

SLAB SECTION

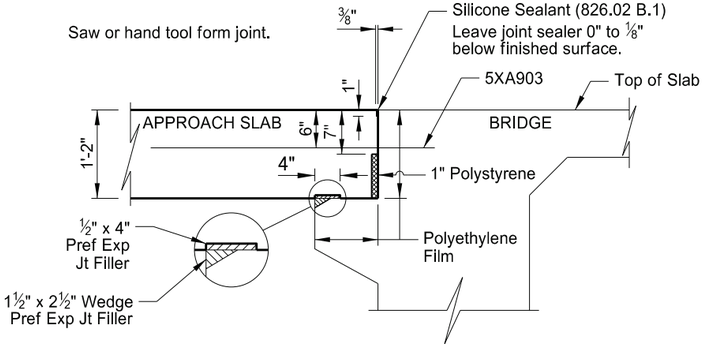
NOTE:

See Dwgs 94-157.328-3 & 4 for location of Sections B-B, J-J, and K-K.



t = Approach Slab Thickness

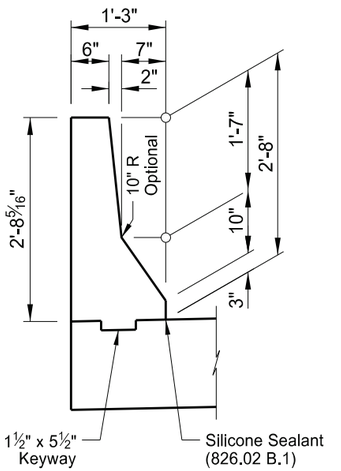
JOINT DETAIL A



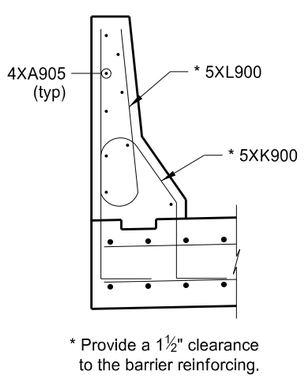
APPROACH SLAB JOINT DETAIL

NOTE:

Install 5XA903 bars according to manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02. Provide a minimum anchorage length of 1 foot.



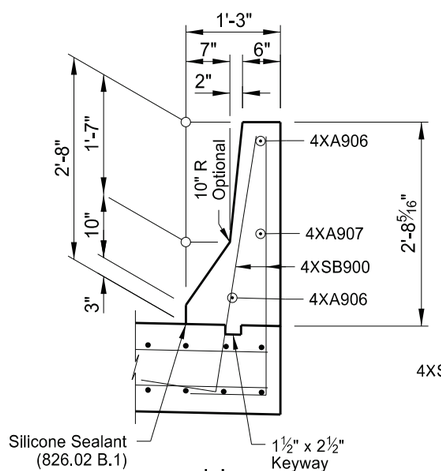
SHOWING DIMENSIONS



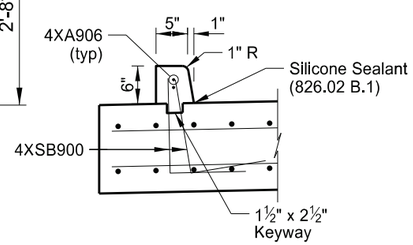
* Provide a 1½" clearance to the barrier reinforcing.

SHOWING REINFORCING

B-B



J-J



K-K

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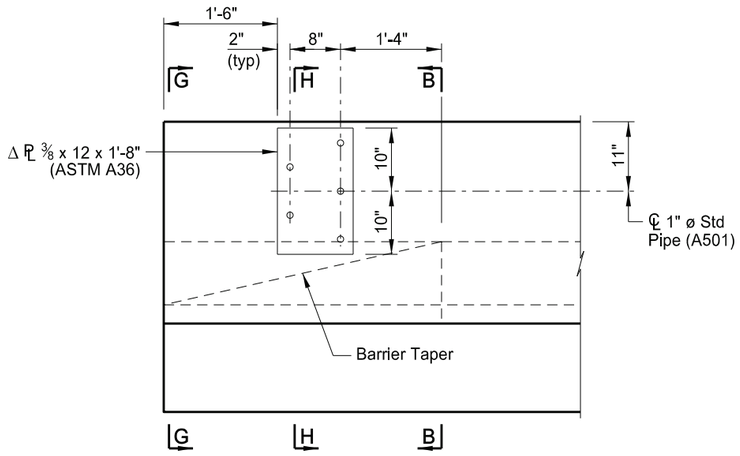
TYLER PARKWAY/
DIVIDE AVENUE INTERCHANGE

APPROACH SLAB DETAILS

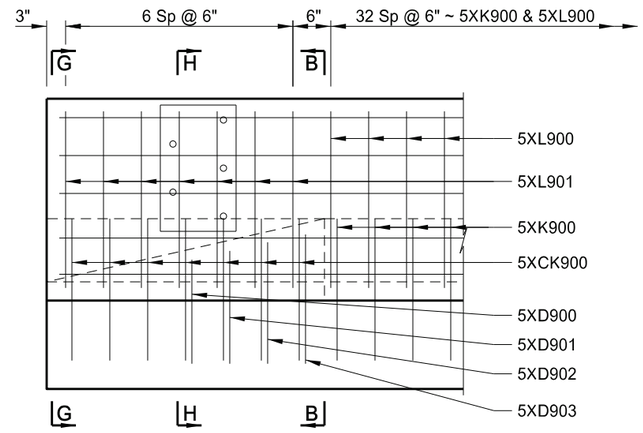
DRAWING NO. 94-157.328-6

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	7



SHOWING DIMENSIONS



SHOWING REINFORCING

(SHOWING BACK FACE & JERSEY BARRIER TRANSITION)

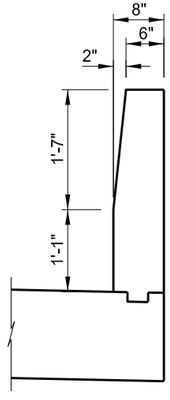
CONNECTION PLATE DETAILS

ESTIMATED MATERIAL QUANTITIES (ONE SLAB)	
CONCRETE	84.7 CY
REINFORCING STEEL	20,646 LBS

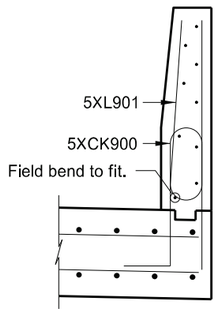
NOTES:

The estimated material quantities shown are for information purposes only.

See Dwg 94-157.328-6 for Section B-B.



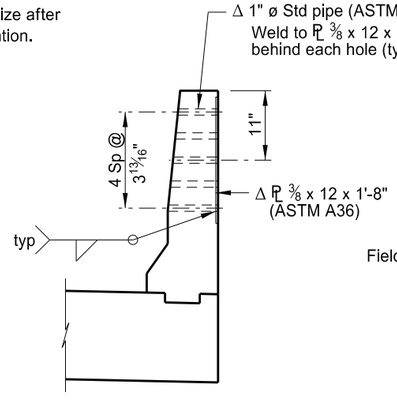
SHOWING DIMENSIONS



SHOWING REINFORCING

G-G

Δ Galvanize after fabrication.



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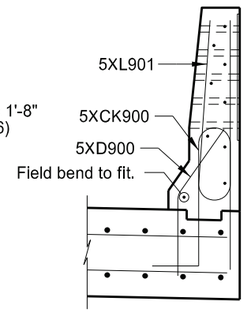


SHOWING REINFORCING

H-H

TYLER PARKWAY/
DIVIDE AVENUE INTERCHANGE

APPROACH SLAB DETAILS

DRAWING NO. 94-157.328-7

BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
ONE APPROACH SLAB	7	XA900	382	19'- 8"		19'- 8"							
	5	XA901	42	40'- 2"		40'- 2"							
	5	XA902	42	55'- 0"		55'- 0"							
	5	XA903	95	4'- 0"		* 4'- 0"							
	6	XA904	10	2'- 6"		2'- 6"							
	4	XA905	9	19'- 8"		19'- 8"							
	4	XA906	2	19'- 7"		19'- 7"							
	4	XA907	1	10'- 0"		10'- 0"							
	5	XD900	1	2'- 0"		1'- 0"	1'- 0"					8.5	12
	5	XD901	1	2'- 2"		1'- 0"	1'- 2"					8.5	12
	5	XD902	1	2'- 4"		1'- 0"	1'- 4"					8.5	12
	5	XD903	1	2'- 6"		1'- 0"	1'- 6"					8.5	12
	5	XK900	33	5'- 7"	1'- 8"	8"	11"	1'- 0"	1'- 0"	2.5"	8"	8.5	12
	5	XL900	33	5'- 1"	3"	2'- 2"	9"	2'- 2"		2.25"		1.25	12
	5	XL901	7	5'- 0"	3"	2'- 2"	8"	2'- 2"		1.875"		1	12
	5	XCK900	7	4'- 8"		1'- 8"	8"	1'- 8"	8"	1.875"			
	4	XSB900	2	66'- 8"	1'- 0"	1'- 3"	1'- 0"	3'- 5"	19				

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	8

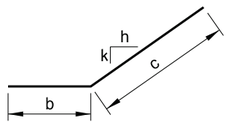
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

NOTES:

1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum of total of the detailing dimensions for that bar, unless otherwise noted.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designates an epoxy coated bar.
6. Include the approach slab bar list quantity in the approach slab pay item.

* Length may vary depending on manufacturer's recommendations for anchorage. Length based on 1 foot minimum anchorage length.

A



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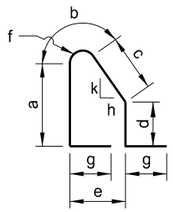

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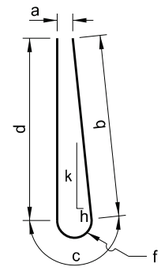

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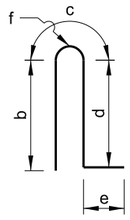

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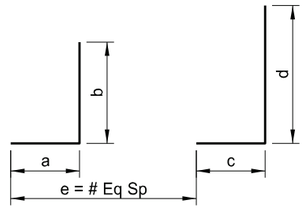

SB

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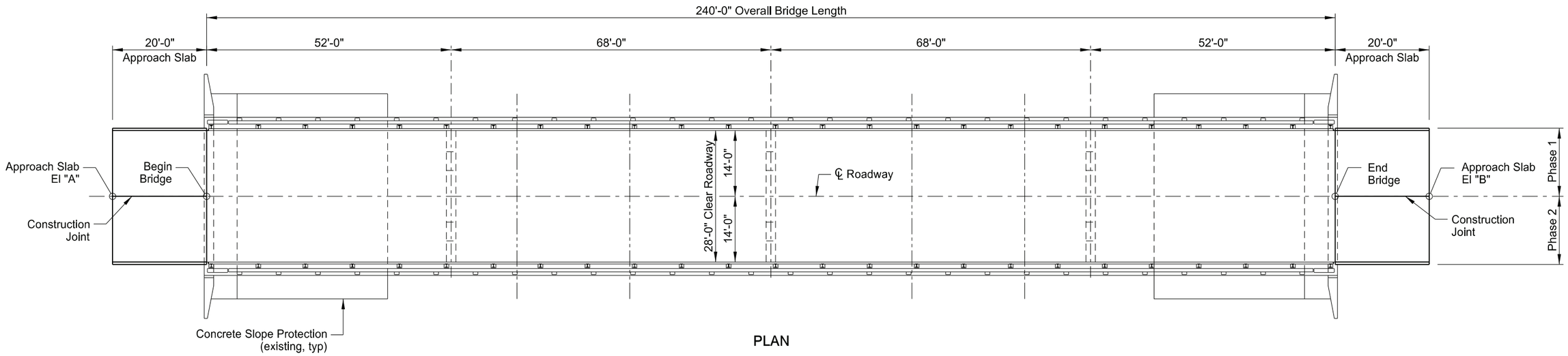
TYLER PARKWAY/
DIVIDE AVENUE INTERCHANGE

REINFORCING BAR LIST & DETAILS

DRAWING NO. 94-157.328-8

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	9



PLAN

NOTE:

Field verify approach slab elevations prior to removal. Adjust approach slab elevations as necessary to match approach roadway elevations and to provide drainage.

APPROACH SLAB ELEVATIONS	
El "A"	0.29' lower than Begin Bridge
El "B"	0.29' lower than End Bridge

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1135	BRIDGE APPROACH SLAB-REMOVE & REPLACE	SY	128.8
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,276
650	0704	OVERLAY CONCRETE	CY	41
650	0707	DECK CONCRETE	CY	25
650	0720	CLASS 1 REMOVAL	SY	747
650	0721	CLASS 2 REMOVAL	SY	149
650	0722	CLASS 2-A REMOVAL	LF	269
650	0723	CLASS 3 REMOVAL	SY	75
650	0724	CLASS 4 REMOVAL	SY	22
930	9612	SPALL REPAIR	SF	14
930	9639	APPROACH SLAB LIP REPAIR	LF	67.3
930	9694	GIRDER PATCHING	L SUM	1

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SPECIAL PROVISIONS	
SP 348(24)	CONCRETE SPALL REPAIR

I-94/MENOKEN INTERCHANGE

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
10/20/25

DRAWING NO. 94-170.519-1

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NOTES

100 SCOPE OF WORK: Work at this site consists of placing a deck overlay, removing and replacing approach slabs, repairing approach slab lips, repairing concrete spall areas on the bridge deck overhang and abutment wingwall, applying penetrating water repellent treatment to the curb, post, and rail, and repairing/patching damaged prestressed concrete beams.

105 CONTROL OF WORK: Spall repair and girder patching work requiring lane closures on eastbound I-94 must be completed prior to head-to-head interstate traffic control is set up from other construction project. See "100-PO1 Coordination of Projects" note on Section 6 Sheet 1.

602 BRIDGE APPROACH SLAB–REMOVE & REPLACE: Remove the existing approach slabs. Excavate the existing subgrade material beneath the approach slabs to the lower limits of foundation fill shown in the plans. Place and compact foundation fill beneath the approach slabs in accordance with Section 210.

Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use a curing period of at least five days. Use Grade 60 reinforcing steel that meets the requirements of Section 612. Provide polystyrene meeting AASHTO M230, preformed joint filler meeting Section 826.02 C or 826.02 F, and polyethylene film that meets ASTM C171.

Include all labor, equipment, and material described above, as well as furnishing and installing silicone sealant in the bid item “Bridge Approach Slab–Remove & Replace.”

602 WATER-WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D., a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: In addition to the top of the deck and new approach slab surfaces, apply the penetrating water repellent solution to the curb, post, and rail. Apply penetrating water repellent solution prior to sealing any bridge deck and approach slab cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling.

The Engineer will measure overlay concrete based on Section 650.05 B.2. “Yield Box Method.”

Protect traffic below from falling material in any Class 4 removal areas.

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer’s recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all work and materials associated with the bridge deck crack sealing in the bid item “Overlay Concrete.” Include all work and materials associated with the approach slab crack sealing in the bid item “Bridge Approach Slab-Remove & Replace.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field.

LOCATION	PHOTO	QUANTITY (SF)
DECK OVERHANG	#3	7
ABUTMENT WINGWALL	#4	7

930 GIRDER PATCHING (Beams 1, 2, & 4): Repair girders according to SP 348(24) “Concrete Spall Repair.” See supplemental bid information for photos of beam concrete spalling.

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23 U.S.C. § 407 Documents
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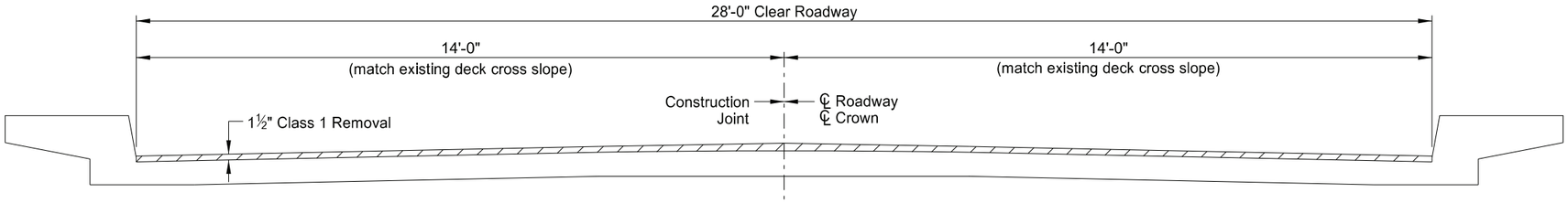
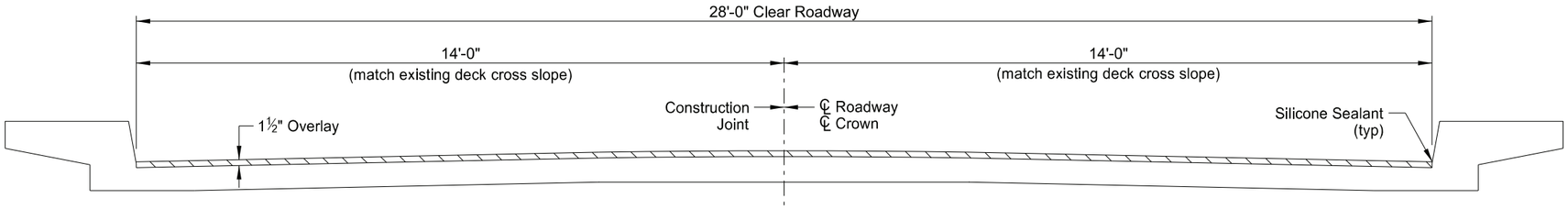
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	11



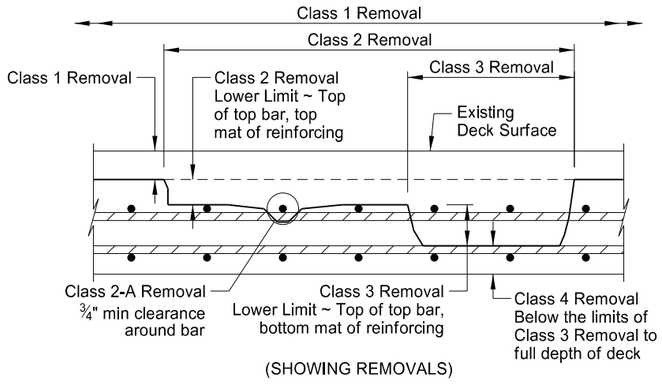
(SHOWING REMOVAL)

TYPICAL DECK SECTION



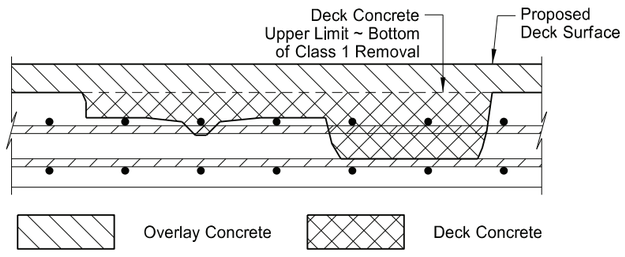
(SHOWING OVERLAY)

TYPICAL DECK SECTION



(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

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QUANTITIES	
OVERLAY CONCRETE	41 CY
DECK CONCRETE	25 CY
CLASS 1 REMOVAL	747 SY
CLASS 2 REMOVAL	149 SY
CLASS 2-A REMOVAL	269 LF
CLASS 3 REMOVAL	75 SY
CLASS 4 REMOVAL	22 SY

I-94/MENOKEN INTERCHANGE

DECK OVERLAY DETAILS

DRAWING NO. 94-170.519-3

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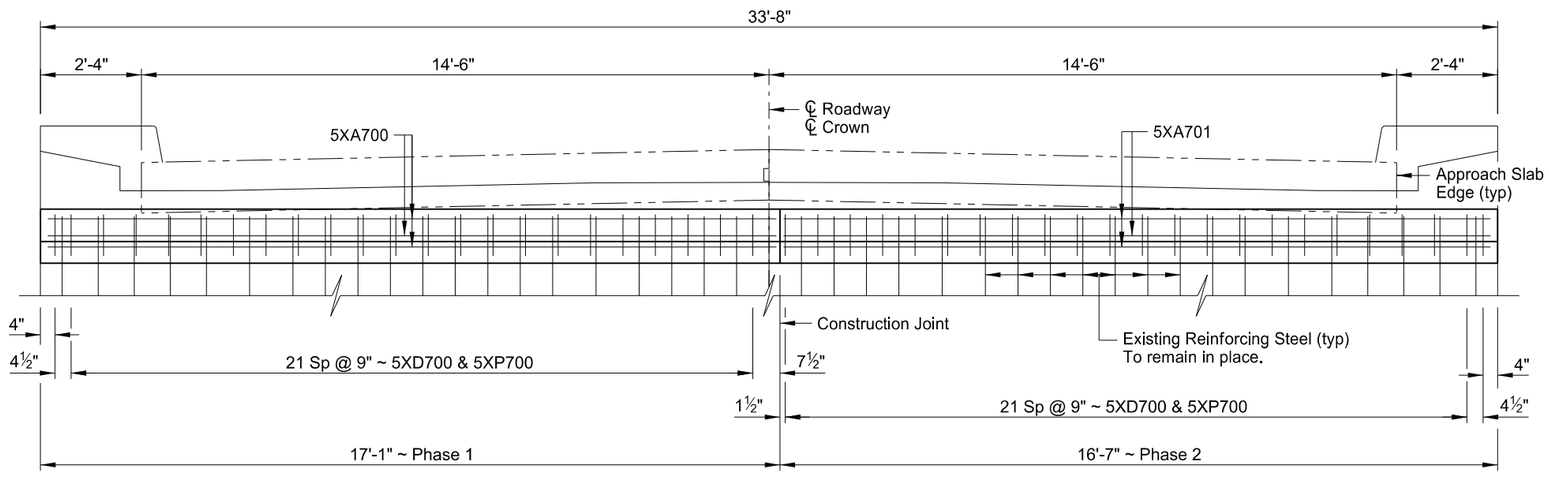
EAJ BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	12



ELEVATION

Hatched area indicates concrete removal.

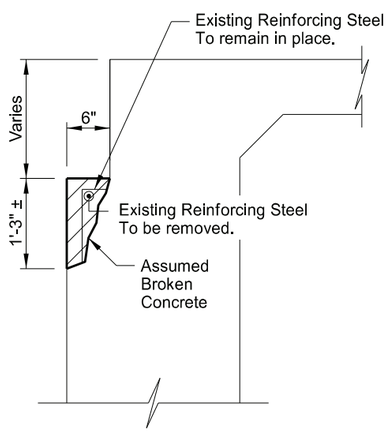
NOTES:

The estimated material quantities shown are for information purposes only. Include all concrete, reinforcing steel, excavation, labor, and equipment required to repair the approach slab ledges in the bid item "Approach Slab Lip Repair."

Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use a curing period of at least five days. Use Grade 60 reinforcing steel that meets the requirements of Section 612.

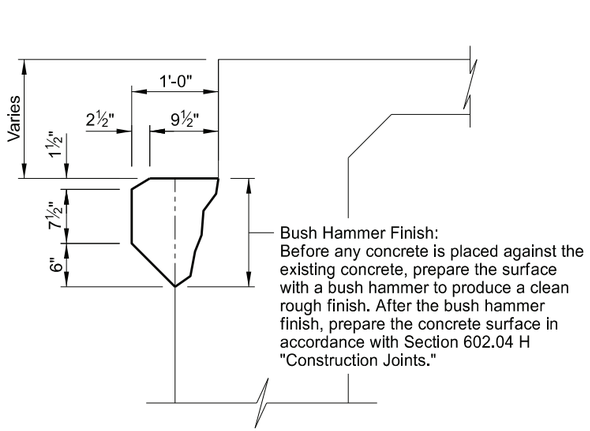
Install the 5XD700 and 5XP700 bars according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02. Provide a minimum anchorage length of 9 inches.

ESTIMATED MATERIAL QUANTITIES (ONE APPROACH LIP)	
CONCRETE	1.0 CY
REINFORCING STEEL	308 LBS



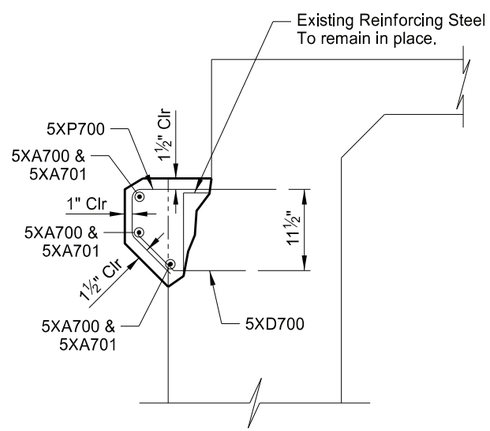
(SHOWING CONCRETE REMOVAL)

EXISTING APPROACH SLAB LEDGE



(SHOWING DIMENSIONS)

NEW APPROACH SLAB LIP



(SHOWING REINFORCING)

NEW APPROACH SLAB LIP

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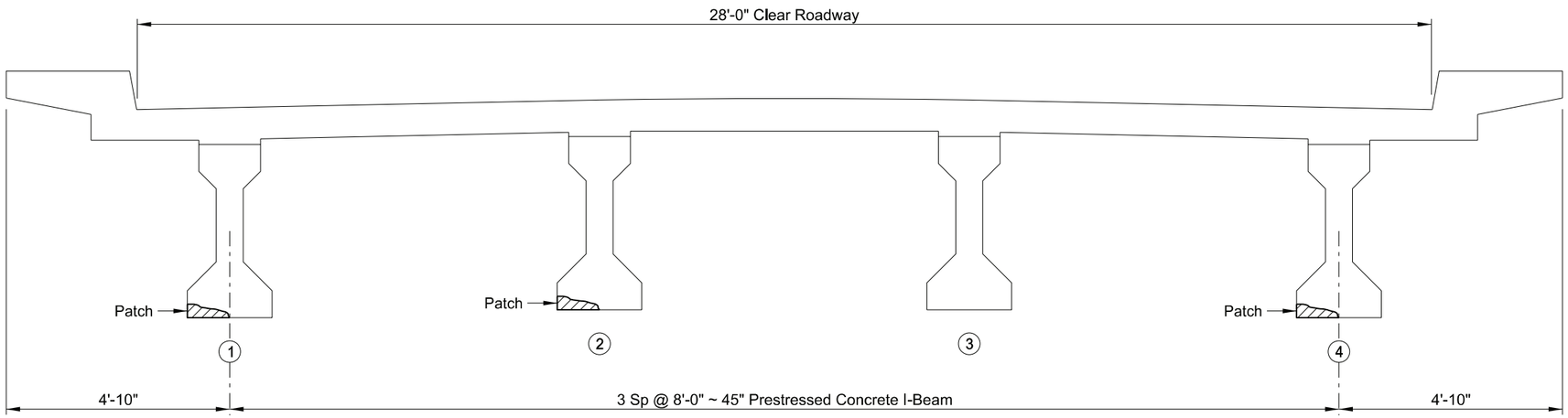
I-94/MENOKEN INTERCHANGE

APPROACH SLAB LIP REPAIR

DRAWING NO. 94-170.519-4

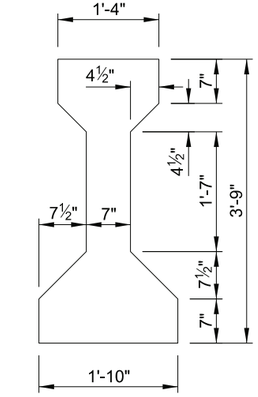
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	13



Indicates beam concrete repair areas.

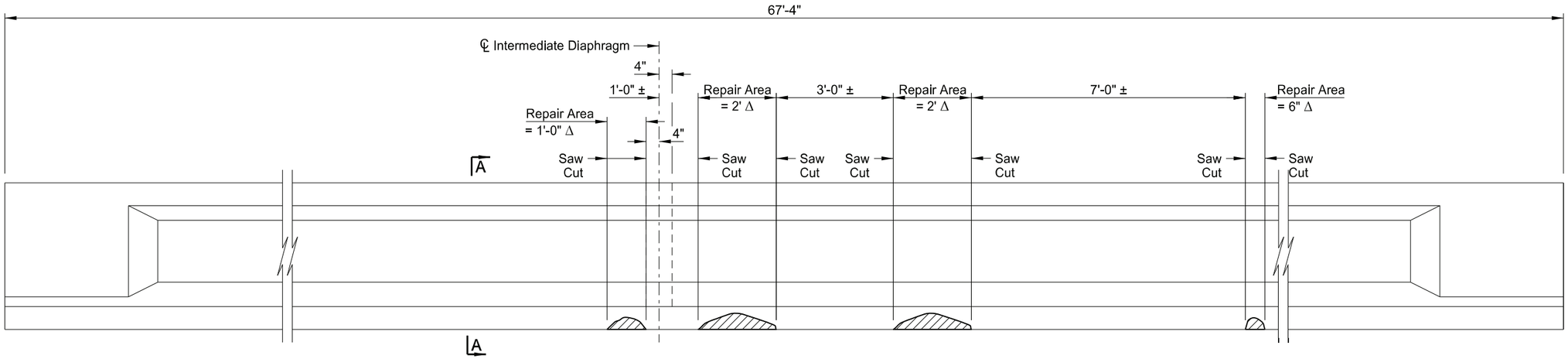
(SPAN OVER WESTBOUND I-94 ~ FACING SOUTH)

TYPICAL SECTION



(SHOWING DIMENSIONS)

A-A



Δ Actual limits to be repaired to be determined by the Engineer in the field.

(SHOWING OUTSIDE FACE ~ FACING WEST)

BEAM 1 ELEVATION ~ SPAN OVER WESTBOUND I-94

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I-94/MENOKEN INTERCHANGE

PRESTRESSED CONCRETE BEAM REPAIR DETAILS

DRAWING NO.	94-170.519-5

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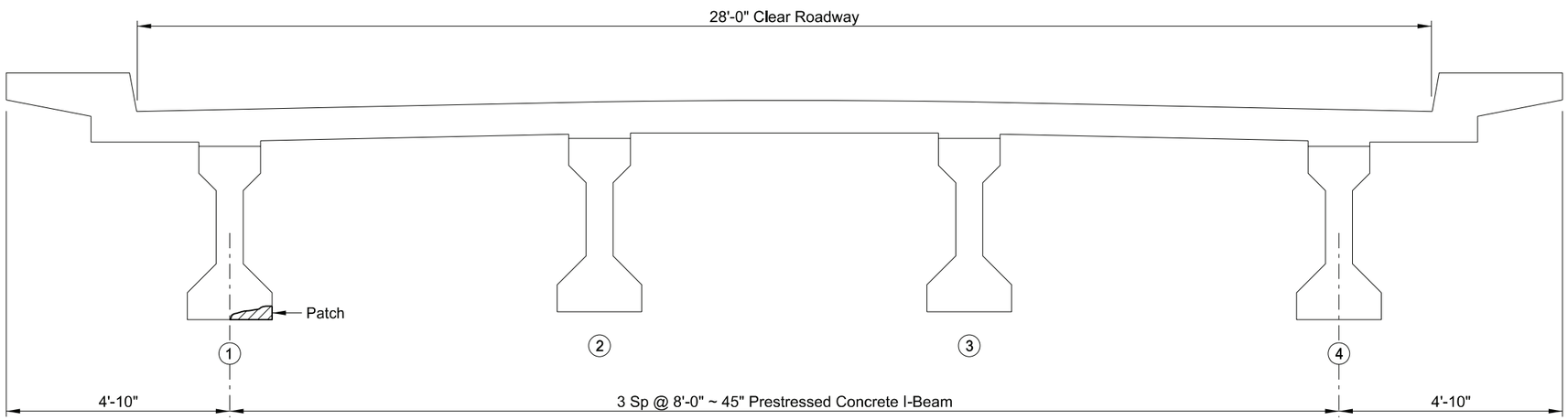
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

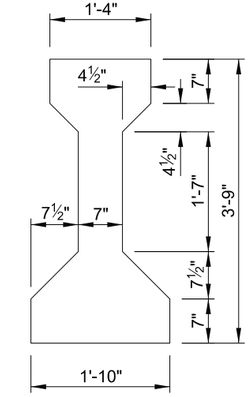
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	14



Indicates beam concrete repair areas.

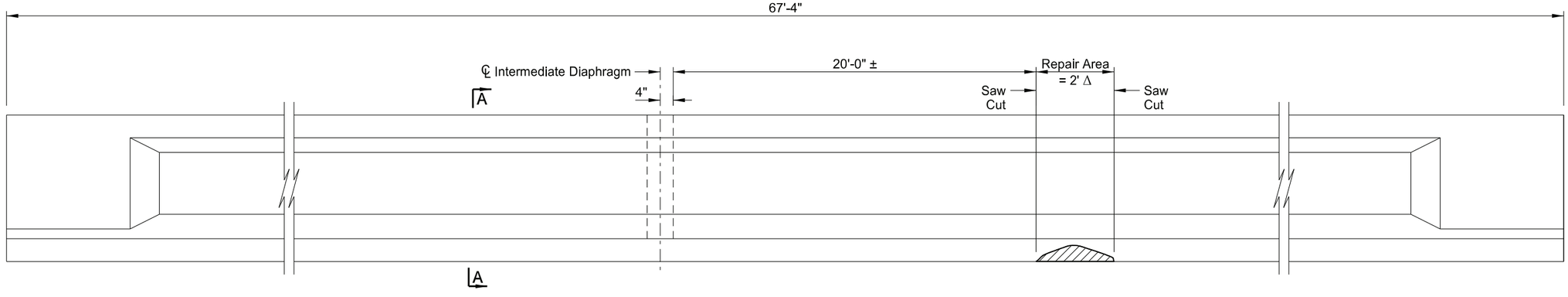
(SPAN OVER EASTBOUND I-94 ~ FACING SOUTH)

TYPICAL SECTION



(SHOWING DIMENSIONS)

A-A



Δ Actual limits to be repaired to be determined by the Engineer in the field.

(SHOWING INSIDE FACE ~ FACING WEST)

BEAM 1 ELEVATION ~ SPAN OVER EASTBOUND I-94

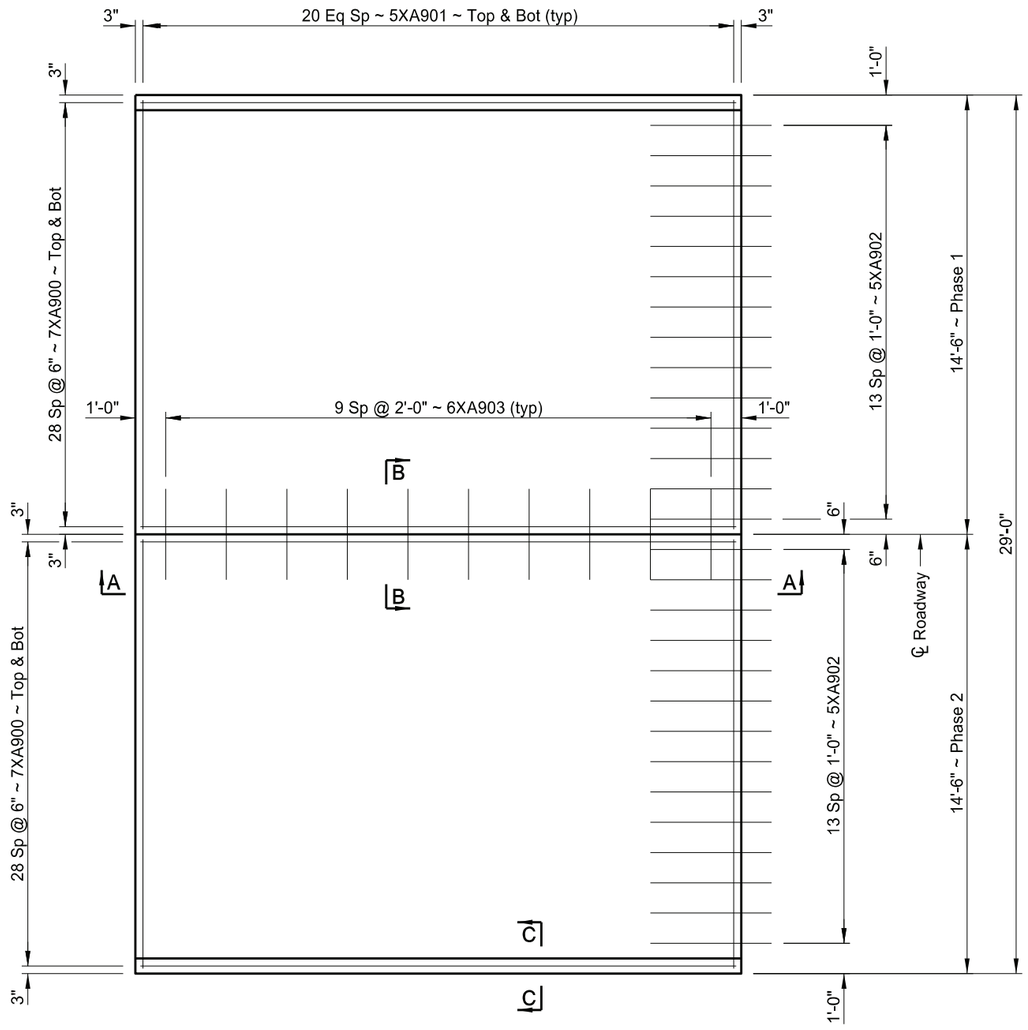
BRIAN W. RASCHKE REGISTERED PROFESSIONAL PE 4361 10/20/25 ENGINEER NORTH DAKOTA

I-94/MENOKEN INTERCHANGE

PRESTRESSED CONCRETE BEAM REPAIR DETAILS

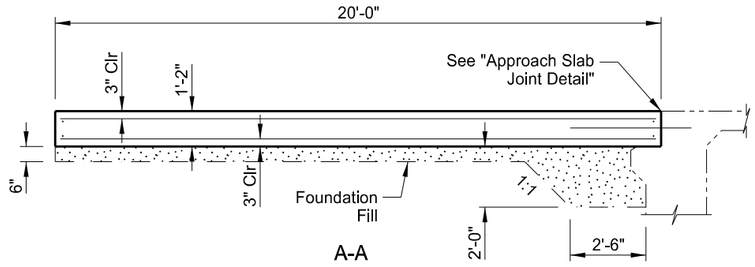
DRAWING NO.	94-170.519-6

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	15

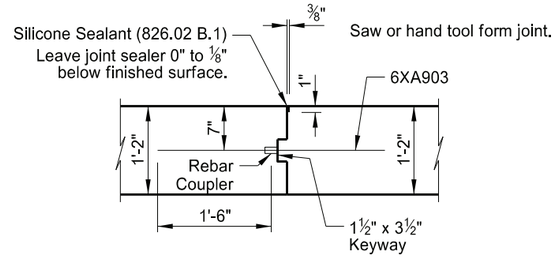


PLAN

ELEVATION



A-A



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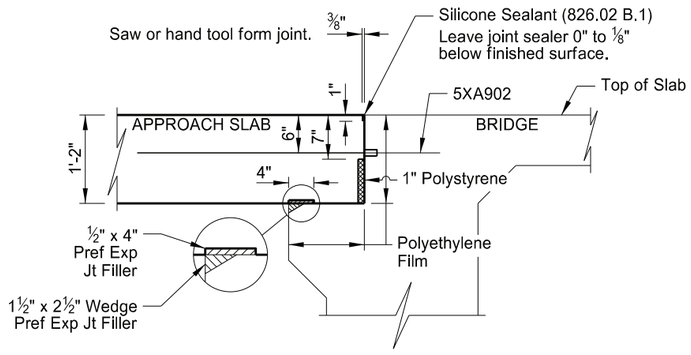

APPROACH SLAB JOINT DETAIL

NOTE:

Install 5XA902 bars according to manufacturer's recommendations with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02. Provide a minimum anchorage length of 1 foot.

NOTE:

See Dwg 94-170.519-8 for Section C-C.

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QUANTITIES

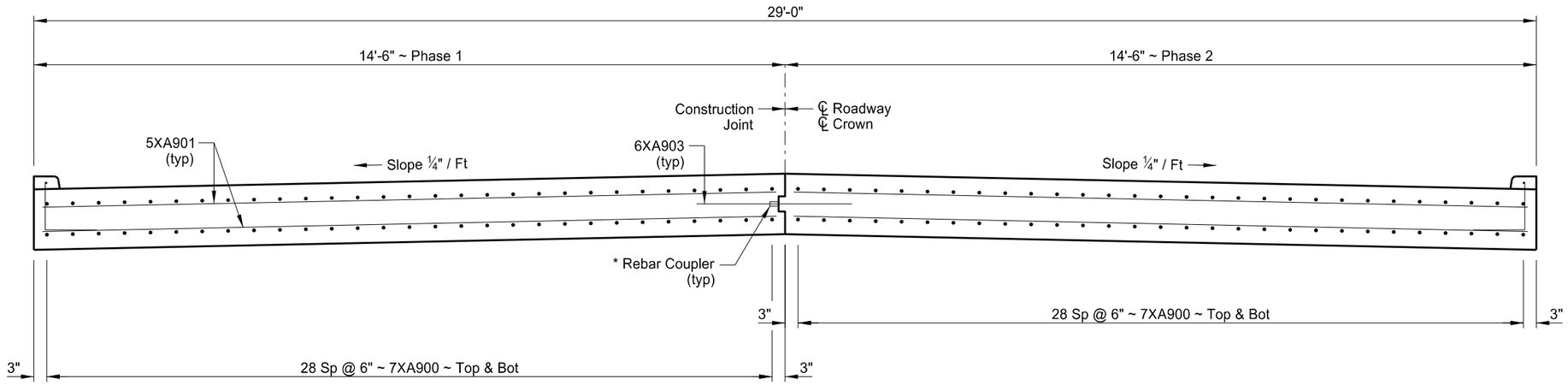
SEE DWG 94-170.519-8

I-94/MENOKEN INTERCHANGE

APPROACH SLAB DETAILS

DRAWING NO.	94-170.519-7

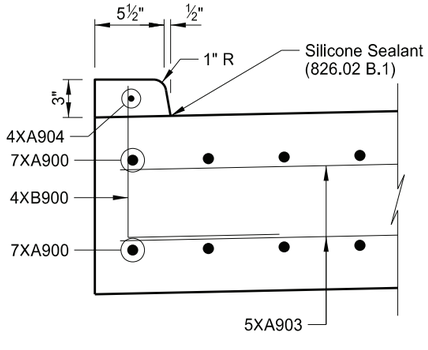
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	16



(NORTH AND SOUTH SLABS)

SLAB SECTION

* Use mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.



C-C

ESTIMATED MATERIAL QUANTITIES (ONE SLAB)	
CONCRETE	25.2 CY
REINFORCING STEEL	6,143 LBS

NOTES:

The estimated material quantities shown are for information purposes only.

See Dwg 94-170.519-7 for location of Section C-C.

BRIAN W. RASCHKE REGISTERED PROFESSIONAL PE 4361 10/20/25 ENGINEER NORTH DAKOTA

QUANTITIES	(ONE SLAB)
APPROACH SLAB	64.4 SY

I-94/MENOKEN INTERCHANGE

APPROACH SLAB DETAILS

DRAWING NO. 94-170.519-8

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	17

BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
ONE APPROACH LIP	5	XA700	3	16'- 10"		16'- 10"							
	5	XA701	3	16'- 4"		16'- 4"							
	5	XD700	46	1'- 7"		** 11"	8"					12	12
	5	XP700	46	2'- 8"	6"	** 1'- 8"	6"			1.25"		12	12

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
ONE APPROACH SLAB	7	XA900	116	19'- 8"		19'- 8"							
	5	XA901	84	14'- 2"		14'- 2"							
	5	XA902	28	4'- 0"		* 4'- 0"							
	6	XA903	20	1'- 6"		1'- 6"							
	4	XA904	2	19'- 8"		19'- 8"							
	4	XB900	38	2'- 0"		1'- 0"	1'- 0"						

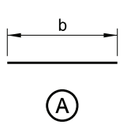
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

NOTES:

1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum of total of the detailing dimensions for that bar, unless otherwise noted.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designates an epoxy coated bar.
6. Include the approach lip and approach slab bar list quantity in the approach lip and approach slab pay items.

* Length may vary depending on manufacturer's recommendations for anchorage. Length based on 1 foot minimum anchorage length.

** Length may vary depending on manufacturer's recommendations for anchorage. Length based on 9 inch minimum anchorage length.



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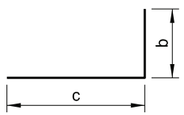

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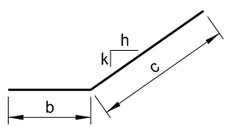

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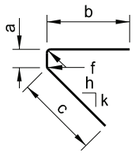

Ⓟ

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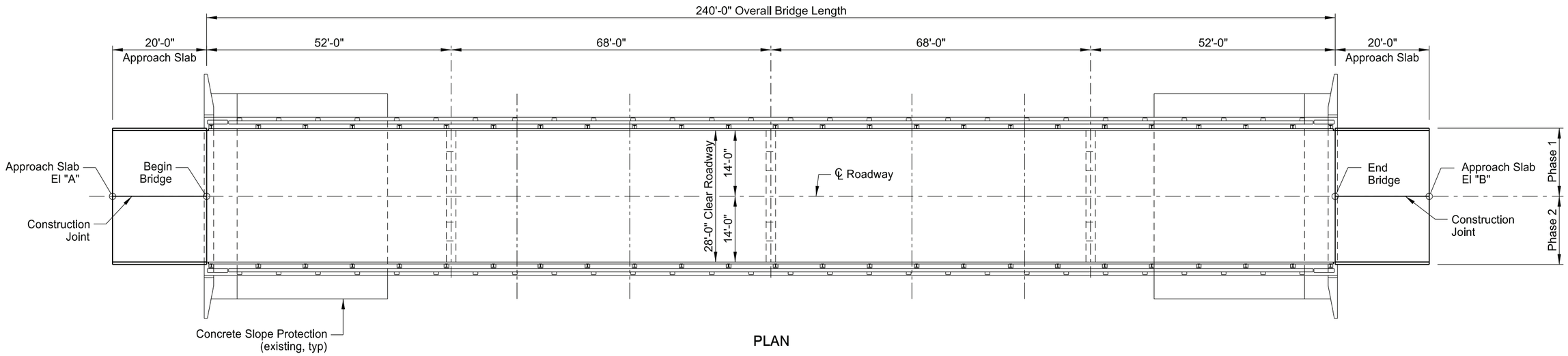
I-94/MENOKEN INTERCHANGE

REINFORCING BAR LIST & DETAILS

DRAWING NO.	94-170.519-9

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	18



PLAN

NOTE:

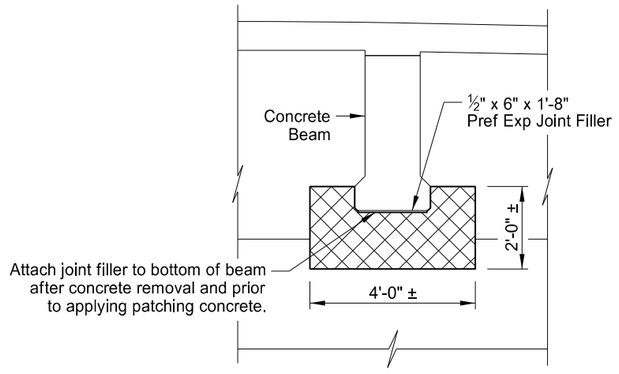
Field verify approach slab elevations prior to removal. Adjust approach slab elevations as necessary to match approach roadway elevations and to provide drainage.

APPROACH SLAB ELEVATIONS	
El "A"	0.29' lower than Begin Bridge
El "B"	0.29' lower than End Bridge

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1135	BRIDGE APPROACH SLAB-REMOVE & REPLACE	SY	128.8
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,276
650	0704	OVERLAY CONCRETE	CY	41
650	0707	DECK CONCRETE	CY	25
650	0720	CLASS 1 REMOVAL	SY	747
650	0721	CLASS 2 REMOVAL	SY	149
650	0722	CLASS 2-A REMOVAL	LF	269
650	0723	CLASS 3 REMOVAL	SY	75
650	0724	CLASS 4 REMOVAL	SY	22
930	9612	SPALL REPAIR	SF	21
930	9639	APPROACH SLAB LIP REPAIR	LF	67.3

Hatched area indicates typical concrete spall repair area.



PARTIAL ABUTMENT ELEVATION

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SPECIAL PROVISIONS	
SP 348(24)	CONCRETE SPALL REPAIR

I-94/McKENZIE INTERCHANGE

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
10/20/25

DRAWING NO.	94-176.501-1

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EAJ BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	19

NOTES

100 SCOPE OF WORK: Work at this site consists of placing a deck overlay, removing and replacing approach slabs, repairing concrete spall areas on the abutments, and applying penetrating water repellent treatment to the curb, post, and rail.

602 BRIDGE APPROACH SLAB–REMOVE & REPLACE: Remove the existing approach slabs. Excavate the existing subgrade material beneath the approach slabs to the lower limits of foundation fill shown in the plans. Place and compact foundation fill beneath the approach slabs in accordance with Section 210.

Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use a curing period of at least five days. Use Grade 60 reinforcing steel that meets the requirements of Section 612. Provide polystyrene meeting AASHTO M230, preformed joint filler meeting Section 826.02 C or 826.02 F, and polyethylene film that meets ASTM C171.

Include all labor, equipment, and material described above, as well as furnishing and installing silicone sealant in the bid item “Bridge Approach Slab–Remove & Replace.”

602 WATER-WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D., a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: In addition to the top of the deck and new approach slab surfaces, apply the penetrating water repellent solution to the curb, post, and rail. Apply penetrating water repellent solution prior to sealing any bridge deck and approach slab cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling.

The Engineer will measure overlay concrete based on Section 650.05 B.2. “Yield Box Method.”

Protect traffic below from falling material in any Class 4 removal areas.

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer’s recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all work and materials associated with the bridge deck crack sealing in the bid item “Overlay Concrete.” Include all work and materials associated with the approach slab crack sealing in the bid item “Bridge Approach Slab-Remove & Replace.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field.

LOCATION	PHOTO	QUANTITY (SF)
ABUTMENT BACKWALL	#5	10
ABUTMENT ENDWALL	#6	11

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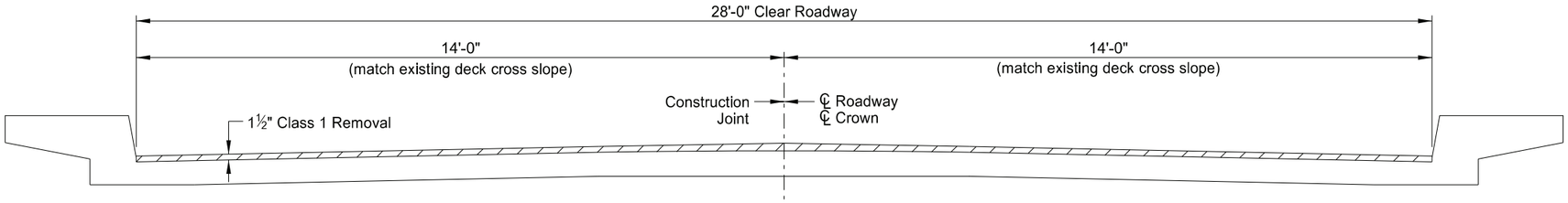
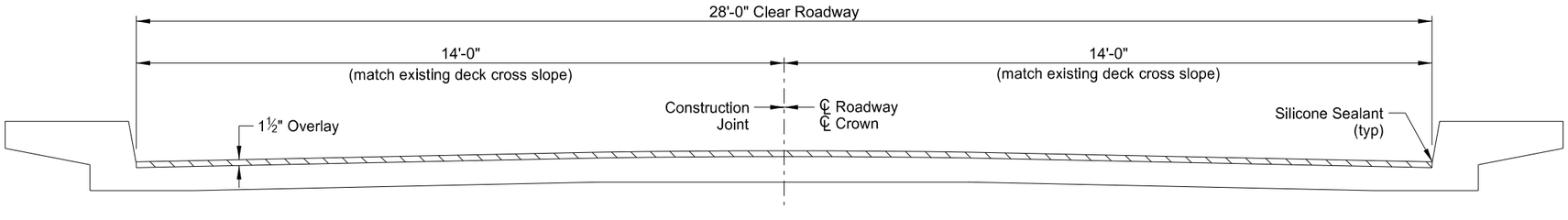
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	20



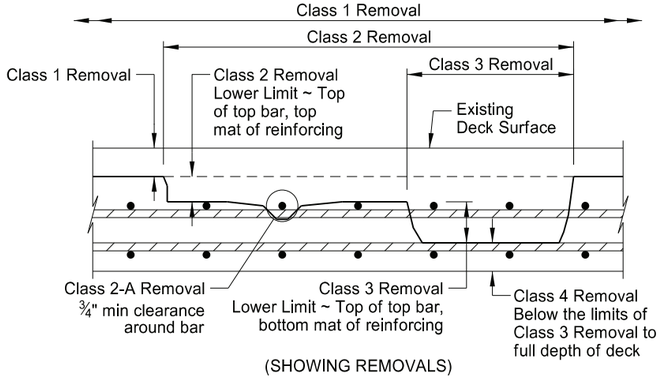
(SHOWING REMOVAL)

TYPICAL DECK SECTION



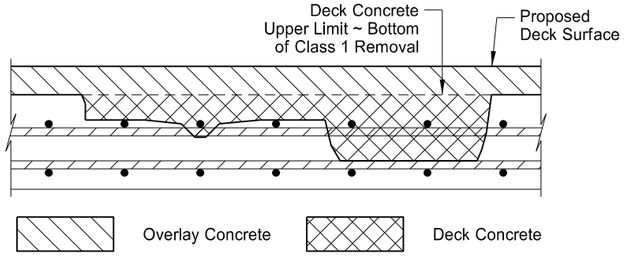
(SHOWING OVERLAY)

TYPICAL DECK SECTION



(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

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10/20/25
ENGINEER
NORTH DAKOTA

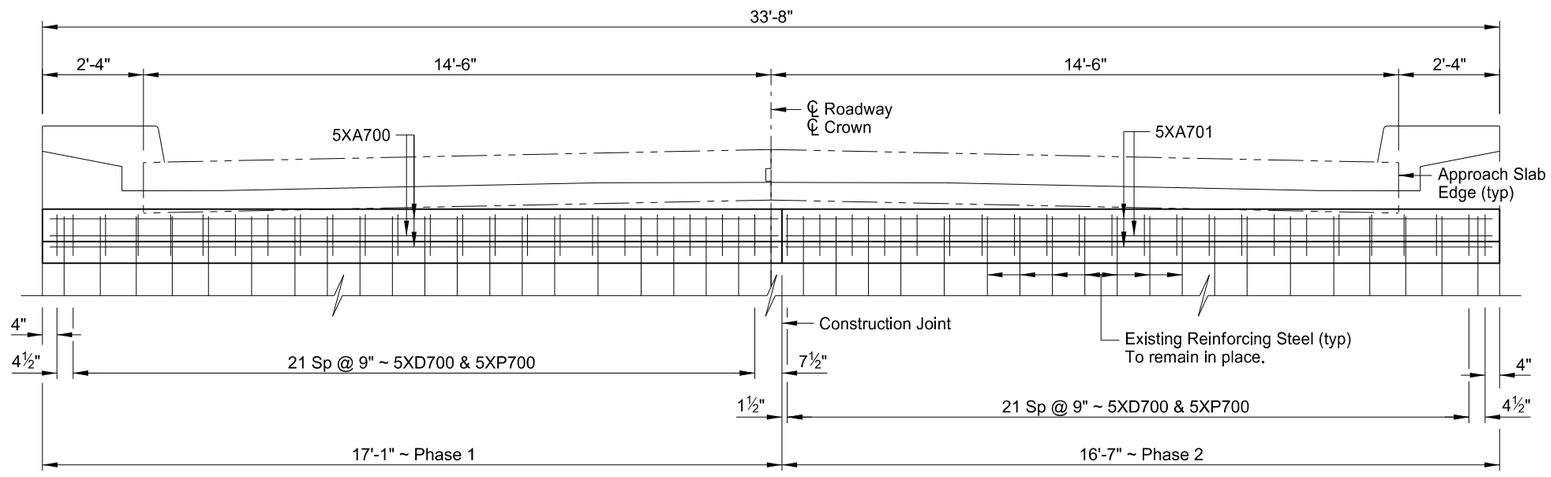
QUANTITIES	
OVERLAY CONCRETE	41 CY
DECK CONCRETE	25 CY
CLASS 1 REMOVAL	747 SY
CLASS 2 REMOVAL	149 SY
CLASS 2-A REMOVAL	269 LF
CLASS 3 REMOVAL	75 SY
CLASS 4 REMOVAL	22 SY

I-94/McKENZIE INTERCHANGE

DECK OVERLAY DETAILS

DRAWING NO. 94-176.501-3

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	21



ELEVATION

Hatched area indicates concrete removal.

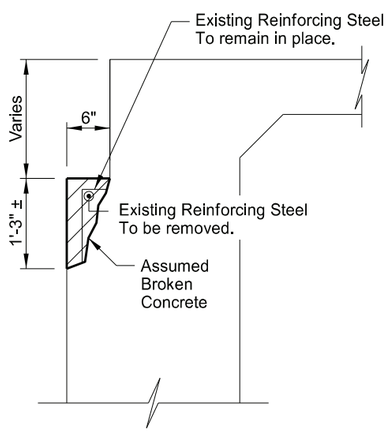
NOTES:

The estimated material quantities shown are for information purposes only. Include all concrete, reinforcing steel, excavation, labor, and equipment required to repair the approach slab ledges in the bid item "Approach Slab Lip Repair."

Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use a curing period of at least five days. Use Grade 60 reinforcing steel that meets the requirements of Section 612.

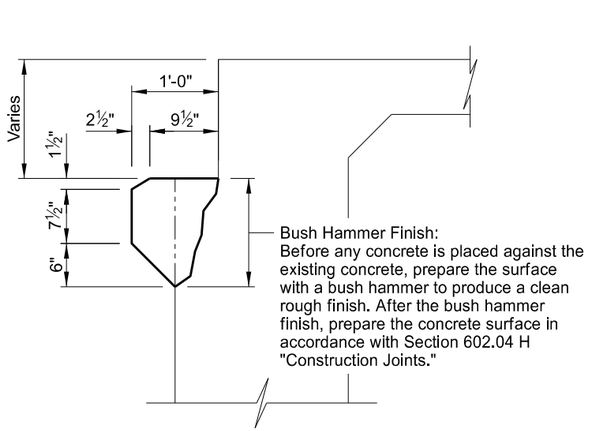
Install the 5XD700 and 5XP700 bars according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02. Provide a minimum anchorage length of 9 inches.

ESTIMATED MATERIAL QUANTITIES (ONE APPROACH LIP)	
CONCRETE	1.0 CY
REINFORCING STEEL	308 LBS



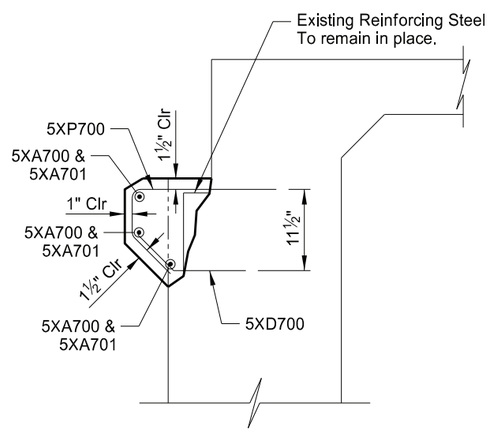
(SHOWING CONCRETE REMOVAL)

EXISTING APPROACH SLAB LEDGE



(SHOWING DIMENSIONS)

NEW APPROACH SLAB LIP



(SHOWING REINFORCING)

NEW APPROACH SLAB LIP

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10/20/25
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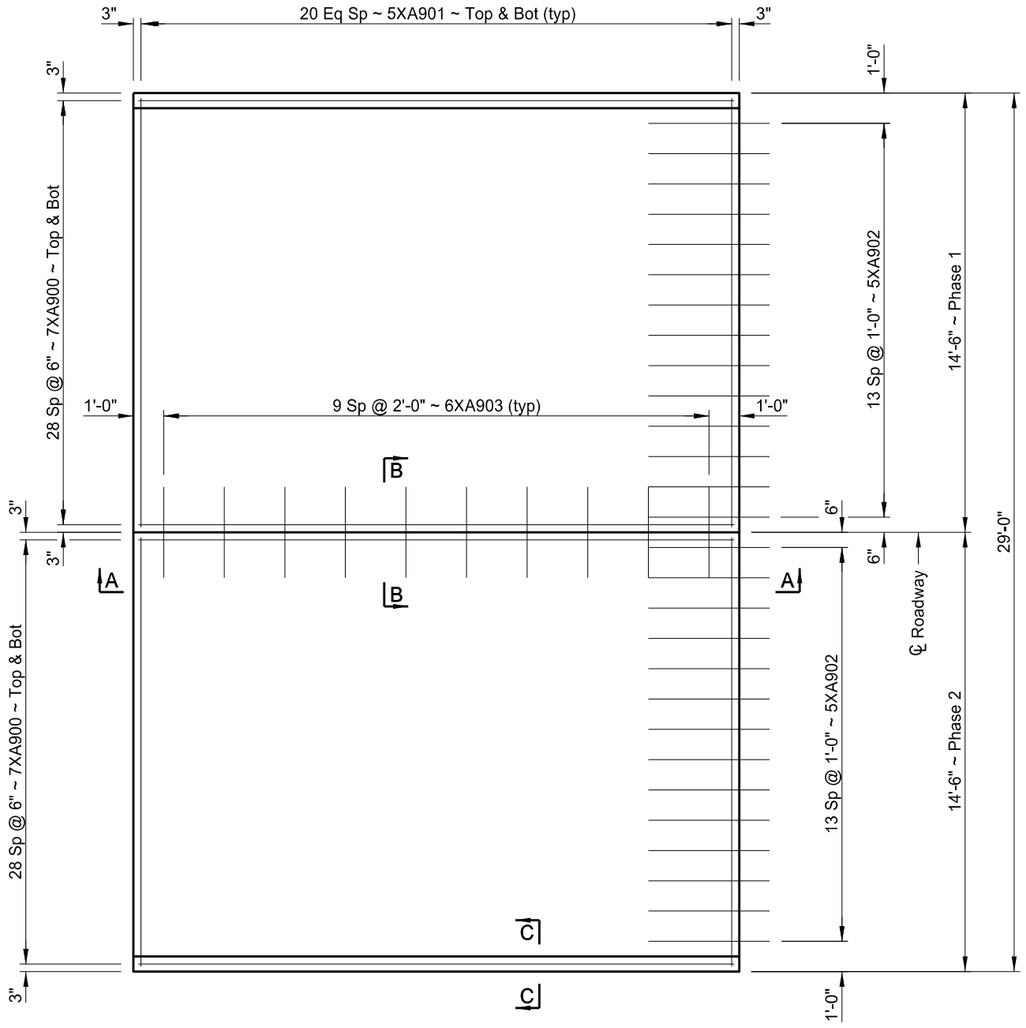
I-94/McKENZIE INTERCHANGE

APPROACH SLAB LIP REPAIR

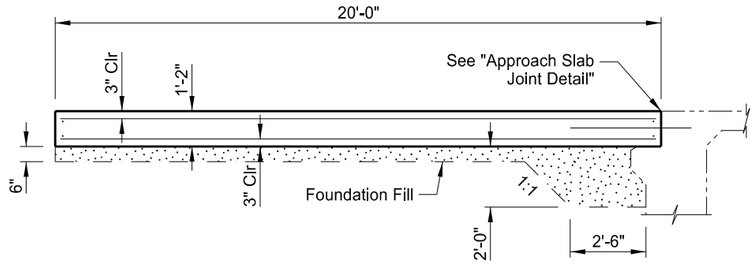
DRAWING NO.	94-176.501-4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	22

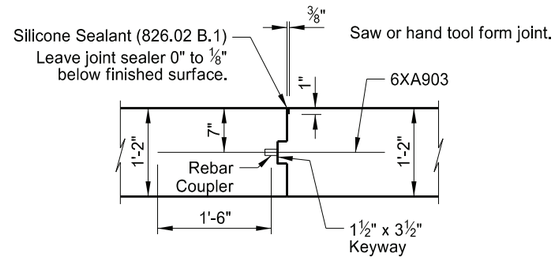


PLAN

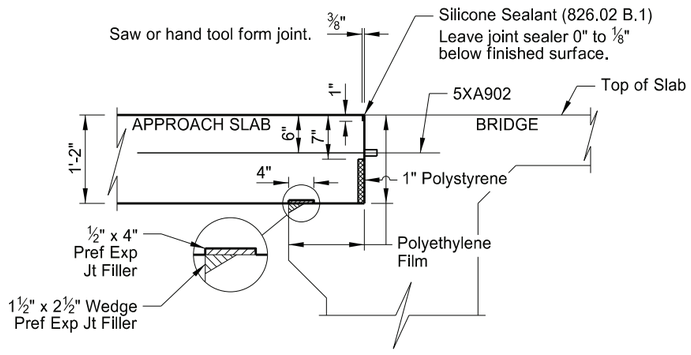
ELEVATION



A-A



B-B



APPROACH SLAB JOINT DETAIL

NOTE:

Install 5XA902 bars according to manufacturer's recommendations with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02. Provide a minimum anchorage length of 1 foot.

NOTE:

See Dwg 94-176.501-6 for Section C-C.

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NORTH DAKOTA

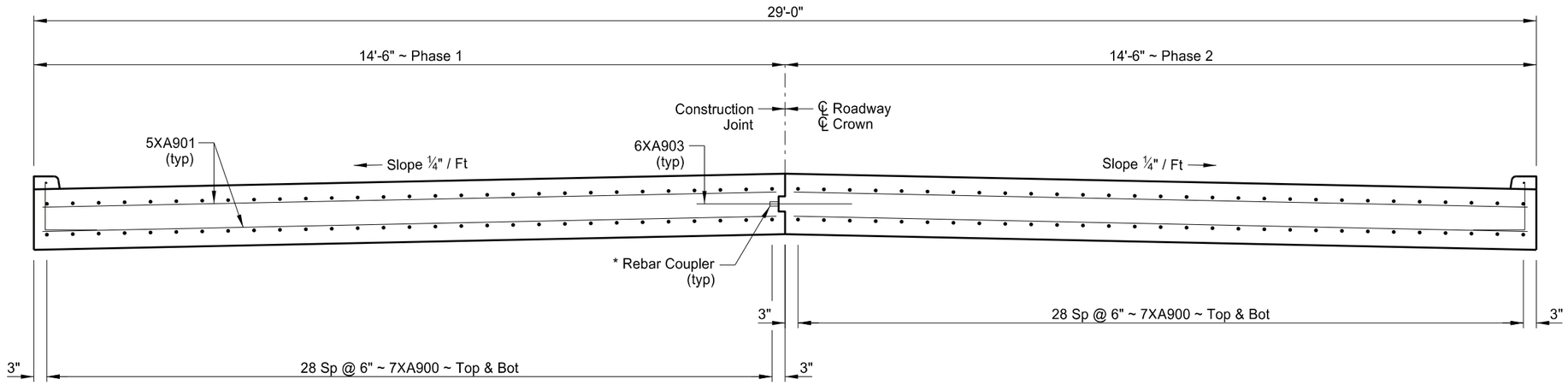
QUANTITIES
SEE DWG 94-176.501-6

I-94/McKENZIE INTERCHANGE

APPROACH SLAB DETAILS

DRAWING NO.	94-176.501-5

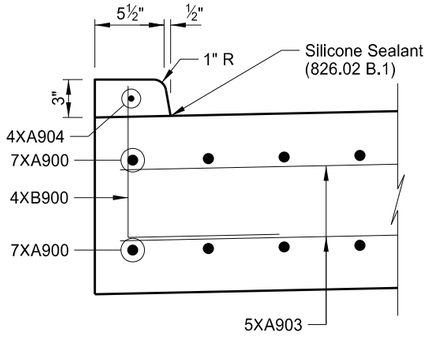
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	23



(NORTH AND SOUTH SLABS)

SLAB SECTION

* Use mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.



C-C

ESTIMATED MATERIAL QUANTITIES (ONE SLAB)	
CONCRETE	25.2 CY
REINFORCING STEEL	6,143 LBS

NOTES:

The estimated material quantities shown are for information purposes only.

See Dwg 94-176.501-5 for location of Section C-C.

BRIAN W. RASCHKE REGISTERED PROFESSIONAL PE 4361 10/20/25 ENGINEER NORTH DAKOTA

QUANTITIES	(ONE SLAB)
APPROACH SLAB	64.4 SY

I-94/McKENZIE INTERCHANGE

APPROACH SLAB DETAILS

DRAWING NO. 94-176.501-6

BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-1-094(236)157	170	24

ONE APPROACH LIP

SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
5	XA700	3	16'- 10"		16'- 10"							
5	XA701	3	16'- 4"		16'- 4"							
5	XD700	46	1'- 7"		** 11"	8"					12	12
5	XP700	46	2'- 8"	6"	** 1'- 8"	6"			1.25"		12	12

ONE APPROACH SLAB

SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
7	XA900	116	19'- 8"		19'- 8"							
5	XA901	84	14'- 2"		14'- 2"							
5	XA902	28	4'- 0"		* 4'- 0"							
6	XA903	20	1'- 6"		1'- 6"							
4	XA904	2	19'- 8"		19'- 8"							
4	XB900	38	2'- 0"		1'- 0"	1'- 0"						

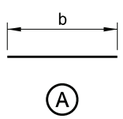
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

NOTES:

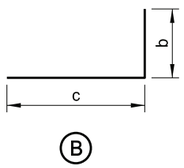
1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum of total of the detailing dimensions for that bar, unless otherwise noted.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designates an epoxy coated bar.
6. Include the approach lip and approach slab bar list quantity in the approach lip and approach slab pay items.

* Length may vary depending on manufacturer's recommendations for anchorage. Length based on 1 foot minimum anchorage length.

** Length may vary depending on manufacturer's recommendations for anchorage. Length based on 9 inch minimum anchorage length.



A



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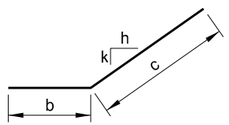
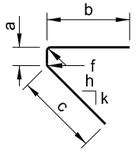


D



P

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REINFORCING BAR LIST & DETAILS

DRAWING NO. 94-176.501-7

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Bk	back
BF	back face
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
BI	beehive inlet
Beg	begin
BG	below grade
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
BH	bore hole
Bot	bottom
Blvd	Boulevard
Bndry	boundary
Brkwy	breakaway
Br	bridge
Bldg	building
Bus.	business
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
CL or ℄	centerline
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
CECB	concrete erosion control blanket
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSFES	corrugated steel flared end section
CSP	corrugated steel pipe
CSTES	corrugated steel traversable end section
Co	County
Crse	course
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	crossroad
Crn	crown
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia or ø	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
Fed	Federal
FP	feed point
Fn	fence
Fn P	fence post
FO	fiber optic
FD	field drive
F	fill
FAA	fine aggregate angularity
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser
FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed

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12-18-20	General Revisions
08-16-22	General Revisions

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NDDOT ABBREVIATIONS

D-101-2

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

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Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
VSFS	vehicle speed feedback sign
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
Wrng	wearing
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner

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NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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LINE STYLES

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break
- Existing High Tension Cable Guardrail
- Existing High Tension Cable Guardrail with Posts

Proposed Topography

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

Existing Utilities

- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Existing Culvert
- Existing Telephone Line
- Existing TV Line
- Existing Water or Steam Line
- Existing Under Drain
- Existing Slotted Drain
- Existing Conduit
- Existing Conductor
- Existing Down Guy Wire Down Guy
- Existing Underground Vault or Lift Station

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement

Countours

- Failure Line
- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

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

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

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

Existing Section Corner (Full, Quarter, Sixteenth, Meander)

Existing Witness Corner

Existing Control Point (CP, GPS-RTK, TRI)

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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

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SYMBOLS

D-101-31

- Flexible Delineator
- Flexible Delineator Type A (Exst, Ppsd)
- Flexible Delineator Type B (Exst, Ppsd)
- Flexible Delineator Type C (Exst, Ppsd)
- Flexible Delineator Type D (Exst, Ppsd)
- Flexible Delineator Type E (Exst, Ppsd)
- Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type C (Exst, Ppsd, Diamond Grade)
- Delineator Type D (Exst, Ppsd, Diamond Grade)
- Delineator Type E (Exst, Ppsd, Diamond Grade)
- Barricade (Type I, Type II, Type III}
- Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)
- Attenuation Device
- Truck Mounted Attenuator
- Delineator Drums
- Flagger
- Tubular Marker
- Traffic Cone
- Back to Back Vertical Panel Sign

- Highway Sign (Exst, Ppsd)
- Mile Post Type A (Exst-Ppsd-Reset)
- Mile Post Type B (Exst, Ppsd)
- Mile Post Type C (Exst, Ppsd)
- Object Marker Type I (Exst, Ppsd)
- Object Marker Type II (Exst, Ppsd)
- Object Marker Type III (Exst, Ppsd)
- Existing Reference Marker
- Road Closure Gate 18 Ft (Exst, Ppsd)
- Road Closure Gate 28 Ft (Exst, Ppsd)
- Road Closure Gate 40 Ft (Exst, Ppsd)
- Existing Railroad Battery Box
- Existing RR Profile Spot
- Existing Railroad Crossbuck
- Existing Railroad Frog
- Existing Mailbox (Private, Federal)

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

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12 18 2020

SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

- High Mast Light Standard 3 Luminaire (Exst, Ppsd)
- High Mast Light Standard 4 Luminaire (Exst, Ppsd)
- High Mast Light Standard 5 Luminaire (Exst, Ppsd)
- High Mast Light Standard 6 Luminaire (Exst, Ppsd)
- High Mast Light Standard 7 Luminaire (Exst, Ppsd)
- High Mast Light Standard 8 Luminaire (Exst, Ppsd)
- High Mast Light Standard 9 Luminaire (Exst, Ppsd)
- High Mast Light Standard 10 Luminaire (Exst, Ppsd)
- Overhead Sign Structure Load Center (Exst, Ppsd)
- Traffic Signal Controller (Exst, Ppsd)
- Pad Mounted Traffic Signal Controller (Exst, Ppsd)
- Flashing Beacon (Exst, Ppsd)
- Concrete Foundation (Exst, Ppsd)
- Pipe Mounted Flasher (Exst, Ppsd)
- Pad Mounted Feed Point (Exst, Ppsd)
- Pipe Mounted Feed Point with Pad (Exst, Ppsd)
- Pole Mounted Feed Point (Exst, Ppsd)
- Junction Box (Exst, Ppsd)
- Existing Pedestrian Head with Number
- Existing Signal Head
- Pole Mounted Head
- Existing Lighting Standard Pole

- Existing Traffic Signal Standard
- Pull Box (Exst-Ppsd-Undefined)
- Intelligent Transportation Pull Box (Exst, Ppsd)
- Transformer (Exst, Ppsd)
- Power Pole (Exst-Ppsd-with Transformer)
- Wood Pole (Exst, Ppsd)
- Pedestrian Push Button Post (Exst, Ppsd)
- Existing Pole
- Existing Telephone Pole
- Existing Post
- Connection Conductor (Ground, Neutral, Phase 1, Phase 2)

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

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)

Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)

Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)

Force Main Storm Drain Manhole (Exst, Exst with Valve)

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

Catch Basin (Riser 30 Inch, Beehive, Type A)

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

Inlet Special (Catch Basin, Type 1, Type A)

Inlet (Tee, Type 1, Type 2, Type 2 Double)

Median Drain

Headwall (Exst, Ppsd, Ppsd Single with Vegitation Barrier, Ppsd Double with Vegitation Barrier)

Cap or Stub
Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water

Existing Pedestal
Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined

Existing Pipe Vent
Gas, Fuel, Sanitary, Storm Drain, Water, Undefined

Valve
Exst Gas, Exst Water, Ppsd Water, Exst Undefined

Pump
Sanitary, Storm Drain, Exst Water

Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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

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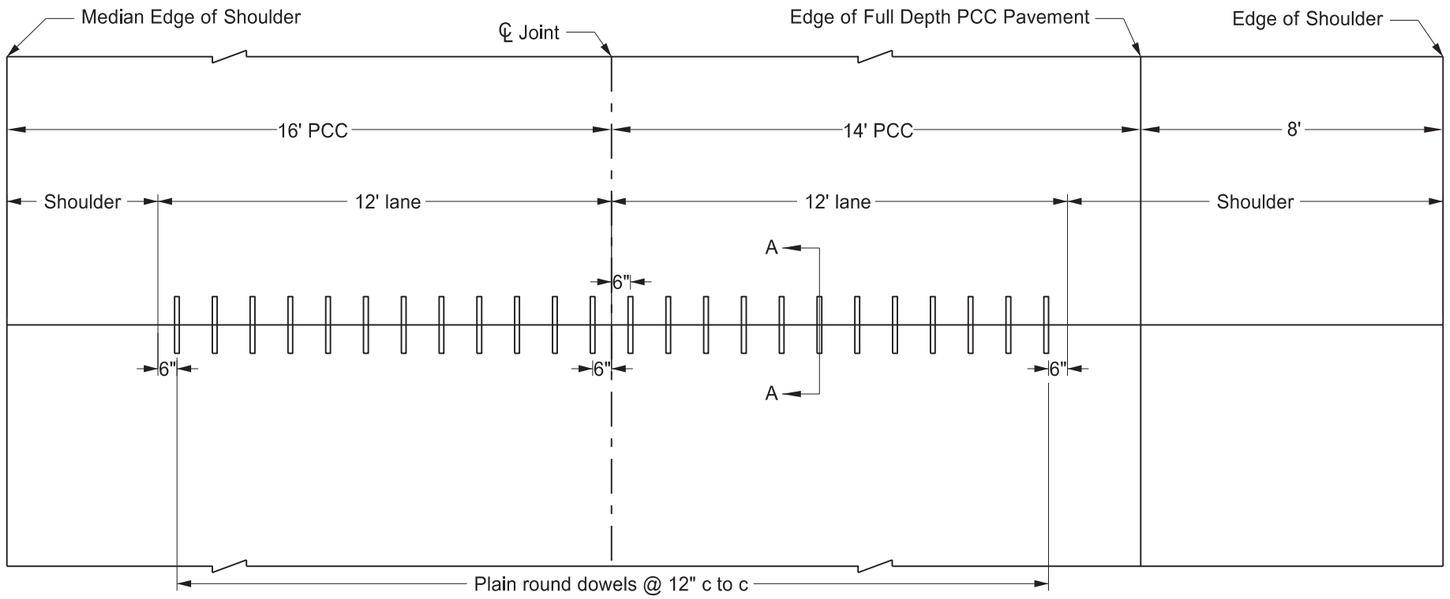
12 18 2020

TRANSVERSE CONTRACTION JOINT DETAILS

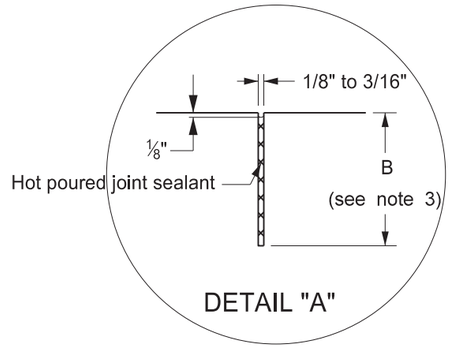
D-550-3



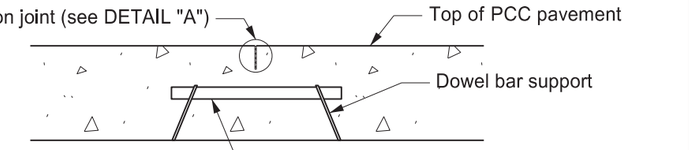
CONTRACTION JOINT DOWEL ASSEMBLY
INTERSTATE

Notes

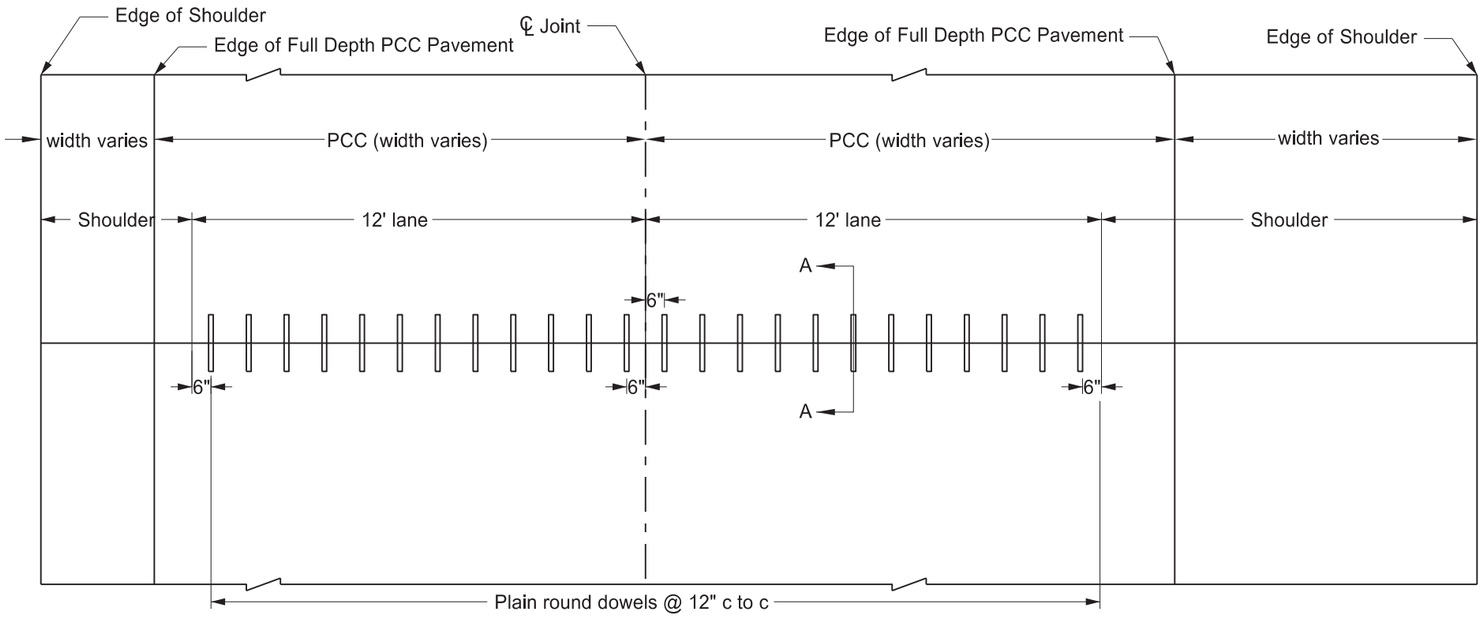
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. B = T/4 + ¼" for AE or non-dowelled concrete pavement or
   B = T/3 for AAE or dowelled concrete pavement



DETAIL "A"



SECTION A-A



CONTRACTION JOINT DOWEL ASSEMBLY
NON-INTERSTATE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-10	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference
3/16/2016	Revised Joint Details and notes
10/25/2019	Expanded Details for clarity
03/13/2025	Revised # of Dowels & Note 3.

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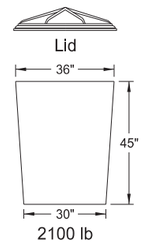
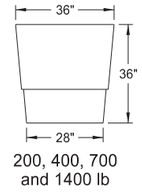
03/13/25

ATTENUATION DEVICE

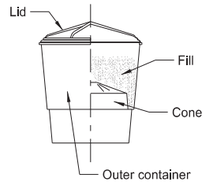
D-704-1





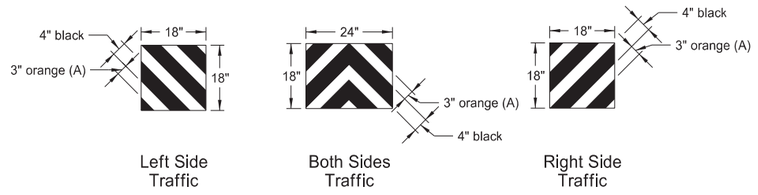
Outer Containers

Cones



Typical Assembly

Typical Module
Construction Detail

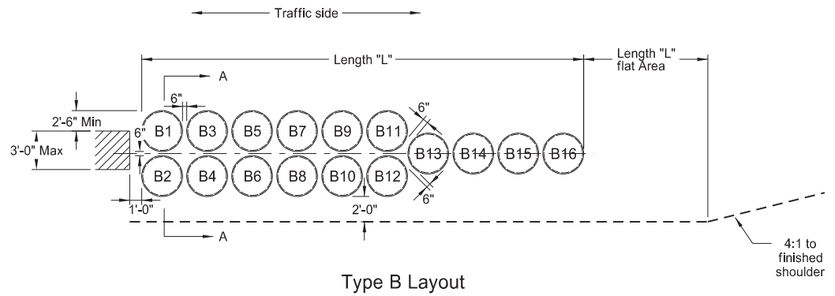


Reflective Sheet Detail

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

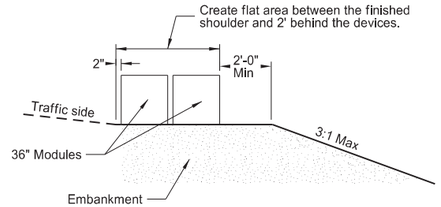
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

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



Type B Layout

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



Section A-A
(Type B Layout)

Type B Attenuation Device												
Module Number	Dash Number											
	80	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)											
B1	2100	2100										
B2	2100	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module											
2100	1	1	1	1	1	1	1	1	1	1		
1400	1	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	2	1	1	1	1	1	1	1	1

Notes:

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

2. Modules
   Provide modules in two sizes containing volumes of either 2, 4, 7, 14, or 21 cubic feet minimum.
   A) Provide three components for 2, 4, or 7 cubic foot module containers:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
      3) A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
   B) Provide two components for the 14 cubic foot module container:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
   C) Provide two components for the 21 cubic foot module container:
      1) A 36" height X 36" width yellow outer container.
      2) A black lid which locks securely over the top of the container.

3. For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.

4. For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.

5. The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-25-12

REVISIONS

DATE	CHANGE
07-18-14	Revised sheeting in reflective sheet detail
09-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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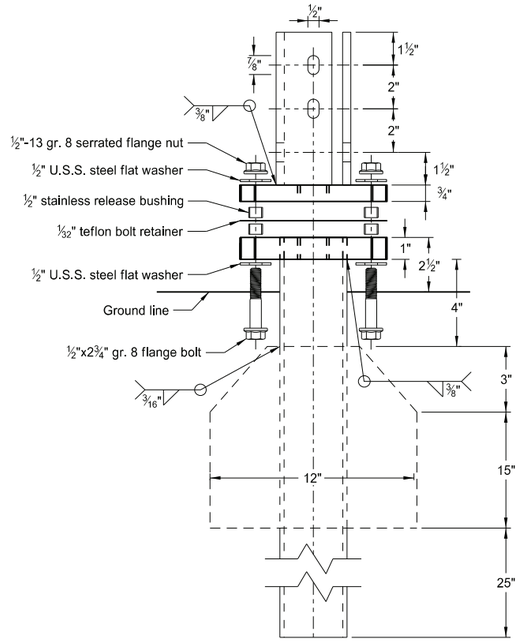
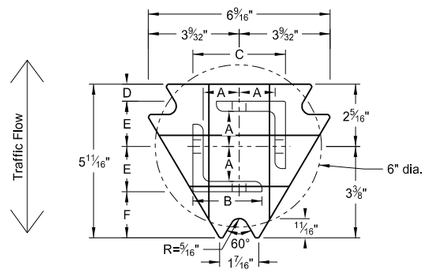
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

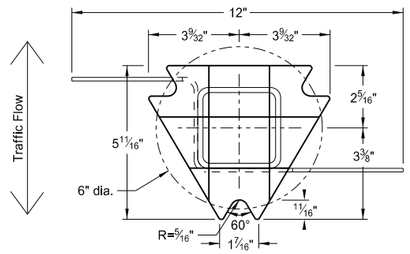
D-704-7



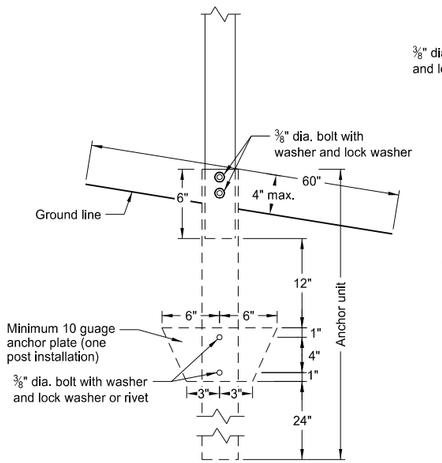
Multi-Directional
Slip Base Assembly



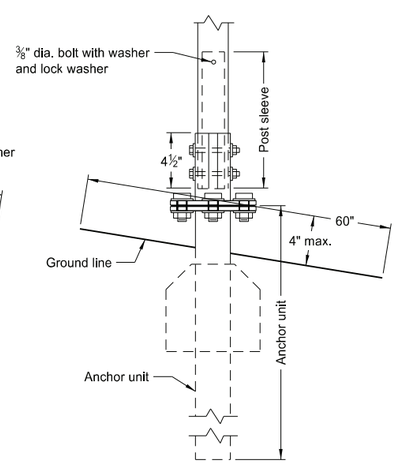
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



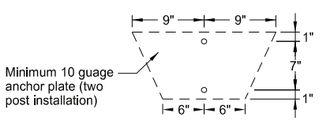
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

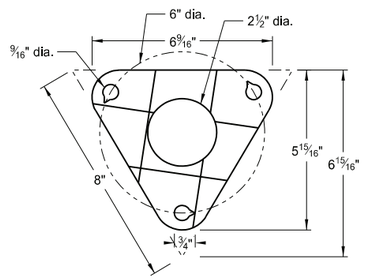


Anchor Unit and Post Assembly



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	2⅜16	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
2⅜16 x 2⅜16	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
2⅜16"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	2⁵⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⅝16"	⅝"	1²¹⁄₃₂"	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 2⅜16"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

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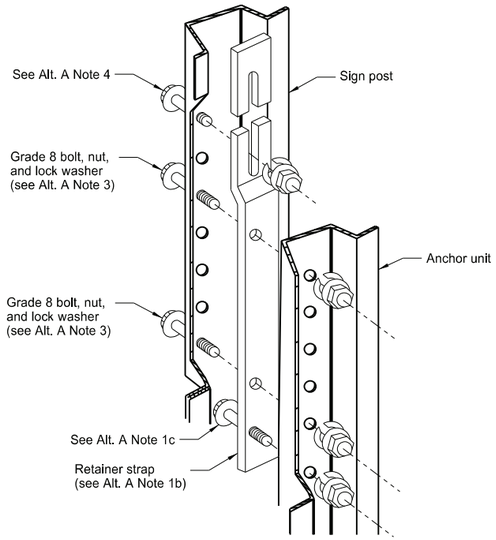
08/01/24

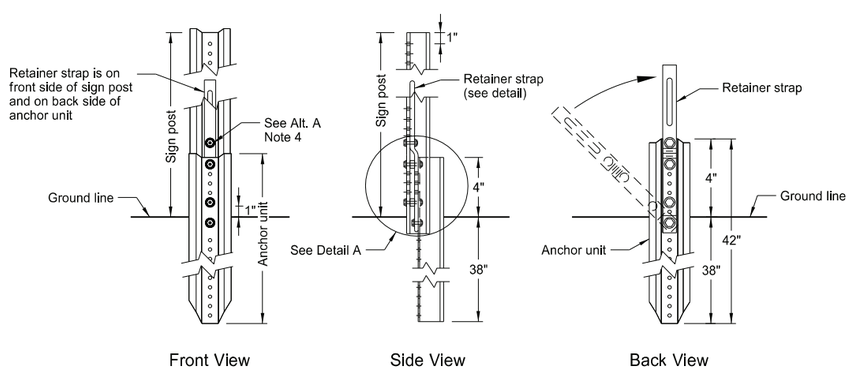
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



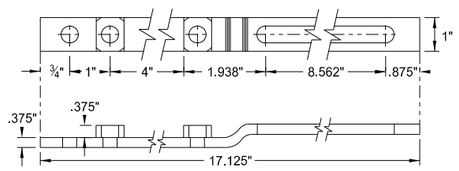
Detail A



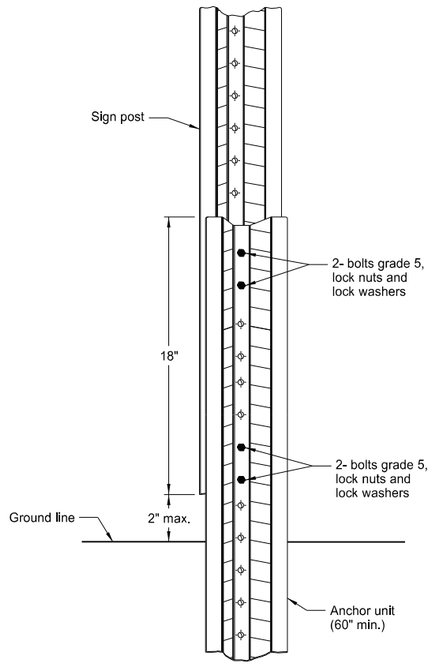
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

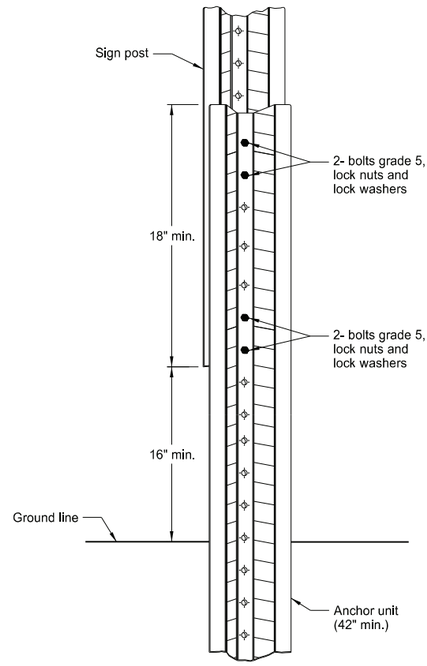


Retainer Strap Detail



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

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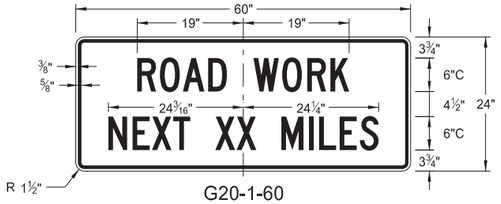
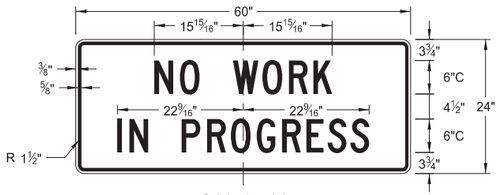
08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

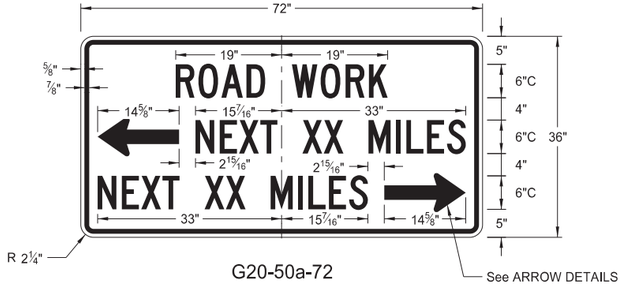
D-704-9



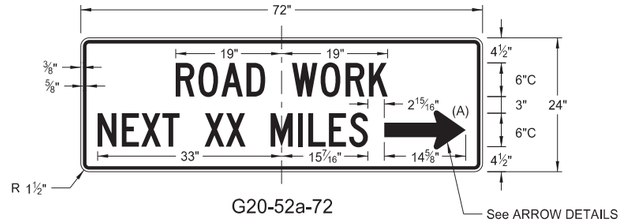
G20-1-60
Legend: black (non-refl)
Background: orange



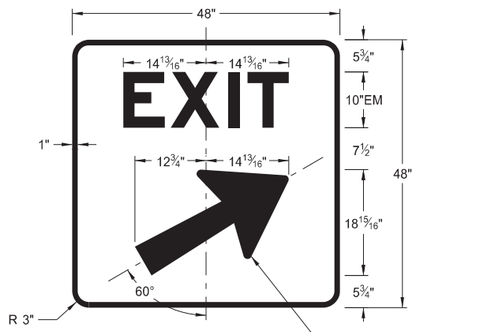
G20-1b-60
Legend: black (non-refl)
Background: orange



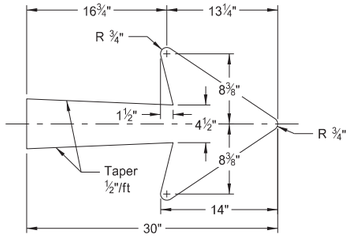
G20-50a-72
Legend: black (non-refl)
Background: orange



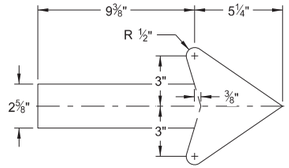
G20-52a-72
Legend: black (non-refl)
Background: orange



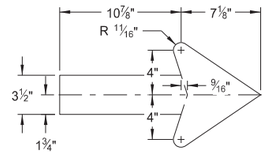
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



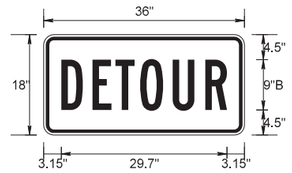
E5-1-48



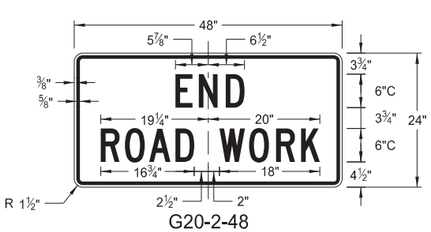
G20-50a-72
G20-52a-72



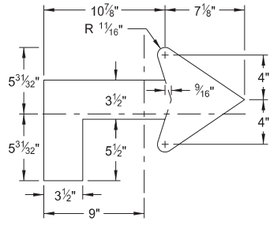
M4-9(L or R)-30
Right or Left



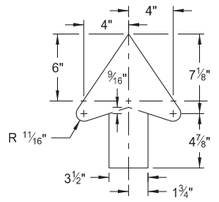
M4-8-36
Legend: black (non-refl)
Background: orange



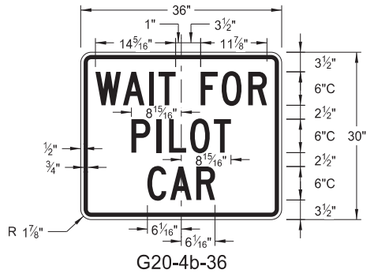
G20-2-48
Legend: black (non-refl)
Background: orange



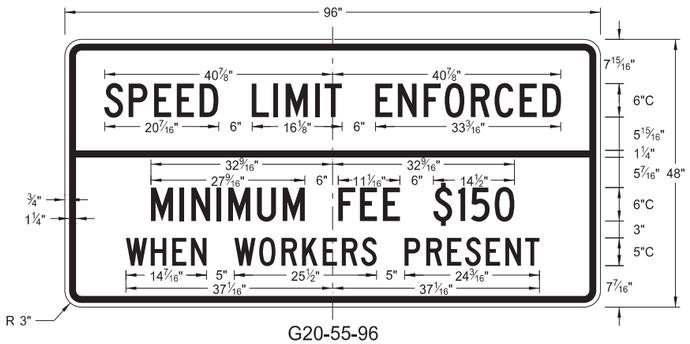
M4-9(L or R)-30
Advanced Right or Left



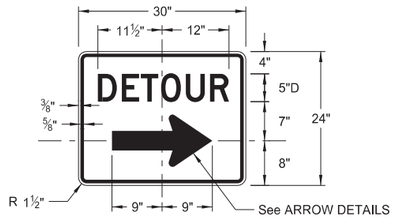
M4-9-30
Straight



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



G20-55-96
Legend: black (non-refl)
Background: orange



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

ARROW DETAILS

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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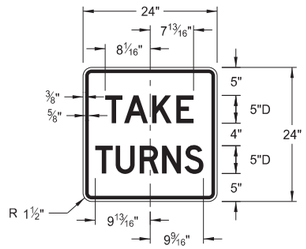
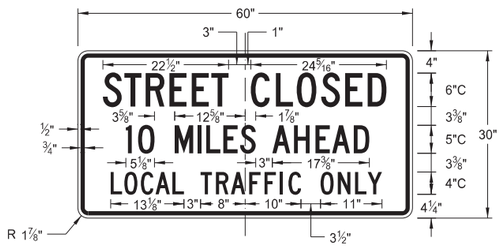
NORTH DAKOTA

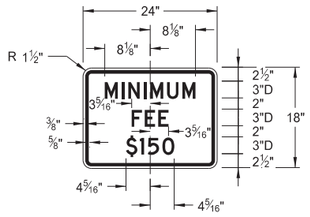
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



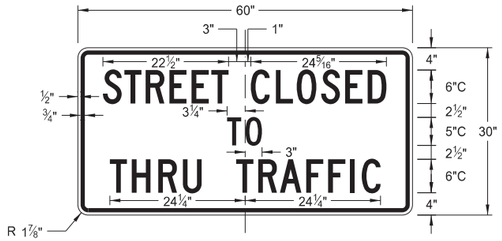
R1-50P-24
Legend: black (non-refl)
Background: white



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



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



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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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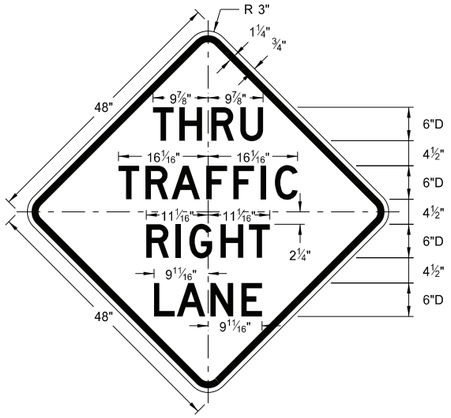
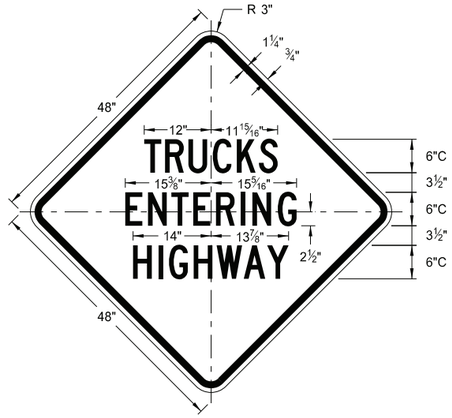
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

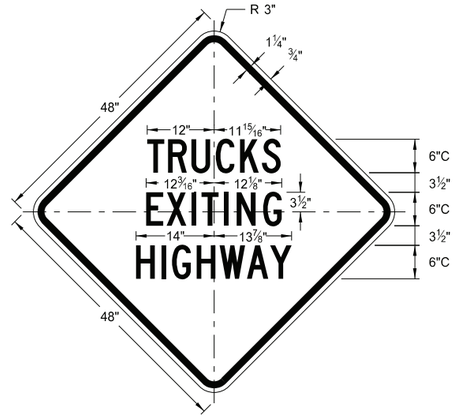
D-704-11



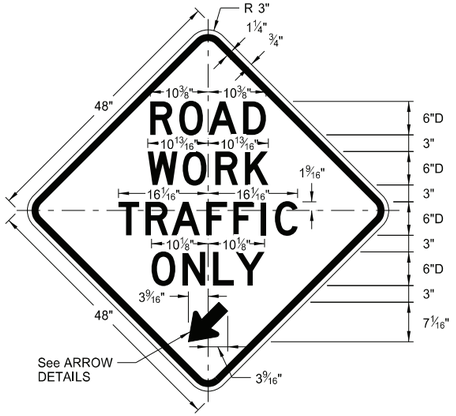
W5-8-48
Legend: black (non-refl)
Background: orange



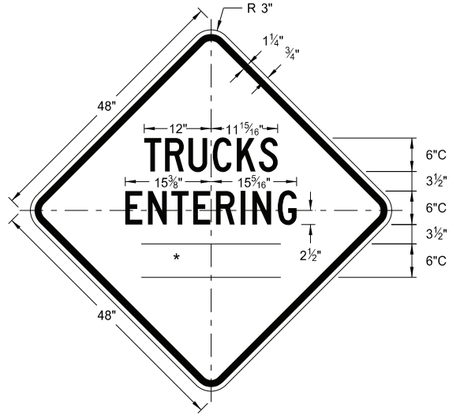
W8-53-48
Legend: black (non-refl)
Background: orange



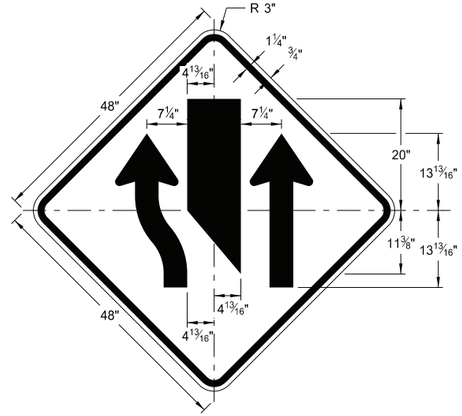
W8-56-48
Legend: black (non-refl)
Background: orange



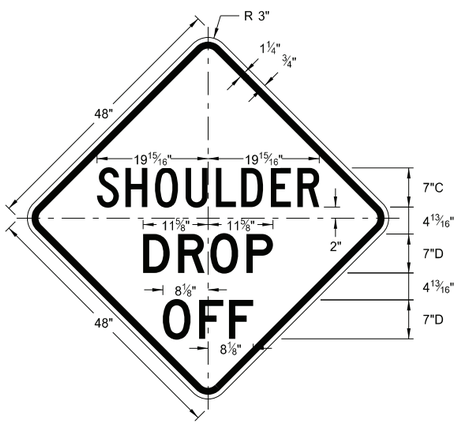
W5-9-48
Legend; black (non-refl)
Background: orange



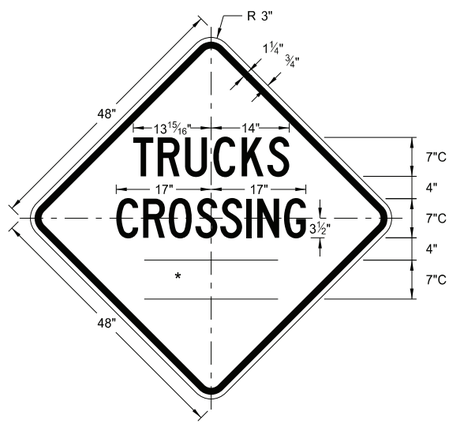
W8-54-48
Legend; black (non-refl)
Background: orange



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



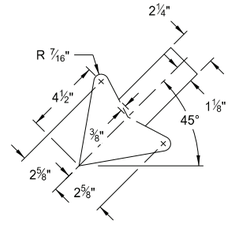
W8-9a-48
Legend: black (non-refl)
Background: orange



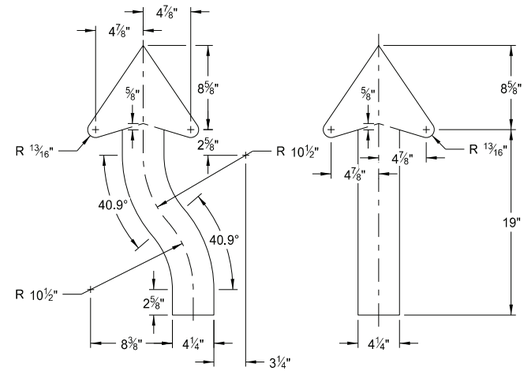
W8-55-48
Legend: black (non-refl)
Background: orange

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

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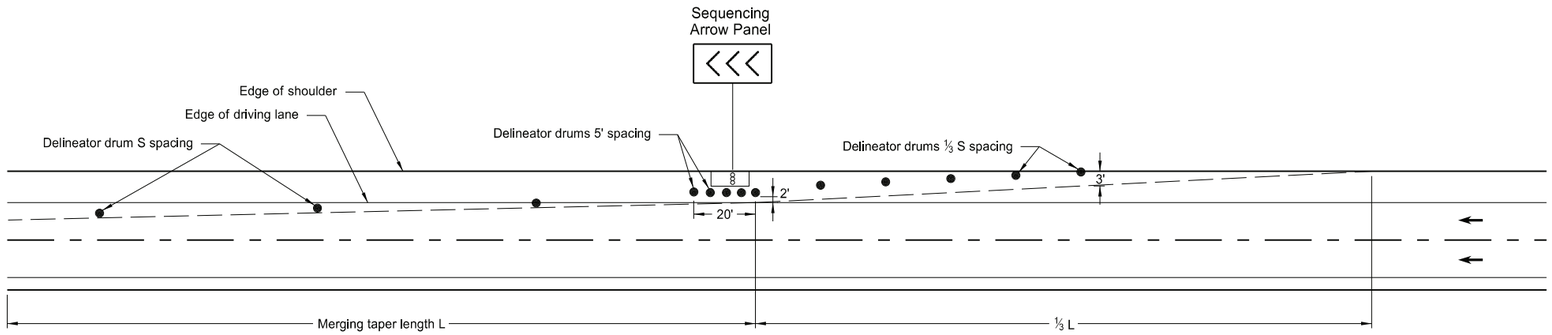
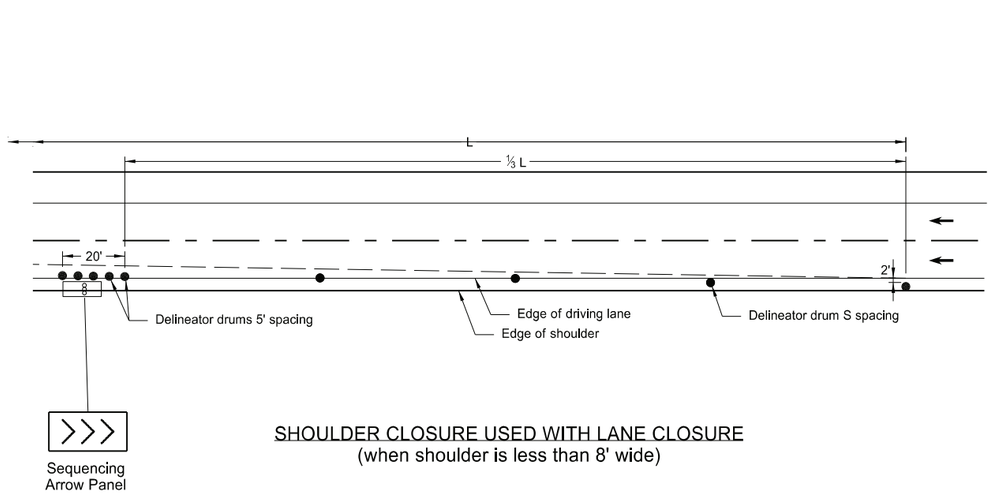
08/01/24

SHOULDER CLOSURE TAPERS

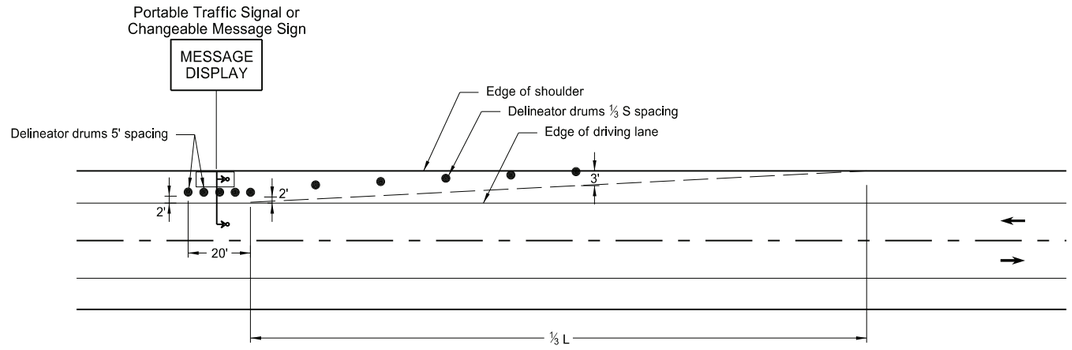
D-704-12



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY	
● Delineator Drum	∞ Sequencing Arrow Panel
○ Message Display	Portable Traffic Signal

Notes:

1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   $L = WS^2/60$ (40mph or less)
   L = WS (45mph or more)

2. If a shoulder taper is used, use a length of approximately ⅓L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.

3. When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active volce
10-25-19	Added L dimension to detail
8-01-24	Electronic Stamp/Signature

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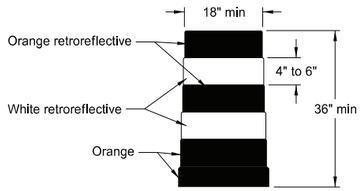
08/01/24

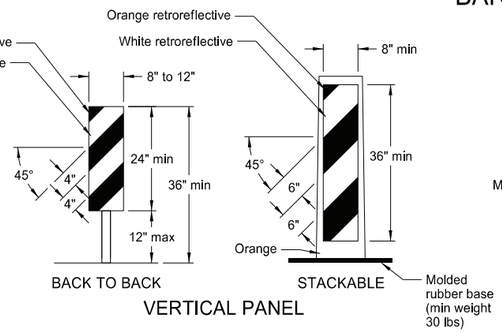
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



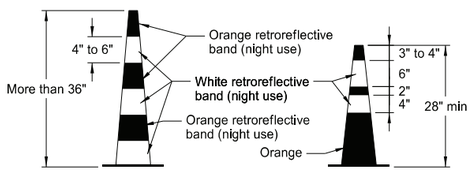
DELINEATOR DRUM

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.



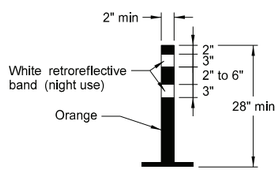
VERTICAL PANEL

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.



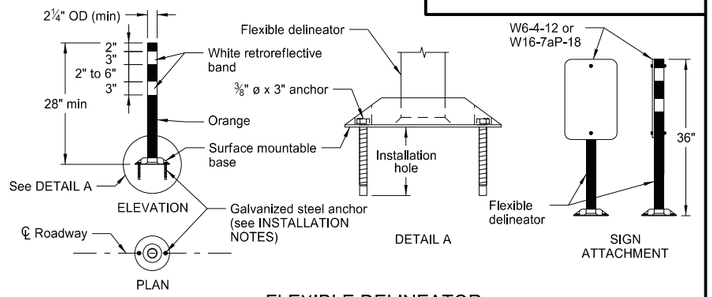
TRAFFIC CONE

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

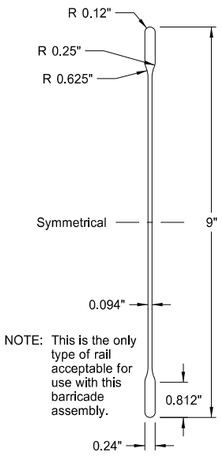
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

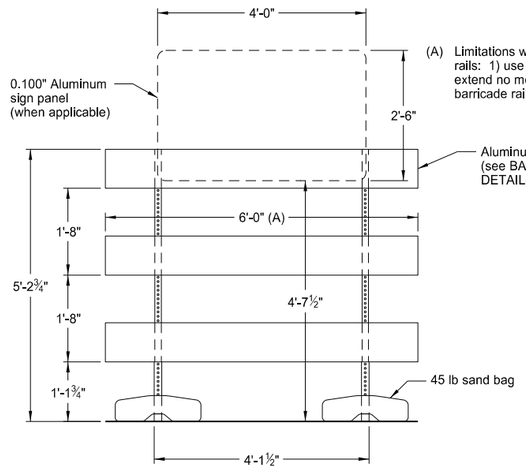
INSTALLATION NOTES:

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.



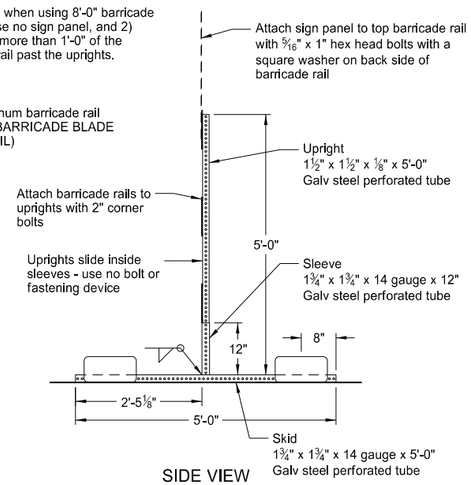
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



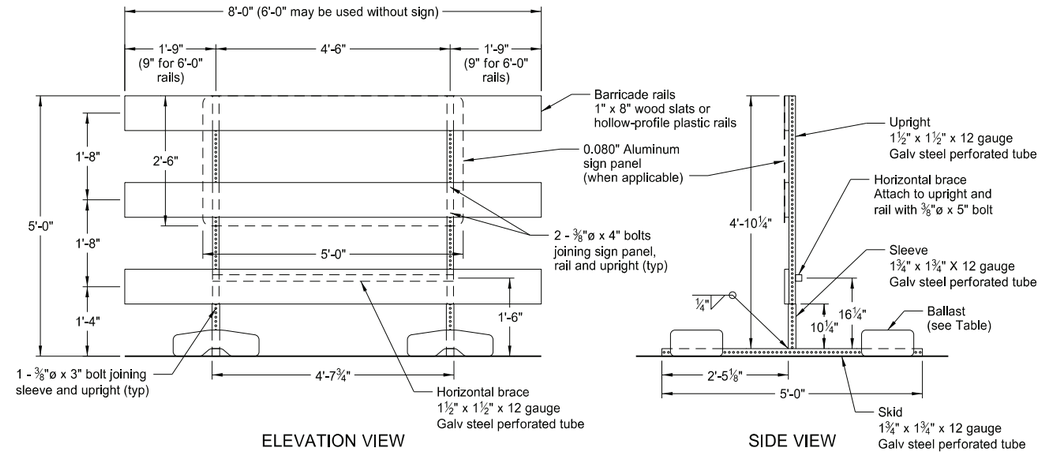
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



SIDE VIEW

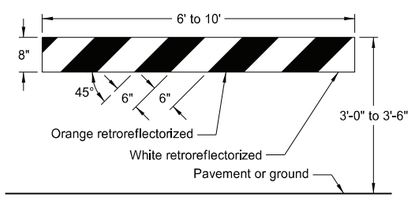
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



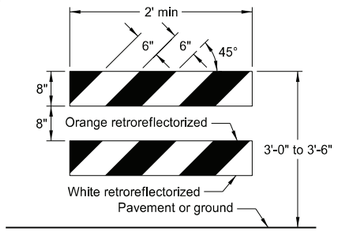
ELEVATION VIEW — SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

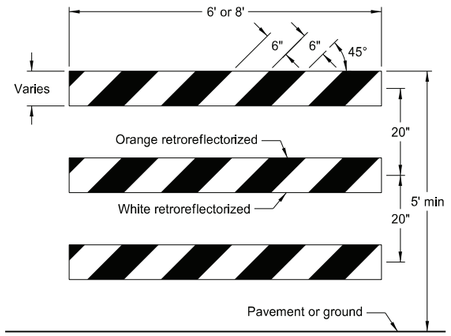
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

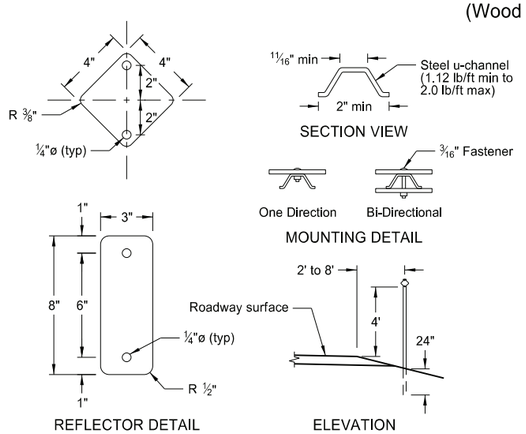


TYPE II BARRICADE



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

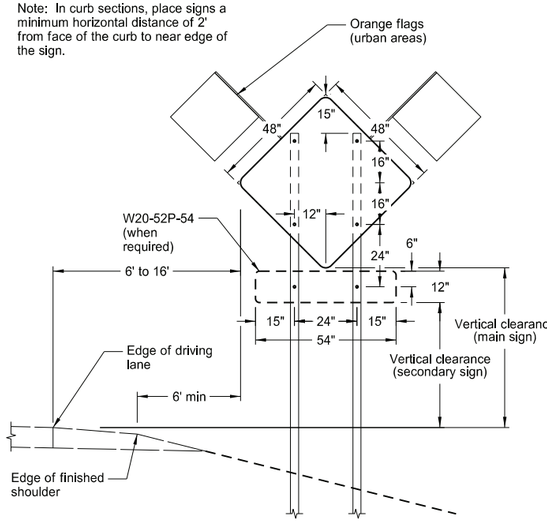
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/01/24

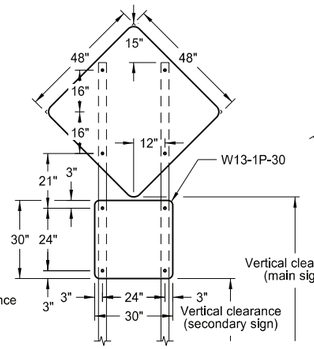
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

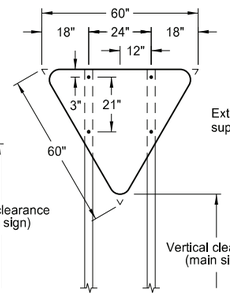
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



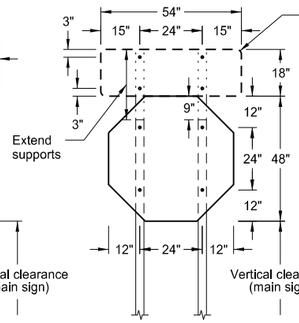
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



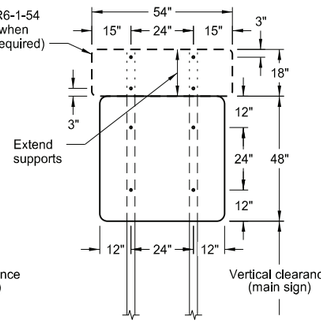
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



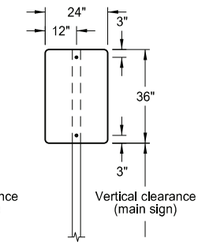
R1-2-60 - YIELD SIGN



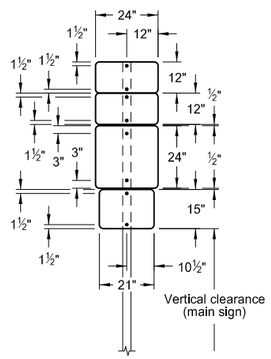
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



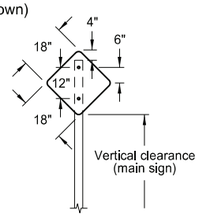
48" x 48" SIGN
(with R6-1-54 sign as required)



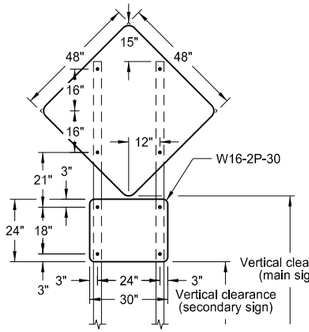
24" x 36" SIGN



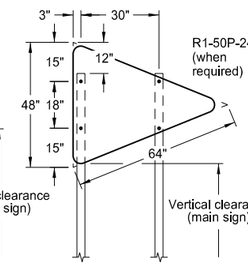
24" x 24"
ROUTE MARKER
ASSEMBLY



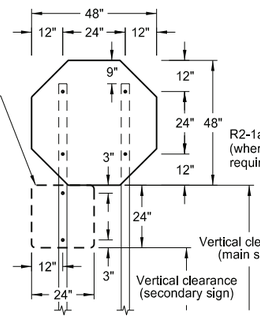
18" x 18"
DIAMOND SIGN



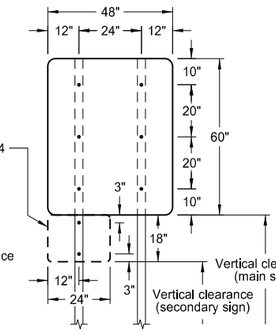
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



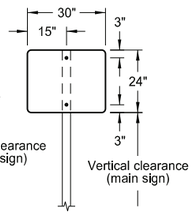
W14-3-64 - PENNANT SIGN



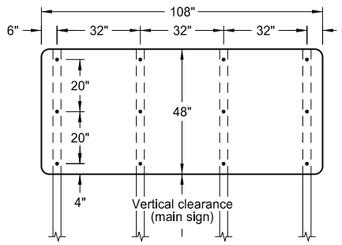
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



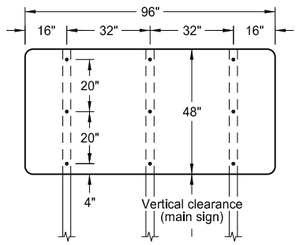
48" x 48" SIGN
(with R2-1aP-24 sign as required)



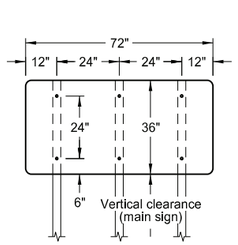
30" x 24" SIGN



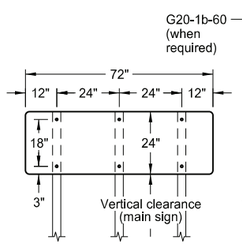
108" x 48" SIGN



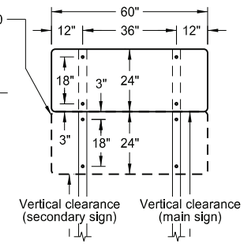
96" x 48" SIGN



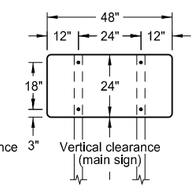
72" x 36" SIGN



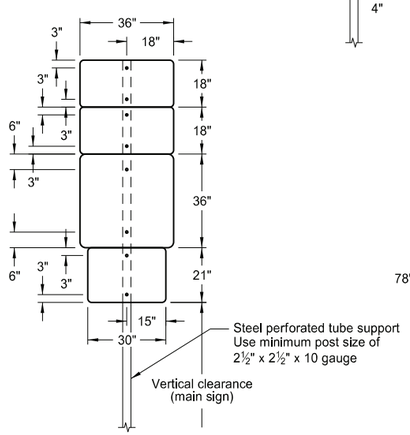
72" x 24" SIGN



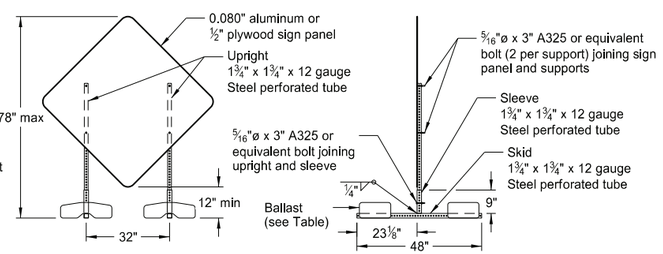
60" x 24" SIGN



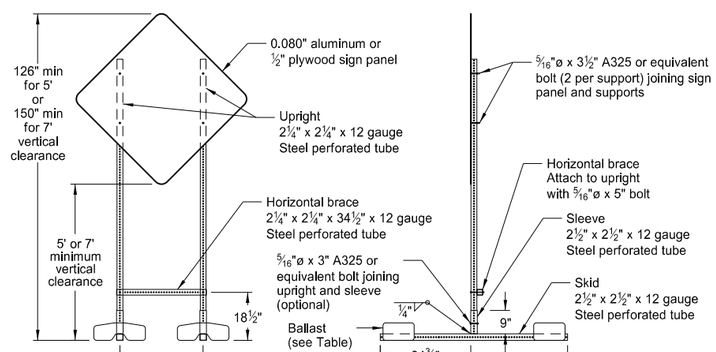
48" x 24" SIGN



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

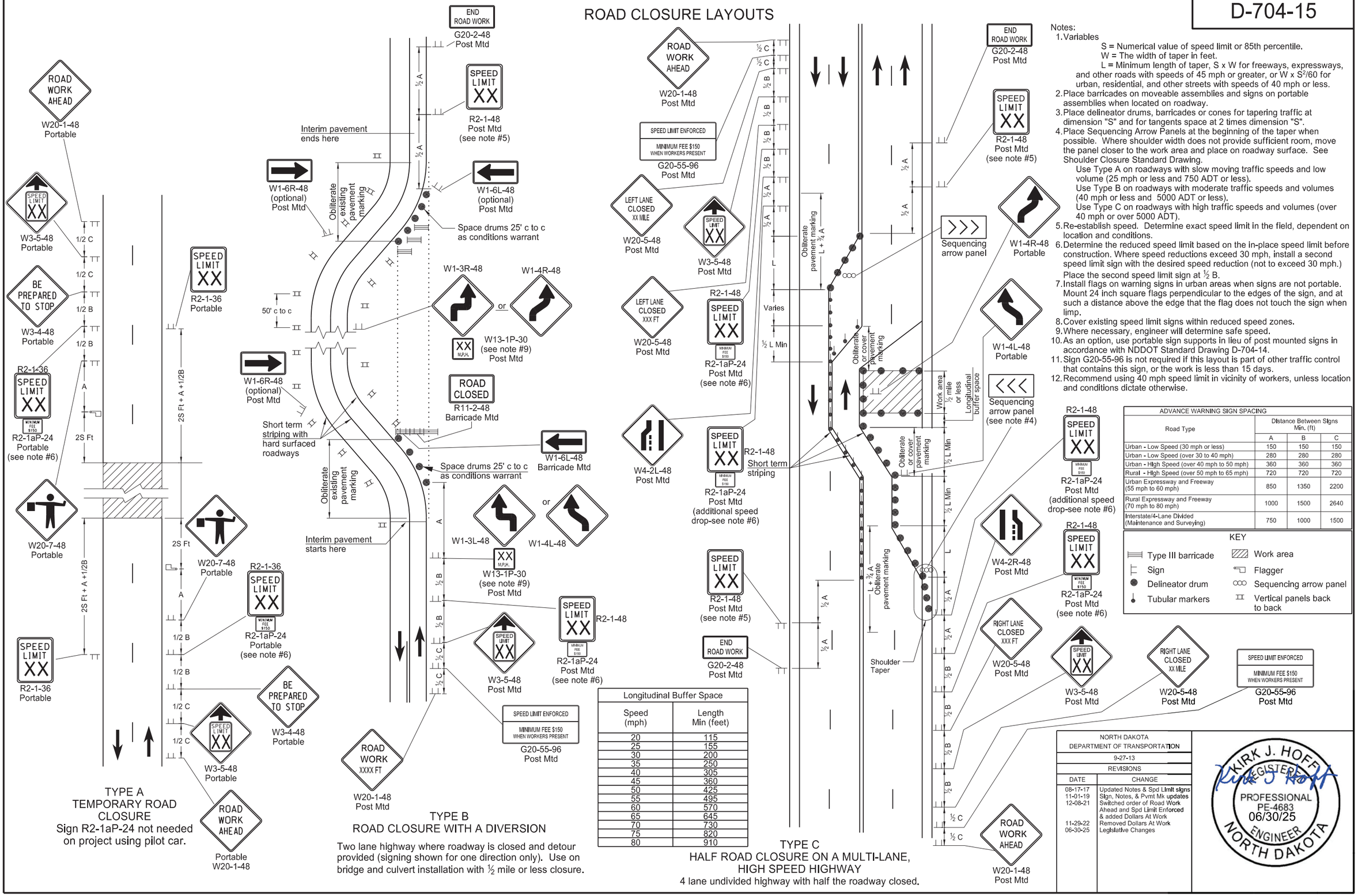
REVISIONS

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



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.

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
80	910

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 80 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

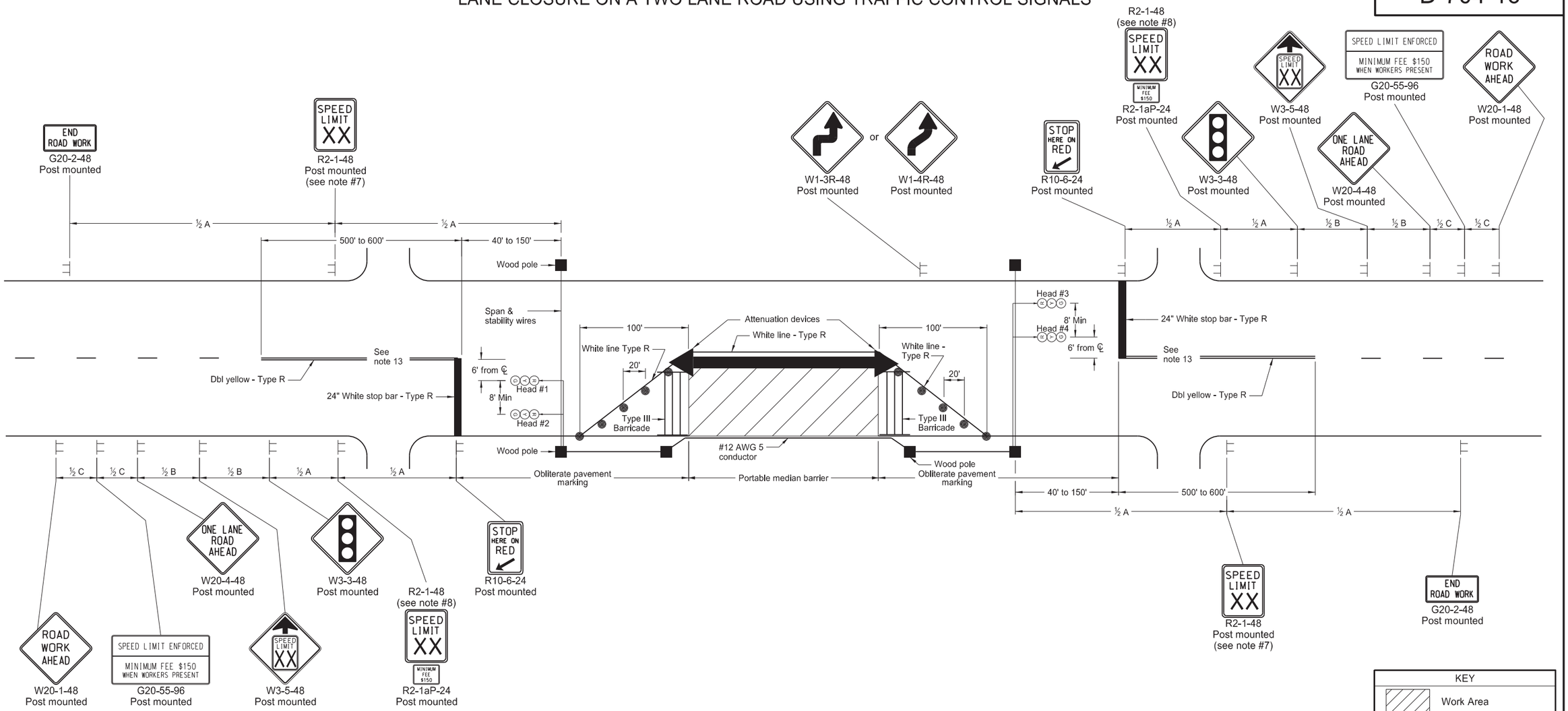
REVISIONS

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
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

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

KEY

- Work Area
- Type III Barricade
- Sign
- Delineator Drum
- Wood Pole

Notes:

1. Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
2. Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
4. Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
6. See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
7. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
8. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Cover existing speed limit signs within a reduced speed zone.
11. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Continue double yellow centerline thru private drives.
14. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
15. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
16. As an option, use solar powered signals instead of wood pole signal system.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

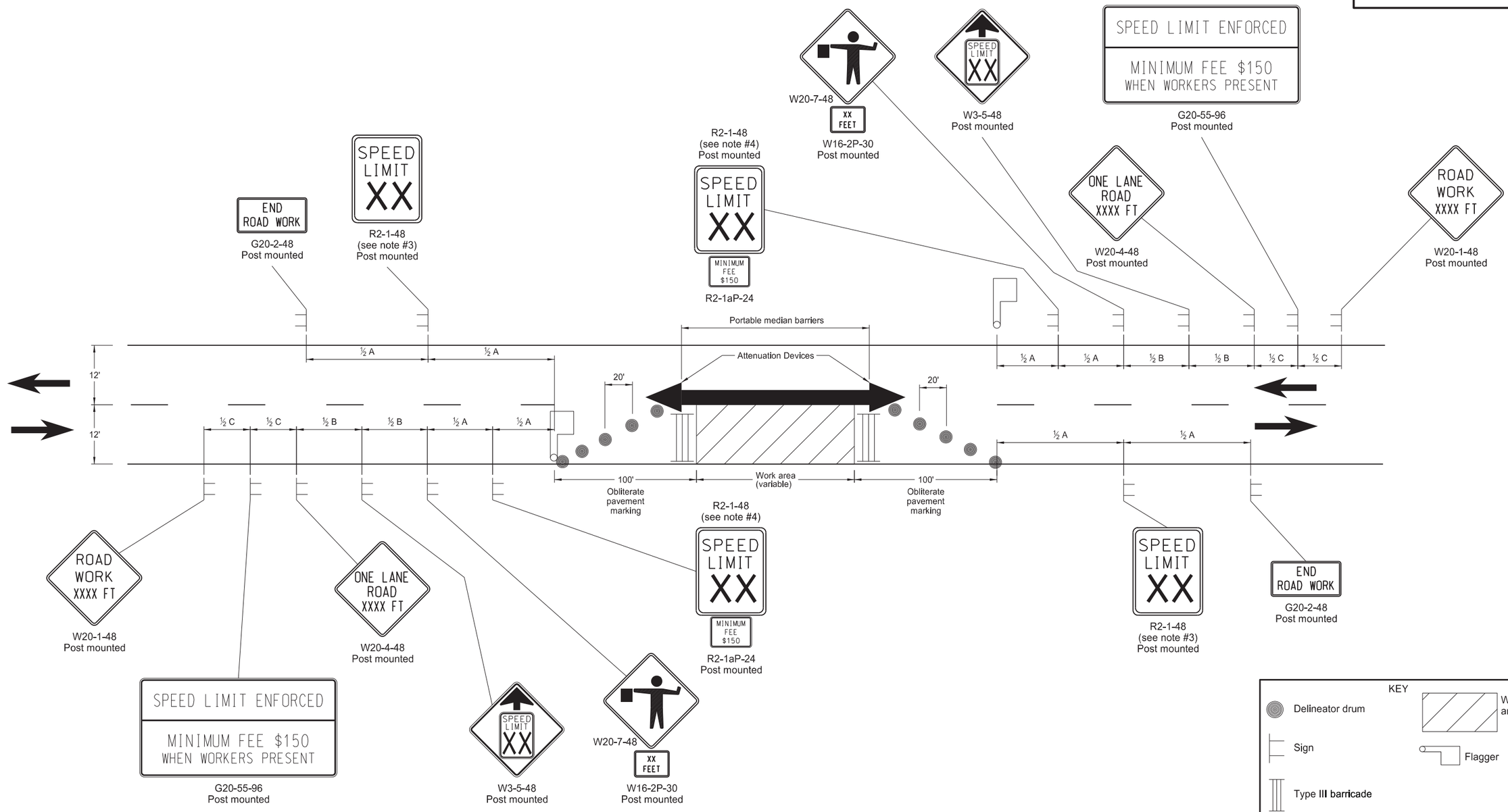
REVISIONS

DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered
	Minimum Fee plaque
08-17-17	Revised notes & added note
11-01-19	Revise sign #s & pvmt mk type
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-31-23	Corrected Note 14 grammar
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

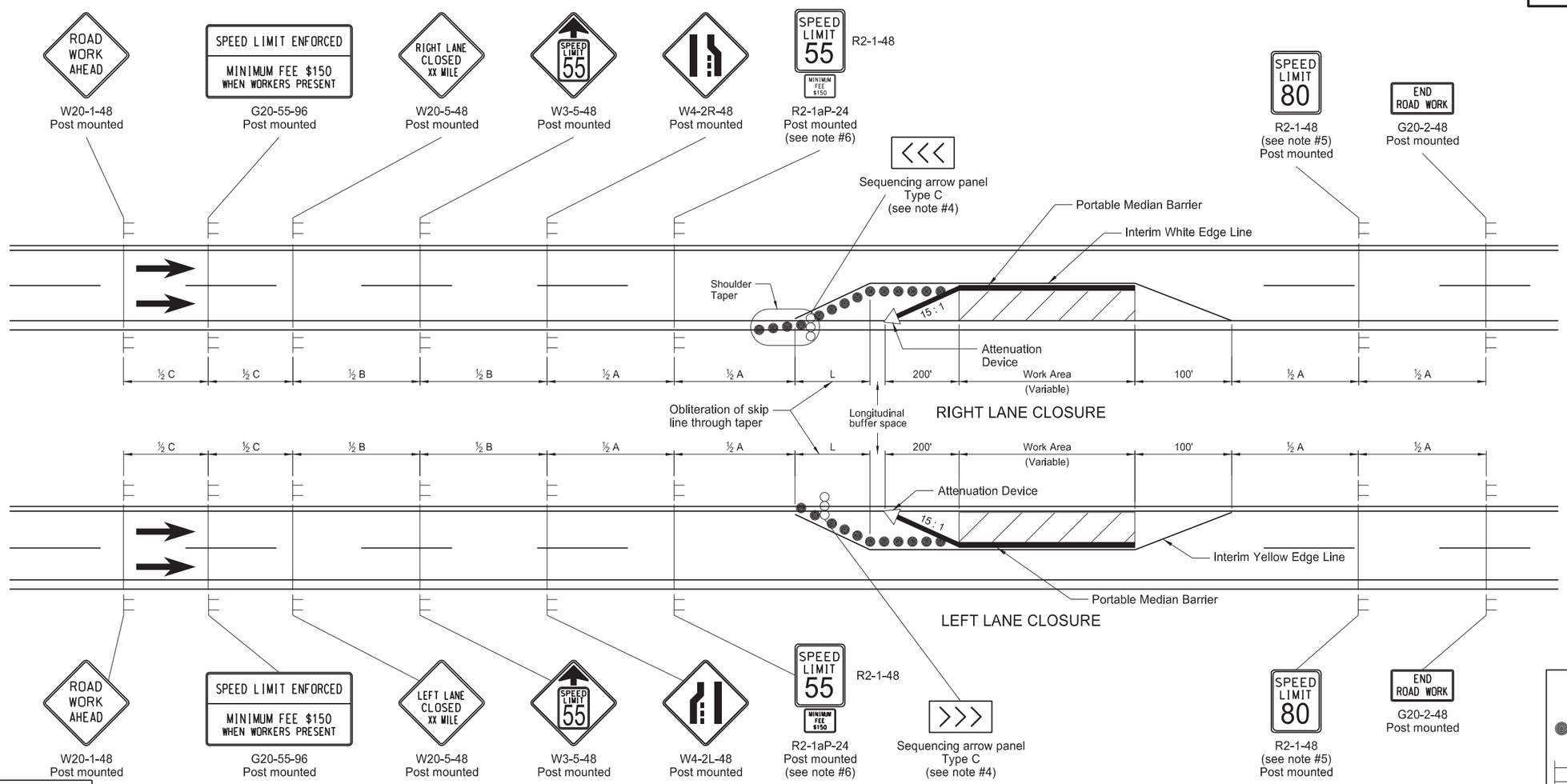
Notes:
1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½B.
5. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

SIGN LAYOUT FOR INTERSTATE SYSTEM ONE LANE CLOSURE

D-704-18



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
80	910

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

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Notes:

1. Variables
   S = Numerical value of posted speed limit, off-peak 85th percentile speed prior to work starting, or anticipated operating speed in MPH.
   W = The width of offset in feet.
   L = Minimum taper length in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or
   W x S^2 /60 for urban, residential, and streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
3. Space delineator drums used for tapering traffic and on tangent at 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 the roadway surface. See Shoulder Closure Standard Drawing. Use Type C on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
5. Re-establish speed limit. 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 a reduced speed zone.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with the Standard D-704-14.
10. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
11. Reduce speed limit further, if location and conditions dictate.

KEY

- Delineator Drum
- Sign
- Attenuation Device
- Sequencing Arrow Panel
- Work Area

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

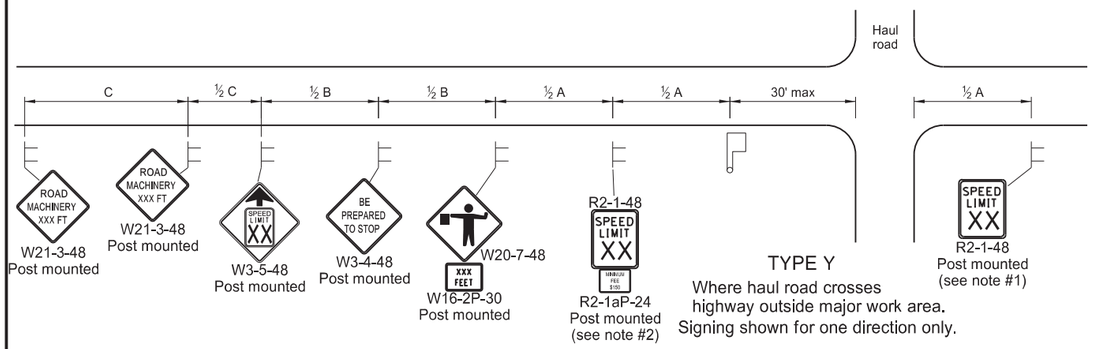
REVISIONS

DATE	CHANGE
01-13-16	Changed to Interim yellow edge line
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers
11-01-19	Note, sign #, & pvmt obllt change
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Portable Median Barriers
06-30-25	Legislative Changes

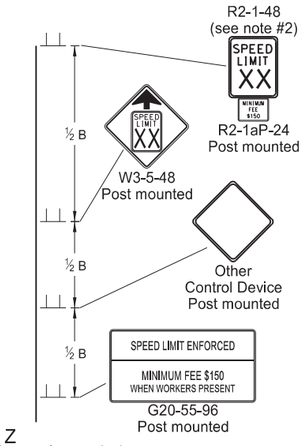
KIRK J. HOFFMANN REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

MISCELLANEOUS SIGN LAYOUTS

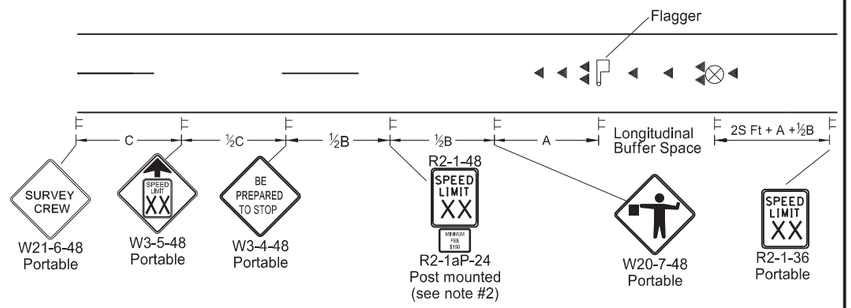
D-704-26



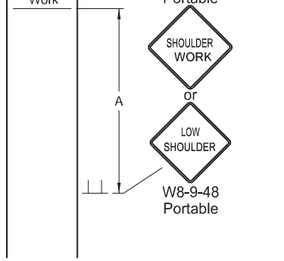
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



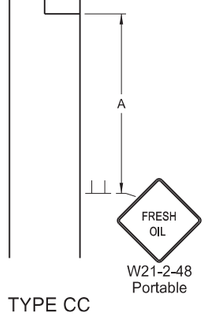
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



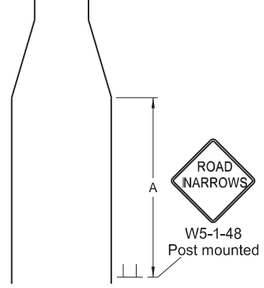
TYPE AA
Where survey crew is used
Signing shown for one direction only.



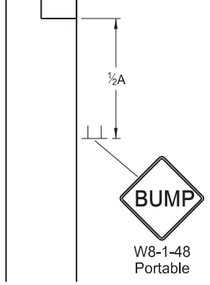
TYPE BB
Within major work area where sign conditions exist



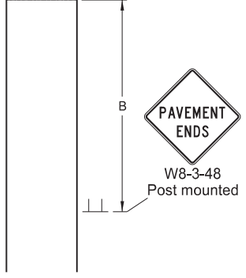
TYPE CC
Where sign conditions exist



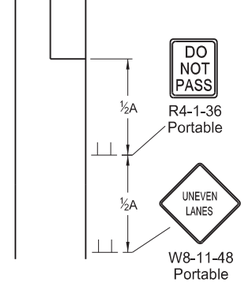
TYPE DD
Where sign conditions exist



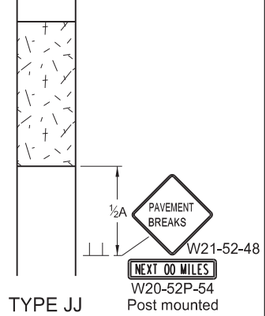
TYPE EE
Where sign conditions exist



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

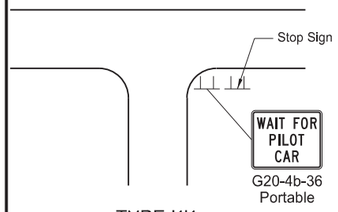


TYPE GG
Where elevation difference exists between lanes



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

KEY
Flagger | Sign
Cones | Survey Equipment
S = Numerical value of speed limit or 85th percentile.



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
4. Cover existing speed limit signs within reduced speed zones.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
9. Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers
02-23-23	Revised distance & removed signs
06-30-25	Legislative Changes

KIRK J. HOFF
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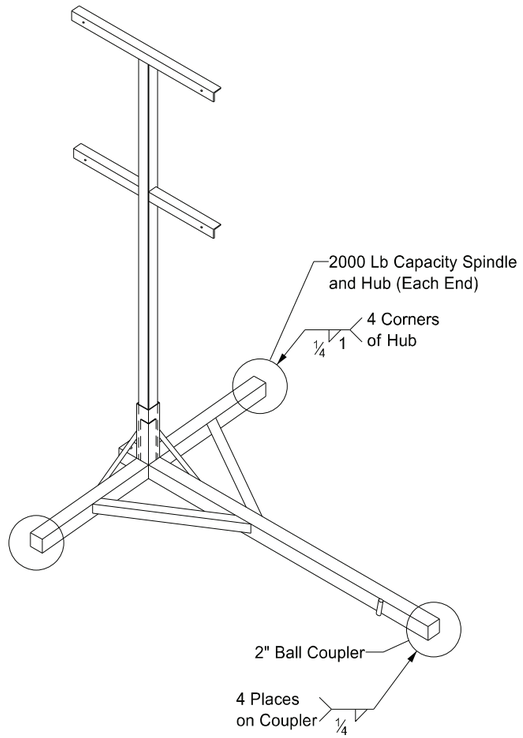
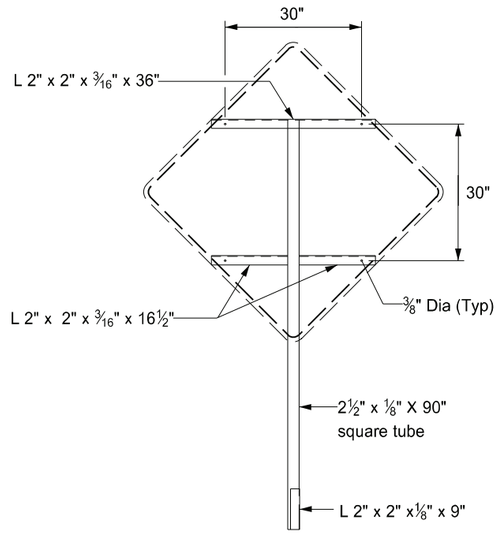
06/30/25
ENGINEER
NORTH DAKOTA

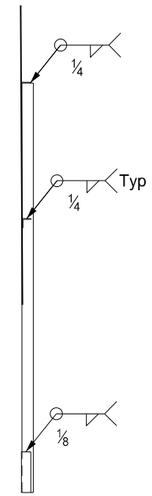
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

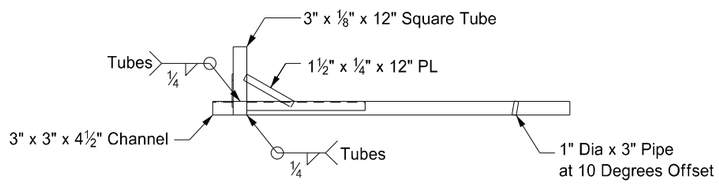


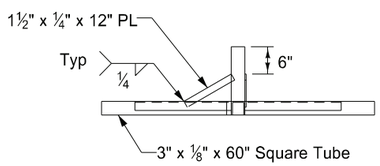
RIGHT

SIGN SUPPORT

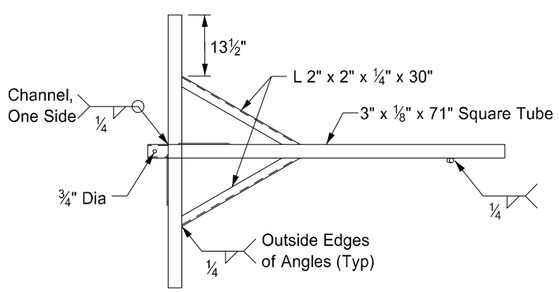
Notes:

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
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NORTH DAKOTA

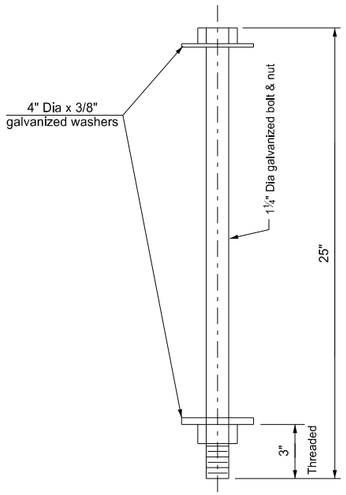
12 02 2020

CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

D-704-51

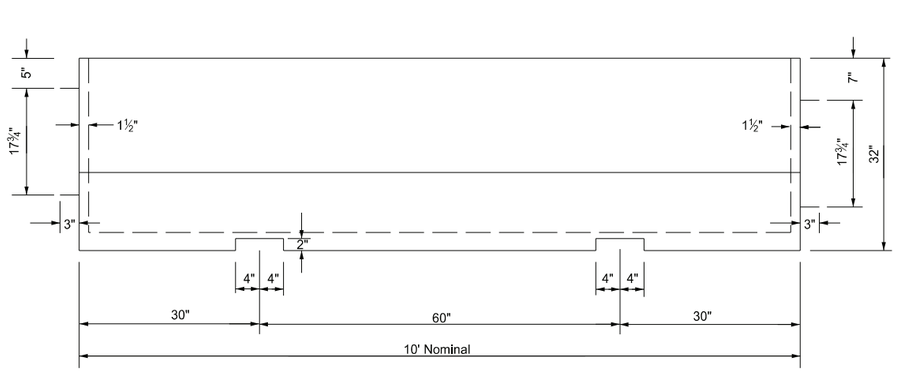
Notes:

1. Barrier ends imprinted with 4 inch letters A and B. Field match A end with B end.
2. Place barrier markers at the center of the barrier at 20' centers.
3. Connect barrier sections with 1 ¼" Dia A-307 double hex connecting bolt. Maintain bottom nut and washer connection for duration of barrier installation.
4. Place barrier to minimize openings between individual sections.



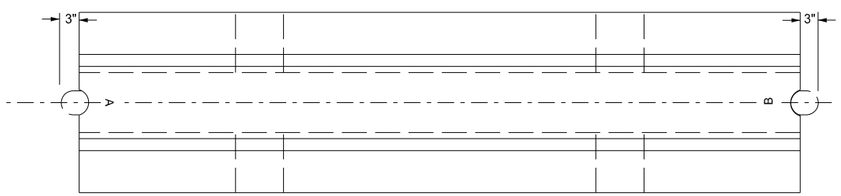
Connecting Bolt Detail

(One per 10 Ft section)

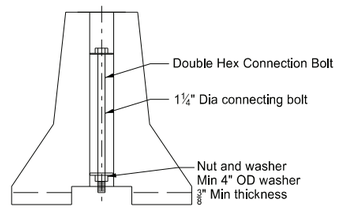


End View

Side View



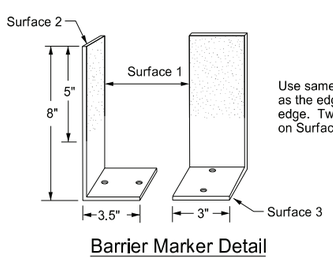
Plan View



Bolt Connection Detail

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

Property	Result	ASTM Test Method
Thickness (min)	.090"	——
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI ¼" @ 73°F	8,000	D790
Flexural modulus, PSI ¼" @ 73°F	300,000	D790
Elongation @ yield	30%	D638



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

Barrier Marker Detail

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

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

Adhesive
Use factory applied solid butyl rubber ⅛" thick, 2" wide on 2¼" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-20-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	New Design Engr PE Stamp
8-21-24	Removed Fabrication Info

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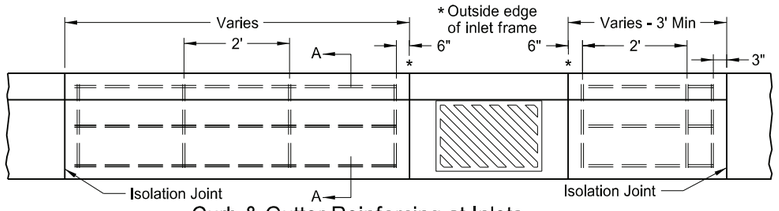
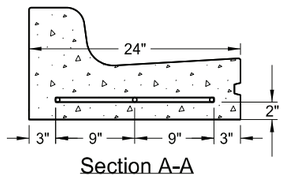
08/21/24

Curb & Gutter and Valley Gutter

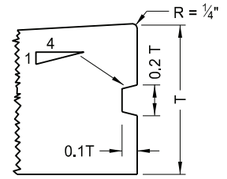
D-748-1



Curb & Gutter Reinforcing at Inlets



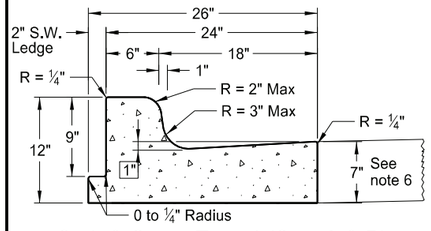
Section A-A



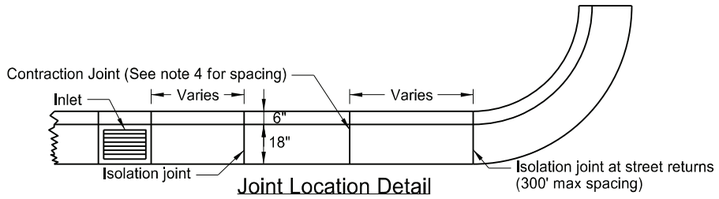
Keyway Detail for Curb & Gutter

(To be used with PCC Pavement and Drives)

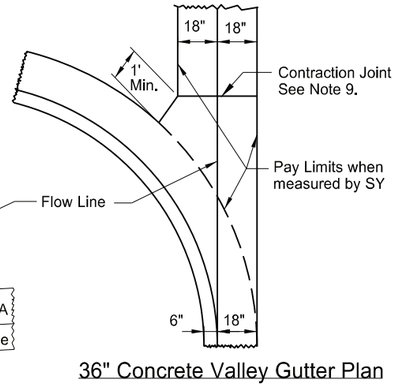
T= Thickness of pavement unless otherwise noted on plans.



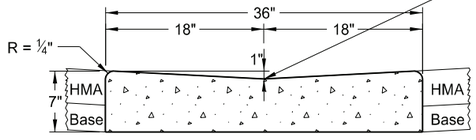
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot. (Sec. A shown. See Sec B for additional details.)



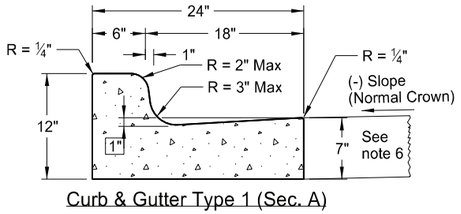
Joint Location Detail



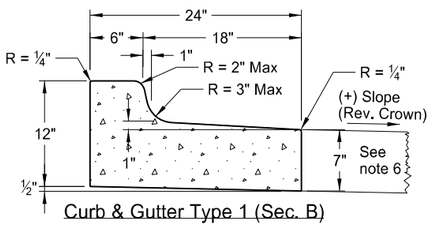
36" Concrete Valley Gutter Plan



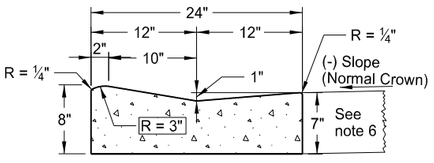
36" Concrete Valley Gutter Detail



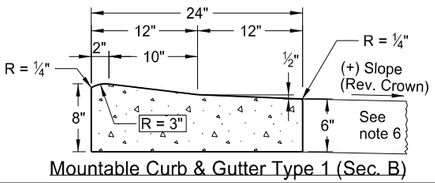
Curb & Gutter Type 1 (Sec. A)



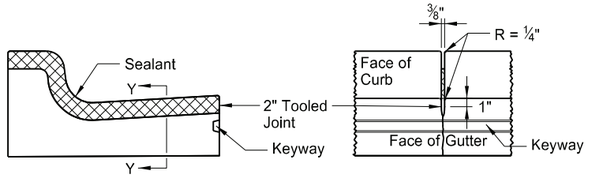
Curb & Gutter Type 1 (Sec. B)



Mountable Curb & Gutter Type 1 (Sec. A)



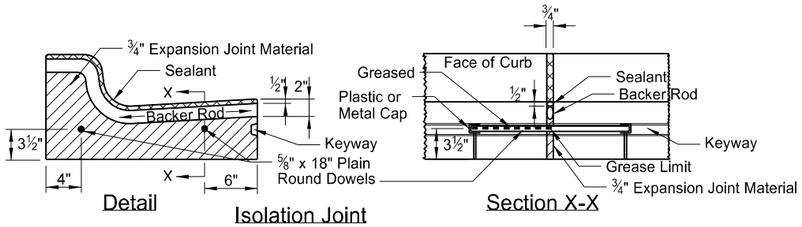
Mountable Curb & Gutter Type 1 (Sec. B)



Detail
(10' Max Spacing)

Contraction Joint

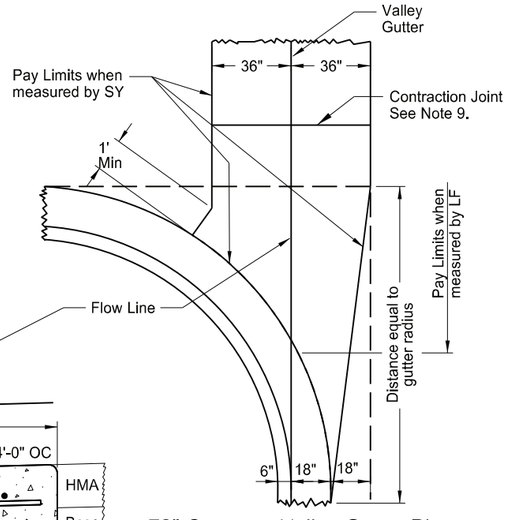
Section Y-Y



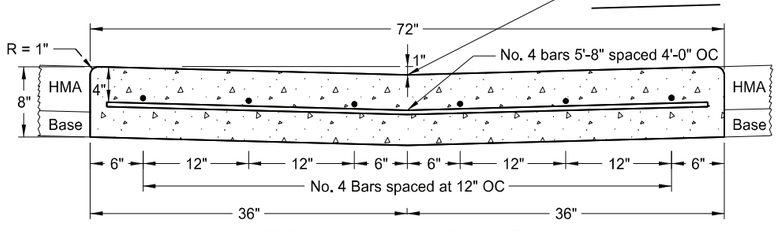
Detail

Isolation Joint

Section X-X



72" Concrete Valley Gutter Plan



72" Concrete Valley Gutter Detail

NOTES:

1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use ¾" expansion joint material for isolation joints. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.
4. Joint Spacing: For hot mix asphalt pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)
5. Joint sealing: For contraction joint, use joint sealant that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.
6. Curb & Gutter-Pavement Interface: For hot mix asphalt pavement use gutter depth shown. For PCC pavements, either match gutter depth to adjacent pavement depth or construct gutter depth shown.
7. Tie curb and gutter to abutting PCC pavement with No. 4 bars, 2'-0" in length, spaced at 3'-9" centers for 15' joint spacing (maximum spacing of 4' centers).
8. On street returns and other locations where new curb and gutter ends and does not abut existing curb and gutter, taper the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint (the same shape as the curb and gutter just ahead of the taper) with an 18" plain round bar across the joint.
9. Valley Gutter Joints: Form, saw, or score ⅛" min. to ⅜" max. width contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic type joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.
10. Reinforcing at Inlets: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlets (even inlets located on radii) in the price bid for "Curb & Gutter - Type 1" or "Curb & Gutter Mountable - Type 1." Extend reinforcement to the second joint (with rebar placed through the first joint) in cases where the 3' minimum panel length can't be obtained.

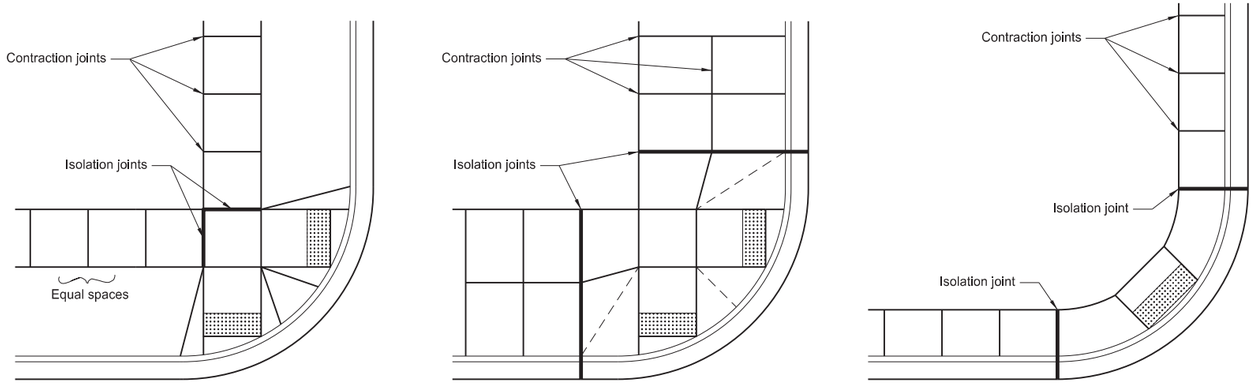
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.
10-30-24	Revised bar size & notes.

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

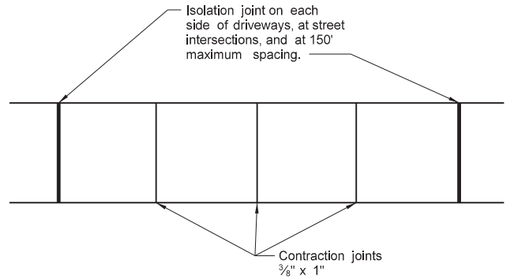
10/30/24

SIDEWALK

D-750-2



Typical Joint Layouts



NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

   Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

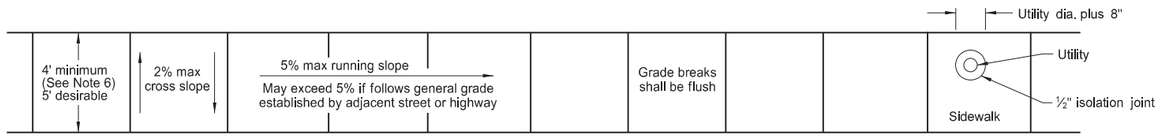
   Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

   When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

   Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

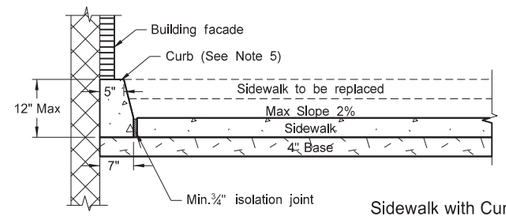
   Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

   When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.

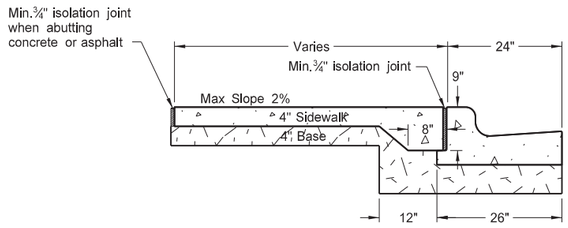


Sidewalk Width and Grade

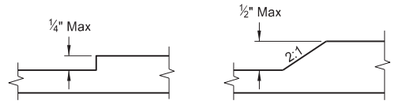
Utility Blockout



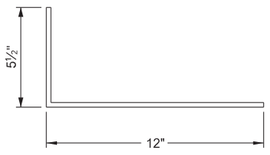
Sidewalk with Curb Detail
(Building face application)



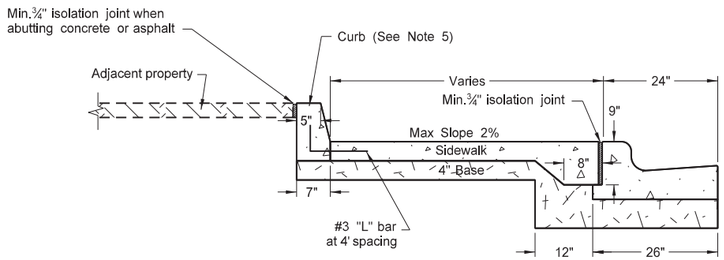
Sidewalk Detail
(Installed adjacent to curb and gutter)



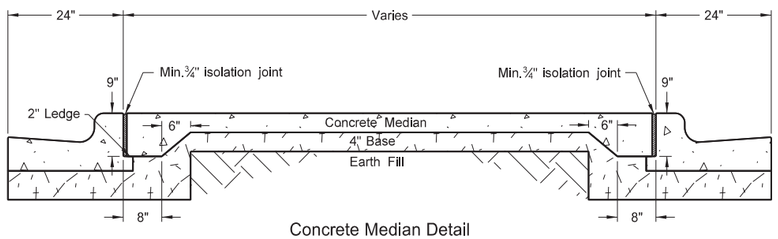
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



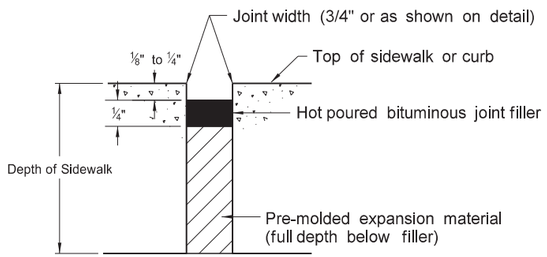
"L"Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



Typical Isolation Joint Seal
(longitudinal and transverse)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width & grade & passing lane requirements.
08-27-19	New Design Engineer PE Stamp.
08-09-24	Electronic Stamp/Signature.

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

08/09/24

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.

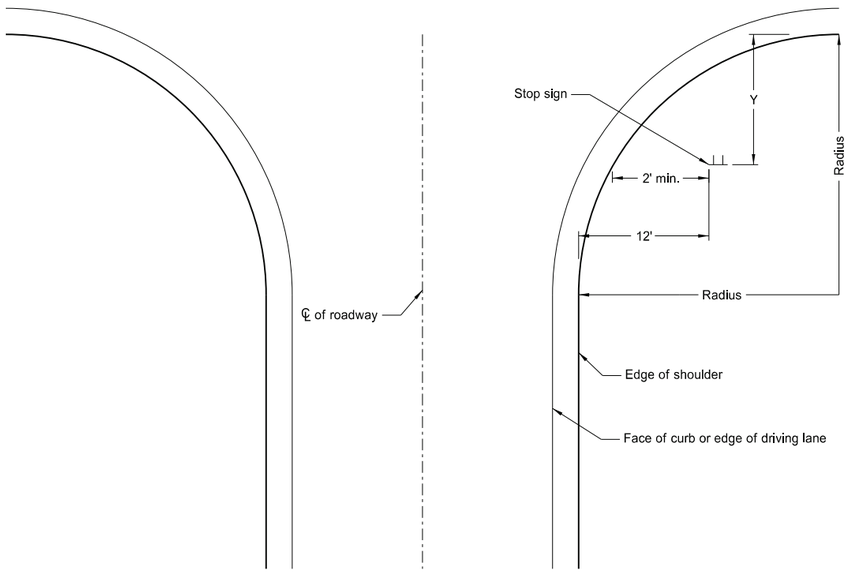
   Install signs on expressways a minimum height of 7'.

   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.

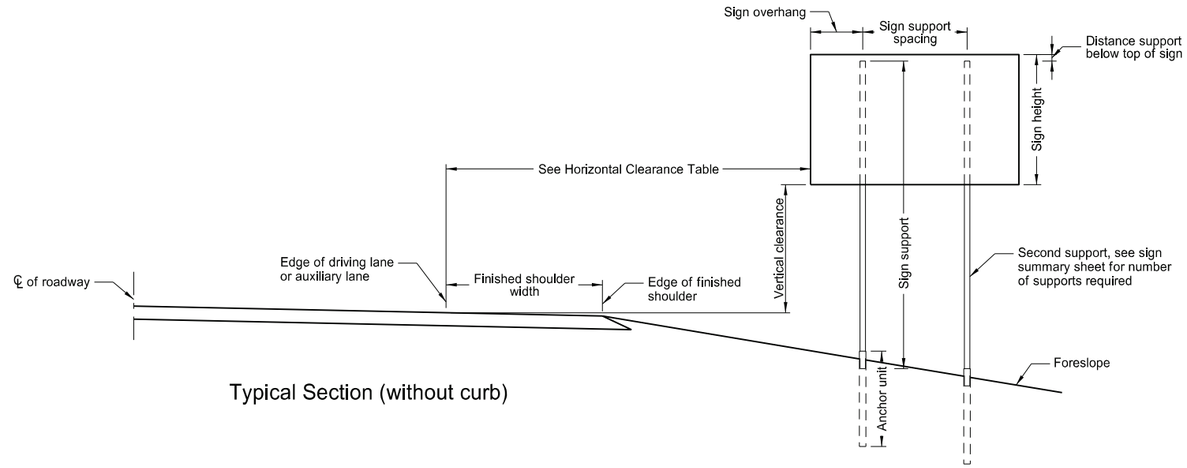
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

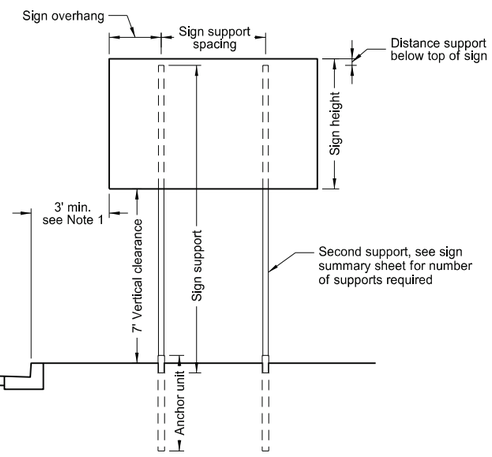
Use layout for the placement of "Stop" signs.

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



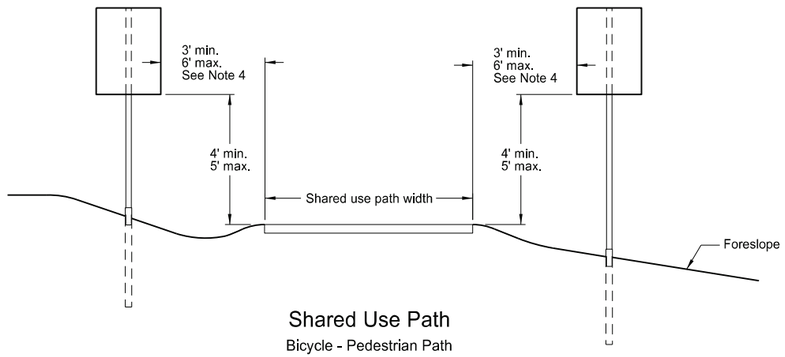
Typical Section (without curb)

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

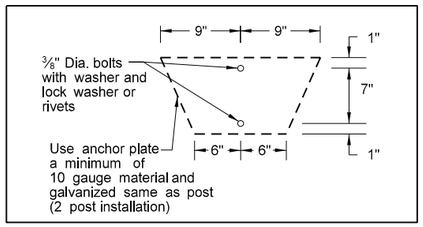
08/05/24

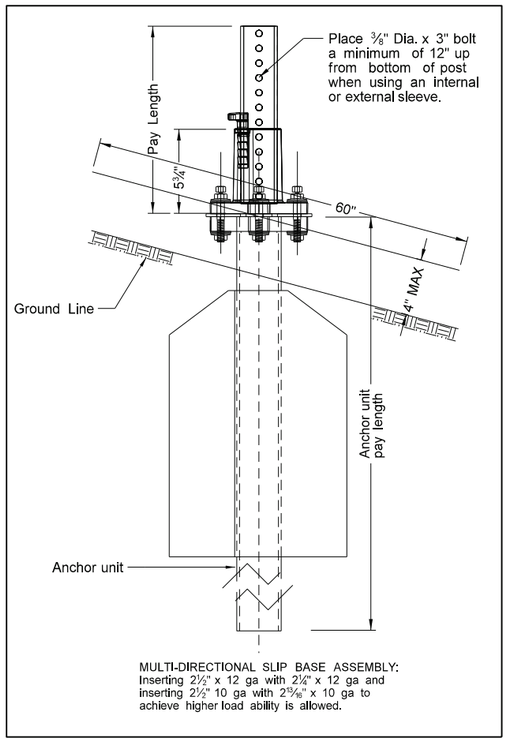
Mounting Details Perforated Tube

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	2⁹⁄₁₆	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.

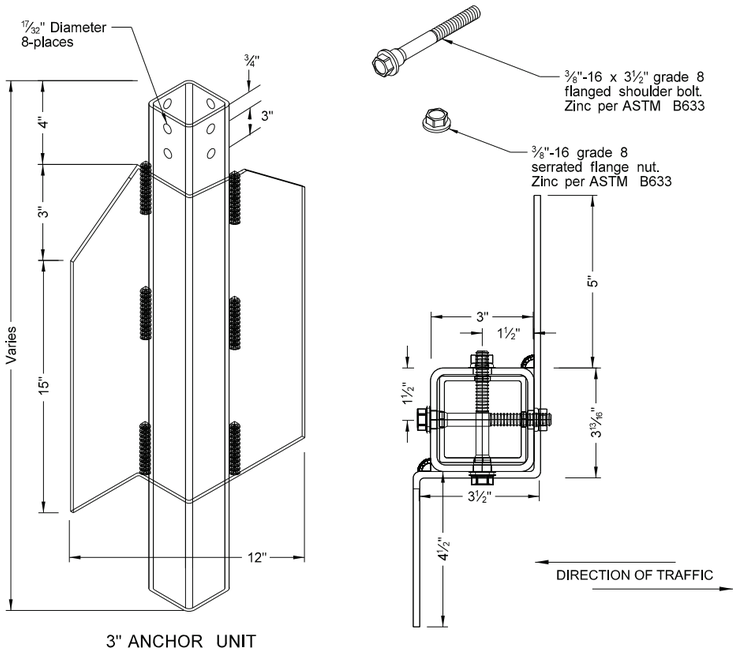




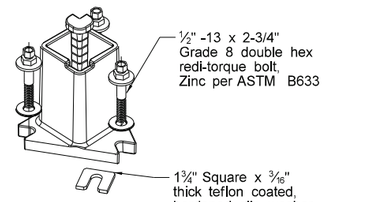
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2¹³⁄₁₆" x 10 ga to achieve higher load ability is allowed.

SHOULDER BOLT

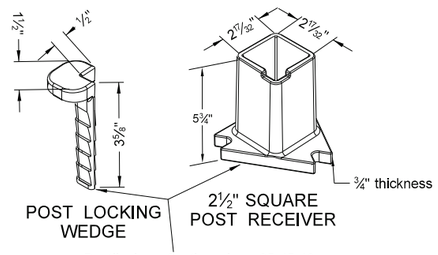
Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)

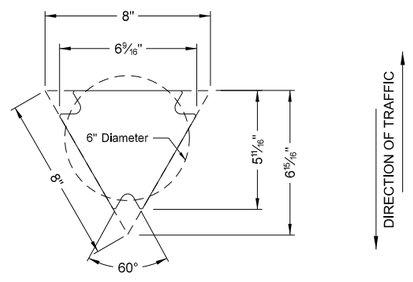


3" ANCHOR UNIT



SLIP BASE FOR 2½" POST





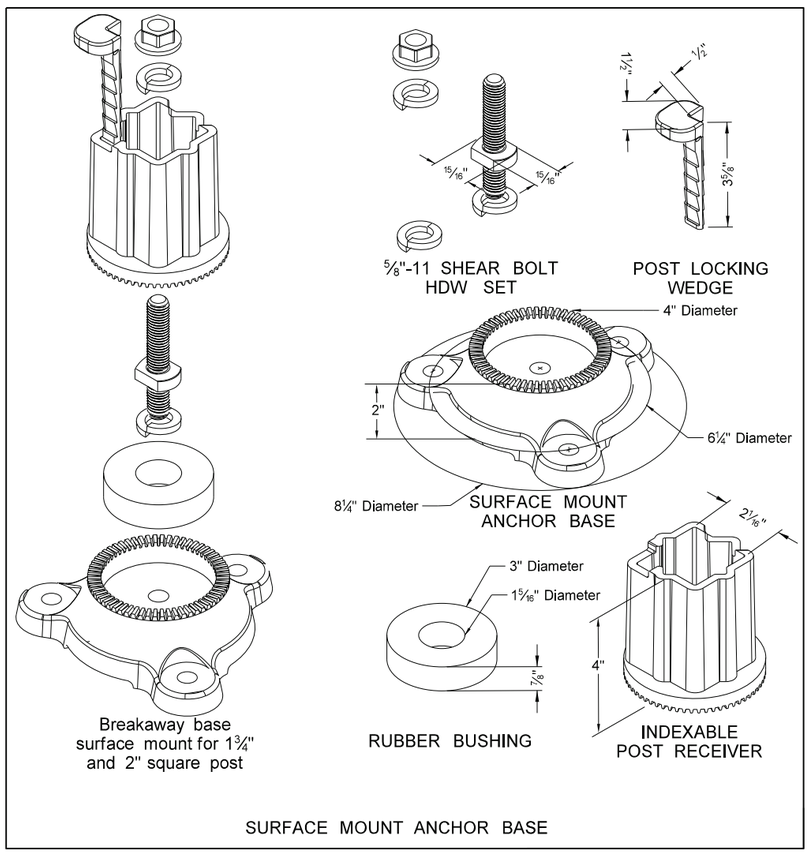
SLIP BASE DETAIL

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
2⅜ x 2⅜	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 ⅜" 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

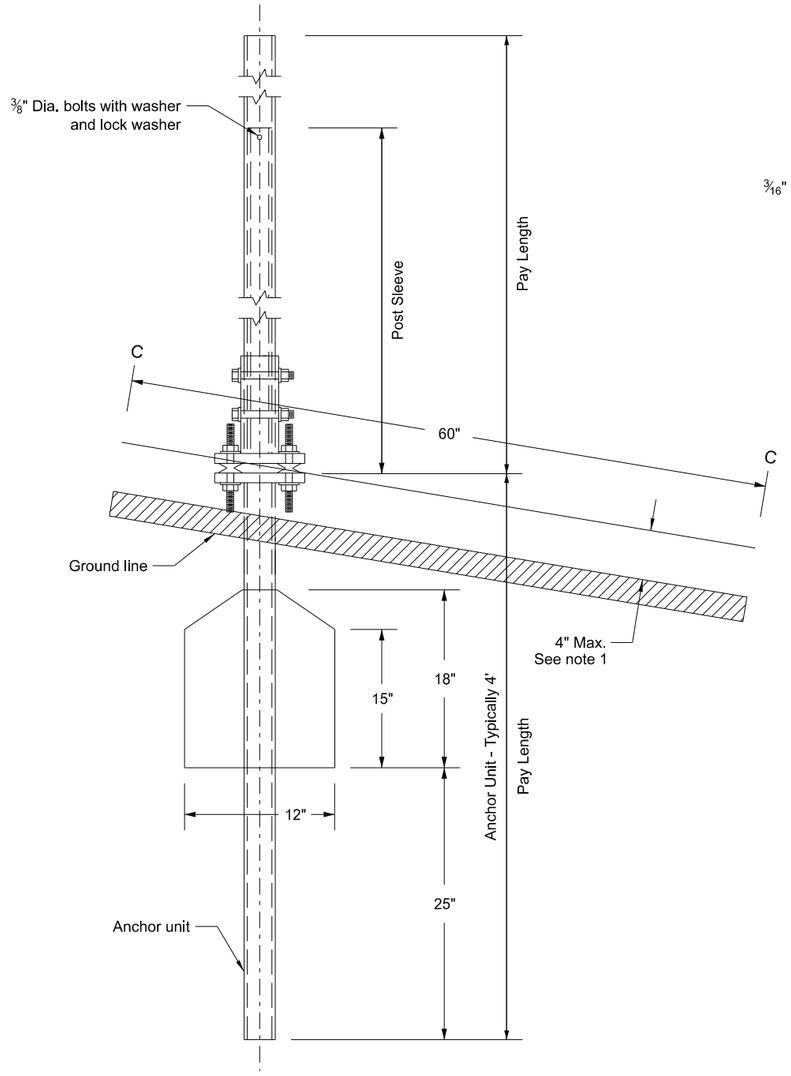
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

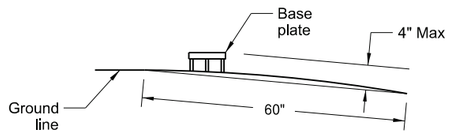
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

D-754-24A

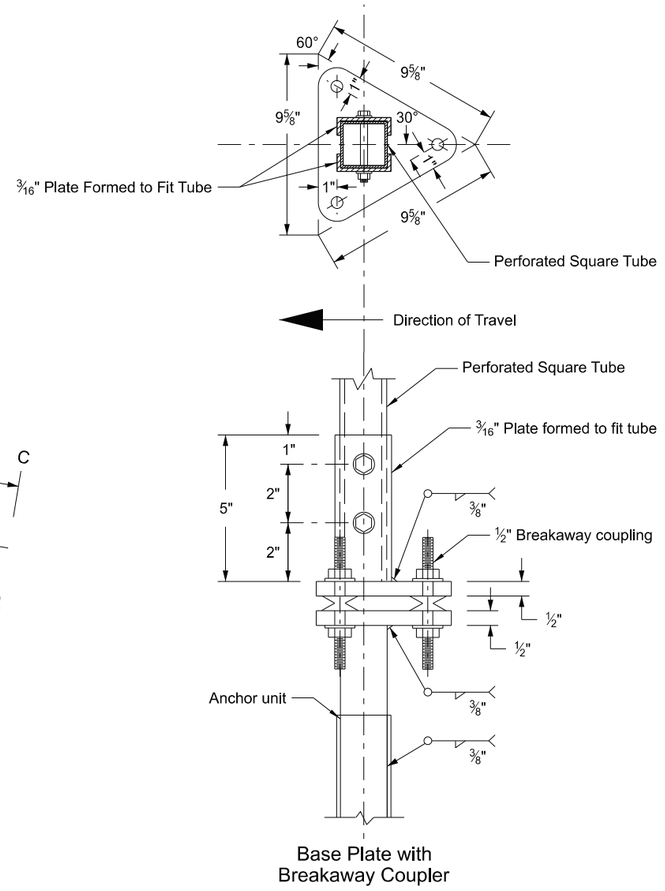
Breakaway Coupler System for Perforated Tubes



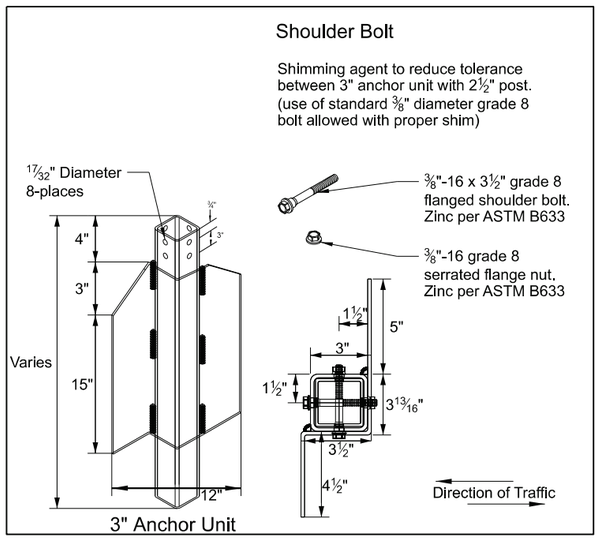


Section C-C

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

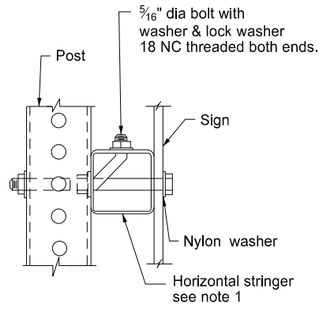
DATE	CHANGE
8-30-18	Updated notes to active volce.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

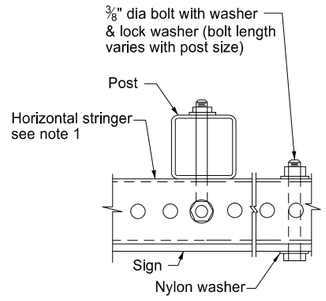
08/05/24

Mounting Details Perforated Tube

D-754-25

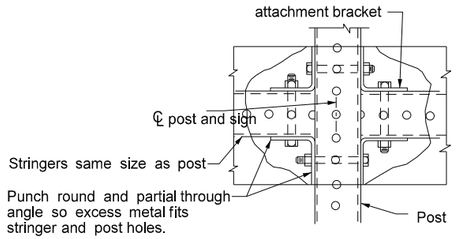


Side View



Top View

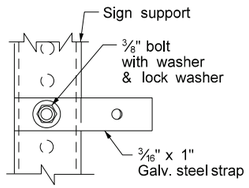
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



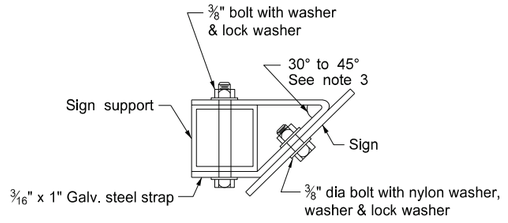
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

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.

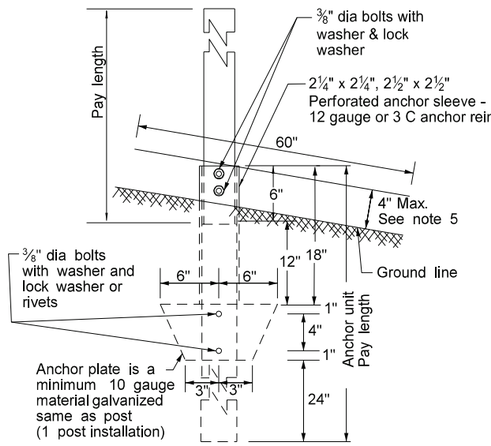


Side View



Top View

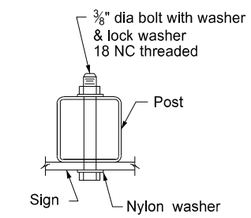
STRAP DETAIL



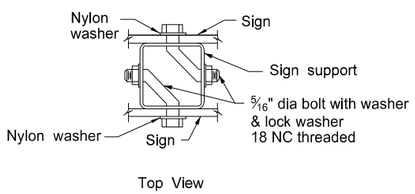
ANCHOR UNIT AND POST ASSEMBLY

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.

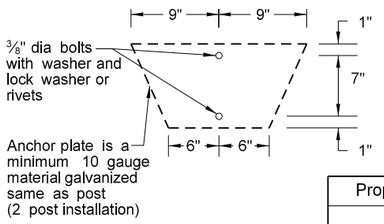


BOLT MOUNTING



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

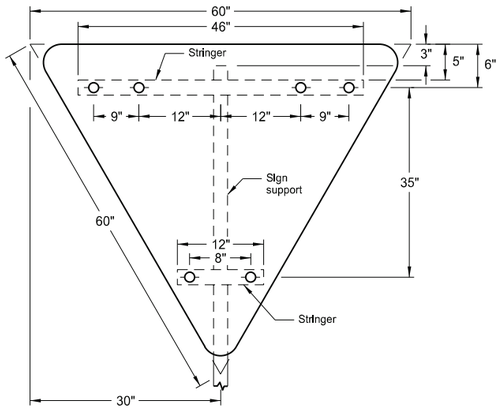
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

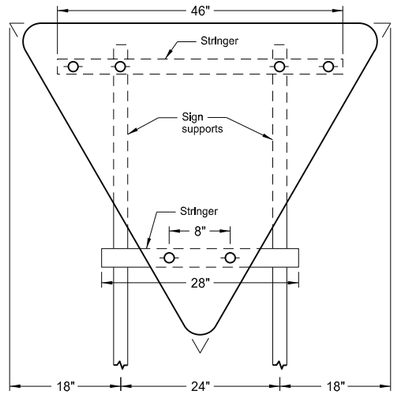
08/05/24

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

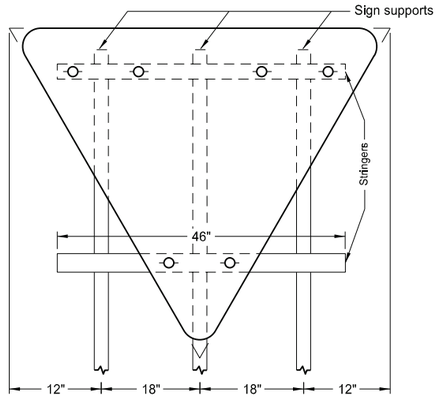
D-754-27



1 Post



2 Posts

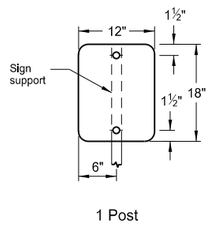


3 Posts

Assembly No. 6

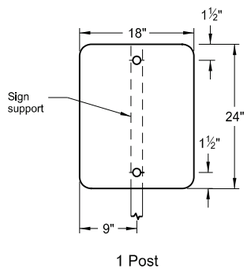
Notes:

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.



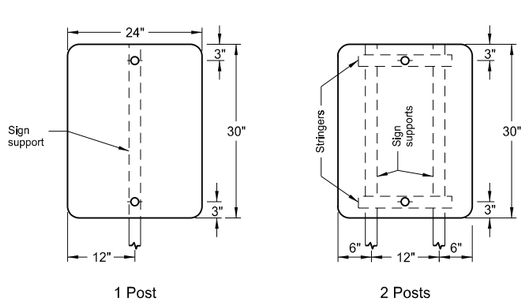
1 Post

Assembly No. 7



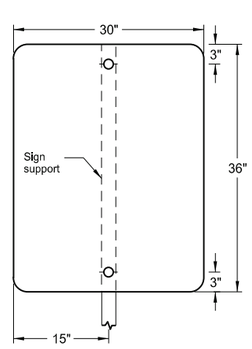
1 Post

Assembly No. 8

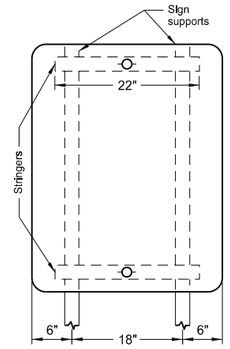


1 Post 2 Posts

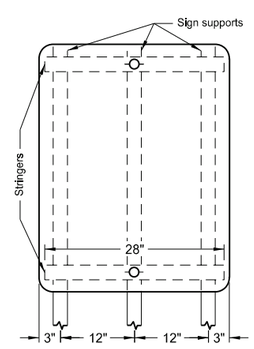
Assembly No. 9



1 Post

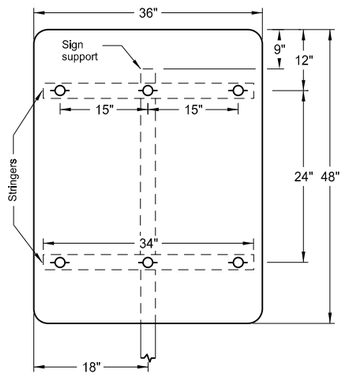


2 Posts

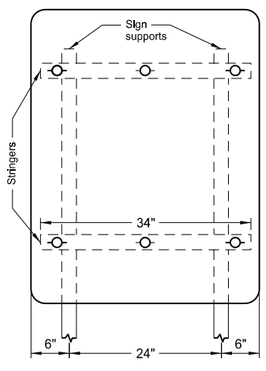


3 Posts

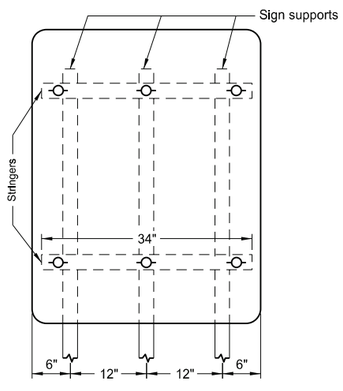
Assembly No. 10



1 Post



2 Posts



3 Posts

Assembly No. 11

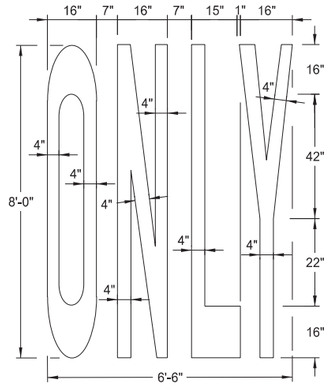
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

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

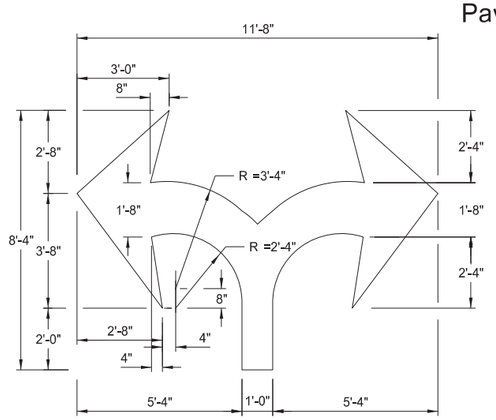
08/06/24

Pavement Marking Message Details

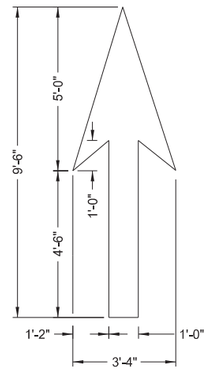
D-762-1



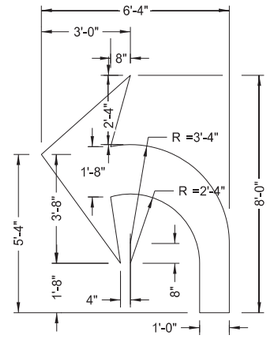
22 S. F.



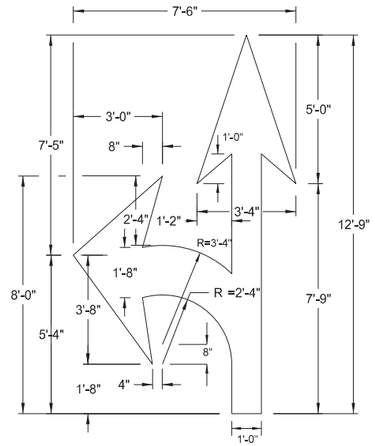
29 S. F.



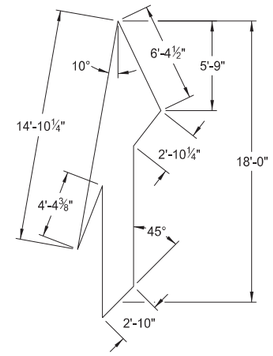
12 S. F.



16 S. F.

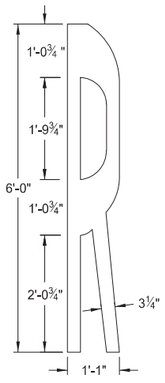


27 S. F.

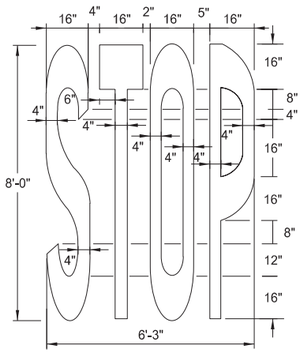


41 S. F.

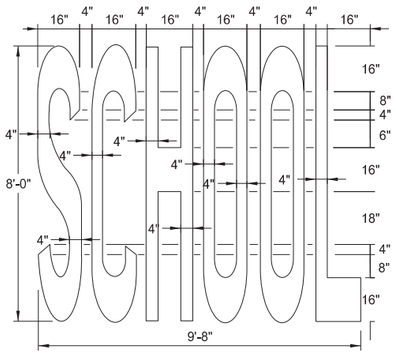
Note: Rotate merge arrow 20° from edge of roadway.



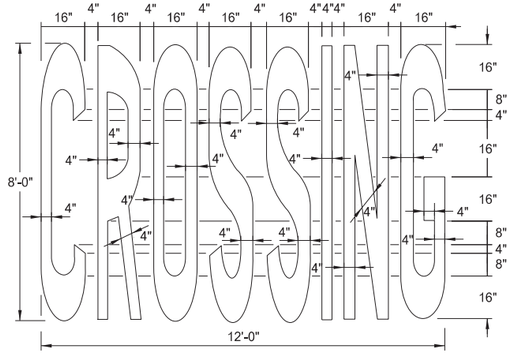
4 S. F.



22 S. F.



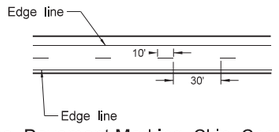
34.5 S. F.



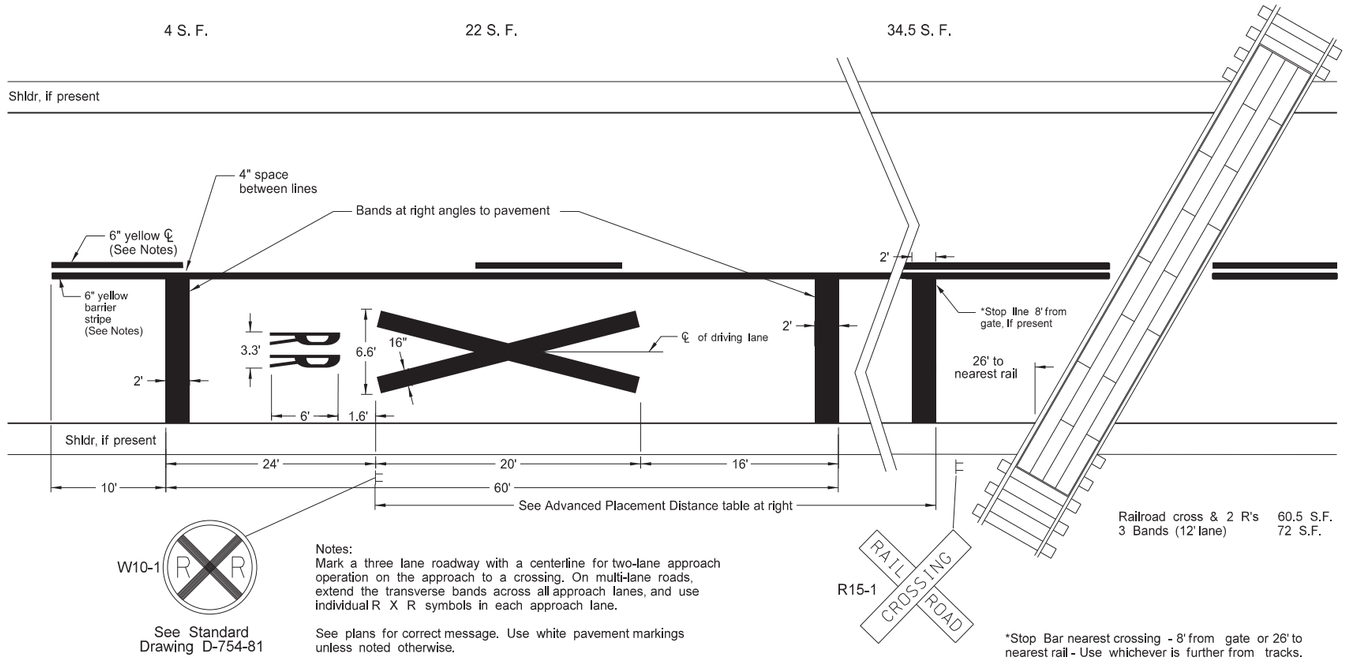
46 S. F.

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



Centerline Pavement Marking Skip Spacing Detail

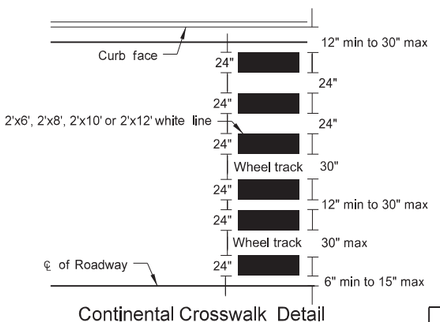


Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

See plans for correct message. Use white pavement markings unless noted otherwise.

Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

*Stop Bar nearest crossing - 8' from gate or 26' to nearest rail - Use whichever is further from tracks.



Continental Crosswalk Detail

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

NOTES:

1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

REVISIONS

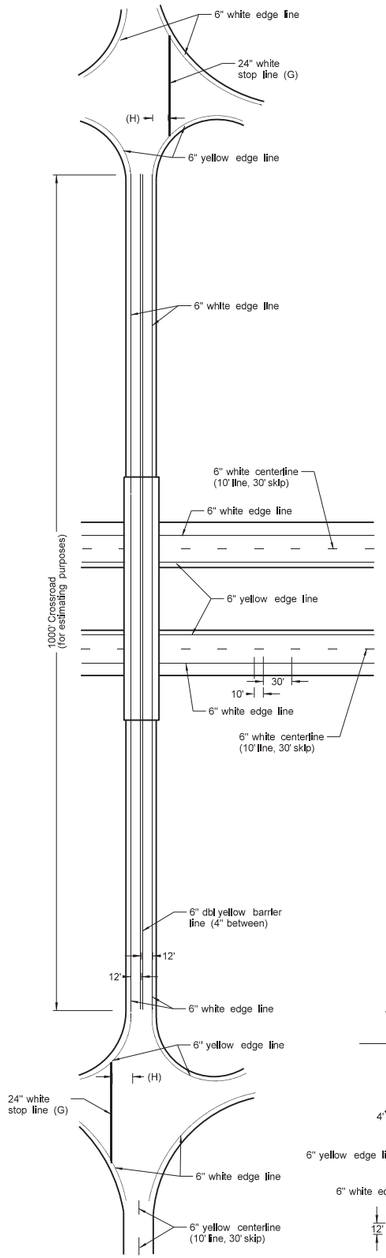
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.
11-22-2023	Revised pavement marking widths.

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 11/22/23 ENGINEER NORTH DAKOTA

Kirk J. Hoff

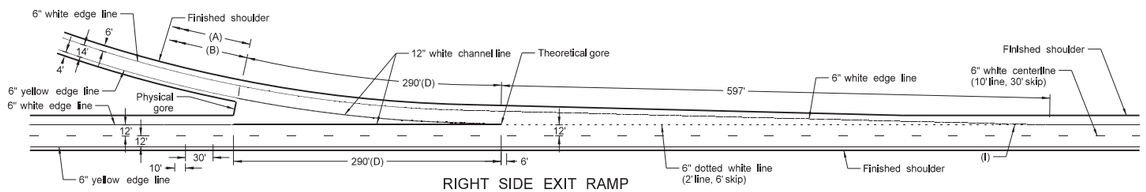
INTERSTATE PAVEMENT MARKING
4 LANE DIVIDED HIGHWAY

D-762-2

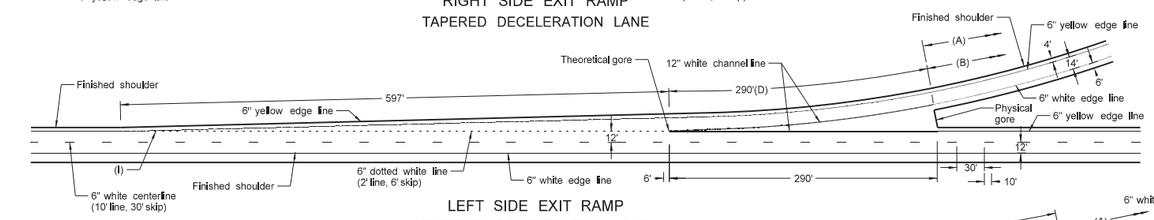


CROSS-ROAD & STRUCTURE

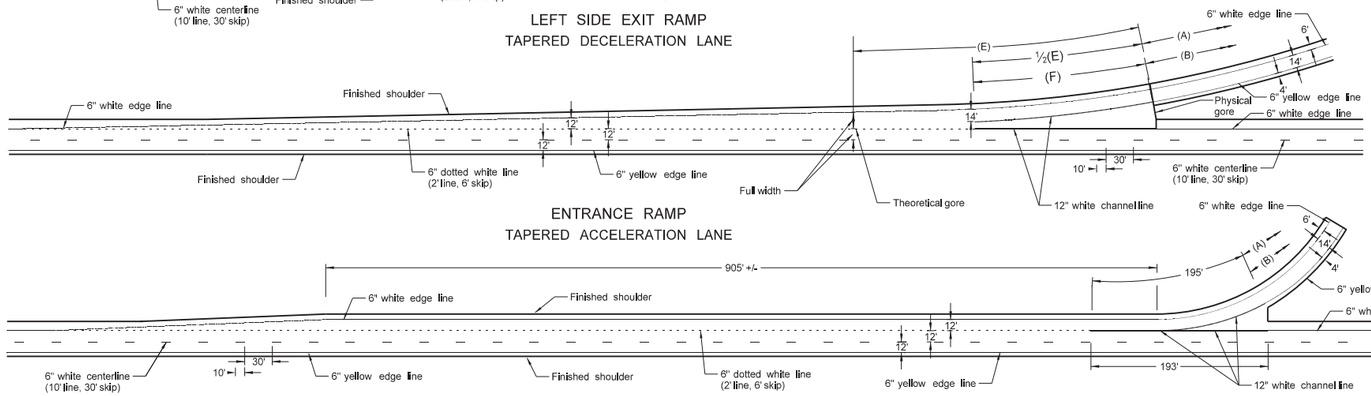
Engineer will determine length striped.



RIGHT SIDE EXIT RAMP
TAPERED DECELERATION LANE

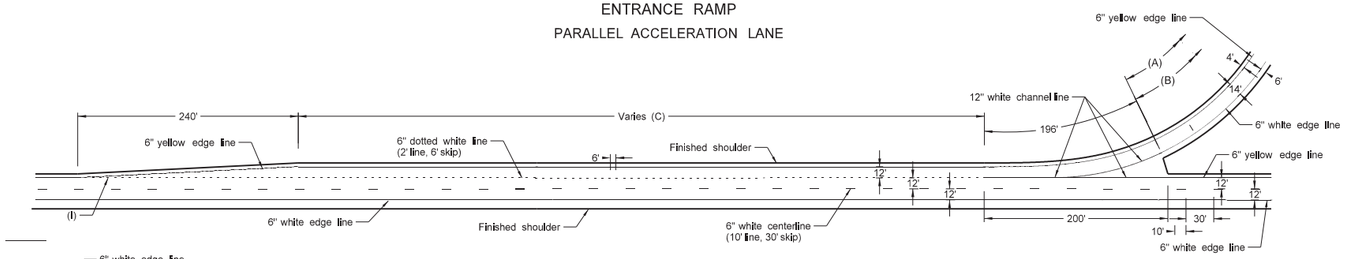


LEFT SIDE EXIT RAMP
TAPERED DECELERATION LANE

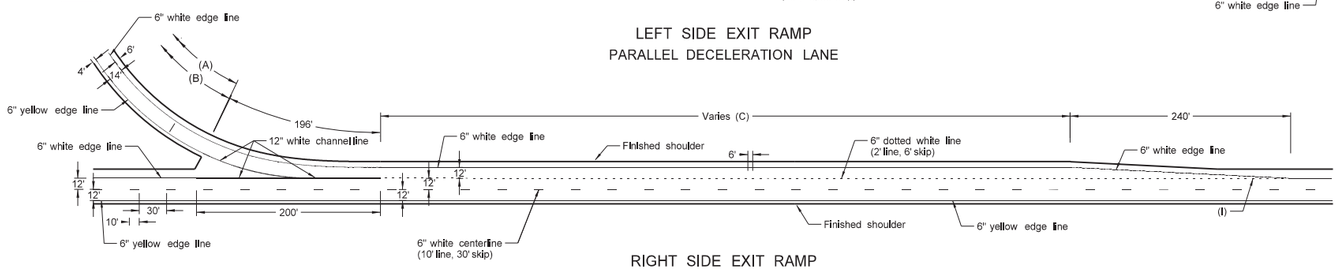


ENTRANCE RAMP
TAPERED ACCELERATION LANE

ENTRANCE RAMP
PARALLEL ACCELERATION LANE



LEFT SIDE EXIT RAMP
PARALLEL DECELERATION LANE



RIGHT SIDE EXIT RAMP
PARALLEL DECELERATION LANE

NOTE:

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

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

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

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

(C) Assume "varies" equals 790' for purpose of estimate. Place pavement marking from beginning of taper to the 12" line.
(D) Beginning of physical gore to theoretical gore.
(E) If the distace is less than 350' extend the 12" channel line to the theoretical gore, otherwise use 195'.
(F) Use 195' for estimating purposes.
(G) Not required for gravel surface crossroad approaches.
(H) 4' minimum, 15' maximum from nearest edge of intersection traveled way.
(I) Extend dotted line until it touches the edgeline.

BASIS OF ESTIMATE		
LOCATION	ITEM	
Right or Left Side Exit Ramp TAPERED	12" White channel line	580 LF
	24" White stop line	60 LF
	6" White dotted line	148 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp TAPERED	12" White channel line	390 LF
	6" White dotted line	258 LF
	6" White edge line	1270 LF
	6" Yellow edge line	1075 LF
Right or Left Side Exit Ramp PARALLEL	12" White channel line	396 LF
	24" White stop line	60 LF
	6" White dotted line (C)	258 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp PARALLEL	12" White channel line	388 LF
	6" White dotted line	283 LF
	6" White edge line	1275 LF
	6" Yellow edge line	1075 LF
Main Line (Both Roadways)	6" White lane line, 10' line, 30' skip	2640 LF/MI
	6" White edge line	10,560 LF/MI
	6" Yellow edge line	10,560 LF/MI
Cross Road	6" White edge line	2000 LF
	6" Dbl yellow barrier line (4" between)	2000 LF

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Replaced 2' Max dim with Note (I)
11-05-21	Revised labels
11-22-23	Revised pvmt marking widths
1-17-24	Revised wide pvmt marking width

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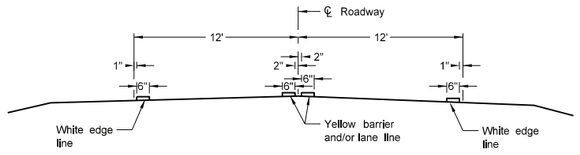
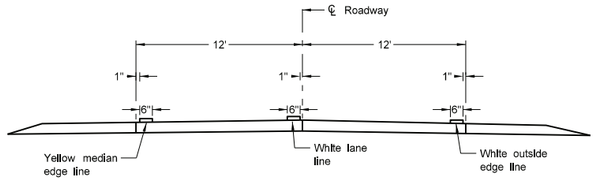
PAVEMENT MARKING

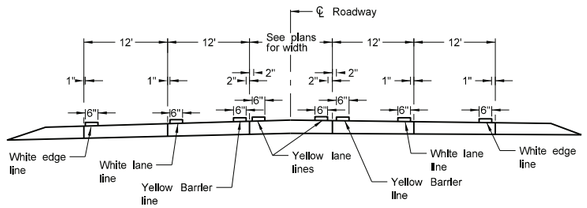
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

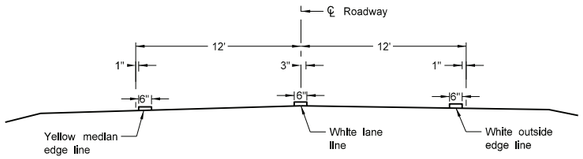
NOTES:

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

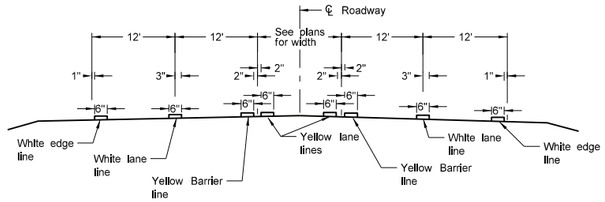
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

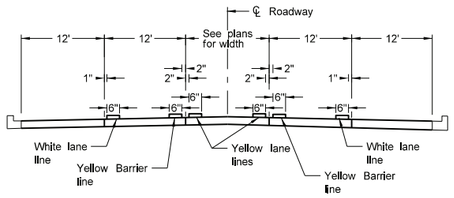
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



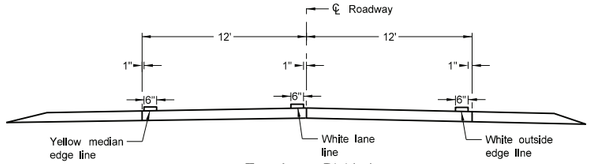
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



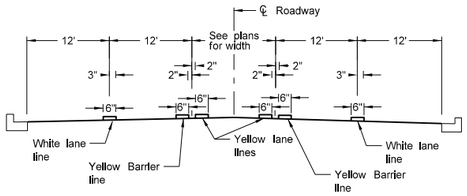
RURAL FIVE LANE ROADWAY
Asphalt Section



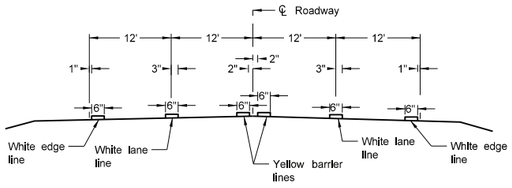
URBAN FIVE LANE SECTION
Concrete Section



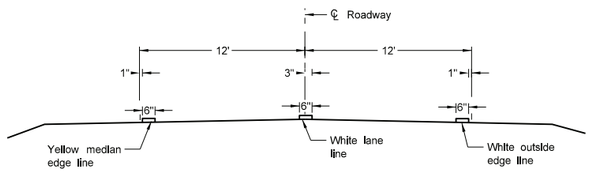
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



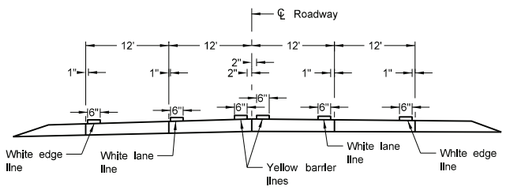
URBAN FIVE LANE SECTION
Asphalt Section



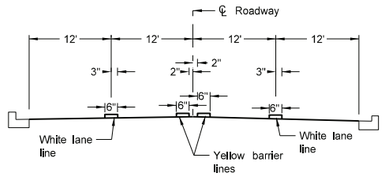
RURAL FOUR LANE ROADWAY
Asphalt Section



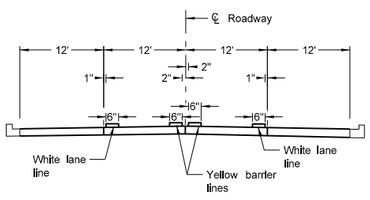
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



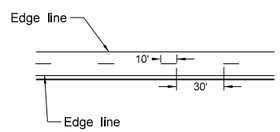
RURAL FOUR LANE ROADWAY
Concrete Section



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.

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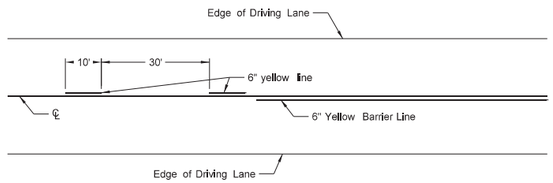
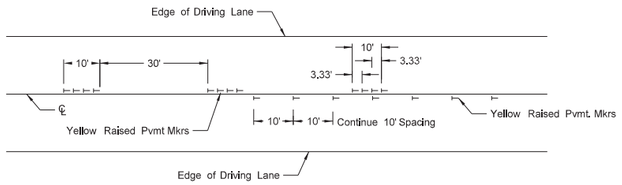
SHORT-TERM PAVEMENT MARKING

D-762-11

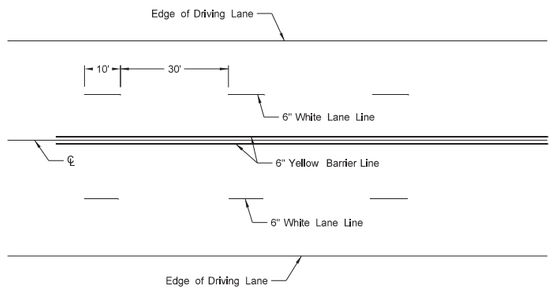


Painted or Tape Lines

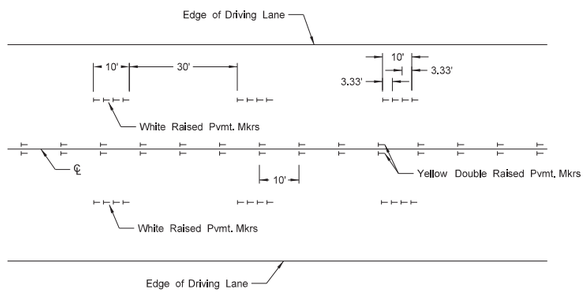


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

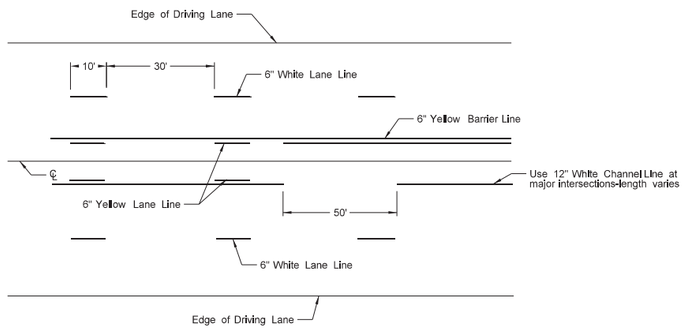


Painted or Tape Lines

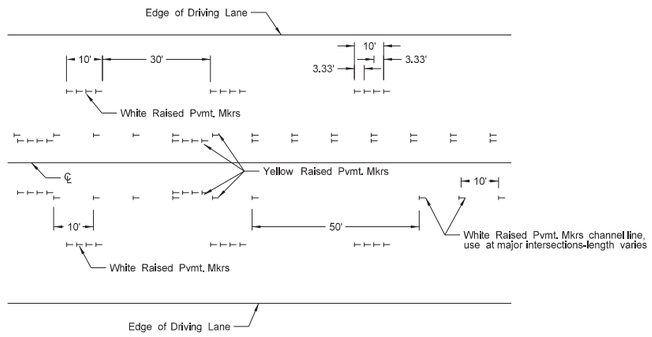


Raised Pavement Markers

FOUR LANE ROADWAY

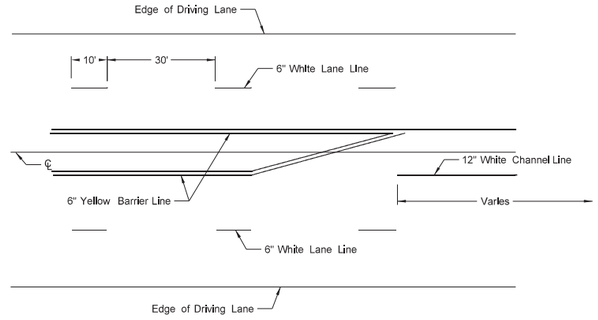


Painted or Tape Lines

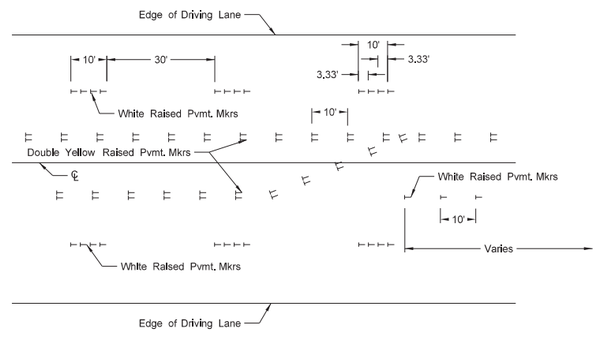


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-1-10

REVISIONS

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

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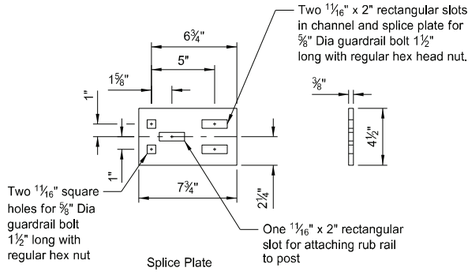
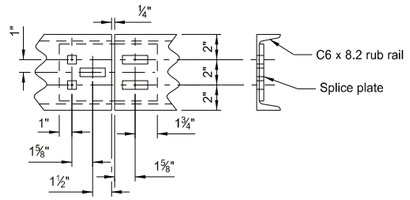
W-BEAM GUARDRAIL GENERAL DETAILS

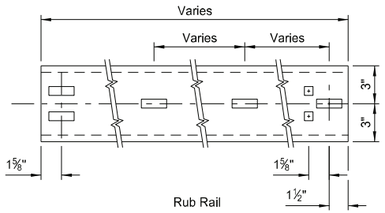
D-764-1



Splice Plate

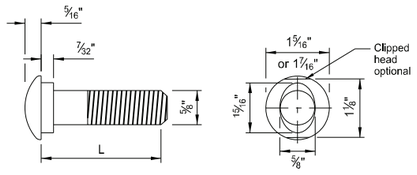


Splice Detail

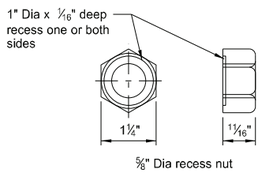


Rub Rail

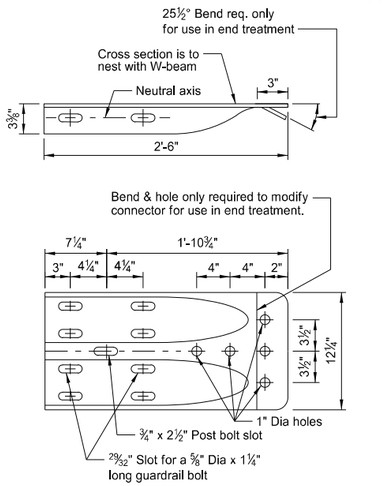
C6x8 RUB RAIL AND SPLICE PLATE



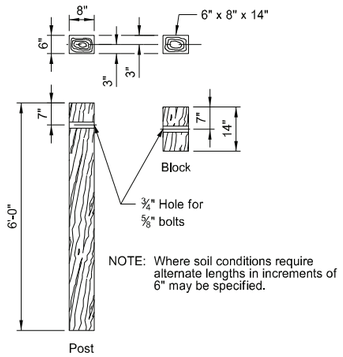
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



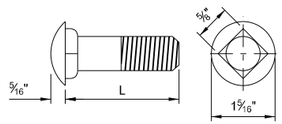
5/8" GUARDRAIL BOLT & RECESS NUT



W BEAM TERMINAL CONNECTOR

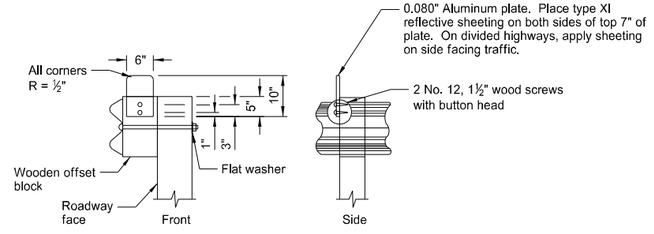


6"x8" TIMBER POST & BLOCK



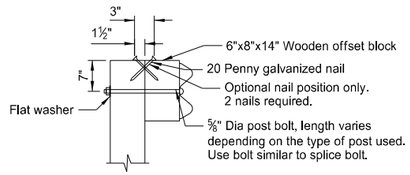
5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

5/8" CARRIAGE BOLT & NUT

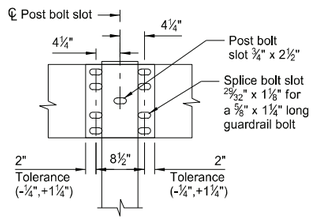


REFLECTORIZED PLATE DETAIL

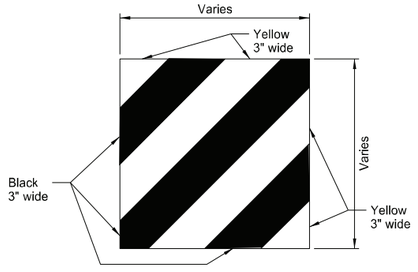
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



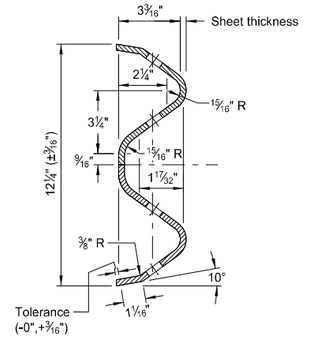
TYPICAL POST ATTACHMENT DETAIL



SPLICE DETAIL



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-11-13

REVISIONS

DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.
12-02-20	Updated clipped head to optional

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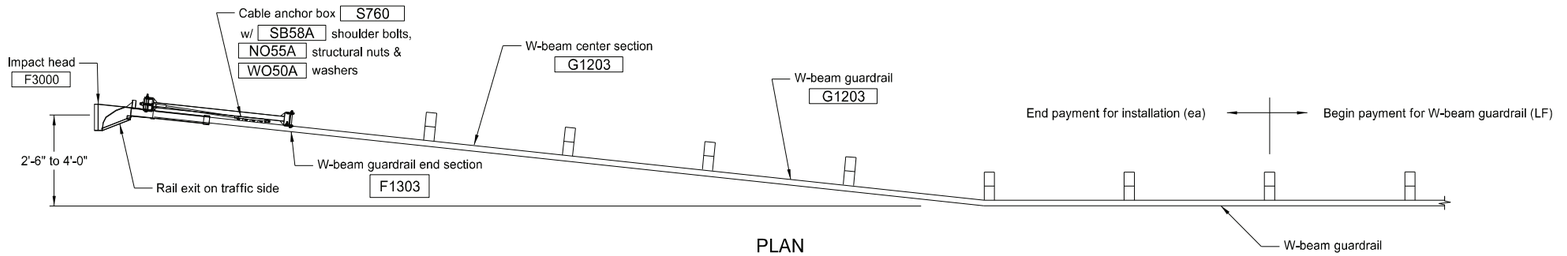
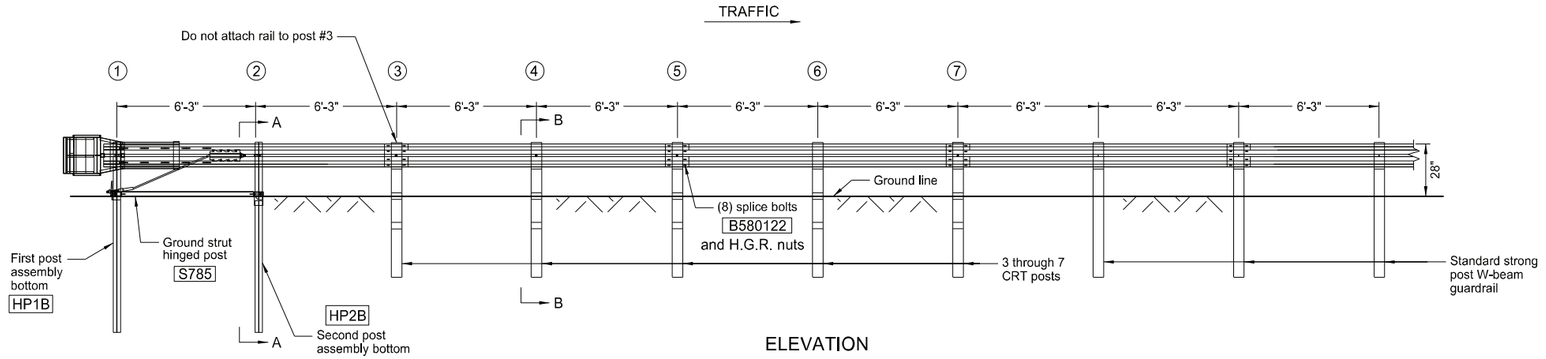
12 02 2020

FLARED ENERGY ABSORBING TERMINAL

D-764-6



PLAN

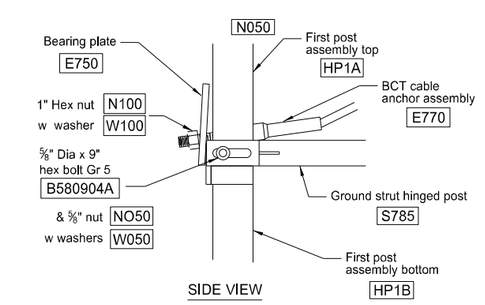


ELEVATION

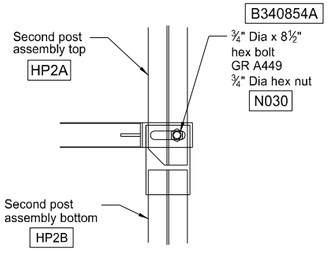
ITEM #	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA
G1203	2	W-BEAM GUARDRAIL, 12 GA
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
P671	5	WOOD CRT POST
P675	5	TIMBER BLOCKOUT OR RECYCLED EQUIVALENT
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
S785	1	GROUND STRUT HINGED POST
		HARDWARE
B140404	2	¼" Dia x 4" HEX BOLT
WO14	4	¼" WASHER
N014	2	¼" HEX NUT
B580122	17	⅝" Dia x 1¼" SPLICE BOLT
B581802	4	⅝ Dia x 10" H.G.R. BOLT (POSTS 3 THRU 6)
B580904A	1	⅝" Dia x 9" HEX BOLT GR 5
W050	5	⅝" WASHER
N050	22	⅝" Dia H.G.R. NUT
B340854A	1	¾" Dia x 8½" HEX BOLT GR A449
NO30	1	¾" Dia HEX NUT
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	½" A325 STRUCTURAL NUT
W050A	16	1 1/16" OD x 3/16" ID A325 STR. WASHER

GENERAL NOTES

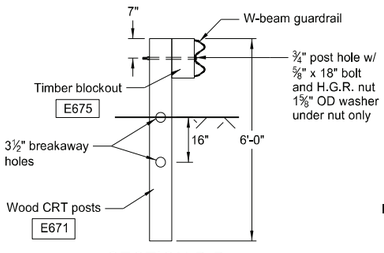
1. Use wood posts with the Flared Energy Absorbing Terminal except posts #1 and #2.
2. Use galvanized bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Grade site as needed to prevent lower sections of the posts from protruding more than 4 inches above the ground (measured along a 60 inch cord).
4. Drive the lower section without the upper post attached. If the post is placed in a drilled hole, compact the backfill material satisfactorily to prevent settlement.
5. When rock is encountered during excavation, use a 12" diameter post hole 20" into the rock surface, if approved by the Engineer. Place granular material in the bottom of hole approximately 2½" deep to provide drainage. Field cut soil tubes to length, place in hole, and back fill with adequately compacted material excavated from hole.
6. Place the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
7. "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails in each post to prevent them from turning when the wood shrinks.
8. Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, flare the Flared Energy Absorbing Terminal at the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, turn the Flared Energy Absorbing Terminal parallel to the roadway.



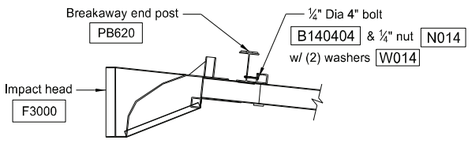
SIDE VIEW



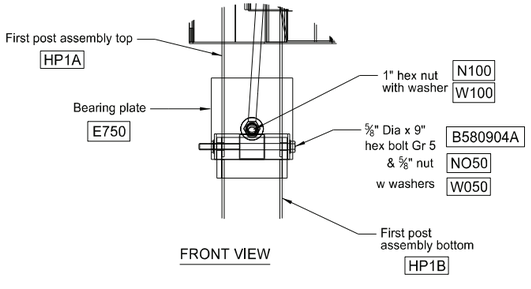
SIDE VIEW DETAIL OF POST #2



SECTION B-B
POST 3 THRU 7

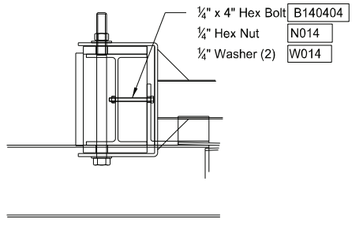


IMPACT HEAD CONNECTING DETAIL

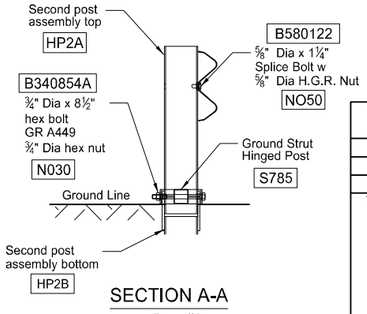


FRONT VIEW

POST #1 CONNECTION DETAILS



IMPACT HEAD CONNECTION DETAIL



SECTION A-A
at Post #2

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10-11-13	
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DATE	CHANGE
12-02-20	Update notes to active voice.

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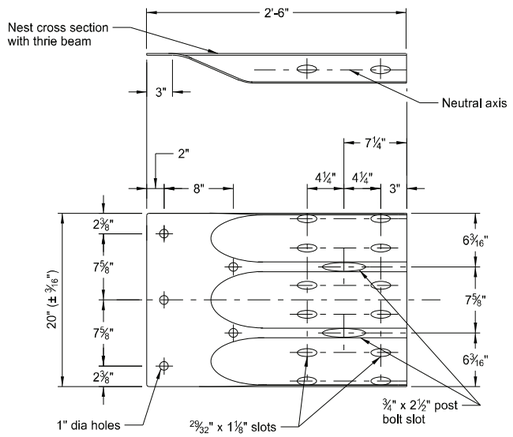
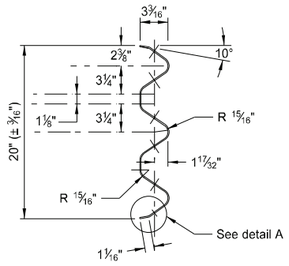
12 02 2020

THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT

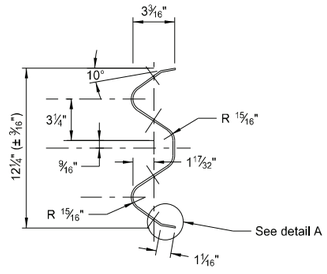
D-764-10



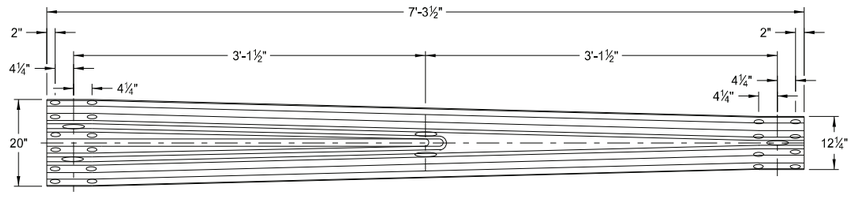
THRIE BEAM TERMINAL CONNECTOR



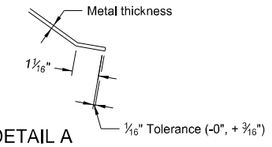
THRIE BEAM END VIEW



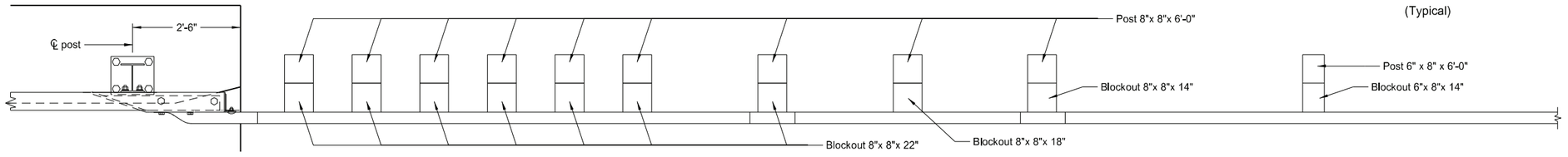
W-BEAM END VIEW



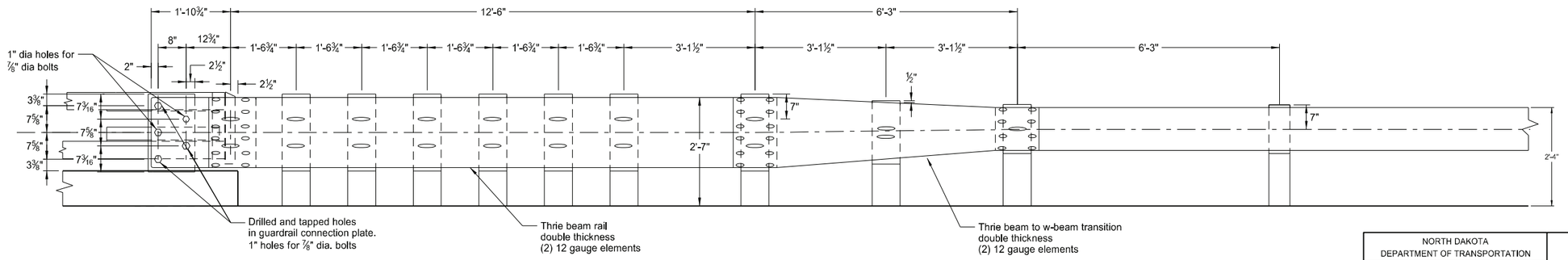
THRIE BEAM TO W-BEAM TRANSITION SECTION



DETAIL A
(Typical)



PLAN



ELEVATION

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10-11-13	
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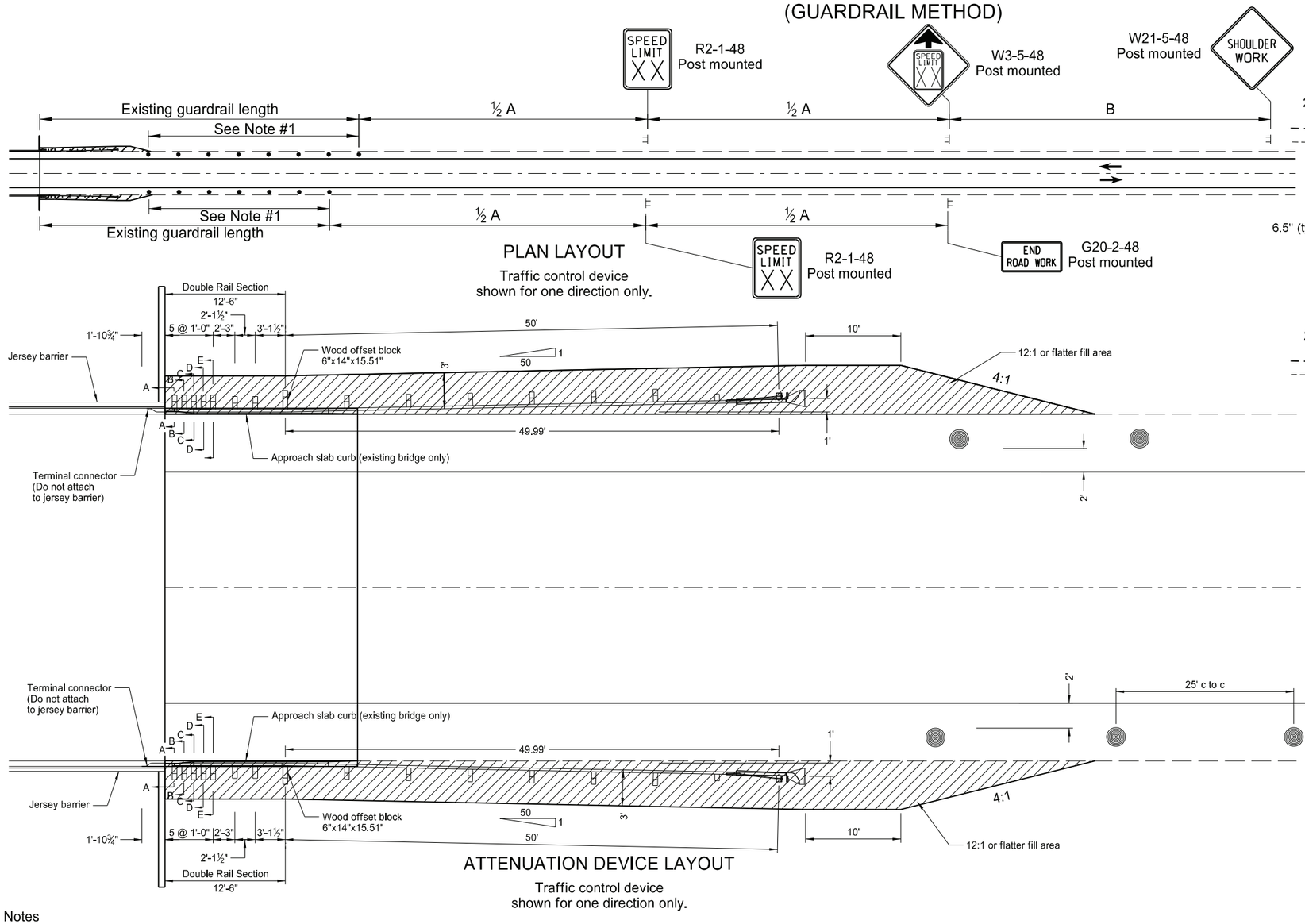
SHORT TERM END TREATMENT FOR BRIDGES
(GUARDRAIL METHOD)

D-764-21

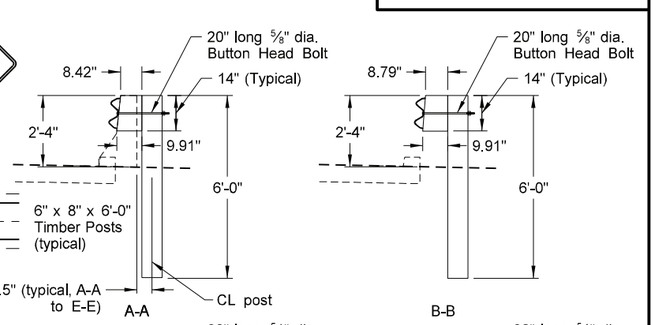


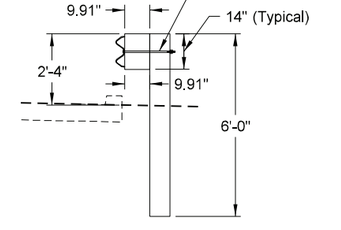
PLAN LAYOUT

Traffic control device
shown for one direction only.

ATTENUATION DEVICE LAYOUT

Traffic control device
shown for one direction only.





E-E

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

Notes

1. If the shoulder width is less than 3', use vertical panels placed as far from the driving lane as possible and still be on the finished shoulder. When there is no shoulder, place vertical panels as near as possible to the driving lane on the foreslope of the shoulder.
2. If the bridge is within construction zone signing, eliminate the reduced speed ahead sign.
3. Determine the reduced speed limit dependent on the in place speed limit before construction. Where total speed reduction exceed 30 mph, reduce the speed limit in two stages with each reduction not exceeding 30 mph. Place the second speed limit sign at ½ B.
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Cover existing speed limit signs within a reduced speed zone.

KEY

Sign

Delineator drum

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9-27-13

REVISIONS

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

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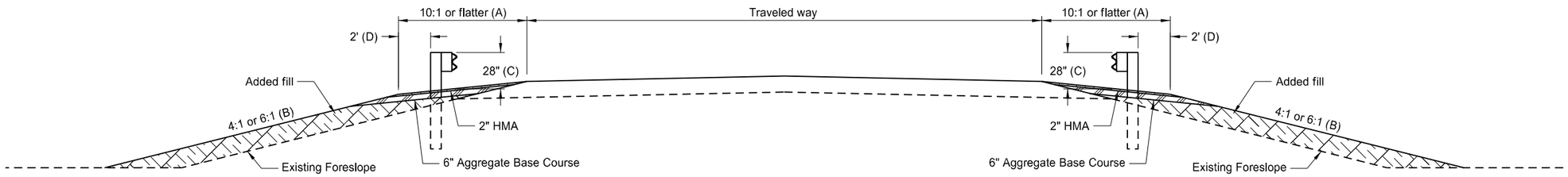
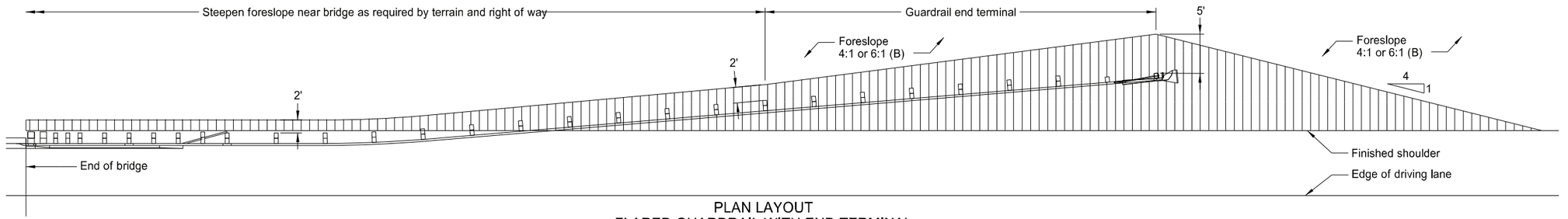
D-764-22

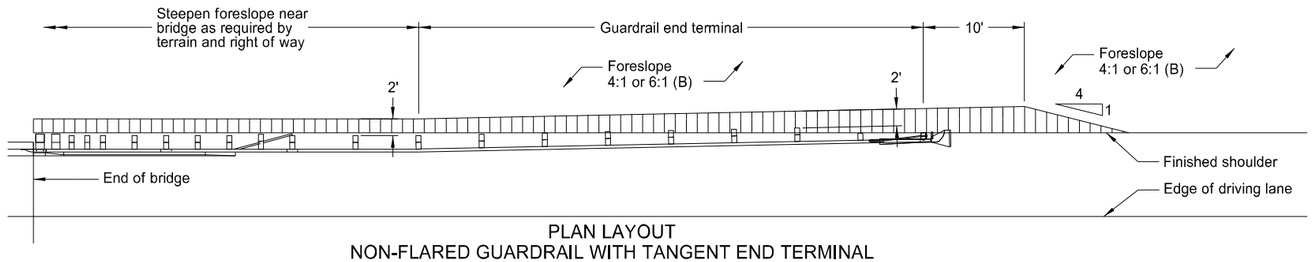
TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL



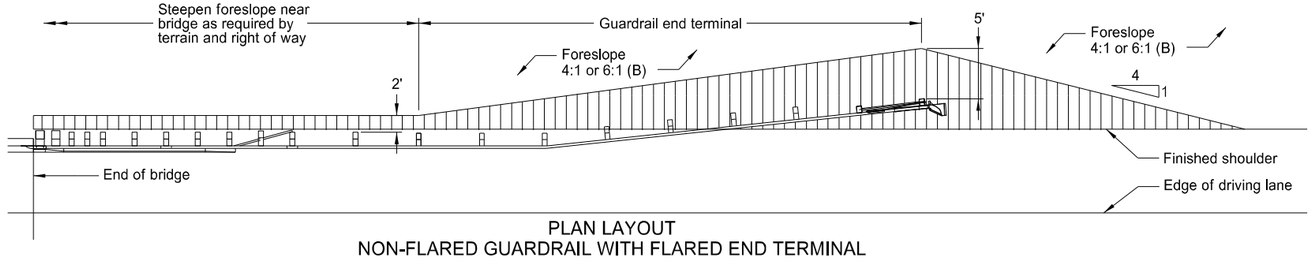
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Use slope flatter than 10:1 when necessary to provide proper guardrail height.

(B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.

(C) Measure from top of guardrail to top of surfacing at front face of guardrail.

(D) Dimension at end terminals vary per Plan Layouts shown on this sheet.

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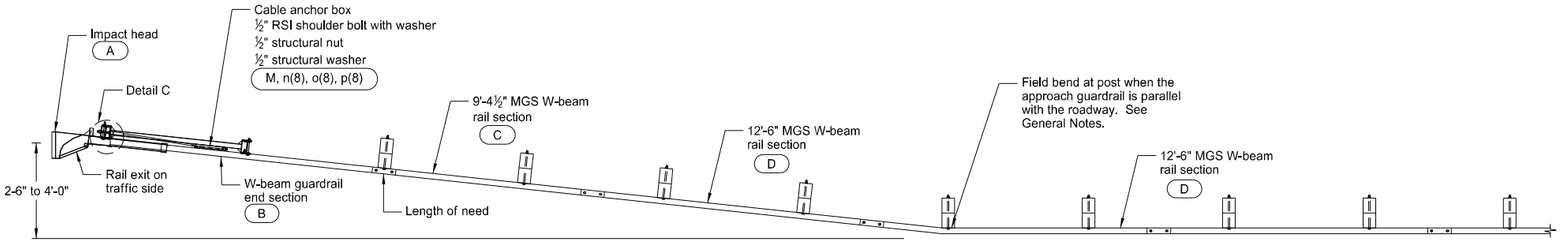
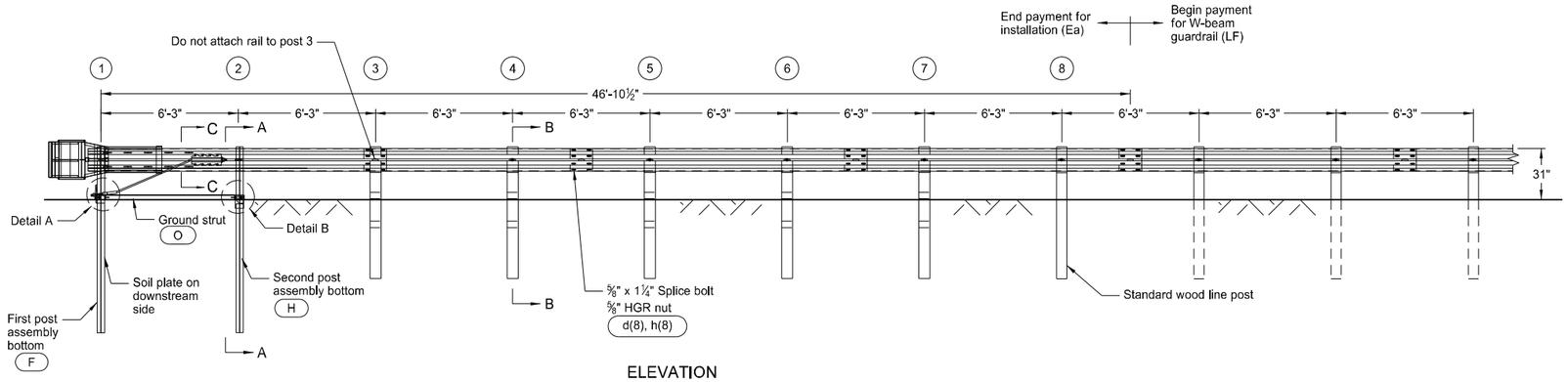
MGS FLARED ENERGY ABSORBING TERMINAL - WOOD POST

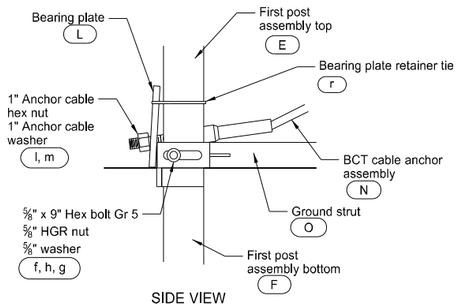
D-764-38



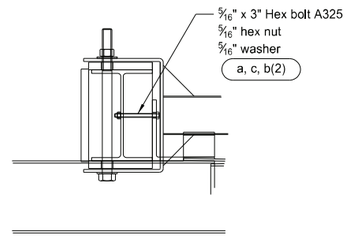
PLAN



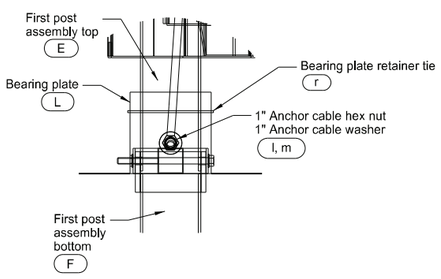
ELEVATION



SIDE VIEW

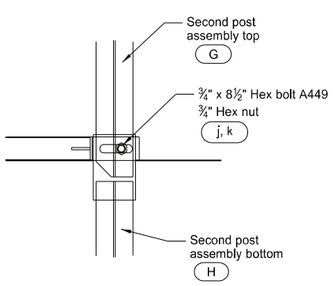


DETAIL C
Post 1 (Impact Head connection)

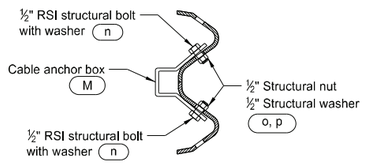


FRONT VIEW

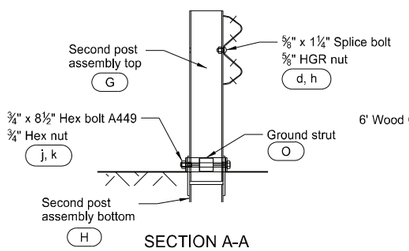
DETAIL A
Post 1



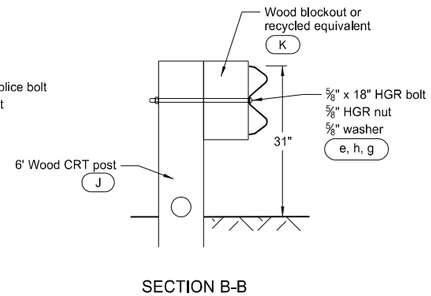
DETAIL B
Post 2



SECTION C-C



SECTION A-A
Post 2



SECTION B-B
Posts 3 through 7

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	F3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	UHP1A	FIRST POST ASSEMBLY TOP	1
F	HP1B	FIRST POST ASSEMBLY BOTTOM	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
J	UP671	WOOD CRT POST	5
K	P675	WOOD BLOCKOUT OR RECYCLE EQUIVALENT	5
L	E750	BEARING PLATE	1
M	S760	CABLE ANCHOR BOX	1
N	E770	BCT CABLE ANCHOR ASSEMBLY	1
O	S785	GROUND STRUT HINGED POST	1
		HARDWARE	
a	B5160304A	⅝" x 3" HEX BOLT A325	2
b	W0516	⅝" WASHER	4
c	N0516	⅝" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia X 18" HGR BOLT	5
f	B580904A	⅝" Dia x 9" HEX BOLT GRD 5	1
g	W050	⅝" WASHER	7
h	N050	⅝" Dia HGR NUT	39
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

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

GENERAL NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-14-17

REVISIONS

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

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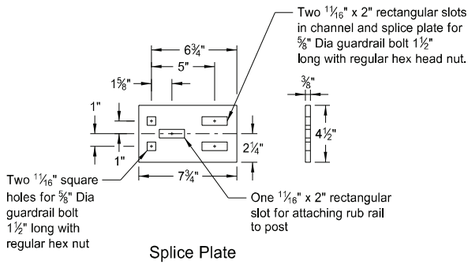
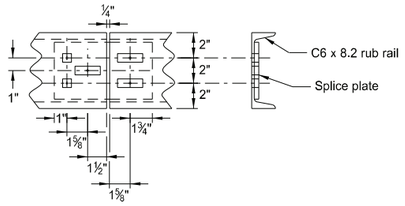
12 02 2020

MGS W-BEAM GUARDRAIL GENERAL DETAILS

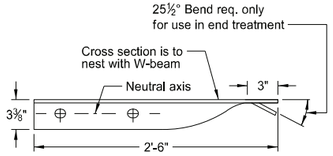
D-764-40

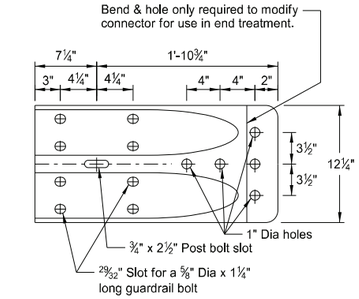


Splice Plate

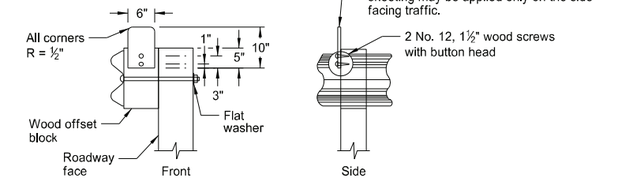


Splice Detail



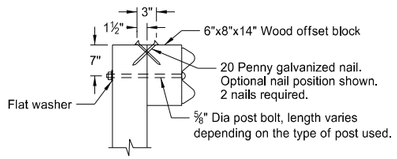


W BEAM TERMINAL CONNECTOR



REFLECTORIZED PLATE DETAIL

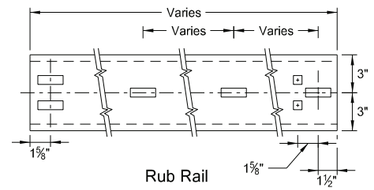
NOTE: Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



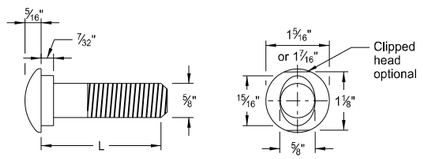
TYPICAL WOOD POST ATTACHMENT DETAIL

NOTES:

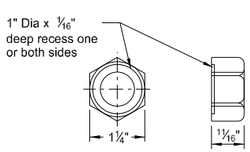
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material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



C6x8.2 RUB RAIL AND SPLICE PLATE

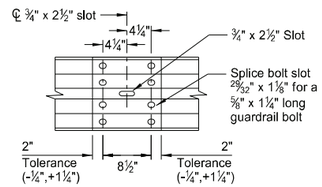


5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



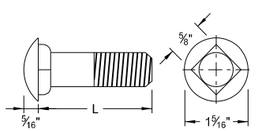
5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT



SPLICE DETAIL

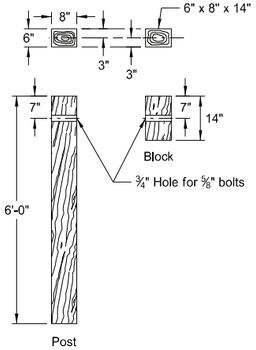
NOTE: Do not install center bolt in the 3/4" x 2 1/2" slot at mid span splices.



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

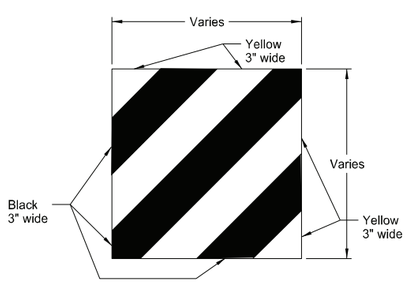
5/8" Dia hex nut

5/8" CARRIAGE BOLT & NUT

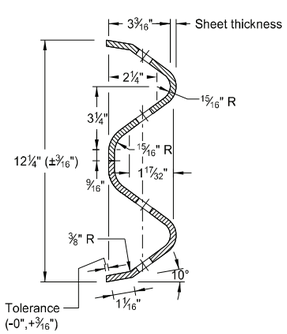


6" x 8" WOOD POST & BLOCK

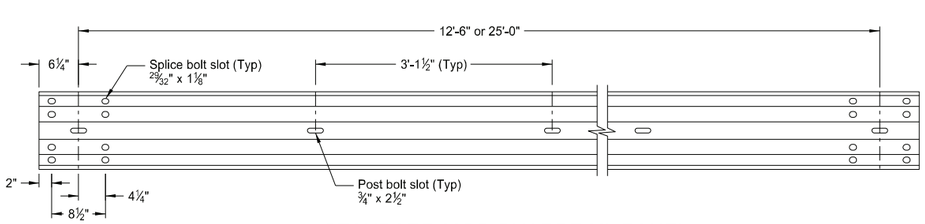
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



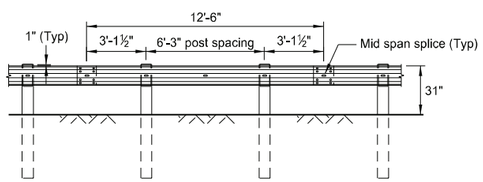
IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM

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

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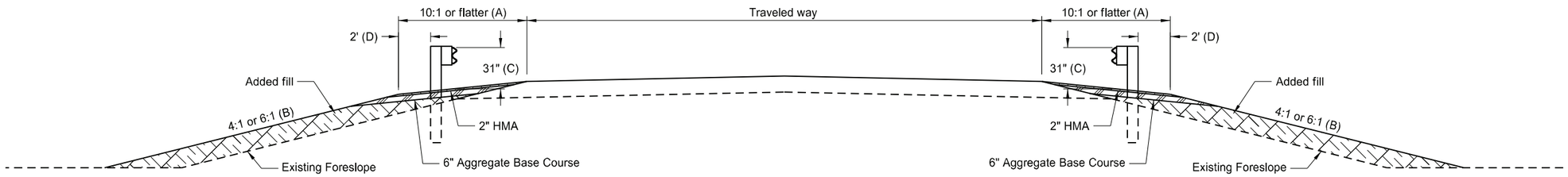
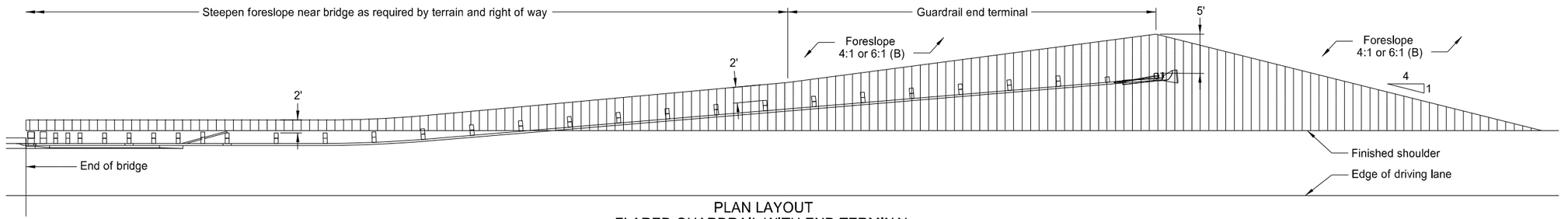
12 02 2020

TYPICAL GRADING AT BRIDGE ENDS WITH MGS W-BEAM GUARDRAIL

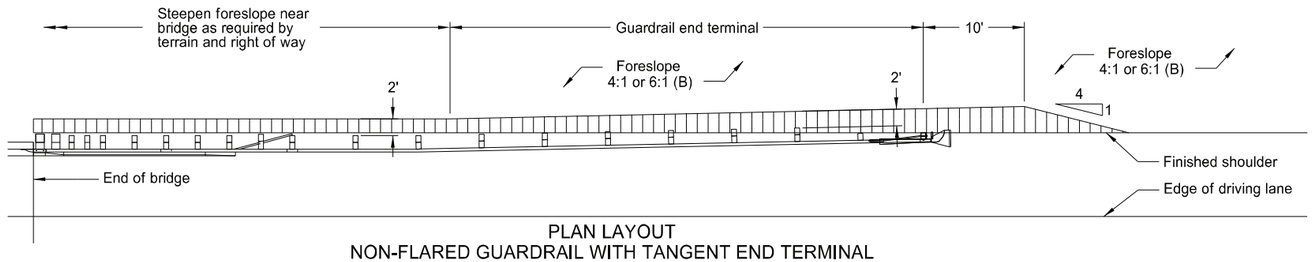
D-764-48



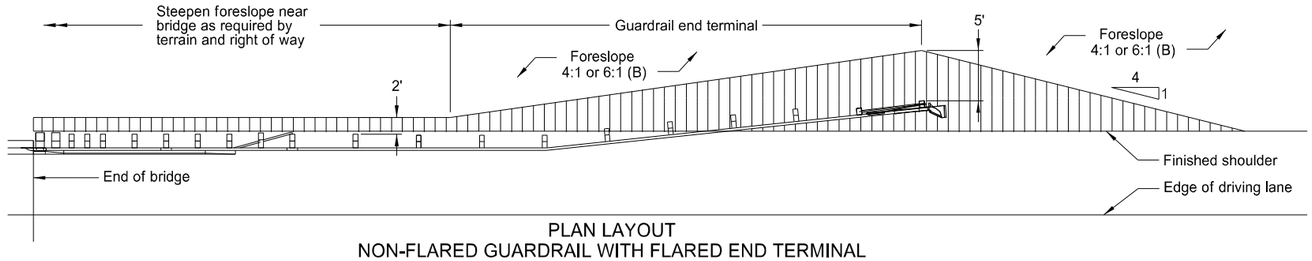
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Use slope flatter than 10:1 when required to provide proper guardrail height.

(B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.

(C) Measure from top of guardrail to top of surfacing at front face of guardrail.

(D) Vary dimension at end terminals per Plan Layouts shown on this sheet.

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12/02/20	Updated notes to active voice.

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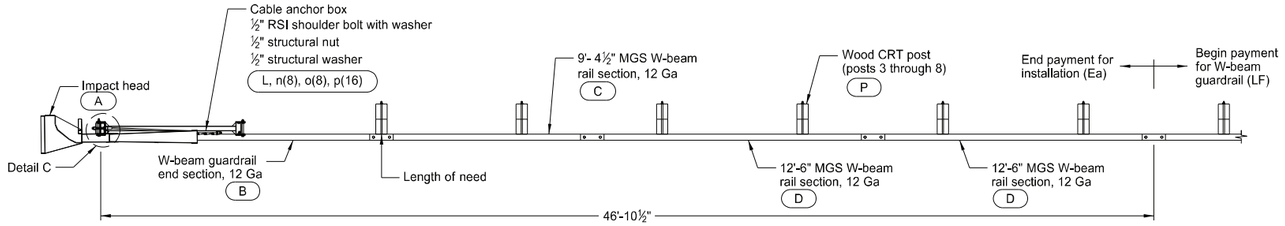
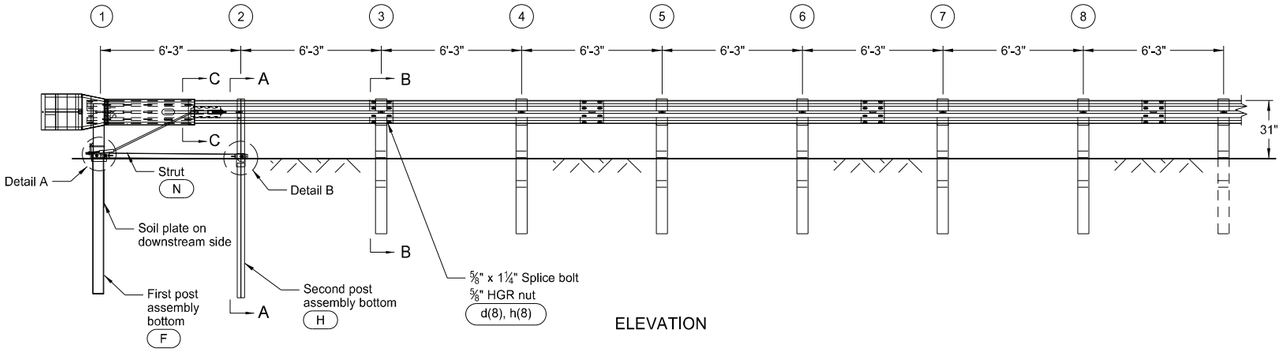
MASH SEQUENTIAL KINKING TERMINAL - WOOD POST

D-764-51



PLAN

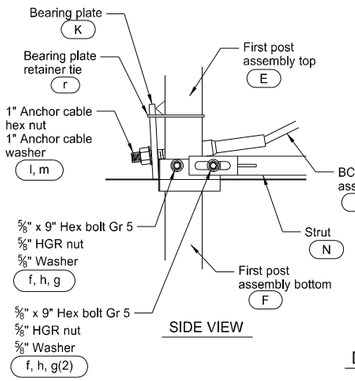


ELEVATION

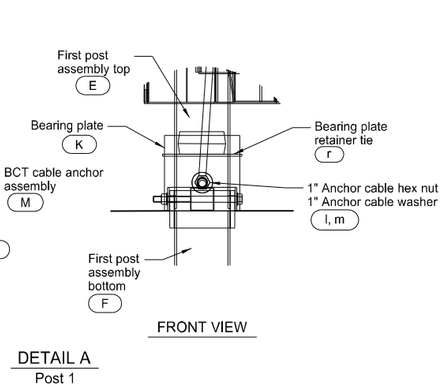
GENERAL NOTES:

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

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	MS3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	MTPHP1A	FIRST POST ASSEMBLY TOP (6" X 6" X⅛" Tube)	1
F	MTPHP1B	FIRST POST ASSEMBLY BOTTOM (6' W6X15)	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
K	E750	BEARING PLATE	1
L	S760	CABLE ANCHOR BOX	1
M	E770	BCT CABLE ANCHOR ASSEMBLY	1
N	MS785	STRUT	1
P	UP671	6' WOOD CRT POST	6
R	P675	WOOD BLOCKOUT OR RECYCLED EQUIVALENT	6
		HARDWARE	
a	B5160104A	5/16" x 1" HEX BOLT GR 5	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia x 18" HGR BOLT (POSTS 3 THRU 8)	6
f	B580904A	⅝" x 9" HEX BOLT GR 5	2
g	W050	⅝" WASHER	9
h	N050	⅝" Dia HGR NUT	35
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

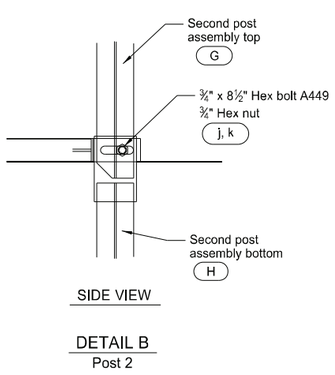


SIDE VIEW



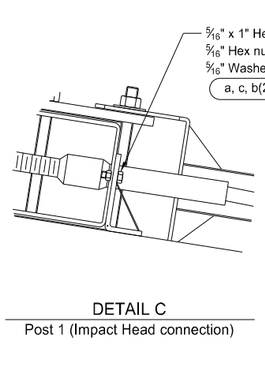
FRONT VIEW

DETAIL A
Post 1

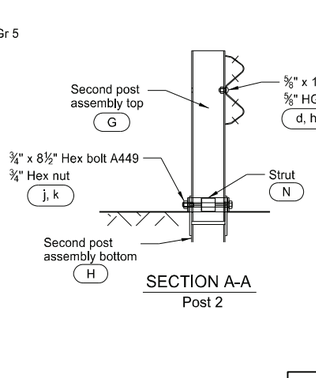


SIDE VIEW

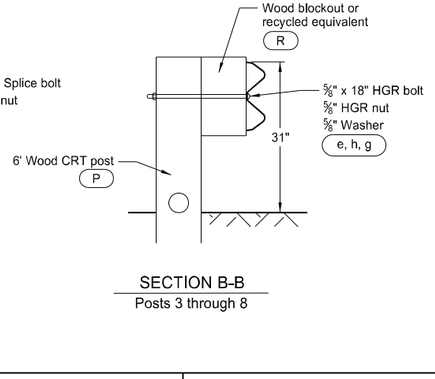
DETAIL B
Post 2



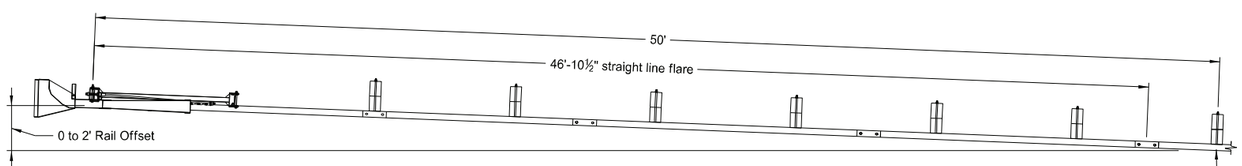
DETAIL C
Post 1 (Impact Head connection)



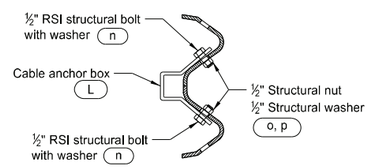
SECTION A-A
Post 2



SECTION B-B
Posts 3 through 8



FLARED INSTALLATION
25:1 maximum flare rate



SECTION C-C

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

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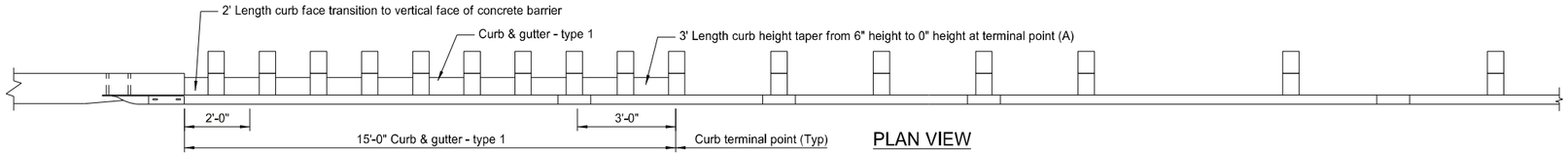
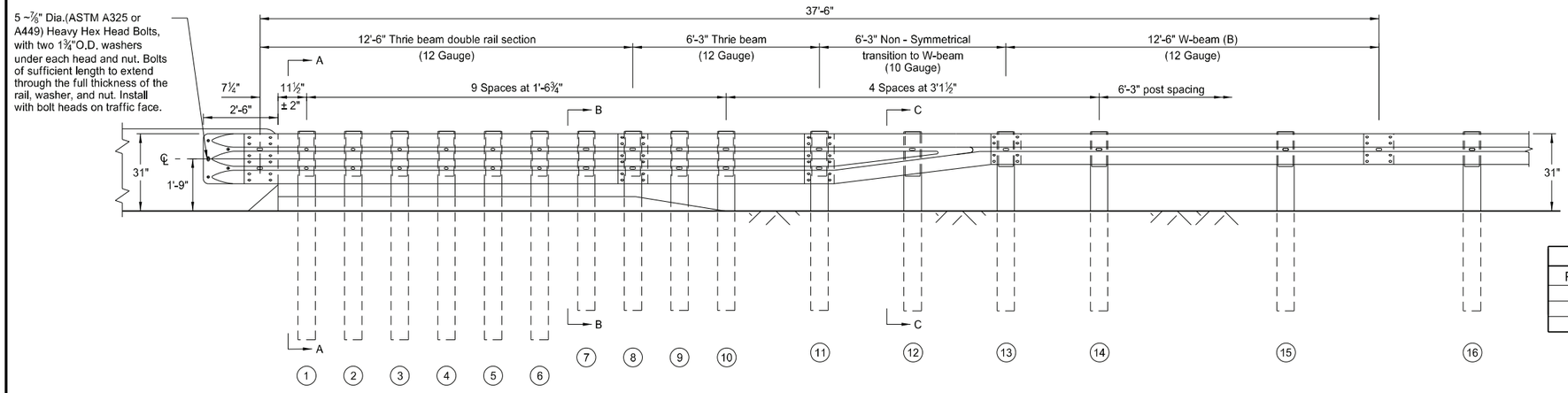
12 02 2020

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

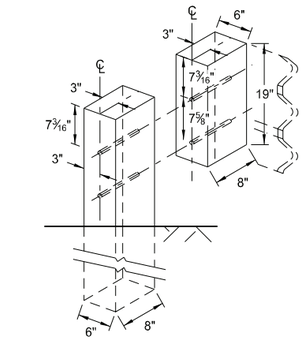
D-764-60



PLAN VIEW

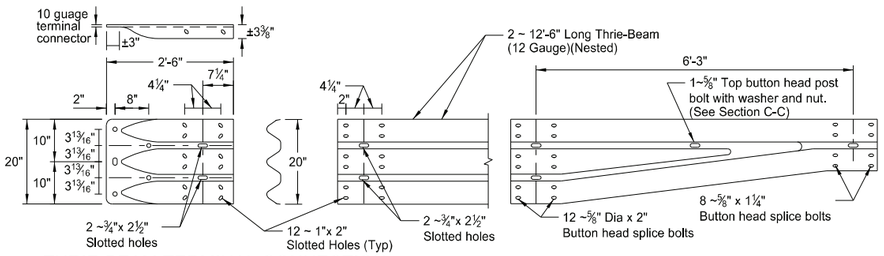


ELEVATION VIEW



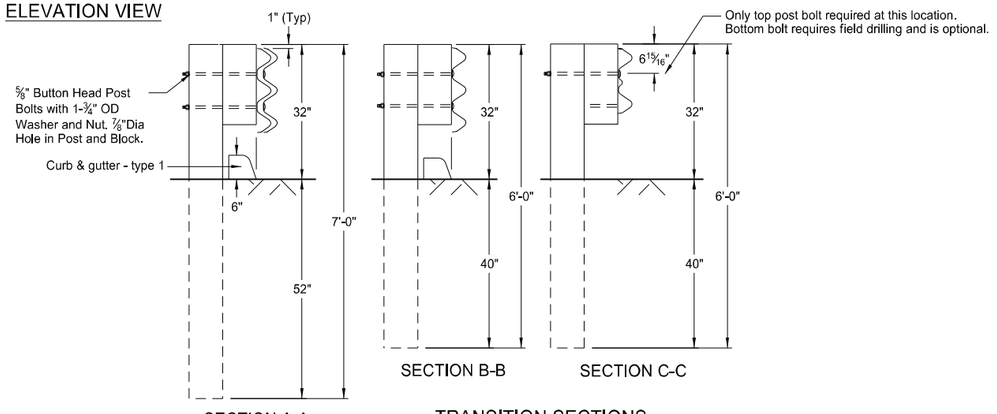
WOOD BLOCK
TO RECTANGULAR WOOD POST
(At posts 1 to 11)

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



THRIE-BEAM TERMINAL CONNECTION

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

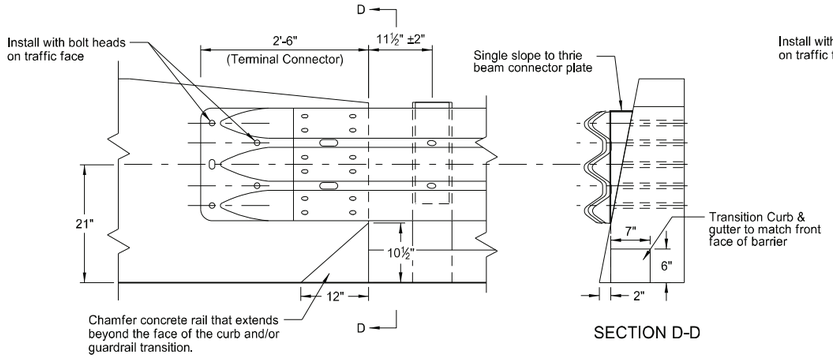


SECTION A-A

SECTION B-B

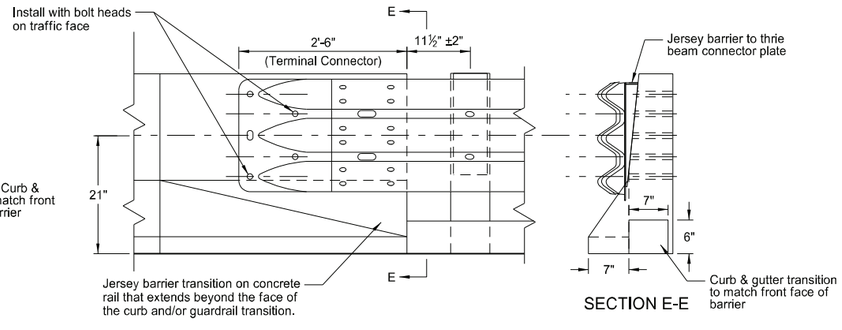
SECTION C-C

TRANSITION SECTIONS



SECTION D-D

CONNECTION TO CONCRETE SINGLE SLOPE BRIDGE RAIL AND TRAFFIC BARRIERS



SECTION E-E

CONNECTION TO CONCRETE JERSEY BARRIER BRIDGE RAIL AND TRAFFIC BARRIERS

(A) Where curb is required to continue past 15' length, taper the curb down to 3" height at the terminal point shown above, instead of 0" height. Use 3" height curb between posts 10 and 16.

(B) Install 12'-6" length W-beam double rail section at location where curb extends past 15' length.

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12-02-20	Updated notes to active voice.

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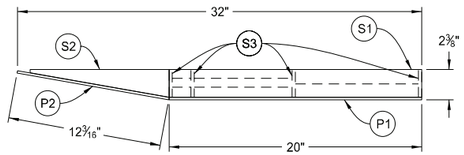
12 02 2020

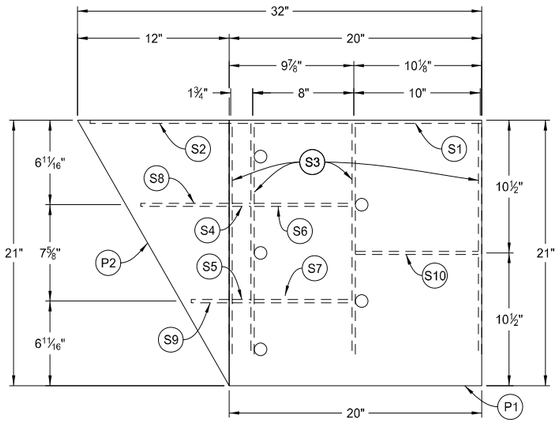
JERSEY BARRIER TO THRIE BEAM CONNECTOR PLATE DETAILS

D-764-62

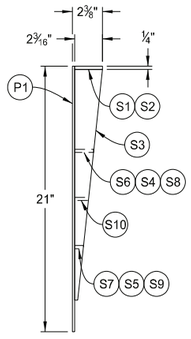


PLAN

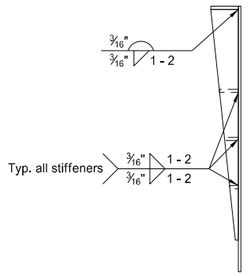
NOTE: Assembly Detail is shown for guardrail installation on right hand side of entrance end of bridge barrier. Mirror for opposite side installation.



ELEVATION



END



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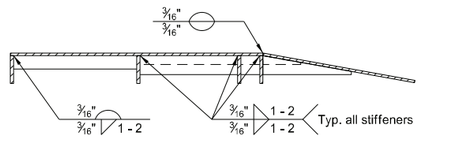
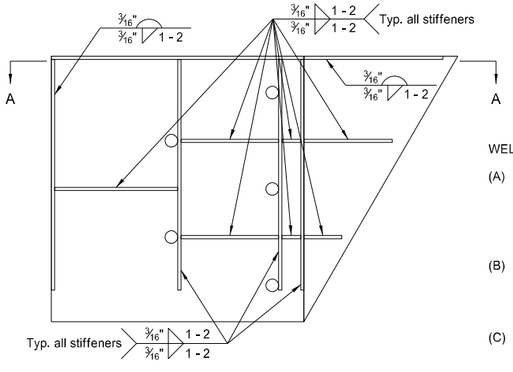
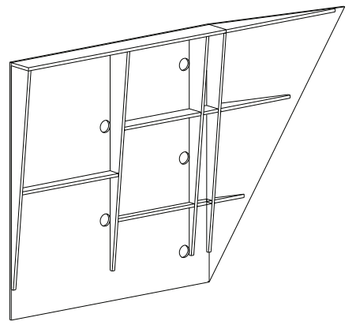


SECTION A-A



ELEVATION



PICTORIAL DRAWING
(Showing Back of Connector Plate)

WELDING INSTRUCTIONS:

(A) Weld stiffeners located on the outside edges of the cover plates as follows: ¾16" continuous back weld on exterior sides and ¾16" fillet weld 1" long spaced at 2" center-to-center on interior sides.

(B) Weld stiffeners located on the inside of the cover plates as follows: ¾16" fillet weld 1" long spaced at 2" center-to-center.

(C) Weld cover plates P1 and P2 together with a ¾16" continuous back weld on both sides.

(D) Weld components with E60 rod.

ASSEMBLY DETAIL
(Front View)

WELDING DETAIL
(Back View)

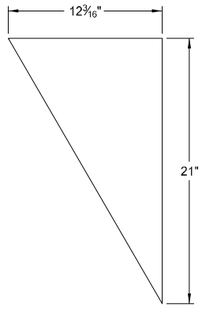


PLATE P2
Quantity: 1

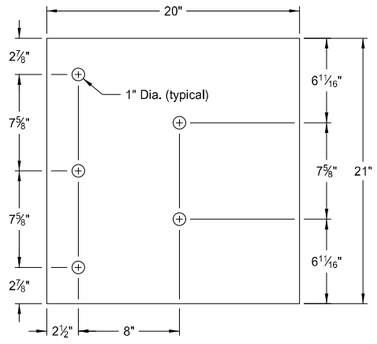
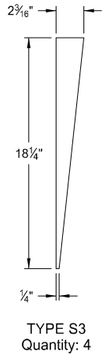


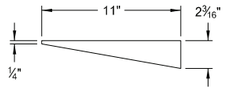
PLATE P1
Quantity: 1

COVER PLATES

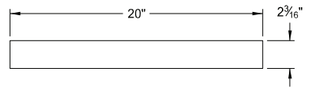


TYPE S3
Quantity: 4

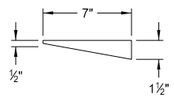
VERTICAL PLATES



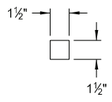
TYPE S2
Quantity: 1



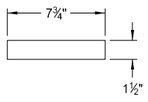
TYPE S1
Quantity: 1



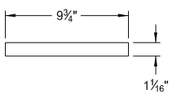
TYPE S8
Quantity: 1



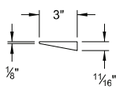
TYPE S4
Quantity: 1



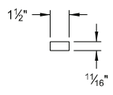
TYPE S6
Quantity: 1



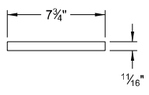
TYPE S10
Quantity: 1



TYPE S9
Quantity: 1



TYPE S5
Quantity: 1



TYPE S7
Quantity: 1

HORIZONTAL PLATES

STIFFENER PLATES

NOTES:

1. Fabricate cover plates P1 and P2 from ¾16" thick ASTM A36 Grade structural steel.
2. Fabricate stiffener plates from ¼" thick ASTM A36 Grade structural steel.
3. Galvanize connector plate in accordance with AASHTO M111.

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

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