

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	23902	1	1

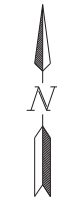
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

IM-5-094(165)059

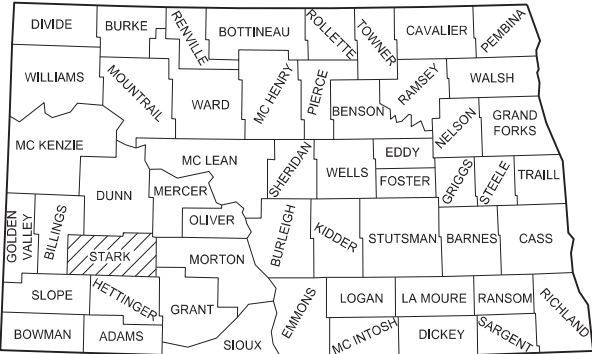
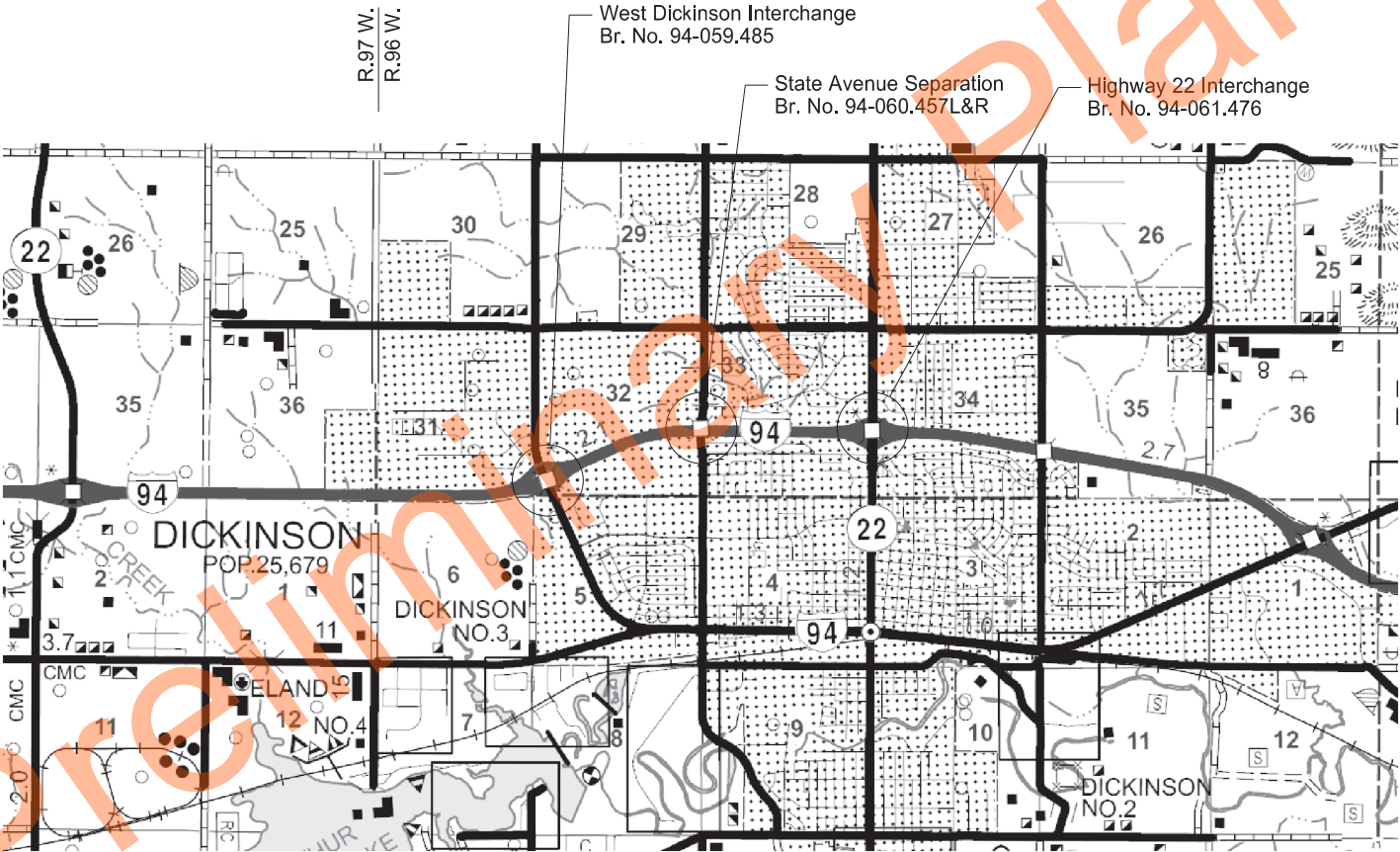
Stark County
West Dickinson Interchange, State Avenue Separation, Highway 22 Interchange ~ Dickinson District
Bridge Deck Overlay, Approach Slabs, Erosion Repair, Concrete Spall Repairs, and Mill & Overlay

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-5-094(165)059	N/A	N/A



T.140 N.
T.139 N.



STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson

Jason Thorenson
09/09/26

BRIDGE DIVISION



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SP 450(25)	Hydrodemolition and Overlay of Concrete Bridge Decks								
SP 452(25)	Concrete Spall Repair								
SP 494(25)	Commercial Grade Asphalt - with Density								

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NOTES

- 105-P01

PROJECT PHASING: Complete all work at the West Dickinson Interchange (Exit 59) during the non-peak hours. All traffic lanes in the designated travel way of restricted areas will be open to traffic at the end of each non-peak hour cycle.

The following timeframes are considered non-peak hours:

 - Monday 7:00 PM to Tuesday 6:00 AM (11 hrs.)
 - Tuesday 7:00 PM to Wednesday 6:00 AM (11 hrs.)
 - Wednesday 7:00 PM to Thursday 6:00 AM (11 hrs.)
 - Thursday 7:00 PM to Friday 6:00 AM (11 hrs.)
 - Friday 7:00 PM to Saturday 6:00 AM (11 hrs.)
 - Saturday 7:00 PM to Sunday 6:00 AM (11 hrs.)
 - Sunday 7:00 PM to Sunday 6:00 AM (11 hrs.)

The Engineer will assess liquidated damages at \$1,600 per lane per hour for each 1,000 feet of lane closure for the failure to open traffic lanes in the construction areas restricted to work only in non-peak hours. Any fraction of 1,000 feet or hour shall be considered a full 1,000 feet or hour. Charges will be assessed when lane closures are in place, whether or not work is in progress and regardless of weather conditions. The Engineer, in their sole discretion, reserves the right to waive liquidated damages charges in extenuating circumstances. Liquidated damages for lane closures in restricted areas may run concurrently with liquidated damages associated with failure to complete all work by the required completion date.
- 302-P01

FOUNDATION FILL: Compact proposed and/or existing aggregate underneath any roadway pavement to at least 95 percent of the maximum dry density with a moisture content at the time of compaction not less than 2.0 percentage points below, nor more than 3.0 percentage points above the optimum moisture content. The Engineer will determine the maximum dry density and optimum moisture content as specified in ND T180.
- 704-200

STATE FURNISHED MEDIAN BARRIER: Obtain (64) 22.5" x 12.5' concrete barriers. They can be picked up and returned to the Belfield yard at 801 1st Ave NE in Belfield ND 58622. Contact the Dickinson District office at 701-227-6500 to facilitate the exchanges.

Obtain (47) 22.5" x 12.5' concrete barriers. They can be picked up and returned to the Minot District yard at 1305 Hwy 2 Bypass E in Minot ND 58701. Contact the Minot District office at 701-857-6925 to facilitate the exchanges.

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".
- 704-900

ATTENUATION DEVICE TYPE B: Install either of the following attenuation devices:

 - The barrel type shown on standard D-704-01; or
 - The liquid filled attenuation device described in this note.

Install liquid filled attenuation devices that are 2.5 feet wide.

Before installing devices, provide the Engineer a Certificate of Compliance stating that the devices meet NCHRP Report 350, MASH 2009, or MASH 2016, and a copy of an eligibility letter from FHWA.

Use devices rated for the MPH designation used in the item description.

Install devices according to the manufacturer's specifications.

Liquid filled attenuators may not be deployed in any portion of the months of January, February, and December, nor before the 15th of March.

If liquid filled attenuation devices are deployed after the 15th of March or in any portion of the months of April, October or November, include calcium magnesium acetate or potassium acetate in the liquid filled barrier solution. Mix the anti-icing chemicals with water as recommended by the anti-icing chemical manufacturer to protect the barrier from freezing to a temperature of 0°F. Contact the Engineer and the NDDOT Environmental and Transportation Services Division in the case of a spill leaving the roadway. Dispose of the mixture inside the device as specified in Section 107.17, "Removed Material".

Provide a full replacement set of attenuators available to the project. If the replacement devices are installed, have a set of replacement devices available to the project within 3 calendar days.

Immediately replace any damaged pieces. The Department will reimburse the Contractor for damaged pieces based on the invoice price plus 10 percent. All other costs associated with installing and maintaining replacement pieces will be at no additional cost to the Department.



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NOTES

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the following layouts in the Standard Drawings for traffic control.

- 1. Standard D-704-15 Type C; Road Closure Layouts
- 2. Standard D-704-17; Sign Layout for One Lane Closure Two Lane Roadway
- 3. Standard D-704-18; Sign Layout for Interstate System One Lane Closure
- 4. Standard D-704-35; Sign Layout for One Lane Closure Interstate System

704-P02 TRAFFIC CONTROL PHASING: Quantities provided in the traffic control devices list were calculated using the following phases:

Phase 1a refers to the southbound lane closures on 30th Ave. W at Exit 59 of I-94, outside lane closure on I-94 at Exit 59 on both bounds, one lane closure on State Ave., and an inside lane closures on I-94 at RP 60.457.

Phase 1b refers to the northbound lane closures on 30th Ave. W at Exit 59 of I-94, westbound inside lane closure on I-94 at Exit 59, one lane closure on State Ave., and an outside lane closures on I-94 at RP 60.457.

Phase 2a refers to the northbound lane closure on 3rd Ave. at Exit 61 of I-94

Phase 2b refers to the southbound lane closure on 3rd Ave. at Exit 61 of I-94

Work for Phase 1a and 1b on 30th Ave. W at Exit 59 and work on 3rd Ave. at Exit 61 cannot be completed simultaneously, one location needs to be completed before work on the other may start.

For the outside lane closure, place median barriers so that they are centered over the centerline marking. Install interim white edgeline adjacent to the barriers as shown in Standard Drawing D-704-18. Maintain a minimum of 14 feet of open travel lane width at all times.

Upon completion of the outside lane closure, move the median barriers placed at a 15:1 taper from the outside lane to a 15:1 taper on the inside lane. The median barriers placed in a straight line may remain in place.

704-P03 MEDIAN BARRIERS: A quantity of 42 barriers for each bound are needed for the work at RP 60.457, 27 barriers needed at the location on State Ave., and 56 barriers are needed for the work at Exit 61. The quantity of barriers provided is enough for the locations at Exit 59, State Ave. and RP 60.457 to be worked on simultaneously but work on Exit 61 needs to be done separately.

704-P04 LANE CLOSURE – SIGNAL CONTROL/FLAGGING: Install either the signal controlled lane closure on Standard D-704-16

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 standard. 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-P05 EXISTING SIGNAL SYSTEMS: After temporary signals are in use at ND 22 for work being completed on 3rd Ave. E, cover the traffic signal heads and pedestrian heads at the following intersections:

ND 22 and Interchange Ramps

Uncover the signal heads when the ND 22 work is complete. Include all cost associated with adjustments to the existing signal systems in the price bid for "Traffic Control Signs."

704-P10 TEMPORARY TRAFFIC SIGNALS: Install signals at each location required in the traffic control layout. Provide a minimum of 1 signal head per movement per lane. Provide a traffic signal trailer capable of hanging 4 signal heads. Span wire signals can be used in lieu of trailer mounted traffic signals.

Solar powered signals are preferred, but the generators can be used as long as they are part of a trailer mounted unit.

The Engineer will measure the Temporary Traffic Signal based on each intersection (e.g. 4 signals at one intersection will constitute one measuring unit). Include the cost of temporary traffic signals in the contract unit price for "Temporary Traffic Signals".



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NOTES

SECTION 130

748-P01 CURB & GUTTER – TYPE 1 SPECIAL: Install curb and gutter at the entrance end of the Eastbound State Avenue Separation, RP 60.457, in accordance with Standard Drawing D-748-1, except for a 14” gutter depth and transitions provided at each end, as shown on Standard Drawing D-764-60. Install #4 rebar in the curb & gutter with a length that will provide 3” clear distance on each end. Tie the curb & gutter to the adjacent pavement using 2’ long #4 rebar. Use grade 60 reinforcing steel meeting Section 612.

Include all work and materials for constructing the curb and gutter as described above, in the contract unit price bid for “Curb & Gutter – Type 1 Special.”

764-P01 REMOVE END TREATMENT & TRANSITION: Deliver the removed end treatment and transition materials which are not reset by the contractor to the NDDOT Maintenance Storage Yard in Dickinson and neatly stack them at a location designated by the engineer. The address of the NDDOT Maintenance Storage Yard is:

DICKINSON NDDOT
1700 3RD Ave W Ste 101
Dickinson, ND 58601-3009

Include all costs for delivery and stacking of the removed end treatment and transition materials in the contract unit price bid for "Remove End Treatment and Transition."



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100 CONTRACT BOND	L SUM	1	1
202	0114 REMOVAL OF CONCRETE PAVEMENT	SY	271	271
202	0132 REMOVAL OF BITUMINOUS SURFACING	SY	674	674
203	0195 EMBANKMENT SPECIAL	L SUM	1	1
255	0201 TRM TYPE 1	SY	18	18
302	0120 AGGREGATE BASE COURSE CL 5	TON	191	191
411	0105 MILLING PAVEMENT SURFACE	SY	1,580	1,580
430	0500 COMMERCIAL GRADE HOT MIX ASPHALT	TON	230	230
570	0650 CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	136	136
602	1135 BRIDGE APPROACH SLAB-REMOVE & REPLACE	SY	185.6	185.6
602	1208 CONCRETE BRIDGE BARRIER	LF	15.2	15.2
602	1250 PENETRATING WATER REPELLENT TREATMENT	SY	4,130	4,130
602	1260 BRIDGE DECK CRACK SEALING	LF	2,261	2,261
602	1300 BRIDGE DECK GROOVING	SF	27,260	27,260
602	2105 CURB REPAIR	SF	19.3	19.3
602	7000 SPECIAL SURFACE FINISH	SF	7,570	7,570
650	0704 OVERLAY CONCRETE	CY	193	193
650	0707 DECK CONCRETE	CY	47	47
650	0710 CLASS 1-H REMOVAL	SY	2,851	2,851
650	0720 CLASS 1 REMOVAL	SY	2,851	2,851
650	0723 CLASS 3 REMOVAL	SY	142	142
650	0724 CLASS 4 REMOVAL	SY	29	29
650	0805 DECK SPALL REPAIR	SF	310	310
702	0100 MOBILIZATION	L SUM	1	1
704	0100 FLAGGING	MHR	480	480
704	1000 TRAFFIC CONTROL SIGNS	UNIT	4,241	4,241
704	1035 ATTENUATION DEVICE-TYPE B-25	EA	2	2
704	1037 ATTENUATION DEVICE-TYPE B-35	EA	2	2
704	1044 ATTENUATION DEVICE-TYPE B-70	EA	2	2
704	1052 TYPE III BARRICADE	EA	10	10
704	1060 DELINEATOR DRUMS	EA	170	170
704	1067 TUBULAR MARKERS	EA	94	94
704	1080 STACKABLE VERTICAL PANELS	EA	31	31

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	8	2

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	4	4
704	1500 OBLITERATION OF PAVEMENT MARKING	SF	1,205	1,205
704	3511 STATE FURNISHED MEDIAN BARRIER	LF	1,370	1,370
748	0141 CURB & GUTTER-TYPE 1 SPECIAL	LF	30	30
762	0113 EPOXY PVMT MK 4IN LINE	LF	4,960	4,960
762	0114 EPOXY PVMT MK 6IN LINE	LF	126	126
762	0115 EPOXY PVMT MK 8IN LINE	LF	534	534
762	0117 EPOXY PVMT MK 24IN LINE	LF	60	60
762	0136 EPOXY PVMT MK MESSAGE-GROOVED	SF	64	64
762	0420 SHORT TERM 4IN LINE-TYPE R	LF	11,820	11,820
762	0424 SHORT TERM 8IN LINE-TYPE R	LF	105	105
764	0131 W-BEAM GUARDRAIL	LF	367	367
764	0145 W-BEAM GUARDRAIL END TERMINAL	EA	2	2
764	0150 REMOVE & RESET GUARDRAIL	LF	27	27
764	0151 REMOVE W-BEAM GUARDRAIL & POSTS	LF	379	379
764	2081 REMOVE END TREATMENT & TRANSITION	EA	2	2
930	3640 HIGH EXPANSION POLYURETHANE FOAM	GAL	90	90
930	8670 CONCRETE SLEEPER SLAB	EA	2	2
930	8850 POLYURETHANE FOAM JOINT SEAL	LF	82	82
930	9612 SPALL REPAIR	SF	84	84
930	9665 BARRIER REPAIR	EA	2	2
930	9694 GIRDER PATCHING	L SUM	1	1

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762-0113 PVMT MK 4IN LINE		
Type	Quantity	Unit
Dbl Yellow Centerline	1760	LF
White Centerline	2040	LF
White Edge Line	1160	LF

762-0114 PVMT MK 6IN LINE		
Type	Quantity	Unit
White Crosswalk Line	126	LF

762-0115 PVMT MK 8IN LINE		
Type	Quantity	Unit
White Channel Line	534	LF

762-0117 Epoxy PVMT MK 24in Line		
Type	Quantity	Unit
White Stop Line	60	LF

762-0136 Epoxy PVMT MK Message-Grooved		
Type	Quantity	Unit
Left Turn Arrow	64	SF

Preliminary Plans

Basis of Estimate



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ESTIMATED QUANTITIES FOR GUARDRAIL EMBANKMENT SURFACING

				State Ave Separation RP 60.457 Eastbound Roadway Begin Bridge		
Spec	Code	Bid Item	UNIT	Rt	Rt Mdn	Total
202	0132	REMOVAL OF BITUMINOUS PAVEMENT	SY	294.4	379	673.4
		2" Bituminous with 6" Aggregate Base	-	-	-	-
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 Ton/CY	TON	82.3	108.7	191
*	*	TACK COAT @ 0.05 Gal/SY	GAL	11.7	15.6	27.3
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT @ 2 Ton/CY	TON	24.9	33.5	58.4
*	*	PG ASPHALT CEMENT @ 6%	TON	1.5	2	3.5

* 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-764-48 for details

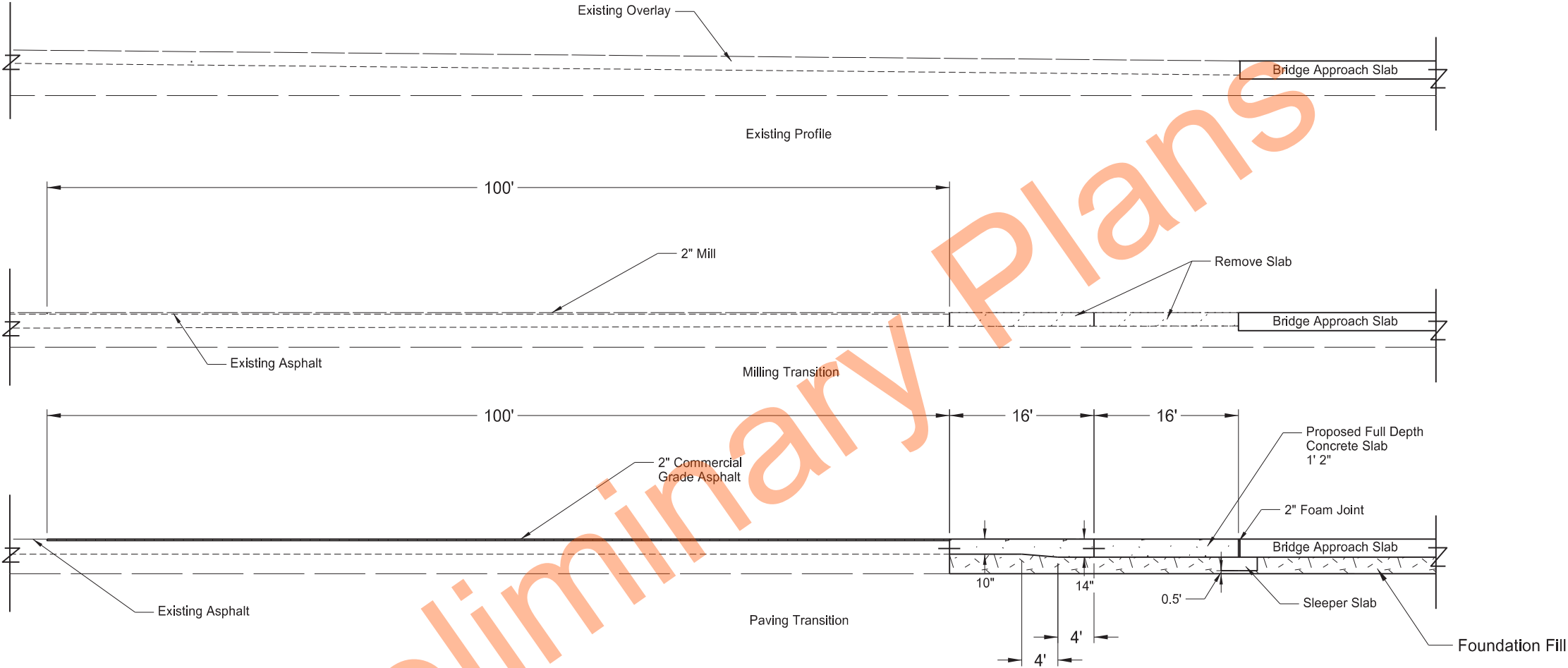
Basis of Estimate

State Ave Separation
RP 60.457
Eastbound Roadway

I-94



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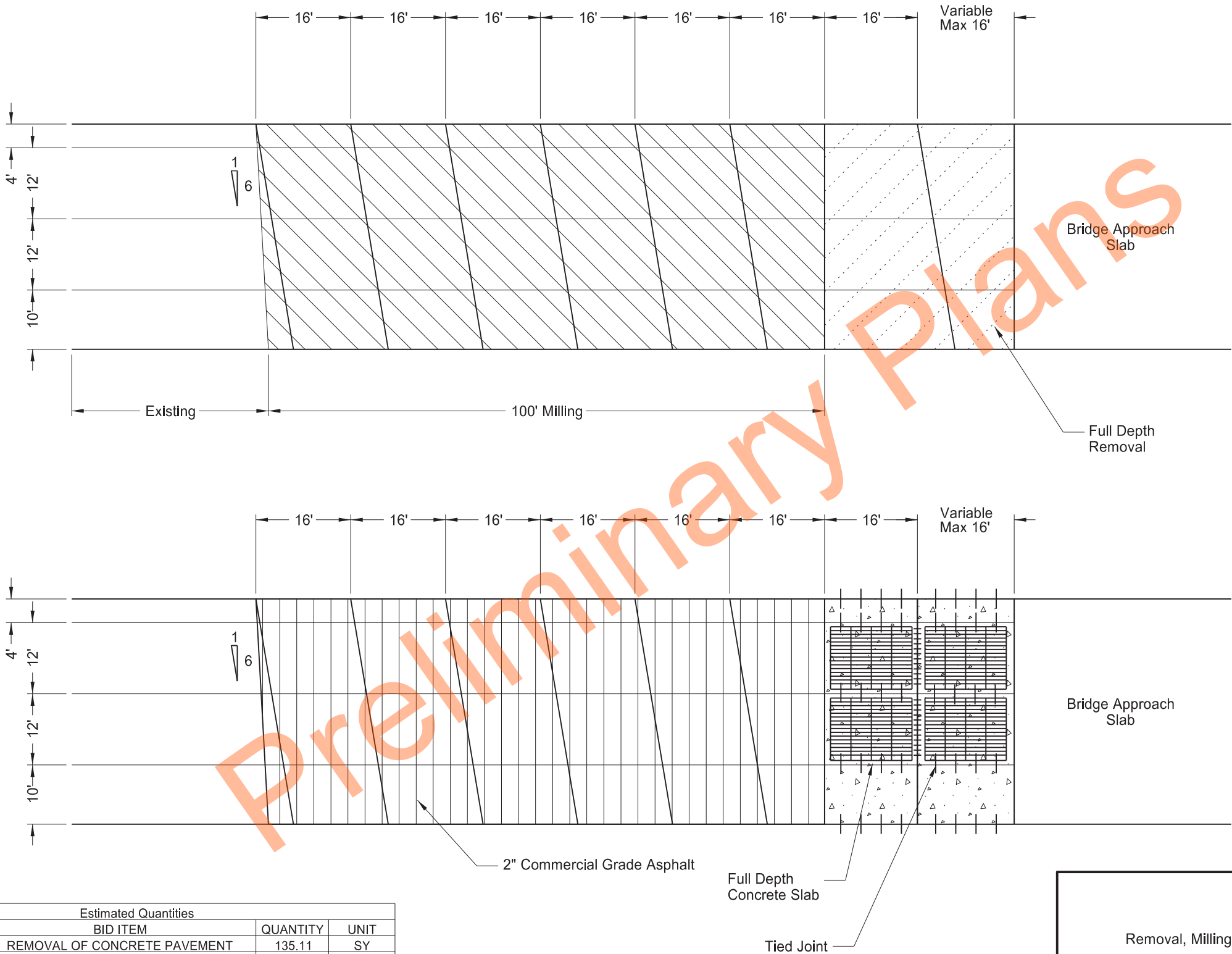
Legend

	Concrete		Remove Asphalt
	Commercial Grade Asphalt		Foundation Fill

Sleeper Slab Detail
RP 60.457 Bridge
West End of Bridge



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Estimated Quantities			
SPEC & CODE	BID ITEM	QUANTITY	UNIT
202-0114	REMOVAL OF CONCRETE PAVEMENT	135.11	SY
411-0105	MILLING PAVEMENT SURFACE	422.22	SY
430-0500	COMMERCIAL GRADE HOT MIX ASPHALT*	44.54	TON
570-0650	CONCRETE PAVEMENT REPAIR - FULL DEPT	135.11	SY

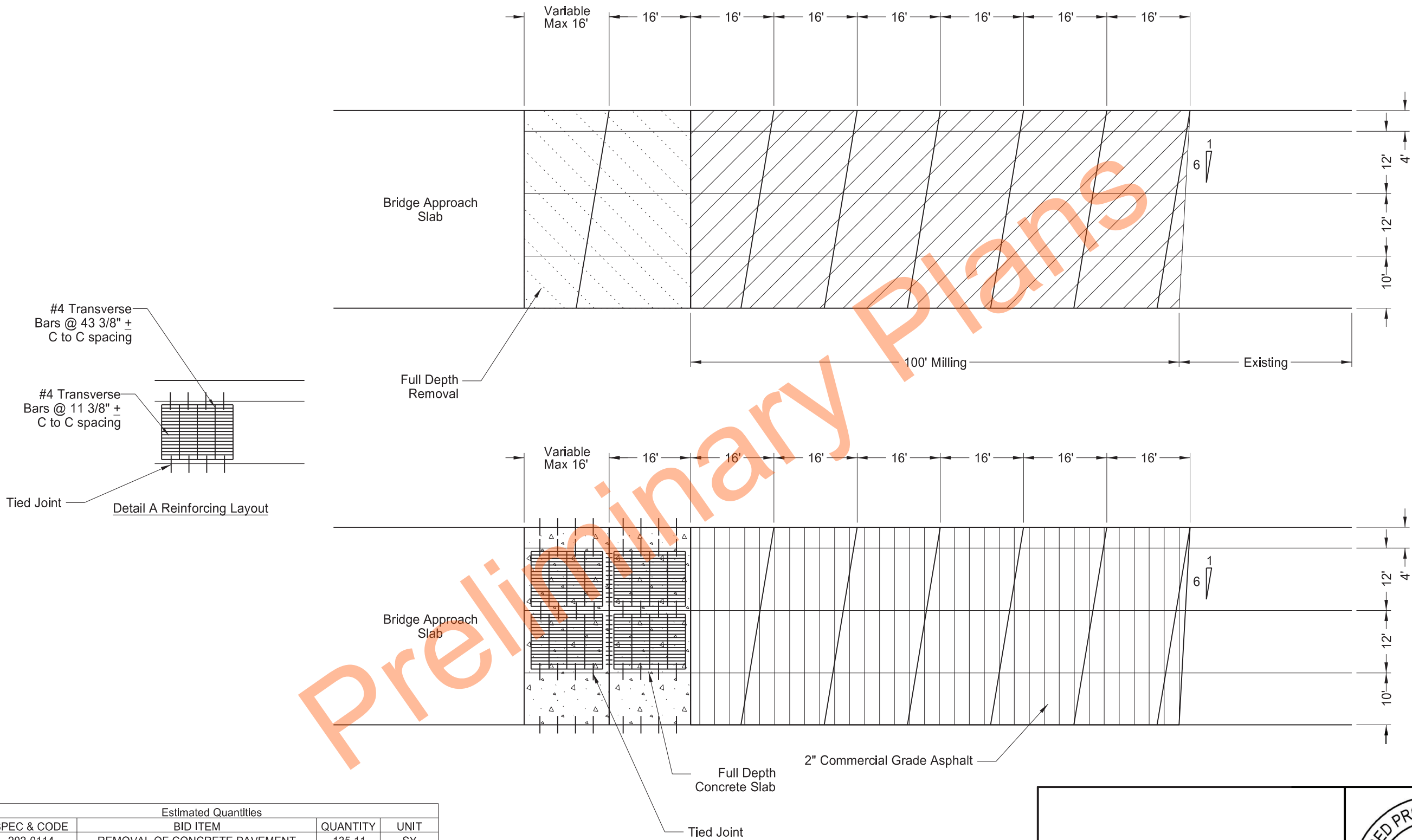
* Commercial Grade Hot Mix Asphalt @ 2.0 Ton/CY

NOTE: See sec 130 for Curb & Gutter Detail

Removal, Milling, & Paving Detail
Joint at West End of Bridge
RP 60.457 Bridge



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Estimated Quantities			
SPEC & CODE	BID ITEM	QUANTITY	UNIT
202-0114	REMOVAL OF CONCRETE PAVEMENT	135.11	SY
411-0105	MILLING PAVEMENT SURFACE	422.22	SY
430-0500	COMMERCIAL GRADE HOT MIX ASPHALT*	44.54	TON
570-0650	CONCRETE PAVEMENT REPAIR - FULL DEPT	135.11	SY

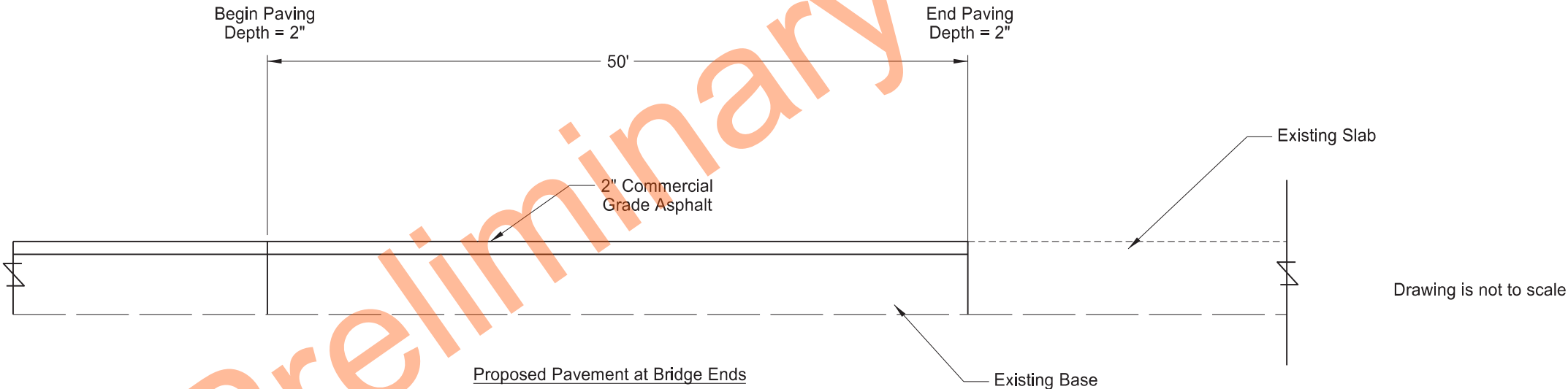
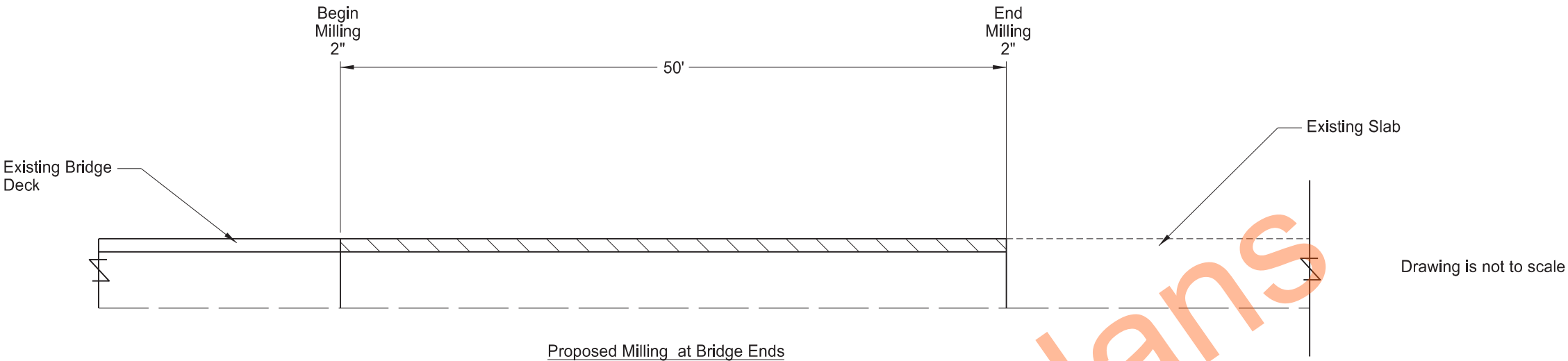
* Commercial Grade Hot Mix Asphalt @ 2.0 Ton/CY

NOTE: See section 130 for Curb & Gutter Detail

Removal, Milling, & Paving Detail
Joint at East End of Bridge
RP 60.457 Bridge



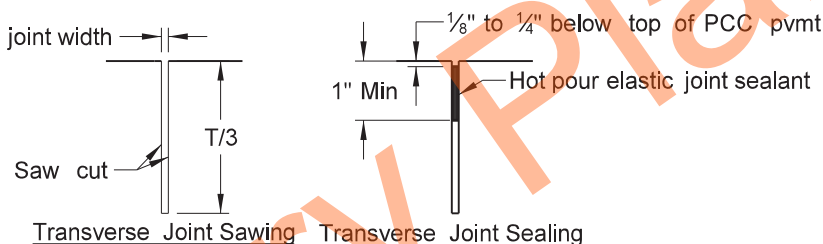
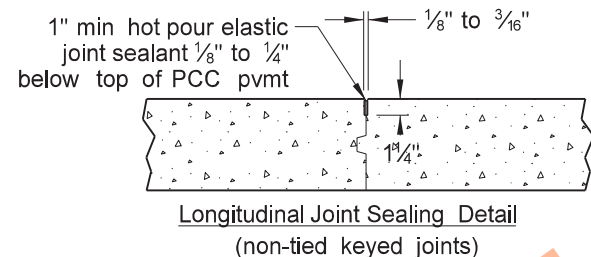
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Estimated Quantities for Milling and Paving				
Location (Milling)	Begin Milling Depth (IN)	End Milling Depth (IN)	Milling Width (FT)	Milling (SY)
South Bridge En	2.00	2.00	66.00	366.67
North Bridge End	2.00	2.00	66.00	366.67
Location (Paving)	Begin Paving Depth (IN)	End Paving Depth (IN)	Paving Width (FT)	
South Bridge En	2.00	2.00	66	
North Bridge End	2.00	2.00	66	

Milling & Paving
Joint at North Bridge End
Hwy 22 Interchange



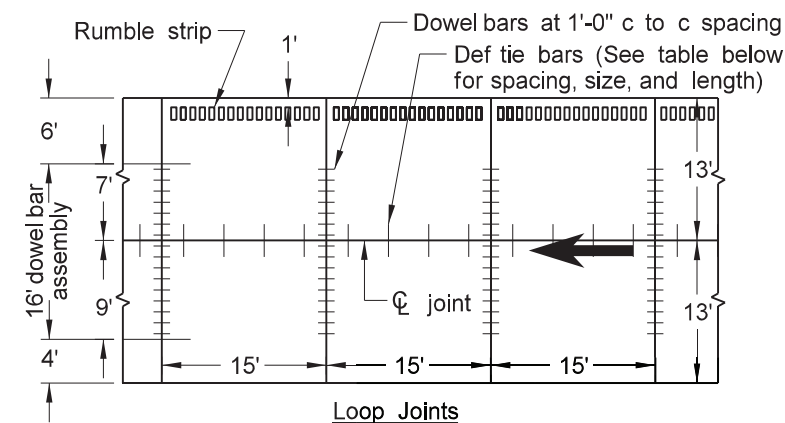
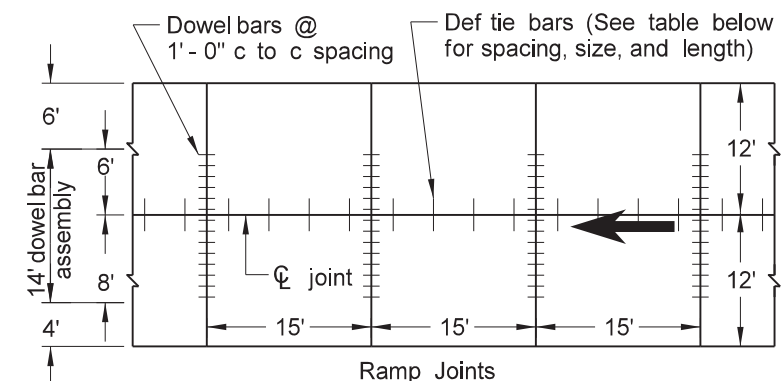
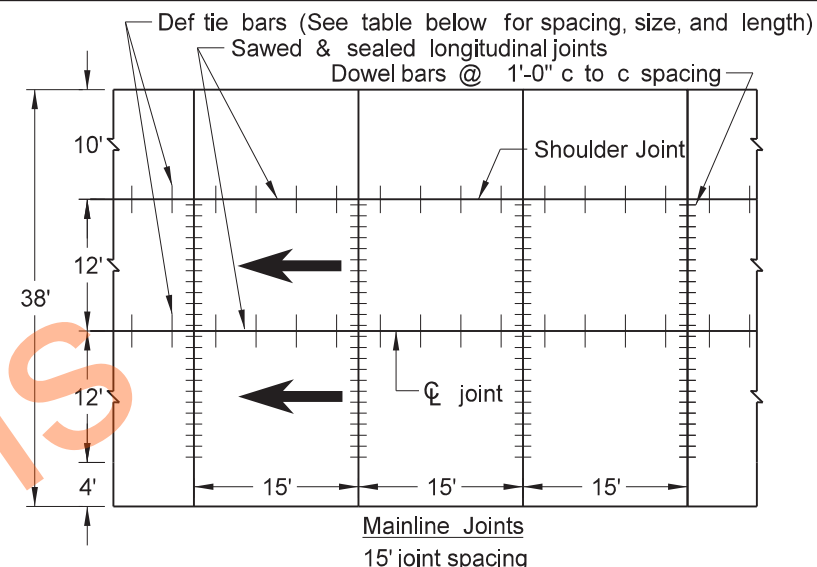


- Notes:
1. S = Tiebar spacing
 2. T = Pavement thickness
 3. Place dowels in ramp tapers also.
 4. Place no tie bar within 15" of a transverse joint.

Grade 40 Longitudinal Joint Tie Bars															
PCC Depth	8"	8 1/2"	9"	9 1/2"	10"	10 1/2"	11"	11 1/2"	12"	12 1/2"	13"	13 1/2"	14"	14 1/2"	15"
Mainline Centerline															
Bar Size x Length (S=30")	#5 x 30" #6 x 36"														
Bar Size x Length (S=45")	#6 x 36" Grade 60 Required														
Ramp/Loop Centerline															
Bar Size x Length (S=30")	#4 x 24" #5 x 30" #6 x 36"														
Bar Size x Length (S=45")	#5 x 30" #6 x 36" Grade 60 Required														
10' Shoulder Joint															
Bar Size x Length (S=30")	#4 x 24" #5 x 30"														
Bar Size x Length (S=45")	#5 x 30" #6 x 36"														

Grade 60 Longitudinal Joint Tie Bars															
PCC Depth	8"	8 1/2"	9"	9 1/2"	10"	10 1/2"	11"	11 1/2"	12"	12 1/2"	13"	13 1/2"	14"	14 1/2"	15"
Mainline Centerline															
Bar Size x Length (S=30")	#4 x 36" #5 x 42"														
Bar Size x Length (S=45")	#5 x 42" #6 x 48"														
Ramp/Loop Centerline															
Bar Size x Length (S=30")	#4 x 36" #5 x 42"														
Bar Size x Length (S=45")	#4 x 36" #5 x 42"														
10' Shoulder Joint															
Bar Size x Length (S=30")	#3 x 30" #4 x 36"														
Bar Size x Length (S=45")	#4 x 36" #5 x 42"														

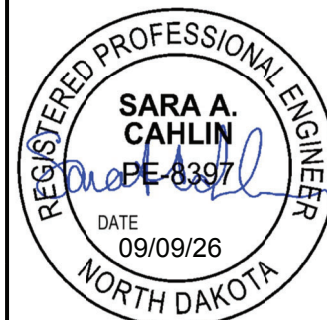
Joint Location	Dia x Length
ML	d1" x 18"
Ramp	d2" x 18"
Loop	d3" x 18"



PCC Pavement - Perpendicular Joints@ 15' Spacing
and 10' Wide Full Depth PCC Outside Shoulder

PCC Pavement Reconstruction

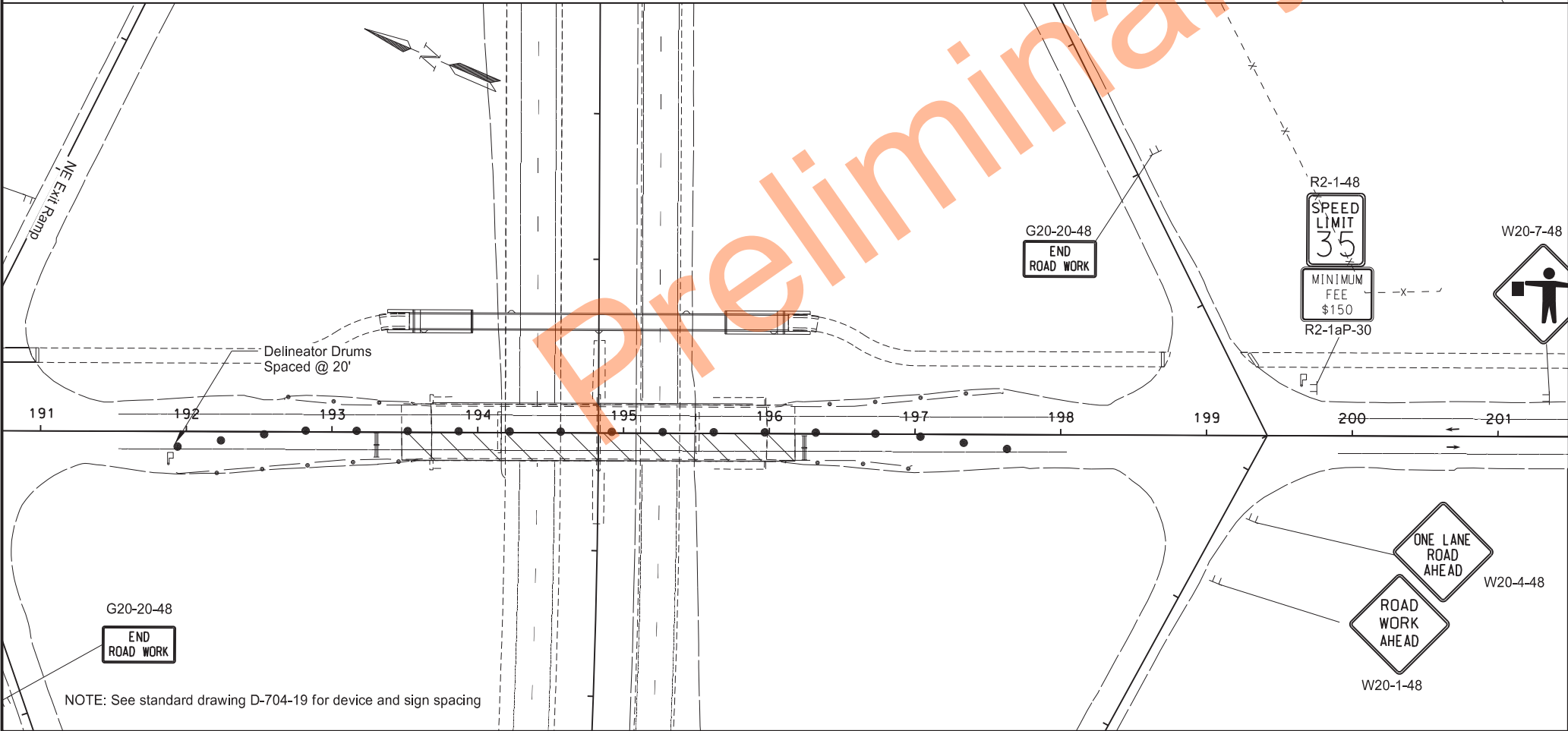
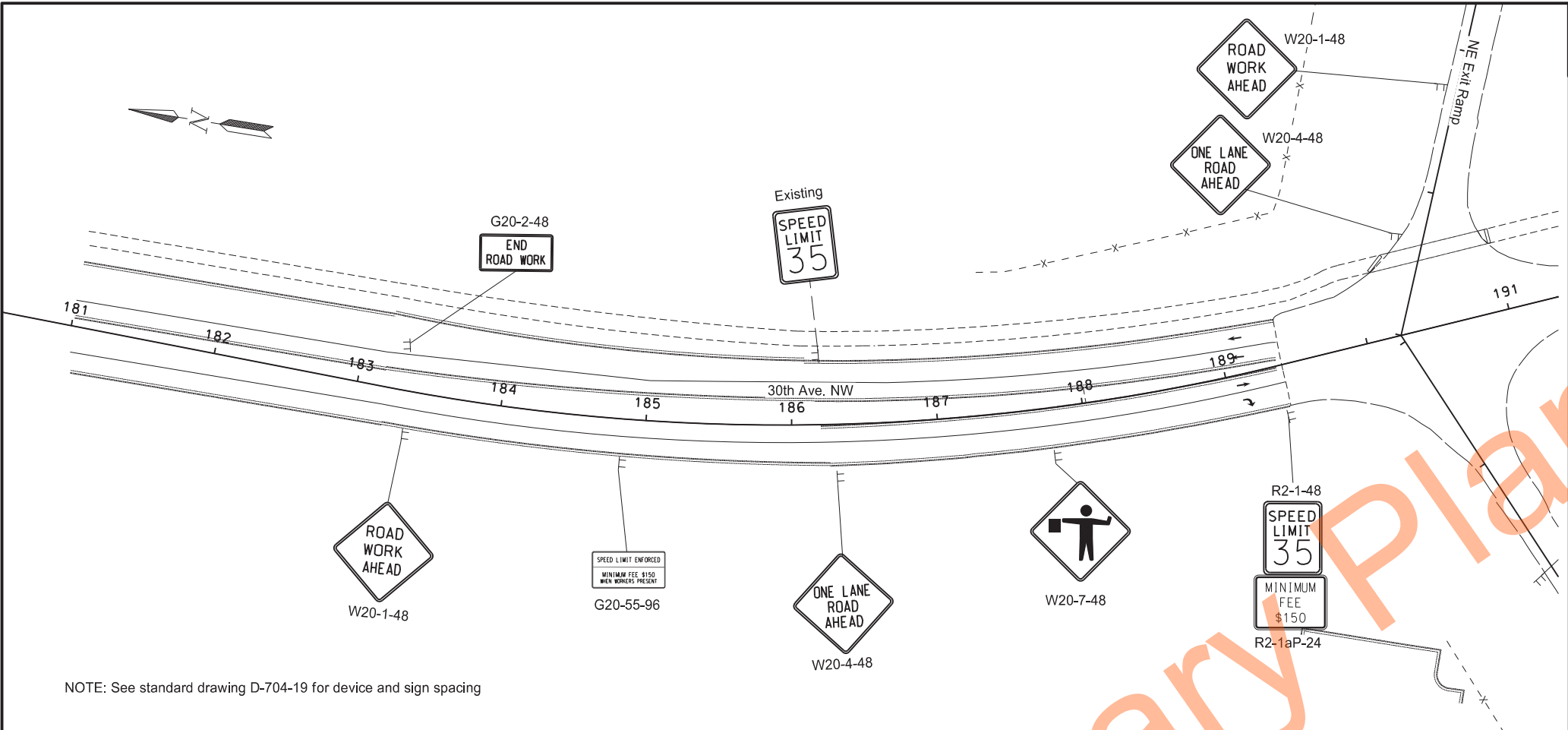
Project Location



SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED				TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.						
			1a	1b	2a	2b			
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	
Temporary Plans									
SPECIAL SIGNS									
CONSIGN 1	48"x48"							28	
SPEC & CODE									
704-1000		TRAFFIC CONTROL SIGNS				TOTAL UNITS		4241	

A circular professional engineer seal for Sara A. Cahlin, PE #3397, State of North Dakota. The seal features the text "REGISTERED PROFESSIONAL ENGINEER" around the top and "NORTH DAKOTA" around the bottom. In the center, the name "SARA A. CAHLIN" and the number "PE-#3397" are printed. A blue ink signature is written over the central text, and the date "DATE 09/09/26" is stamped at the bottom center.

9/8/2026 3:06 PM R:\project\50094059.165\Design\Sheets\100WZ_001_TCDL_new.xlsm VERSION: 6.26.2025



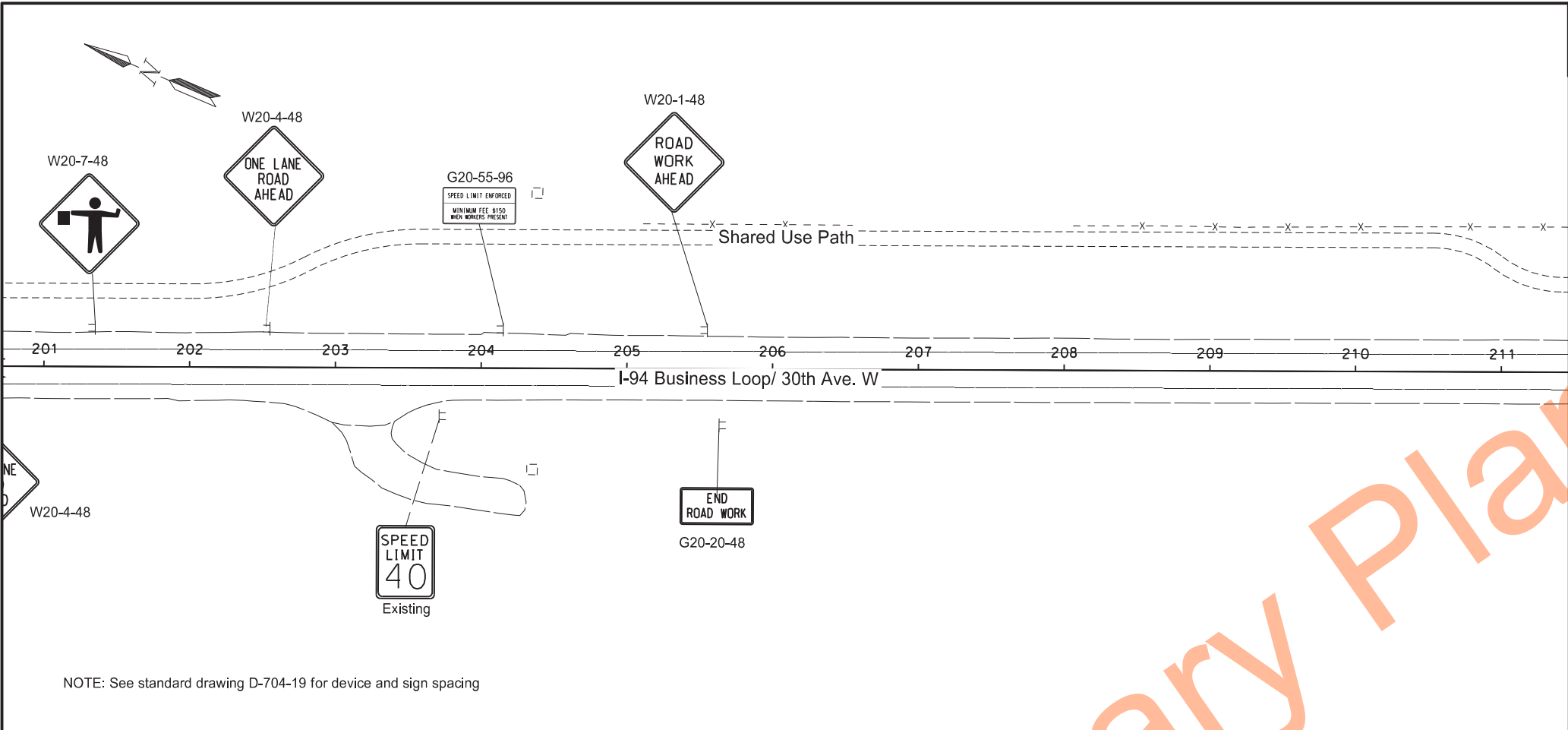
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	2

Legend

- Work Area
- Delineator Drums
- Sign
- Type III Barricade

Phase 1a
Construction Signing
West Dickinson Interchange
Exit 59
30th Ave. W

SARA A. CAHLIN
REGISTERED PROFESSIONAL ENGINEER
PE-8397
DATE 09/09/26
NORTH DAKOTA



NOTE: See standard drawing D-704-19 for device and sign spacing

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	3

Legend

-  Work Area
-  Delineator Drums
-  Sign
-  Type III Barricade

Phase 1a
Construction Signing
West Dickinson Interchange
Exit 59
30th Ave. W



Match Line 1

N

Preliminary

Delineator Drums Spaced @ 25'

Exit 59 EB off ramp

R2-1-36

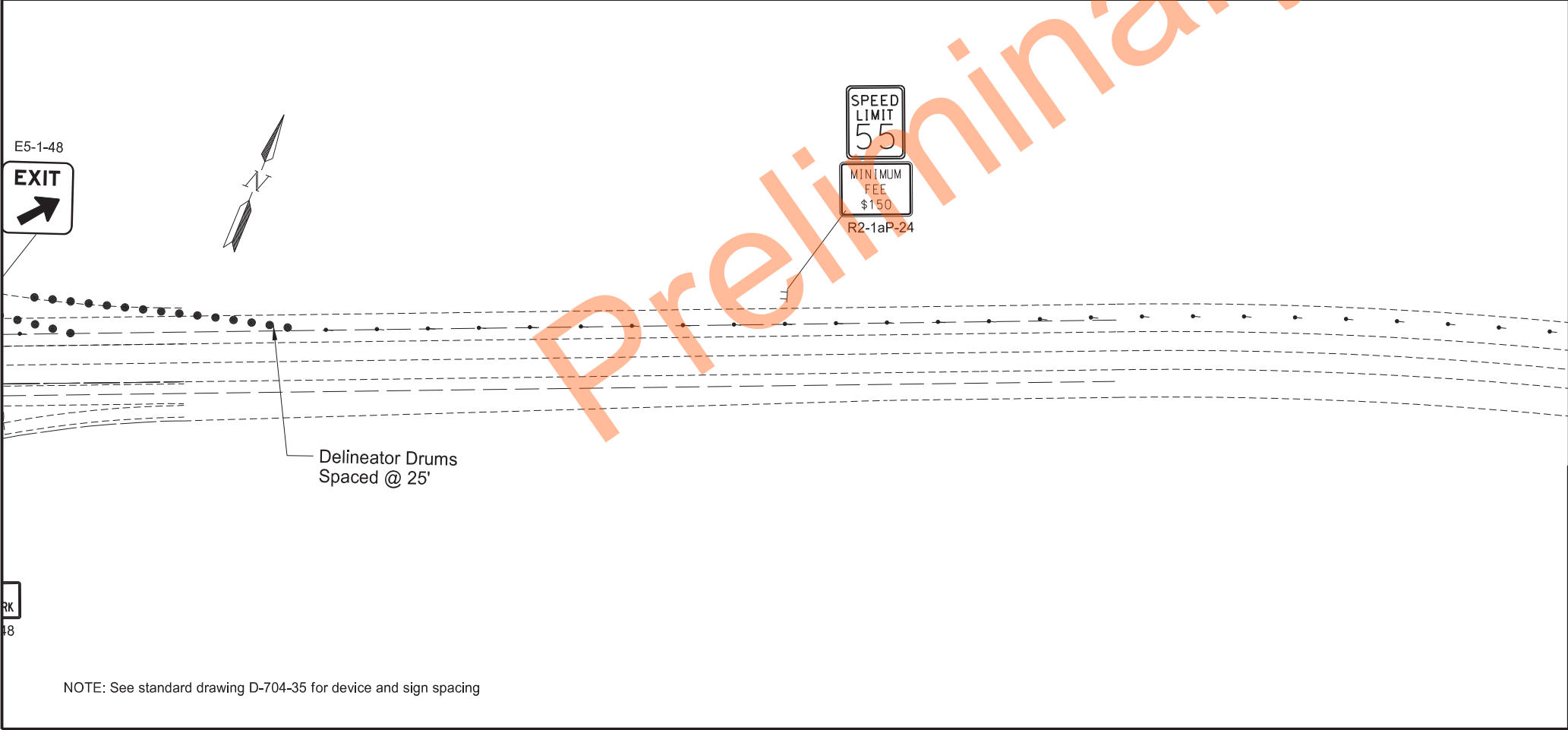
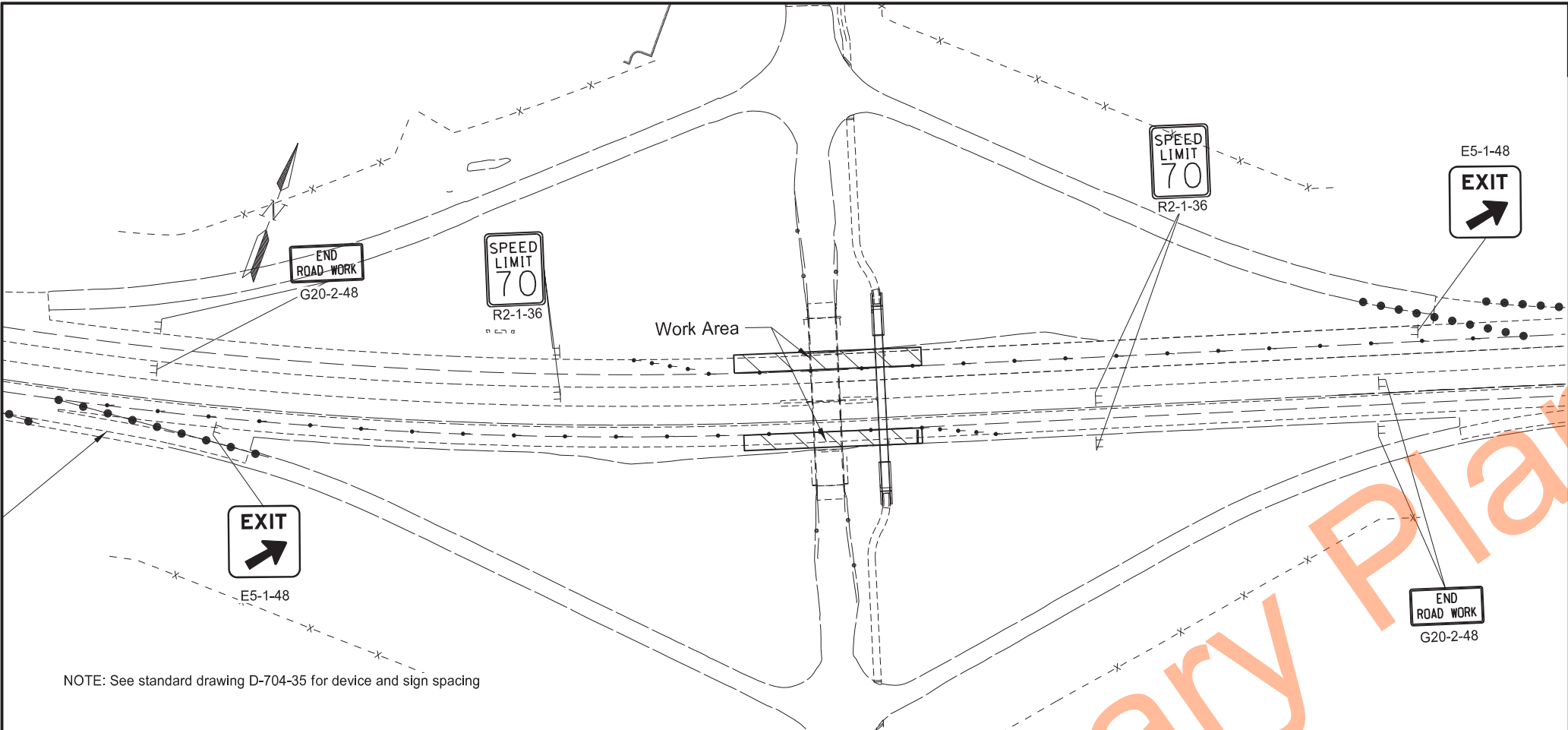
SPEED LIMIT 55

MINIMUM FEE \$150

R2-1aP-24

NOTE: See standard drawing D-704-35 for device and sign spacing

Phase 1a Construction Signing West Dickinson Interchange Exit 59 I-94	
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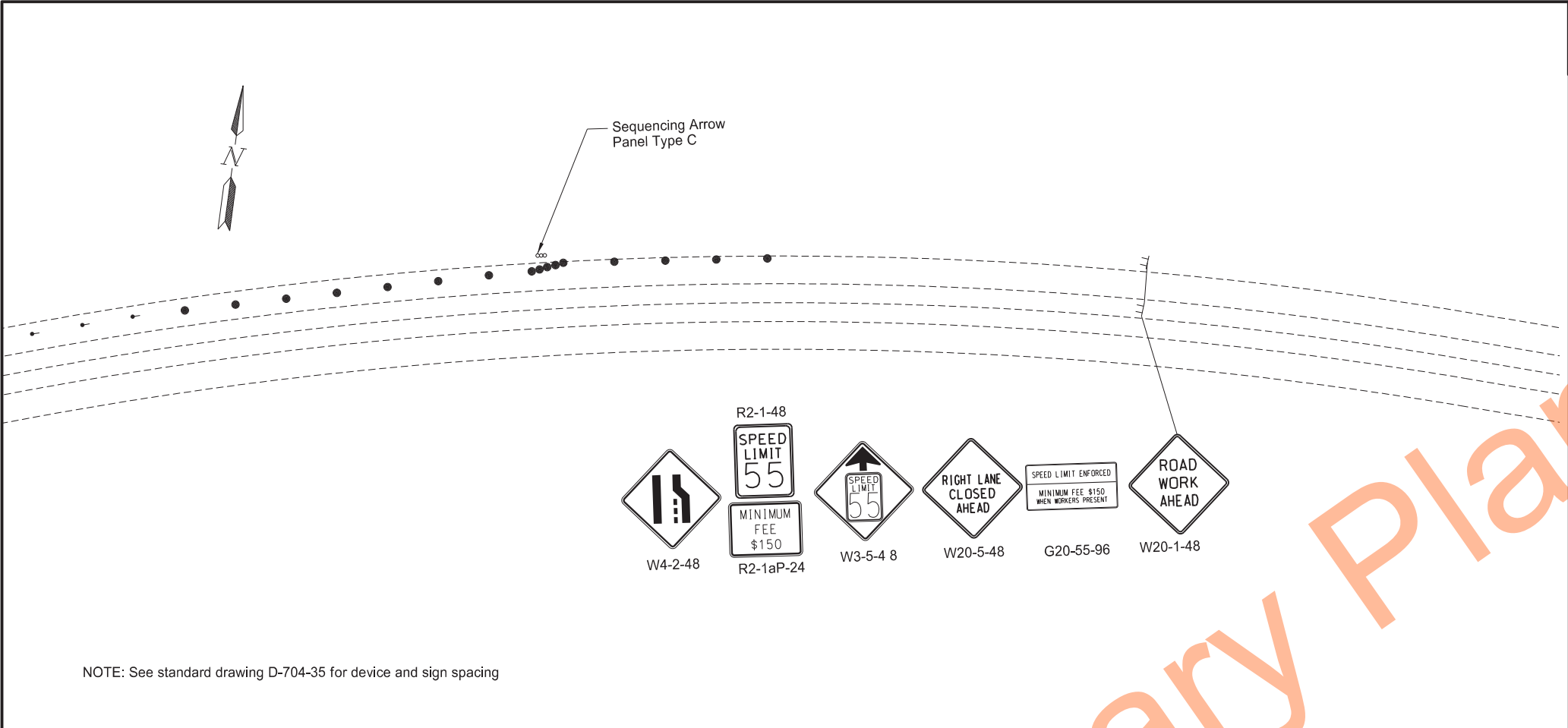
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	5

Legend

- Work Area
- Tubular Marker
- Delineator Drums
- Sign

Phase 1a
Construction Signing
West Dickinson Interchange
Exit 59
I-94

REGISTERED PROFESSIONAL ENGINEER
SARA A. CAHLIN
PE-8397
DATE 09/09/26
NORTH DAKOTA



NOTE: See standard drawing D-704-35 for device and sign spacing

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	6

Legend



Work Area



Tubular Marker



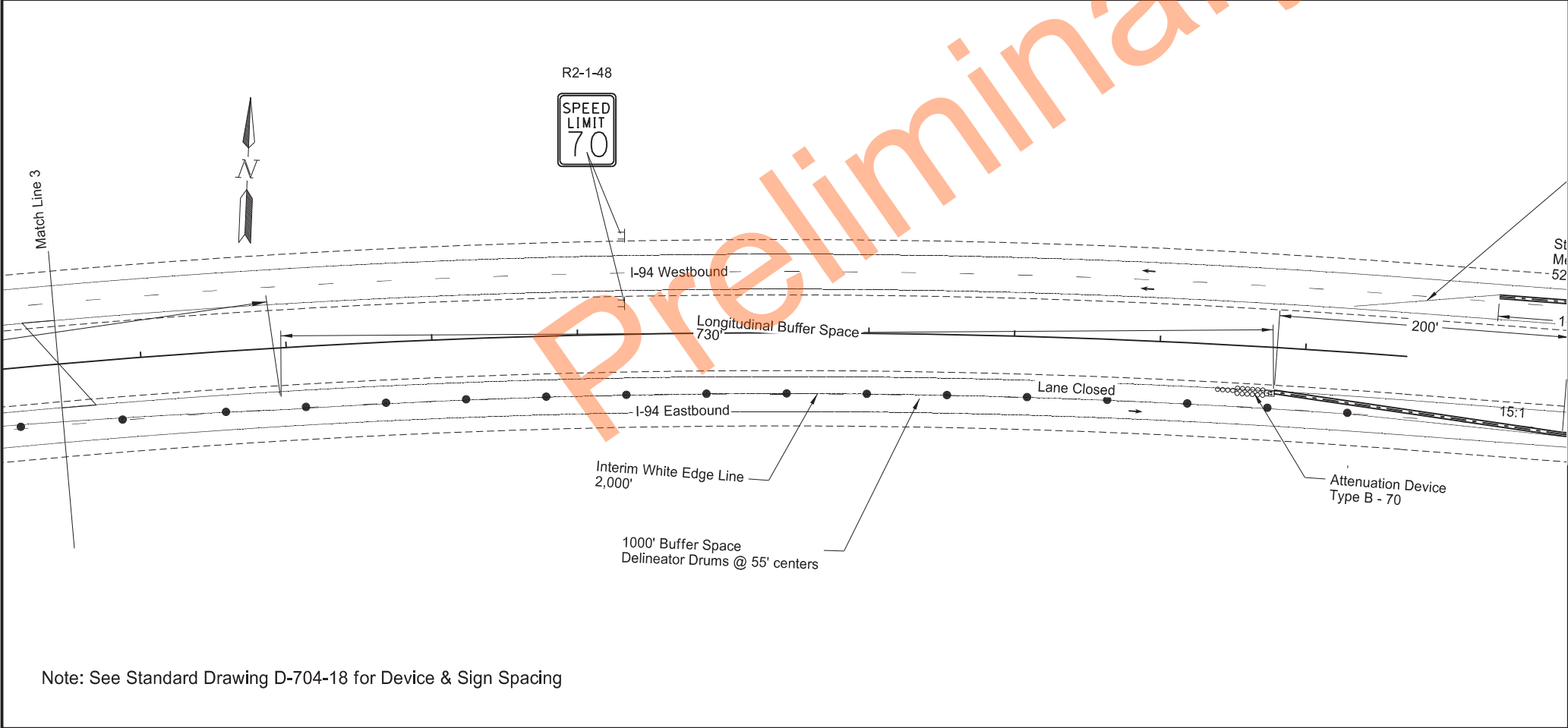
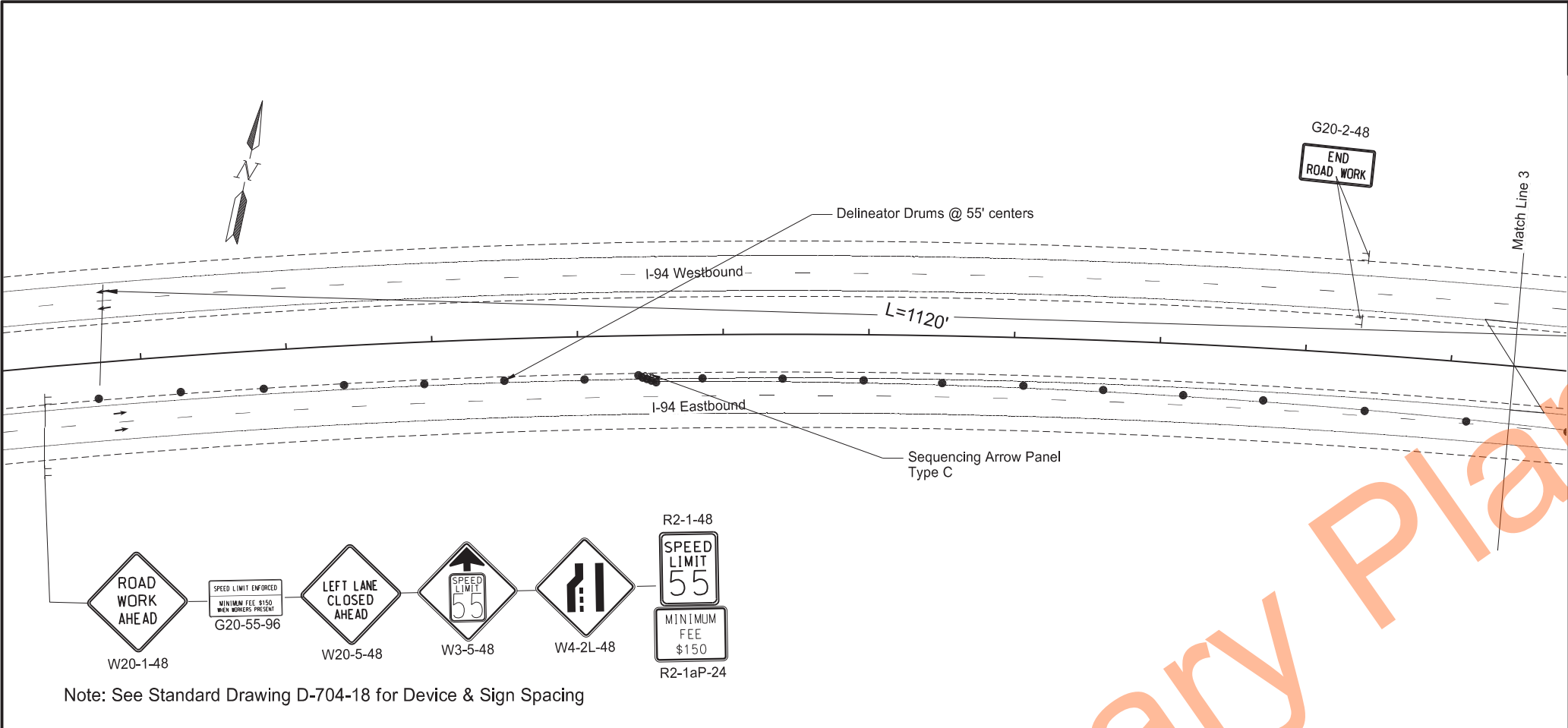
Delineator Drums



Sign

Phase 1a
Construction Signing
West Dickinson Interchange
Exit 59
I-94





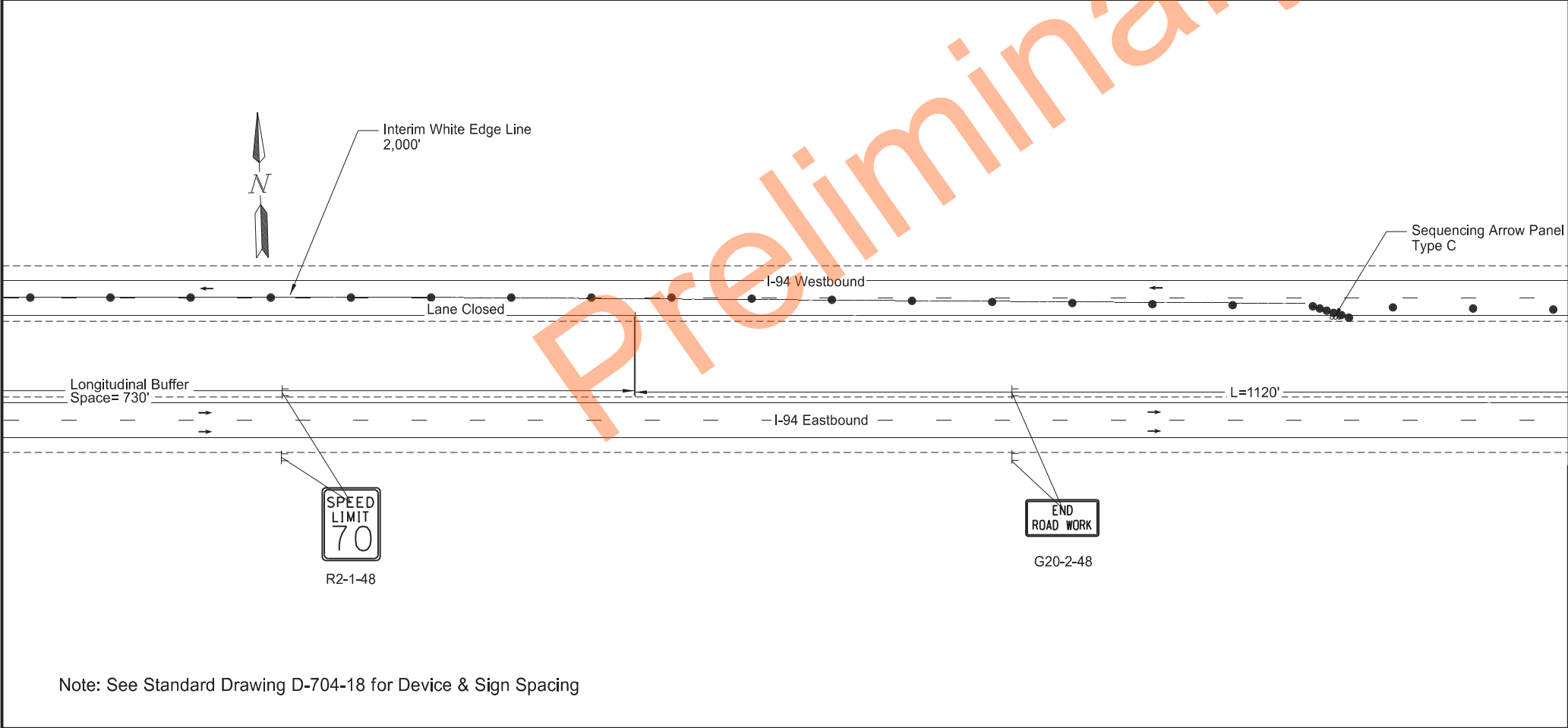
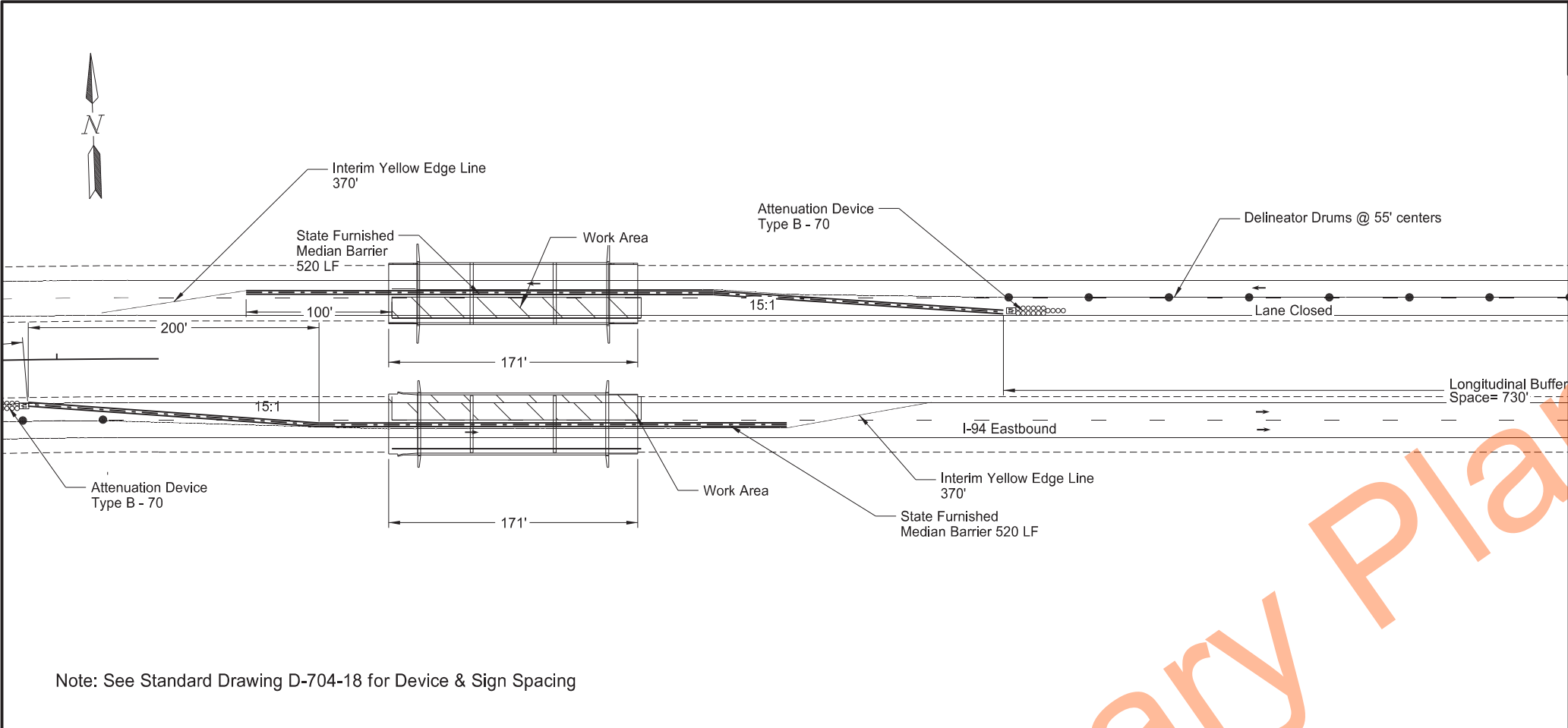
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	7

Legend

-  Work Area
-  Delineator Drums
-  Sign

Phase 1a
Construction Signing
RP 60.457 Bridge





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	8

Legend

- Work Area
- Delineator Drums
- Sign

Phase 1a
Construction Signing
RP 60.457 Bridge



Legend _____

 Work Area

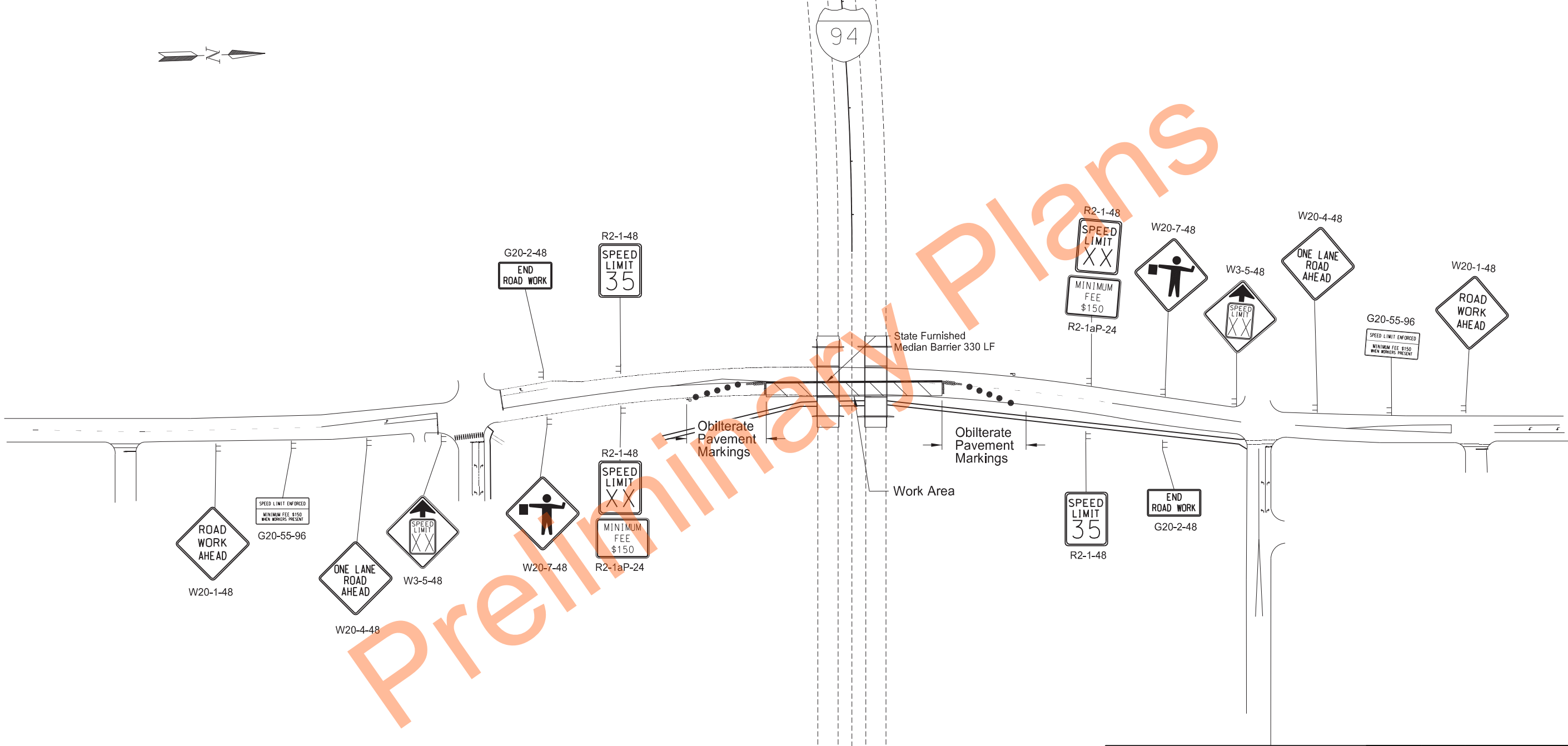
 Delineator Drums

 Sign

-  Work Area
-  Delineator Drum
-  Sign

A circular professional engineer seal for Sara A. Cahlin, a Registered Professional Engineer in North Dakota. The seal features the text "REGISTERED PROFESSIONAL ENGINEER" around the top and "NORTH DAKOTA" around the bottom. In the center, the name "SARA A. CAHLIN" is printed above the license number "PE-8397". A blue ink signature, "Sara A. Cahlin", is written across the center. Below the license number, the word "DATE" is printed above the expiration date "09/09/26".

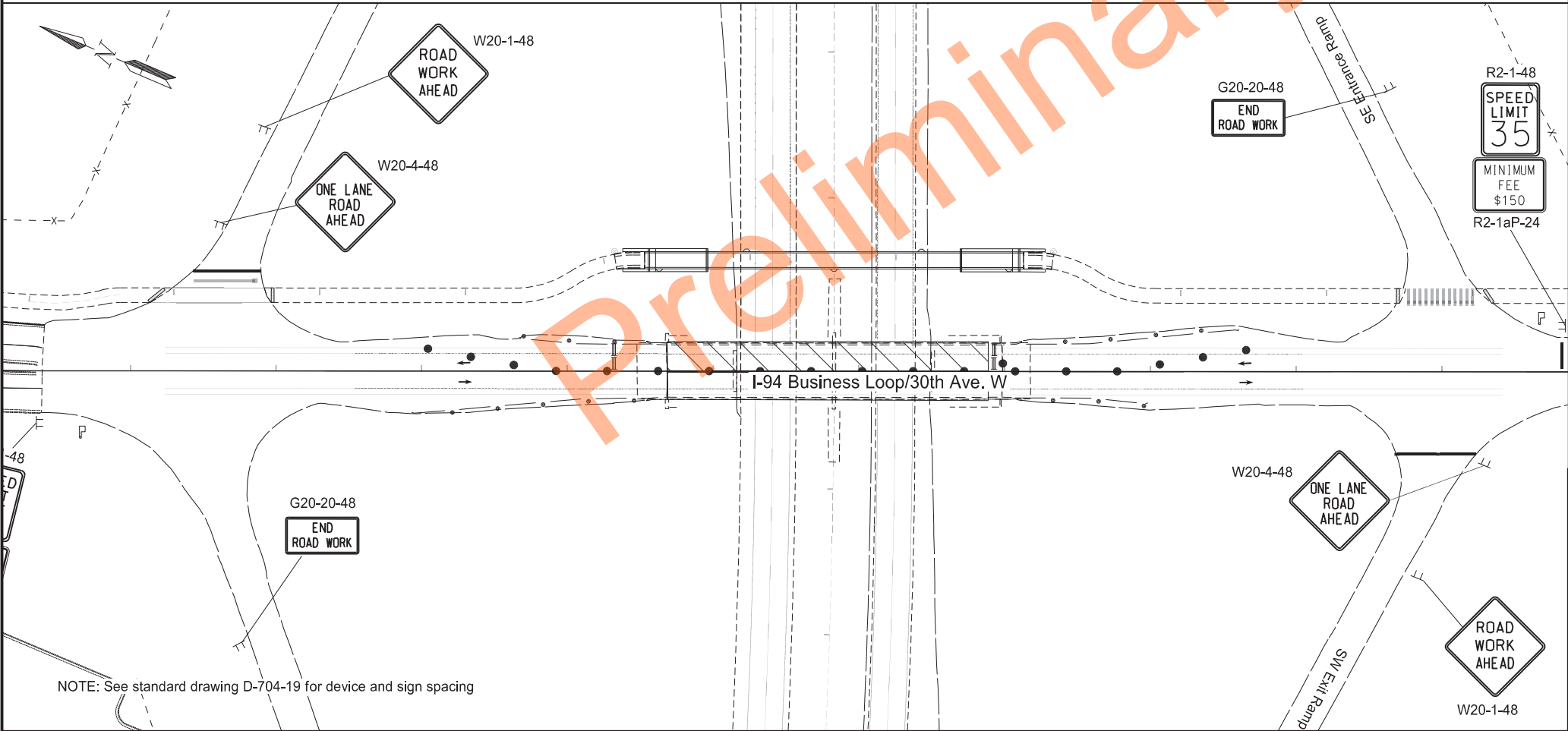
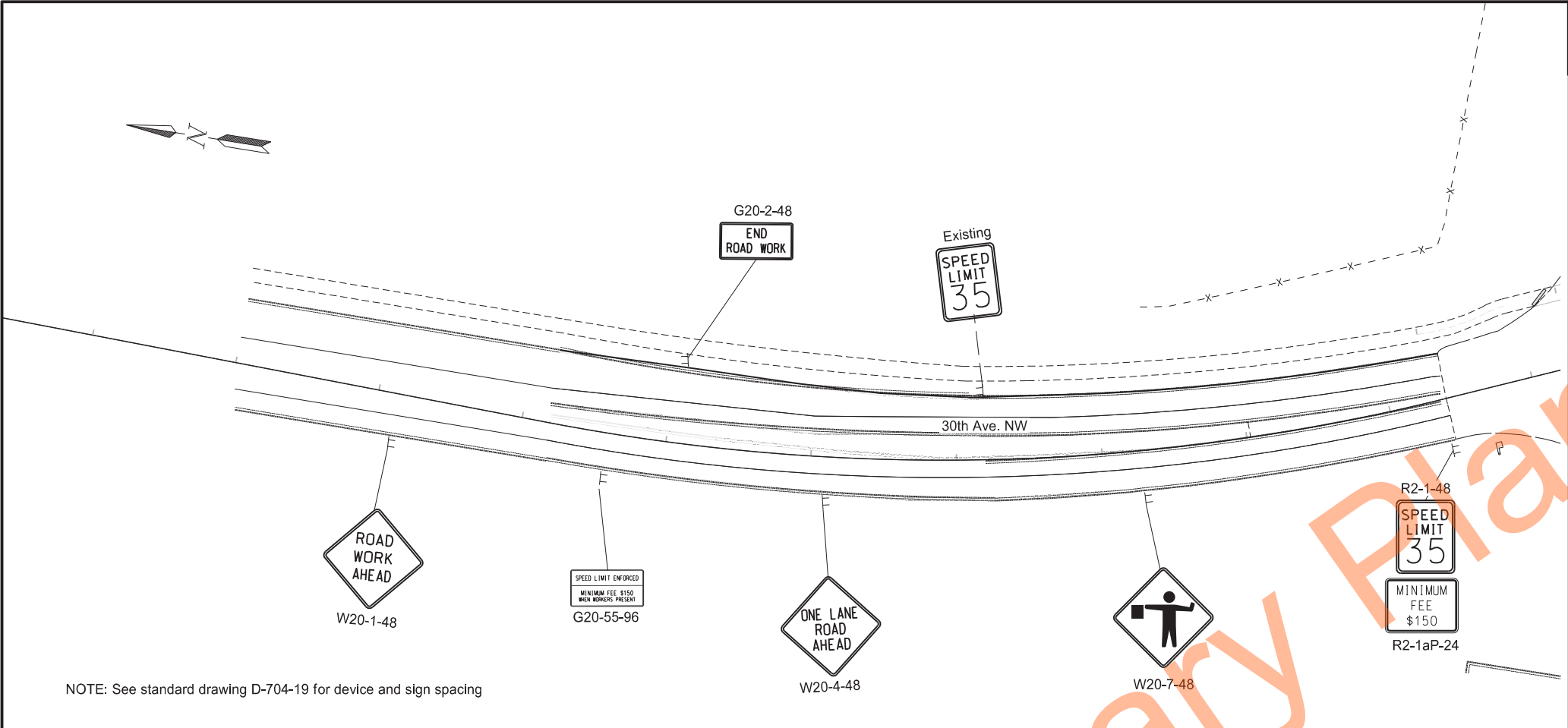
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	10



NOTE: See standard drawing D-704-17 for device and sign spacing

Phase 1a
Construction Signing
State Ave.





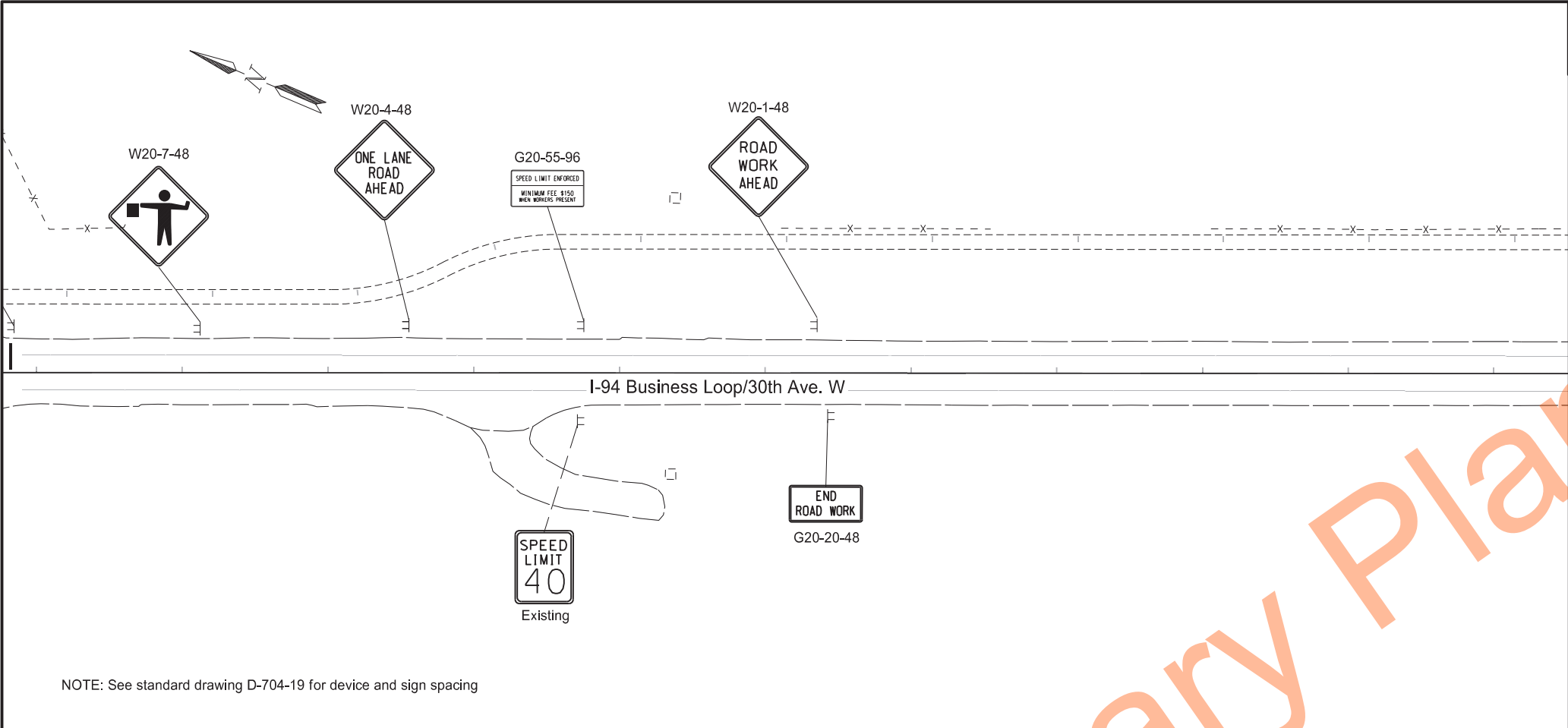
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	11

Legend

- Work Area
- Delineator Drums
- Sign
- Type III Barricade

Phase 1b
Construction Signing
West Dickinson Interchange
Exit 59
30th Ave. W





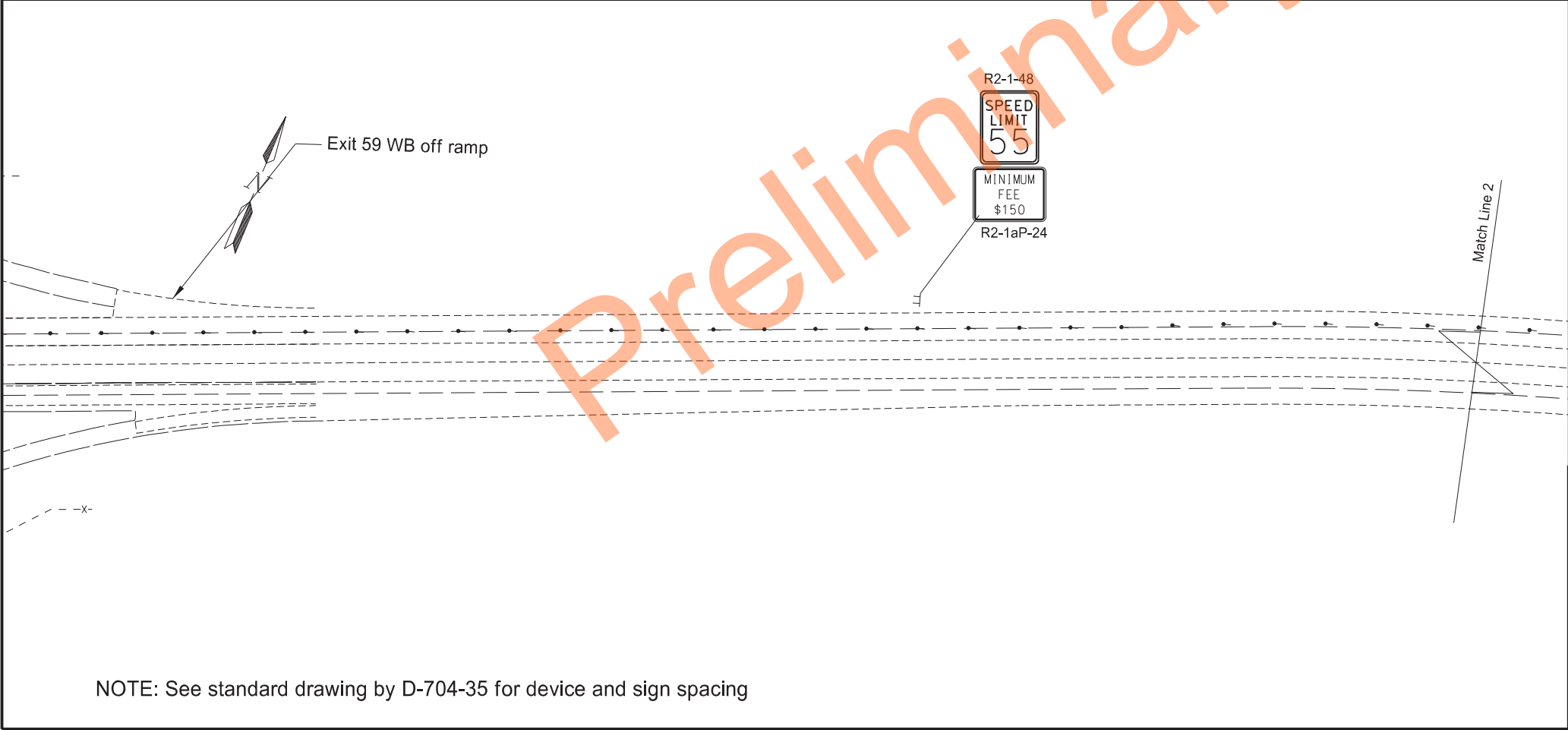
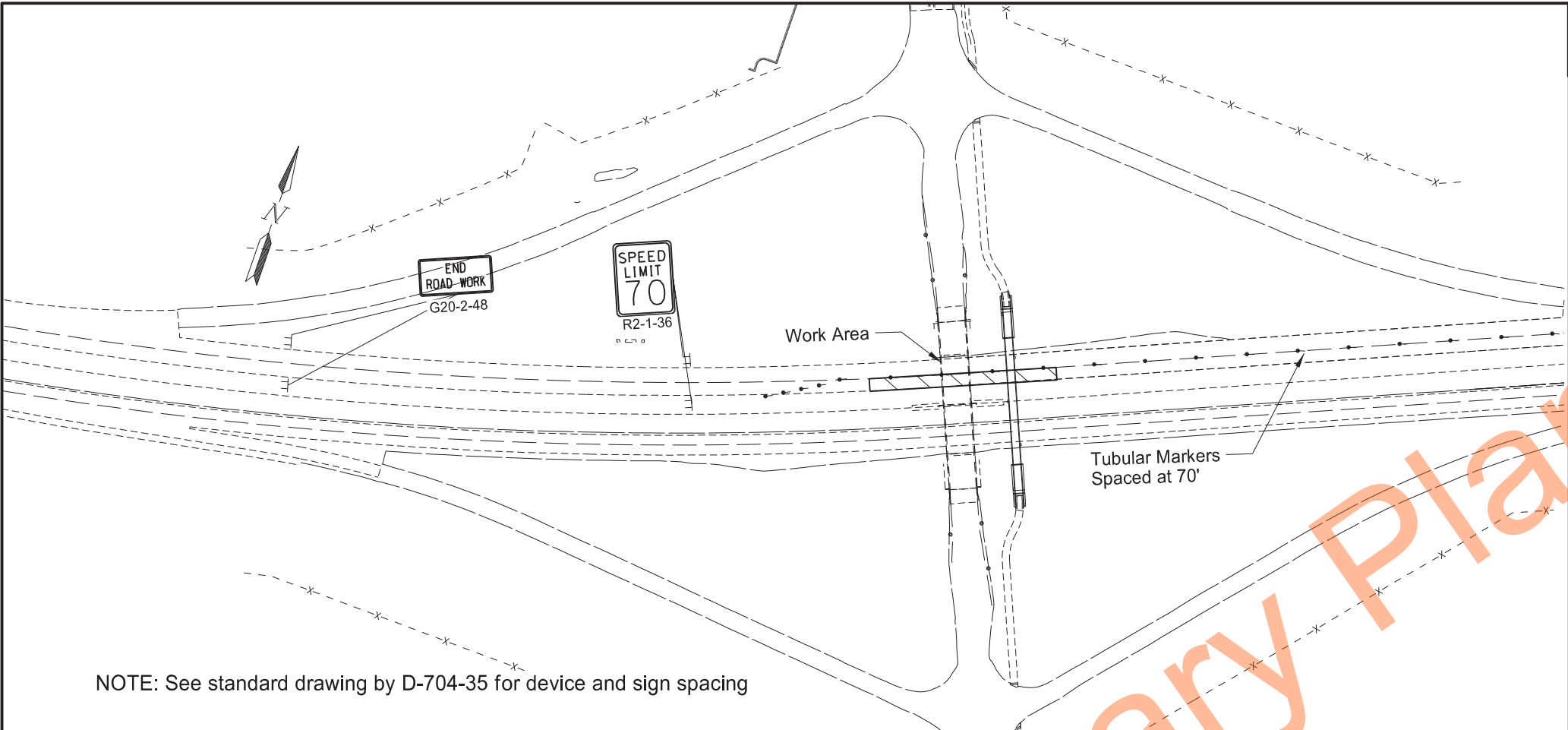
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	ND	IM-5-094(165)059	100	12

Legend

-  Work Area
-  Delineator Drums
-  Sign
-  Type III Barricade

Phase 1b
Construction Signing
West Dickinson Interchange
Exit 59
30th Ave. W





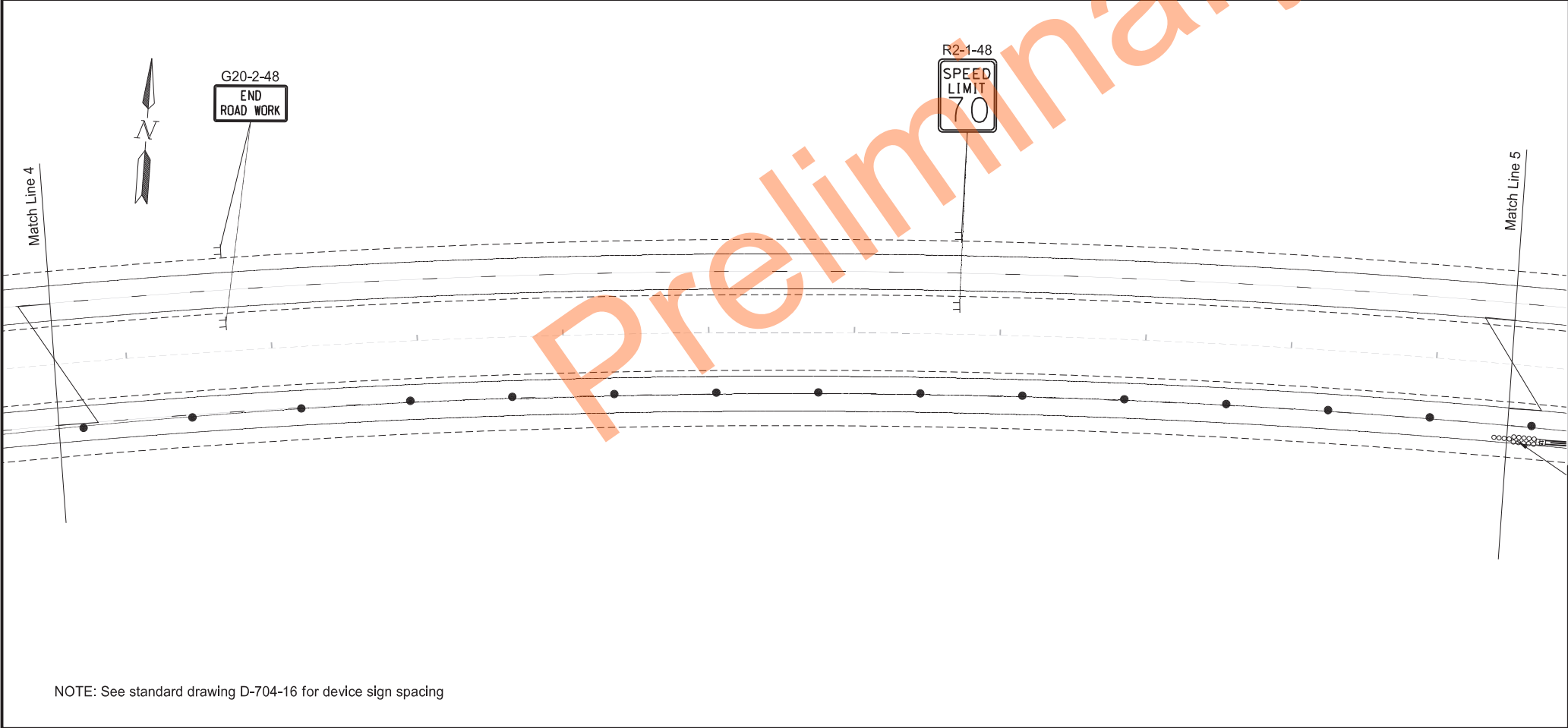
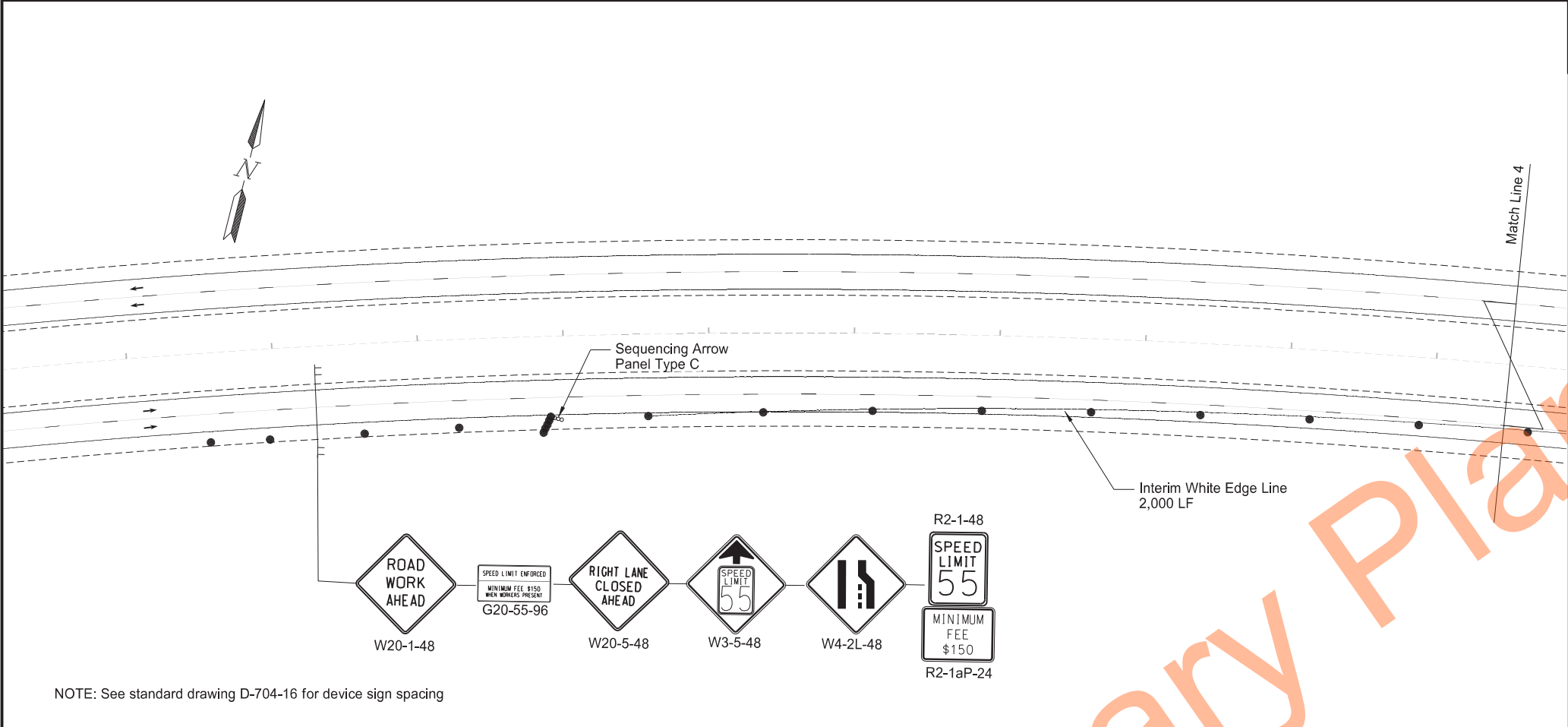
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	ND	IM-5-094(165)059	100	13

Legend

- Work Area
- Tubular Marker
- Delineator Drums
- Sign

Phase 1b
Construction Signing
West Dickinson Interchnage
Exit 59
I-94

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	15

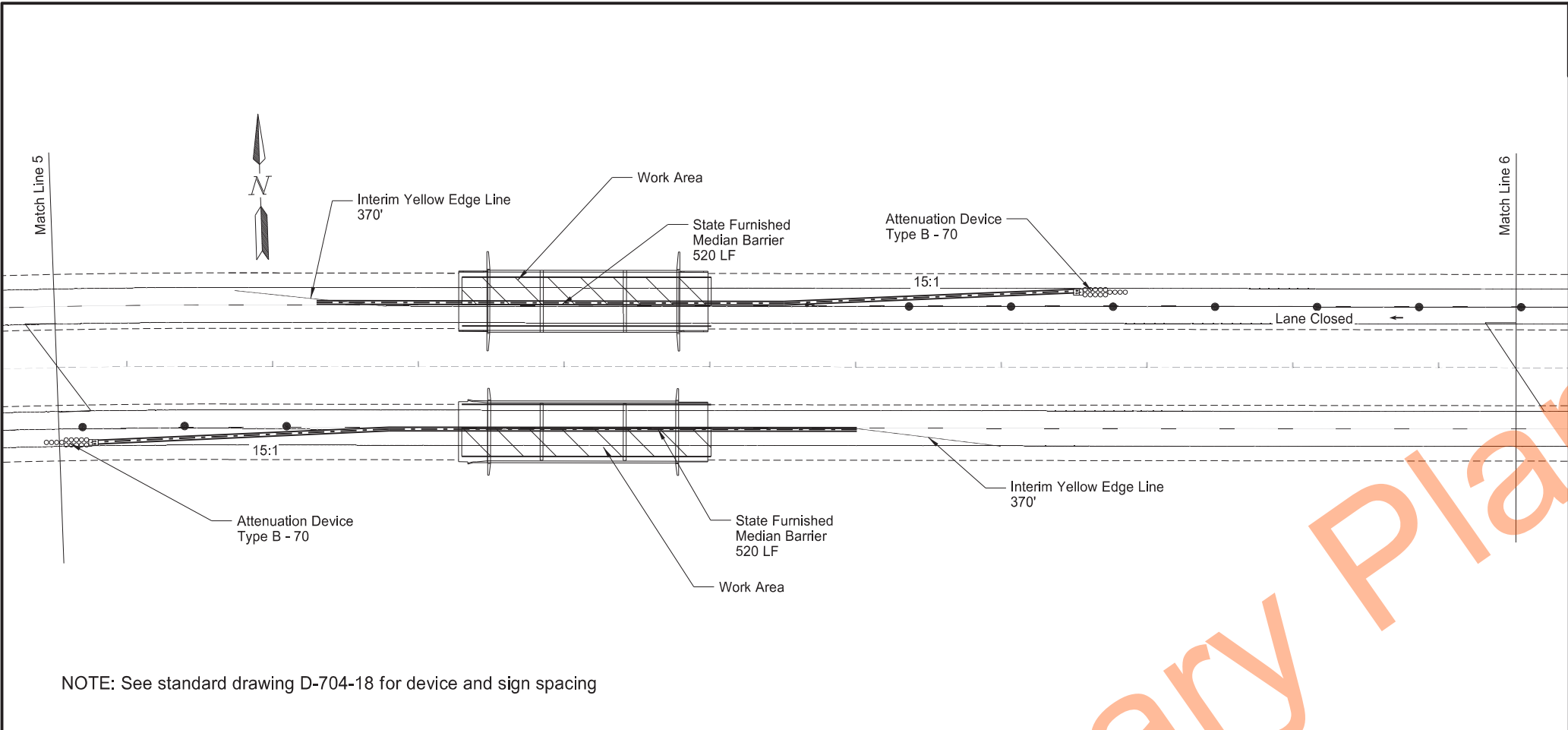


Legend

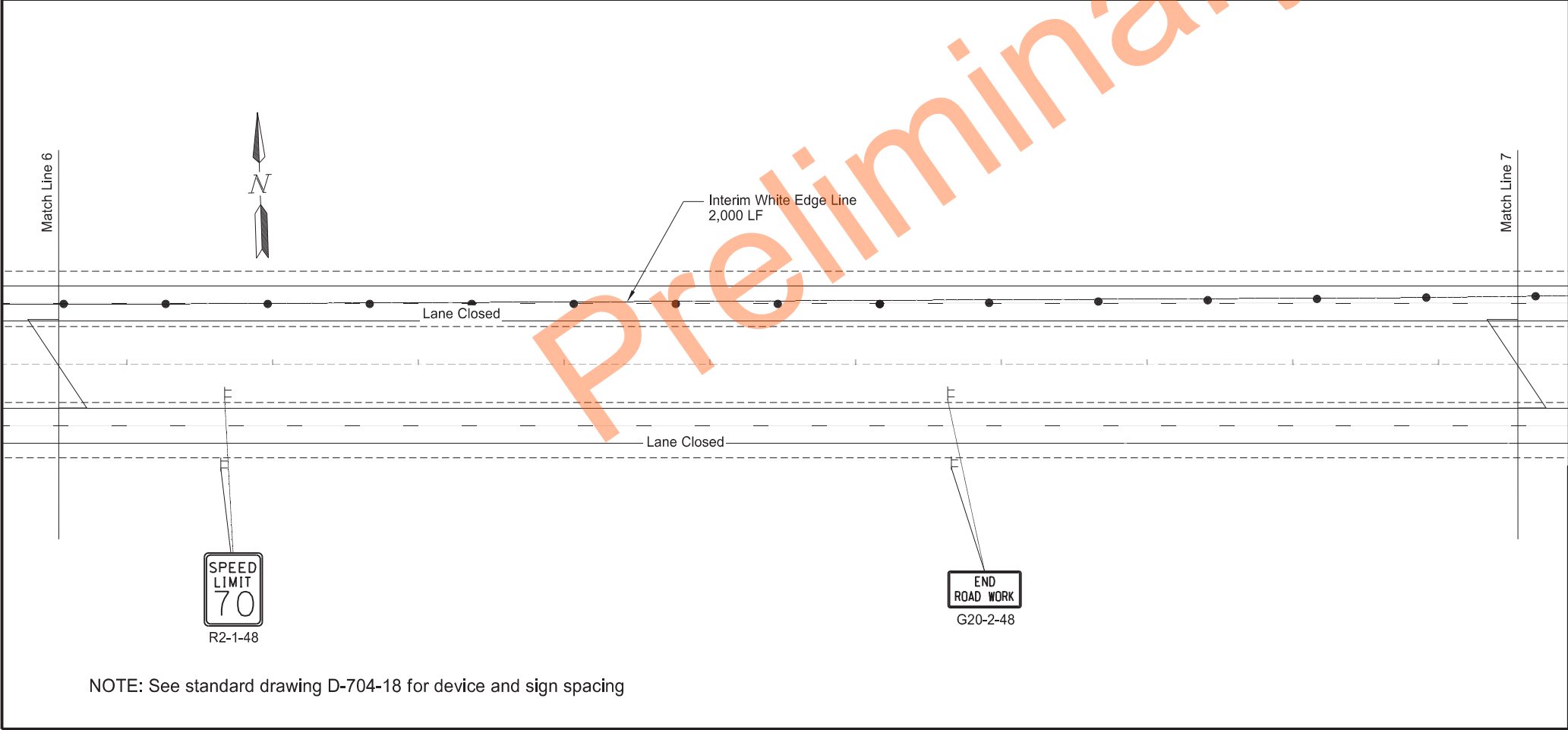
- Work Area
- Delineator Drums
- Sign

Phase 1b
Construction Signing
RP 60.457





NOTE: See standard drawing D-704-18 for device and sign spacing



NOTE: See standard drawing D-704-18 for device and sign spacing

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	16

- Legend
- Work Area
 - Delineator Drums
 - Sign

Phase 1b
Construction Signing
RP 60.457

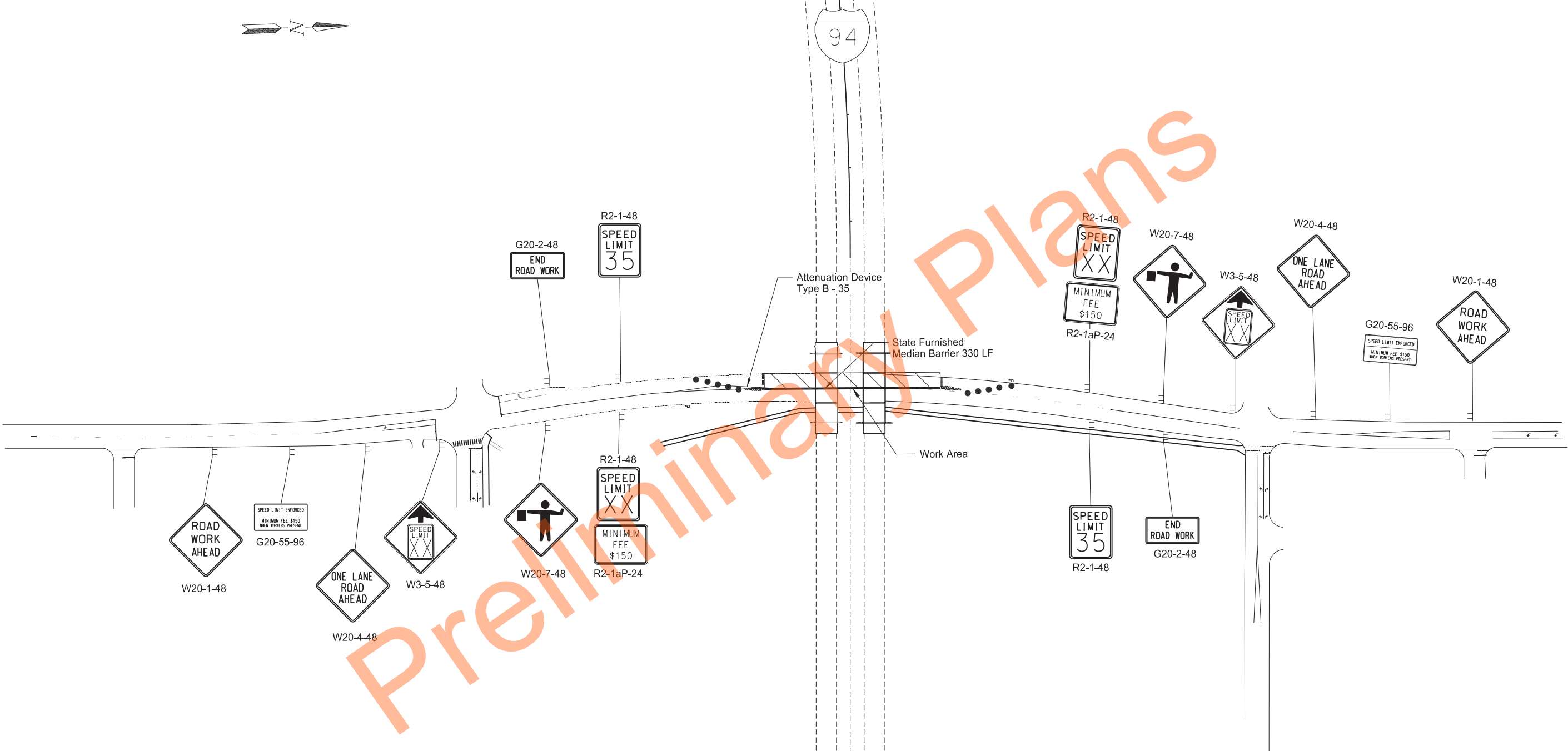


Preliminary

Legend

 Work Area
 Delineator Drums
 Sign

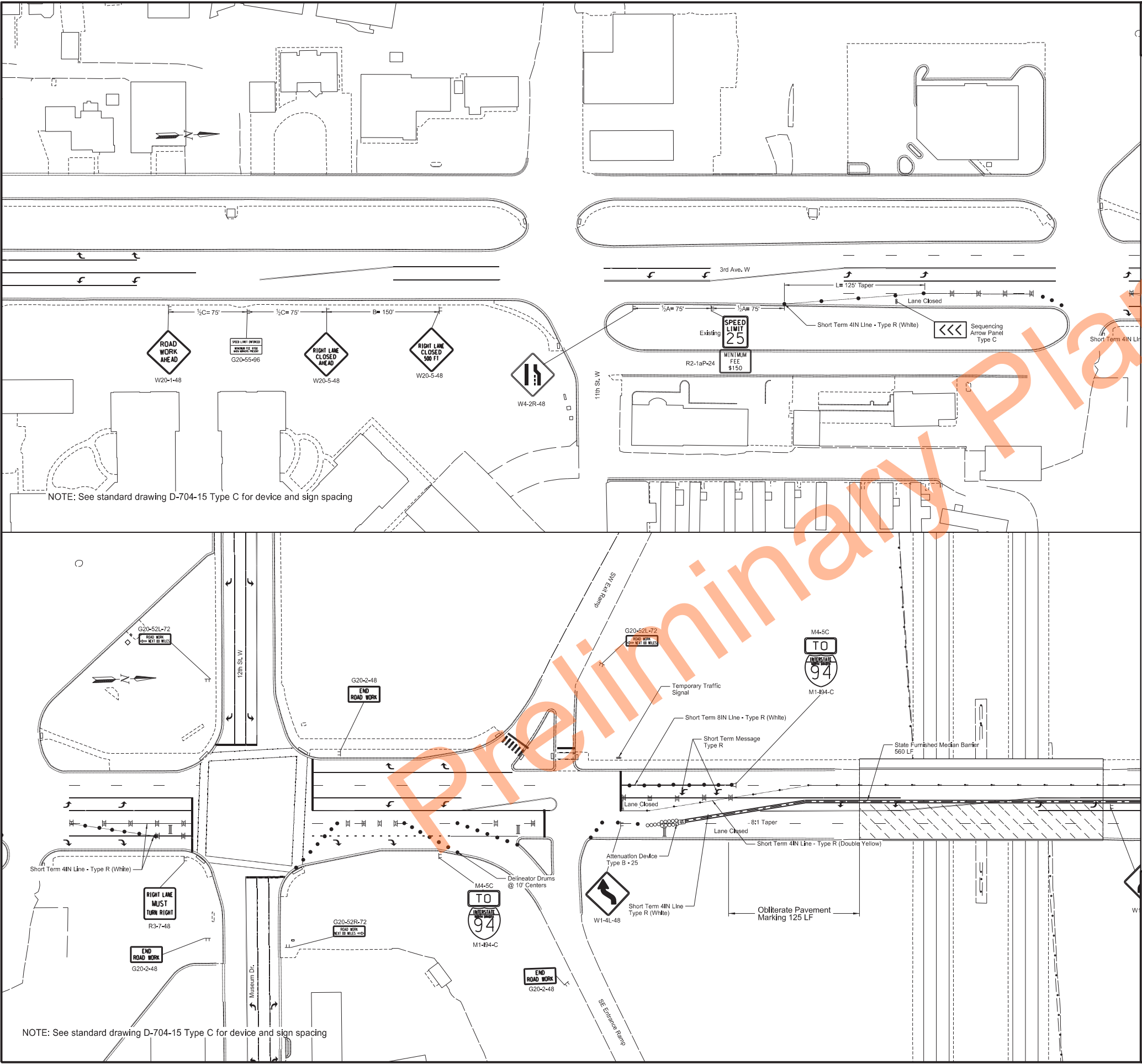
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	ND	IM-5-094(165)059	100	18



NOTE: See standard drawing D-704-17 for device and sign spacing

Phase 1b
Construction Signing
State Ave.





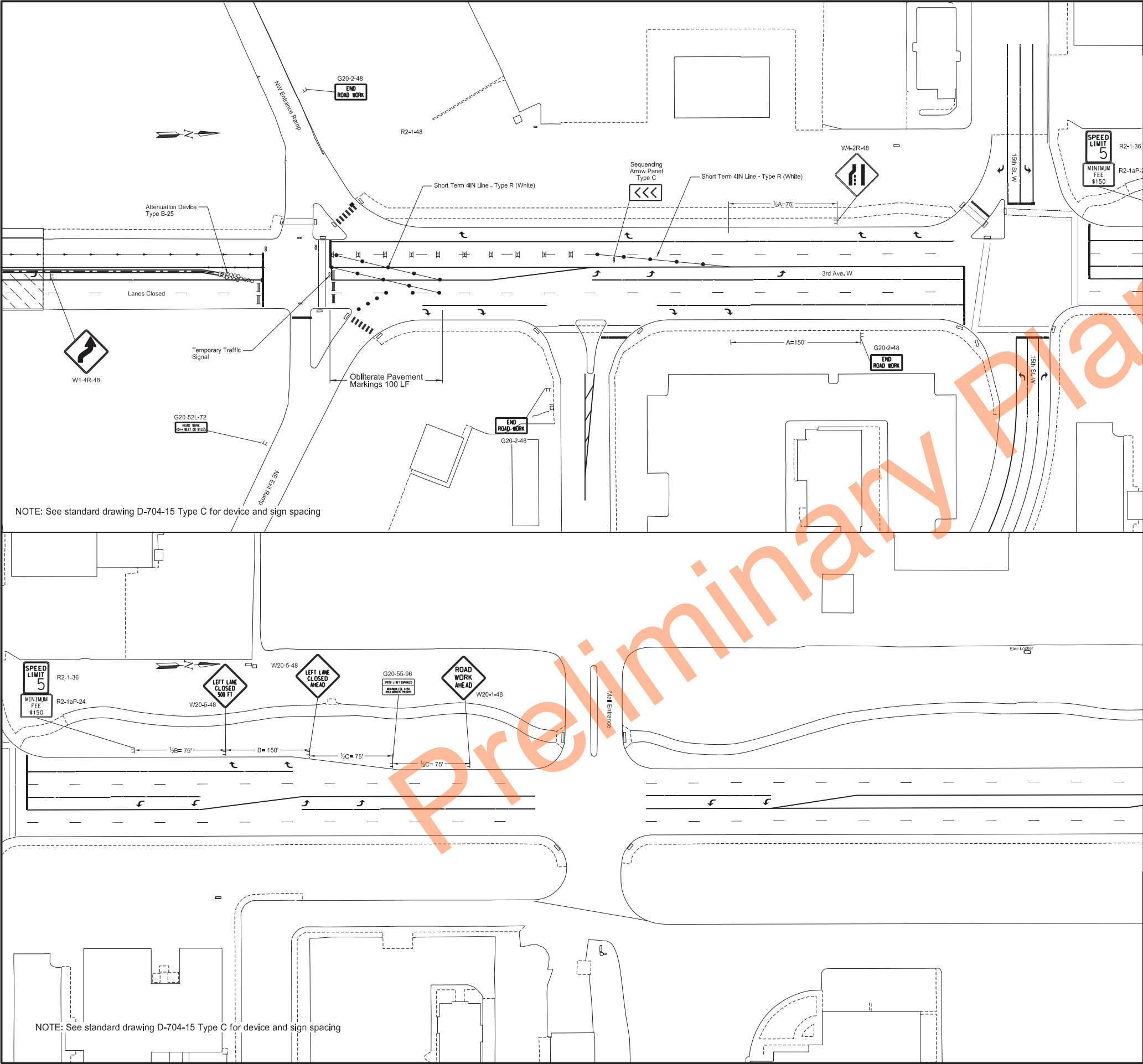
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	19

Legend

- Work Area
- Delineator Drums
- Sign
- Type III Barricade
- Stackable Vertical Panels
- Attenuation Device
- State Furnished Median Barrier

Phase 2a
Construction Signing
Hwy 22 Interchange
Exit 61
3rd Ave. E

REGISTERED PROFESSIONAL ENGINEER
SARA A. CAHLIN
PE-8397
DATE 09/09/26
NORTH DAKOTA



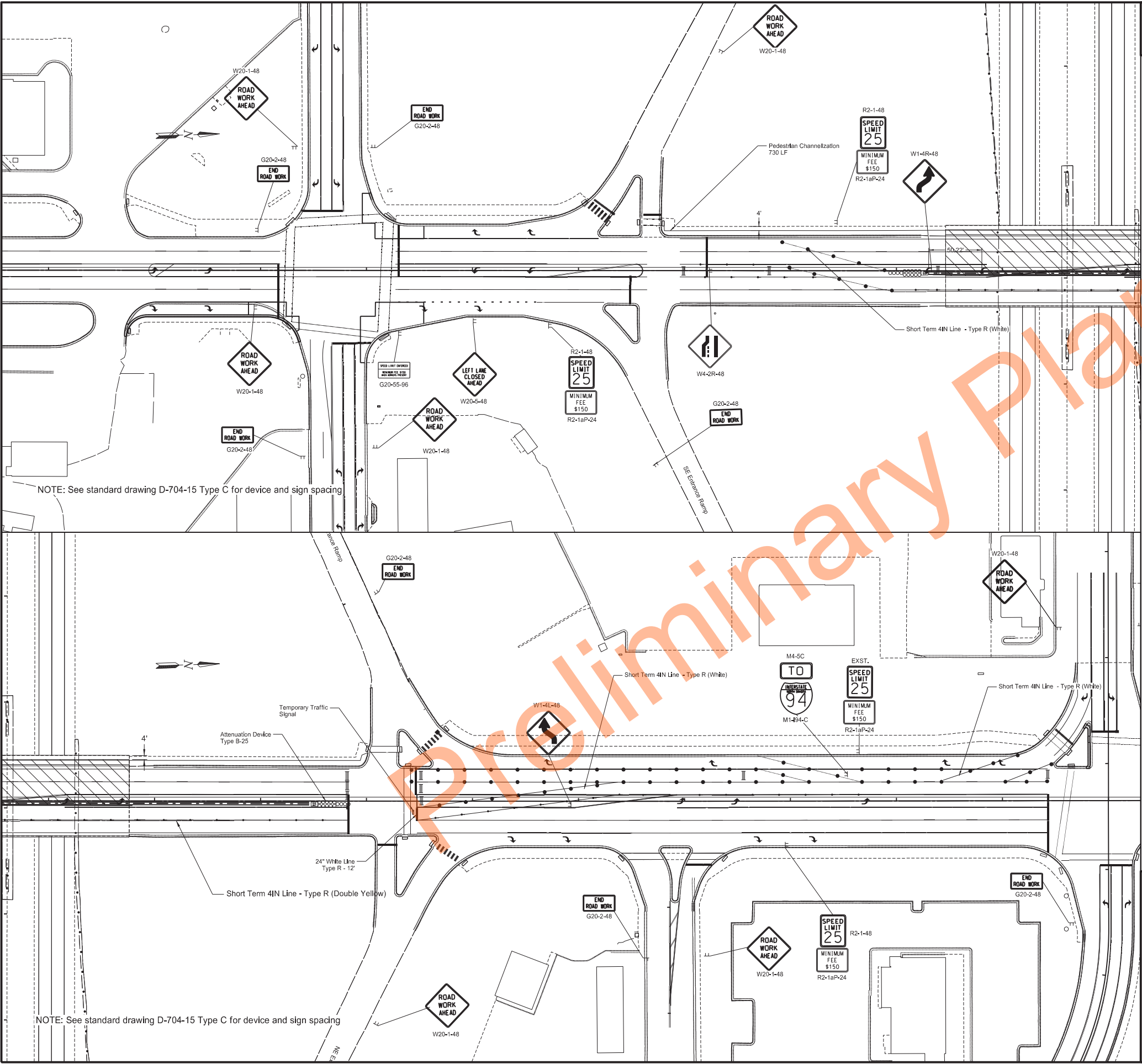
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	20

Legend

-  Work Area
-  Delineator Drums
-  Sign
-  Type III Barricade
-  Stackable Vertical Panels
-  Attenuation Device
-  State Furnished Median Barrier

Phase 2a
Construction Signing
Hwy 22 Interchange
Exit 61
3rd Ave. W





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	100	21

Legend

Work Area

Delineator Drums

Sign

Type III Barricade

Stackable Vertical Panels

Attenuation Device

State Furnished Median Barrier

Phase 2b
Construction Signing

Hwy 22 Interchange

Exit 61

3rd Ave. W

REGISTERED PROFESSIONAL ENGINEER

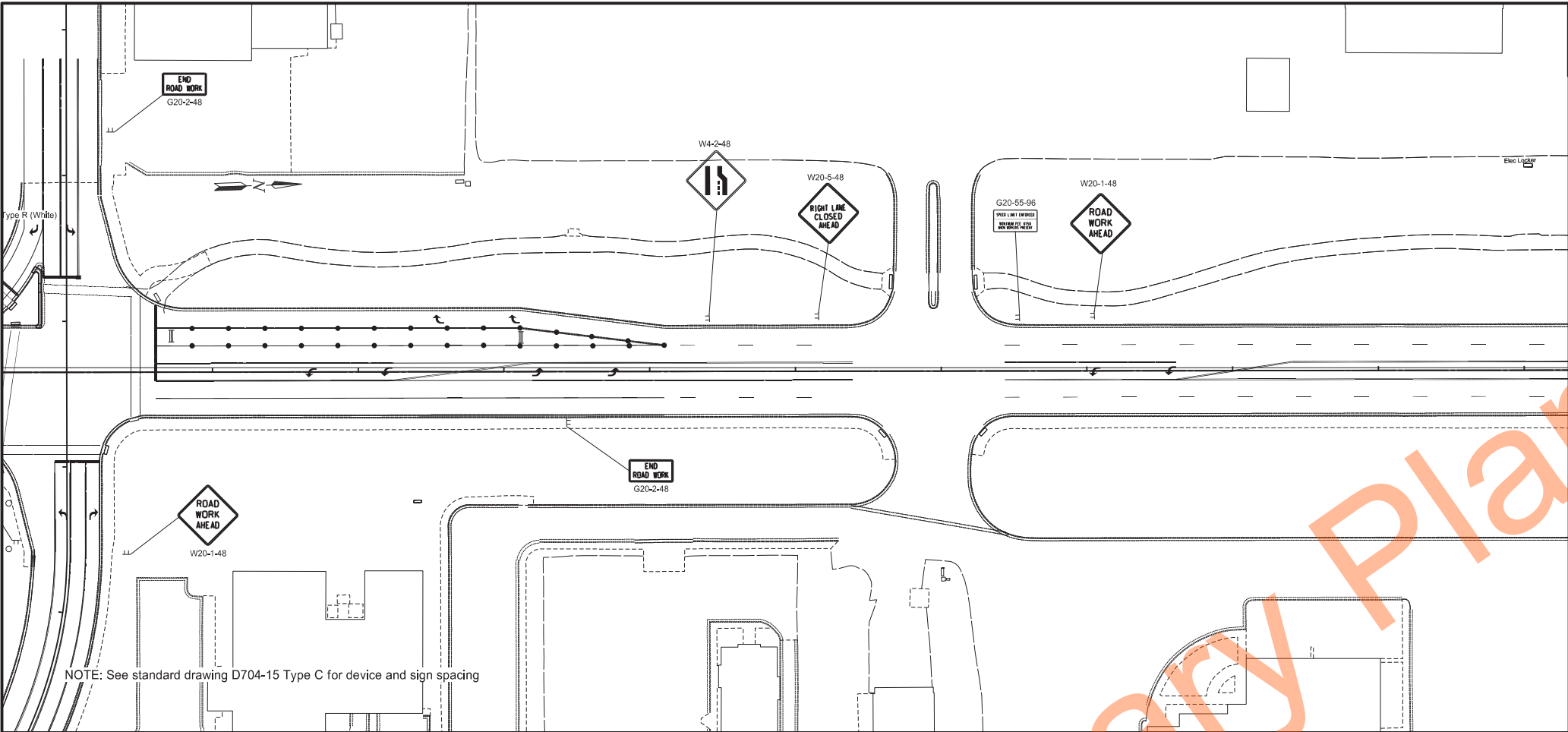
SARA A. CAHLIN

PE-8397

DATE 09/09/26

NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	22

- Legend
- Work Area

Delineator Drums

Sign

Type III Barricade

Stackable Vertical Panels

Attenuation Device

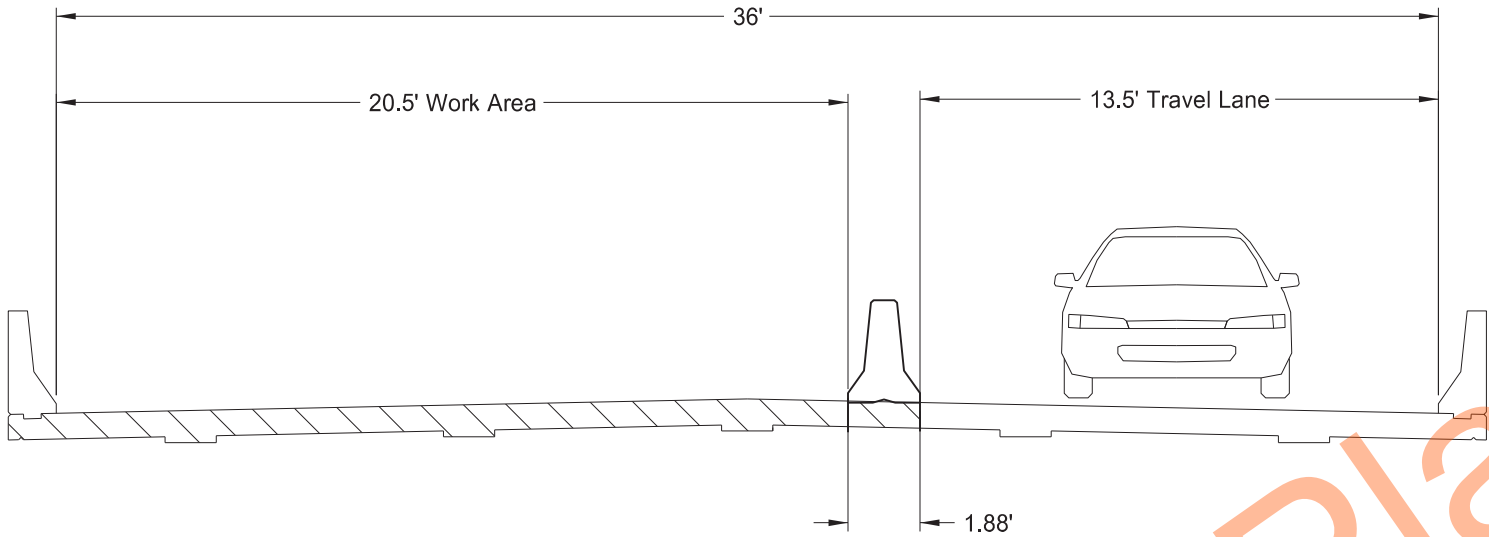
State Furnished Median Barrier
- Phase 2b
Construction Signing

Hwy 22 Interchange

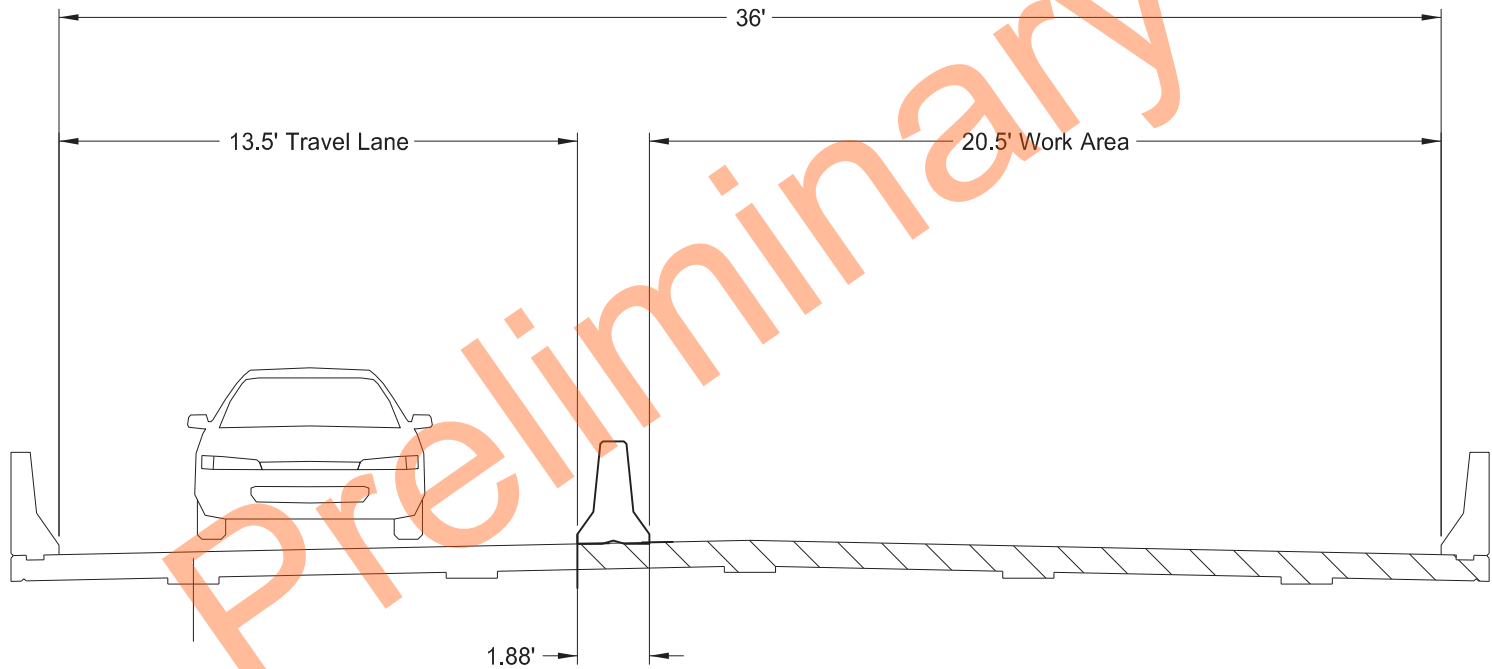
Exit 61

3rd Ave. W
-
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	23



Typical Section
Phase 1a

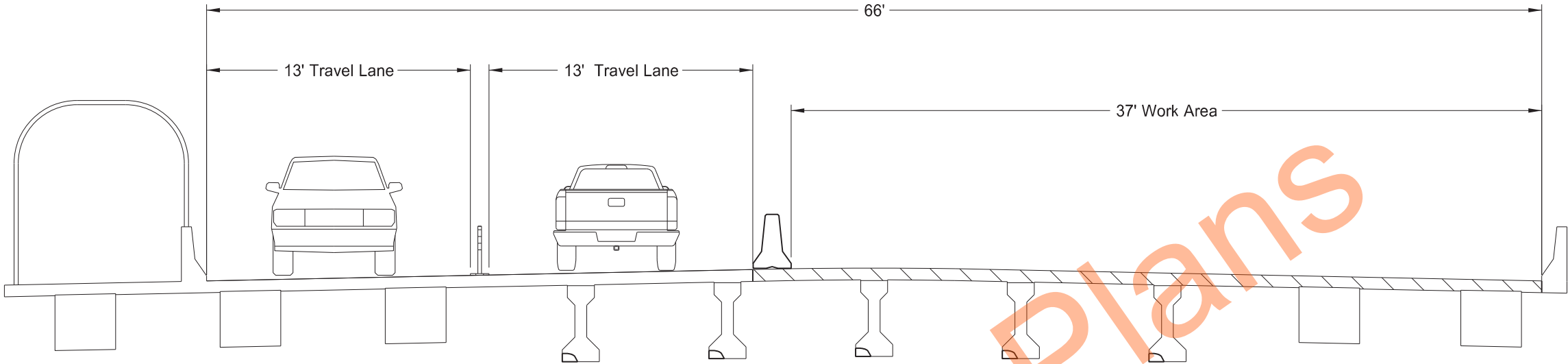


Typical Section
Phase 1b

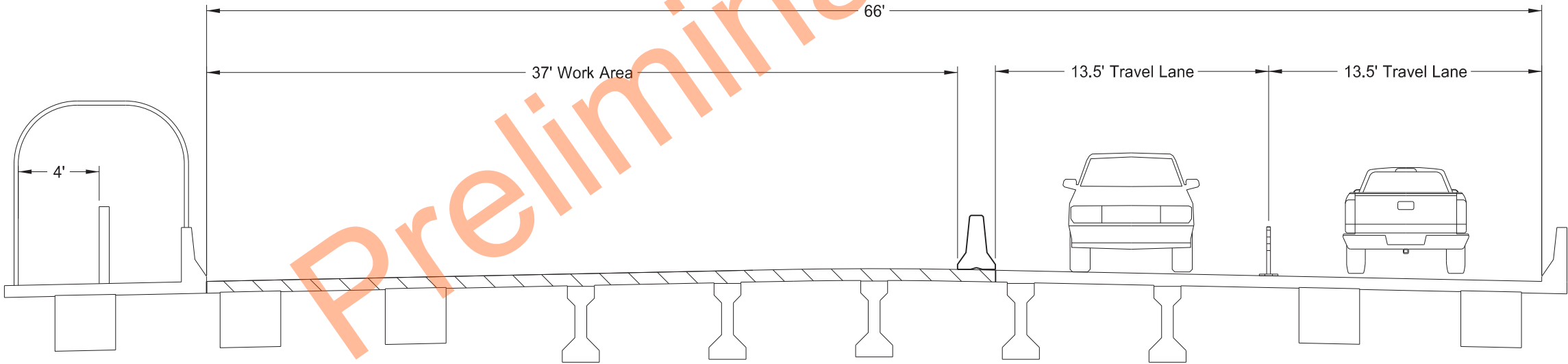
West Dickinson Interchange
Exit 59
30th Ave W



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	24



Typical Sections
Phase 2a

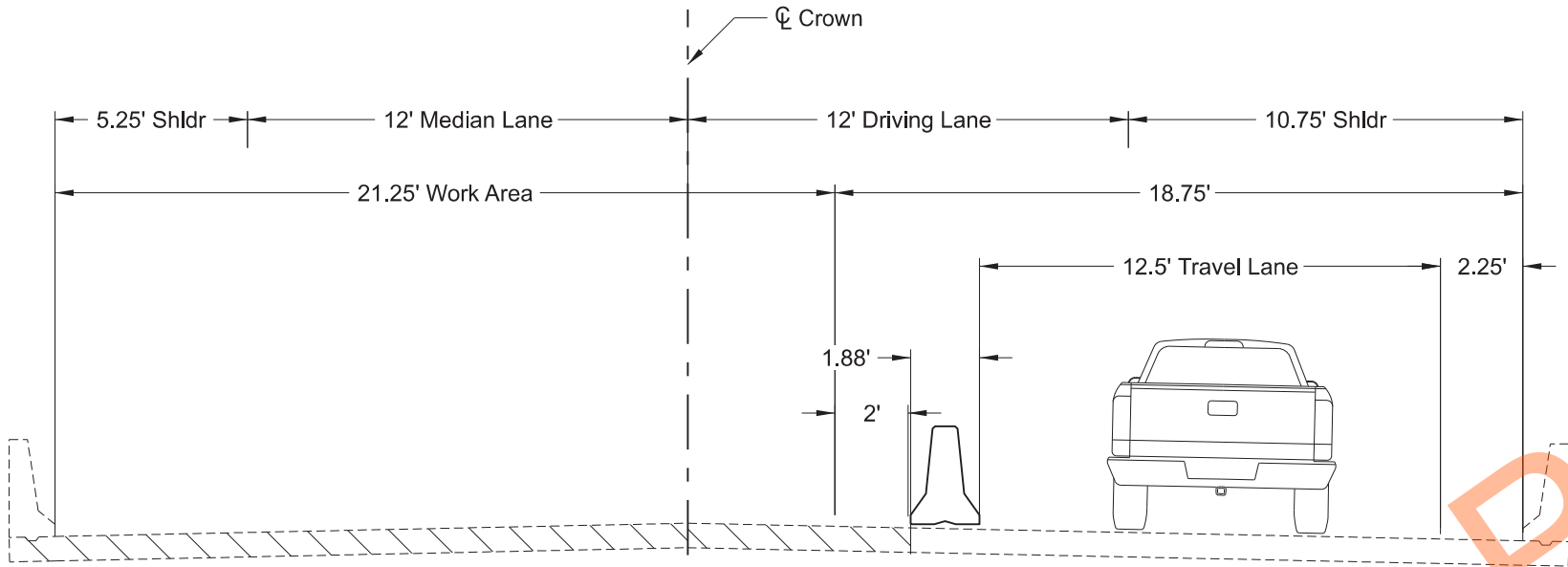


Typical Sections
Phase 2b

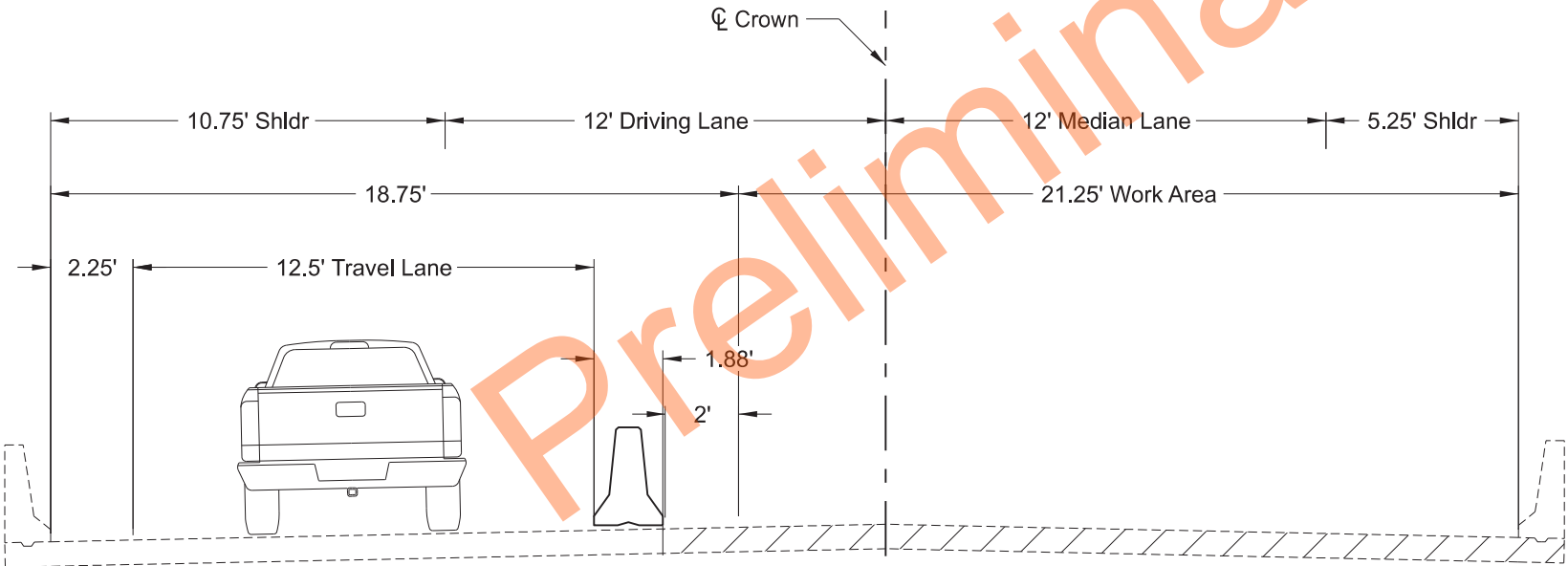
East Dickinson Interchange
Exit 61
3rd Ave W



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	25



Phase 1a
Median Lane & Shldr - Bridge Deck Overlay
Eastbound I-94
RP 60.457R



Phase 1b
Driving Lane & Shldr - Bridge Deck Overlay
Eastbound I-94
RP 60.457R

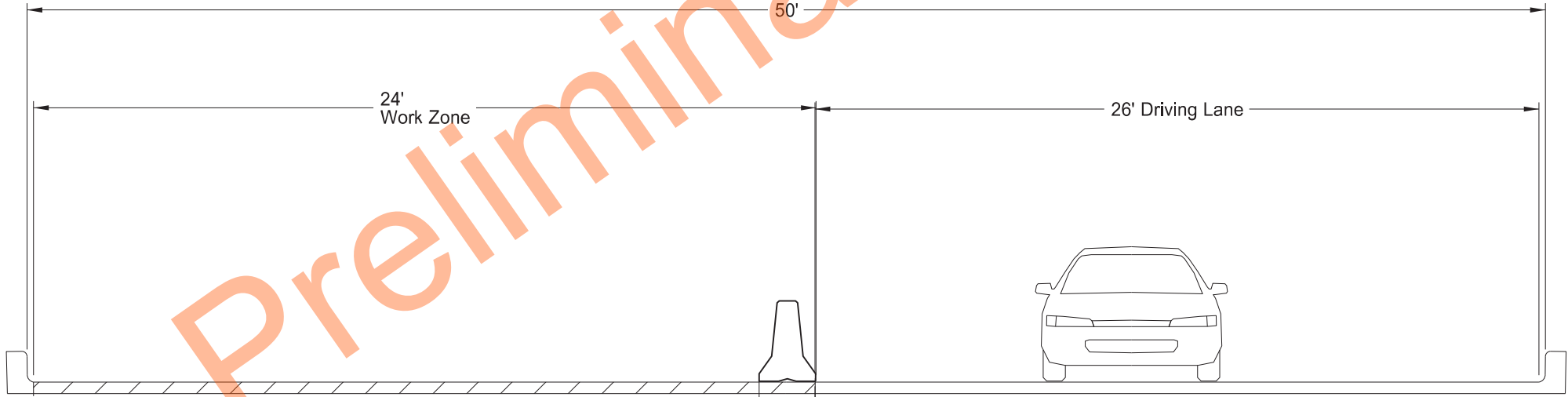
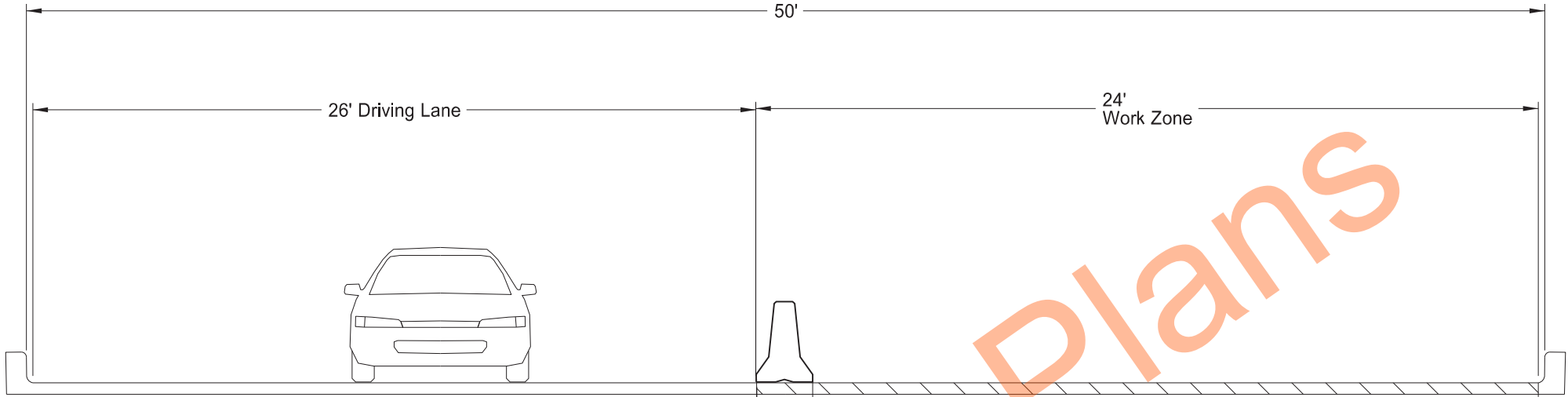
Note: Eastbound I-94 is shown. Westbound I-94 is mirrored

Work Zone Traffic Control
Typical Section

Phase 1a & Phase 1b
Eastbound & Westbound I-94
RP 60.457R & 60.457L



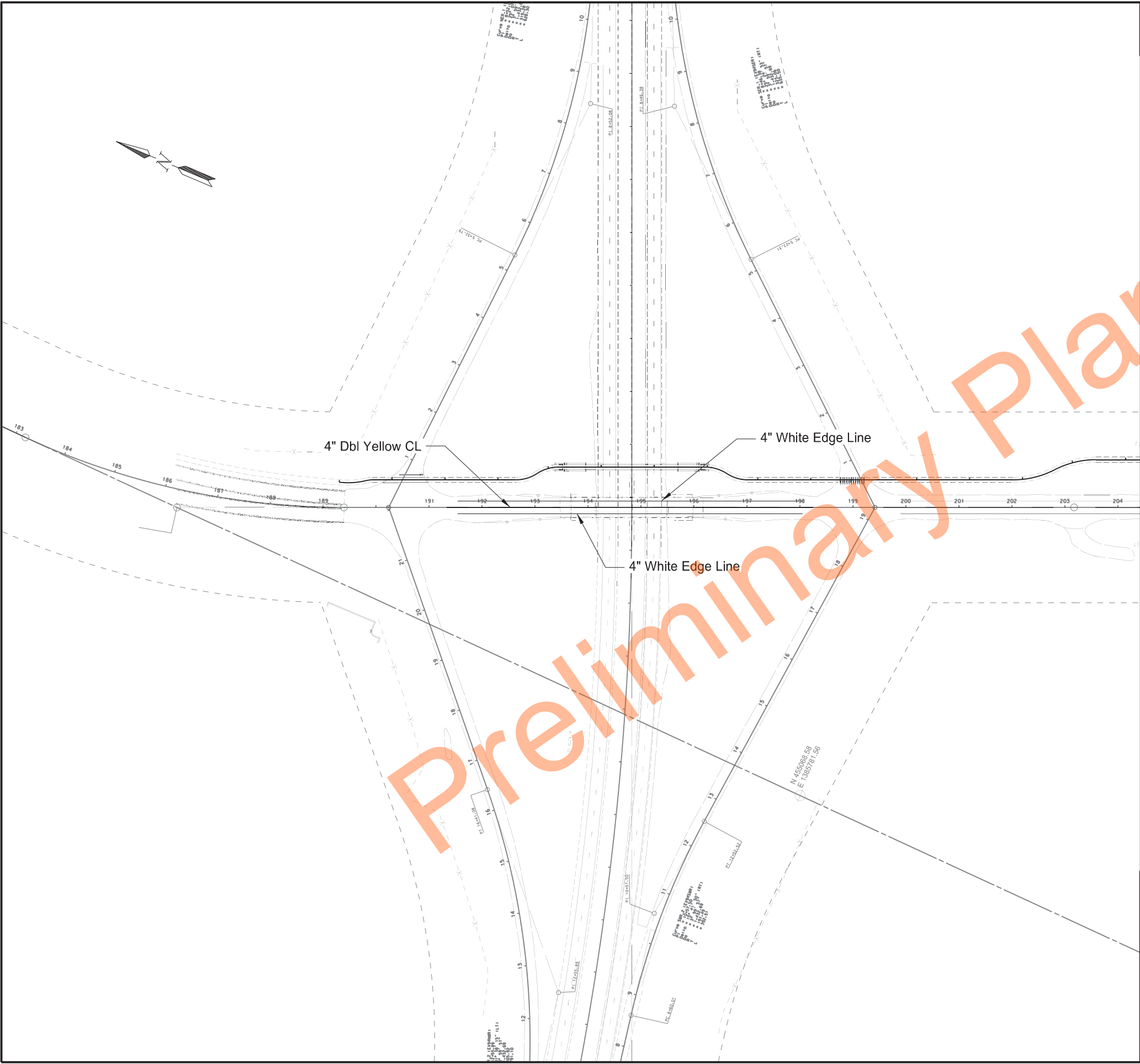
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	100	26



Typical Section
Phase 1b

Work Zone Traffic Control
Typical Section
State Ave.





STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		IM-5-094(165)059	120	1

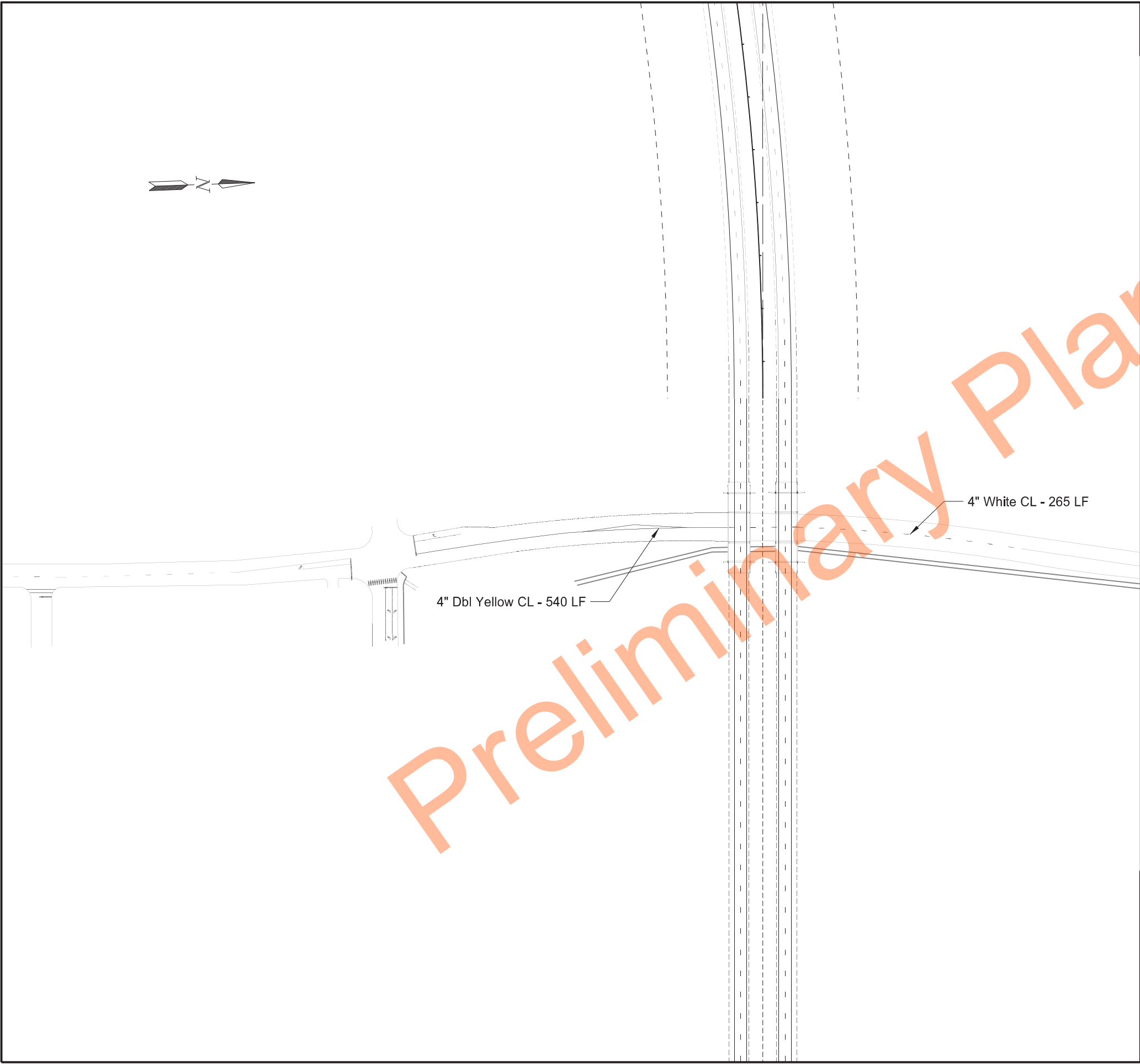
SPEC	CODE	BID ITEM	QTY	UNIT
762	0113	Epoxy PVMT MK 4in Line		
		4" Double Yellow Centerline	580.00	LF
		4" White Edge Line	1,160.00	LF

Pavement Marking

West Dickinson Interchange

Exit 59

I-94

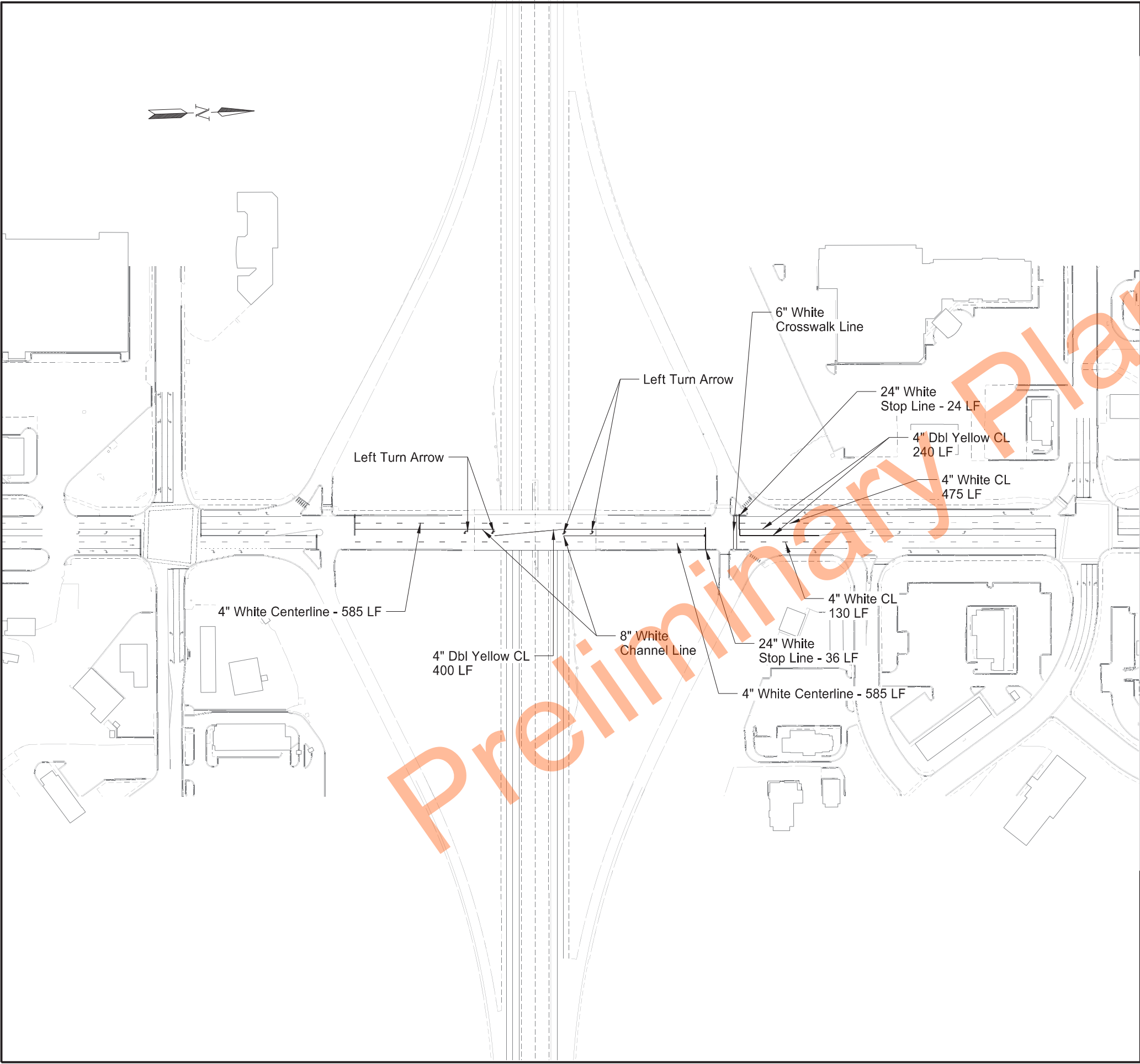


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	120	2

SPEC	CODE	BID ITEM	QTY	UNIT
762	0113	Epoxy PVMT MK 4in Line		
		4" Double Yellow Centerline	540.00	LF
		4" White Centerline	265.00	LF

Pavement Marking
State Ave.





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	120	3

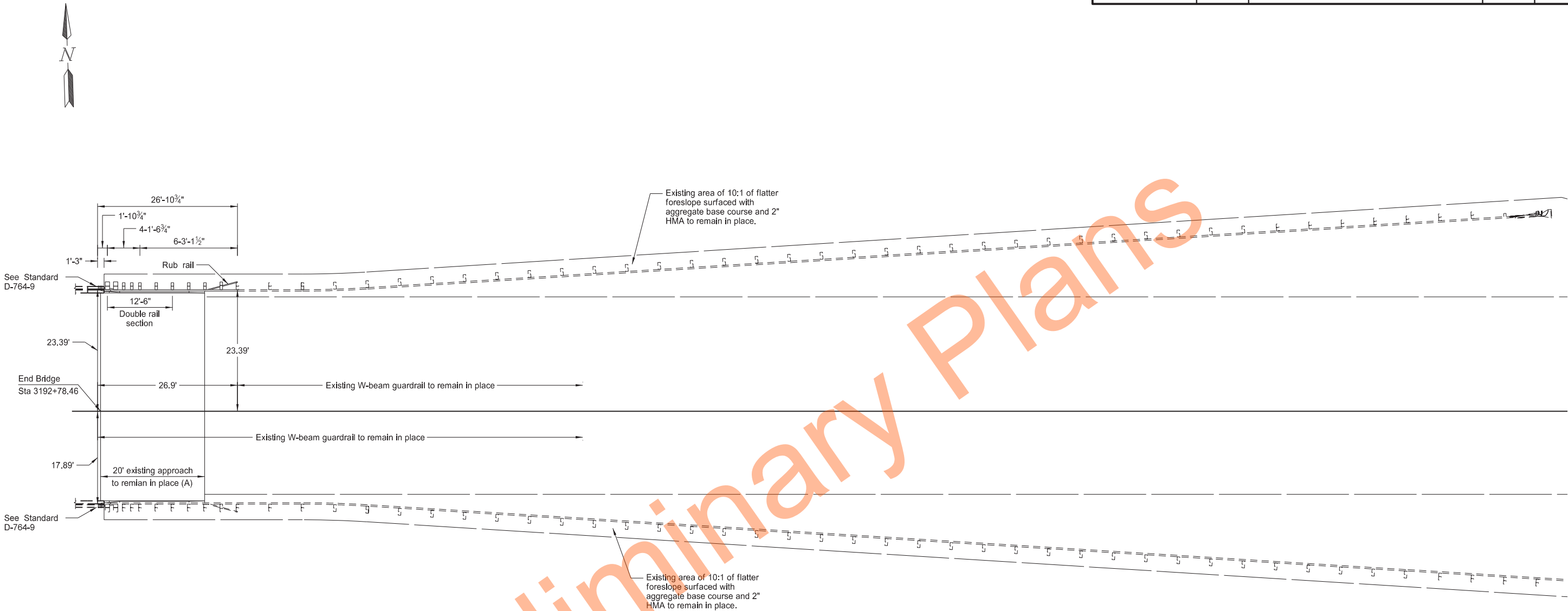
SPEC	CODE	BID ITEM	QTY	UNIT
762	0113	Epoxy PVMT MK 4in Line		
		4" Double Yellow Centerline	640.00	LF
		4" White Centerline	1,775.00	LF
762	0114	Epoxy PVMT MK 6in Line		
		White Crosswalk Line	126.00	LF
762	0115	Epoxy PVMT MK 8in Line		
		White Channel Line	534.00	LF
762	0117	Epoxy PVMT MK 24in Line		
		White Stop Line	60	LF
762	0136	Epoxy PVMT MK Message-Grooved		
		Left Turn Arrow(4)	64	SF

Pavement Marking
Hwy 22 Interchange
Exit 61
3rd Ave. W



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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	130	1



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL Sta 3192+77.88 to 3193+04.78 Lt	26.9	LF

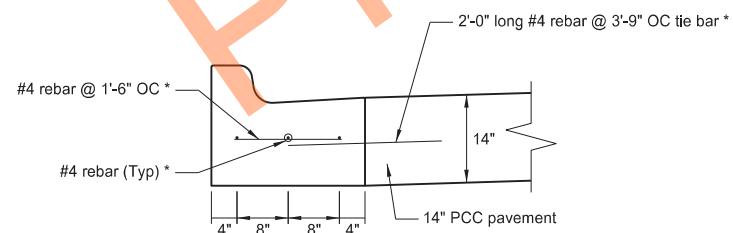
(A) See Section 170 for work at the north curb on the approach slab.

W-Beam Guardrail Layout

State Ave Separation
RP 60.457
Westbound Roadway

I-94



[illegible]

Curb & Gutter Detail

* Install #4 rebar in the curb and gutter section as shown. Use a length of rebar that will provide 3" clear distance to the concrete at each end.

Install #4 rebar to tie the C&G to the adjacent pavement.

Include the cost to furnish and install rebar in the unit cost for "Curb & Gutter - Type 1 Special".

- (A) Thrie beam rail section (double thickness)
- (B) Thrie beam rail section
- (C) Asymmetrical W-Thrie beam transition section
- (D) Curb & gutter - type 1 special. Install in accordance with Standard Drawing D-748-1, except for a 14" gutter depth, and transitions on each end as shown on Standard Drawing D-764-60.
- (E) Install either a MASH SKT or a MASH SoftStop Terminal at this location.

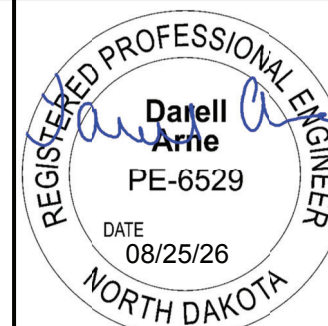
If a MASH SKT is installed, install the end terminal as shown above. See Standard D-764-51.

If a MASH SoftStop is installed, install it with the offset as shown on Standard D-764-60.
- (F) 2' expansion joint. See Section 170.
- (G) 2' concrete sleeper slab beyond expansion joint. See Section 170.
- (H) Install a 6" x 19" x 12" block with 22" long guardrail bolts.

Thrie/MGS W-Beam Guardrail Layout

State Ave Separation
RP 60.457
Eastbound Roadway

1-94



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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	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 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	(A) 5/8" Ø x 22" LONG GUARD- RAIL BOLT	(A) 6" x 12" x 19" WOOD OFF- SET BLOCK
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 3189+65.68 to 3191+29.96 Rt	42	29	23	132	10	1	10	6	10	1	1	1	1	5	1	4	2
Sta 3189+28.26 to 3191+29.96 Rt Mdn	48	35	29	156	13	1	7	6	10	1	1	1	1	5	1	4	2
TOTAL	90	64	52	288	23	2	17	12	20	2	2	2	2	10	2	8	4

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

SPEC	CODE	BID ITEM	QTY	UNIT	SPEC	CODE	BID ITEM	QTY	UNIT
748	0141	CURB & GUTTER - TYPE 1 SPECIAL			764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 3191+12.46 to 3191+27.46 Rt	15	LF			Sta 3189+63.34 to 3191+39.96 Rt	176.9	LF
		Sta 3191+12.46 to 3191+27.46 Rt Mdn	15	LF			Sta 3189+38.40 to 3191+39.96 Rt Mdn	201.9	LF
		Total	30	LF			Total	378.8	LF
764	0131	W-BEAM GUARDRAIL			764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 3189+65.68 to 3191+29.96 Rt	164.4	LF			Sta 3189+13.45 to 3189+63.34 Rt	1	Ea
		Sta 3189+28.26 to 3191+29.96 Rt Mdn	201.9	LF			Sta 3188+88.51 to 3189+38.40 Rt Mdn	1	Ea
		Total	366.3	LF			Total	2	Ea
764	0145	W-BEAM GUARDRAIL END TERMINAL							
		Sta 3189+18.60 to 3189+65.68 Rt	1	Ea					
		Sta 3188+81.64 to 3189+28.26 Rt Mdn	1	Ea					
		Total	2	Ea					



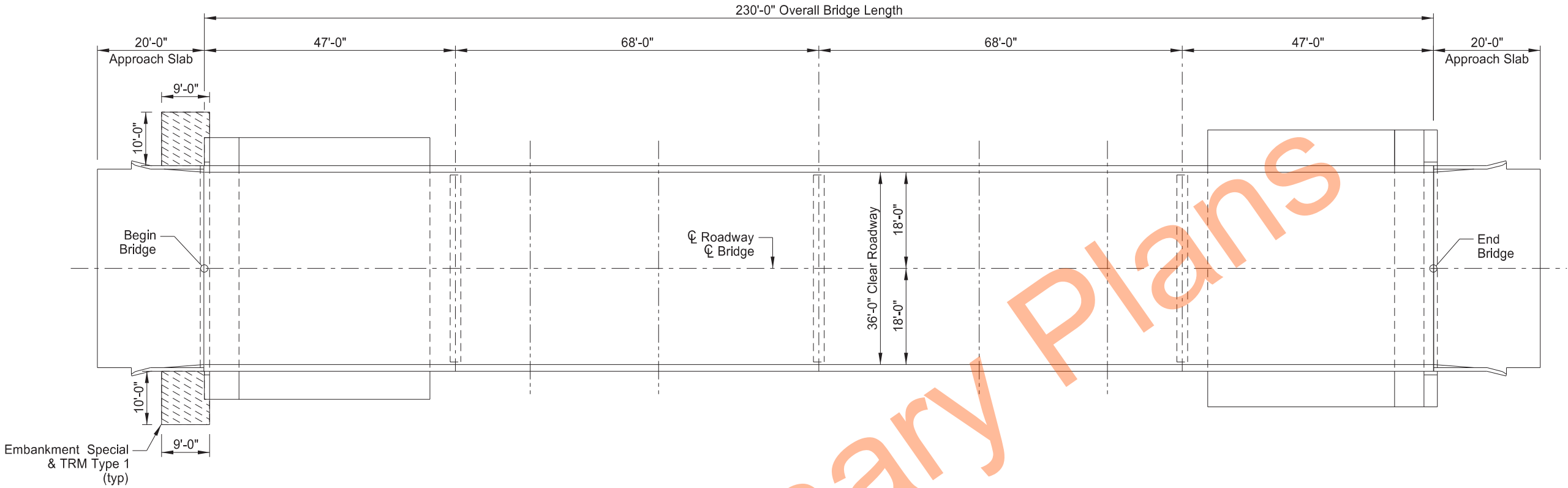
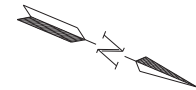
Thrie/MGS W-Beam Guardrail Quantities

State Ave Separation
RP 60.457
Eastbound Roadway

I-94

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	1



The patterned area indicates limits of embankment special & TRM Type 1.

BRIDGE BID ITEMS					
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	
203	0195	EMBANKMENT SPECIAL	L SUM	1	
255	0201	TRM TYPE 1	SY	18	
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	920	
602	1260	BRIDGE DECK CRACK SEALING	LF	2,101	
602	7000	SPECIAL SURFACE FINISH	SF	1,640	
650	0805	DECK SPALL REPAIR	SF	274	
930	9665	BARRIER REPAIR	EA	2	
930	9694	GIRDER PATCHING	L SUM	0.1	



SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 449(25)	CONCRETE BEAM PATCHING
WEST DICKINSON INTERCHANGE	
BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	
Jason Thorenson 08/24/26	
DRAWING NO.	94-059.485-1

		23 U.S.C. § 407 Documents NDDOT Reserves All Objections	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
			ND	IM-5-094(165)059	170	2

NOTES

100

SCOPE OF WORK: Work at this site consists of the following:

- Deck spall repair
- Concrete beam repair
- Concrete barrier repair
- Penetrating water repellent treatment
- Crack sealing
- Special surface finish
- Erosion repair

203

EMBANKMENT SPECIAL: Furnish and place imported topsoil meeting Section 203.04 D.3 to restore areas of erosion behind the south abutment wingwalls. Place the material to the top of each wingwall and shape the topsoil to match the surrounding contours. An estimated 10 CY of material will be required for the erosion repairs.

Place and compact the topsoil in lifts not to exceed 8 inches. Compact the material using a jumping jack or plate compactor. Include all labor, equipment, and material to repair the erosion adjacent to the south abutment wingwalls in the lump sum bid item "Embankment Special."

255

TRM TYPE 1: After placing the Embankment Special, seed the embankment with Class II seed mixture meeting Section 251.03 D. Prior to seeding, loosen the soil by means of a hand rake or drag. Place seed by broadcasting the area at a rate of 0.06 pounds per SY. After seeding, rake the area loosely to cover the seed. Install TRM Type 1 over the repaired embankment. Include all labor, equipment, and material to seed and install the TRM in the bid item "TRM Type 1."

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: Apply the penetrating water repellent solution to the top of the bridge deck. Apply penetrating water repellent solution prior to sealing the bridge deck 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 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 "Bridge Deck Crack Sealing."

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.

650

DECK SPALL REPAIR: The bridge deck has surface spall areas. The actual limits of the surface spall area 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.

Complete the deck spall repairs in accordance with the construction requirement of Section 650.04 with the following exceptions:

- Saw cut the perimeter of the repair area to a depth of 1". Remove all concrete within the repair area to a minimum depth of 2" or to sound concrete. Limit the depth of concrete removal to a maximum depth of 4".
- Complete removals using mechanical equipment, with the exception that a milling machine specified for Class 1 removals will not be required.
- 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 in the deck spall repair areas according to Section 602.04 D.2 "Approach Slab Tining."

Complete the deck spall repairs using a rapid-setting, fiber reinforced, concrete repair material. Use a material that will attain a compressive strength of greater than 2500 psi within 2 hours. Place, finish, and cure per manufacturer's recommendations. Use a material listed below, or a similar material approved for use by the Engineer.

- Rapid Set DOT Concrete Mix (CTS Cement Manufacturing Corporation)
- Phoscrete Formula 1-HC (Phoscrete Corporation)
- Pavemend DOTLine Rapid Repair Concrete (Aquafin Inc.)

Include all labor, equipment, and materials required to remove the concrete and repair the bridge deck spall areas in the bid item "Deck Spall Repair."

930

BARRIER REPAIR: Barrier repairs consist of filling the large gaps between bridge and approach panel barriers at the south end of the bridge with a high-expansion polyurethane foam.

At the south end of the bridge, remove all existing repair materials and debris and clean the joint opening between the bridge deck and approach panel, and between the barriers, to the limits shown in the plans. Fasten a ½" thick galvanized steel plate to the outside edge of the approach panel using ½" diameter galvanized screw anchors intended for use in cracked or uncracked concrete. Fill the gaps at both barriers using a high-expansion, waterproof, UV resistant, polyurethane foam intended for outdoor use. After installation, cut any excess foam to be flush with the back face and front face of the barriers.

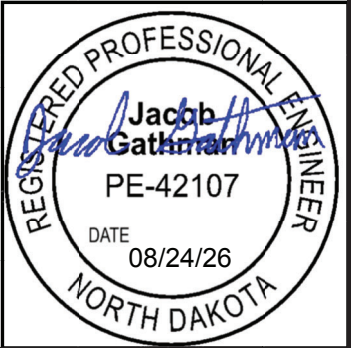
Include all labor, equipment, and materials required to complete the work in the bid item "Barrier Repair."

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

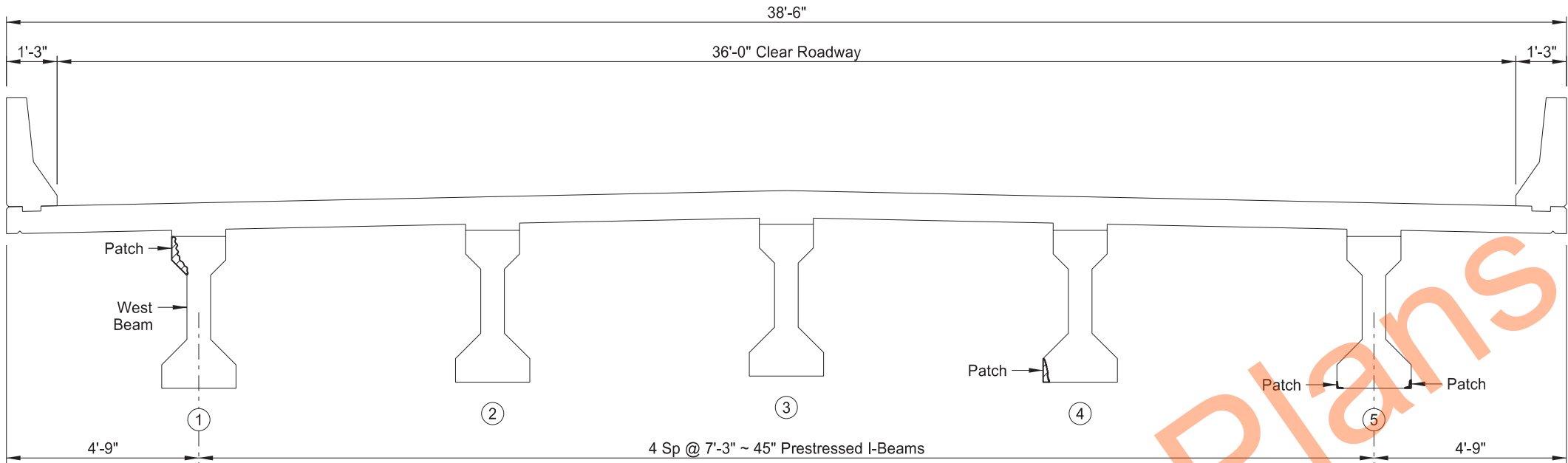
Finish the surface with a uniform texture, color, and appearance free from fins, projections, cavities, and porous areas. Use a "sand" textured finish. Use gray surface finish color number 36424 meeting AMS-STD-595.

REGISTERED PROFESSIONAL ENGINEER
Jacob Gathman
PE-42107
DATE 08/24/26
NORTH DAKOTA

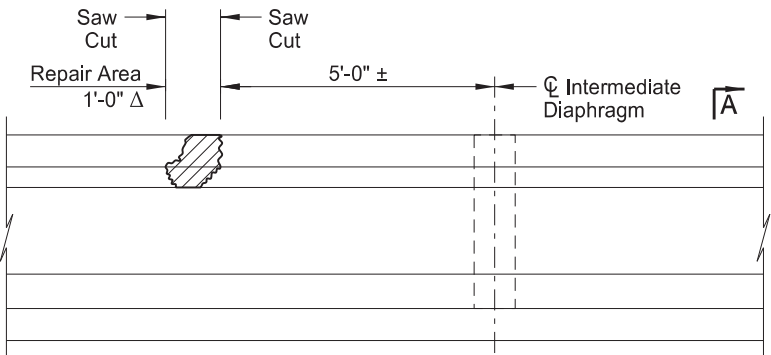


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

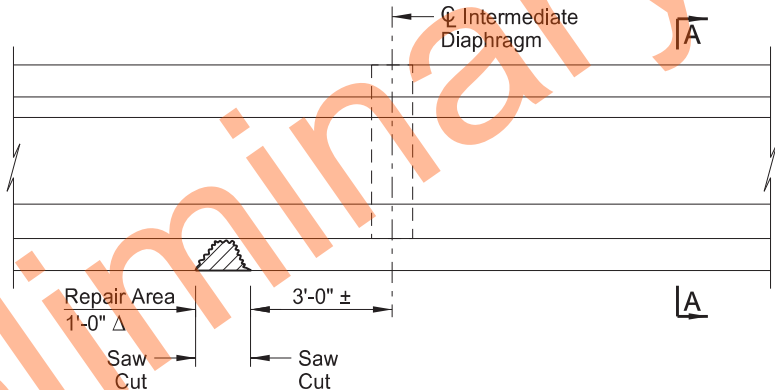
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	4



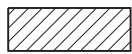
(FACING NORTH)
TYPICAL SECTION



(SHOWING OUTSIDE FACE ~ LOOKING EAST)
BEAM 1 ELEVATION ~ SPAN OVER WESTBOUND I-94

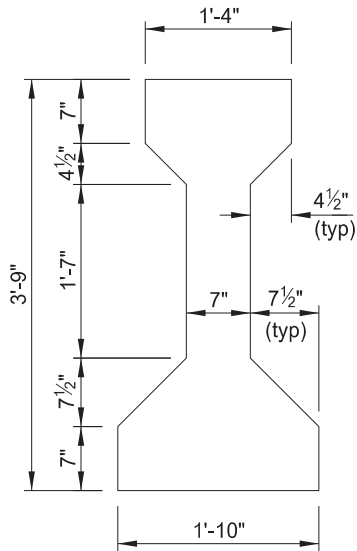


(SHOWING INSIDE FACE ~ LOOKING EAST)
BEAM 4 ELEVATION ~ SPAN OVER EASTBOUND I-94

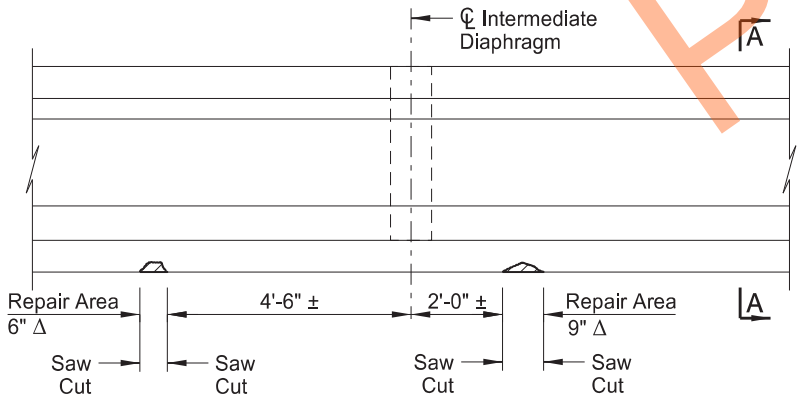


Indicates beam concrete repair areas.

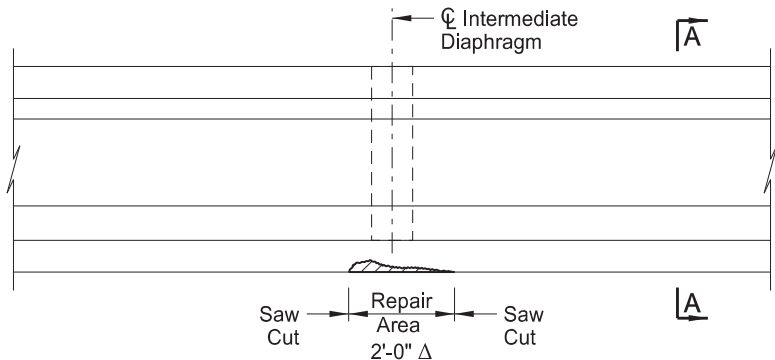
Δ Actual limits to be repaired will be determined by the Engineer in the field.



(SHOWING DIMENSIONS)
A-A



(SHOWING INSIDE FACE ~ LOOKING EAST)
BEAM 5 ELEVATION ~ SPAN OVER EASTBOUND I-94



(SHOWING OUTSIDE FACE ~ LOOKING WEST)
BEAM 5 ELEVATION ~ SPAN OVER WESTBOUND I-94



WEST DICKINSON INTERCHANGE
CITY OF DICKINSON

PRESTRESSED CONCRETE BEAM
REPAIR DETAILS

DRAWING NO. 94-059.485-4

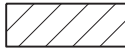
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	5

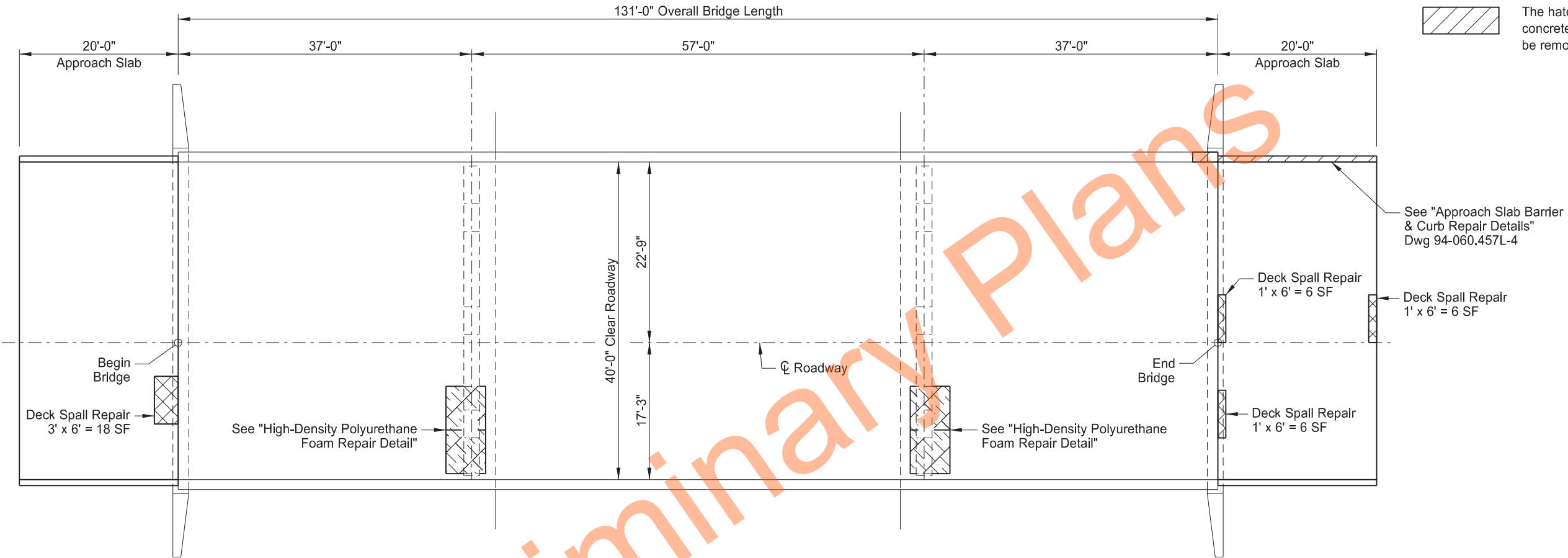


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The hatched areas indicate high-density polyurethane foam.
- 

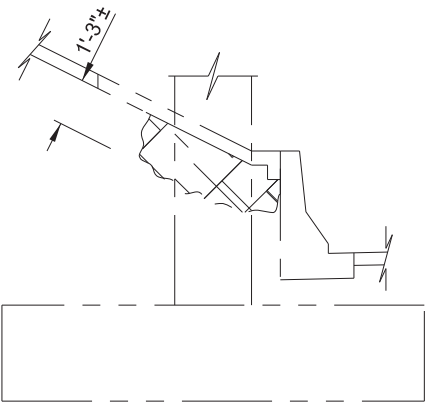
The hatched area indicates deck spall repair area.
- 

The hatched area indicates concrete barrier or curb to be removed and replaced.



PLAN

BRIDGE BID ITEMS				
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1208	CONCRETE BRIDGE BARRIER	LF	3.2
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	760
602	1260	BRIDGE DECK CRACK SEALING	LF	160
602	1300	BRIDGE DECK GROOVING	SF	5,240
602	2105	CURB REPAIR	LF	19.3
602	7000	SPECIAL SURFACE FINISH	SF	1,875
650	0704	OVERLAY CONCRETE	CY	32
650	0707	DECK CONCRETE	CY	10
650	0710	CLASS 1-H REMOVAL	SY	582
650	0720	CLASS 1 REMOVAL	SY	582
650	0723	CLASS 3 REMOVAL	SY	29
650	0724	CLASS 4 REMOVAL	SY	6
650	0805	DECK SPALL REPAIR	SF	36
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	40



HIGH-DENSITY POLYURETHANE
FOAM REPAIR DETAIL



SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 450(25)	HYDRODEMOLITION AND OVERLAY
STATE AVENUE SEPARATION CITY OF DICKINSON	
BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	
Jason Thorenson 08/24/26	
DRAWING NO.	94-060.457L-1

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

STATE
ND

PROJECT NO.
IM-5-094(165)059

SECTION NO.
170

SHEET NO.
6

NOTES

100

SCOPE OF WORK: Work at this site consists of the following

- Deck overlay
- Deck spall repair (approach slab)
- Concrete curb repair
- Concrete bridge barrier
- Penetrating water repellent treatment
- Crack sealing
- Special surface finish
- Slope protection void repair

602

CONCRETE BRIDGE BARRIER: Complete repair work designated in the Plan as “Concrete Bridge Barrier” using formed concrete as specified in the Special Provision for Concrete Spall Repair.

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: Apply the penetrating water repellent solution to the top of the bridge deck overlay and approach slabs. Do not apply pavement marking or allow traffic 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 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 Deck Crack Sealing.”

602

BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.

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, top, and back surfaces
- Outside edge of deck

Finish the surface with a uniform texture, color, and appearance free from fins, projections, cavities, and porous areas. Use a texture and color matching the existing bridge meeting AMS-STD-595.

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 the public from falling debris during removal and concrete placement operations. Include the cost for any required protection in the price bid for “Overlay Concrete.”

650

DECK SPALL REPAIR: The approach slabs have surface spall areas. The actual limits of the surface spall area 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.

Complete the deck spall repairs in accordance with the construction requirements of Section 650.04 with the following exceptions.

- Saw cut the perimeter of the repair area to a depth of 1". Remove all concrete to a minimum 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.”

Include all labor, equipment, and materials required to remove the concrete and repair the approach slab spall areas in the bid item “Deck Spall Repair.”

930

HIGH EXPANSION POLYURETHANE FOAM: Fill the voids beneath the concrete slope protection around the pier columns as designated in the plans using a high expansion polyurethane foam. Expansive foam must consist of a high expansion hydrophobic polyurethane foam that is nontoxic, nonflammable, and meets the following requirements below.

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

After the foam has cured in place, remove any excessive polyurethane foam material flush with the top of the slope protection. Dispose of all removed material in an environmentally acceptable manner conforming to Federal, State and local regulations. The Contractor is responsible for any blowouts or excessive lifting of any slope protection panels which may result from the process and will repair the damaged area to the satisfaction of the Engineer without additional cost.

It is estimated that 40 gallons of foam (prior to expansion) will be required to fill the voids, assuming a 16x expansion rate.

Include all labor, equipment, and material to fill the void beneath the concrete slope protection around the pier columns in the bid item “High Expansion Polyurethane Foam”.

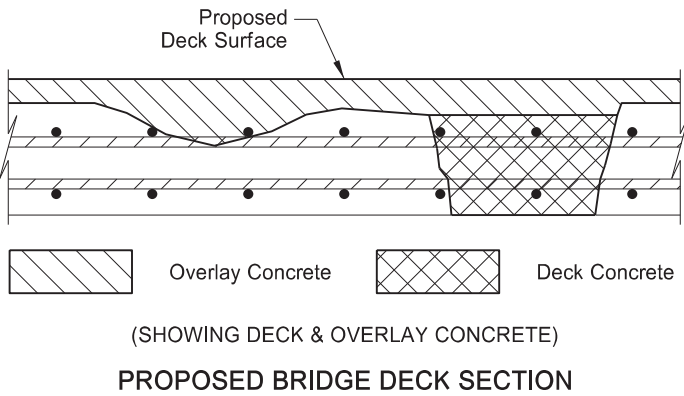
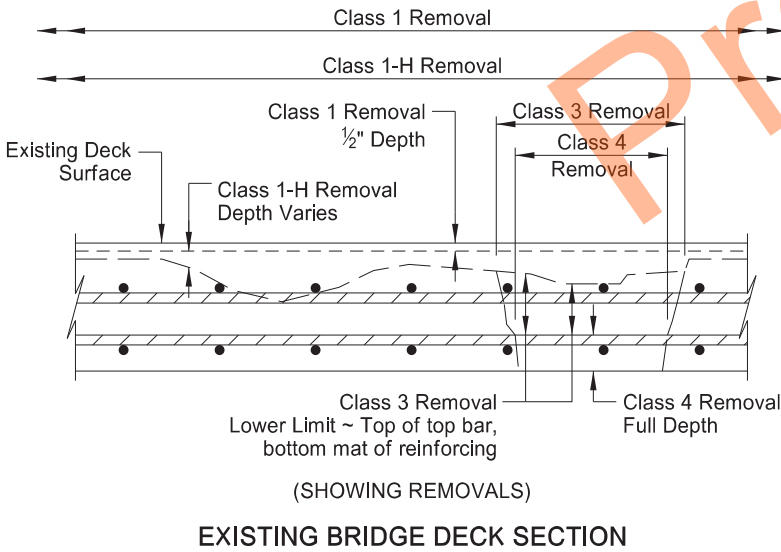
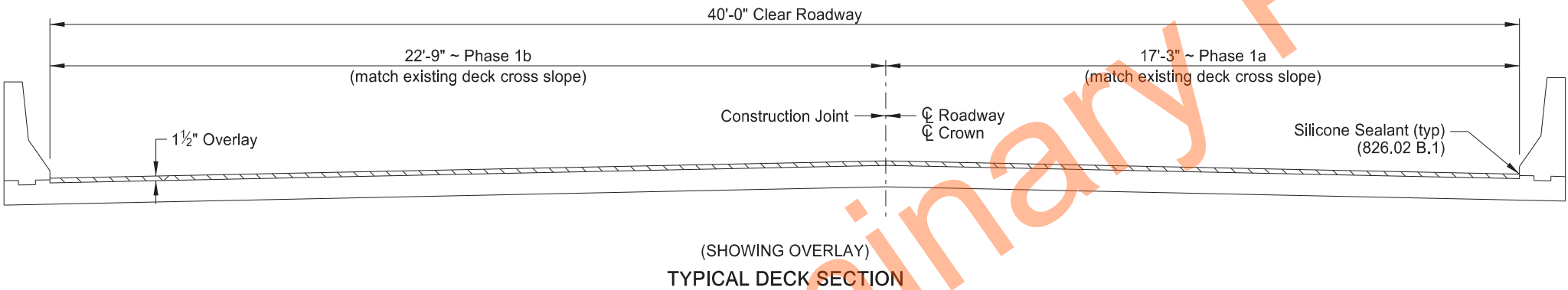
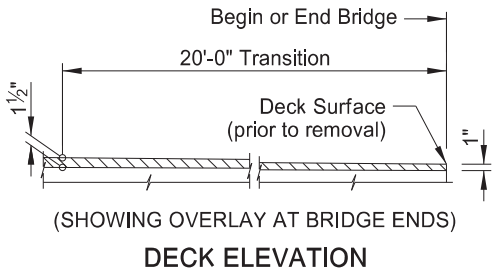
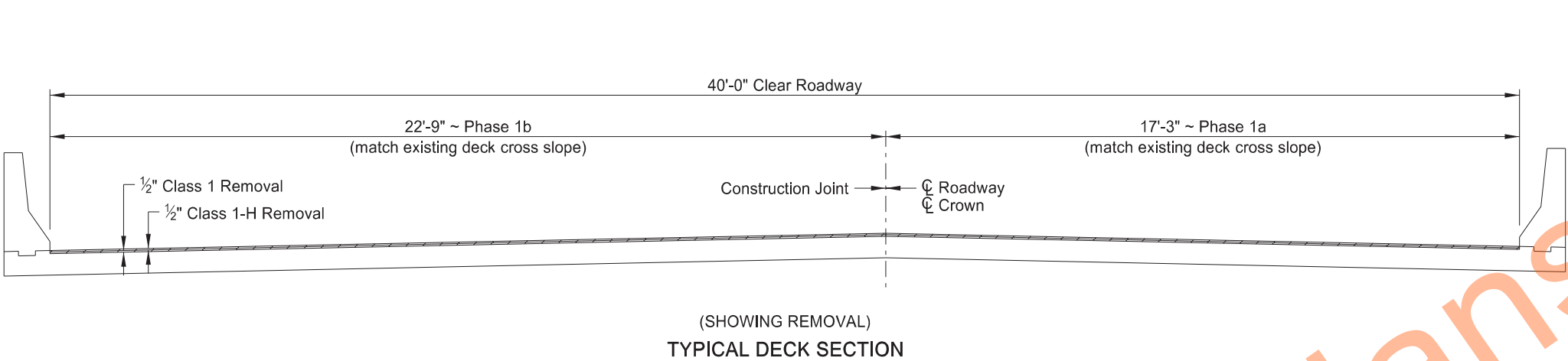
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94-060.457L-2

A circular professional engineer seal for Jacob Gathman, PE-42107, North Dakota. The seal includes the text "REGISTERED PROFESSIONAL ENGINEER", "Jacob Gathman", "PE-42107", "DATE 08/24/26", and "NORTH DAKOTA". There is a signature over the name.

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	7



QUANTITIES	
OVERLAY CONCRETE	32 CY
DECK CONCRETE	10 CY
CLASS 1-H REMOVAL	582 SY
CLASS 1 REMOVAL	582 SY
CLASS 3 REMOVAL	29 SY
CLASS 4 REMOVAL	6 SY
STATE AVENUE SEPARATION CITY OF DICKINSON	
DECK OVERLAY DETAILS	
DRAWING NO.	94-060.457L-3



PARTIAL APPROACH SLAB PLAN



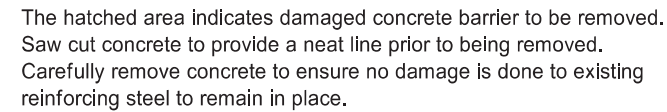
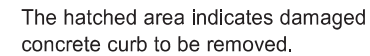
PARTIAL APPROACH SLAB ELEVATION



PARTIAL APPROACH SLAB PLAN



PARTIAL APPROACH SLAB ELEVATION



The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, and labor to remove and replace the curb in the pay item "Curb Repair." Include the concrete, connection plates, pipes, and labor to remove and replace the bridge barrier in the pay item "Concrete Bridge Barrier."

* Install 4A901 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 9 inches.

ESTIMATED MATERIAL QUANTITIES

CONCRETE (curb)	0.24 CY
REINFORCING STEEL (curb)	25.4 LBS
CONCRETE (barrier)	0.24 CY



(SHOWING FRONT FACE)
CONNECTION PLATE DETAILS



J-J



CURB TRANSITION ELEVATION



G-G



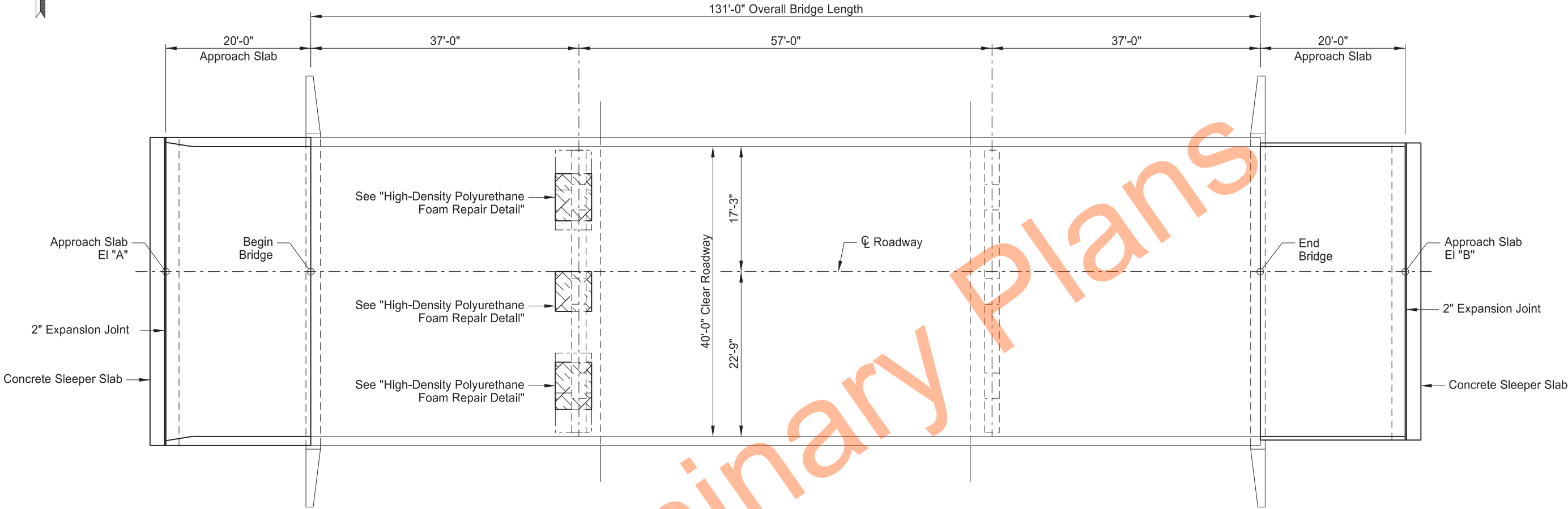
EAST END

DRAWING NO.	94-060.457L-4
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23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	9

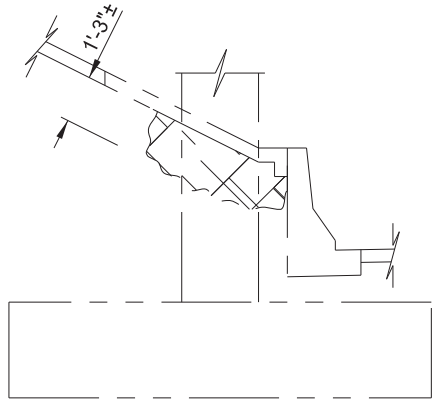
The hatched areas indicate high-density polyurethane foam.



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	
EI "A"	0.34' higher than Begin Bridge
EI "B"	0.34' lower than End Bridge

BRIDGE BID ITEMS				
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1135	BRIDGE APPROACH SLAB-REMOVE & REPLACE	SY	185.6
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	760
602	1300	BRIDGE DECK GROOVING	SF	6,840
602	7000	SPECIAL SURFACE FINISH	SF	1,950
650	0704	OVERLAY CONCRETE	CY	32
650	0707	DECK CONCRETE	CY	10
650	0710	CLASS 1-H REMOVAL	SY	582
650	0720	CLASS 1 REMOVAL	SY	582
650	0723	CLASS 3 REMOVAL	SY	29
650	0724	CLASS 4 REMOVAL	SY	6
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	50
930	8670	CONCRETE SLEEPER SLAB	EA	2
930	8850	POLYURETHANE FOAM JOINT SEAL	LF	82.0
930	9694	GIRDER PATCHING	L SUM	0.9



HIGH-DENSITY POLYURETHANE FOAM
REPAIR DETAIL



SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 449(25)	CONCRETE BEAM PATCHING
SP 450(25)	HYDRODEMOLITION AND OVERLAY
STATE AVENUE SEPARATION CITY OF DICKINSON	
BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	
Jason Thorenson 08/24/26	
DRAWING NO.	94-060.457R-1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	10

NOTES

- 100 SCOPE OF WORK: Work at this site consists of the following:
- Deck overlay

• Approach slabs

• Concrete beam repair

• Penetrating water repellent treatment

• Special surface finish

• Slope protection void repair
- 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: Apply the penetrating water repellent solution to the top of the bridge deck overlay and approach slabs. 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.
- 602 BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.
- 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, top, and back surfaces

• Outside edge of deck

- Finish the surface with a uniform texture, color, and appearance free from fins, projections, cavities, and porous areas. Use a texture and color matching the existing bridge meeting AMS-STD-595.
- 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.”
- 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 the public from falling debris during removal and concrete placement operations. Include the cost for any required protection in the price bid for “Overlay Concrete.”
- 930 CONCRETE SLEEPER SLAB: Construct concrete sleeper slabs at the ends of the bridge approach slabs as shown in the plans.
- 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 Grade 60 reinforcing steel that meets the requirements of Section 612.
- 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. Place a double layer of 4 mil polyethylene sheeting as a bond breaker between the sleeper slab and approach slab interface. Include all labor, materials, and equipment needed to install the sleeper slab in the contract unit price of “Concrete Sleeper Slab.”



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NOTES

930 POLYURETHANE FOAM JOINT SEAL: Install a pre-compressed, polymer-impregnated polyurethane foam expansion joint seal at the sleeper slab, with a nominal joint width as specified in the plans. Provide a seal coated with highway-grade silicone providing a permanent, weather-tight barrier. Use a compatible two-component epoxy adhesive to bond the seal to the joint faces.

The joint seal may be Wabo FS Bridge Seal (Watson Bowman Acme); BEJS Bridge Expansion Joint System (Emseal); Iso-Flex Silfast XL (LymTal International); or an approved equal. Prepare the joint opening and install the joint seal according to the manufacturer’s recommendations. At the west approach slab, provide a joint seal the full length of the clear roadway width between barriers plus an additional 6 inches of joint seal at each end to be turned up vertically matching the inside face of the barrier. At the east approach slab, provide a joint seal the full length of the clear roadway width plus curbs. Do not install the joint until the approach slab concrete has been in place for a minimum of 14 days.

Include all labor, materials, and equipment needed to install the polyurethane foam joint seal in the unit price bid for “Polyurethane Foam Joint Seal.”

930 HIGH EXPANSION POLYURETHANE FOAM: Fill the voids beneath the concrete slope protection around the pier columns as designated in the plans using a high expansion polyurethane foam. Expansive foam must consist of a high expansion hydrophobic polyurethane foam that is nontoxic, nonflammable, and meets the following requirements below.

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

After the foam has cured in place, remove any excessive polyurethane foam material flush with the top of the slope protection. Dispose of all removed material in an environmentally acceptable manner conforming to Federal, State and local regulations. The Contractor is responsible for any blowouts or excessive lifting of any slope protection panels which may result from the process and will repair the damaged area to the satisfaction of the Engineer without additional cost.

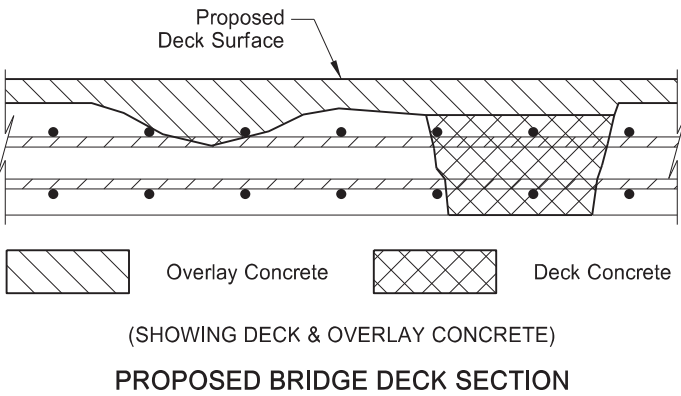
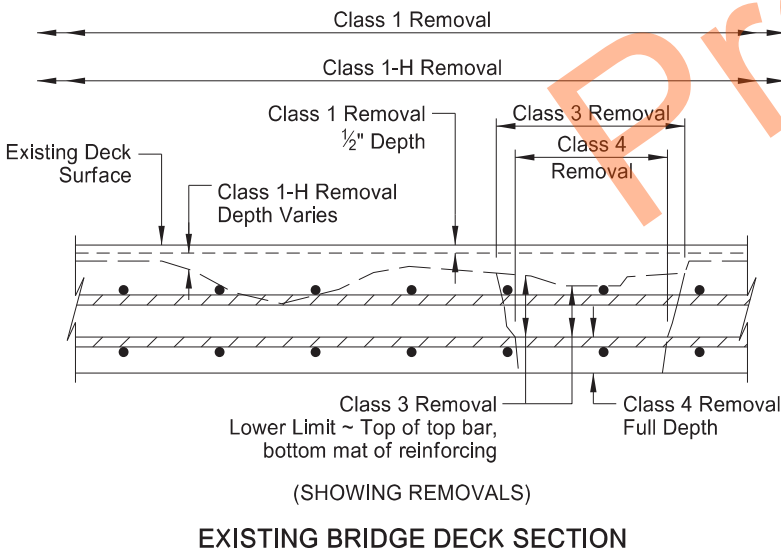
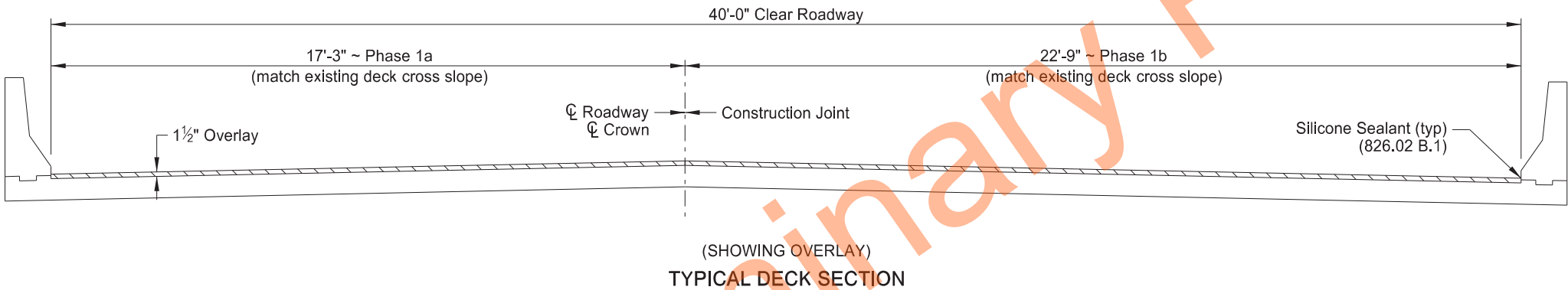
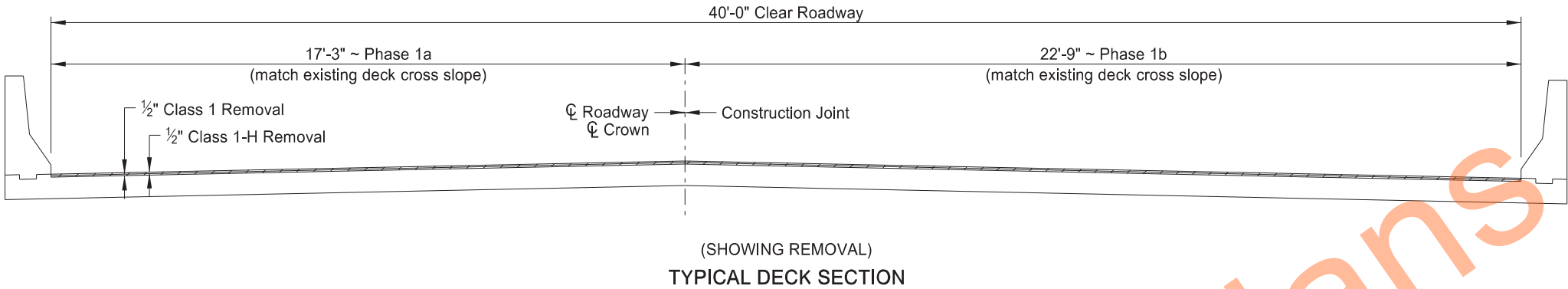
It is estimated that 50 gallons of foam (prior to expansion) will be required to fill the voids, assuming a 16x expansion rate.

Include all labor, equipment, and material to fill the void beneath the concrete slope protection around the pier columns in the bid item “High Expansion Polyurethane Foam”.



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

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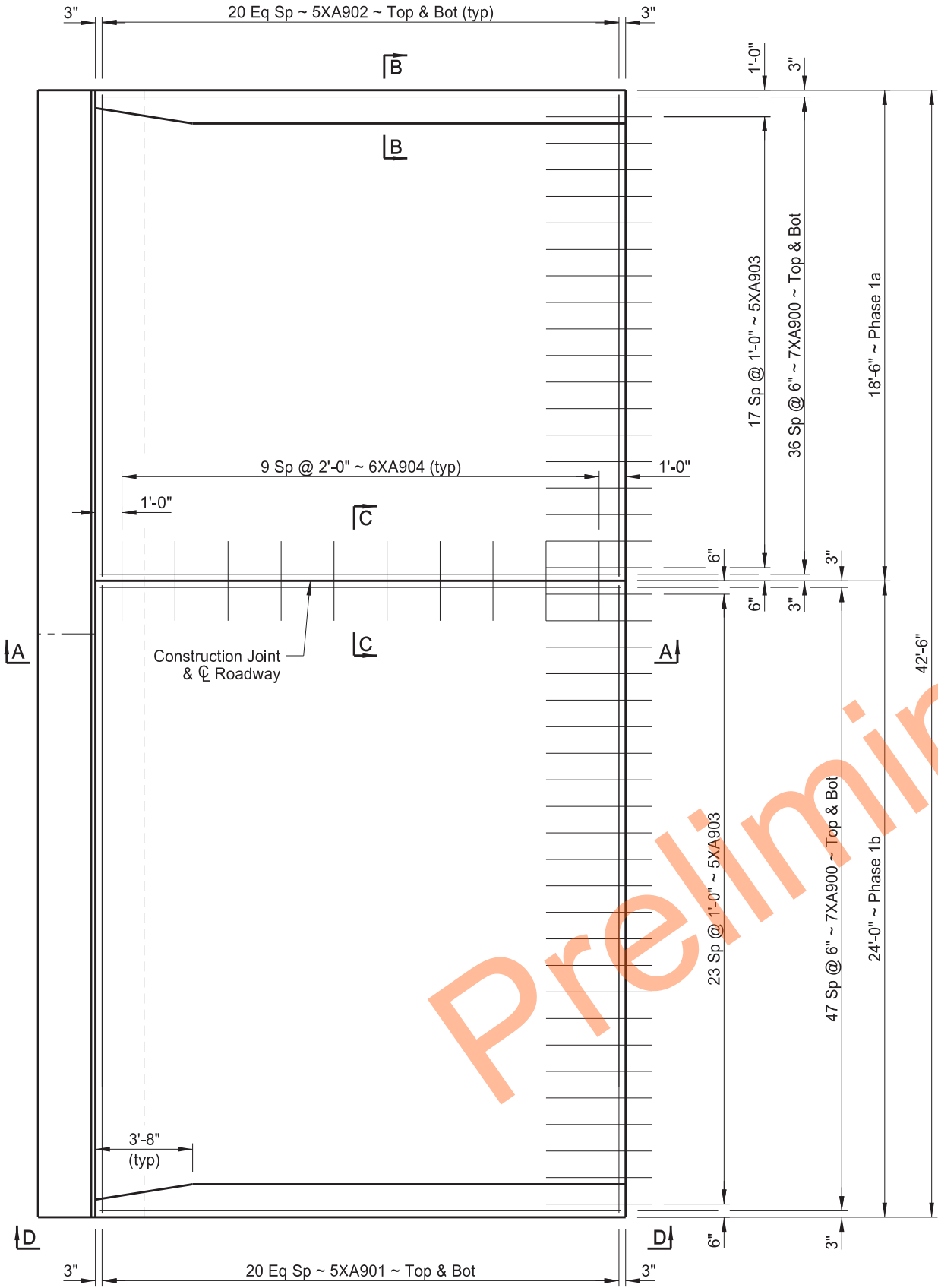


QUANTITIES	
OVERLAY CONCRETE	32 CY
DECK CONCRETE	10 CY
CLASS 1-H REMOVAL	582 SY
CLASS 1 REMOVAL	582 SY
CLASS 3 REMOVAL	29 SY
CLASS 4 REMOVAL	6 SY
STATE AVENUE SEPARATION CITY OF DICKINSON	
DECK OVERLAY DETAILS	
DRAWING NO.	94-060.457R-4

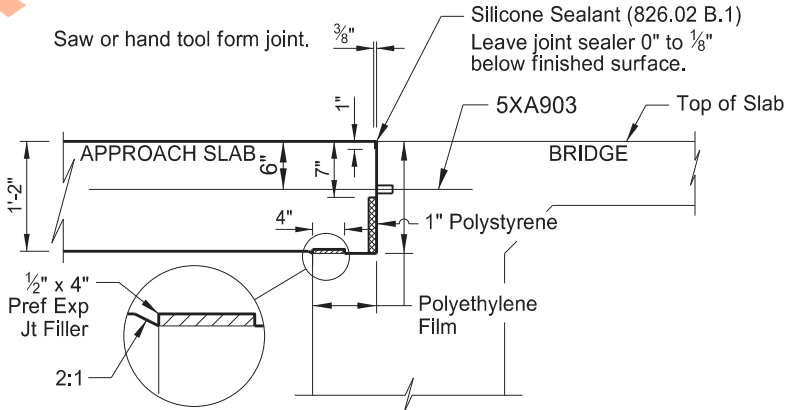
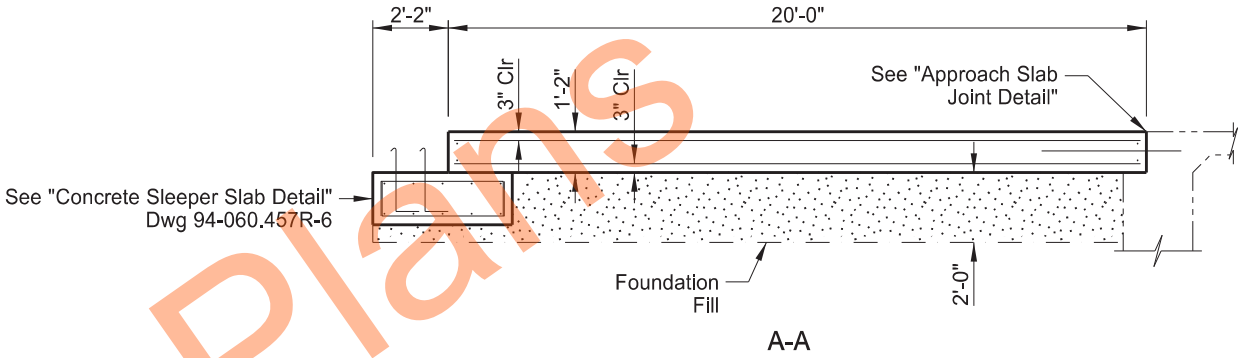
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	13

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.



PLAN



APPROACH SLAB JOINT DETAIL

ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
10,932 LBS	48.9 CY

NOTE:
The estimated material quantities shown are for information purpose only.
See Dwg 94-060.457R-7 for Section C-C.
See Dwg 94-060.457R-8 for Section B-B & D-D.

QUANTITIES	
APPROACH SLAB	94.4 SY
CONCRETE SLEEPER SLAB	1 EA
POLYURETHANE FOAM JOINT SEAL	41 LF

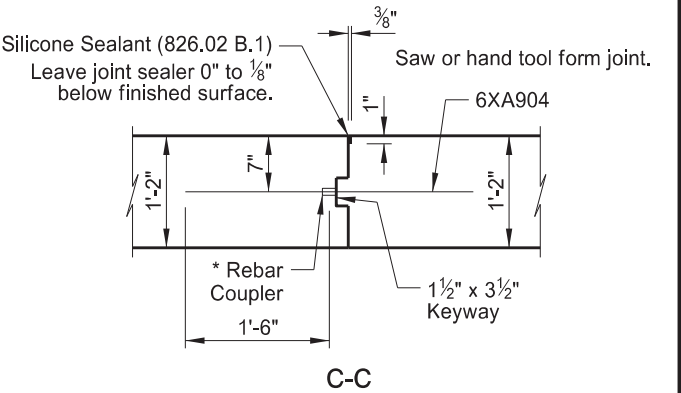
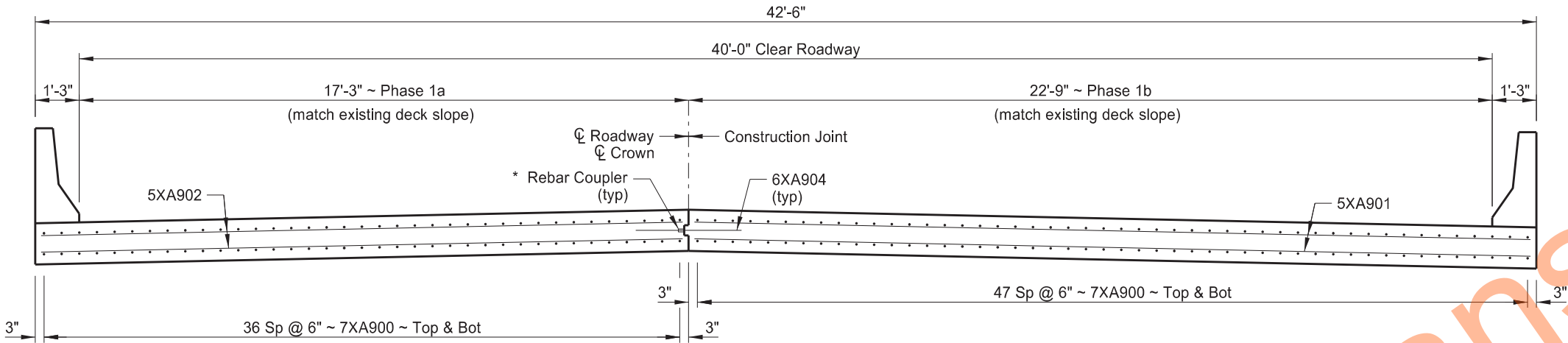
STATE AVENUE SEPARATION
CITY OF DICKINSON
(WEST END APPROACH SLAB AT BEGIN BRIDGE)
APPROACH SLAB DETAILS

DRAWING NO.	94-060.457R-5
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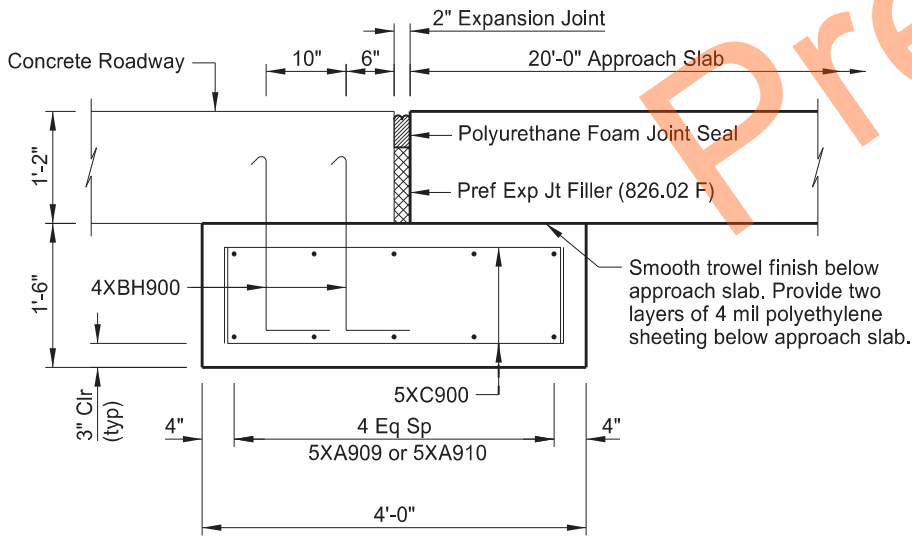
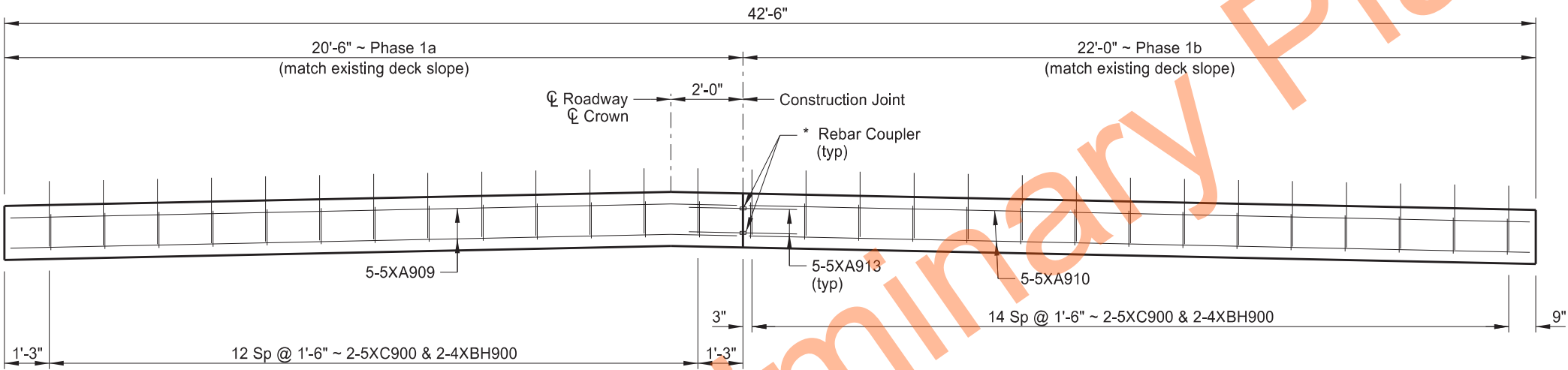


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	14



* 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.



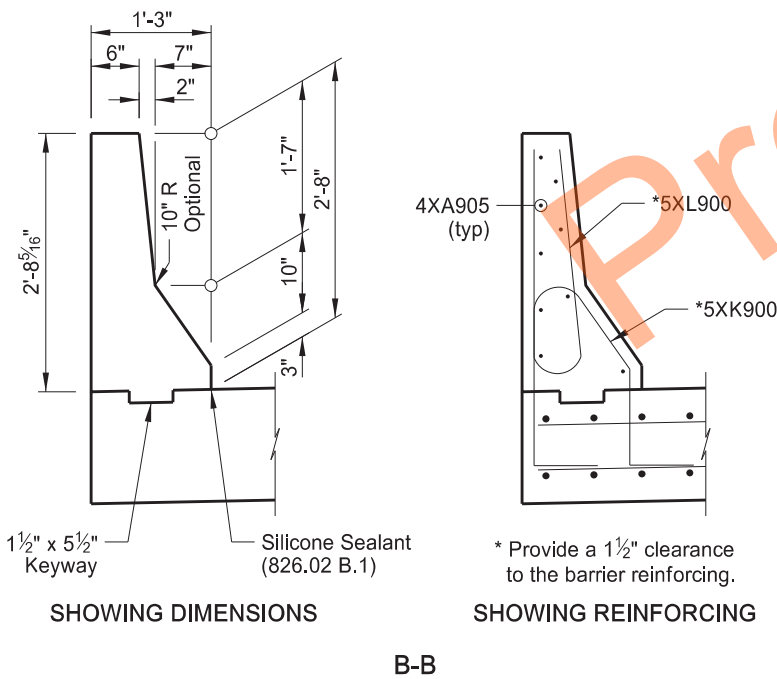
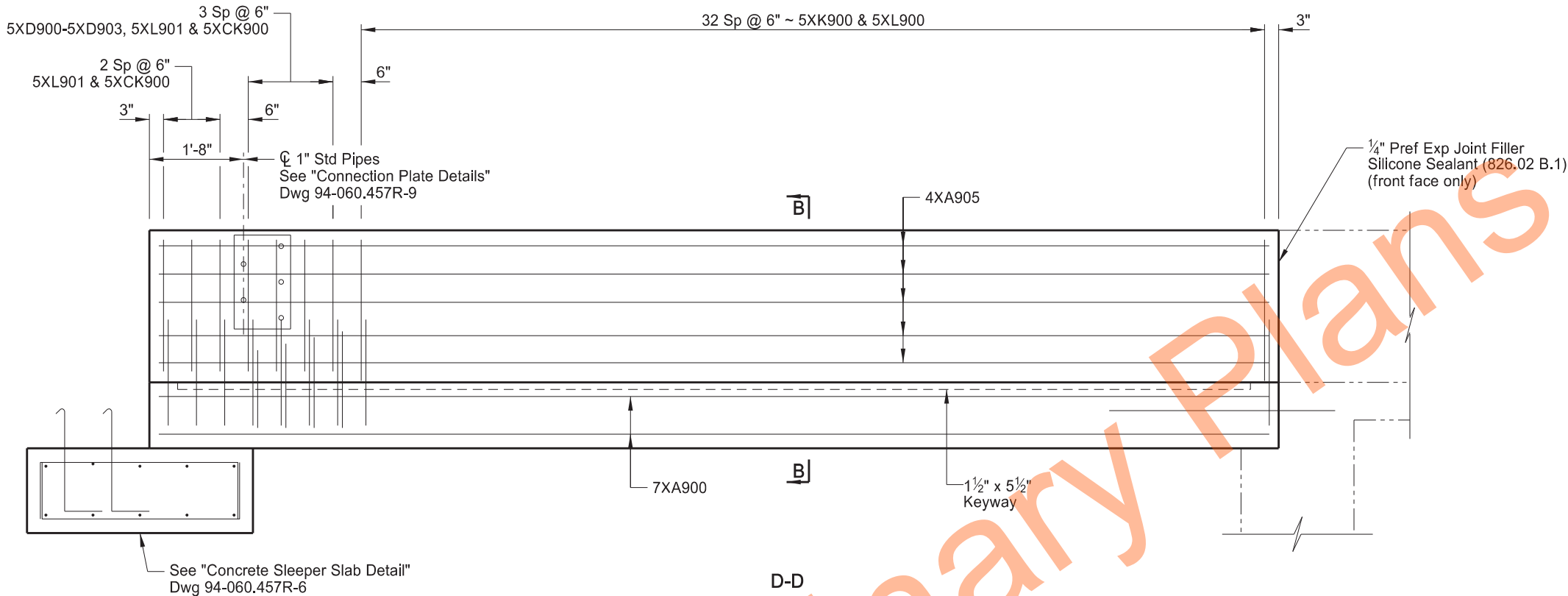
NOTE:
See Dwg 94-060.457R-5 for location of Section C-C.



STATE AVENUE SEPARATION CITY OF DICKINSON	
(WEST END APPROACH SLAB AT BEGIN BRIDGE)	
APPROACH SLAB DETAILS	
DRAWING NO.	94-060.457R-6

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	15



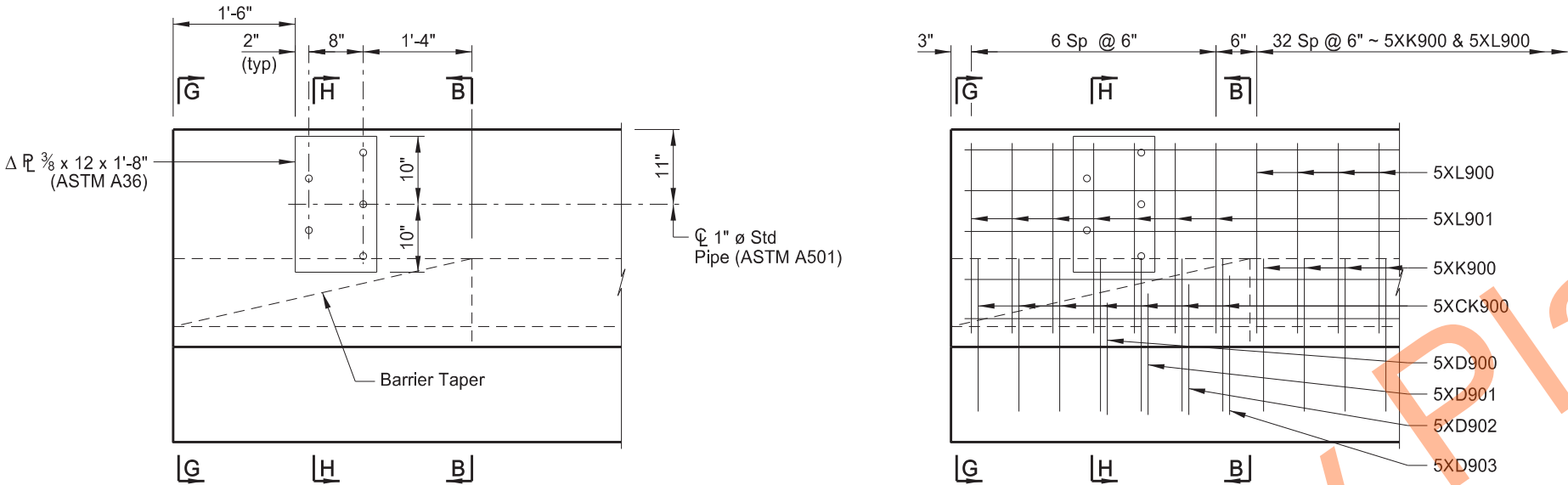
NOTE:
See Dwg 94-060.457R-5 for location of Section B-B & D-D.



STATE AVENUE SEPARATION CITY OF DICKINSON	
(WEST END APPROACH SLAB AT BEGIN BRIDGE)	
APPROACH SLAB DETAILS	
DRAWING NO.	94-060.457R-7

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	16

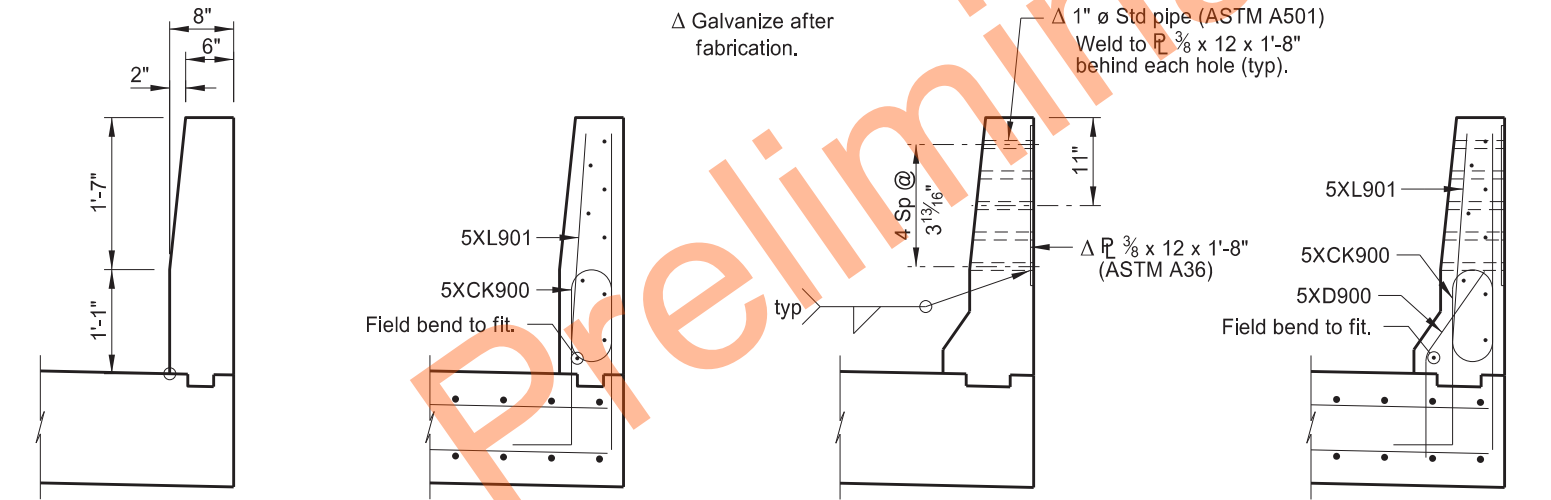


SHOWING DIMENSIONS

SHOWING REINFORCING

(SHOWING BACK FACE & JERSEY BARRIER TRANSITION)

CONNECTION PLATE DETAILS



SHOWING DIMENSIONS

SHOWING REINFORCING

SHOWING DIMENSIONS

SHOWING REINFORCING

G-G

H-H

NOTE:
See Dwg 94-0060.457R-7 for location of connection plate details.
See Dwg 94-0060.457R-7 for Section B-B.

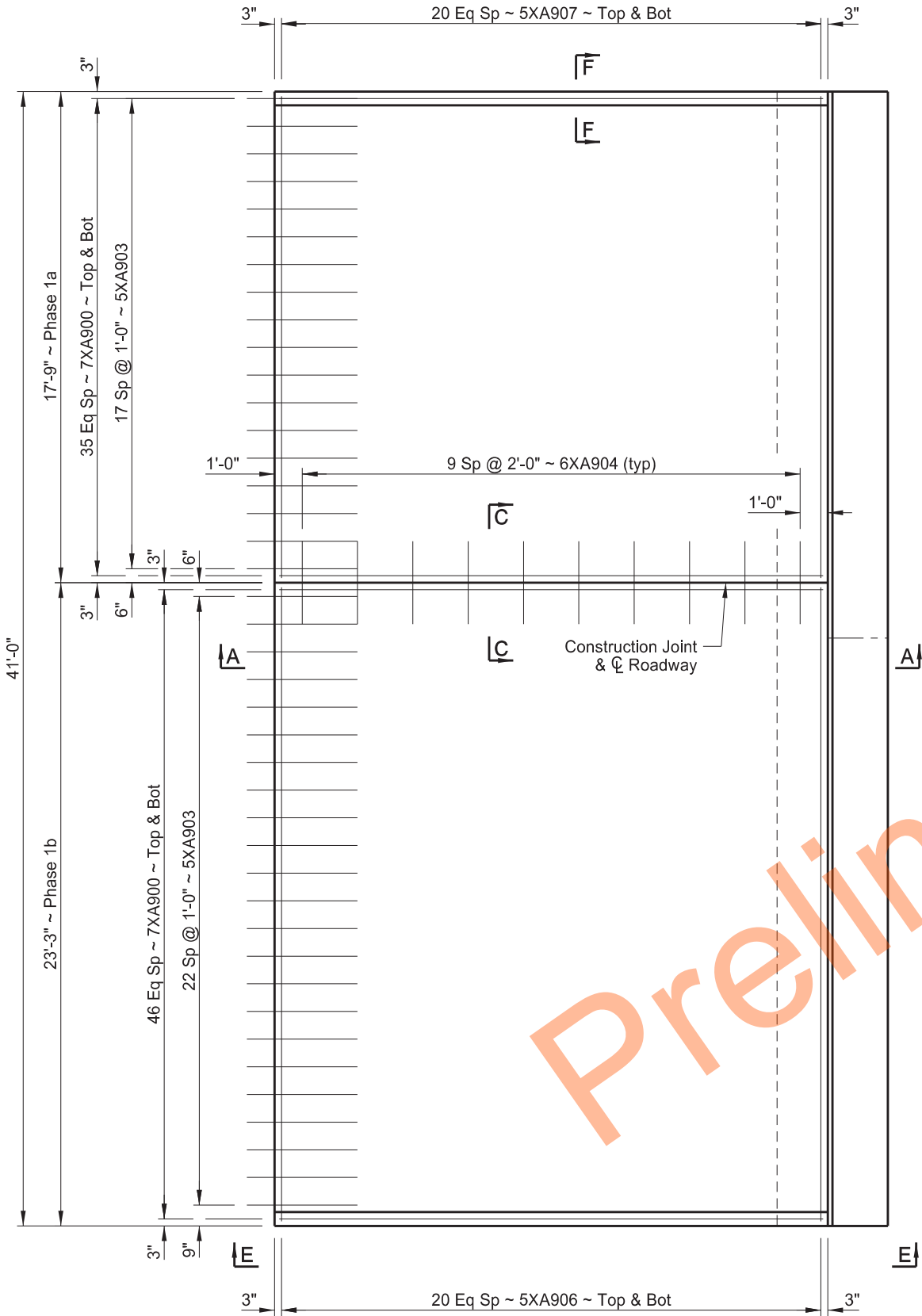


STATE AVENUE SEPARATION
CITY OF DICKINSON
(WEST END APPROACH SLAB AT BEGIN BRIDGE)
APPROACH SLAB DETAILS

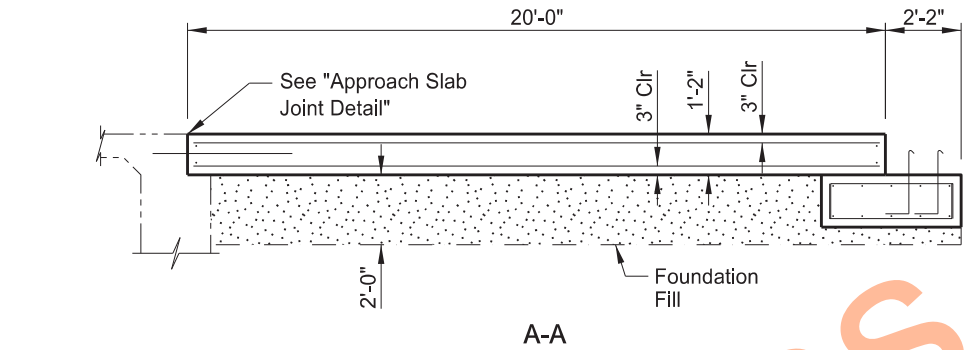
DRAWING NO. 94-060.457R-8

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

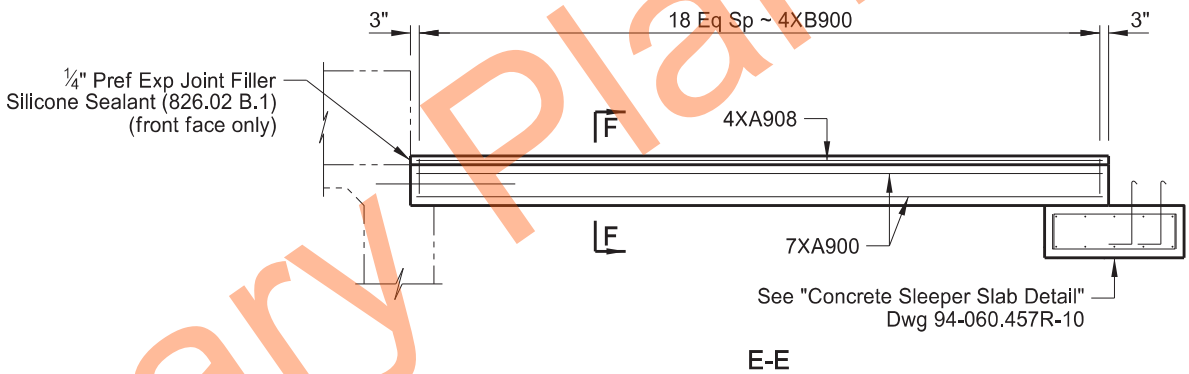
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	17



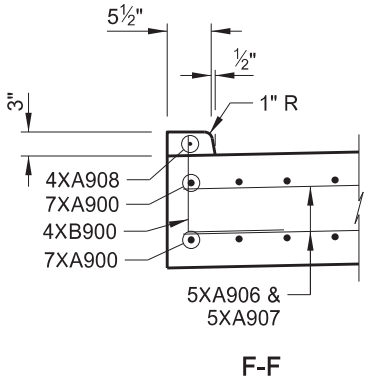
PLAN



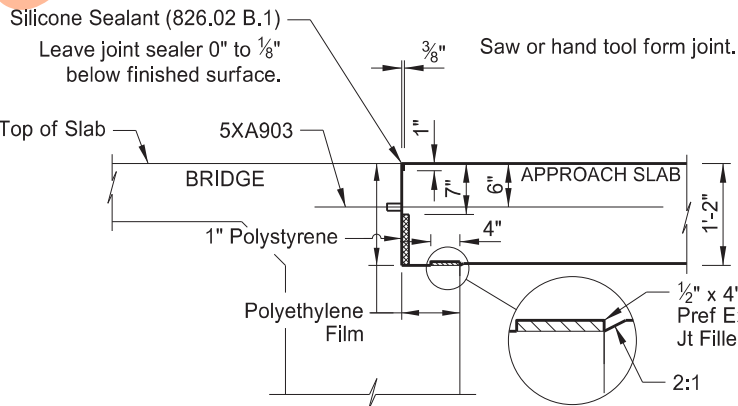
A-A



E-E



F-F



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.

ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
9,600 LBS	44.7 CY

NOTE:

The estimated material quantities shown are for information purpose only.

See Dwg 94-060.457R-7 for Section C-C.

QUANTITIES

APPROACH SLAB	91.1 SY
CONCRETE SLEEPER SLAB	1 EA
POLYURETHANE FOAM JOINT SEAL	41 LF

STATE AVENUE SEPARATION
CITY OF DICKINSON

(EAST END APPROACH SLAB AT END BRIDGE)

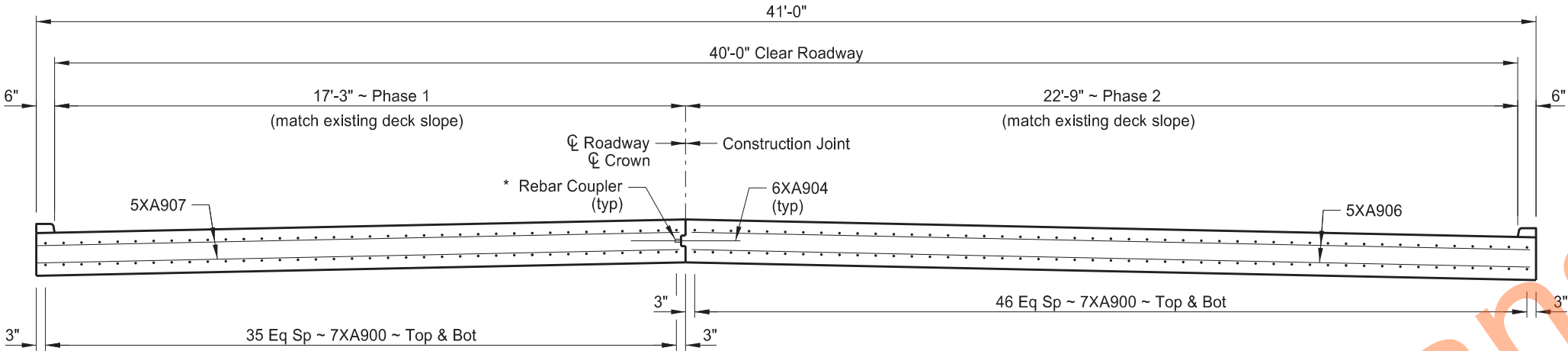
APPROACH SLAB DETAILS

DRAWING NO.	94-060.457R-9
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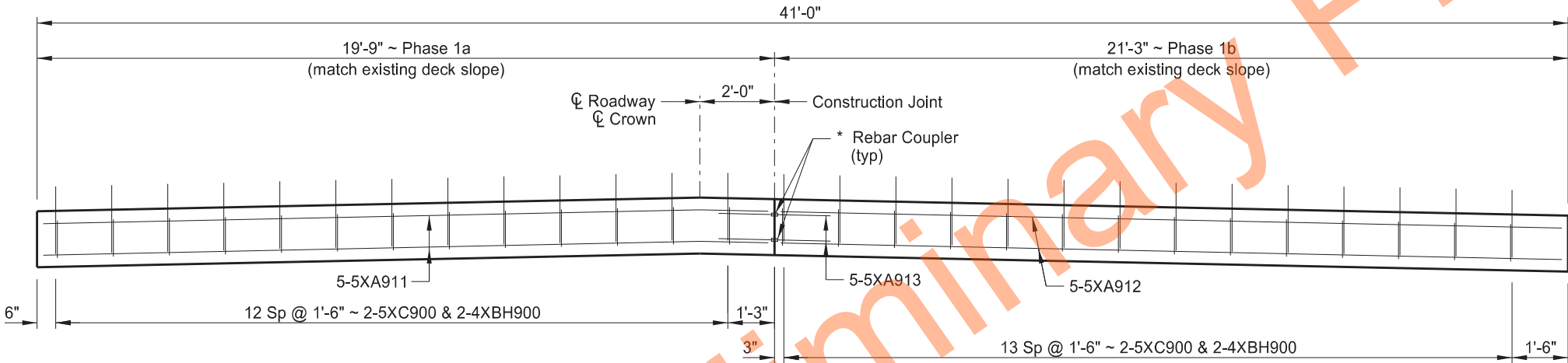


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

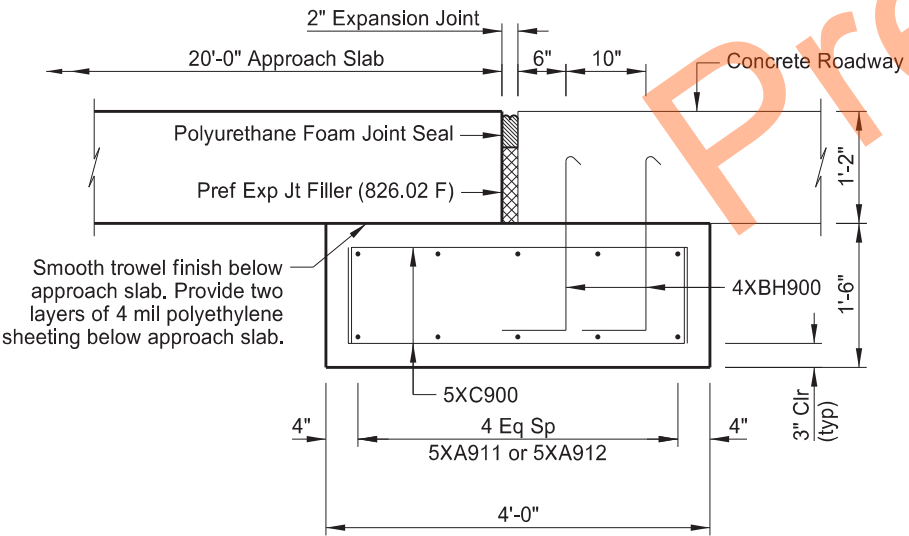
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	18



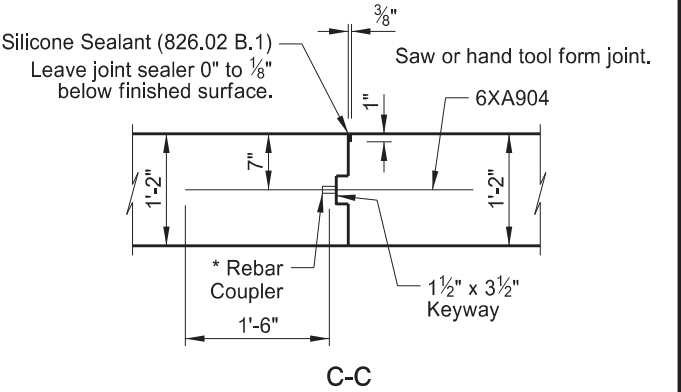
SLAB SECTION



CONCRETE SLEEPER SLAB SECTION



CONCRETE SLEEPER SLAB DETAIL



* 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.

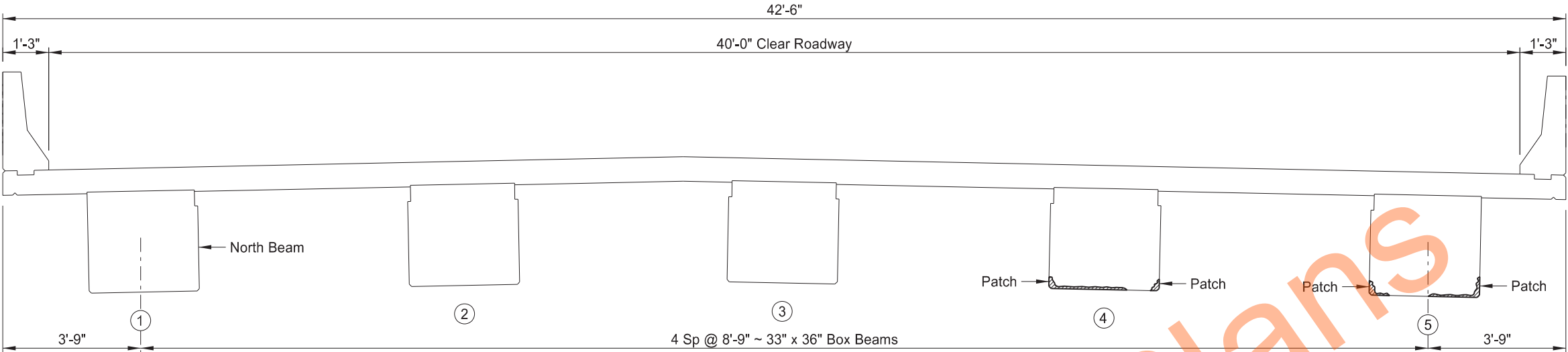
NOTE:
See Dwg 94-060.457R-9 for location of Section C-C.



STATE AVENUE SEPARATION CITY OF DICKINSON (EAST END APPROACH SLAB AT END BRIDGE) APPROACH SLAB DETAILS	
DRAWING NO.	94-060.457R-10

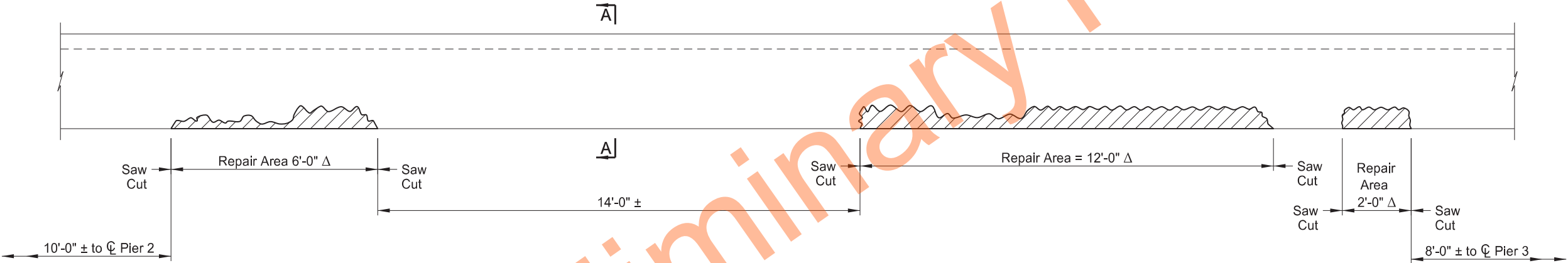
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	20

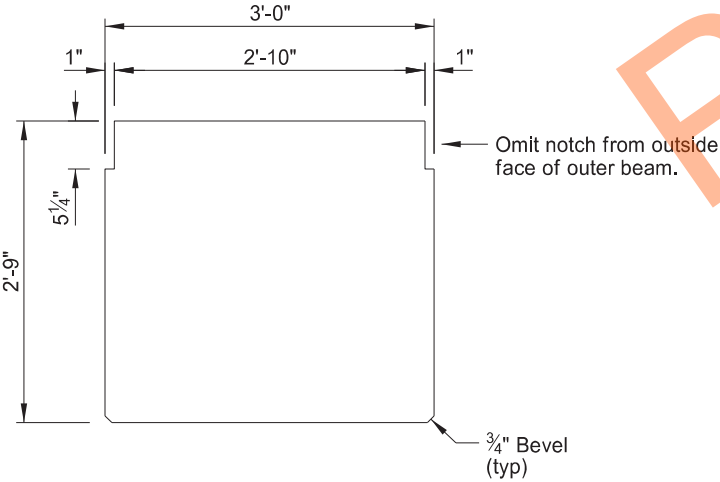


TYPICAL DECK SECTION

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



(SHOWING OUTSIDE FACE ~ LOOKING NORTH)
BEAM 5 ELEVATION ~ SPAN 2



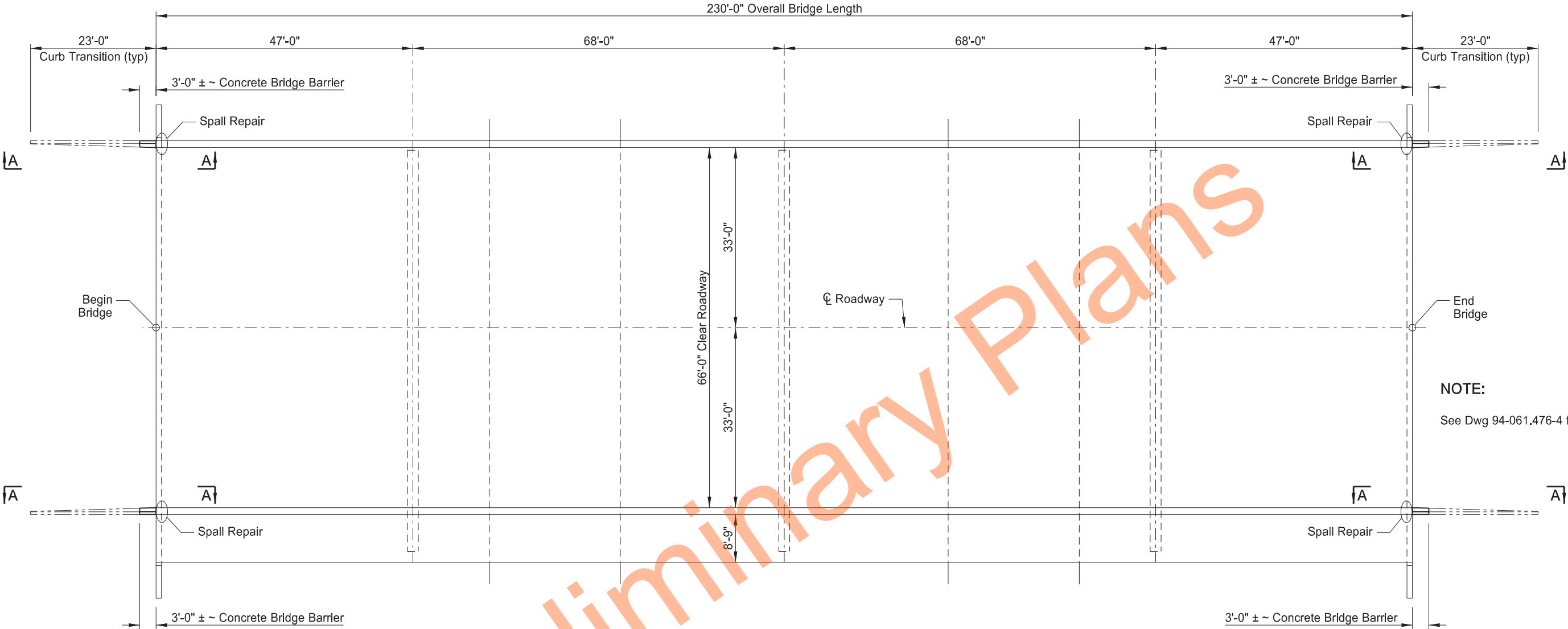
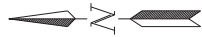
(SHOWING DIMENSIONS)
A-A



STATE AVENUE SEPARATION CITY OF DICKINSON	
PRESTRESSED CONCRETE SPREAD BOX BEAM PATCHING DETAILS	
DRAWING NO.	94-060.457R-12

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

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PLAN

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1208	CONCRETE BRIDGE BARRIER	LF	12
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,690
602	1300	BRIDGE DECK GROOVING	SF	15,180
602	7000	SPECIAL SURFACE FINISH	SF	2,105
650	0704	OVERLAY CONCRETE	CY	129
650	0707	DECK CONCRETE	CY	27
650	0710	CLASS 1-H REMOVAL	SY	1687
650	0720	CLASS 1 REMOVAL	SY	1687
650	0723	CLASS 3 REMOVAL	SY	84
650	0724	CLASS 4 REMOVAL	SY	17
930	9612	SPALL REPAIR	SF	84



SPECIAL PROVISIONS

SSP 2	MIGRATORY BIRD TREATY ACT
SP 452(25)	CONCRETE SPALL REPAIR
SP 450(25)	HYDRODEMOLITION AND OVERLAY

HIGHWAY 22 INTERCHANGE

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson Jason Thorenson
08/24/26

DRAWING NO. 94-061.476-1

23 U.S.C. § 407 Documents NDDOT Reserves All Objections	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	170	22

NOTES

- 100 SCOPE OF WORK: Work at this site consists of the following:
- Deck overlay

• Spall repair

• Concrete barrier repair

• Penetrating water repellent treatment

• Special surface finish
- 602 CONCRETE BRIDGE BARRIER: Complete repair work designated in the Plan as “Concrete Bridge Barrier” using formed concrete as specified in the Special Provision for Concrete Spall Repair.
- 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: Apply the penetrating water repellent solution to the top of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.
- 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.
- East barrier inside and top surfaces

• West barrier inside, top, and back surfaces
- 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.
- 602 BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.
- 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 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.”

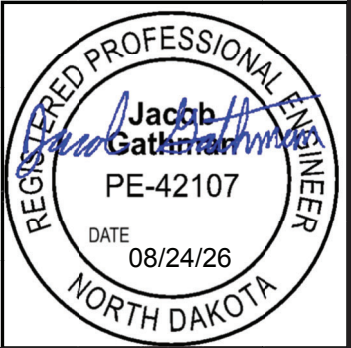
650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling.

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

Protect the public from falling debris during removal and concrete placement operations. Include the cost for any required protection in the price bid for “Overlay Concrete.”

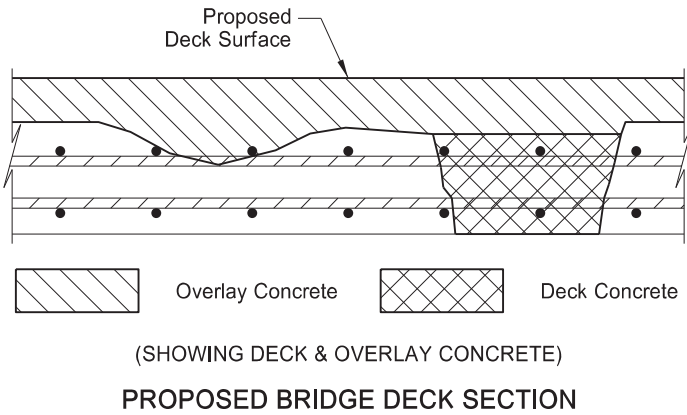
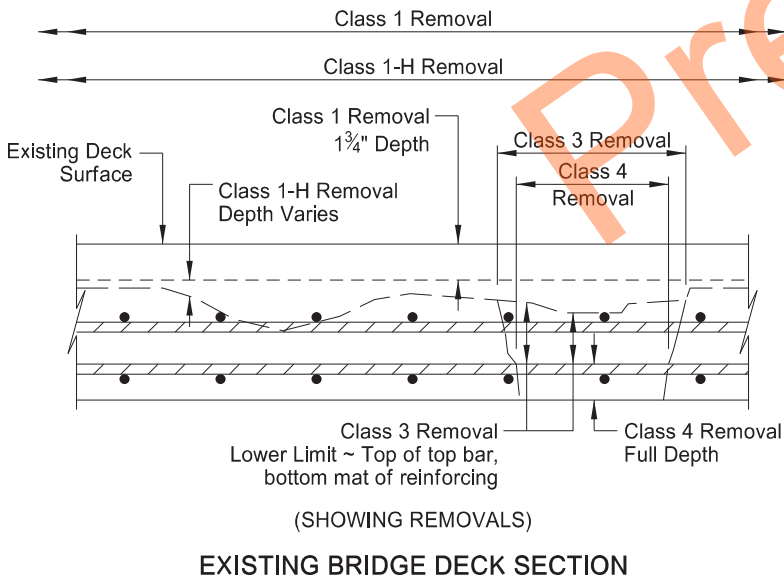
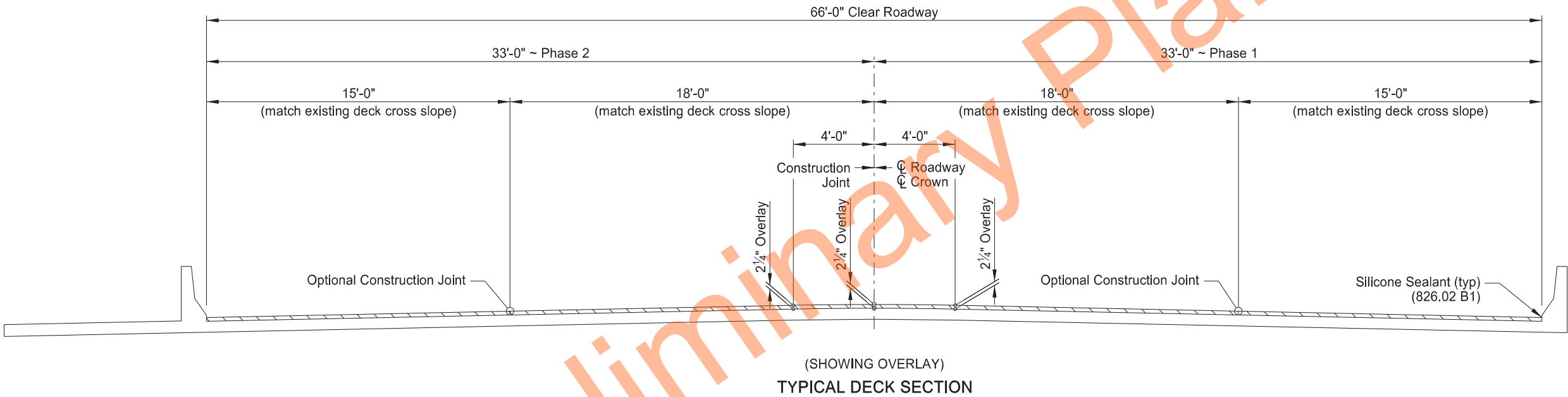
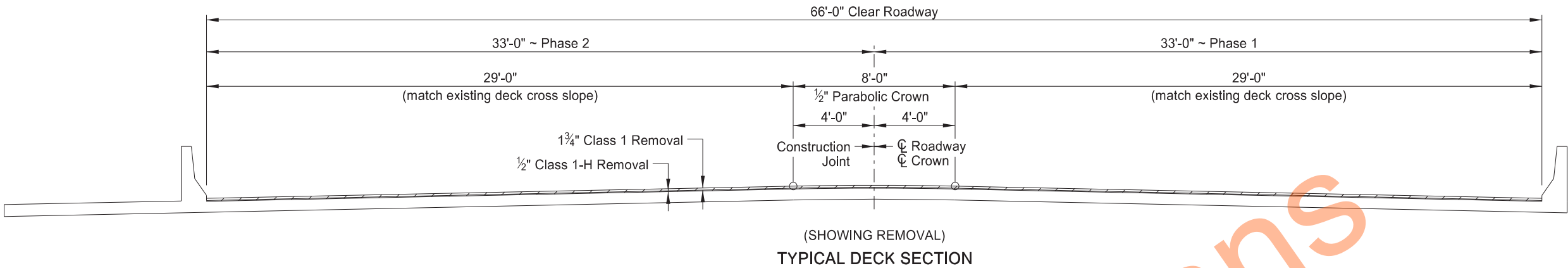
930 SPALL REPAIR: The barriers and abutment endwalls have areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and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

LOCATION	PHOTO	QUANTITY (SF)
NE Barrier	1	5
SE Barrier	2	5
SW Barrier	3	3
NW Barrier	4	3
South Abutment	5-8	20
North Abutment	9-16	48



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NDDOT Reserves All Objections

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QUANTITIES	
OVERLAY CONCRETE	129 CY
DECK CONCRETE	27 CY
CLASS 1-H REMOVAL	1,687 SY
CLASS 1 REMOVAL	1,687 SY
CLASS 3 REMOVAL	84 SY
CLASS 4 REMOVAL	17 SY
HIGHWAY 22 INTERCHANGE	
DECK OVERLAY DETAILS	
DRAWING NO.	94-061.476-3

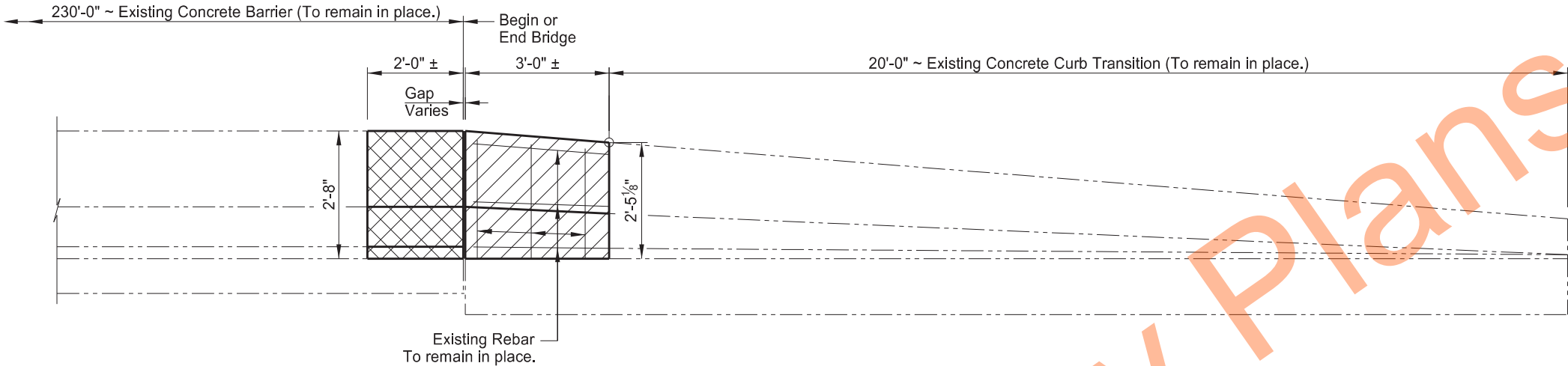
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(165)059	170	24

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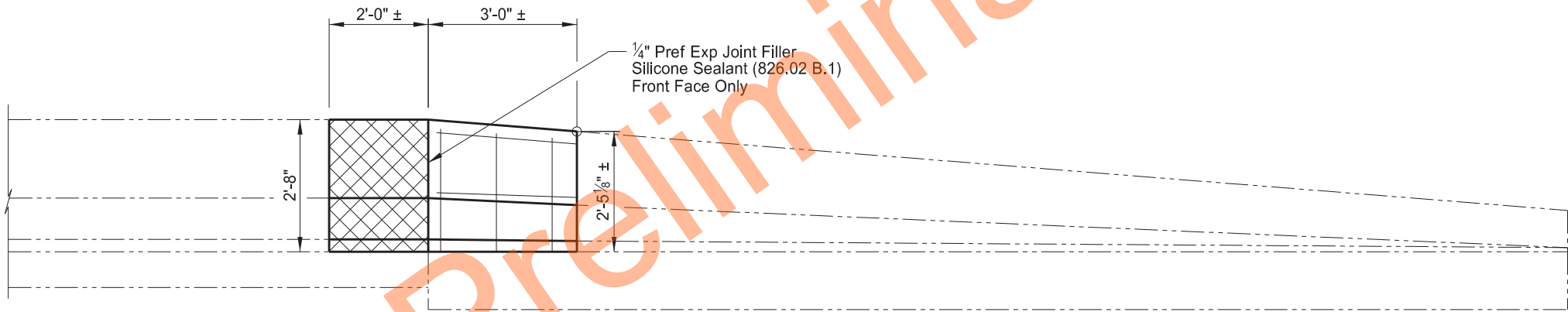
The hatched area indicates damaged concrete barrier to be removed. Saw cut concrete to provide a neat line prior to being removed. Carefully remove concrete to ensure no damage is done to existing reinforcing steel that is to remain in place.
- 

The hatched area indicates spall repair area.

NOTE:
See Dwg 94-061.476-1 for location of Section A-A.



(SHOWING BARRIER CONCRETE REMOVAL)
A-A
BARRIER ELEVATION



(SHOWING NEW BARRIER DIMENSIONS)
A-A
BARRIER ELEVATION



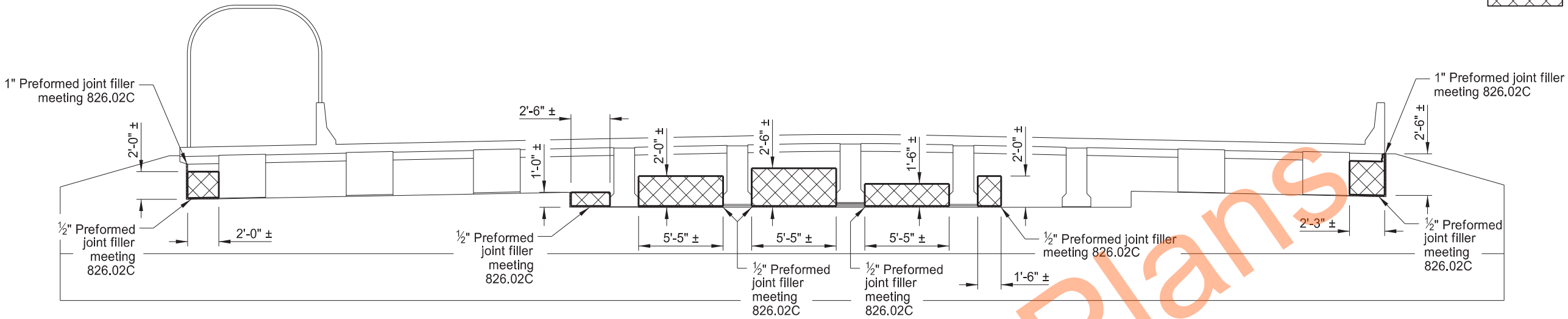
HIGHWAY 22 INTERCHANGE	
BARRIER REPAIR	
DRAWING NO.	94-061.476-4

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

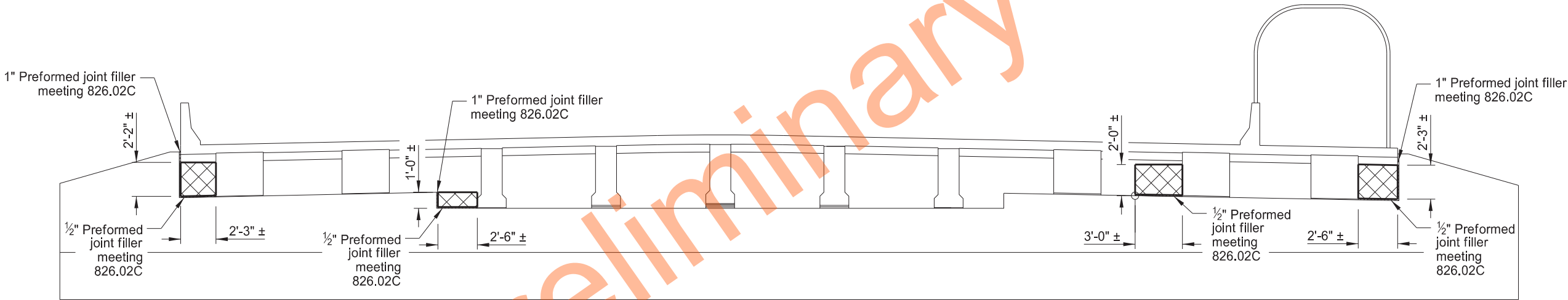
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(165)059	170	25



The hatched areas indicates
spall repair area.



(FACING NORTH)
NORTH ABUTMENT ELEVATION



(FACING SOUTH)
SOUTH ABUTMENT ELEVATION

NOTE:
Install preformed joint filler the full depth of
the repair at all existing construction joints
between the abutments and endwalls.



HIGHWAY 22 INTERCHANGE	
SPALL REPAIR	
DRAWING NO.	94-061.476-5

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

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NDDOT ABBREVIATIONS

D-101-3

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

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NDDOT ABBREVIATIONS

D-101-4

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
CC	closing corner
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
MC	meander corner
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
SC	standard corner
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
WC	witness corner
WGS	World Geodetic System
YP Cap	yellow plastic cap
Z	zenith

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

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702COM
ACCENT
AGASSIZ WU
AGC
ALL PL
ALL SEAS WU
AMOCO PI
AMRDA HESS
AT&T
B PAW
BAKER ELEC
BASIN ELEC
BEK TEL
BELLE PL
BLM
BNSF
BOEING
BRNS RWD
BURK-DIV ELEC
BURL WRD
CABLE ONE
CABLE SERV
CAP ELEC
CASS CO ELEC
CASS RWU
CAV ELEC
CBLCOM
CENEX PL
CENT PL WATER DIST
CENT PWR ELEC
CENTURYLINK
COE
CONS COMM
CONS TELCOM
CONT RES
CPR
D O E
DAK CARR
DAK CENT TEL
DAK RWD
DGC
DICKY R NET
DICKY WRD
DICKY TEL
DNRR
DOME PL
DVELEC
DVMW
E CENT REG WD
ENBRDG
ENVENTIS
EQUINOR
FALK MNG
FHWA
G FKS-TRL WD
GETTY TRD & TRAN
GLDN W ELEC

702 Communications
Accent Communications
Agassiz Water Users District
Associated General Contractors of America
Alliance Pipeline
All Seasons Water Users District
Amoco Pipeline Company
Amerada Hess Corporation
AT&T Corporation
Bear Paw Energy Incorporated
Baker Electric
Basin Electric Cooperative Incorporated
Bek Communications Cooperative
Belle Fourche Pipeline Company
Bureau of Land Management
Burlington Northern Santa Fe Railway
Boeing
Barnes Rural Water District
Burke-Divide Electric Cooperative
Burleigh County Water Resource District
Cable One
Cable Services
Capital Electric Cooperative Incorporated
Cass County Electric Cooperative
Cass Rural Water Users District
Cavalier Rural Electric Cooperative
Cablecom Of Fargo
Cenex Pipeline
Central Pipe Line Water District
Central Power Electric Cooperative
CenturyLink
Corps of Engineers
Consolidated Communications
Consolidated Telcom
Continental Resource Inc
Canadian Pacific Railway
Department Of Energy
Dakota Carrier Network
Dakota Central Telephone
Dakota Rural Water District
Dakota Gasification Company
Dickey Rural Networks
Dickey County Water Resource District
Dickey Telephone
Dakota Northern Railroad
Dome Pipeline Company
Dakota Valley Electric Cooperative
Dakota, Missouri Valley & Western
East Central Water District
Enbridge Pipelines Incorporated
Enventis Telephone
Equinor Pipeline
Falkirk Mining Company
Federal Highway Administration
Grand Forks-traill Water District
Getty Trading & Transportation
Golden West Electric Cooperative

GTR RAMSEY WD
GT PLNS NAT GAS
HALS TEL
IDEA1
INT-COMM TEL
KANEB PL
KEM ELEC
KOCH GATH SYS
LKHD PL
LWR YELL R ELEC
LUMEN
MCKNZ CON
MCKNZ ELEC
MCKNZ WRD
MCLEOD
MCLN ELEC
MCLN-SHRDN R WAT
MDU
MIDCO
MIDSTATE TEL
MINOT CABLE
MINOT TEL
MISS VALL COMM
MISS W W S
MINKOTA PWR
MOR-GRAN-SOU ELEC
MOUNT-WILLI ELEC
MLGC
MUNICIPAL
MUNICIPAL
N CENT ELEC
N PRAIR REG WD
ND PKS & REC
ND TEL
NDDOT
NE REG WD
NDSU SOIL SCI DEPT
NEMONT TEL
NODAK R ELEC
NOON FRMS TEL
NPR
NSP
NTHN BRDR PL
NTHN PLNS ELEC
NTHWSTRN REF
NW COMM
NWRWD
ONEOK
OSHA
OTTR TL PWR
PAAP
P L E M
POLAR COM
PVT ELEC
QWEST
R&T REG WD

Greater Ramsey Water District
Great Plains Natural Gas Company
Halstad Telephone Company
Idea1
Inter-Community Telephone Company
Kaneb Pipeline Company
Kem Electric Cooperative Incorporated
Koch Gathering Systems Incorporated
Lakehead Pipeline Company
Lower Yellowstone Rural Electric
Lumen Technologies Incorporated
McKenzie Consolidated Telcom
McKenzie Electric Cooperative
McKenzie County Water Resource District
McLeod USA
McLean Electric Cooperative
McLean-Sheridan Rural Water District
Montana-dakota Utilities
MidContinent Communications
Midstate Telephone Company
Minot Cable Television
Minot Telephone Company
Missouri Valley Communications Incorporated
Missouri West Water System
Minnkota Power
Mor-gran-sou Electric Cooperative
Mountrail-williams Electric Cooperative
Moore & Liberty - Griggs County
City Water And Sewer
City Of '.....'
North Central Electric Cooperative
North Prairie Regional Water District
North Dakota Parks And Recreation
North Dakota Telephone Company
North Dakota Department of Transportation
Northeast Regional Water District
NDSU Soil Science Department
Nemont Telephone
Nodak Rural Electric Cooperative
Noonan Farmers Telephone Company
Northern Plains Railroad
Northern States Power
Northern Border Pipeline
Northern Plains Electric Cooperative Incorporated
Northwestern Refinery Company
Northwest Communication Cooperation
Northwest Rural Water District
Oneok gas
Occupational Safety and Health Administration
Otter Tail Power Company
Plains All American Pipeline
Praieliands Energy Marketing
Polar Communications
Private Electric
Qwest Communications
R & T Water District

RED RIV COMM
RESVTN TEL
ROBRTS TEL
R-RIDER ELEC
RRVW
S CENT REG WD
SE W U
SCOTT CABLE
SHERDN ELEC
SHEYN VLY ELEC
SKYTECH
SLOPE ELEC
SOURIS RIV TELCOM
ST WAT COMM
STATE LN WATER
STER ENG
STUT RWD
SW PL PRJ
SWWA
SUNOCO
T M C
TCI
TESORO GHG PLNS PL
TRI-CNTY WU
TRL CO WRD
UNTD TEL
UPPR SOUR WD
US SPRINT
USAF MSL CABLE
USFWS
USW COMM
VRNDRY ELEC
W RIV TEL
WAPA
WAWSA
WEB
WILLI WRD
WILSTN BAS PL
WLSH RWD
WOLVRTN TEL
XLENER
YSVR

Red River Communications
Reservation Telephone
Roberts Company Telephone
Roughrider Electric Cooperative
Red River Valley & Western Railroad
South Central Regional Water District
Southeast Water Users Incorporated
Scott Cable Television Dickinson
Sheridan Electric Cooperative
Sheyenne Valley Electric Cooperative
Skyland Technologies Incorporated
Slope Electric Cooperative Incorporated
Souris River Telecommunications
State Water Commission
State Line Water Cooperative
Sterling Energy
Stutsman Rural Water District
Southwest Pipeline Project
Southwest Water Authority
Sunoco LP
Turtle Mountain Communications
TCI of North Dakota
Tesoro High Plains Pipeline
Tri-County Water Users Incorporated
Traill County Water Resource District
United Telephone
Upper Souris Water District
U.S. Sprint
U.S.A.F. Missile Cable
US Fish and Wildlife Service
U.S. West Communications
Verendrye Electric Cooperative
West River Telephone Incorporated
Western Area Power Administration
Western Area Water Supply Authority
W. E. B. Water Development Association
Williams County Water Resource District
Williston Basin Interstate Pipeline Company
Walsh Water Rural Water District
Wolverton Telephone
Xcel Energy
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

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LINE STYLES

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Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S
	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

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KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

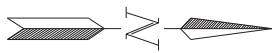
ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30

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

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SYMBOLS

D-101-31

	Flexible Delineator		Highway Sign (Exst, Ppsd)
	Flexible Delineator Type A (Exst, Ppsd)		Mile Post Type A (Exst-Ppsd-Reset)
	Flexible Delineator Type B (Exst, Ppsd)		Mile Post Type B (Exst, Ppsd)
	Flexible Delineator Type C (Exst, Ppsd)		Mile Post Type C (Exst, Ppsd)
	Flexible Delineator Type D (Exst, Ppsd)		Object Marker Type I (Exst, Ppsd)
	Flexible Delineator Type E (Exst, Ppsd)		Object Marker Type II (Exst, Ppsd)
	Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)		Object Marker Type III (Exst, Ppsd)
	Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)		Existing Reference Marker
	Delineator Type C (Exst, Ppsd, Diamond Grade)		Road Closure Gate 18 Ft (Exst, Ppsd)
	Delineator Type D (Exst, Ppsd, Diamond Grade)		Road Closure Gate 28 Ft (Exst, Ppsd)
	Delineator Type E (Exst, Ppsd, Diamond Grade)		Road Closure Gate 40 Ft (Exst, Ppsd)
	Barricade (Type I, Type II, Type III)		Existing Railroad Battery Box
	Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)		Existing RR Profile Spot
	Attenuation Device		Existing Railroad Crossbuck
	Truck Mounted Attenuator		Existing Railroad Frog
	Delineator Drums		Existing Mailbox (Private, Federal)
	Flagger		
	Tubular Marker		
	Traffic Cone		
	Back to Back Vertical Panel Sign		

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

12 18 2020

SYMBOLS

D-101-32

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

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



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



12 18 2020

SYMBOLS

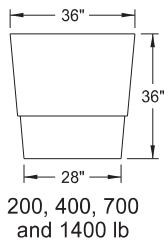
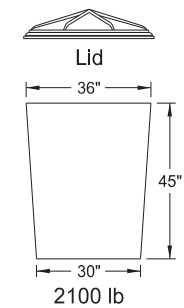
D-101-33

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

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

12 18 2020

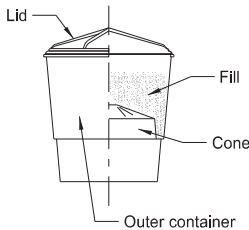
ATTENUATION DEVICE



Outer Containers

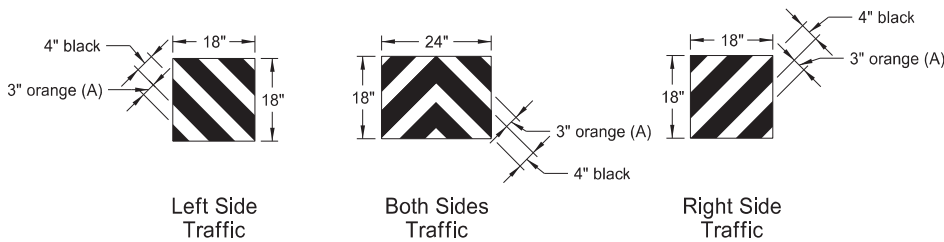


Cones



Typical Assembly

Typical Module Construction Detail

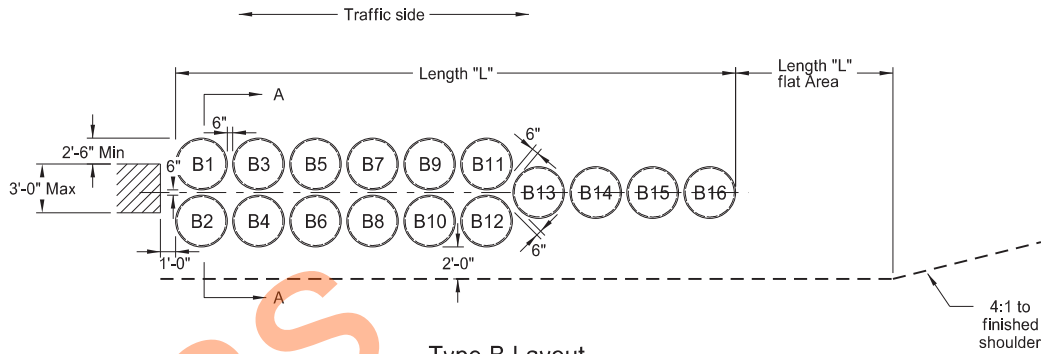


Reflective Sheet Detail

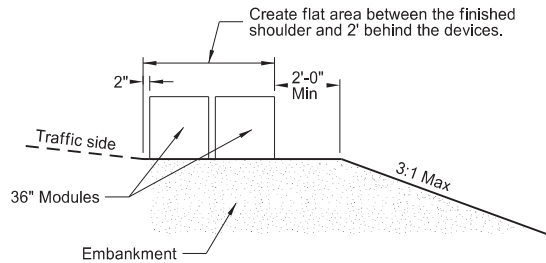
Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above.
Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

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

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



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



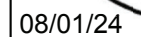
Type B Attenuation Device												
Module Number	Dash Number											
	80	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)											
B1	2100	2100										
B2	2100	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	
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											
	1	1	1	1	1	1	1	1	1	1	1	1
2100	1	1	1	1	1	1	1	1	1	1	1	1
1400	1	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	2	1	1	1	1	1	1	1	1

Notes:

- Materials
 - Use modules manufactured from frangible polyethylene material which shatters upon impact.
 - Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.
- Modules
 - Provide three components for 2, 4, or 7 cubic foot module containers:
 - A 14 C.F., yellow outer container.
 - A black lid securely locking over the top lip of the container.
 - A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
 - Provide two components for the 14 cubic foot module container:
 - A 14 C.F., yellow outer container.
 - A black lid securely locking over the top lip of the container.
 - Provide two components for the 21 cubic foot module container:
 - A 36" height X 36" width yellow outer container.
 - A black lid which locks securely over the top of the container.
- For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.
- For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.
- The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
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

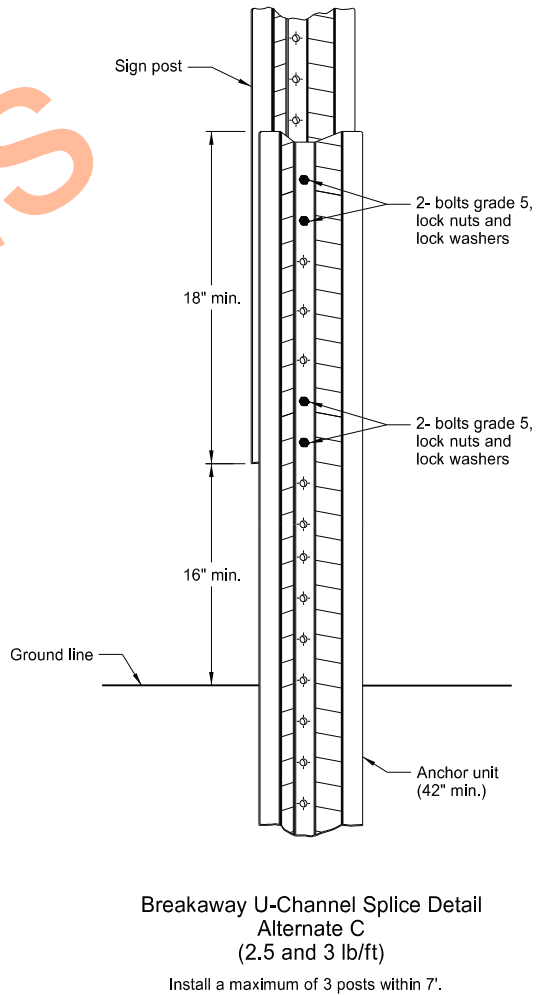
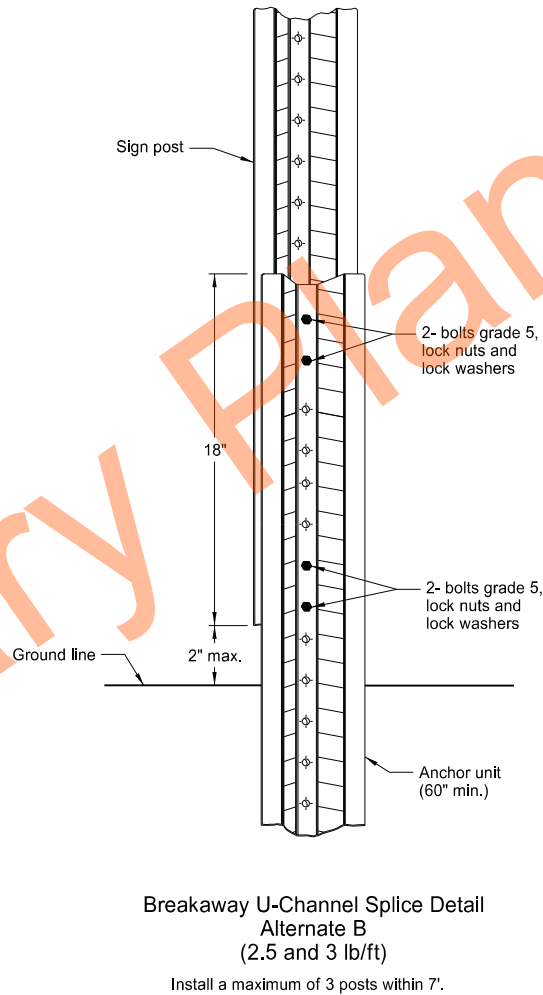
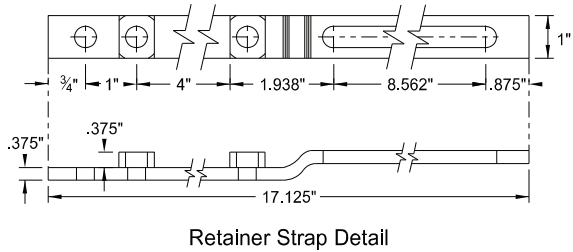
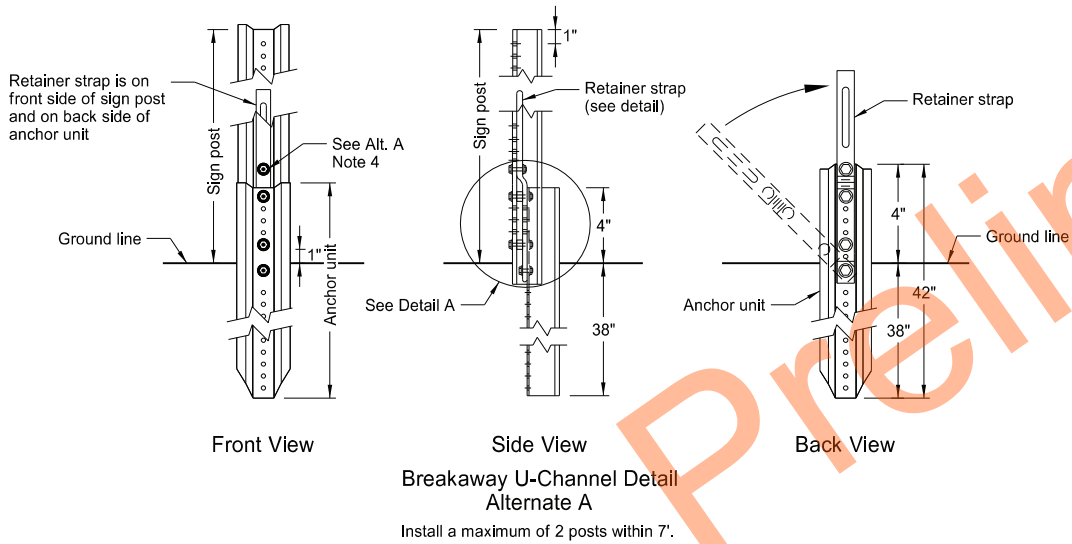
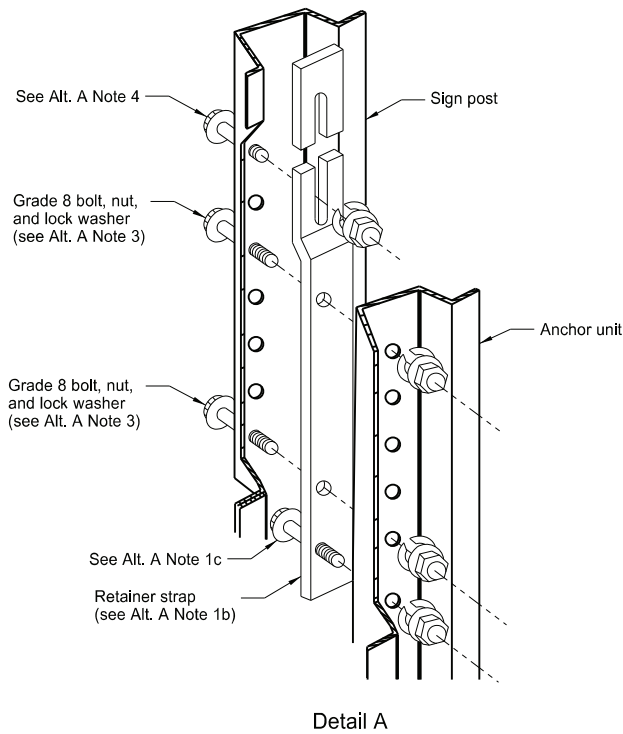




BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

- 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.
- a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
- 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.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- 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

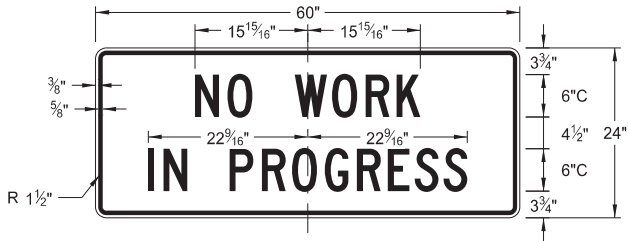


08/01/24

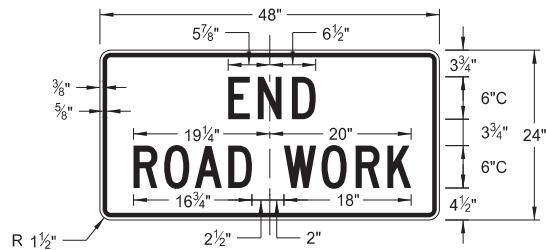
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



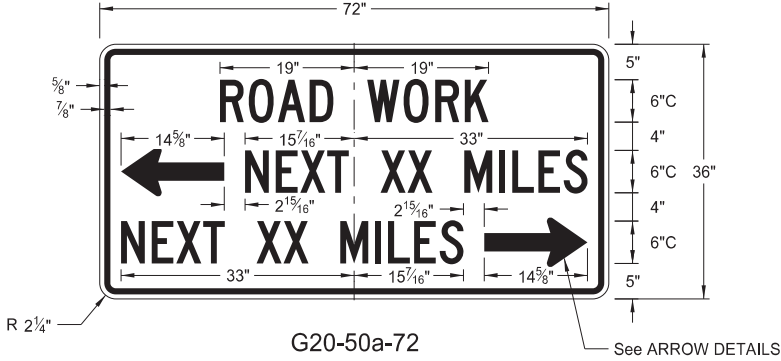
G20-1b-60
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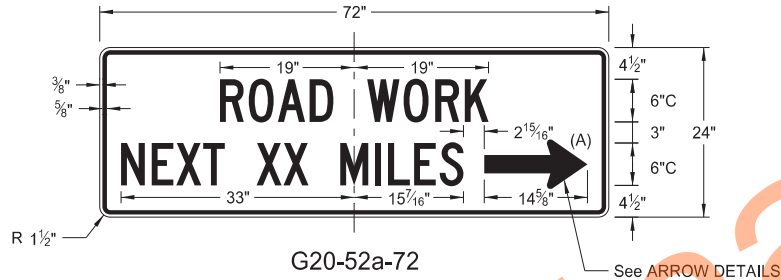
G20-2-48
Legend: black (non-refl)
Background: orange



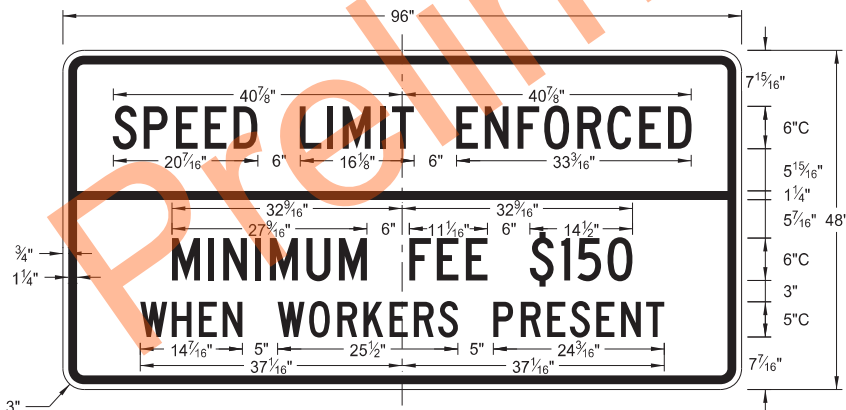
G20-4b-36
Legend: black (non-refl)
Background: orange



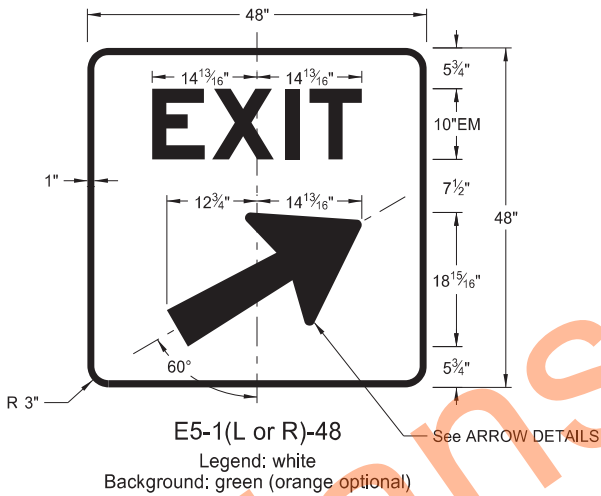
G20-50a-72
Legend: black (non-refl)
Background: orange



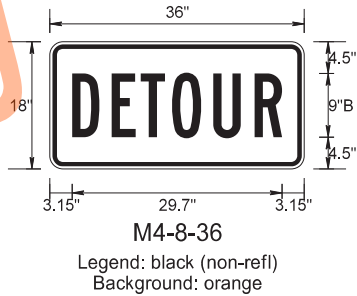
G20-52a-72
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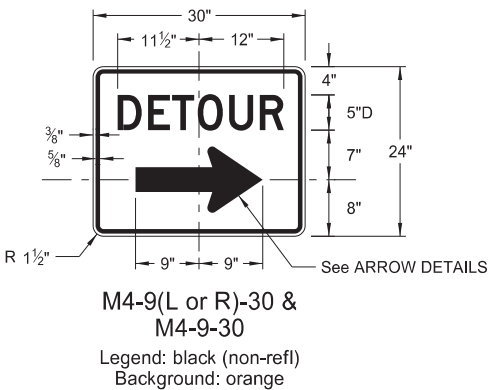
G20-55-96
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Background: orange



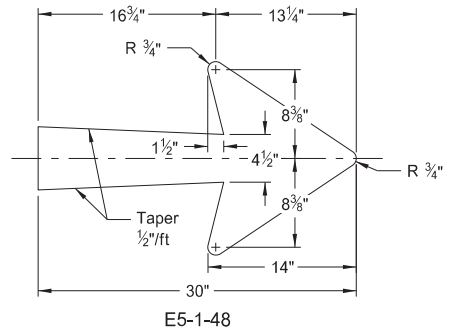
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



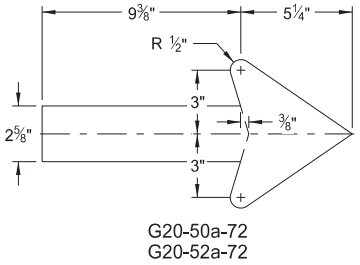
M4-8-36
Legend: black (non-refl)
Background: orange



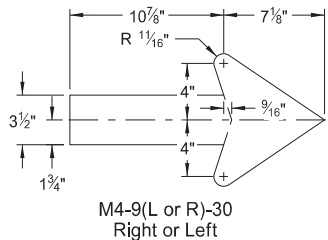
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



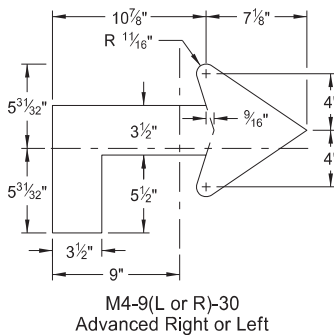
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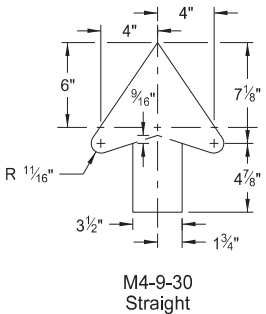
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

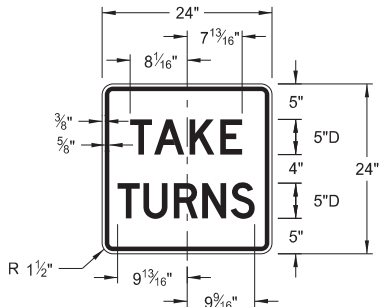
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
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

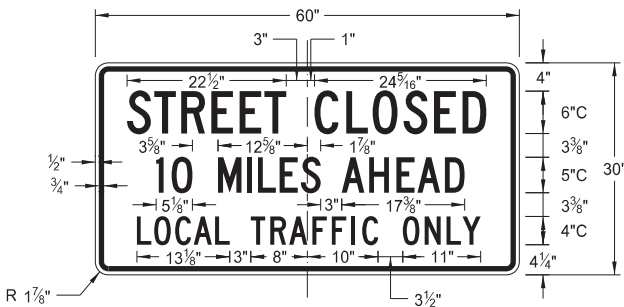


CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

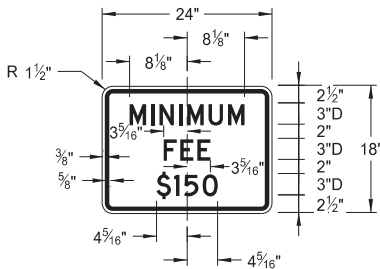
D-704-10



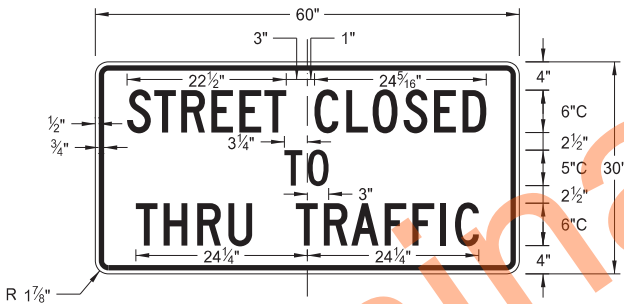
R1-50P-24
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Background: white



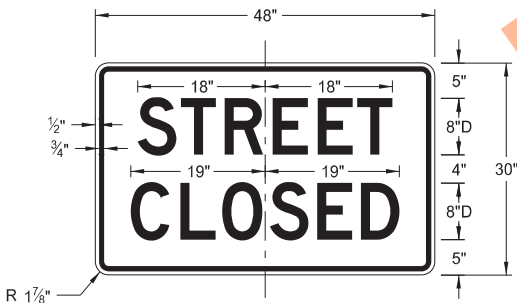
R11-3c-60
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Background: white



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

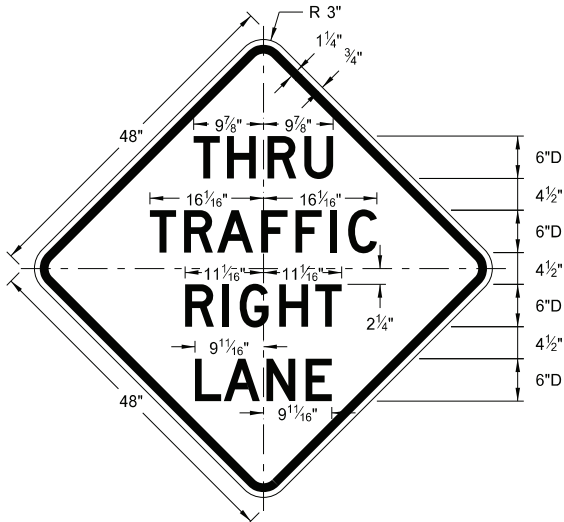
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



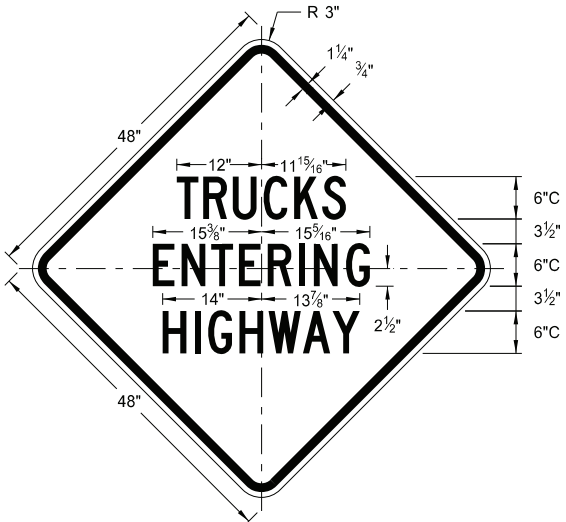
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

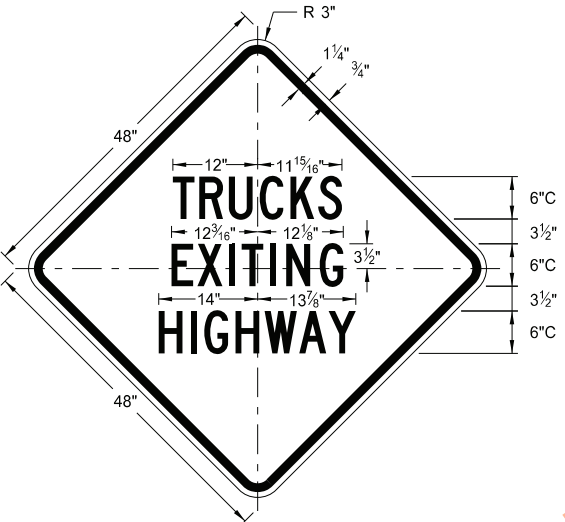
* DISTANCE MESSAGES



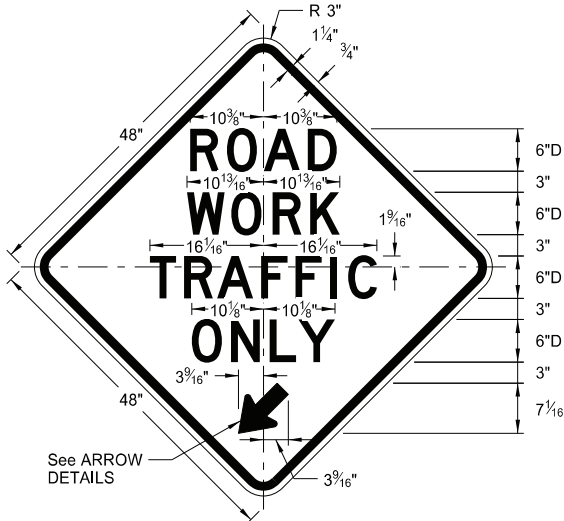
W5-8-48
Legend: black (non-refl)
Background: orange



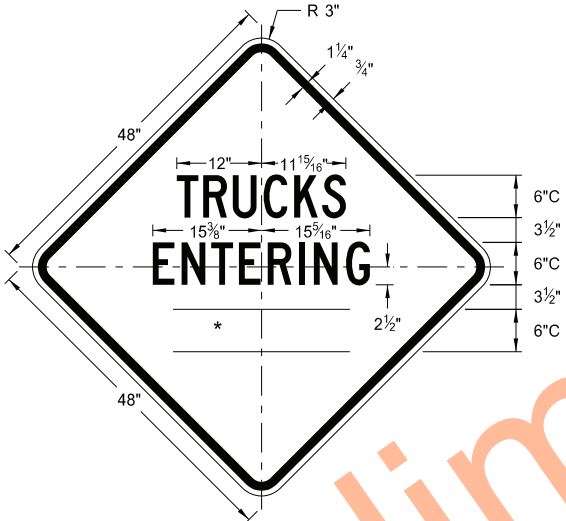
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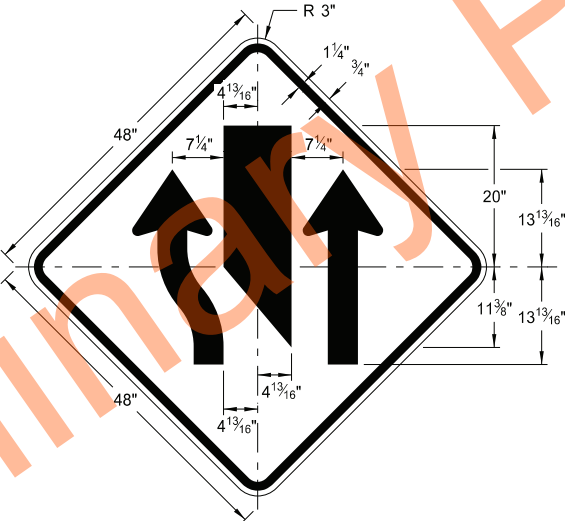
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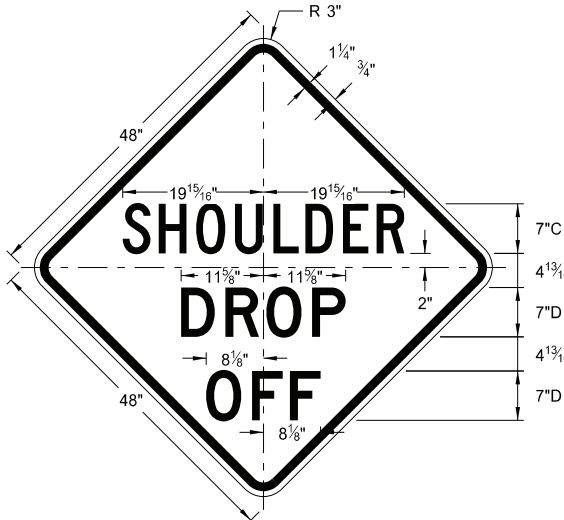
W5-9-48
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Background: orange



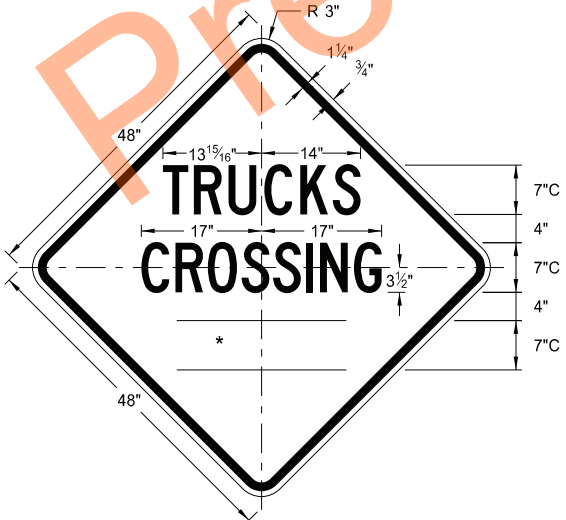
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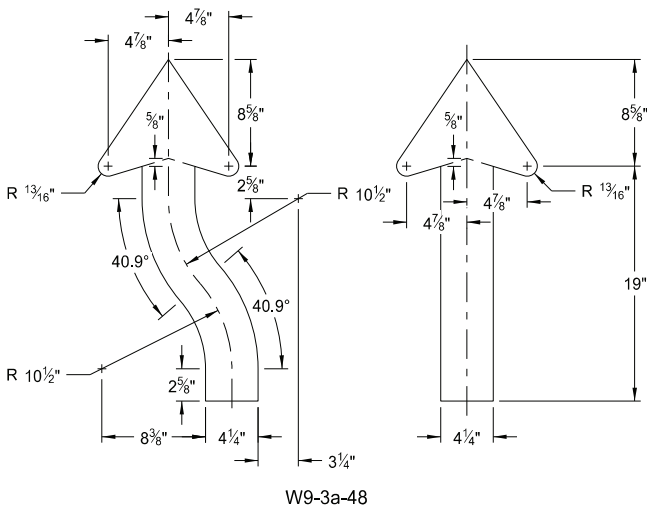
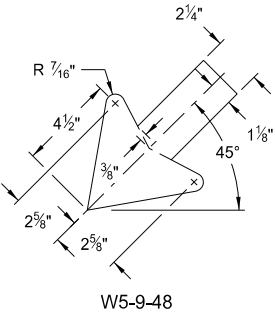
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



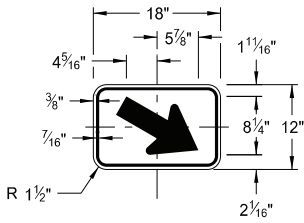
ARROW DETAILS

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

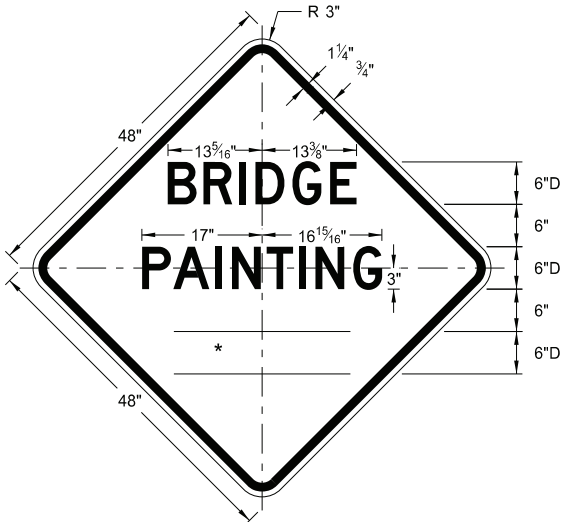


08/01/24

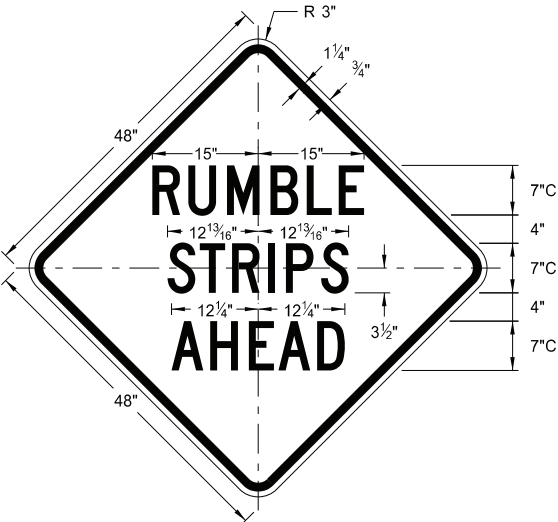
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



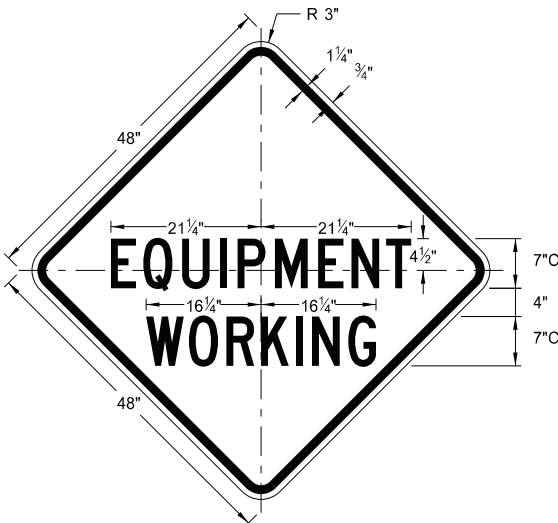
W16-7aP-18
Legend: black (non-refl)
Background: orange



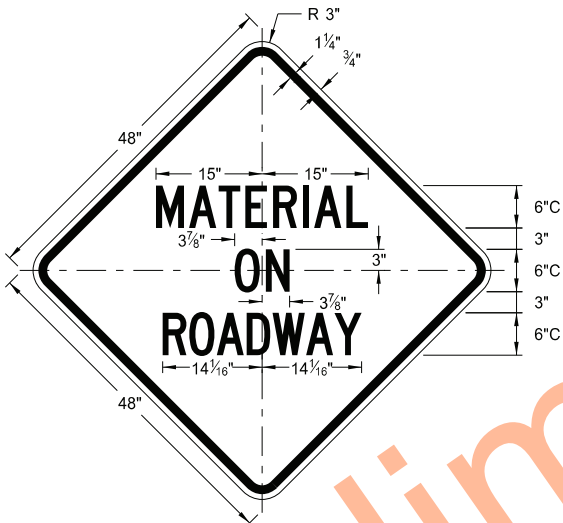
W21-50-48
Legend: black (non-refl)
Background: orange



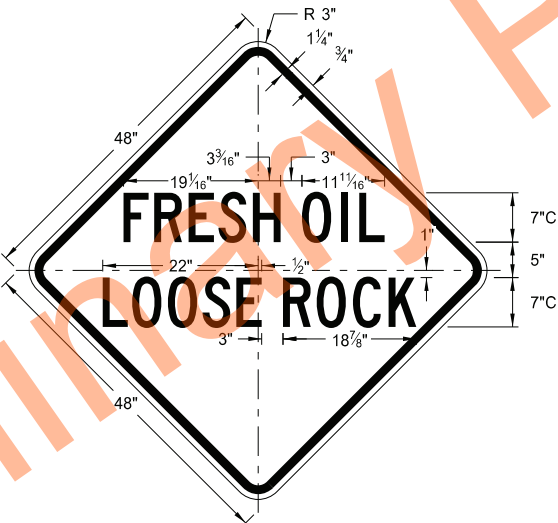
W21-53-48
Legend: black (non-refl)
Background: orange



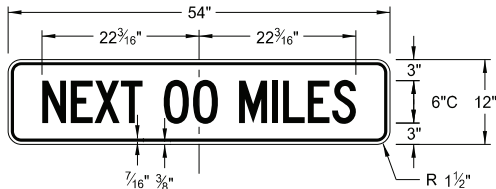
W20-51-48
Legend: black (non-refl)
Background: orange



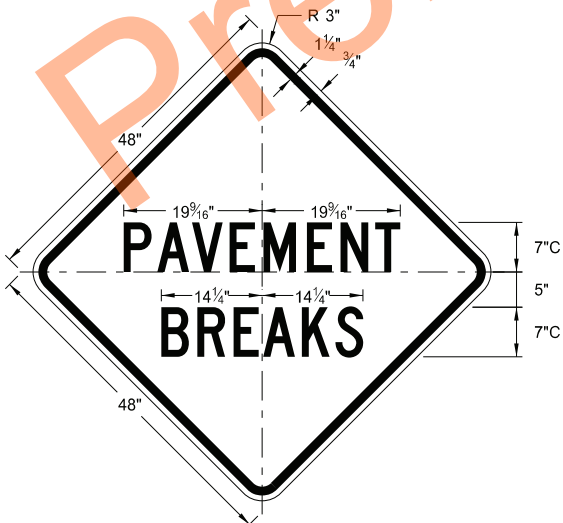
W21-51-48
Legend: black (non-refl)
Background: orange



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



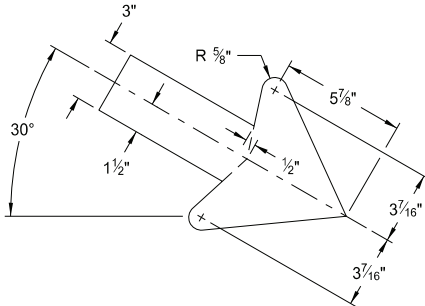
W20-52P-54
Legend: black (non-refl)
Background: orange



W21-52-48
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



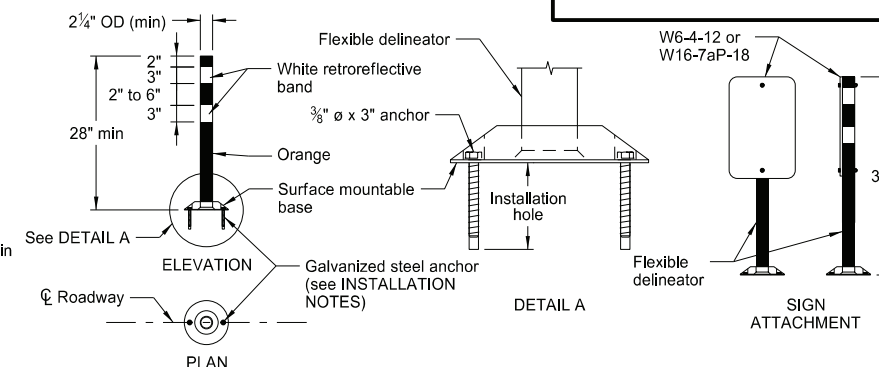
W16-7aP-18

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



08/01/24

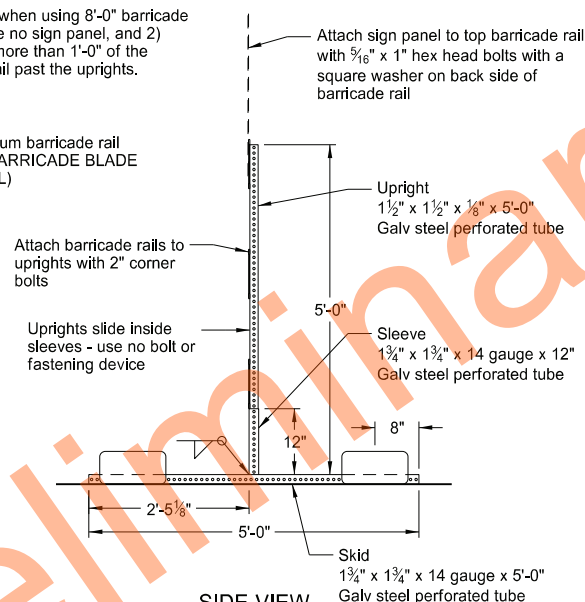
D-704-13



FLEXIBLE DELINEATOR

INSTALLATION NOTES:

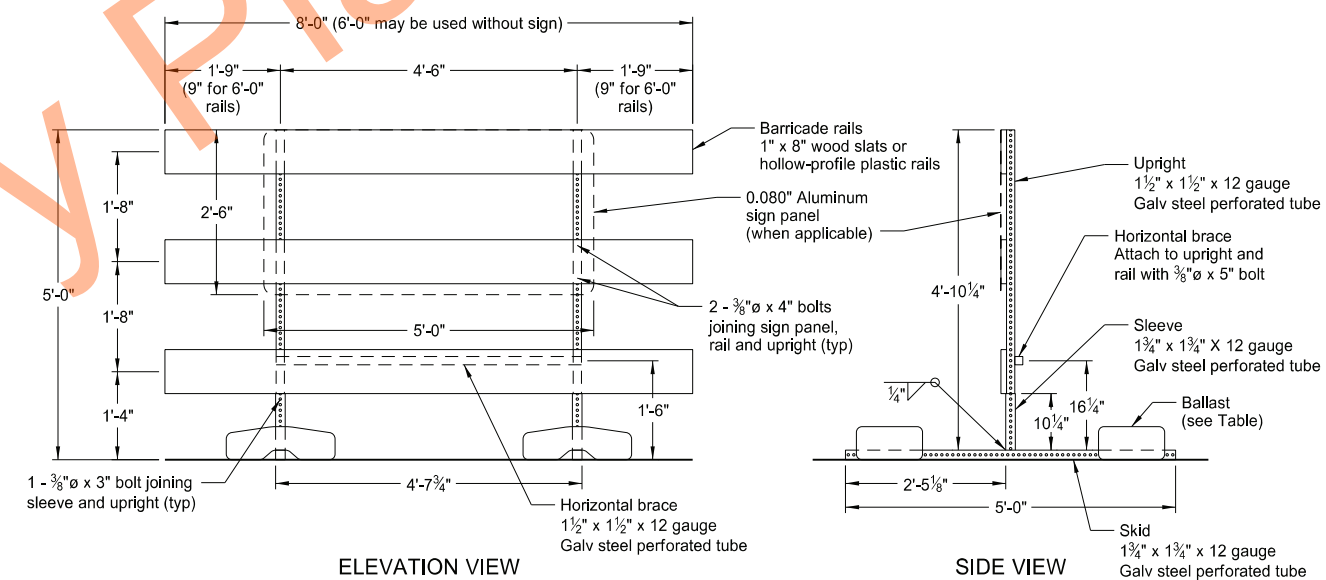
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close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



BARRICADE BLADE DETAIL

ELEVATION VIEW

SIDE VIEW



ELEVATION VIEW

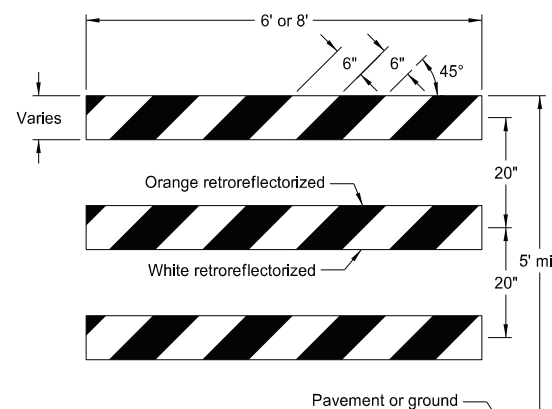
BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

SIDE VIEW

LAST
(code support)

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

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

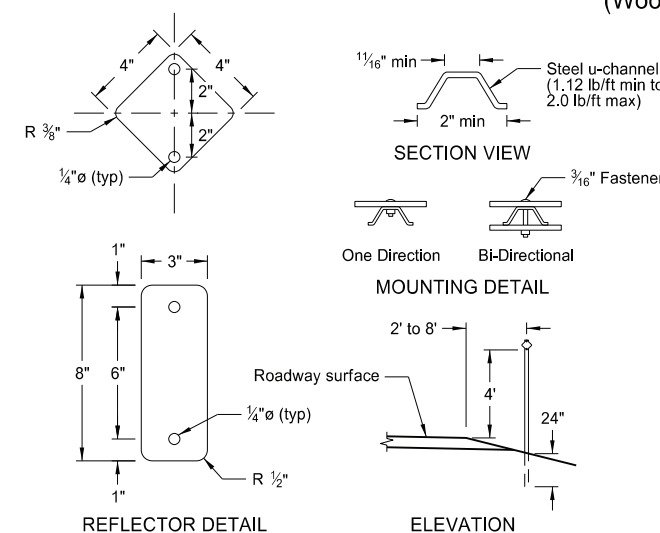


TYPE I BARRICADE

TYPE II BARRICADE

TYPE III BARRICADE

BARRICADE RAIL DETAILS



REFLECTOR DETAIL

ELEVATION

DELINEATORS

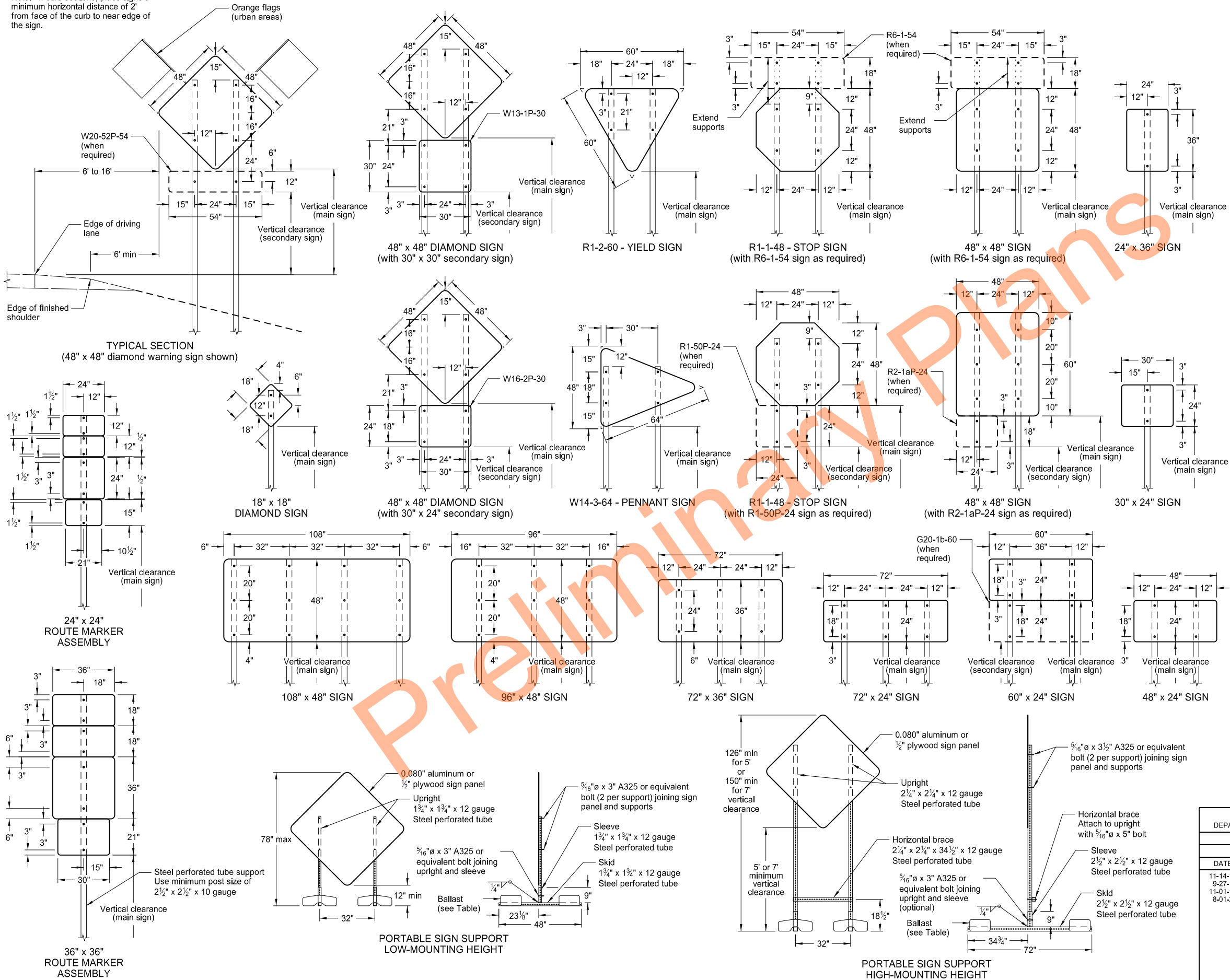
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



08/01/24

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

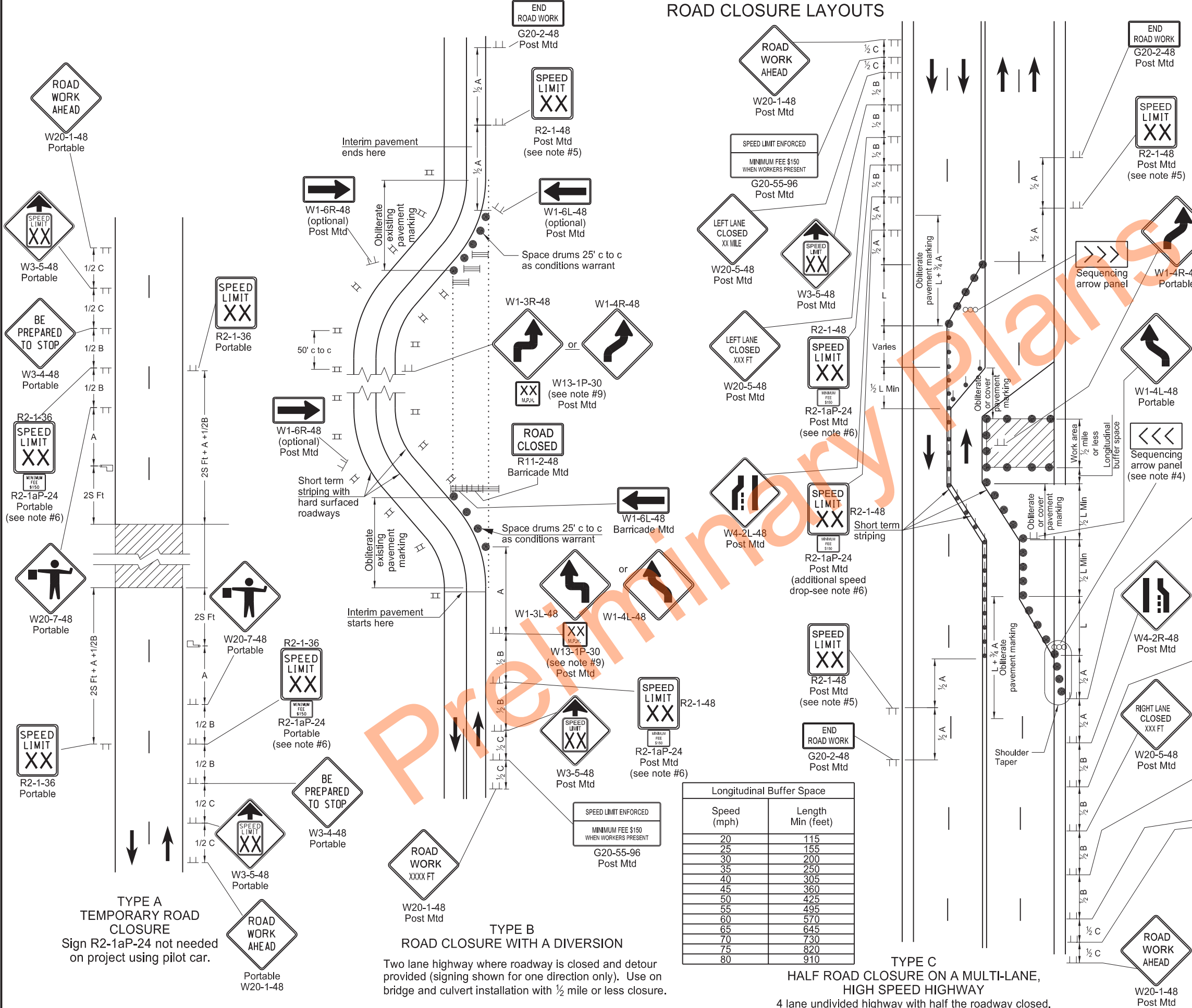
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



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



ROAD CLOSURE LAYOUTS



- Notes:
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet.
 - L = Minimum length of taper, $S \times W$ for freeways, expressways, and other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 - Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
 - 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).
 - Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within reduced speed zones.
 - Where necessary, engineer will determine safe speed.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 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

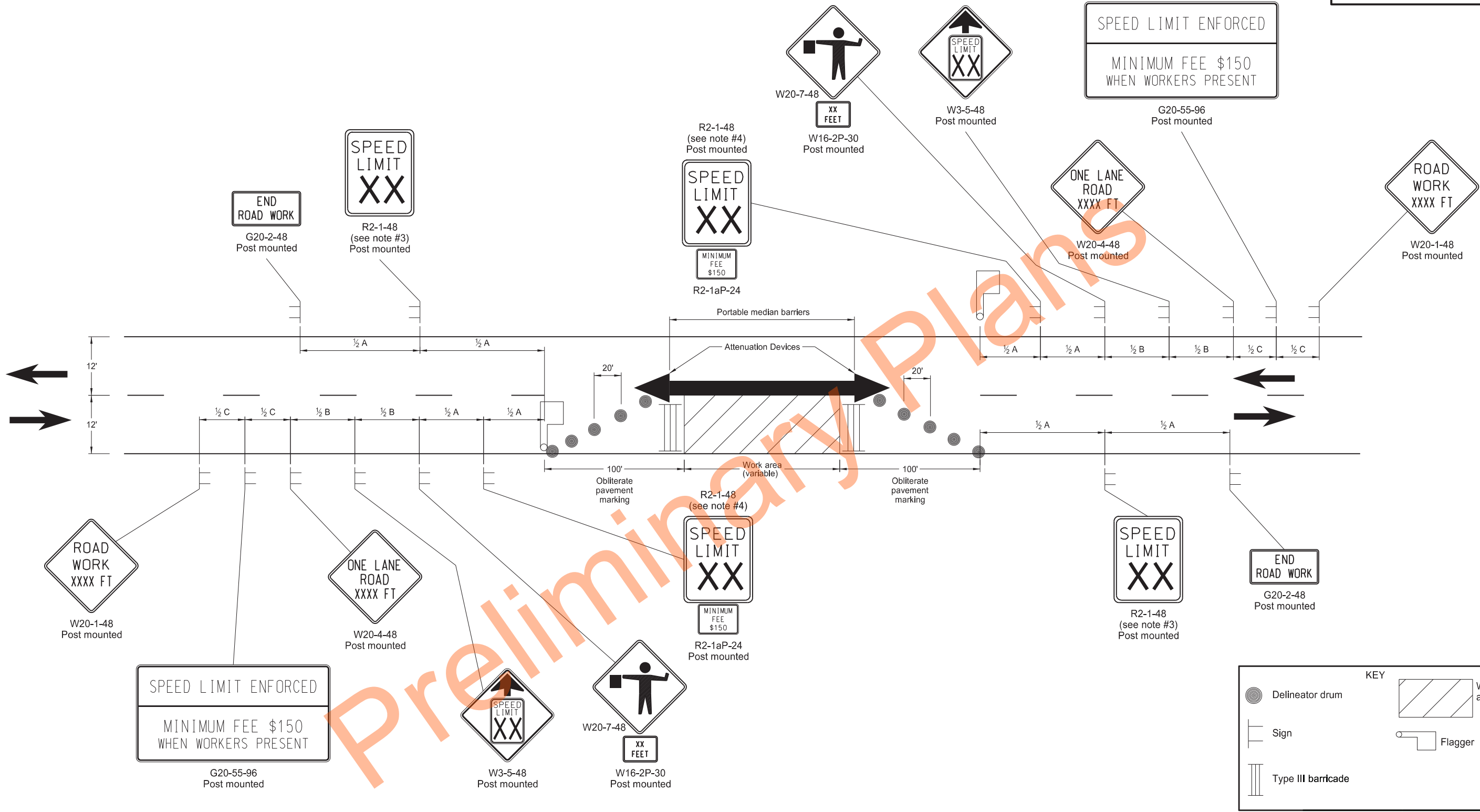
KEY	
	Type III barricade
	Sign
	Delineator drum
	Tubular markers
	Work area
	Flagger
	Sequencing arrow panel
	Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmnt 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



SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



KEY

Delineator drum

Sign

Type III barricade

Work area

Flagger

Notes:

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

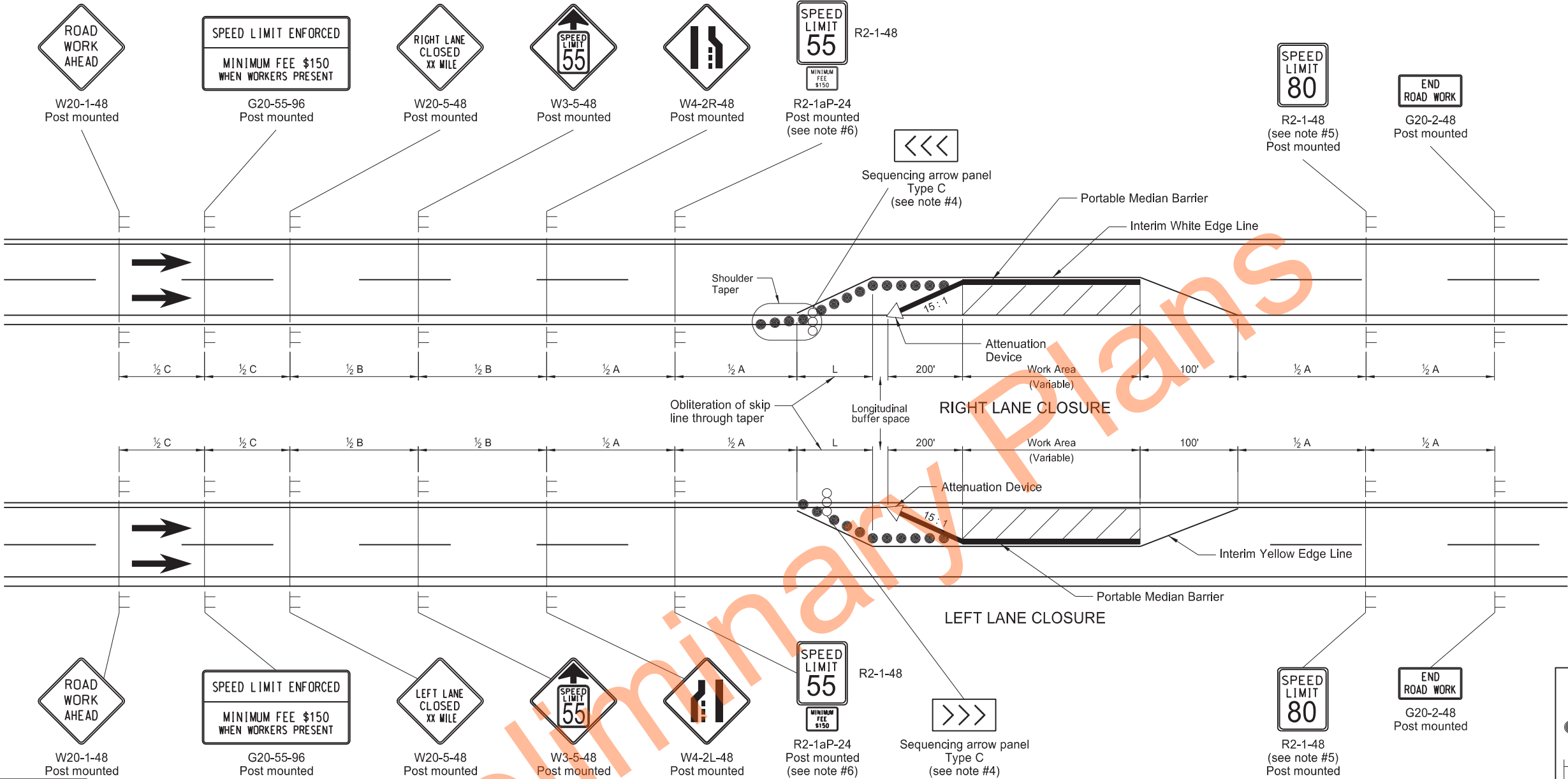
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

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



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:
- 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. $S \times W$ for freeways, expressways, and roads with speeds of 45 mph or greater, or $W \times S^2 / 60$ for urban, residential, and streets with speeds of 40 mph or less.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
 - Space delineator drums used for tapering traffic and on tangent at dimension "S".
 - 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).
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at $\frac{1}{2}$ B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within a reduced speed zone.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with the Standard D-704-14.
 - 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.
 - Reduce speed limit further, if location and conditions dictate.

KEY

Delineator Drum

Sign

Attenuation Device

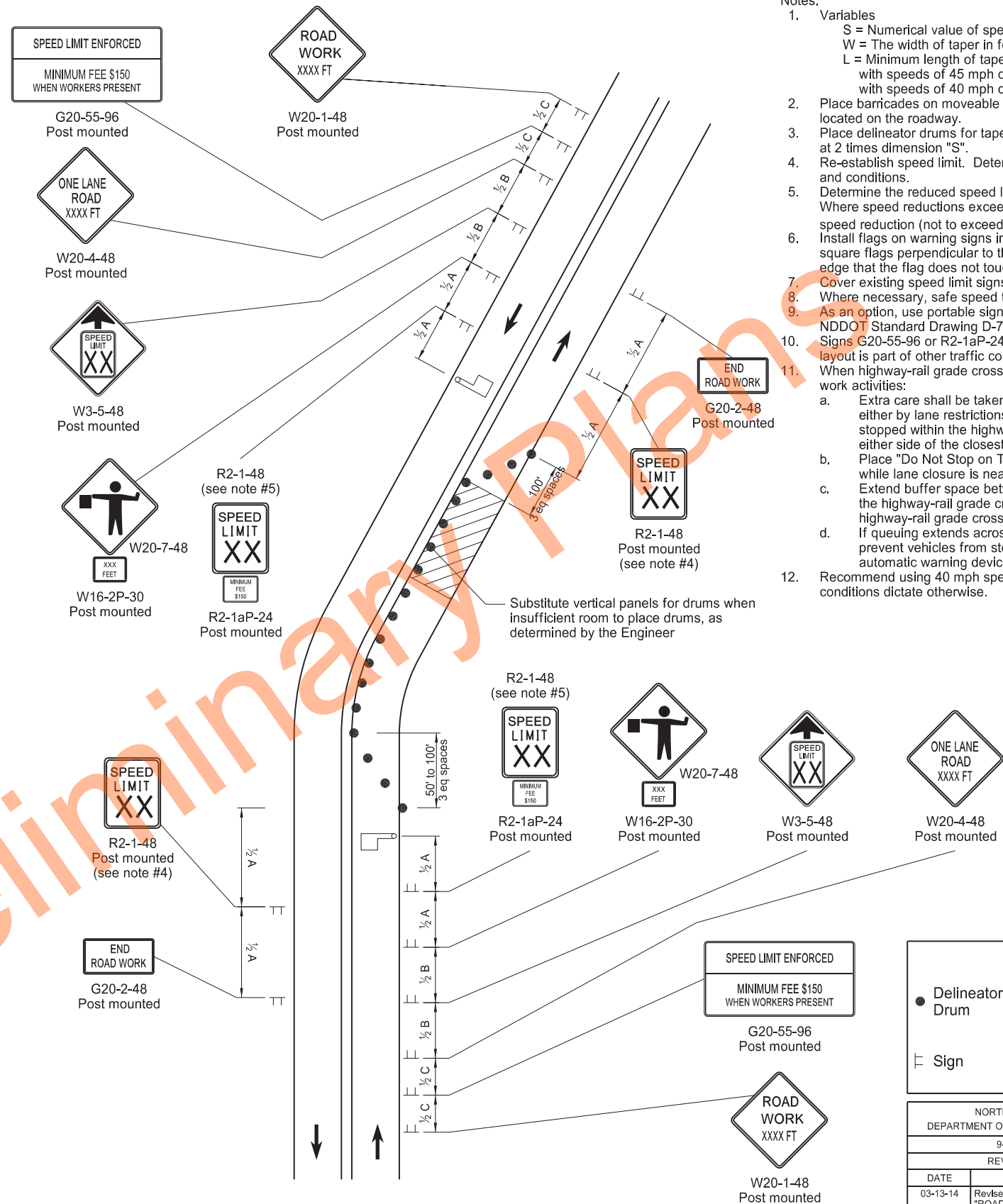
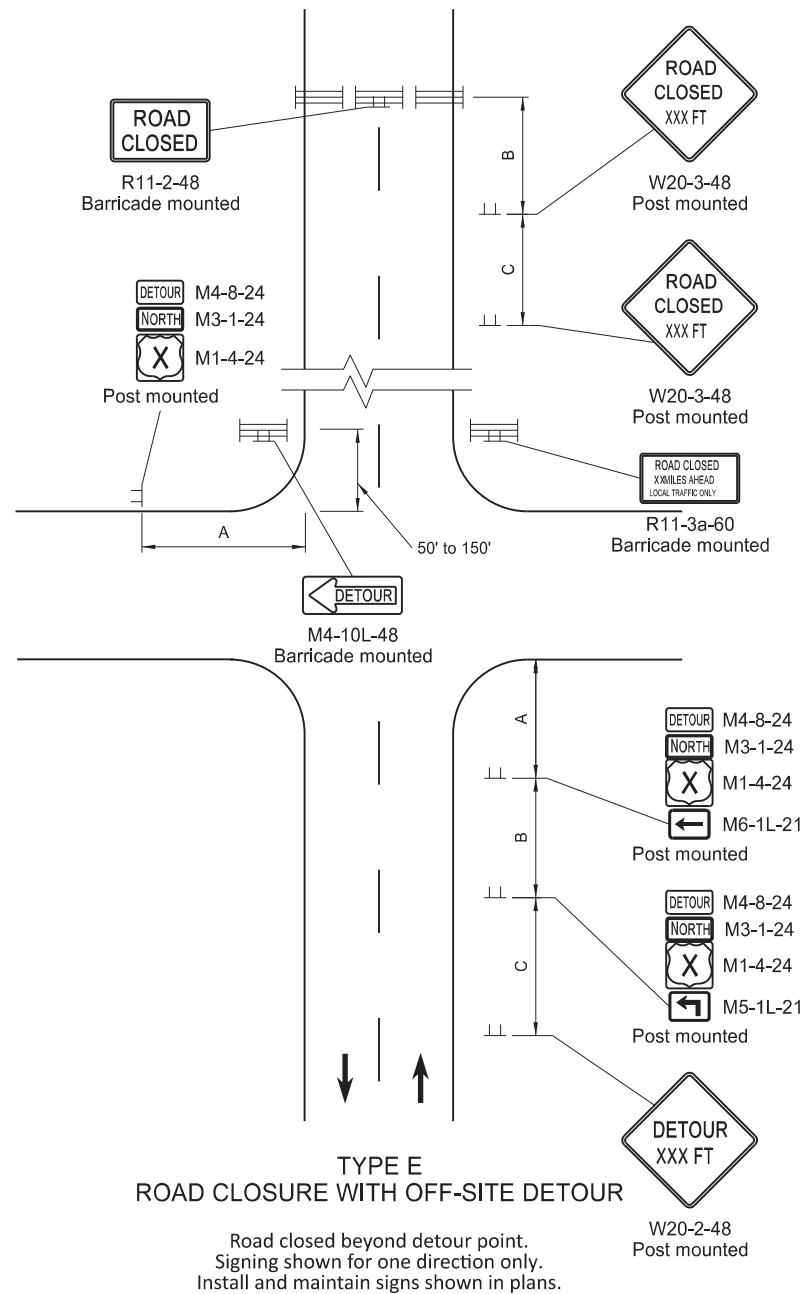
Sequencing Arrow Panel

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 #, & pmt obl 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



ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD 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 in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or W x S²/60 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. Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
 4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 5. Determine the reduced speed limit based on the in place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place second speed limit sign at 1/2B.
 6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 7. Cover existing speed limit signs within a reduced speed zone.
 8. Where necessary, safe speed to be determined by the Engineer.
 9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 10. Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
 11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - b. Place "Do Not Stop on Tracks" sign (R8-8-24) near cross buck in each direction while lane closure is near tracks.
 - c. Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
 - d. If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
 12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

KEY

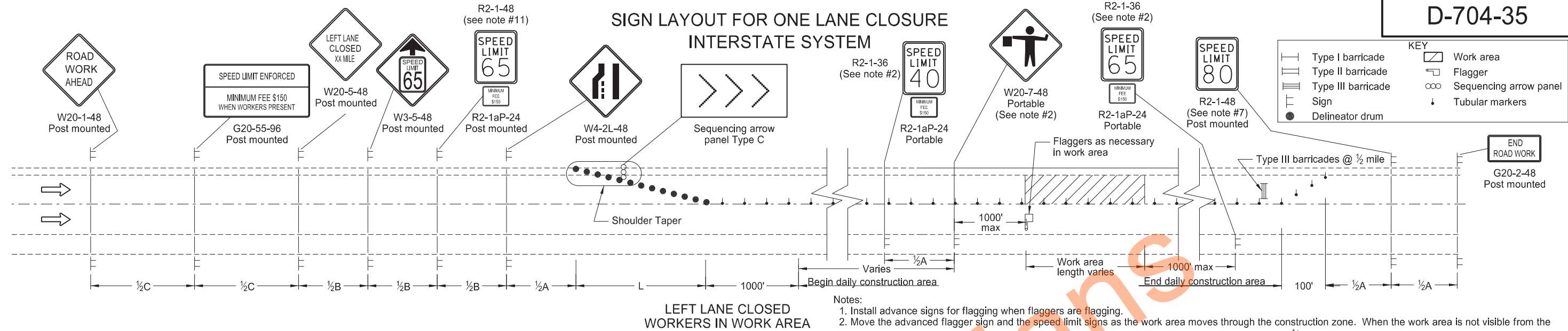
 Delineator Drum	 Type III Barricade	 Flagger
 Sign	 Work/Hazard Area	

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
03-13-14	Revised Sign Cell "ROAD WORK XXX FT"
08-17-17	Update notes, sign numbers
11-01-19	Revised signs, sign #s, & notes
12-08-21	Switched order of Road Work XXX and Sqd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

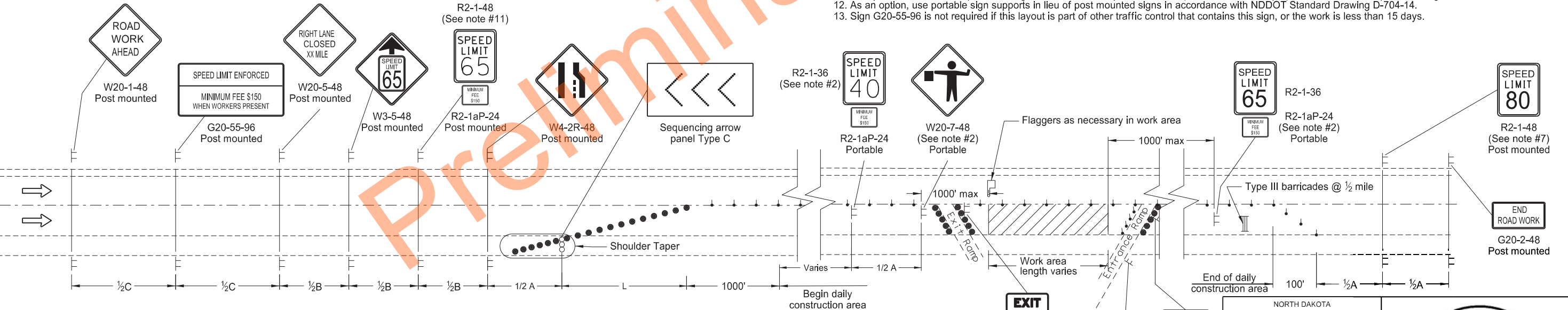


SIGN LAYOUT FOR ONE LANE CLOSURE
INTERSTATE SYSTEM

D-704-35



ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
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



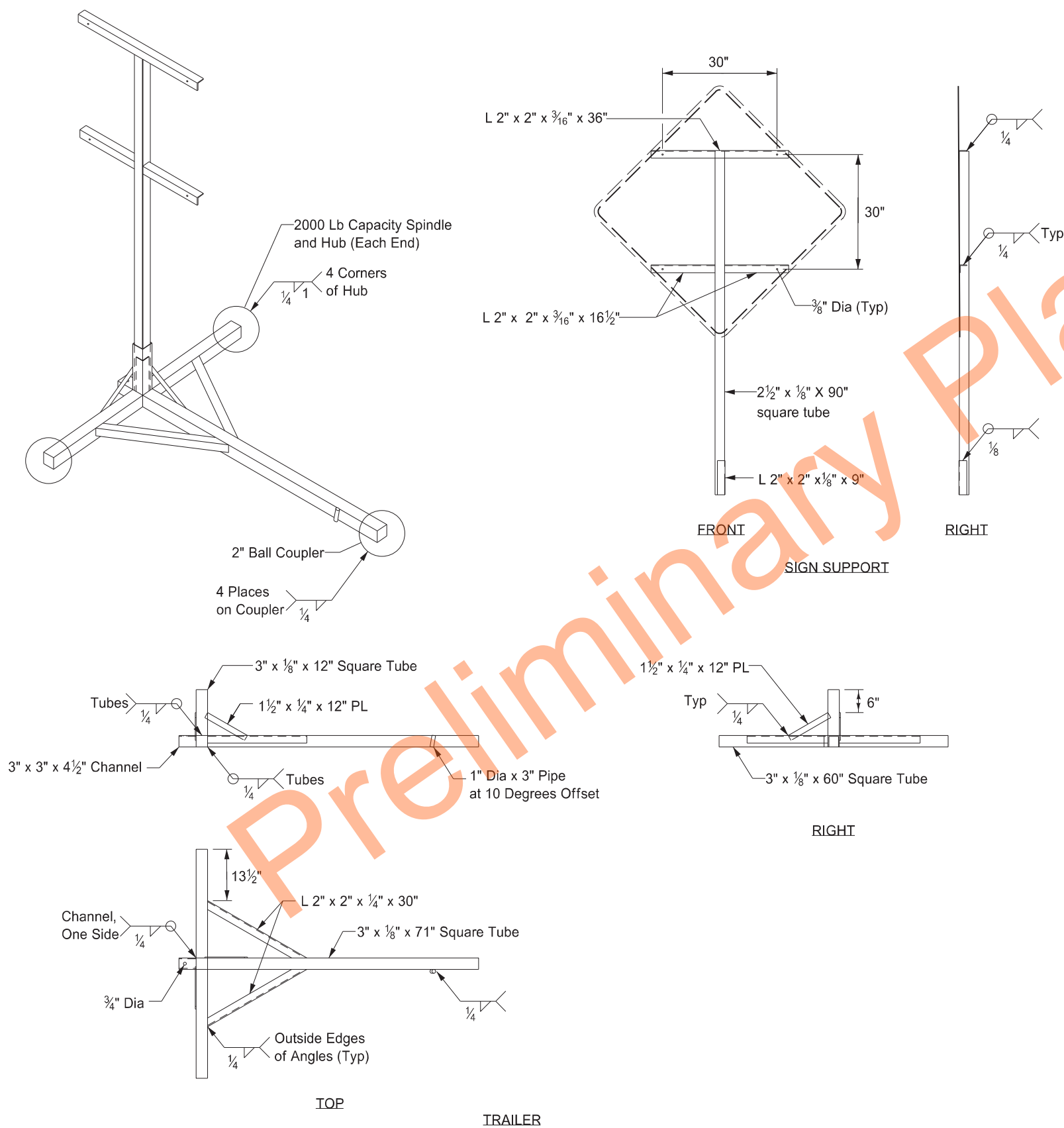
- Notes:
1. Install advance signs for flagging when flaggers are flagging.
 2. Move the advanced flagger sign and the speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Space the 40 mph speed limit sign at 1/2A in advance of the flagger sign and move the 65 mph speed limit sign. Cover or remove the 40 mph speed limit and Minimum Fee \$150 signs and the 65 mph speed limit sign upon completion of the work day or when workers are not present.
 3. RAMPs: When the work area encompasses an entrance ramp, install a 40 mph speed limit sign on the ramp and cover any existing yield sign. Install new yield sign as necessary. Remove the ramp speed limit sign when the main line 40 mph speed zone is moved past the ramp.
 4. Variables:
S=Numerical value of speed limit or 85th percentile
W=The width of taper.
L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or WxSxS/60 for urban, residential, and other streets with speeds of 40 mph or less.
 5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
 6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
Use Type C on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
 7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 8. Cover existing speed limit signs within a reduced speed zone.
 9. Upon approval, the Engineer will measure obliterated or covered pavement marking as Obliteration of Pavement Marking.
 10. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 11. Determine the reduced speed limit dependent on the in place speed limit before construction. When speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2B.
 12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 13. 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.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-7-2012	
REVISIONS	
DATE	CHANGE
06-23-14	Revised Note 12
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Moved speed signs & added note
10-17-17	Corrected spelling of "shoulder"
11-01-19	Revised tubular Mkrs symbols
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced, added Dollars At Work, & removed table
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



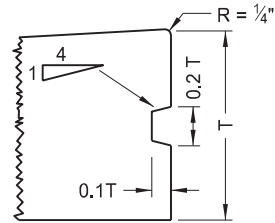
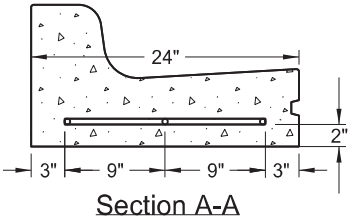
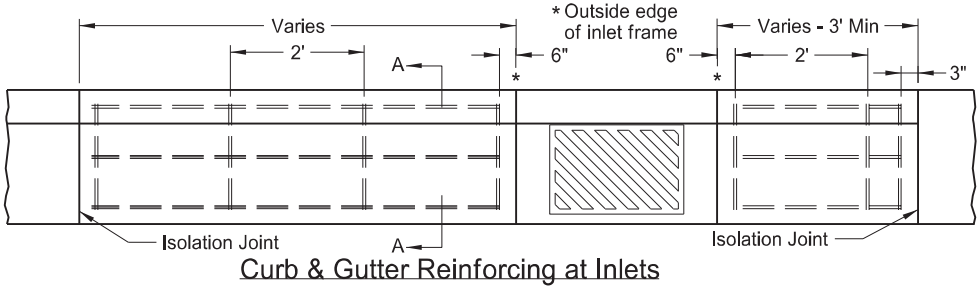
Notes:

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

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

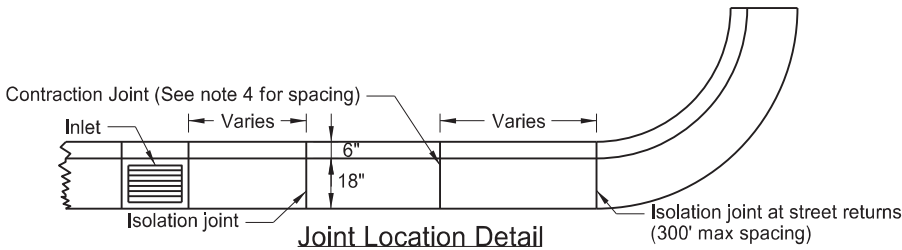


Curb & Gutter and Valley Gutter

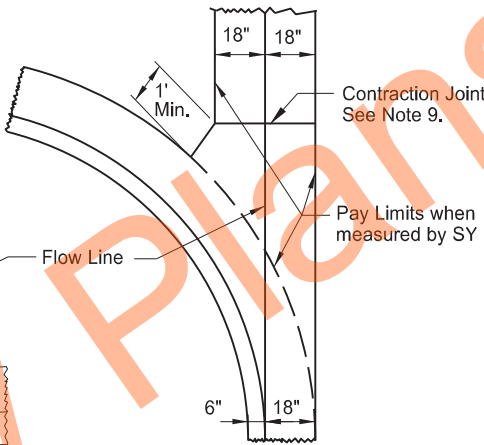


Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)

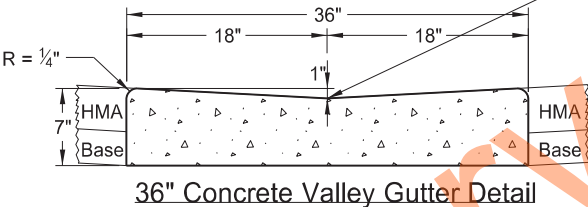
T= Thickness of pavement unless otherwise noted on plans.



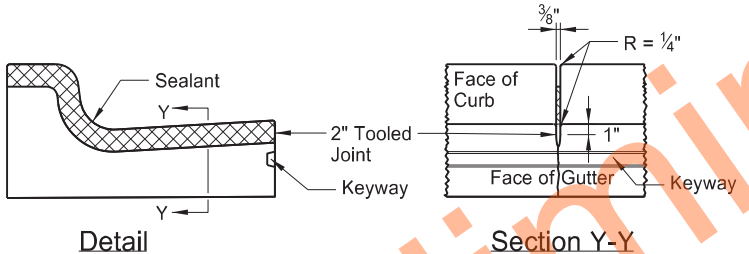
Joint Location Detail



36" Concrete Valley Gutter Plan



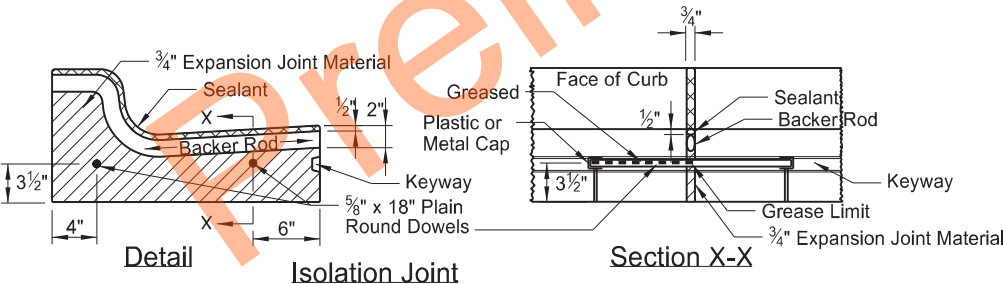
36" Concrete Valley Gutter Detail



Detail

Contraction Joint

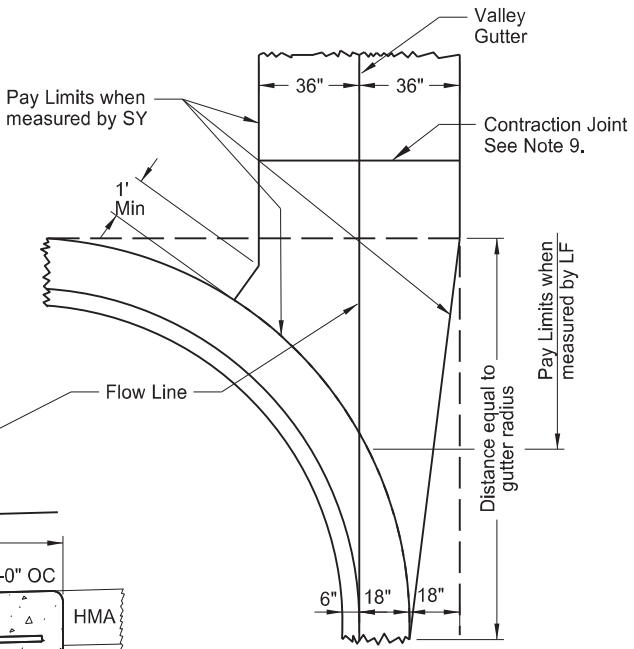
Section Y-Y



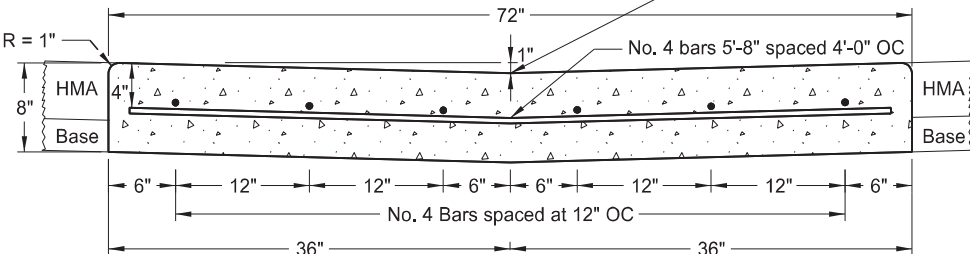
Detail

Isolation Joint

Section X-X



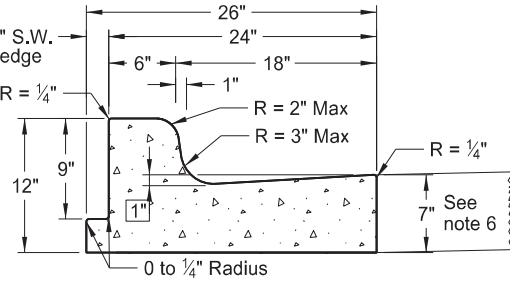
72" Concrete Valley Gutter Plan



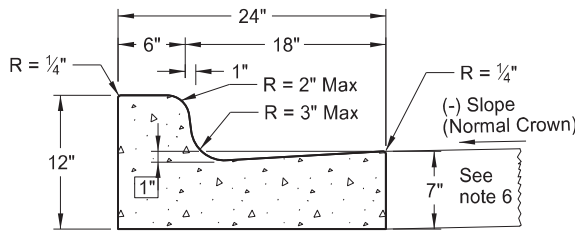
72" Concrete Valley Gutter Detail

NOTES:

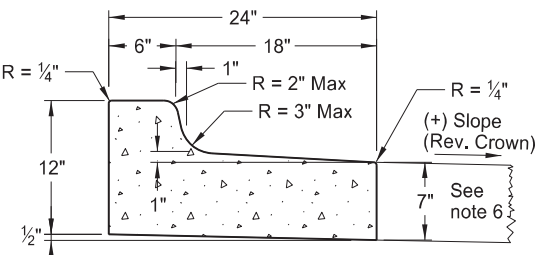
1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use $\frac{3}{4}$ " expansion joint material for isolation joints. 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 $\frac{1}{8}$ " min. to $\frac{3}{8}$ " 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.



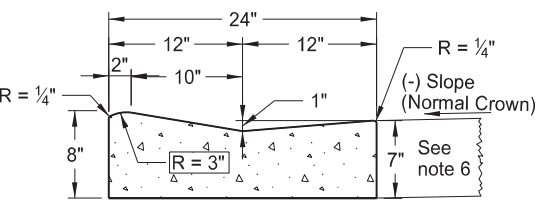
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median,
or Parking Lot. (Sec. A shown. See
Sec B for additional details.)



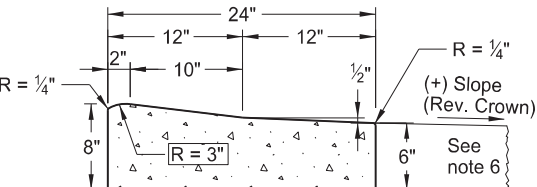
Curb & Gutter Type 1 (Sec. A)



Curb & Gutter Type 1 (Sec. B)



Mountable Curb & Gutter Type 1 (Sec. A)



Mountable Curb & Gutter Type 1 (Sec. B)

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.



10/30/24

[illegible]

Technical drawing of a complex shape, likely a mechanical part, showing dimensions and radii. The overall width is 11'-8" and the overall height is 8'-4". The shape features a central vertical section with a semi-circular top (R = 2'-4") and a horizontal section with a semi-circular top (R = 3'-4"). The drawing includes various other dimensions such as 3'-0", 8", 2'-8", 1'-8", 3'-8", 2'-0", 5'-4", 1'-0", and 5'-4".

[illegible]

Technical drawing of a mechanical part with the following dimensions:

- Overall width: 7'-6"
- Overall height: 12'-9"
- Top left vertical dimension: 7'-5"
- Top right vertical dimension: 5'-0"
- Left side vertical dimension: 8'-0"
- Right side vertical dimension: 7'-9"
- Horizontal dimension from left edge to first vertical line: 3'-0"
- Horizontal dimension between first and second vertical lines: 8"
- Horizontal dimension between second and third vertical lines: 1'-2"
- Horizontal dimension between third and fourth vertical lines: 3'-4"
- Horizontal dimension from fourth vertical line to right edge: 1'-0"
- Vertical dimension from top to first horizontal line: 2'-4"
- Vertical dimension from first horizontal line to second horizontal line: 1'-8"
- Vertical dimension from second horizontal line to third horizontal line: 3'-8"
- Vertical dimension from third horizontal line to fourth horizontal line: 5'-4"
- Vertical dimension from fourth horizontal line to bottom edge: 1'-8"
- Horizontal dimension from left edge to fourth vertical line: 4"
- Horizontal dimension between fourth and fifth vertical lines: 8"
- Horizontal dimension from fifth vertical line to right edge: 1'-0"
- Radius R = 3'-4" (indicated for the upper curved section)
- Radius R = 2'-4" (indicated for the lower curved section)

Technical drawing of a door handle assembly. The drawing shows a vertical handle with a curved top and a tapered base. Dimensions are indicated on the left and bottom. The total height is 6'-0". The top section is 1'-0 3/4" high. The middle section is 1'-9 3/4" high. The bottom section is 1'-0 3/4" high. The base section is 2'-0 3/4" high. The width of the handle is 1'-1". A 3/4" slope is indicated on the tapered base.

Technical drawing of a large 'STOP' sign. The sign is 8'-0" high and 6'-3" wide. The word 'STOP' is rendered in a bold, sans-serif font. Dimensions are provided for the overall sign and the individual letters. The 'S' is 16" wide and 4" high. The 'T' is 16" wide and 4" high. The 'O' is 16" wide and 4" high. The 'P' is 16" wide and 4" high. The 'S' has a 4" gap between the top and bottom curves. The 'T' has a 4" gap between the top and bottom horizontal bars. The 'O' has a 4" gap between the top and bottom curves. The 'P' has a 4" gap between the top and bottom curves. The 'S' has a 4" gap between the left and right curves. The 'T' has a 4" gap between the left and right vertical bars. The 'O' has a 4" gap between the left and right curves. The 'P' has a 4" gap between the left and right curves. The 'S' has a 4" gap between the top and bottom curves. The 'T' has a 4" gap between the top and bottom horizontal bars. The 'O' has a 4" gap between the top and bottom curves. The 'P' has a 4" gap between the top and bottom curves.

Technical drawing of a wooden sign for 'SLOAN'. The sign is 9'-8" wide and 8'-0" high. The letters are 16" high. The dimensions are as follows:

- Overall width: 9'-8"
- Overall height: 8'-0"
- Letter height: 16"
- Letter width (S): 16"
- Letter width (L): 4"
- Letter width (O): 16"
- Letter width (A): 4"
- Letter width (N): 16"
- Letter width (S): 16"
- Letter width (L): 4"
- Letter width (O): 16"
- Letter width (A): 4"
- Letter width (N): 16"
- Letter width (S): 16"
- Letter width (L): 4"
- Letter width (O): 16"
- Letter width (A): 4"
- Letter width (N): 16"

Technical drawing of a 'CRASH' sign. The sign is 12'-0" wide and 8'-0" high. The letters are in a stylized, outlined font. Dimensions are provided for the overall size and the spacing between the letters. The overall width is 12'-0" and the overall height is 8'-0". The spacing between the letters is 4" for the first four letters (C, R, A, S) and 4" 4/4" for the last two letters (H, S). The height of the letters is 16" for the first four letters and 16" for the last two letters. The thickness of the letters is 4".

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'

Diagram illustrating a road layout with a 30' wide road and a 10' wide edge line. The diagram shows a cross-section of a road with a central travel lane and a shoulder. The total width of the road is 30 feet. The shoulder width is 10 feet, and the travel lane width is 20 feet. The edge line is marked on the shoulder.

4 S. F.

22 S. F.

34.5 S. F.

Shldr, if present

6" yellow barrier stripe (See Notes)

4" space between lines

Bands at right angles to pavement

6" yellow center line (See Notes)

2' of driving lane

2' of shoulder

26' to nearest rail

See Advanced Placement Distance table at right

W10-1 

R15-1

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

Diagram illustrating the dimensions and markings for a 12-foot wide roadway. The diagram shows a cross-section of the road with various markings and dimensions:

- 12" min to 30" max**: Dimension for the top section of the road.
- 24"**: Dimension for the first blacked-out section.
- 24"**: Dimension for the second blacked-out section.
- 24"**: Dimension for the third blacked-out section.
- 24"**: Dimension for the fourth blacked-out section.
- Wheel track**: Dimension for the wheel track.
- 30"**: Dimension for the wheel track.
- 12" min to 30" max**: Dimension for the bottom section of the road.
- 30" max**: Dimension for the wheel track.
- 6" min to 15" max**: Dimension for the bottom section of the road.

Labels and dimensions include:

- Curb face**: Points to the left edge of the road.
- 2'x6', 2'x8", 2'x10' or 2'x12' white line**: Points to the white line markings.
- Wheel track**: Points to the wheel track markings.
- ϕ of Roadway**: Points to the centerline of the roadway.

NOTES:

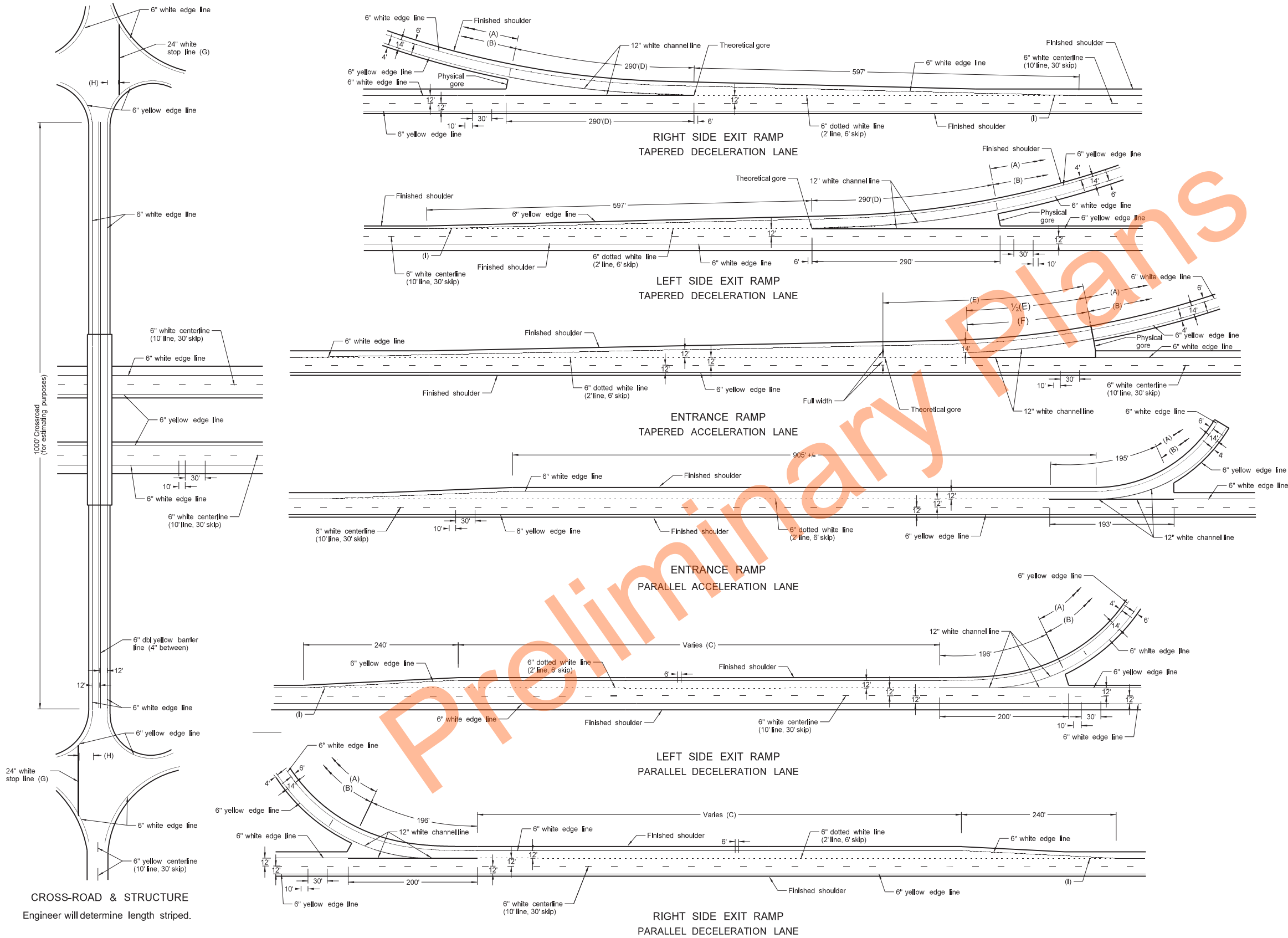
1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

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

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.



INTERSTATE PAVEMENT MARKING
4 LANE DIVIDED HIGHWAY



- 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 distance 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.

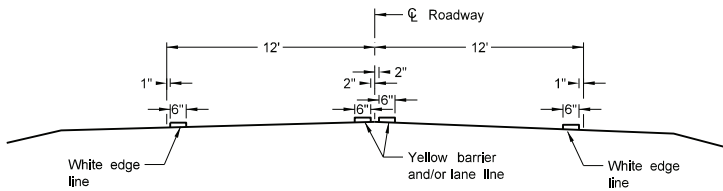
BASIS OF ESTIMATE		
LOCATION	ITEM	
Right or Left Side Exit Ramp TAPERED	12" White channel line	580 LF
	24" White stop line	60 LF
	6" White dotted line	148 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp TAPERED	12" White channel line	390 LF
	6" White dotted line	258 LF
	6" White edge line	1270 LF
Right or Left Side Exit Ramp PARALLEL	6" Yellow edge line	1075 LF
	12" White channel line	398 LF
	24" White stop line	60 LF
	6" White dotted line (C)	258 LF
	6" White edge line	1115 LF
Entrance Ramp PARALLEL	6" Yellow edge line	1075 LF
	12" White channel line	388 LF
	6" White dotted line	283 LF
	6" White edge line	1275 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

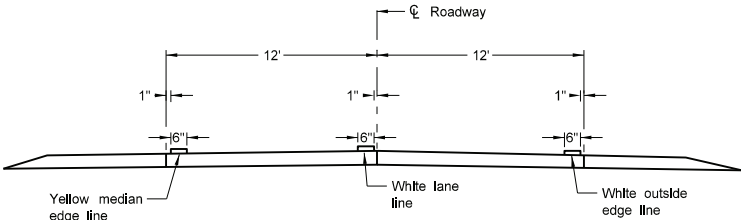


PAVEMENT MARKING

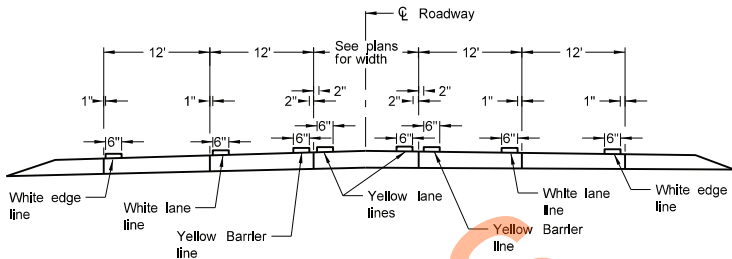
D-762-4



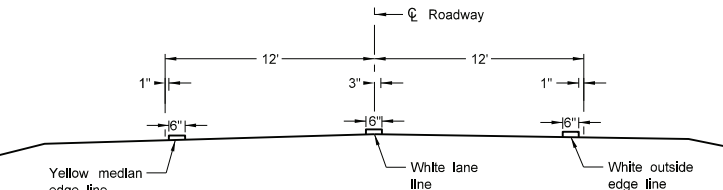
Two Lane Two Way
RURAL ROADWAY



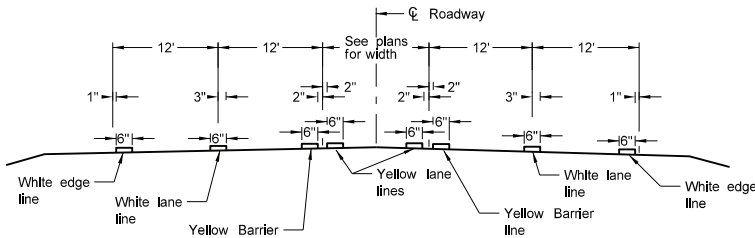
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



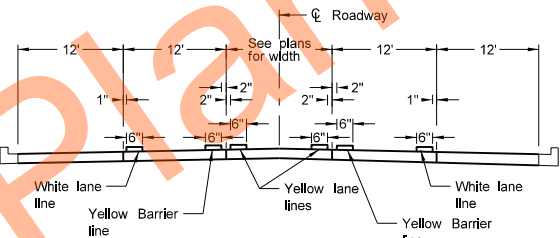
RURAL FIVE LANE ROADWAY
Concrete Section



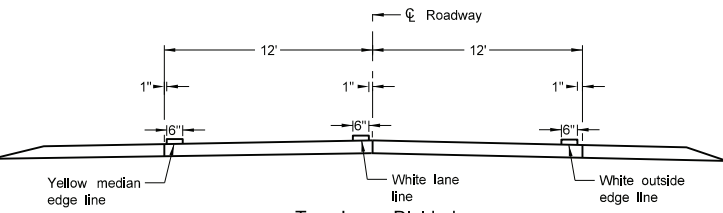
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



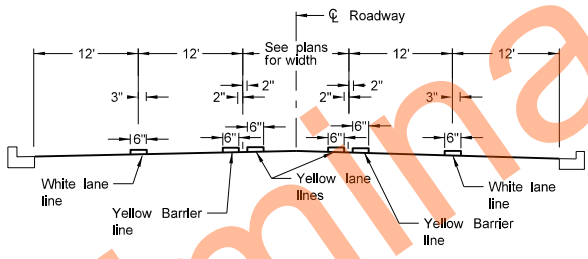
RURAL FIVE LANE ROADWAY
Asphalt Section



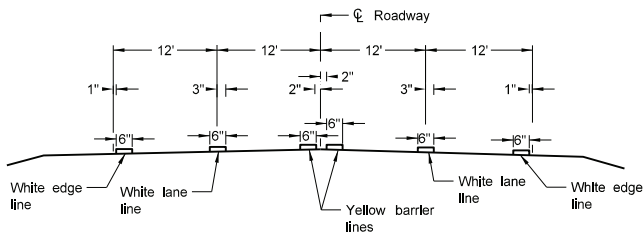
URBAN FIVE LANE SECTION
Concrete Section



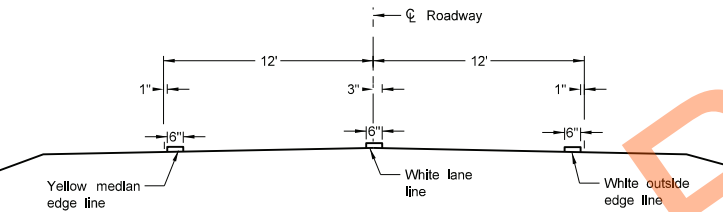
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



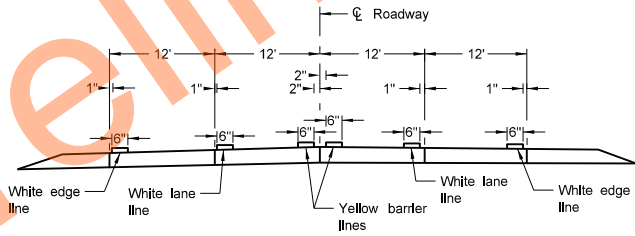
URBAN FIVE LANE SECTION
Asphalt Section



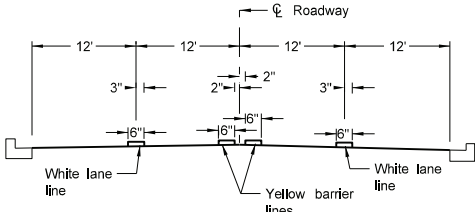
RURAL FOUR LANE ROADWAY
Asphalt Section



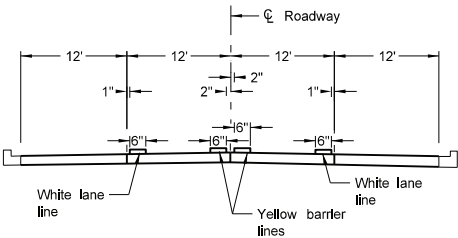
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



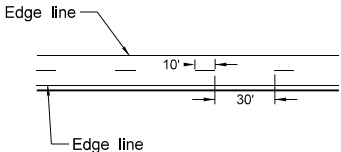
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

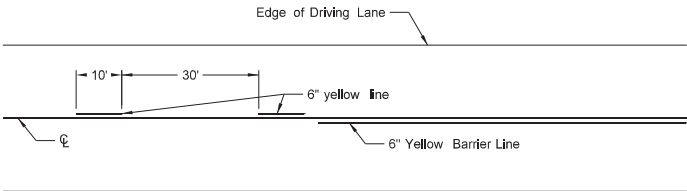
- NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
 2. For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.
 3. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
 3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

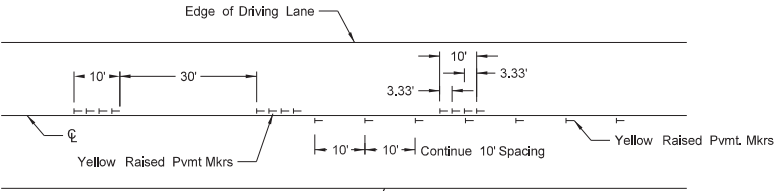


SHORT-TERM PAVEMENT MARKING

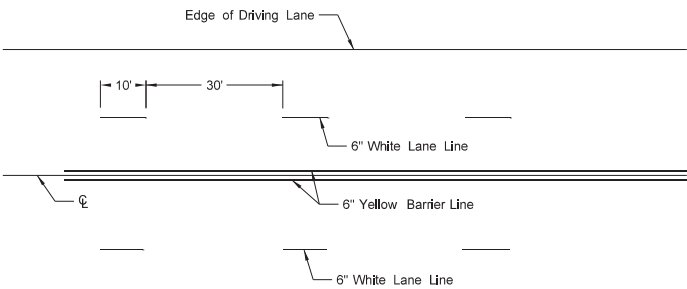
D-762-11



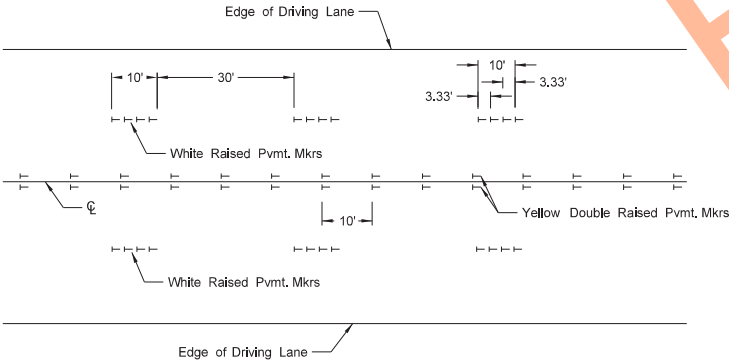
Painted or Tape Lines



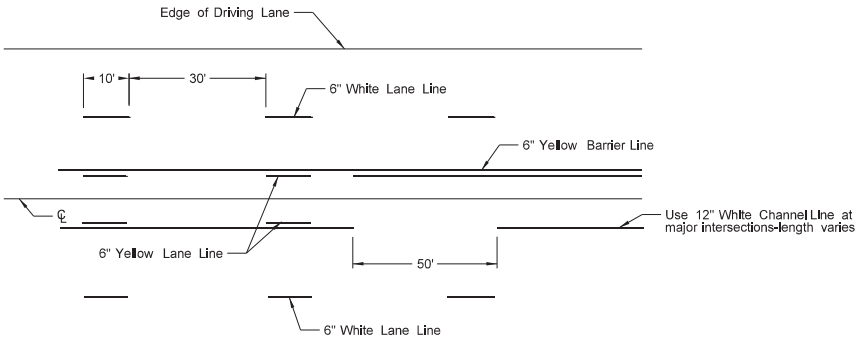
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



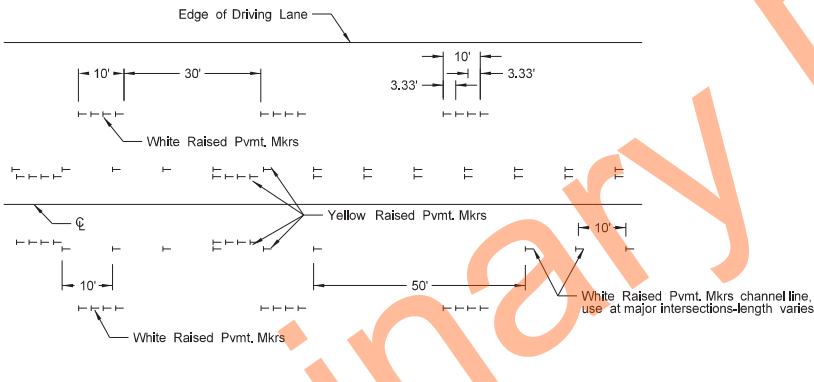
Painted or Tape Lines



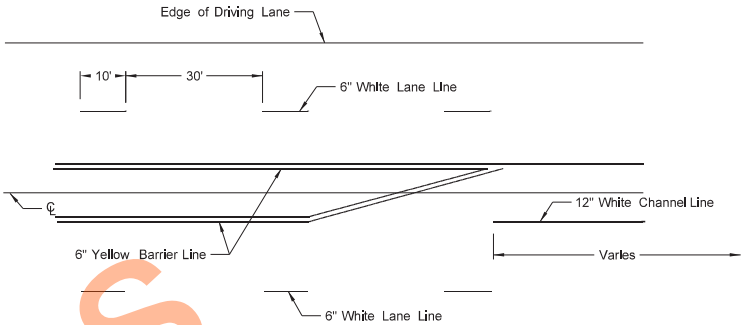
Raised Pavement Markers
FOUR LANE ROADWAY



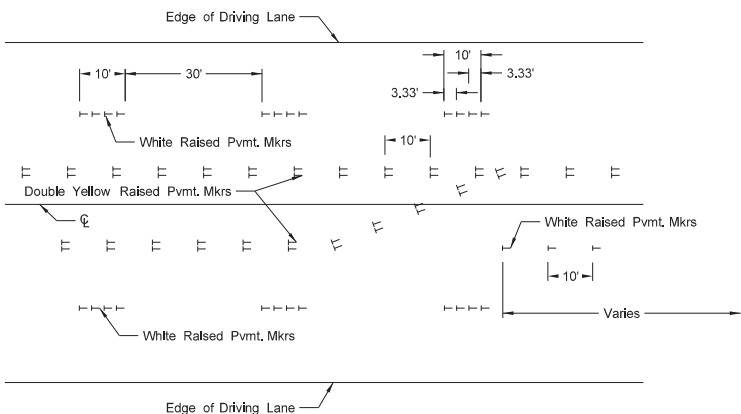
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

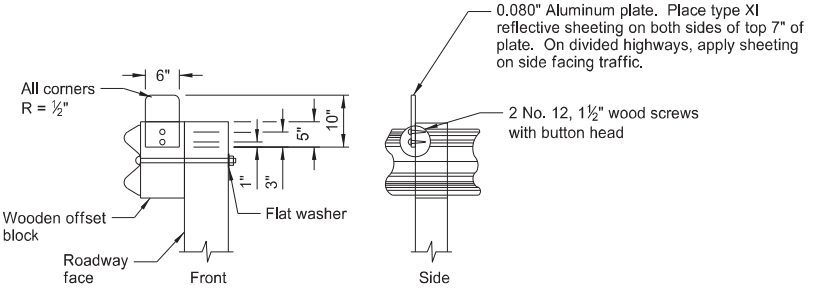
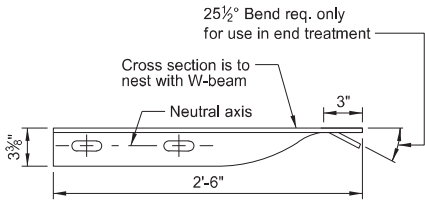
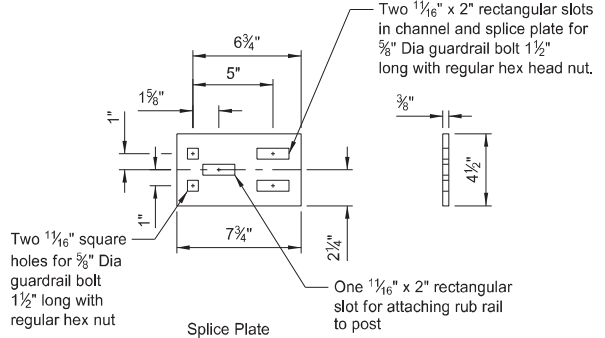
- NOTES:
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
 2. Place short term center line stripe (paint) 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.

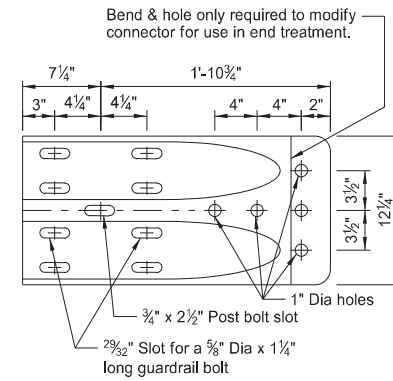
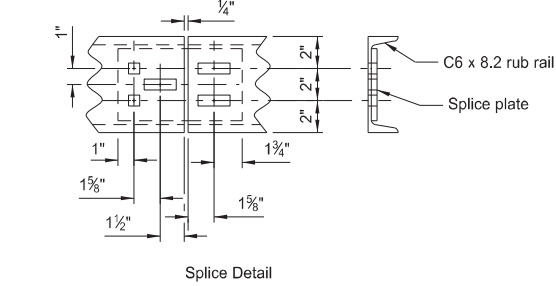


W-BEAM GUARDRAIL GENERAL DETAILS

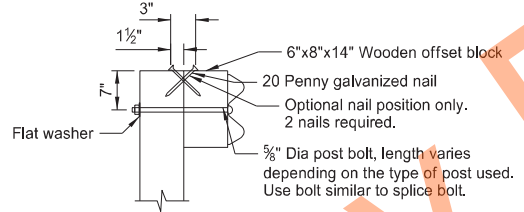
- NOTES:
- Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
 - Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
 - Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
 - Guardrail installation height tolerance = - ¼", + 1".
 - Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1½" is acceptable.



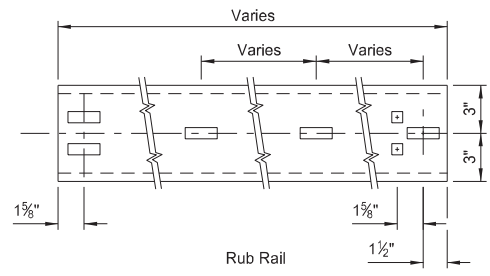
REFLECTORIZED PLATE DETAIL
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



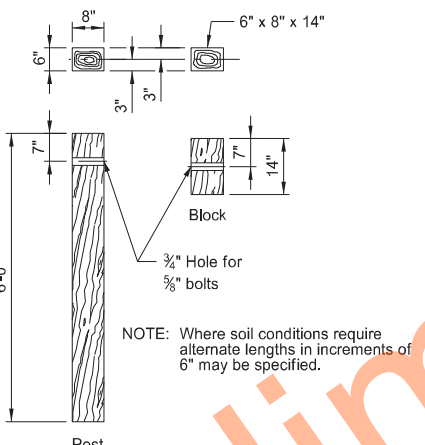
W BEAM TERMINAL CONNECTOR



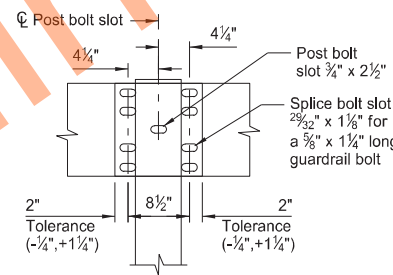
TYPICAL POST ATTACHMENT DETAIL



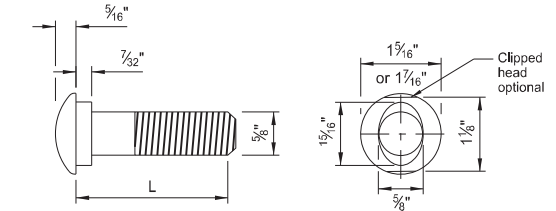
C6x8 RUB RAIL AND SPLICE PLATE



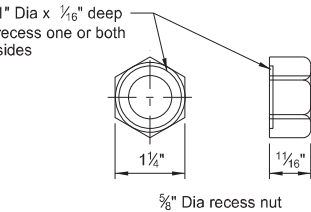
6"x8" TIMBER POST & BLOCK



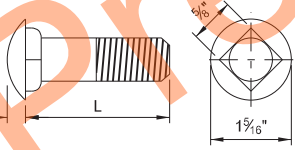
SPLICE DETAIL



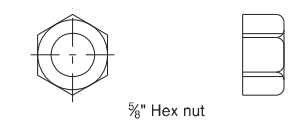
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



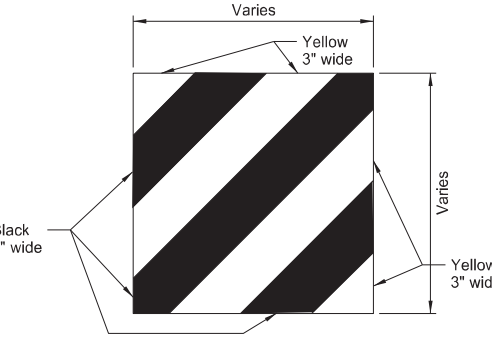
5/8" GUARDRAIL BOLT & RECESS NUT



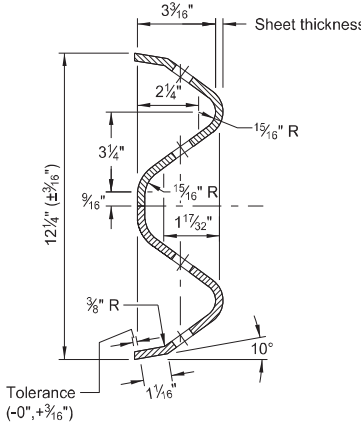
5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length



5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



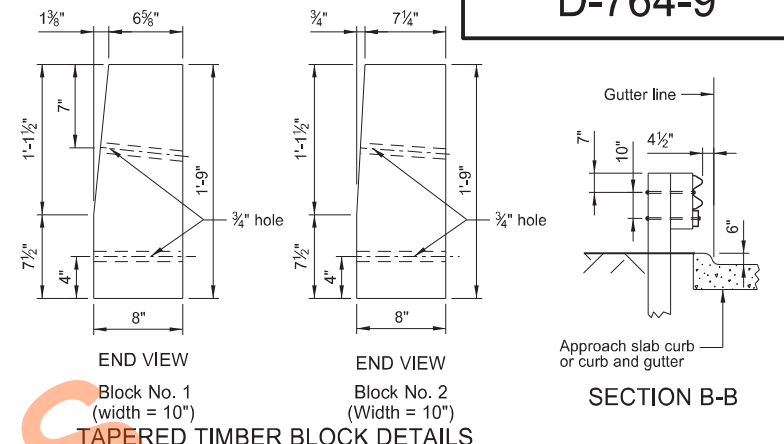
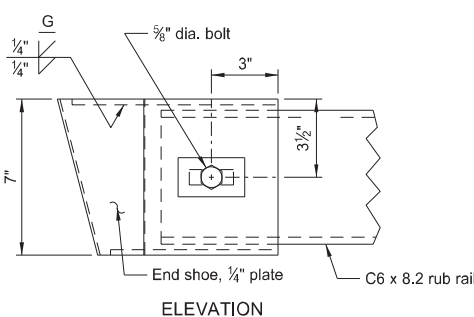
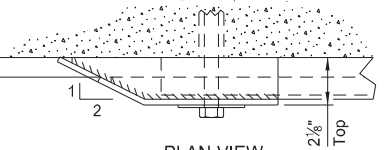
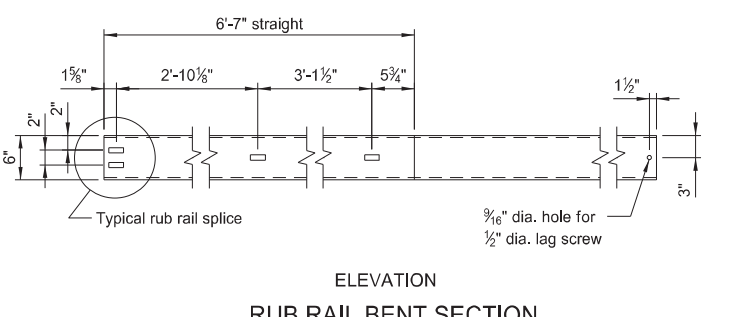
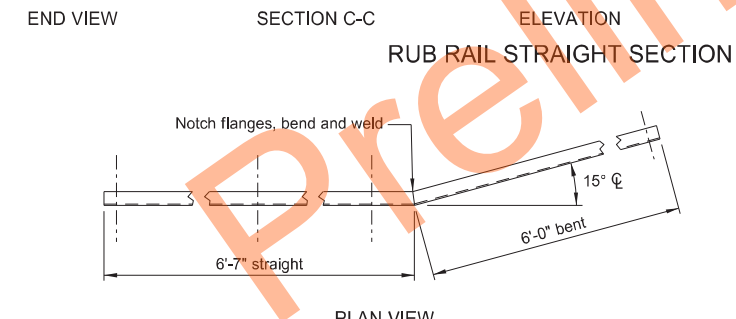
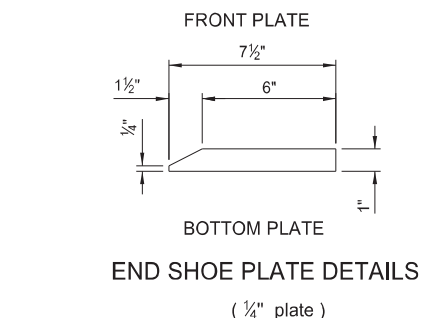
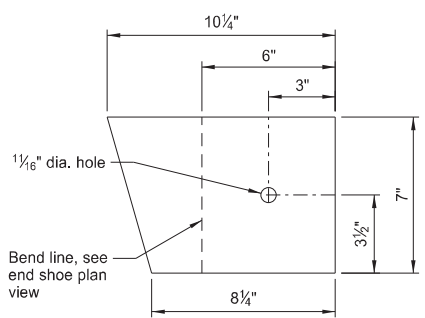
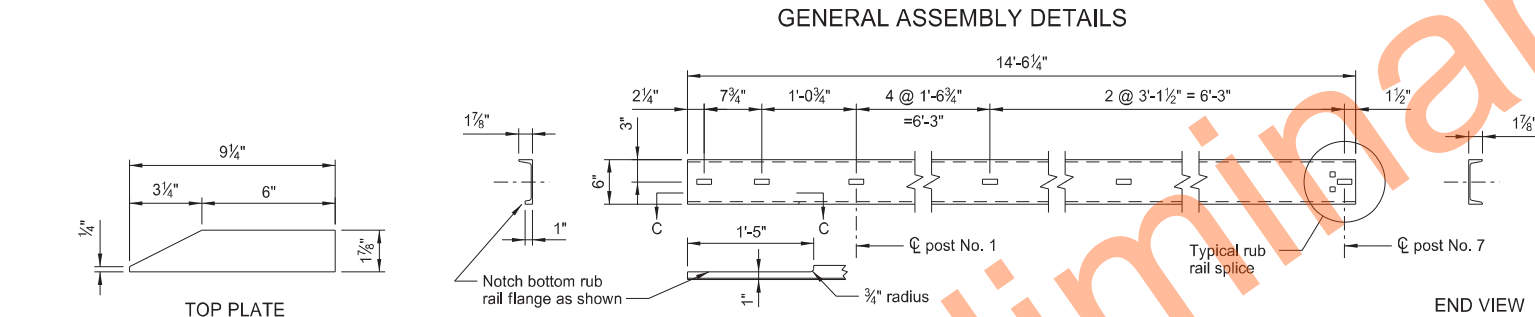
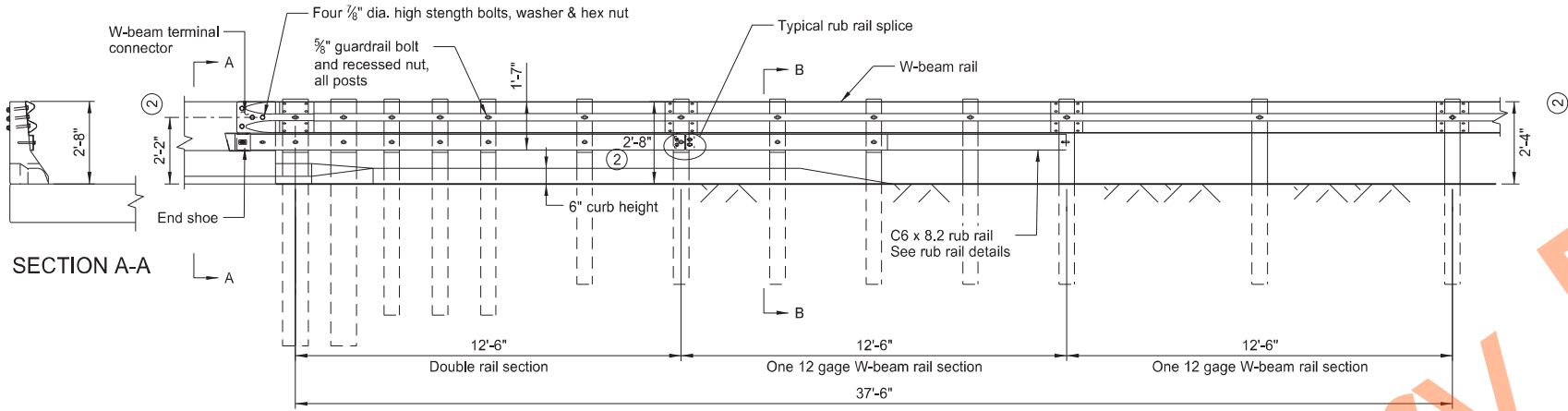
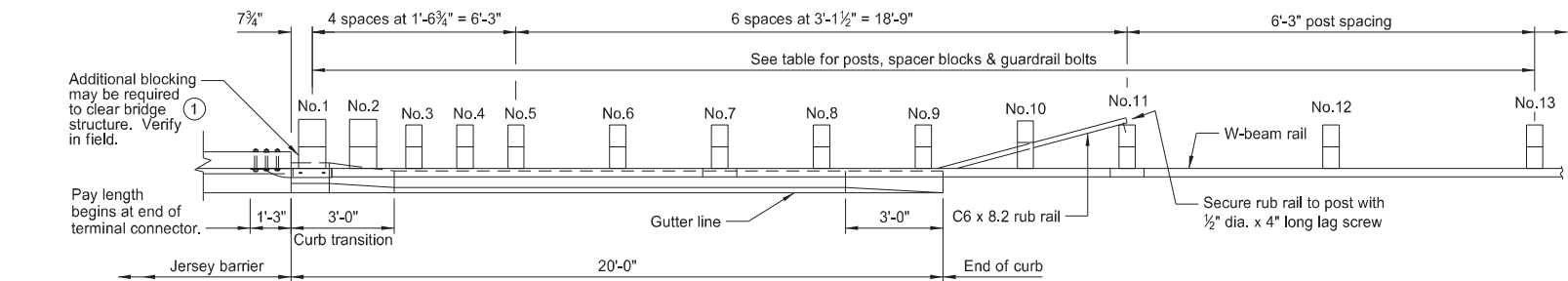
W-BEAM CROSS SECTION

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

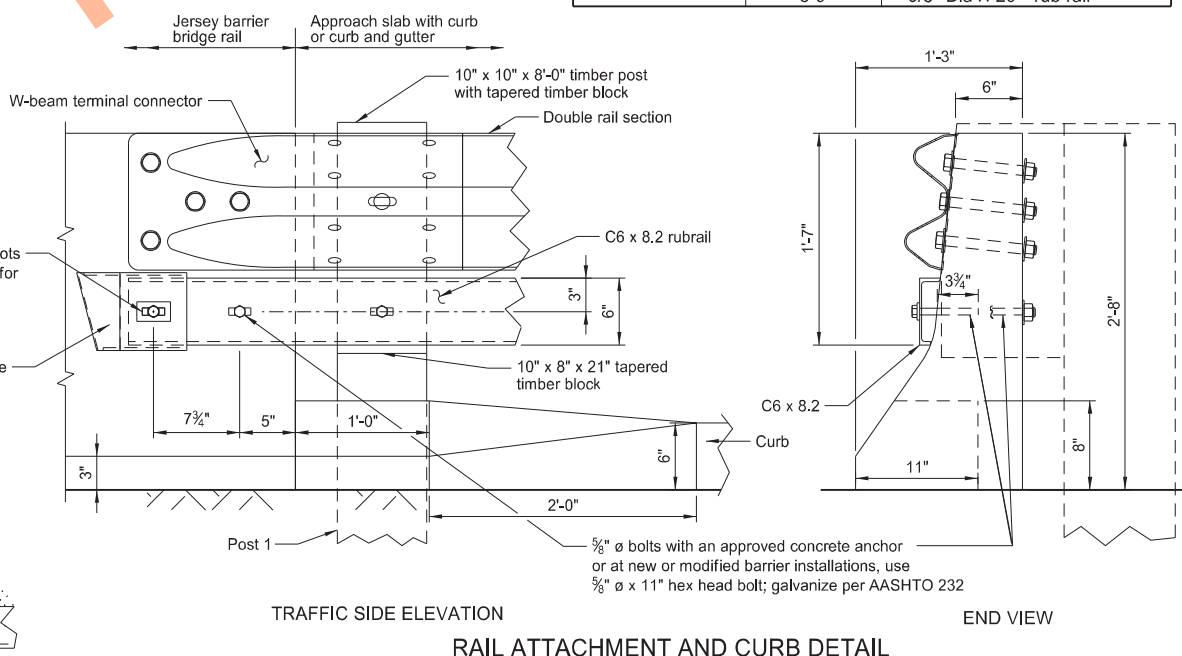
KIRK J. HOFF
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NORTH DAKOTA
12 02 2020

W-BEAM TRANSITION TO CONCRETE JERSEY BARRIER WITH APPROACH CURB

D-764-9



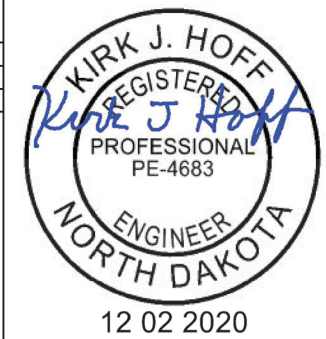
POST, TIMBER BLOCK & BOLT TABLE		
DESCRIPTION	POST NO.	SIZE
Post	1 & 2	10" X 10" X 8'-0" min long
	3-5	6" X 8" X 7'-0" min long
	6-13	6" X 8" X 6'-0" min long
	1-2	10" X 8" X 21" tapered block
Spacer block	3-9	6" X 8" X 21"
	10	6" X 9 3/4" X 14"
	11-13	6" X 8" X 14"
	1 & 2 & 10	5/8" Dia X 20" - guardrail
Guardrail bolt & recessed nut	3-9, 11-13	5/8" Dia X 18" - guardrail
	1-2	5/8" Dia X 22" - rub rail
	3-9	5/8" Dia X 20" - rub rail



- 1 Additional blocking may be required at post No. 1.
2 Height is 2'-8" from 0' to 12'-6" from bridge. Height tapers from 2'-8" to 2'-4" between 12'-6" to 37'-6" from bridge.

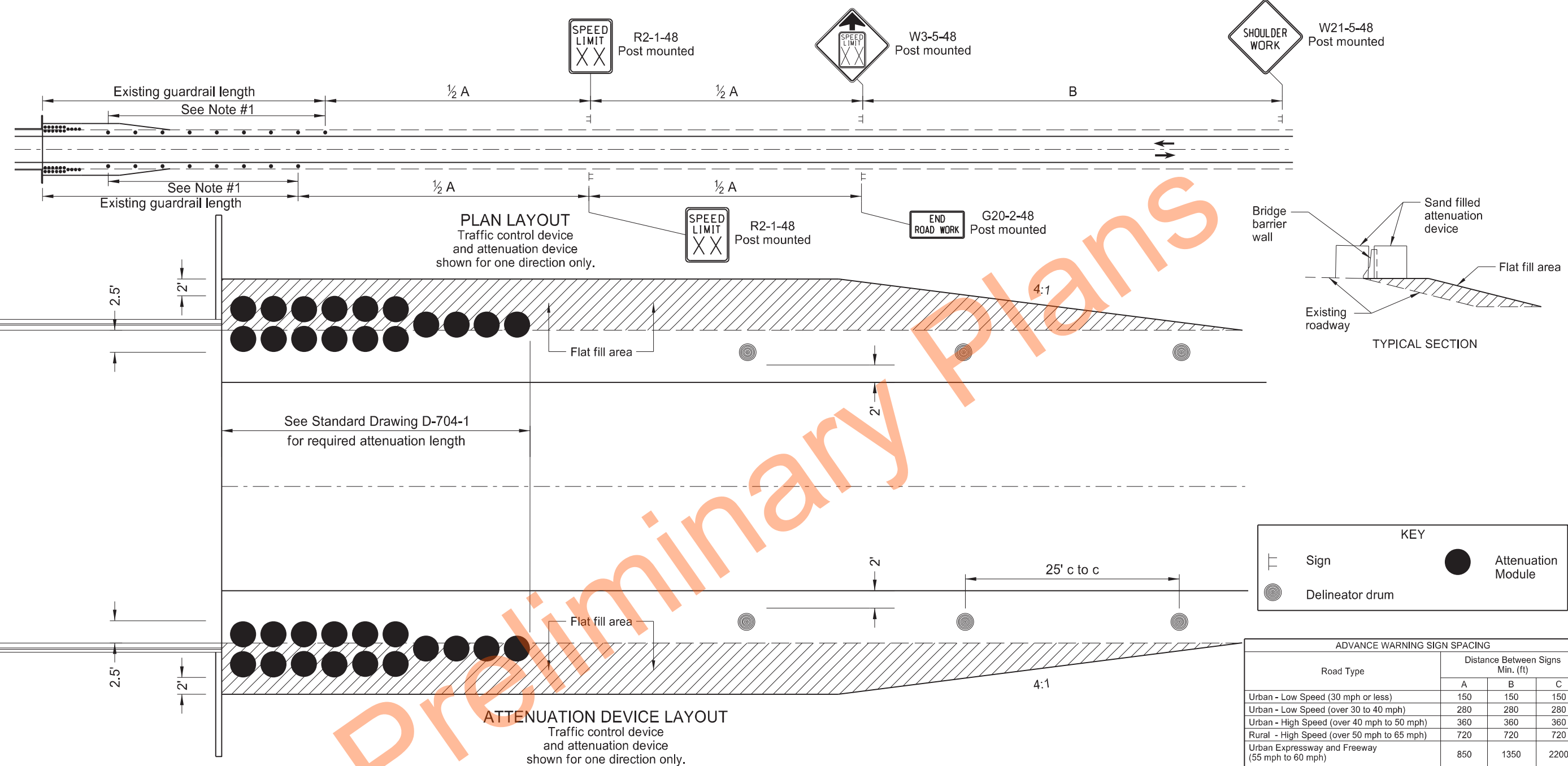
NOTES:
Galvanize all hardware in accordance with AASHTO M232.
Use AASHTO 270M Grade 250 C6 x 8.2 rub rail and structural steel galvanized after fabrication in accordance with AASHTO M111.
All rub rail slotted holes are 1 1/8" x 2".
All rub rail square holes are 1 1/8".
Use timber posts and blocks for the W-beam guardrail.

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



SHORT TERM END TREATMENT FOR BRIDGES
(ATTENUATION DEVICE METHOD)

D-764-20



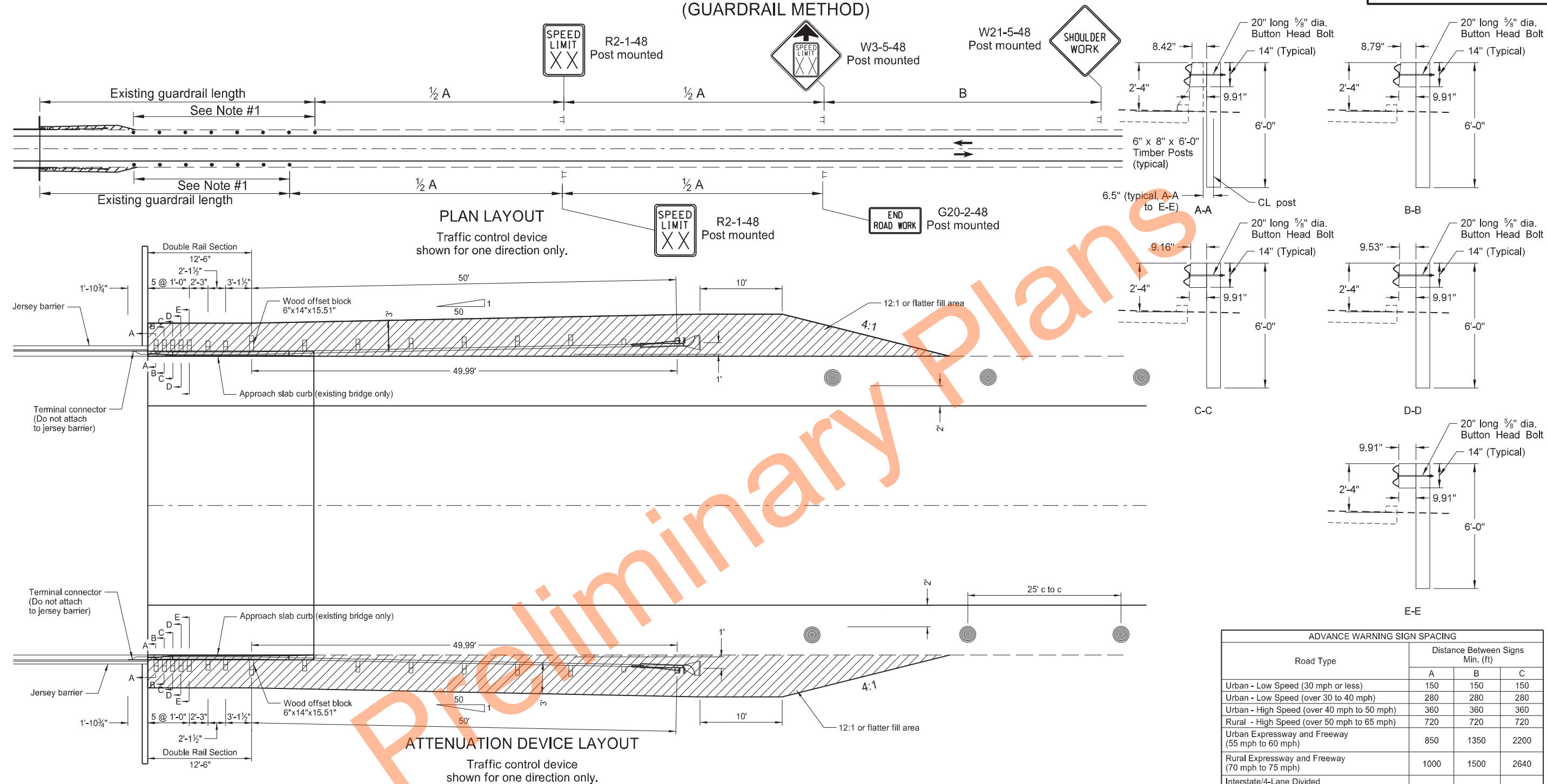
Notes

- When the shoulder width is less than 3', use vertical panels placed as far from the driving lane as possible 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.
- When the bridge is within the construction zone signing, eliminate the reduced speed ahead sign.
- 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 $\frac{1}{2}$ B.
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- Cover existing speed limit signs within a reduced speed zone.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.



SHORT TERM END TREATMENT FOR BRIDGES (GUARDRAIL METHOD)



Notes

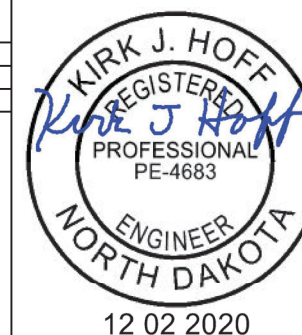
- If the shoulder width is less than 3', use vertical panels placed as far from the driving lane as possible and still be on the finished shoulder. When there is no shoulder, place vertical panels as near as possible to the driving lane on the foreslope of the shoulder.
- If the bridge is within construction zone signing, eliminate the reduced speed ahead sign.
- 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 $\frac{1}{2}$ B.
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- Cover existing speed limit signs within a reduced speed zone.

KEY

- Sign
- Delineator drum

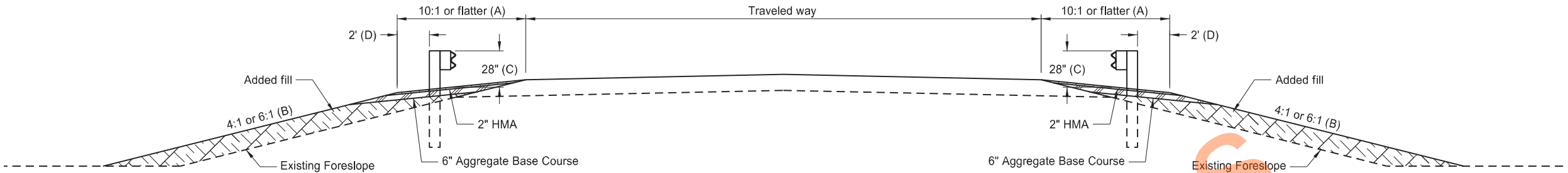
Road Type	ADVANCE WARNING SIGN SPACING Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

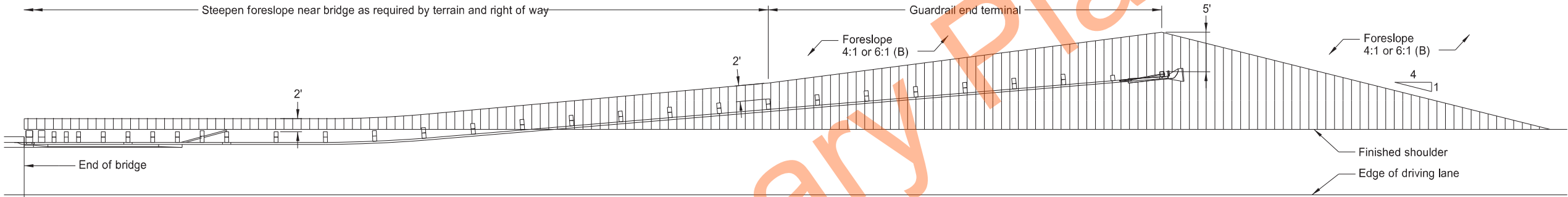


TYPICAL GRADING AT BRIDGE ENDS
WITH W-BEAM GUARDRAIL

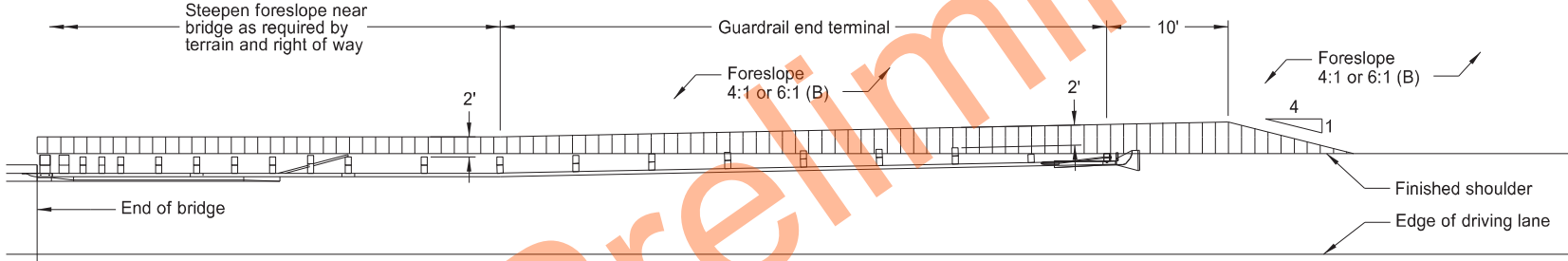
D-764-22



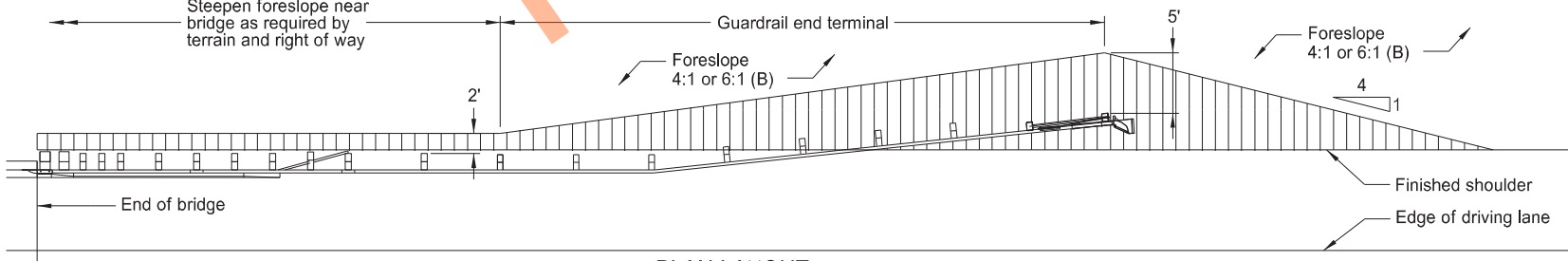
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

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

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

KIRK J. HOFF

REGISTERED

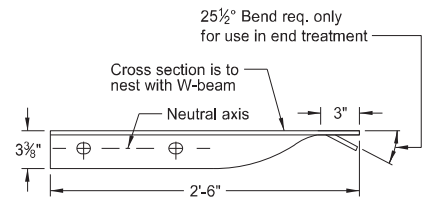
PROFESSIONAL

PE-4683

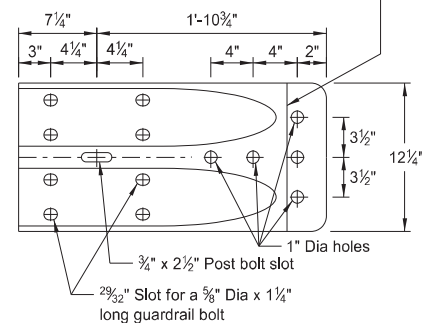
ENGINEER

NORTH DAKOTA

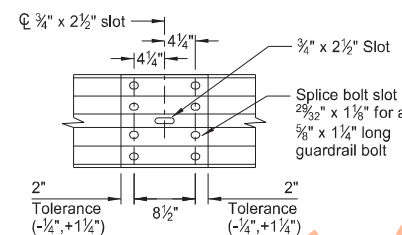
12 02 2020



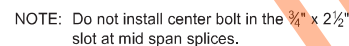
Bend & hole only required to modify connector for use in end treatment.



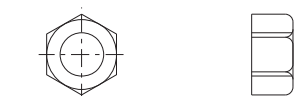
W BEAM TERMINAL CONNECTOR



SPLICE DETAIL

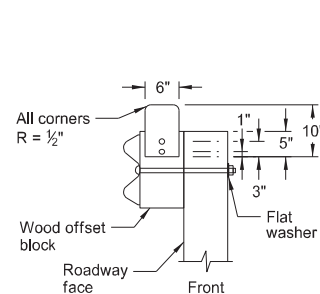


5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

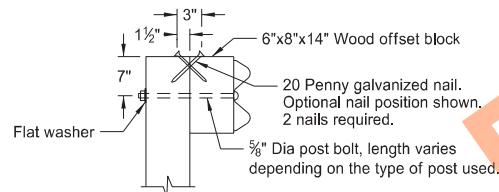


$\frac{5}{8}$ " Dia hex nut

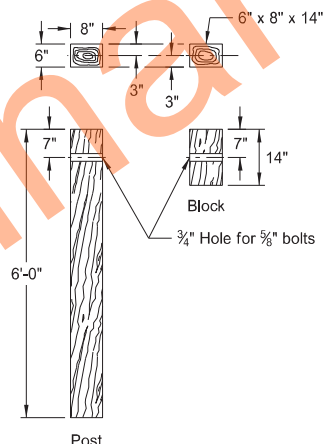
$\frac{5}{8}$ " CARRIAGE BOLT & NUT



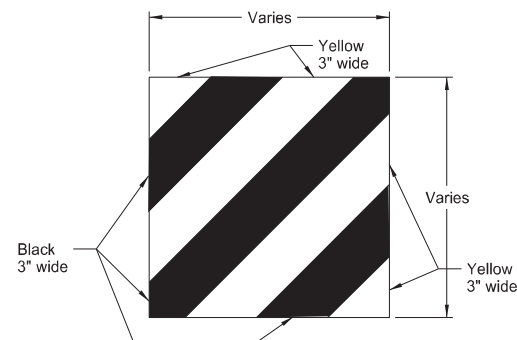
NOTE: Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



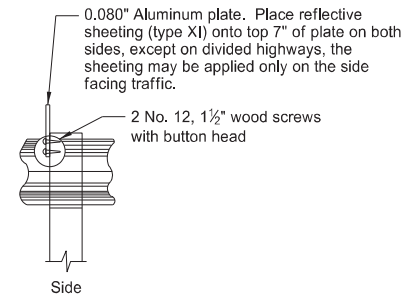
TYPICAL WOOD POST ATTACHMENT DETAIL



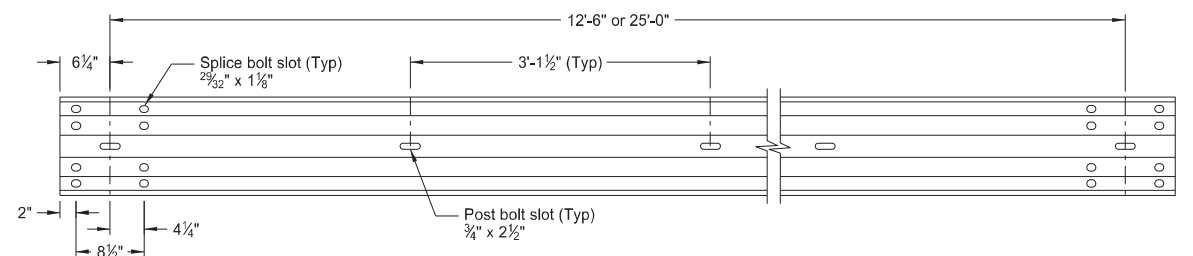
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



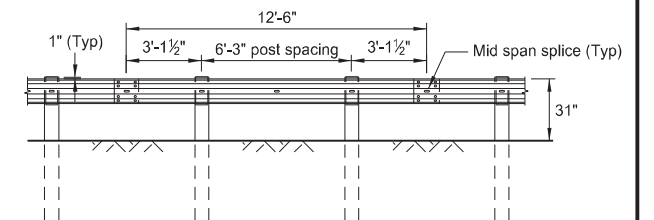
IMPACT HEAD OBJECT MARKER



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



STANDARD MGS GUARDRAIL PANEL

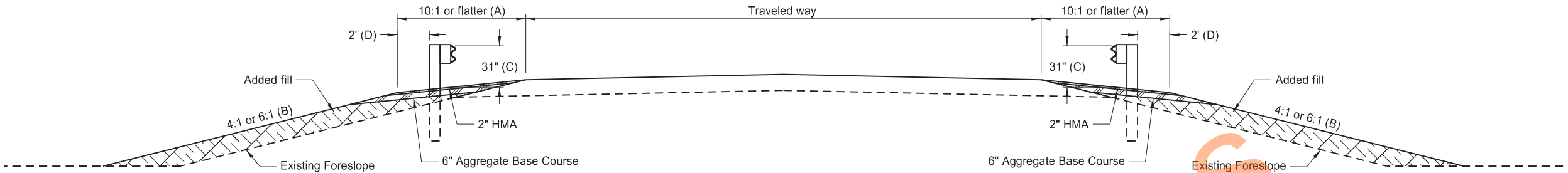


STANDARD MGS GUARDRAIL SYSTEM

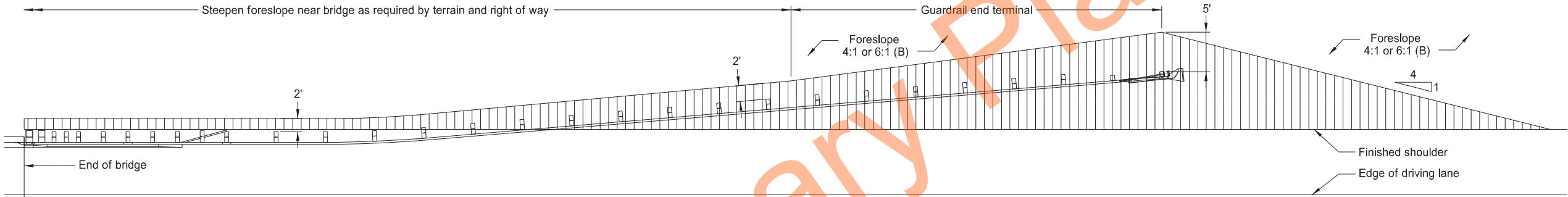
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TYPICAL GRADING AT BRIDGE ENDS
WITH MGS W-BEAM GUARDRAIL

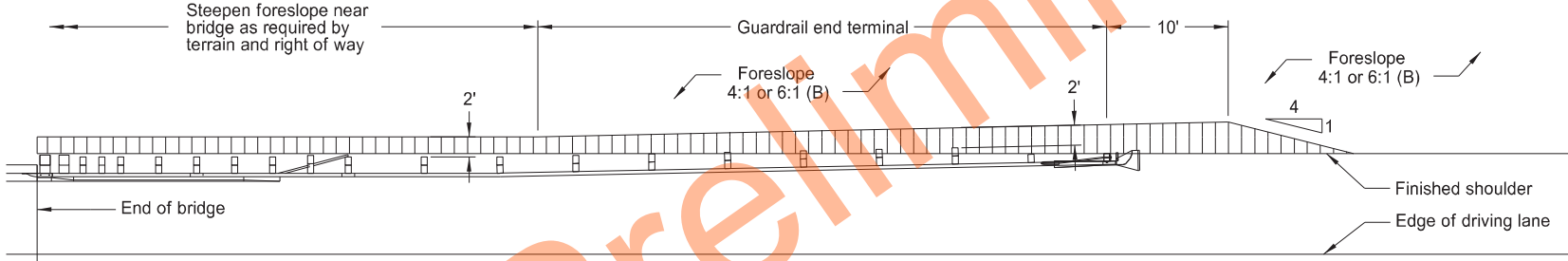
D-764-48



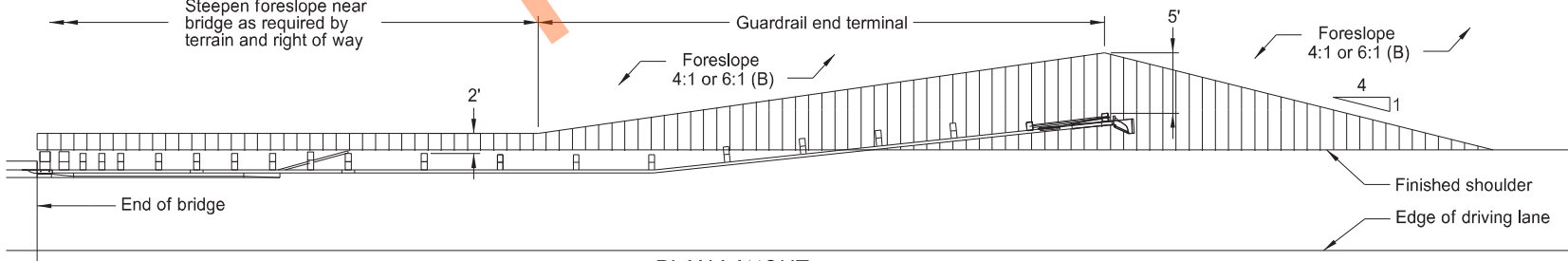
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

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

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

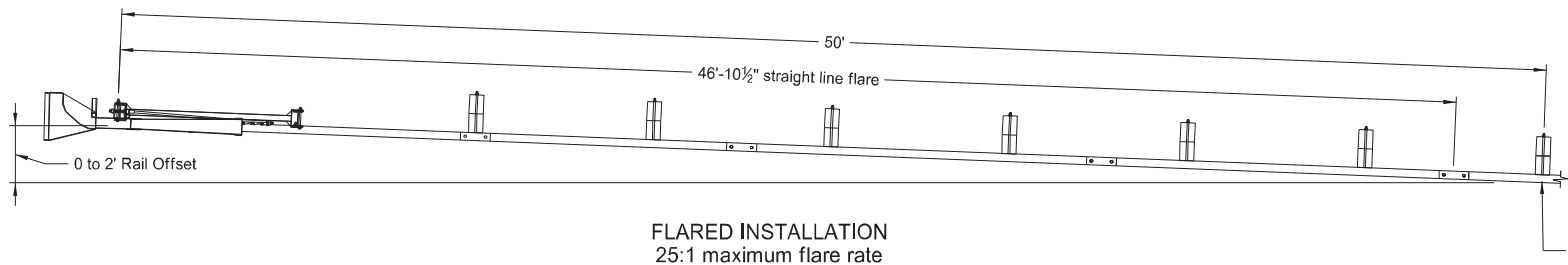
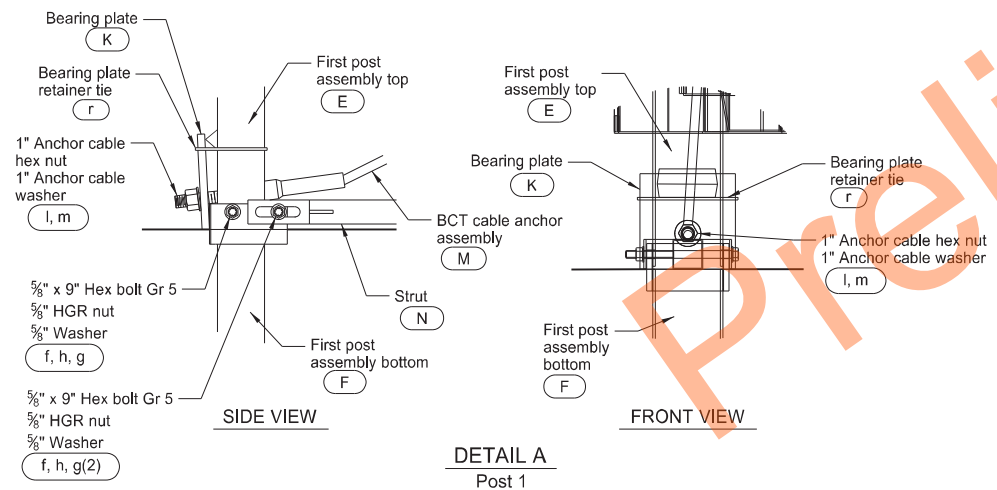
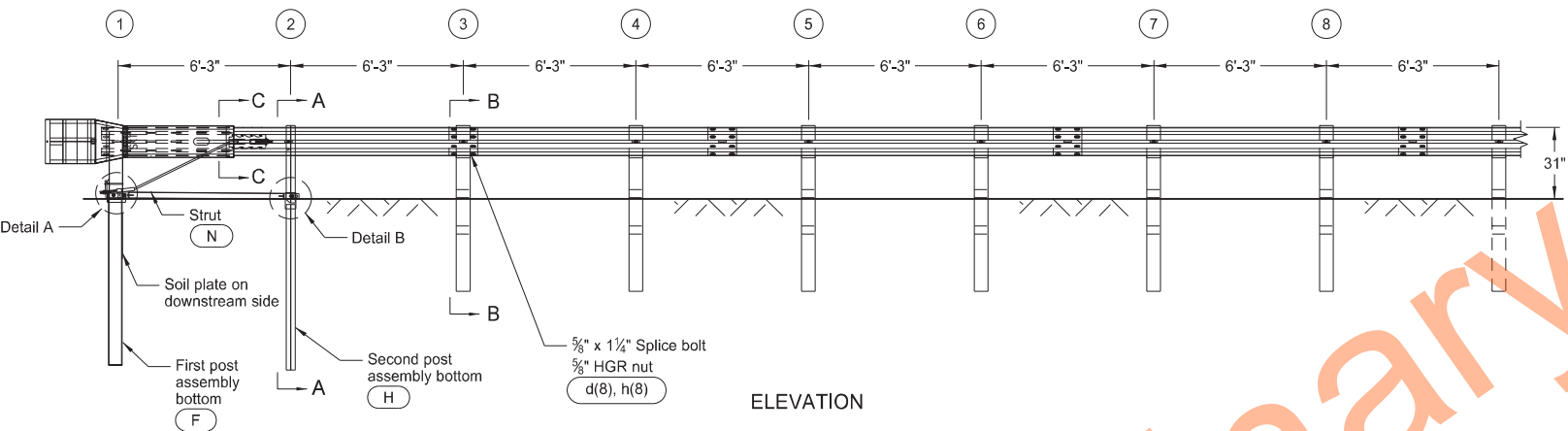
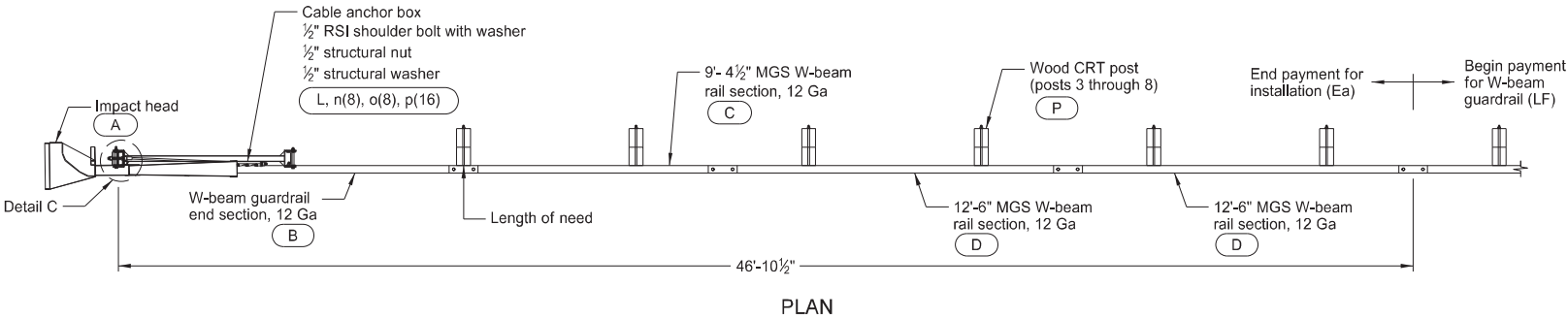
12 02 2020

D-764-50



MASH SEQUENTIAL KINKING TERMINAL - WOOD POST

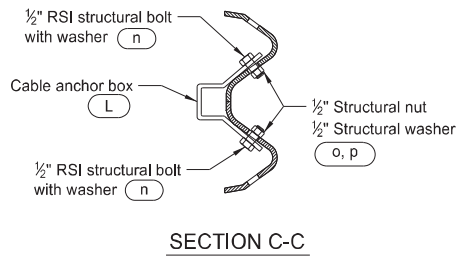
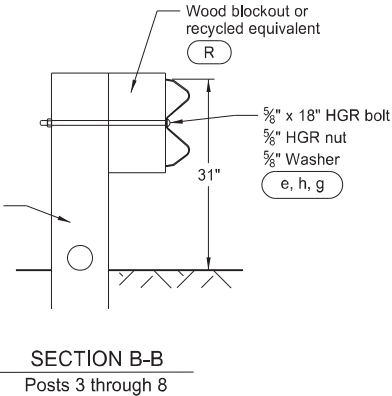
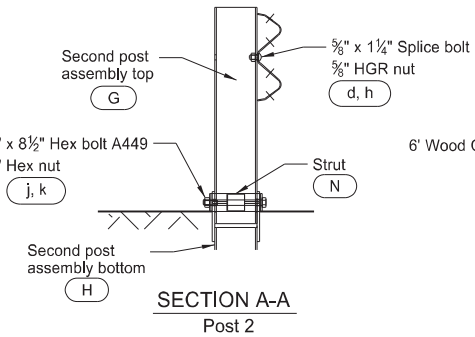
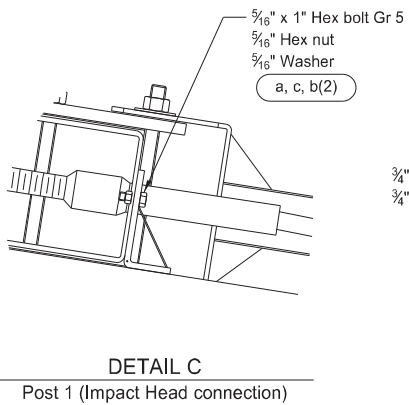
D-764-51



GENERAL NOTES:

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

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

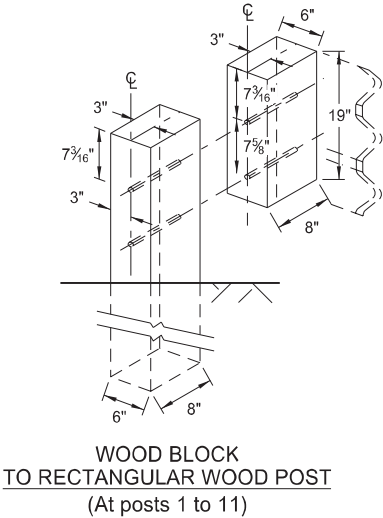
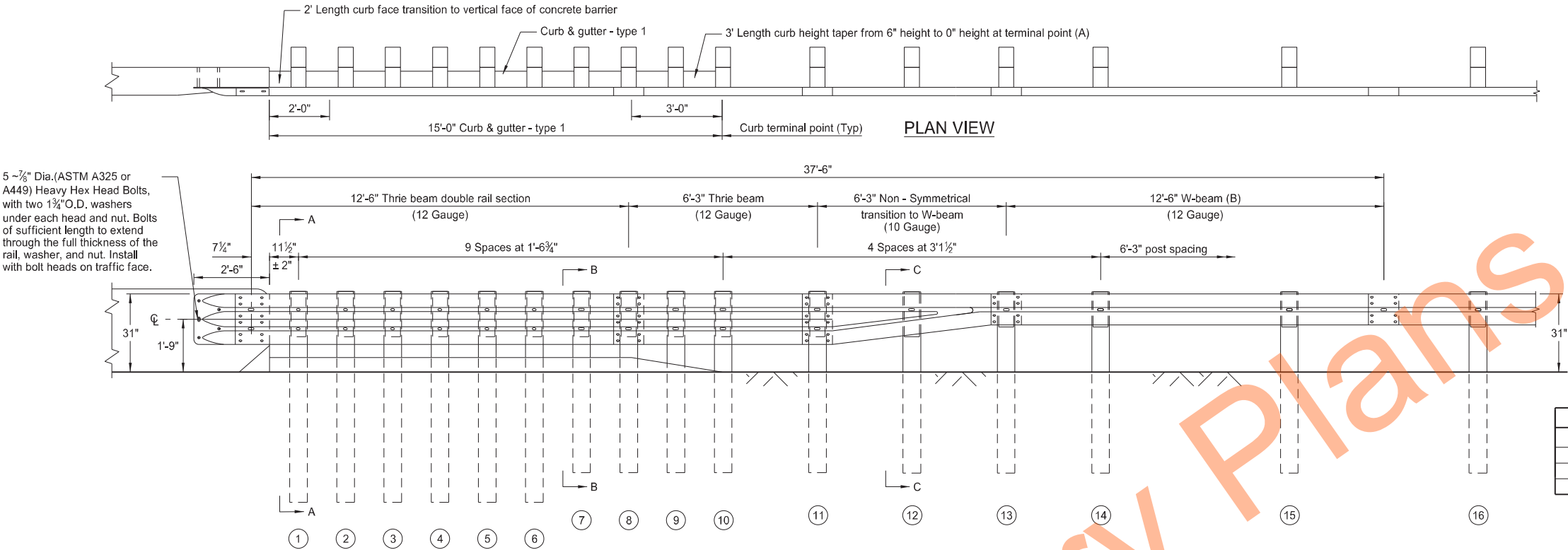


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

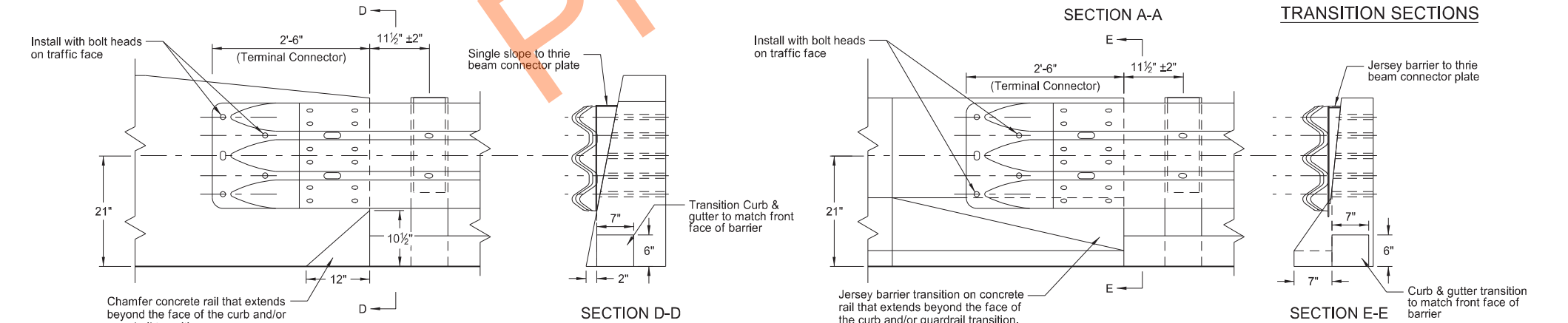
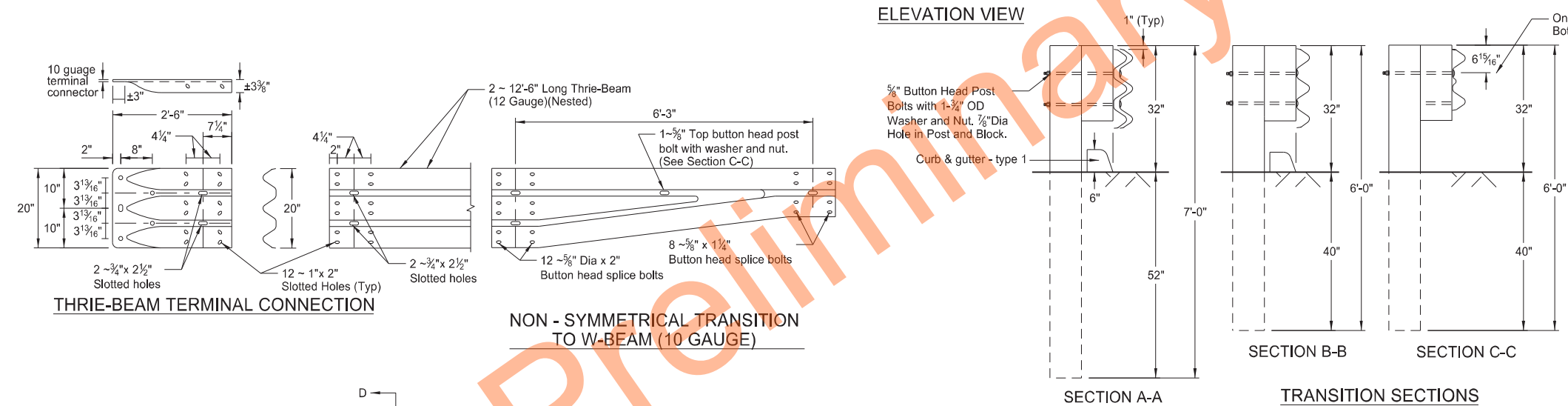


MGS W-BEAM TRANSITION WITH APPROACH CURB TO CONCRETE SINGLE SLOPE OR JERSEY BARRIER

D-764-60



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"



CONNECTION TO CONCRETE SINGLE SLOPE BRIDGE RAIL AND TRAFFIC BARRIERS

CONNECTION TO CONCRETE JERSEY BARRIER BRIDGE RAIL AND TRAFFIC BARRIERS

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

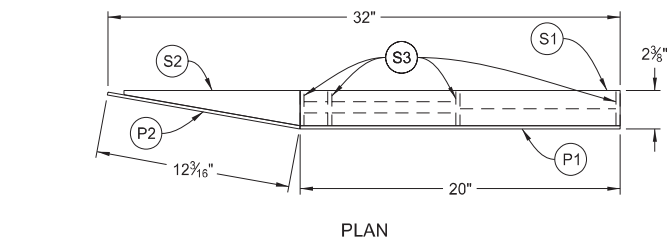
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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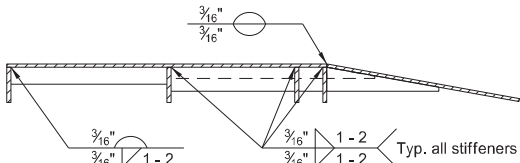
12 02 2020

JERSEY BARRIER TO THRIE BEAM CONNECTOR PLATE DETAILS

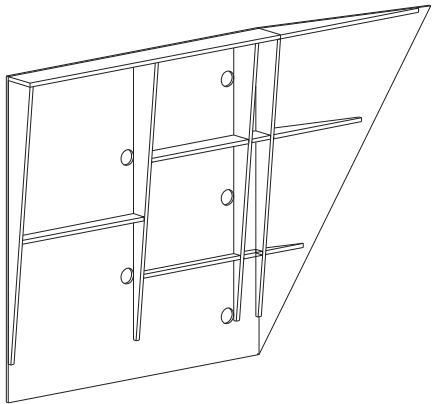
D-764-62



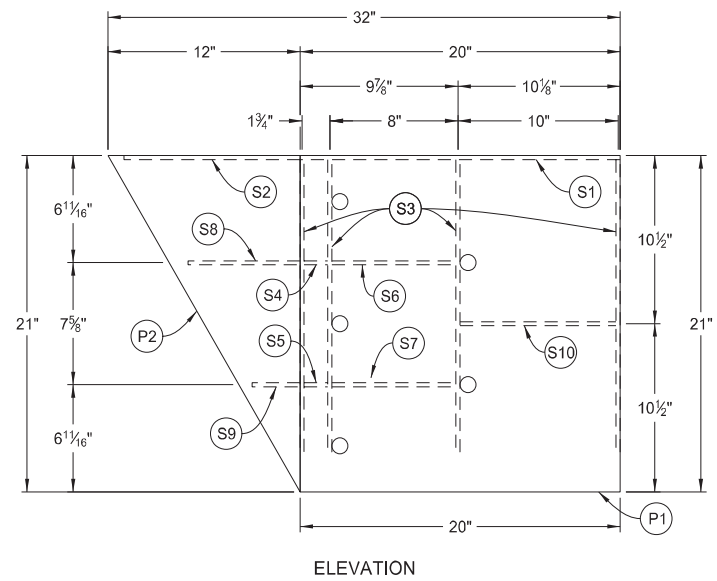
NOTE: Assembly Detail is shown for guardrail installation on right hand side of entrance end of bridge barrier. Mirror for opposite side installation.



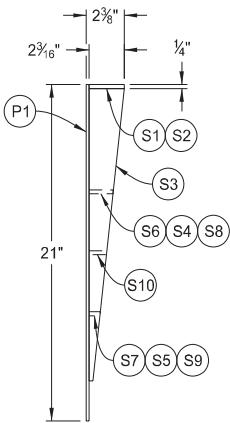
SECTION A-A



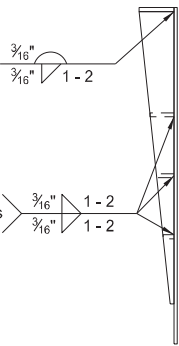
PICTORIAL DRAWING
(Showing Back of Connector Plate)



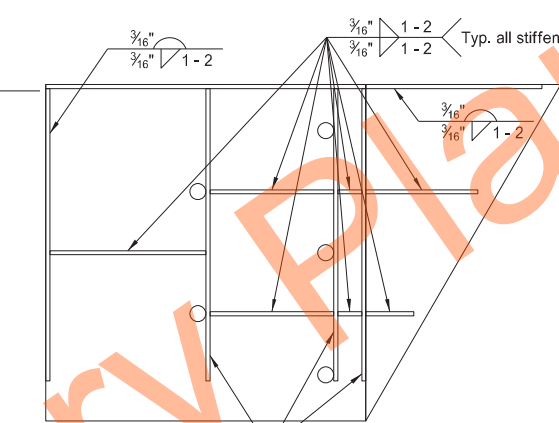
ASSEMBLY DETAIL
(Front View)



END



END



ELEVATION

WELDING DETAIL
(Back View)

WELDING INSTRUCTIONS:

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

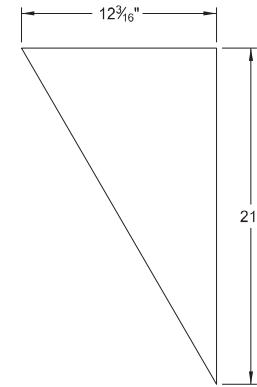


PLATE P2
Quantity: 1

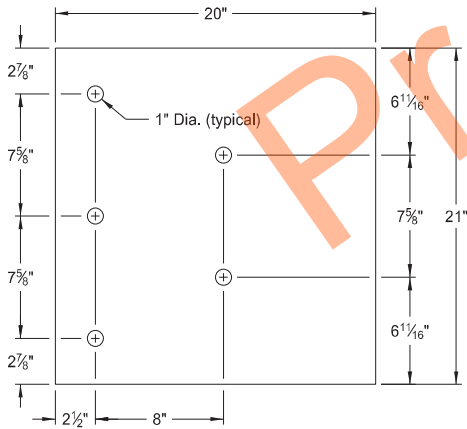
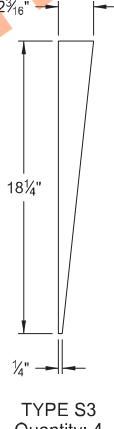


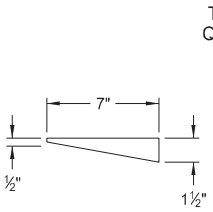
PLATE P1
Quantity: 1

COVER PLATES

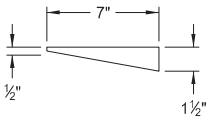


TYPE S3
Quantity: 4

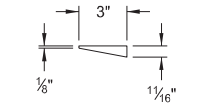
VERTICAL PLATES



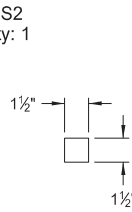
TYPE S2
Quantity: 1



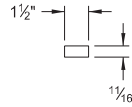
TYPE S8
Quantity: 1



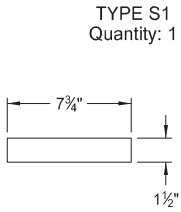
TYPE S9
Quantity: 1



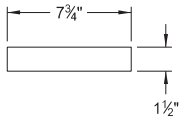
TYPE S4
Quantity: 1



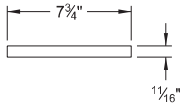
TYPE S5
Quantity: 1



TYPE S1
Quantity: 1

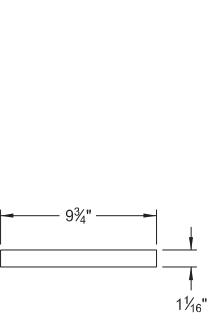


TYPE S6
Quantity: 1



TYPE S7
Quantity: 1

HORIZONTAL PLATES



TYPE S10
Quantity: 1

STIFFENER PLATES

NOTES:

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

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