

**JOB# 6**

STATE	PROJECT NUMBER	PCN	SECTION NUMBER	SHEET NUMBER
ND	SC-3331(054)	21426	1	1

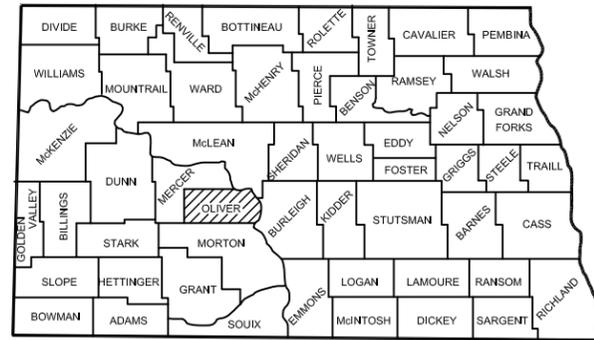
**OLIVER COUNTY, NORTH DAKOTA  
PLANS FOR FEDERAL AID PROJECT  
SC-3331(054)**

**OLIVER COUNTY HIGHWAY 3331  
BITUMINOUS SEAL COAT & INCIDENTALS**

GOVERNING SPECIFICATIONS  
2014 Standard Specifications adopted by the North Dakota  
Department of Transportation and the Supplemental Specifications  
effective on the date the project is advertised.

**PROJECT LENGTH**

PROJECT	GROSS MILES	EXCEPTION MILES	NET MILES
SC-3331(054)	4.971	0.000	4.971



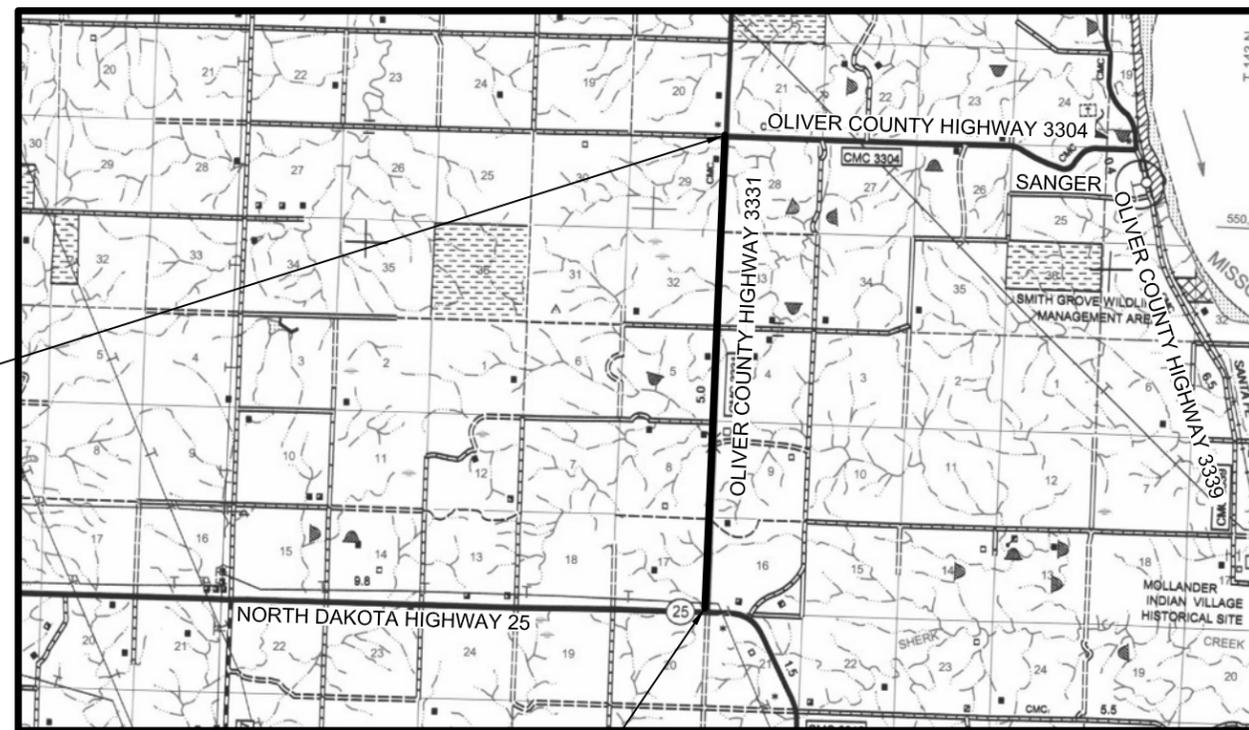
STATE COUNTY MAP

Project consists of approximately 5 miles of Bituminous Seal Coat and Incidentals.  
Project is located on Oliver County Highway 3331, beginning at ND Highway 25 and  
extending North approximately 5 miles.

**DESIGN DATA**

TRAFFIC ~ SC-3331(054)	AVERAGE DAILY			EST. 30th MAX. HR.	
	PASSENGER	TRUCKS	TOTAL		
CURRENT TRAFFIC	2016	475	N/A	475	48
TRAFFIC FORECAST	2036	525	N/A	525	53

DESIGN SPEED 55 MPH  
MINIMUM SIGHT DISTANCE (STOPPING) 495 FEET



**END PROJECT SC-3331(054)**  
Sta. 363+25 = A Point Approximately  
67 Feet North and 27 Feet  
West of the Northeast Corner of  
Sec. 29, Twp. 143 N., Rge. 82 W.

**BEGIN PROJECT SC-3331(054)**  
Sta. 100+76 = A Point Approximately 76 Feet  
North of the Southwest Corner of  
Sec. 16, Twp. 142 N., Rge. 82 W.

PS&E Corrections  
Surveyed & Designed Date

March 2016  
February 2016

DESIGNER	Dylan Schwarz
DESIGNER	-

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**CERTIFICATION**  
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY  
ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A  
DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE  
LAWS OF THE STATE OF NORTH DAKOTA.

JAMES D. JACKSON (s)  
KADRMAS, LEE & JACKSON, INC.

DATE 03/18/2016 REGISTRATION NUMBER PE-9469



4585 Coleman St  
P.O. BOX 1157  
BISMARCK, ND 58502-1157  
(701) 355-8400, FAX (855) 288-8055

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-3331(054)	2	1

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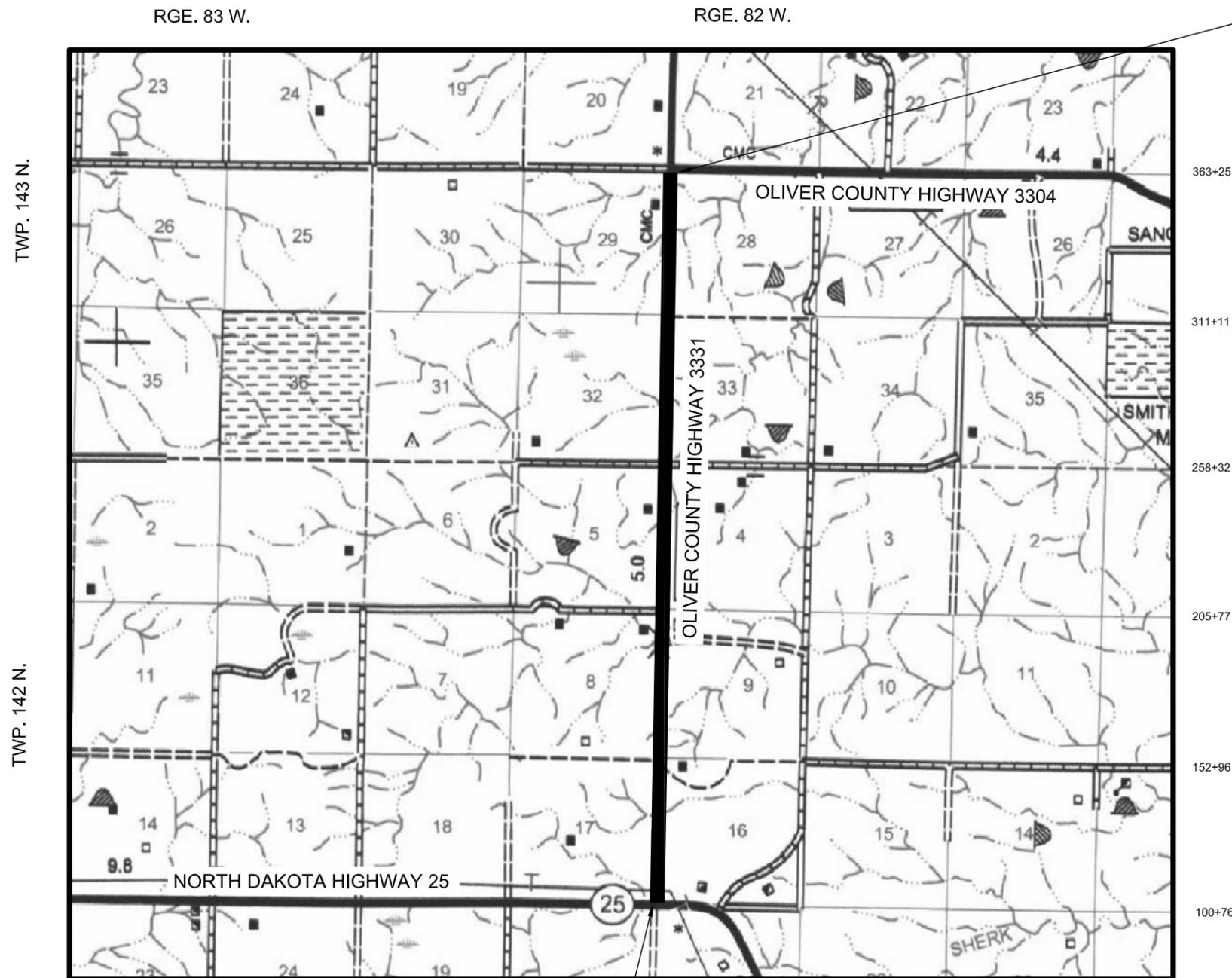
<u>SECTION NO.</u>	<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	1	Title Sheet
2	1	Table of Contents & List of Standard Drawings
4	1	Scope of Work
6	1	Plan Notes
8	1	Estimate of Quantities & Basis of Estimate
11	1	Pavement Marking
20	1	General Details
30	1	Typical Section
100	1	Traffic Control Devices List
100	2	Traffic Control Signing Layout

**LIST OF STANDARD DRAWINGS**

<u>STANDARD NO.</u>	<u>DESCRIPTION</u>
D-704-3	Lane Markers (Spotting Tab for Seal Projects Only)
D-704-7 & 8	Breakaway Systems for Construction Zone Signs
D-704-9	Construction Sign Details Terminal and Guide Signs
D-704-10	Construction Sign Details Regulatory Signs
D-704-11	Construction Sign Details Warning Signs
D-704-14	Construction Sign Punching and Mounting Details
D-704-15	Road Closure Layouts
D-704-20	Terminal and Seal Coat Sign Layouts
D-704-22	Construction Truck and Temporary Detour Layouts
D-704-27	Traffic Control Plan for Moving Operations
D-704-50	Portable Sign Support Assembly
D-762-4	Pavement Marking



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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**END PROJECT SC-3331(054)**  
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 67 Feet North and 27 Feet  
 West of the Northeast Corner  
 of Sec. 29, Twp. 143 N., Rge. 82 W.



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 Bituminous Seal Coat & Incidentals

**BEGIN PROJECT SC-3331(054)**  
 Sta. 100+76 = A Point Approximately  
 76 Feet North of the Southwest Corner  
 of Sec. 16, Twp. 142 N., Rge. 82 W.

<b>SC-3331(054)</b> OLIVER COUNTY, NORTH DAKOTA		
		<b>SCOPE OF WORK</b>
DRWN. BY DS	CHKD BY JK	PROJECT NO. 1314108

## PLAN NOTES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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**107-710 HAUL ROADS:** Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".

**420-P01 COVER COAT MATERIAL CL 41:** Cover coat material is not required on shoulders except in areas adjacent to wetlands. The Engineer will determine the locations where the shoulders will receive cover coat applications.

**704-P01 TRAFFIC CONTROL FOR SEAL COATS:** Provide traffic control consisting of a temporary lane closure, flagging, and a pilot car.

Traffic control device quantities are based on the following list:

1. Standard D-704-15, Layout A, flagging stations near the active work area require sign W20-7a-48 only; and
2. Standard D-704-22, Layouts K and/or L.

Provide additional devices at no cost to the contract.

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

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<b>SC-3331(054)</b> <small>OLIVER COUNTY, NORTH DAKOTA</small>		
	<b>PLAN NOTES</b>	
	DRWN. BY DS	CHKD. BY JK

## ESTIMATE OF QUANTITIES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-3331(054)	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	*DRIVES (10/24)	TOTAL
103	0100	CONTRACT BOND	L SUM	1	-	1
401	0070	FOG SEAL	GAL	3,500	-	3,500
420	0111	CRS2P EMULSIFIED ASPHALT	GAL	34,300	780	35,080
420	0125	COVER COAT MATERIAL CL 41	TON	974	24	998
702	0100	MOBILIZATION	L SUM	1	-	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	857	-	857
762	1104	PVMT MK PAINTED 4IN LINE	LF	72,028	-	72,028

\*(Section & Private Drives / Field Drives)

## BASIS OF ESTIMATE

TYPICAL SECTION		DRIVES		UNIT	ITEM DESCRIPTION
QUANTITY PER MILE	WIDTH	PRIVATE & SECTION DRIVES (10)	FIELD DRIVES (24)		
704	24'	-	-	GAL	Fog Seal (0.05 Gal/SY)
6,900	28'	30	20	GAL	CRS2P Emulsified Asphalt (0.42 Gal/SY)
176	24'	1	0.6	TON	Cover Coat Material CL 41 (25 Lbs/SY)
20	-	-	-	TON	Cover Coat Material CL 41 for Shoulders

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<b>SC-3331(054)</b> OLIVER COUNTY, NORTH DAKOTA		
	<b>ESTIMATE OF QUANTITIES &amp; BASIS OF ESTIMATE</b>	
DRAWN BY DS	CHECKED BY JK	PROJECT NO. 1314108

**PAVEMENT MARKING**

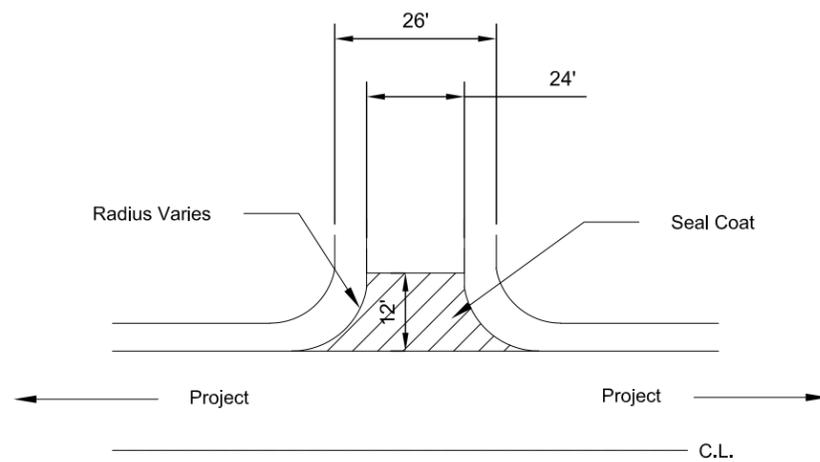
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-3331(054)	11	1

DESCRIPTION				UNIT	QUANTITY PER LOCATION
4" Yellow No Passing Zone (Solid Line)					
Sta. 100+84	to	Sta. 108+34	LT	LF	750
Sta. 112+98	to	Sta. 120+48	RT	LF	750
Sta. 121+98	to	Sta. 129+48	LT	LF	750
Sta. 161+68	to	Sta. 170+93	RT	LF	925
Sta. 170+78	to	Sta. 178+98	LT	LF	820
Sta. 200+18	to	Sta. 207+98	RT	LF	780
Sta. 208+48	to	Sta. 216+98	LT	LF	850
Sta. 212+98	to	Sta. 220+28	RT	LF	730
Sta. 221+98	to	Sta. 228+78	LT	LF	680
Sta. 233+98	to	Sta. 237+98	RT	LF	400
Sta. 242+78	to	Sta. 246+98	LT	LF	420
Sta. 252+18	to	Sta. 265+98	RT	LF	1,380
Sta. 260+68	to	Sta. 274+28	LT	LF	1,360
Sta. 282+28	to	Sta. 291+13	RT	LF	885
Sta. 290+48	to	Sta. 300+18	LT	LF	970
Sta. 318+00	to	Sta. 319+80	RT	LF	180
Sta. 326+70	to	Sta. 328+50	LT	LF	180
Sta. 336+48	to	Sta. 340+18	RT	LF	370
<b>Subtotal</b>				<b>LF</b>	<b>13,180</b>
DESCRIPTION				UNIT	QUANTITY PER LOCATION
4" Yellow Center Lines (10' Line, 30' Sklp)					
Sta. 100+76	to	Sta. 170+78		LF	1,760
Sta. 170+93	to	Sta. 212+98		LF	1,060
Sta. 216+98	to	Sta. 260+68		LF	1,100
Sta. 265+98	to	Sta. 290+48		LF	620
Sta. 291+13	to	Sta. 363+25		LF	1,810
<b>Subtotal</b>				<b>LF</b>	<b>6,350</b>
<b>Total 4" Yellow Pavement Marking Paint</b>				<b>LF</b>	<b>19,530</b>
DESCRIPTION				UNIT	QUANTITY PER LOCATION
4" White Edge Lines					
Sta. 100+76	to	Sta. 363+25			<b>52,498</b>
<b>Subtotal</b>				<b>LF</b>	<b>52,498</b>
<b>Total 4" Permanent Pavement Marking</b>				<b>LF</b>	<b>72,028</b>

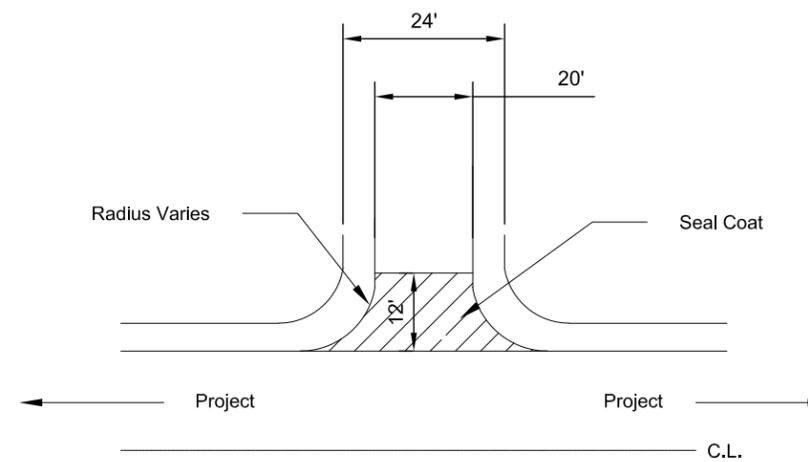
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<b>SC-3331(054)</b> OLIVER COUNTY, NORTH DAKOTA			
	<b>PAVEMENT MARKING</b>		
	<table border="1"> <tr> <td>DRWN. BY DS</td> <td>CHKD BY JK</td> <td>PROJECT NO. 1314108</td> </tr> </table>	DRWN. BY DS	CHKD BY JK
DRWN. BY DS	CHKD BY JK	PROJECT NO. 1314108	

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-3331(054)	20	1



**PRIVATE AND SECTION DRIVES**

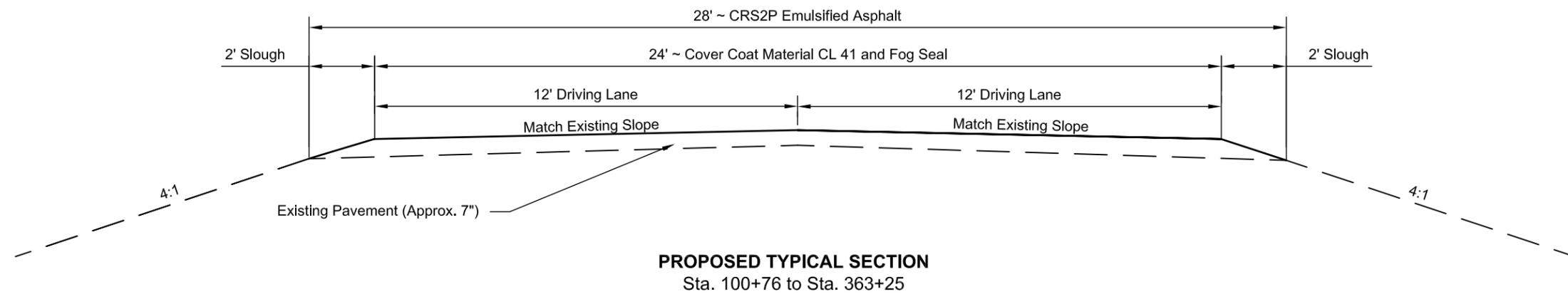


**FIELD DRIVES**

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<b>SC-3331(054)</b> OLIVER COUNTY, NORTH DAKOTA		
	<b>GENERAL DETAILS</b>	
	DRWN. BY DS	CHKD BY JK

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	ND	SC-3331(054)	30	1

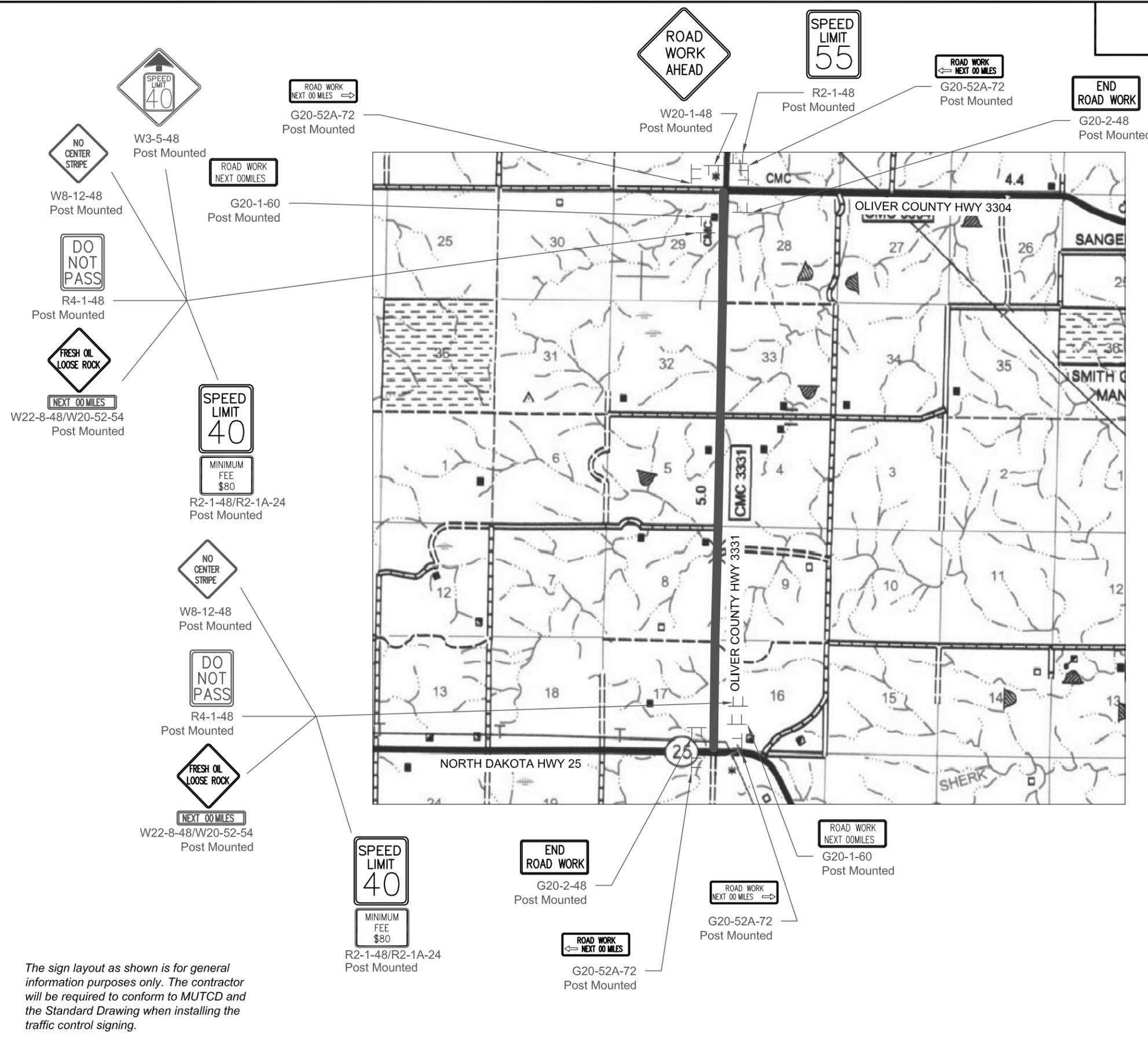


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<b>SC-3331(054)</b> <small>OLIVER COUNTY, NORTH DAKOTA</small>		
	<b>TYPICAL SECTION</b>	
	<small>DRWN. BY</small> DS	<small>CHKD BY</small> JK



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-3331(054)	100	2



Existing speed limit signs within a reduced speed zone shall be covered. This work shall be incidental to other traffic control items.



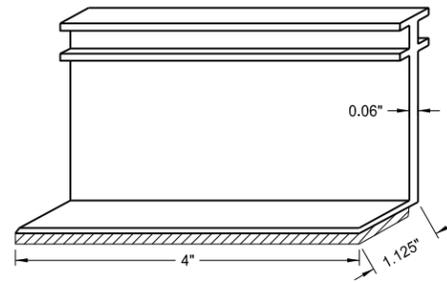
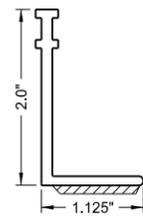
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The sign layout as shown is for general information purposes only. The contractor will be required to conform to MUTCD and the Standard Drawing when installing the traffic control signing.

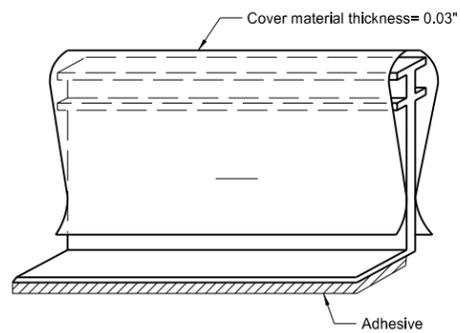
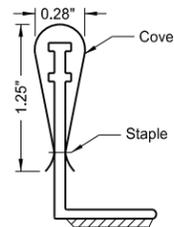
<b>SC-3331(054)</b> OLIVER COUNTY, NORTH DAKOTA		
	<b>TRAFFIC CONTROL          SIGNING LAYOUT</b>	
	<small>DRWN BY</small> DS	<small>CHKD BY</small> JK

LANE MARKERS  
(Spotting Tab for Seal Projects only)

D-704-3



Marker Body



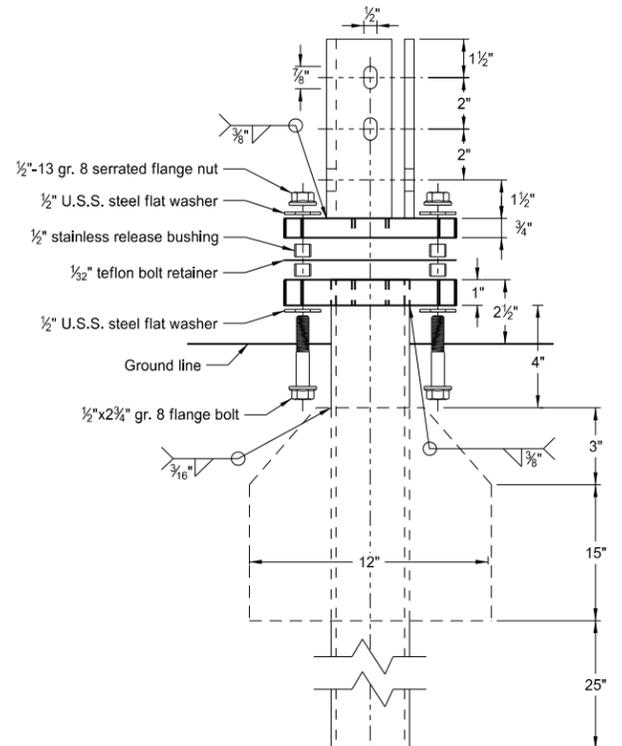
Marker Body with Protective Cover

Notes:

1. The lane line markers shall be installed as shown, prior to the beginning of the seal coat.
2. The cover shall be attached to the vertical part of the marker in such a way that traffic will not cause it to detach and so that it may be easily removed manually.
3. The protective covers shall be removed, immediately after the seal coat is applied.
4. The markers shall be removed after permanent pavement marking has been installed.
5. The marker body and cover shall be manufactured from polyurethane material.
6. Marker types:  
Type Y - Yellow body and cover with yellow reflective tape on both sides.  
Type W - White body and cover with white reflective tape on one side.
7. The reflective tape shall be a retroreflective material. The tape shall have a minimum reflectance of 1200 candle power per foot-candle per square foot, using a .1 degree observation angle and 0 degree entrance angle.
8. The adhesive shall conform to AASHTO M 237.

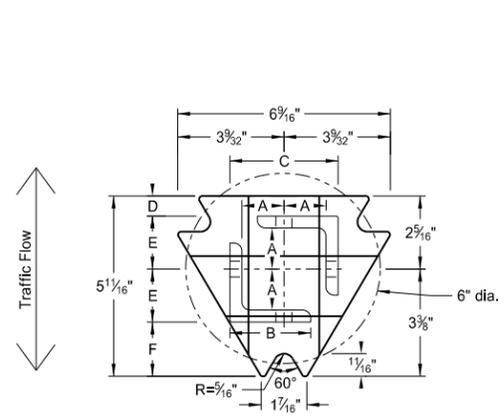
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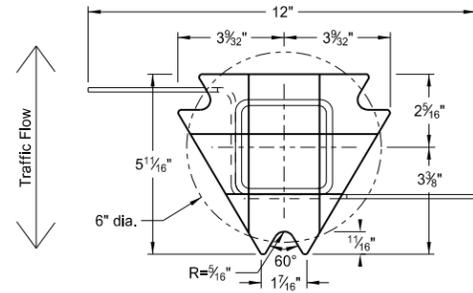


Multi-Directional Slip Base Assembly

Perforated Tube



Top Post Receiver  
Plate - ASTM A572 grade 50  
Angle Receiver - 2 1/2"x2 1/2"x3/8" ASTM A36 structural angle



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

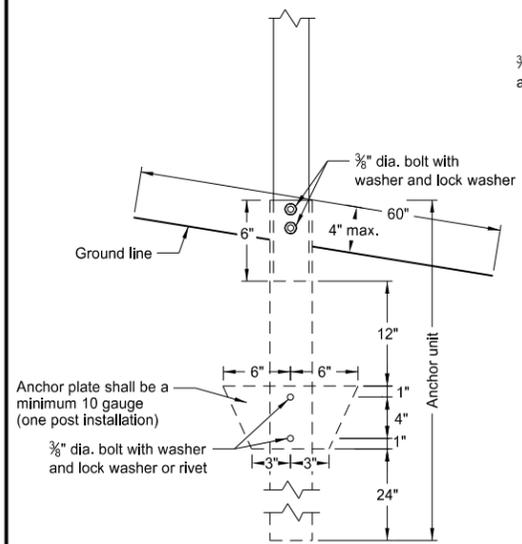
Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

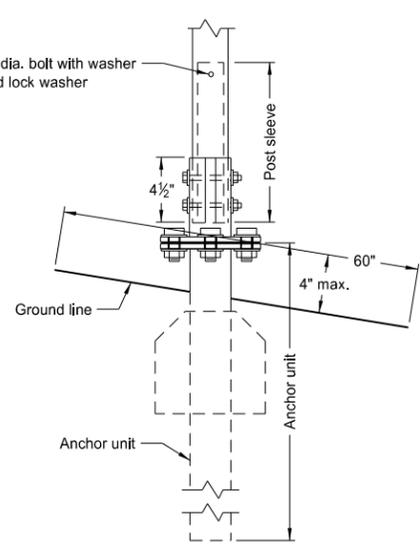
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	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. <sup>4</sup>	Cross Sec. Area in. <sup>2</sup>	Section Modulus in. <sup>3</sup>
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

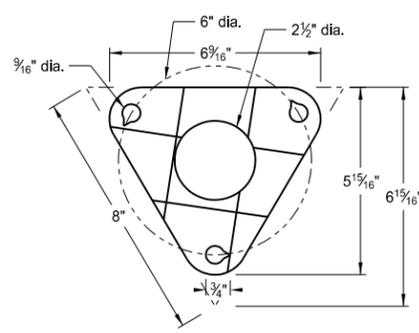
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2"x10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"



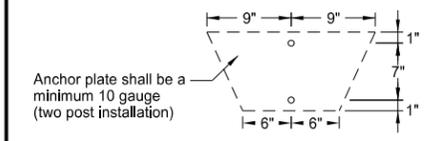
Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



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



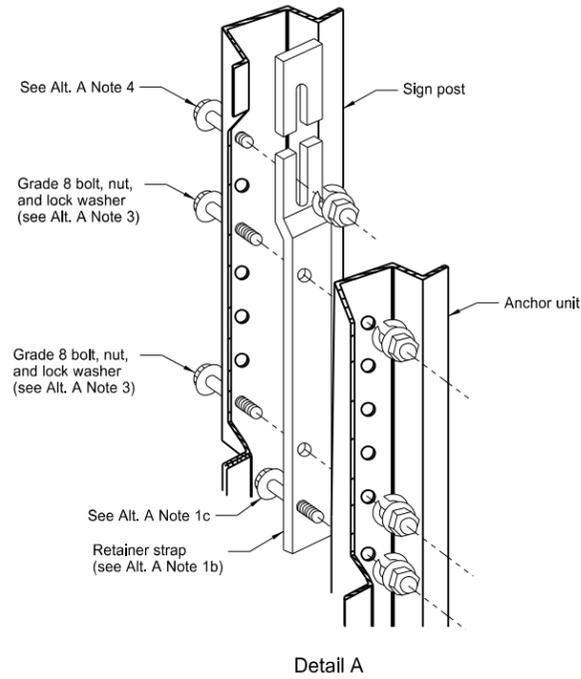
Anchor plate shall be a minimum 10 gauge (two post installation)

- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
- (B) The 2 3/16"x10 ga. may be inserted into 2 1/2"x10 ga. for additional wind load.

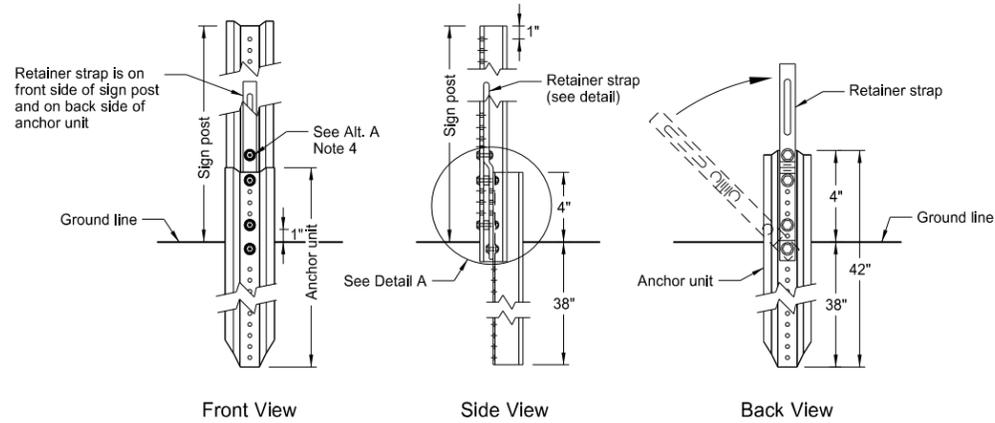
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2-28-14	
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U-Channel Post



Detail A



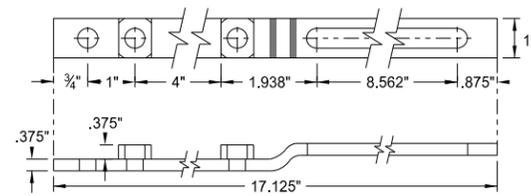
Front View

Side View

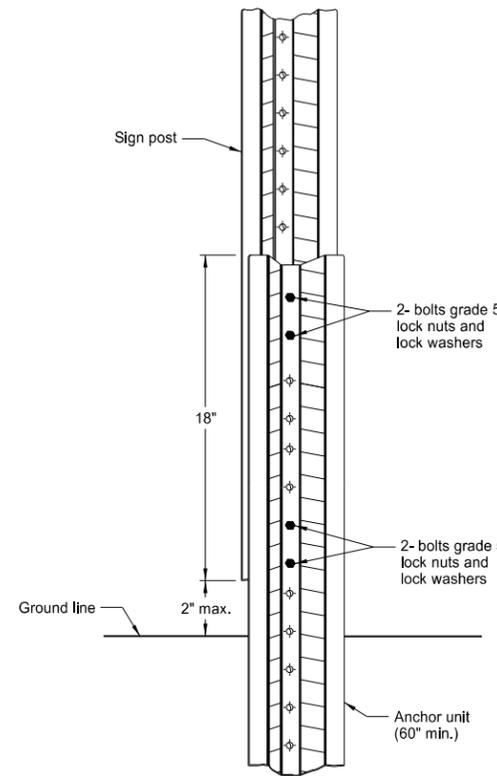
Back View

Breakaway U-Channel Detail Alternate A

A maximum of 2 posts shall be installed within 7'.

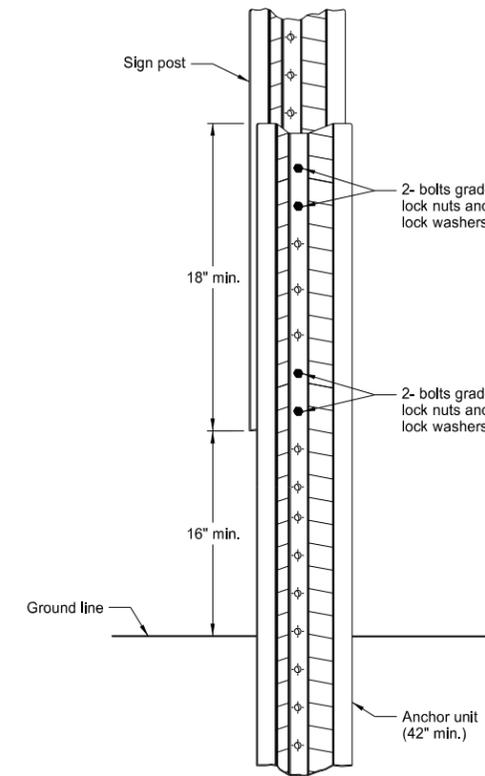


Retainer Strap Detail



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

A maximum of 3 posts shall be installed within 7'.



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

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

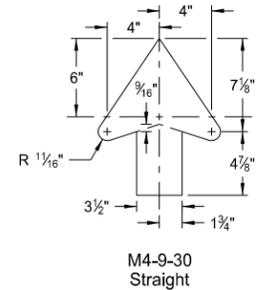
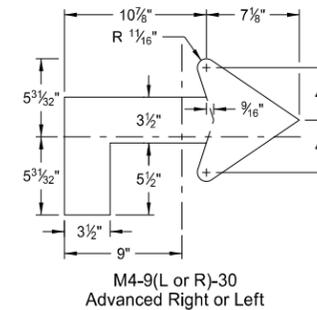
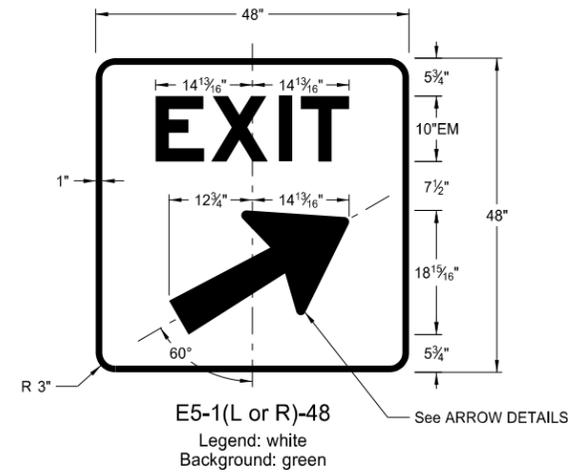
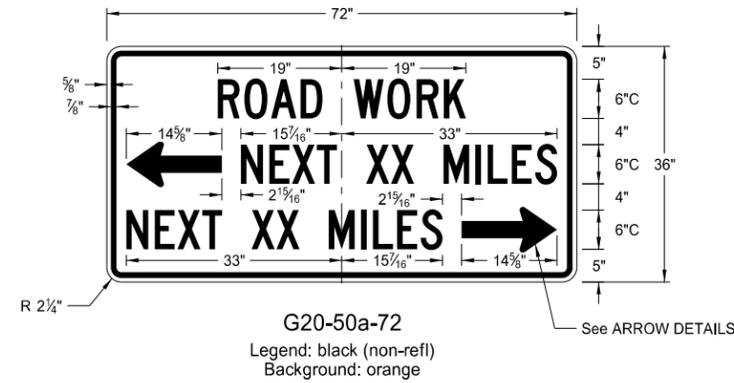
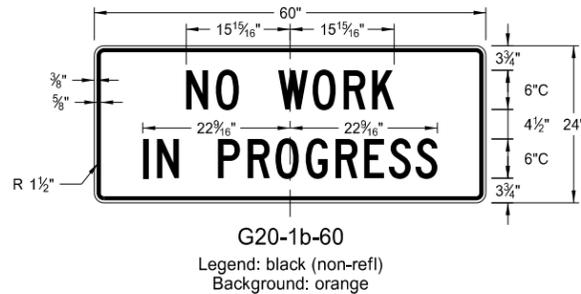
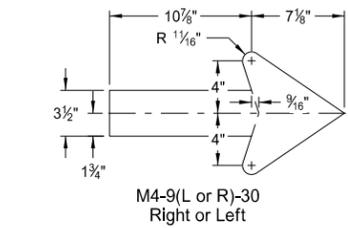
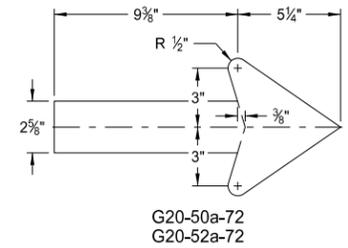
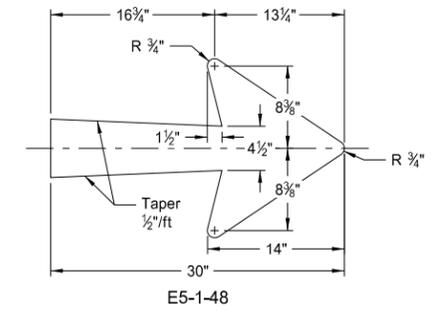
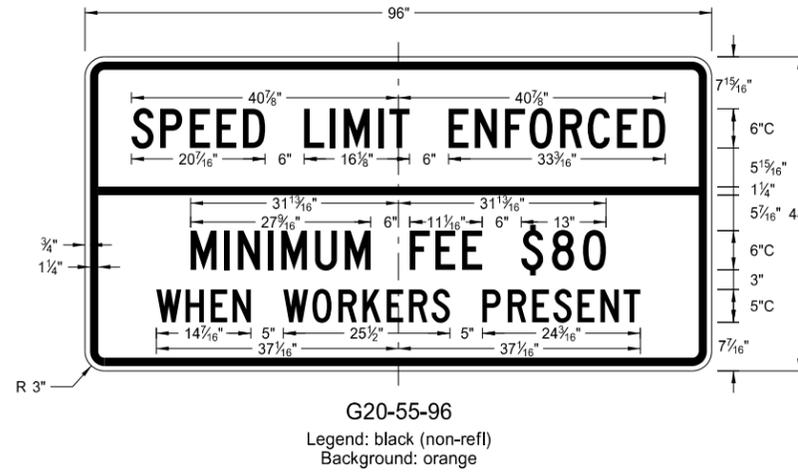
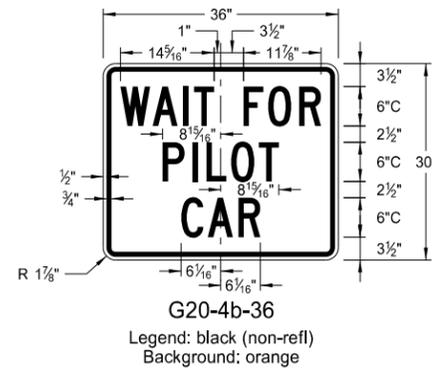
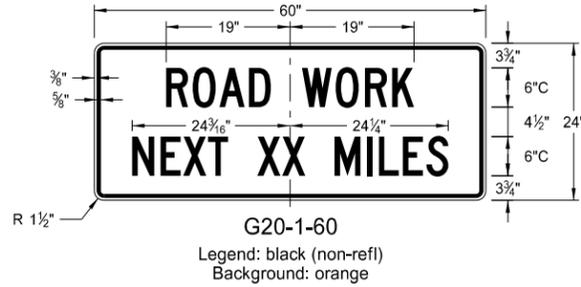
1. a) Drive anchor unit to within 12" of ground level.  
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.  
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.  
d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.  
b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.  
b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. The base post, strap and sign post shall be properly nested. 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

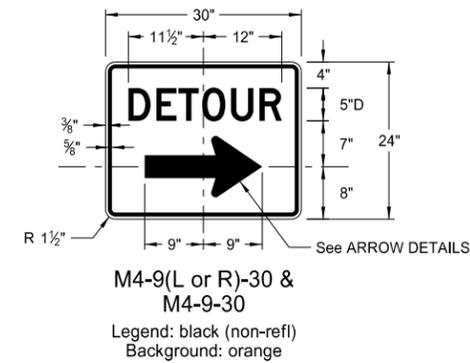
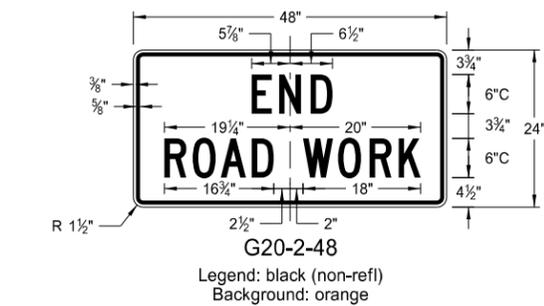
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CONSTRUCTION SIGN DETAILS  
TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

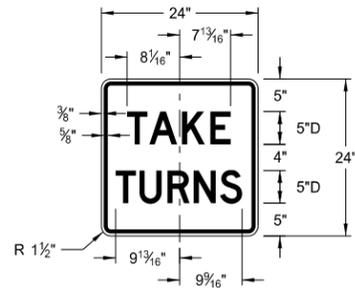
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

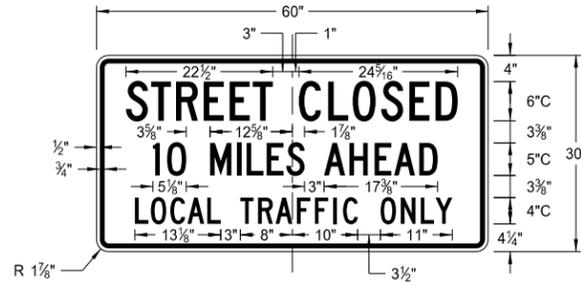
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on 8/13/13 and the original document is stored at the  
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of Transportation

CONSTRUCTION SIGN DETAILS  
REGULATORY SIGNS

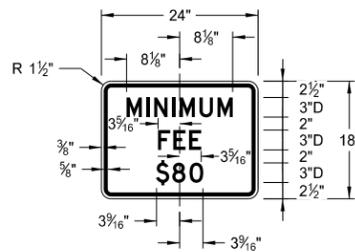
D-704-10



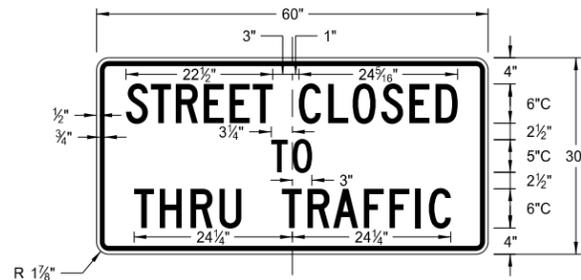
R1-50-24  
Legend: black (non-refl)  
Background: white



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



R2-1a-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

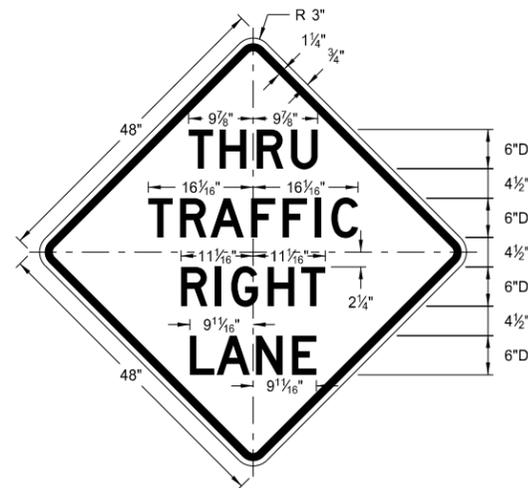
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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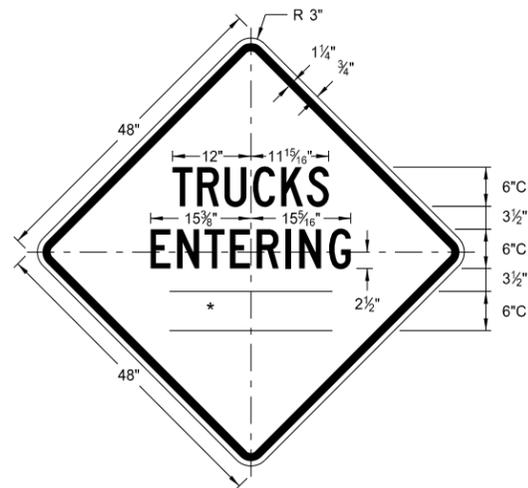
CONSTRUCTION SIGN DETAILS  
WARNING SIGNS

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

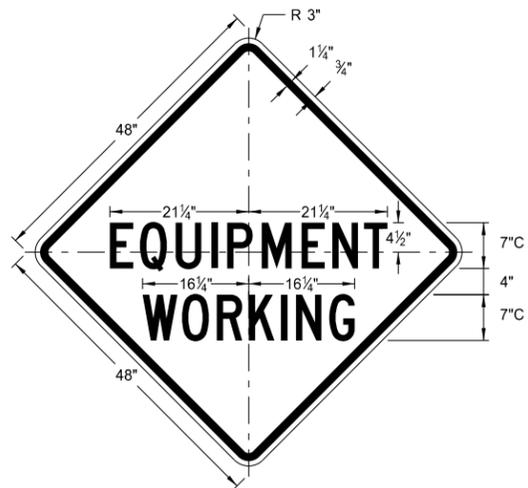
\* DISTANCE MESSAGES



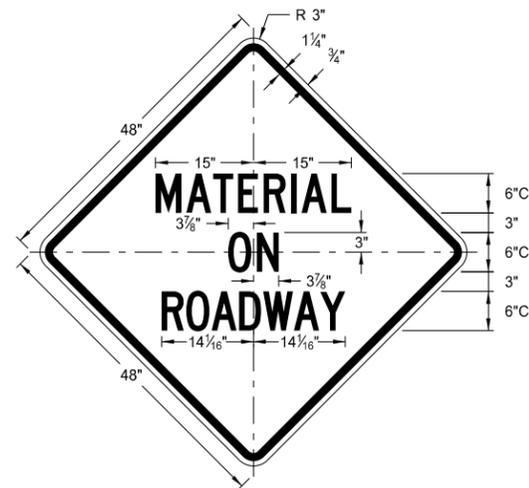
W5-8-48  
Legend: black (non-refl)  
Background: orange



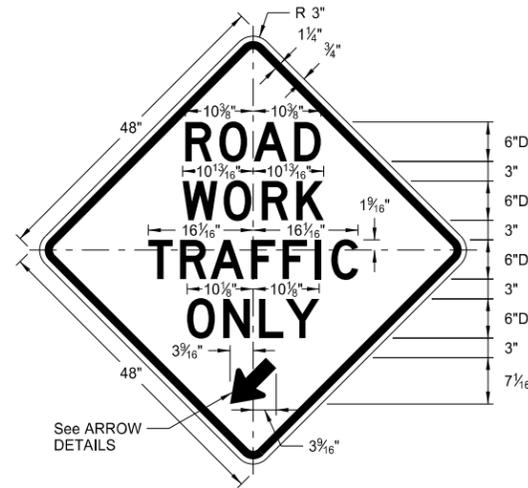
W8-54-48  
Legend: black (non-refl)  
Background: orange



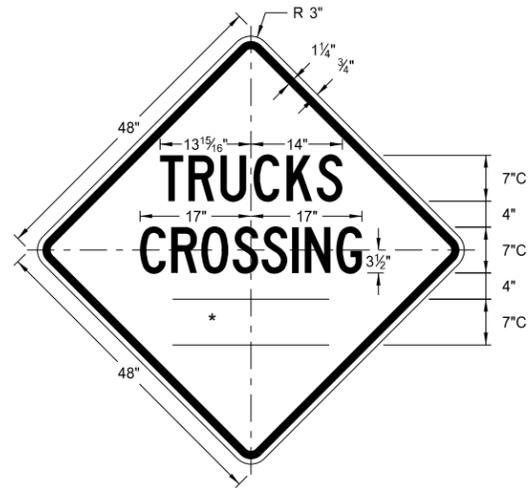
W20-51-48  
Legend: black (non-refl)  
Background: orange



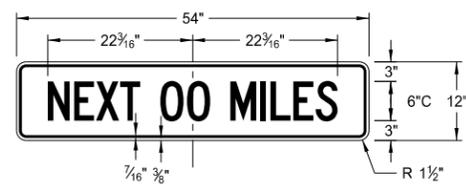
W21-51-48  
Legend: black (non-refl)  
Background: orange



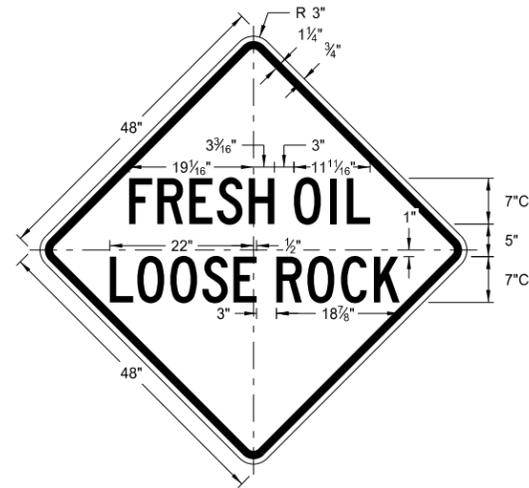
W5-9-48  
Legend: black (non-refl)  
Background: orange



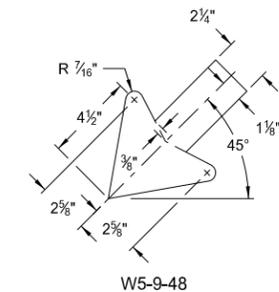
W8-55-48  
Legend: black (non-refl)  
Background: orange



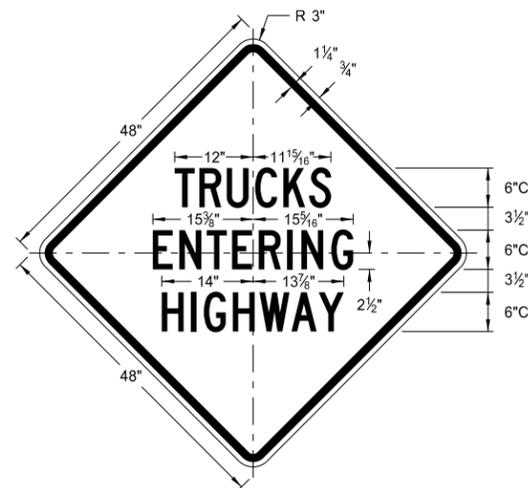
W20-52-54  
Legend: black (non-refl)  
Background: orange



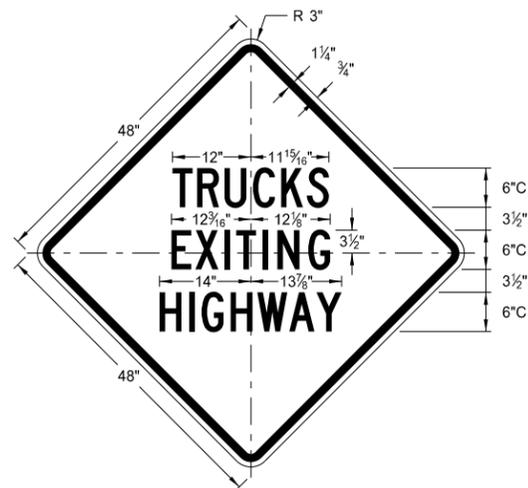
W22-8-48  
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Background: orange



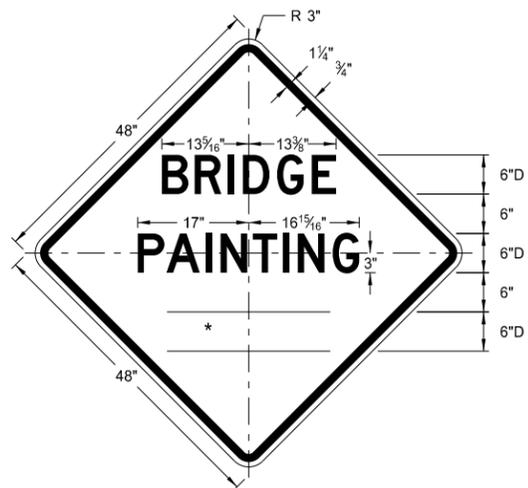
W5-9-48  
ARROW DETAILS



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



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



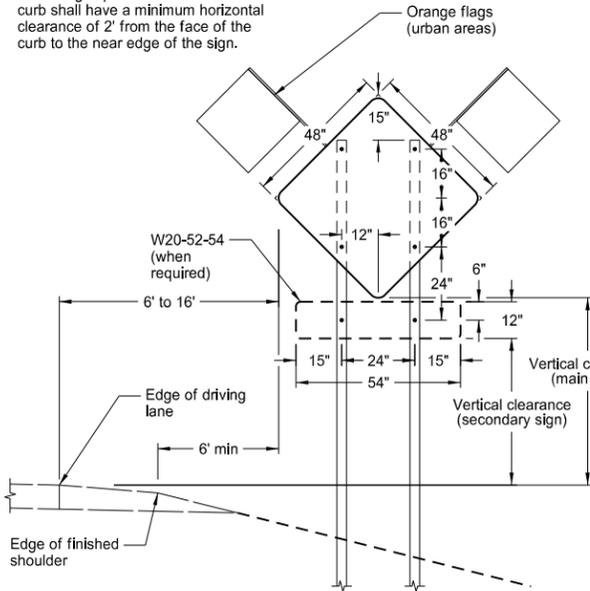
W21-50-48  
Legend: black (non-refl)  
Background: orange

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

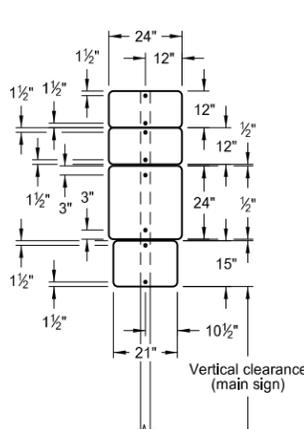
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

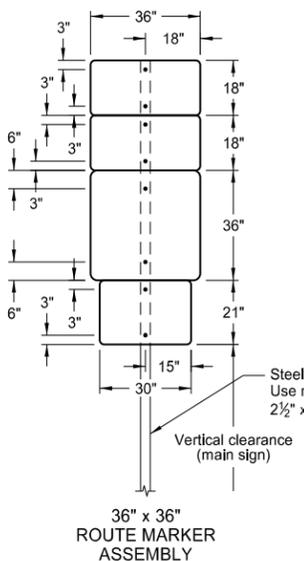
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



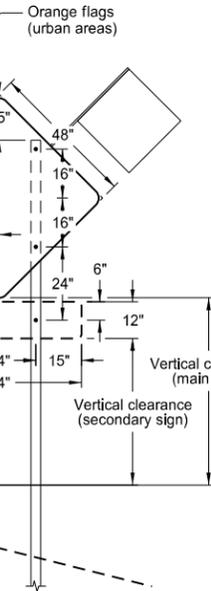
TYPICAL SECTION  
(48" x 48" diamond warning sign shown)



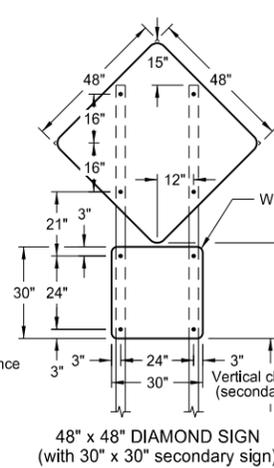
24" x 24" ROUTE MARKER ASSEMBLY



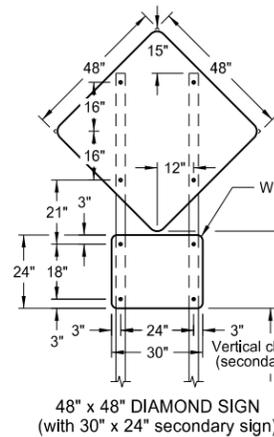
36" x 36" ROUTE MARKER ASSEMBLY



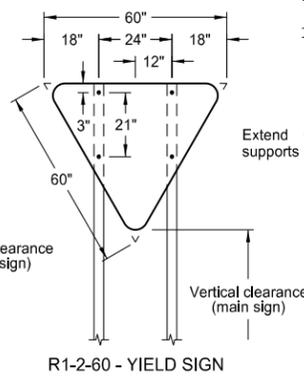
18" x 18" DIAMOND SIGN



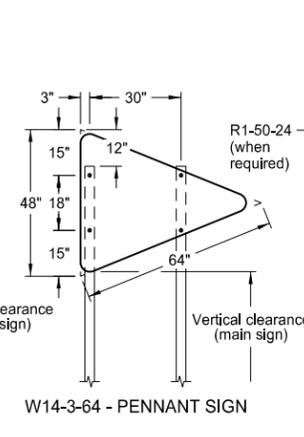
48" x 48" DIAMOND SIGN  
(with 30" x 30" secondary sign)



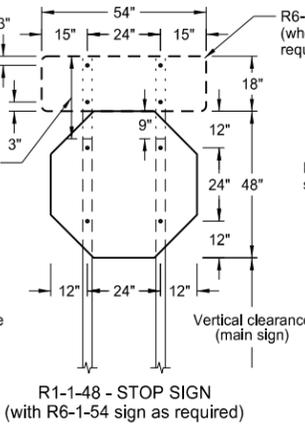
48" x 48" DIAMOND SIGN  
(with 30" x 24" secondary sign)



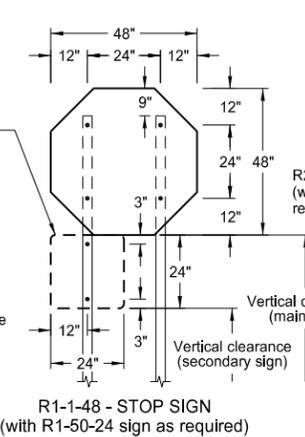
R1-2-60 - YIELD SIGN



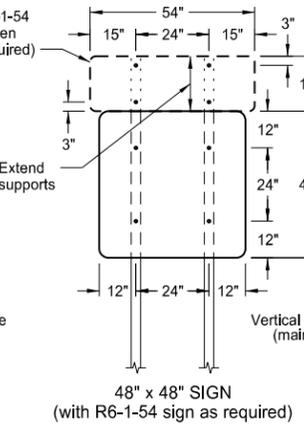
W14-3-64 - PENNANT SIGN



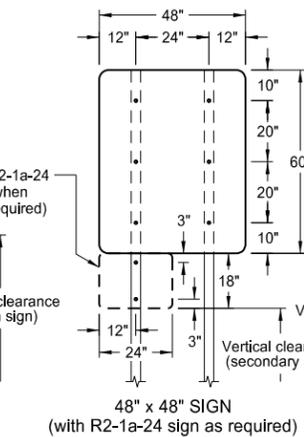
R1-1-48 - STOP SIGN  
(with R6-1-54 sign as required)



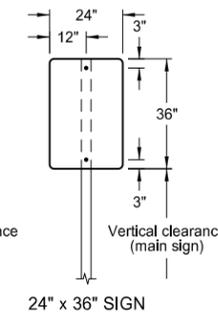
R1-1-48 - STOP SIGN  
(with R1-50-24 sign as required)



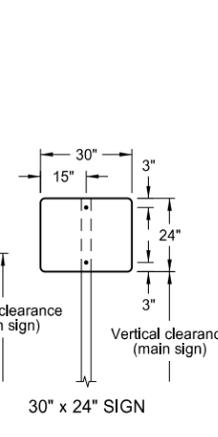
48" x 48" SIGN  
(with R6-1-54 sign as required)



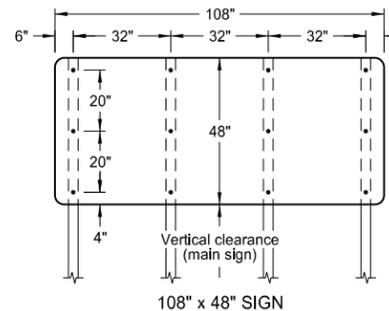
48" x 48" SIGN  
(with R2-1a-24 sign as required)



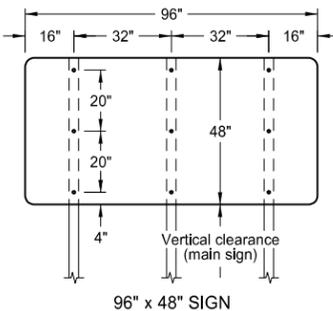
24" x 36" SIGN



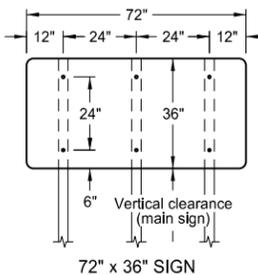
30" x 24" SIGN



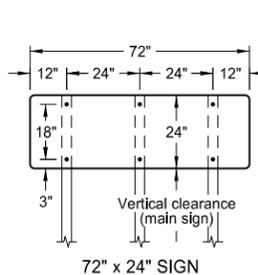
108" x 48" SIGN



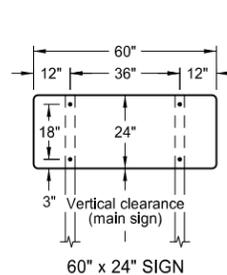
96" x 48" SIGN



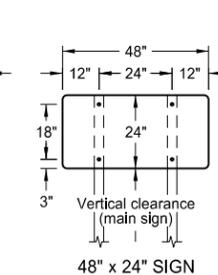
72" x 36" SIGN



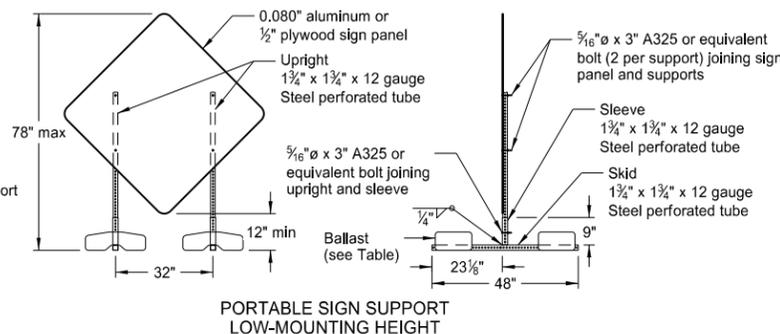
72" x 24" SIGN



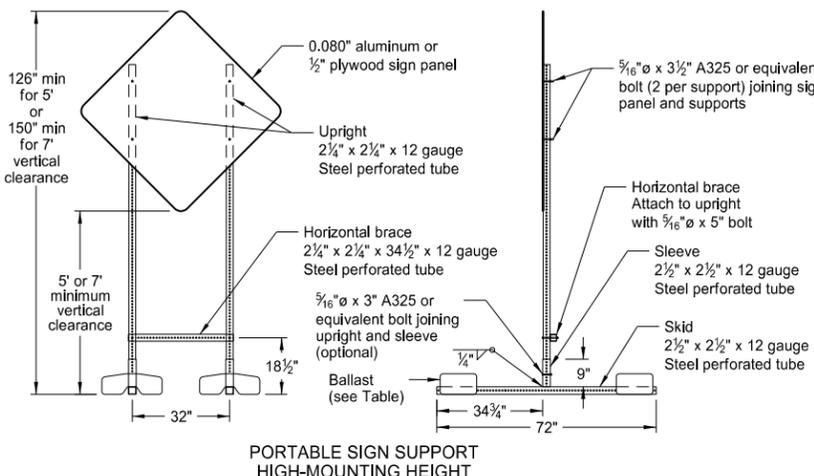
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT  
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT  
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. 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, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

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

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

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

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-5 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST  
(For each side of sign support base)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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ROAD CLOSURE LAYOUTS

Notes

- 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  $W \times S^2/60$  for urban, residential, and other streets with speeds of 40 mph or less.
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
- Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
- Sequencing Arrow Panels
  - Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
  - Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
  - Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
  - Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- Use when work area is 1 mile or longer.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- Where necessary, safe speed to be determined by the Engineer.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

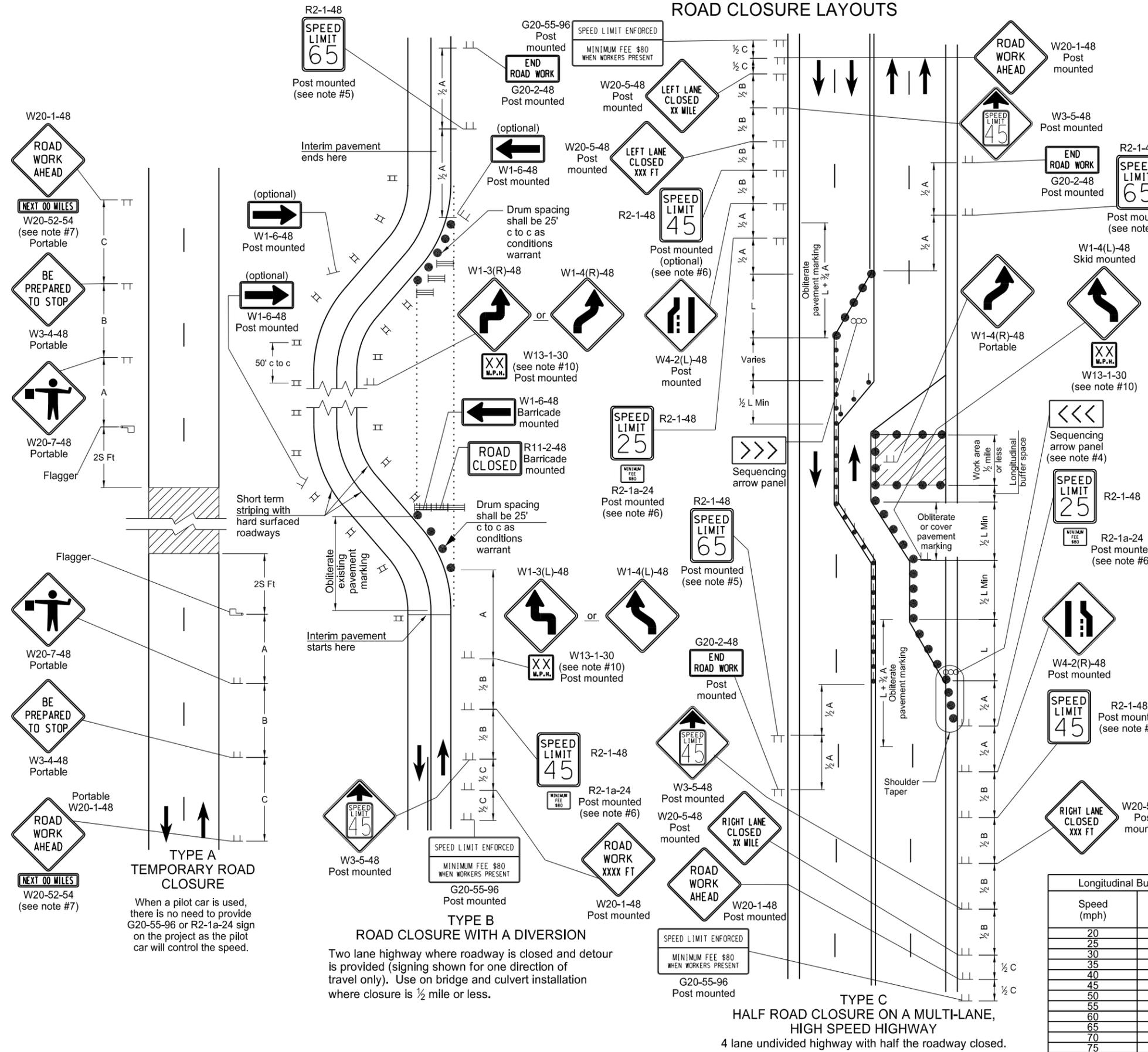
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60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

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

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**TYPE A TEMPORARY ROAD CLOSURE**

When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.

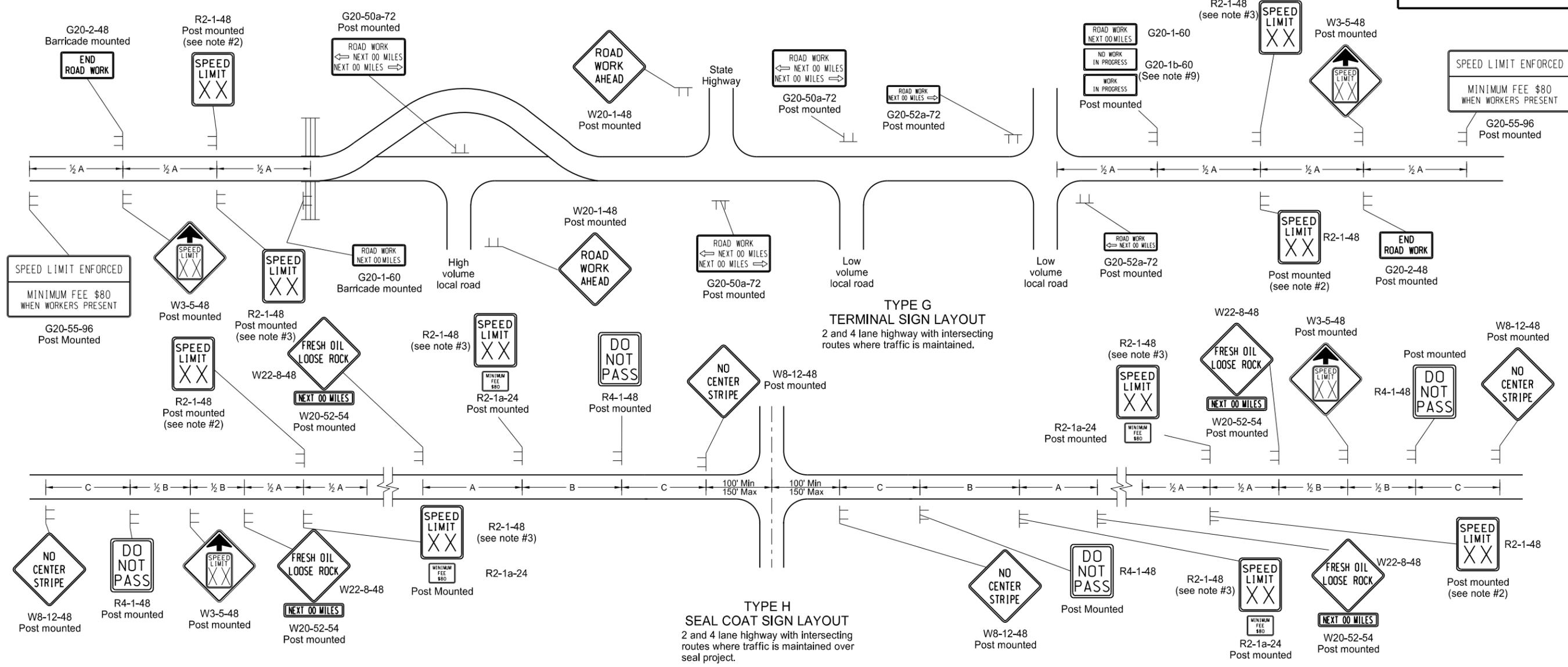
**TYPE B ROAD CLOSURE WITH A DIVERSION**

Two lane highway where roadway is closed and detour is provided (signing shown for one direction of travel only). Use on bridge and culvert installation where closure is 1/2 mile or less.

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

# TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
- The contractor shall install the G20-1b-60 sign when work is suspended for winter.
- Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
- G20-55-96 sign is not required if work is less than 15 days.

KEY

≡ Type III barricade

⊥ Sign

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

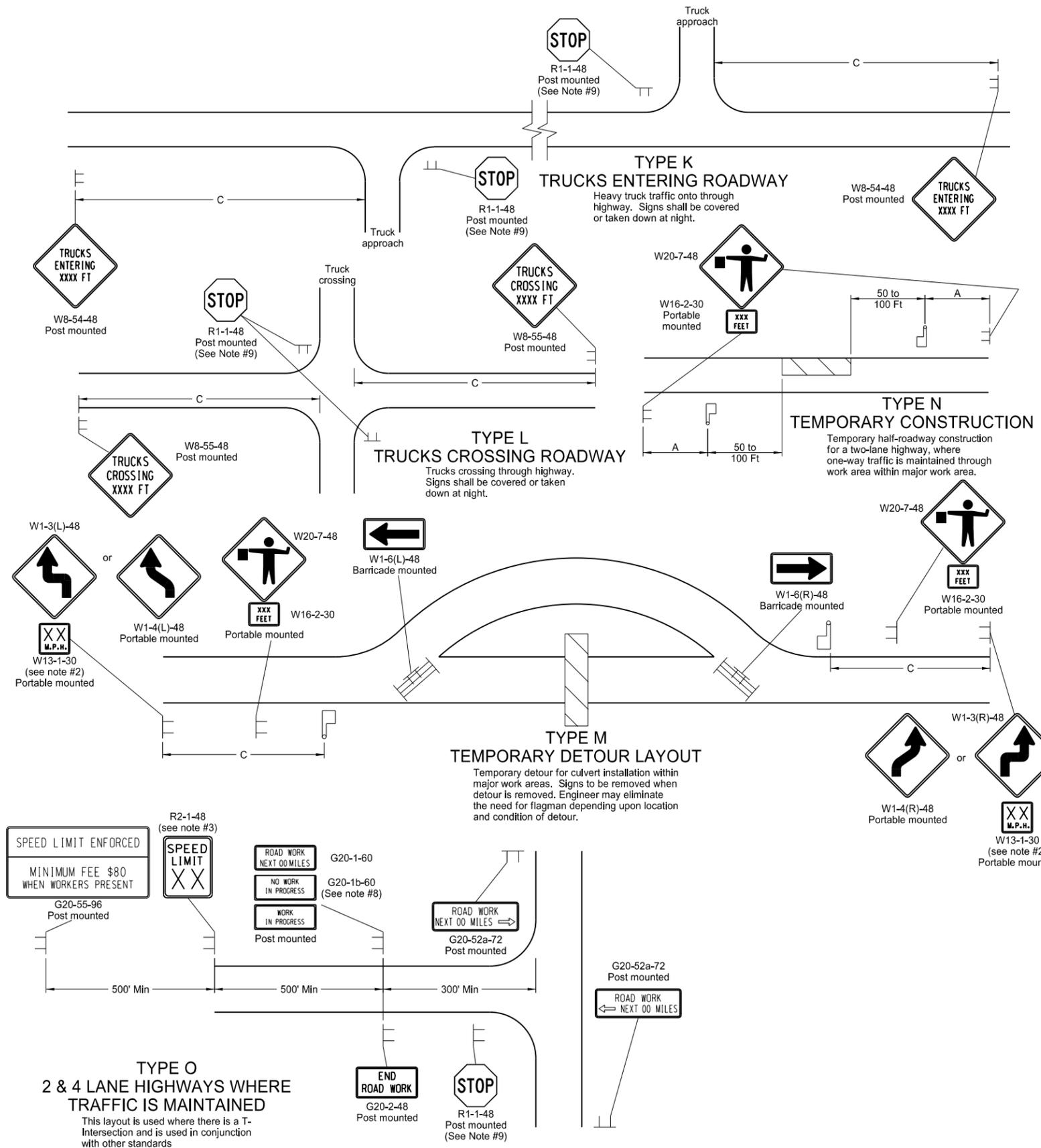
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DEPARTMENT OF TRANSPORTATION  
9-27-13

REVISIONS	
DATE	CHANGE

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# CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



- Notes
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies. Where necessary, safe speed to be determined by the Engineer.
  - The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
  - When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
  - Existing speed limit signs within a reduced speed zone shall be covered. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
  - The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
  - The contractor shall install the G20-1b-60 sign when work is suspended for winter.
  - If existing stop sign is in place, a 48" stop sign is not required.
  - G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

**KEY**

- Type III barricade
- Work area
- Sign
- Flagger

**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

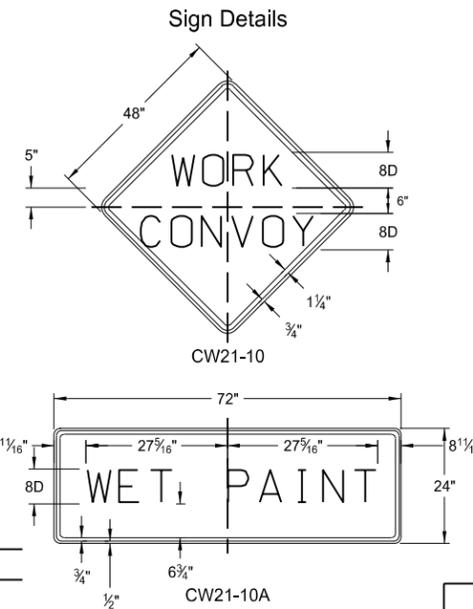
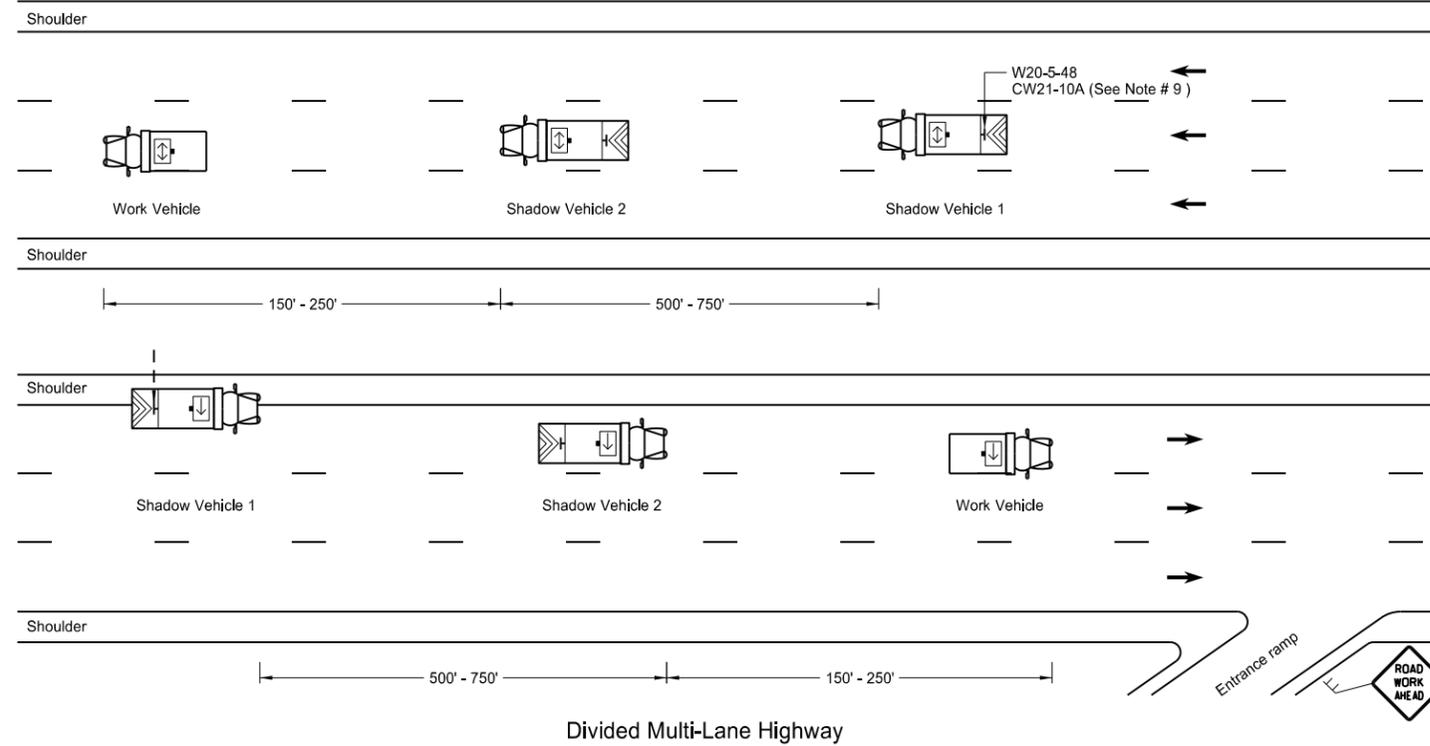
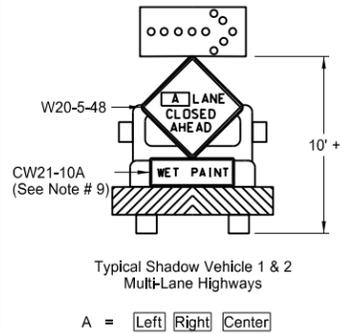
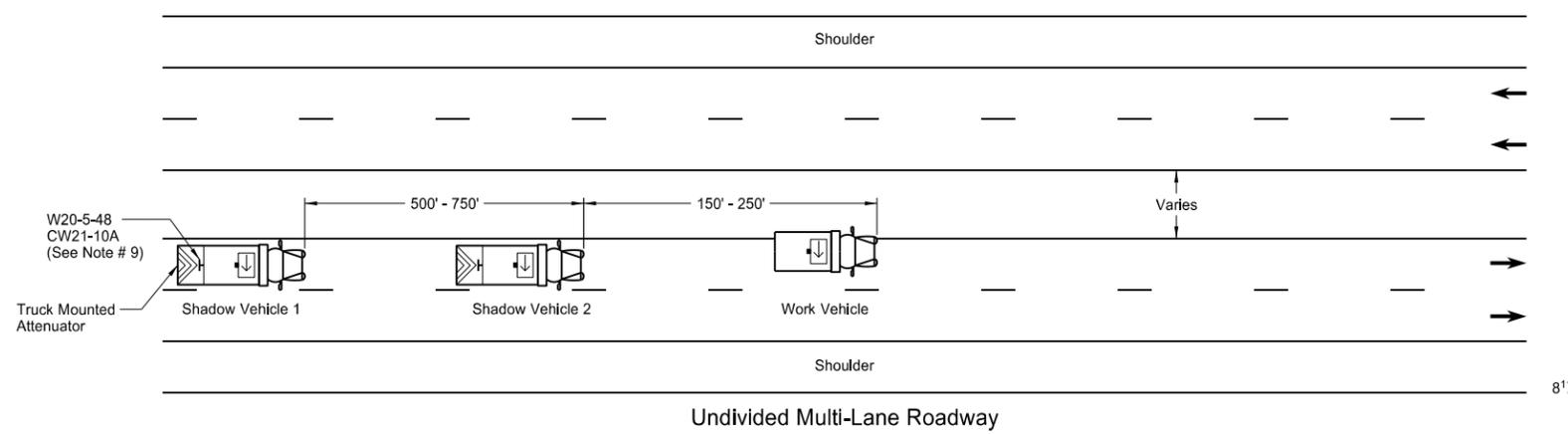
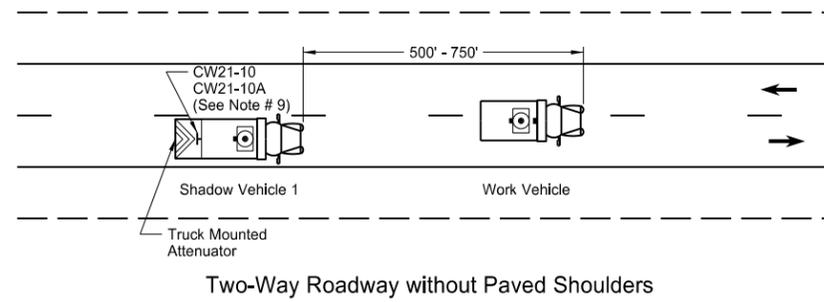
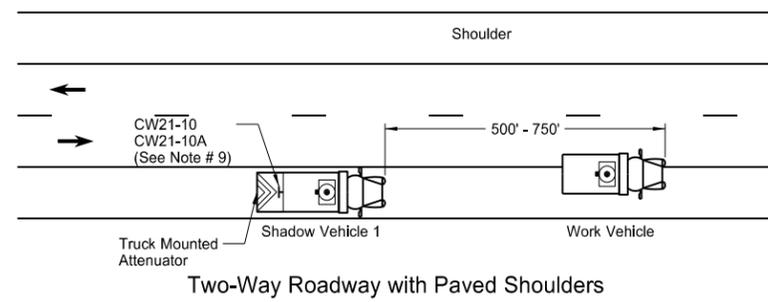
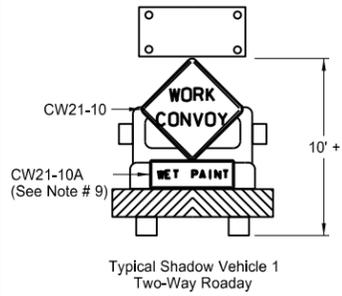
REVISIONS

DATE	CHANGE

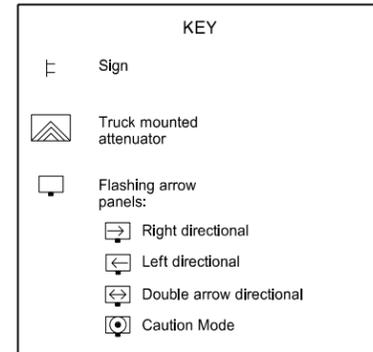
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# TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

D-704-27



- Notes
- If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
  - Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the plans.
  - Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
  - Each vehicle shall have two-way electronic communication capability.
  - When work convoys must change lanes, shadow vehicle 1 should change lanes first to shadow other convoy vehicles.
  - Vehicle spacing between the shadow vehicle 1 and shadow vehicle 2 will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the trail vehicle in time to slow down and/or change lanes as they approach the shadow vehicle.
  - Sign Colors  
Letters = Black  
Border = Black  
Background = Orange
  - Shadow vehicle 2 may be used as the paint tender vehicle.
  - Sign CW21-10A shall only be used during a painting operation.
  - On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.

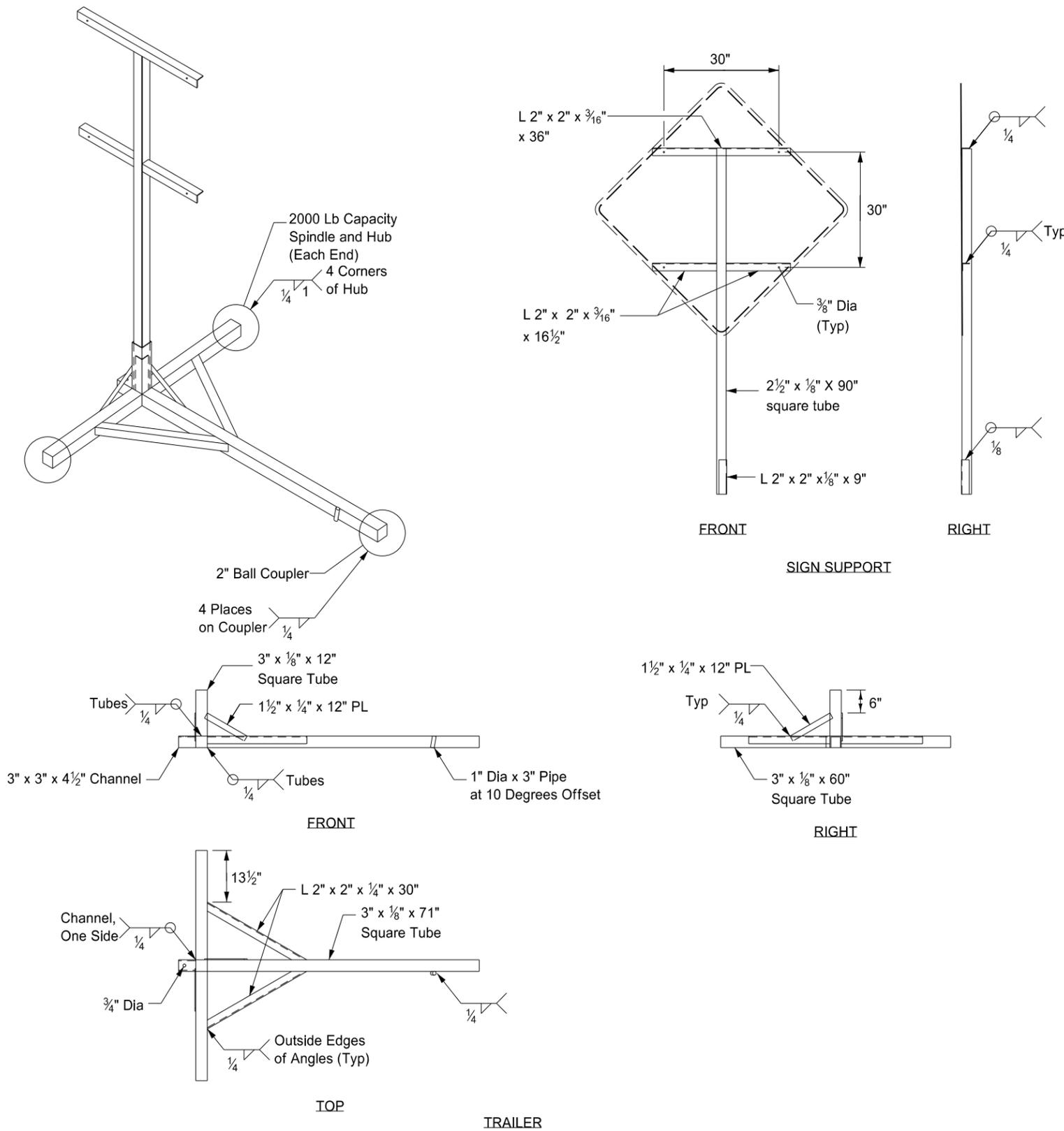


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9-27-13	
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6-18-14	Removed shadow vehicle 2 on two lane roadways

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

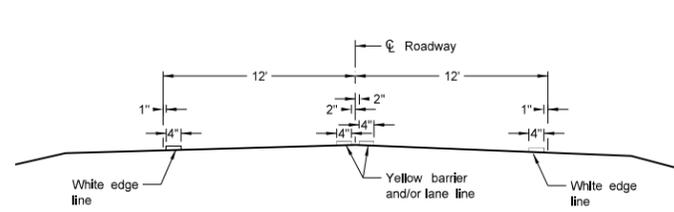
- ① The maximum weight of the assembly is 250 pounds.
- ② Use a 14" wheel and tire.
- ③ Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
- ④ Other NCHRP 350 crash tested assemblies are acceptable.

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11-23-10	
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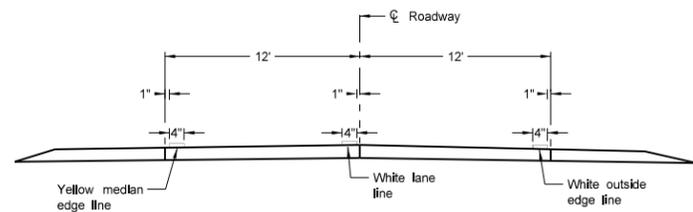
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# PAVEMENT MARKING

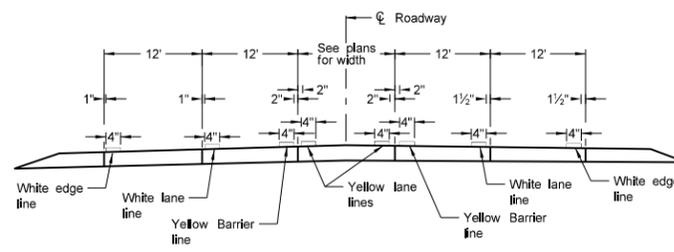
D-762-4



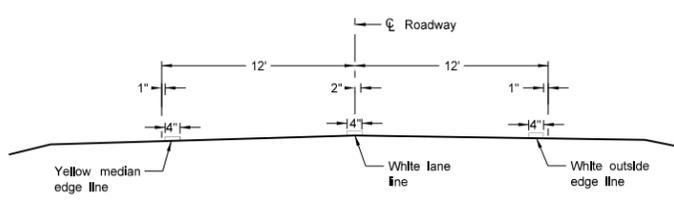
Two Lane Two Way  
RURAL ROADWAY



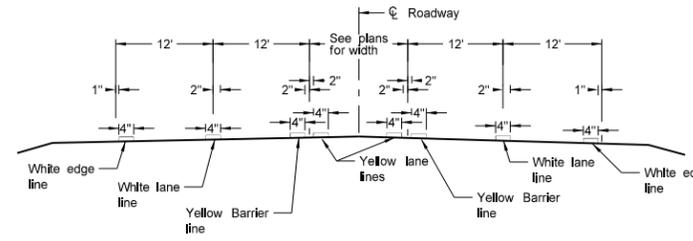
Two Lane Roadway  
INTERSTATE HIGHWAY  
Concrete Section



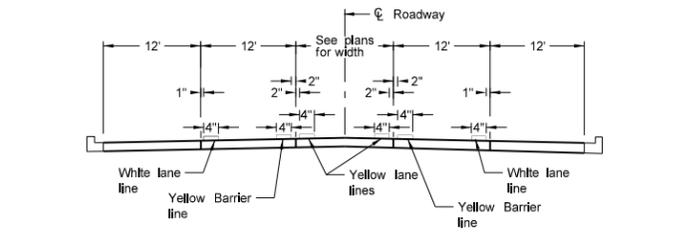
RURAL FIVE LANE ROADWAY  
Concrete Section



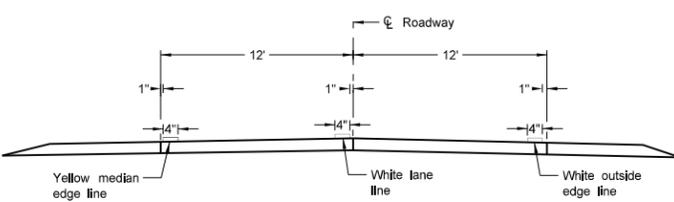
Two Lane Divided  
Rural Roadway  
PRIMARY HIGHWAY  
Asphalt Section



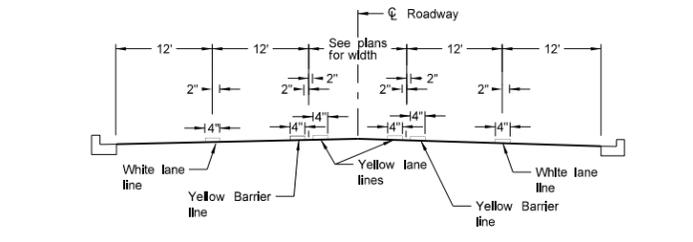
RURAL FIVE LANE ROADWAY  
Asphalt Section



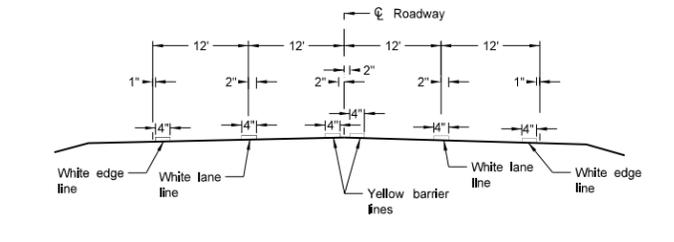
URBAN FIVE LANE SECTION  
Concrete Section



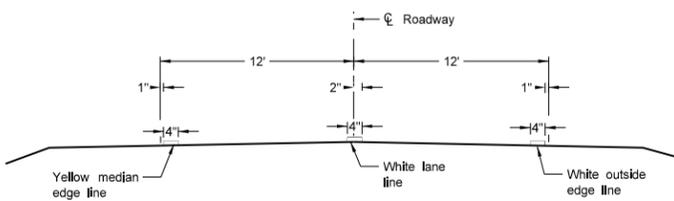
Two Lane Roadway  
PRIMARY HIGHWAY  
Concrete Section



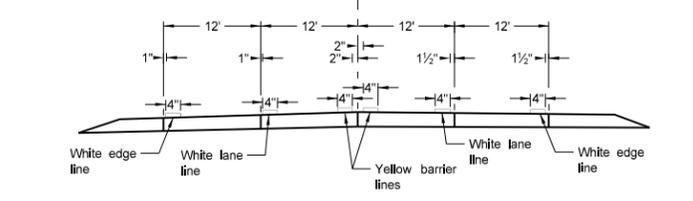
URBAN FIVE LANE SECTION  
Asphalt Section



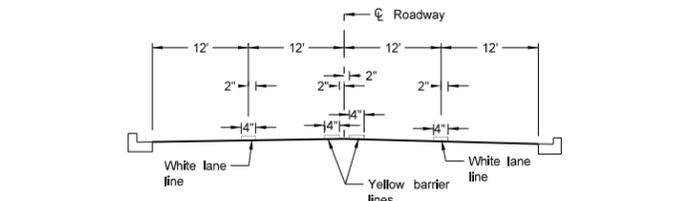
RURAL FOUR LANE ROADWAY  
Asphalt Section



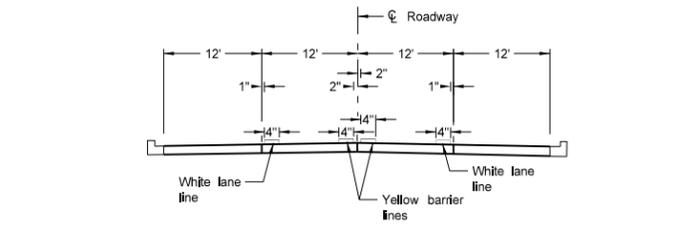
Two Lane Roadway  
INTERSTATE HIGHWAY  
Asphalt Section



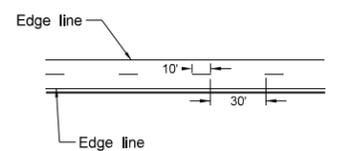
RURAL FOUR LANE ROADWAY  
Concrete Section



URBAN FOUR LANE SECTION  
Asphalt Section



URBAN FOUR LANE SECTION  
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:  
1. Edge lines shall be continued through private drives and field drives and broken for intersections.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
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