DESIGN DATA				
Traffic	Average Daily			
Current 2020	Pass: 2103	Trucks: 764	Total: 2867	
Preventive Maintenance				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	23578	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

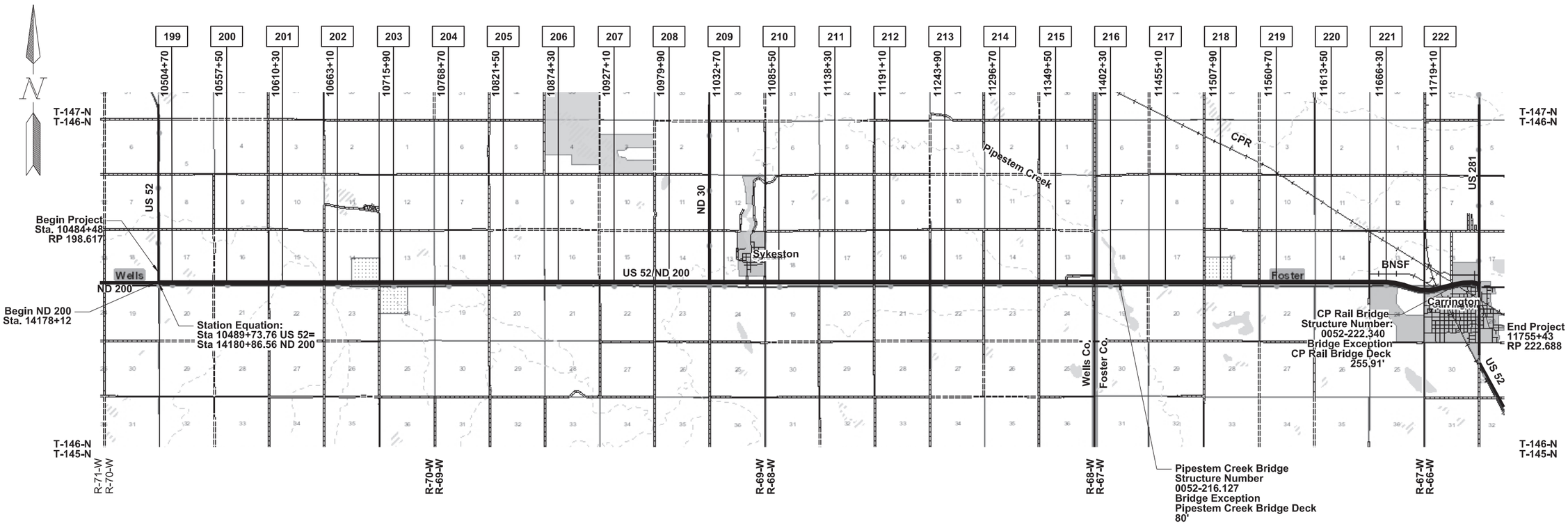
NH-3-052(055)198

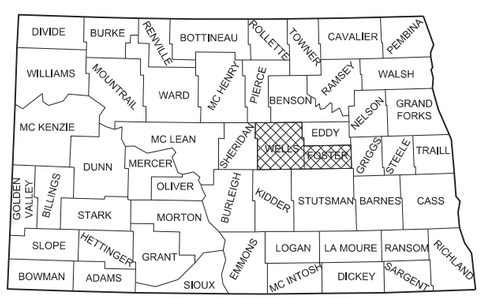
Wells and Foster County
US 52-W Jct ND 200 to E Jct ND 200

Milling and HBP

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	1/1/2022
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-3-052(055)198 / Mill and Overlay	**24.071**	**24.071**





STATE COUNTY MAP

DESIGNER
Steeg Nelson
DESIGNER
Dustin Legacie
DESIGNER
Jason Hunter

ND DEPARTMENT OF TRANSPORTATION
Devils Lake District

Beggs, Chris K.
03/23/22

NDDOT-DEVILS LAKE DISTRICT

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER K. BEGGS
PE-6240
DATE
NORTH DAKOTA
03/23/22

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	2	1

TABLE OF CONTENTS

PLAN SECTIONS

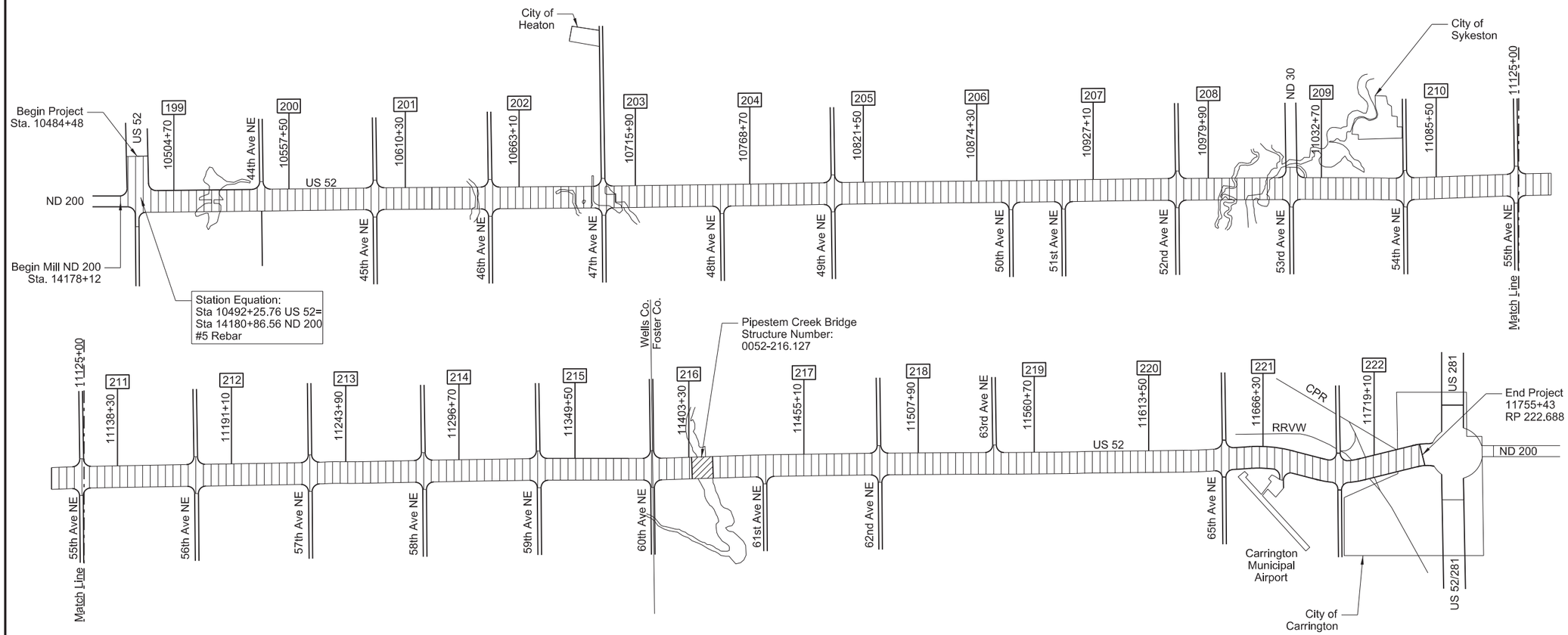
SPECIAL PROVISIONS

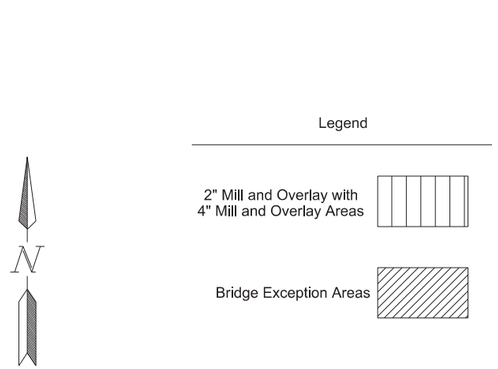
Number	Description
SP 25(22)	Flexible Pavement Surface Tolerance
SSP 10	E Ticketing
SSP 4	Longitudinal Joint Density

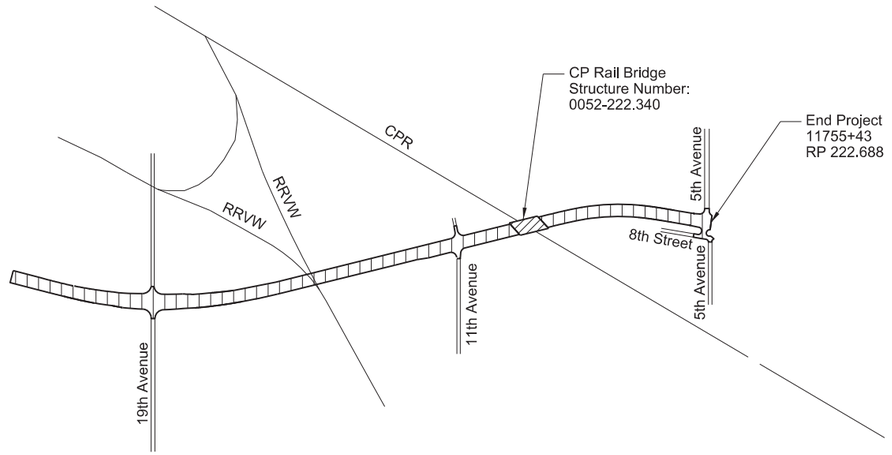
LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2,3,4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32,33	Symbols
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
D-704-5	Construction Sign Detail
D-704-6	Construction Sign Details Project Funding Sign
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-23	Short Term Urban Detour And Lane Closure On A Divided Highway Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Mobile Operation (Pavement Marking)
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
D-706-1	Bituminous Laboratory
D-760-3	Rumble Strips Undivided Highways (Shoulders 4' Or Greater)
D-760-5	Saw Slotted Rumble Strips At Intersections
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)
D-762-6	Pavement Marking for Standard 90 Degree Flared Intersection - (Center Left Turn Lane on Major Road)
D-762-11	Short-Term Pavement Marking

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	4	1







City of Carrington

REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA
PE-28791
DATE
Kitsch, Ethan R
03/23/22

Scope of Work

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	6	1

NOTES

100-P01 COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2022 construction season. This project is NDDOT project SS-3-030(036)088, PCN 22602 and is a structure replacement project on ND 30 at RP 88.503 over the Pipestem Creek which US 52 is the designated detour route. Additional Tied projects with this project is ND project INF-X-3-052(053)185 and NH-3-052(054)185. There is also a safety delineator project that will run through this project which is ND project HES-3-999(048).

107-114 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the Red River Valley and Western Railroad Company at MP 221.97. The type of work that will be performed within the railroad right of way is Mill & Overlay. Direct inquiries regarding railroad protective liability insurance to:

Jill Kvidera
Red River Valley and Western Railroad Company
P.O. Box 608
Wahpeton, ND 58074
Jill.Kvidera@rrvw.net
701-642-8257

Obtain information regarding crossing number DOT 086425C from the Federal Railroad Administration website: http://safetydata.fra.dot.gov/Officeofsafety/

107-P01 HAUL ROAD RESTORATION: Use Class 13 aggregate for haul road restoration.

107-P02 AIRPORT HEIGHT RESTRICTION: Between Sta 11651+00 and 11657+00, restrict all construction vehicle equipment to a total height of 16 feet or less due to Carrington Municipal Airport operation. Equipment height will be measured from the centerline of the roadway and will include the extended box of dump vehicles.

411-P01 MILLING PAVEMENT SURFACE: 1126 tons of milled material will be used on approach transitions and the contractor will take ownership of the additional milled material from the project. This material will be paid for under “302-0308 Salvage Bituminous Pavement”.

430-100 HMA LONGITUDINAL JOINTS: Construct the joints within the final lift of pavement as detailed within this note.

Place a longitudinal joint at the centerline of the roadway.
Construct each lane and the adjoining shoulder using a single pass or a hot seam.
A hot seam is defined as follows:

- Constructed using two pavers simultaneously;
- No more than 300 feet between pavers; and
- Roll the seam between paver passes in a manner such that the seam is not visible.

430-P01 CONTRACTOR CORING: Before placing bituminous material into core holes, apply a tack coat on all sides of the core holes as specified in Section 401.

704-255 TRAFFIC CONTROL FOR SHOULDER DROP-OFF: If the shoulder and adjacent driving lane are not even at the end of the day, the following criteria will apply:

Place the following sign assembly at the locations listed below.

Sign Assembly: Sign No. W8-17-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52P-54 to identify the distance.

Locations:

- In advance of the drop off;
- Spaced at each mile from the advance sign; and
- At major intersections (CMC routes, state and US highways, and Interstate Ramps).

If the difference in elevation between the shoulder and the driving lane is 2" or greater, construct a slough on the driving lane that is 4:1 or flatter.

If the difference in elevation between the shoulder and driving lane is less than 2", no slough is required.

Sign assemblies will be measured and paid for according to Section 704 "Temporary Traffic Control"

704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

- “Be Prepared to Stop” (E3-4); and
- “Flagger” symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacture’s speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS construction in one of the following manners:

REGISTERED PROFESSIONAL ENGINEER
KITSCH
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R
03/25/22

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	6	2

NOTES

- A single piece;
- Inter locking segments; or
- Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 2 individual strips.
Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for “Portable Rumble Strips”.

704-P01 PORTABLE RUMBLE STRIPS: A quantity of 2 portable rumble strips are provided to be used during the duration of the project. Additional quantities are at the contractors expense.

704-P02 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and a pilot car.

Traffic control device quantities are based on a 6 mile limitation and the list below. The Department will pay for all necessary deployed devices, regardless of the length of the lane closure.

1. Standard D-704-15;
4. Standard D-704-22, layouts and
5. Standard D-704-26, layouts CC, EE, and GG.

704-P03 TRAFFIC CONTROL: Maintain traffic during construction to the 12’ driving lanes to avoid damage to the shoulders.

762-P01 SHORT TERM 4IN LINE-TYPE NR: Quantity for three applications of short term centerline pavement marking has been included in the plans. Additional applications required to accommodate the contractor’s operation are at the contractor’s expense.

- One application for mill each day
- One application for HBP Overlay
- One application for FOG SEAL.

REGISTERED PROFESSIONAL ENGINEER
KITSCH
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R.
03/25/22

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	0.33	0.33
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1	1
302	0308	SALVAGED BITUMINOUS PAVEMENT	TON	1,126	1,126
401	0050	TACK COAT	GAL	29,952	29,952
411	0100	MILLING PAVEMENT SURFACE	TON	88,071	88,071
430	0045	SUPERPAVE FAA 45	TON	88,071	88,071
430	1000	CORED SAMPLE	EA	599	599
430	5818	PG 58H-34 ASPHALT CEMENT	TON	5,284	5,284
702	0100	MOBILIZATION	L SUM	0.33	0.33
704	0100	FLAGGING	MHR	620	620
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,864	1,864
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
704	1067	TUBULAR MARKERS	EA	250	250
704	1185	PILOT CAR	HR	310	310
706	0550	BITUMINOUS LABORATORY	EA	0.33	0.33
706	0600	CONTRACTOR'S LABORATORY	EA	0.33	0.33
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	40.124	40.124
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	24.477	24.477
762	0103	PVMT MK PAINTED-MESSAGE	SF	601	601
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	120,734	120,734
762	1104	PVMT MK PAINTED 4IN LINE	LF	149,662	149,662
762	1108	PVMT MK PAINTED 8IN LINE	LF	2,802	2,802
762	1124	PVMT MK PAINTED 24IN LINE	LF	264	264

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	10	1

TOP 2" SUPERPAVE & MILLING TABLE

LOCATION	BEGIN STATION	END STATION	LENGTH	AVERAGE WIDTH (FT)	AREA WITH SLOUGH (SY)	MILLING PAVEMENT SURFACE (TON)	SUPERPAVE FAA 45 @ 2 Ton/CY (TON)	PG 58H-34 ASPHALT CEMENT @ 6.0% of HBP (TON)	TACK COAT @ 0.05 GAL/SY (GAL)
Mainline with Right Turn Lane - US 52 W Jct 200	10489+28	10495+60	632	48	3,441	382	382	23	172
Mainline with Right Turn Lane Taper - US 52 W Jct 200	10495+60	10496+80	120	44	600	67	67	4	30
Mainline - US 52	10496+80	10622+85	12,605	40	57,423	6,380	6,380	383	2,871
**Mainline- US 52	10503+90	10622+85	11,895	32	43,615	4,846	4,846	291	2181
Mainline - US 52	10622+85	10814+41	19,156	40	87,266	9,696	9,696	582	4,363
**Mainlin - US 52	10814+41	10932+05	11,764	32	43,135	4,793	4,793	288	2157
Mainline - US 52	10932+05	11018+45	8,640	40	39,360	4,373	4,373	262	1,968
Mainline with Right Turn Lane - US 52 ND 30	11018+45	11023+75	530	48	2,886	321	321	19	144
Mainline with Right Turn Lane Taper - US 52 ND 30	11023+75	11024+95	120	44	600	67	67	4	30
Mainline - US 52	11024+95	11053+87	2,892	40	13,175	1,464	1,464	88	659
Mainline with Right Turn Lane - US 52 Hughes Ave	11053+87	11059+29	542	48	2,951	328	328	20	148
Mainline with Right Turn Lane Taper - US 52 Hughes Ave	11059+29	11060+49	120	44	600	67	67	4	30
Mainline - US 52	11060+49	11079+15	1,866	40	8,501	945	945	57	425
**Mainline - US 52	11079+15	11196+85	11,770	32	43,157	4,795	4,795	288	2158
Mainline - US 52	11196+85	11340+15	14,330	40	65,281	7,253	7,253	435	3,264
*Mainline - US 52	11340+15	11433+25	9,230	40	42,048	4,672	4,672	280	2102
Mainline - US 52	11433+25	11582+15	14,890	40	67,832	7,537	7,537	452	3,392
**Mainline - US 52	11582+15	11694+25	11,210	32	41,103	4,567	4,567	274	2055
Mainline - US 52	11694+25	11695+65	140	40	638	71	71	4	32
Mainline with Turn Lane Taper - US 52 19th Ave	11695+65	11701+46	581	48	3,163	351	351	21	158
Mainline with Turn Lanes - US 52 19th Ave	11701+46	11705+95	449	56	2,844	316	316	19	142
Mainline with Turn Lane Taper - US 52 19th Ave	11705+95	11711+72	577	49	3,206	356	356	21	160
Mainline - US 52	11711+72	11726+72	1,500	40	6,833	759	759	46	342
Mainline with Right Turn Lane Taper - US 52 11th Ave	11726+72	11727+68	96	44	480	53	53	3	24
*Mainline with Right Turn Lane - US 52 11th Ave	11727+68	11738+48	784	48	4,268	474	474	28	213
Mainline - US 52	11738+48	11751+39	1291	40	5,881	653	653	39	294
* Length Adjusted for Bridge									
**Width Adjusted for Exception Area see Sec 20, Sheet 2									
SUBTOTAL			**137,730**		**590,286**	**65,587**	**65,587**	**3,935**	**29,514**

ITEM - MISCELLANEOUS	BEGIN STATION	END STATION	LENGTH (FT)	AVERAGE WIDTH 2" (FT)	AREA WITH SLOUGH (SY)	MILLING PAVEMENT SURFACE (TON)	Superpave FAA 45 @ 2 Ton/CY (TON)	PG 58H-34 ASPHALT CEMENT @ 6.0% of HBP (TON)	TACK COAT @ 0.05 GAL/SY (GAL)
WB Right Turn Lane - W Jct ND 200					1,113	124	124	7	56
W Jct ND 200 Intersection					943	105	105	6	47
US 52 N of W Jct ND 200 Intersection					2,134	237	237	14	107
West Jct ND 200 Intersection					240	27	27	2	12
ND 30 Intersection					1,620	180	180	11	81
Hughes Ave Intersection					860	96	96	6	43
19th Ave Intersection					980	109	109	7	49
11th Ave Intersection					820	91	91	5	41
Carrington Roundabout tie-ins					40	4	4	0	2
Section Lines Approaches and Private Drives						2,610	2,610	157	0
Section 20, Sheet 2 (Superpave and Milling Detail)						18,901	18,901	1,134	8,505
Miscellaneous Items Subtotal					**8,750**	**22,483**	**22,483**	**1,349**	**8,943**
Grand Total					**599,036**	**88,071**	**88,071**	**5,284**	**38,457**

REGISTERED PROFESSIONAL ENGINEER
KITSCH
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R
03/23/22

Basis of Estimate

Pavement Marking Details Summary						
Beg Sta.	End Sta.	Description	PVMT MK Painted Message (SF)	PVMT MK Painted 4IN Line (LF)	PVMT MK Painted 8 IN Line (LF)	PVMT MK Painted 24IN Line (LF)
14174+00	10500+39	W Jct ND 200 WB Right Turn Lane	48	2,313	530	50
11010+52	11025+55	ND 30 WB Right Turn Lane	48	2,420	530	50
11046+02	11061+09	Hughes Ave S WB Right Turn Lane	48	1,935	542	50
11695+65	11702+79	19th Ave N EB Left and Right Turn Lanes	80	2,256	500	40
11703+95	11711+09	19th Ave N WB Left and Right Turn Lanes	80	2,256	500	40
11715+39	11719+57	Rail Road Crossing	265	-	-	-
11726+23	11729+67	11th Ave NE EB Turn Lane	32	-	200	34
Total:			601	11,180	2,802	264

HMA CORED SAMPLES							
	A	B	C	D			
SPECIFICATION SECTION	DISTANCE (FT) / 2,000	LANES	LIFTS	SUBLOTS (AxBxC)	QUANTITY (Dx2)	QUANTITY (1 PER MILE)	UNIT
430.04 I.2.b(1), "General", Top 2"	75	2	1	149	298	N/A	EA
430.04 I.2.b(1), "General", Bottom 2"	64	1	1	64	128	N/A	EA
SP 968(14) Longitudinal Joint Density in HMA Pavements (Centerline)	75	1	1	75	149	N/A	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"							
					N/A	24	EA
				TOTAL	**575**	**24**	**EA**

RUMBLE STRIPS				
ITEM	BEGIN STATION	END STATION	ROAD MILES	TOTAL MILES
RUMBLE STRIPS - ASPHALT SHOULDER	10489+28	11738+88	24.477	24.477
RUMBLE STRIPS - ASPHALT CENTERLINE	10489+28	11738+88	24.477	40.124
*Adjusted 8.83 Miles from passing lane exception area see Section 20, Sheet 3				

Permanent Stripe

Edge Line (4-IN White)

Chain	Beg Sta.	End Sta.	Length
ND 30	4661+63	4665+09	346
US 52	10485+57	11751+92	126,635
ND 200	14178+50	14180+85	235
Total: (x2)			127,216

EB Barrier Stripe (4-IN Yellow)

Beg Sta.	End Sta.	Length
11385+02	11390+02	500
11404+02	11413+02	900
11711+09	11751+92	4,083
Total:		5,483

WB Barrier Stripe (4-IN Yellow)

Beg Sta.	End Sta.	Length
11396+02	11413+02	1,700
11711+09	11751+92	4,083
Total:		5,783

Center Skip (4-IN Yellow)

Beg Sta.	End Sta.	Description	Length
10497+41	11010+52	CL	12,828
11025+55	11046+02	CL	512
11061+09	11385+02	CL	8,098
11385+02	11390+02	WB	125
11390+02	11396+02	CL	150
11396+02	11404+02	EB	200
11413+02	11695+65	CL	7,066
Total:			28,979

Temporary Stripe

EB Barrier Stripe (4-IN Yellow)

Beg Sta.	End Sta.	Length
11385+02	11390+02	500
11404+02	11413+02	900
11711+09	11751+92	4,083
Total:		16,449

WB Barrier Stripe (4-IN Yellow)

Beg Sta.	End Sta.	Length
11396+02	11413+02	1,700
11711+09	11751+92	4,083
Total:		17,349

Center Skip (4-IN Yellow)

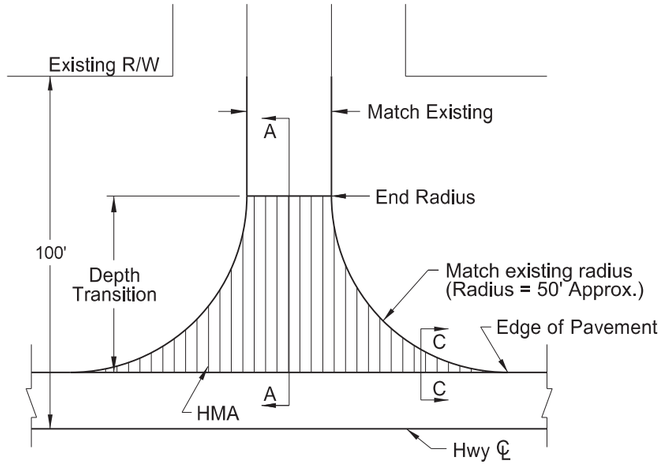
Beg Sta.	End Sta.	Description	Length
10497+41	11010+52	CL	12,828
11025+55	11046+02	CL	512
11061+09	11385+02	CL	8,098
11385+02	11390+02	WB	125
11390+02	11396+02	CL	150
11396+02	11404+02	EB	200
11413+02	11695+65	CL	7,066
Total:			86,936

Quantities figured for 3 applications.

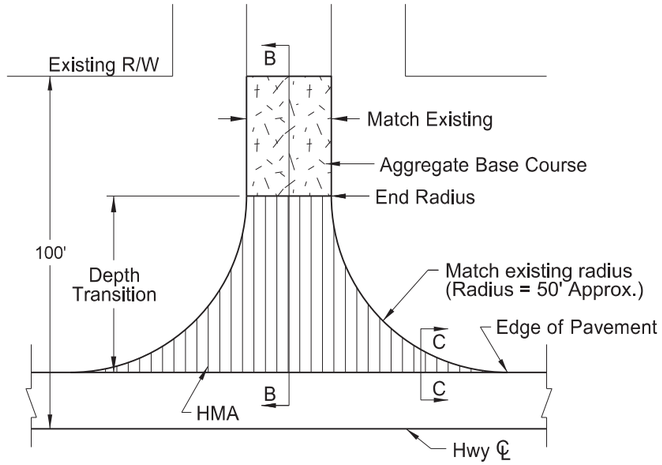
REGISTERED PROFESSIONAL ENGINEER
Ethan R. Kitsch
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R.
03/23/22

Basis of Estimate

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)185	20	1



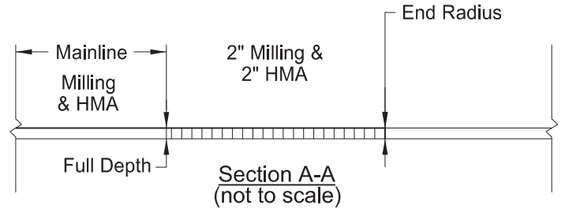
(1) Paved Section Line, County Road, or City Street Approach



(2) Gravel Section Line, County Road, or Street Approach

Notes:

1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
3. Aggregate base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



Section A-A
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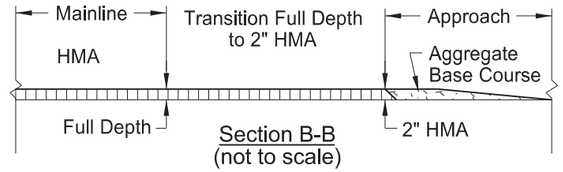

Section B-B
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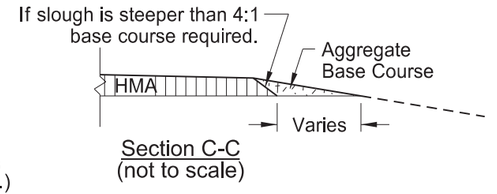
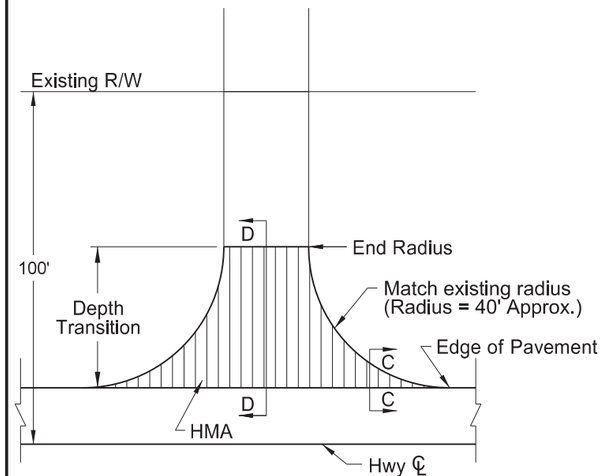
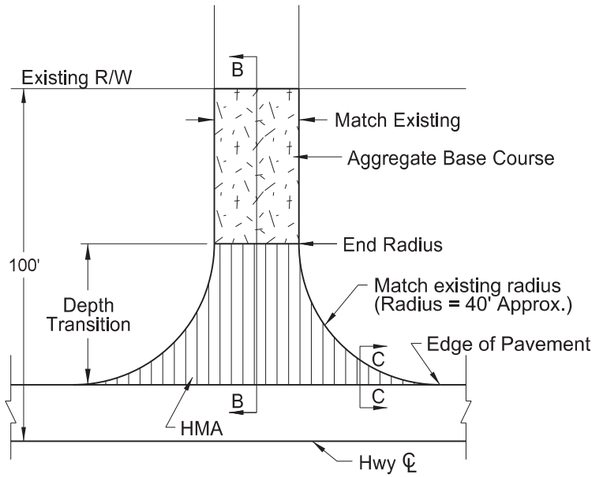


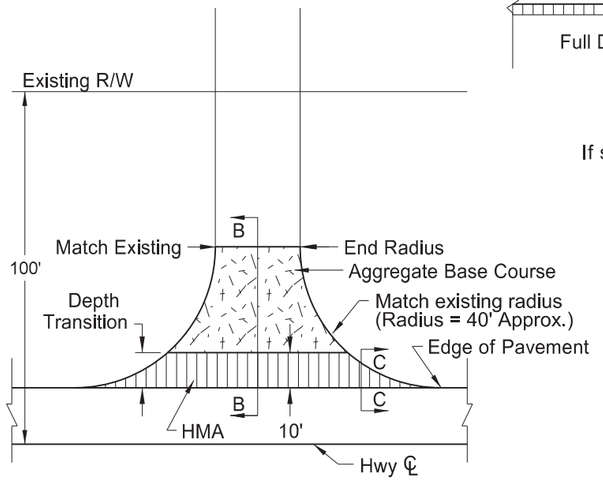
Section C-C
(not to scale)



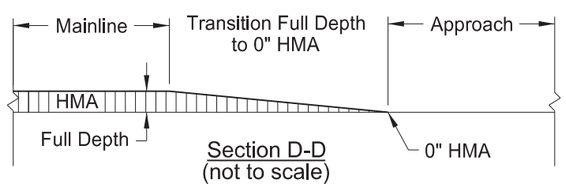
(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



(5) Field Drive Approach



Section D-D
(not to scale)

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Private Drive	Field Drive	TOTALS
Number of Locations	#	11	35	9	0	94	
Salvaged Bituminous Pavement	TON	N/A	8	N/A	N/A	9	1126
Milling Pavement Surface (2")	TON	40	30	20	20	10	2610
Tack Coat	GAL	24	9.15	9.15	3.62	2.19	1575
Superpave FAA 45	TON	40	30	20	20	10	2610
PG 58H-34 Asphalt Cement	TON	2.4	1.8	1.2	1.2	0.6	157

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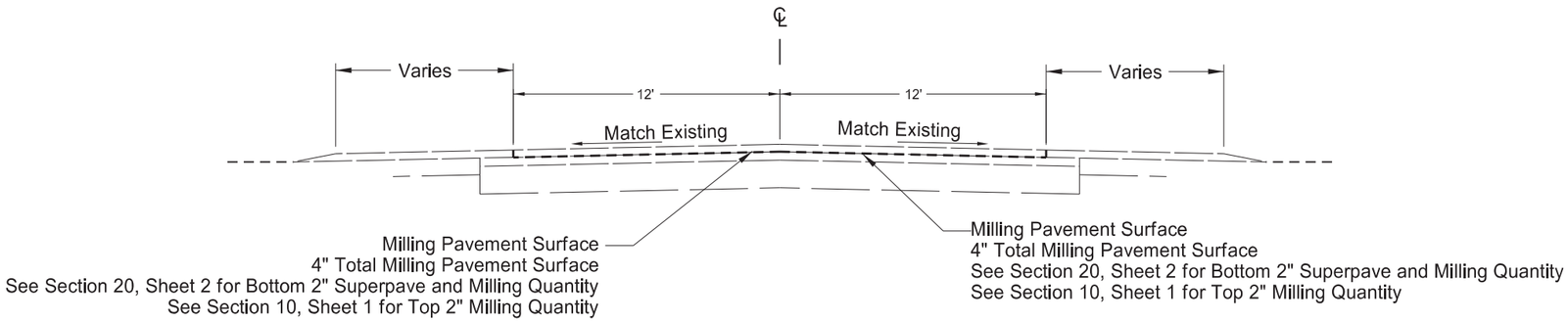
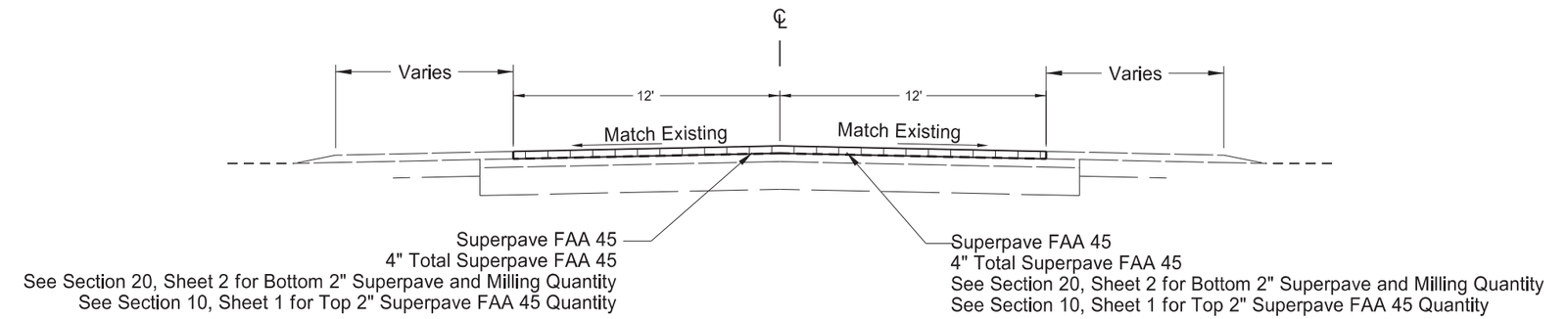
Approach Paving Details for Existing Approaches

(No Approach Grading)

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	20	2





BOTTOM 2" SUPERPAVE & MILLING TABLE

LOCATION	BEGIN STATION	END STATION	LENGTH (FT)	WIDTH, LANE (FT)	AREA (SY)	MILLING PAVEMENT SURFACE (TON)	SUPERPAVE FAA 45 @ 2 TON/CY (TON)	PG 58H-34 ASPHALT CEMENT @ 6.0% of HBP (TON)	TACK COAT @ 0.05 GAL/SY (GAL)
Mainline	10739+55	10757+23	1,768	12 WB	2,357	262	262	16	118
Mainline	10879+93	11153+60	27,367	12 WB	36,489	4,054	4,054	243	1824
Mainline	11287+87	11598+12	31,025	12 WB	41,367	4,596	4,596	276	2068
Mainline	10536+37	11210+57	67,420	12 EB	89,893	9,988	9,988	599	4495
		Total	**127,580**		**170,107**	**18,901**	**18,901**	**1,134**	**8,505**

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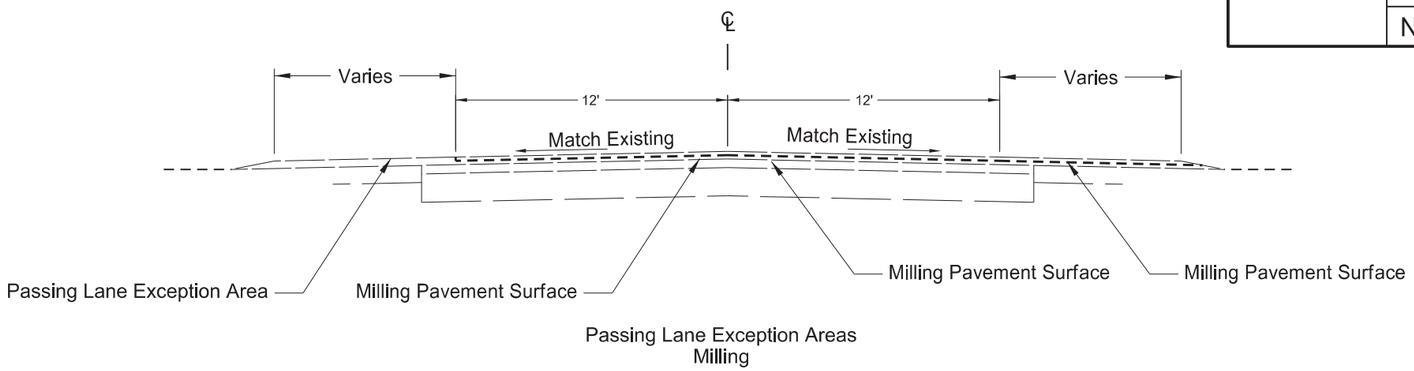
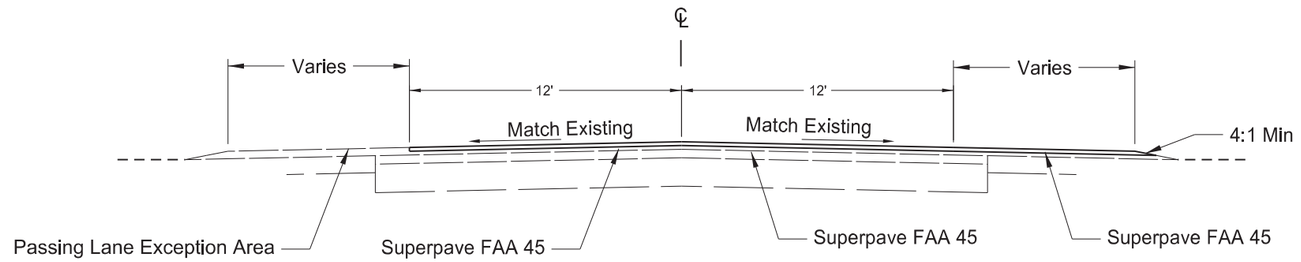
4" Superpave and Milling Detail

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	20	3



Passing Lane Exception Areas
Milling



Passing Lane Exception Areas
Paving

ITEM	BEGIN STATION	END STATION	LENGTH
Mainline- US 52 Rt Shoulder Exclusion	10503+90	10622+85	11,895
Mainlin - US 52 LT Shoulder Exclusion	10814+41	10932+05	11,764
Mainlin - US 52 RT Shoulder Exclusion	11079+15	11196+85	11,770
Mainlin - US 52 LT Shoulder Exclusion	11582+15	11694+25	11,210

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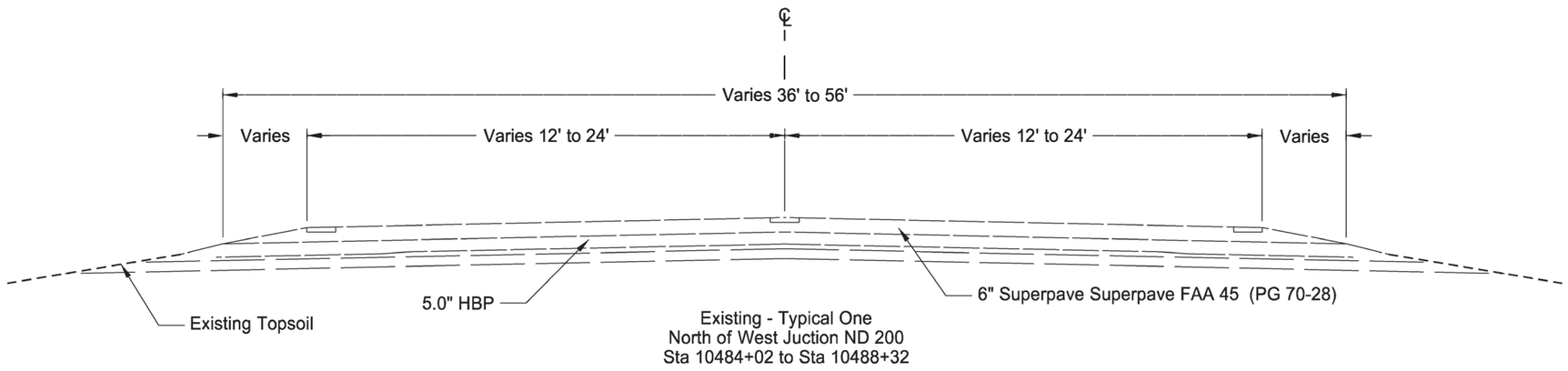
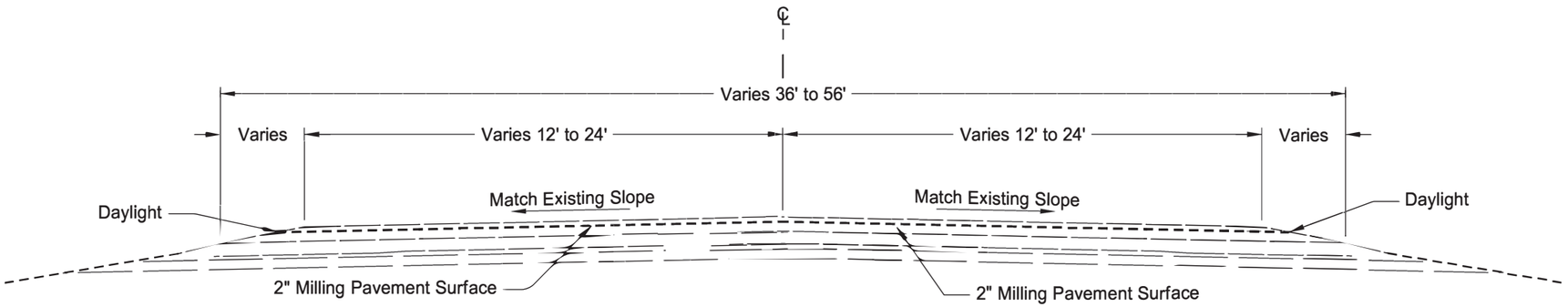
Passing Lane Exception Area Detail

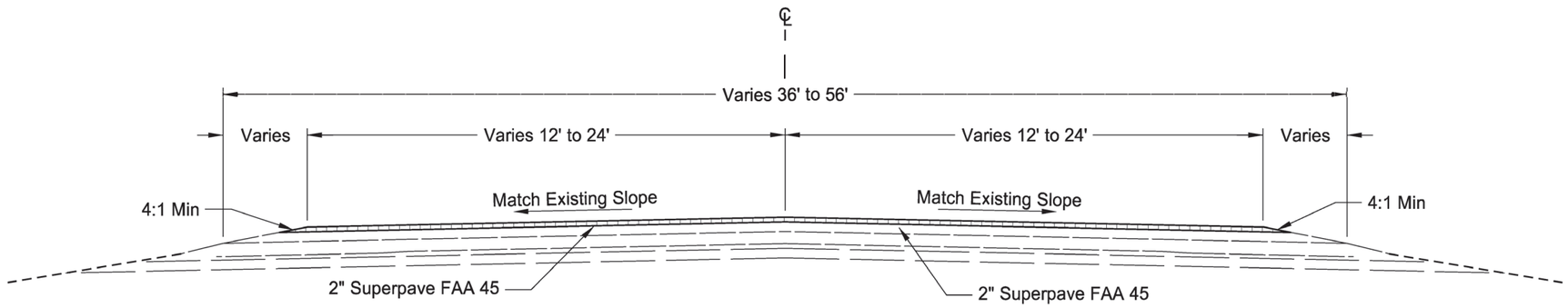
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	30	1



Existing - Typical One
North of West Juction ND 200
Sta 10484+02 to Sta 10488+32



Proposed Milling - Typical One
North of West Juction ND 200
Sta 10484+02 to Sta 10488+32



Proposed Paving - Typical One
North of West Juction ND 200
Sta 10484+02 to Sta 10488+32

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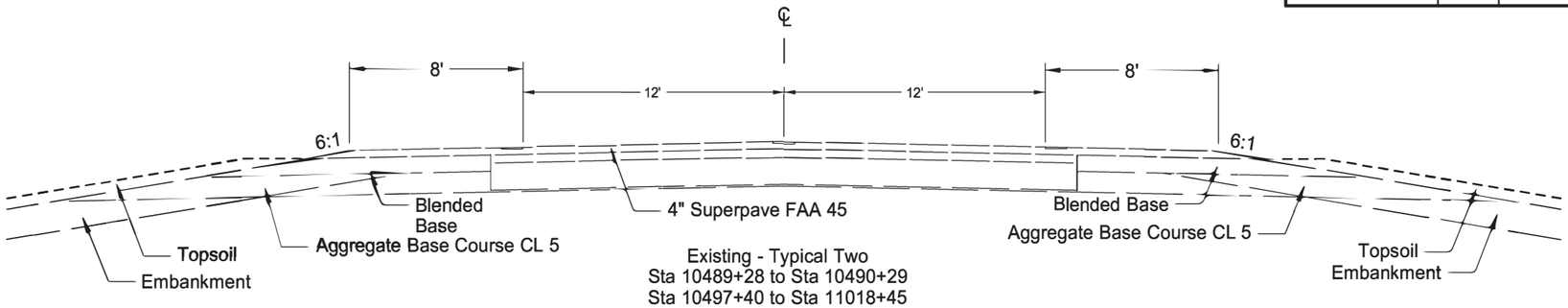
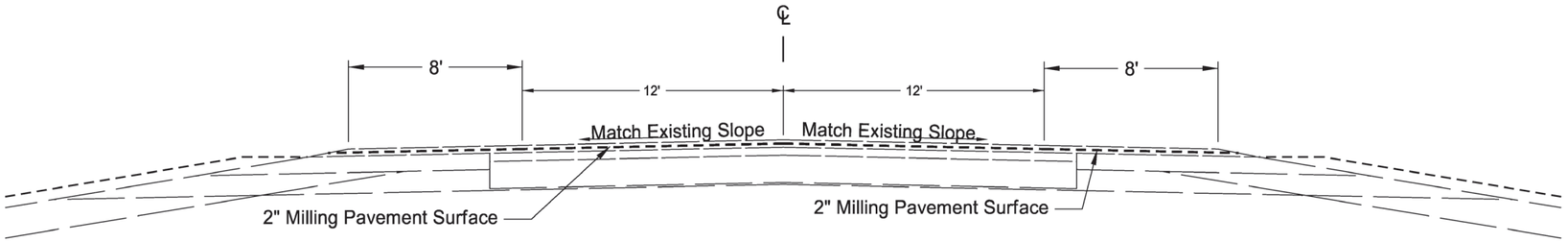
Existing & Proposed
Typical Sections

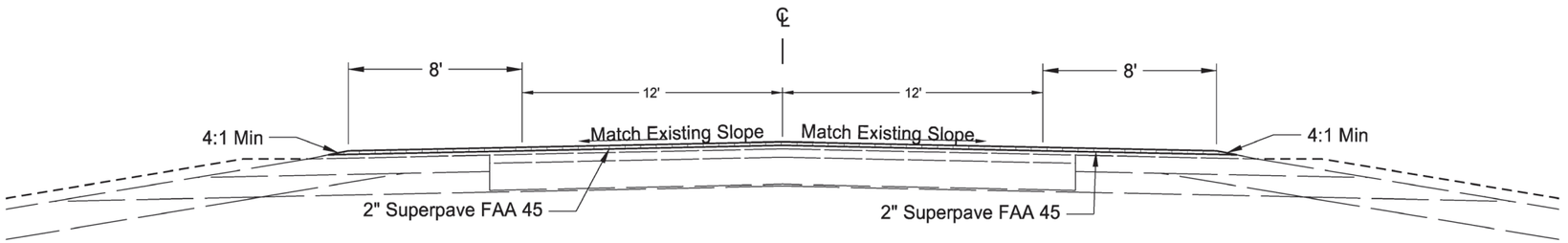
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	30	2



Existing - Typical Two
Sta 10489+28 to Sta 10490+29
Sta 10497+40 to Sta 11018+45
Sta 11025+55 to Sta 11053+95
Sta 11061+04 to Sta 11695+12
Sta 11702+29 to Sta 11704+36
Sta 11725+72 to Sta 11726+24
Sta 11729+62 to Sta 11756+58



Proposed Milling - Typical Two
Sta 10489+28 to Sta 10490+29
Sta 10497+40 to Sta 11018+45
Sta 11025+55 to Sta 11053+95
Sta 11061+04 to Sta 11695+12
Sta 11702+29 to Sta 11704+36
Sta 11725+72 to Sta 11726+24
Sta 11729+62 to Sta 11756+58



Proposed Paving - Typical Two
Sta 10489+28 to Sta 10490+29
Sta 10497+40 to Sta 11018+45
Sta 11025+55 to Sta 11053+95
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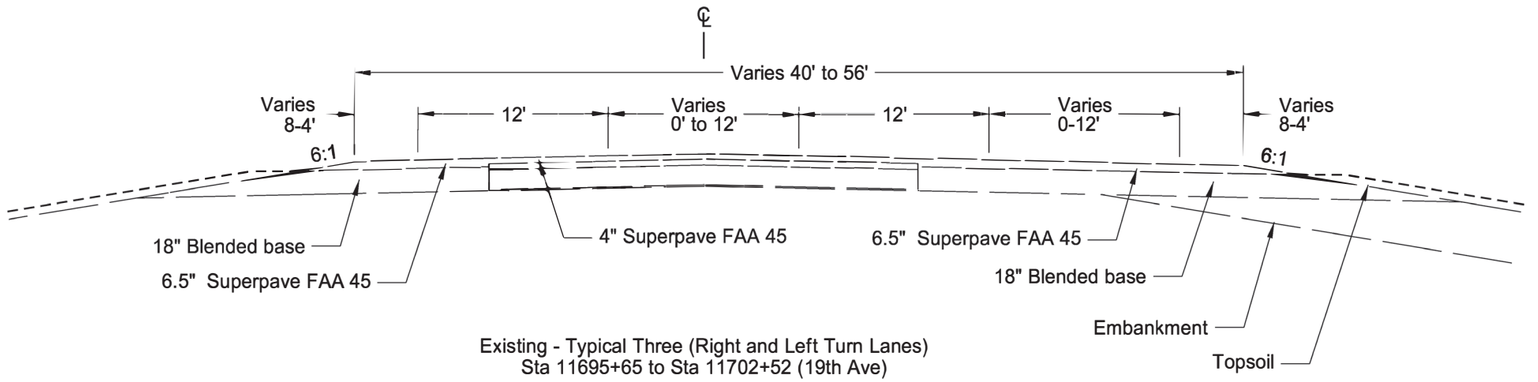
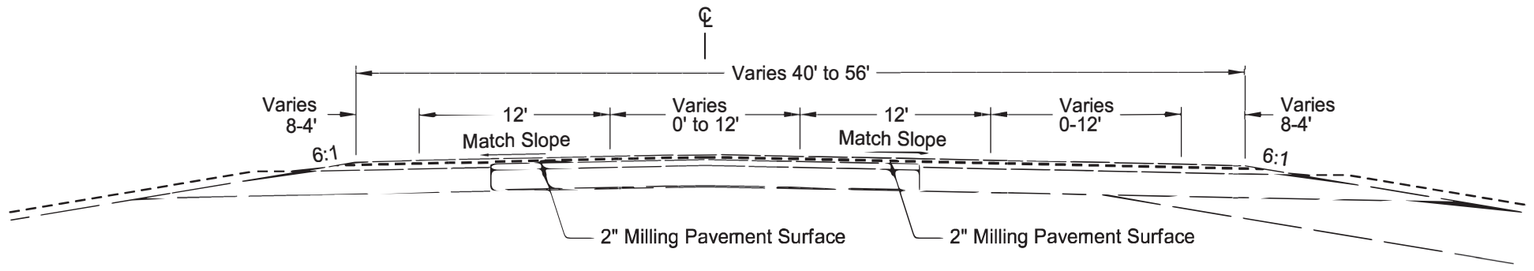
Typical Sections

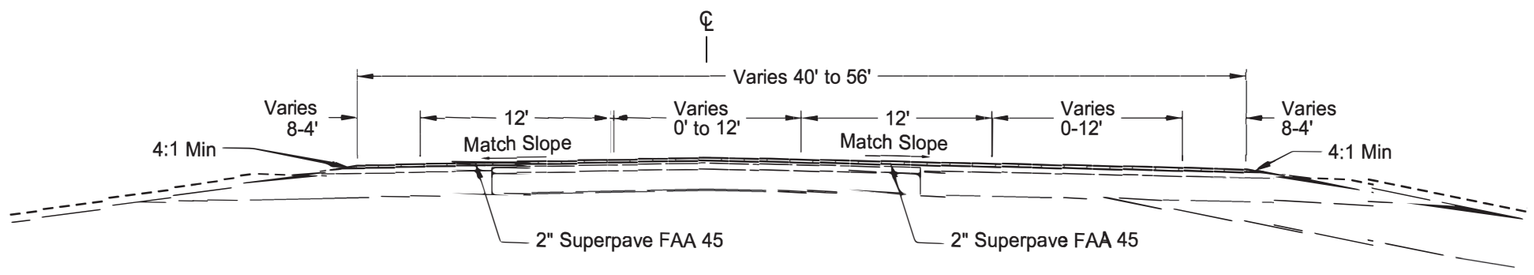
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	30	3



Existing - Typical Three (Right and Left Turn Lanes)
Sta 11695+65 to Sta 11702+52 (19th Ave)



Proposed Milling - Typical Three (Right and Left Turn Lanes)
Sta 11695+65 to Sta 11702+52 (19th Ave)



Proposed Paving - Typical Three (Right and Left Turn Lanes)
Sta 11695+65 to Sta 11702+52 (19th Ave)

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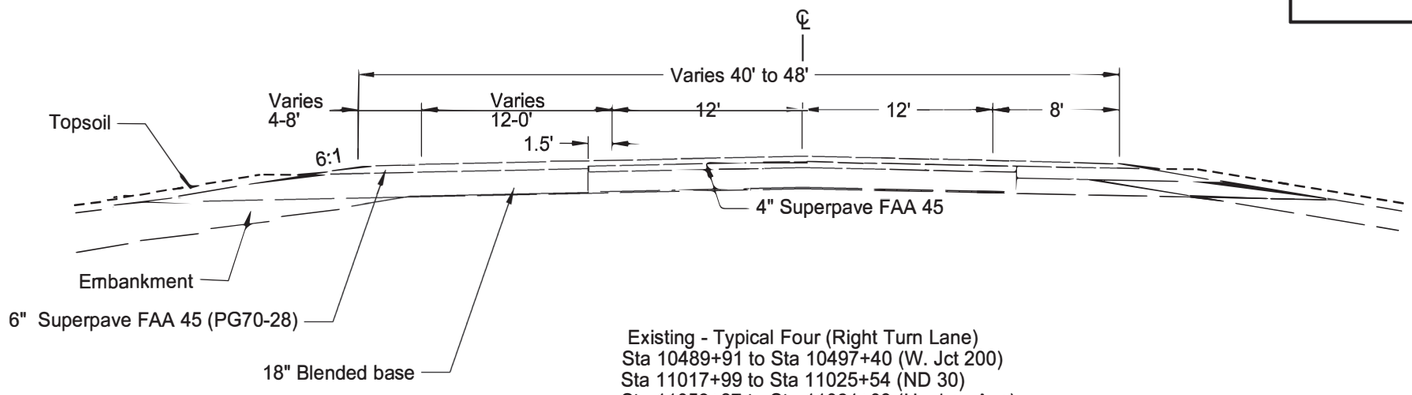
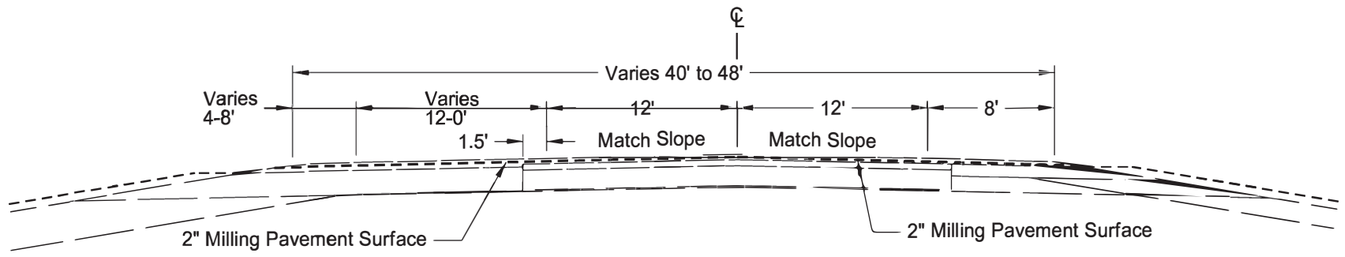
Existing & Proposed
Typical Sections

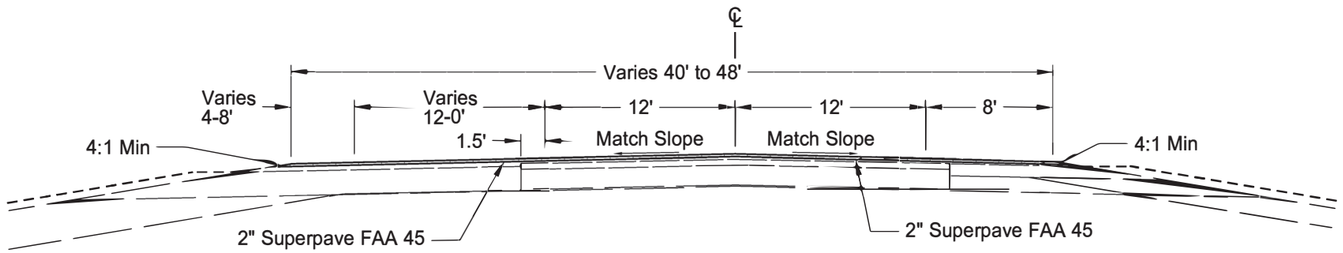
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	30	4



Existing - Typical Four (Right Turn Lane)
Sta 10489+91 to Sta 10497+40 (W. Jct 200)
Sta 11017+99 to Sta 11025+54 (ND 30)
Sta 11053+87 to Sta 11061+09 (Hughes Ave)



Proposed Milling - Typical Four (Right Turn Lane)
Sta 10489+91 to Sta 10497+40 (W. Jct 200)
Sta 11017+99 to Sta 11025+54 (ND 30)
Sta 11053+87 to Sta 11061+09 (Hughes Ave)



Proposed Paving - Typical Four (Right Turn Lane)
Sta 10489+91 to Sta 10497+40 (W. Jct 200)
Sta 11017+99 to Sta 11025+54 (ND 30)
Sta 11053+87 to Sta 11061+09 (Hughes Ave)

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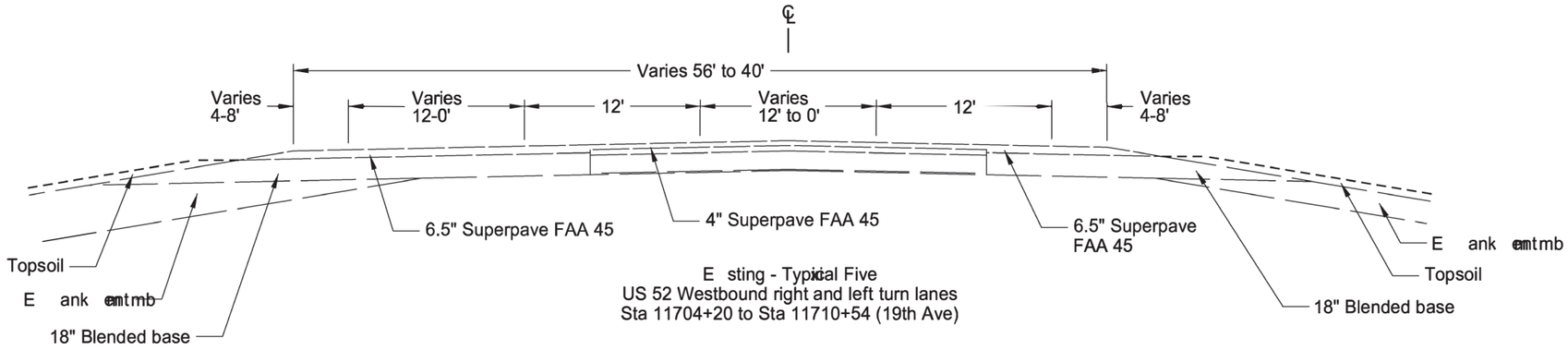
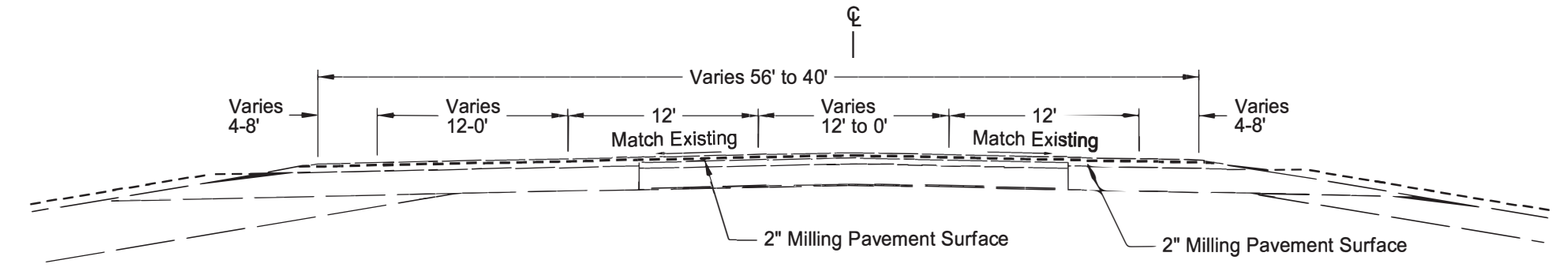
Existing & Proposed
Typical Sections

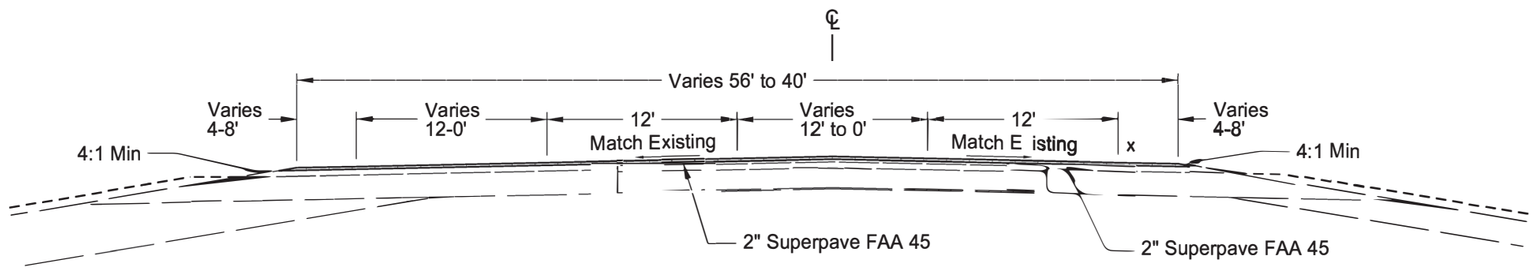
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	30	5



E sting - Typical Five
US 52 Westbound right and left turn lanes
Sta 11704+20 to Sta 11710+54 (19th Ave)



Proposed Milling - Typical Five
US 52 Westbound right and left turn lanes
Sta 11704+20 to Sta 11710+54 (19th Ave)



Proposed Paving - Typical Five
US 52 Westbound right and left turn lanes
Sta 11704+20 to Sta 11710+54 (19th Ave)

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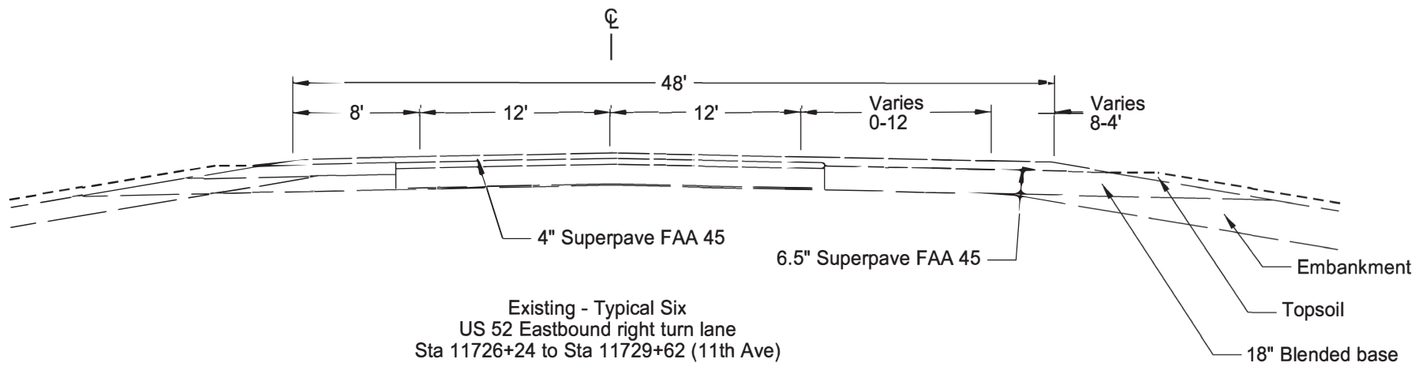
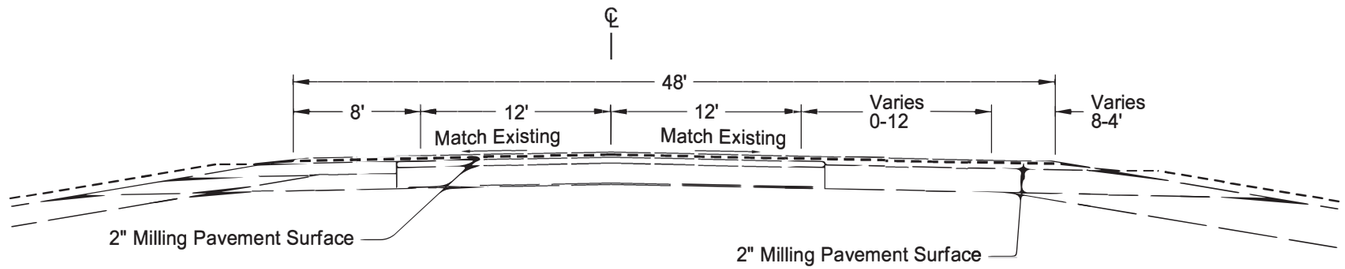
E sting & Proposed
Typical Sections

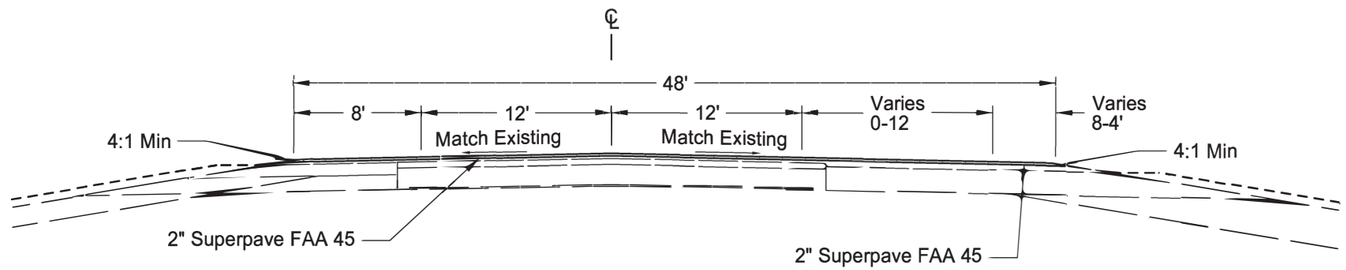
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	30	6



Existing - Typical Six
US 52 Eastbound right turn lane
Sta 11726+24 to Sta 11729+62 (11th Ave)



Proposed Milling - Typical Six
US 52 Eastbound right turn lane
Sta 11726+24 to Sta 11729+62 (11th Ave)



Proposed Paving - Typical Six
US 52 Eastbound right turn lane
Sta 11726+24 to Sta 11729+62 (11th Ave)

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Existing & Proposed
Typical Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**28**	**56**
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**3**	**26**	**78**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**	**18**	**18**
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**3**	**70**	**210**
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**6**	**43**	**258**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**3**	**36**	**108**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**3**	**59**	**177**
I2-5-96	**96"x48"**	**YOUR HIGHWAY DOLLARS AT WORK**	**3**	**59**	**177**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**6**	**30**	**180**
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**6**	**10**	**60**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**2**	**35**	**70**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	**48"x48"**	**NO CENTER LINE**	**2**	**35**	**70**
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	**48"x48"**	**TRUCKS ENTERING HIGHWAY**	**2**	**35**	**70**
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	48"x48"	ROAD WORK AHEAD or _FT or _ MILE		35	
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1892**

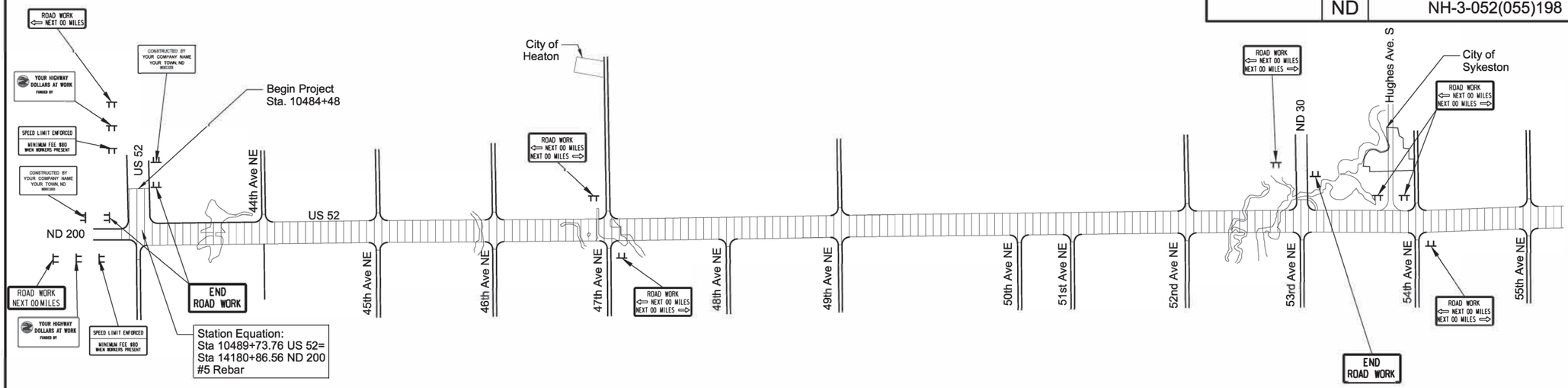
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**617**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**250**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	
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**	**120734**

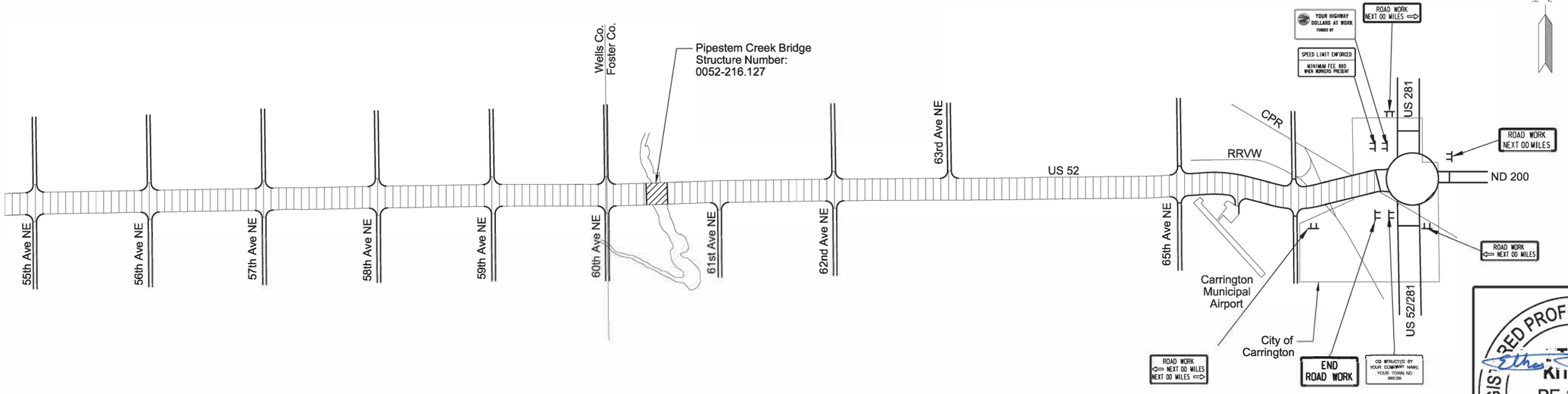
NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

REGISTERED PROFESSIONAL ENGINEER
KITSCH
PE-28791
DATE
Kitsch, Ethan R.
03/23/22
NORTH DAKOTA

Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	100	2

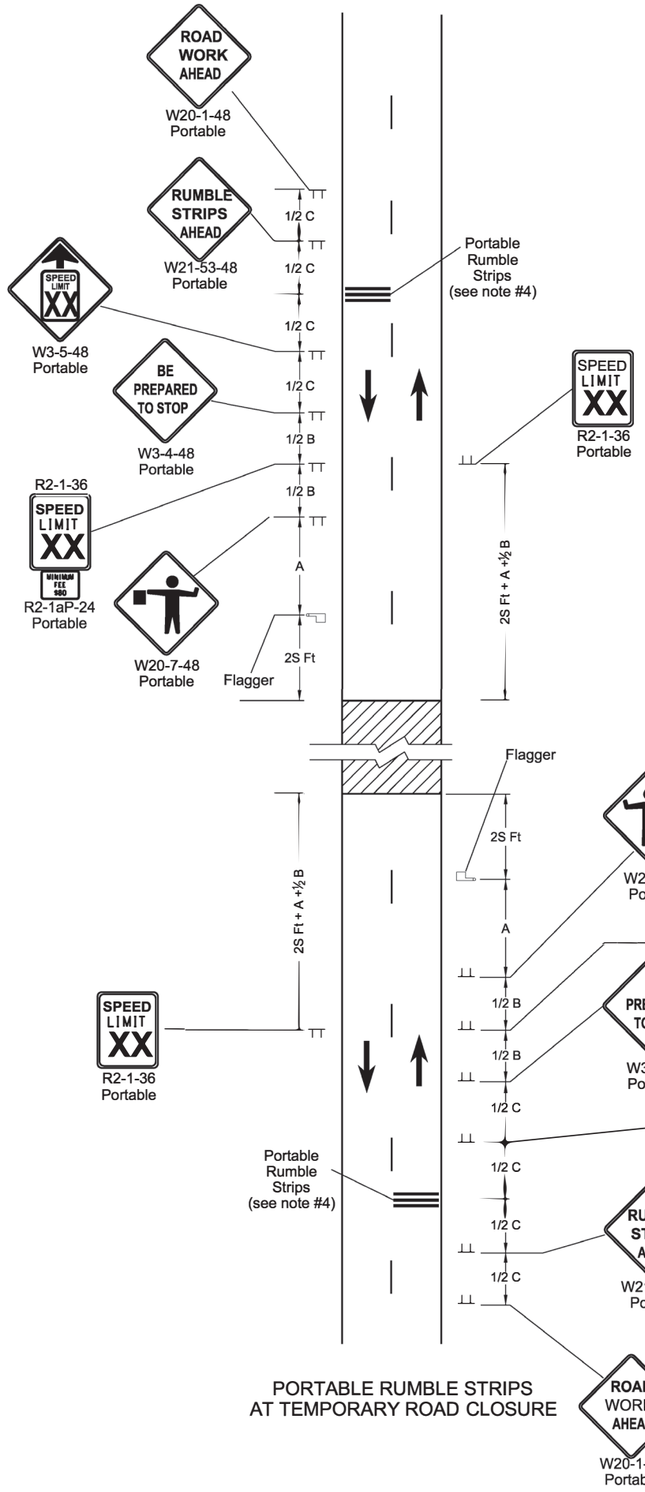




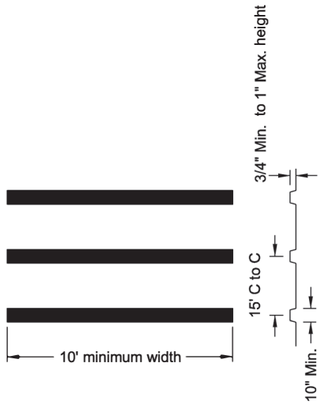
REGISTERED PROFESSIONAL ENGINEER
Ethan R. Kitsch
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R
03/23/22

Work Zone Traffic Control

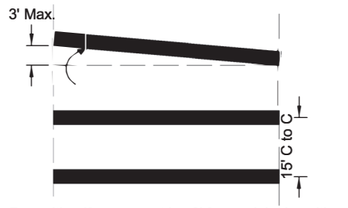
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	100	3



PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE

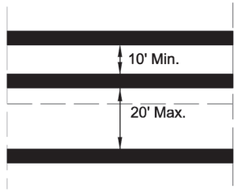


PORTABLE RUMBLE STRIPS ARRAY DETAIL



Reposition if movement is >3' from original position.
Skewing

Reposition if movement is >2' from original position.
Lateral



Reposition if distance between strips is <10' or >20'.
Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:
1. Number of devices were calculated using 40 mph. Speed determined in the field based on location and conditions.
2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
3. Sign R2-1aP-24 is not required when pilot car operation is used.
4. Rumble strips are not used on a non paved surface or in a pre-construction speed zone of 25 mph 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

KEY
- Work area
- Flagger
- Sign

S = Numerical value of speed limit or 85th percentile

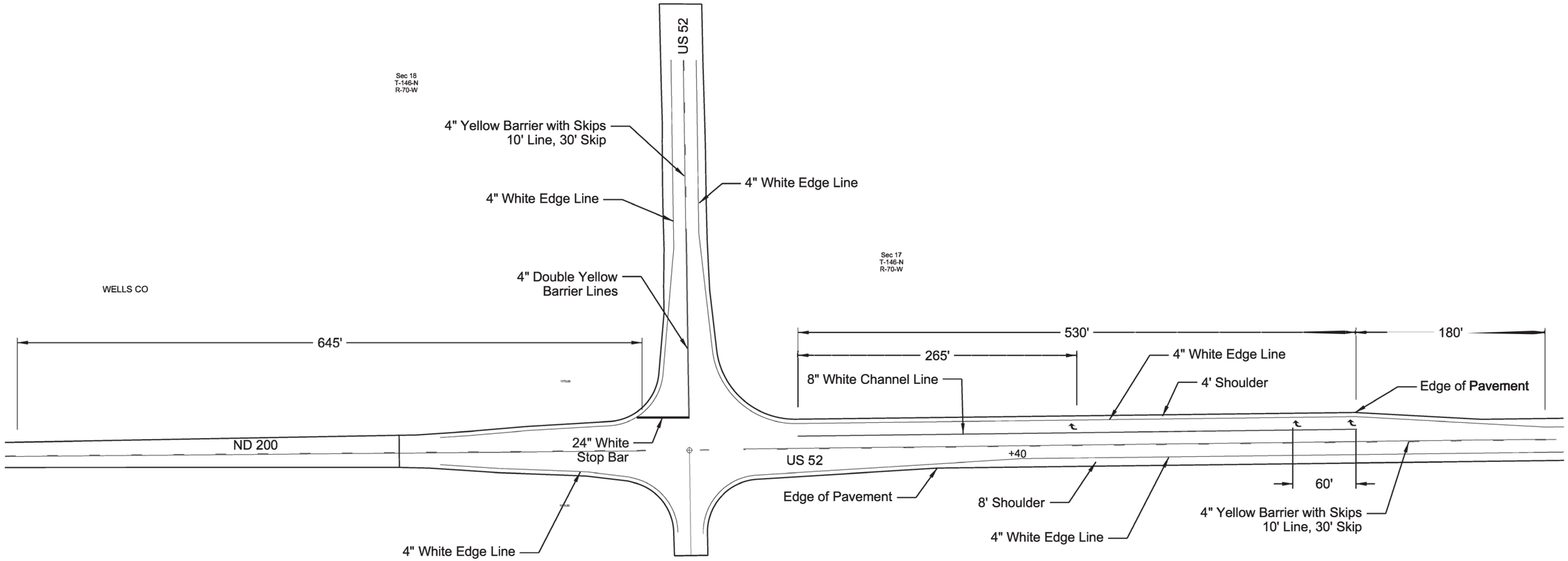
REGISTERED PROFESSIONAL ENGINEER
Ethan R. Kitsch
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R.
03/23/22

TWO-LANE PORTABLE RUMBLE STRIPS

Mill and Overlay

US 52-W Jct ND 200 to E Jct ND 200

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	120	1

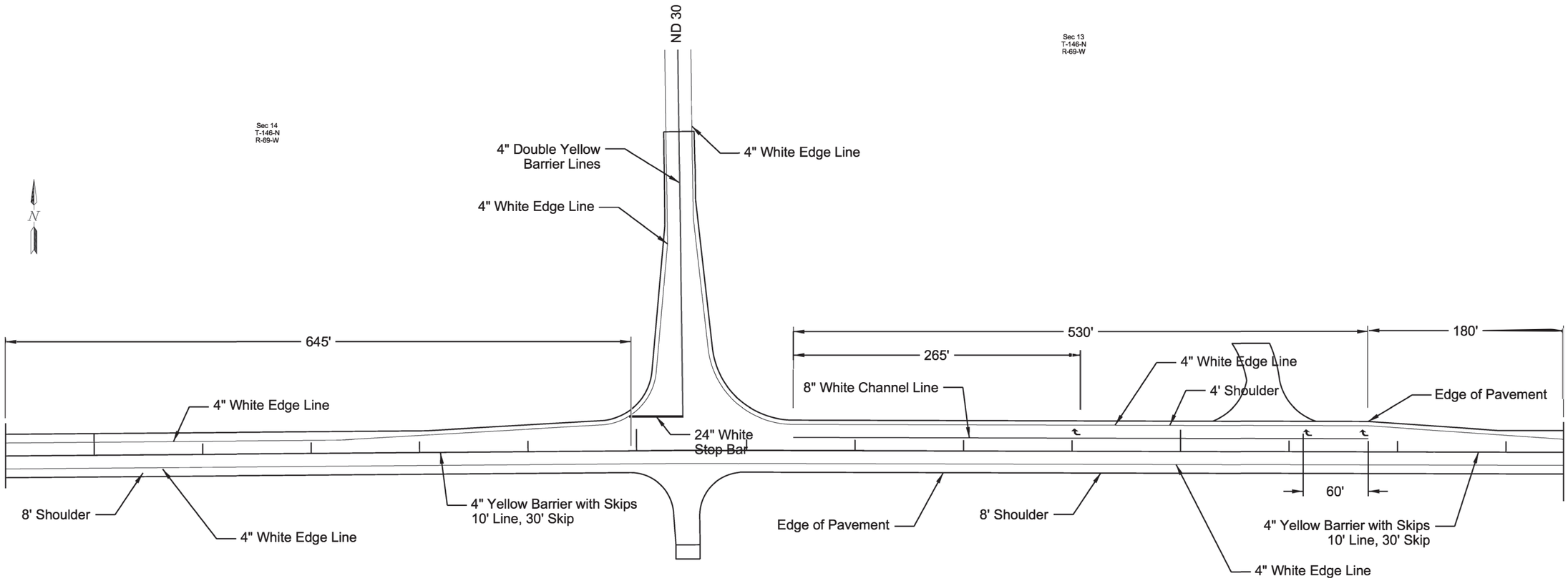


REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA
PE-28791
DATE
Kitsch, Ethan R
03/23/22

US 52
Pavement Marking Detail
W Jct ND 200 E

3/23/2022 10:21:14 AM dlegacie F:\DVLSLAKE\CONST\DISTRICT DESIGNS\Projects 2021-2022\NH-3-052(055)198, Mill and Overlay\Design\120MK_001_WJct200.dgn

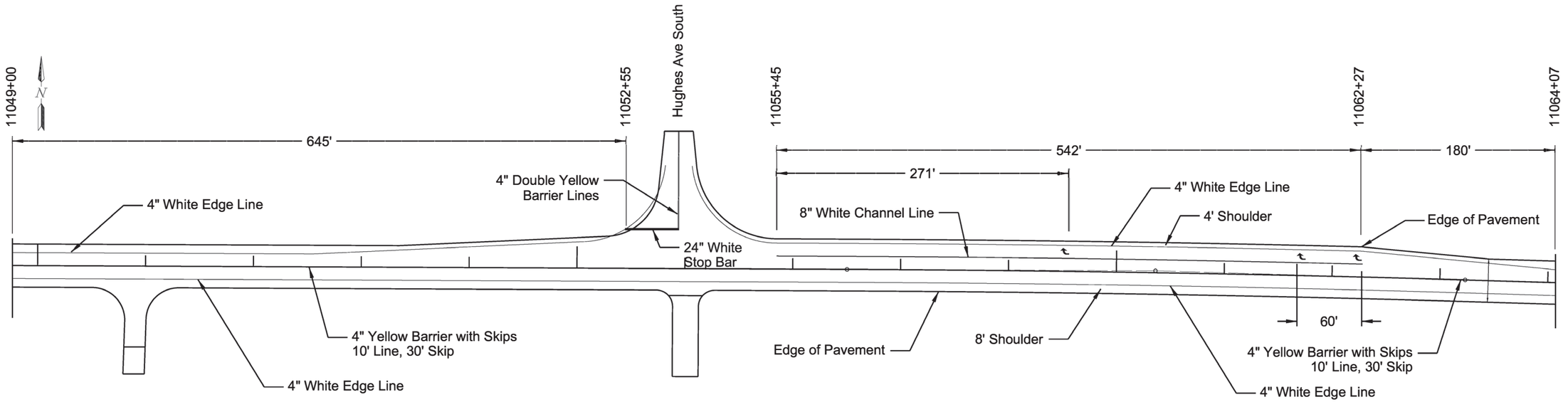
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	120	2



REGISTERED PROFESSIONAL ENGINEER
Ethan R. Kitsch
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R.
03/23/22

US 52
Pavement Marking Detail
ND 30

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	120	3



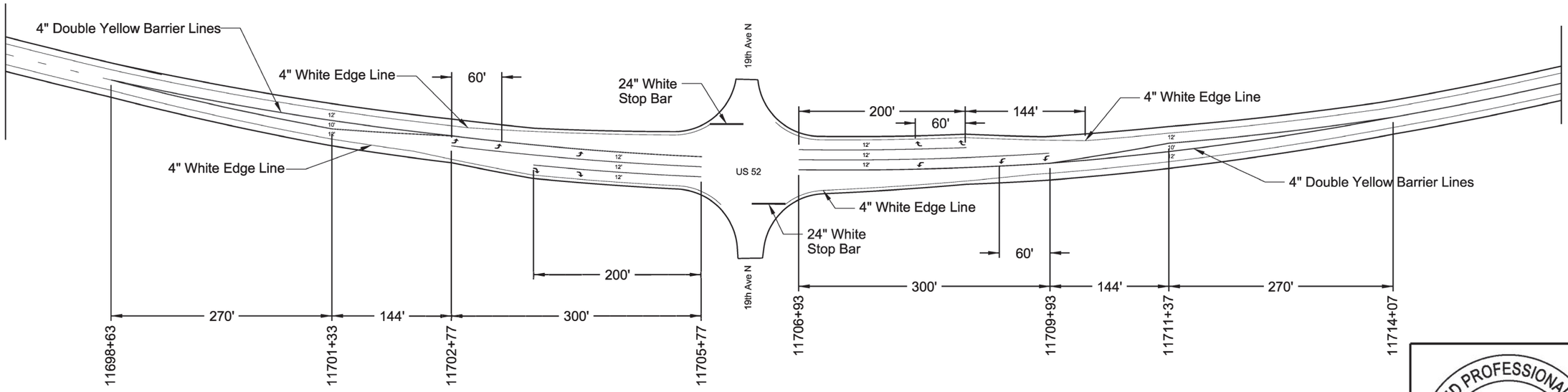
REGISTERED PROFESSIONAL ENGINEER
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R.
03/23/22

US 52
Pavement Marking Detail
Hughes Ave S

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	120	4

N

Sec 24
T-146-N
R-67-W



REGISTERED PROFESSIONAL ENGINEER
PE-28791
DATE
NORTH DAKOTA
Kitsch, Ethan R.
03/23/22

US 52
Pavement Markings Detail
19th Ave N

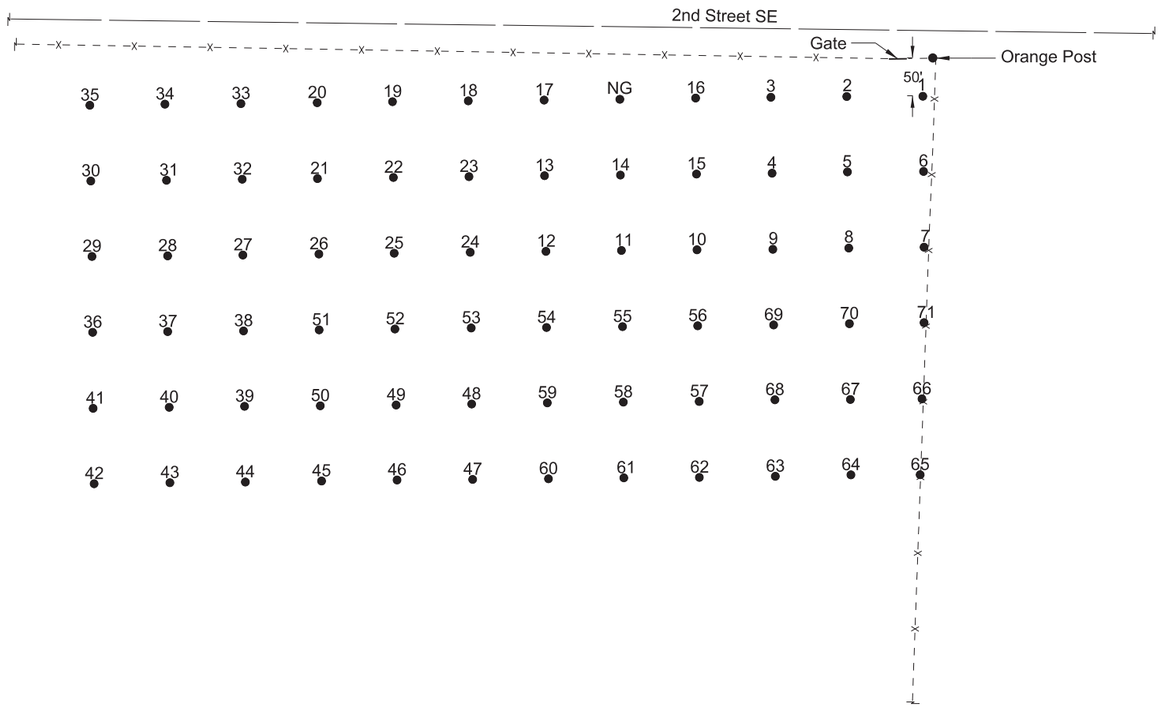
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	180	1

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

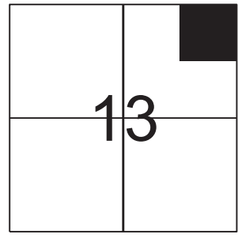
TEST HOLE PLAT

Location: NE1/4NE1/4 13-145-74 County: Sheridan

Ownership: Betty Mertz, John Mertz and Terry Mertz



LOCATION OF PIT IN SECTION



Area "A" consists of Test Holes 1 - 9
Area "B" consists of Test Holes 10 - 17
Area "C" consists of Test Holes 18 - 26
Area "D" consists of Test Holes 27 - 35
Area "E" consists of Test Holes 36 - 44
Area "F" consists of Test Holes 45 - 53
Area "G" consists of Test Holes 54 - 62
Area "H" consists of Test Holes 63 - 71

Legend:
gr = gravel
sd = sand
FS = fine sand
Fgr = fine gravel
CS = coarse sand
sh = shale
SiCl = silt clay
rk = rock
FeO = Iron oxide
CoS = Coal Slack
WL = water line
NG = no gravel
DM = disturbed material
CGr = course gravel

Scale 1"=200'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	180	2

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	2.0	2.0 gr SiCl	0	8	19	30	SiCl
		1.0 sd SiCl					
2	1.0	11.0 Fgr	2	9	20	31	+gr
		1.0 FgrSiCl					
		1.0 Fgr					
		2.0 FgrSiCl					
		1.0 gr SiCl					
		2.0 gr					
		1.0 gr SiCl					
3	0.5	10.5 Fgr	0	3	8	14	+gr
		2.0 gr SiCl					
		7.0 gr					
4	1.0	5.0 FgrSiCl	0	0	6	11	+gr
		1.0 Fgr					
		1.0 FgrSiCl					
		10.0 Fgr					
		2.0 FgrSiCl					
5	1.0	3.0 gr	0	2	8	18	SiCl
		2.0 Fgr					
		3.0 gr					
		2.5 Fgr					
		1.5 FgrSiCl					
7	0.5	1.5 gr	0	0	5	11	SiCl
8	0.5	2.5 gr	0	5	13	22	+gr
		1.0 Fgr					
		1.0 gr					
		2.0 FgrSiCl					
		1.0 gr CoS					
		3.0 Fgr					
9	0.5	2.5 gr	0	13	24	34	+cave
		2.0 FS					
		2.0 Fgr					
		2.0 gr					
		1.0 gr CoS					
		1.0 gr					
		4.0 CGr					
10	0.5	2.5 gr	0	6	15	27	SiCl
		2.0 Fgr					
		1.0 gr					
		5.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
11	2.0	5.0 gr	0	10	20	30	+gr
		1.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.0 FgrSiCl					
		3.0 Fgr					
12	2.0	1.0 gr	0	3	15	28	+gr
		10.0 Fgr					
		1.0 gr					
		1.0 FgrSiCl					
		5.0 Fgr					
13	0.5	5.5 Fgr	1	6	14	24	SiCl
		9.0 gr					
		3.0 Fgr					
14	2.0	3.0 Fgr	0	8	22	36	SiCl
		2.0 gr					
15	1.0	3.0 Fgr	0	1	4	7	SiCl
		3.0 sd sh					
		2.0 gr					
16	0.5	9.5 Fgr	0	4	11	19	SiCl
		2.0 gr					
17	1.0	3.0 Fgr	2	23	36	48	rk
		5.0 gr					
18	1.0	11.0 Fgr	0	3	8	17	SiCl
		1.0 gr					
19	1.5	11.5 Fgr	0	5	9	17	SiCl
20	0.5	19.5 Fgr	0	1	7	15	+gr
21	2.0	2.0 gr	0	10	19	27	+gr
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		5.0 Fgr					
		1.0 sd sh					
		1.0 Fgr					
		1.0 sd					
22	1.5	12.5 Fgr	0	3	9	18	SiCl
23	2.0	8.5 Fgr	0	2	8	15	SiCl
		0.5 sd					
		2.5 Fgr					
24	1.0	6.0 gr	3	11	22	34	+gr
		1.0 Fgr					
		6.0 gr					
		2.0 CGr					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
25	0.5	5.5 Fgr	2	12	23	34	+gr
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		3.0 Fgr					
		3.0 gr					
		3.0 Fgr					
26	0.5	7.5 gr	0	11	19	30	+gr
		2.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					
		5.0 Fgr					
27	0.5	6.5 gr	4	17	29	40	+gr
		5.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.5 Fgr sh					
		3.5 CGr					
28	0.5	4.5 Fgr	4	14	25	34	rk
		1.0 gr					
		6.0 Fgr					
30	2.0	9.0 Fgr	0	3	10	18	SiCl
		1.0 sd sh					
31	2.0	14.0 Fgr	0	2	9	17	SiCl
32	2.0	11.0 Fgr	0	4	12	21	SiCl
		1.0 sd					
		4.5 Fgr					
33	0.5	11.5 Fgr	0	0	3	10	SiCl
		1.0 Fgr sh					
		6.0 Fgr					
34	3.0	5.0 Fgr	0	2	6	12	+gr
		1.0 sd					
		3.0 Fgr					
		1.0 CS					
		3.0 Fgr					
		1.0 sd					
		3.0 Fgr					
35	2.0	10.0 Fgr	0	1	4	9	SiCl
36	2.0	12.0 Fgr	1	11	19	27	+gr
		1.0 FgrSiCl					
		2.0 sd sh					
		1.0 sd					
		2.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
37	1.0	5.0 gr	1	15	25	36	rk
		4.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		4.0 gr					
38	1.0	7.0 gr	0	9	19	28	SiCl
		4.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		1.5 sd sh					
39	0.5	9.5 gr	1	8	18	27	+gr
		3.0 Fgr					
		2.0 gr					
		5.0 Fgr					
40	1.5	3.5 Fgr	0	5	13	22	+gr
		2.0 gr					
		10.0 Fgr					
		3.0 sd					
41	1.5	2.5 gr	0	4	13	21	+gr
		1.0 Fgr					
		2.0 gr					
		6.0 Fgr					
		2.0 Fgr sh					
		1.0 gr					
42	0.5	2.5 Fgr	0	3	10	16	+gr
		1.0 gr					
		6.0 Fgr					
		2.0 Fgr sh					
		1.0 Fgr					
		1.0 Fgr sh					
		1.0 FS					
		1.0 Fgr sh					
		0.5 Fgr					
		1.5 Fgr sh					
		2.0 sd					
43	1.0	4.0 Fgr	2	6	14	23	+gr
		3.0 gr					
		12.0 Fgr					

RANGE 74 **TWP** 145 **SEC** NE 1/4 13

COUNTY Sheridan May-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jun-17

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	180	3

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
44	1.0	6.0 gr	0	8	19	29	+gr
		2.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		5.0 Fgr					
45	0.5	4.5 Fgr	0	10	20	31	+gr
		1.0 gr					
		8.0 Fgr					
		1.0 gr					
		5.0 Fgr					
46	1.0	8.0 gr	1	11	22	33	+gr
		1.0 Fgr					
		5.0 gr					
		5.0 Fgr					
47	0.5	2.5 Fgr	1	16	25	36	+gr
		5.0 gr					
		1.0 Fgr					
		1.0 gr					
		7.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
48	0.5	13.5 gr	1	12	23	35	+gr
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
49	0.5	2.5 gr	1	13	23	34	+gr
		1.0 Fgr					
		2.0 gr					
		5.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		2.0 gr					
		2.0 Fgr					
50	0.5	7.5 gr	1	8	20	31	+gr
		1.0 Fgr					
		4.0 gr					
		7.0 Fgr					
51	0.5	5.5 gr	3	16	26	36	+gr
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		2.0 gr					
		5.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
52	0.5	10.5 gr	1	9	22	34	+gr
		2.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.5 gr					
		2.5 Fgr					
53	1.0	6.0 gr	2	11	25	37	+gr
		1.0 Fgr					
		5.0 gr					
		3.0 Fgr					
		4.0 gr					
54	1.0	2.0 Fgr	3	15	26	37	+gr
		4.0 gr					
		1.0 Fgr					
		9.0 gr					
		1.0 Fgr					
		2.0 gr					
55	0.5	19.5 gr	2	14	27	39	+gr
56	0.5	8.5 gr	3	14	27	39	+gr
		1.0 Fgr					
		3.0 gr					
		1.5 Fgr					
		0.5 gr					
		2.0 Fgr					
		3.0 gr					
57	0.5	19.5 gr	2	13	25	37	+gr
58	0.5	2.5 gr	2	12	25	36	+gr
		1.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		5.0 gr					
		2.5 Fgr					
		3.5 gr					
59	0.5	13.5 gr	0	14	27	39	+cave
60	0.5	5.5 gr	2	10	25	39	rk
		2.0 Fgr					
		3.0 gr					
61	2.0	18.0 gr	1	12	26	38	+gr
62	0.5	5.5 gr	2	14	26	37	+gr
		2.0 Fgr					
		3.5 gr					
		0.5 Fgr					
		3.0 gr					
		1.0 Fgr					
		4.0 gr					
63	3.0	17.0 gr	2	10	22	35	+gr

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
64	0.5	4.5 gr	2	16	26	38	+gr
		1.0 Fgr					
		8.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
65	0.5	9.5 gr	0	10	21	34	+gr
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		1.0 FgrSiCl					
		2.0 Fgr					
66	0.5	3.5 gr	0	3	12	23	+gr
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		13.0 gr					
68	1.0	13.0 gr	3	13	30	39	+gr
		1.0 Fgr					
		5.0 gr					
69	1.0	7.0 gr	3	14	28	42	+gr
		1.0 Fgr					
		11.0 gr					
70	0.5	2.5 CGr	2	11	22	33	SiCl
		5.0 gr					
		2.0 Fgr					
		2.0 FgrSiCl					
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					
71	0.5	3.5 gr	0	5	13	23	SiCl
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

RANGE 74 **TWP** 145 **SEC** NE 1/4 13

COUNTY Sheridan May-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jun-17

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(055)198	180	4

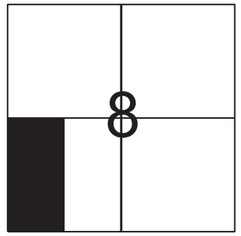
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

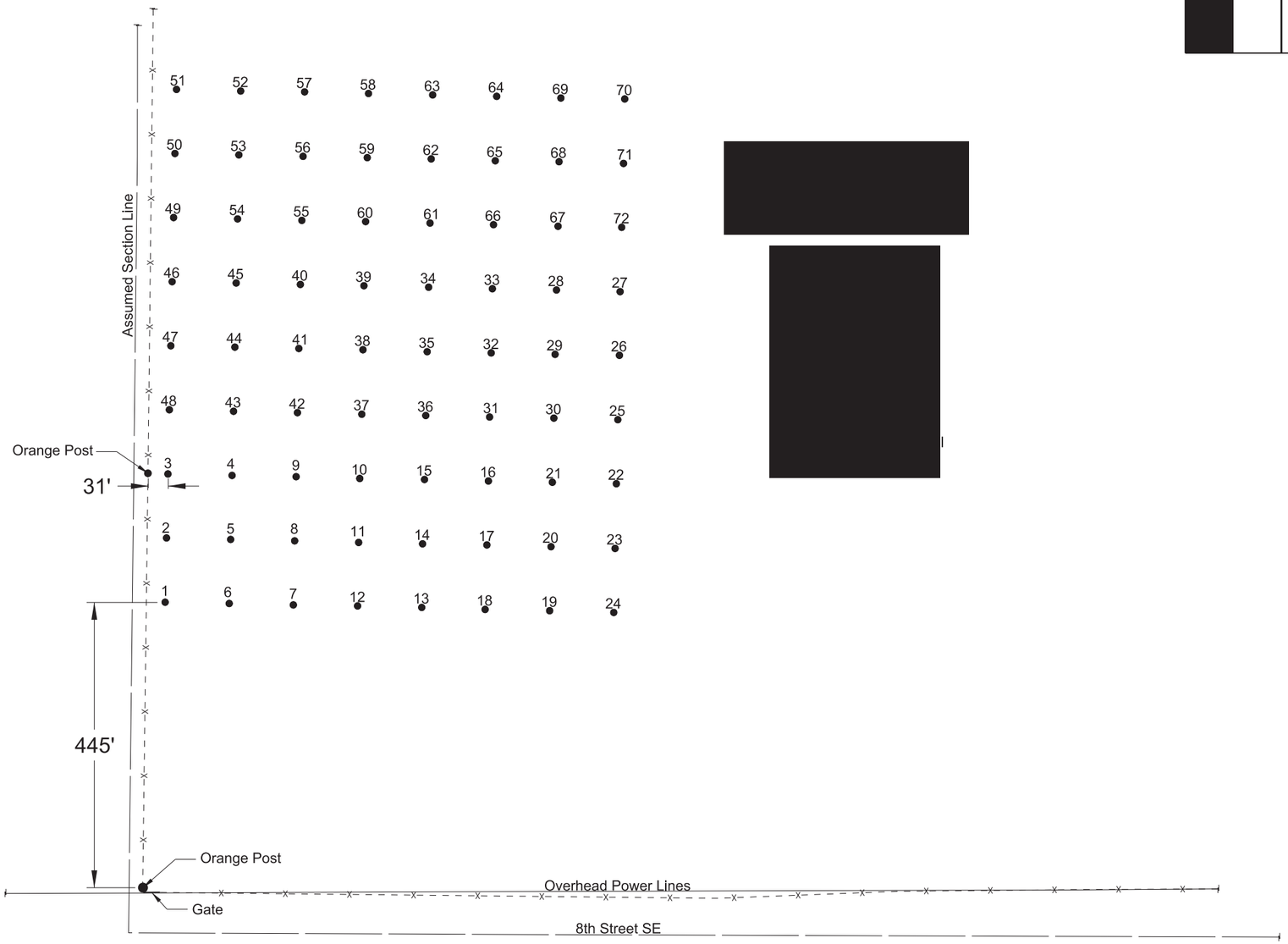
TEST HOLE PLAT

Location: W1/2SW1/4 8-144-71 County: Kidder

Ownership: Karen Hirchert

LOCATION OF PIT IN SECTION





Scale 1" = 200"

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	180	5

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	2.0	2.0 gr	2	11	21	29	+gr
		6.0 Fgr					
		2.0 gr					
		1.0 FS					
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					
		1.0 Fgr					
2	1.5	0.5 Fgr	5	18	27	35	+gr
		2.0 gr					
		1.0 FS					
		9.0 Fgr					
		1.0 CS					
		1.0 Fgr					
		1.0 gr					
		1.0 sd					
		1.0 Fgr					
		1.0 gr					
3	0.5	5.0 Fgr	3	13	23	32	+gr
		0.5 CS					
		4.0 Fgr					
		2.0 gr					
		3.0 Fgr					
		5.0 gr					
4	0.5	2.5 gr	4	13	22	32	+gr
		4.0 Fgr					
		2.0 gr					
		4.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		2.0 gr					
5	0.5	1.5 gr	3	13	23	31	+gr
		7.5 Fgr					
		0.5 FS					
		3.0 gr					
		1.0 Fgr					
		1.0 CS					
		2.0 gr					
		2.0 Fgr					
		1.0 CGr					
		1.0 gr					
6	2.0	1.0 gr	1	15	24	33	+gr
		6.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 sd					
		2.0 Fgr					
		1.0 gr					
		3.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
7	1.0	10.0 Fgr	3	18	29	39	+gr
		4.0 gr					
		3.0 Fgr					
		2.0 gr					
8	1.0	2.0 gr	3	17	22	31	+gr
		5.0 Fgr					
		6.5 gr					
		4.5 Fgr					
		1.0 gr					
9	1.5	1.5 gr	2	12	21	28	+gr
		2.0 sd					
		15.0 Fgr					
10	0.5	6.5 Fgr	1	9	17	26	+gr
		1.0 FS					
		1.0 gr					
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.5 gr					
		0.5 sd					
		1.0 gr					
		1.0 Fgr					
11	1.5	3.5 Fgr	1	12	23	31	+gr
		3.0 sd					
		9.0 Fgr					
		3.0 gr					
12	0.5	2.5 gr	6	15	26	37	+gr
		4.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		5.0 gr					
		1.0 Fgr					
		2.0 gr					
		2.0 CGr					
13	1.0	2.0 gr	1	13	23	31	+gr
		5.5 Fgr					
		0.5 sd					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
14	1.0	2.0 gr	4	14	25	35	+gr
		1.0 Fgr					
		1.0 sd					
		3.0 Fgr					
		6.0 gr					
		3.0 Fgr					
		2.0 gr					
15	1.0	10.0 Fgr	1	13	25	35	+gr
		3.0 gr					
		3.0 Fgr					
		2.0 gr					
		2.0 CGr					
		1.0 Fgr					
16	1.5	1.5 gr	0	8	18	29	+gr
		5.0 Fgr					
		5.0 gr					
		6.0 Fgr					
		1.0 gr					
17	1.5	0.5 gr	0	11	23	33	+gr
		8.0 Fgr					
		5.0 gr					
		5.0 Fgr					
18	1.0	2.0 gr	0	6	15	24	+gr
		2.0 Fgr					
		1.0 FS					
		4.0 Fgr					
		4.0 gr					
		3.0 Fgr					
		2.0 gr					
		1.0 Fgr					
19	1.0	1.0 gr	2	15	25	35	+gr
		8.0 Fgr					
		3.0 gr					
		4.0 Fgr					
		2.0 gr					
		1.0 CGr					
20	1.0	5.0 Fgr	1	9	21	31	+gr
		2.0 gr					
		2.0 Fgr					
		7.0 gr					
		2.0 CGr					
		1.0 gr					
21	1.5	0.5 gr	1	13	23	33	+gr
		5.5 Fgr					
		0.5 gr					
		6.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
22	1.0	8.0 Fgr	0	12	24	34	+gr
		6.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 FS					
23	1.5	1.5 gr	2	13	25	34	+gr
		4.0 Fgr					
		1.0 CS					
		3.0 Fgr					
		3.0 gr					
		2.0 CGr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
24	1.0	3.0 Fgr	2	10	20	29	+gr
		1.0 FS					
		3.0 Fgr					
		6.0 gr					
		1.0 Fgr					
		5.0 gr					
25	1.0	2.0 Fgr	1	10	22	31	+gr
		2.0 sd					
		7.0 Fgr					
		3.0 gr					
		5.0 Fgr					
26	1.0	1.0 Fgr	3	14	23	34	+gr
		2.0 gr					
		4.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		4.0 gr					

RANGE 71 **TWP** 144 **SEC** 8

COUNTY Kidder Aug-15

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Aug-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	180	6

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
27	2.0	2.0 Fgr	2	13	22	31	+gr
		1.0 gr					
		2.0 sd					
		4.5 Fgr					
		2.5 gr					
		4.0 Fgr					
		1.0 CGr					
		1.0 Fgr					
28	1.0	2.0 gr	1	13	23	34	+gr
		5.0 Fgr					
		1.0 sd					
		1.0 gr					
		2.0 Fgr					
		4.0 gr					
		1.0 CS					
		3.0 gr					
29	0.5	2.5 gr	0	14	26	38	+gr
		4.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		5.0 gr					
30	1.0	2.0 gr	4	13	25	37	+gr
		5.0 Fgr					
		12.0 gr					
31	1.0	8.5 Fgr	0	13	22	32	+gr
		0.5 sd					
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		1.0 CGr					
		2.0 Fgr					
		2.0 gr					
32	1.0	2.0 gr	2	10	21	31	+gr
		2.0 Fgr					
		1.0 sd					
		1.0 Fgr					
		1.0 gr					
		1.0 sd					
		4.0 gr					
		1.0 Fgr					
		6.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
33	1.0	1.0 gr	1	13	26	37	+gr
		2.0 Fgr					
		1.0 sd					
		6.0 Fgr					
		1.0 gr					
		3.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 CGr					
		1.0 Fgr					
		2.0 gr					
34	1.5	2.5 gr	4	18	29	40	+gr
		1.5 FS					
		3.5 Fgr					
		7.0 gr					
		2.0 CGr					
		2.0 gr					
35	1.0	3.0 Fgr	2	16	25	35	+gr
		1.0 sd					
		5.0 Fgr					
		1.0 gr					
		3.0 Fgr					
		3.0 CGr					
		2.0 gr					
		1.0 Fgr					
36	1.0	1.0 gr	0	9	20	29	+gr
		2.0 Fgr					
		1.0 sd					
		3.0 Fgr					
		2.0 gr					
		1.0 CS					
		5.5 gr					
		1.5 FS					
		2.0 Fgr					
37	1.0	5.0 Fgr	1	15	27	37	+gr
		1.0 sd					
		4.0 gr					
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
38	0.5	1.5 gr	1	11	22	33	+gr
		5.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		1.0 sd					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
39	2.0	7.0 Fgr	3	17	27	36	+gr
		2.0 gr					
		1.0 sd					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
		1.0 CGr					
		2.0 gr					
		1.0 Fgr					
40	2.0	2.0 Fgr	1	9	21	33	+gr
		1.0 sd					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		1.0 gr					
41	1.5	3.5 Fgr	1	12	23	34	+gr
		1.0 CS					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
42	1.0	3.0 gr	0	11	22	33	+gr
		4.0 Fgr					
		5.0 gr					
		1.0 FS					
		1.0 gr					
		2.0 Fgr					
		1.0 CGr					
		2.0 gr					
43	1.0	2.0 Fgr	0	13	24	33	+gr
		2.0 sd					
		8.0 Fgr					
		5.0 gr					
		2.0 Fgr					
44	1.0	2.0 gr	0	9	22	36	+gr
		2.0 Fgr					
		6.0 gr					
		2.0 Fgr					
		1.0 gr					
		3.0 Fgr					
		3.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
45	1.0	2.0 gr	0	6	18	31	+gr
		3.0 Fgr					
		7.0 gr					
		4.0 Fgr					
		3.0 gr					
46	1.0	2.0 gr	2	17	26	34	+gr
		2.5 Fgr					
		0.5 sd					
		4.0 gr					
		2.0 Fgr					
		4.0 gr					
		3.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
47	0.5	2.5 gr	2	12	23	34	+gr
		3.0 Fgr					
		1.0 CS					
		1.0 Fgr					
		5.0 gr					
		1.0 CGr					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
48	1.0	1.0 gr	0	8	16	25	+gr
		2.0 Fgr					
		1.0 sd					
		9.0 Fgr					
		1.0 gr					
		5.0 Fgr					

RANGE 71 **TWP** 144 **SEC** 8

COUNTY Kidder Aug-15

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Aug-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(055)198	180	7

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
49	1.0	1.0 gr	0	9	20	32	+gr
		1.0 Fgr					
		2.0 FS					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		5.0 gr					
		2.0 Fgr					
		1.0 gr					
50	1.0	7.0 Fgr	0	13	26	36	+gr
		2.0 gr					
		1.0 Fgr					
		4.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
51	1.0	4.0 Fgr	0	11	23	31	+gr
		2.0 gr					
		1.0 sd					
		2.0 Fgr					
		10.0 gr					
52	2.0	1.0 Fgr	1	16	26	35	+gr
		1.0 sd					
		15.0 Fgr					
		1.0 gr					
53	1.0	1.0 gr	1	13	23	33	+gr
		6.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		7.0 gr					
54	2.0	5.0 Fgr	1	13	23	32	+gr
		2.0 gr					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		4.0 gr					
55	4.0	9.0 Fgr	0	11	22	31	+gr
		1.0 gr					
		3.0 Fgr					
		1.0 sd					
		1.0 gr					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
56	1.0	2.0 gr	2	14	25	35	+gr
		3.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		7.0 gr					
57	2.0	6.0 Fgr	0	9	21	30	+gr
		3.0 gr					
		1.0 sd					
		1.0 Fgr					
		2.0 sd					
		2.0 Fgr					
58	1.0	1.0 gr	0	10	20	31	+gr
		4.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		2.0 CGr					
		6.0 gr					
59	1.0	4.0 Fgr	0	13	24	33	+gr
		1.0 sd					
		1.0 Fgr					
		1.0 FS					
		2.0 gr					
		5.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		1.0 gr					
60	2.0	3.0 Fgr	1	9	20	30	+gr
		1.0 gr					
		2.0 Fgr					
		1.0 sd					
		8.0 gr					
		2.0 Fgr					
		1.0 gr					
61	3.0	1.0 gr	0	15	27	37	+gr
		7.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					
62	1.0	2.0 gr	0	12	23	34	+gr
		2.0 Fgr					
		1.0 sd					
		14.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
63	1.0	9.0 Fgr	0	11	22	32	+gr
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		4.0 Fgr					
		1.0 gr					
64	1.0	3.0 Fgr	0	12	20	30	+gr
		1.0 FS					
		3.0 Fgr					
		7.0 gr					
		3.0 Fgr					
		2.0 gr					
65	1.0	7.0 Fgr	0	11	22	31	+gr
		2.0 gr					
		1.0 Fgr					
		4.0 gr					
		4.0 Fgr					
		1.0 gr					
66	3.0	2.0 gr	0	8	19	30	+gr
		4.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		5.0 gr					
		1.0 Fgr					
		1.0 FS					
		1.0 gr					
67	0.5	9.5 Fgr	1	13	25	37	+gr
		5.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
68	0.5	2.5 gr	0	8	17	28	+gr
		1.0 sd					
		2.0 Fgr					
		1.0 sd					
		2.5 Fgr					
		0.5 CS					
		2.0 gr					
		1.0 Fgr					
		7.0 gr					
69	3.0	5.0 Fgr	1	16	28	38	+gr
		3.0 gr					
		1.0 sd					
		1.0 gr					
		3.0 Fgr					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
70	0.5	2.5 gr	0	10	18	28	+gr
		3.5 Fgr					
		0.5 FS					
		4.0 gr					
		2.0 FS					
		7.0 gr					
71	1.5	0.5 Fgr	0	10	21	31	+gr
		1.0 gr					
		7.0 Fgr					
		2.0 gr					
		6.0 Fgr					
		2.0 gr					
72	0.5	2.5 gr	1	12	22	32	+gr
		6.0 Fgr					
		6.0 gr					
		1.0 Fgr					
		4.0 gr					

RANGE 71 **TWP** 144 **SEC** 8

COUNTY Kidder Aug-15

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Aug-15

NDDOT ABBREVIATIONS

D-101-1

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

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NDDOT ABBREVIATIONS

D-101-2

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

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NDDOT ABBREVIATIONS

D-101-3

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

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

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NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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LINE STYLES

D-101-20

Existing Topography

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

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

This document was originally issued and sealed by Kirk Hoff, Registration Number PE-4683, on 12/18/20 and the original document is stored at the North Dakota Department of Transportation

SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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

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SYMBOLS

D-101-31

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

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

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

This document was originally issued and sealed by Kirk Hoff, Registration Number PE-4683, on 12/18/20 and the original document is stored at the North Dakota Department of Transportation

SYMBOLS

D-101-32

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

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

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

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

This document was originally issued and sealed by Kirk Hoff, Registration Number PE-4683, on 12/18/20 and the original document is stored at the North Dakota Department of Transportation

SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

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

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

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

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

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

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

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

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

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

Median Drain

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

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

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

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

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

Pump
Sanitary, Storm Drain, Exst Water

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

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

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

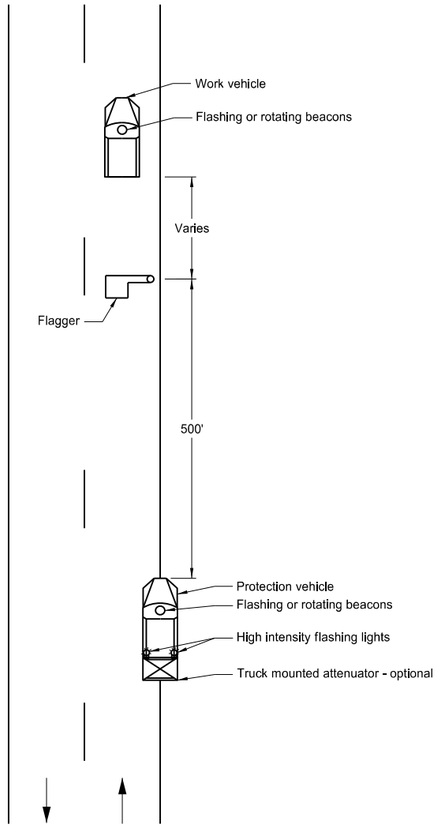
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

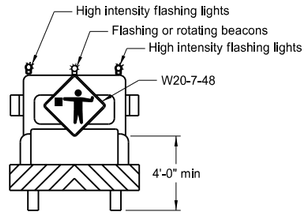
This document was originally issued and sealed by Kirk Hoff, Registration Number PE-4683, on 12/18/20 and the original document is stored at the North Dakota Department of Transportation

TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

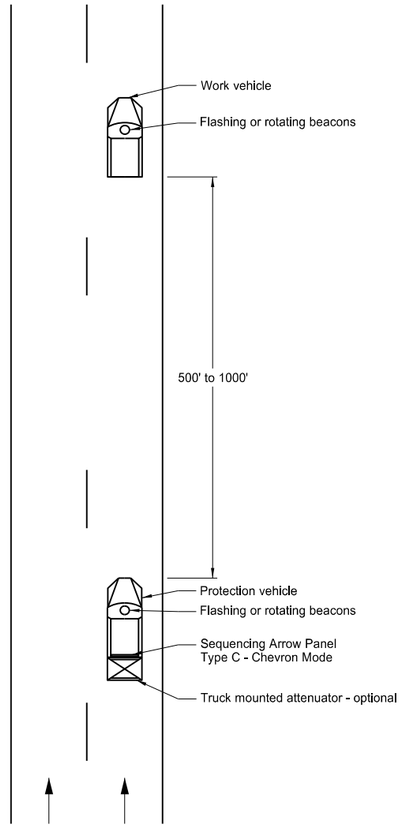
Two Lane, Two Way Roadways

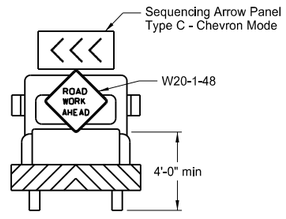




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.

2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.

3. Use these layouts during daylight hours and in areas of good visibility only.

4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

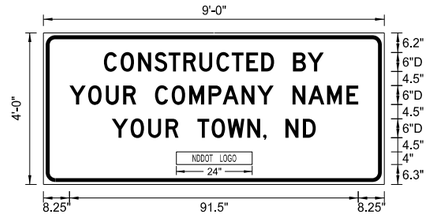
CONSTRUCTION SIGN DETAIL

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. Post mount sign a distance of ½A following the End Road Work (G20-2-48) sign (maximum 2 signs per project.)

2. Use sign on rural projects with a 30 day or longer duration (not required on seal coats or other short duration projects.)

3. Do not place sign 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.
9-27-17	Updated to active voice.
8-30-18	Updated sign number in note 1.
10-03-19	New Design Engineer PE Stamp.

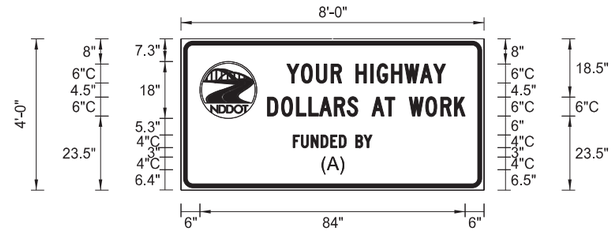
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAILS
PROJECT FUNDING SIGN

SIGN NUMBER	I2-5-96
WIDTH X HEIGHT	8'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: White
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_CIRCLE_LOGO	6	22.8	18	18	0
	44.2	4.2	7.5	8.6	0

STATION(S): AREA: 32.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Reg_48_Large.ssi

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
Y	O	U	R	H	I	G	H	W	A	Y									50.3	6	C 2000
33.5	38.1	42.8	47.5	55.4	60.1	62.1	66.7	70.9	75.8	80											
D	O	L	L	A	R	S	A	T	W	O	R	K							62.6	6	C 2000
27.4	31.8	36.5	40.4	43.9	48.5	52.6	60.5	64.7	72.2	77.5	82.3	86.6									
F	U	N	D	E	D	B	Y												25	4	C 2000
35.5	38.1	41.2	44.3	47.4	50.1	55.3	57.9														

(A)

FUNDING SOURCE MESSAGE VARIATIONS
FEDERAL
STATE
FEDERAL - STATE
FEDERAL - LOCAL
FEDERAL - STATE - LOCAL
STATE - LOCAL

Use a horizontal spacing of 3" between words and hyphens. Center message horizontally in sign panel.

Notes:

1) Contact the Communications Division of the NDDOT to obtain a copy of the image for the NDDOT Logo.

2) Contact Project Engineer for funding source message.

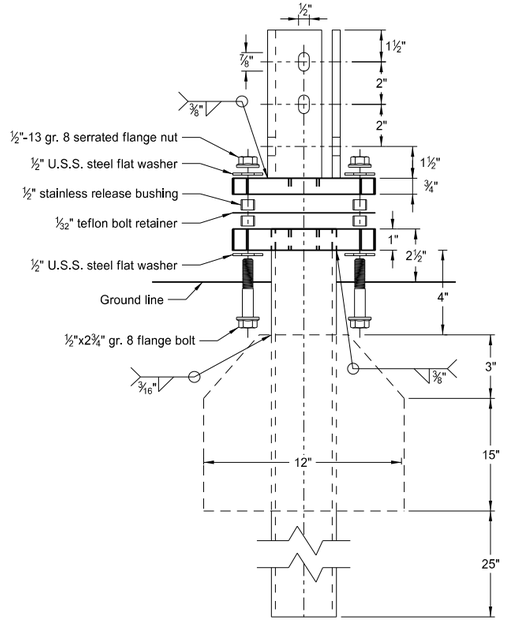
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-08-21	
REVISIONS	
DATE	CHANGE

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

12/08/21

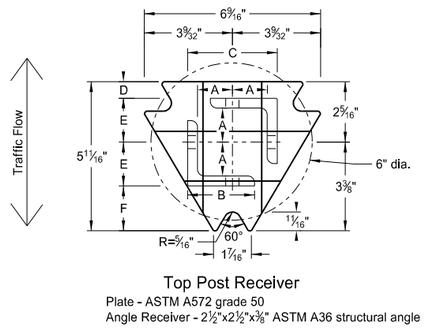
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

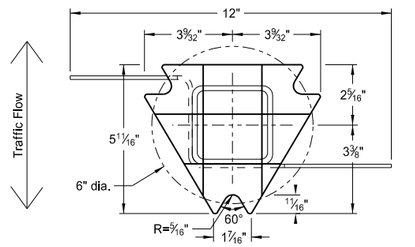


Multi-Directional
Slip Base Assembly

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

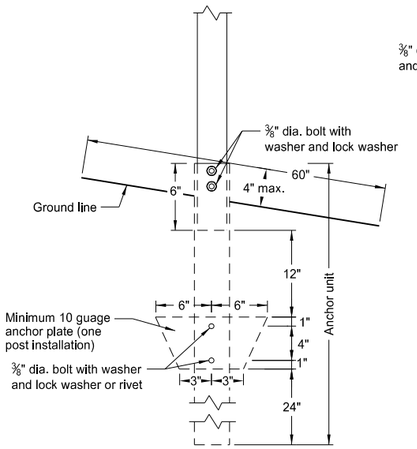
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½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

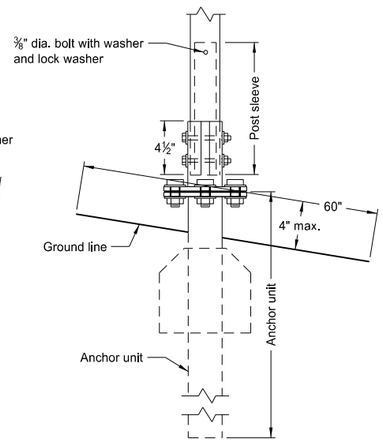
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³⁄₁₆"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	25⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⁵⁄₁₆"	⅝"	1²¹⁄₃₂"	1¾"

(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

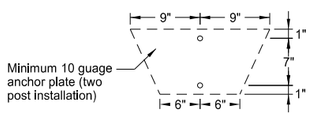
(B) For additional wind load, insert the 2³⁄₁₆"x10 ga. into 2½"x10 ga.

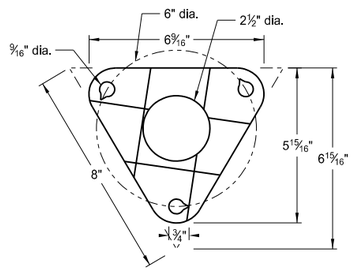


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

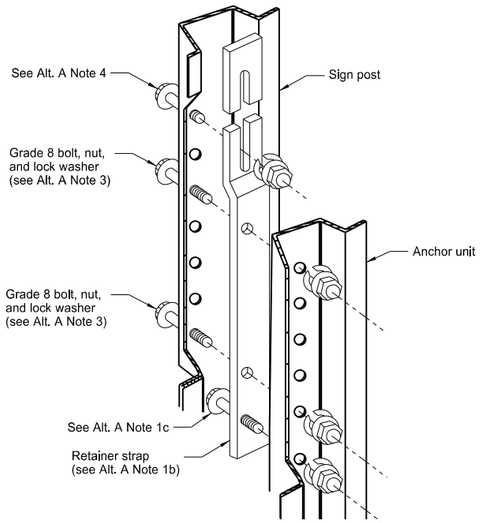
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

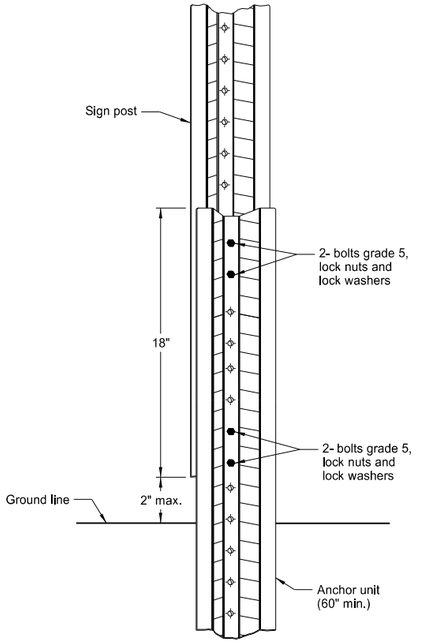
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post

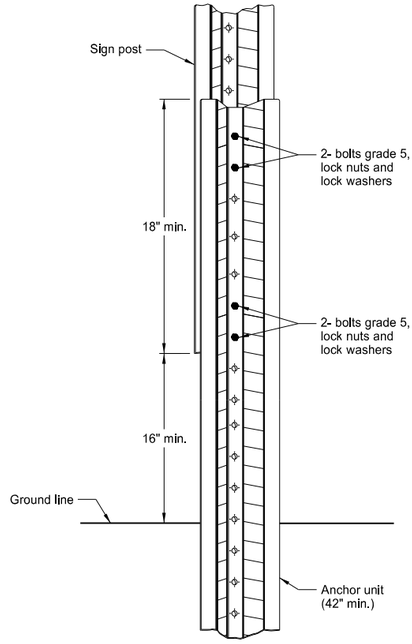


Detail A



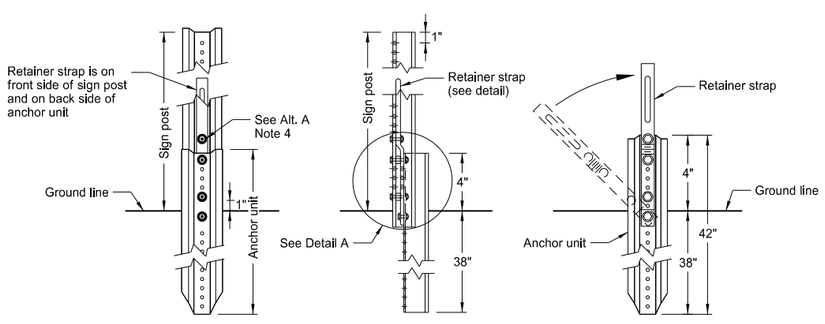
Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



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

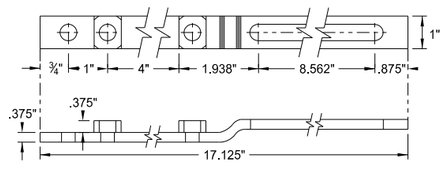
Install a maximum of 3 posts within 7'.



Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

Install a maximum of 2 posts within 7'.



Retainer Strap Detail

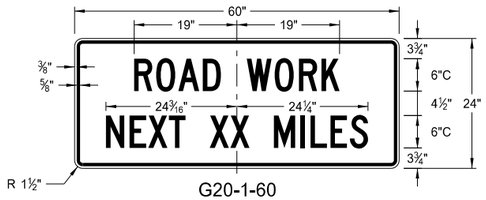
Alternate A Steps of Installation:

1. a) Drive anchor unit to within 12" of ground level.
   b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
   d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
   b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
   b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

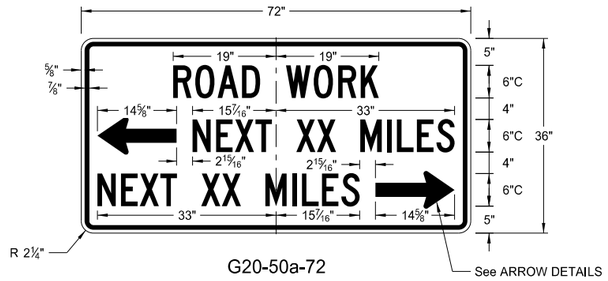
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



G20-50a-72
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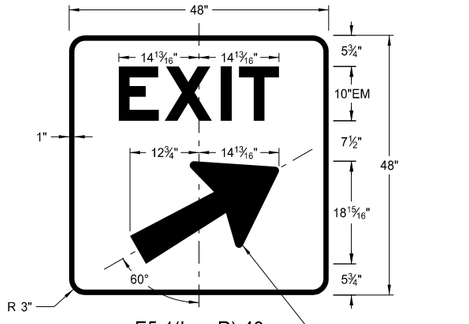
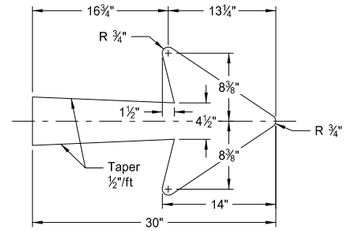
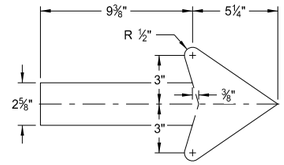
Background: orange



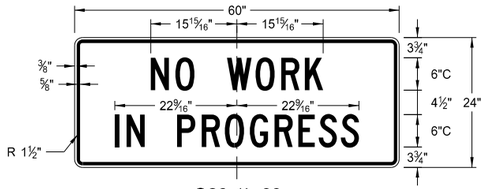
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



E5-1-48



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



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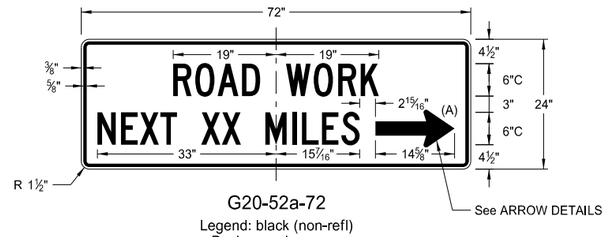

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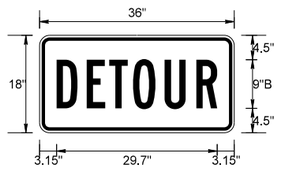

M4-8-36
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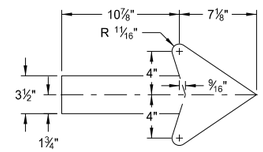
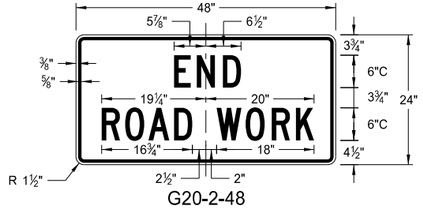
Background: orange



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



G20-2-48
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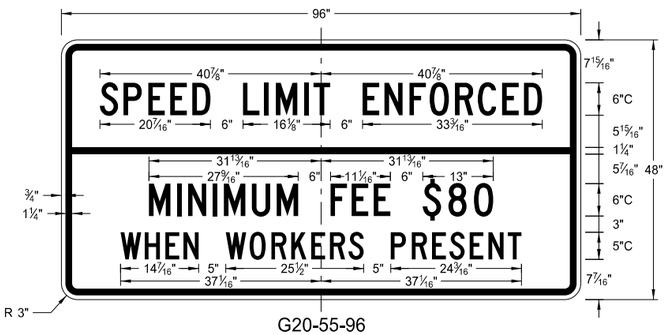
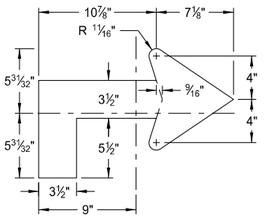
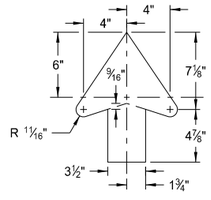
Background: orange



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

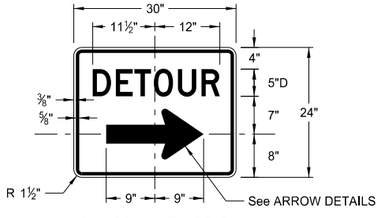


M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

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



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

ARROW DETAILS

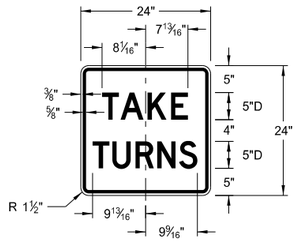
NOTES:

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

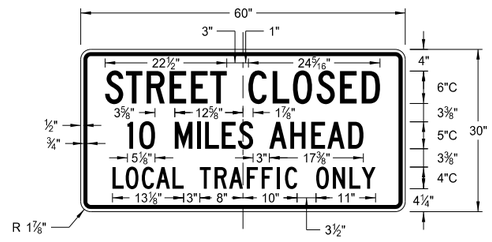
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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



R11-3c-60
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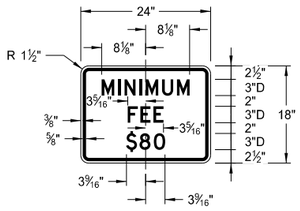
Background: white



R2-1aP-24
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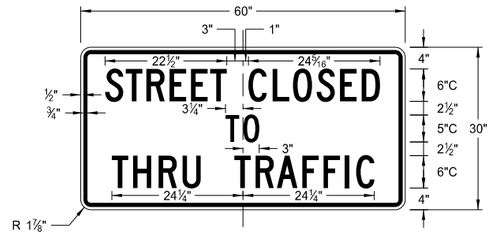
Background: white



R11-4a-60
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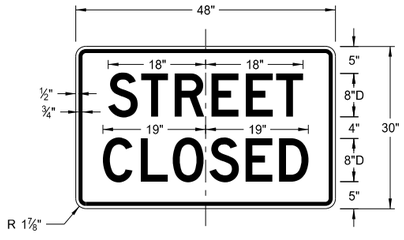
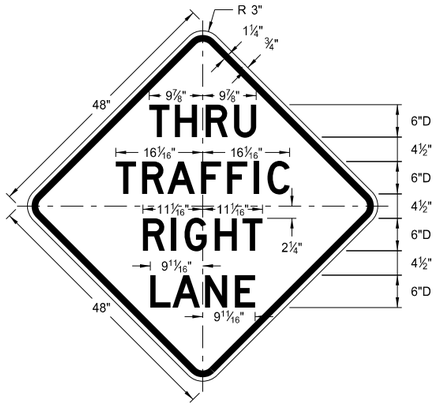


R11-2a-48
Legend: black (non-refl)
Background: white

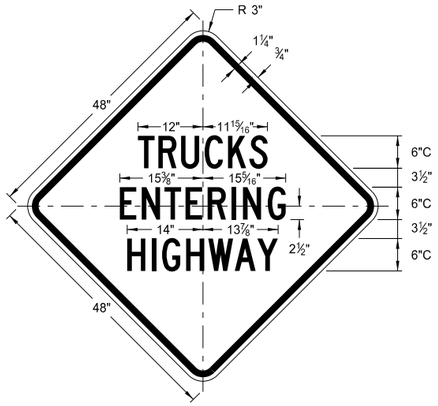
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



W8-53-48
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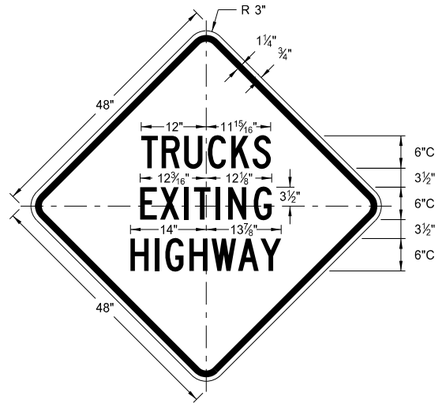
Background: orange



W8-56-48
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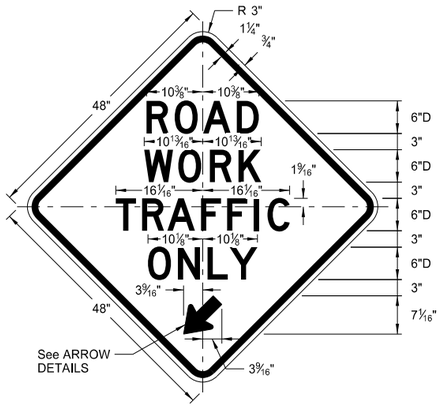

W5-9-48
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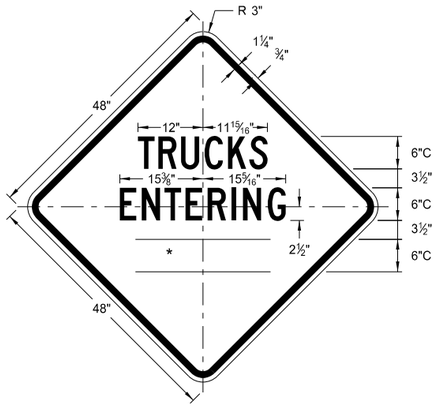
Background: orange



W8-54-48
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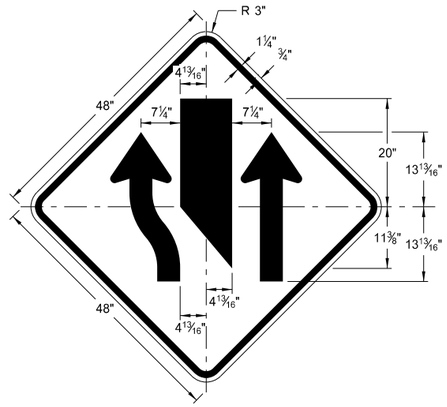
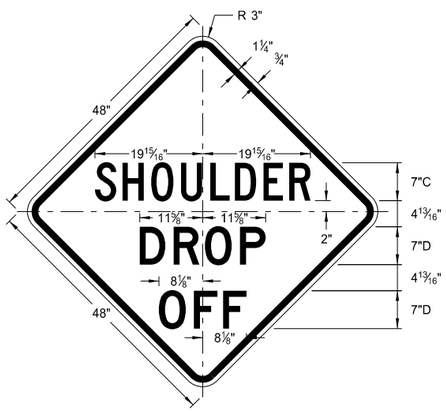
Background: orange



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



W8-9a-48
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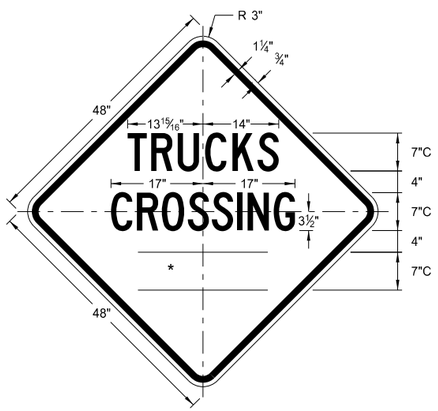
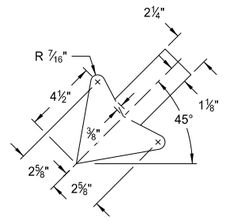
Background: orange



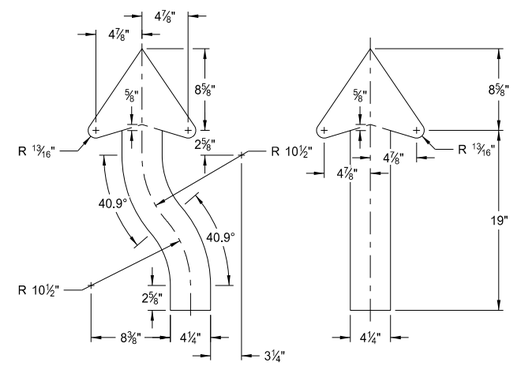
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



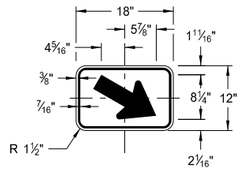
W9-3a-48

ARROW DETAILS

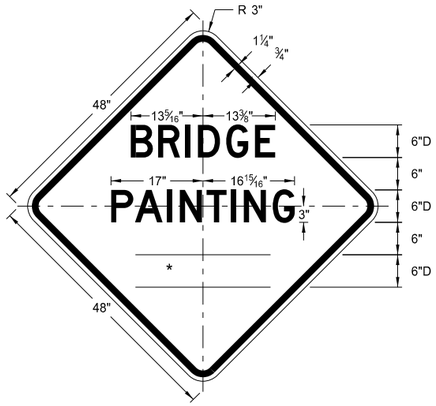
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 5-31-18 10-03-19	Updated sign number Revised sign and arrow details New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



W21-50-48
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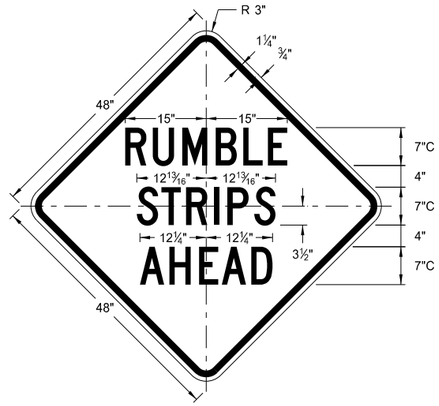
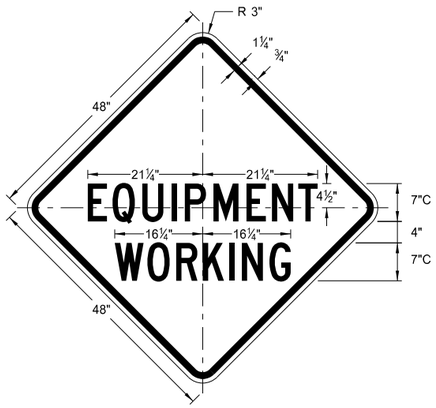


W21-53-48
Legend: black (non-refl)
Background: orange

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



W20-51-48
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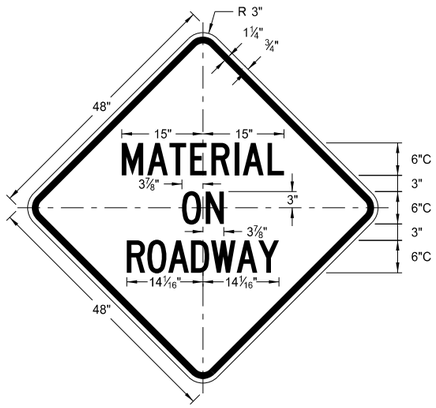

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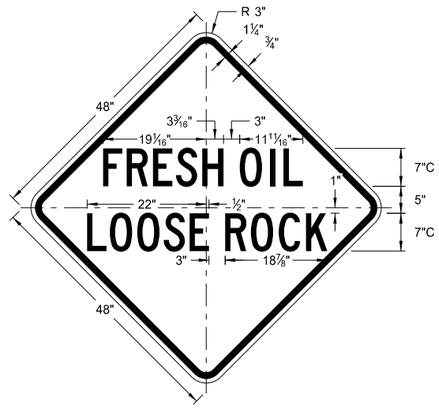

W22-8-48
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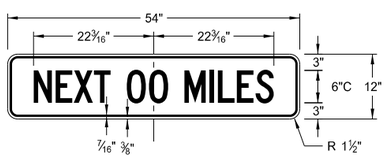

W20-52P-54
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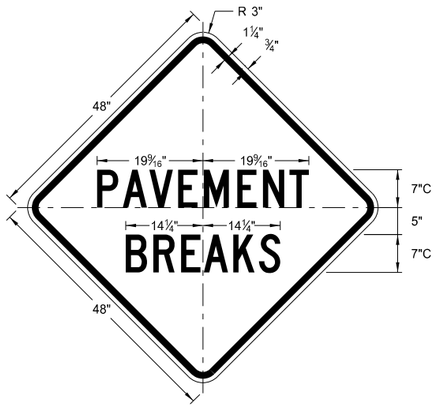

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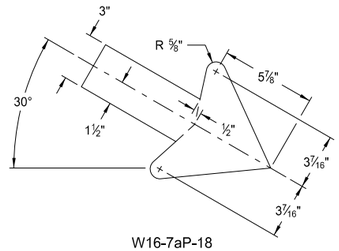
Background: orange



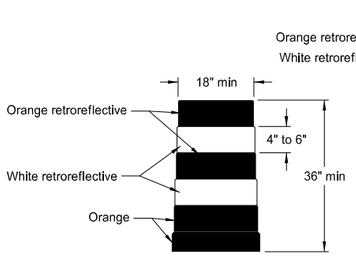
W16-7aP-18

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

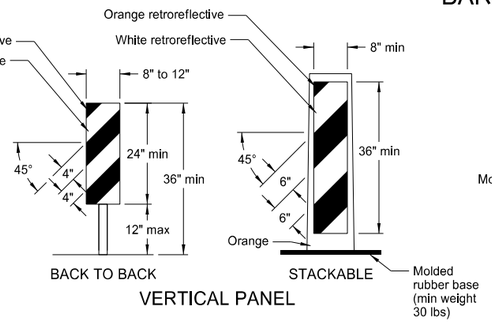
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



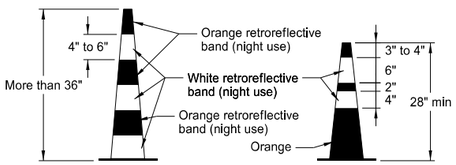
DELINEATOR DRUM

Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectorized spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.



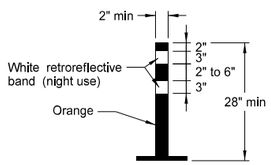
VERTICAL PANEL

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.



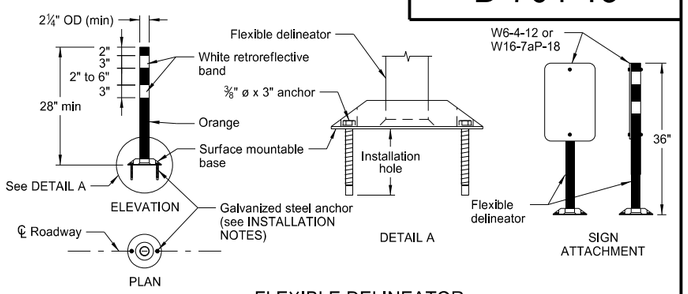
TRAFFIC CONE

Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectorized space between the orange and white stripes.



TUBULAR MARKER

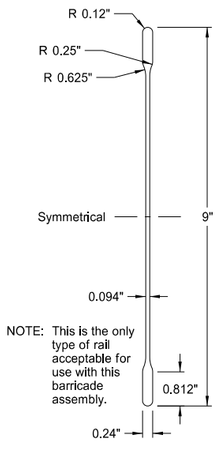
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



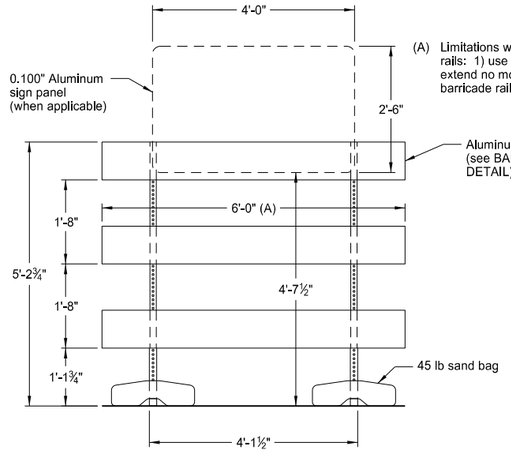
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

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

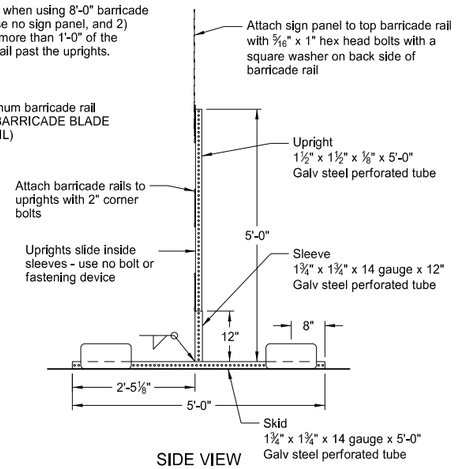


BARRICADE BLADE DETAIL



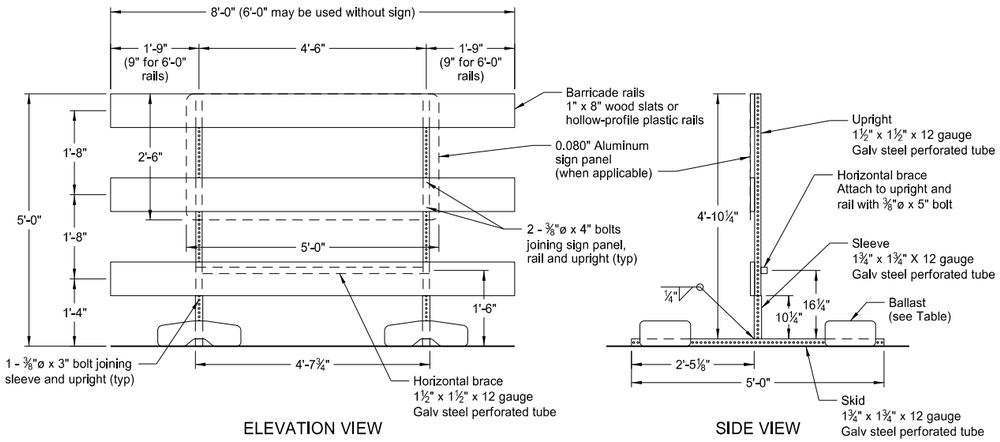
ELEVATION VIEW

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



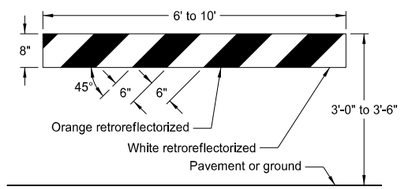
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

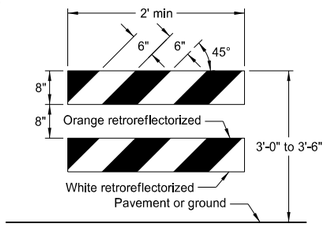


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

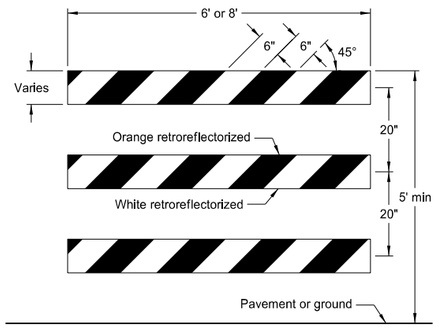
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

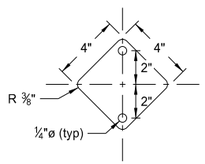


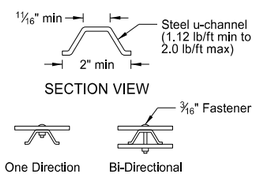
TYPE II BARRICADE

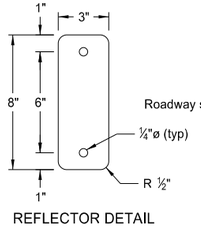


TYPE III BARRICADE

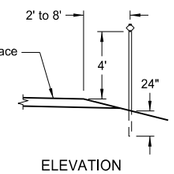
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

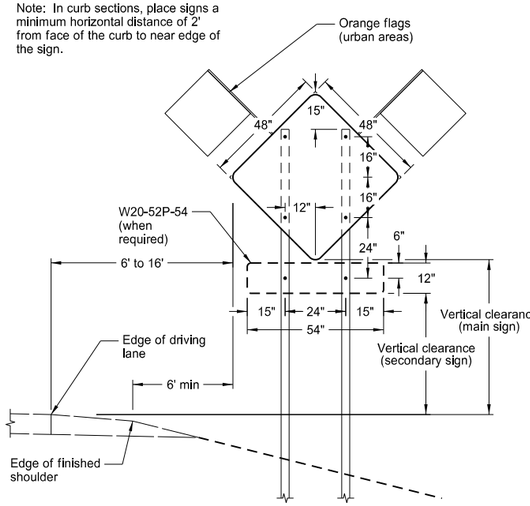
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

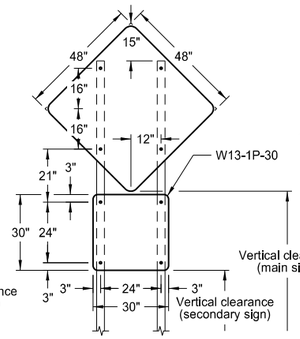
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

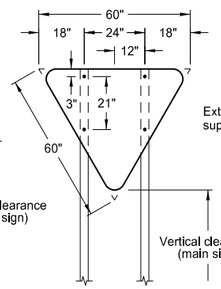
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



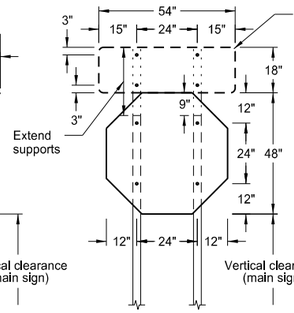
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



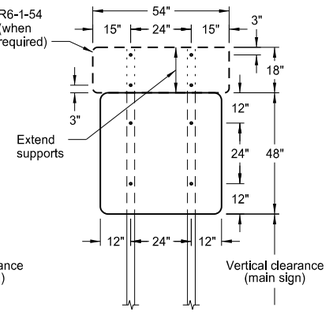
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



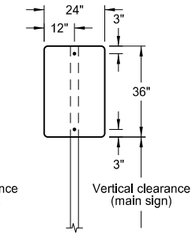
R1-2-60 - YIELD SIGN



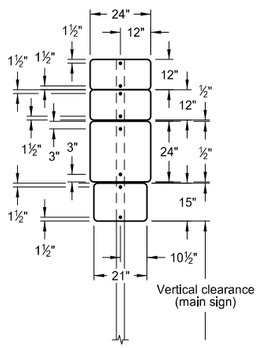
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



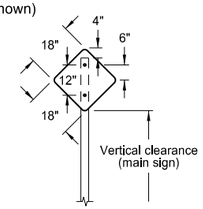
48" x 48" SIGN
(with R6-1-54 sign as required)



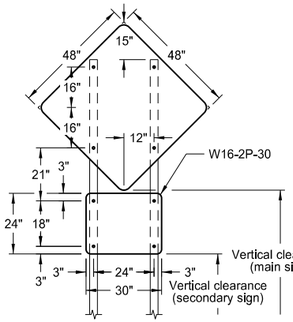
24" x 36" SIGN



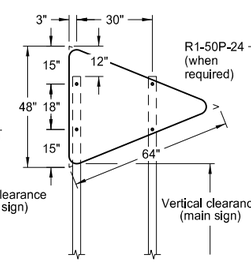
24" x 24"
ROUTE MARKER
ASSEMBLY



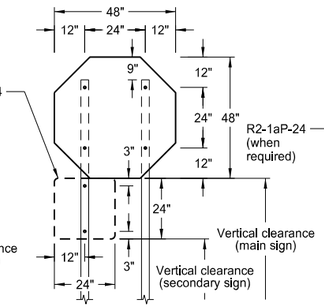
18" x 18"
DIAMOND SIGN



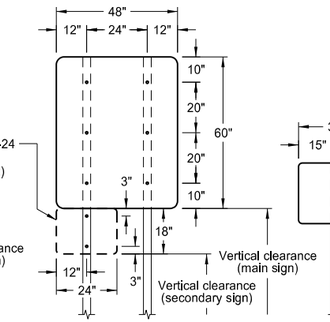
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



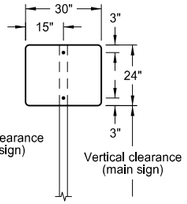
W14-3-64 - PENNANT SIGN



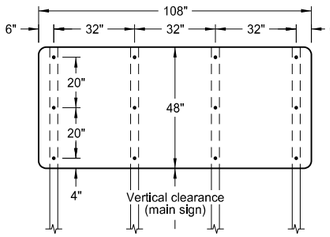
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



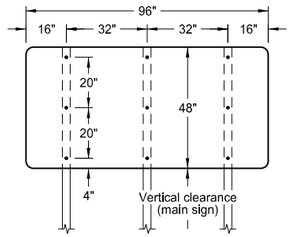
48" x 48" SIGN
(with R2-1aP-24 sign as required)



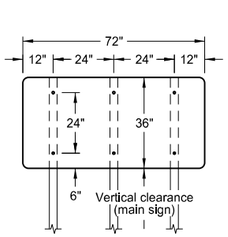
30" x 24" SIGN



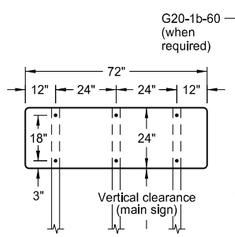
108" x 48" SIGN



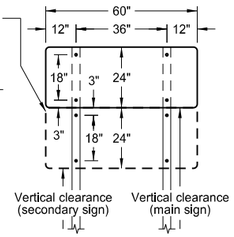
96" x 48" SIGN



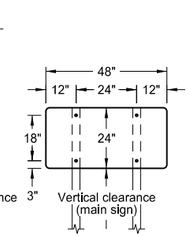
72" x 36" SIGN



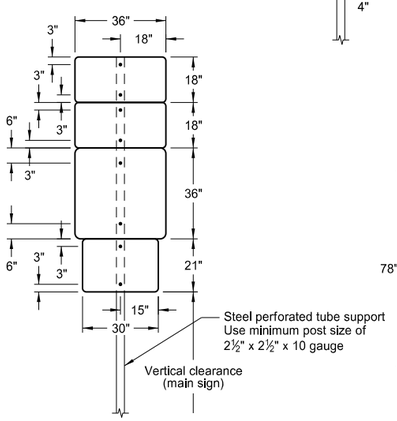
72" x 24" SIGN



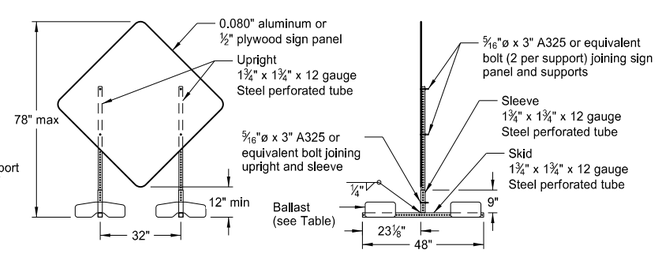
60" x 24" SIGN



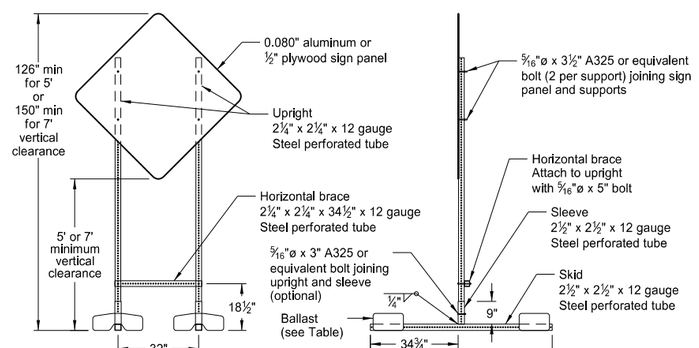
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

   Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

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

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅜" bolts.

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

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

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

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

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

   Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

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

   Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

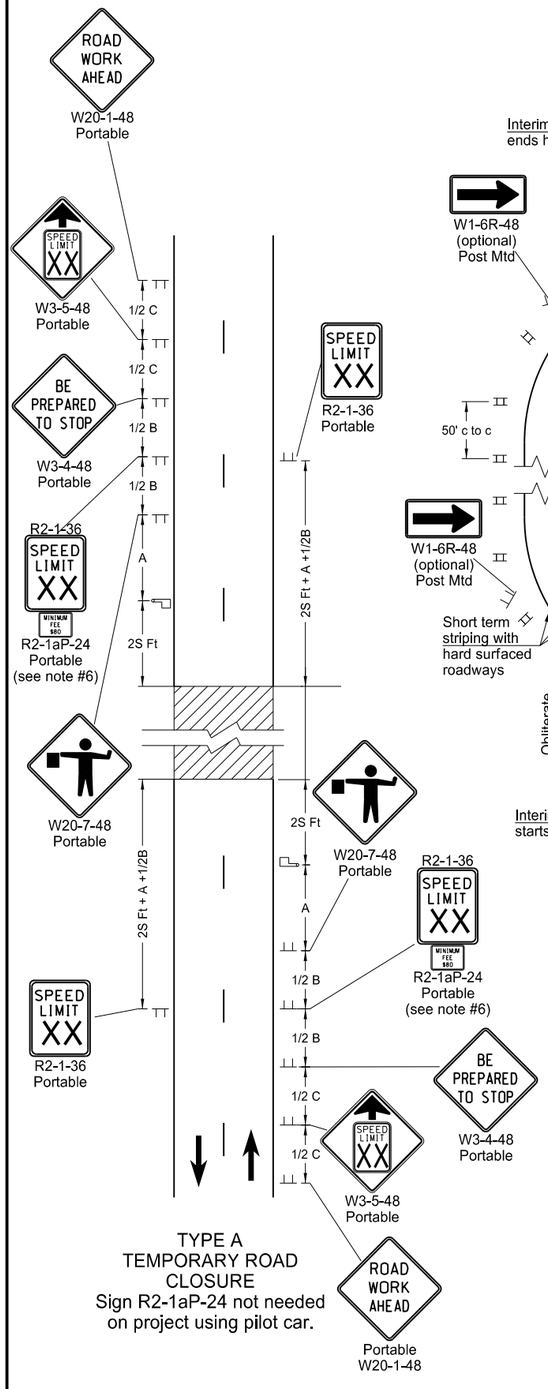
10-4-13

REVISIONS

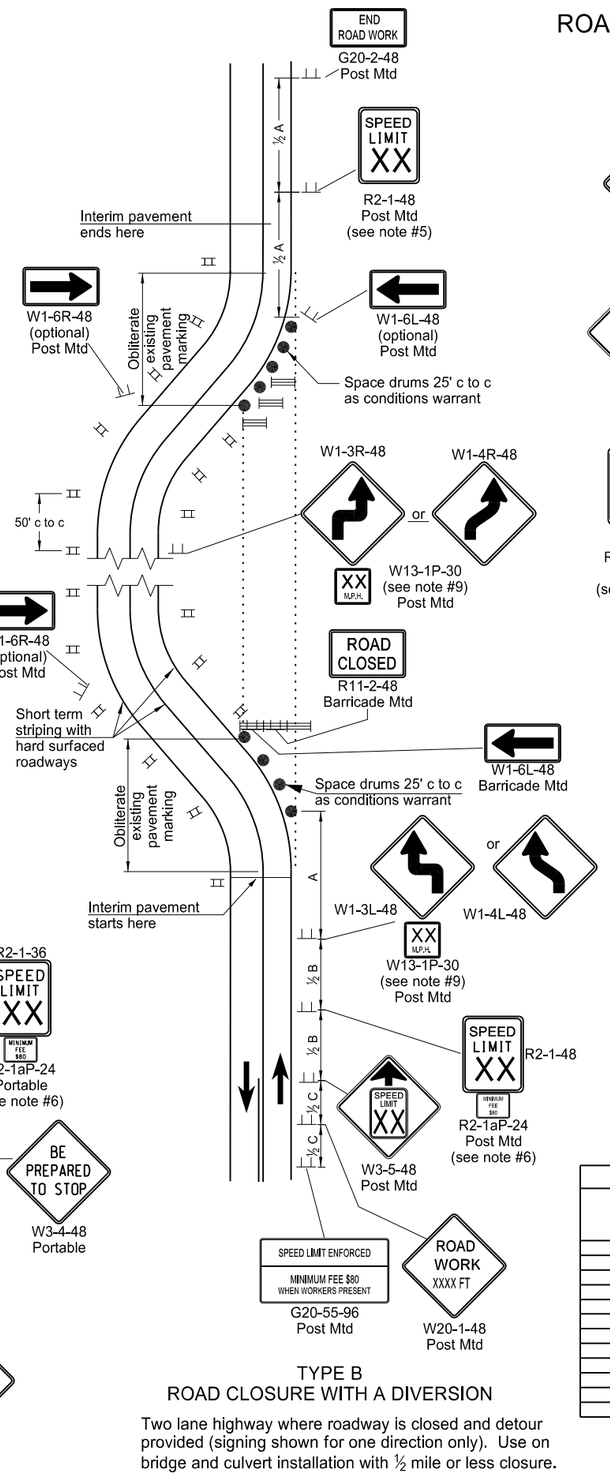
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

ROAD CLOSURE LAYOUTS



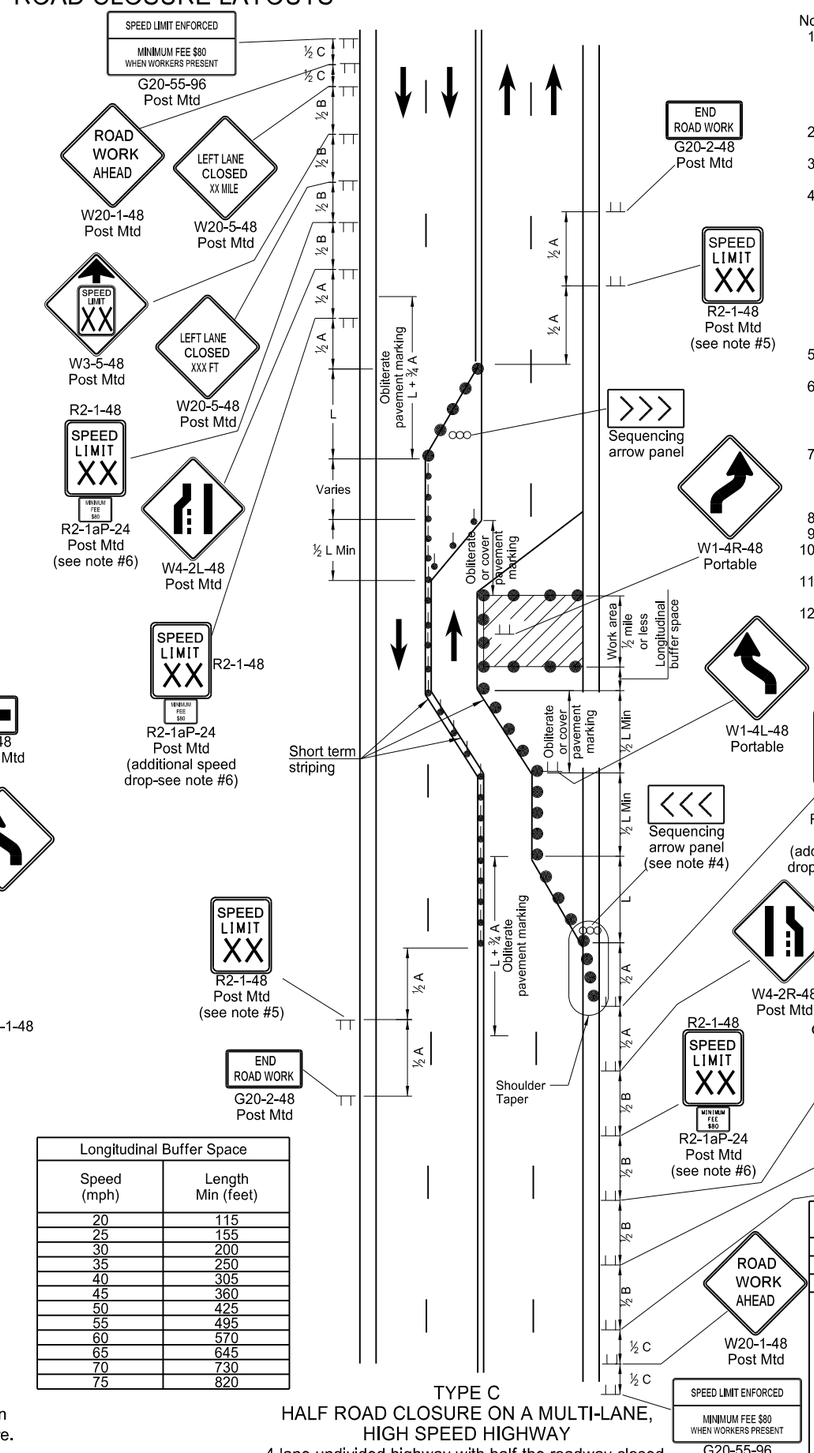
TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.

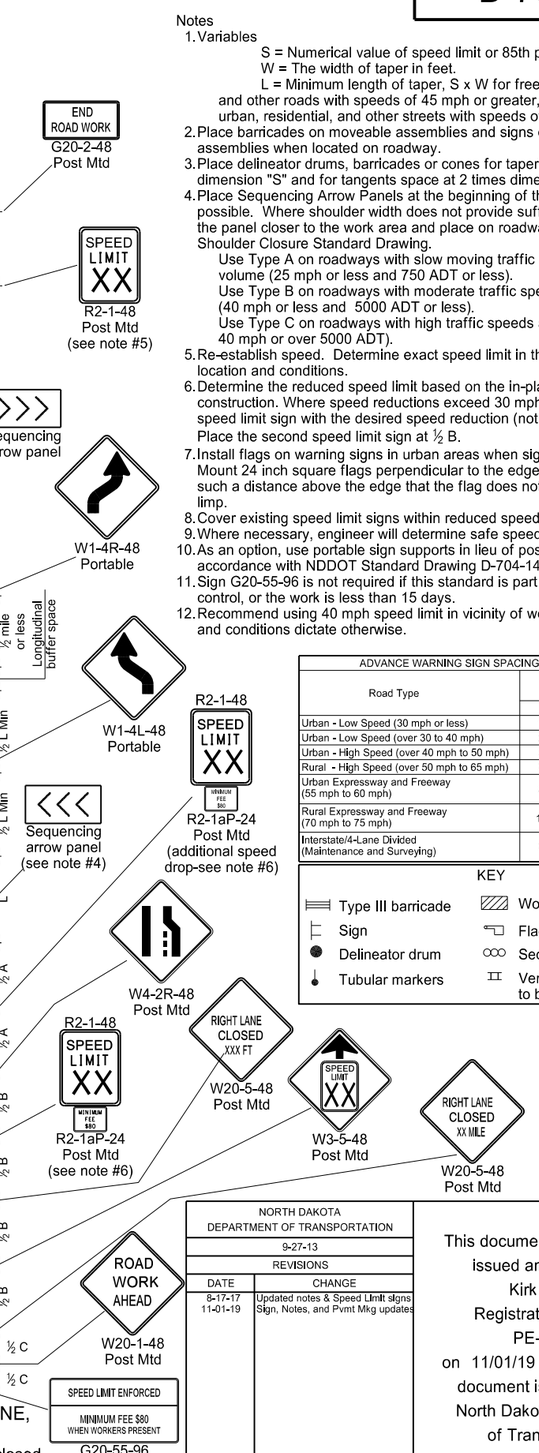


TYPE B
ROAD CLOSURE WITH A DIVERSION

Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

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





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

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this standard is part of other traffic control, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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
- Delineator drum
- Tubular markers
- Work area
- Flagger
- Sequencing arrow panel
- Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

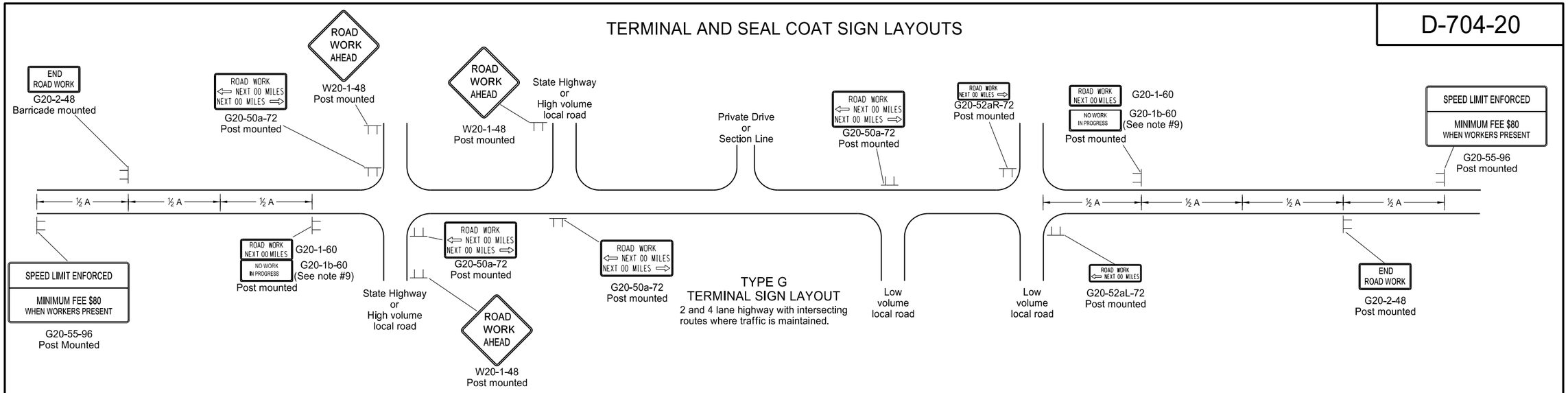
9-27-13

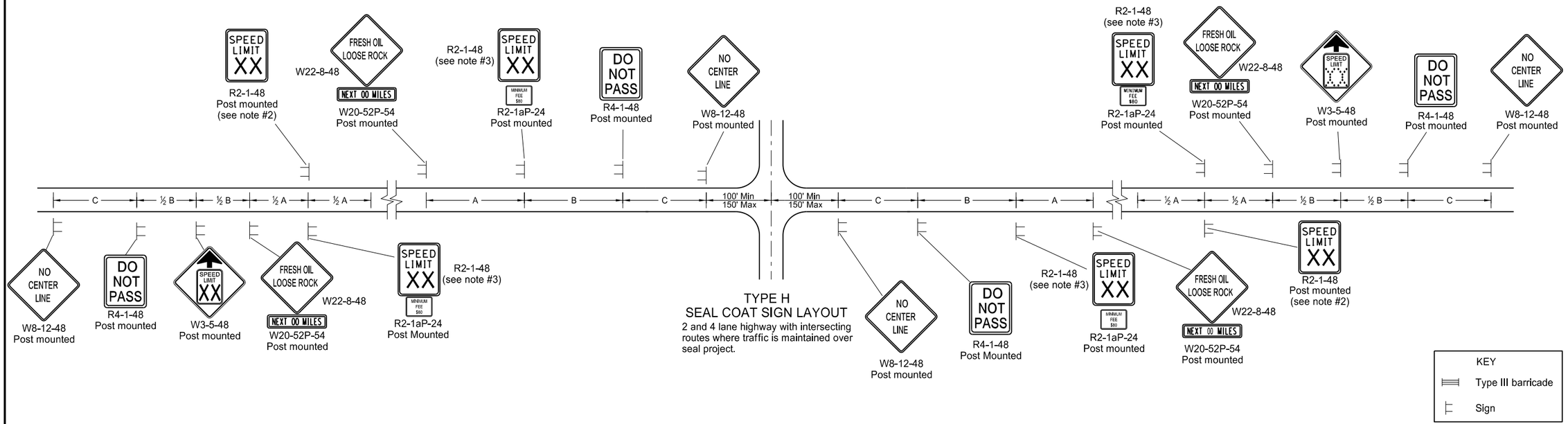
REVISIONS

DATE	CHANGE
8-17-17	Updated notes & Speed Limit signs
11-01-19	Sign, Notes, and Pvmt Mkg updates

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20





1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Determine the exact speed limit in the field, based on location and conditions.
3. Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
8. Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
9. Install sign G20-1b-60 when work is suspended for winter.
10. Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
11. Sign G20-55-96 is not required if work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
8-17-17	Updated notes & sign numbers.
11-01-19	Note & sign updates.

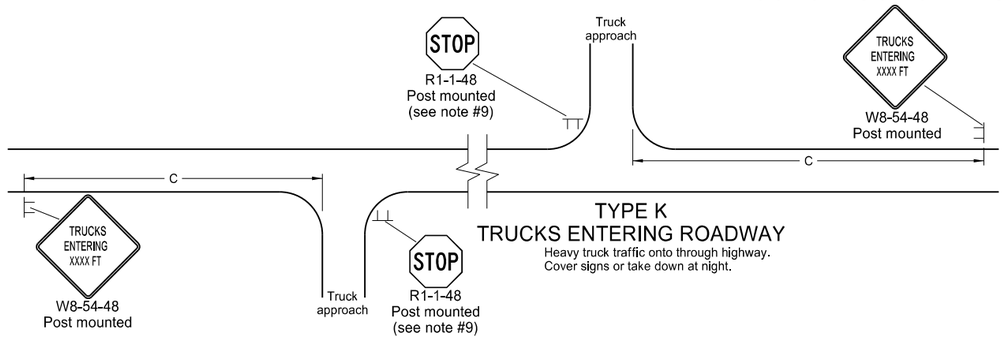
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

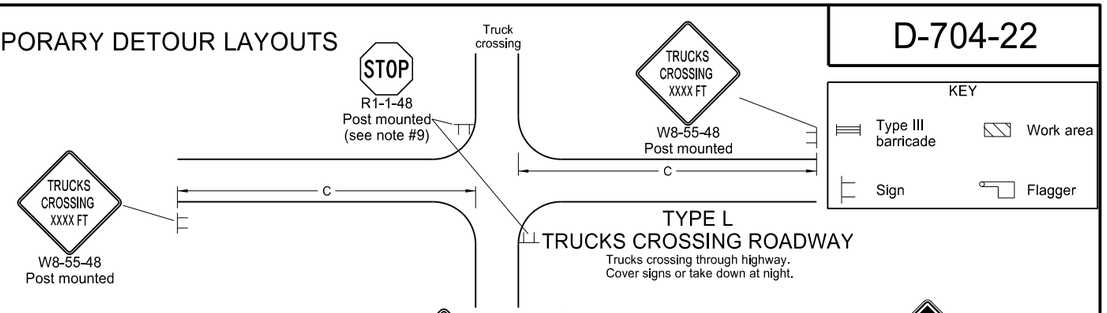
KEY

Type III barricade | Work area | Sign | Flagger



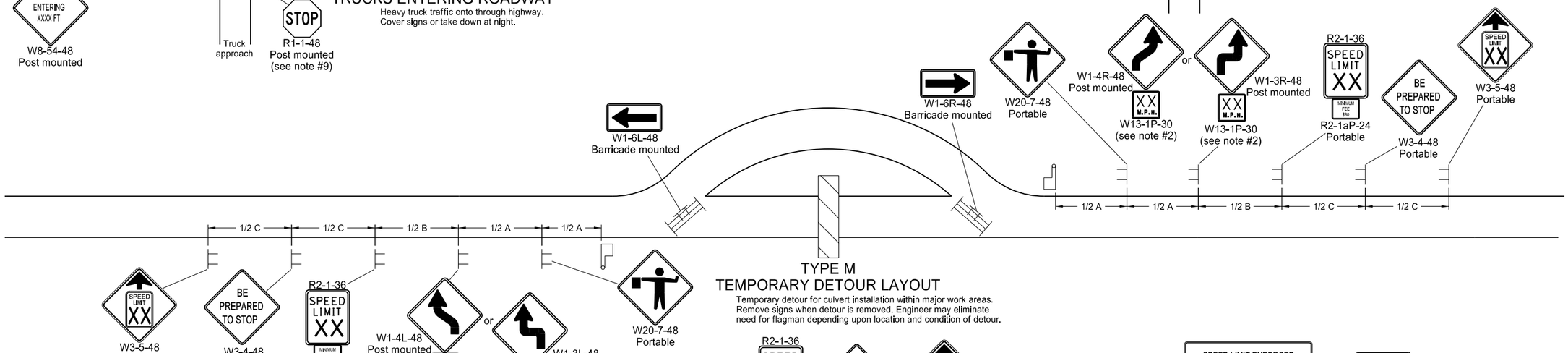
TYPE K
TRUCKS ENTERING ROADWAY

Heavy truck traffic onto through highway.
Cover signs or take down at night.



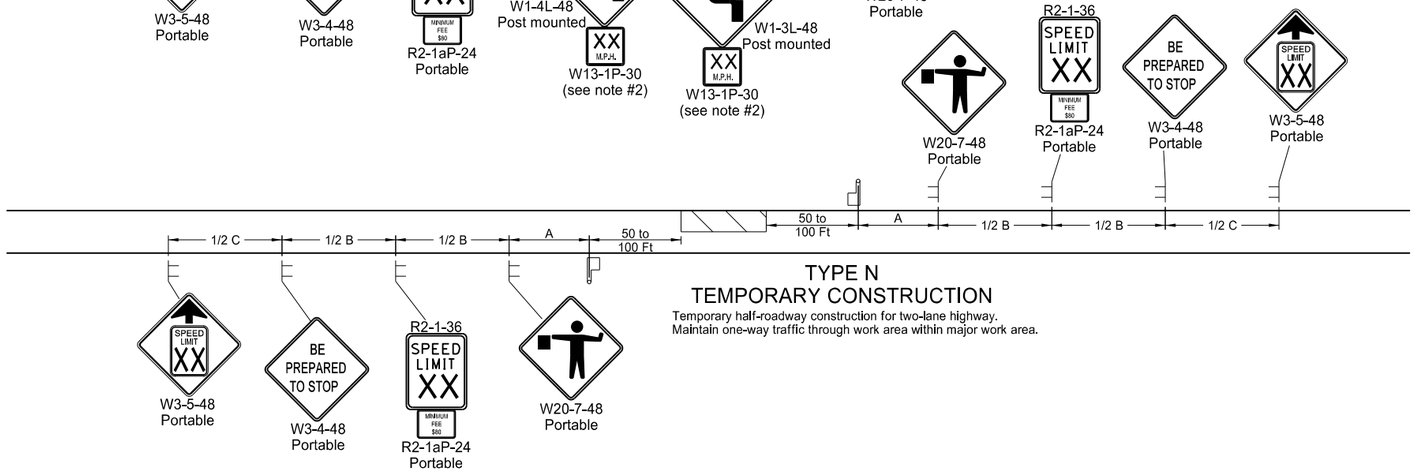
TYPE L
TRUCKS CROSSING ROADWAY

Trucks crossing through highway.
Cover signs or take down at night.



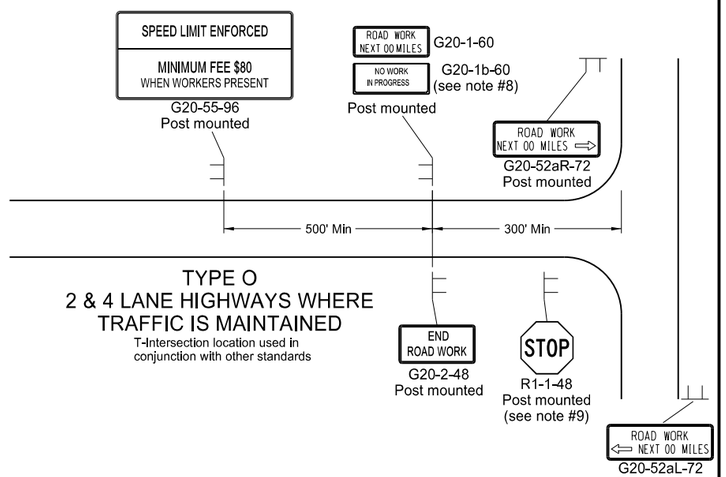
TYPE M
TEMPORARY DETOUR LAYOUT

Temporary detour for culvert installation within major work areas.
Remove signs when detour is removed. Engineer may eliminate need for flagman depending upon location and condition of detour.



TYPE N
TEMPORARY CONSTRUCTION

Temporary half-roadway construction for two-lane highway.
Maintain one-way traffic through work area within major work area.



TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes

1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
11. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

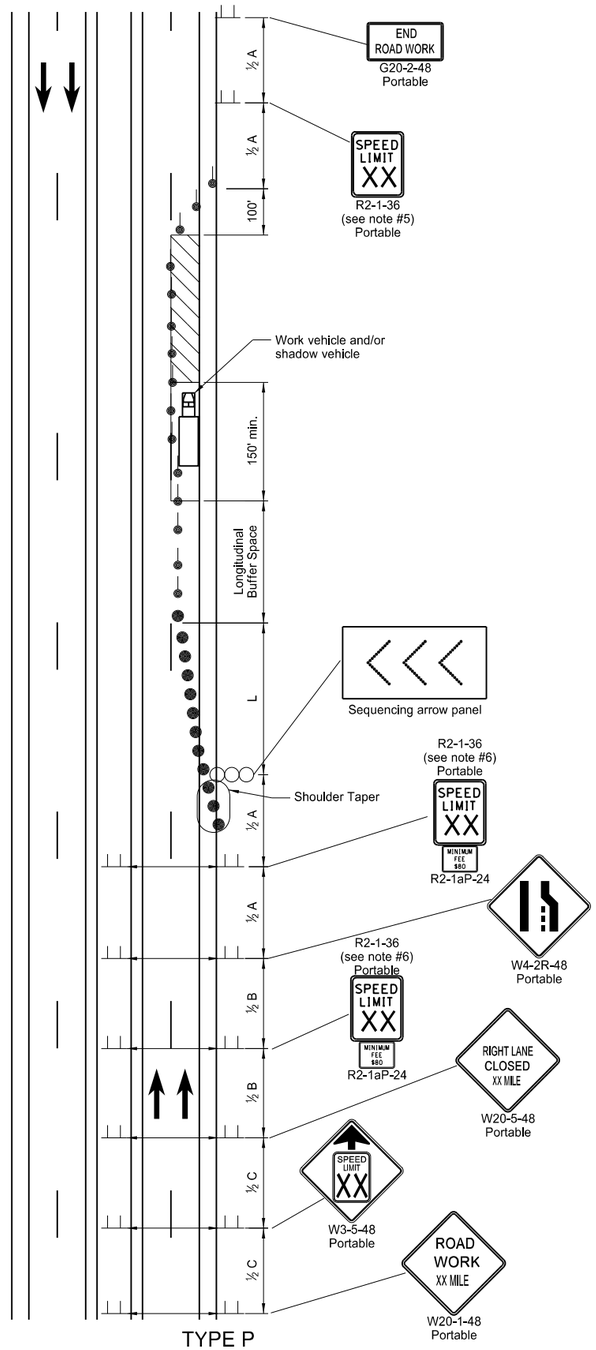
REVISIONS

DATE	CHANGE
8-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

SHORT TERM URBAN DETOUR AND LANE CLOSURE ON A DIVIDED HIGHWAY LAYOUTS

D-704-23

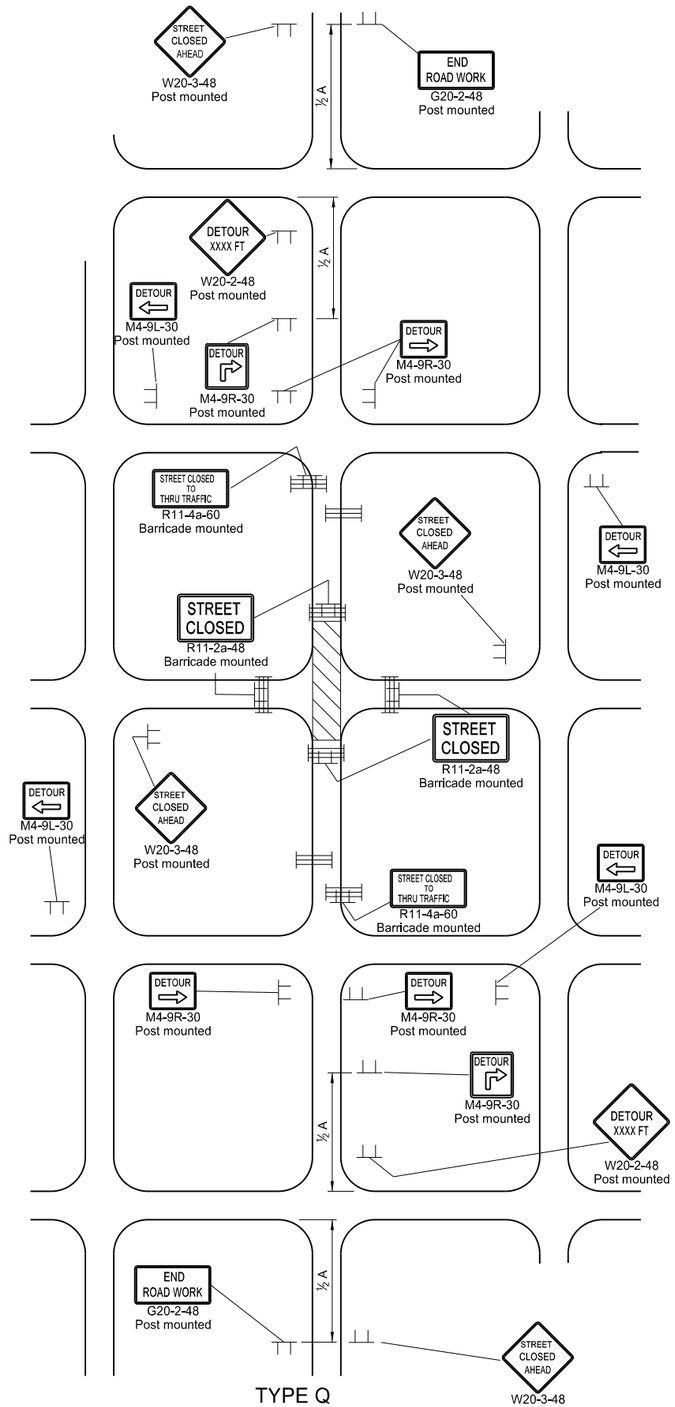


TYPE P

STATIONARY LANE CLOSURE ON A DIVIDED HIGHWAY

4 lane divided roadway where ½ of roadway is closed.

Short-term (more than 1 hour within a single daylight period.)



TYPE Q

DETOUR FOR A CLOSED STREET

Where city streets are used for detouring traffic.

Urban projects do not require the G20-55-96 and R2-1aP-24 signs.

Notes

1. Variables
   - S = Numerical value of speed limit or 85th percentile.
   - W = The width of taper in feet
   - L = Minimum length of taper, S x W for freeways, expressways, and 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. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
4. Place Sequencing Arrow Panels at the beginning of taper. Where shoulder width does not provide sufficient room, move panel closer to the work area and place on roadway surface.
   - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   - Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   - Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-established speed limit. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within a reduced speed zone.
9. Covered (when approved by engineer) or obliterated payment marking measured as as Obliteration of Pavement Marking.
10. Change intersection control on detour for Type Q when determined necessary by the engineer.
11. Engineer to determine safe speed where necessary. When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Recommend using 40 mph speed limit in vicinity of workers for Layout Type P, unless location and conditions dictate otherwise.

KEY

Type III barricade	Work area
Sign	Sequencing arrow panel
Delineator Drum	Tubular Markers

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

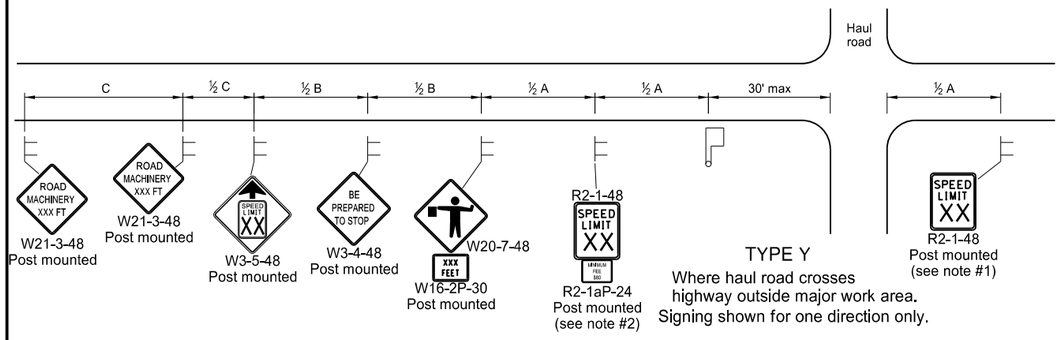
REVISIONS

DATE	CHANGE
8-17-17	Removed Speed limit signs, & updated notes & sign numbers.
11-01-19	Revised sign numbers & note.

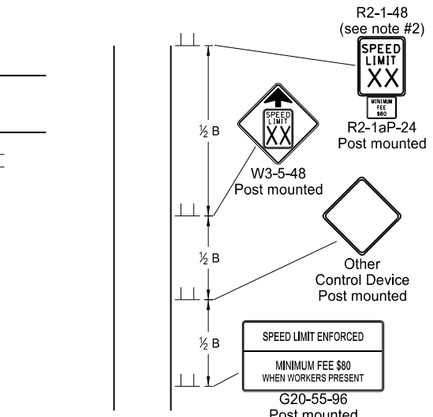
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

MISCELLANEOUS SIGN LAYOUTS

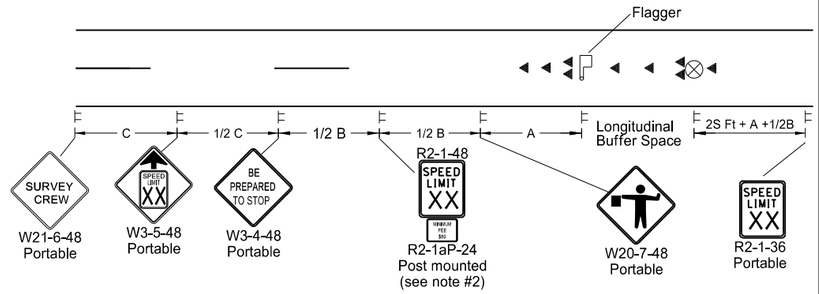
D-704-26



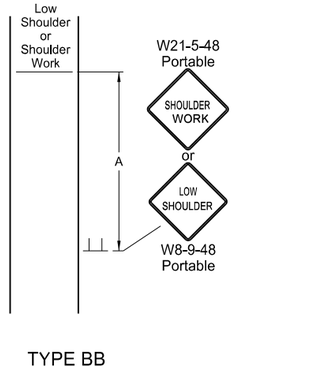
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



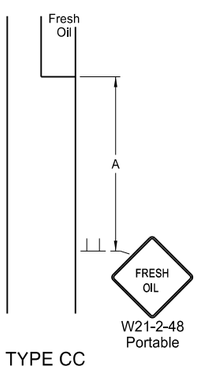
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



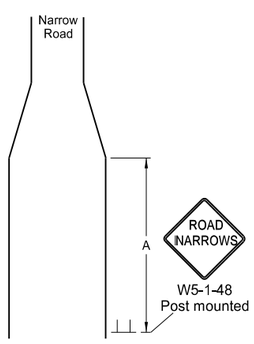
TYPE AA
Where survey crew is used
Signing shown for one direction only.



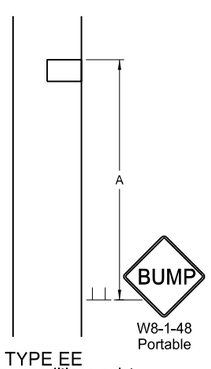
TYPE BB
Within major work area where sign conditions exist



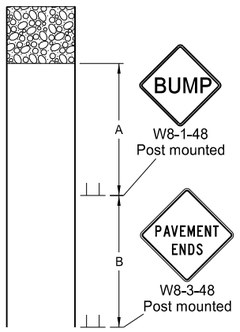
TYPE CC
Where sign conditions exist



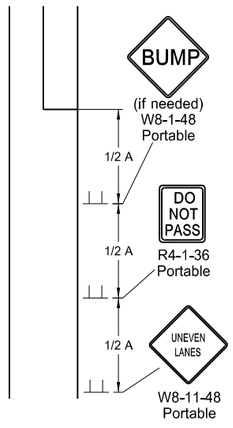
TYPE DD
Where sign conditions exist



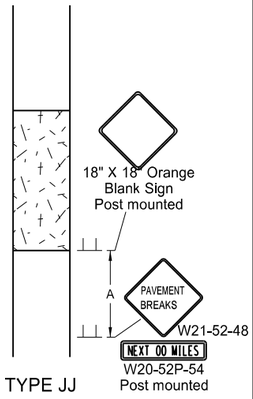
TYPE EE
Where sign conditions exist



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



TYPE GG
Where elevation difference exists between lanes

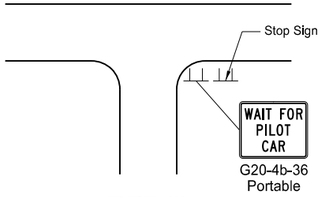


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

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

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

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

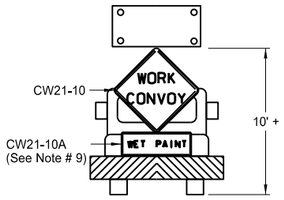
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers

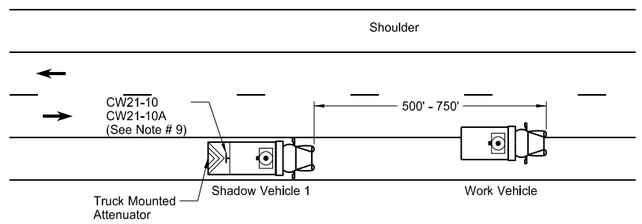
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
(PAVEMENT MARKING)

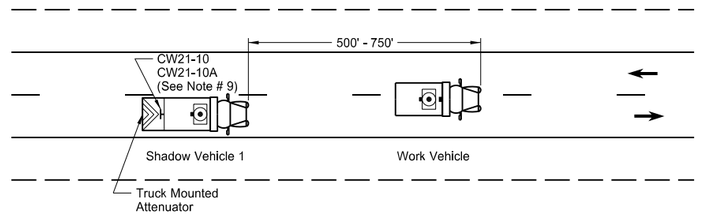
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

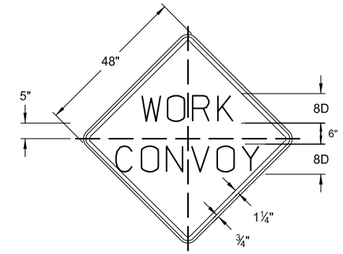


Two-Way Roadway with Paved Shoulders

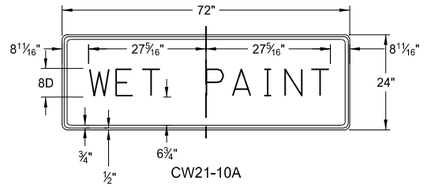


Two-Way Roadway without Paved Shoulders

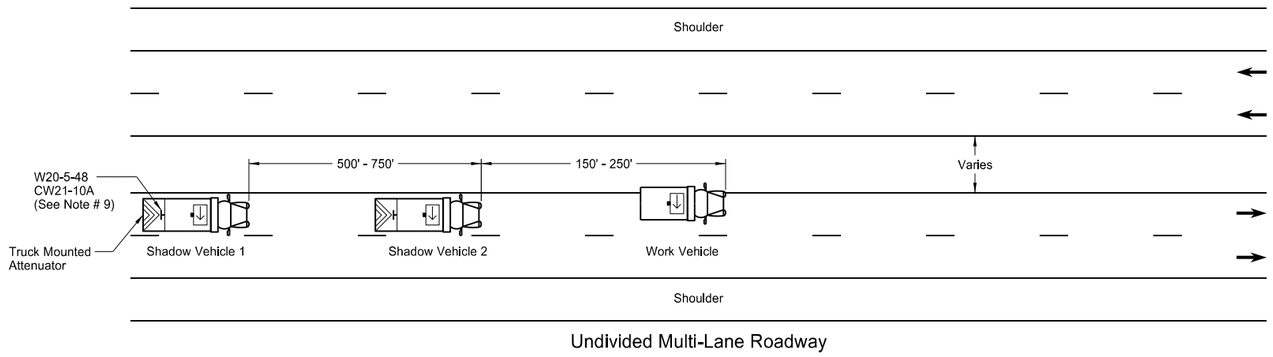
Sign Details



CW21-10

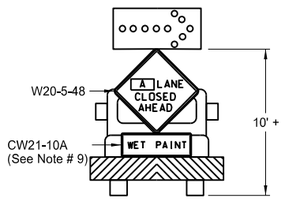


CW21-10A



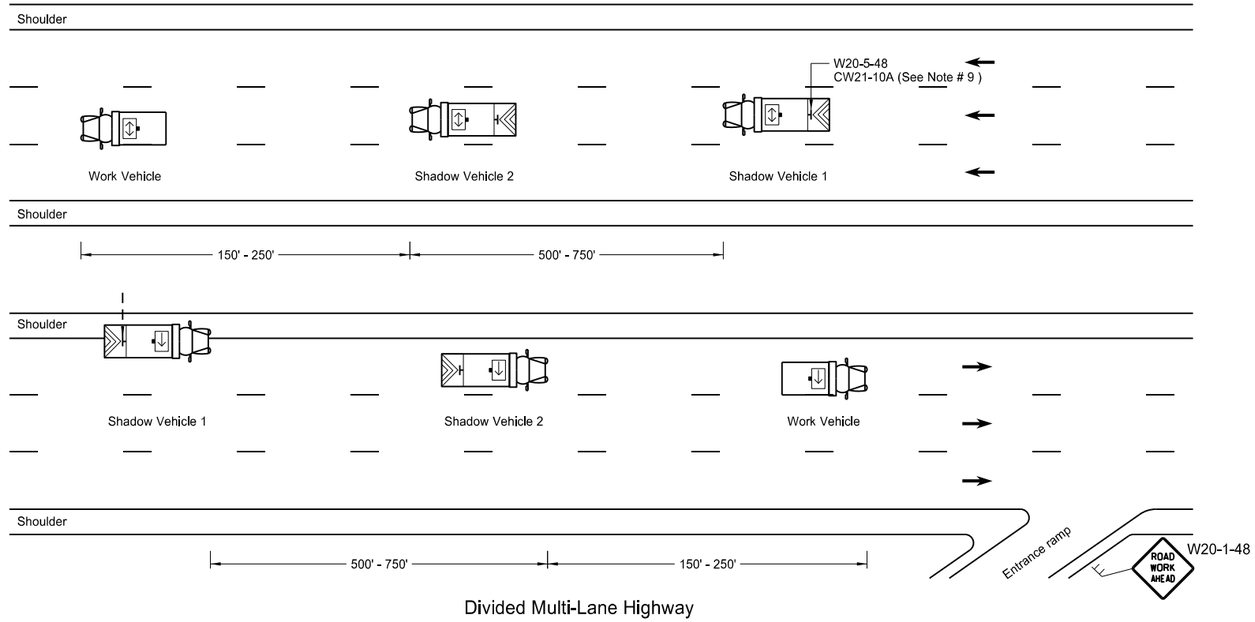
Undivided Multi-Lane Roadway

Notes
1. Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
2. Display yellow rotating beacons or stobe lights on shadow and work vehicles, unless otherwise stated in the plans.
3. Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
4. Provide each vehicle with two-way electronic communication capability.
5. Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
6. Vary vehicle spacing between shadow vehicle 1 and shadow vehicle 2 based on sight distance restrictions. Motorists approaching the work convoy need to see trail vehicle in time to slow down and/or change lanes as they approach shadow vehicle.
7. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange
8. As an option, use shadow vehicle 2 the paint tender vehicle.
9. Use sign CW21-10A only during painting operation.
10. Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

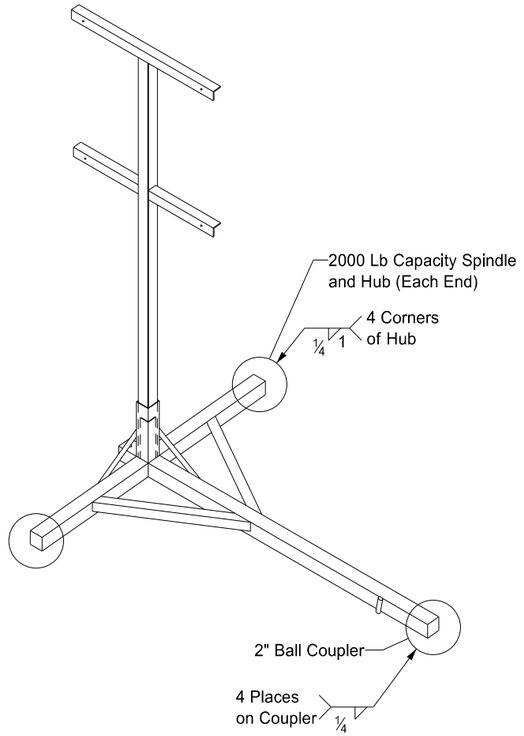
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

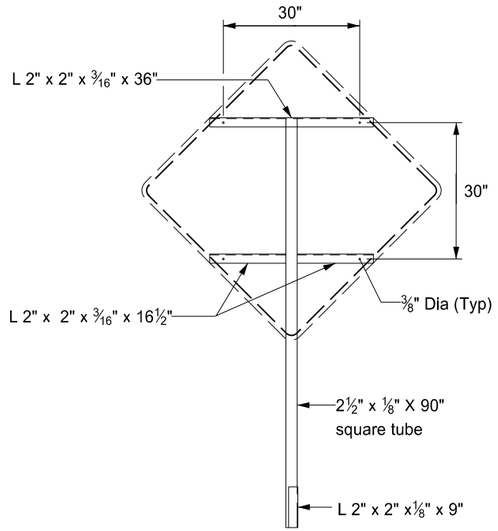
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/08/19 and the original document is stored at the North Dakota Department of Transportation

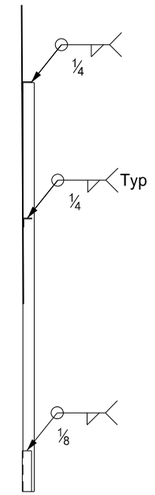
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

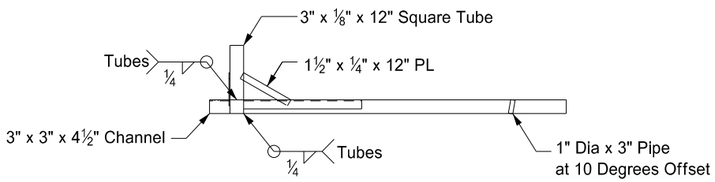


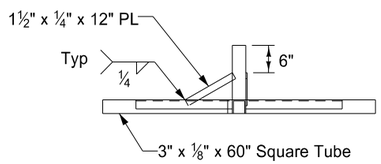
RIGHT

SIGN SUPPORT

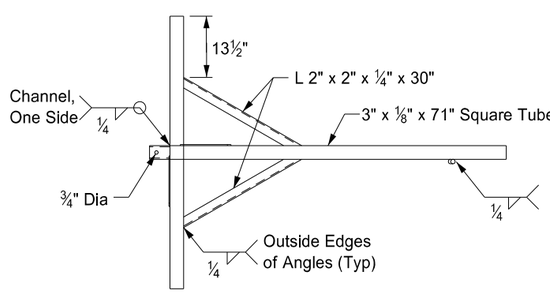
Notes:

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





RIGHT



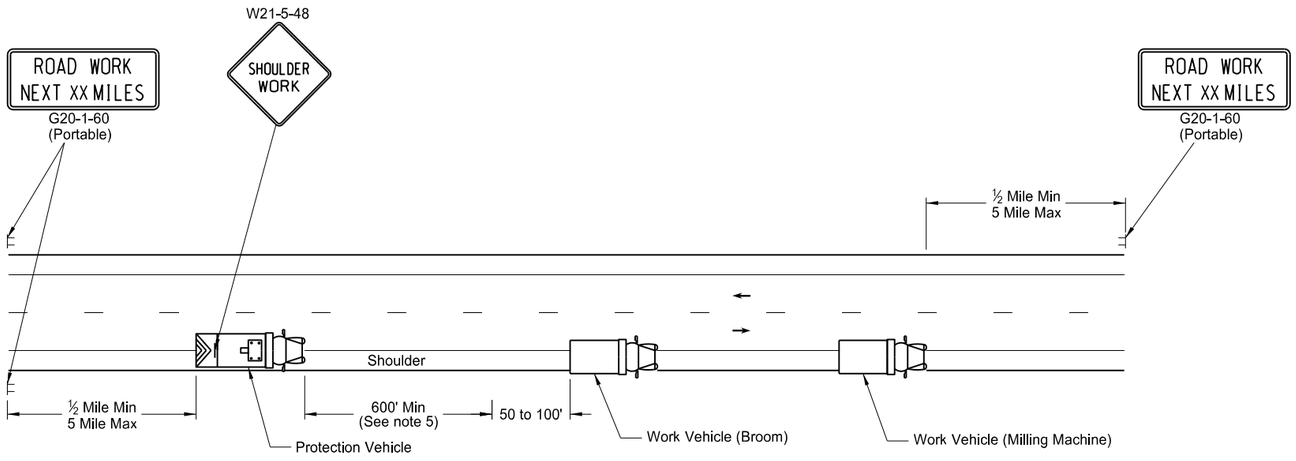
TOP

TRAILER

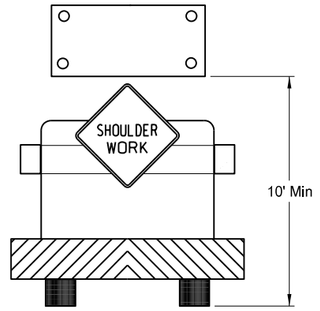
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 12/2/20 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
Grinding Shoulder Rumble Strips



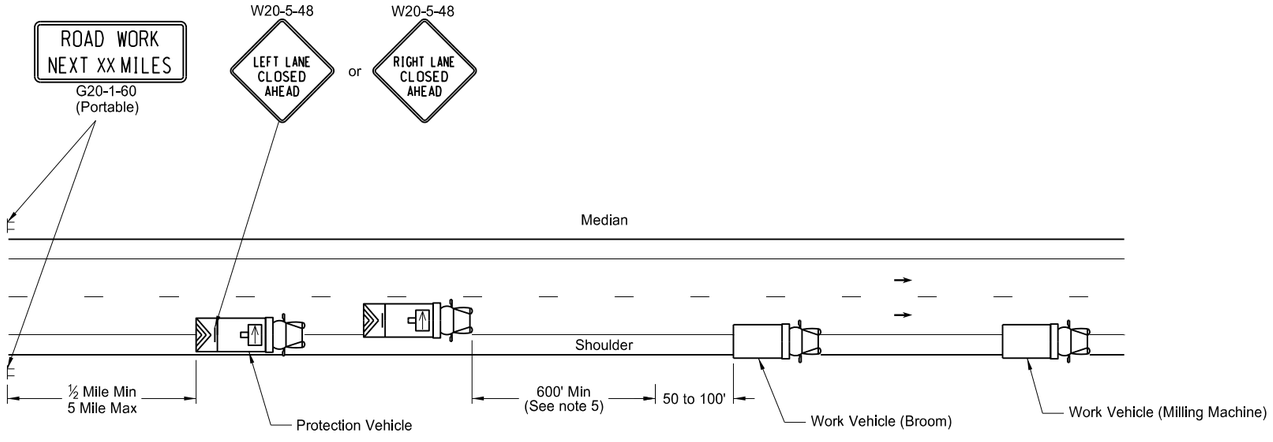
TWO LANE - TWO WAY ROADWAY



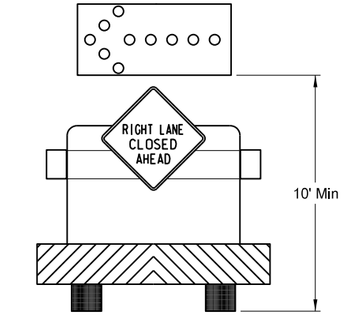
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with Flashing Arrow Panel In Caution Mode

Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
4. Provide two - way electronic communication capability in each vehicle.
5. Vary vehicle spacing between the protection vehicle and work vehicle depending on sight distance restrictions. Keep the spacing of the convoy vehicles such that motorists approaching the work convoy can see the protection vehicle in time to slow down and safely pass the work vehicles.
6. Move advance Road Work Ahead signs as the work area moves through the construction zone.

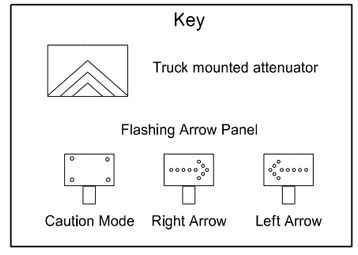


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow Panel In Flashing Arrow Mode

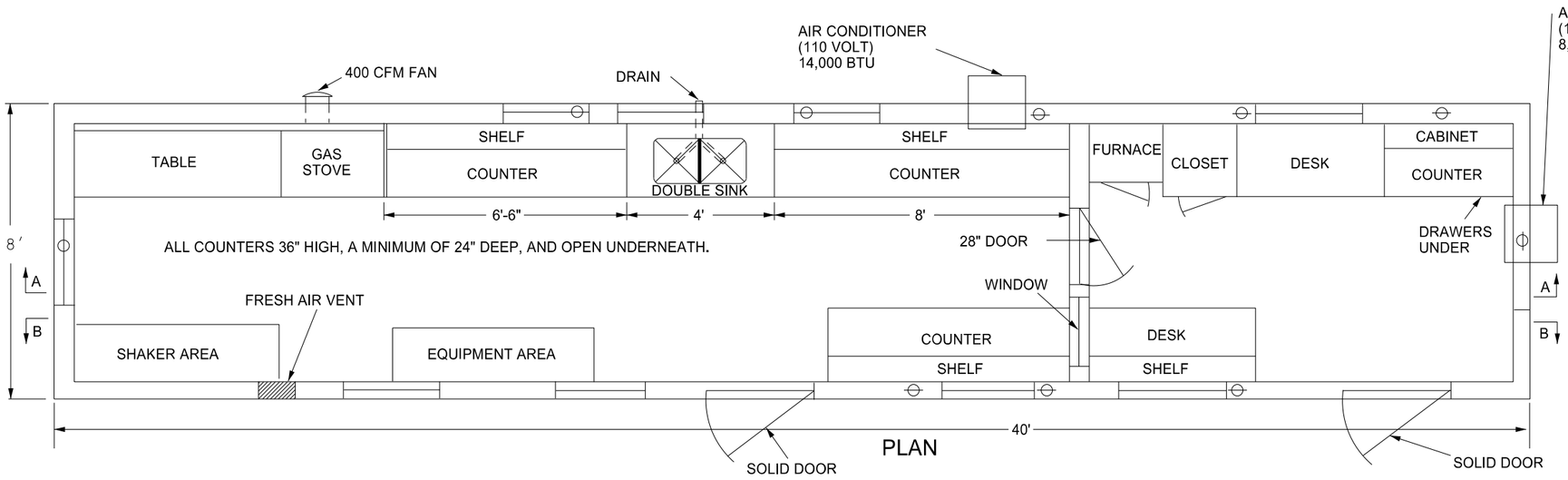


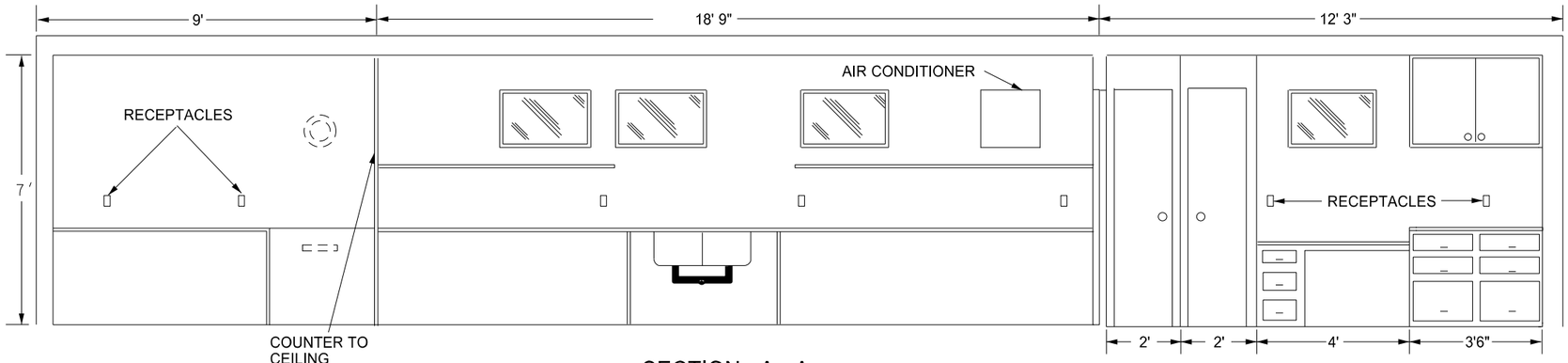
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 10/3/19 and the original document is stored at the North Dakota Department of Transportation

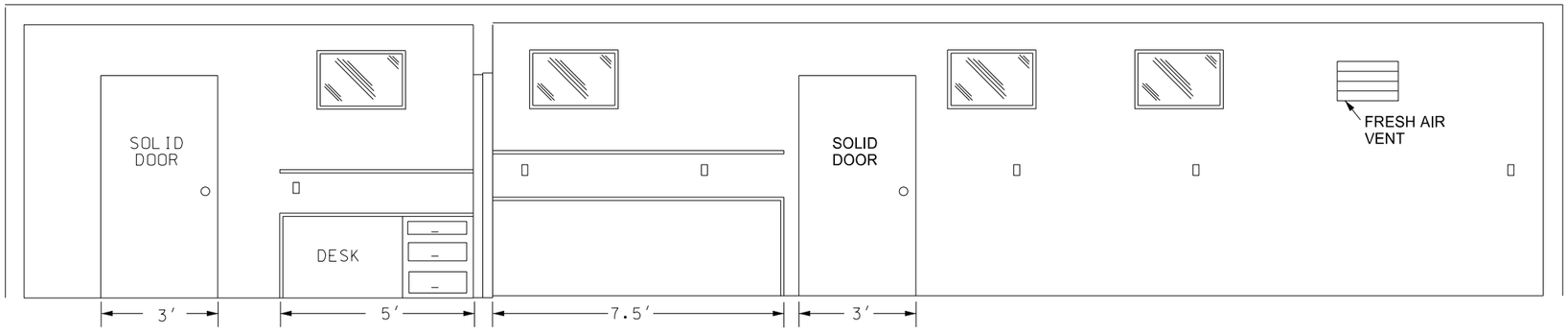
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

Provide a laboratory with the following:

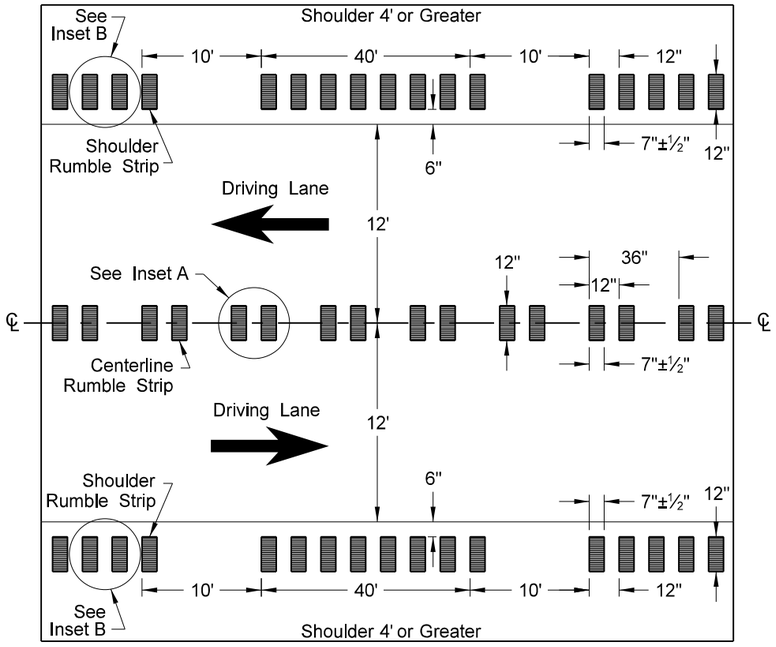
1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

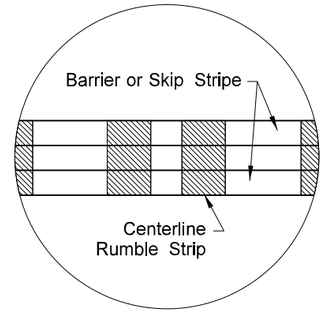
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)

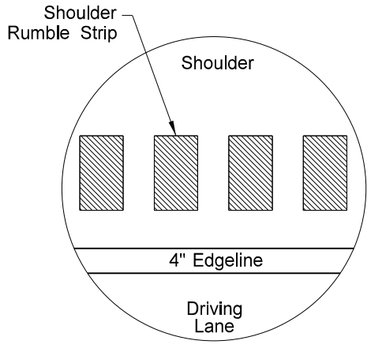
D-760-3



Undivided Highways (Shoulders 4' or Greater)



Inset A - Centerline Rumble Strip

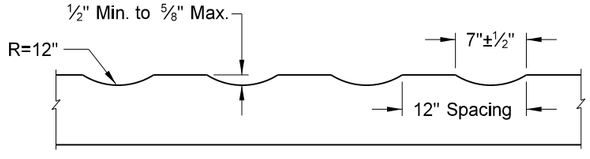


Inset B - Shoulder Rumble Strip

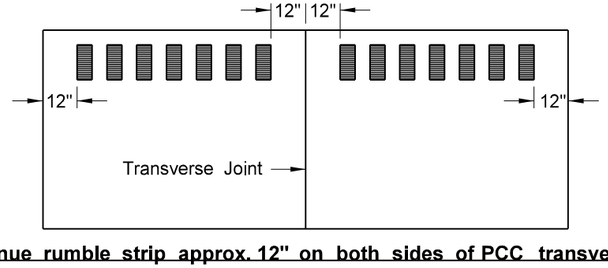
NOTES:

1) Discontinue shoulder rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.

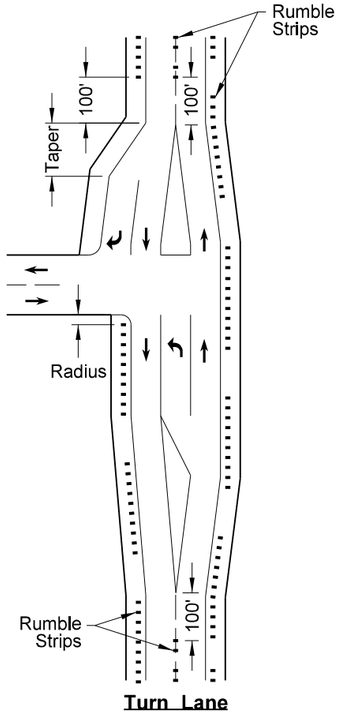
2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, and 100' before and after a paved or gravel highway, section line, approach, or private drive.



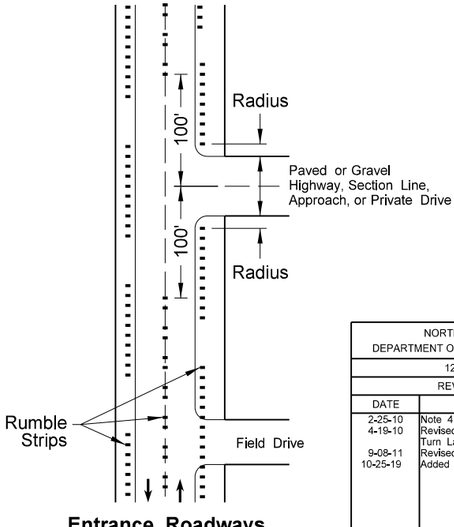
Profile of Rumble Strips - Bituminous and PCC Pavements



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint



Turn Lane (Right & Left)

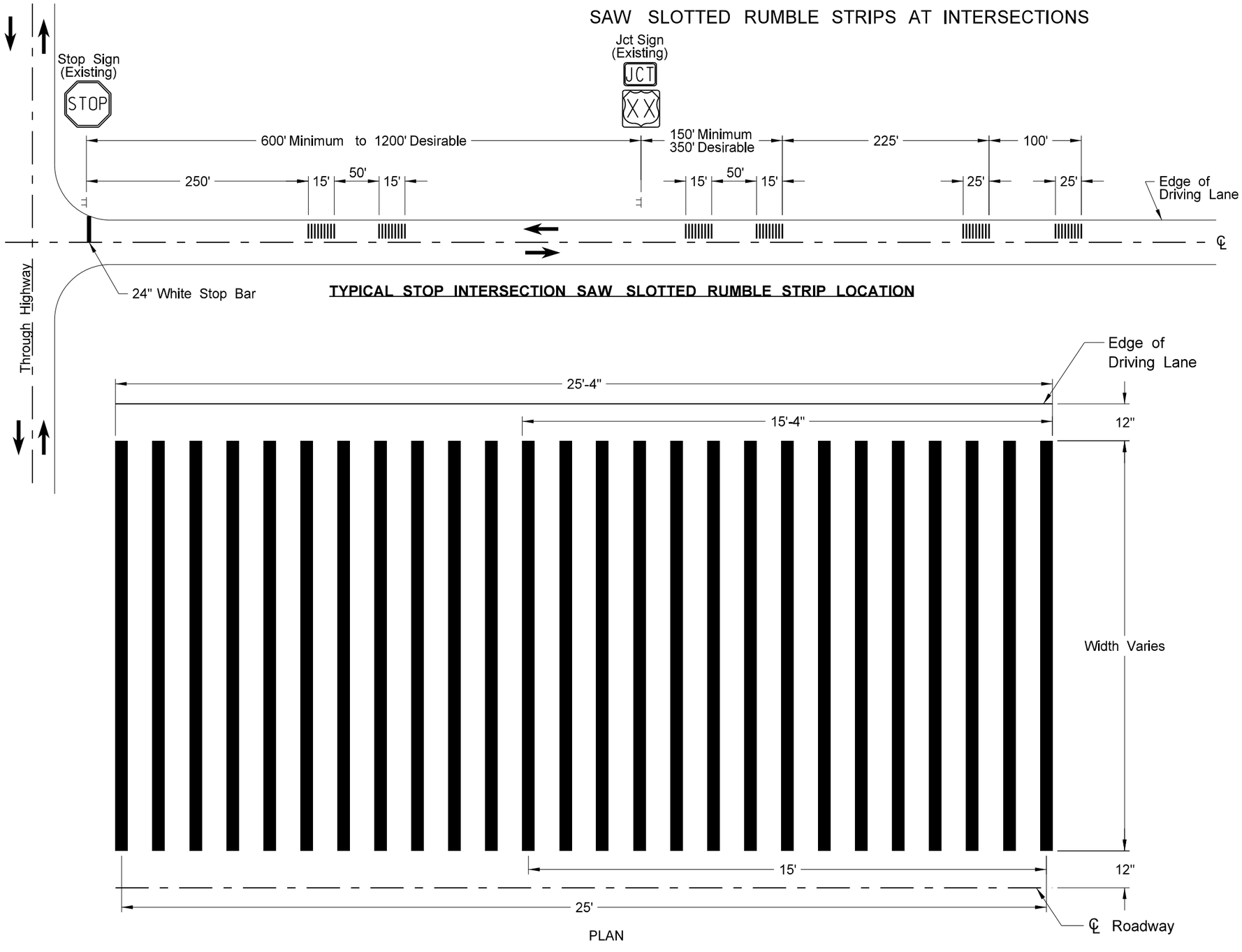


Entrance Roadways

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10 4-19-10 9-08-11 10-25-19	Note 4 was added. Revised Note 5, Note 6, and Turn Lane (Right & Left). Revised Notes and D-760-3. Added missing dimensions.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/25/19 and the original document is stored at the North Dakota Department of Transportation

SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS



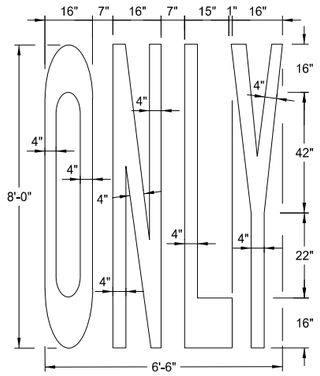
SAW SLOTTED RUMBLE STRIP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-22-10	Saw Slotted width revised.
2-25-10	Note 7 was added.
9-8-11	Revised Notes and D-760-5.
7-7-14	Deleted Notes.
8-27-19	New Design Engr PE Stamp.

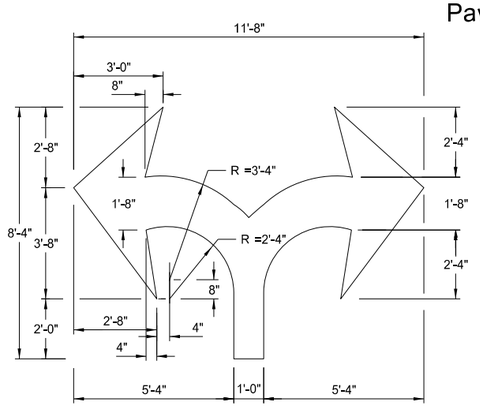
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 , on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

Pavement Marking Message Details

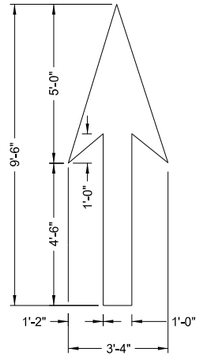
D-762-1



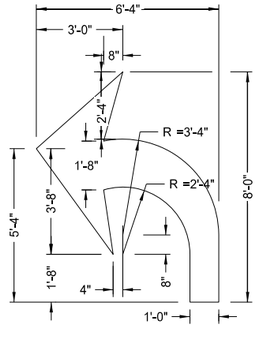
22 S. F.



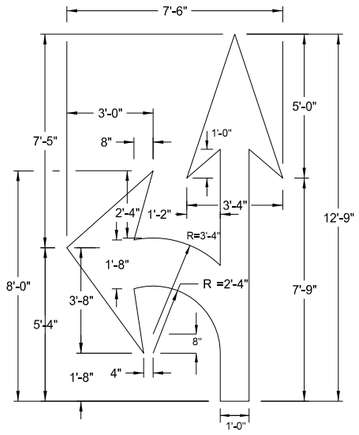
29 S. F.



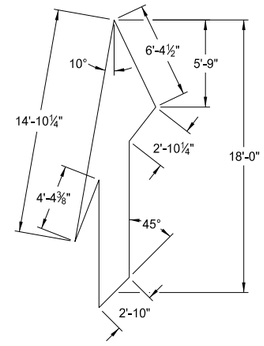
12 S. F.



16 S. F.

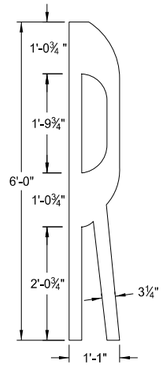


27 S. F.

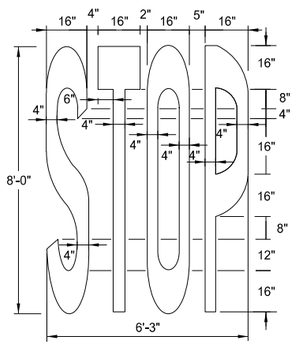


41 S. F.

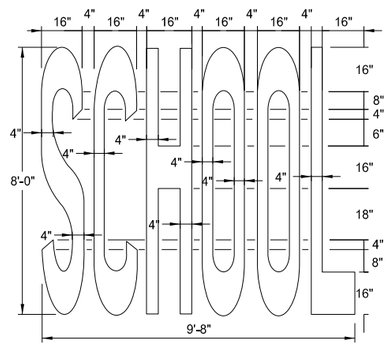
Note: Rotate merge arrow 20° from edge of roadway.



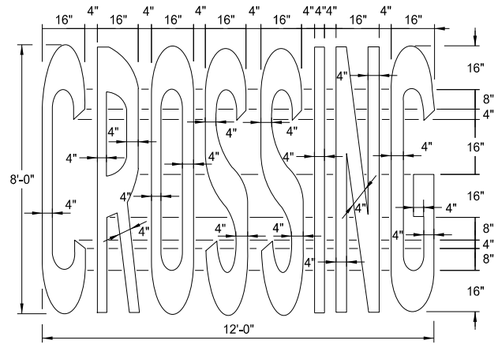
4 S. F.



22 S. F.



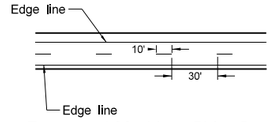
34.5 S. F.



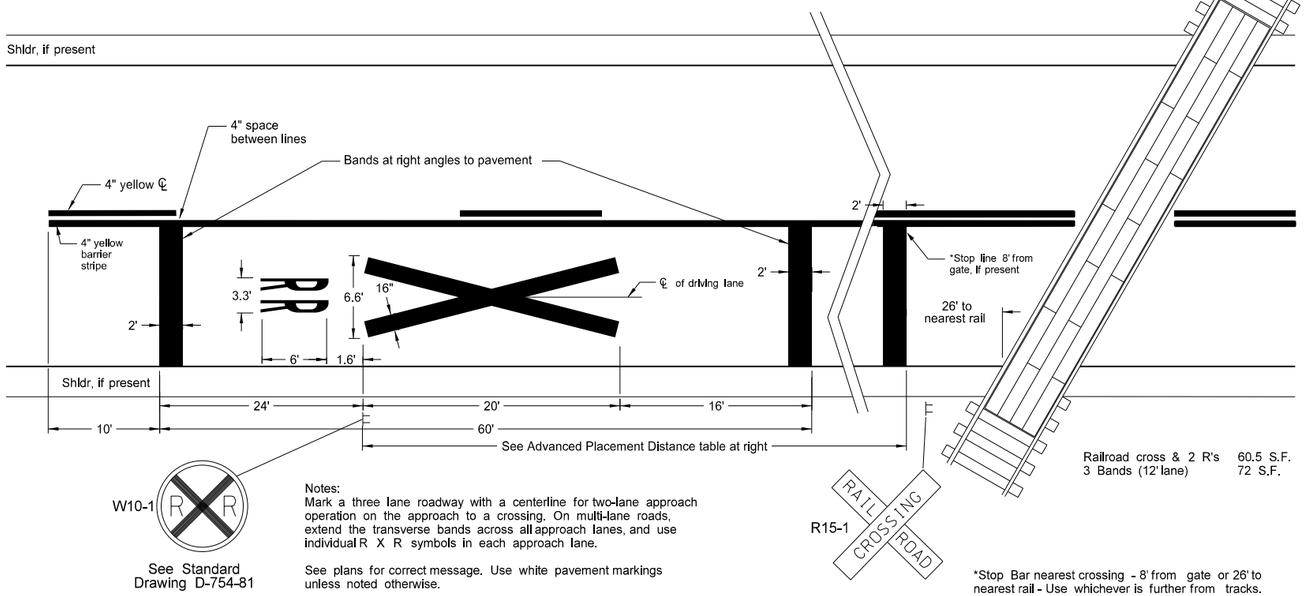
46 S. F.

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

Chevron Crosshatching Table



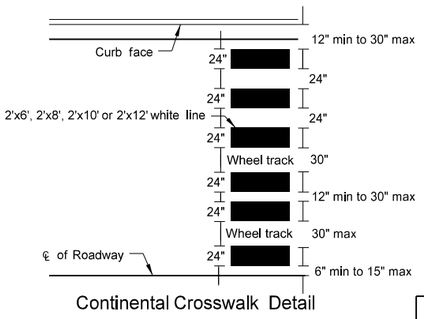
Centerline Pavement Marking Skip Spacing Detail



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

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

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



Continental Crosswalk Detail

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

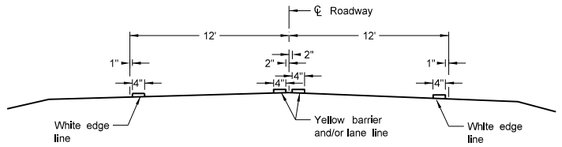
REVISIONS

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

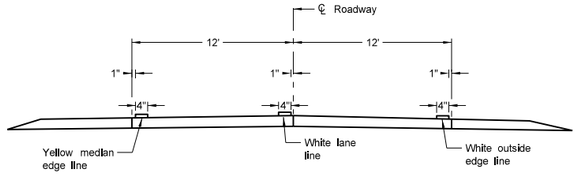
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 1/28/2020 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

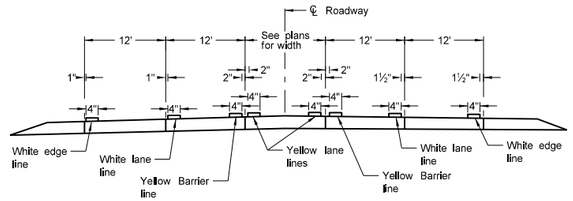
D-762-4



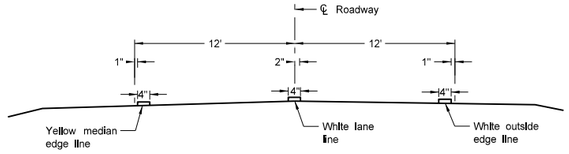
Two Lane Two Way
RURAL ROADWAY



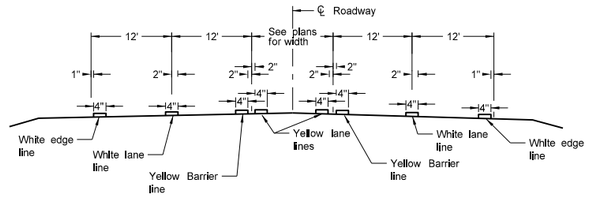
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



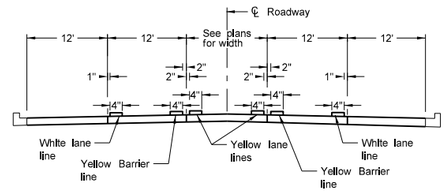
RURAL FIVE LANE ROADWAY
Concrete Section



Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



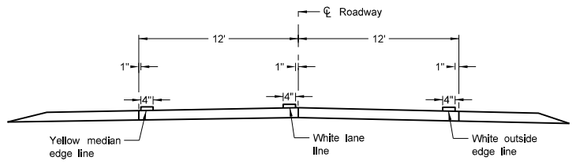
RURAL FIVE LANE ROADWAY
Asphalt Section



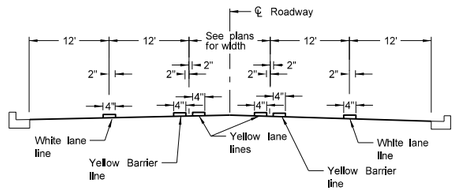
URBAN FIVE LANE SECTION
Concrete Section

NOTES:

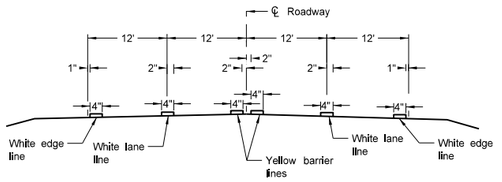
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.



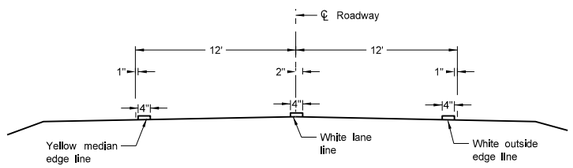
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



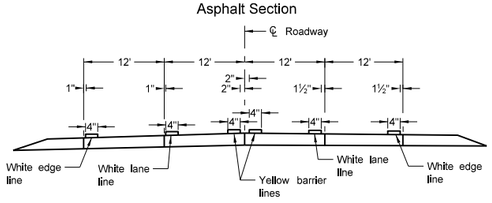
URBAN FIVE LANE SECTION
Asphalt Section



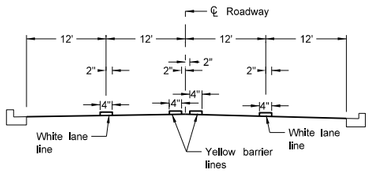
RURAL FOUR LANE ROADWAY
Asphalt Section



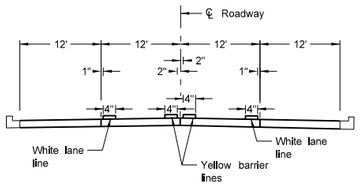
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



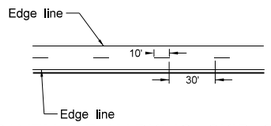
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



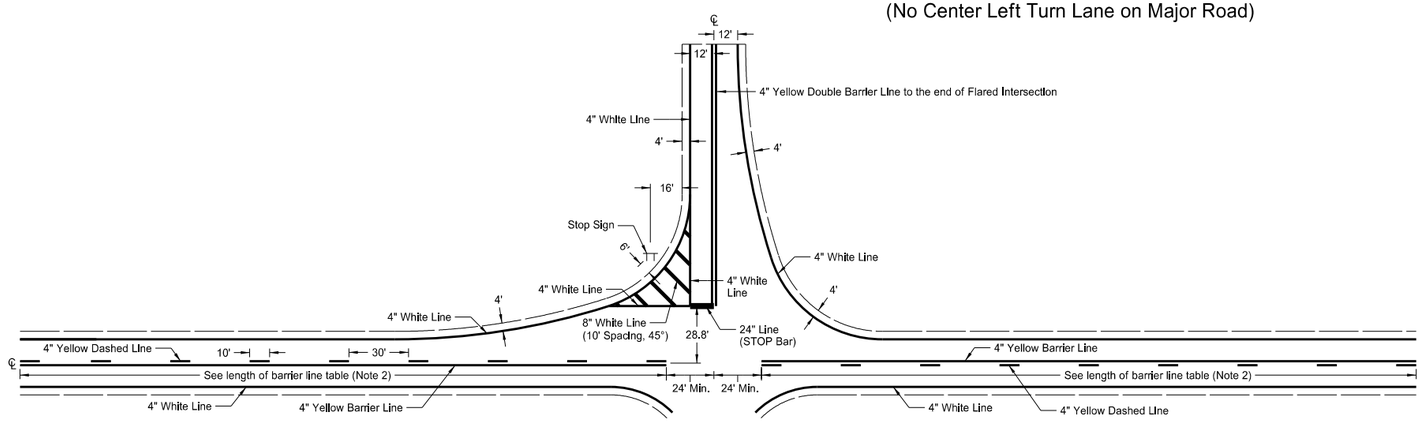
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19	Updated to active voice. New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

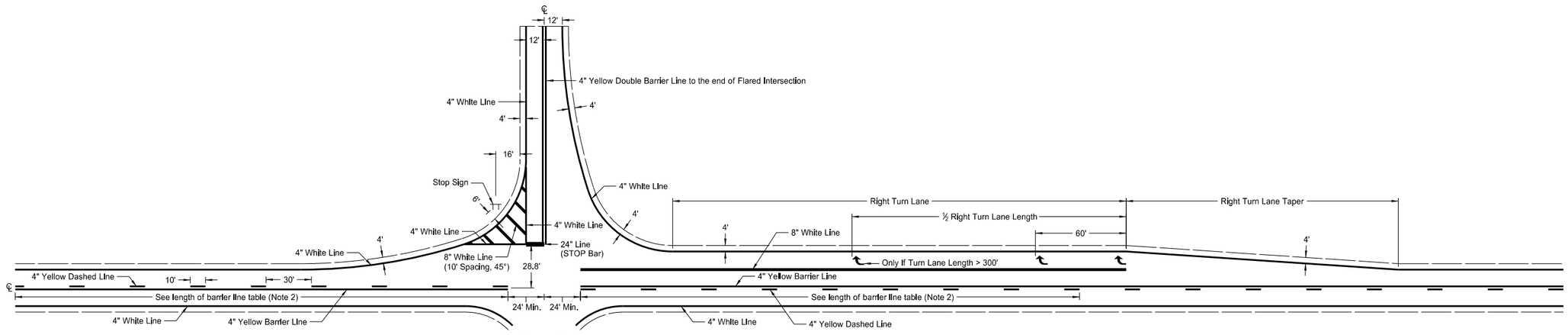
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

(No Center Left Turn Lane on Major Road)



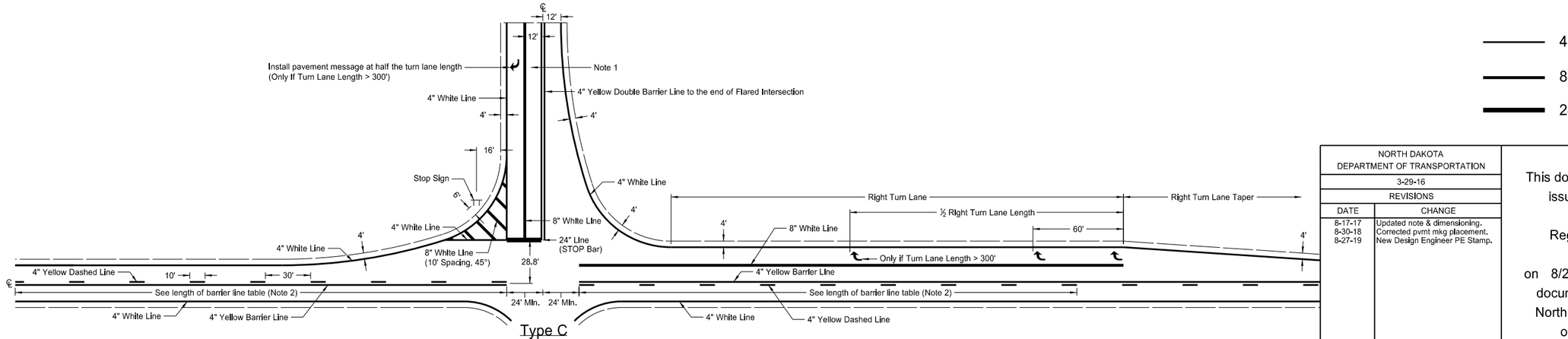
Type A

(No turn lanes present)



Type B

(Right Turn Lane on Major Road)



Type C

(Right Turn Lane on Major Road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)

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

4" Marking

8" Marking

24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17 8-30-18 8-27-19	Updated note & dimensioning. Corrected pvmt mkg placement. New Design Engineer PE Stamp.

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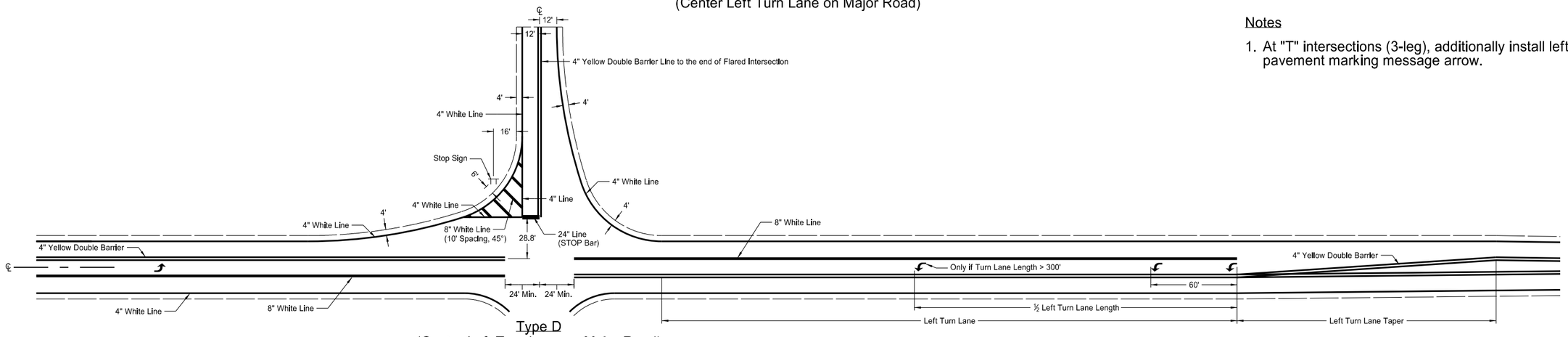
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

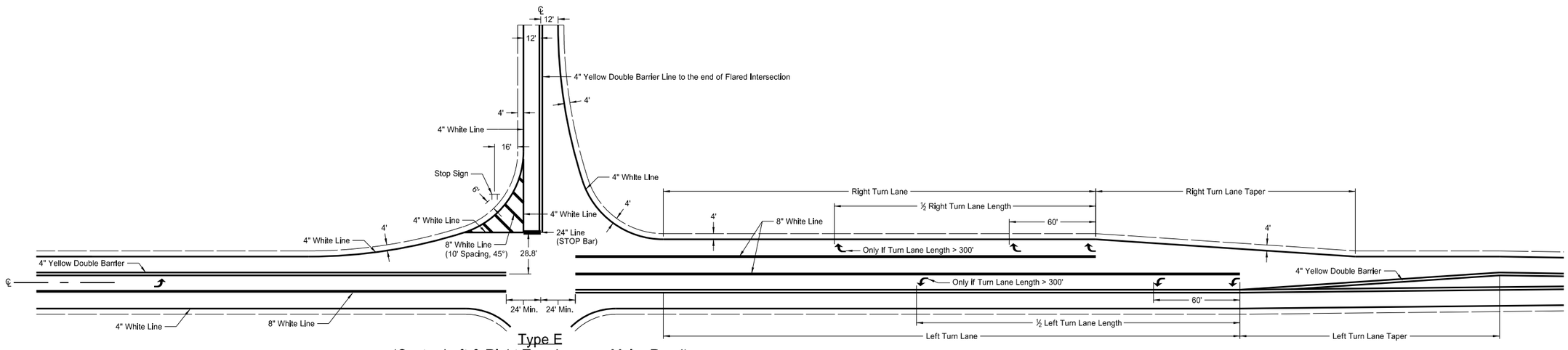
D-762-6

(Center Left Turn Lane on Major Road)



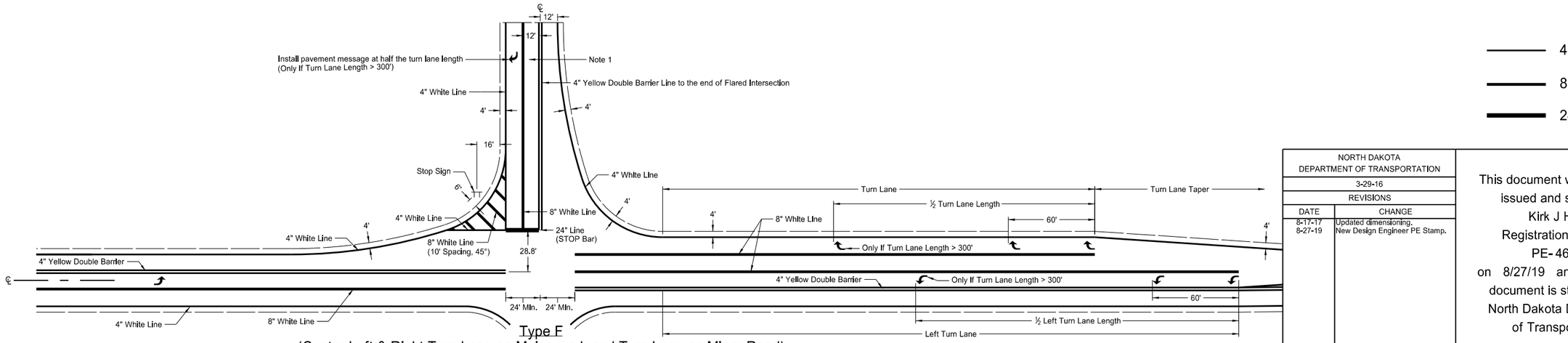
Type D

(Center Left Turn Lane on Major Road)



Type E

(Center Left & Right Turn Lane on Major Road)



Type F

(Center Left & Right Turn Lane on Major road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.

4" Marking

8" Marking

24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Updated dimensioning.
8-27-19	New Design Engineer PE Stamp.

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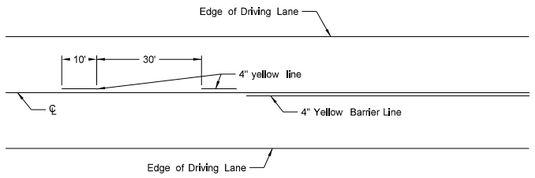
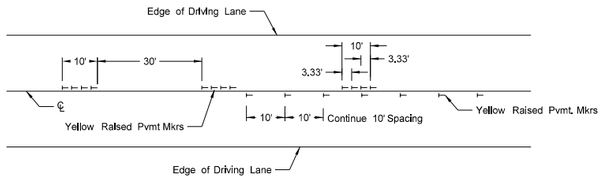
SHORT-TERM PAVEMENT MARKING

D-762-11

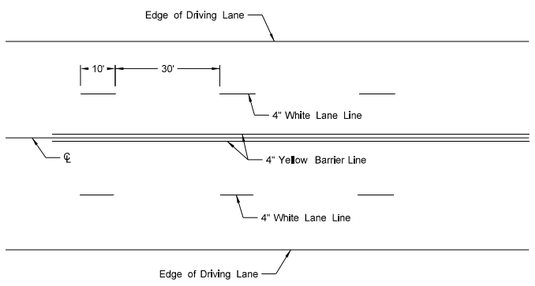


Painted or Tape Lines

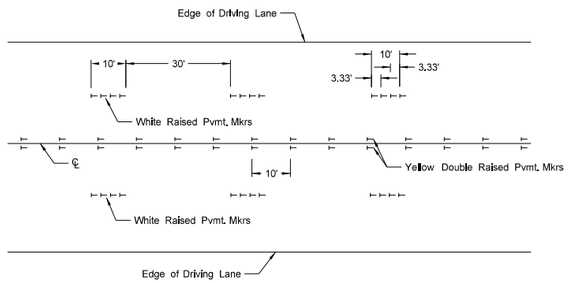


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

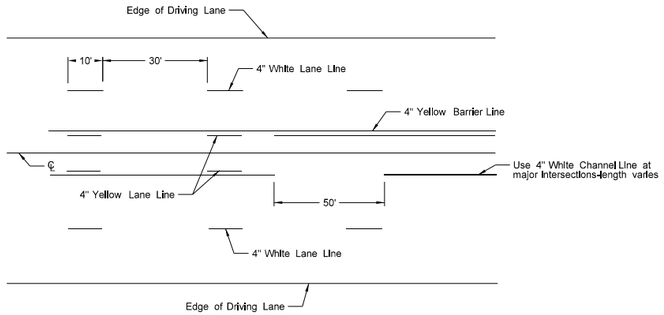


Painted or Tape Lines

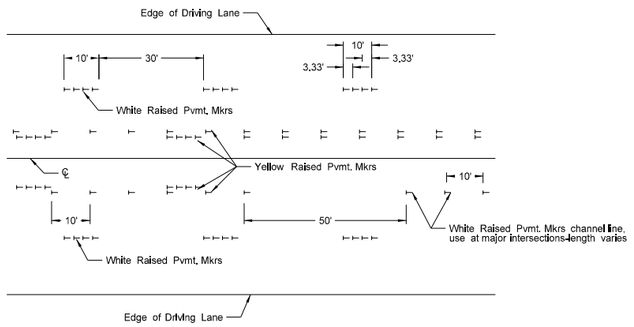


Raised Pavement Markers

FOUR LANE ROADWAY

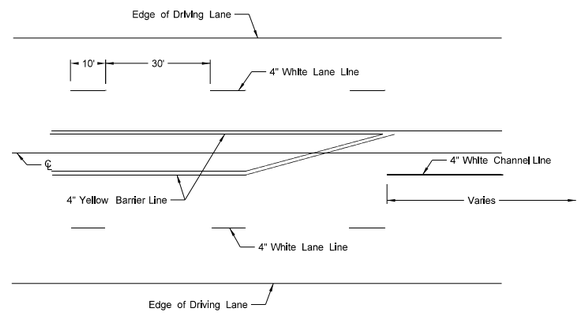


Painted or Tape Lines

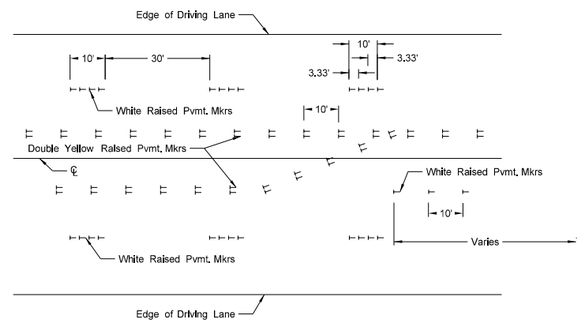


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.

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