DESIGN DATA				
Traffic	Average Daily			
Current 2012	Pass: 1100	Trucks: 410	Total: 1510	
Preventative Maintenance				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SOIB -4-002(095)171	18888	1	1

JOB # 6
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

SOIB-4-002(095)171

McHenry County
1.7 Mi E Granville to 2 Mi W Jct 14 - Eastbound

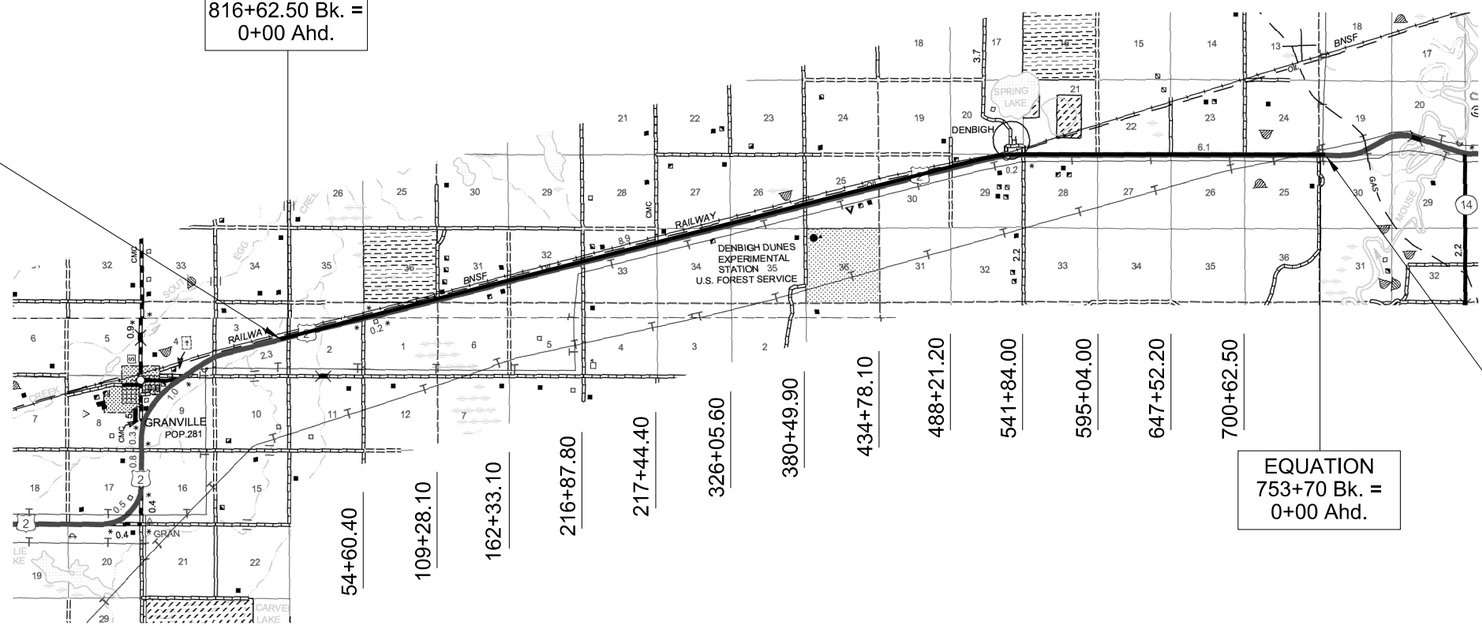
Concrete Pavement Repair, Grinding, Dowel Bar Retrofit, Aggregate Surfacing, and Incidentals

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 NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-4-002(095)171	14.372	14.372

EQUATION
816+62.50 Bk. =
0+00 Ahd.

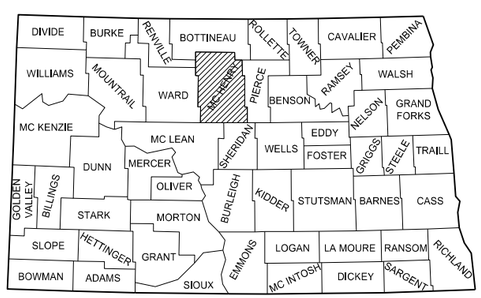
Begin Project NH-4-002(095)171
Sec 3, Twp 155 N, Rge 79 W
RP 171.714
Station 814+03.78



N

EQUATION
753+70 Bk. =
0+00 Ahd.

End Project NH-4-002(095)171
Sec 30, Twp 156 N, Rge 76 W
RP 186.086
Station 02+53.44



STATE COUNTY MAP

DESIGNERS

Amer Hmidan

Jay Alberta

Nathan Medler

Lonnie Heth

APPROVED DATE 12/02/14

James L. Redding /s/
MINOT DISTRICT ENGINEER
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 12/02/14

Chad E. Beggs /s/
MINOT DISTRICT

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	002	1

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D-101-20, 21	Linestyles
D-101-30, 31, 32	Symbols
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-550-4	Transverse Expansion Joint Detail
D-550-5	Transverse Construction Joint
D-704-5	Contractor Sign Detail
D-704-7, 8	Breakaway System for Construction Zone Signs
D-704-9, 10, 11	Construction Sign Details
D-704-12	Shoulder Closure Tapers
D-704-13	Barricade Details And Channelizing Devices
D-704-14	Construction Sign Punching and Mounting Details
D-704-20	Terminal and Seal Coat Sign Layouts
D-704-22	Construction Truck and Temporary Detour Layouts
D-704-24	Shoulder Closures and Bridge Painting Layouts
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D-704-32	Sign Layout for One Lane Closure Divided Highway Moving Operation
D-704-34	Sign Layout for One Lane Closure
D-704-34a	Traffic Control System for Lane Shift Where Right or Left Lane is Closed and the Opposite Lane is Closed Ahead
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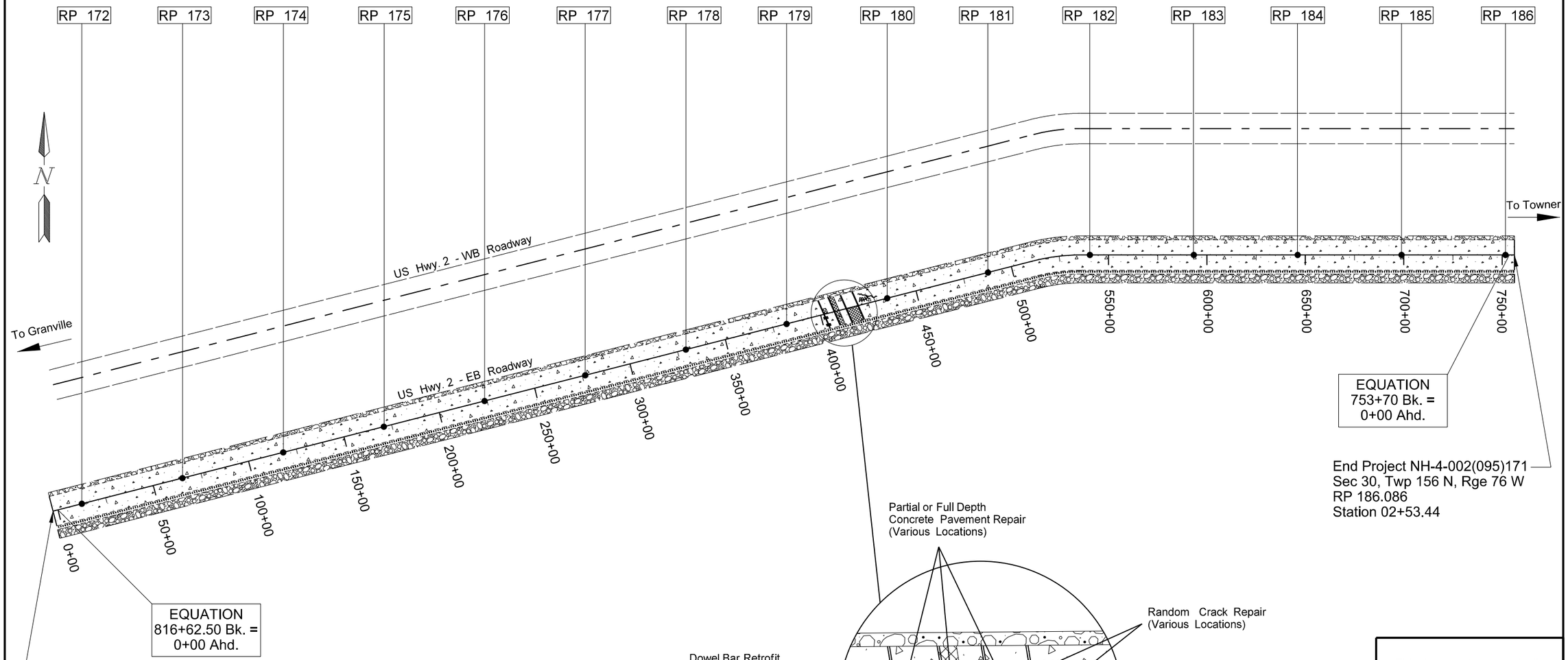
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-6	Short Term Pavement Marking

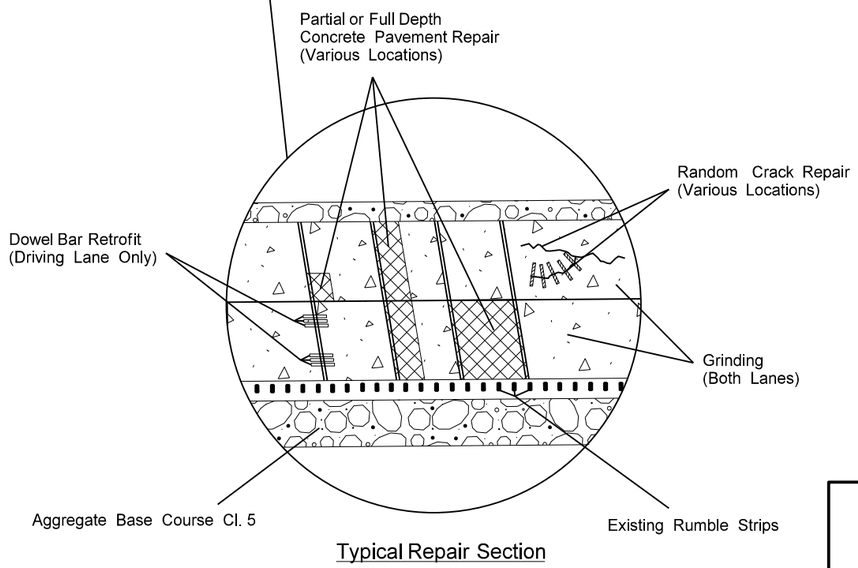
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	004	1



= Concrete Pavement Repair, Grinding, & Dowel Bar Retrofit

= Shoulder Surfacing (Class 5 Aggregate)

= Partial Or Full Depth Repair Area



Typical Repair Section

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Scope Of Work

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	006	1

NOTES

302-P01 **AGGREGATE BASE COURSE CL 5:** Place Class 5 Aggregate on shoulders prior to construction to fill existing drop-offs. After concrete repairs have been completed, place Class 5 Aggregate on shoulders to eliminate drop-offs caused by construction activities and traffic.

570-P01 **CONCRETE PAVEMENT REPAIR:** An additional 10% has been added to the quantities for "Concrete Pavement Repair-Full Depth-Doweled", "Random PCC Crack Cleaning and Sealing", "Spall Repair-Partial Depth", "Saw Concrete", "Doweled Contraction Joint Assembly" and "Dowel Bars" to be used if directed by the Engineer.

570-P03 **TRANSVERSE AND LONGITUDINAL JOINT SEALING:** Saw and seal longitudinal and transverse joints that fall within the following repair areas:

- Full depth repairs;
- Random cracks; and
- Spall repairs.

No other joints will require sawing or sealing.

762-P01 **PAVEMENT MARKING:** If the Engineer and Contractor agree, plan quantity will be used as the basis for payment of pavement markings

704-P01 TRAFFIC CONTROL FOR CONCRETE REPAIR: Provide traffic control consisting of a temporary lane closure and flagging.

Traffic control device quantities are based on a 6 mile limitation and the list below. The Department will pay for delineator drums used for approach access within the 6 mile limitation at the contract unit price. Provide additional devices at no cost to the Department.

1. Standard D-704-20, layout G.
2. Standard D-704-22, layouts K and L;
3. Standard D-704-26, layout GG; and
4. Standard D-704-34; quantities include 48 delineator drums for approaches.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
216	0100	WATER	M GAL	431	431
230	0125	SHOULDER PREPARATION	MILE	28.8	28.8
302	0120	AGGREGATE BASE COURSE CL 5	TON	2,875	2,875
570	0095	SAW CONCRETE	LF	2,837	2,837
570	0210	PCC PAVEMENT GRINDING	SY	227,653	227,653
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	620	620
570	0424	DOWEL BARS	EA	1,144	1,144
570	0431	DOWEL BAR RETROFIT-TYPE B	EA	33,216	33,216
570	0650	CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	1,973	1,973
570	0959	CONTRACTION JOINT SILICONE SEAL	LF	620	620
570	0966	RANDOM PCC CRACK CLEANING & SEALING	LF	248	248
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	2,796	2,796
570	1600	EPOXY COATED DEFORMED BARS	EA	140	140
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	200	200
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,950	2,950
704	1050	TYPE I BARRICADE	EA	50	50
704	1052	TYPE III BARRICADE	EA	18	18
704	1060	DELINEATOR DRUMS	EA	80	80
704	1067	TUBULAR MARKERS	EA	440	440
704	1080	STACKABLE VERTICAL PANELS	EA	150	150
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1	1
706	0500	AGGREGATE LABORATORY	EA	1	1
762	0112	EPOXY PVMT MK MESSAGE	SF	96	96
762	0113	EPOXY PVMT MK 4IN LINE	LF	170,739	170,739
762	0115	EPOXY PVMT MK 8IN LINE	LF	300	300
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	18,971	18,971

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	010	1

BASIS OF ESTIMATE

MATERIAL

Aggregate Surface Course CL 5 (Shoulders) @ 200 Ton/Mile
- 14.372 Miles x 200 Ton/Mile = **2,875 Tons**
- Use as directed by the Engineer for correcting shoulder drop-offs

Water @ 30 MGal/Mile
- 14.372 Miles x 30 MGal/Mile = **431 MGal**
- Estimated 30 MGal/Mile for dust control and moisture of soils and aggregates

SHOULDER PREPARATION

14.372 Miles x 2 (median & outside shoulder) = **28.744 ≈ 28.8 Miles**

GRINDING PCC PAVEMENT

14.372 Miles x 5,280 = 75,884 (project length)
27 ft. width x 75,884 LF (project length) / 9 = **227,653 SY**
- 12 ft. US 2 EB driving lane
- 12 ft. US 2 EB passing lane
- 3 ft. shoulder taper

DOWEL BAR RETROFIT – TYPE B

14.372 Miles x 5,280 = 75,884 (project length)
75,884 LF (project length) / 13.5 ft. = 5,621 joints
5,621 – 85 = 5,536 joints x 6 dowel bars per joint = **33,216 Dowel Bars**
- Average joint spacing = 13.5 ft.
- Full Depth Repair joints = 85

EPOXY COATED DEFORMED BARS

- Random Crack Stitching Repair – 140 Ea.

PAVEMENT MARKING

SHORT TERM TYPE NR PAVEMENT MARKINGS – MAINLINE

4” White Broken Line – Type NR
- RP 171.714 – RP 186.086 = 14.372 Miles
- 14.372 Mile x 1,320 LF/Mile = **18,971 LF**
- 1,320 LF/Mile for short term pavement marking 4” line (4” White CL, 10’ Line, 30’ Skip)

EPOXY PERMANENT PAVEMENT MARKINGS - MAINLINE

4” White CL (10’ Line, 30’ Skip)
- RP 171.714 – RP 186.086 = 14.372 Miles
- 14.372 Mile x 1,320 LF/Mile = **18,971 LF**

4” White Edge Line
- RP 171.714 – RP 186.086 = 14.372 Miles
- 14.372 Mile x 5,280 LF/Mile = **75,884 LF**

4” Yellow Edge Line
- RP 171.714 – RP 186.086 = 14.372 Miles
- 14.372 Mile x 5,280 LF/Mile = **75,884 LF**

8” White Channel Line
- Three Turn Lanes: @ RP 178.950, 182.010, and 186.020
- 3 Turn Lanes x 100 LF/Turn Lane = **300 LF**

EPOXY PERMANENT PAVEMENT MARKING MESSAGES - MAINLINE

Pavement Marking Messages for Turn Lanes
- 3 Turn Lanes x 2 “Arrow” messages per Turn Lane x 16 SF per Arrow = **96 SF**

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	1

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
171.714																	
	816+14	DRIVING	20	x	15	33	50	20	12	12							
	816+14	PASSING	20	x	12	27	44	20	12	12							
	0+08	DRIVING	11	x	15	18	41	20									
	0+92	DRIVING									2	x	2	4			
	1+44	DRIVING	60	x	15	100	90	20	48	48							
	2+31	DRIVING									2	x	2	4			
	3+75	PASSING									2	x	2	4			
	4+07	DRIVING									2	x	2	4			
	4+50	PASSING									2	x	2	4			
	4+63	DRIVING	44	x	15	73	74	20	36	36							
	6+52	DRIVING									2	x	2	4			Rock Popout
	8+19	PASSING									2	x	2	4			
	8+29	DRIVING									2	x	2	4			
	9+39	DRIVING									2	x	2	4			Rock Popout
	10+88	DRIVING	34	x	15	57	64	20	24	24							
	11+62	DRIVING	28	x	15	47	58	20	12	12							
	11+71	PASSING									2	x	2	4			
	12+23	PASSING									2	x	2	4			
	12+27	DRIVING	18	x	15	30	48	20	12	12							
SUBTOTAL						**385**	**469**	**160**	**156**	**156**				**44**	**0**	**0**	**SUBTOTAL FOR MILE 171**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	Station	Lane	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
172.000																	
	12+59	DRIVING	14	X	15	23	44	20									
	12+71	PASSING									2	X	2	4			
	14+44	DRIVING	55	X	15	92	85	20	36	36							
	16+37	PASSING									2	X	2	4			
	16+43	DRIVING	6	X	15	10	36	20			2	x	2	4			
	16+43	PASSING	6	X	12	8	30	20									
	16+99	DRIVING									2	x	2	4			
	18+63	PASSING									2	x	2	4			
	18+86	DRIVING									2	x	2	4			
	20+08	DRIVING									2	x	2	4			
	20+91	PASSING									2	x	2	4			
	21+33	PASSING									2	x	2	4			
	21+97	PASSING									2	x	2	4			
	22+20	DRIVING									2	x	2	4			Rock Popout
	22+24	DRIVING									2	x	2	4			
	23+44	DRIVING									2	x	2	4			Rock Popout
	23+47	DRIVING	16	X	15	27	46	20	12	12							
	23+47	PASSING	16	X	12	21	40	20	12	12							

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	2

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
172.000																	
CONTD	23+72	DRIVING	6	X	15	10	36	20									
	23+86	PASSING									2	x	2	4			
	24+94	DRIVING									2	x	2	4			
	24+94	PASSING									2	x	2	4			
	25+42	PASSING									2	x	2	4			
	26+10	PASSING									2	x	2	4			
	26+10	PASSING									2	x	2	4			
	26+27	PASSING									2	x	7	14			
	26+80	PASSING									2	x	2	4			
	27+04	PASSING									2	x	2	4			
	27+08	DRIVING									2	x	2	4			
	27+51	DRIVING									2	x	2	4			
	30+99	PASSING									2	x	2	4			
	31+56	DRIVING									2	x	2	4			
	31+96	DRIVING									2	x	2	4			
	32+02	PASSING									2	x	2	4			
	32+02	DRIVING									2	x	2	4			
	32+19	DRIVING									2	x	2	4			
	32+19	PASSING									2	x	2	4			
	33+55	PASSING	30	x	12	40	54	20	12	12							
	34+87	PASSING									2	x	2	4			
	35+69	PASSING									2	x	2	4			
	38+04	PASSING													40	21	Longitudinal Crack - Crack Stitch
	39+42	PASSING									2	x	2	4			
	39+62	DRIVING									2	x	2	4			
	39+96	DRIVING									2	x	2	4			
	40+21	PASSING									2	x	2	4			
	42+03	PASSING									2	x	2	4			
	42+54	PASSING									2	x	2	4			
	42+86	DRIVING	41	x	15	68	71	20	24	24							
	43+40	DRIVING									2	x	2	4			
	44+78	PASSING									2	x	2	4			
	45+57	DRIVING									2	x	2	4			
	45+82	PASSING									2	x	2	4			
	46+91	PASSING									2	x	2	4			
	47+02	PASSING									2	x	2	4			
	47+97	DRIVING	56	x	15	93	86	20	36	36							
	51+71	PASSING									2	x	2	4			
	52+32	PASSING									2	x	2	4			
	53+10	PASSING									2	x	2	4			
	53+80	DRIVING	28	x	15	47	58	20	12	12							
	54+43	PASSING	18	x	12	24	42	20	12	12							
	54+80	PASSING									2	x	2	4			
	54+92	PASSING									2	x	2	4			
	57+52	DRIVING									2	x	3	6			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	3

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
172.000	59+40	PASSING									2	x	2	4			
CONT'D	60+77	PASSING									2	x	2	4			
	62+68	PASSING									2	x	2	4			
SUBTOTAL			**292**			**463**	**628**	**240**	**156**	**156**				**228**	**40**	**21**	**SUBTOTAL FOR MILE 172**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
173.000																	
	66+02	PASSING									2	x	2	4			
	66+02	DRIVING									2	x	2	4			
	66+10	PASSING									2	x	2	4			
	67+70	PASSING									2	x	2	4			
	72+43	DRIVING													16	9	Transverse Crack - Crack Stitch
	78+00	PASSING									2	x	2	4			
	79+44	DRIVING									2	x	2	4			
	79+76	DRIVING	24	x	15	40	54	20	12	12							
	80+50	PASSING									2	x	2	4			
	82+40	PASSING									2	x	2	4			
	84+33	DRIVING									2	x	2	4			
	84+48	PASSING									2	x	2	4			
	87+36	DRIVING									2	x	2	4			
	89+19	DRIVING									2	x	2	4			
	91+73	DRIVING									2	x	2	4			
	93+12	DRIVING									2	x	2	4			
	94+16	DRIVING													12	7	Longitudinal Crack - Crack Stitch
	95+22	DRIVING									2	x	2	4			
	97+24	DRIVING									2	x	2	4			
	97+40	PASSING									2	x	2	4			
	97+52	DRIVING									2	x	2	4			
	98+88	DRIVING									2	x	2	4			
	98+88	DRIVING									2	x	2	4			
	99+23	PASSING	6	x	12	8	30	20									
	99+69	DRIVING									2	x	2	4			
	101+01	PASSING									2	x	2	4			
	101+05	DRIVING													10	6	Longitudinal Crack - Crack Stitch
	104+37	PASSING									2	x	2	4			
	111+21	DRIVING									2	x	2	4			
	112+90	PASSING									2	x	2	4			
	113+43	DRIVING									2	x	2	4			
	117+60	DRIVING									2	x	2	4			
	117+72	PASSING									2	x	2	4			
SUBTOTAL						**48**	**84**	**40**	**12**	**12**				**112**	**38**	**22**	**SUBTOTAL FOR MILE 173**

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	4

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
174.000																	
	121+18	PASSING									2	x	2	4			
	123+16	PASSING									2	x	2	4			
	123+34	PASSING									2	x	2	4			
	124+30	PASSING									2	x	2	4			
	124+43	PASSING									2	x	2	4			
	125+56	DRIVING									2	x	2	4			
	126+88	DRIVING									2	x	2	4			
	137+89	DRIVING									2	x	2	4			
	140+35	DRIVING									2	x	7	14			Relief Joint - Delamination
	140+35	PASSING									2	x	2	4			Relief Joint
	141+64	DRIVING									2	x	2	4			
	141+64	PASSING									2	x	2	4			
	142+49	PASSING									2	x	5	10			
	146+22	DRIVING	32	x	15	53	62	20	12	12							
	146+39	PASSING	9	x	12	12	33	20									
	146+64	DRIVING									2	x	2	4			
	147+01	DRIVING	6	x	15	10	36	20									
	147+29	DRIVING									2	x	2	4			
	147+29	PASSING									2	x	9	18			
	147+38	DRIVING	6	x	15	10	36	20									
	147+38	PASSING													13	7	Longitudinal Crack - Crack Stitch
	148+06	PASSING	27	x	12	36	51	20	12	12							
	148+12	DRIVING									2	x	2	4			
	148+47	PASSING									2	x	2	4			
	148+47	PASSING									2	x	2	4			
	148+47	DRIVING									2	x	2	4			
	148+47	DRIVING	14	x	15	23	44	20									
	151+04	PASSING									2	x	2	4			
	152+63	PASSING									2	x	2	4			
	153+44	PASSING									2	x	2	4			
	154+18	PASSING									2	x	2	4			
	158+01	PASSING									2	x	2	4			
	160+34	DRIVING													14	8	Longitudinal Crack - Crack Stitch
	160+60	DRIVING									2	x	2	4			
	162+59	PASSING	30	x	12	40	54	20	12	12							
	163+42	DRIVING									2	x	2	4			
	164+74	PASSING									2	x	2	4			
	168+05	DRIVING									2	x	2	4			
	168+62	DRIVING									2	x	2	4			Relief Joint
	168+62	PASSING									2	x	2	4			Relief Joint
SUBTOTAL						**185**	**316**	**140**	**36**	**36**				**154**	**27**	**15**	**SUBTOTAL FOR MILE 174**

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	5

RP	STATION	LANE	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR				RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
			DIMENSIONS			AREA					DIMENSIONS			AREA			
			LENGTH	x	WIDTH						LENGTH	x	WIDTH				
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
175.000																	
	171+36	PASSING									2	x	2	4			
	172+67	DRIVING	8	x	15	13	38	20									
	172+88	PASSING	6	x	12	8	30	20									West of Joint
	172+88	PASSING	7	x	12	9	31	20									East of Joint
	173+02	DRIVING									2	x	2	4			
	175+78	DRIVING									2	x	2	4			
	177+32	DRIVING									2	x	4	8			
	177+37	DRIVING	9	x	15	15	39	20									
	178+65	DRIVING	7	x	15	12	37	20									
	179+43	PASSING									2	x	2	4			
	182+26	DRIVING													6	4	Longitudinal Crack - Crack Stitch
	185+75	DRIVING									2	x	2	4			
	187+28	DRIVING									2	x	2	4			
	189+45	PASSING									2	x	2	4			
	189+45	PASSING									2	x	2	4			
	194+70	PASSING									2	x	2	4			
	196+86	DRIVING									2	x	2	4			
	197+80	DRIVING									2	x	2	4			
	197+80	PASSING									2	x	2	4			
	198+71	DRIVING									2	x	2	4			Exposed Rebar
	198+71	PASSING									2	x	2	4			
	199+79	DRIVING									2	x	2	4			
	201+49	PASSING									2	x	2	4			
	202+81	DRIVING									2	x	2	4			
	204+72	DRIVING									2	x	2	4			
	204+86	PASSING	26	x	12	35	50	20	12	12							Severe Faulting - 2 Panels - 1" to 5/8"
	204+86	DRIVING	26	x	15	43	56	20	12	12							Moderate Faulting - 2 Panels - 1/2" to 0"
	206+60	DRIVING									2	x	2	4			Eastside of Joint
	206+60	PASSING									2	x	2	4			Eastside of Joint
	206+60	DRIVING									2	x	2	4			Westside of Joint
	207+09	DRIVING													5	3	Longitudinal Crack - Crack Stitch
	207+23	DRIVING									2	x	2	4			
	207+95	DRIVING									2	x	2	4			
	208+39	DRIVING									2	x	2	4			
	209+85	DRIVING									2	x	2	4			
	209+94	DRIVING									2	x	2	4			
	209+94	PASSING									2	x	2	4			
	209+94	PASSING									2	x	2	4			
	210+27	DRIVING													12	7	Longitudinal Crack - Crack Stitch
	211+03	DRIVING									2	x	2	4			
	211+10	DRIVING									2	x	2	4			
	212+65	PASSING									2	x	2	4			
	213+67	DRIVING									2	x	2	4			
	215+47	DRIVING	15	x	15	25	45	20									
	216+14	DRIVING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	6

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
175.000	217+53	PASSING									2	x	2	4			
CONT'D	219+03	PASSING									2	x	2	4			
	219+10	DRIVING									2	x	2	4			
	219+47	DRIVING									2	x	2	4			
	219+47	PASSING									2	x	2	4			
	222+05	DRIVING									2	x	2	4			
	222+85	PASSING									2	x	2	4			
SUBTOTAL						**160**	**326**	**160**	**24**	**24**				**168**	**23**	**14**	**SUBTOTAL FOR MILE 175**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
176.000																	
	224+24	PASSING									2	x	2	4			
	229+46	DRIVING									2	x	2	4			
	230+08	DRIVING									2	x	2	4			
	232+79	PASSING									2	x	2	4			
	234+15	DRIVING									2	x	2	4			
	236+83	DRIVING									2	x	2	4			
	238+68	DRIVING									2	x	2	4			
	238+68	DRIVING									2	x	2	4			
	240+12	PASSING									2	x	2	4			
	244+80	DRIVING									2	x	2	4			
	245+85	DRIVING									2	x	2	4			
	247+17	DRIVING									2	x	2	4			
	250+30	DRIVING									2	x	2	4			
	250+76	DRIVING									2	x	2	4			
	251+12	PASSING													14	8	Transverse Crack - Crack Stitch
	251+26	PASSING	28	x	12	37	52	20	12	12							
	251+54	PASSING													12	7	Longitudinal Crack - Crack Stitch
	252+23	PASSING									2	x	2	4			
	252+36	DRIVING													12	7	Longitudinal Crack - Crack Stitch
	256+14	DRIVING									2	x	2	4			
	257+35	DRIVING									2	x	2	4			
	259+10	DRIVING									2	x	2	4			
	261+26	PASSING									2	x	6	12			
	261+26	PASSING									2	x	2	4			
	262+83	DRIVING									2	x	2	4			
	264+34	DRIVING									2	x	2	4			
	268+57	PASSING									2	x	2	4			
	271+45	PASSING									2	x	2	4			
	273+51	DRIVING									2	x	2	4			
	276+35	PASSING									2	x	3	6			
SUBTOTAL						**37**	**52**	**20**	**12**	**12**				**114**	**38**	**22**	**SUBTOTAL FOR MILE 176**

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	7

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
177.000																	
	277+02	PASSING									2	x	2	4			
	284+10	DRIVING									2	x	2	4			
	285+13	DRIVING									2	x	2	4			
	286+45	DRIVING									2	x	2	4			
	286+45	PASSING									2	x	2	4			
	288+03	PASSING									2	x	2	4			
	290+72	DRIVING	68	x	15	113	98	20	48	48							5 Panels Effected
	291+59	PASSING									2	x	2	4			
	291+78	DRIVING									2	x	2	4			
	291+88	PASSING									2	x	2	4			
	294+08	PASSING									2	x	2	4			
	294+16	PASSING									2	x	2	4			
	295+09	DRIVING													5	3	Longitudinal Crack - Crack Stitch
	296+87	DRIVING									2	x	2	4			
	299+51	PASSING									2	x	2	4			
	301+27	DRIVING									2	x	2	4			
	303+37	DRIVING	29	x	15	48	59	20	12	12							
	306+17	DRIVING									2	x	2	4			
	306+77	PASSING									2	x	2	4			
	311+55	PASSING									2	x	2	4			
	311+67	DRIVING									2	x	5	10			
	313+11	DRIVING									2	x	2	4			
	313+63	PASSING									2	x	2	4			
	314+81	PASSING									2	x	2	4			
	314+90	DRIVING									2	x	2	4			
	317+50	PASSING									2	x	2	4			
	317+71	PASSING									2	x	2	4			
	319+53	DRIVING									2	x	2	4			
	326+02	DRIVING									2	x	2	4			
	326+19	DRIVING									2	x	2	4			
	326+20	DRIVING									2	x	2	4			
	327+10	DRIVING									2	x	2	4			
	327+88	PASSING									2	x	2	4			
SUBTOTAL						**162**	**157**	**40**	**60**	**60**				**126**	**5**	**3**	**SUBTOTAL FOR MILE 177**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
178.000																	
	329+38	DRIVING									2	x	2	4			
	329+72	PASSING									2	x	2	4			
	330+57	DRIVING									2	x	2	4			
	337+62	DRIVING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	8

RP	STATION	LANE	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR				RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
			DIMENSIONS			AREA					DIMENSIONS			AREA			
			LENGTH	x	WIDTH						LENGTH	x	WIDTH				
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
178.000	337+62	DRIVING									2	x	2	4			
CONT'D	338+04	DRIVING									2	x	2	4			
	338+79	DRIVING									2	x	2	4			
	341+52	PASSING									2	x	2	4			
	342+82	PASSING									2	x	2	4			
	344+27	PASSING									2	x	2	4			
	345+14	PASSING									2	x	2	4			
	345+94	DRIVING									2	x	2	4			
	346+21	DRIVING									2	x	2	4			
	346+21	PASSING									2	x	2	4			
	346+62	DRIVING									2	x	2	4			
	347+45	DRIVING									2	x	2	4			
	349+10	DRIVING									2	x	2	4			
	349+26	DRIVING									2	x	3	6			
	349+51	DRIVING									2	x	2	4			
	350+53	DRIVING									2	x	2	4			
	351+48	PASSING									2	x	2	4			
	351+58	PASSING									2	x	2	4			
	351+59	PASSING									2	x	2	4			
	351+72	PASSING									2	x	3	6			
	351+73	PASSING									2	x	2	4			
	352+93	PASSING									2	x	2	4			
	353+70	PASSING									2	x	2	4			
	356+01	PASSING									2	x	2	4			
	356+86	DRIVING									2	x	2	4			
	357+00	DRIVING									2	x	2	4			
	357+02	PASSING									2	x	2	4			
	357+25	DRIVING									3	x	2	6			
	357+39	DRIVING									2	x	2	4			
	357+52	DRIVING									2	x	2	4			
	358+36	PASSING									2	x	2	4			
	358+75	PASSING									2	x	2	4			
	358+93	DRIVING									2	x	2	4			
	359+25	DRIVING									2	x	2	4			
	359+94	DRIVING									3	x	2	6			
	360+10	DRIVING									2	x	6	12			
	360+79	DRIVING									2	x	6	12			
	360+79	DRIVING									2	x	2	4			Eastside of Joint
	361+35	DRIVING									2	x	2	4			
	361+56	DRIVING									2	x	2	4			
	362+28	DRIVING									2	x	2	4			
	362+86	DRIVING									2	x	2	4			
	362+96	DRIVING									2	x	2	4			
	363+84	PASSING									2	x	2	4			
	363+96	PASSING									2	x	2	4			
	364+18	PASSING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	9

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
178.000	364+28	DRIVING									2	x	2	4			
CONT'D	365+29	DRIVING									2	x	2	4			
	366+57	PASSING									2	x	2	4			
	367+21	DRIVING									2	x	2	4			
	367+26	PASSING									2	x	2	4			
	369+00	DRIVING									2	x	2	4			
	370+63	PASSING									2	x	2	4			
	370+70	PASSING									2	x	2	4			
	372+51	DRIVING									2	x	2	4			
	373+46	PASSING									2	x	2	4			
	373+52	PASSING									2	x	2	4			
	374+60	PASSING									2	x	2	4			
	374+63	PASSING									2	x	2	4			
	375+77	DRIVING									2	x	2	4			
	376+70	DRIVING									2	x	2	4			
	377+75	DRIVING									2	x	2	4			
	378+83	PASSING									2	x	2	4			
	379+03	DRIVING									2	x	2	4			
	379+51	DRIVING									2	x	2	4			
	379+64	DRIVING									2	x	2	4			
	379+75	PASSING									2	x	2	4			Relief Joint
	380+25	DRIVING									2	x	2	4			
	380+25	DRIVING									2	x	5	10			
	380+37	DRIVING									2	x	2	4			
	380+44	PASSING									2	x	3	6			
	380+44	DRIVING									2	x	2	4			
	380+44	DRIVING									2	x	2	4			Westside of Joint
	381+70	DRIVING									2	x	2	4			
SUBTOTAL						**0**	**0**	**0**	**0**	**0**				**344**	**0**	**0**	**SUBTOTAL FOR MILE 178**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
179.000																	
	382+34	PASSING									2	x	2	4			
	382+78	PASSING									2	x	2	4			
	382+88	PASSING									2	x	2	4			
	383+15	PASSING									2	x	2	4			
	383+16	DRIVING									2	x	2	4			
	383+87	PASSING									2	x	2	4			
	383+89	PASSING									2	x	2	4			
	383+93	DRIVING									2	x	2	4			
	383+95	DRIVING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	10

RP	STATION	LANE	FULL DEPTH REPAIR				SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR				RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
			DIMENSIONS			AREA					DIMENSIONS			AREA			
			LENGTH	x	WIDTH						LENGTH	x	WIDTH				
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
179.000	386+22	DRIVING									2	x	2	4			
CONT'D	387+82	DRIVING									2	x	2	4			
	388+06	DRIVING									2	x	2	4			
	389+19	DRIVING									2	x	2	4			
	391+06	PASSING									2	x	2	4			
	391+90	DRIVING									2	x	2	4			
	392+18	PASSING									2	x	2	4			
	392+30	PASSING									2	x	2	4			
	394+06	PASSING	39	x	12	52	63	20	24	24							3 Panels
	395+66	PASSING									2	x	2	4			
	396+08	DRIVING									2	x	2	4			
	396+77	DRIVING									2	x	2	4			
	397+28	DRIVING									2	x	2	4			
	397+31	PASSING									2	x	2	4			
	397+43	DRIVING									2	x	2	4			
	398+08	DRIVING									2	x	2	4			
	398+21	PASSING									2	x	2	4			Faulting
	398+88	PASSING									2	x	3	6			
	398+89	DRIVING									2	x	3	6			
	399+81	DRIVING									2	x	2	4			
	402+13	PASSING									2	x	2	4			
	402+50	PASSING									2	x	2	4			
	403+24	PASSING									2	x	2	4			
	403+35	PASSING									2	x	2	4			
	404+05	DRIVING									2	x	2	4			
	406+50	PASSING									2	x	2	4			
	408+23	PASSING	12	x	12	16	36	20									1 Panel
	408+75	PASSING									2	x	2	4			
	409+38	PASSING									2	x	2	4			
	409+94	DRIVING									2	x	2	4			
	411+05	PASSING									2	x	2	4			
	412+41	PASSING									2	x	2	4			
	413+34	DRIVING									2	x	2	4			
	413+35	DRIVING									2	x	3	6			
	414+18	DRIVING									2	x	2	4			
	414+26	PASSING									2	x	2	4			
	414+84	DRIVING									2	x	2	4			
	415+50	PASSING									2	x	2	4			
	415+50	DRIVING									2	x	2	4			
	415+78	DRIVING									2	x	2	4			
	416+44	DRIVING									2	x	2	4			
	416+84	DRIVING									2	x	2	4			
	416+96	DRIVING									4	x	2	8			
	417+11	PASSING									2	x	2	4			
	417+65	DRIVING									2	x	2	4			
	418+15	PASSING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	11

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
179.000																	
CONT'D	419+46	PASSING									2	x	2	4			
	419+86	PASSING									2	x	2	4			
	420+04	PASSING									2	x	2	4			
	420+38	PASSING									2	x	2	4			
	420+93	DRIVING									2	x	2	4			
	421+61	PASSING									3	x	2	6			
	422+28	PASSING									2	x	2	4			
	423+34	DRIVING									2	x	2	4			
	423+46	DRIVING									2	x	2	4			
	424+01	DRIVING									2	x	2	4			
	424+13	PASSING									2	x	2	4			
	426+03	DRIVING									2	x	2	4			
	427+00	DRIVING									2	x	2	4			
	427+79	DRIVING									4	x	2	8			
	427+80	PASSING									2	x	2	4			
	428+04	DRIVING									2	x	2	4			
	430+11	PASSING									2	x	2	4			
	431+50	PASSING									2	x	2	4			
	433+30	PASSING									2	x	2	4			
	433+31	DRIVING									3	x	2	6			
	433+84	DRIVING									2	x	2	4			
	434+37	DRIVING									2	x	2	4			
SUBTOTAL						**68**	**99**	**40**	**24**	**24**				**318**	**0**	**0**	**SUBTOTAL FOR MILE 179**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
180.000																	
	434+91	PASSING									2	x	2	4			
	435+19	PASSING									2	x	2	4			
	435+31	DRIVING									2	x	2	4			
	435+47	PASSING									2	x	2	4			
	435+60	DRIVING									2	x	2	4			
	435+75	PASSING									2	x	2	4			
	436+66	PASSING									2	x	2	4			
	437+05	PASSING									2	x	2	4			
	437+06	DRIVING									2	x	2	4			
	437+27	PASSING									2	x	2	4			
	437+27	PASSING									2	x	2	4			
	437+46	DRIVING									2	x	2	4			
	437+74	PASSING									2	x	2	4			
	437+79	DRIVING									2	x	2	4			
	438+02	PASSING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	12

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
180.000																	
CONT'D	438+16	DRIVING									2	x	2	4			Both Sides of Joint
	438+16	DRIVING									2	x	2	4			Both Sides of Joint
	438+45	PASSING									2	x	2	4			
	438+56	DRIVING									2	x	2	4			
	439+25	DRIVING									2	x	2	4			
	439+92	DRIVING									2	x	2	4			
	440+18	DRIVING									2	x	2	4			
	440+74	DRIVING									2	x	2	4			
	442+09	DRIVING									2	x	2	4			
	443+17	DRIVING									2	x	6	12			
	443+55	PASSING									2	x	4	8			
	443+55	DRIVING									2	x	2	4			
	443+84	DRIVING									2	x	2	4			
	444+48	DRIVING									2	x	2	4			
	444+49	DRIVING									2	x	4	8			
	445+31	DRIVING									2	x	2	4			
	446+78	DRIVING									2	x	2	4			
	447+01	DRIVING									2	x	2	4			
	448+89	PASSING									2	x	2	4			
	451+52	PASSING									2	x	2	4			
	451+80	PASSING									2	x	2	4			
	451+81	DRIVING									2	x	2	4			
	452+73	DRIVING									2	x	2	4			
	452+73	PASSING									2	x	2	4			
	453+38	DRIVING									2	x	2	4			
	454+64	DRIVING									2	x	2	4			
	456+27	PASSING									2	x	2	4			
	456+27	DRIVING									2	x	2	4			
	456+53	DRIVING									2	x	2	4			
	456+53	PASSING									2	x	4	8			
	458+41	PASSING									2	x	2	4			
	458+43	PASSING									2	x	2	4			
	459+06	PASSING									4	x	2	8			
	459+07	DRIVING	62	x	15	103	92	20	48	48							
	459+26	PASSING									2	x	7	14			
	459+50	PASSING	8	x	12	11	32	20									
	460+86	DRIVING									2	x	2	4			
	461+01	PASSING									2	x	2	4			
	461+05	PASSING									2	x	2	4			
	461+11	PASSING	6	x	12	8	30	20									
	463+17	PASSING									2	x	2	4			
	469+54	DRIVING									3	x	2	6			
	473+47	DRIVING									3	x	2	6			
	473+76	DRIVING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	13

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
180.000	475+44	PASSING									2	x	2	4			
CONTD	478+37	DRIVING									4	x	2	8			
	480+39	DRIVING									2	x	2	4			
	481+13	PASSING									2	x	2	4			
	481+19	PASSING									2	x	2	4			
	484+16	DRIVING									2	x	2	4			
SUBTOTAL						**122**	**154**	**60**	**48**	**48**				**290**	**0**	**0**	**SUBTOTAL FOR MILE 180**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
181.000																	
	487+02	DRIVING									2	x	2	4			
	490+59	DRIVING									2	x	2	4			
	493+45	DRIVING									2	x	2	4			
	495+85	PASSING									2	x	2	4			
	497+79	PASSING									2	x	2	4			
	499+72	PASSING									2	x	2	4			
	500+74	PASSING									2	x	2	4			
	501+87	DRIVING									2	x	2	4			
	503+73	DRIVING									2	x	2	4			
	505+26	DRIVING									2	x	2	4			
	509+15	PASSING									2	x	2	4			
	511+88	DRIVING									2	x	2	4			
	513+32	DRIVING									2	x	2	4			
	513+96	DRIVING									2	x	2	4			
	515+50	PASSING									2	x	2	4			
	519+02	DRIVING									2	x	2	4			
	530+30	PASSING									2	x	2	4			
	536+84	PASSING									2	x	2	4			
SUBTOTAL						**0**	**0**	**0**	**0**	**0**				**72**	**0**	**0**	**SUBTOTAL FOR MILE 181**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
182.000																	
	541+63	PASSING									2	x	2	4			
	548+92	DRIVING									2	x	2	4			
	550+30	PASSING									2	x	2	4			
	550+39	PASSING									2	x	2	4			
	551+13	DRIVING									3	x	2	6			
	551+26	DRIVING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	14

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
182.000																	
CONT'D	551+65	DRIVING									2	x	2	4			
	551+85	PASSING									2	x	2	4			
	551+92	DRIVING									2	x	2	4			
	552+01	DRIVING									2	x	2	4			
	552+91	DRIVING									2	x	2	4			
	553+18	DRIVING									2	x	2	4			
	556+59	DRIVING									5	x	2	10			
	556+90	PASSING									2	x	2	4			
	556+90	DRIVING									2	x	2	4			
	559+49	DRIVING									2	x	2	4			
	560+26	PASSING									2	x	2	4			
	560+31	DRIVING									2	x	2	4			
	561+78	PASSING									2	x	2	4			
	563+07	PASSING									2	x	2	4			
	564+74	PASSING									2	x	2	4			
	564+74	DRIVING									2	x	2	4			
	567+48	PASSING									2	x	2	4			
	569+69	PASSING									2	x	2	4			
	572+14	PASSING									2	x	2	4			
	572+79	DRIVING									2	x	2	4			
	573+32	DRIVING									2	x	2	4			
	573+69	PASSING									2	x	2	4			
	575+16	PASSING									2	x	2	4			
	575+49	PASSING									2	x	2	4			
	575+67	DRIVING									2	x	2	4			
	576+86	PASSING									2	x	2	4			
	577+54	PASSING									2	x	2	4			
	579+42	DRIVING									2	x	2	4			
	579+88	PASSING									2	x	2	4			
	580+83	DRIVING									2	x	2	4			
	581+35	DRIVING									2	x	2	4			
	582+09	DRIVING									2	x	2	4			
	583+27	PASSING									2	x	2	4			
	583+82	DRIVING									2	x	2	4			
	583+96	DRIVING	15	x	15	25	45	20									
	586+22	PASSING									2	x	2	4			
	587+82	PASSING									2	x	2	4			
SUBTOTAL						**25**	**45**	**20**	**0**	**0**				**176**	**0**	**0**	**SUBTOTAL FOR MILE 182**

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	011	15

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	FULL DEPTH REPAIR AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	SPALL REPAIR AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
183.000																	
	594+37	DRIVING									2	x	2	4			
	595+17	DRIVING									2	x	2	4			
	600+50	PASSING	30	x	12	40	54	20	12	12							
	602+64	DRIVING													15	8	Transverse Crack - Crack Stitch
	605+66	DRIVING									2	x	2	4			
	610+16	DRIVING									2	x	2	4			
	612+93	DRIVING									2	x	2	4			
	618+12	DRIVING									2	x	2	4			
	618+37	DRIVING									2	x	2	4			
	619+18	PASSING									2	x	2	4			
	619+34	DRIVING									2	x	2	4			
	620+21	DRIVING									2	x	2	4			
	620+21	PASSING									2	x	2	4			
	621+90	DRIVING									2	x	2	4			
	622+74	DRIVING									2	x	2	4			
	623+07	DRIVING									2	x	2	4			
	624+76	PASSING	9	x	12	12	33	20									
	625+48	DRIVING									2	x	2	4			
	627+37	PASSING									2	x	2	4			
	628+59	PASSING									2	x	2	4			
	628+61	DRIVING									3	x	2	6			
	628+70	DRIVING									2	x	2	4			
	630+37	DRIVING									2	x	2	4			
	632+44	DRIVING									2	x	2	4			
	633+39	PASSING	6	x	12	8	30	20									
	635+56	DRIVING									2	x	2	4			
	636+66	DRIVING													15	8	Transverse Crack - Crack Stitch
	636+66	PASSING													13	7	Transverse Crack - Crack Stitch
	638+63	DRIVING									2	x	2	4			
	640+72	DRIVING									2	x	2	4			
	640+97	PASSING	30	x	12	40	54	20	12	12							
	642+45	DRIVING									2	x	2	4			
	643+73	PASSING									2	x	2	4			
SUBTOTAL						**100**	**171**	**80**	**24**	**24**				**106**	**43**	**23**	**SUBTOTAL FOR MILE 183**

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	16

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
184.000																	
	647+58	DRIVING									2	x	2	4			
	648+42	PASSING									2	x	2	4			
	649+10	DRIVING									2	x	2	4			
	650+71	PASSING									2	x	2	4			
	659+55	PASSING									2	x	2	4			
	662+31	DRIVING									2	x	2	4			
	669+85	DRIVING									2	x	2	4			
	678+51	DRIVING									2	x	2	4			Exposed Rebar
	680+20	DRIVING													12	7	Longitudinal Crack - Crack Stitch
	682+39	DRIVING									2	x	2	4			
	687+79	DRIVING									2	x	2	4			
	696+76	PASSING									2	x	2	4			
	698+64	DRIVING									2	x	2	4			
SUBTOTAL						**0**	**0**	**0**	**0**	**0**				**48**	**12**	**7**	**SUBTOTAL FOR MILE 184**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
185.000																	
	699+16	DRIVING									2	x	2	4			
	699+18	DRIVING									2	x	2	4			
	709+96	PASSING									2	x	2	4			
	714+12	PASSING									2	x	2	4			
	715+44	PASSING									2	x	2	4			
	716+63	PASSING									2	x	2	4			
	716+64	PASSING									2	x	2	4			
	716+96	DRIVING									2	x	2	4			
	718+12	PASSING									2	x	2	4			
	722+02	DRIVING									2	x	2	4			
	724+95	DRIVING									2	x	2	4			
	725+30	PASSING									2	x	2	4			
	725+94	DRIVING	18	x	15	30	48	20	12	12							
	726+29	PASSING									2	x	2	4			
	727+93	PASSING									2	x	2	4			
	728+06	PASSING									2	x	2	4			
	735+07	PASSING									2	x	2	4			
	735+75	DRIVING									2	x	4	8			
	737+89	PASSING									2	x	6	12			
	738+27	PASSING									2	x	2	4			
	743+36	PASSING									2	x	2	4			
	743+90	DRIVING									2	x	2	4			
	744+59	PASSING									2	x	2	4			
	745+37	PASSING									2	x	2	4			

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Concrete Pavement Repair Data Sheet

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	011	17

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
185.000																	
CONT'D	746+89	DRIVING									2	x	12	24			
	746+89	PASSING									2	x	4	8			
	748+26	DRIVING									2	x	12	24			
	748+40	DRIVING									2	x	8	16			
	749+04	DRIVING									2	x	6	12			
	749+20	DRIVING									2	x	2	4			
	749+20	DRIVING									2	x	2	4			
	749+62	DRIVING									2	x	7	14			
	751+91	PASSING									2	x	2	4			
SUBTOTAL						**30**	**48**	**20**	**12**	**12**				**214**	**0**	**0**	**SUBTOTAL FOR MILE 185**

RP	STATION	LANE	FULL DEPTH REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	SAWCUT	DOWEL BARS	DOWEL CONTRACTION JOINT ASSEMBLY	CONTRACTION JOINT SILICONE SEAL	SPALL REPAIR DIMENSIONS LENGTH	x	WIDTH	AREA	RANDOM CRACK REPAIR	DEFORMED BARS	COMMENTS
RP	STATION	LANE	FT	x	FT	SY	LF	EA	LF	LF	FT	x	FT	SF	LF	EA	COMMENTS
186.000																	
	752+19	PASSING									2	x	2	4			
	752+35	DRIVING									2	x	2	4			
	752+35	DRIVING									2	x	2	4			
	752+35	PASSING									2	x	2	4			
	753+15	PASSING	6	x	12	8	30	20									
	0+10	PASSING									2	x	2	4			
	0+44	PASSING									2	x	2	4			
	0+44	PASSING									2	x	2	4			
SUBTOTAL						**8**	**30**	**20**	**0**	**0**				**28**	**0**	**0**	**SUBTOTAL FOR MILE 186**
TOTAL			**1151**			**1793**	**2579**	**1040**	**564**	**564**				**2542**	**226**	**127**	
TOTAL + 10%						**1973**	**2837**	**1144**	**620**	**620**				**2796**	**248**	**140**	

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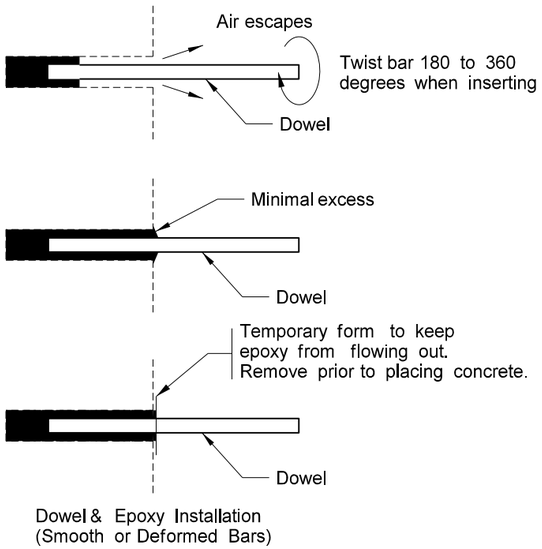
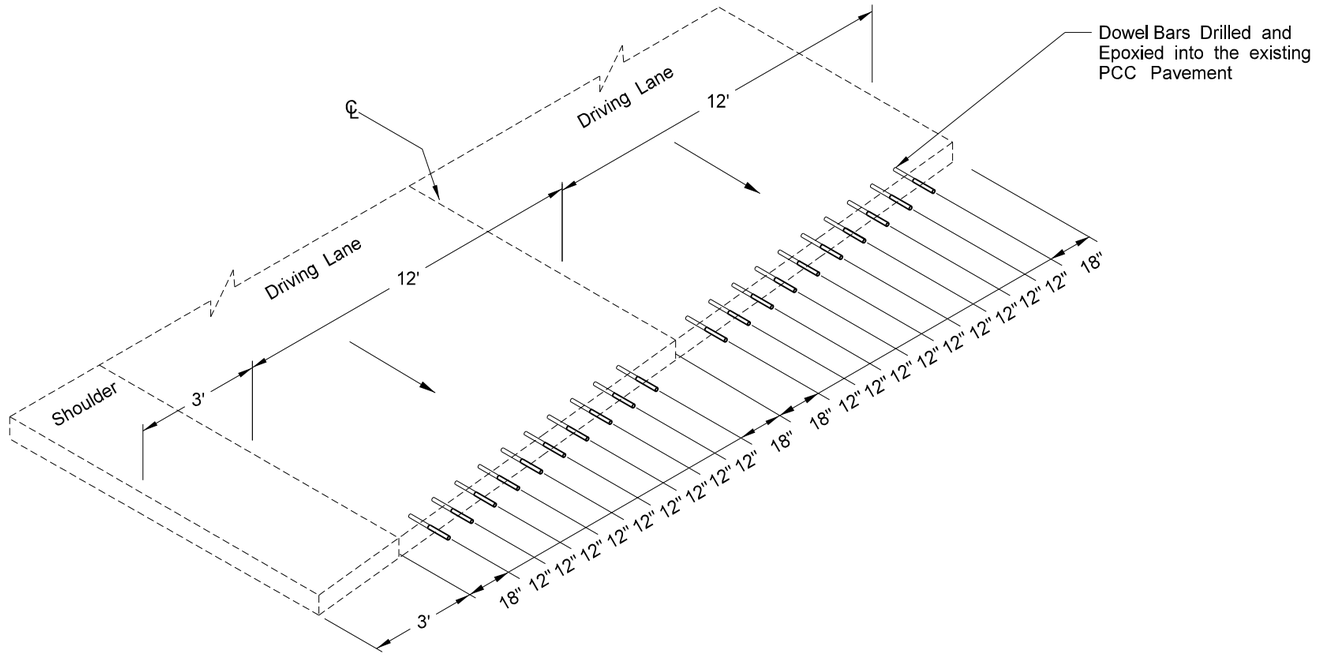
Concrete Pavement Repair Data Sheet

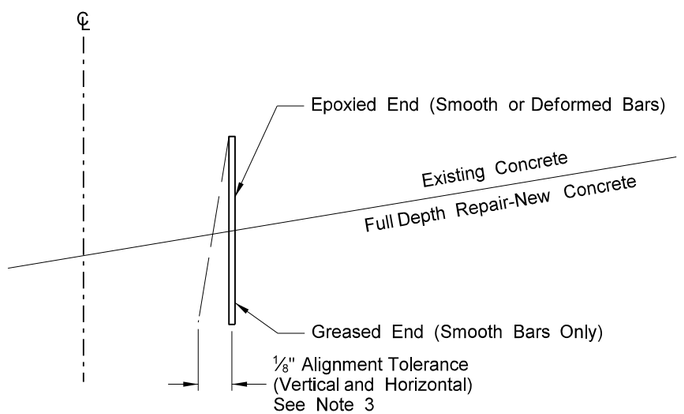
1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy.2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	1



Dowel & Epoxy Installation
(Smooth or Deformed Bars)





Dowel Alignment Tolerance

NOTES:

1. Use 10 bars spaced at 12" C to C for full depth repairs.
2. Dowel bars shall be placed at the vertical midpoint of the existing PCC pavement.
3. Deformed bars shall be aligned parallel to the roadway surface and perpendicular to the joint face.

   Smooth bars and dowel bar assemblies shall be aligned parallel to the roadway centerline and pavement surface.

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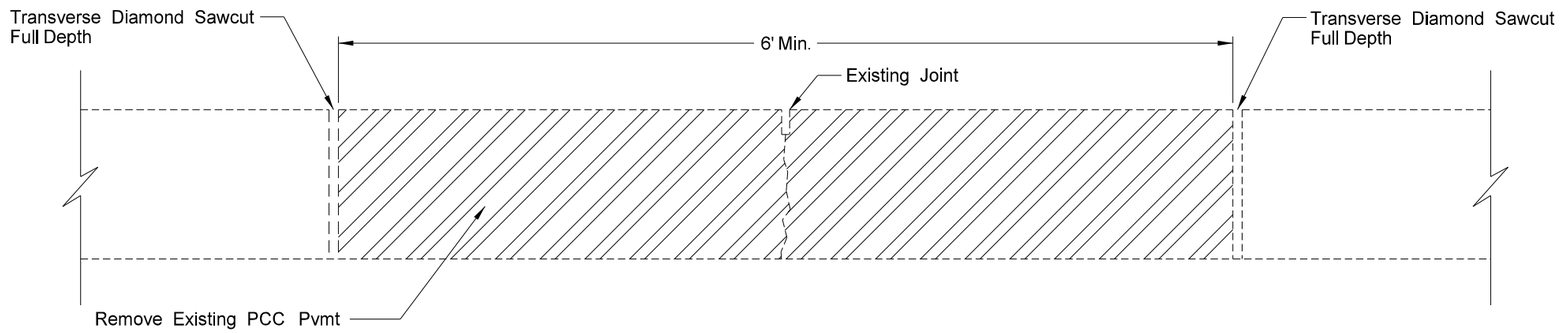
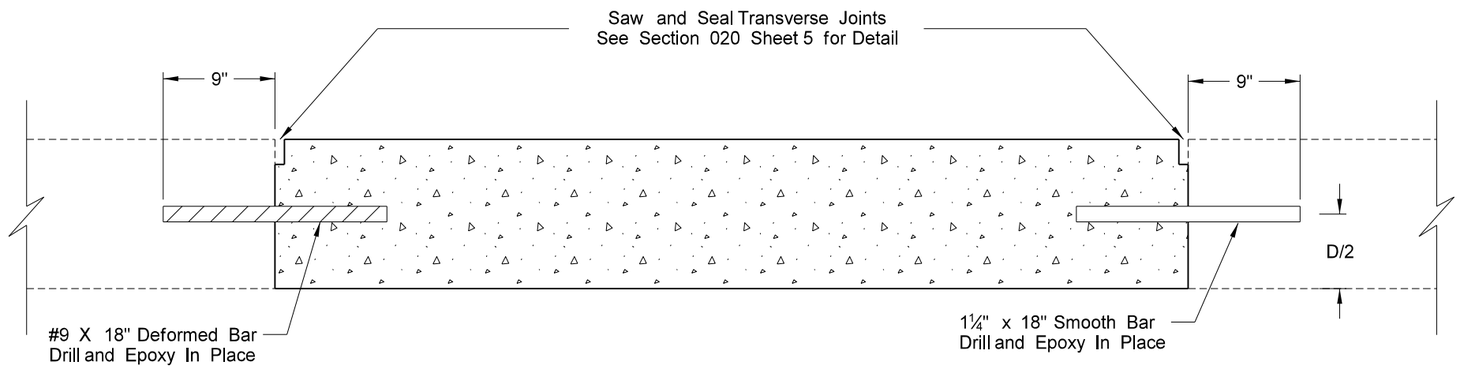
Dowel Bar Placement, Full Depth Repairs
(Smooth or Deformed Bars)
Concrete Pavement Repair

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND		20	2



FULL DEPTH PAVEMENT REMOVAL



FULL DEPTH PAVEMENT REPLACEMENT

Notes:

1. Variables: D = Depth of Pavement
2. Removal and replacement also applies to full depth repairs at cracks.
3. Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.
4. Exposed end of 1¼" x 18" smooth Bar will be greased.

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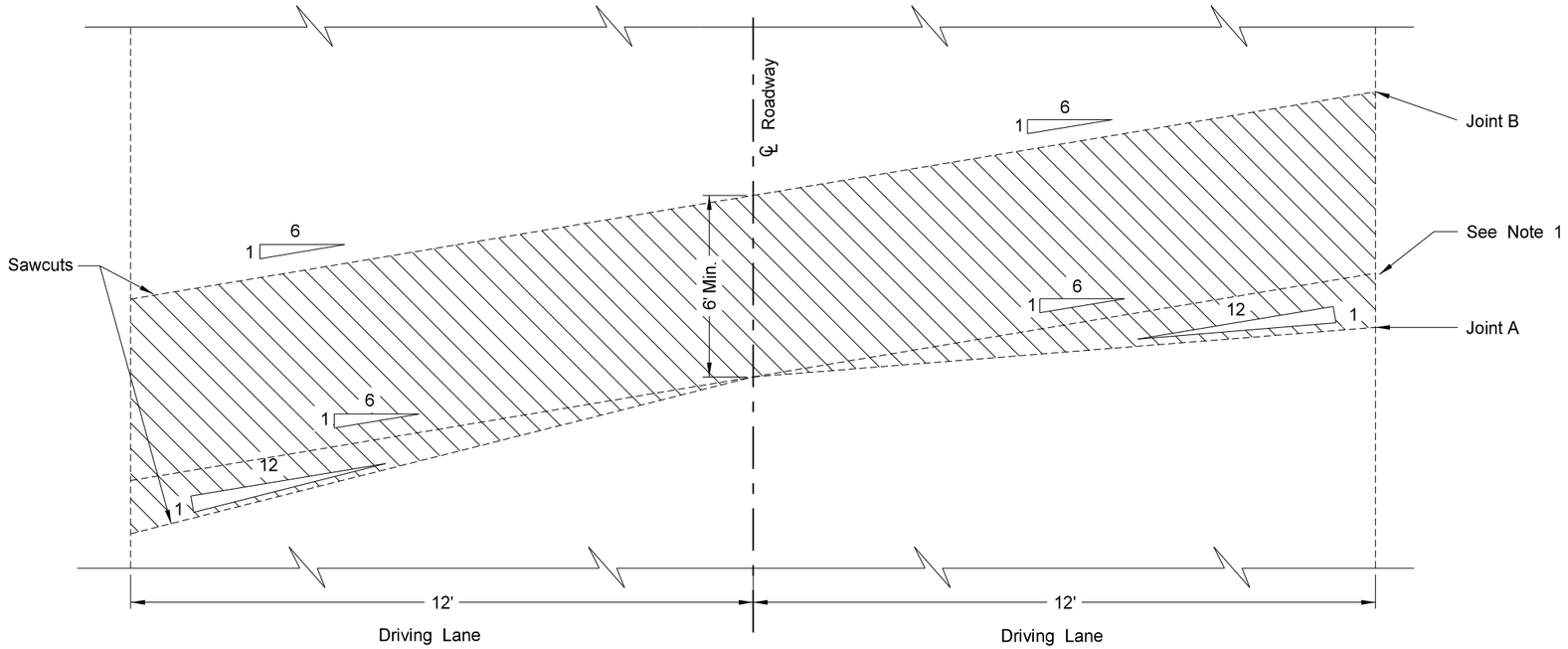
Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement
(Longitudinal Length Less Than One Panel)

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	3



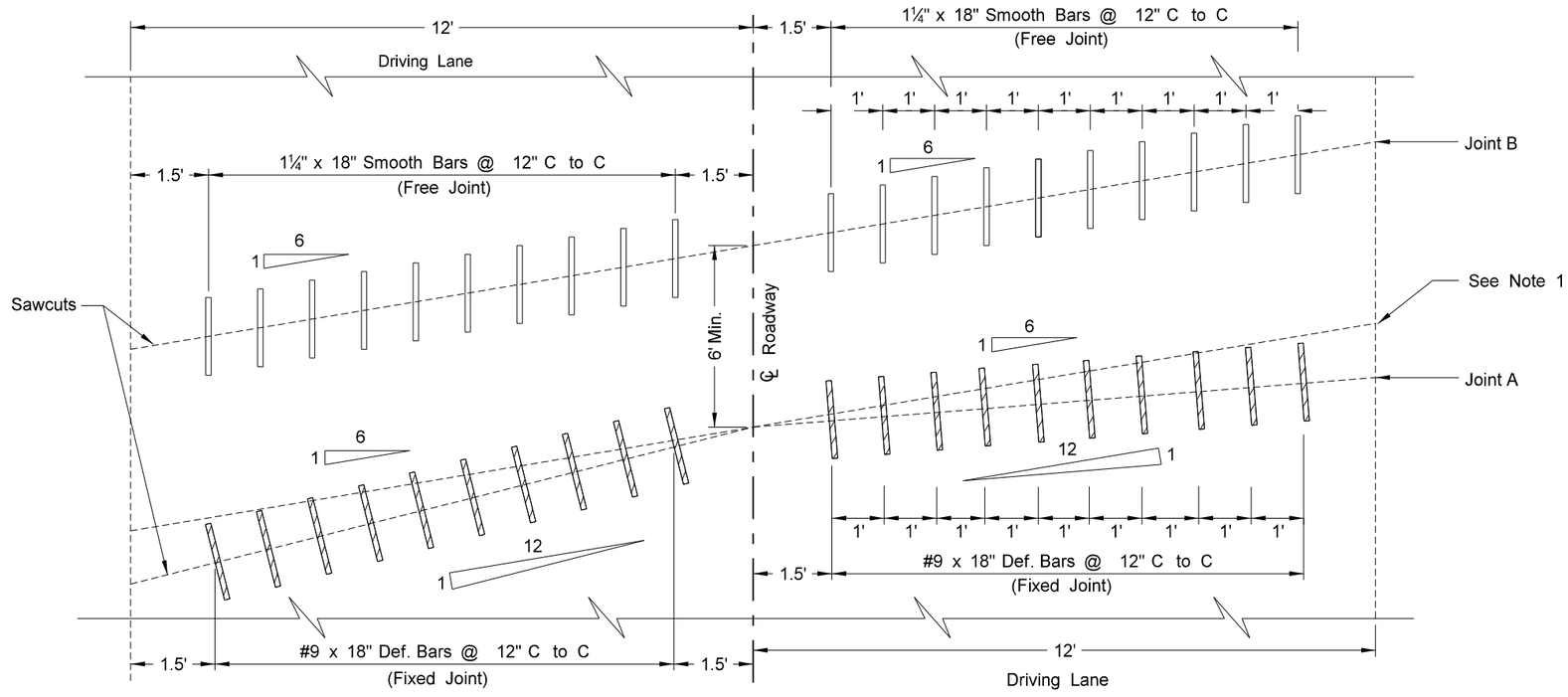
PCC Removal

Notes:

1. Joint A (fixed joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut may be made at a 1 to 6 skew, or up to a maximum of a 1 to 12 skew, referenced off the 1 to 6 skewed transverse joints. The deformed bars shall be placed perpendicular to the face of the saw cut.

2. Joint B (free joint) shall be the new joint with the greatest distance to the next transverse joint or working random crack. The smooth bars shall be installed within the tolerances shown on the "Dowel Bar Placement - Full Depth Repair" detail sheet.

3. When the distance to the next transverse joint or working random crack is equal for both new joints, the free joint (joint B) shall be placed on the approach side of the repair.



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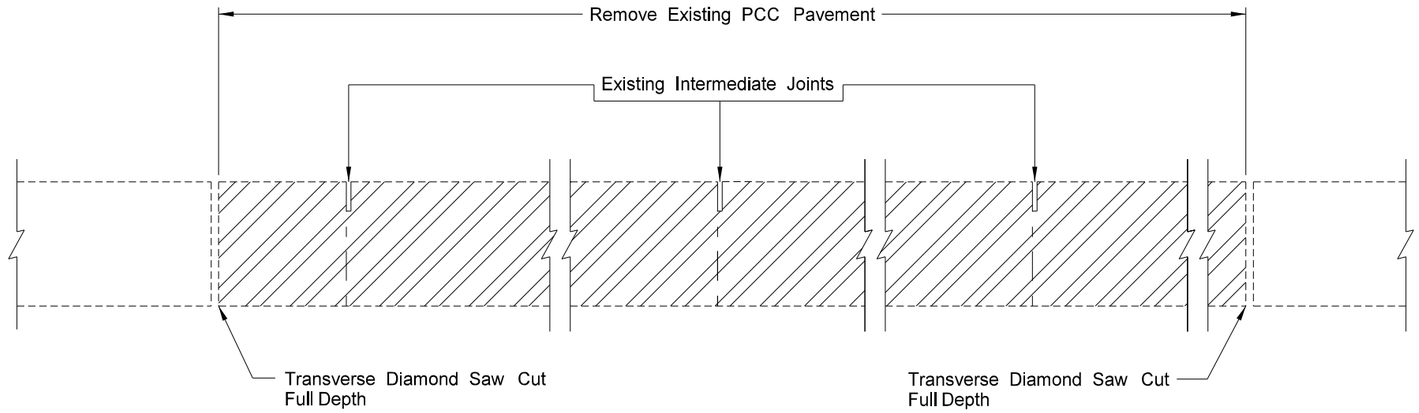
Removal of Concrete & Dowel Bar Placement
Full Depth Repair
(Longitudinal Length Less Than One Panel)

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

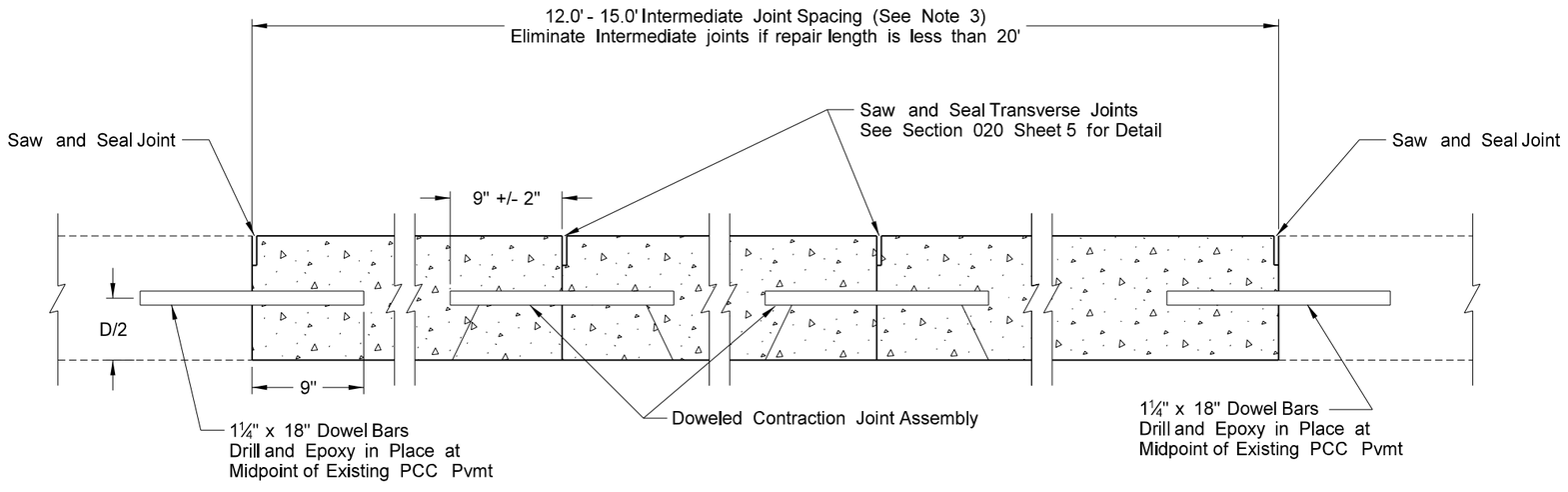
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	4



PCC Pavement Removal

Notes:

1. Variables: D = Pavement Depth
2. A saw cut shall always be made at the beginning and end of the repair area.
3. Joint spacing shall be 12.0' to 15.0'. Where repair length does not allow even spacing of this length, a minimum of 10 foot spacing is required.
4. In repair areas which are not the entire roadway width, joints shall be placed to match the existing pavement wherever possible.
5. Doweled Contraction Joint Assemblies shall be paid for at the rate of 12 LF per 12 foot lane width when installed.
6. Exposed end of 1¼" x 18" Dowel Bars shall be greased.



PCC Pavement Replacement

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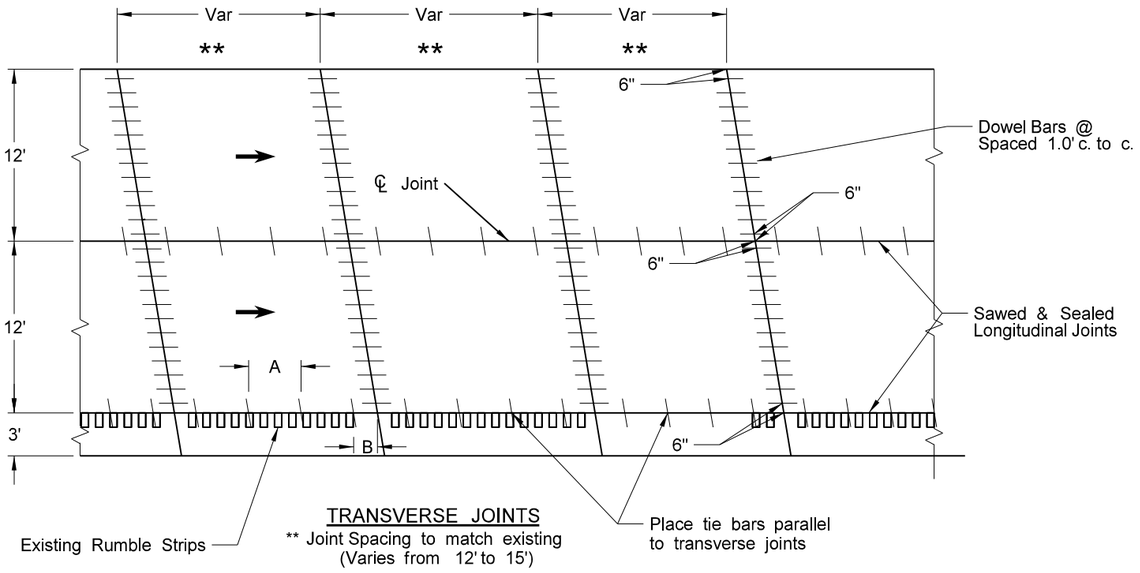
Concrete Pavement Repair
Full Depth, Non-Reinforced PCC Pavement
(Longitudinal Length One Panel or More)

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	5

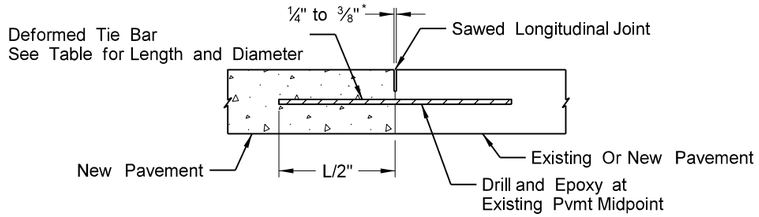


TRANSVERSE JOINTS

** Joint Spacing to match existing
(Varies from 12' to 15')

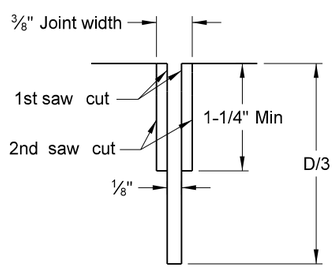
Longitudinal Joint Tie Bar Spacing		
Joint Spacing	Distance A	Distance B
12'	36"	18"
13'	36"	24"
14'	44"	18"
15'	44"	24"

Longitudinal Joint Tie Size and Length					
Pavement Depth	8"	9"	10"	11"	12"
Centerline	#6 X 36"			#7 X 36"	
Shoulder	#5 X 30"				

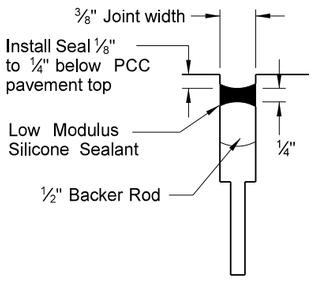


LONGITUDINAL JOINT WITH DEFORMED BAR

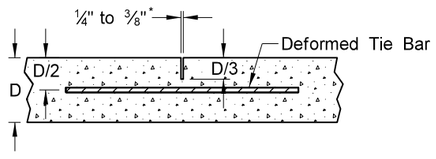
(longitudinal length greater than one panel)



TRANSVERSE JOINT SAWING

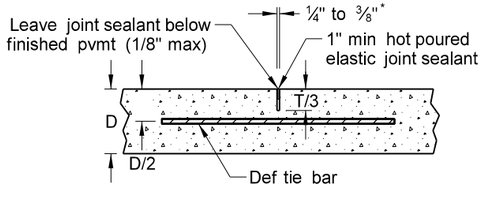


TRANSVERSE JOINT SEALING
SILICONE SEAL



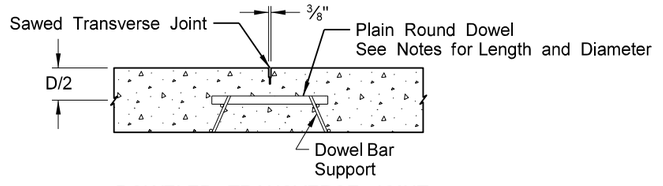
LONGITUDINAL JOINT SAWING DETAIL

(all sawed and tied joints)



LONGITUDINAL JOINT SEALING DETAIL

*Width requirement for top 1" only. Bottom portion of saw cut may be narrower.



DOWELED TRANSVERSE JOINT

Notes:

Variables D = Pavement Thickness
L = Length of Deformed/Dowel Bar

For D = 10" or less, use 1¼" x 18" dowel bars
For D greater than 10", use 1½" x 18" dowel bars

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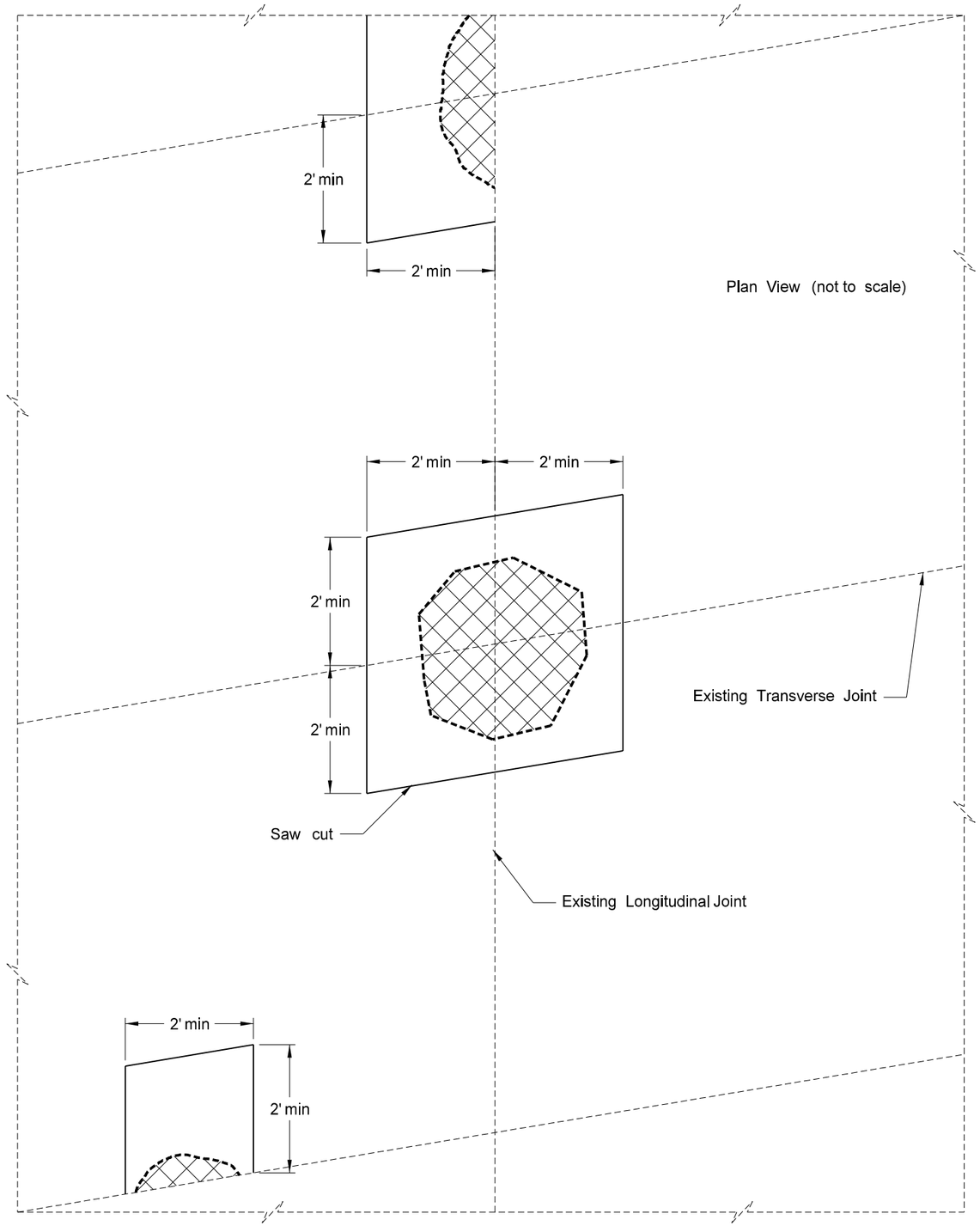
Joint Details for Repairs
Concrete Pavement Repair

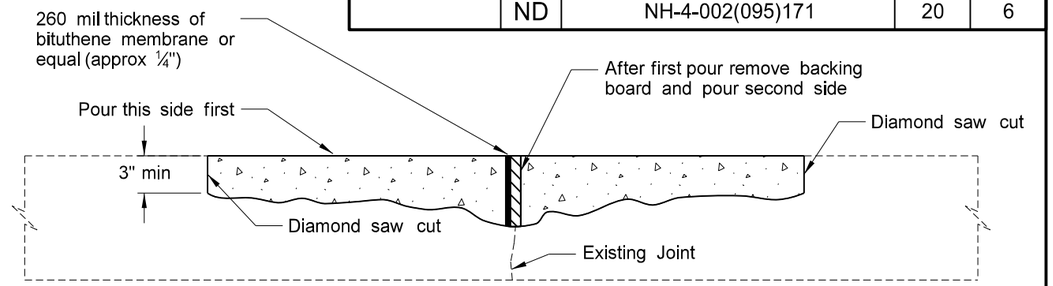
1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	20	6

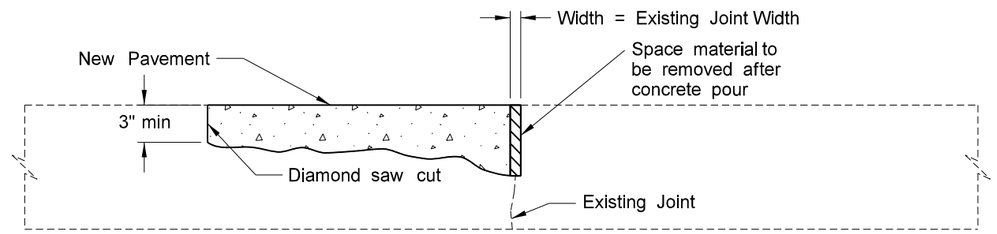


Plan View (not to scale)

Spall Repair



Cross Section - Repair Area on Both Sides of the Joint



Cross Section - Repair Area on One Side of the Joint

Notes:

1. Existing concrete shall be removed with a chipping hammer or other methods as approved by the engineer. A milling machine may be used, as approved by the engineer, but sawing and chipping will still be required to finish the removal.

2. Grout shall be applied to the sides (excluding joint faces) and bottom of the repair area. The grout shall be prepared in accordance with section 602.03 H.1 of the NDDOT Standard Specification.

3. A spacer material, as approved by the engineer, shall be placed on the joint face to maintain the joint during repair. The material shall have the capability of maintaining a width equal to that of the existing joint, and being easily removed after the pour. In the case of repair on both sides of the transverse joint each side shall be poured separately.

4. In the case of repair on both sides of the joint, if deemed necessary by the engineer, a bituthene waterproofing membrane will be placed on the face of the newly poured joint in lieu of the spacer material prior to the concrete pour. The material shall be a minimum of 260 Mil (approximately 1/4") thick or equal to the width of the existing joint, whichever is larger. The material shall be cut to fit over the entire face of the existing joint. The material shall be placed to provide for expansion and to prevent water from entering the existing joint through the sides or bottom. The material shall be hand pressed into place to conform to the face of the existing joint. In the case of repair on both sides of the joint a backer board material, as approved by the engineer shall be placed over the bituthene material on the side facing the second pour prior to the 2nd pour. The backer board shall be removed after the repair is completed.

   In the case of repair on one side of the joint, if deemed necessary by the engineer, a bituthene waterproofing membrane will be placed on the face of the existing joint in lieu of the spacer material and prior to the concrete pour.

5. All joints shall be sealed in accordance with applicable plan sheets and NDDOT standard specifications.

6. All costs for cleaning and sealing joints and any bituthene installment shall be covered under the bid item " Spall Repair - Partial Depth."

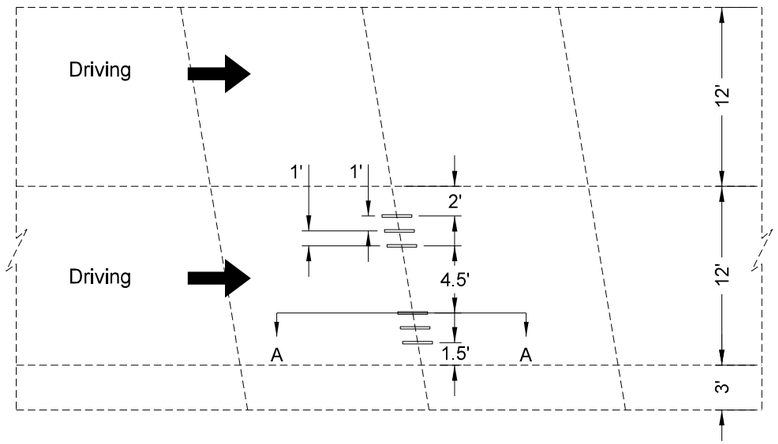
Spall

Concrete Removal Area

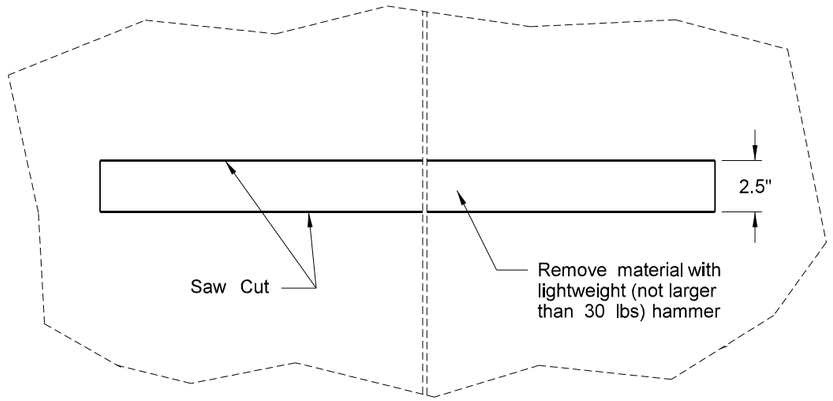
Spall Repair - Partial Depth Detail

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	7

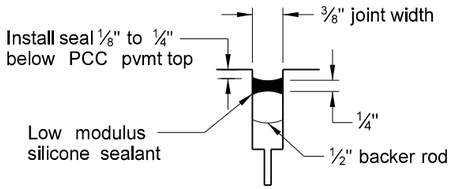


Retrofit Dowel Bar Spacing

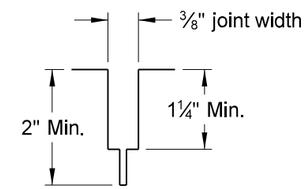


Plan View Dowel Bar Retrofit Slot Material Removal

Note: The 12' driving lane where the dowel bar retrofit is placed shall be sawed and sealed according to the Dowel Bar Retrofit Silicone Joint Detail. All costs to saw and seal the dowel bar retrofit joints shall be paid for at the unit price bid for "Dowel Bar Retrofit - Type B".

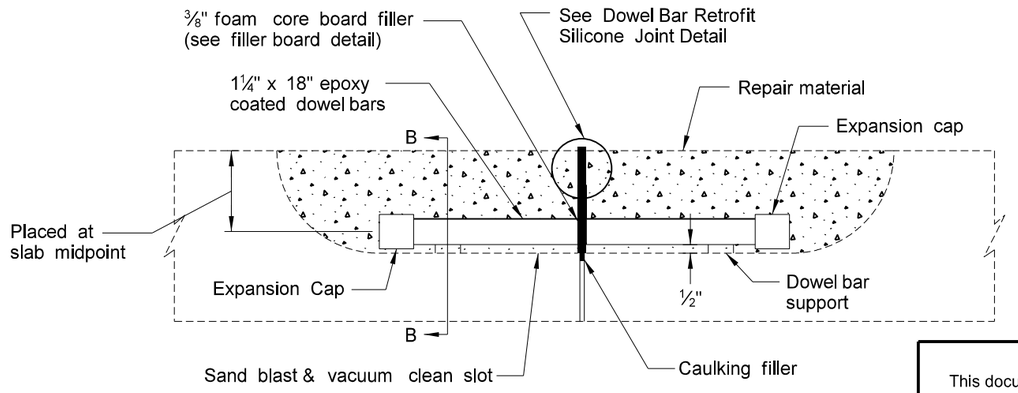


Transverse Joint Seal



Transverse Joint Sawing

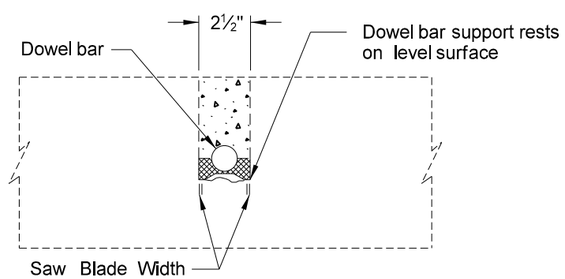
Dowel Bar Retrofit Silicone Joint Detail



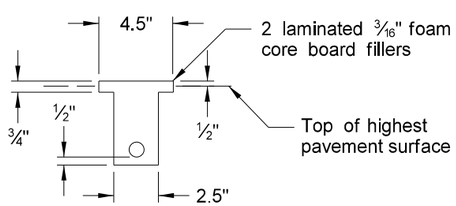
Section A-A

Dowel Bar Installation Detail

NOTE: Repair material shall be placed above the existing PCC pavement (a maximum of ¼".)



Section B-B



Filler Board Detail

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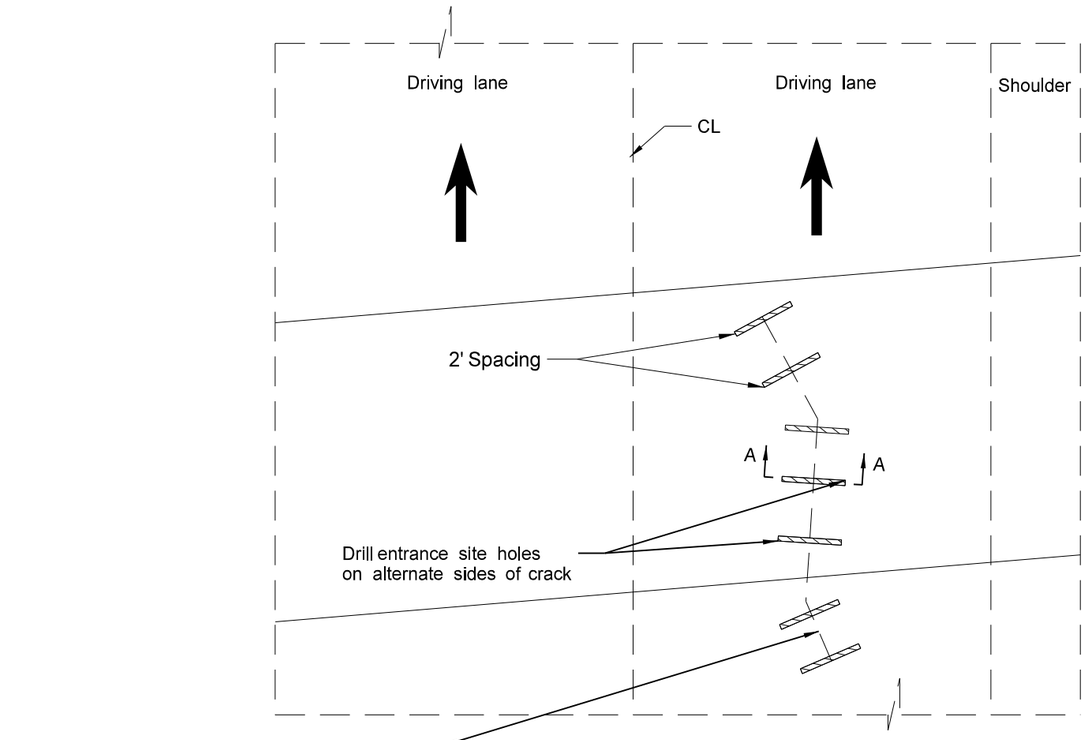
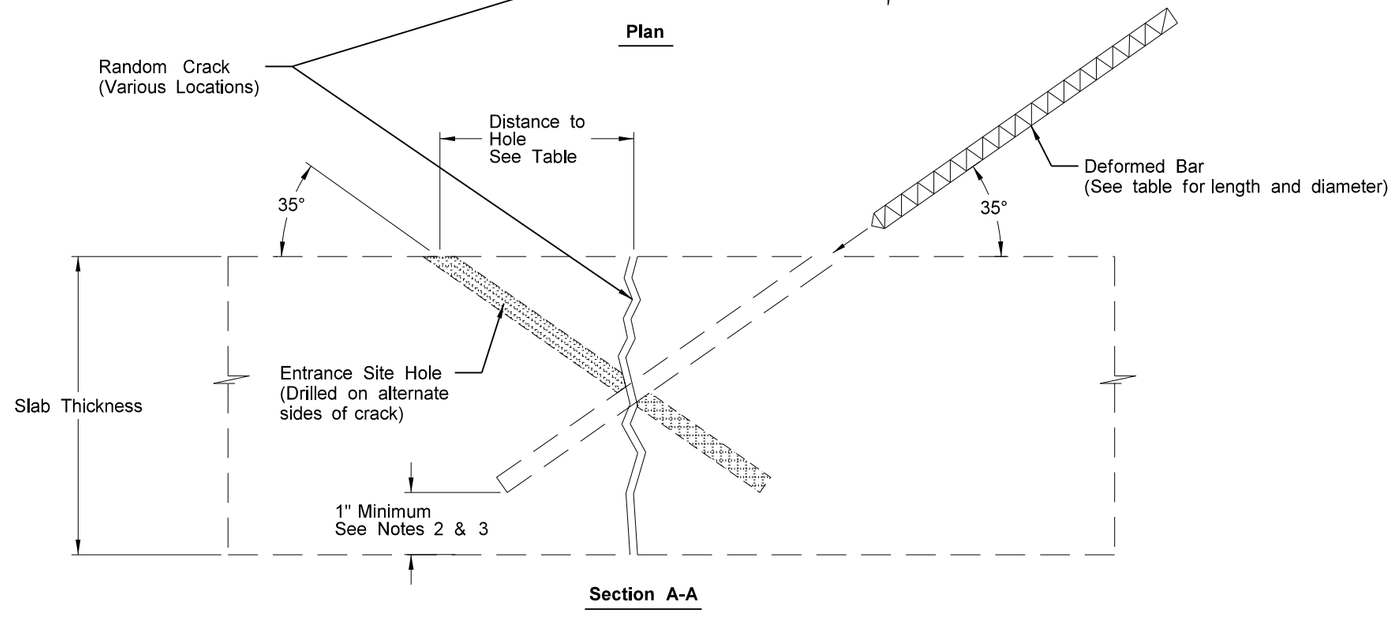
Dowel Bar Retrofit Installation Detail

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	8



Plan



Section A-A

Cross Stitching Bar Dimensions and Location of Holes					
Degree of Bar	Slab Thickness (In)				
	8	9	10	11	12
	Distance to Hole (In)				
35°	5.75	6.50	7.25	7.75	8.50
	Length of Bar (In)				
35°	9.5	11.00	12.50	14.5	16.00
	Size of Bar				
	No. 6	No. 6	No. 6	No. 6	No. 6

Notes:

1. Exact cross-stiching locations will be determined by the engineer in the field upon commencement of work. For estimate purposes, deformed bars have been calculated based on cross-stiching locations identified in Section 011 of the plan sheets.
2. Epoxy deformed bar into hole. Length shown in table provide 1 inch cover at surface and assume drilling per note 3.
3. Do not drill hole completely through slab. Stop drilling so epoxy/grout will not run out of the bottom when filling.

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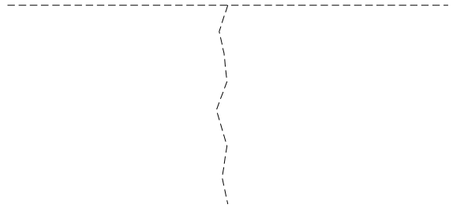
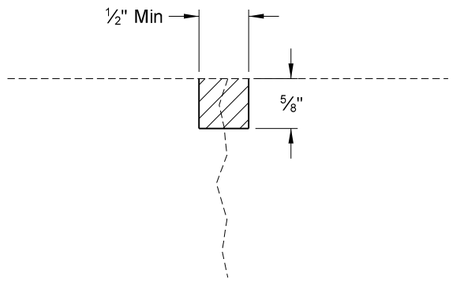
Random Crack Stitching Detail

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

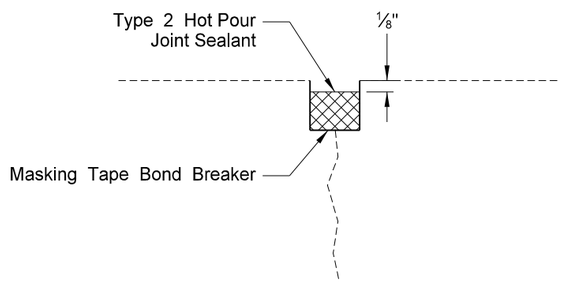
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	20	9



Existing Random Crack



Random Crack Sawing



Random Crack Sealing

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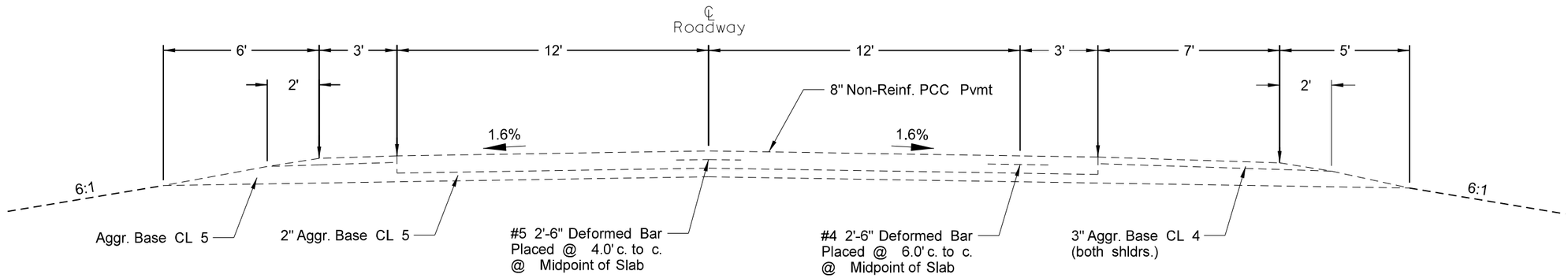
Random Crack
Sawing and Sealing

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	30	1

Existing Typical Section
RP 171.714 - 186.086
Eastbound Roadway



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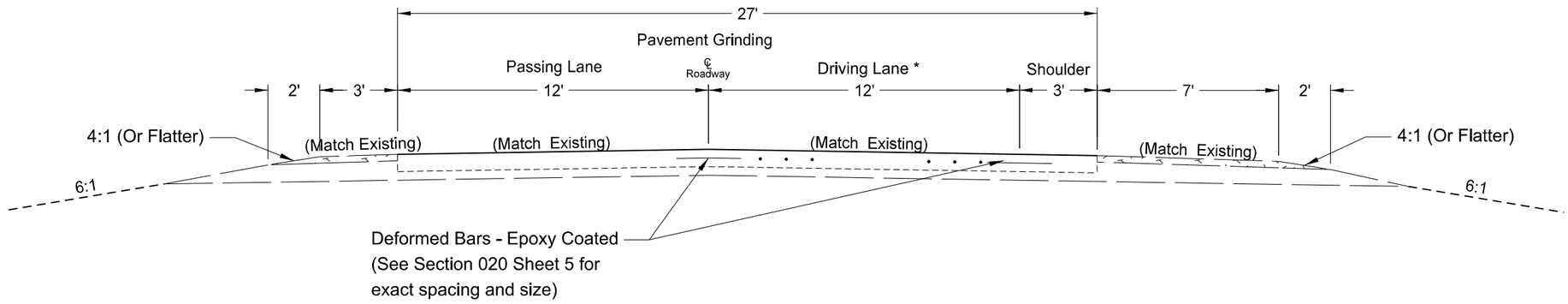
Existing Typical Section

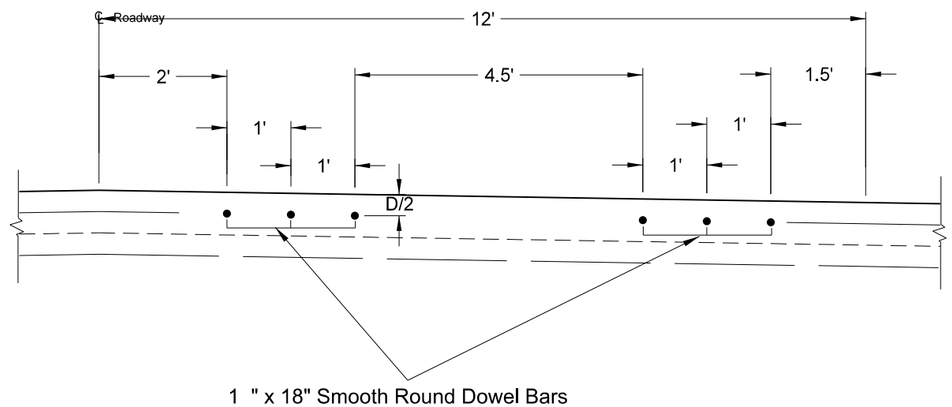
1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	30	2

Proposed Typical Section
RP 171.714 - 186.086
Eastbound Roadway



* Driving Lane



1 " x 18" Smooth Round Dowel Bars
Spaced @ 12" c. to c. @ Midpoint of Slab

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Proposed Typical Section

1.7 Mi E Granville to 2 Mi W Jct 14

US Hwy. 2 - Eastbound

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(095)171	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**19**	**38**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**1**	**64**	**64**
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		37	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**12**	**30**	**360**
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)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**12**	**32**	**384**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**2**	**5**	**10**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**18**	**39**	**702**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**14**	**10**	**140**
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**4**	**39**	**156**
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		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"**	**RIGHT or LEFT LANE TRANSITION SYMBOL**	**4**	**35**	**140**
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	**48"x48"**	**BUMP**	**4**	**35**	**140**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	**48"x48"**	**TRUCKS ENTERING HIGHWAY**	**4**	**35**	**140**
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**4**	**35**	**140**
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	**48"x48"**	**RIGHT or LEFT LANE CLOSED AHEAD or __ FT.**	**4**	**35**	**140**
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**2**	**35**	**70**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		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.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2950**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**200**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	**TYPE I BARRICADES**	**EACH**	**50**
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**18**
704-1060	**DELINEATOR DRUMS**	**EACH**	**80**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**440**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	**VERTICAL PANELS - BACK TO BACK**	**EACH**	**150**
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**
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
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**	**18971**
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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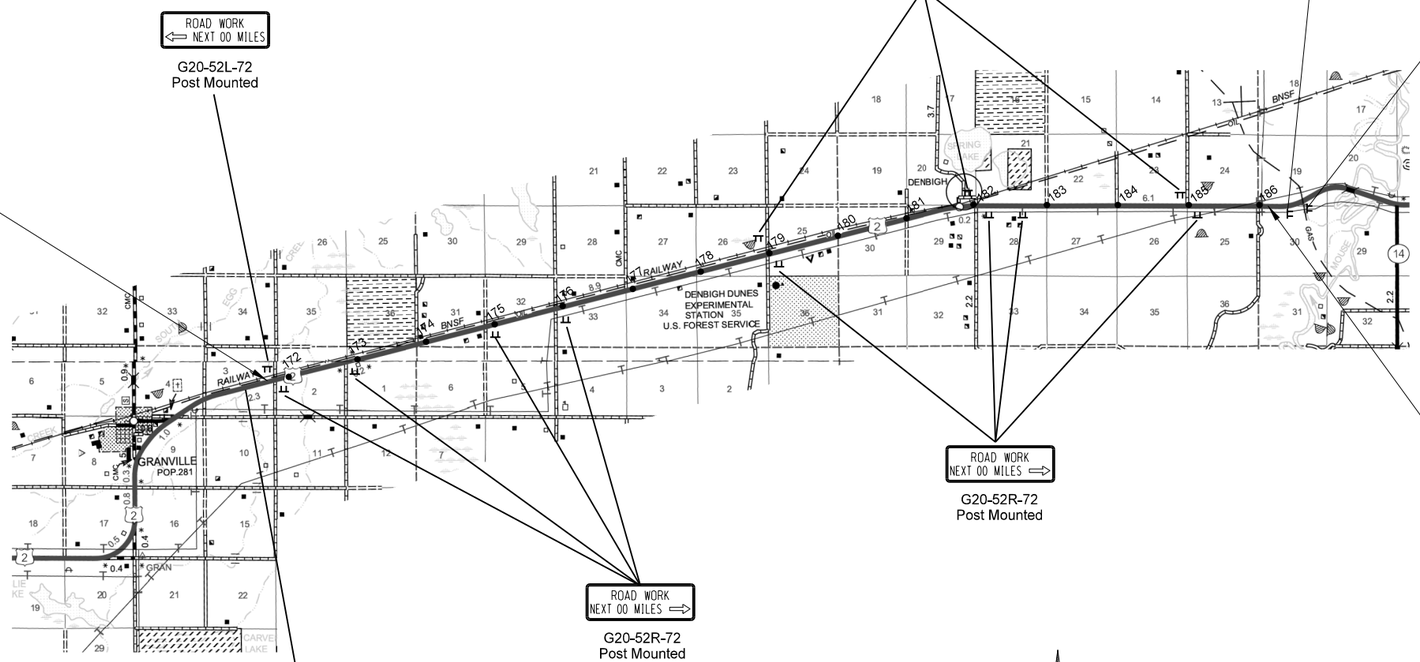
Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-002(095)171	2	100



ROAD WORK NEXT XX MILES
(2) G20-1a-60
Post Mounted

SPEED LIMIT ENFORCED
MINIMUM FEE $80
WHEN WORKERS PRESENT
(2) G20-55-96
Post Mounted

ROAD WORK AHEAD
(2) W20-1-48
Post Mounted

DO NOT PASS
(2) R4-1-48
Skid Mounted

RIGHT LANE CLOSED XX MILE
(2) W20-5-48
Skid Mounted

SPEED LIMIT 60
(2) W3-5-48
Skid Mounted

SPEED LIMIT 60
(2) R2-1-48
Skid Mounted

(2) W4-2-48
Skid Mounted

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Work Zone Traffic Control Layout
(Post Mounted Signing Only)

1.7 Mi E Granville to 2 Mi W Jct 14
US Hwy. 2 - Eastbound

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	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
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
Cl or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
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
CSP	corrugated steel pipe
C	coulomb
Co	County
Crse	course
C Gr	course gravel
CS	course sand
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia	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
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
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
Fs	foresight
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed
Gal	gallon
Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Geod	geodetic
GIS	Geographical Information System
G	giga
GPS	Global Positioning System
Gov	government
Grd	graded/grade
Gr	gravel
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ha	hectare
Ht	height
HI	height of instrument
Hel	helical
H	henry
Hz	hertz
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
Hr	hour(s)
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
In or "	inch
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IM	iron monument
I Pn	Iron Pin
IP	iron Pipe
Jt	joint
J	joule
Jct	junction
K	kelvin
Kn	kilo newton
Kpa	kilo pascal
Kg	kilogram
Kg/m3	kilogram per cubic meter
Km	kilometer
K	Kip(s)
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
Ln	lane
Lg	large
Lat	latitude
Lt	left
L	length of curve
Lens	lenses
Lvl	level
LB	level book
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Lig Co	lignite coal
Lig Sl	lignite slack
LF	linear foot
Liq	liquid
LL	liquid limit
L	litre
Lm	loam
Loc	location
LC	long chord
Long.	longitude
Lp	loop
LD	loop detector
Lm	lumen
Lum	luminaire
L Sum	lump sum
Lx	lux
ML	main line
M Hr	man hour
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
M	mega
Mer	meridian
M	meter
M/s	meters per second
M	mid ordinate of curve
Mi	mile
MM	mile marker
MP	mile post
Ml	milliliter
Mm	millimeter
Mm/hr	millimeters per hour
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Mun	municipal
N	nano
NGS	National Geodetic Survey
NS	near side
Neop	neoprene
Ntwk	network
N	newton
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Obsn	observation
Ocpd	occupied
Ocpy	occupy
Off Loc	office location
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PK	Parker-Kalon nail
Pa	pascal
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl	plate
Pt	point
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
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
Lb or #	pounds
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

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NDDOT ABBREVIATIONS

D-101-3

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RTP	random traverse point
Rge or R	range
RC	rapid curing
Rec	record
Rcy	recycle
RPCC	recycled Portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
Reinf	reinforcement
Res	reservation
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	Roadway Weather Information System
Rk	rock
Rt	route
Salv	salvage(d)
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
San	sanitary sewer line
Sc	scoria
Sec	seconds
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sh	shale
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw	sidewalk
S	siemens
SD	sight distance
SN	sign number
Sig	signal
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam
Sgl	single
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SC	spiral to curve
ST	spiral to tangent
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
SF	square feet
Km2	square kilometer
M2	square meter
SY	square yard
Stk	stake
Std	standard
N	standard penetration test
Std Specs	Standard Specifications
Sta	station
Sta Yd	station yards
Stm L	steam line
SEC	steel encased concrete
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SE	superelevation
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical
SI	Systems International
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	tesla
T	thinwall tube sample
T/mi	tons per mile
Ts	topsoil
Twp or T	township
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
TB	transit book
Trans	transition
TT	transmission tower
Trans	transverse
Trav	traverse
TP	traverse point
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
TP	turning point
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VC	vertical curve
VCP	vitrified clay pipe
V	volt
Vol	volume
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
W	watt
Wrng	wearing
Wb	weber
WIM	Weigh In Motion
W	West
WB	Westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner
WGS	World Geodetic System
Z	zenith

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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D-101-20

Line Styles

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Sight Distance Triangle Line
- Small Hidden Object
- Dimension Leader
- Existing Ground
- Existing Topsoil (Cross Section View)
- Large Hidden Object
- Edge Drain
- Geotextile Fabric Type D
- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Geogrid
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Geotextile Fabric Type R
- Geotextile Fabric Type R1
- Remove Line
- Geotextile Fabric Type RR
- Geotextile Fabric Type S
- Floating Silt Curtain
- Existing Telephone Line
- Existing TV Line
- Existing Assumed Ground (Not Surveyed)
- Tentative Ground Line
- Existing Water or Steam Line
- Existing Under Drain
- Under Drain
- Wall
- Existing Slotted Drain
- Existing Cemetary Boundary
- 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
- Wetland Mitigation
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Easement
- Existing Concrete
- Existing Easement
- Existing Gravel Surface
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Riprap
- Existing Underground Vault or Lift Station
- Tangent Line
- Hidden Object
- Existing Dirt Surface
- Existing Conduit
- Topsoil Profile
- Existing Conductor
- Conductor
- Fiber Optic
- Existing Loop Detector
- Subgrade, Subcut or Ditch Grade
- Existing Asphalt Surface
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar
- Existing Tie Point Line
- Existing State or International Line
- Existing Quarter Section Line
- Existing County
- Existing Section Line
- Existing Township
- Existing Railroad Centerline
- Centerline
- Existing Centerline
- Supplemental Contour
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Failure Line
- Existing Conditions
- Existing Ground (Details)
- Existing Sixteenth Section Line
- Existing Right of Way Not State Owned
- Phantom Object
- Centerline Main
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Excavation Limits
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines

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D-101-21

Line Styles

- Subgrade Reinforcement
- Existing Down Guy Wire Down Guy
- Existing Fence
- Existing Railroad
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Fence
- Silt Fence
- Existing Field Line
- Exst Flow
- Flow
- Existing Culvert
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Overhead Sign Structure
- Existing Micro Loop Detector
- Micro Loop Detector
- Existing Overhead Sign Structure Cantilever
- Existing Railroad Switch
- Overhead Sign Structure Cantilever
- 24 Inch Pipe
- Reinforced Concrete Pipe
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm
- Tie Bar at Random Spacing
- 3-Cable w Posts
- Existing 3-Cable w Posts
- Site Boundary
- Fiber Rolls
- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Depression Contours
- Existing City Corporate Limits or Reservation Boundary
- Gravel Pit - Borrow Area
- Existing Tree Boundary
- Tree Row
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Retaining Wall (Plan View)
- Sheet Piling
- W-Beam w Posts
- Existing W-Beam Guardrail with Posts
- Exst Wet Area-Vegetation Break
- Existing Wetland Delineated

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

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Symbols

D-101-31

- Existing Light Standard
- Existing High Mast Light Standard 10 Luminaire
- Existing High Mast Light Standard 3 Luminaire
- Existing High Mast Light Standard 4 Luminaire
- Existing High Mast Light Standard 5 Luminaire
- Existing High Mast Light Standard 6 Luminaire
- Existing High Mast Light Standard 7 Luminaire
- Existing High Mast Light Standard 8 Luminaire
- Existing High Mast Light Standard 9 Luminaire
- Existing Overhead Sign Structure Load Center
- Existing Luminaire
- Existing Light Standard Luminaire
- Existing Federal Mailbox
- Existing Private Mailbox
- Existing Meander Section Corner
- Existing Meter
- Existing Electrical Manhole
- Existing Gas Manhole
- Existing Sanitary Manhole
- Existing Sanitary Force Main Manhole
- Existing Sanitary Manhole with Valve
- Existing Storm Drain Manhole
- Existing Force Main Storm Drain Manhole
- Existing Force Main Storm Drain Manhole with Valve
- Existing Telephone Manhole
- Existing Manhole with Valve Water
- Existing Water Manhole
- Existing Mile Post Type A
- Existing Mile Post Type B
- Existing Mile Post Type C
- Existing Reference Marker
- Existing RW Marker
- Existing Utility Marker
- Iron Monument Found
- Iron Pin R/W Monument
- Existing Object Marker Type I
- Existing Object Marker Type II
- Existing Object Marker Type III
- Existing Electrical Pedestal
- Existing Telephone Pedestal
- Existing Fiber Optic Telephone Pedestal
- Existing TV Pedestal
- Existing Fiber Optic TV Pedestal
- Existing Fuel Filler Pipes
- Existing Traverse PI Aerial Panel
- Existing Pole
- Existing Power Pole
- Existing Power Pole with Transformer
- Existing Telephone Pole
- Existing Wood Pole
- Existing Post
- Existing Pedestrian Push Button Post
- Existing Control Point CP
- Existing Control Point GPS-RTK
- Existing Control Point TRI
- Existing Reference Marker Point NGS
- Existing Pull Box
- Existing Intelligent Transportation Pull Box
- Existing Water Pump
- Existing Slotted Reinforced Concrete Pipe
- Existing RR Profile Spot
- Existing Fuel Leak Sensors
- Existing Highway Sign
- Existing Miscellaneous Spot
- Existing Lighting Standard Pole
- Existing Traffic Signal Standard
- Existing Transformer
- Existing Large Evergreen Tree
- Existing Small Evergreen Tree
- Existing Large Tree
- Existing Small Tree
- Existing Tree Trunk
- Existing Pad Mounted Traffic Signal Control Box
- Existing Undefined Manhole
- Existing Undefined Pull Box
- Existing Undefined Pedestal
- Existing Undefined Valve
- Existing Undefined Pipe Vent
- Existing Gas Valve
- Existing Water Valve
- Existing Fuel Pipe Vent
- Existing Gas Pipe Vent
- Existing Sanitary Pipe Vent
- Existing Storm Drain Pipe Vent
- Existing Water Pipe Vent
- Existing Weather Station
- Existing Ground Water Well Bore Hole
- Existing Windmill or Tower
- Existing Witness Corner
- Flashing Beacon
- Flagger
- Pipe Mounted Flasher
- Sanitary Force Main with Valve

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Symbols

D-101-32

- Pad Mounted Feed Point
- Pipe Mounted Feed Point with Pad
- Pole Mounted Feed Point
- Headwall
- Double Headwall with Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate Type 2
- Junction Box
- High Mast Light Standard 10 Luminaire
- High Mast Light Standard 3 Luminaire
- High Mast Light Standard 4 Luminaire
- High Mast Light Standard 5 Luminaire
- High Mast Light Standard 6 Luminaire
- High Mast Light Standard 7 Luminaire
- High Mast Light Standard 8 Luminaire
- High Mast Light Standard 9 Luminaire
- Relocate Light Standard
- Overhead Sign Structure Load Center
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 175 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Manhole
- Manhole 48 Inch
- Sanitary Force Main Manhole
- Sanitary Sewer Manhole
- Storm Drain Manhole
- Storm Drain Manhole with Inlet
- Reset Mile Post
- Mile Post Type A
- Mile Post Type B
- Mile Post Type C
- Right of Way Marker
- Tubular Marker
- Alignment Monument
- Iron Pin Reference Monument
- Object Marker Type I
- Object Marker Type II
- Object Marker Type III
- Caution Mode Arrow Panel
- Back to Back Vertical Panel Sign
- Double Direction Arrow Panel
- Left Directional Arrow Panel
- Right Directional Arrow Panel
- Sequencing Arrow Panel
- Truck Mounted Arrow Panel
- Power Pole
- Wood Pole
- Pedestrian Push Button Post
- Property Corner
- Pull Box
- Intelligent Transportation Pull Box
- Sanitary Pump
- Storm Drain Pump
- Reinforced Pavement
- Reinforced Concrete End Section 15 Inch
- Reinforced Concrete End Section 18 Inch
- Reinforced Concrete End Section 24 Inch
- Reinforced Concrete End Section 30 Inch
- Reinforced Concrete End Section 36 Inch
- Reinforced Concrete End Section 42 Inch
- Reinforced Concrete End Section 48 Inch
- Reinforced Concrete End Section 54 Inch
- Reset Right of Way Marker
- Reset USGS Marker
- Right of Way Markers
- Riser 30 Inch
- Continuous Split Barrel Sample (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

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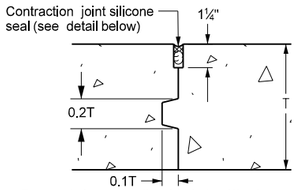
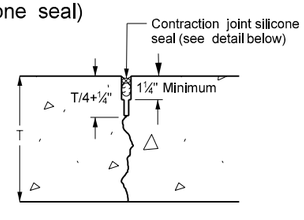
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS (silicone seal)

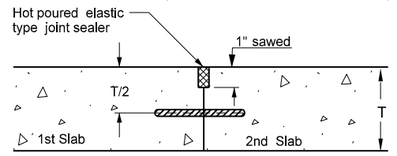


Sawed longitudinal joint with keyway



Sawed longitudinal joint without keyway

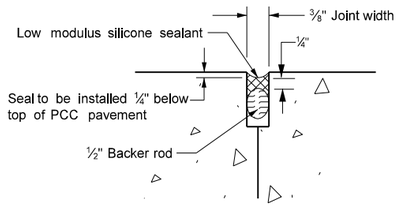
TIED JOINTS (hot poured elastic seal)



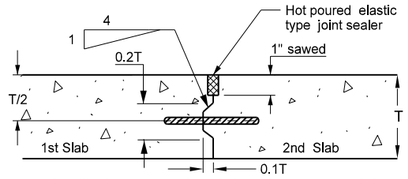
Longitudinal construction joint (tied butt joint)

Notes:

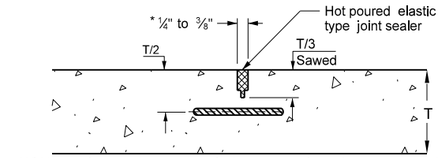
1. The hot poured elastic type joint sealer shall be in accordance with Section 826.02A.2 of the Standard Specifications.
2. The longitudinal joint and seal shall be included in the price bid for the P.C.C. pavement.
3. Tie bars shall not be placed within 18 inches of a transverse skewed joint.
4. Where tie bars are installed bent and later straightened, Grade 40 steel shall be used.
5. Tie bar spacing can be increased up to 10% to facilitate construction.
6. Tie Bars shall be at a 48 inch maximum spacing.
7. A "Warp" joint is a sawed joint or a construction joint with a keyway.
8. A "Butt joint" is a construction joint with no keyway.



Contraction joint silicone seal



Longitudinal construction joint (tied keyed joint)



* Width requirement for top 1" only, bottom portion of saw cut may be narrower

Sawed longitudinal joint

TIEBAR SPACINGS (In)

BAR SIZE / GRADE STEEL / BAR LENGTH / DIST TO FREE EDGE (FT) / JOINT TYPE / PVMT THICKNESS

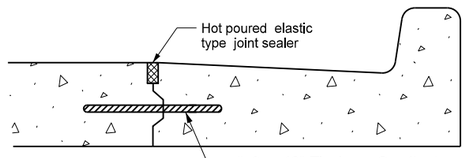
PVMT THICKNESS	JOINT TYPE	# 3 BAR GRADE 40 24"				# 3 BAR GRADE 60 30"					
		4	6	8	10	4	6	8	10	12	14
6"	WARP		48	39			48	48			
	BUTT		37	27			48	42			
8"	WARP	48	39	29	24	48	48	44	35	29	25
	BUTT	42	27			48	42	31	25		
8½"	WARP	48	37	28		48	48	42	33	28	24
	BUTT	39	26			44	39	29			
9"	WARP	48	35	26		48	48	39	31	26	
	BUTT	37	24			48	37	27			
9½"	WARP	48	33	25		48	48	37	30	25	
	BUTT	35				48	35	26			
10"	WARP	47	31			48	47	35	28		
	BUTT	33				48	33	25			
10½"	WARP	45	30			48	45	34	27		
	BUTT	32				48	32	24			
11"	WARP	43	28			48	43	32	26		
	BUTT	30				46	30				
11½"	WARP	41	27			48	41	31	24		
	BUTT	29				44	29				
12"	WARP	39	26			48	39	29			
	BUTT	27				42	27				
12½"	WARP	38	25			48	38	28			
	BUTT	27				40	27				
13"	WARP	36	24			48	36	27			
	BUTT	25				38	25				
13½"	WARP	35				48	35	26			
	BUTT	25				37	25				
14"	WARP	34				48	34	25			
	BUTT	24				35	24				
14½"	WARP	32				48	32	24			
	BUTT					34					
15"	WARP	31				47	31				
	BUTT					33					

PVMT THICKNESS	JOINT TYPE	# 4 BAR GRADE 40 24"					# 4 BAR GRADE 60 36"						
		8	10	12	14	16	8	10	12	14	16	22	24
6"	WARP	48					48						
	BUTT	48					48						
8"	WARP	48	42	35	30	26	48	48	48	45	39	28	26
	BUTT	37	29	24			48	44	37	32	27		
8½"	WARP	48	39	33	28	24	48	48	48	42	37	27	24
	BUTT	35	27				48	42	35	29	26		
9"	WARP	47	37	31	26		48	48	47	40	35	25	
	BUTT	33	26				48	40	33	28	25		
9½"	WARP	44	35	29	25		48	48	44	38	33	24	
	BUTT	31	25				47	37	31	27			
10"	WARP	42	34	28	24		48	48	42	36	31		
	BUTT	29	24				45	36	29	25			
10½"	WARP	40	32	26			48	48	40	34	30		
	BUTT	28					42	34	28	24			
11"	WARP	38	31	25			48	46	38	33	28		
	BUTT	27					40	32	27				
11½"	WARP	36	29	24			48	44	36	31	27		
	BUTT	25					39	31	25				
12"	WARP	35	28				48	42	35	30	26		
	BUTT	25					37	30	25				
12½"	WARP	33	27				48	40	33	29	25		
	BUTT						35	28					
13"	WARP	32	26				48	39	32	27	24		
	BUTT						34	27					
13½"	WARP	31	25				47	37	31	26			
	BUTT						33	26					
14"	WARP	30	24				45	36	30	25			
	BUTT						32	25					
14½"	WARP	29					43	35	29	25			
	BUTT						30	25					
15"	WARP	28					42	33	28	24			
	BUTT						29						

PVMT THICKNESS	JOINT TYPE	# 4 BAR GRADE 60 36"							# 5 BAR GRADE 40 30"						
		8	10	12	14	16	22	24	10	12	14	16	22	24	
6"	WARP														
	BUTT														
8"	WARP	48	48	48	45	39	28	26	48	48	47	41	30	27	
	BUTT	48	44	37	32	27			46	39	33	29			
8½"	WARP	48	48	48	42	37	27	24	48	48	48	44	38	28	25
	BUTT	48	42	35	29	26			44	36	31	27			
9"	WARP	48	48	47	40	35	25		48	48	42	36	26	24	
	BUTT	48	40	33	28	25			41	34	29	25			
9½"	WARP	48	48	44	38	33	24		48	46	39	34	25		
	BUTT	47	37	31	27				39	32	27	25			
10"	WARP	48	48	42	36	31			48	44	37	33	24		
	BUTT	45	36	29	25				37	31	26	24			
10½"	WARP	48	48	40	34	30			48	42	36	31			
	BUTT	42	34	28	24				35	29	25				
11"	WARP	48	46	38	33	28			48	40	34	30			
	BUTT	40	32	27					34	28	24				
11½"	WARP	48	44	36	31	27			46	38	32	28			
	BUTT	39	31	25					32	27					
12"	WARP	48	42	35	30	26			44	36	31	28			
	BUTT	37	30	25					31	25					
12½"	WARP	48	40	33	29	25			42	35	30	26			
	BUTT	35	28						29	25					
13"	WARP	48	39	32	27	24			40	33	29	25			
	BUTT	34	27						28						
13½"	WARP	47	37	31	26				39	32	28	24			
	BUTT	33	26						27						
14"	WARP	45	36	30	25				37	31	27				
	BUTT	32	25						26						
14½"	WARP	43	35	29	25				36	30	26				
	BUTT	30	25						25						
15"	WARP	42	33	28	24				35	29	25				
	BUTT	29							25						

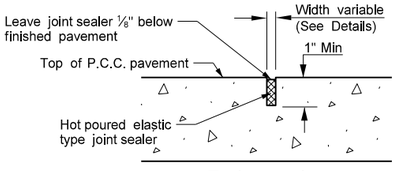
PVMT THICKNESS	JOINT TYPE	# 5 BAR GRADE 60 42"							# 6 BAR GRADE 40 36"						
		10	12	14	16	22	24		10	12	14	16	19	22	24
6"	WARP														
	BUTT														
8"	WARP	48	48	48	48	45	41		48	48	48	48	48	43	39
	BUTT	48	48	48	43	32	29		48	48	48	48	35	30	27
8½"	WARP	48	48	48	48	42	38		48	48	48	47	40	37	
	BUTT	48	48	47	41	30	27		48	48	45	39	33	28	26
9"	WARP	48	48	48	48	40	36		48	48	48	48	44	38	35
	BUTT	48	48	44	39	28	25		48	48	42	37	31	26	24
9½"	WARP	48	48	48	48	38	34		48	48	48	48	42	36	33
	BUTT	48	48	42	37	27	24		48	47	40	35	29	25	
10"	WARP	48	48	48	48	36	33		48	48	48	48	40	34	31
	BUTT	48	46	40	35	25			48	45	38	33	28	24	
10½"	WARP	48	48	48	47	34	31		48	48	48	45	38	33	30
	BUTT	48	44	38	33	24			48	42	36	32	27		
11"	WARP	48	48	48	45	32	30		48	48	48	43	36	31	28
	BUTT	48	42	36	32				48	40	35	30	25		
11½"	WARP	48	48	48	43	31	28		48	48	47	41	34	30	27
	BUTT	48	40	35	30				46	39	33	29	24		
12"	WARP	48	48	47	41	30	27		48	48	45	40	33	28	26
	BUTT	46	39	33	29				45	37	32	28			
12½"	WARP	48	48	45	39	28	26		48	48	43	38	32	27	25
	BUTT	44	37	32	27				42	35	30	27			
13"	WARP	48	48	43	38	27	25		48	48	41	36	30	26	24
	BUTT	42	35	30	27				41	34	29	25			
13½"	WARP	48	48	42	36	26	24		48	47	40	35	29	25	
	BUTT	41	34	29	25				39	33	28	25			
14"	WARP	48	48	41	36	26	24		48	45	38	34	28	24	
	BUTT	39	33	28	25				38	32	27	24			
14½"	WARP	48	48	40	35	25			48	43	37	32	27		
	BUTT	38	32	27	24				36	30	26				
15"	WARP	48	48	39	34	24			48	42	36	31	26		
	BUTT	37	31	26					35	29	25				

PVMT THICKNESS	JOINT TYPE	# 6 BAR GRADE 60 48"														
		10	12	14	16	19	22	24								
6"	WARP															
	BUTT															
8"	WARP	48	48	48	48	48	48	48								
	BUTT	48	48	48	48	48	45	41								
8½"	WARP	48	48	48	48	48	48	48								
	BUTT	48	48	48	48	48	42	39								
9"	WARP	48	48	48	48	48	48	48								
	BUTT	48	48	48	48	48	40	37								
9½"	WARP	48	48	48	48	48	48	48								
	BUTT	48	48	48	48	48	44	35								
10"	WARP	48	48	48	48	48	48	47								
	BUTT	48	48	48	48	42	36	33								
10½"	WARP	48	48	48	48	48	48	45								
	BUTT	48	48	48	48	40	34	31								
11"	WARP	48	48	48	48	48	47	43								
	BUTT	48	48	48	46	38	33	30								
11½"	WARP	48	48	48	48	48	45	41								
	BUTT	48	48	48	44	37	31	29								
12"	WARP	48	48	48	48	48	43	39								
	BUTT	48	48	48	42	35	30	27								
12½"	WARP	48	48	48	48	48	41	38								
	BUTT	48	48	45	40	34	29	26								
13"	WARP	48	48	48	48	48	46	40								
	BUTT	48	48	44	38	32	28	25								
13½"	WARP	48	48	48	48	44	38	35								
	BUTT	48	48	42	37	31	27	24								
14"	WARP	48	48	48	48	43	37	34								
	BUTT	48	47	40	35	30	26									
14½"	WARP	48	48	48	48	41	35	32								
	BUTT	48	46	39	34	29	25									
15"	WARP	48	48	48	47	40	34	31								
	BUTT	48	44	38	33	28	24									



Curb and gutter sections

JOINT SEALER DETAILS



Typical section

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-15-2010

REVISIONS

DATE	CHANGE
10/23/2012	Expanded Tie Bar Table

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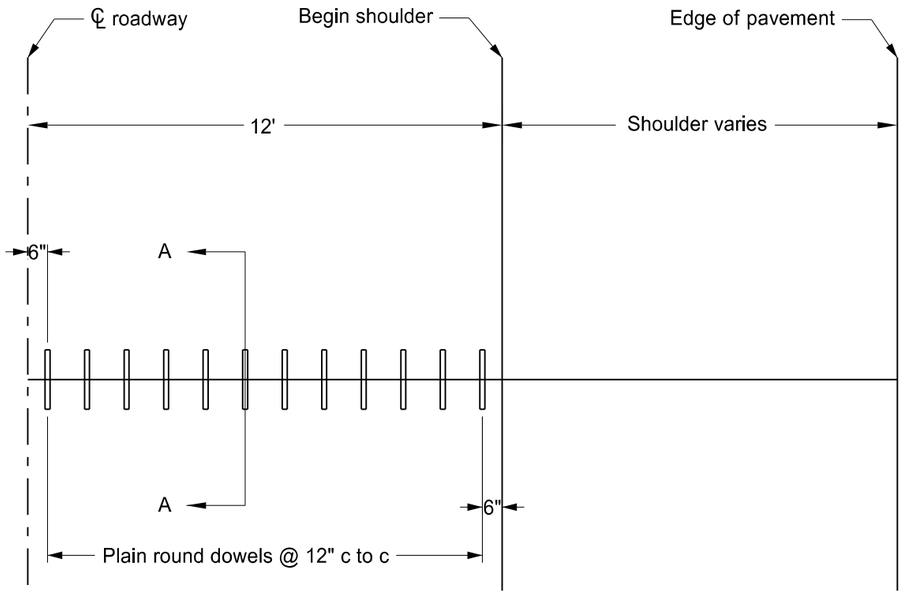
TRANSVERSE CONTRACTION JOINT DETAILS

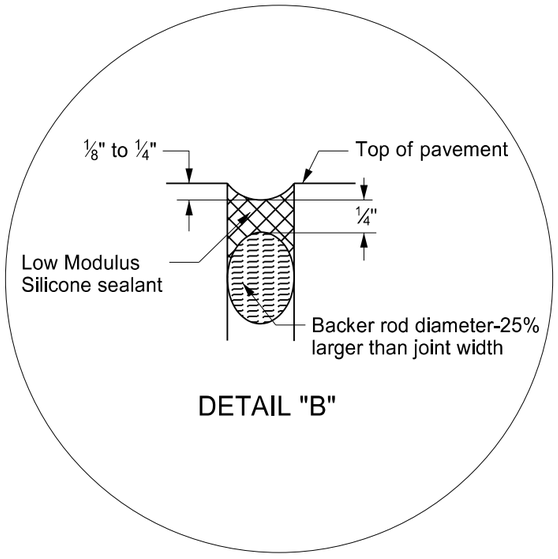
D-550-3



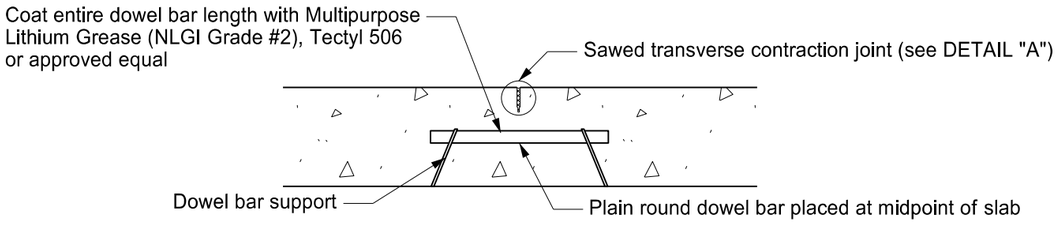
CONTRACTION JOINT DOWEL ASSEMBLY
(1/2 roadway shown)

Notes

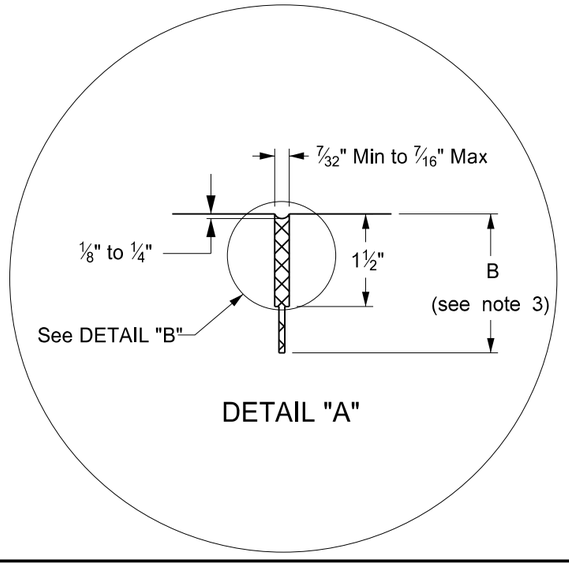
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. B = T/4 + ¼" for AE or YE for non-dowelled concrete pavement or
   B = T/3 for high early or dowelled concrete pavement



DETAIL "B"



SECTION A-A



DETAIL "A"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference

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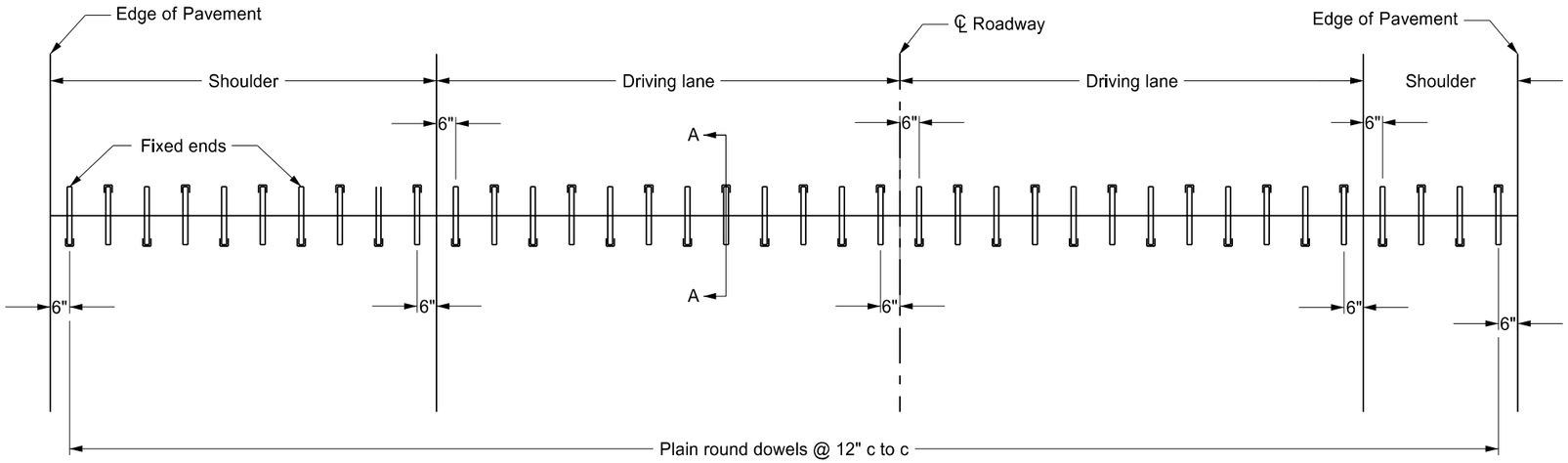
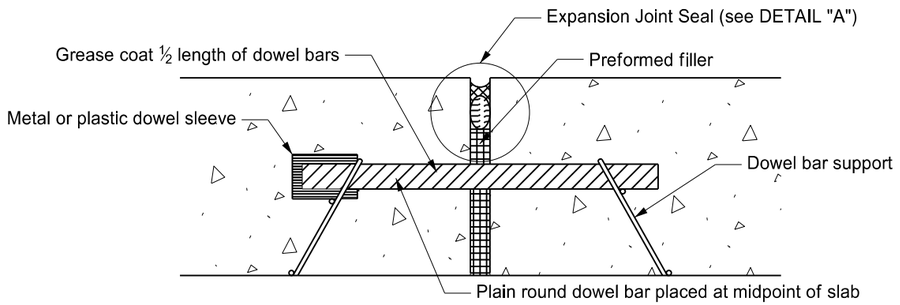
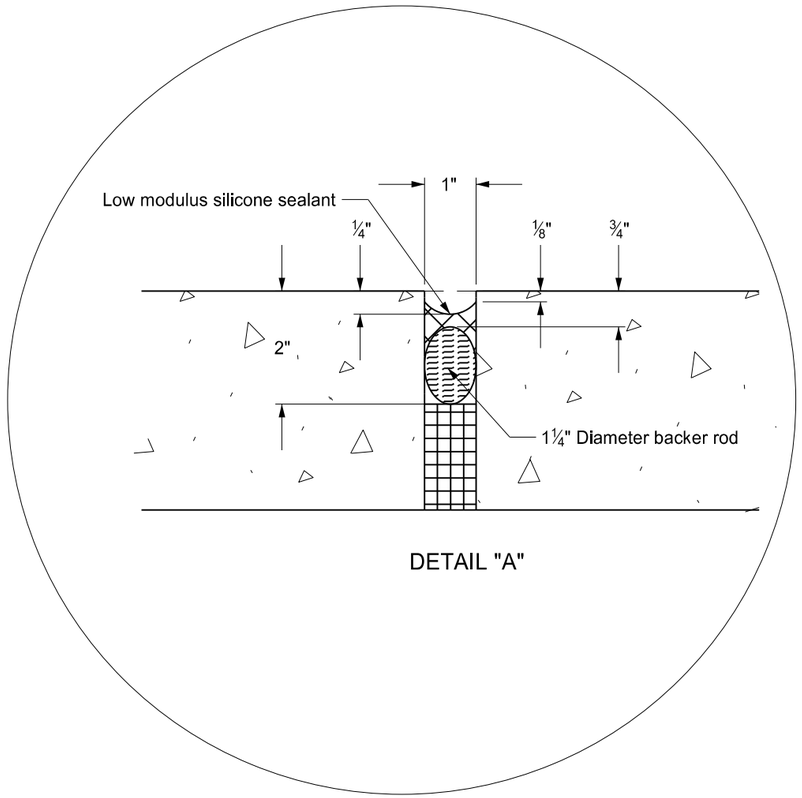
TRANSVERSE EXPANSION JOINT DETAIL



DOWELED EXPANSION JOINT ASSEMBLY



SECTION A-A



DETAIL "A"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel bar sizes

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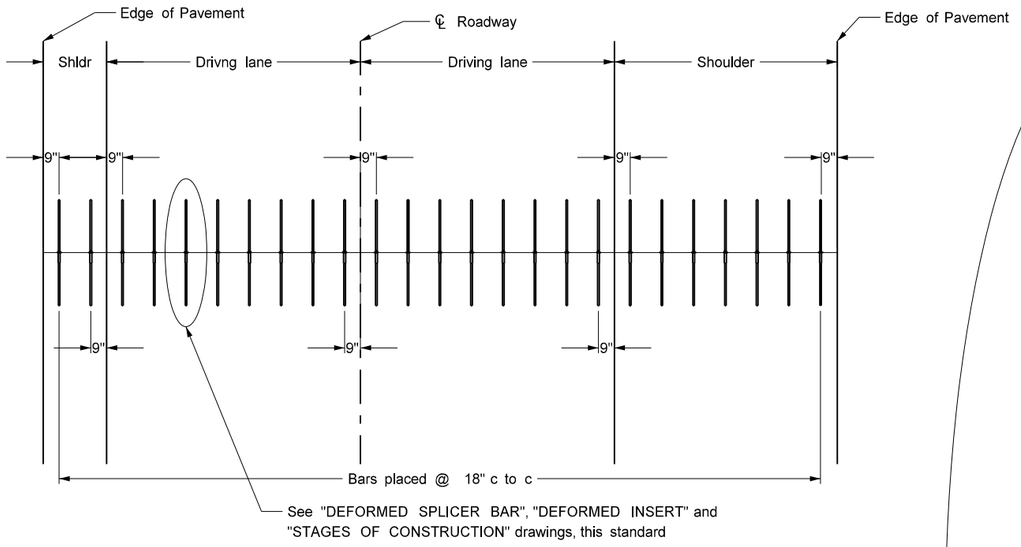
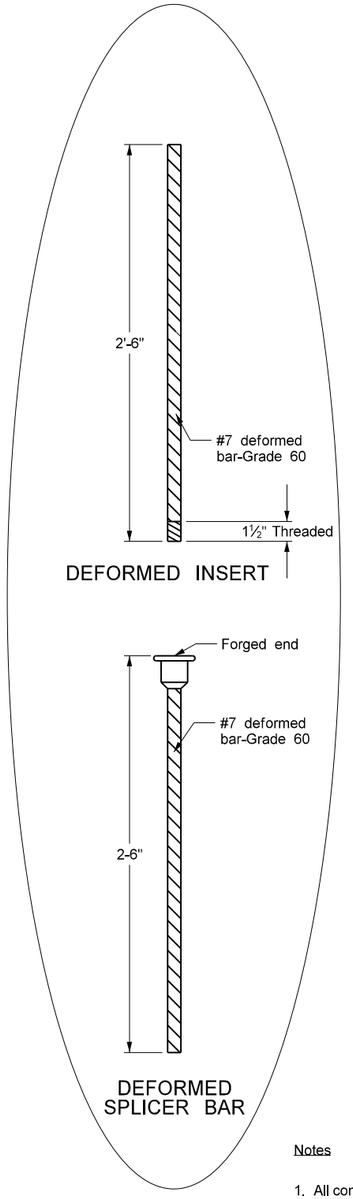
TRANSVERSE CONSTRUCTION JOINT

D-550-5

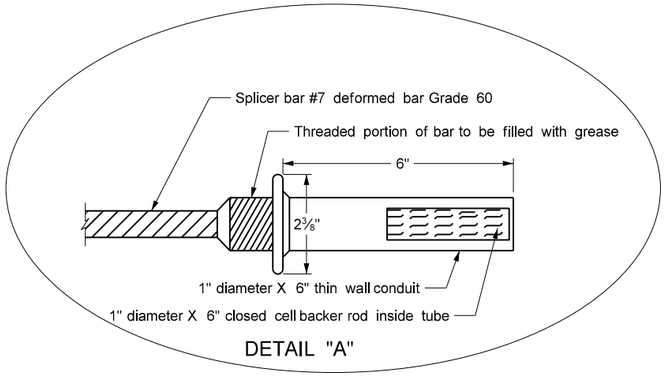


PLAN VIEW

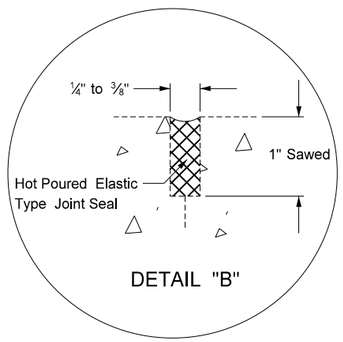


DEFORMED INSERT

DEFORMED SPLICER BAR

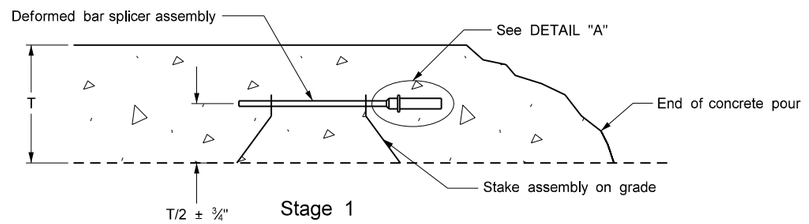


DETAIL "A"

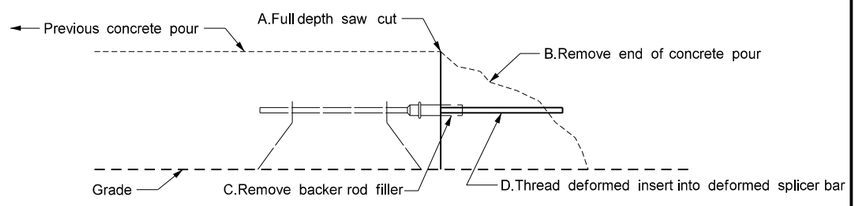


DETAIL "B"

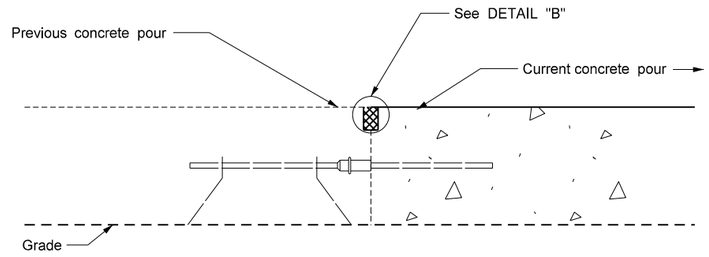
STAGES OF CONSTRUCTION



Stage 1



Stage 2



Stage 3

Notes

1. All construction joints shall be sawed and sealed.
2. The cost for all transverse construction joints shall be included in the price bid for P.C.C. pavement.
3. The contractor shall not saturate the subgrade during the sawing operation.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE

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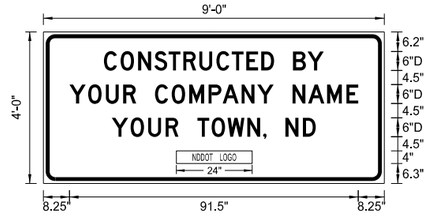
CONSTRUCTION SIGN DETAIL

D-704-5

SIGN NUMBER	G20-10-108
WIDTH x HEIGHT	9'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Refl
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S): AREA: 36.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D		B	Y						69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7								
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E			91.5	6	D 2000
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96					
Y	O	U	R		T	O	W	N	,		N	D							64.6	6	D 2000
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2									

Notes:

1. Sign shall be placed a distance of ½A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
2. Sign shall be post mounted.
3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
4. Sign shall not be placed in urban areas or within city limits.

Advance Warning Sign Spacing (A)			
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	
8-22-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revise sheeting to type IV

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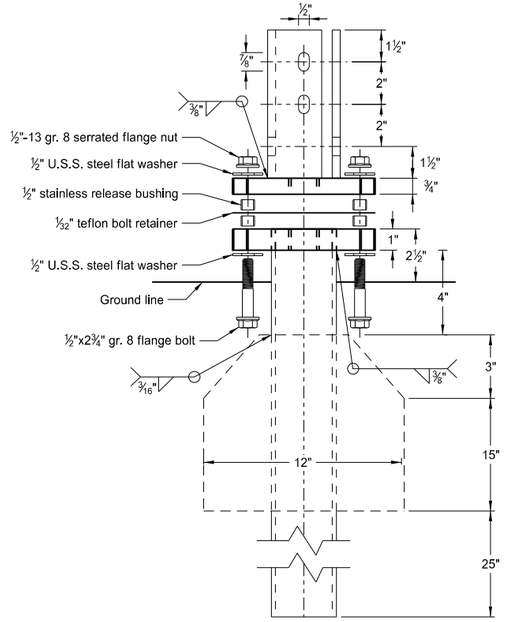
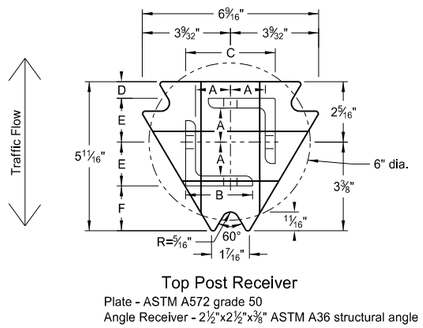
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

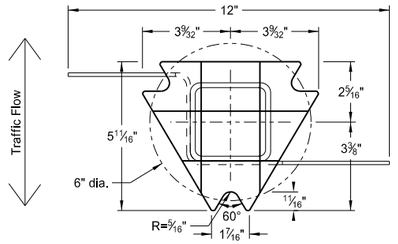


Multi-Directional
Slip Base Assembly

Perforated Tube



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



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

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.

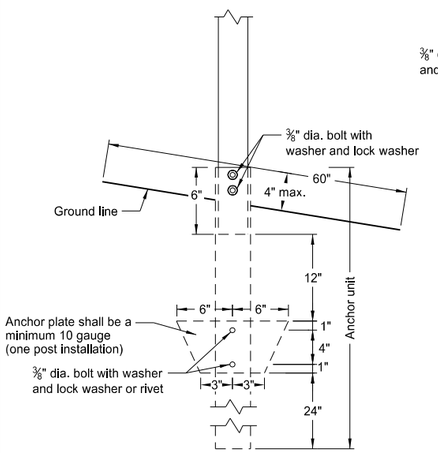
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2³⁄₁₆	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia $in.^4$	Cross Sec. Area $in.^2$	Section Modulus $in.^3$
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2³⁄₁₆ x 2³⁄₁₆	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

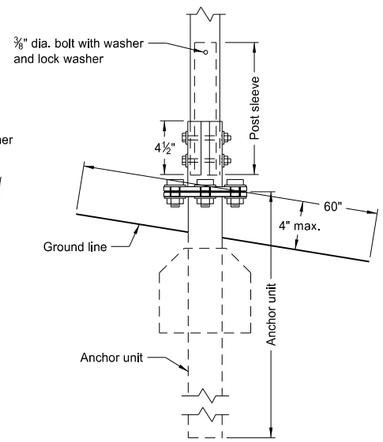
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³⁄₁₆"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	25⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⁵⁄₁₆"	⅝"	1²¹⁄₃₂"	1¾"

(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

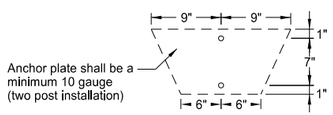
(B) The 2³⁄₁₆"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

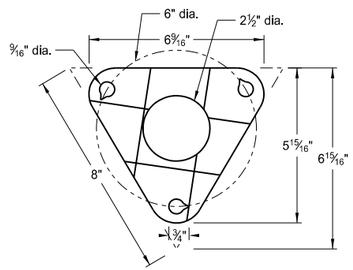


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

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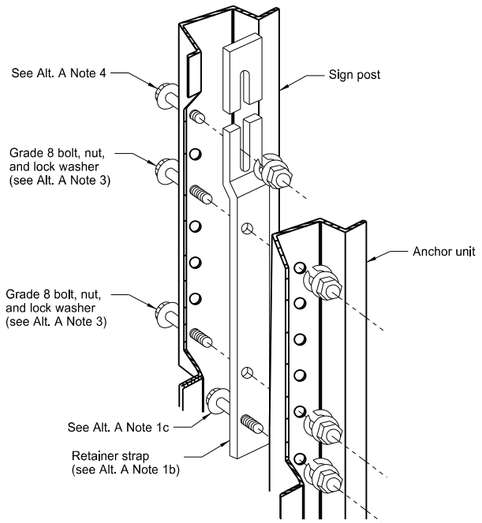
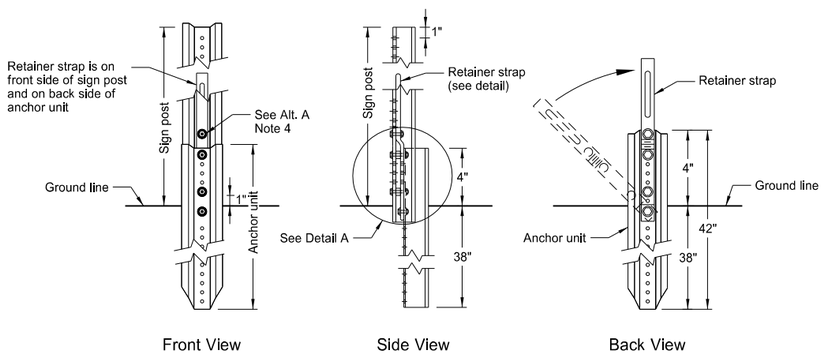
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



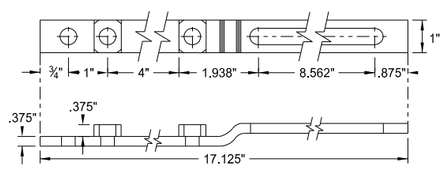
Detail A



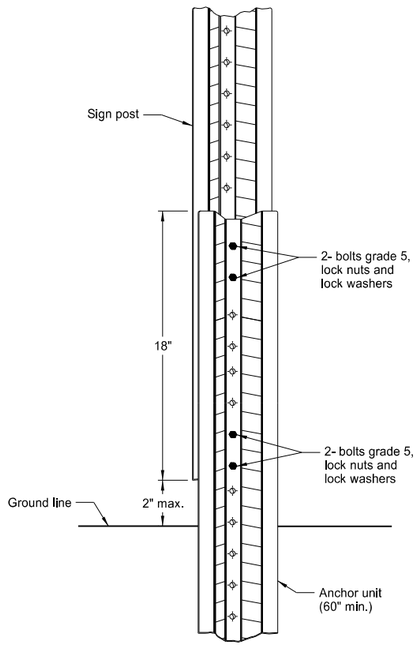
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

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

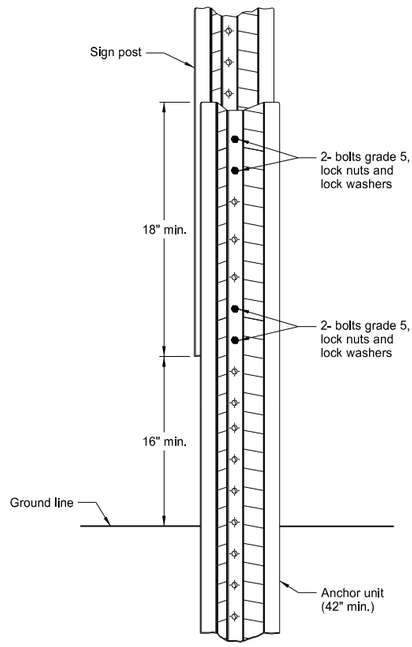


Retainer Strap Detail



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.

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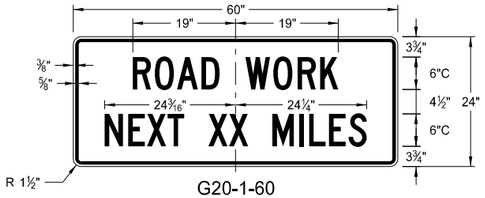
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
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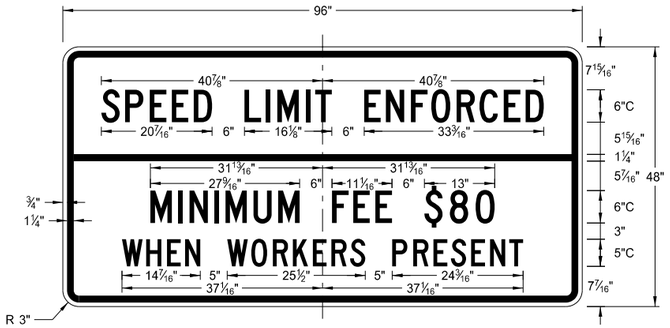
Background: orange

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



G20-55-96
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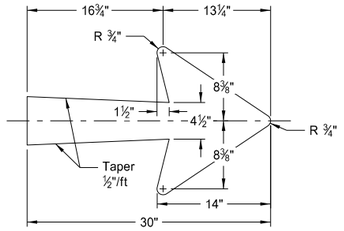
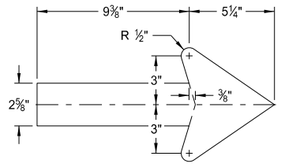
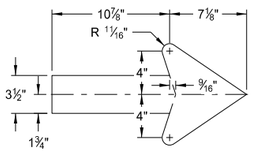
Background: orange



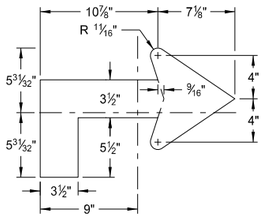
E5-1-48



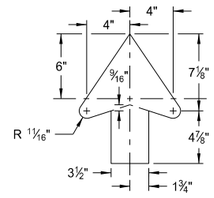
G20-50a-72
G20-52a-72



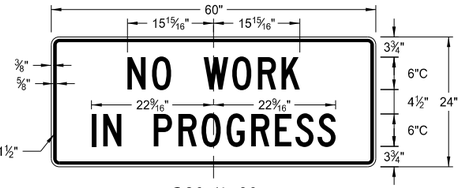
M4-9(L or R)-30
Right or Left



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



M4-9-30
Straight



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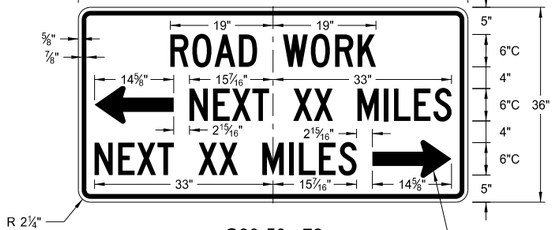

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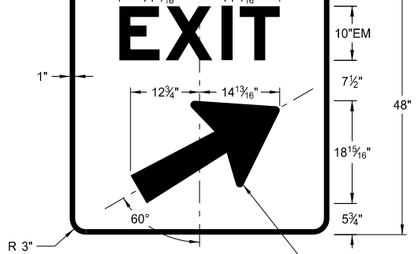

E5-1(L or R)-48
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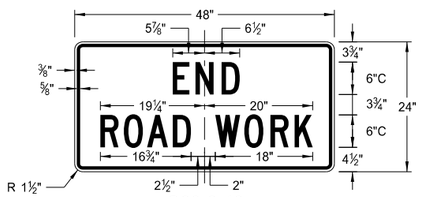
Background: green



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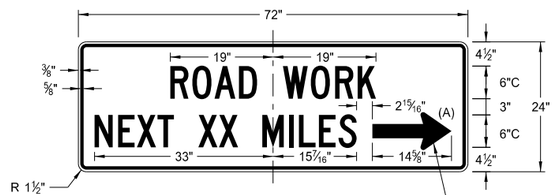
Background: orange



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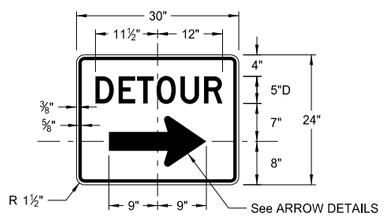

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

ARROW DETAILS

NOTES:

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

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8-13-13	
REVISIONS	
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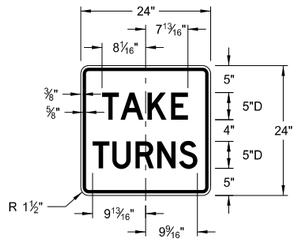
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50-24
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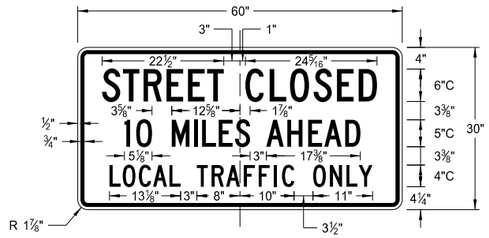
Background: white



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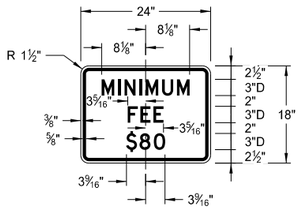

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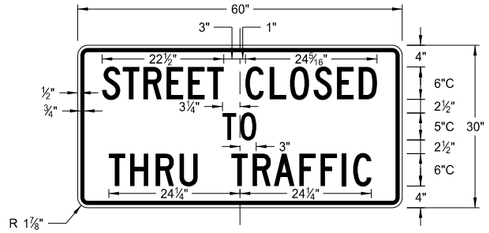

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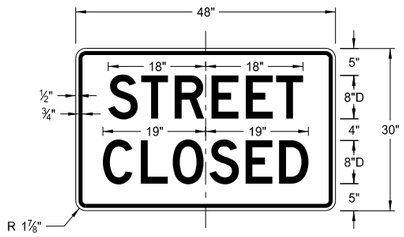

R11-2a-48
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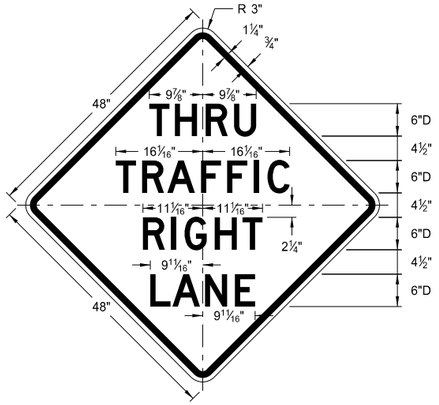
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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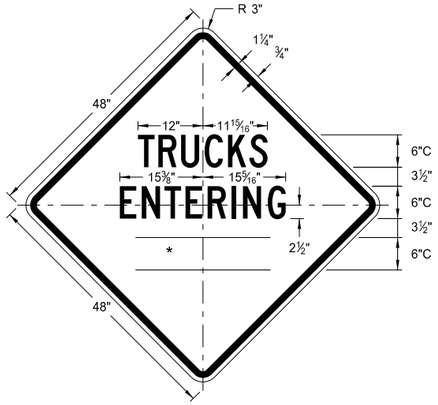

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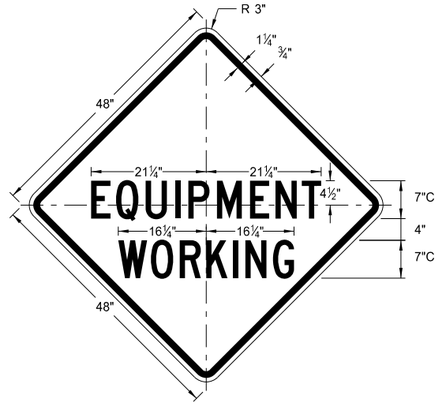

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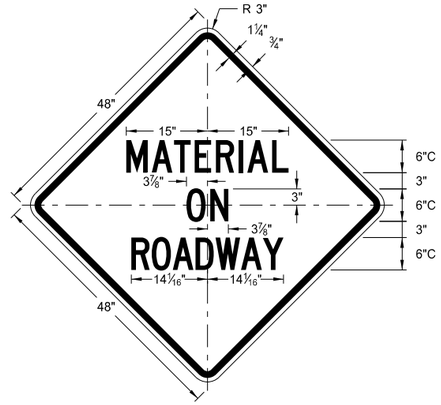
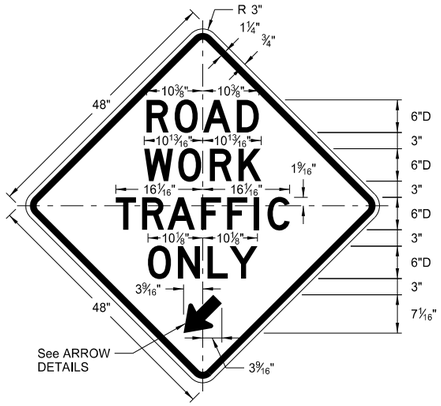


W21-51-48
Legend: black (non-refl)
Background: orange

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



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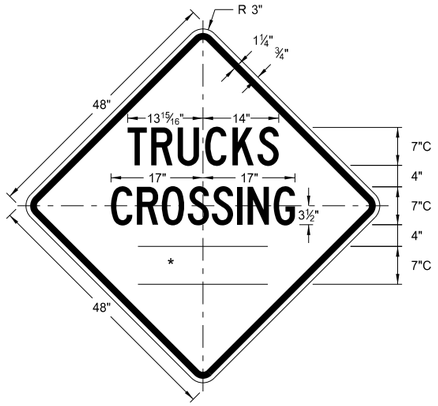

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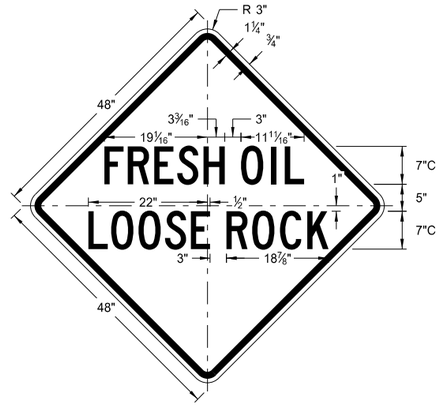
Background: orange

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



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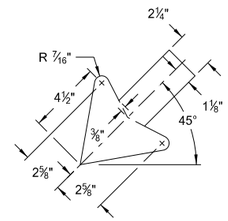
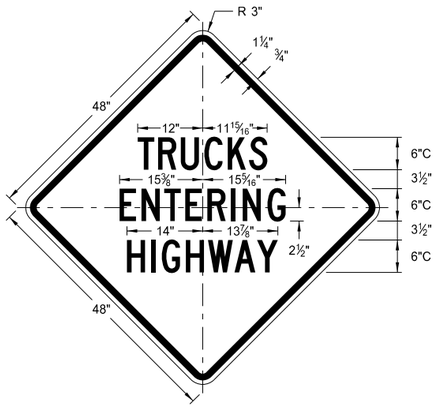


W5-9-48

ARROW DETAILS



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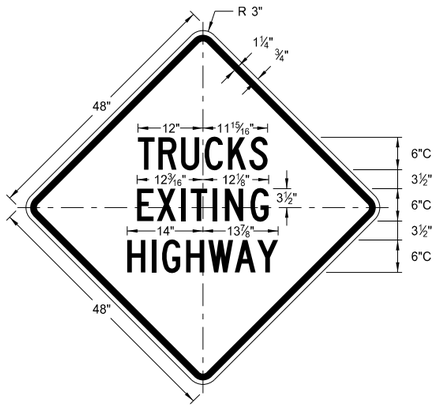

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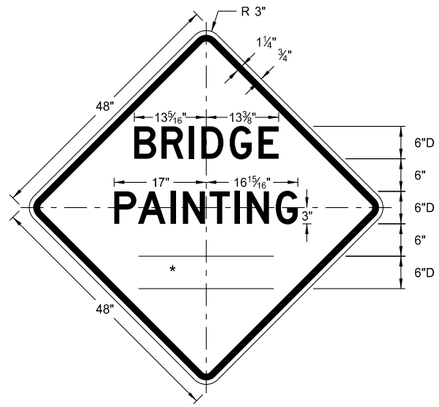

W21-50-48
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Background: orange

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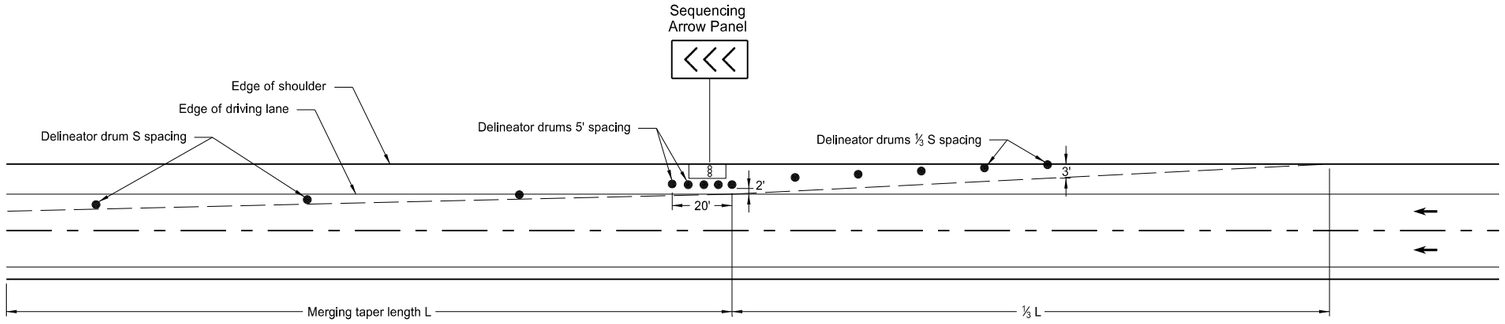
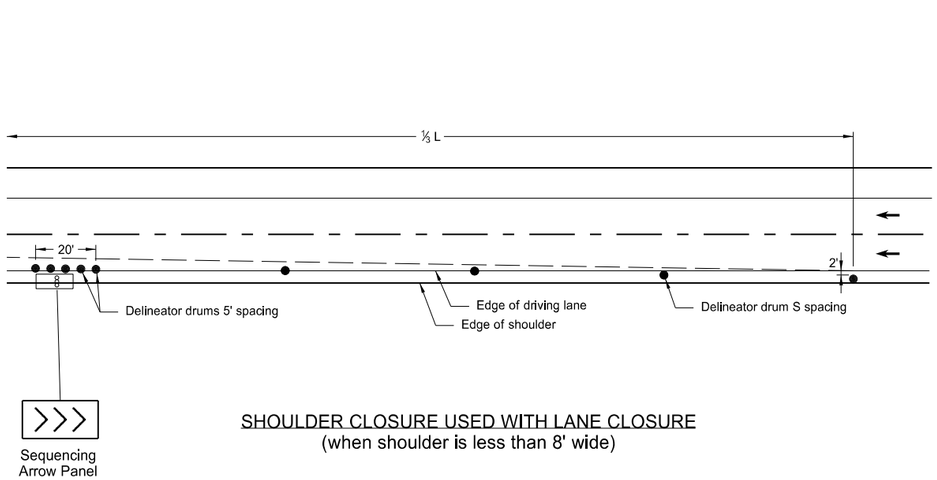
SHOULDER CLOSURE TAPERS

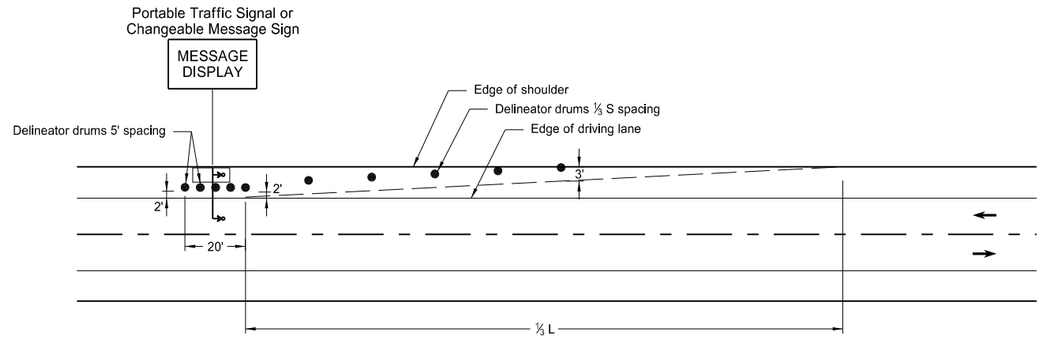
D-704-12



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

Notes:

1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   L = $WS^2/60$ (40mph or less)
   L = WS (45mph or more)
2. If a shoulder taper is used, it should have a length of approximately ⅓L. If a shoulder is used as a travel lane, a normal merging or shifting taper should be used.
3. When paved shoulders of 8 foot width or more are closed, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.

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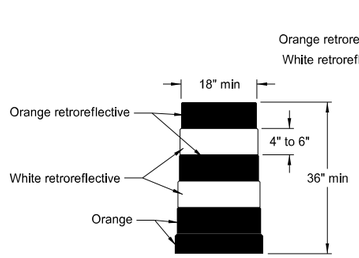
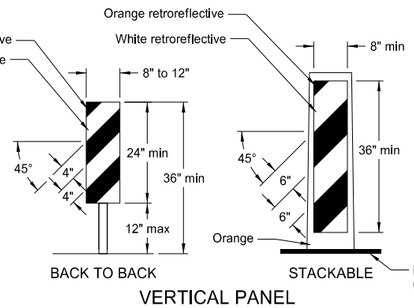
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



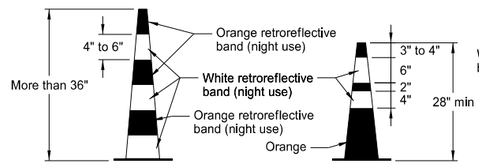
DELINEATOR DRUM

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.



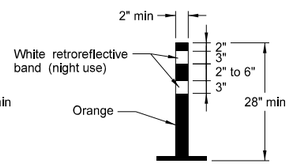
VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.



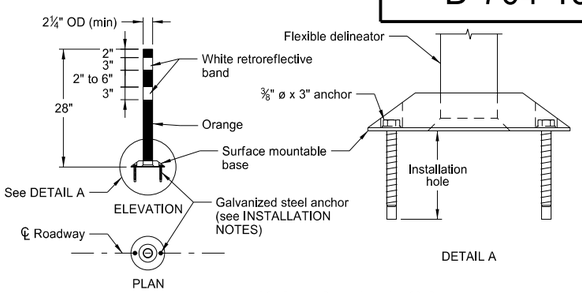
TRAFFIC CONE

Retroreflectorization of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized space between the orange and white stripes shall not exceed 3" wide.



TUBULAR MARKER

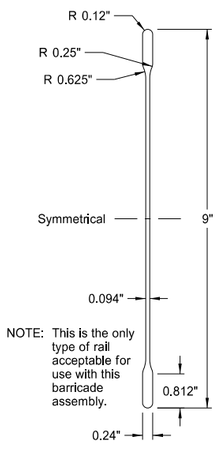
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



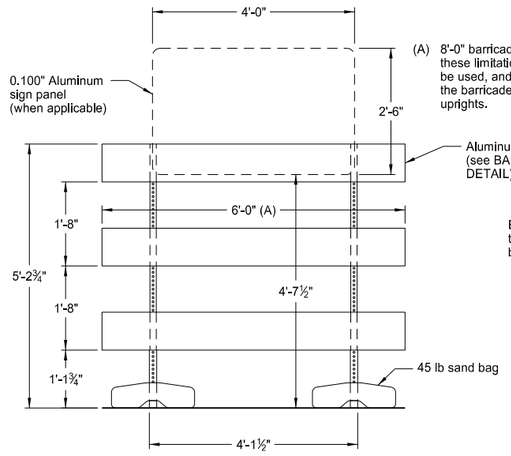
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

1. Drill installation holes to diameter and depth as 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, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

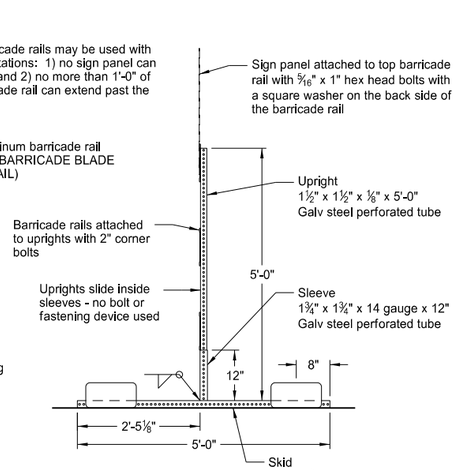


BARRICADE BLADE DETAIL



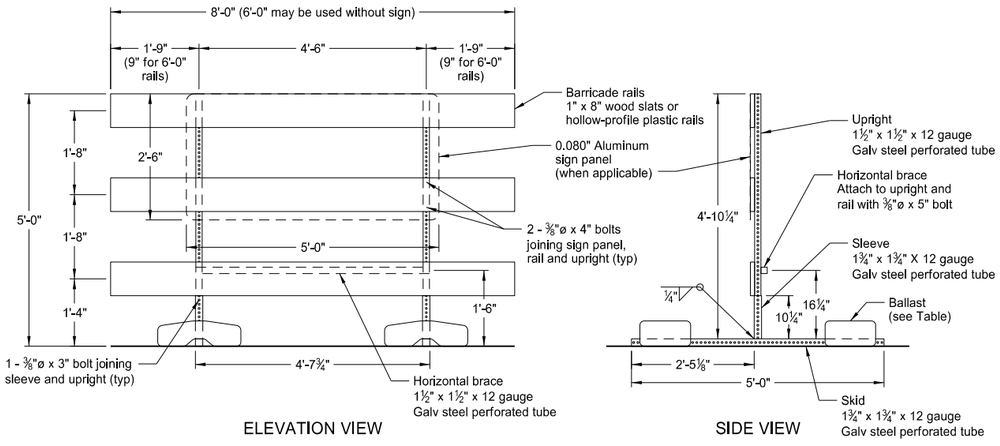
ELEVATION VIEW

(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.



SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

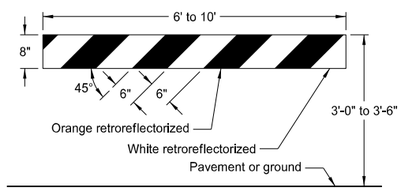


ELEVATION VIEW

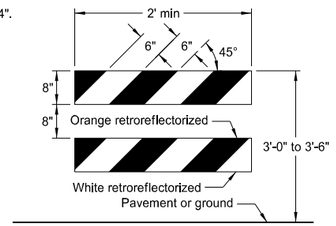
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

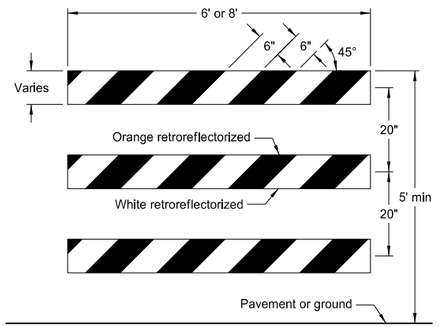
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".



TYPE I BARRICADE

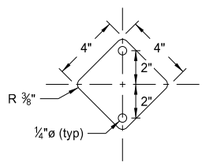


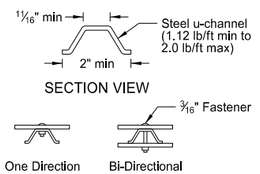
TYPE II BARRICADE

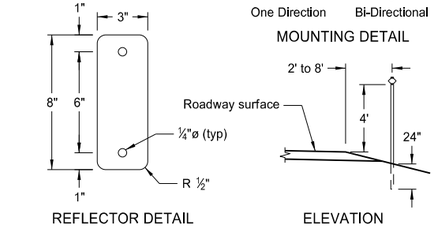


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

Note: 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	
10-3-13	
REVISIONS	
DATE	CHANGE

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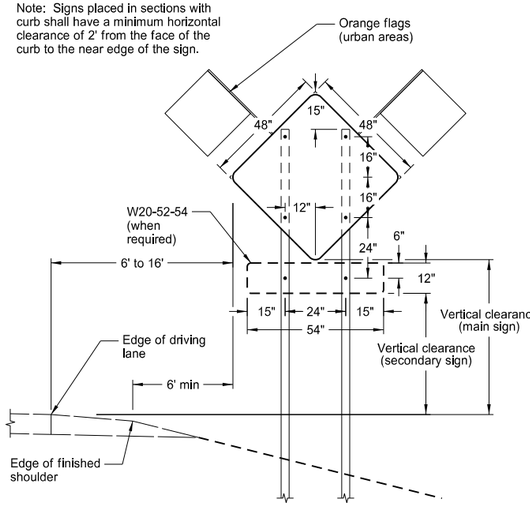
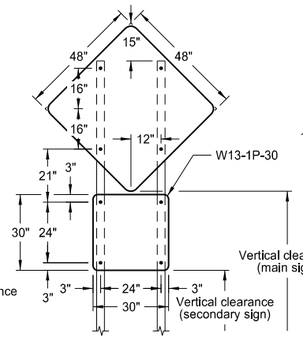
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

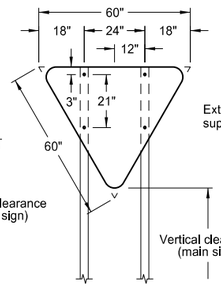
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



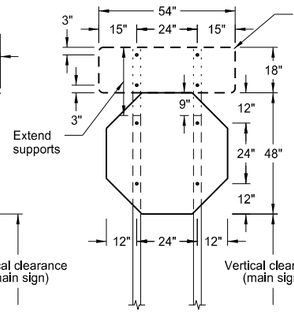
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



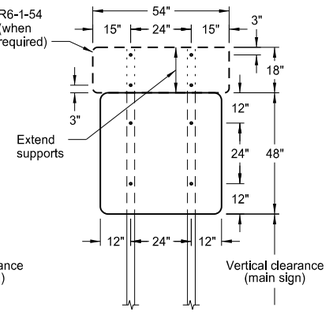
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



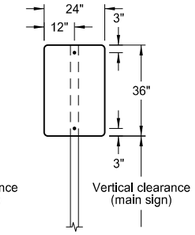
R1-2-60 - YIELD SIGN



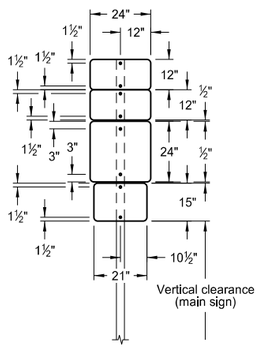
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



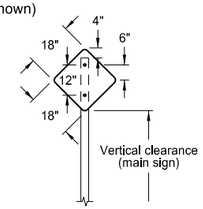
48" x 48" SIGN
(with R6-1-54 sign as required)



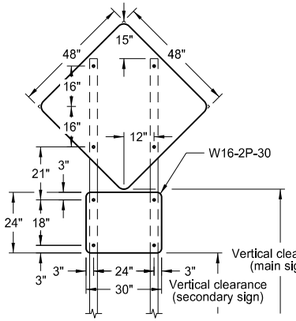
24" x 36" SIGN



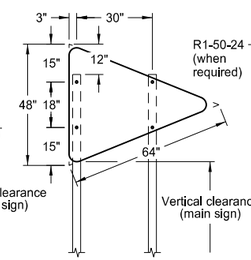
24" x 24"
ROUTE MARKER
ASSEMBLY



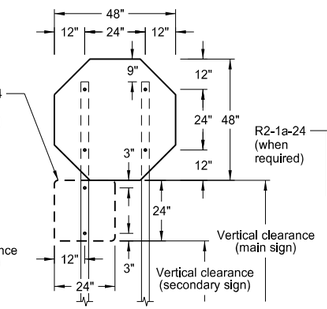
18" x 18"
DIAMOND SIGN



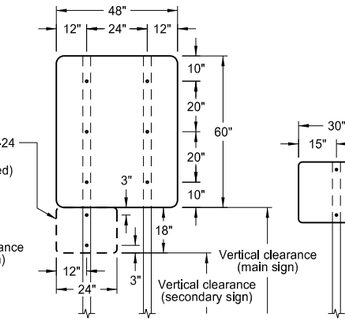
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



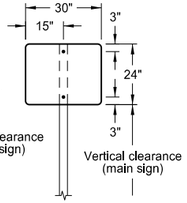
W14-3-64 - PENNANT SIGN



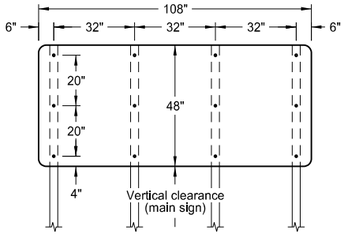
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



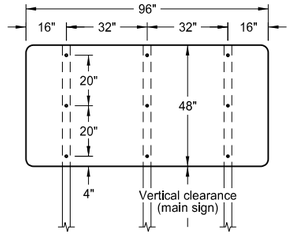
48" x 48" SIGN
(with R2-1a-24 sign as required)



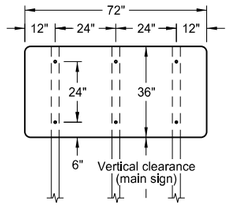
30" x 24" SIGN



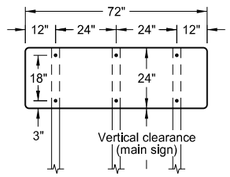
108" x 48" SIGN



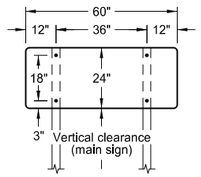
96" x 48" SIGN



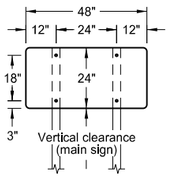
72" x 36" SIGN



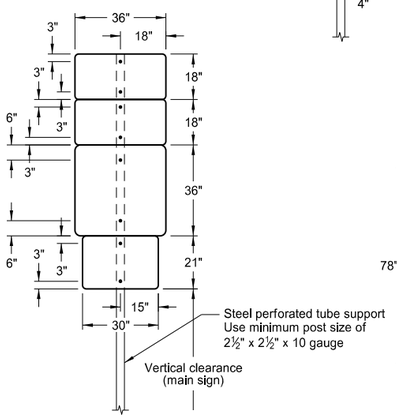
72" x 24" SIGN



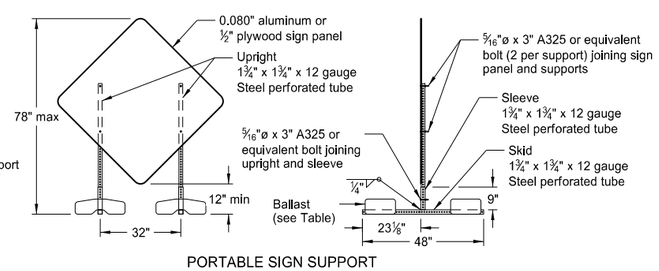
60" x 24" SIGN



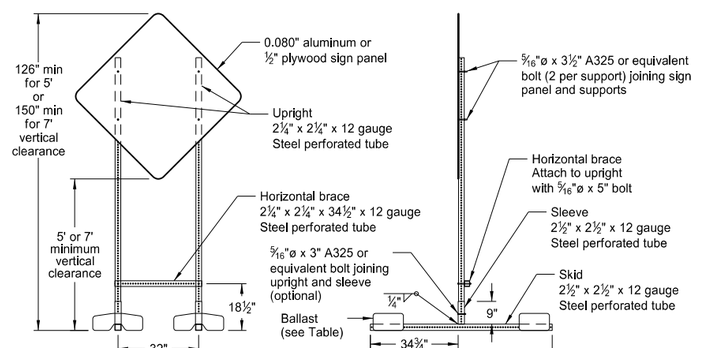
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: 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 2½" x 2½" 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, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" 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 unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 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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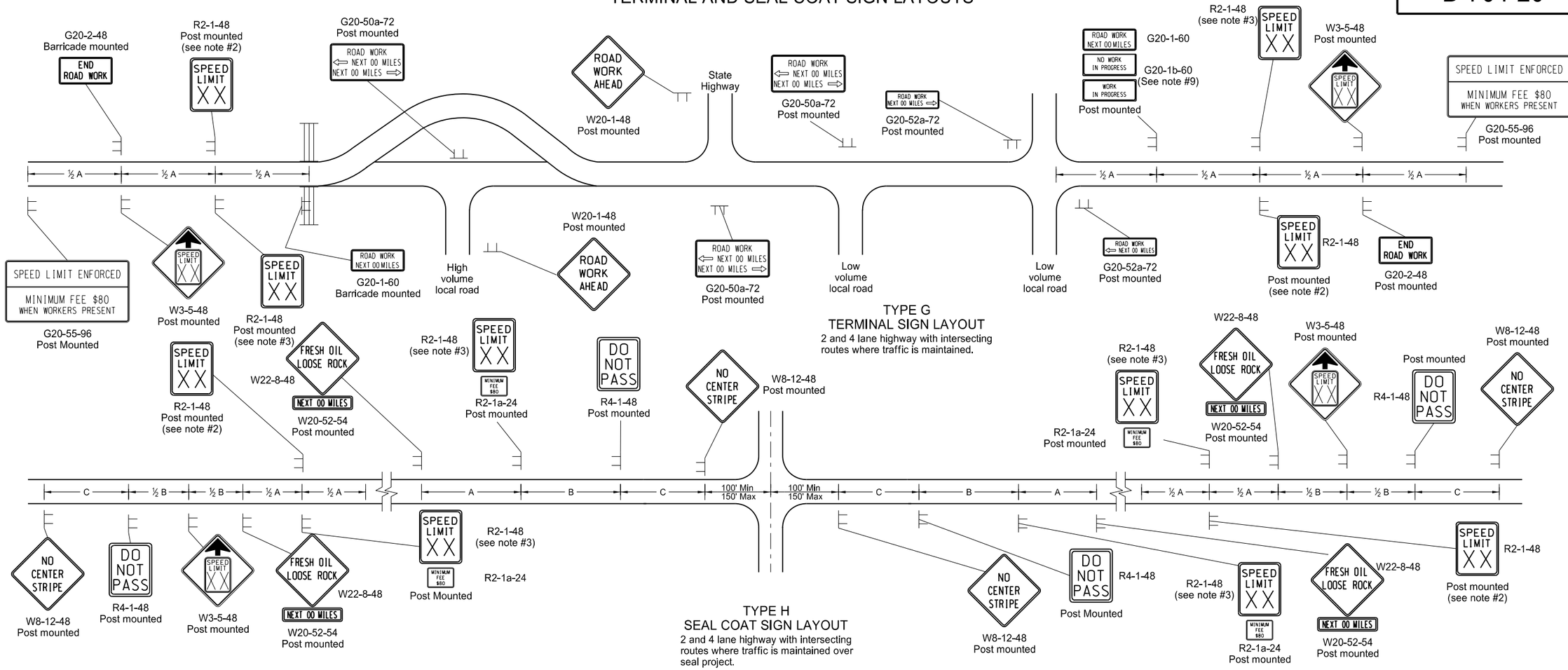
TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. 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 ½ B.
4. 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.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. 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.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. 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.
11. G20-55-96 sign is not required if work is less than 15 days.

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

KEY

Type III barricade

Sign

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

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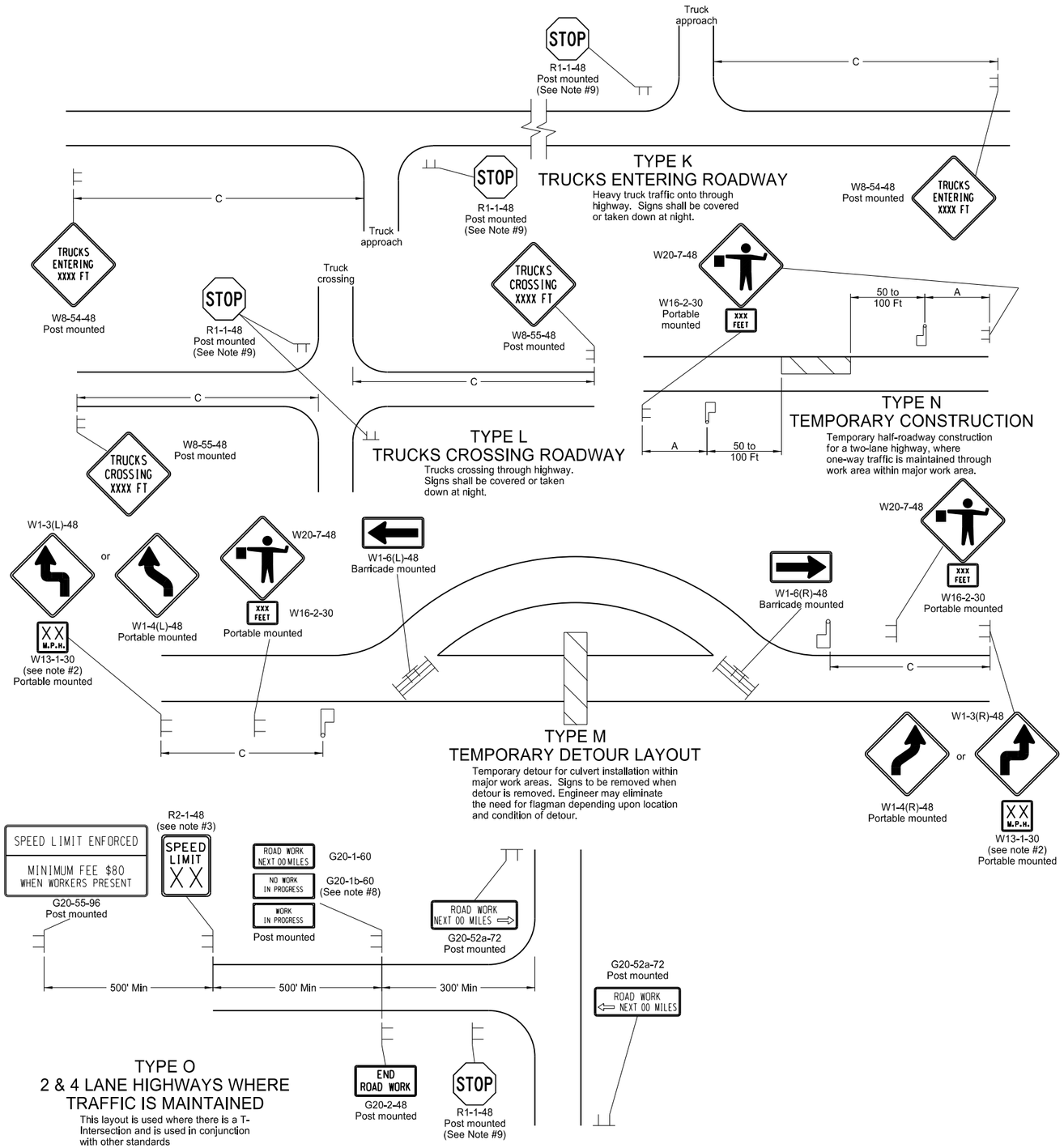
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. 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 ½ B.
4. 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.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. 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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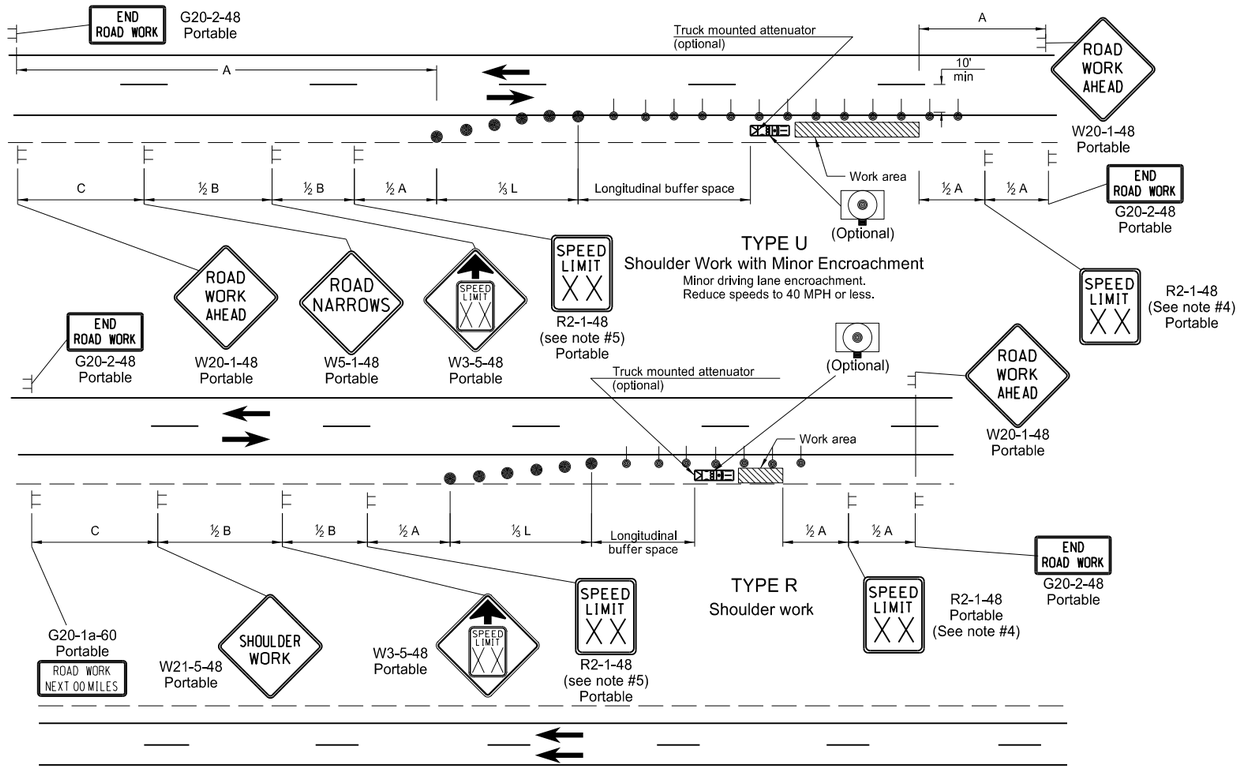
SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24



Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Delineator drums used for tapering traffic shall be spaced at dimension "S".
   Delineator drums or tubular markers used for tangents shall be spaced at 2 times "S".
3. Sequencing Arrow Panels
   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).
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. 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 ½B.
6. 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.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.

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

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 — Work area
Delineator Drum — Tubular Marker
Sequencing Arrow Panel (Caution Mode)

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

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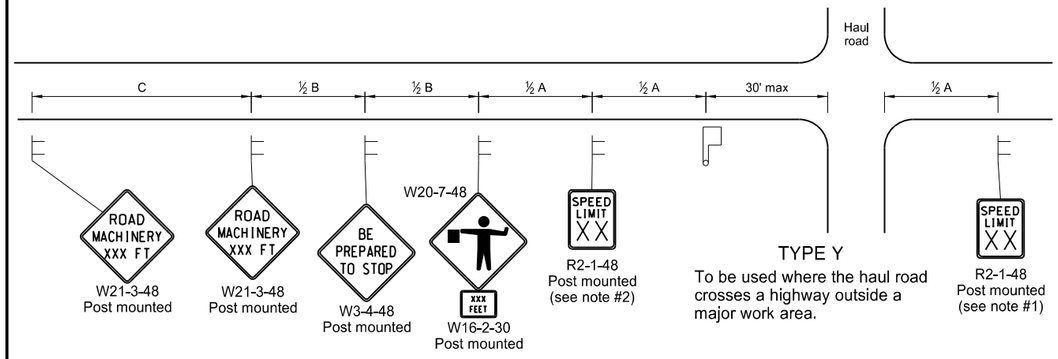
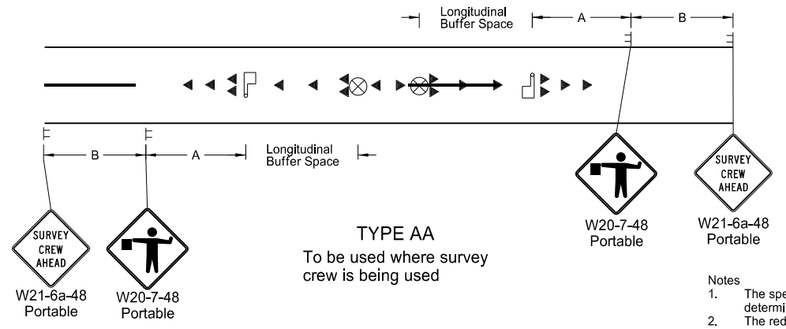
MISCELLANEOUS SIGN LAYOUTS

D-704-26



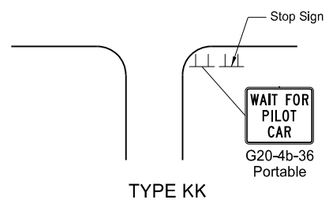
TYPE Y

To be used where the haul road crosses a highway outside a major work area.



TYPE AA

To be used where survey crew is being used

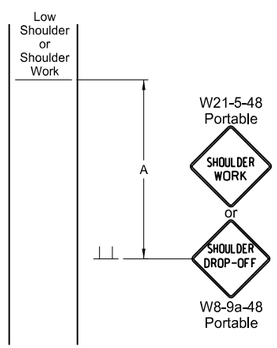


TYPE KK

To be used at major intersections within pilot car control area

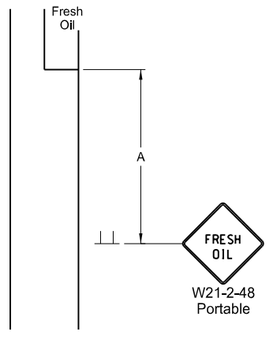
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. 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 ½ B.
3. 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.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



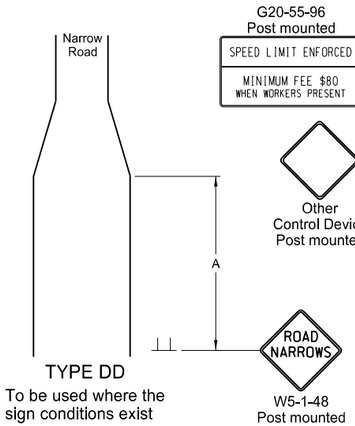
TYPE BB

To be used within a major work area where the sign conditions exist



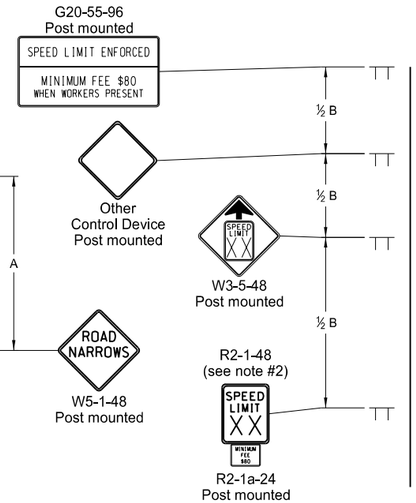
TYPE CC

To be used where the sign conditions exist



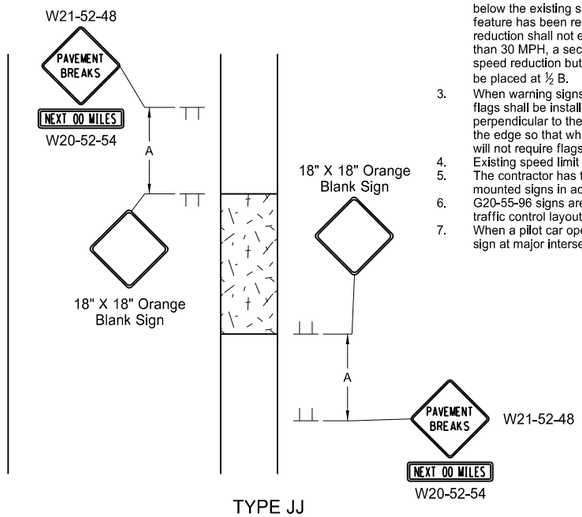
TYPE DD

To be used where the sign conditions exist



TYPE Z

To be used where speed zone is needed

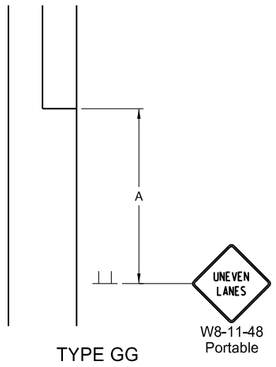


TYPE JJ

To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

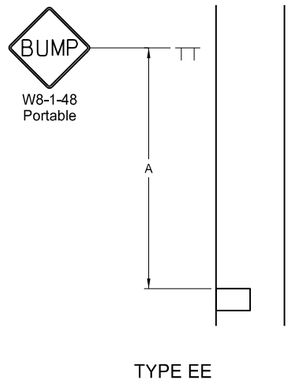
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

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



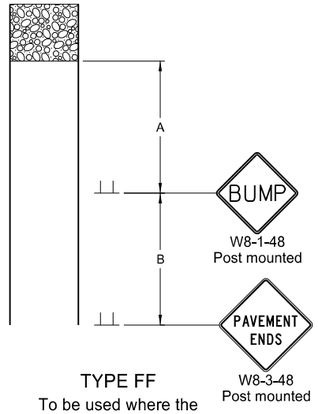
TYPE GG

To be used where a difference of elevation between lanes exist



TYPE EE

To be used where the sign conditions exist



TYPE FF

To be used where the sign conditions exist

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 — Flagger

Cones

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

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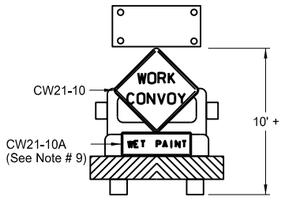
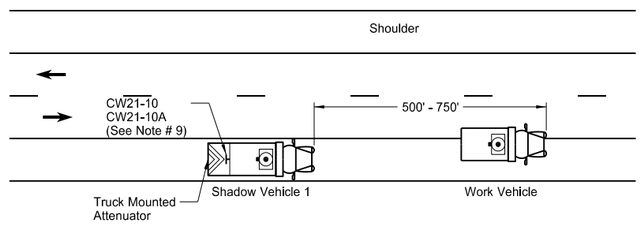
TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

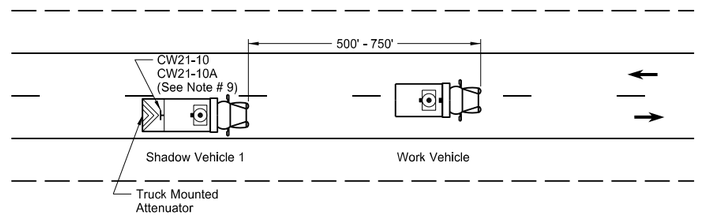
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday



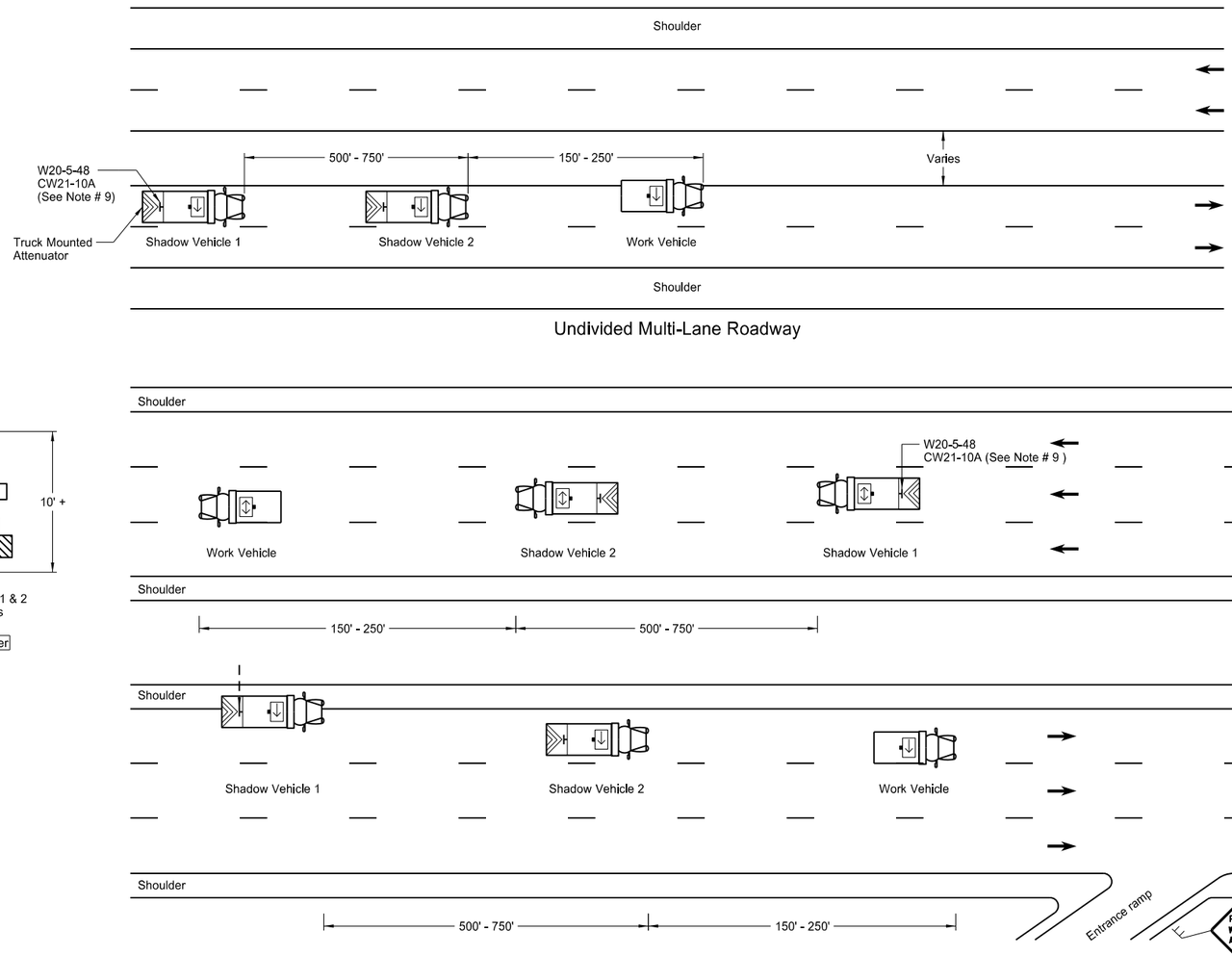
Two-Way Roadway with Paved Shoulders



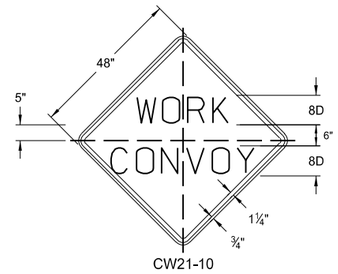
Two-Way Roadway without Paved Shoulders

Notes

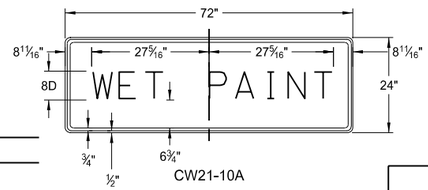
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
2. Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the plans.
3. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
4. Each vehicle shall have two-way electronic communication capability.
5. When work convoys must change lanes, shadow vehicle 1 should change lanes first to shadow other convoy vehicles.
6. 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.
7. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange
8. Shadow vehicle 2 may be used as the paint tender vehicle.
9. Sign CW21-10A shall only be used during a painting operation.
10. On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.



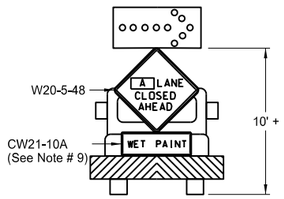
Sign Details



CW21-10



CW21-10A



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center

KEY

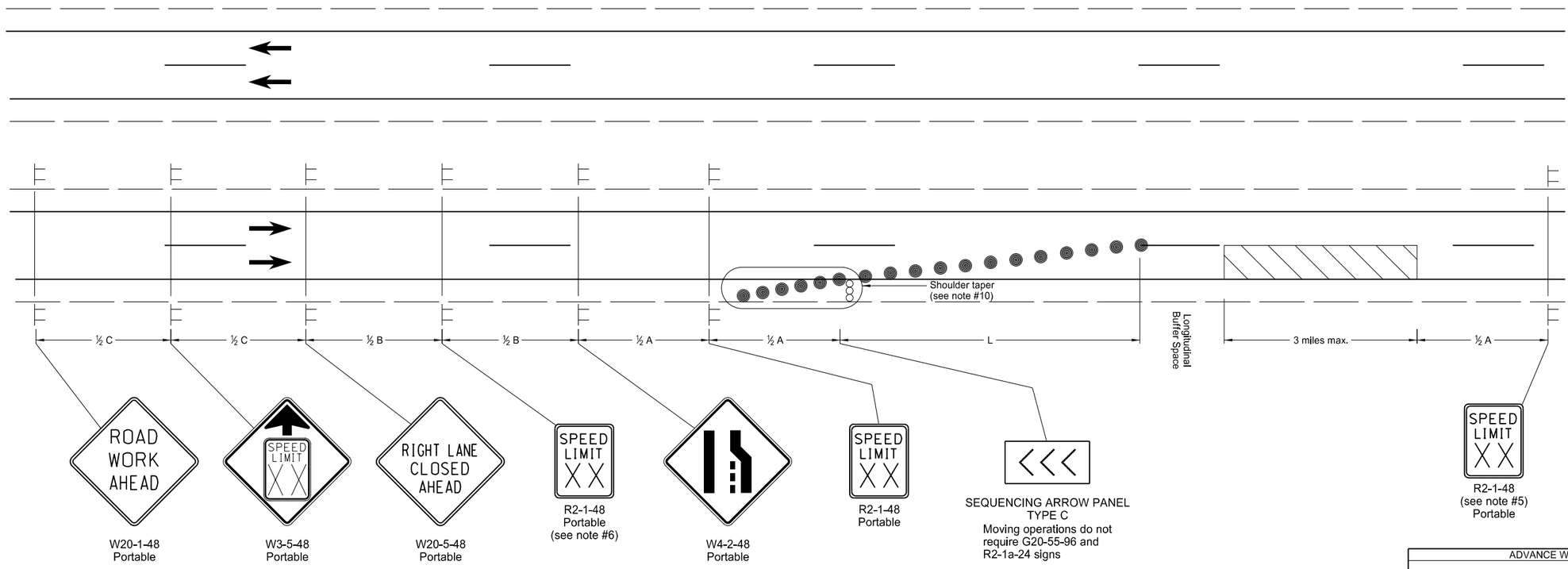
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 06/18/14 and the original document is stored at the North Dakota Department of Transportation

SIGN LAYOUT FOR ONE LANE CLOSURE DIVIDED HIGHWAY MOVING OPERATION

D-704-32



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

KEY

Sign — Work area

Delineator Drums — Sequencing arrow panel

Notes

1. If the moving operation is not visible to the motorist from the end of the taper, an additional sequencing arrow panel should be provided near the work area placed in the closed lane.
2. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
3. Delineator drums used for tapering traffic shall be spaced at the dimension "S".
4. 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.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph & 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph and 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. 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 ½ B.
7. 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.
8. Existing speed limit signs within a reduced speed zone shall be covered.
9. The contractor has the option of using portable sign supports in lieu of post mounted sign in accordance with the NDDOT Standard Specifications.
10. If the shoulder is 8' or wider, a shoulder taper shall be provided.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-24-14	Revised Note 9

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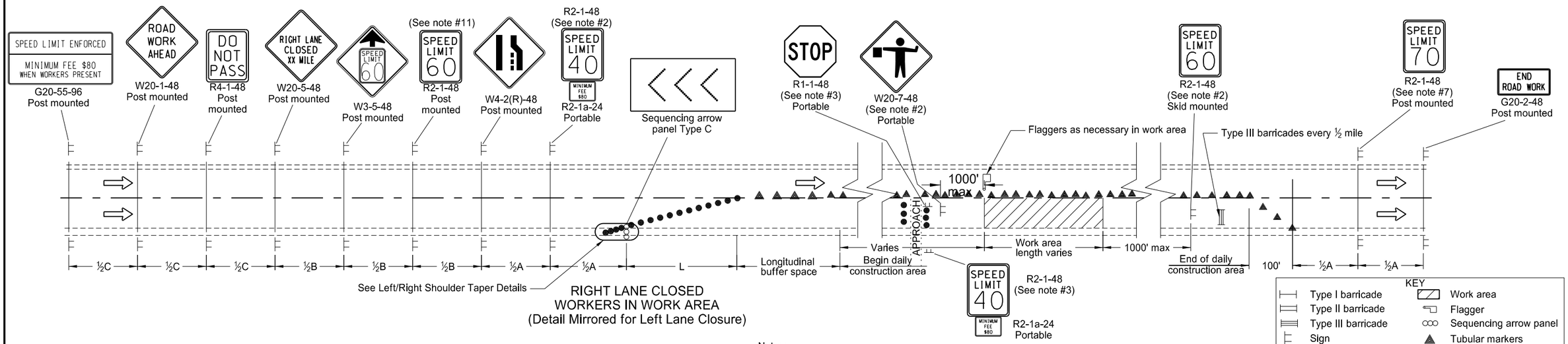
SIGN LAYOUT FOR ONE LANE CLOSURE

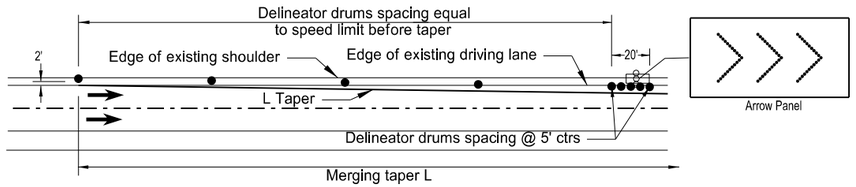
D-704-34



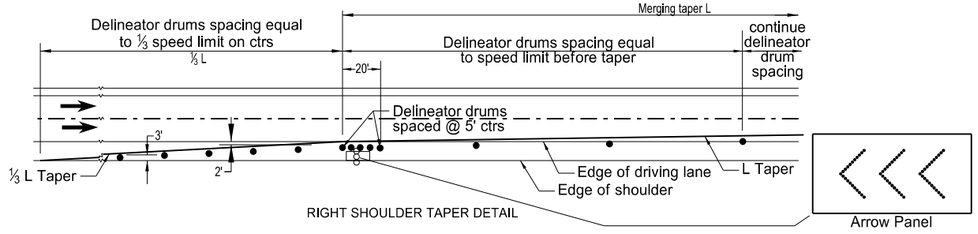
RIGHT LANE CLOSED
WORKERS IN WORK AREA
(Detail Mirrored for Left Lane Closure)

Notes:

1. Advance signs for flagging should be installed when flaggers are present.
2. The advanced flagger sign and the speed limit signs shall be moved as the work area moves through the construction zone. When the work area is not visible from the flagger, the flagger station shall be placed so the work area is visible. The 40 mph speed limit sign shall be spaced at ½A in advance of the flagger sign. The 60 mph speed limit sign shall also be moved. Upon completion of the work day or when workers are not present, the 40 mph speed limit and the Minimum Fee $80 signs shall be covered or removed. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, the approach shall be controlled by installing a 40 mph speed limit sign. If this approach is on the side of the lane closure, the existing stop sign shall be covered and a new portable stop sign shall be installed. When the main line 40 mph speed zone is moved past the approach, the approach speed limit sign shall be removed.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Delineator drums, used for tapering traffic shall be spaced at the dimension "S". Tubular markers used for tangents shall be spaced at 2 times dimension "S".
6. Sequencing arrow 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.
   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).
7. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
8. Existing speed limit signs within a reduced speed zone shall be covered.
9. 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.
10. 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 ½B.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
12. Sign G20-55-96 is not required if this standard is part of other traffic control layouts or the work is less than 15 days.



LEFT SHOULDER TAPER DETAIL



RIGHT SHOULDER TAPER DETAIL

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

9-26-2012

REVISIONS

DATE	CHANGE

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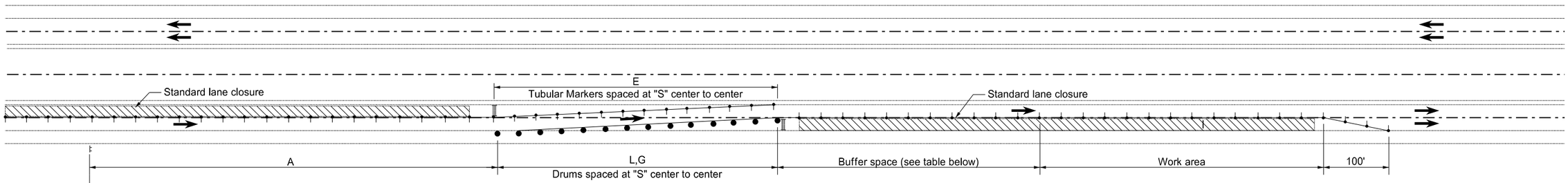
D-704-34A

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



QUANTITIES	
TYPE III BARRICADES	2 Each
DELINEATOR DRUMS	14 Each
TUBULAR MARKERS	14 Each
RAISED PAVEMENT MARKERS (White)	Varies
OBLITERATION OF PAVEMENT MARKING	Varies

KEY

Work area	Delineator drum
Type III barricade	Tublar markers
Traffic Direction	Sign

LEGEND

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

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.

Notes
1. 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 $L= WS$.
2. Signs and barricade shown to be placed on roadway shall be placed on moveable assemblies.
3. Existing speed limit signs within a reduced speed zone shall be covered.
4. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the Engineer.
5. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings in accordance with NDDOT Standard Specifications.
6. When placing traffic control devices, speed reductions will be necessary. The "Minimum Fee $80" sign shall be placed below these speed limit signs.
7. Obliteration of pavement marking (10' line, 30' skip, centerline) and raised pavement markers are not necessary when the work is 14 days or less.

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

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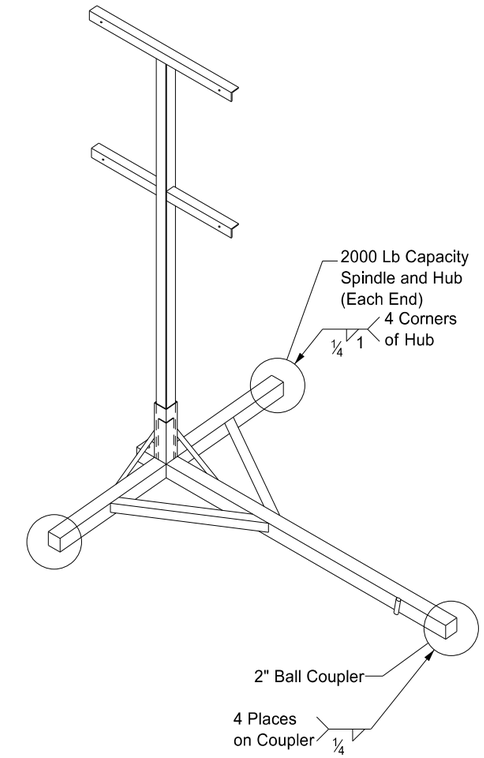
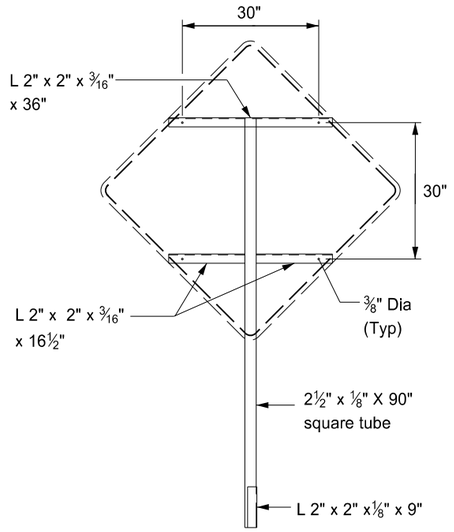
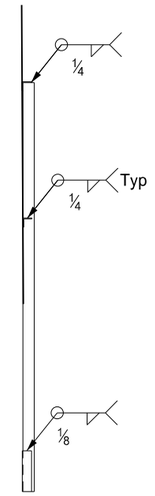
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



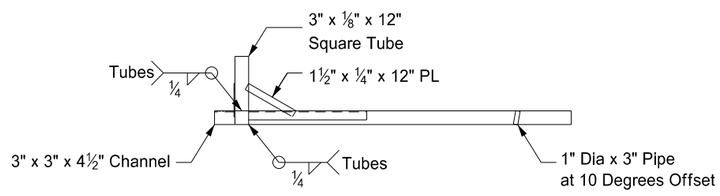


FRONT



RIGHT

SIGN SUPPORT



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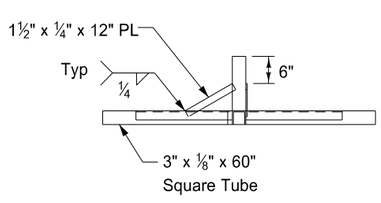

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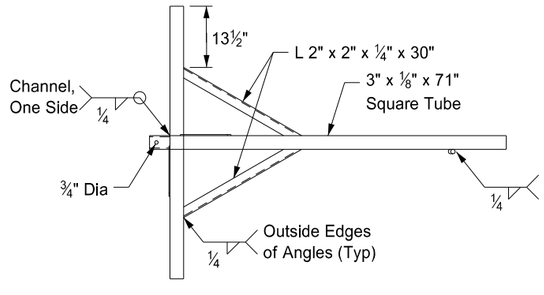

TOP

TRAILER

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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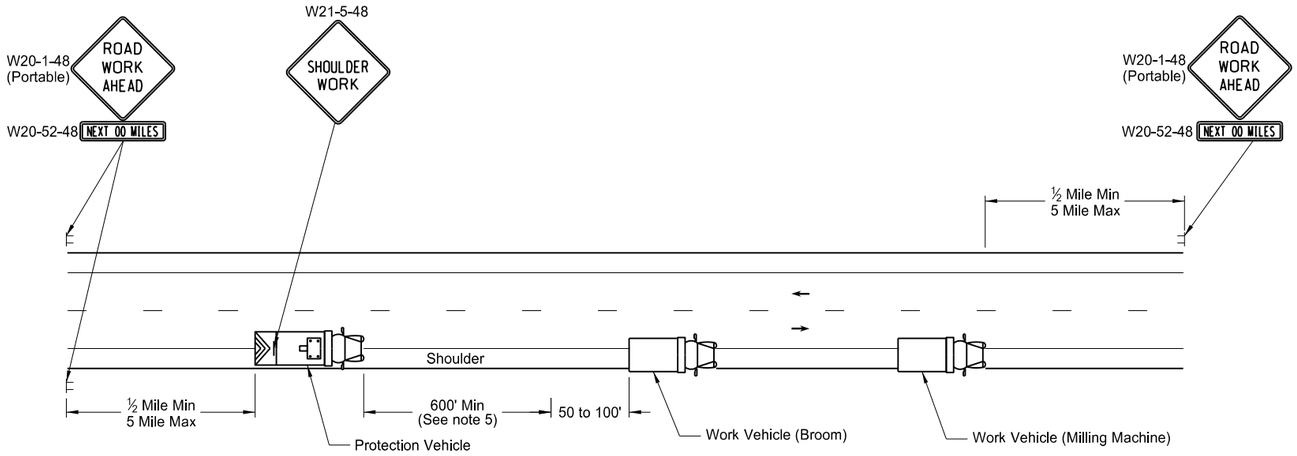
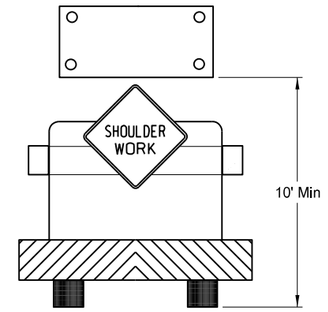
MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



TWO LANE - TWO WAY ROADWAY

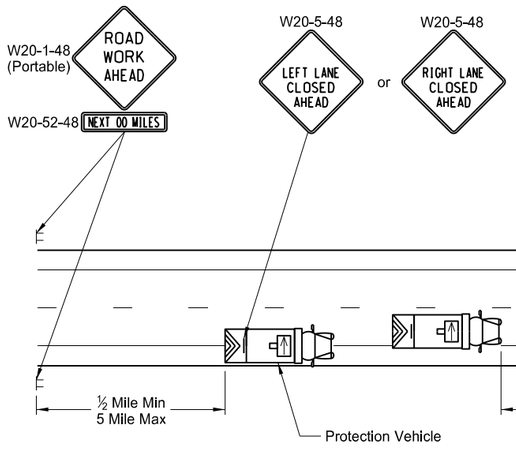


TWO LANE - TWO WAY ROADWAY

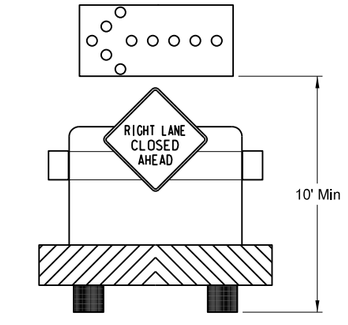
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

1. 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 contractors expense.
2. Vehicles shall have a rotating, flashing, oscillating or strobe lights.
3. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
4. Each vehicle shall have two - way electronic communication capability.
5. Vehicle spacing between the protection vehicle and work vehicle will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the protection vehicle in time to slow down and safely pass the work vehicles.
6. ROAD WORK AHEAD SIGN: Advance Road Work Ahead signs shall be moved as the work area moves through the construction zone.
7. Next XX Miles sign required when the distance from Road Work Ahead sign to the work location is two miles or greater.

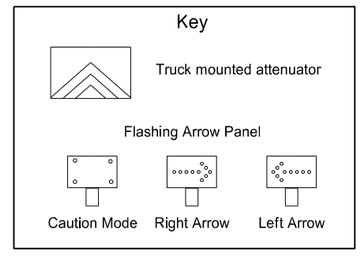


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
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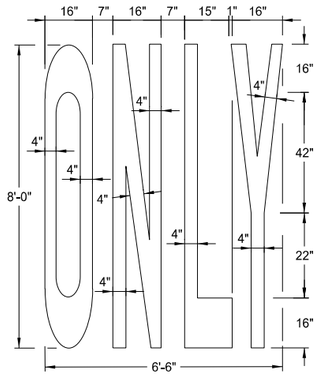
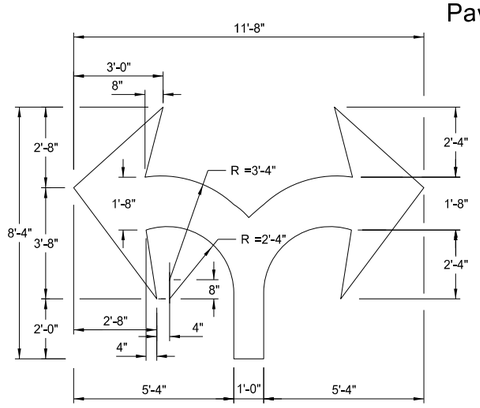
Pavement Marking Message Details

D-762-1



22 S. F.



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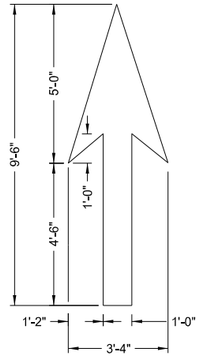
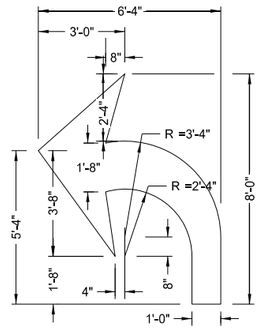
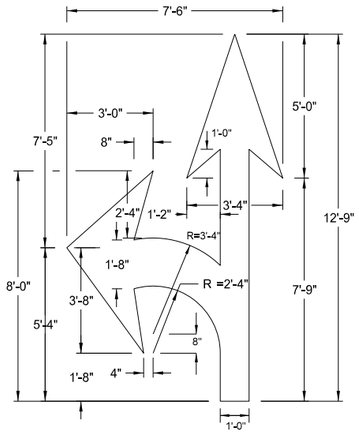


12 S. F.



16 S. F.



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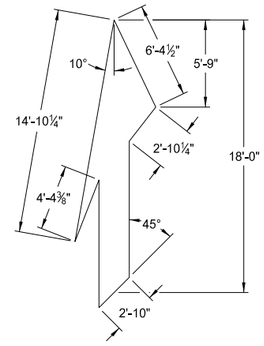
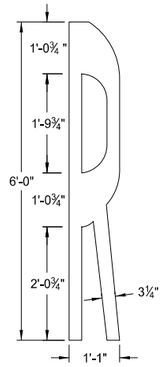
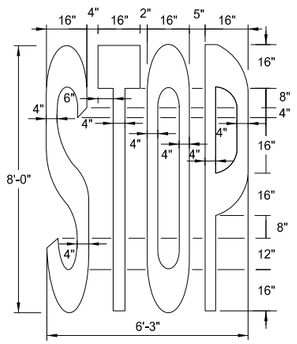


41 S. F.

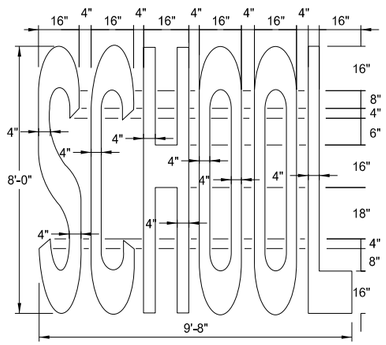
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



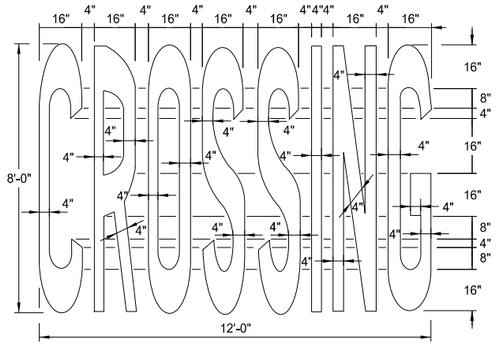
4 S. F.



22 S. F.



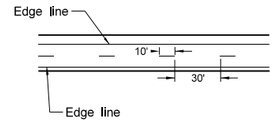
34.5 S. F.



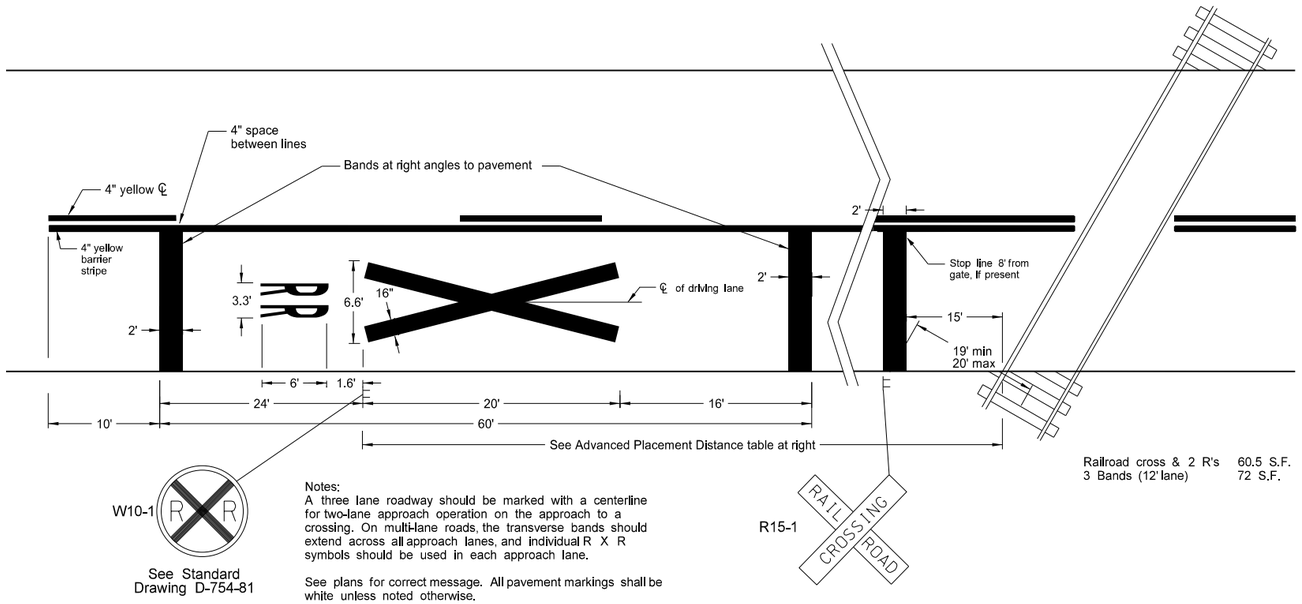
46 S. F.

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

Chevron Crosshatching Table



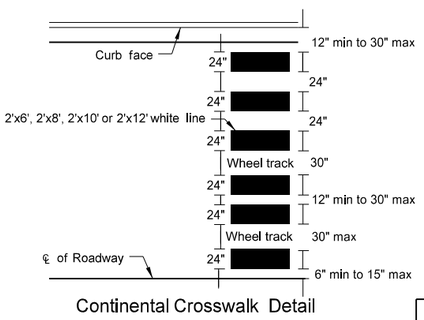
Centerline Pavement Marking Skip Spacing Detail



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

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

See plans for correct message. All pavement markings shall be white unless noted otherwise.



Continental Crosswalk Detail

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
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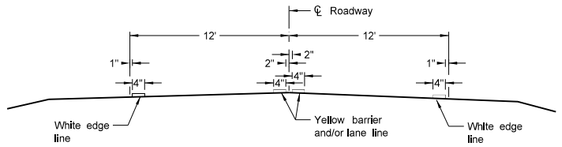
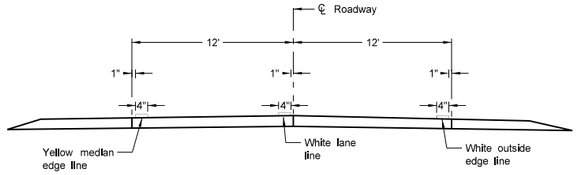
PAVEMENT MARKING

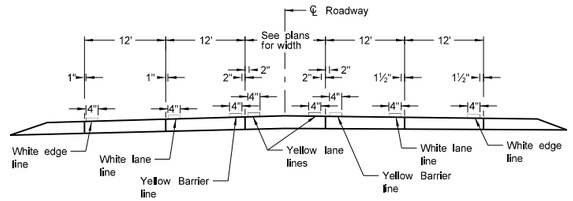
D-762-4



Two Lane Two Way
RURAL ROADWAY



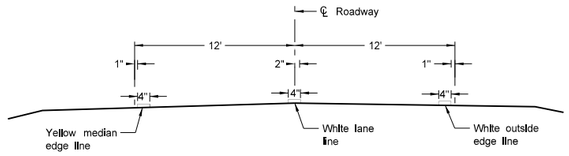
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



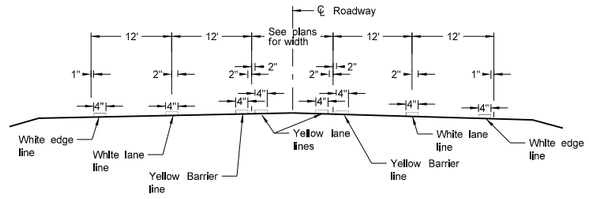
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

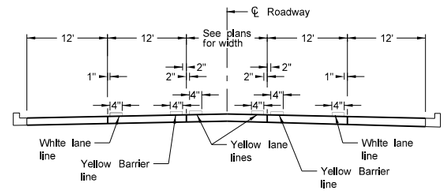
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



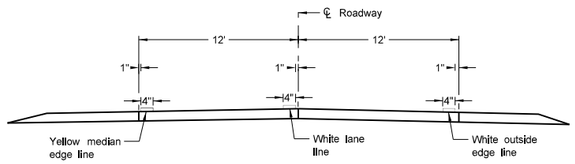
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



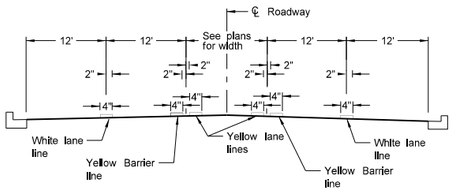
RURAL FIVE LANE ROADWAY
Asphalt Section



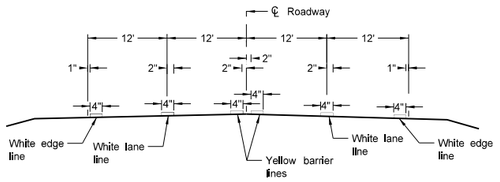
URBAN FIVE LANE SECTION
Concrete Section



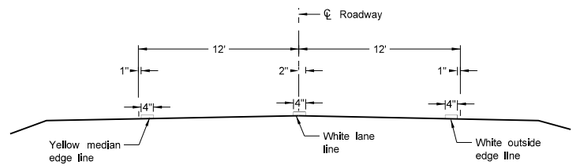
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



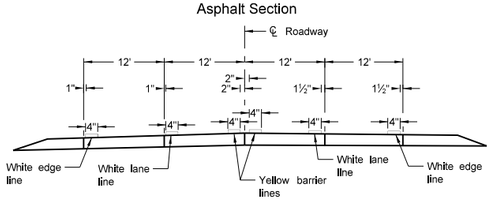
URBAN FIVE LANE SECTION
Asphalt Section



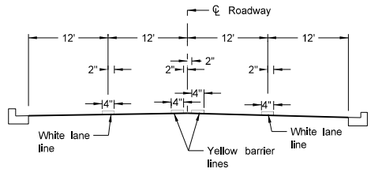
RURAL FOUR LANE ROADWAY
Asphalt Section



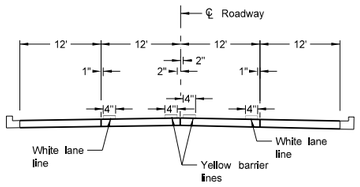
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



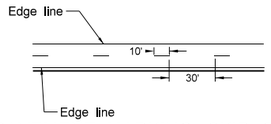
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
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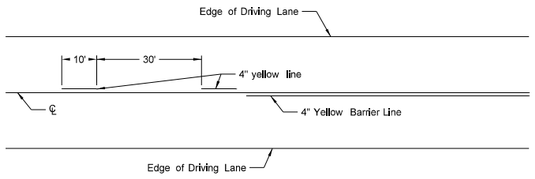
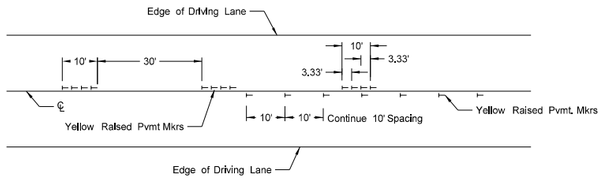
SHORT-TERM PAVEMENT MARKING

D-762-6

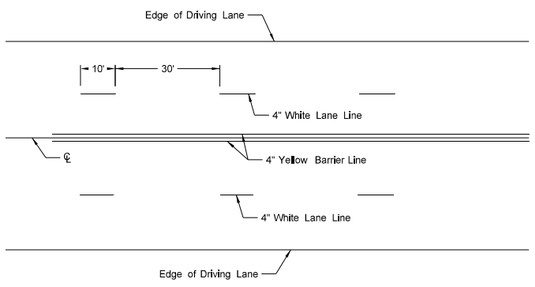


Painted or Tape Lines



Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY



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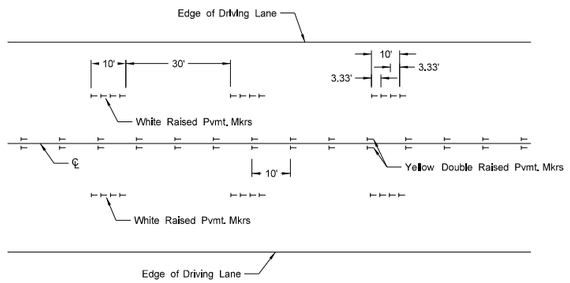
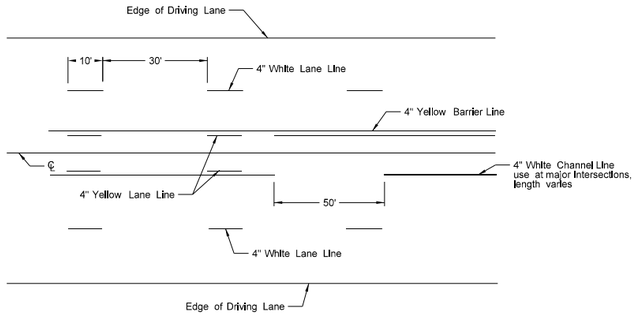


Raised Pavement Markers

FOUR LANE ROADWAY



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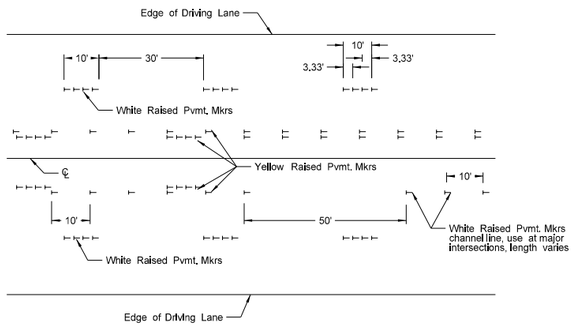
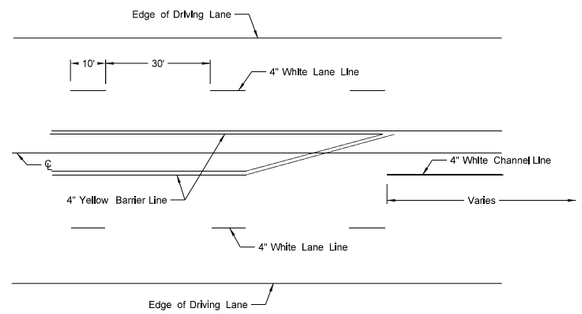
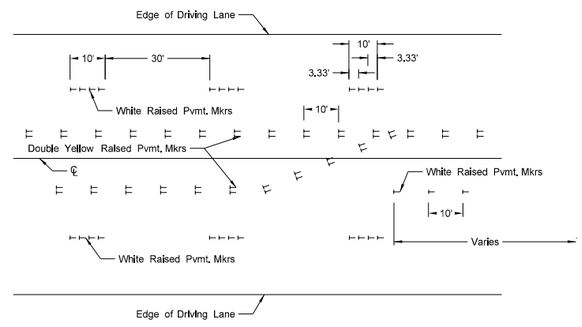


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Two-lane two-way roadways shall have no passing zones placed as shown. No passing zone signs may be placed in lieu of short term no passing zone pavement markings. These signs will be allowed to remain in place for three days, at which time the short term no passing zone pavement marking shall be placed.

2. Short term center line stripe (paint) on top lift shall be carefully placed with exact spacing so that the permanent stripe will match when applied.

3. Raised markers and tape markings shall be removed after permanent pavement marking has been installed. Removed markings shall become the property of the contractor.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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