

DESIGN DATA				
Traffic	Average Daily			
Current 2022	Pass: 12,559	Trucks: 131	Total: 12,690	
Preventive Maintenance				

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NHU-1-083(148)900

Burleigh County
9th Street (Bismarck Expy to Front Street)

Microsurfacing, Pavement Marking

GOVERNING SPECIFICATIONS

Date Published and Adopted
by the North Dakota
Department of Transportation

Standard Specifications

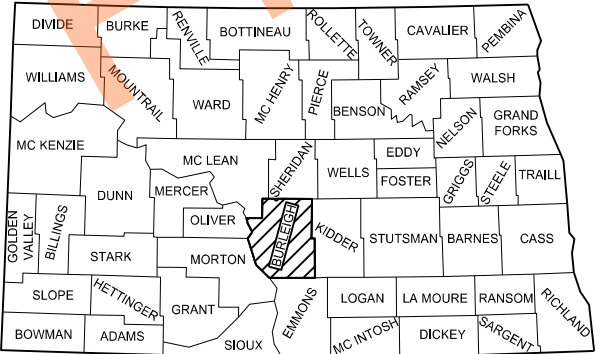
7/1/2024

Supplemental Specifications

NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NHU-1-083(148)900	0.608	0.608

End Project NHU-1-083(148)900
Sta 32+62.2
RP 900.618



Begin Project NHU-1-083(148)900
Sta 0+53.6
RP 900.010

DESIGNER Loren Lee
DESIGNER Luke Nasers
DESIGNER Olivia Tomanek

STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Larry Gangl
02/27/25

NDDOT BISMARCK DISTRICT



TABLE OF CONTENTS						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	NHU-1-083(148)900	2	1
PLAN SECTIONS			LIST OF STANDARD DRAWINGS						
Section	Page(s)	Description	Number	Description					
1	1	Title Sheet	D-101-1, 2,3,4	NDDOT Abbreviations					
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
6	1	Environmental Notes	D-101-20, 21	Line Styles					
8	1	Quantities	D-101-30, 31,32,33	Symbols					
10	1	Basis of Estimate	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
30	1	Typical Sections	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
100	1 - 3	Work Zone Traffic Control	D-704-9	Construction Sign Details - Terminal And Guide Signs					
120	1 - 9	Pavement Marking	D-704-10	Construction Sign Details - Regulatory Signs					
			D-704-11, 11A	Construction Sign Details - Warning Signs					
			D-704-12	Shoulder Closure Tapers					
			D-704-13	Barricade And Channelizing Device Details					
			D-704-14	Construction Sign Punching And Mounting Details					
			D-704-15	Road Closure Layouts					
			D-704-22	Construction Truck And Temporary Detour Layouts					
			D-704-25	Lane Closures On Urban Streets Layouts					
			D-704-26	Miscellaneous Sign Layouts					
			D-704-34	Sign Layout For One Lane Closure					
			D-704-34A	Traffic Control System Lane Shift Between A Lane Closure And An Opposite Lane Closure					
			D-704-50	Portable Sign Support Assembly					
			D-762-1	Pavement Marking Message Details					
			D-762-4	Pavement Marking					
			D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)					
			D-762-6	Pavement Marking for Standard 90 Degree Flared Intersection - (Center Left Turn Lane on Major Road)					
			D-762-11	Short-Term Pavement Marking					
SPECIAL PROVISIONS									
Number	Description								
SP 474(24)	Airport Coordination								

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-083(148)900	6	1

NOTES

- 105-P01

FIRE STATION ACCESS: Maintain access to and from the Fire Station located at 855 East Bismarck Expressway during all phases of construction. Provide 24-hour contact information and daily construction updates to the fire department. The fire station contact numbers will be provided at the pre-job conference.
- 107-500

PAVEMENT SWEEPING: Sweep the roadway adjacent to the construction area at the end of each day. Utilize a vacuum or pickup type sweeper.
- 107-P01

HEIGHT RESTRICTION FOR CONSTRUCTION EQUIPMENT: Equipment is restricted to a height of 16 feet or less due to the Airport restrictions. Equipment height will be measured from the centerline of the roadway.
- 108-P01

PRECONSTRUCTION CONFERENCE: Invite City of Bismarck Fire Department to the Preconstruction Conference.
- 704-100

TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.
- 704-P01

TRAFFIC CONTROL FOR MICROSURFACING: Provide traffic control consisting of a lane closure and flagging.

The maximum work zone length is limited to one day’s production. The length of the work zone includes the daily construction area plus the longitudinal buffer space and does not include tapers.

For estimating purposes, the traffic control device list is based on a 1-mile work zone and the following list:

1. Standard D-704-34

Remove lane closures if no work is scheduled for the following day. Lane closures may remain in place for up to 3 days if weather prevents work from being performed on days when work was scheduled to take place.

The department will pay for all necessary deployed devices, regardless of the number and length of the lane closures.
- 704-P02

OBLITERATION OF PAVEMENT MARKINGS: Obliterate all grooved epoxy and thermoplastic pavement marking before microsurfacing. Obliteration locations are the same as the pavement marking locations in Section 120.
- 762-050

PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement marking items.
- 762-P01

THERMO PLASTIC PAVEMENT MARKING: Groove in all preformed thermo plastic pavement marking.



Estimated Quantities						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	NHU-1-083(148)900	8	1
SPEC	CODE	ITEM DESCRIPTION	UNIT	NHU-1-083(148)900	TOTAL				
103	0100	CONTRACT BOND	L SUM	1	1				
421	0011	AGGREGATE FOR MICROSURFACING TYPE III	TON	206	206				
421	0020	ASPHALT EMULSION FOR MICROSURFACING	GAL	6838	6838				
702	0100	MOBILIZATION	L SUM	1	1				
704	0100	FLAGGING	MHR	200	200				
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1064	1064				
704	1052	TYPE III BARRICADE	EA	11	11				
704	1060	DELINEATOR DRUMS	EA	21	21				
704	1067	TUBULAR MARKERS	EA	60	60				
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1	1				
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	1672	1672				
704	4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1	1				
762	0122	PREFORMED PATTERNED PVTM MK-MESSAGE(GROOVED)	SF	88	88				
762	0420	SHORT TERM 4IN LINE-TYPE R	LF	60	60				
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	2220	2220				
762	0434	SHORT TERM 8IN LINE-TYPE NR	LF	696	696				
762	1255	PREFORMED THERMO PLASTIC PVTM MK 6IN LINE	LF	187	187				
762	1270	PREFORMED THERMO PLASTIC PVTM MK 24IN LINE	LF	143	143				
762	1305	PREFORMED PATTERNED PVTM MK 4IN LINE-GROOVED	LF	2220	2220				
762	1309	PREFORMED PATTERNED PVTM MK 8IN LINE-GROOVED	LF	696	696				
762	1360	PAVEMENT MARKING 4IN LINE-MASKING	LF	30	30				

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-083(148)900	10	1

Material	Unit	Mainline (PCN:24402)		
		Width (ft)	Quantity/Mile	Total
Microsurfacing	SY	45	26,400	16,045
Aggregate for Microsurfacing Type III @ 24 LB/SY	Ton	45	317	193
Asphalt Emulsion for Microsurfacing @ 0.4 GAL/SY	Gal	45	10,560	6,418

Note: See Section 30 for additional miscellaneous Microsurfacing Quantities.

Short Term 4 IN Line-Type NR			
Mainline (PCN:24402)			
Location - Type	Basis	Unit	Quantity
Centerline Skips – 4IN Line	1,320 LF/mile	LF	2,220
1 st Application After Microsurfacing		Total/Application	2,220
		Total	2,220
Short Term 8 IN Line-Type NR			
Mainline (PCN:24402)			
Location - Type	Basis	Unit	Quantity
Solid Line – 8IN Line	5,280 LF/mile	LF	696
1 st Application After Microsurfacing		Total/Application	696
		Total	696

Permanent Pavement Marking		
Mainline (PCN:24402)		
Location - Type	Basis	Quantity
Centerline – Pref. Patt. Pvmt MK 4IN Line – Grooved	Centerline Skips 1,320 LF/mile	2,220 LF
White Cross Walk Line – Pref. Thermo Pl. Pvmt MK 6IN Line	5,280 LF/mile	187 LF
White Solid Lane Line/Dashes – Pref. Patt. Pvmt MK 8IN Line-Grooved	5,280 LF/mile	696 LF
White Stop Bar – Pref. Thermo Pl. Pvmt MK 24IN Line	5,280 LF/mile	143 LF
Message- Pref. Patt. Pvmt MK-Message - Grooved	Straight Arrow 2 EA at 12 SF Right Turn Arrow 3 EA at 16 SF Left Turn Arrow 1 EA at 16 SF	88 SF

Obliteration			
Mainline (PCN:24402)			
Location - Type	Basis	Unit	Quantity
Centerline Skips – 4IN Line	1,320 LF/mile	SF	740
White Cross Walk – 6IN Line	5,280 LF/Mile	SF	94
White Solid Line – 8IN Line	5,280 LF/Mile	SF	464
White Stop Bar – 24IN Line	5,280 LF/Mile	SF	286
Messaging – Arrows	Straight Arrow 2 EA at 12 SF Right Turn Arrow 3 EA at 16 SF Left Turn Arrow 1 EA at 16 SF	SF	88
		Total	1672

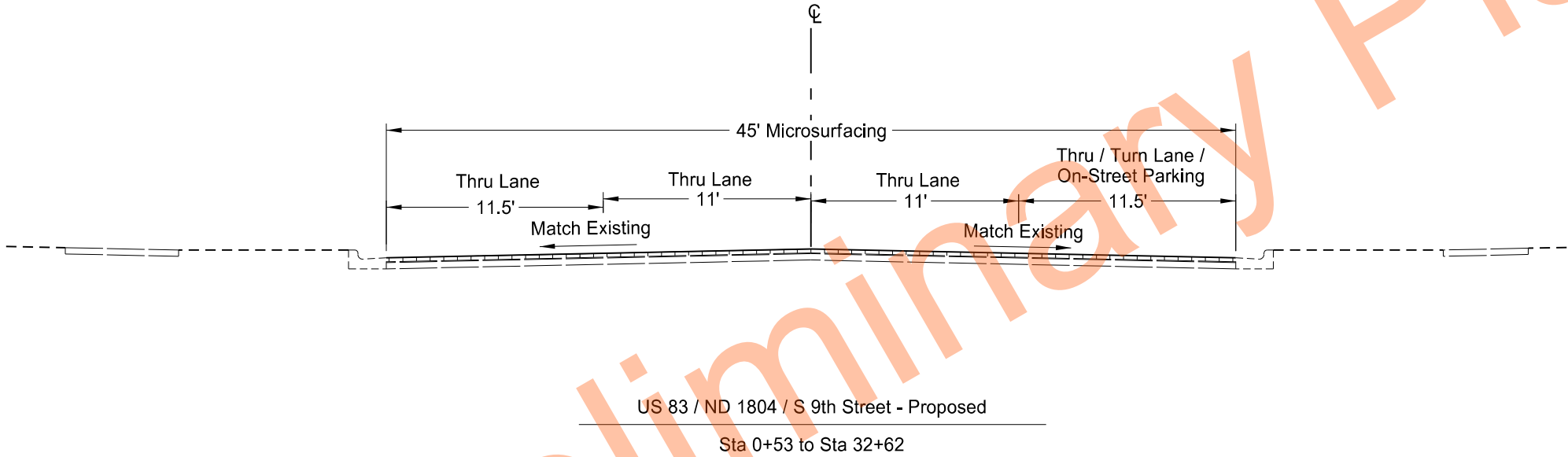


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-083(148)900	30	1

Additional Microsurfacing Quantity for Intersections:
Arbor Ave - 380 SY
E Indiana Ave - 100 SY
E Bowen Ave - 280 SY
E Sweet Ave - 290 SY

Totals:
Aggregate for Microsurfacing Type III @ 24 LB/SY = 13 Tons

Asphalt Emulsion for Microsurfacing @ 0.4 GAL/SY = 420 Gallons



Typical Section

9th Street - Bismarck Expressway to Front Ave

REGISTERED PROFESSIONAL ENGINEER

BRENT M. FLAA

PE-27989

DATE 02/27/25

NORTH DAKOTA

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES	1	28	28
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)	1	18	18
G20-2-48	48"x24"	END ROAD WORK	2	26	52
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW	7	36	252
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	59	118
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)	2	30	60
R2-1-48	48"x60"	SPEED LIMIT __	4	39	156
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	4	10	40
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT	1	35	35
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	2	35	70
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT	2	35	70
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or __ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or __ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	48"x48"	ROAD WORK AHEAD or __ FT or __ MILE	2	35	70
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or __ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or __ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or __ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or __ MILE	2	35	70
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	5	5	25
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or __ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or __ MILE		35	

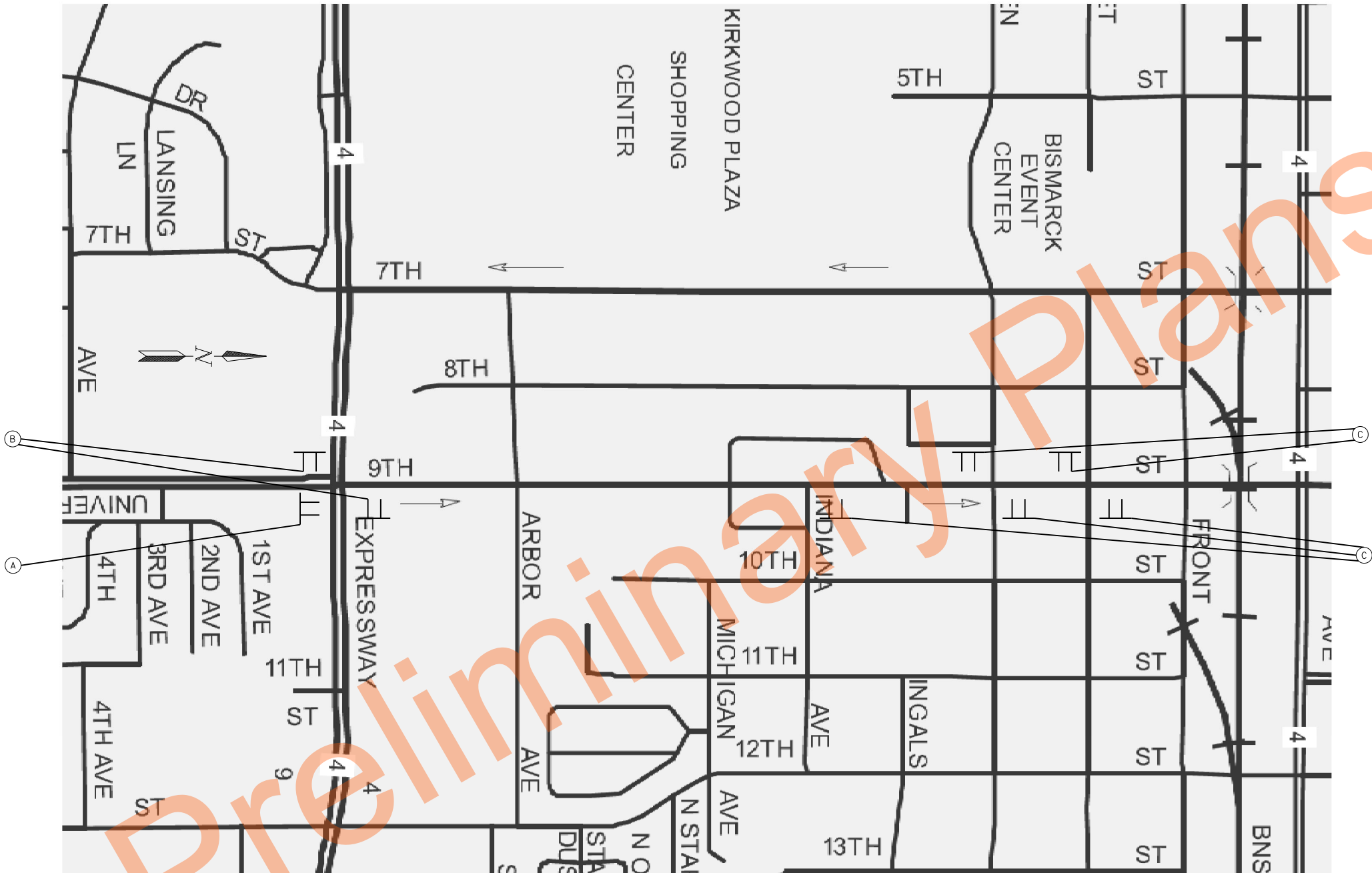
[illegible]

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	200
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	11
704-1060	DELINEATOR DRUMS	EACH	21
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	60
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	1
704-1500	OBLITERATION OF PVMT MK	SF	1672
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	2220
762-0434	SHORT TERM 8IN LINE-TYPE NR	LF	696

A circular professional engineer seal for the State of North Dakota. The outer ring contains the text "REGISTERED PROFESSIONAL ENGINEER" at the top and "NORTH DAKOTA" at the bottom. In the center, the name "BRENT M. FLAA" is printed above the license number "PE-27989". Below the license number, the word "DATE" is printed above the date "02/27/25". A handwritten signature is scrawled across the center of the seal, overlapping the name and license number.

VERSION: 11.21.2022

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-083(148)900	100	2



Sign Group **(A)**

ROAD WORK
NEXT 00 MILES

NO WORK
IN PROGRESS
WORK
IN PROGRESS

SPEED LIMIT ENFORCED
MINIMUM FEE \$40
NO WORKERS PRESENT

G20-1a-60 G20-1b-60 G20-55-96

Sign Group **(B)**

ROAD
WORK
AHEAD

ROAD WORK
NEXT 00 MILES

ROAD WORK
NEXT 00 MILES

W20-1-48 G20-52a(L/R)-72

Sign Group **(C)**

ROAD WORK
NEXT 00 MILES

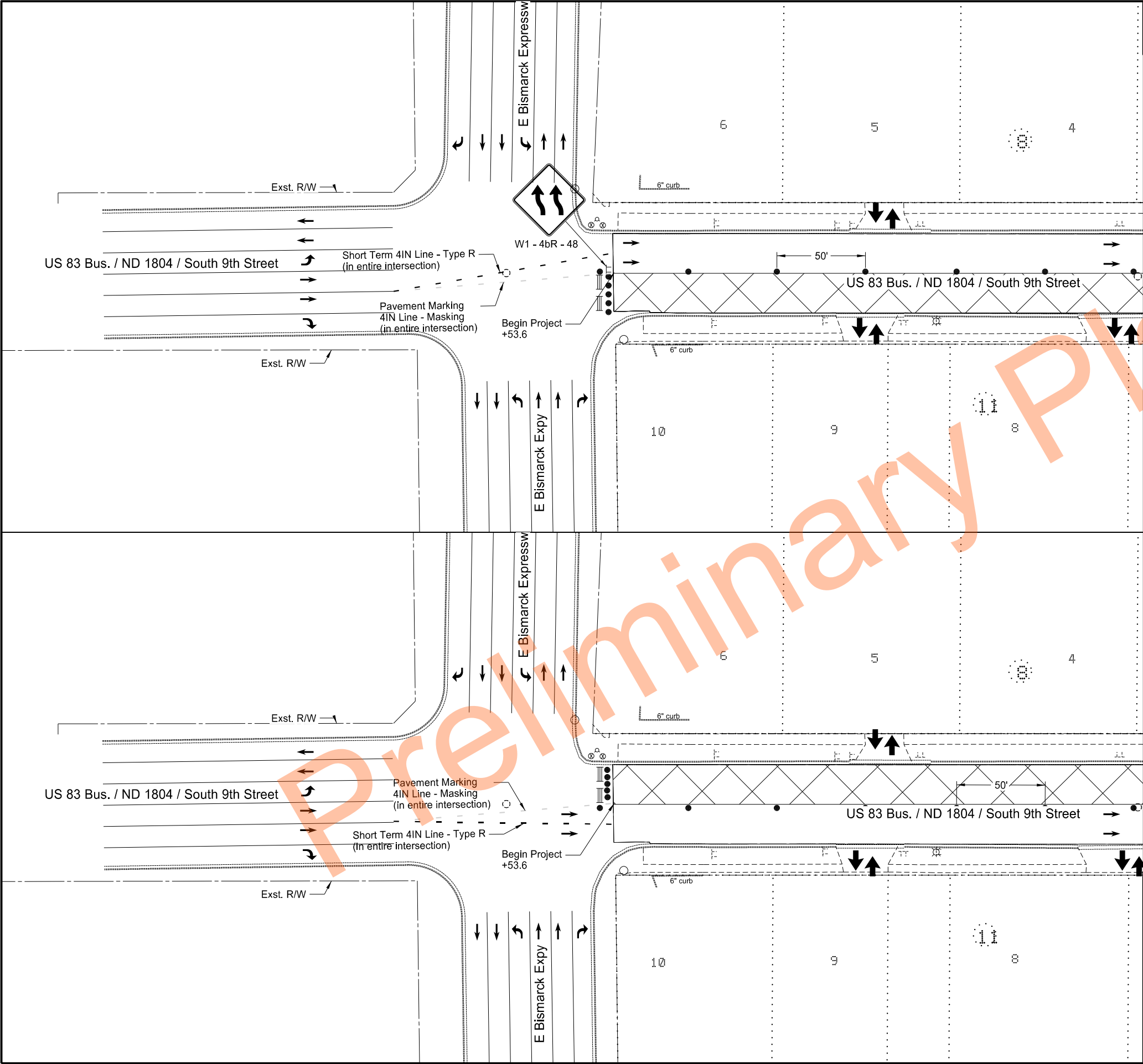
ROAD WORK
NEXT 00 MILES

G20-52a(L/R)-72

Traffic Control

9th St
Bismarck Expressway to Front Ave





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-083(148)900	100	3

SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	420	SHORT TERM 4IN LINE-TYPE R White Centerline Mini Skip	60	LF
762	1360	PAVEMENT MARKING 4IN LINE-MASKING White Centerline Mini Skip	30	LF

9th Street - Bismarck Expressway to Front Ave

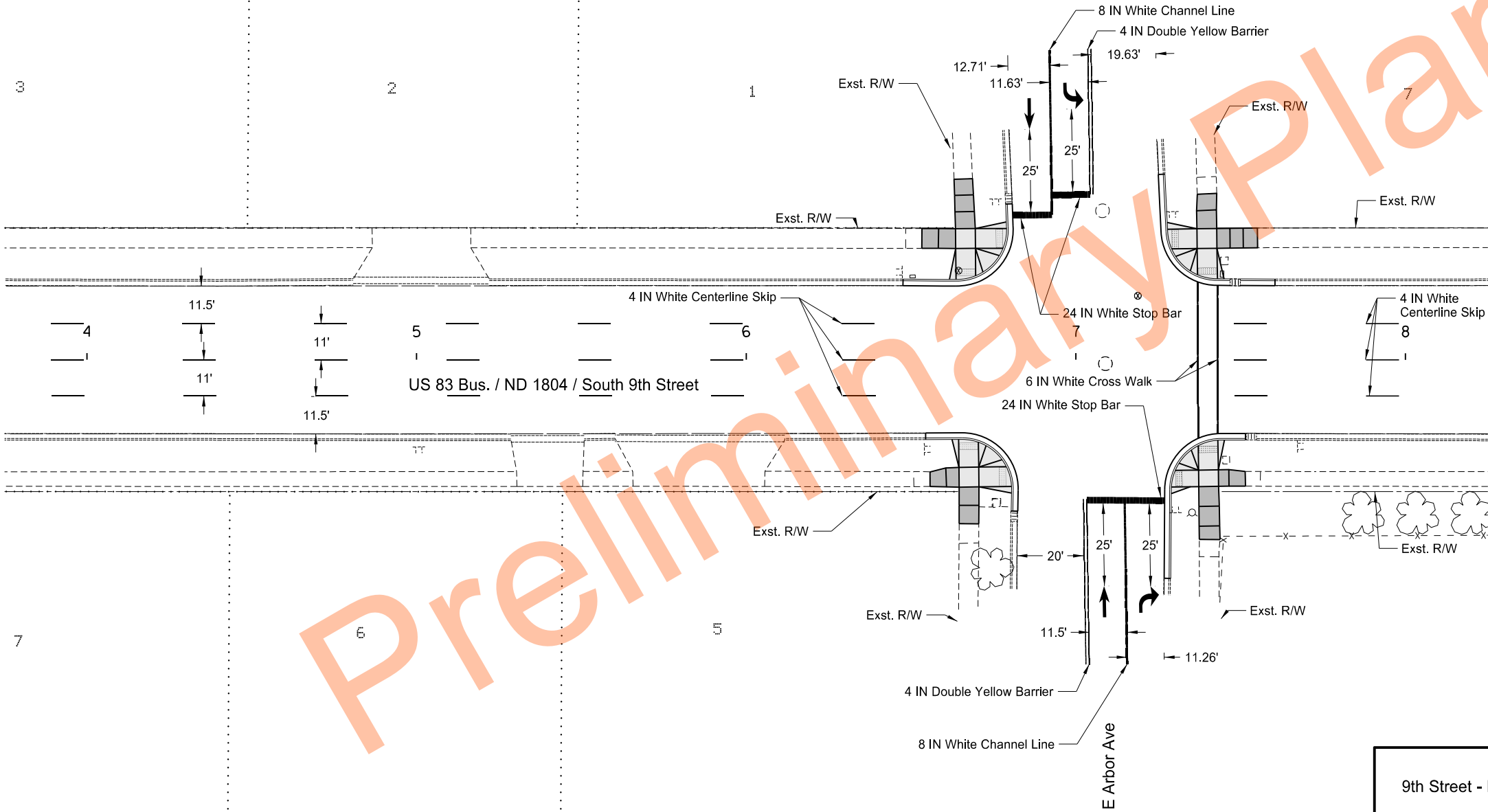
Traffic Control for Lane Shifts

Sta 0+53.6 to Sta 4+00



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-083(148)900	120	2

SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	122	PREF. PATT. PVMT MK-MESSAGE(GROOVED)		
		Straight Arrow - 2 EA at 12 SF	24	SF
		Left Turn Arrow	16	SF
		Right Turn Arrow	16	SF
762	1305	PREF. PATT. PVMT MK 4IN LINE-GROOVED		
		White Centerline Skip	270	LF
		Double Yellow Barrier	200	LF
762	1309	PREF. PATT. PVMT MK 8IN LINE-GROOVED		
		White Solid Lane Line	106	LF
762	1270	PREFORMED THERMO PLASTIC PVMT MK 24 IN LINE		
		White Stop Bar	47	LF
762	1255	PREFORMED THERMO PLASTIC PVMT MK 6 IN LINE		
		White Cross Walk Line	92	LF



9th Street - Bismarck Expressway to Front Ave

Pavement Marking

Sta 4+00 to Sta 8+00

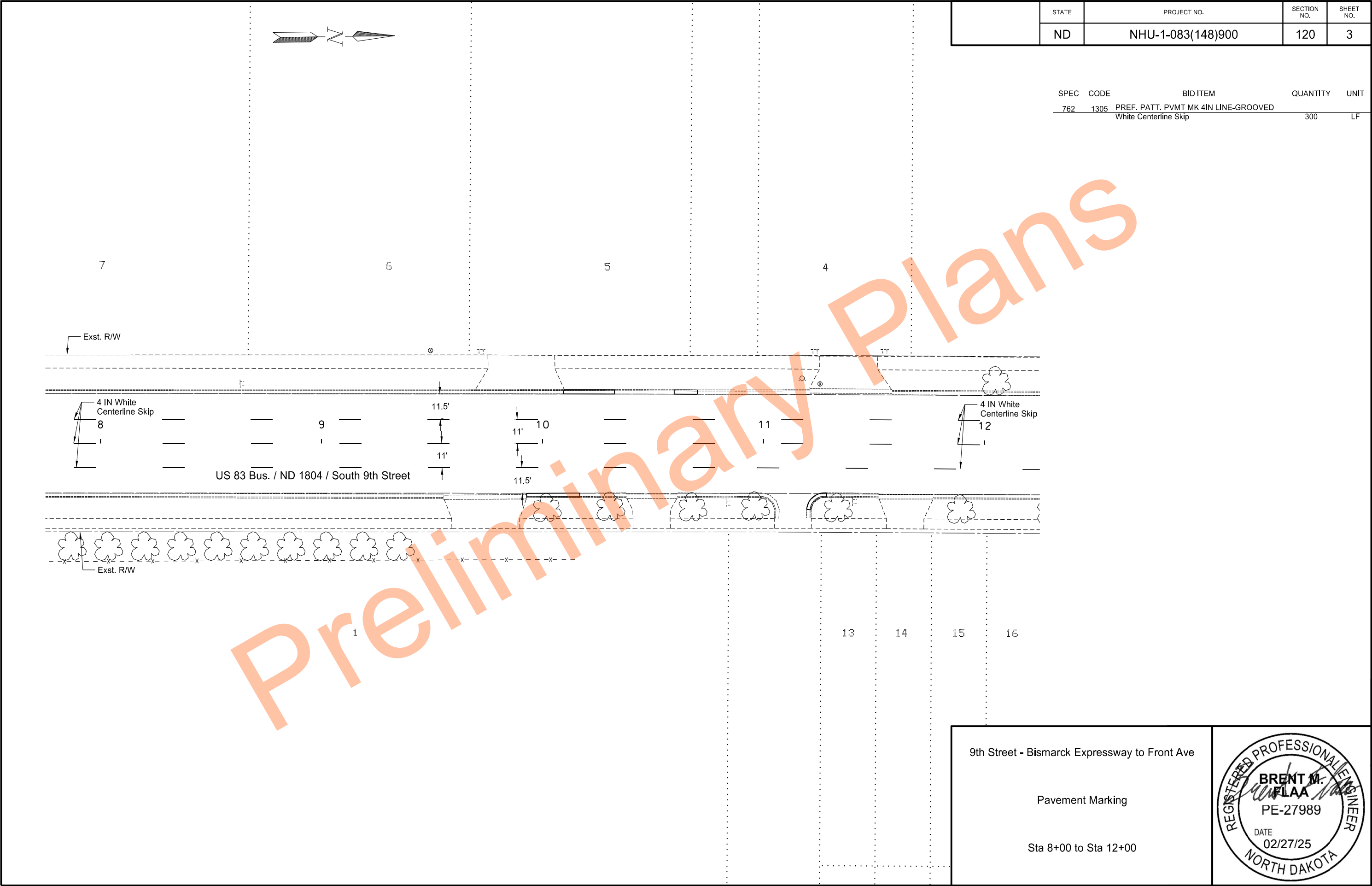
REGISTERED PROFESSIONAL ENGINEER

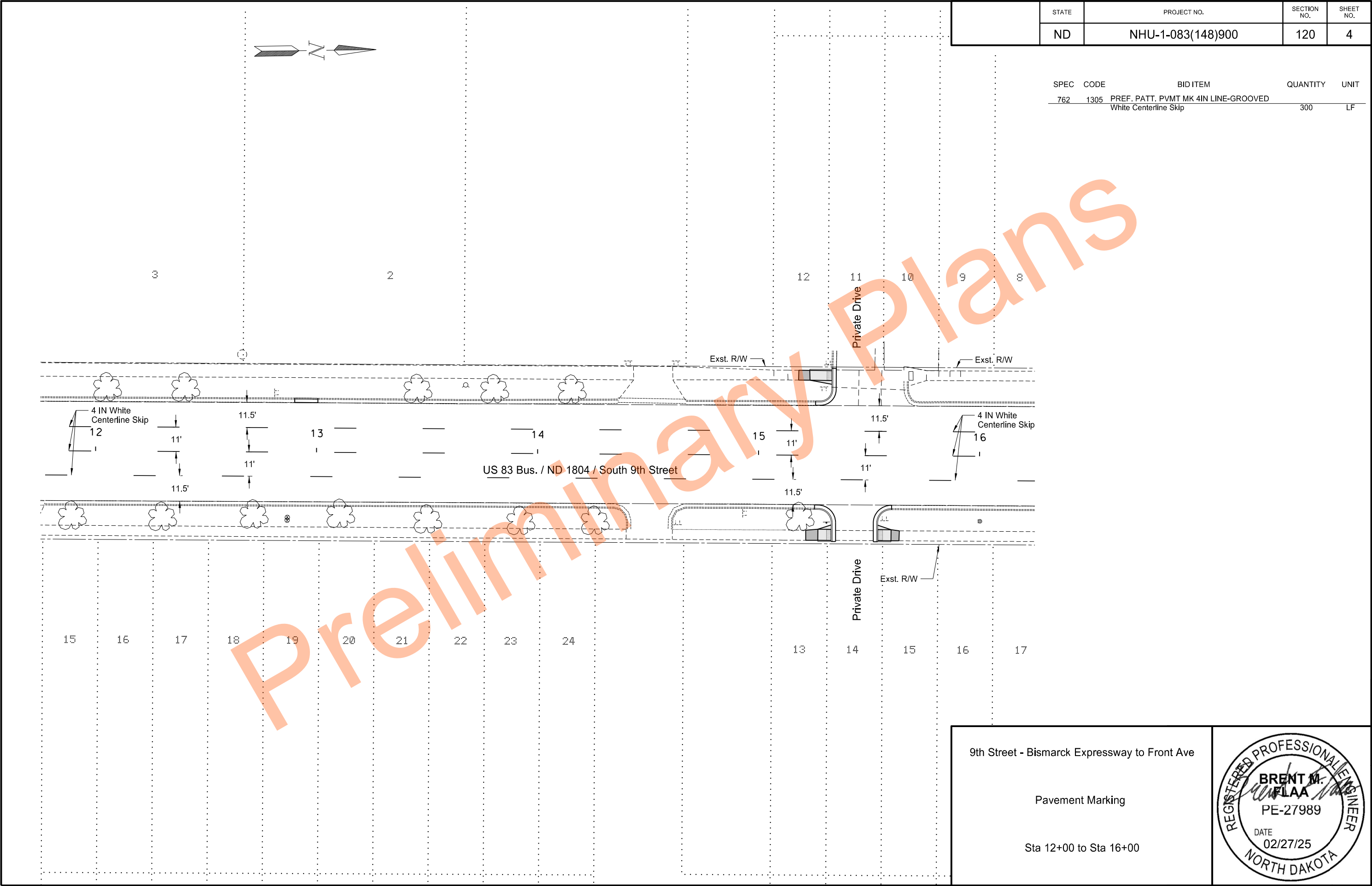
BRENT M. FLAA

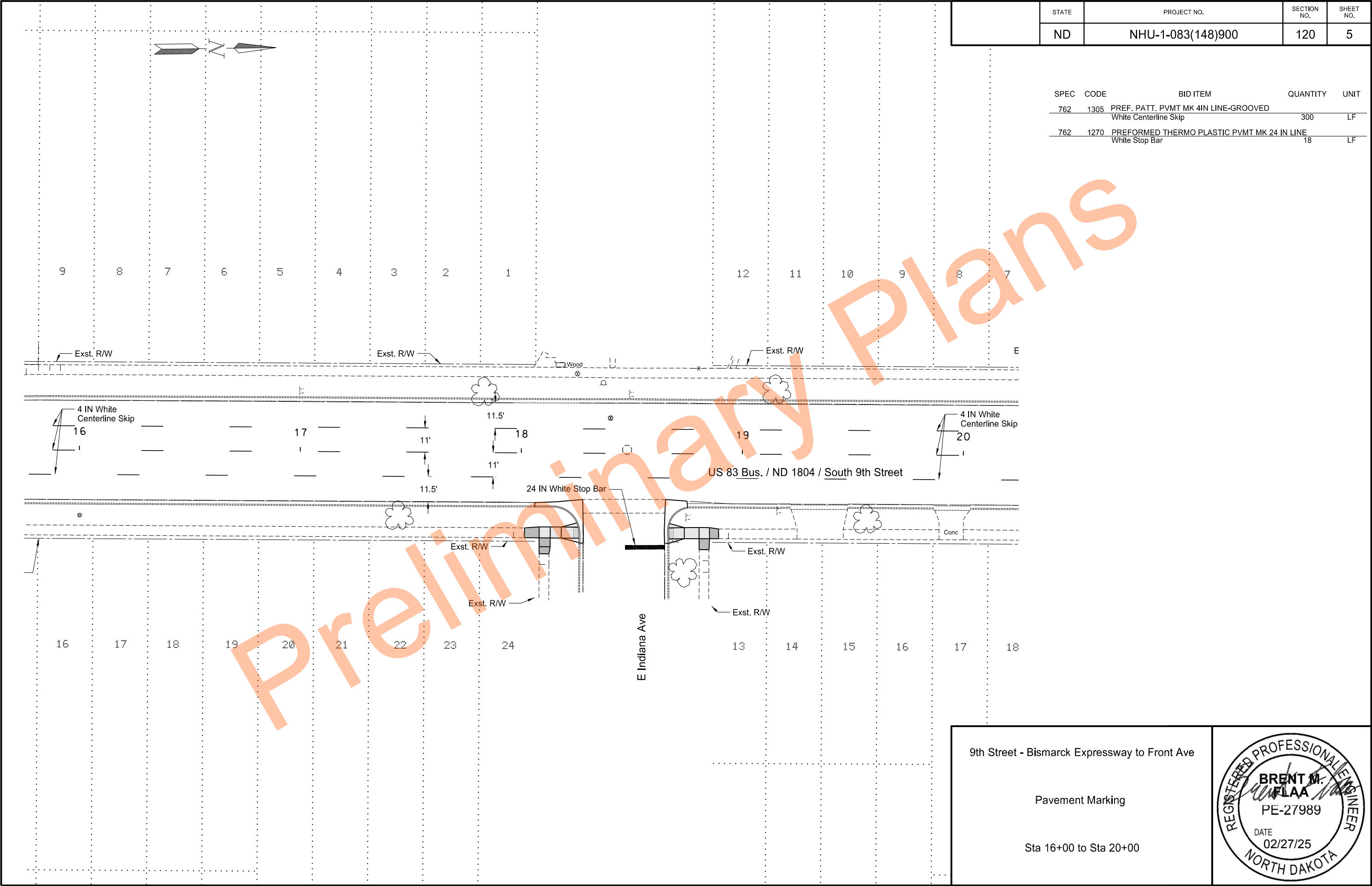
PE-27989

DATE 02/27/25

NORTH DAKOTA

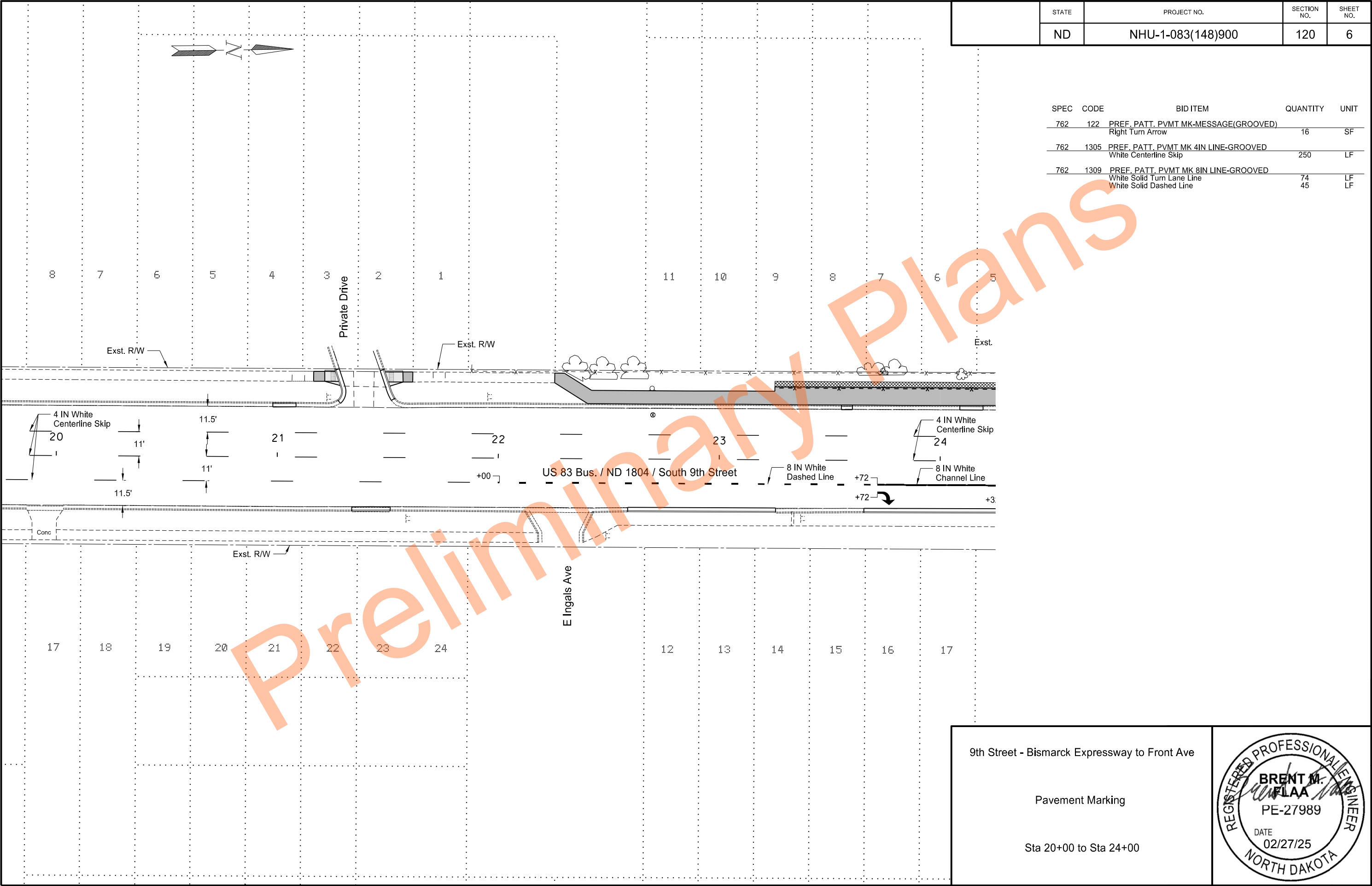


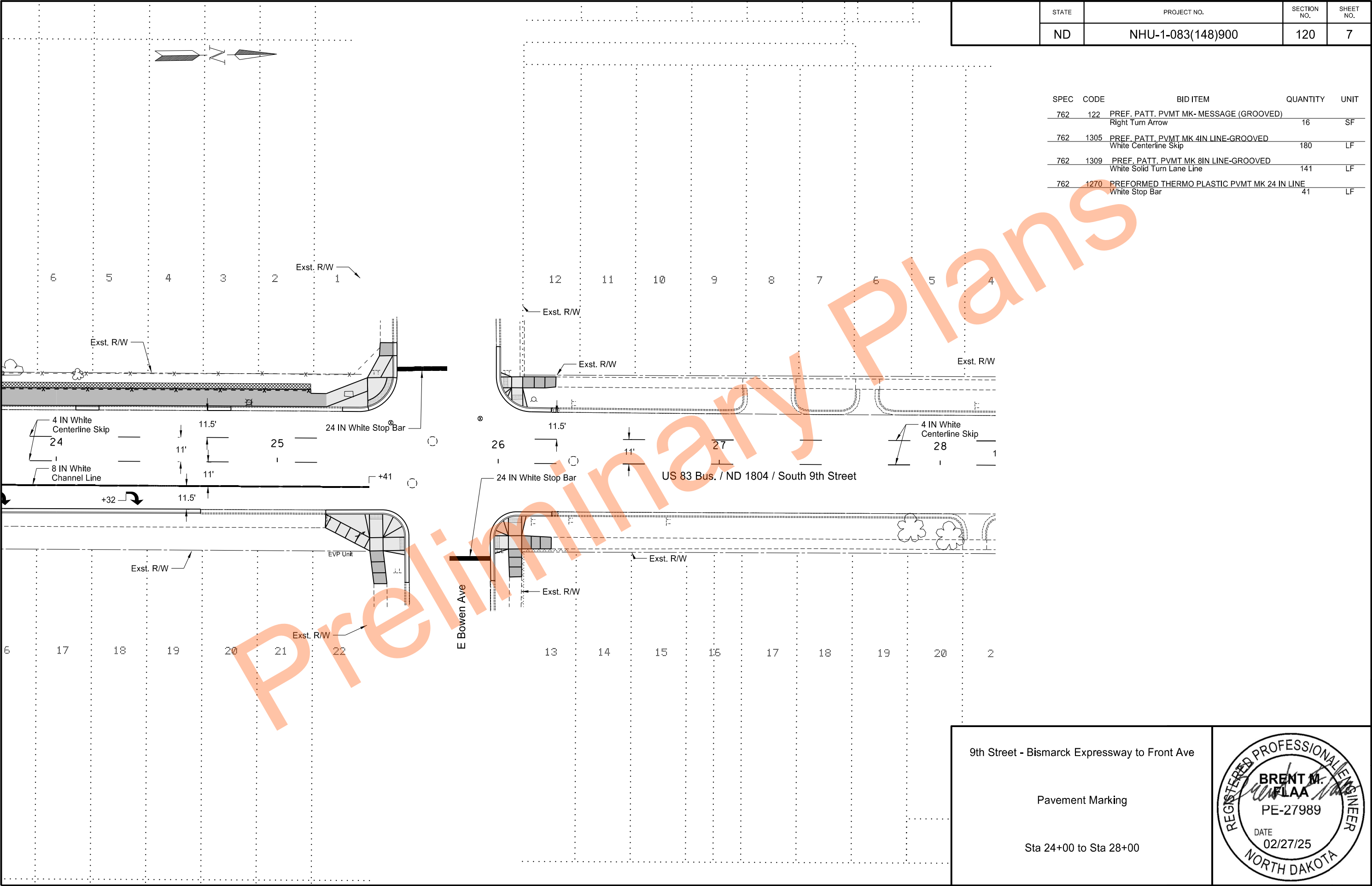


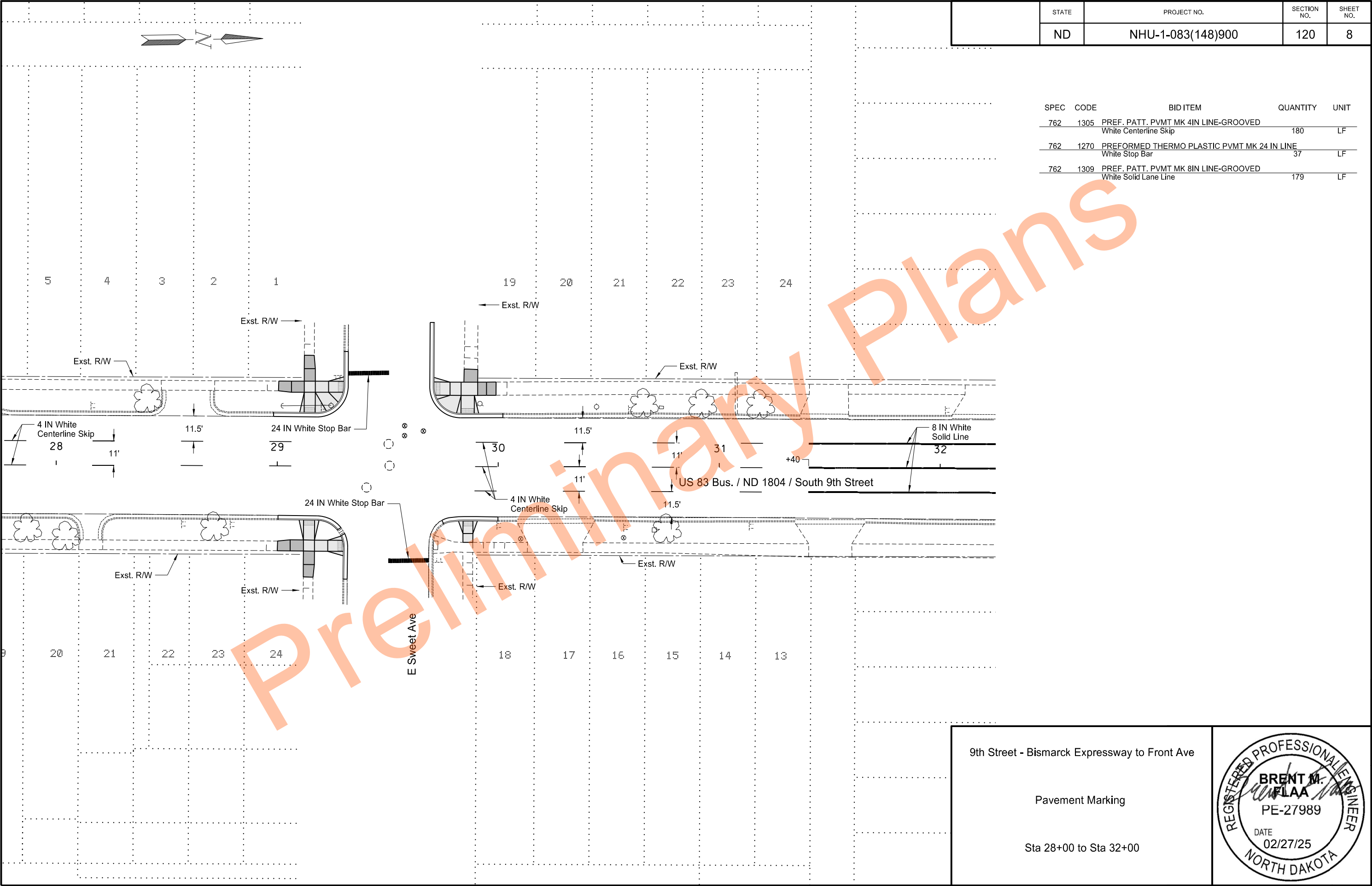


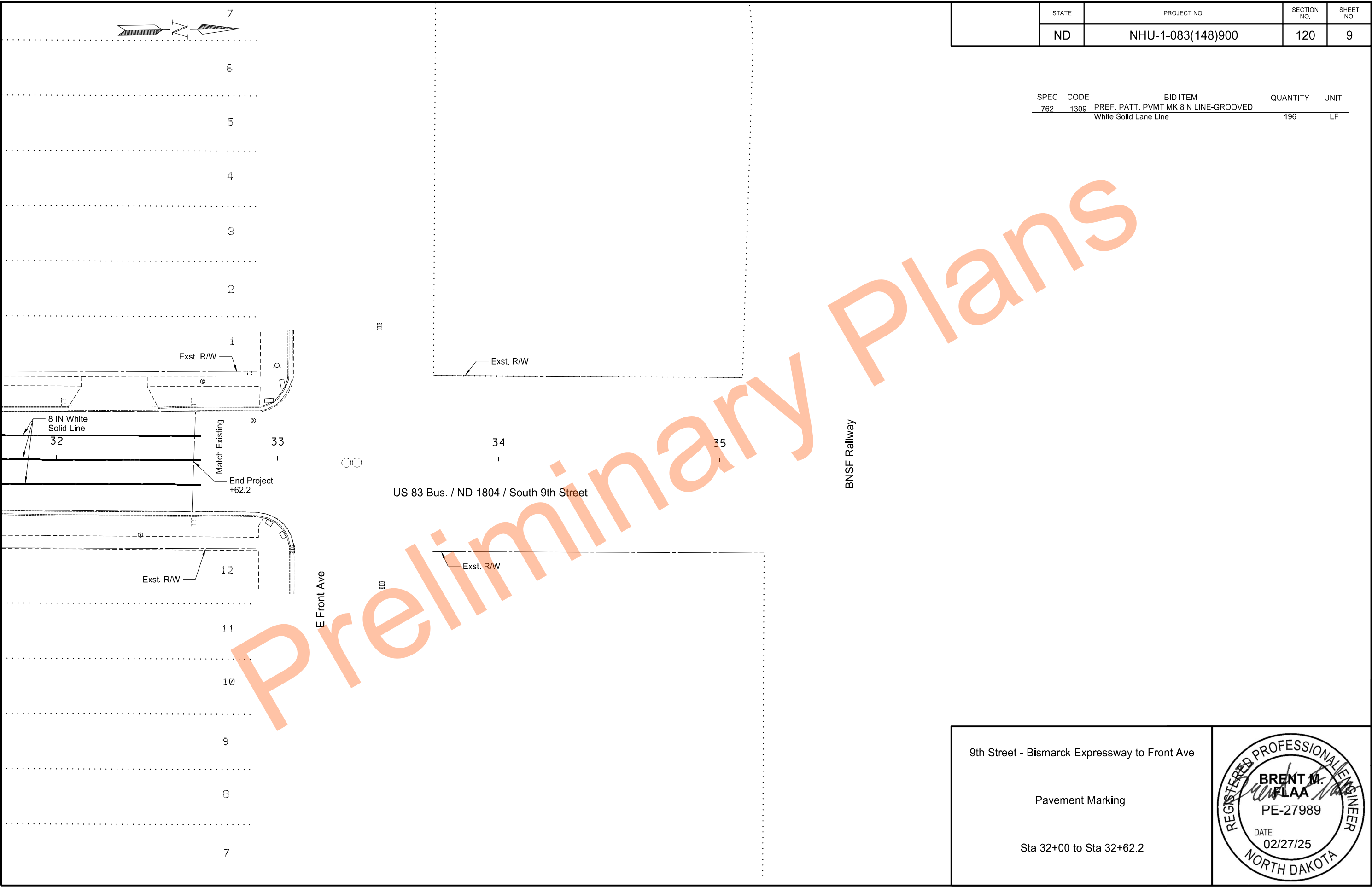
STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		NHU-1-083(148)900	120	5

SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	1305	PREF. PATT. PVMT MK 4IN LINE-GROOVED White Centerline Skip	300	LF
762	1270	PREFORMED THERMO PLASTIC PVMT MK 24 IN LINE White Stop Bar	18	LF









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

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

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

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

Culv culvert
C&G curb & gutter
CI curb inlet
CR curb ramp
C cut

Dd Ld dead load
Defl deflection
Defm deformed
DInt delineate
DIntr delineator
Depr depression
Desc description
Det detail
DWP detectable warning panel
Dtr detour
Dia or ø diameter
Dir direction
Dist distance
DM disturbed material
DB ditch block
DG ditch grade
Dbl double
Dn down
Dwg drawing
Dr drive
Drwy driveway
DI drop inlet
D dry density

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

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

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



08/16/22

NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions

08/16/22

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-28-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

LINE STYLES

D-101-20

Existing Topography

	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	Existing Guardrail Metal
	Existing Edge of Water
	Existing Fence
	Existing Railroad
	Existing Field Line
	Exst Flow
	Existing Curb
	Existing Valley Gutter
	Existing Driveway Gutter
	Existing Curb and Gutter
	Existing Mountable Curb and Gutter

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

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

LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

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				

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

12 18 2020

SYMBOLS

D-101-31

				Flexible Delineator				Highway Sign (Exst, Ppsd)
				Flexible Delineator Type A (Exst, Ppsd)				Mile Post Type A (Exst-Ppsd-Reset)
				Flexible Delineator Type B (Exst, Ppsd)				Mile Post Type B (Exst, Ppsd)
				Flexible Delineator Type C (Exst, Ppsd)				Mile Post Type C (Exst, Ppsd)
				Flexible Delineator Type D (Exst, Ppsd)				Object Marker Type I (Exst, Ppsd)
				Flexible Delineator Type E (Exst, Ppsd)				Object Marker Type II (Exst, Ppsd)
				Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)				Object Marker Type III (Exst, Ppsd)
				Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)				Existing Reference Marker
				Delineator Type C (Exst, Ppsd, Diamond Grade)				Road Closure Gate 18 Ft (Exst, Ppsd)
				Delineator Type D (Exst, Ppsd, Diamond Grade)				Road Closure Gate 28 Ft (Exst, Ppsd)
				Delineator Type E (Exst, Ppsd, Diamond Grade)				Road Closure Gate 40 Ft (Exst, Ppsd)
				Barricade (Type I, Type II, Type III)				Existing Railroad Battery Box
				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

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

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

KIRK J. HOFFMAN

REGISTERED PROFESSIONAL



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



12 18 2020

SYMBOLS

D-101-33

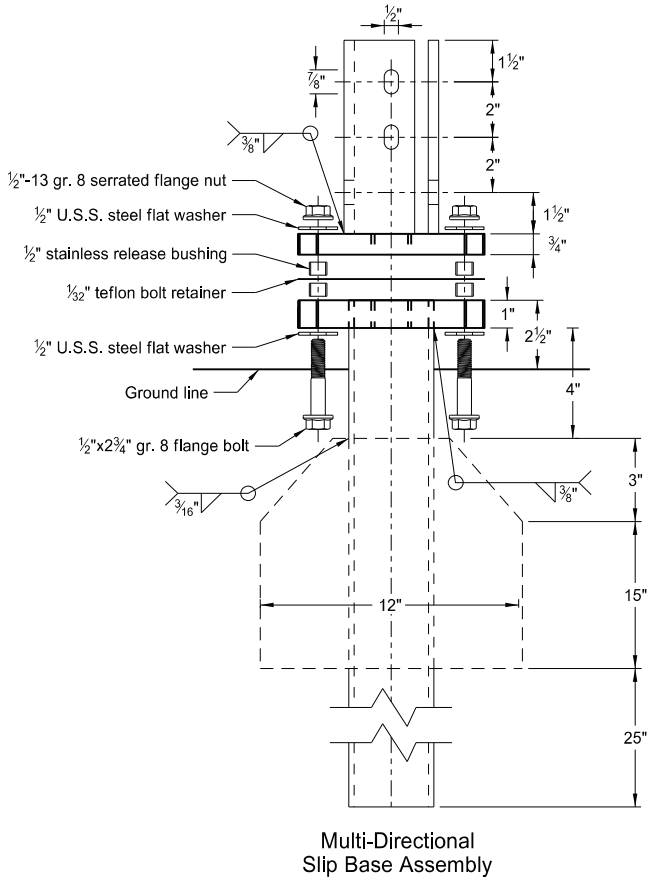
			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, 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

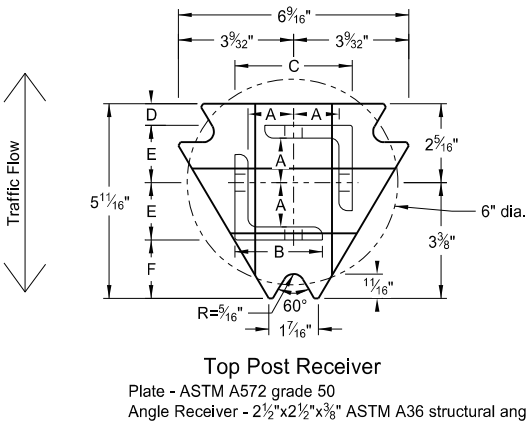
12 18 2020

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



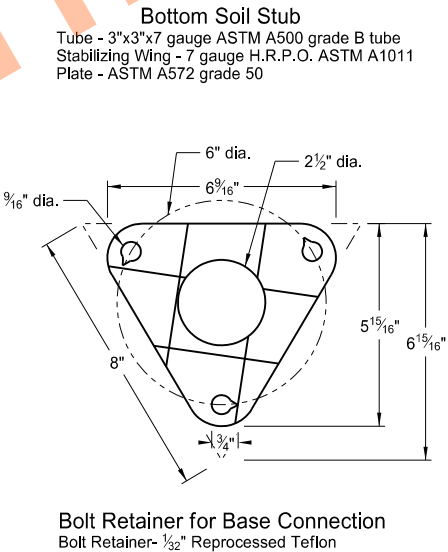
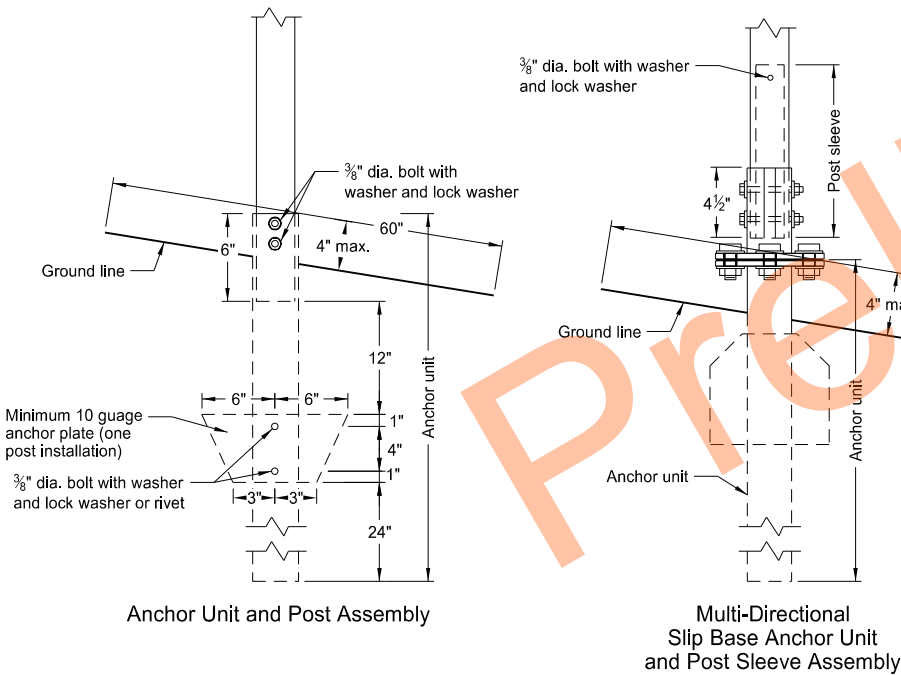
- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete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

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

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

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/16"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/16"x10 ga. into 2 1/2"x10 ga.



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

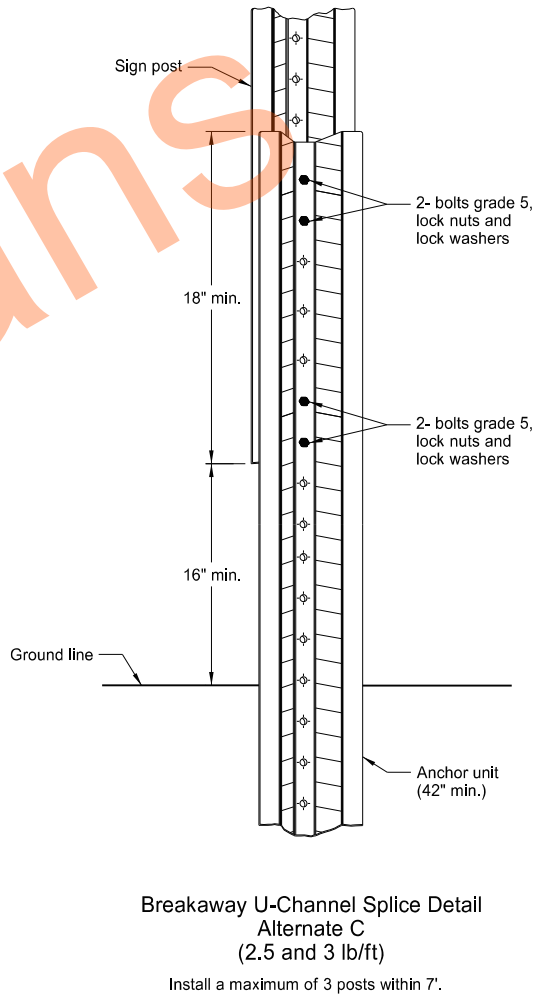
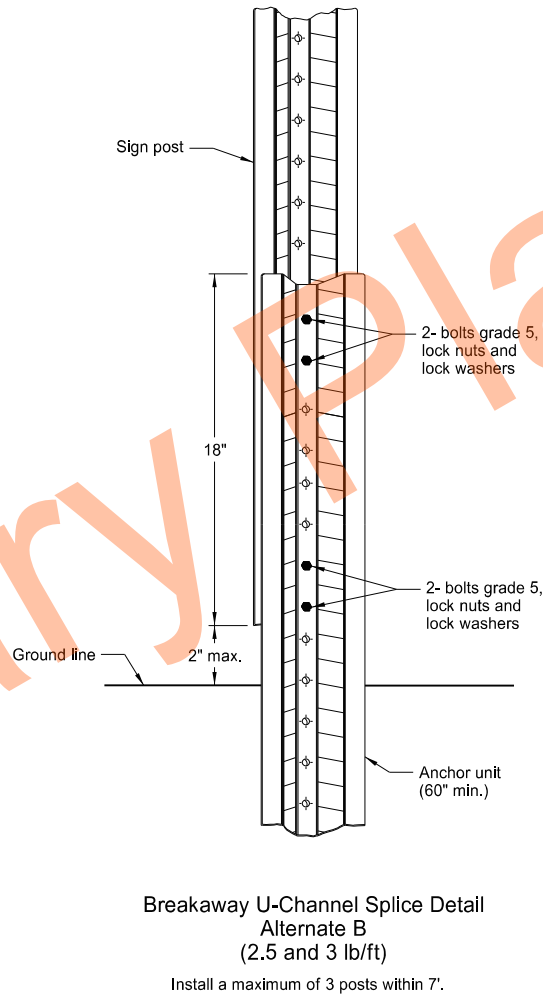
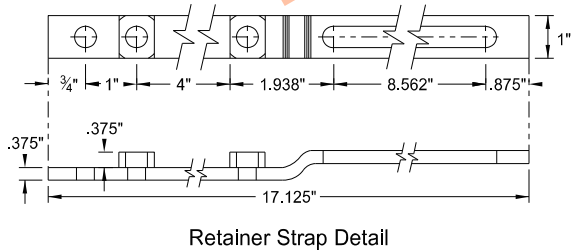
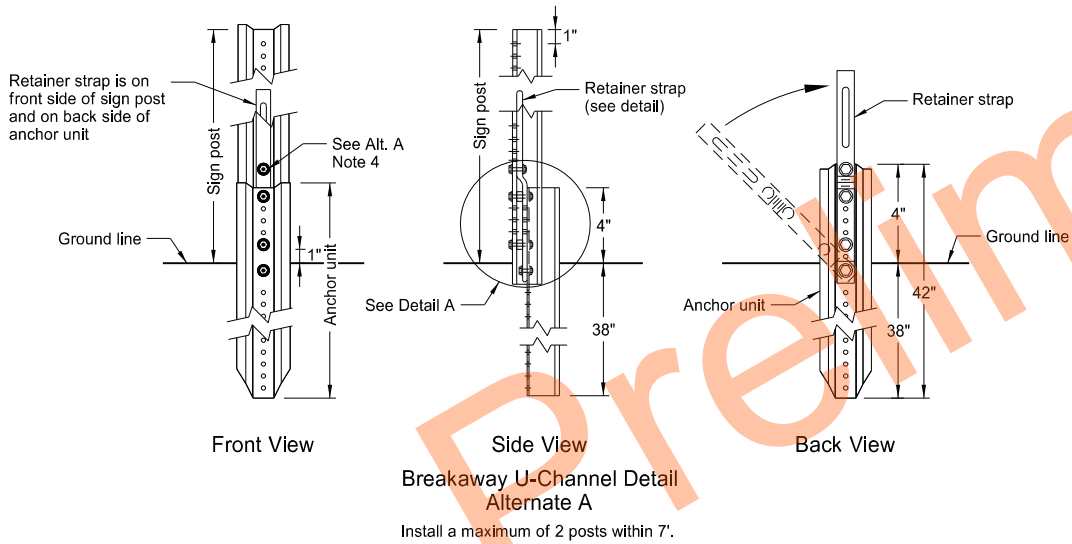
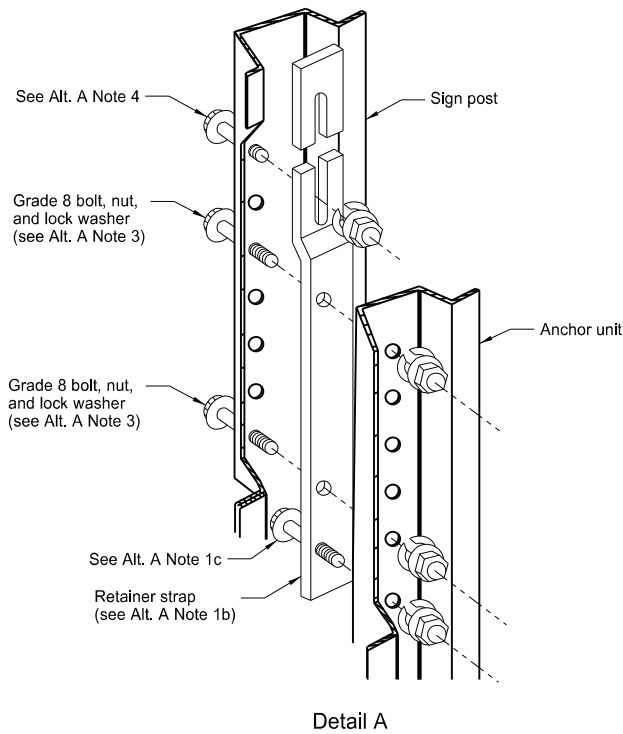


08/01/24

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

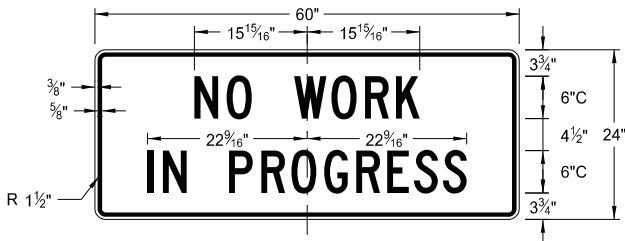


08/01/24

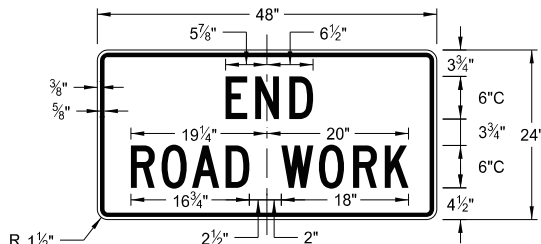
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



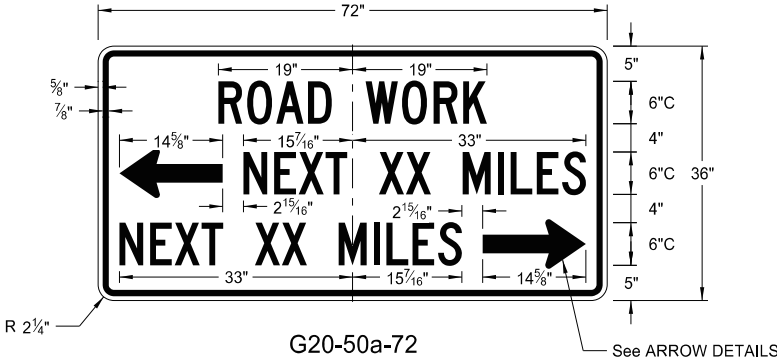
G20-1b-60
Legend: black (non-refl)
Background: orange



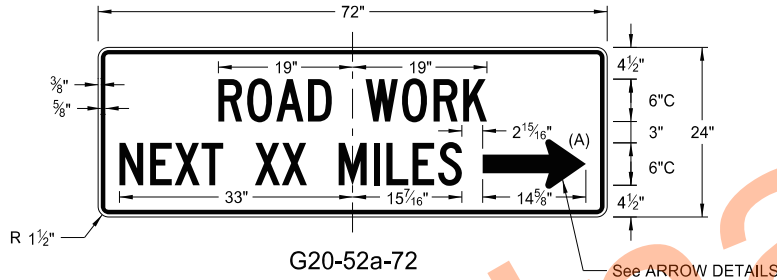
G20-2-48
Legend: black (non-refl)
Background: orange



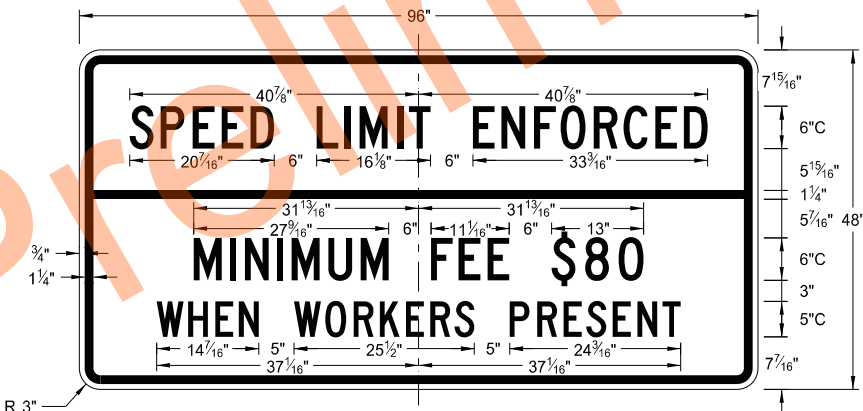
G20-4b-36
Legend: black (non-refl)
Background: orange



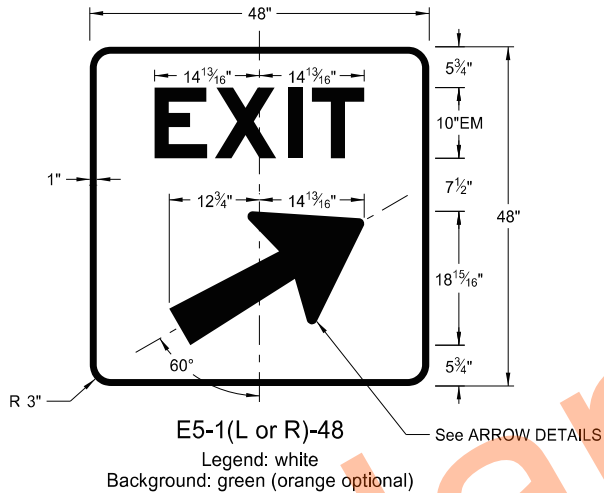
G20-50a-72
Legend: black (non-refl)
Background: orange



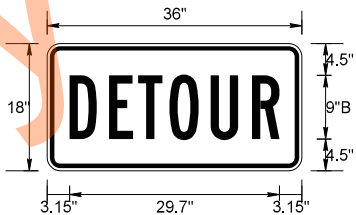
G20-52a-72
Legend: black (non-refl)
Background: orange



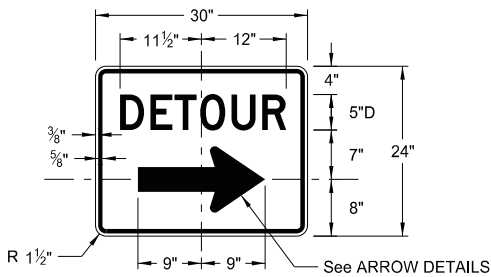
G20-55-96
Legend: black (non-refl)
Background: orange



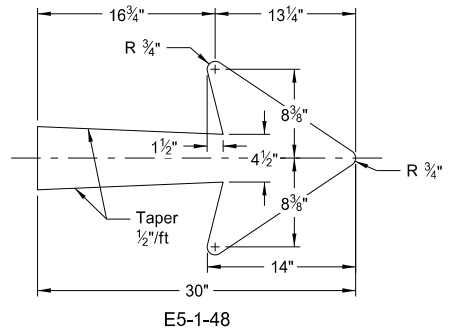
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



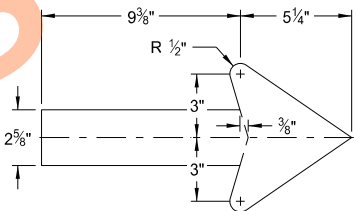
M4-8-36
Legend: black (non-refl)
Background: orange



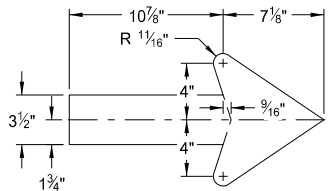
M4-9(L or R)-30 & M4-9-30
Legend: black (non-refl)
Background: orange



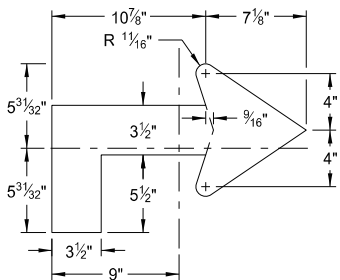
E5-1-48



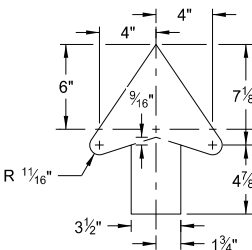
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

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

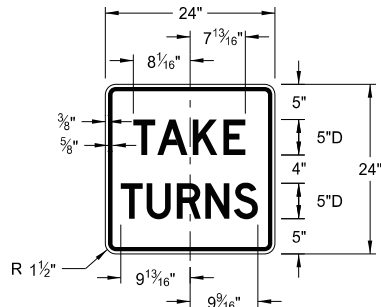
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature



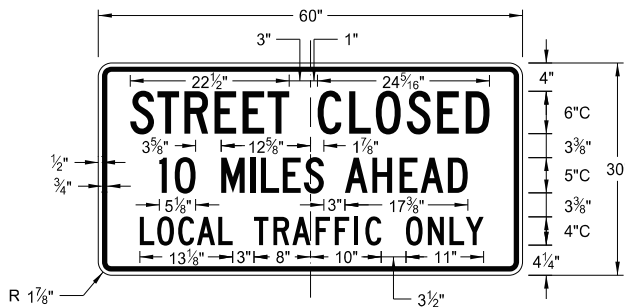
08/01/24

CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

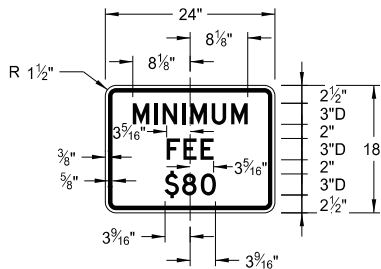
D-704-10



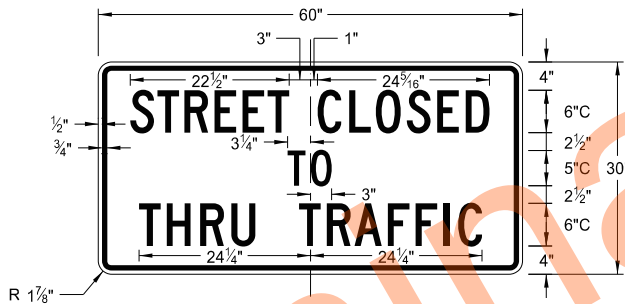
R1-50P-24
Legend: black (non-refl)
Background: white



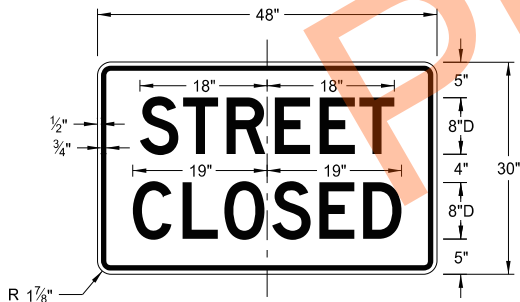
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

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

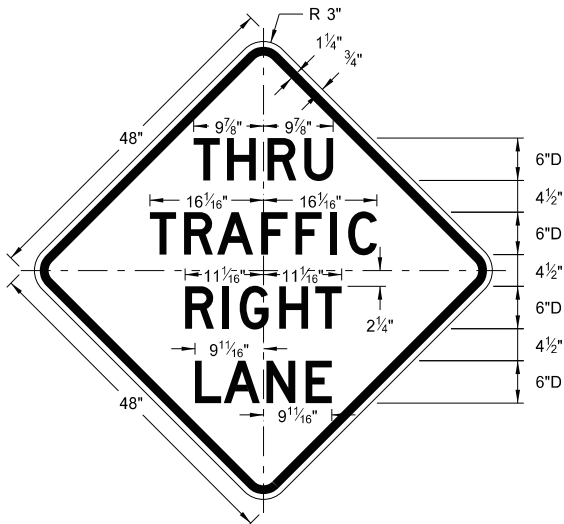


08/01/24

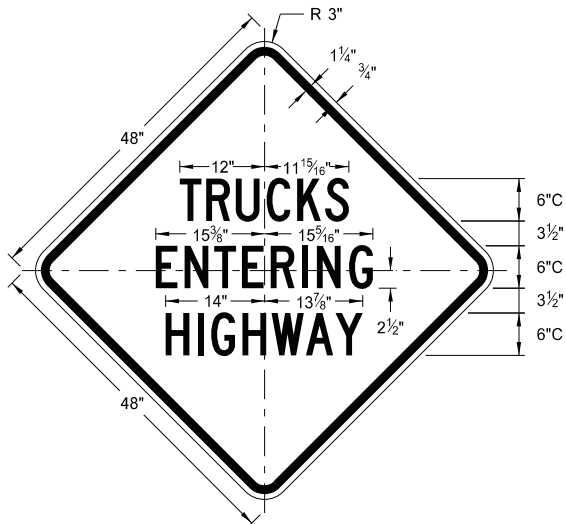
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

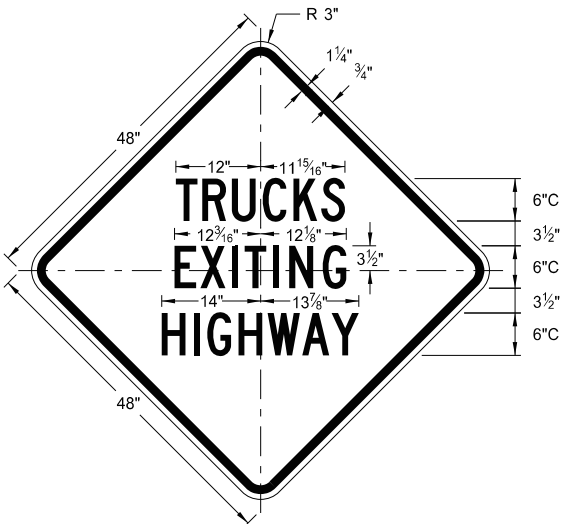
* DISTANCE MESSAGES



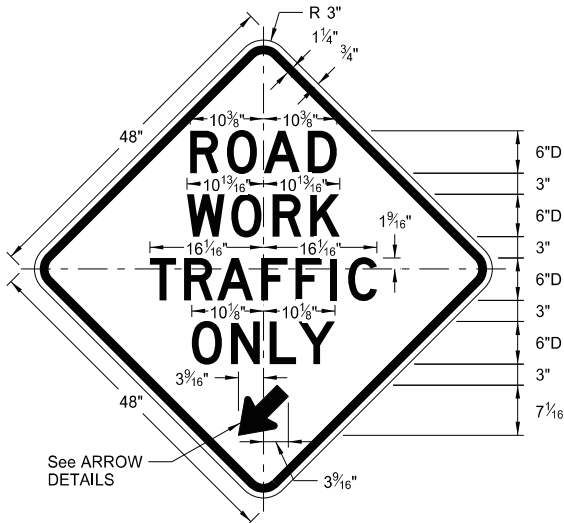
W5-8-48
Legend: black (non-refl)
Background: orange



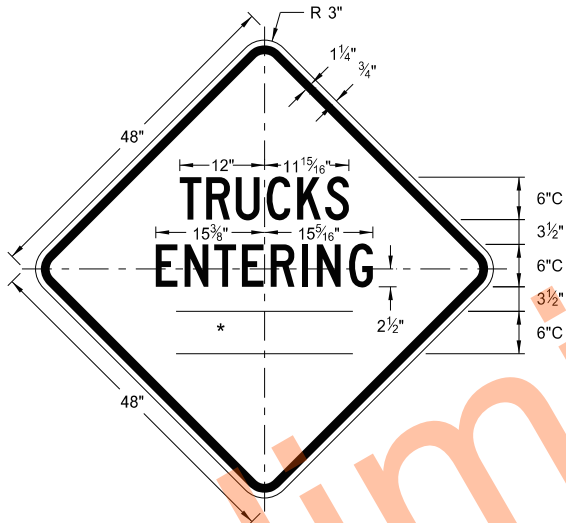
W8-53-48
Legend: black (non-refl)
Background: orange



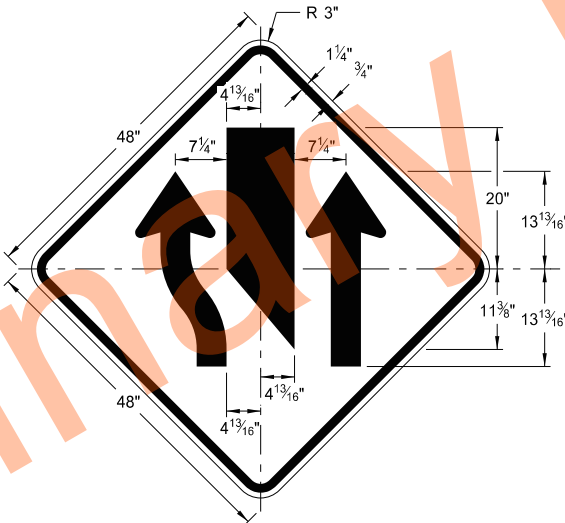
W8-56-48
Legend: black (non-refl)
Background: orange



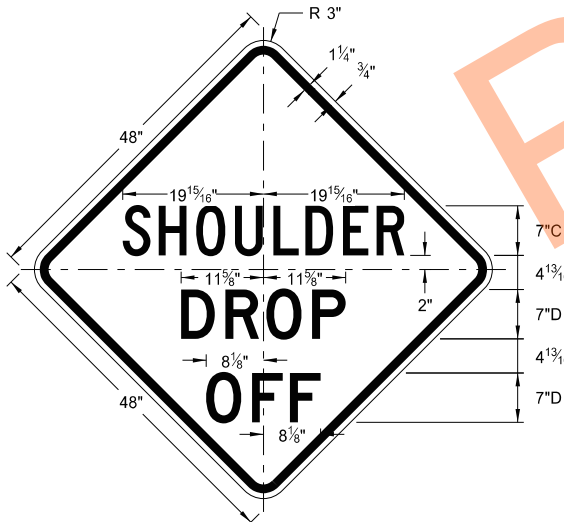
W5-9-48
Legend: black (non-refl)
Background: orange



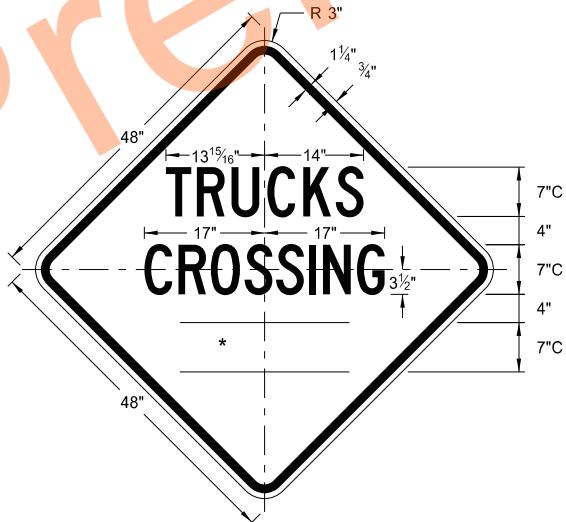
W8-54-48
Legend: black (non-refl)
Background: orange



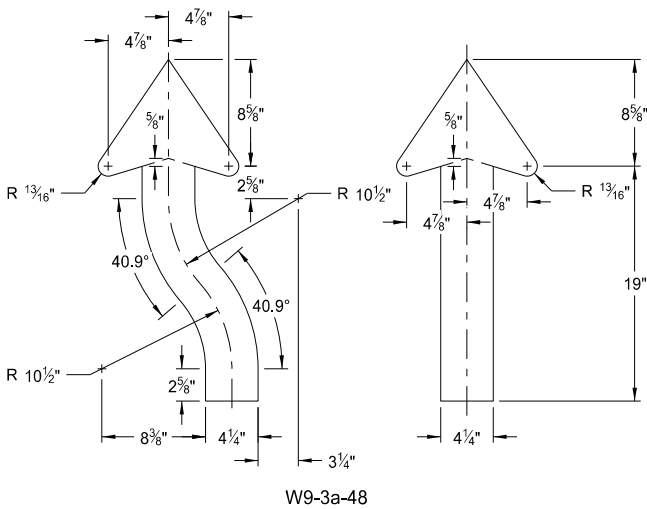
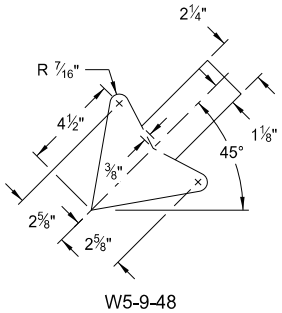
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



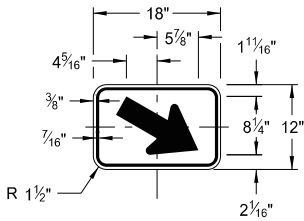
ARROW DETAILS

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



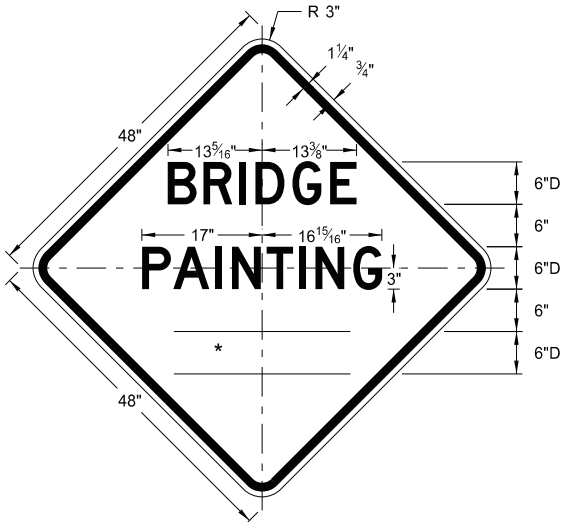
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



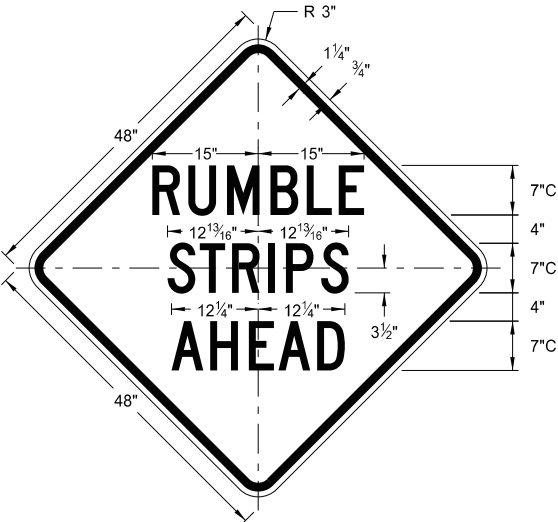
W16-7aP-18

Legend: black (non-refl)
Background: orange



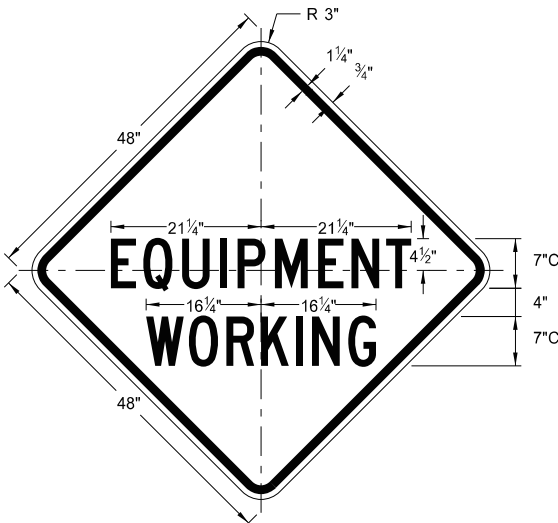
W21-50-48

Legend: black (non-refl)
Background: orange



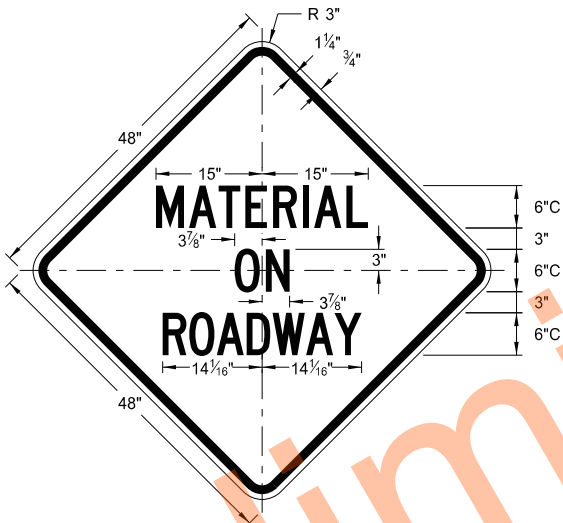
W21-53-48

Legend: black (non-refl)
Background: orange



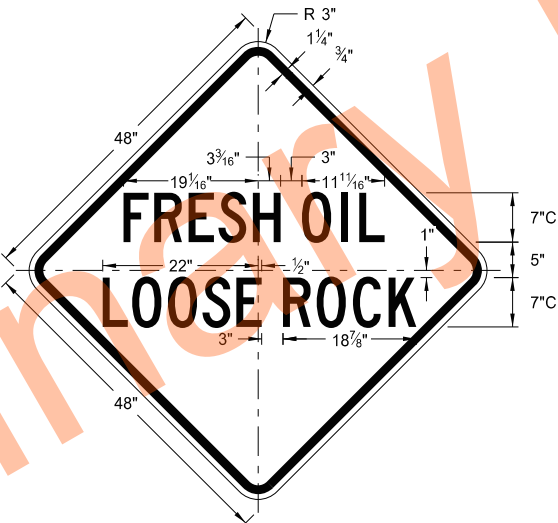
W20-51-48

Legend: black (non-refl)
Background: orange



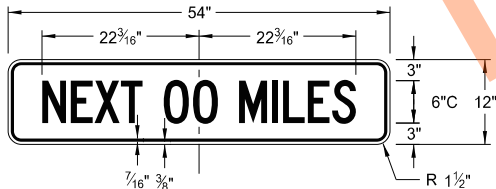
W21-51-48

Legend: black (non-refl)
Background: orange



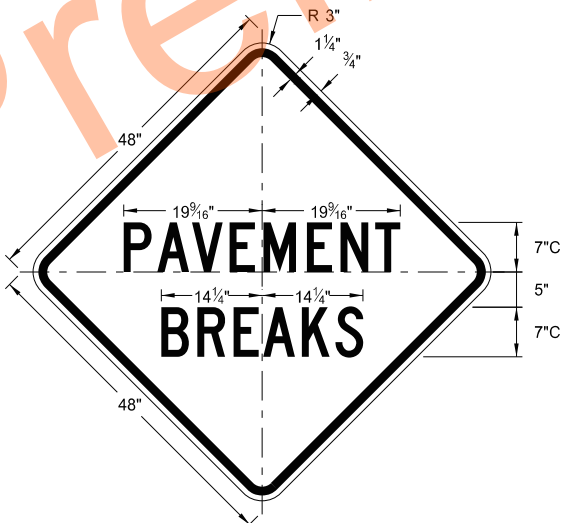
W22-8-48

Legend: black (non-refl)
Background: orange



W20-52P-54

Legend: black (non-refl)
Background: orange

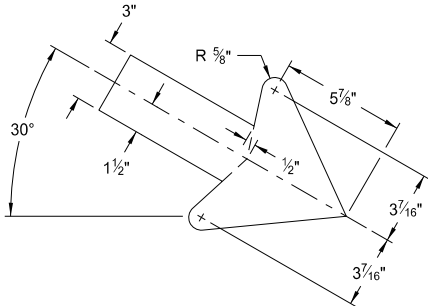


W21-52-48

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

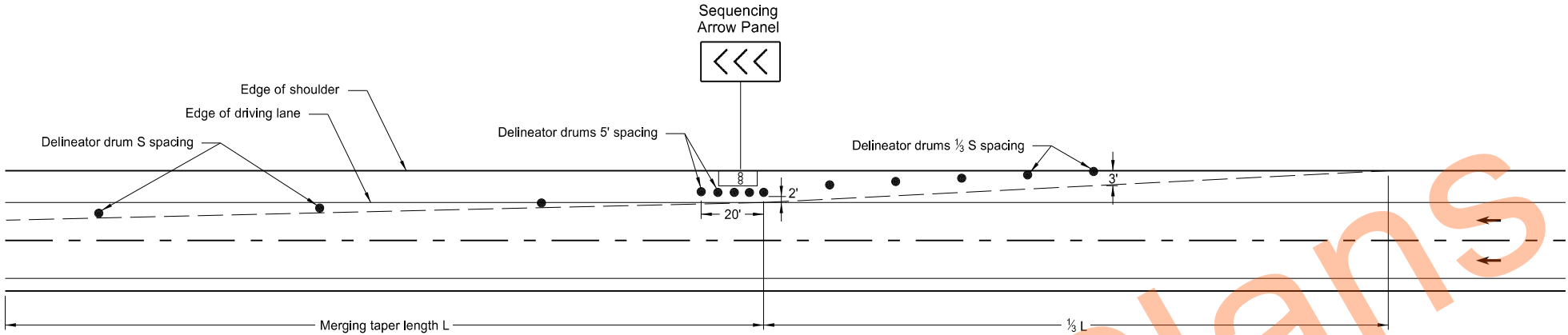
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.



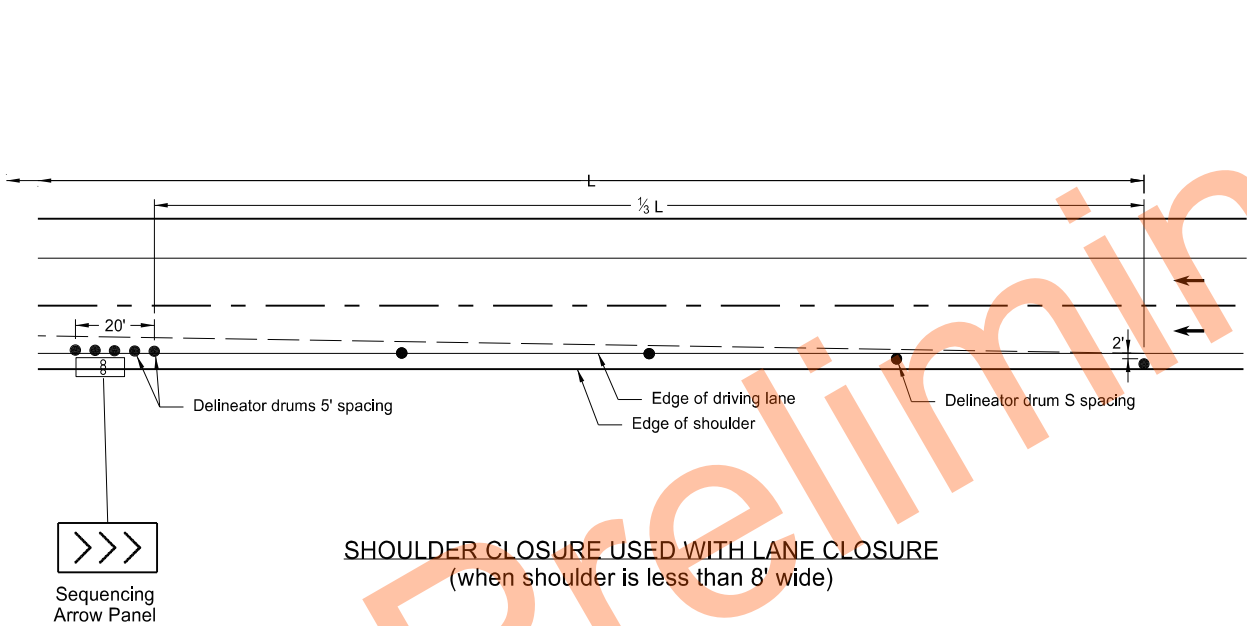
08/01/24

SHOULDER CLOSURE TAPERS

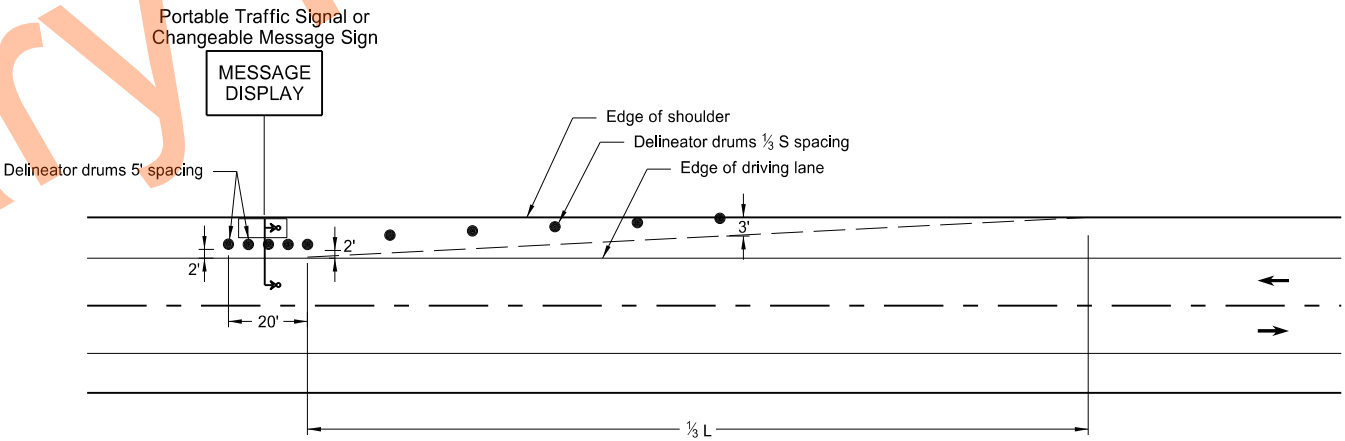
D-704-12



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

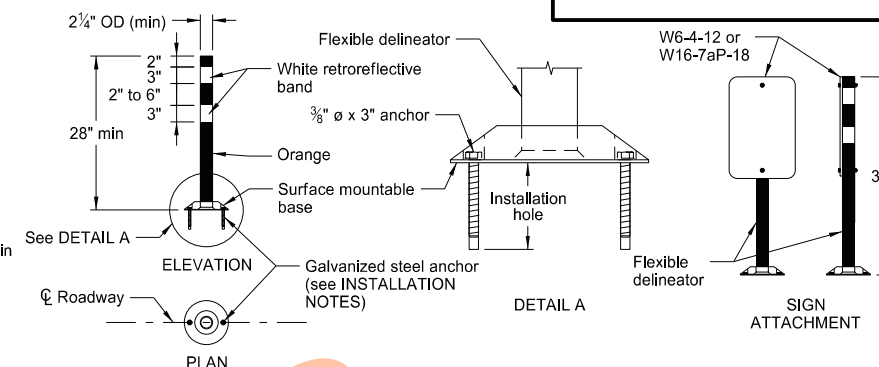
Notes:

- S = Posted Speed Limit in mph
W = Width of offset in feet
L = Taper length in feet
L = WS²/60 (40mph or less)
L = WS (45mph or more)
- If a shoulder taper is used, use a length of approximately 1/3 L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
- When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

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



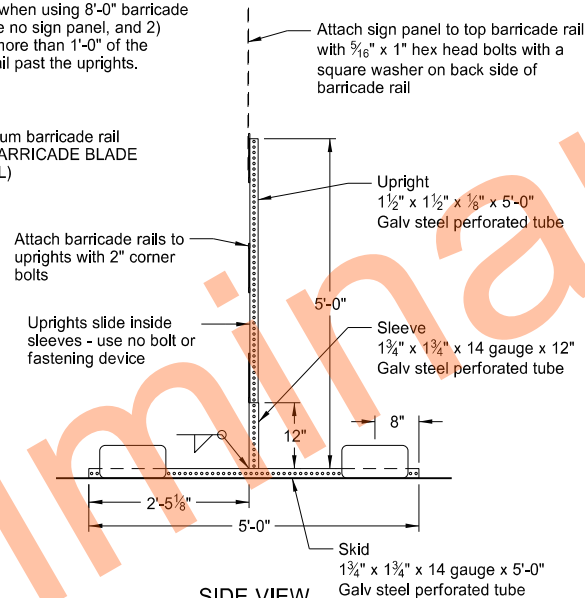
08/01/24



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.

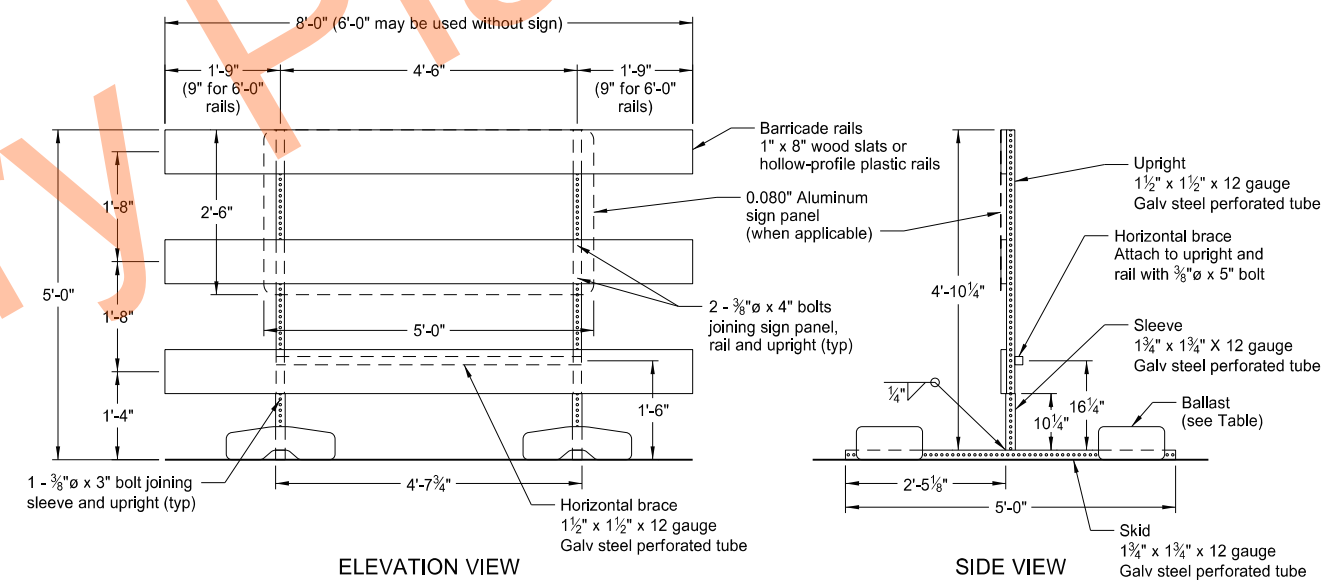


BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

Diagram illustrating the dimensions and materials for a standard traffic warning sign:

- Overall width: 6' to 10'
- Overall height: 8"
- Sign face height: 3'-0" to
- Material specifications:
 - Orange retroreflectorized (diagonal stripes)
 - White retroreflectorized (background)
 - Pavement or ground (bottom area)
- Dimensions for the sign face:
 - 45° angle for the stripes
 - 6" spacing between stripes
 - 6" width of the stripes

BARRICADE RAIL DETAILS



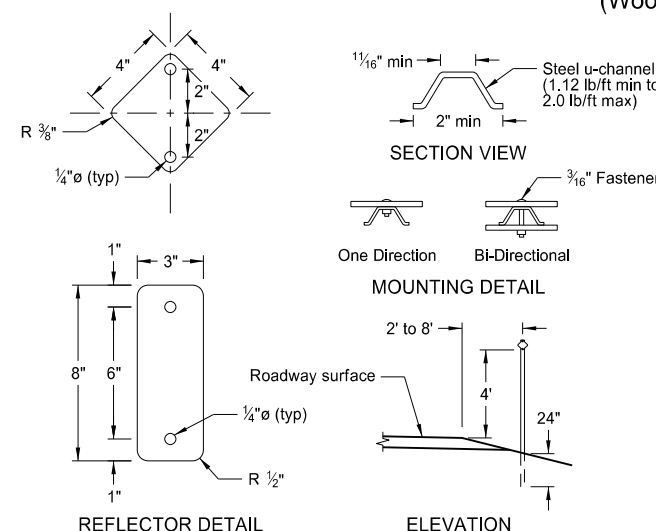
BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

SIDE VIEW

MINIMUM BALLAST
(each side of barricade support)

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

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



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

D-704-14

[illegible][illegible]

The diagram illustrates a vertical sign assembly with the following dimensions and components:

- Overall Width:** 36"
- Top Section:** 18" wide, 18" high.
- Middle Section:** 18" wide, 18" high.
- Bottom Section:** 36" wide, 21" high.
- Vertical Spacing:** 3" between the top and middle sections, and 3" between the middle and bottom sections.
- Horizontal Spacing:** 3" from the left edge to the start of the sign sections, and 3" from the right edge to the end of the sign sections.
- Steel Use:** 2 1/2" x 30" (indicated by a callout).
- Vertical clearance (main sign):** Indicated by a callout.

Diagram illustrating the dimensions and clearances for a diamond sign with a secondary rectangular sign below it.

Dimensions:

- Top Diamond Sign:** 48" x 48" diamond shape.
- Secondary Rectangular Sign:** 30" x 30" rectangular sign.
- Clearances:**
 - Vertical clearance (main): 21"
 - Vertical clearance (secondary sign): 3"
 - Horizontal clearance (main): 12"
 - Horizontal clearance (secondary sign): 3"
- Other Dimensions:** 15" (top width), 16" (top height), 16" (middle height), 24" (bottom height), 3" (bottom width), 3" (bottom height).

Labels:

- W13-1P-30
- Vertical (main)
- Vertical clearance (secondary sign)

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

Diagram of a triangular sign with dimensions and labels:

- Top width: 60"
- Top left offset: 18"
- Top middle offset: 24"
- Top right offset: 18"
- Left side height: 60"
- Vertical clearance (main sign): Indicated by a vertical arrow pointing upwards from the bottom of the sign to the main sign.
- Extend supports: Indicated by a horizontal arrow pointing right from the sign.
- Labels: "V" at the top and bottom vertices, "v" at the bottom vertex, and "V" at the bottom vertex.

Diagram illustrating the vertical clearance for a main sign. The sign is 24" wide and 12" high. The clearance is 48". The structure above the sign has a total width of 54" (15" on each side of the sign) and a height of 18". The sign is mounted on a structure that is 12" wide. The diagram also shows a 3" clearance from the top of the sign to the bottom of the structure above. The diagram is labeled "Vertical clearance (main sign)" and "R6-1 (where required)".

Diagram of a rectangular sign with dimensions and vertical clearance:

- Sign width: 24"
- Sign height: 36"
- Horizontal offset from left edge: 12"
- Horizontal offset from right edge: 3"
- Vertical clearance (main sign): 3"

Diagram illustrating the dimensions for a diamond-shaped sign (W16-2P-30) and a rectangular sign assembly. The diamond sign has a height of 48" and a width of 15". The rectangular sign assembly has a height of 24" and a width of 30". The vertical clearance for the main sign is 21", and the vertical clearance for the secondary sign is 3". The total height of the assembly is 24". The horizontal clearance for the main sign is 12", and the horizontal clearance for the secondary sign is 3".

Diagram of a triangular traffic sign with dimensions and labels:

- Top horizontal dimensions: 3" (left offset), 30" (total width).
- Left vertical dimensions: 15" (top offset), 18" (middle offset), 15" (bottom offset), 48" (total height).
- Right vertical dimension: 64" (height from base to top vertex).
- Top horizontal dimension of the triangle: 12".
- Label: R1-50P-2 (when required).
- Labels: "Clearance (sign)" and "Vertical clearance (main sign)".

The diagram illustrates the vertical clearance requirements for a main sign and a secondary sign. The main sign is an octagon with a height of 9 feet. The secondary sign is a rectangle with a height of 3 feet. The vertical clearance for the main sign is 48 feet, and the vertical clearance for the secondary sign is 24 feet. The diagram also shows the horizontal dimensions of the signs and the vertical clearance for the main sign (48 feet) and the secondary sign (24 feet).

Diagram illustrating the vertical clearance requirements for a main sign and a secondary sign. The main sign is an octagon with a height of 9 feet. The secondary sign is a rectangle with a height of 3 feet. The vertical clearance for the main sign is 48 feet, and the vertical clearance for the secondary sign is 24 feet. The diagram also shows the horizontal dimensions of the signs and the vertical clearance for the main sign (48 feet) and the secondary sign (24 feet).

[illegible]

Diagram illustrating the vertical clearance requirements for a 108" wide sign. The sign width is divided into three 32" sections. The vertical clearance is specified as 20" for the top section, 20" for the middle section, and 48" for the bottom section. A 6" dimension is shown for the top section. The vertical clearance for the main sign is indicated as 4".

The diagram illustrates a four-lane highway cross-section with a total width of 96 feet. The lane widths are specified as 16 feet for the outer lanes and 32 feet for the inner lanes. Vertical clearances are indicated for different heights: 20 feet for the main sign, 48 feet for the overhead structure, and 4 feet for the base of the structure. The vertical clearance for the main sign is labeled as 'Vertical clearance (main sign)'.

Diagram of a 72" wide sign with four vertical clearance points. The horizontal dimensions are 12", 24", 24", and 12". The vertical dimensions are 18" (from top to first point), 24" (between points), and 3" (from bottom to last point). The label "Vertical clearance (main sign)" is present.

Diagram illustrating the vertical clearance requirements for a G20-1b-60 sign (when required). The diagram shows the dimensions for the main sign and secondary sign, including horizontal and vertical clearances.

Horizontal dimensions (from left to right):

- 12"
- 60" (Total width)
- 36"
- 12"

Vertical dimensions (from bottom to top):

- 3"
- 18"
- 24"
- 3"
- 24"
- 18"
- 12"

Labels for vertical clearances:

- Vertical clearance (secondary sign)
- Vertical clearance (main sign)

Diagram of a main sign with dimensions: 48" wide, 18" high, and 24" between vertical elements. Spacing is 12" on the sides and 24" between elements. Vertical clearance is 3".

Technical drawing of a diamond-shaped sign assembly, showing side and end views with dimensions and material specifications.

Side View Dimensions:

- Overall height: 78" max
- Overall width: 32"
- Upright height: 12" min
- Sign panel material: 0.080" aluminum or 1/2" plywood
- Upright material: 1 3/4" x 1 3/4" x 12 gauge Steel perforated tube

End View Dimensions:

- Base width: 48"
- Base height: 9"
- Upright height: 23 1/8"
- Upright material: 1 3/4" x 1 3/4" x 12 gauge Steel perforated tube
- Skid material: 1 3/4" x 1 3/4" x 12 gauge Steel perforated tube
- Assembly material: 5/16" ø x 3" A325 or equivalent bolt (2 per support) joining sign panel and supports
- Sleeve material: 5/16" ø x 3" A325 or equivalent bolt (2 per support) joining upright and sleeve
- Ballast (see Table)

126" min for 5' or 150" min for 7' vertical clearance

0.080" aluminum or 1/2" plywood sign panel

Upright 2 1/4" x 2 1/4" x 12 gauge Steel perforated tube

Horizontal brace 2 1/4" x 2 1/4" x 34 1/2" x 12 gauge Steel perforated tube

5' or 7' minimum vertical clearance

18 1/2"

32"

5/16" ø x 3 1/2" A325 or equivalent bolt (2 per support) joining sign panel and supports

Horizontal brace Attach to upright with 5/16" ø x 5" bolt

Sleeve 2 1/2" x 2 1/2" x 12 gauge Steel perforated tube

Skid 2 1/2" x 2 1/2" x 12 gauge Steel perforated tube

9"

1/4" V

34 3/4"

72"

Ballast (see Table)

1. Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

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

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

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

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

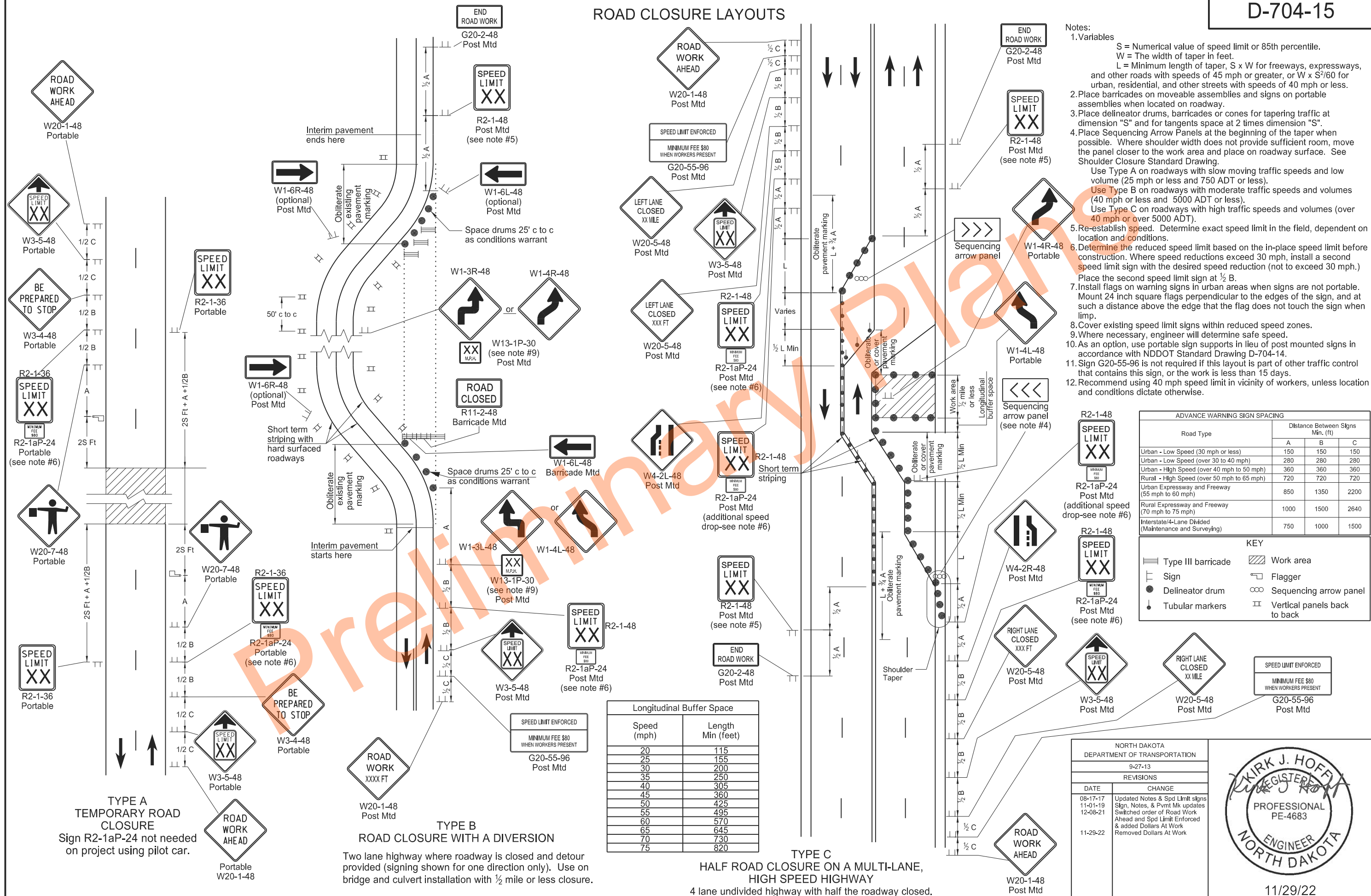
Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

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



08/01/24

ROAD CLOSURE LAYOUTS



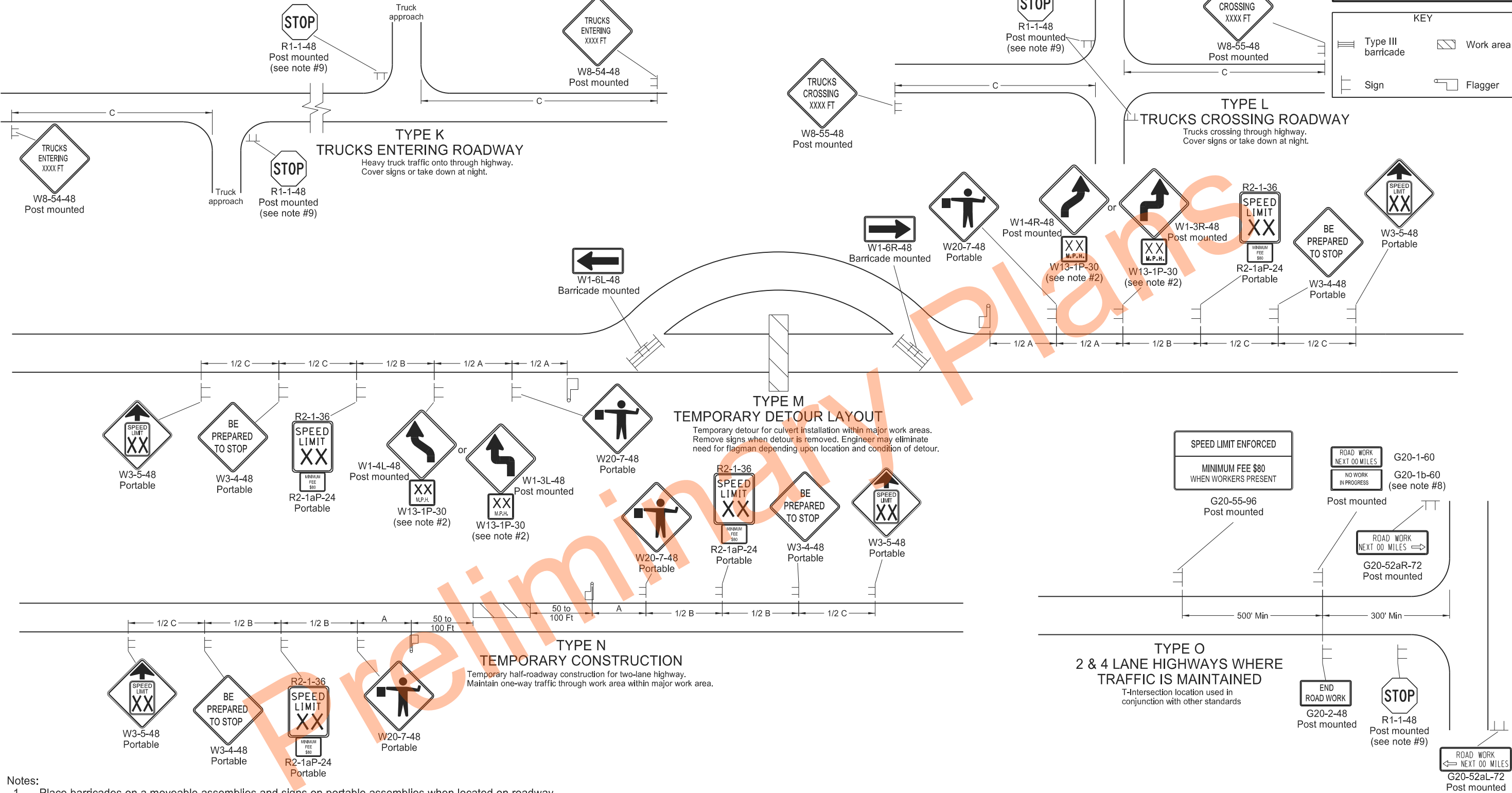
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

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



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes:

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

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

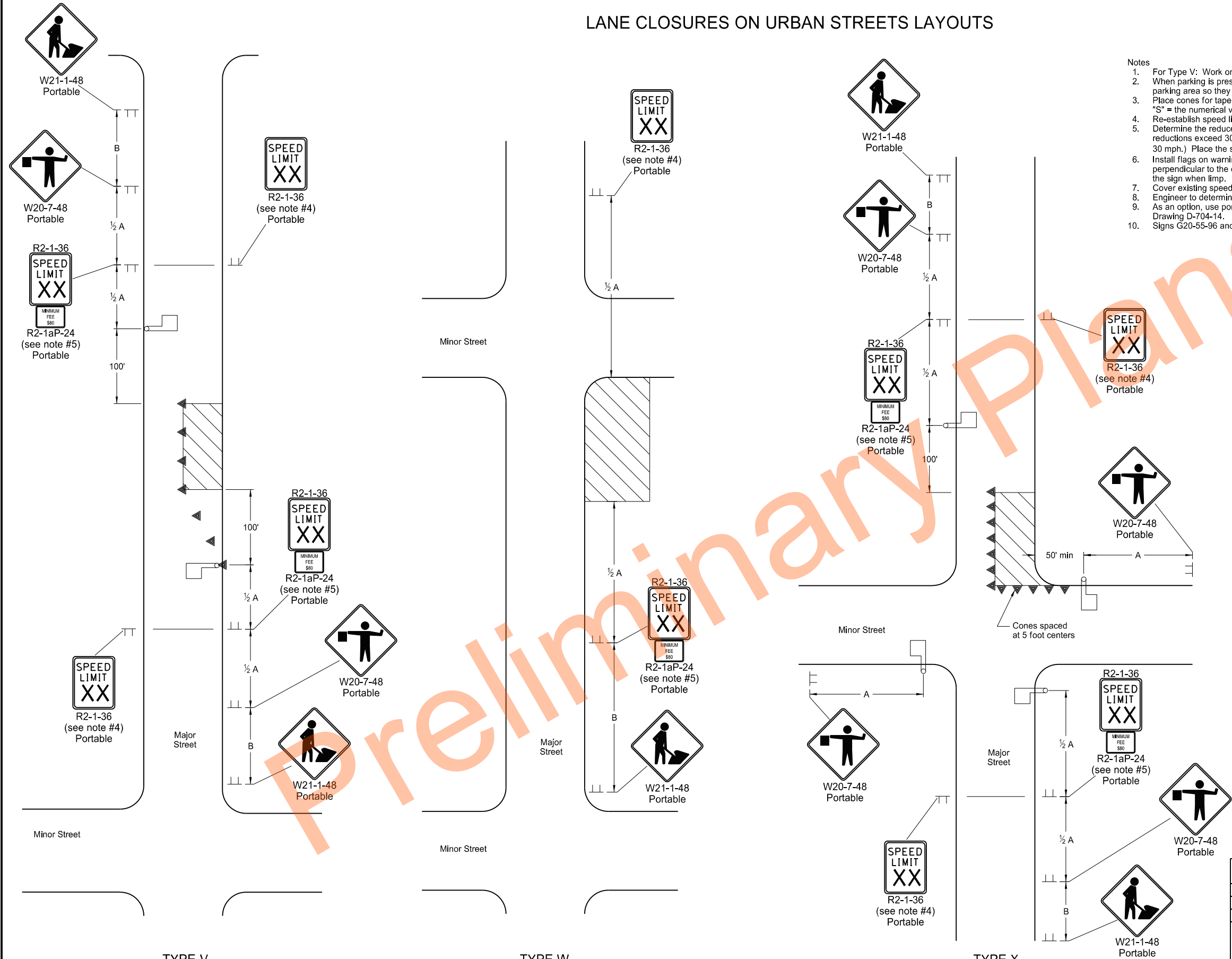
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work



11/29/22

LANE CLOSURES ON URBAN STREETS LAYOUTS

D-704-25



- Notes
- For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
 - When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic. Place signs on portable mounts when located on roadway.
 - Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S". "S" = the numerical value of speed limit.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches 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.
 - Engineer to determine safe speed, when necessary.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

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

KEY	
	Sign
	Cones
	Work area
	Flagger

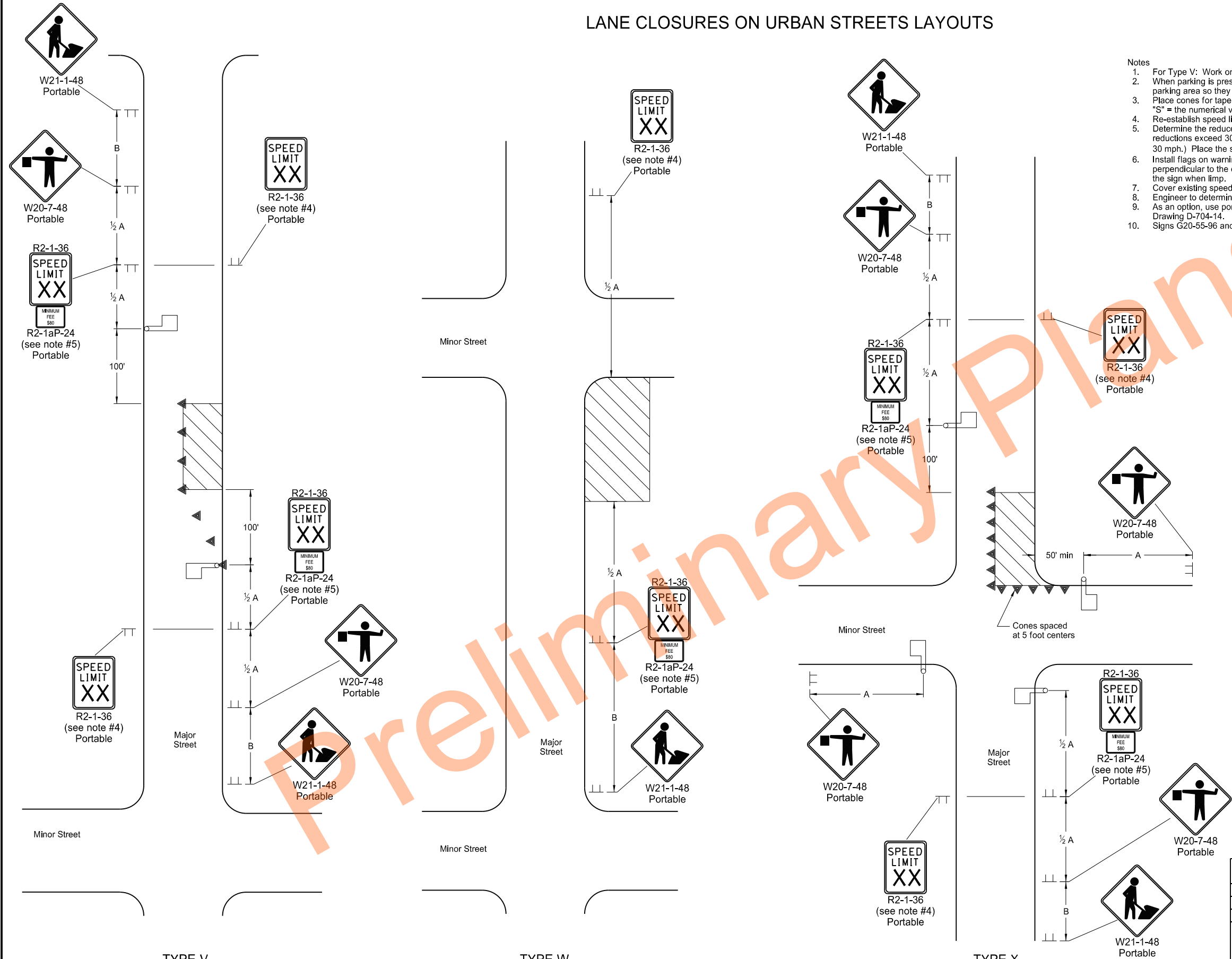
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & removed signs
11-01-19	Revised note & added Min Fee sign
8-01-24	Electronic Stamp/Signature



08/01/24

LANE CLOSURES ON URBAN STREETS LAYOUTS

D-704-25



- Notes
- For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
 - When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic. Place signs on portable mounts when located on roadway.
 - Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S". "S" = the numerical value of speed limit.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches 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.
 - Engineer to determine safe speed, when necessary.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

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

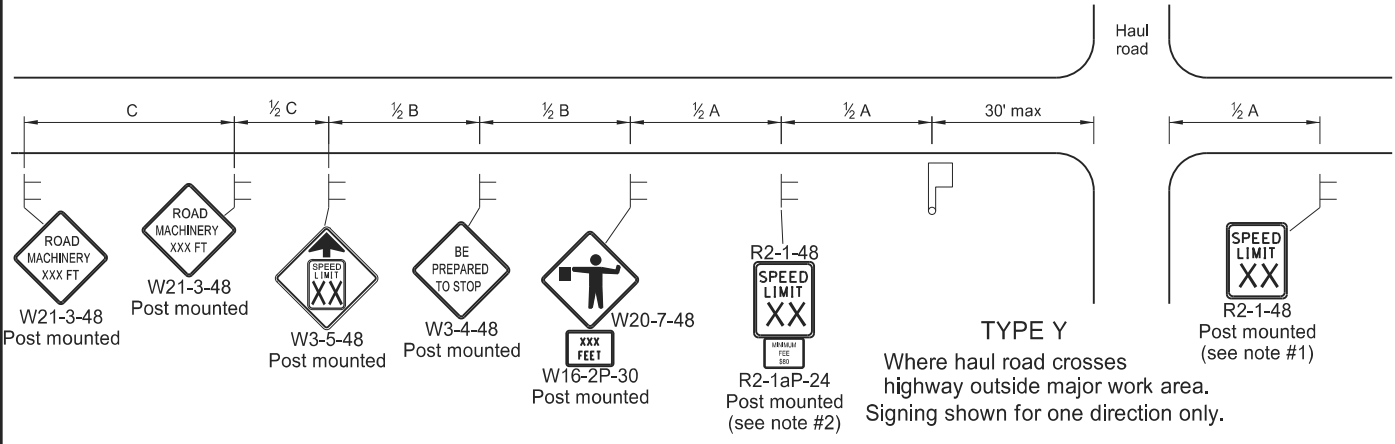
KEY	
	Sign
	Cones
	Work area
	Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & removed signs
11-01-19	Revised note & added Min Fee sign
8-01-24	Electronic Stamp/Signature



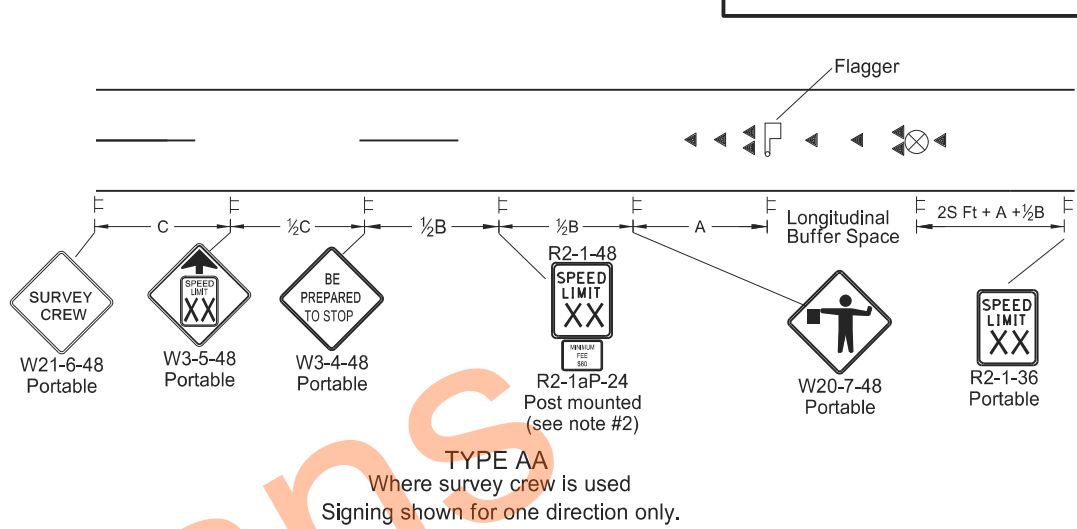
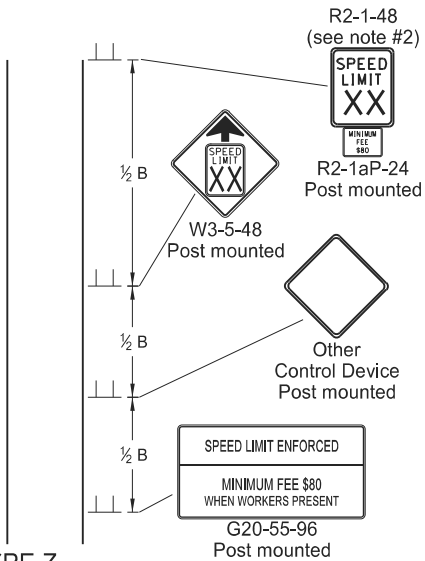
08/01/24

MISCELLANEOUS SIGN LAYOUTS

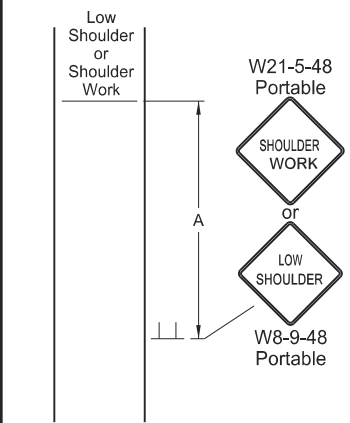


TYPE Y
Where haul road crosses highway outside major work area. Signing shown for one direction only.

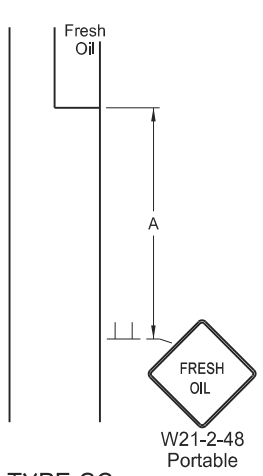
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



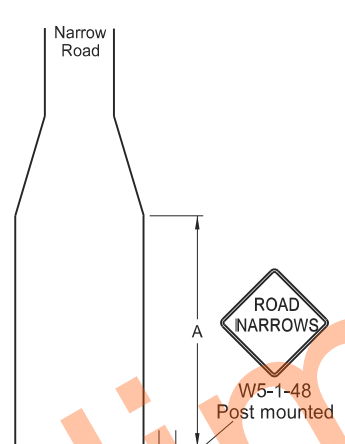
TYPE AA
Where survey crew is used
Signing shown for one direction only.



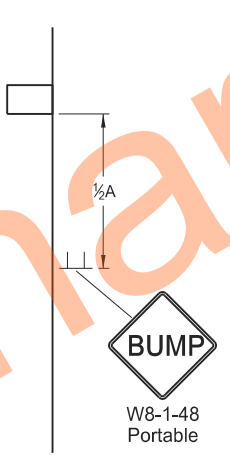
TYPE BB
Within major work area where sign conditions exist



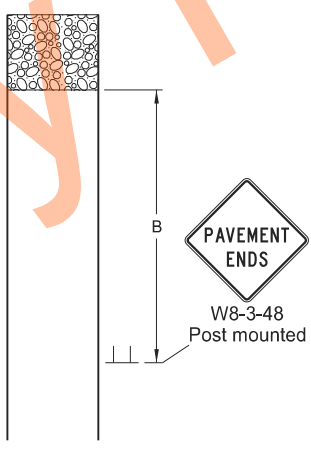
TYPE CC
Where sign conditions exist



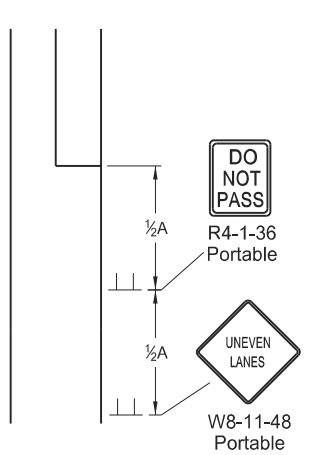
TYPE DD
Where sign conditions exist



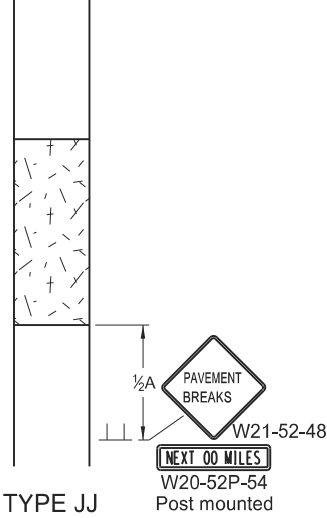
TYPE EE
Where sign conditions exist



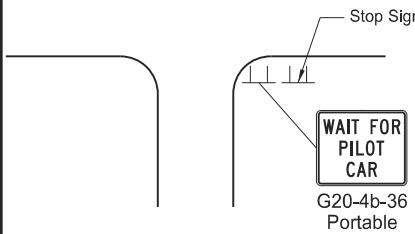
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



TYPE GG
Where elevation difference exists between lanes



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



TYPE KK
At major intersections within pilot car control area

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

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

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

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

KEY

Flagger Sign

Cones Survey Equipment

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

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

KIRK J. HOFFA

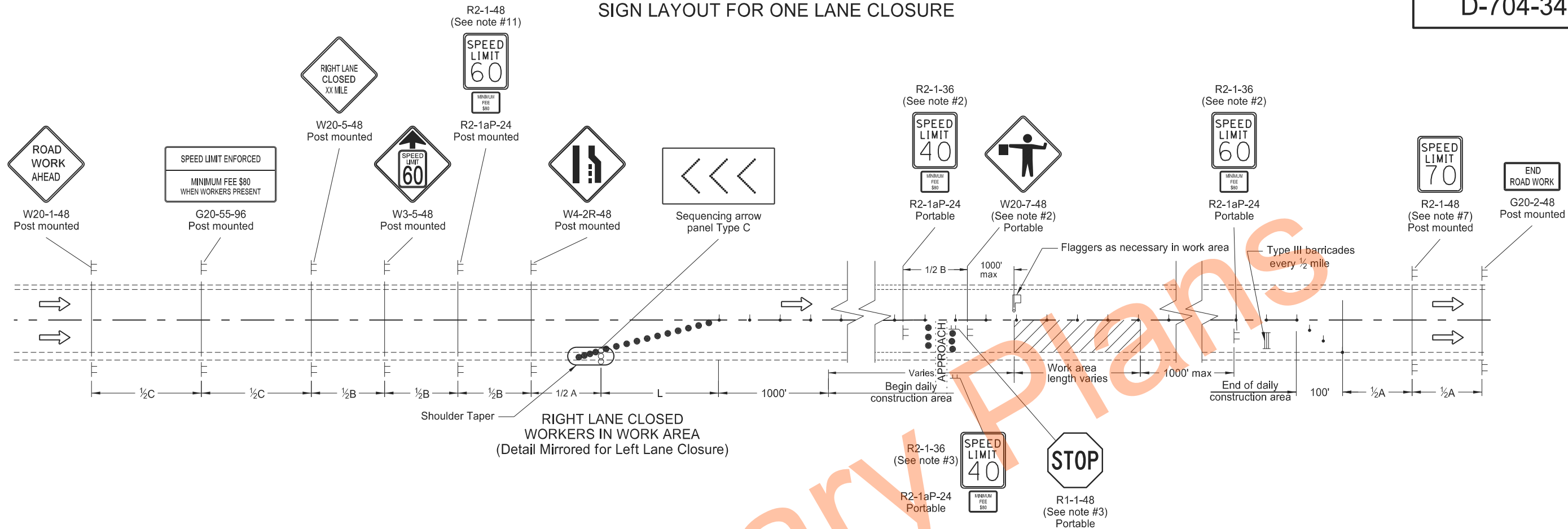
REGISTERED PROFESSIONAL ENGINEER PE-4683

NORTH DAKOTA

02/23/23

SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



Notes:

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

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

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

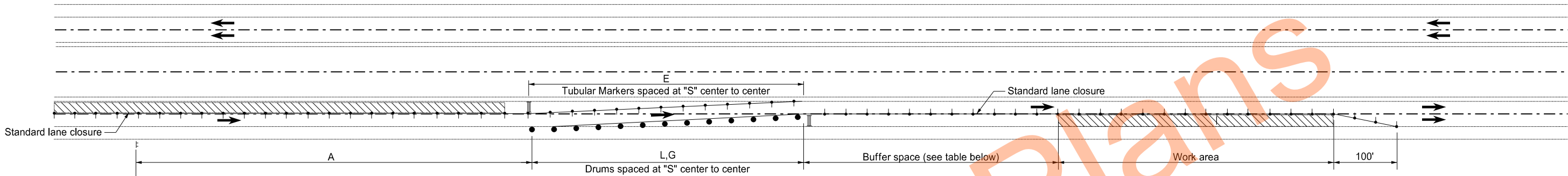
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd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

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

11/29/22

TRAFFIC CONTROL SYSTEM
LANE SHIFT BETWEEN A LANE CLOSURE AND AN OPPOSITE LANE CLOSURE

D-704-34A



QUANTITIES	
TYPE III BARRICADES	2 Each
DELINEATOR DRUMS	13 Each
TUBULAR MARKERS	13 Each
RAISED PAVEMENT MARKERS (White)	Varies
OBLITERATION OF PAVEMENT MARKING	Varies

KEY	
	Work area
	Type III barricade
	Traffic Direction
	Delineator drum
	Tubular markers
	Sign

LEGEND	
E	Obliteration of pavement marking (10' line, 30' skip centerline)
G	Raised pavement markers (white) 5' ctrs.

- Notes
- Variables
 - S = Numerical value of posted speed limit, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.
 - W = Width of offset in feet.
 - L = Taper length in feet. Speeds 40 mph or less $L=WS^2/60$. Speeds 45 mph or greater $L=WS$.
 - Place signs and barricade on roadway on moveable assemblies.
 - Cover existing speed limit signs within reduced speed zones.
 - Upon approval, the Engineer will measure obliterated or covered pavement marking as Obliteration of Pavement Marking.
 - As an option, use portable sign supports in lieu of post mounted sign in accordance with NDDOT Standard Drawing D-704-14.
 - Place "Minimum Fee \$80" signs below speed limit signs when placing traffic control devices to reduce speed.
 - When duration of work is 14 days or less, obliteration of pavement marking (10' line, 30' skip, centerline) and raised pavement markers are not required.

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

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

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

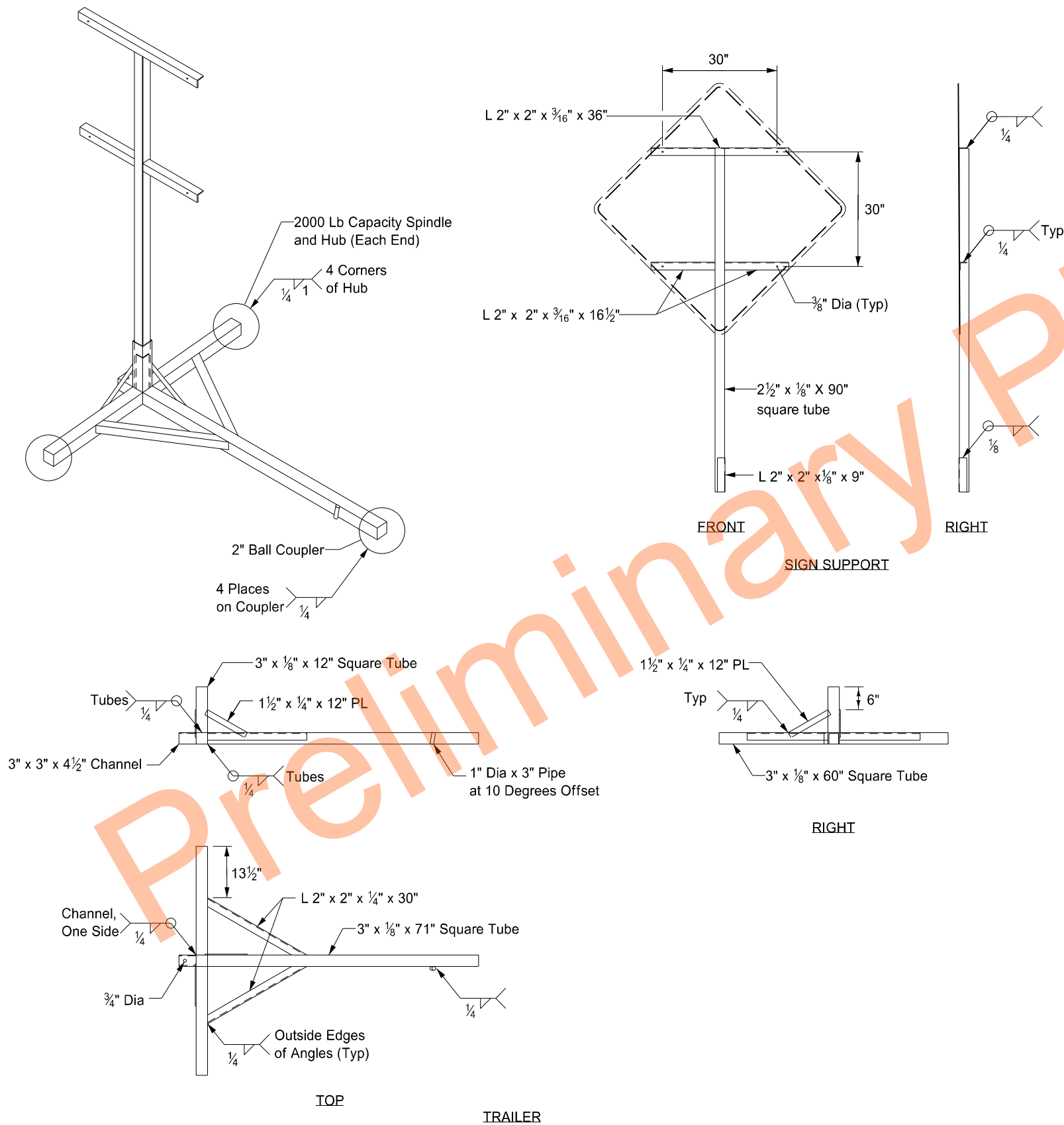
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-26-2012	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Clarified work zone
8-02-24	Electronic Stamp/Signature



08/02/24

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



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

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

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

Technical drawing of a stylized letter 'Y' with dimensions and radii. The overall width is 11'-8" and the overall height is 8'-4". The drawing includes various radii (R) and dimensions for the different parts of the letter.

Dimensions and Radii:

- Overall width: 11'-8"
- Overall height: 8'-4"
- Top horizontal segment: 3'-0"
- Top horizontal segment offset: 8"
- Left vertical segment: 2'-8"
- Left vertical segment offset: 1'-8"
- Left vertical segment offset: 3'-8"
- Left vertical segment offset: 2'-0"
- Right vertical segment: 2'-4"
- Right vertical segment offset: 1'-8"
- Right vertical segment offset: 2'-4"
- Right vertical segment offset: 2'-0"
- Bottom horizontal segment: 5'-4"
- Bottom horizontal segment offset: 1'-0"
- Bottom horizontal segment offset: 5'-4"
- Radius R = 3'-4"
- Radius R = 2'-4"
- Radius R = 8"
- Radius R = 4"

The diagram illustrates the geometric construction of a smooth curve passing through a series of points defined by specific dimensions. Key features include:

- Overall Dimensions:** A total width of 6'-4" and a total height of 5'-4".
- Point Locations:** Points are located at horizontal distances of 3'-0", 8", 2'-4", 3'-8", 1'-8", 4", 8", and 1'-0" from the left edge.
- Curved Segments:** Two circular arcs are used to connect the points. The first arc has a radius of $R = 3'-4"$, and the second arc has a radius of $R = 2'-4"$.
- Tangency and Continuity:** The arcs are drawn such that they are tangent to each other and to the vertical boundaries, ensuring a smooth transition between the segments.

Technical drawing of a complex polygon with dimensions. The drawing includes the following dimensions:

- Overall width: 7'-6"
- Overall height: 12'-9"
- Left side vertical dimensions (from top): 7'-5", 8'-0", 5'-4"
- Top horizontal dimensions (from left): 3'-0", 8"
- Right side vertical dimensions (from top): 5'-0", 7'-9"
- Bottom horizontal dimensions (from left): 1'-8", 4", 8", 1'-0"
- Internal dimensions and radii:
 - 1'-2"
 - 2'-4"
 - 1'-8"
 - 3'-8"
 - 3'-4"
 - R=3'-4"
 - R=2'-4"
 - 1'-0"

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 sign for the word "STOP". The sign is 8'-0" high and 6'-3" wide. The letters are white with black outlines. Dimensions are provided for the overall size and the spacing between the letters. The overall width is 6'-3" and the overall height is 8'-0". The spacing between the letters is 16" between 'S' and 'T', 4" between 'T' and 'O', 16" between 'O' and 'P', 2" between 'P' and the next vertical line, 16" between the next vertical line and the end of the sign, and 5" between the end of the sign and the next vertical line. The letter 'S' has a width of 4" and a height of 8'-0". The letter 'T' has a width of 4" and a height of 8'-0". The letter 'O' has a width of 4" and a height of 8'-0". The letter 'P' has a width of 4" and a height of 8'-0". The sign is mounted on a wall with a 16" gap between the sign and the wall. The sign is made of 1/2" thick material. The sign is made of 1/2" thick material.

Technical drawing of a large 'S' and 'F' logo. The 'S' is 8'-0" high and 16" wide. The 'F' is 9'-8" high and 16" wide. The logo is composed of multiple segments, each 4" wide. The 'S' is formed by two vertical segments, each 4" wide, with a 4" gap between them. The 'F' is formed by two vertical segments, each 4" wide, with a 4" gap between them. The logo is shown in a perspective view, with a 3D effect. The dimensions are given in feet and inches.

Technical drawing of the word "GAS" with dimensions. The drawing shows the word 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".

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 30' wide road with 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 is 30 feet. The shoulder width is 10 feet, and the travel lane width is 20 feet. The edge line is marked on both sides of 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"

3.3"

6.6"

16"

6"

1.6"

60"

See Advanced Placement Distance table at right

26' to nearest rail

Stop line 8' from gate, if present

W10-1 

46 S. F.

The diagram illustrates the cross-section of a 12-foot wide sidewalk. From the curb face on the left to the roadway centerline on the right, the layers and dimensions are as follows:

- Curb face**: The left edge of the sidewalk.
- 2'x6', 2'x8', 2'x10' or 2'x12' white line**: A vertical line marking the edge of the sidewalk, 24 inches from the curb face.
- 24" [Black Bar]**: A 24-inch thick black rectangular layer, 12 inches min to 30 inches max wide.
- 24" [Black Bar]**: A 24-inch thick black rectangular layer, 24 inches wide.
- 24" [Black Bar]**: A 24-inch thick black rectangular layer, 24 inches wide.
- Wheel track**: A 30-inch wide wheel track, 24 inches from the previous layer.
- 24" [Black Bar]**: A 24-inch thick black rectangular layer, 30 inches wide.
- 24" [Black Bar]**: A 24-inch thick black rectangular layer, 12 inches min to 30 inches max wide.
- Wheel track**: A 30-inch max wide wheel track, 24 inches from the previous layer.
- 24" [Black Bar]**: A 24-inch thick black rectangular layer, 6 inches min to 15 inches max wide.
- ϕ of Roadway**: The centerline of the roadway, 24 inches from the previous layer.

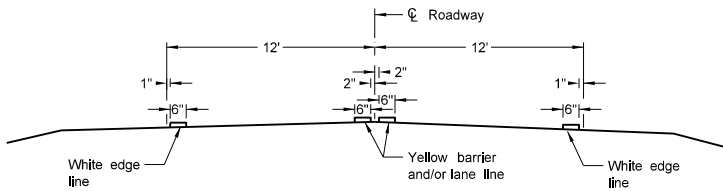
Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

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 ra
11-22-2023	Revised pavement marking wid ths.

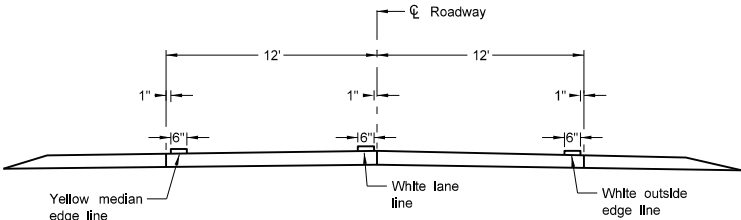


PAVEMENT MARKING

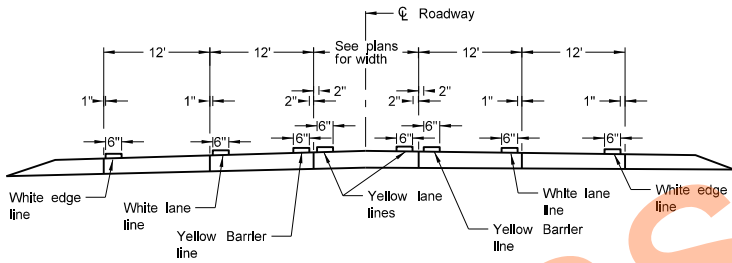
D-762-4



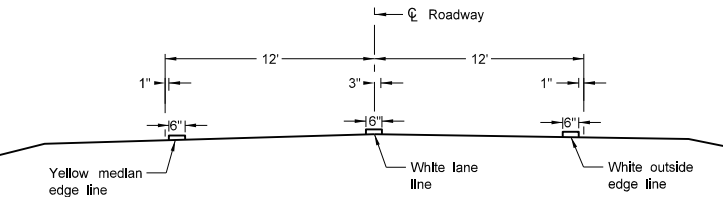
Two Lane Two Way
RURAL ROADWAY



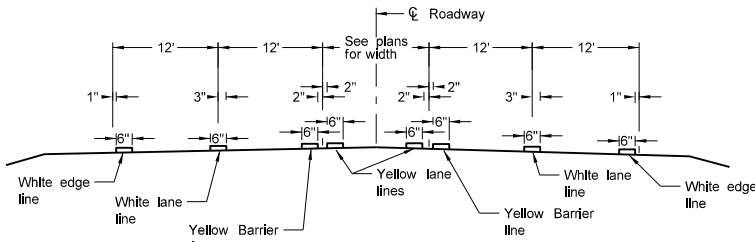
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



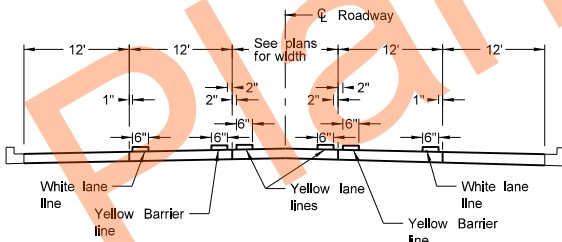
RURAL FIVE LANE ROADWAY
Concrete Section



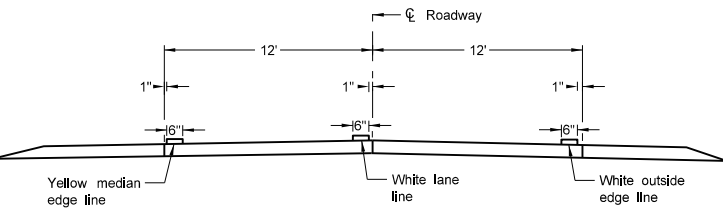
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



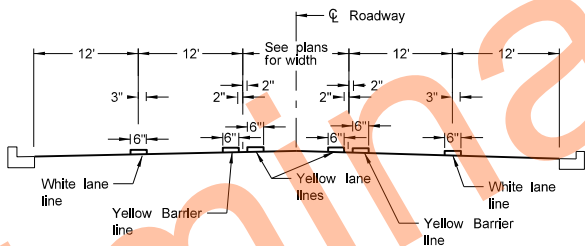
RURAL FIVE LANE ROADWAY
Asphalt Section



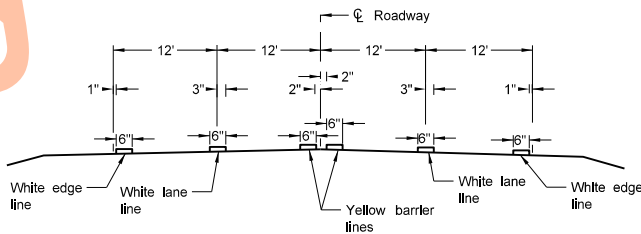
URBAN FIVE LANE SECTION
Concrete Section



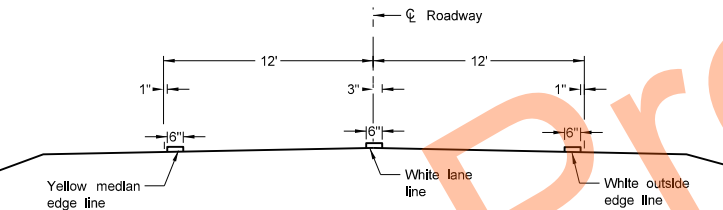
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



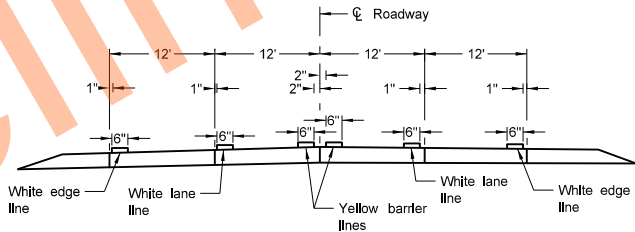
URBAN FIVE LANE SECTION
Asphalt Section



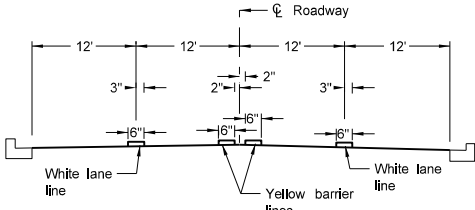
RURAL FOUR LANE ROADWAY
Asphalt Section



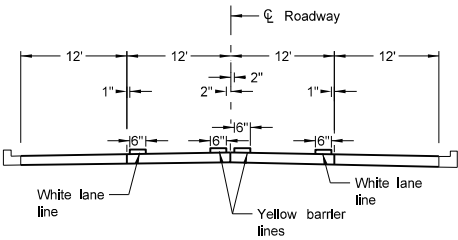
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



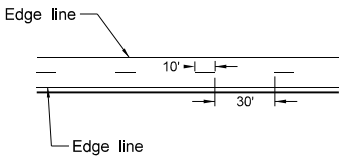
RURAL FOUR LANE ROADWAY
Concrete Section



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.

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

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.



PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

(No Center Left Turn Lane on Major Road)

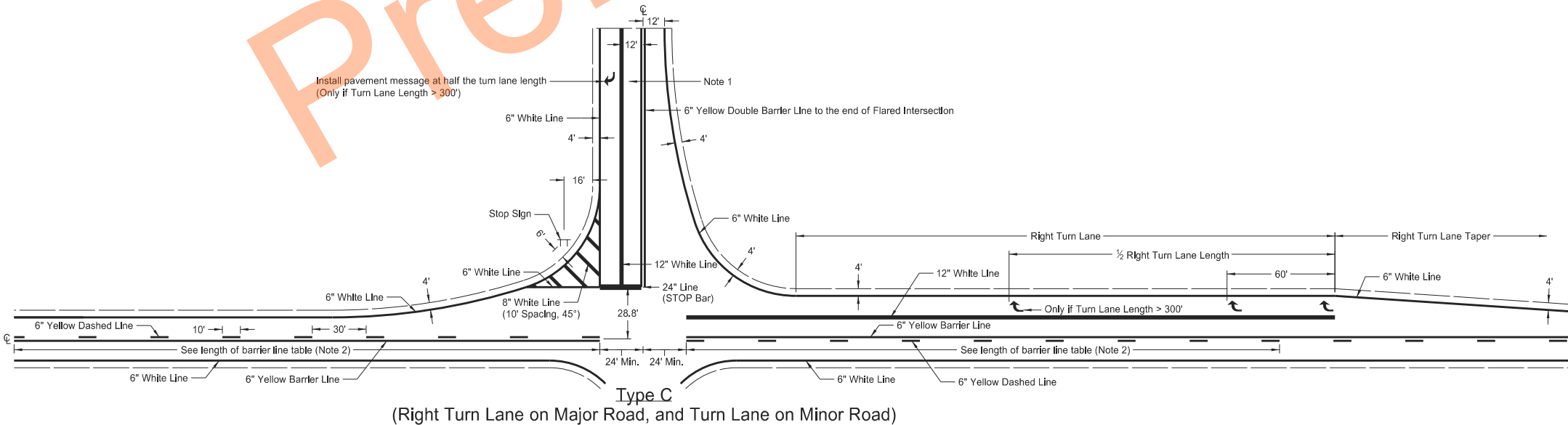
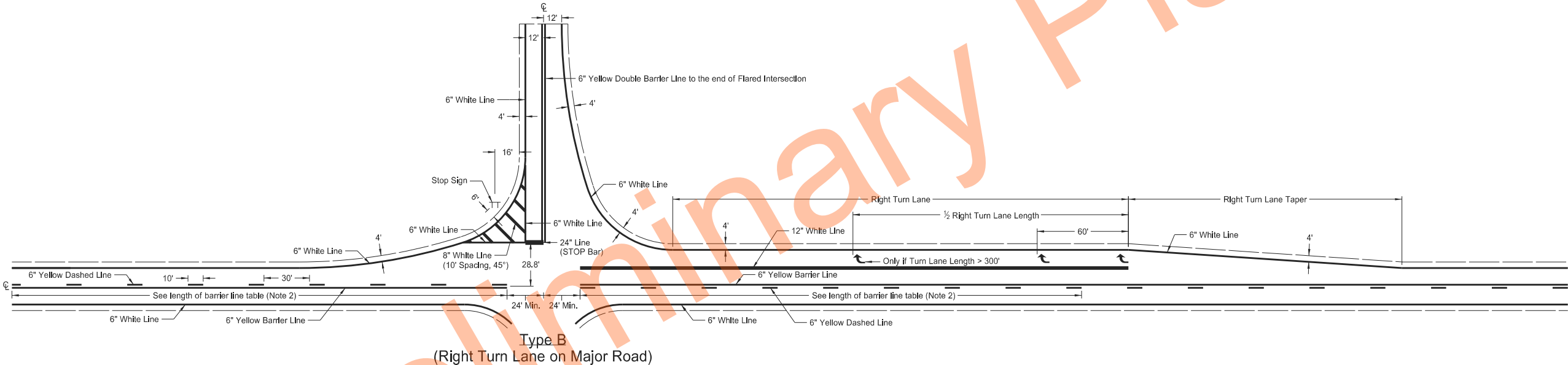
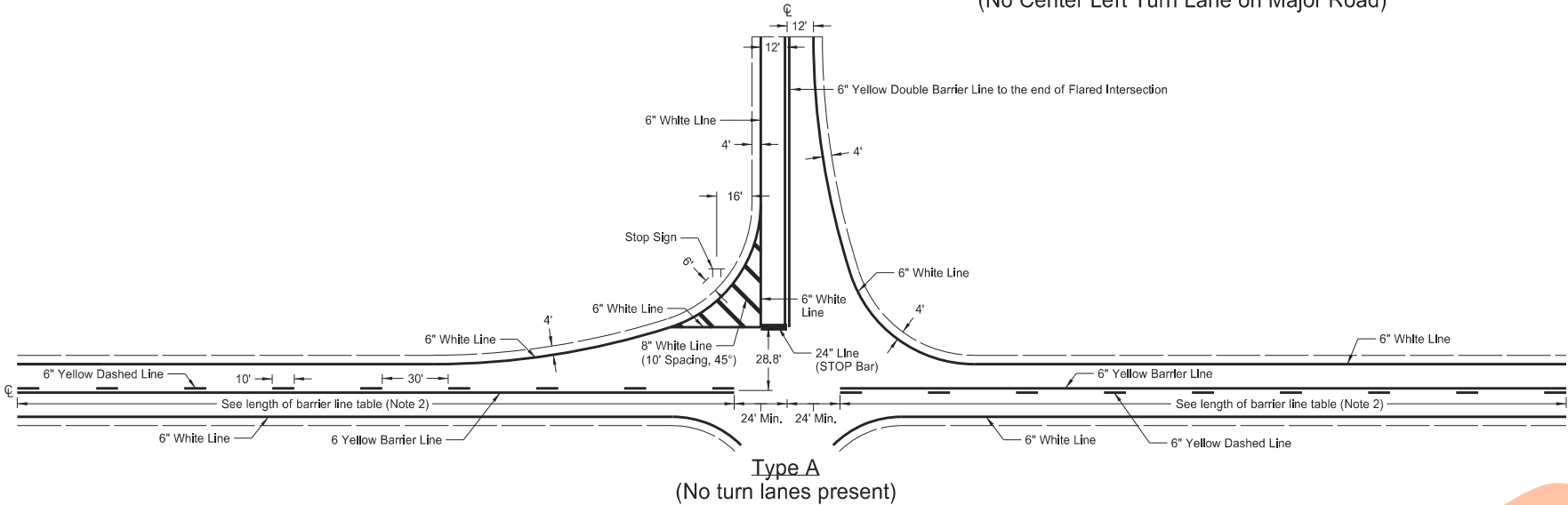
D-762-5

Notes

- 1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
- 2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)
- 3. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
- 4. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40.
- 5. Wide line - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

Table for Length of Barrier Line

Speed Limit (mph)	30	35	40	45	50	55	60	65	70
Minimum Length	200'	250'	305'	360'	425'	495'	570'	645'	730'



- 6" Marking
- 8" Marking
- 12" Marking
- 24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Updated note & dimensioning.
8-30-18	Corrected pvmt mkg placement.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt mkg width.



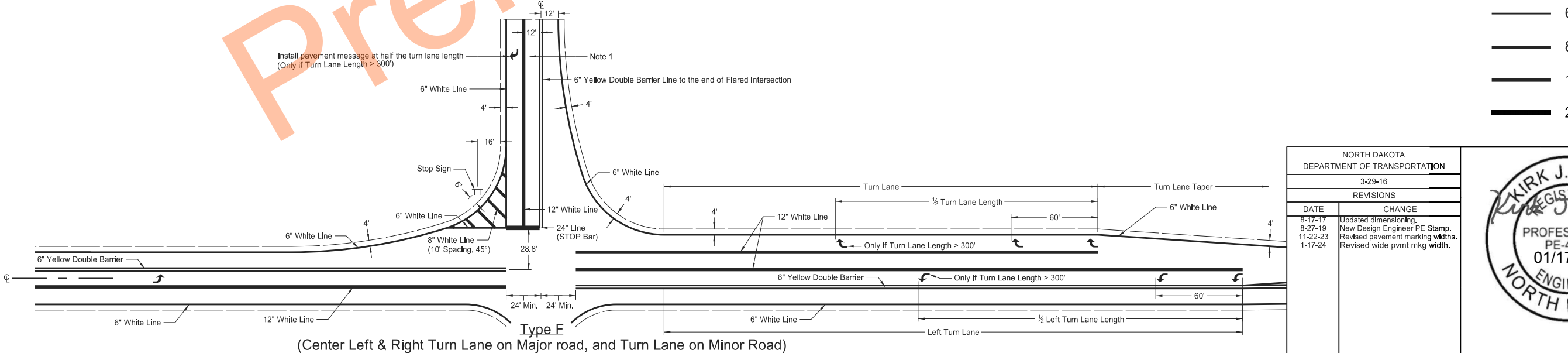
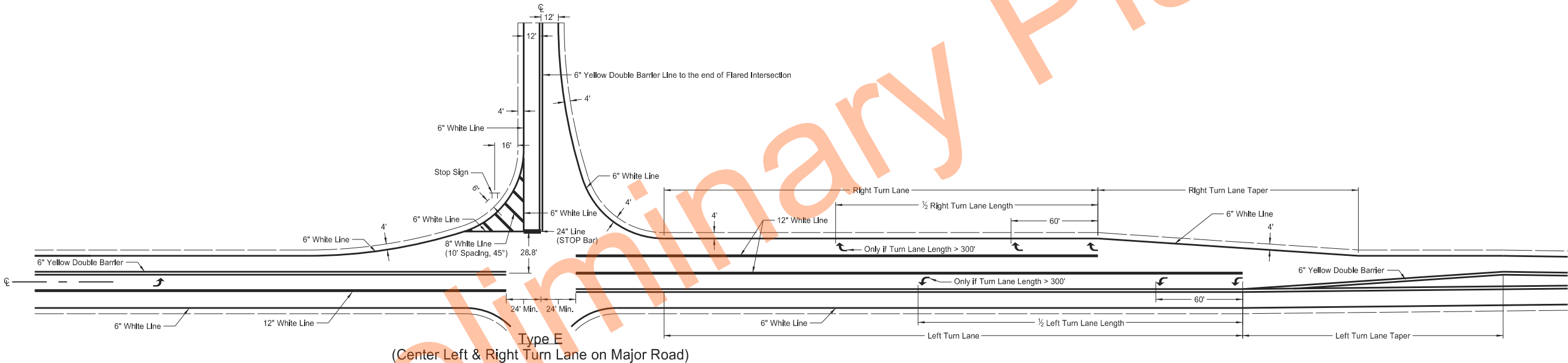
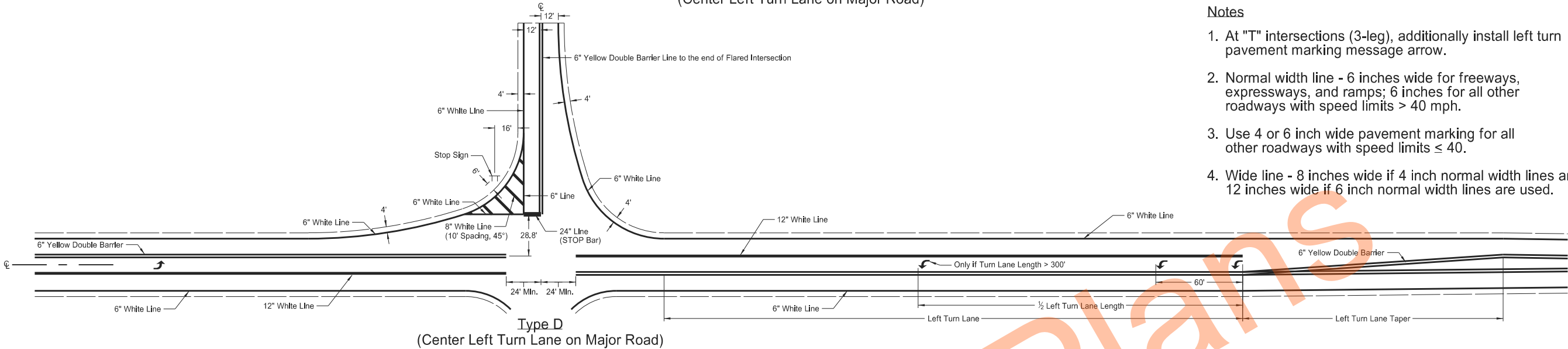
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

(Center Left Turn Lane on Major Road)

D-762-6

Notes

- 1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
- 2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
- 3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40.
- 4. Wide line - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.



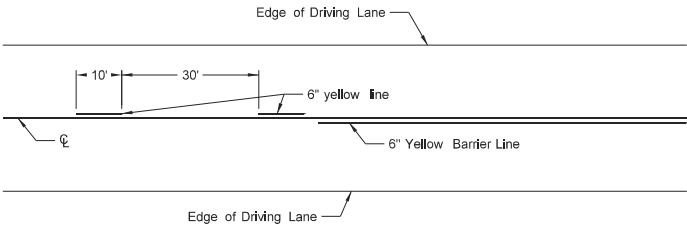
- 6" Marking
- 8" Marking
- 12" Marking
- 24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Updated dimensioning.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt mkg width.

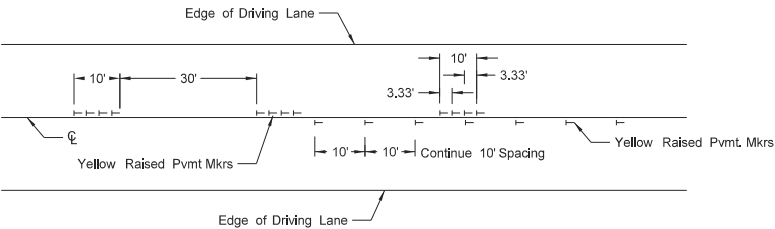


SHORT-TERM PAVEMENT MARKING

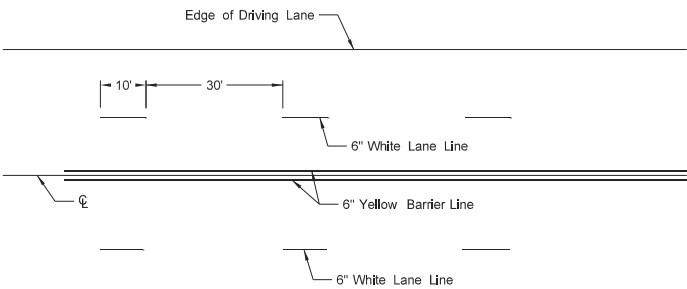
D-762-11



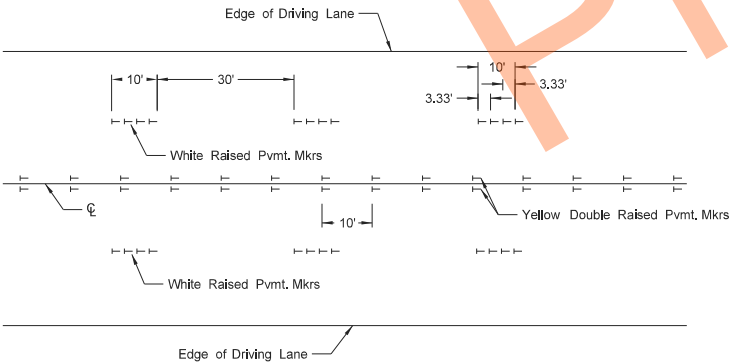
Painted or Tape Lines



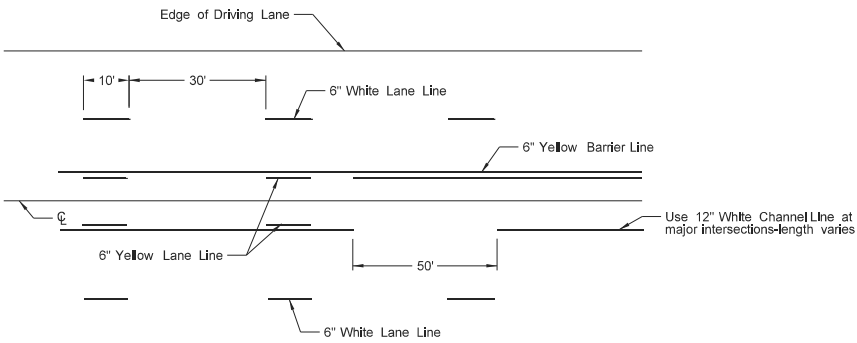
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



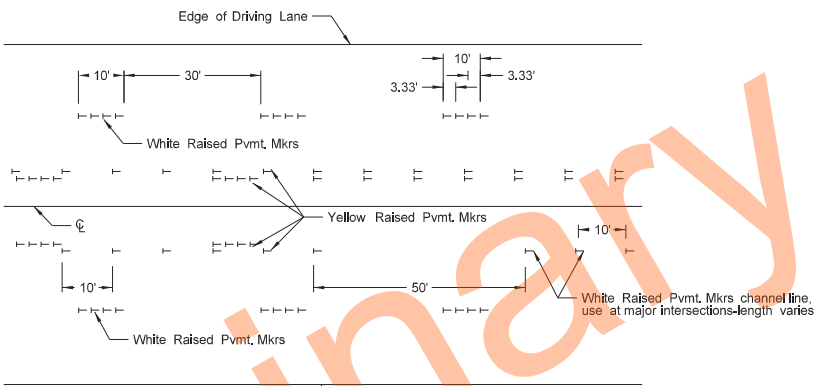
Painted or Tape Lines



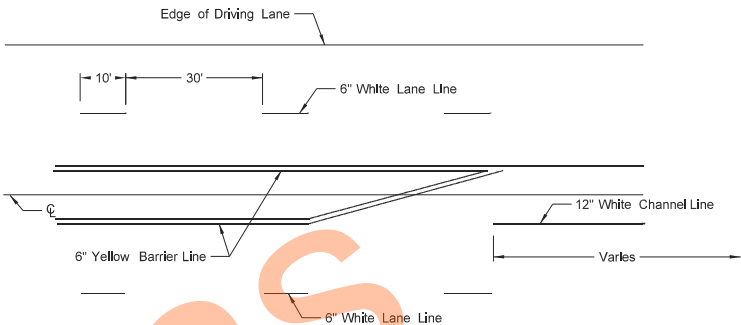
Raised Pavement Markers
FOUR LANE ROADWAY



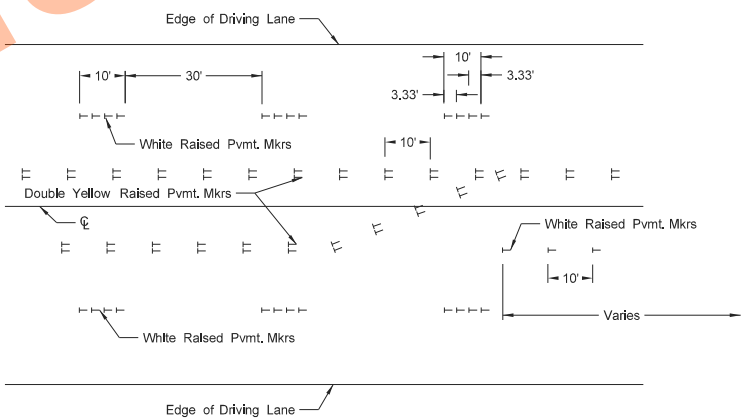
Painted or Tape Lines



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.

