DESIGN DATA				
Traffic	Average Daily			
Current 2015	Pass: 971	Trucks: 141	Total: 1,112	
Preventive Maintenance				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	21661	1	1

JOB # 18
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

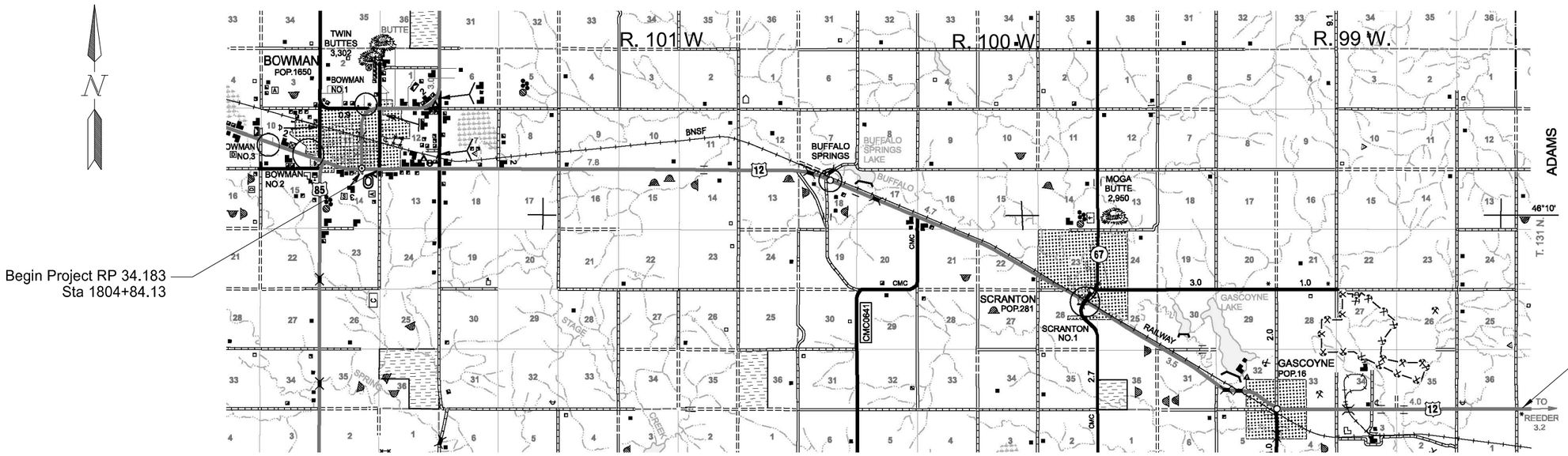
NH-5-012(045)034

Bowman County
East Bowman east to County line

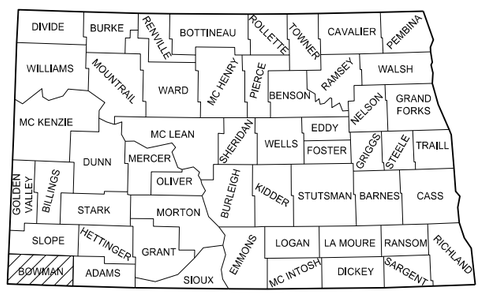
Mill & RAP HMA

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-5-012(045)034 Milling & RAP HMA	19.853	19.933



Structure Numbers	
12-034.221	Box Culvert
12-041.350	Box Culvert
12-042.540	Box Culvert
12-046.415	Bridge Overpass
12-049.205	Box Culvert
12-049.406	Bridge
12-051.308	Structural Plate Pipe
12-051.831	Box Culvert



STATE COUNTY MAP

DESIGNERS

Rob Rayhorn /s/

Jay Lutes /s/

Jason Fischer /s/

Bonnie Brown /s/

Denis Oyugi /s/

APPROVED DATE 12/16/16

Larry Gangl /s/
Dickinson District
ND DEPARTMENT OF TRANSPORTATION

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

APPROVED DATE 12/16/16

Rob Rayhorn /s/
Dickinson District

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-012(045)034	2	1

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PLAN SECTIONS

LIST OF STANDARD DRAWINGS

SPECIAL PROVISIONS

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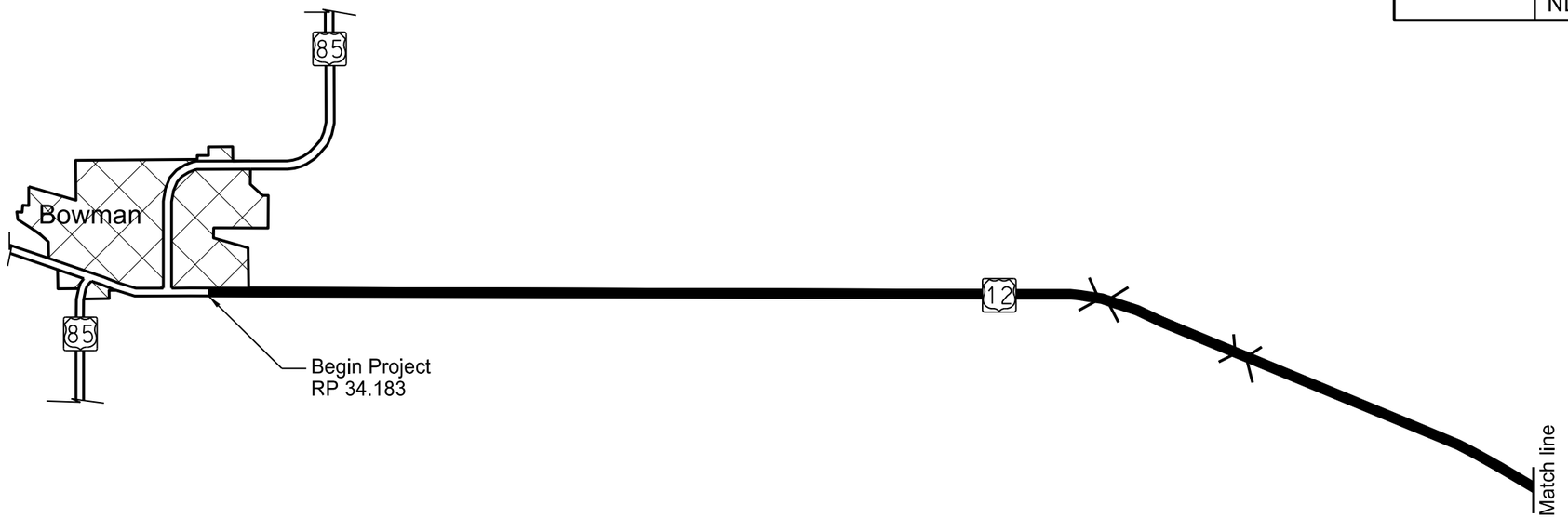

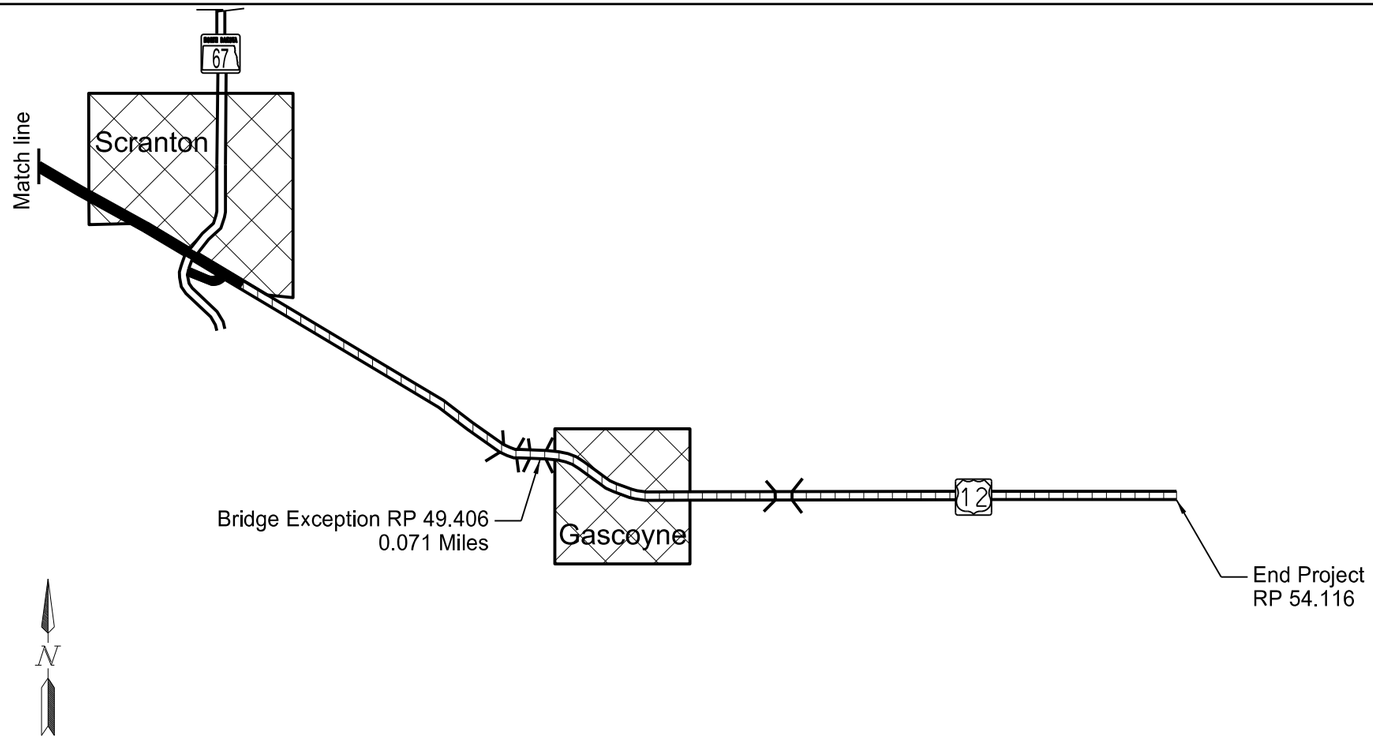

Mill and RAP HMA with paved shoulders

Mill and RAP HMA with gravel shoulders

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Scope of Work

Mill and RAP HMA

US 12 E Side of Bowman E to County line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-012(045)034	6	1

NOTES

GENERAL NOTES

100-P01 HEIGHT OF EQUIPMENT: All portions of all trucks and equipment must be kept lower than 20’ above the roadway between R.P. 37.6 and 38.4.

107-700 HAUL ROADS: The Engineer will not designate paved roads off the state system as haul roads.

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

230-P01 SHOULDER PREPARATION: In addition to the requirements of Section 230.03 B, till or disk the inslope a minimum of 2’ and a maximum of 4’ wide from the bottom of the existing slough. Blade away the tilled or disked material from the pavement sloughs before overlay placement. After the bituminous pavement has been placed on the shoulders, provide a smooth transition between the top of the pavement slough and existing inslope. Remove all asphalt chunks, rock, and lumps of sod or dirt to allow a smooth transition.

251-P01 SEEDING: In addition to the requirements of the Class II seed, add oats at 10 pounds pure live seed per acre.

302-P01 SALVAGED BASE: Virgin class 5 is not allowed as a substitute for salvaged base unless all of the milled material has been used elsewhere on the project.

411-P01 MILLING PAVEMENT SURFACE: Change the 5 day requirement in the last sentence of specification 411.04 to 10 calendar days.

411 P02 MILLING AT GUARDRAIL: Mill the guardrail widening 2” deep to the face of the guardrail.

430-P01 PAVING AT GUARDRAIL: Place 2” of RAP - Superpave FAA 45 on the milled surface at the guardrail widening.

570-P01 PCC GRINDING: Upon completion of the HMA overlay, grind the HMA on the edge of the bridge deck, through the HMA overlaid approach slab and into the new HMA to provide a smooth transition.

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. W8-9a-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52-54 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-P01 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. Provide additional devices at no additional cost to the Department.

1. Standard D-704-15, layout A;
2. Standard D-704-20, layout G .
3. Standard D-704-22, layouts K and L; and
4. Standard D-704-26, layouts CC, EE, and GG.

When installing layout G from Standard D-704-20, move sign W3-5-48 and the sign assembly containing signs R2-1-48 and R2-1a-24 with the work area as it progresses through the construction zone. Place the R2-1-48 assembly a minimum of 500 feet in advance of flagging signs.

Place flaggers and traffic control devices as shown on Standard 704-15, layout A at the intersection of ND 67 and intersection at the Gascoyne road when the lane closure spans across them.

704-P02 TRAFFIC CONTROL FOR MILLING TRANSITIONS: Use D-704-26, Type EE and Type Z after milling the transitions at the begin / end project and bridge ends to show the location of the bump and to reduce the speed to 35 MPH. Place the “Bump” sign after the speed zone. Resume speed after the milling transition.

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NOTES

762-P01 SHORT TEM PAVEMENT MARKINGS: The plan quantity includes 4 applications of short term pavement markings; one application after milling, one application on the milled surface after paving one lane, one application centered on the road after the paving lanes are evened up, one application after the rumble strips are fogged.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
230	0125	SHOULDER PREPARATION	MILE	27.525	27.525
251	0200	SEEDING CLASS II	ACRE	10.01	10.01
302	0100	SALVAGED BASE COURSE	TON	3,307	3,307
401	0050	TACK COAT	GAL	20,595	20,595
411	0100	MILLING PAVEMENT SURFACE	TON	19,797	19,797
430	0145	RAP - SUPERPAVE FAA 45	TON	45,264	45,264
430	1000	CORED SAMPLE	EA	232	232
430	5828	PG 58-28 ASPHALT CEMENT	TON	1,810	1,810
570	0210	PCC PAVEMENT GRINDING	SY	480	480
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	800	800
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,894	1,894
704	1067	TUBULAR MARKERS	EA	245	245
704	1185	PILOT CAR	HR	300	300
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	37.862	37.862
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	18.931	18.931
762	0103	PVMT MK PAINTED-MESSAGE	SF	186	186
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	237,032	237,032
762	0434	SHORT TERM 8IN LINE-TYPE NR	LF	1,075	1,075
762	0442	SHORT TERM MESSAGE-TYPE NR	SF	186	186
762	1104	PVMT MK PAINTED 4IN LINE	LF	271,130	271,130
762	1108	PVMT MK PAINTED 8IN LINE	LF	1,075	1,075
762	1124	PVMT MK PAINTED 24IN LINE	LF	111	111

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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		Mainline (4.805 Sta)			Mainline (4.224 Sta)			Mainline (606.04 Sta)			Mainline (34.109 Sta)			Mainline (1.584 Sta)			Mainline (1.848 Sta)			Mainline (296.630 Sta)			Mainline (49.368 Sta)			Mainline (14.045 Sta)			Mainline (14.520 Sta)			Totals
		34.183 to 34.274			41.330 to 41.370 42.520 to 42.560			34.283 to 41.321 41.379 to 42.511 42.569 to 45.877			45.877 to 46.345 46.737 to 46.915			46.398 to 46.428			46.508 to 46.543			46.915 to 48.344 48.634 to 49.049 49.749 to 49.868 50.452 to 54.107			48.344 to 48.634 49.049 to 49.070 49.709 to 49.749 49.868 to 50.452			49.070 to 49.091 49.464 to 49.709			49.100 to 49.375			
Material	Unit	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	Width	Qu./Sta	Quantity	
Milling Pavement Surface (2 Ton/CY)	Ton	36.56	39.0	187.4	36.56	39.0	164.7	32	17.3	10484.5	32.76	17.5	596.9	46.22	25.4	40.2	58.22	32.8	60.6	28.88	17.6	5220.7	32.91	20.0	987.4	40.74	24.9	349.7	41.5	50.3	730.4	**18,823**
Tack Coat (.05 gal/SY)	Gal	36.5	20.3	97.5	35.5	19.7	83.2	35.5	19.7	11939.0	35.5	19.7	671.9	49.5	27.5	43.6	61.5	34.2	63.2	29.5	16.4	4864.7	33	18.3	903.4	40.5	22.5	316.0	41.5	23.1	335.4	**19,318**
RAP - Superpave FAA 45 (2 ton/CY)	Ton	35	44.1	211.9	34	42.88	181.1	34	43.39	26296.1	34	43.16	1472.1	48	60.5	95.8	60	75.3	139.2	28	35.9	10649.0	31.5	39.9	1969.8	39	49.1	689.6	40	50.3	730.4	**42,435**
PG 58-28 Asphalt Cement (4% of Mix)	Ton	35	1.76	8.48	34	1.72	7.25	34	1.74	1051.84	34	1.73	58.89	48	2.42	3.83	60	3.01	5.57	28	1.44	425.96	31.5	1.60	78.79	39	1.96	27.58	40	2.01	29.21	**1,697**
Salvaged Base Course (1.875 Ton/CY)	Ton	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	9.5	2818.0	4	5.4	266.6	-	-	-	-	-	-	**3,085**

		Milling Tapers (5 Ea @ 50')		Turn Lane Transition	Turn Lane Transition	Turn Lane Transition	Milling Tapers (2 Ea @ 50')		Milling Tapers (1 Ea @ 50')		Scranton Loop	Guardrail Widening	Approaches	Sub Totals	Project Totals
		34.274 to 34.283 41.321 to 41.330 41.370 to 41.379 42.511 to 42.520 42.560 to 42.569		46.345 to 46.398	46.428 to 46.508	46.543 to 46.737	49.091 to 49.100 49.455 to 49.464		54.107 to 54.116		See Section 20 for details and estimate of quantities	See Plan Notes 411-P02 & 430-P01	See Section 20 for details and estimate of quantities		
Material	Unit	Quantity (EA)	Total	Quantity	Quantity	Quantity	Quantity (EA)	Total	Quantity (EA)	Total	Quantity	Quantity	Quantity		
Milling Pavement Surface (2 ton/CY)	Ton	14.1	70.5	63.7	128.1	283.8	18.8	37.6	13.3	13.3	276	11	89.5	**974**	**19,797**
Tack Coat (.05 gal/SY)	Gal	10	50.0	70	136	304	11.3	22.6	8.2	8.2	230	10	446	**1,277**	**20,595**
RAP - Superpave FAA 45 (2 ton/CY)	Ton	21.5	107.5	153	297	662	24.6	49.2	18	18.0	501	22	1019	**2,829**	**45,264**
PG 58-28 Asphalt Cement (4% of Mix)	Ton	0.86	4.3	6.12	11.88	26.48	0.984	2.0	0.72	0.7	20.04	0.88	40.76	**113**	**1,810**
Salvaged Base Course (1.875 Ton/CY)	Ton	-	-	-	-	-	-	-	-	-	-	-	222	**222**	**3,307**

Shoulder Preparation

Begin R.P.	End R.P.	Length	Left	Right	Quantity
34.183	46.915	12.732	X	X	25.464
48.344	48.634	0.290	X		0.290
49.049	49.070	0.021		X	0.021
49.070	49.379	0.309	X	X	0.618
49.455	49.709	0.254	X	X	0.508
49.709	49.749	0.040	X		0.040
49.868	50.452	0.584		X	0.584
				TOTAL	27.525

Rumble Strips

Begin R.P.	End R.P.	Length	Centerline	Lt & Rt Shoulder
35.185	54.116	18.931	18.931	37.862

Seeding Class II

Begin R.P.	End R.P.	Length (mile)	Width (feet)	Left	Right	Quantity (acre)
34.183	46.915	12.732	6	X	X	9.26
48.344	48.634	0.290	3	X		0.11
49.049	49.070	0.021	3		X	0.01
49.070	49.379	0.309	6	X	X	0.22
49.455	49.709	0.254	6	X	X	0.18
49.709	49.749	0.040	3	X		0.01
49.868	50.452	0.584	3		X	0.21
					TOTAL	10.01

HBP Cored Samples

	A	B	C	D			
Specification Section	Distance (Ft)÷2000	Lanes	Lifts	Sublots (A × B × C)	Quantity (D × 2)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General"	53	2	1	106	212	N/A	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"					N/A	20	EA
				Total	212	20	EA

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Basis of Estimate

Mill & RAP HMA

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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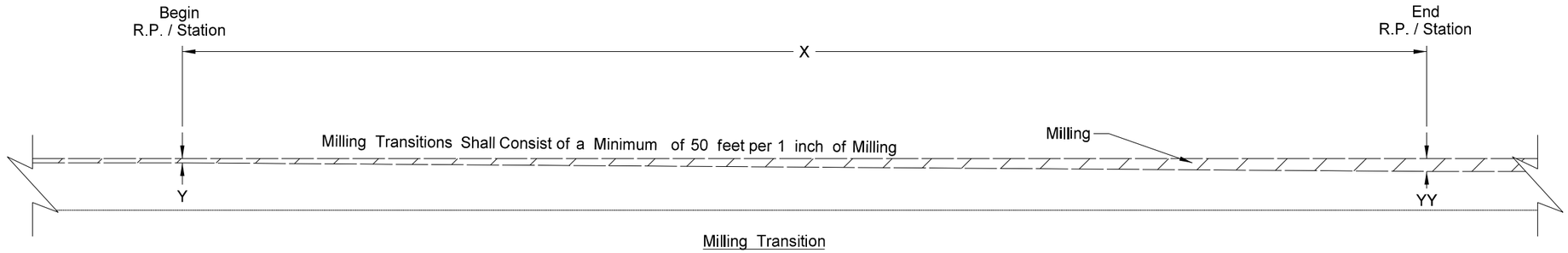
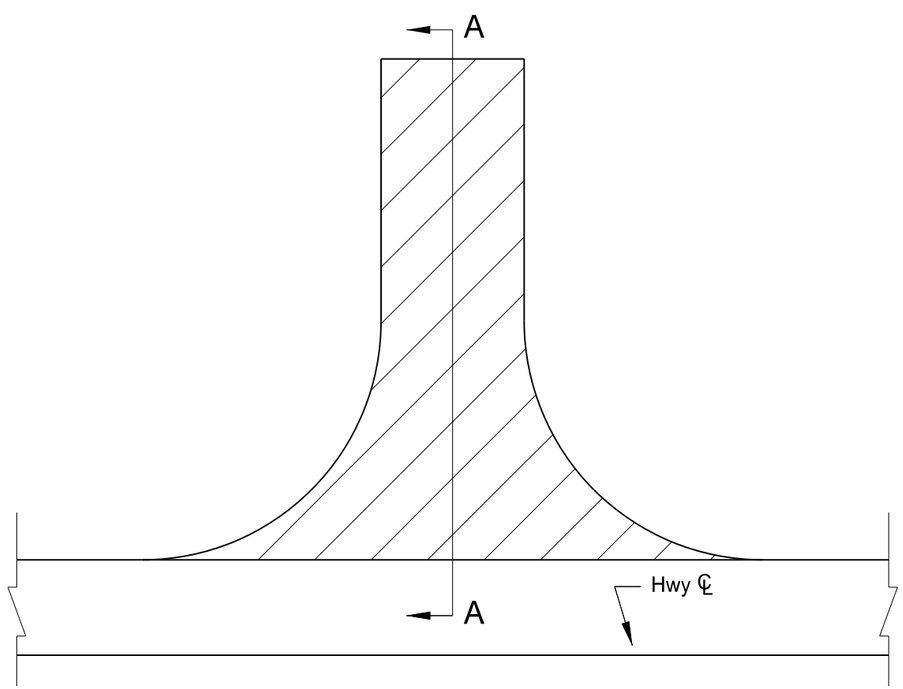


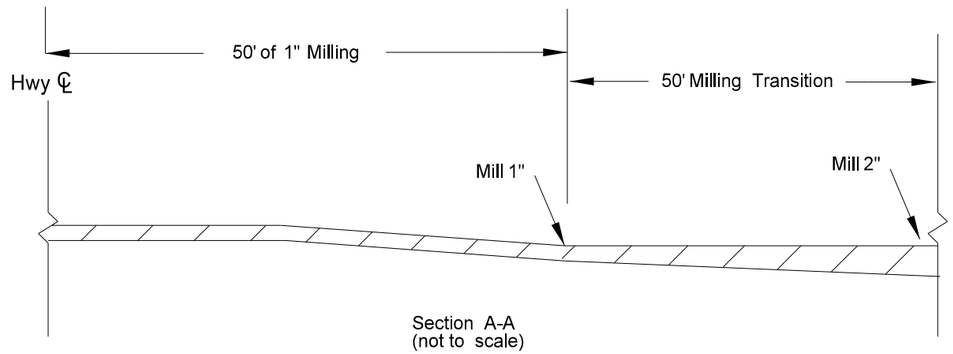
Milling Transition

Milling Transitions				
	Begin		End	
X	R.P.	Y	R.P.	YY
50 ft	34.283	1 in.	34.274	2 in.
50 ft	41.321	1 in.	41.330	2 in.
50 ft	41.379	1 in.	41.370	2 in.
50 ft	42.511	1 in.	42.520	2 in.
50 ft	42.569	1 in.	42.560	2 in.
50 ft	49.091	1 in.	49.100	2 in.
50 ft	49.464	1 in.	49.455	2 in.
50 ft	54.107	1 in.	54.116	2 in.

	Begin		End	
X	Station	Y	Station	YY
50 ft	8+35	1 in.	7+85	2 in.



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



Section A-A
(not to scale)

Approach Milling		
R.P.	Lt / Rt	Ton
35.172	Lt	27.5
43.28	Rt	32.7
50.109	Rt	29.3
Total		89.5

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Milling Transitions

Mill & RAP HMA

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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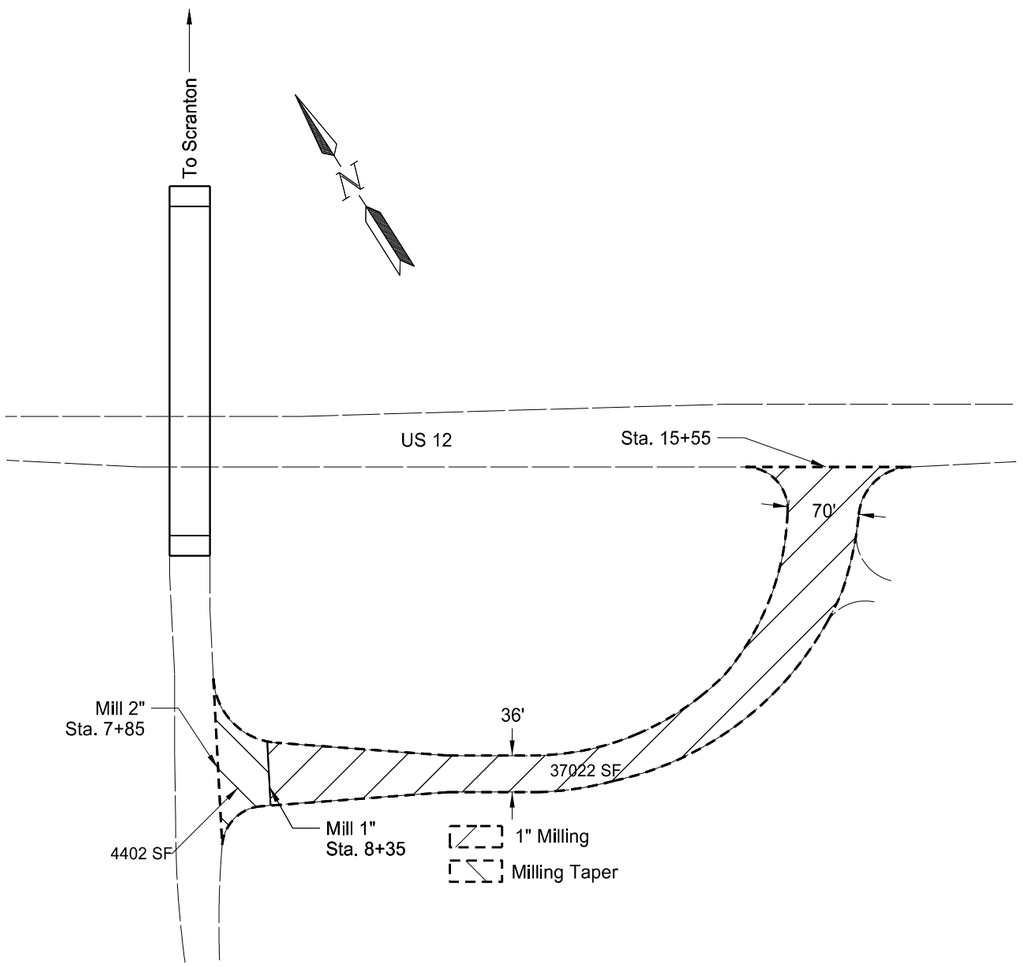
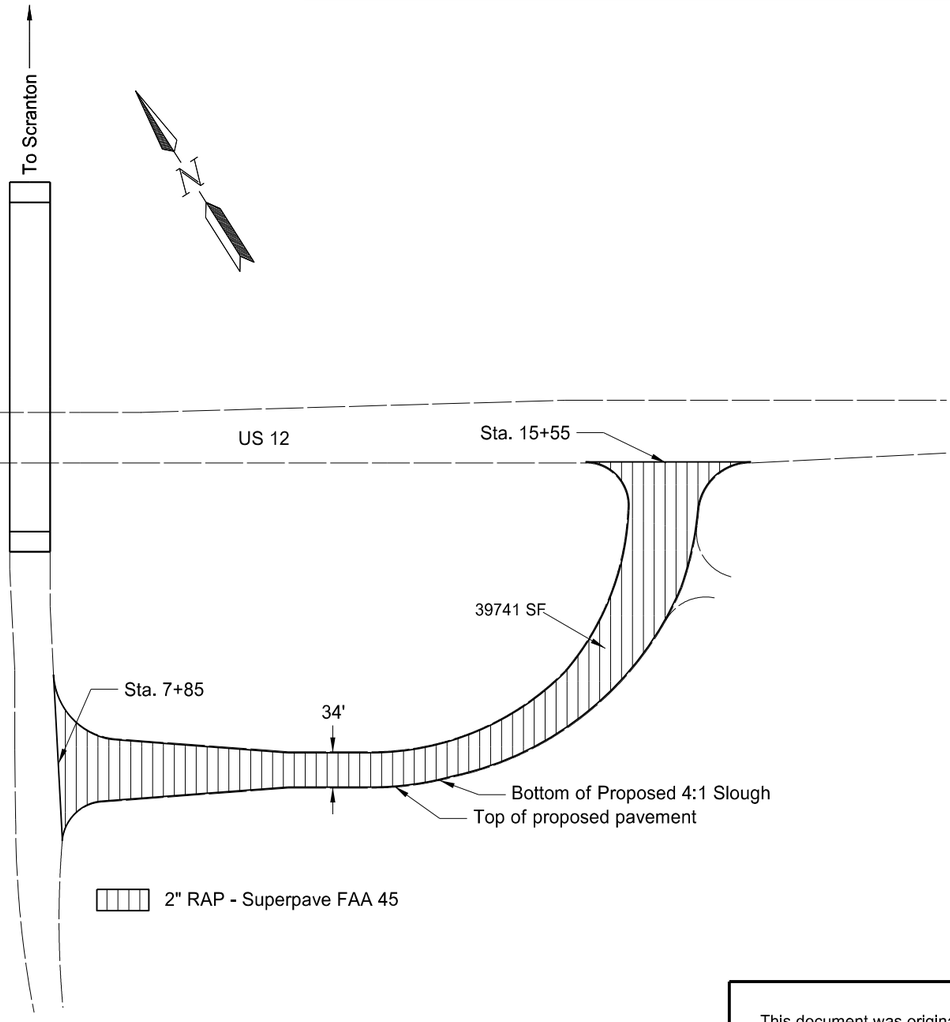


Note: Loop width varies. Daylight 1" milling to the edge of the existing pavement matching the driving lane slopes

Bid Item			Milling
Basis of Estimate			2 ton / CY
Begin Sta	End Sta	Area SF	Ton
7+85	8+35	4,402	48
8+35	15+55	37,022	229
Sheet Total			276



Note: Loop width varies. Place proposed pavement with the toe of the 4:1 slough at the edge of the existing milled surface.

Bid Item			Tack Coat	RAP - Superpave FAA 45	PG 58-28 AC
Basis of Estimate			.05 gal/sy	2 ton / CY	4% of Mix
Begin Sta	End Sta	Area SF	Gal.	Ton	Ton
7+85	15+15	39,741	221	491	19.63
Additional for slough			9	10	0.40
Sheet Total			230	501	20

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Scranton Loop Milling/Paving Details

Mill & RAP HMA

US 12 E Side of Bowman E to County Line

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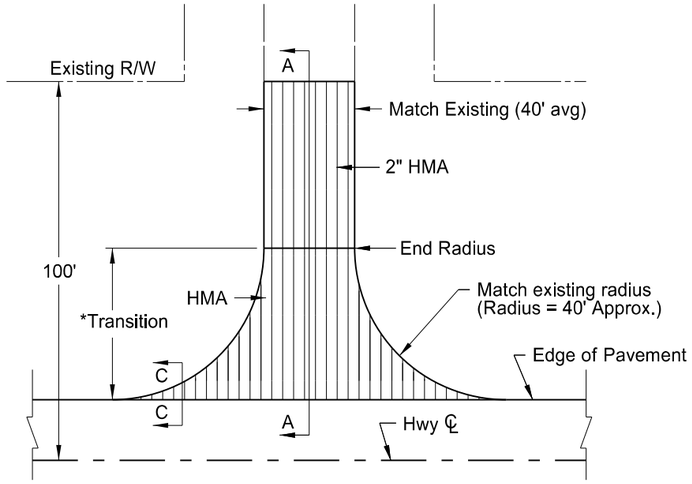
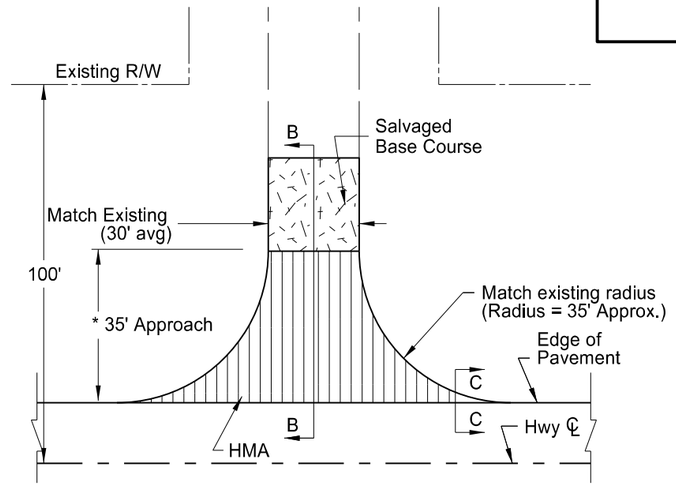
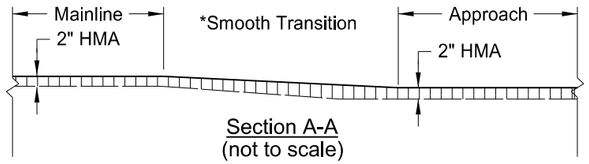


(1) Paved Section Line, County Road, or Street Approach



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

1. Actual HMA paving and salvaged 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. Salvaged base course may be needed to fill in around the radii. This material is required when sloughs are steeper than 4:1 (see section C-C).
4. At the airport aproach (RP38.147 Rt), provide a 12" HMA slough on top of the concrete approach.



Section A-A
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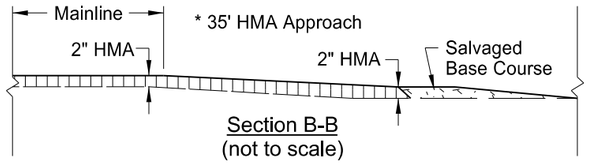

Section B-B
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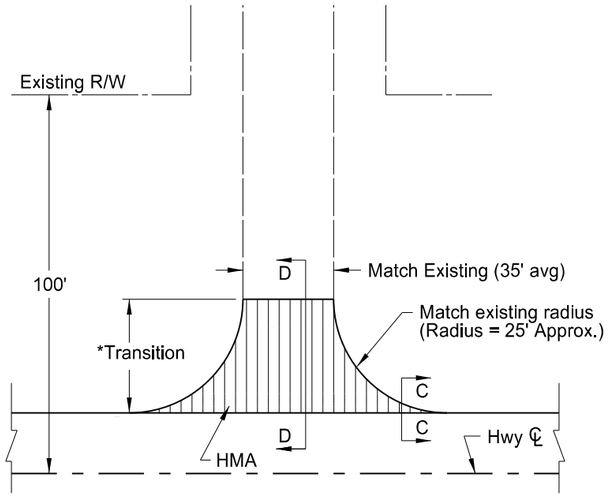
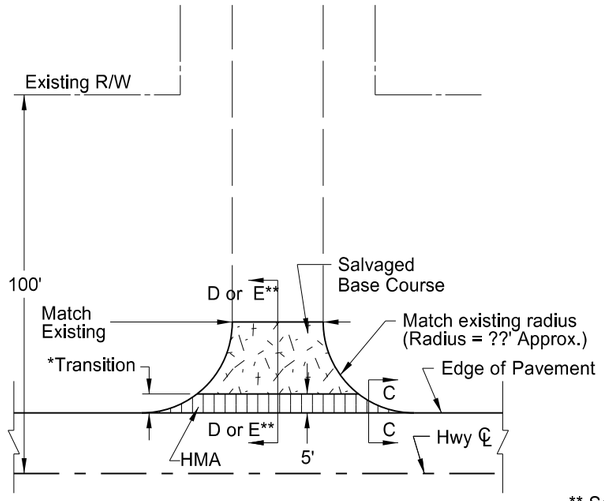
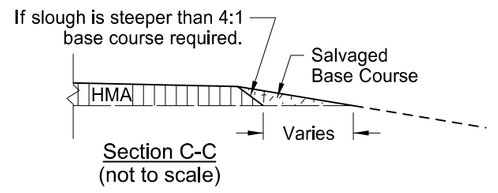


(3) Paved Private Drive Approach



(4) Gravel Private or Field Drive Approach



Section C-C
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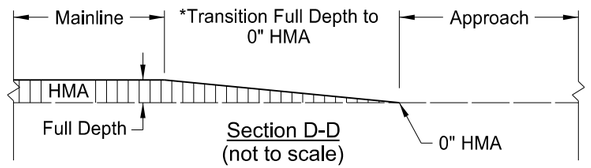
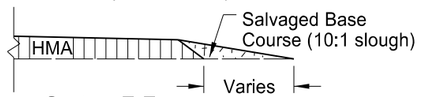


Section D-D
(not to scale)



Section E-E
(not to scale)

** Section D-D applies if proposed HMA ends on existing HMA (23 locations). Section E-E applies where proposed HMA completely covers existing HMA (42 locations).

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Field/ Private Drive	TOTALS
Number of Locations	#	3	16	3	65	87
Salvaged Base Course	TON	N/A	6	N/A	3**	222
Tack Coat	GAL	28	13	8	2	446
RAP Superpave FAA 45	TON	63	28	19	5	1019
PG 58-28 Asphalt Cement	TON	2.5	1.1	.7	.2	40.2

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Approach Paving Details

Mill & RAP HMA
US 12 E Side fo Bowman E to County Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-012(045)034	20	4

Approach Location and Type

Reference Point	Left or Right	Approach Type
34.342	Rt	4
34.400	Rt	3
34.400	Lt	3
34.517	Rt	4
34.670	Rt	4
34.670	Lt	4
34.818	Lt	3
34.963	Lt	4
35.078	Lt	4
35.172	Rt	2
35.172	Lt	1
35.217	Rt	4
35.217	Lt	4
35.649	Rt	4
35.649	Lt	4
35.804	Lt	4
35.859	Lt	4
36.150	Rt	4
36.150	Lt	2
36.723	Lt	4
37.154	Rt	2
37.154	Lt	2
37.709	Rt	4
37.856	Rt	4
37.856	Lt	4
37.909	Rt	4
38.147	Rt	airport
38.147	Lt	4
38.364	Rt	4
38.543	Rt	4

Reference Point	Left or Right	Approach Type
39.153	Rt	4
39.153	Lt	4
39.897	Rt	4
39.979	Rt	4
39.979	Lt	4
40.150	Rt	2
40.150	Lt	2
40.624	Rt	4
40.994	Lt	4
41.153	Rt	4
41.559	Rt	4
41.628	Rt	2
41.628	Lt	2
41.707	Rt	4
41.900	Rt	4
41.924	Rt	4
42.349	Lt	4
43.280	Rt	1
43.349	Lt	4
43.396	Rt	4
44.365	Rt	4
44.510	Rt	4
44.510	Lt	4
44.935	Rt	4
45.420	Rt	4
45.496	Lt	4
45.514	Rt	2
45.989	Rt	4
46.663	Rt	4
46.812	Lt	4

Reference Point	Left or Right	Approach Type
46.954	Rt	4
47.828	Rt	4
47.983	Lt	4
48.000	Rt	4
48.243	Rt	4
48.243	Lt	4
49.015	Rt	2
49.716	Lt	2
50.109	Rt	1
50.109	Lt	2
50.670	Rt	4
50.877	Rt	4
50.877	Lt	4
51.115	Rt	2
51.115	Lt	2
51.599	Lt	4
51.705	Rt	4
51.705	Lt	4
52.075	Rt	4
52.075	Lt	4
52.114	Lt	4
52.594	Lt	4
52.622	Rt	4
52.844	Lt	4
53.117	Rt	2
53.117	Lt	2
53.400	Rt	4
53.690	Lt	4

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Approach List

Mill & RAP HMA

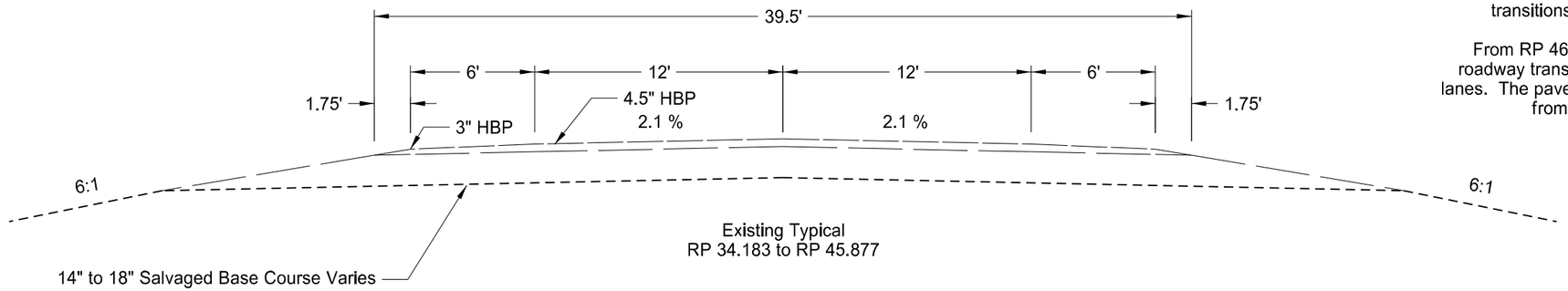
US 12 E SIde of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	1

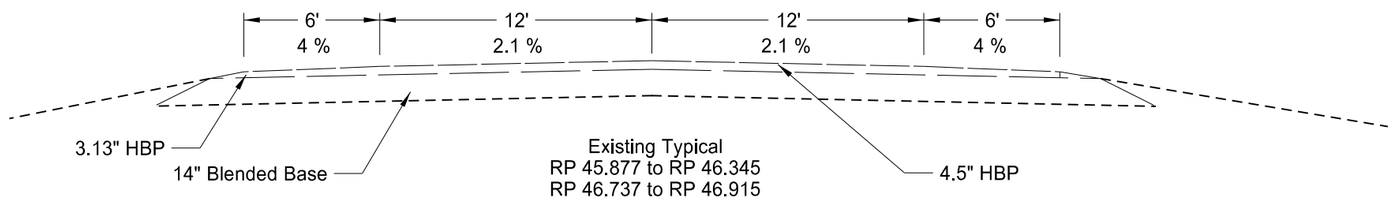
Note: From RP 46.345 to 46.398 the roadway transitions for a right turn lane. The top width transitions from 36' to 50'.

From RP 46.428 to 46.508 the roadway transitions for left and right turn lanes. The top pavement width transitions from 50' to 62'.

From RP 46.543 to 46.737 the roadway transitions out of the turn lanes. The pavement width transitions from 62' to 36'.



Existing Typical
RP 34.183 to RP 45.877



Existing Typical
RP 45.877 to RP 46.345
RP 46.737 to RP 46.915

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Existing Typical Section

Mill & RAP HMA

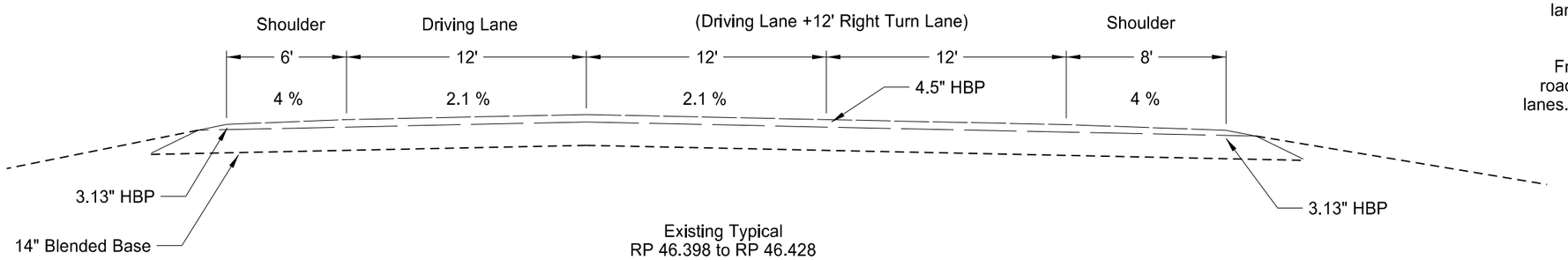
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	2

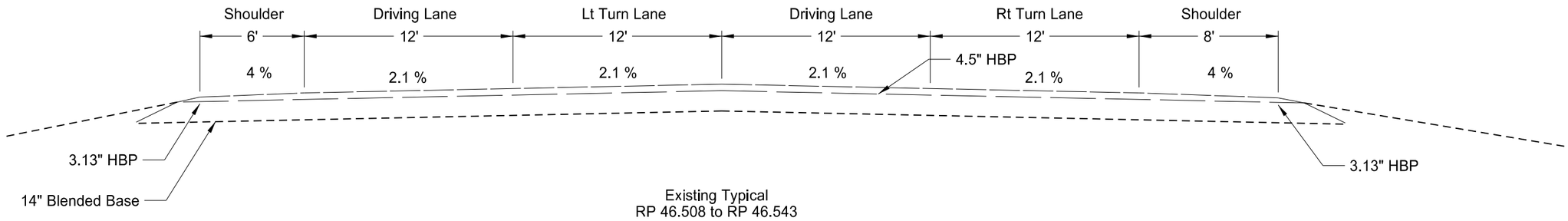
Note: From RP 46.345 to 46.398 the roadway transitions for a right turn lane. The top width transitions from 36' to 50'.

From RP 46.428 to 46.508 the roadway transitions for left and right turn lanes. The top pavement width transitions from 50' to 62'.

From RP 46.543 to 46.737 the roadway transitions out of the turn lanes. The pavement width transitions from 62' to 36'.



Existing Typical
RP 46.398 to RP 46.428



Existing Typical
RP 46.508 to RP 46.543

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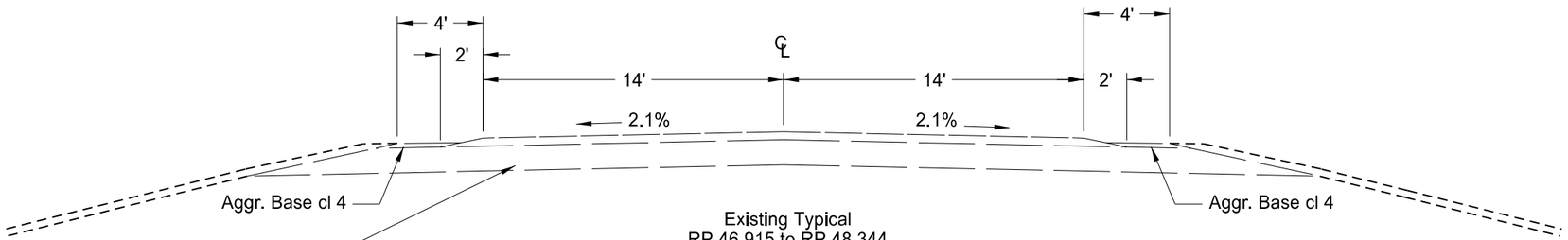
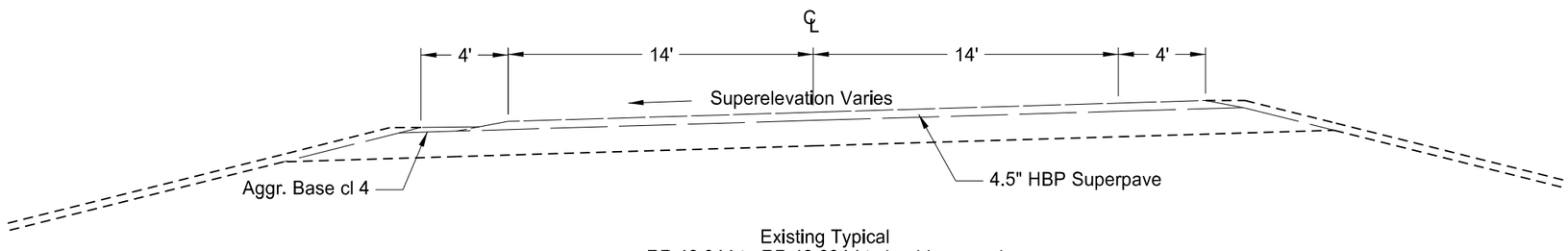
Existing Typical Section

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	3



Existing Typical
RP 46.915 to RP 48.344
RP 48.634 to RP 49.049
RP 49.749 to RP 49.868
RP 50.452 to RP 54.116



Existing Typical
RP 48.344 to RP 48.634 Lt shoulder paved
RP 49.049 to RP 49.070 Rt shoulder paved
RP 49.709 to RP 49.749 Lt shoulder paved
RP 49.868 to RP 50.452 Rt shoulder paved

Note: The shoulder on the high side of superelevated curves are are paved. The shoulder on the low side of superelevated curves are aggregate. Only left hand curves are shown in typical section. Right hand curves are mirrored.

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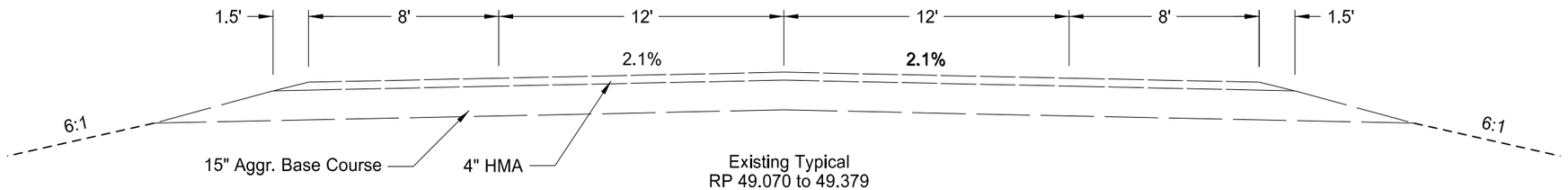
Existing Typical Section

Mill & RAP HMA

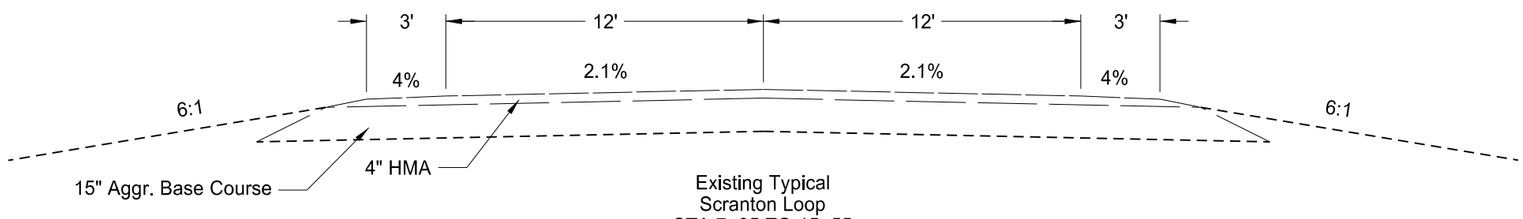
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	4



Existing Typical
RP 49.070 to 49.379
RP 49.455 to 49.709

Gascoyne Bridge Exception 49.379 to 49.455



Existing Typical
Scranton Loop
STA 7+85 TO 15+55

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Existing Typical Section

Mill & RAP HMA

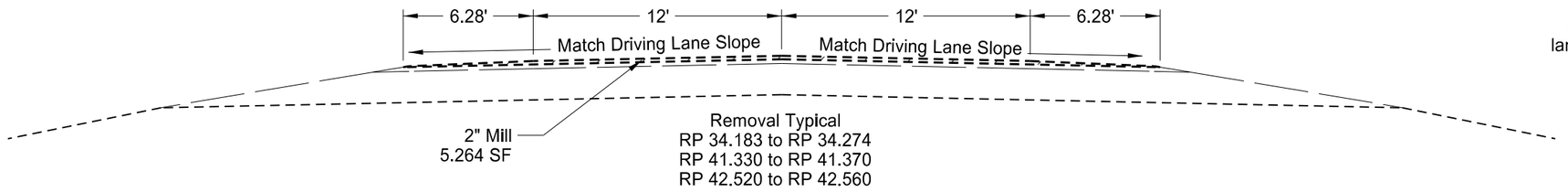
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	5

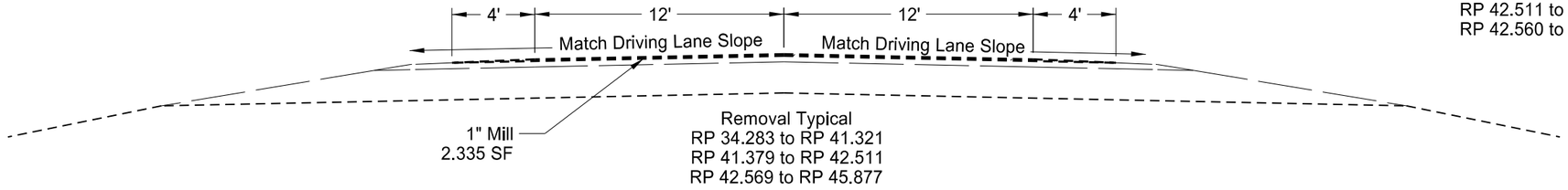
Note: From RP 46.345 to 46.398 the roadway transitions for a right turn lane. The top width transitions from 36' to 50'.

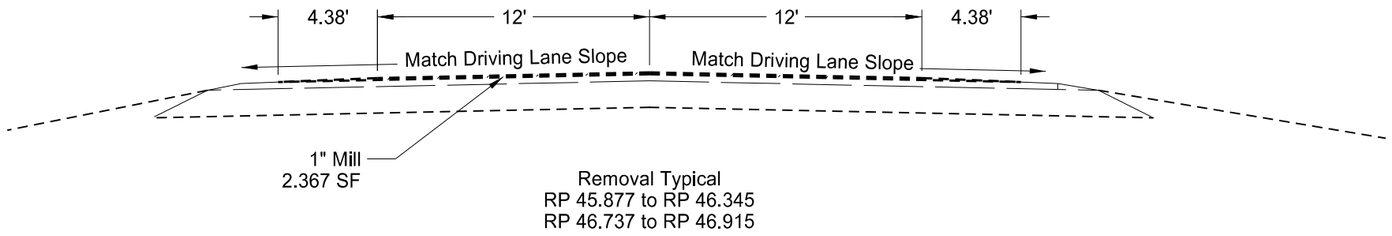
From RP 46.428 to 46.508 the roadway transitions for left and right turn lanes. The top pavement width transitions from 50' to 62'.

From RP 46.543 to 46.737 the roadway transitions out of the turn lanes. The pavement width transitions from 62' to 36'.



Milling Tapers from
RP 34.274 to RP 34.283
RP 41.370 to RP 41.379
RP 42.511 to RP 42.520
RP 42.560 to RP 42.569





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Removal Typical Section

Mill & RAP HMA

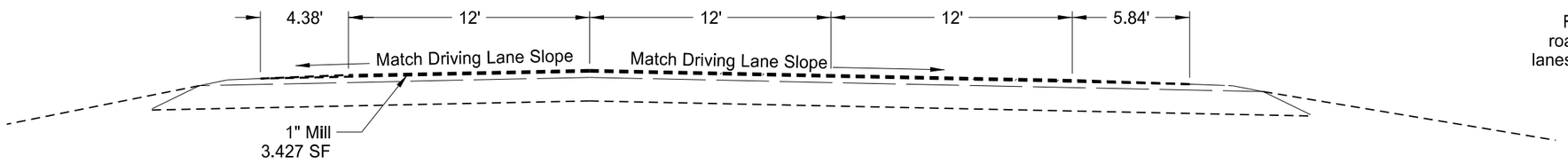
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	6

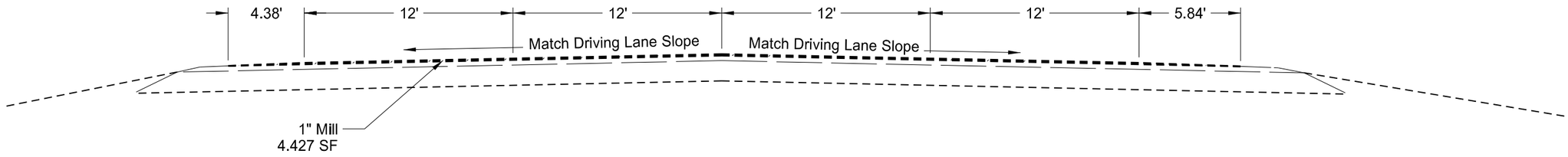
Note: From RP 46.345 to 46.398 the roadway transitions for a right turn lane. The top width transitions from 36' to 50'.

From RP 46.428 to 46.508 the roadway transitions for left and right turn lanes. The top pavement width transitions from 50' to 62'.

From RP 46.543 to 46.737 the roadway transitions out of the turn lanes. The pavement width transitions from 62' to 36'.



Removal Typical
RP 46.398 to RP 46.428



Removal Typical
RP 46.508 to RP 46.543

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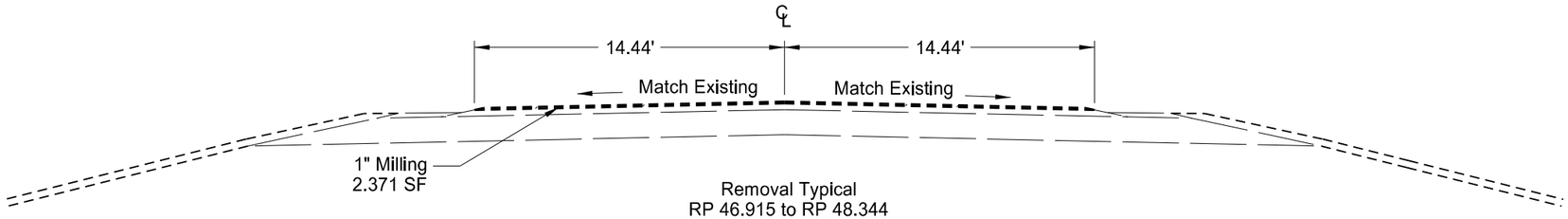
Removal Typical Section

Mill & RAP HMA

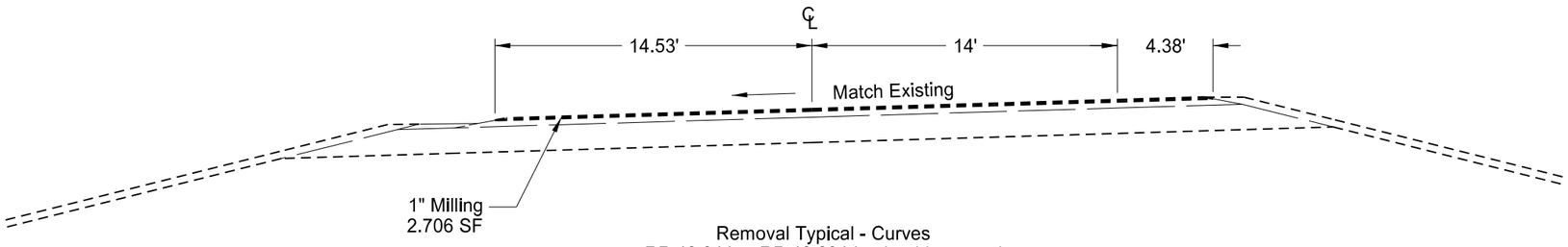
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	7



Removal Typical
RP 46.915 to RP 48.344
RP 48.634 to RP 49.049
RP 49.749 to RP 49.868
RP 50.452 to RP 54.107

Note: Milling tapers form 1" to 2" from 54.107 to 54.116



Removal Typical - Curves
RP 48.344 to RP 48.634 Lt shoulder paved
RP 49.049 to RP 49.070 Rt shoulder paved
RP 49.709 to RP 49.749 Lt shoulder paved
RP 49.868 to RP 50.452 Rt shoulder paved

Note: The shoulder on the high side of superelevated curves are are paved. The shoulder on the low side of superelevated curves are aggregate. Only left hand curves are shown in typical section. Right hand curves are mirrored.

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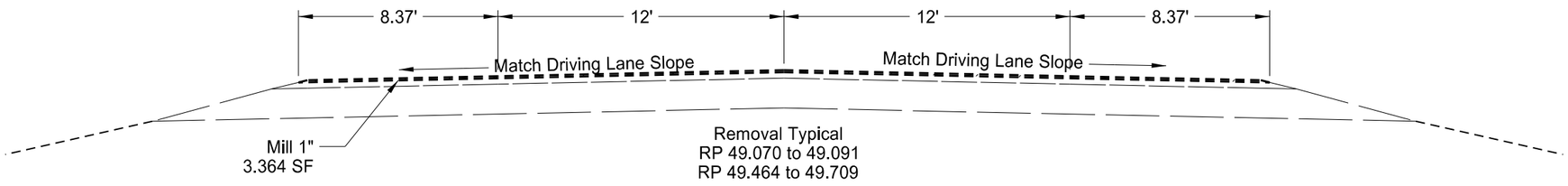
Removal Typical Section

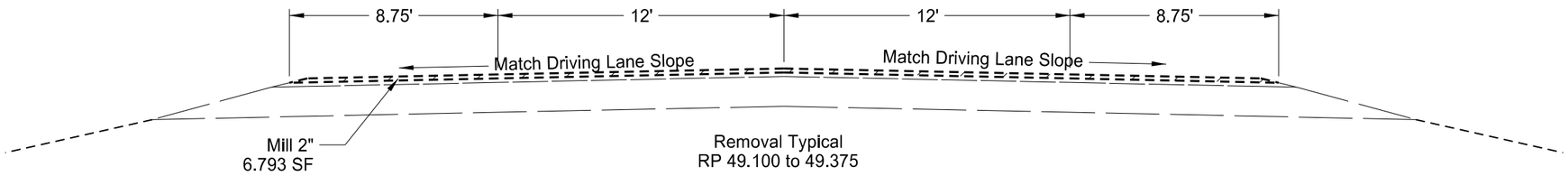
Mill & RAP HMA

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	8

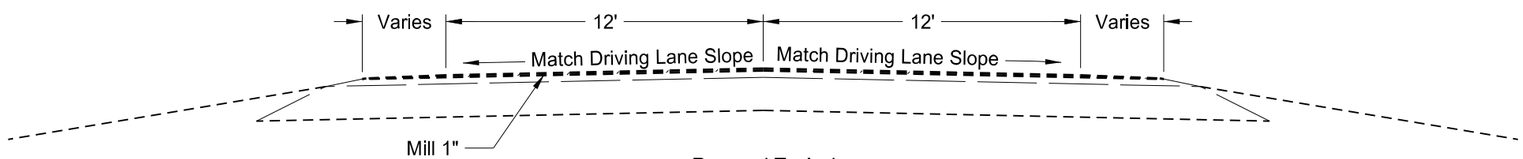


Removal Typical
RP 49.070 to 49.091
RP 49.464 to 49.709



Removal Typical
RP 49.100 to 49.375

Gascoyne Bridge Exception 49.375 to 49.455
Milling Tapers from 49.091 to 49.100
Milling Tapers from 49.455 to 49.464



Removal Typical
Scranton Loop
STA 8+35 to 15+55

Milling Taper 7+85 to 8+35

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Removal Typical Section

Mill & RAP HMA

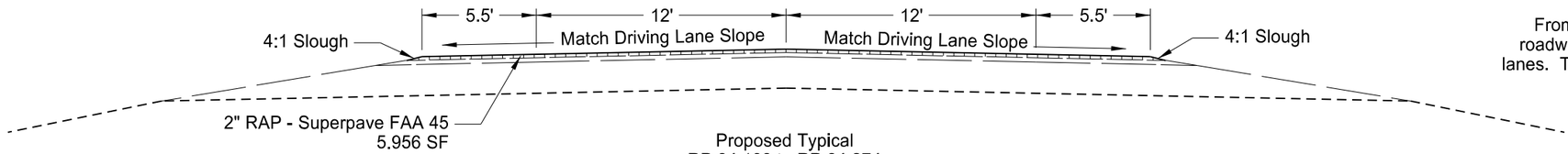
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	9

Note: From RP 46.345 to 46.398 the roadway transitions for a right turn lane. The top width transitions from 34' to 48'.

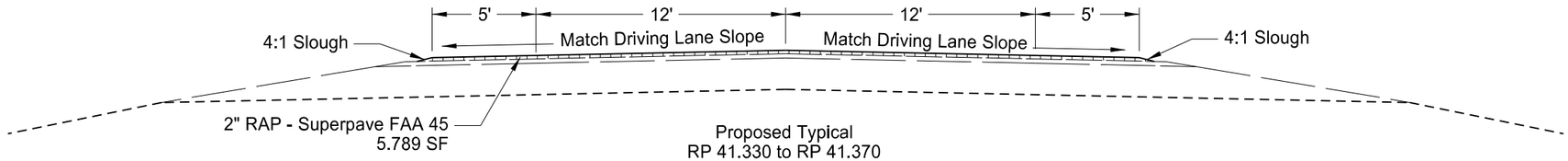
From RP 46.428 to 46.508 the roadway transitions for left and right turn lanes. The top pavement width transitions from 48' to 60'.

From RP 46.543 to 46.737 the roadway transitions out of the turn lanes. The pavement width transitions from 60' to 34'.

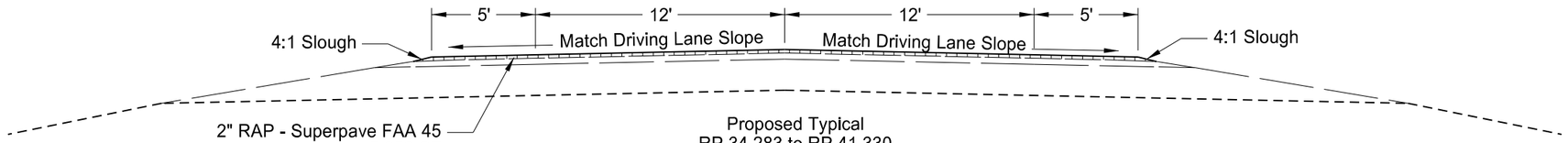


Proposed Typical
RP 34.183 to RP 34.274

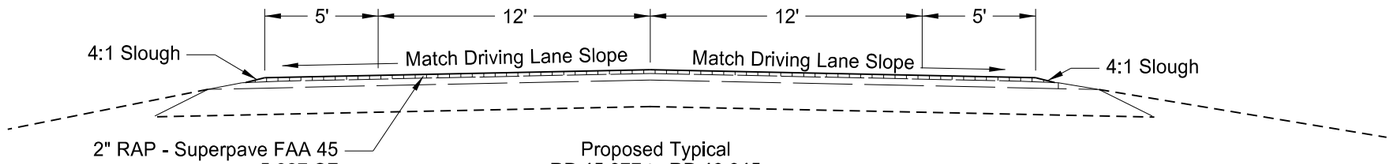
Rt & Lt Shoulder Tapers from 5.5' to 5' from 34.274 to 34.283



Proposed Typical
RP 41.330 to RP 41.370
RP 42.520 to RP 42.560



Proposed Typical
RP 34.283 to RP 41.330
RP 41.370 to RP 42.520
RP 42.560 to RP 45.877



Proposed Typical
RP 45.877 to RP 46.345
RP 46.737 to RP 46.915

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Proposed Typical Section

Mill & RAP HMA

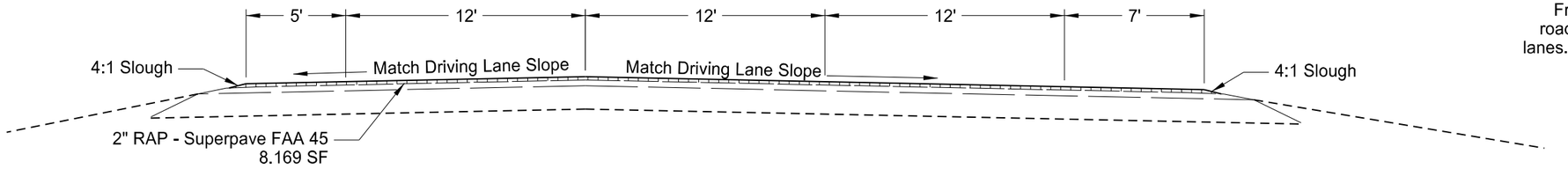
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	10

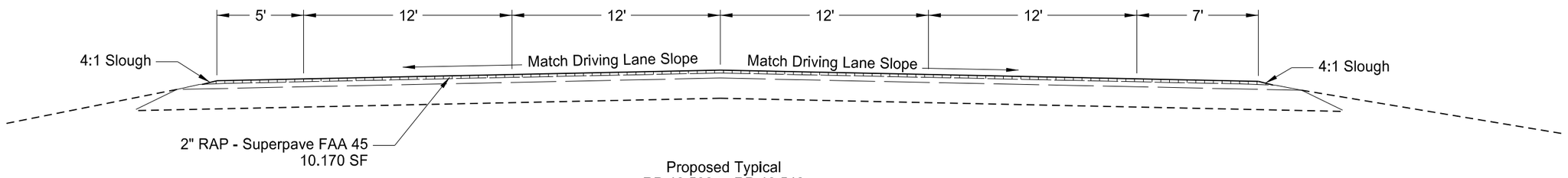
Note: From RP 46.345 to 46.398 the roadway transitions for a right turn lane. The top width transitions from 34' to 48'.

From RP 46.428 to 46.508 the roadway transitions for left and right turn lanes. The top pavement width transitions from 48' to 60'.

From RP 46.543 to 46.737 the roadway transitions out of the turn lanes. The pavement width transitions from 60' to 34'.



Proposed Typical
RP 46.398 to RP 46.428



Proposed Typical
RP 46.508 to RP 46.543

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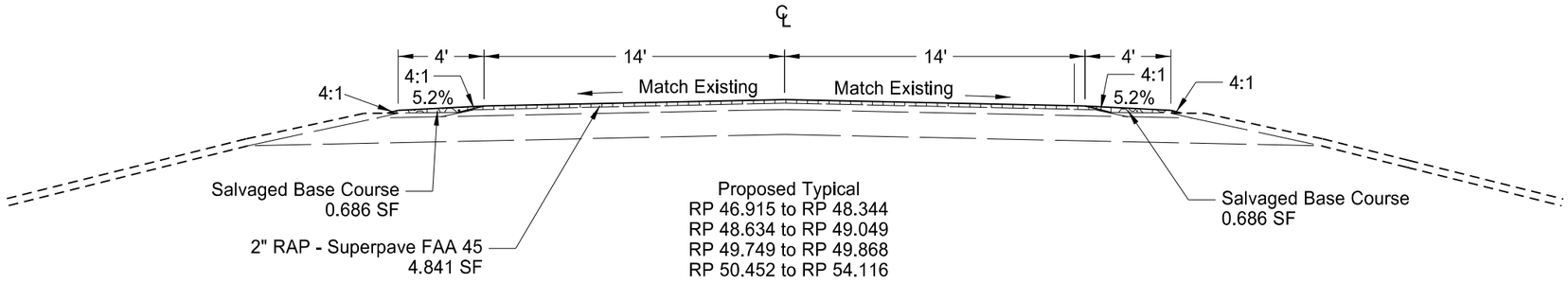
Proposed Typical Section

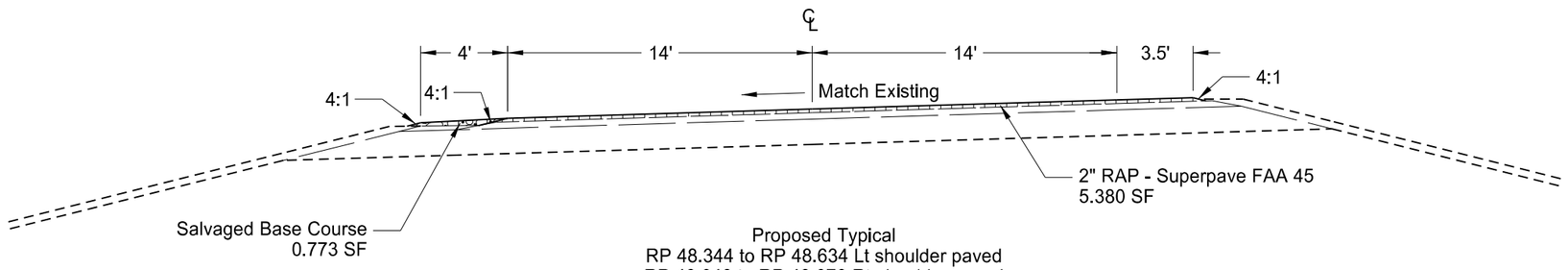
Mill & RAP HMA

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	11



Proposed Typical
RP 46.915 to RP 48.344
RP 48.634 to RP 49.049
RP 49.749 to RP 49.868
RP 50.452 to RP 54.116



Proposed Typical
RP 48.344 to RP 48.634 Lt shoulder paved
RP 49.049 to RP 49.070 Rt shoulder paved
RP 49.709 to RP 49.749 Lt shoulder paved
RP 49.868 to RP 50.452 Rt shoulder paved

Note: The shoulder on the high side of superelevated curves are are paved. The shoulder on the low side of superelevated curves are aggregate. Only left hand curves are shown in typical section. Right hand curves are mirrored.

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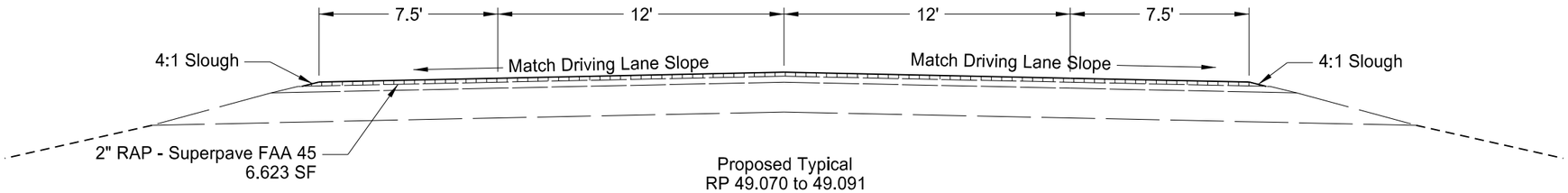
Proposed Typical Section

Mill & RAP HMA

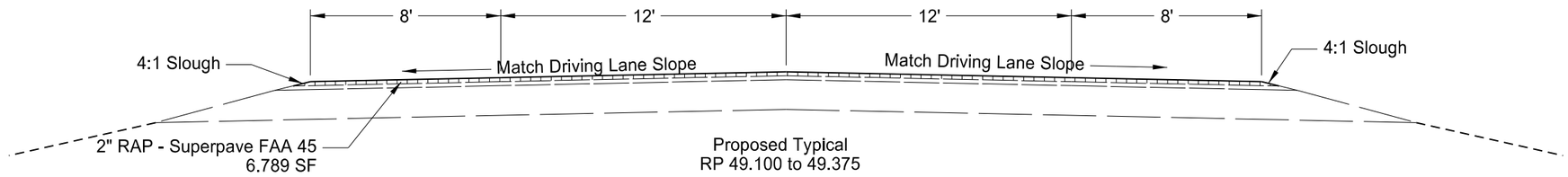
US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	30	12



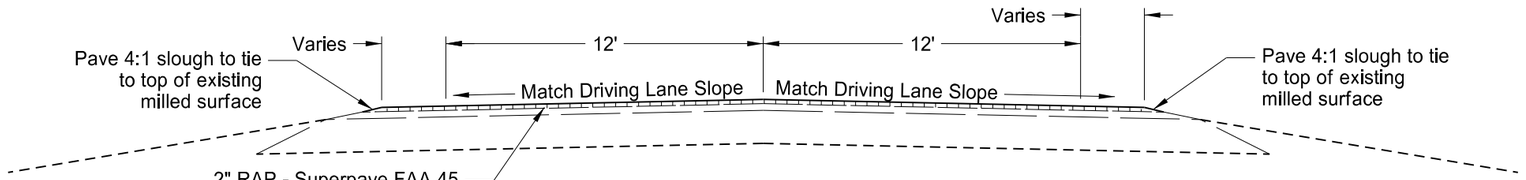
Proposed Typical
RP 49.070 to 49.091
RP 49.464 to 49.709

Note: Transition shoulder from 7.5' to 8' from RP 49.091 to 49.100.
Transition shoulder from 8' to 7.5' from RP 49.455 to 49.464.



Proposed Typical
RP 49.100 to 49.375

Gascoyne Bridge Exception 49.375 to 49.455



Proposed Typical
Scranton Loop
STA 7+85 to 15+55

Note: See section 20 for milliing and paving detail on Scranton Loop.

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Proposed Typical Section

Mill & RAP HMA

US 12 E Side of Bowman E to County Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-012(045)034	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**19**	**38**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**	**18**	**18**
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**5**	**37**	**185**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**1**	**30**	**30**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**1**	**32**	**32**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**4**	**5**	**20**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**12**	**39**	**468**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**4**	**35**	**140**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		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 SYMBOL		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	
W8-9a-48	**48"x48"**	**SHOULDER DROP-OFF**	**2**	**35**	**70**
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**2**	**35**	**70**
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		35	
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**4**	**35**	**140**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	**54"x12"**	**NEXT__ MILES (Mounted on warning sign post)**	**6**	**12**	**72**
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	**48"x48"**	**SHOULDER WORK**	**1**	**35**	**35**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	1894

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**800**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**245**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	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	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	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**	**237032**
762-0434	**SHORT TERM 8IN LINE-TYPE NR**	**LF**	**1075**
762-0442	**SHORT TERM MESSAGE-TYPE NR**	**SF**	**186**
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

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

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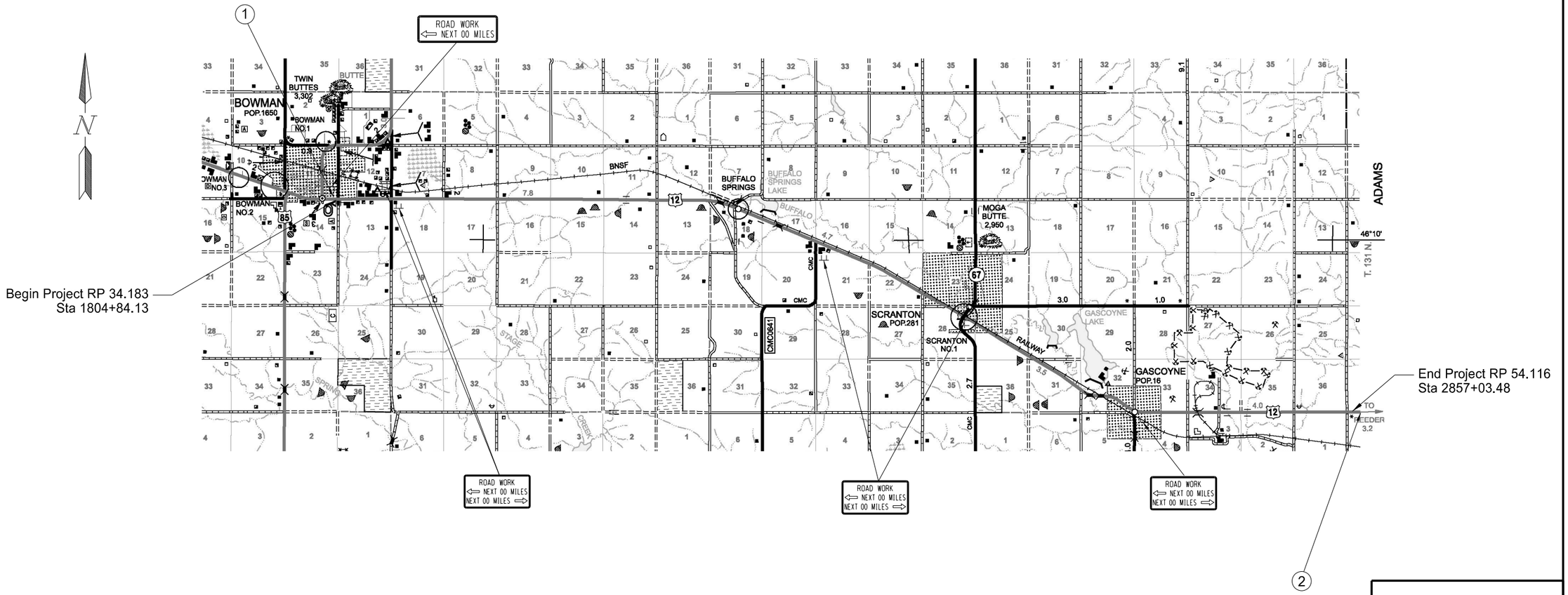
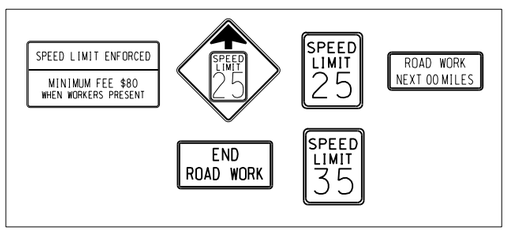
Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	100	2





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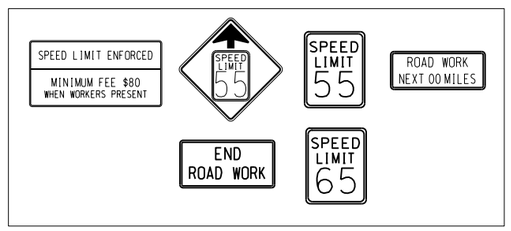

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Note: See Standard Drawing D-704-20, layout G & H for sign spacing and layout of signs

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Construction Sign Layout

Mill & RAP HMA

US 12 E. side of Bowman East to County Line

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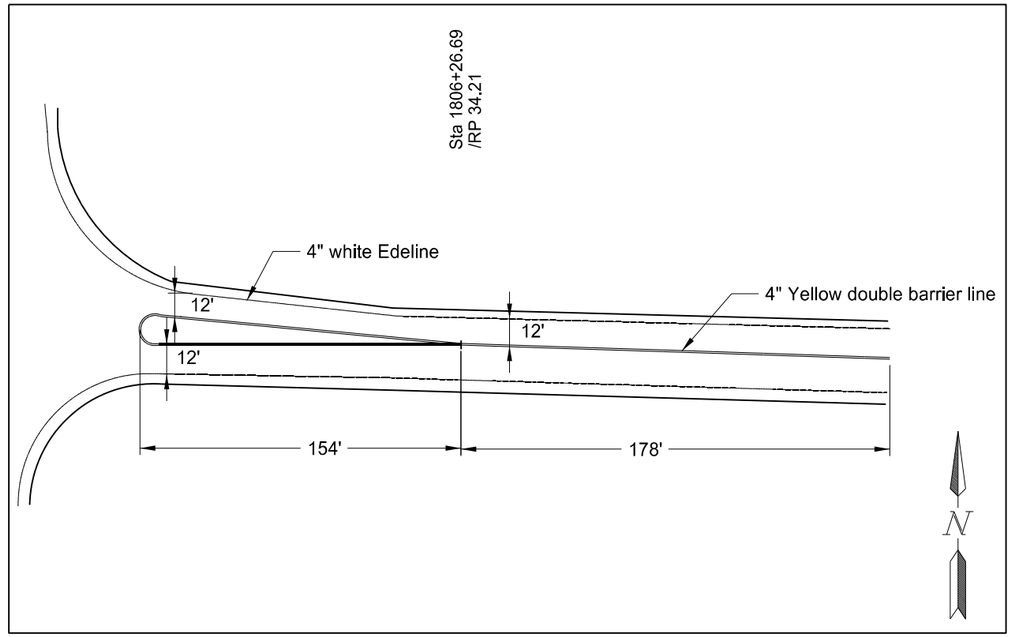
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	120	1

Pavement Marking

Begin RP	End RP	Skips (LF)	Right Barrier (LF)	Left Barrier (LF)	Double Barrier (LF)	Edgeline (LF)	8 IN line (LF)	24 IN line (LF)	Messages (SF)	Layout Sheet
34.183	34.240	0	0	0	0	602	0	0	0	Sheet 1
34.240	35.305	1406	0	0	0	11246	0	0	0	-
35.305	35.420	152	607	0	0	1214	0	0	0	-
35.420	35.524	137	0	0	0	1098	0	0	0	-
35.524	35.644	158	632	0	0	1267	0	0	0	-
35.644	37.670	2674	0	0	0	21395	0	0	0	-
37.670	37.870	264	1056	0	0	2112	0	0	0	-
37.870	37.919	65	0	0	0	517	0	0	0	-
37.919	38.110	252	0	1008	0	2017	0	0	0	-
38.110	38.888	1027	0	0	0	8216	0	0	0	-
38.888	39.112	296	1180	0	0	2365	0	0	0	-
39.112	39.198	0	0	0	912	908	0	0	0	-
39.198	39.422	296	0	1180	0	2365	0	0	0	-
39.422	39.785	479	0	0	0	3833	0	0	0	-
39.785	39.930	191	764	0	0	1531	0	0	0	-
39.930	40.025	125	0	0	0	1003	0	0	0	-
40.025	40.155	172	0	684	0	1373	0	0	0	-
40.155	40.350	257	0	0	0	2059	0	0	0	-
40.350	40.475	165	660	0	0	1320	0	0	0	-
40.475	40.579	137	0	0	0	1098	0	0	0	-
40.579	40.719	185	0	739	0	1478	0	0	0	-
40.719	41.781	1402	0	0	0	11215	0	0	0	-
41.781	41.939	209	834	0	0	1668	0	0	0	-
41.939	42.009	92	0	0	0	739	0	0	0	-
42.009	42.164	205	0	816	0	1637	0	0	0	-
42.164	42.523	474	0	0	0	3791	0	0	0	-
42.523	42.662	183	732	0	0	1468	0	0	0	-
42.662	42.752	119	0	0	0	950	0	0	0	-
42.752	42.882	172	0	684	0	1373	0	0	0	-
42.882	43.027	191	0	0	0	1531	0	0	0	-
43.027	43.187	211	844	0	0	1690	0	0	0	-
43.187	43.242	73	0	0	0	581	0	0	0	-
43.242	43.405	215	0	860	0	1721	0	0	0	-
43.405	44.630	1617	0	0	0	12936	0	0	0	-
44.630	44.730	132	528	0	0	1056	0	0	0	-
44.730	44.855	165	0	0	0	1320	0	0	0	-
44.855	44.955	132	0	528	0	1056	0	0	0	-
44.955	46.356	1849	0	0	0	14795	0	0	0	-
46.356	46.739	0	0	0	7572	5424	1075	111	186	Sheets 2 & 3
46.739	47.873	1497	0	0	0	11975	0	0	0	-
47.873	48.037	216	864	0	0	1732	0	0	0	-
48.037	48.057	26	0	0	0	211	0	0	0	-
48.057	48.283	298	0	1192	0	2387	0	0	0	-
48.283	49.165	1164	0	0	0	9314	0	0	0	-
49.165	49.375	277	1088	0	0	2218	0	0	0	-
49.375	49.504	0	0	0	680	1362	0	0	0	-
49.504	49.564	79	0	316	0	634	0	0	0	-
49.564	50.567	1324	0	0	0	10592	0	0	0	-
50.567	50.771	269	1076	0	0	2154	0	0	0	-
50.771	50.811	0	0	0	212	422	0	0	0	-
50.811	51.121	409	0	1636	0	3274	0	0	0	-
51.121	51.934	1073	0	0	0	8585	0	0	0	-
51.934	52.039	139	0	552	0	1109	0	0	0	-
52.039	52.079	53	0	0	0	422	0	0	0	-
52.079	52.244	218	0	868	0	1742	0	0	0	-
52.244	52.532	380	0	0	0	3041	0	0	0	-
52.532	52.807	363	1452	0	0	2904	0	0	0	-
52.807	53.017	277	0	1108	0	2218	0	0	0	-
53.017	54.116	1451	0	0	0	11605	0	0	0	-
Total		**25394**	**12317**	**12171**	**9376**	**211872**	**1075**	**111**	**186**	



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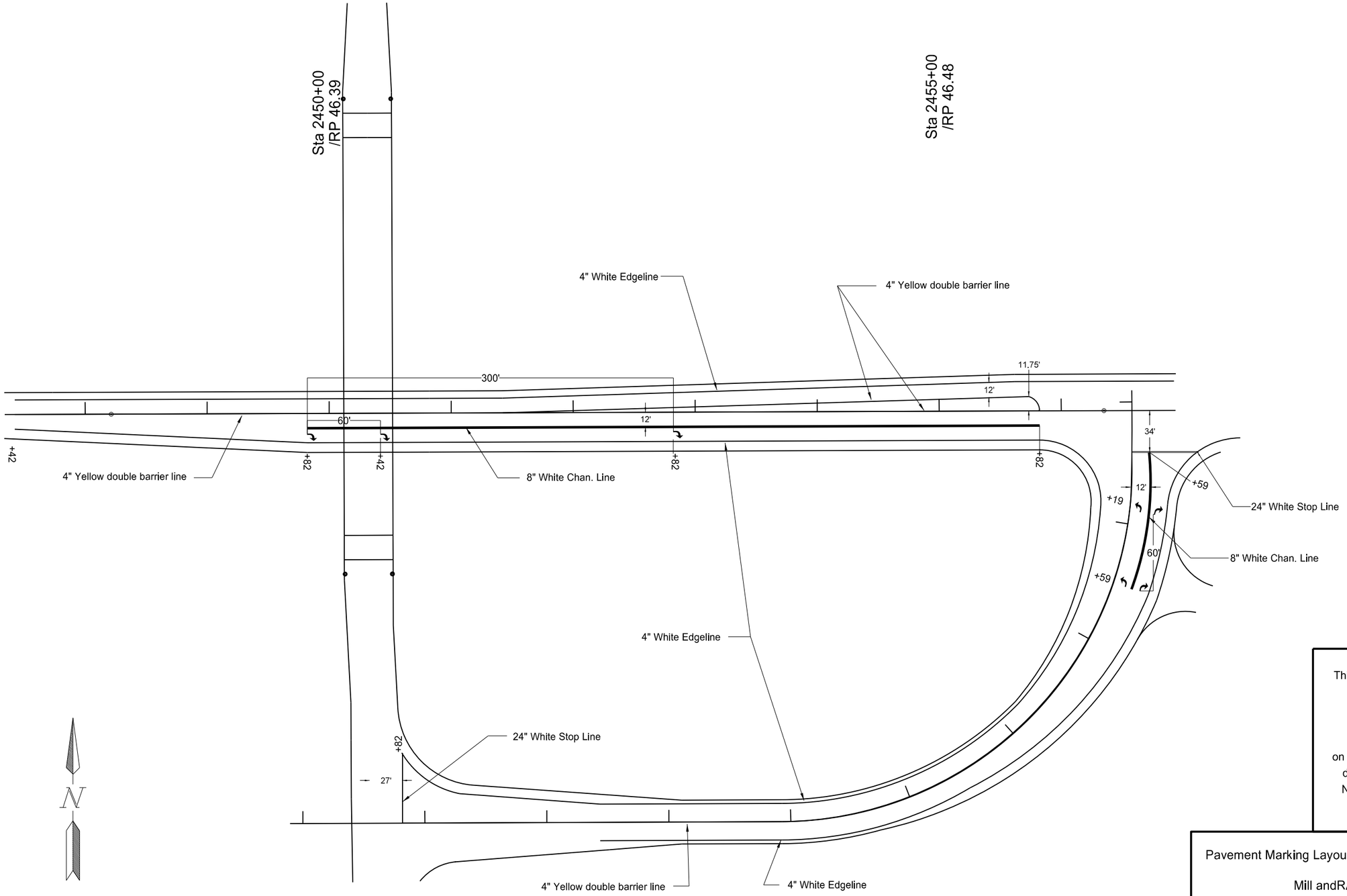
Pavement Marking Layout RP 34.18 - RP 34.24

Mill and RAP HMA

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	120	2



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Pavement Marking Layout RP 46.356 to RP 46.53

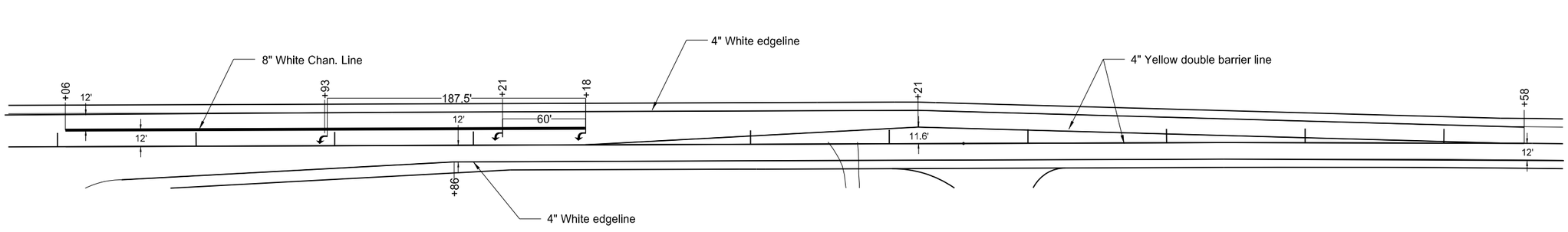
Mill andRAP HMA

US 12 E Side of Bowman E to County Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	120	3

Sta 2460+00
/RP 46.58

Sta 2465+00
/RP 46.67



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Pavement Marking Layout RP 46.530 to 46.739

Mill & RAP HMA

US 12 E Side of Bowman E to County line

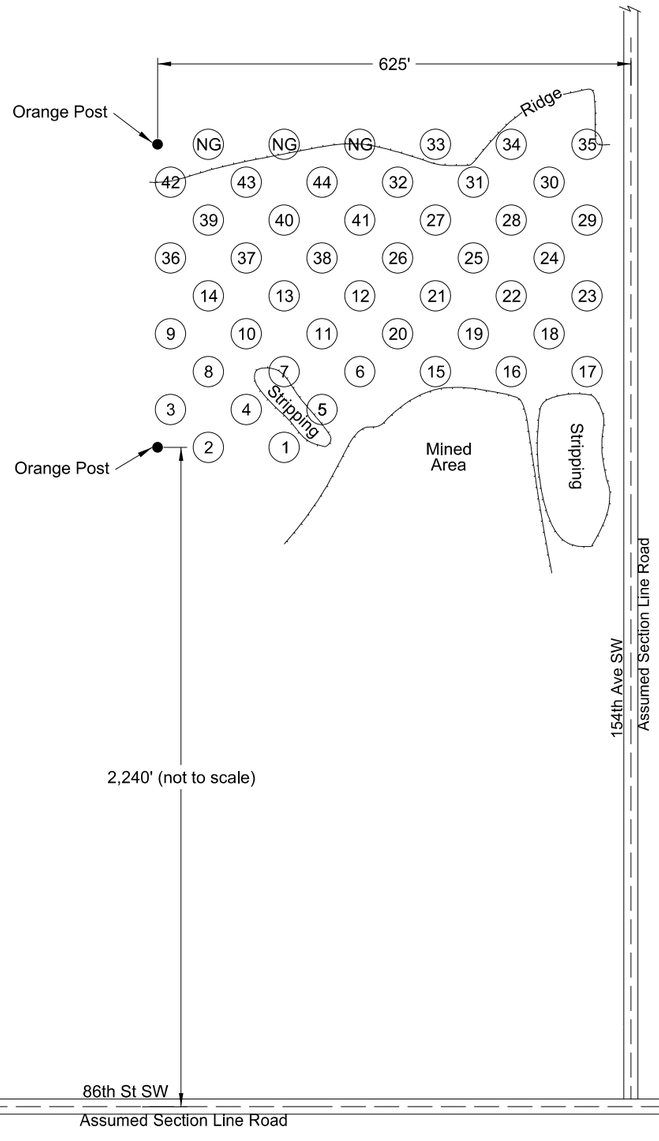
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-5-012(045)034	180	1

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TEST HOLE PLAT

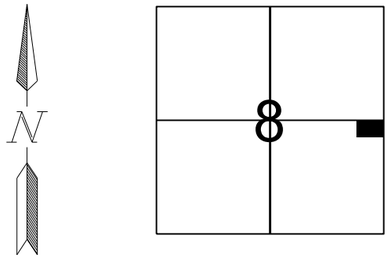
Location: SE1/4 8-131-103 County: Bowman

Ownership: James Lutz, Bowman, ND



Scale 1" = 200'

LOCATION OF PIT IN SECTION



Area "A" consists of Test Holes 1 - 14
Area "B" consists of Test Holes 15 - 23
Area "C" consists of Test Holes 24 - 35
Area "D" consists of Test Holes 36 - 44

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
CGr = Course gravel

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-5-012(045)034	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	1.0 Fgr	0	13	36	49	SiCl
		2.0 gr					
		4.0 CGr					
		1.0 Fgr					
		3.0 CGr					
		1.0 gr					
2	2.0	5.0 CGr	0	18	40	55	FS
		2.0 gr					
		2.0 Fgr					
		3.0 CGr					
		1.0 Fgr					
3	2.0	6.0 gr	2	16	34	47	gr SiCl
		3.0 CGr					
		1.0 gr					
		2.0 CGr					
		4.0 gr					
4	3.0	7.0 CGr	0	10	30	43	FS
		1.0 Fgr					
		2.0 gr					
		1.0 CGr					
		5.0 Fgr					
5	2.0	5.0 gr	1	18	37	48	FS
		1.0 CGr					
		1.0 gr					
		6.0 CGr					
		5.0 gr					
6	4.0	2.0 Fgr	4	18	32	40	gr SiCl
		3.0 gr					
		1.0 Fgr					
		4.0 CGr					
		1.0 gr					
		2.0 FS					
		1.0 CGr					
7	2.0	4.0 gr	1	17	37	50	gr SiCl
		8.0 CGr					
		1.0 FS					
		2.0 gr					
		1.0 Fgr					
8	3.0	4.0 CGr	1	15	30	41	FS
		3.0 gr					
		1.0 Fgr					
		1.0 CGr					
		2.0 FS					
		1.0 CS					
		3.0 Cgr					
9	1.0	1.0 gr	3	17	33	45	FS
		8.0 Cgr					
		4.0 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	Bottom of Test Hole
10	2.0	1.0 Fgr	0	18	37	48	gr SiCl
		3.0 CGr					
		1.0 gr					
		4.0 CGr					
		2.0 Fgr					
11	2.0	1.0 gr	1	13	32	46	SiCl
		8.0 CGr					
		1.5 gr					
		0.5 CGr					
		2.0 Fgr					
		1.5 gr					
		0.5 gr SiCl					
		1.0 gr					
12	5.0	3.0 CGr	3	17	36	49	SiCl
		2.0 gr					
		2.0 CGr					
		4.0 gr					
13	2.0	2.0 gr	0	17	31	43	FS
		2.0 CGr					
		1.0 Fgr					
		4.0 CGr					
		2.0 gr					
14	1.0	2.0 gr	1	18	35	48	FS
		8.0 CGr					
		2.0 gr					
15	3.0	7.0 gr	0	12	32	46	SiCl
		1.0 CGr					
16	3.0	5.0 CGr	0	19	41	53	gr SiCl
17	3.0	3.0 gr	2	12	28	42	gr SiCl
		1.0 CGr					
18	2.0	1.0 gr	0	18	36	48	SiCl
		3.5 CGr					
		0.5 gr SiCl					
		1.0 gr					
19	4.0	5.0 CGr	0	19	38	49	FS
20	3.0	4.0 gr	1	16	37	48	FS
		5.0 CGr					
		1.0 gr					
21	3.0	6.0 CGr	0	14	33	45	SiCl
		1.0 FS					
		1.0 Fgr					
22	4.0	4.0 gr	2	20	35	43	SiCl
23	3.0	3.0 CGr	0	18	35	46	SiCl
24	2.0	3.0 CGr	0	14	33	45	FS
		2.0 Fgr					
25	4.0	4.0 CGr	0	8	31	46	SiCl

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
26	2.0	4.0 gr	1	19	34	43	FS
		5.0 CGr					
		2.0 Fgr					
		1.0 CS					
		1.0 CGr					
27	3.0	3.0 CGr	0	8	19	27	SiCl
		3.0 gr					
		1.0 Fgr					
		2.0 FS					
		3.0 CGr					
28	2.0	4.0 gr	0	13	25	32	SiCl
		2.0 CGr					
		2.0 FS					
29	2.0	6.0 CGr	0	13	30	42	SiCl
30	3.0	2.0 CGr	0	7	19	28	SiCl
		1.0 Fgr					
		1.0 gr					
		2.0 FS					
		3.0 CS					
		1.0 gr					
		1.0 CGr					
31	1.0	1.0 CGr	0	13	24	31	FS
		1.0 Fgr					
		1.0 FS					
		1.0 Fgr					
		1.0 FS SiCl					
		1.0 Fgr					
		1.0 gr					
		1.0 CGr					
32	1.5	1.5 gr	1	16	33	45	FS
		4.0 CGr					
		2.0 Fgr					
		1.0 CGr					
		1.0 gr					
		1.0 CGr					
		1.5 Fgr					
33	1.0	5.5 gr	0	9	24	34	FS
		2.0 Fgr					
		0.5 FS SiCl					
		1.0 CGr					
34	1.0	2.0 gr	0	9	22	30	FS
		2.0 CGr					
		2.0 FS					
		2.0 Fgr					
		1.5 CGr					

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
35	2.0	2.0 CGr	0	7	18	25	FS
		1.0 gr					
		1.0 CGr					
		1.0 gr					
		3.0 Fgr					
		2.0 FS					
		1.0 gr					
		1.0 CGr					
36	1.0	4.0 Fgr	1	12	28	38	FS
		2.0 CGr					
		3.0 Fgr					
		1.5 gr					
		2.5 CGr					
37	4.0	3.0 CGr	0	9	24	36	FS
		1.0 Fgr					
		3.0 gr					
38	2.0	3.0 gr	0	11	30	42	FS
		1.5 CGr					
		2.5 gr					
		7.0 CGr					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
		2.0 gr					
39	4.0	2.0 CGr	0	11	28	36	FS
		2.0 Fgr					
		1.0 gr					
		1.0 CGr					
		2.0 gr					
40	2.0	2.0 CGr	0	10	27	41	gr SiCl
		2.0 gr					
		1.0 gr SiCl					
		4.0 gr					
41	3.0	3.0 gr	0	7	24	36	gr SiCl
		1.0 CGr					
		1.0 gr					
		2.0 CGr					
		1.0 Fgr					
42	3.0	3.0 gr	0	10	26	38	FS
		1.0 CGr					

RANGE 103 **TWP** 131 **SEC** SE 1/4 8

COUNTY Bowman Sep-11

PROSPECTED BY Swank/Rogstad

INSPECTED & APPROVED B. Hoesel Dec-12

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
Cl or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSP	corrugated steel pipe
C	coulomb
Co	County
Crse	course
C Gr	course gravel
CS	course sand
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fs	foresight
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups

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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

- Hidden Object
- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Centerline Main
- Centerline
- Existing Ground (Details)
- Existing Conditions
- 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	
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09-23-16	Added and Revised Items, Organized by Functional Groups

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

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Symbols

D-101-31

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

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Symbols

D-101-32

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

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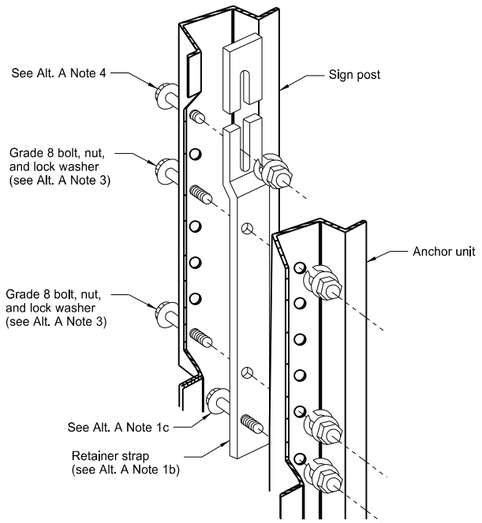
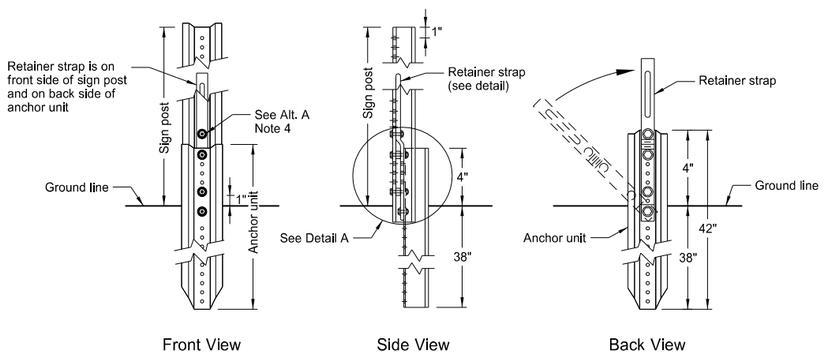
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



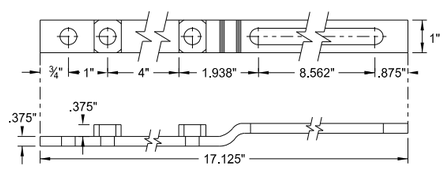
Detail A



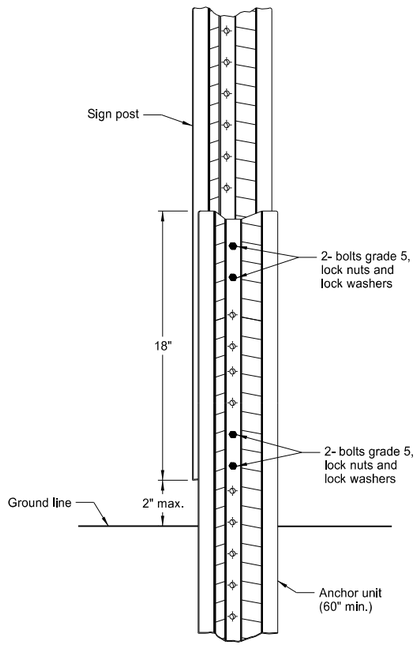
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

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

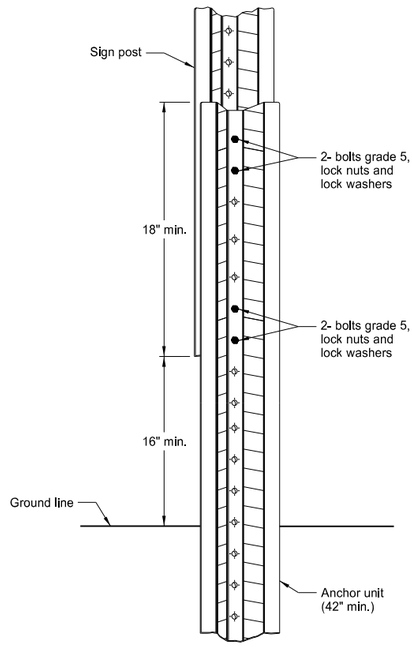


Retainer Strap Detail



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

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



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

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

Alternate A Steps of Installation:

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

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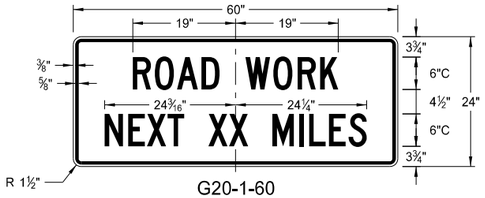
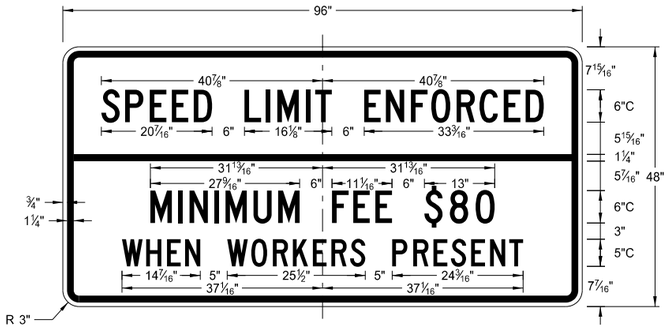
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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

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



G20-55-96
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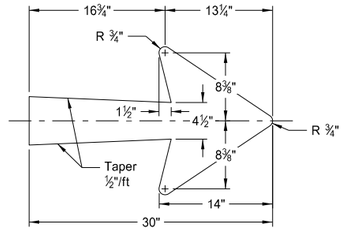
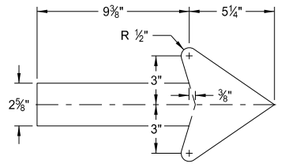
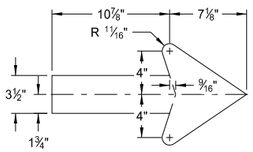
Background: orange



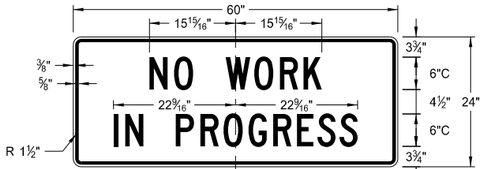
E5-1-48



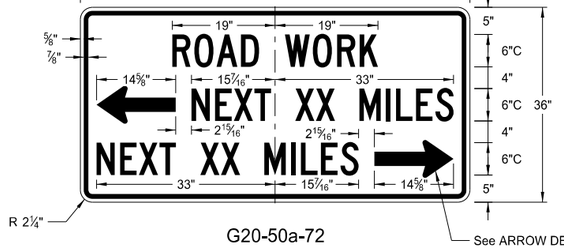
G20-50a-72
G20-52a-72



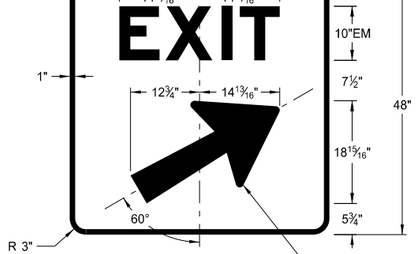
M4-9(L or R)-30
Right or Left



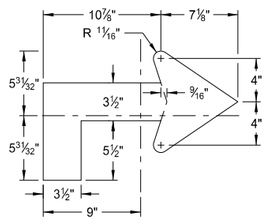
G20-1b-60
Legend: black (non-refl)
Background: orange



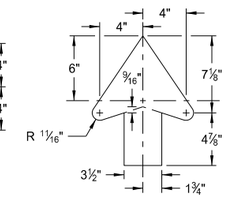
G20-50a-72
Legend: black (non-refl)
Background: orange



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

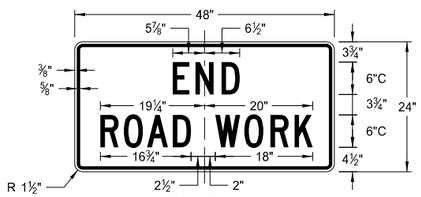


M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS



G20-2-48
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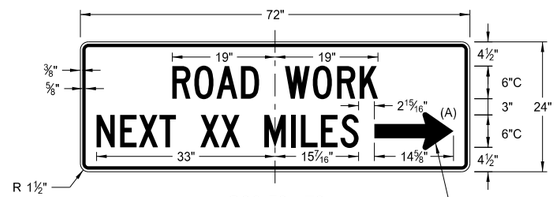
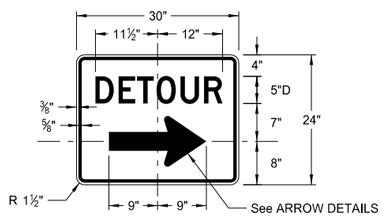
Background: orange



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



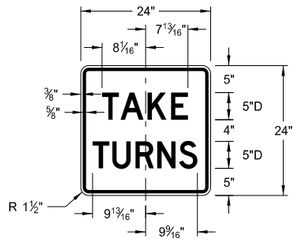
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

NOTES:

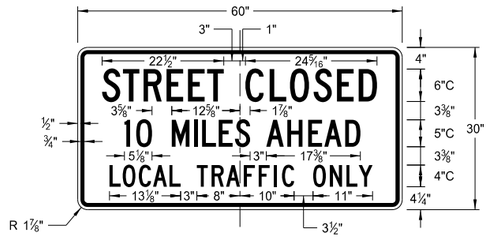
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

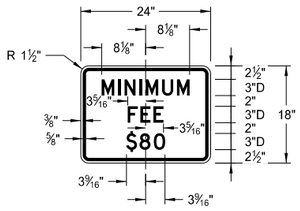
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



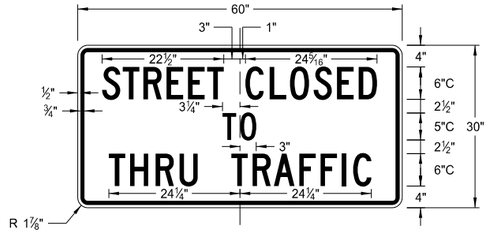
R1-50-24
Legend: black (non-refl)
Background: white



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



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



R11-4a-60
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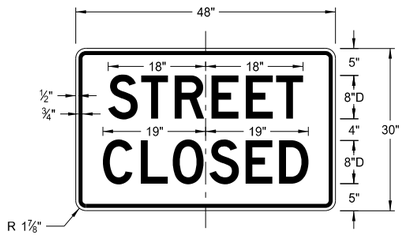

R11-2a-48
Legend: black (non-refl)
Background: white

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

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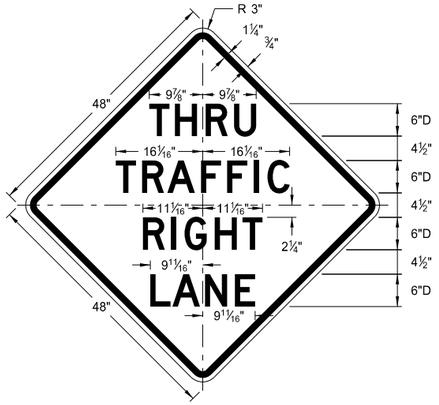
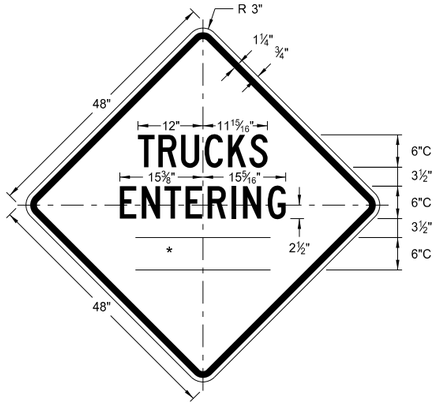
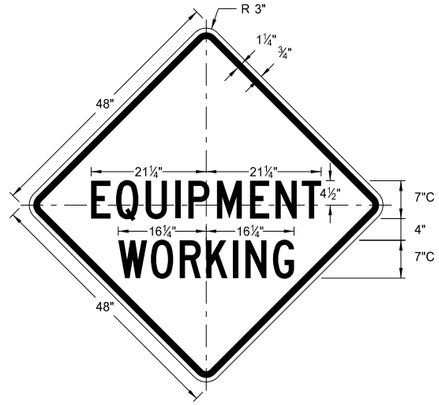
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



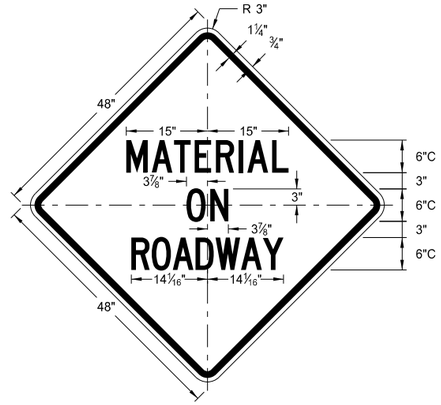
W5-8-48
Legend: black (non-refl)
Background: orange



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



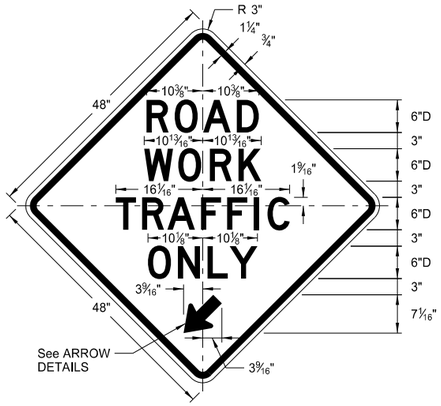
W20-51-48
Legend: black (non-refl)
Background: orange



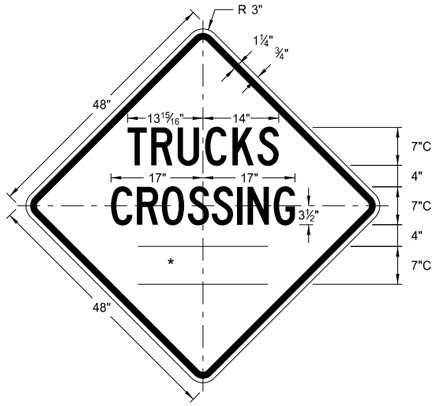
W21-51-48
Legend: black (non-refl)
Background: orange

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

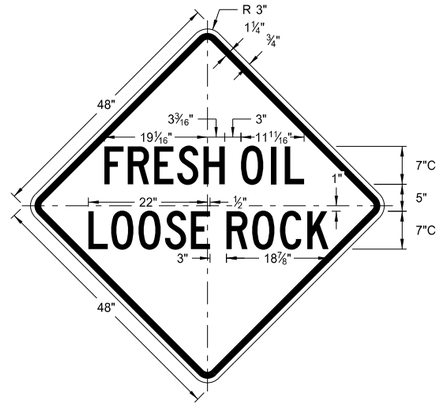


W5-9-48
Legend: black (non-refl)
Background: orange

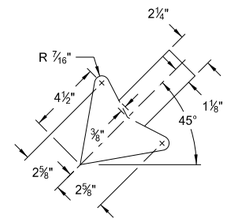


W8-55-48
Legend: black (non-refl)
Background: orange

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

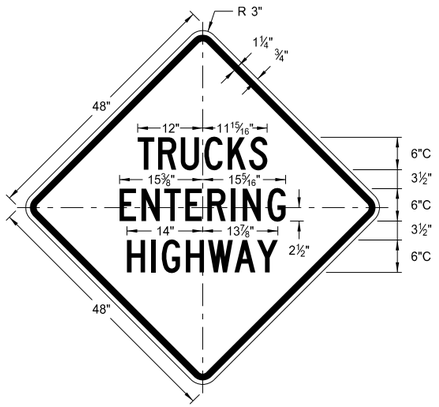


W22-8-48
Legend: black (non-refl)
Background: orange

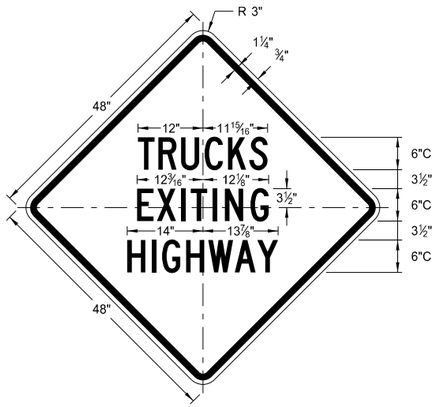


W5-9-48

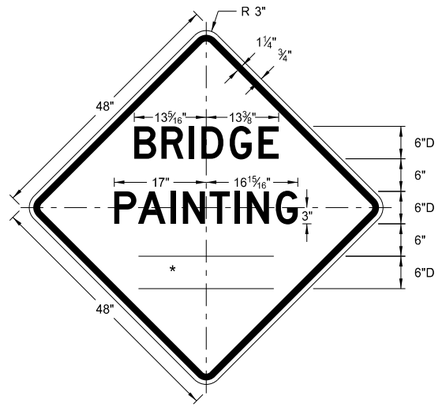
ARROW DETAILS



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



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



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

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

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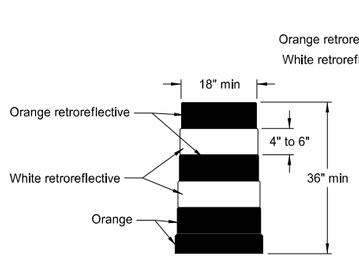
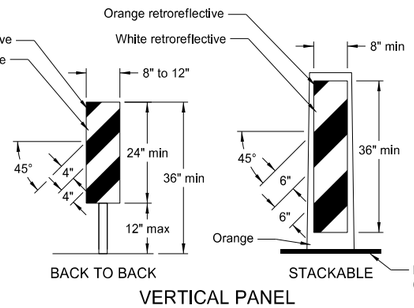
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



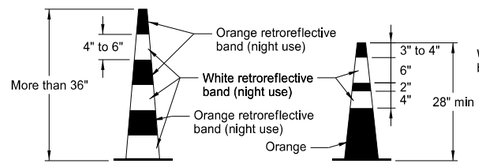
DELINEATOR DRUM

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



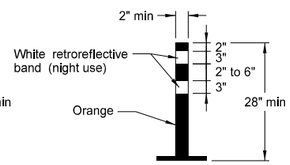
VERTICAL PANEL

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



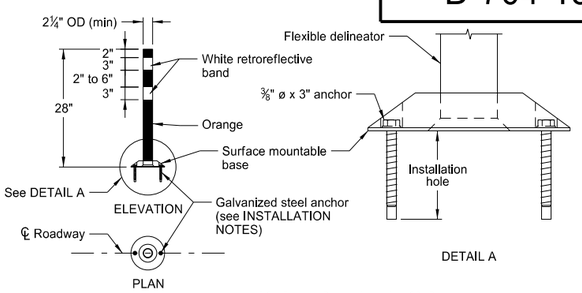
TRAFFIC CONE

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



TUBULAR MARKER

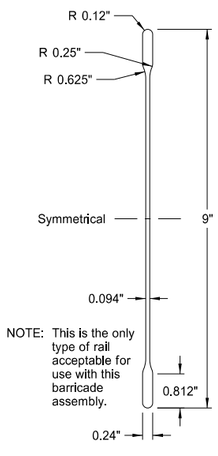
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



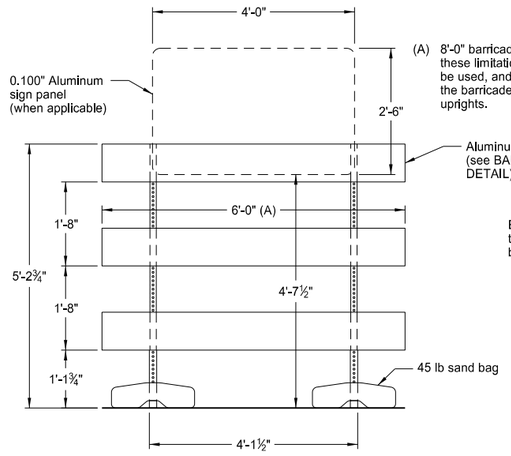
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

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

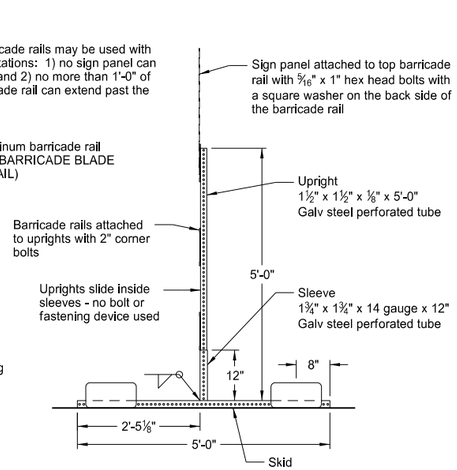


BARRICADE BLADE DETAIL



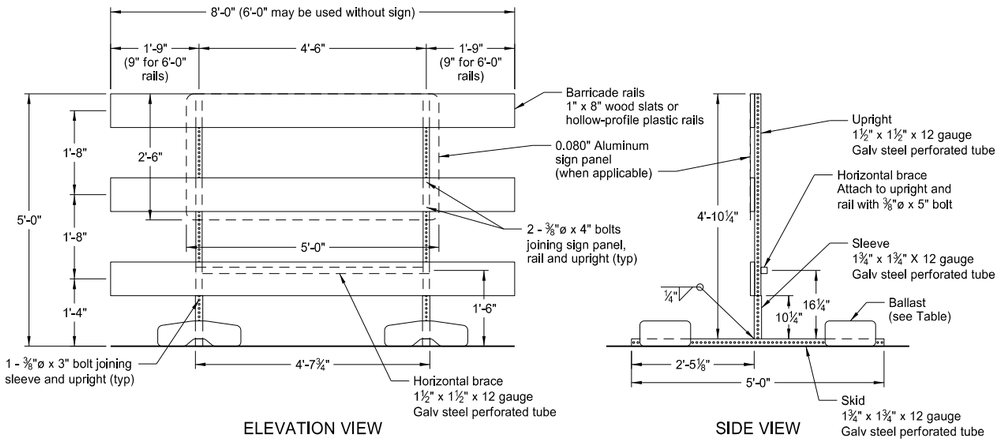
ELEVATION VIEW

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



SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

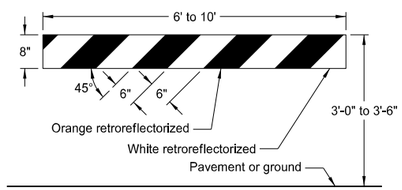


ELEVATION VIEW

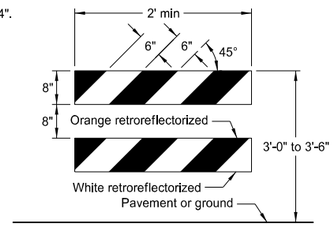
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

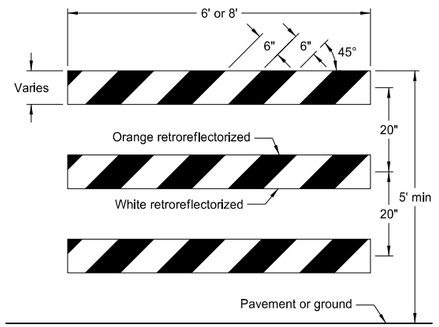
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

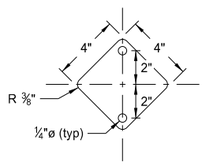


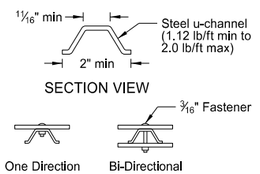
TYPE II BARRICADE

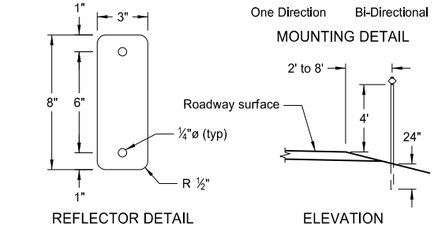


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
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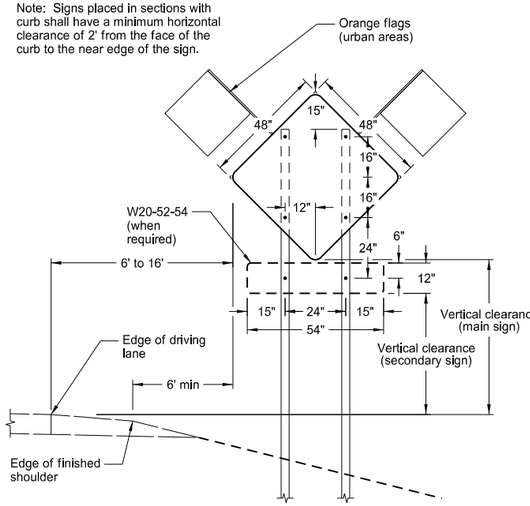
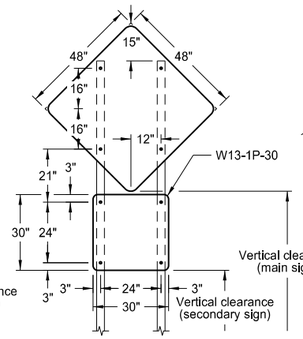
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

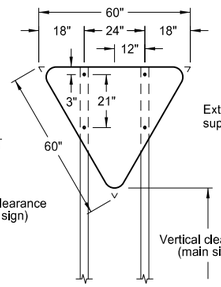
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



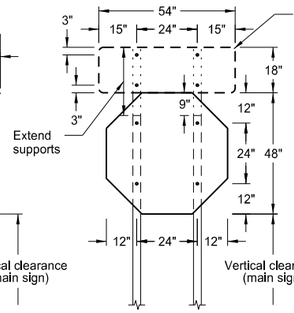
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



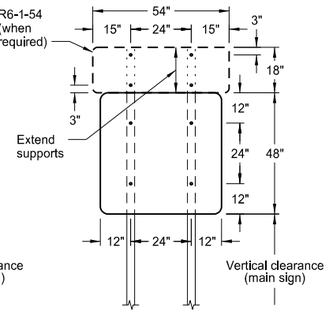
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



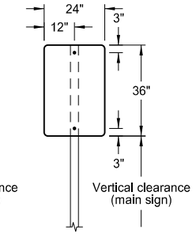
R1-2-60 - YIELD SIGN



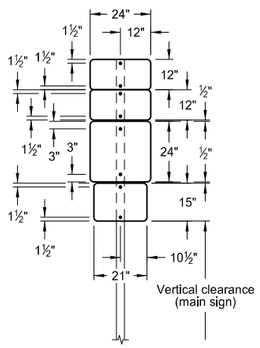
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



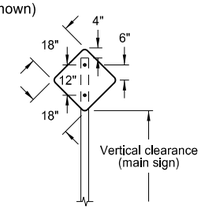
48" x 48" SIGN
(with R6-1-54 sign as required)



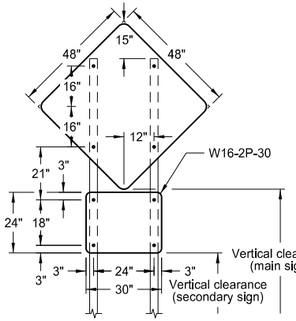
24" x 36" SIGN



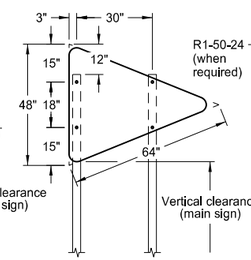
24" x 24"
ROUTE MARKER
ASSEMBLY



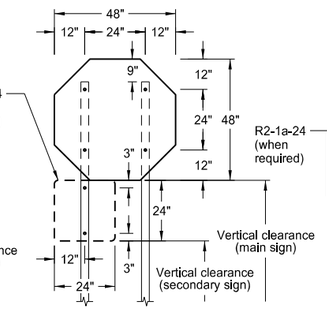
18" x 18"
DIAMOND SIGN



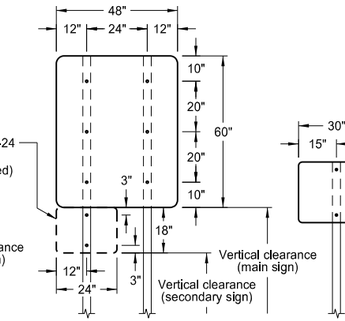
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



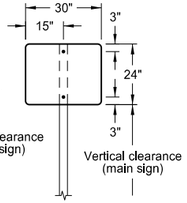
W14-3-64 - PENNANT SIGN



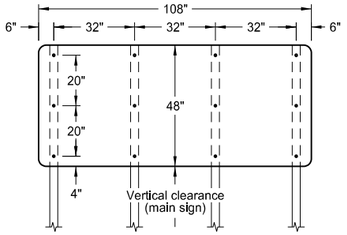
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



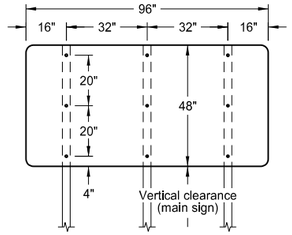
48" x 48" SIGN
(with R2-1a-24 sign as required)



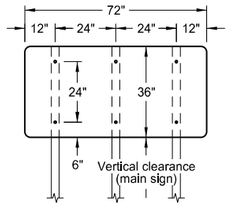
30" x 24" SIGN



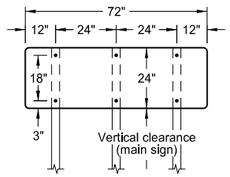
108" x 48" SIGN



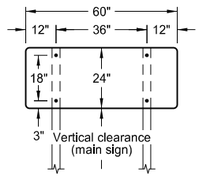
96" x 48" SIGN



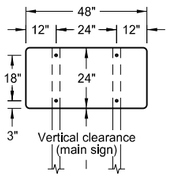
72" x 36" SIGN



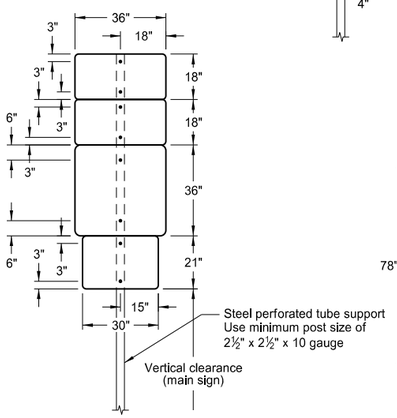
72" x 24" SIGN



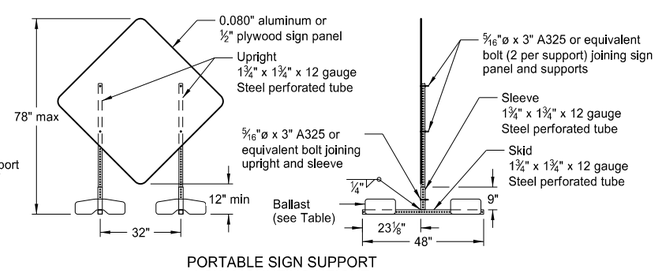
60" x 24" SIGN



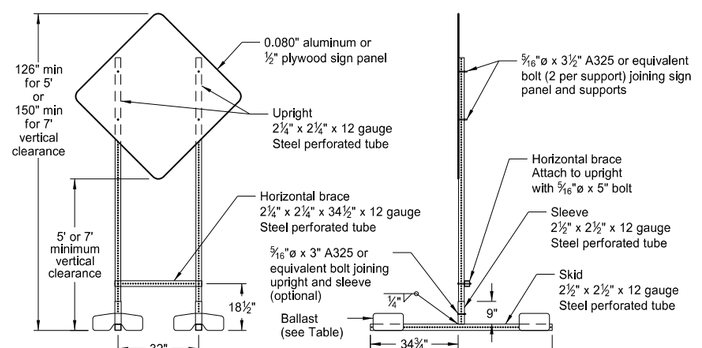
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

   Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

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

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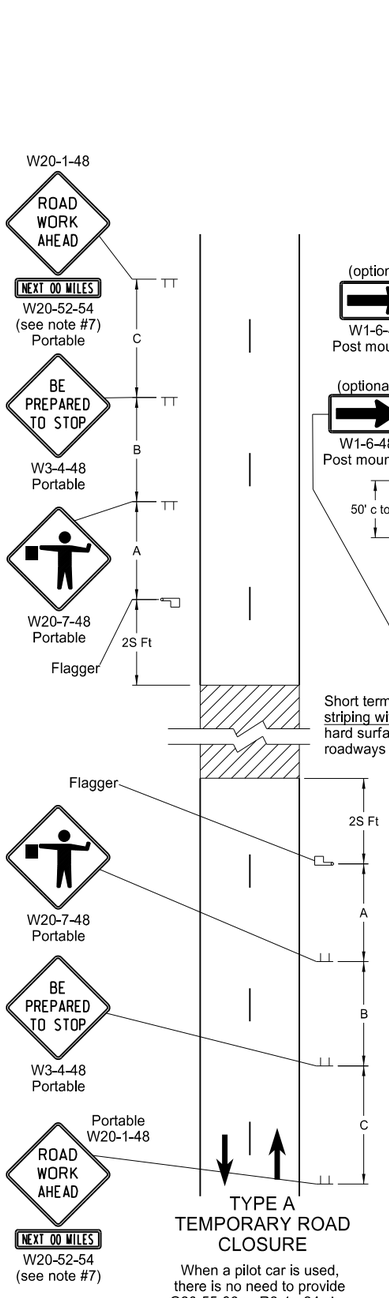
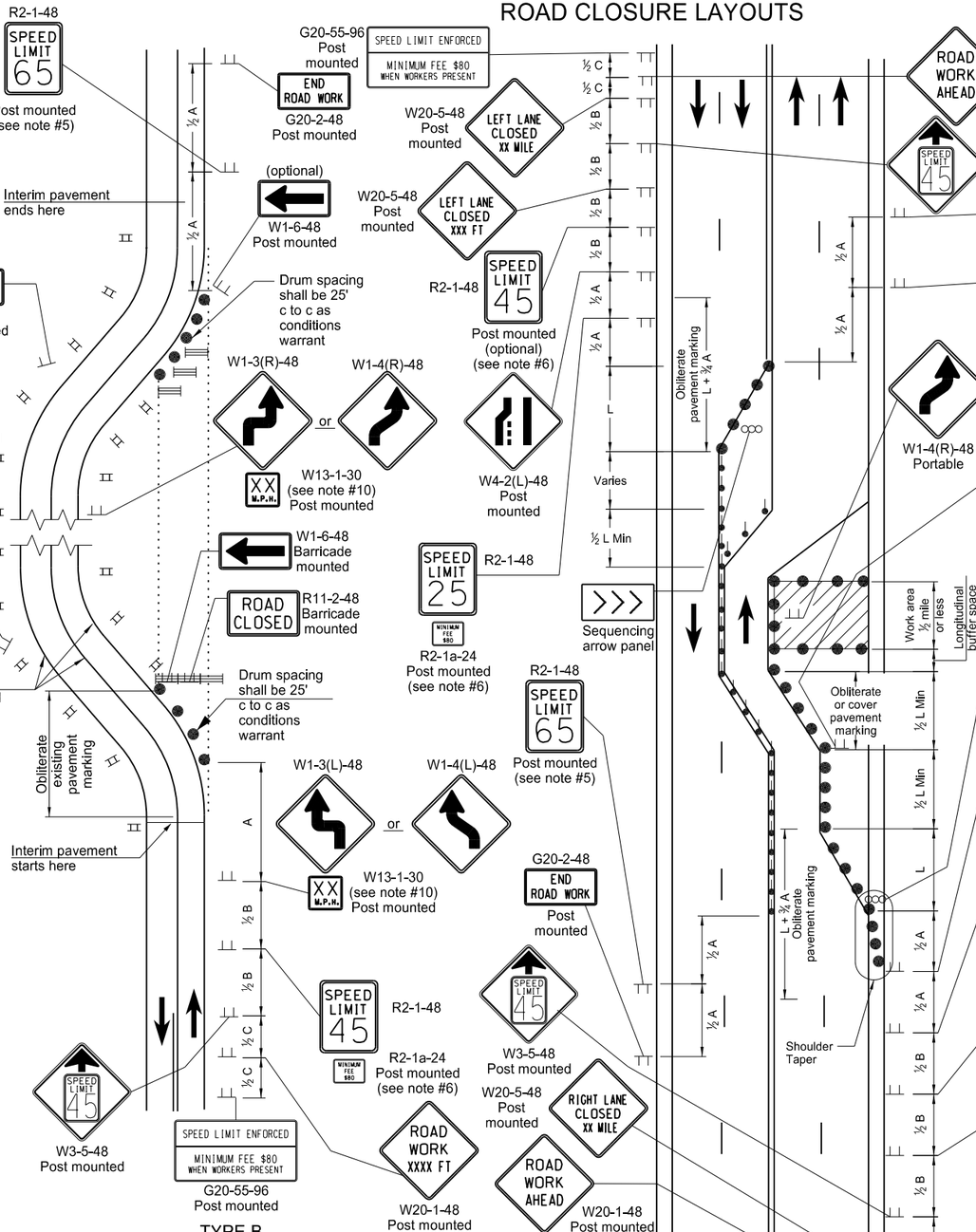
ROAD CLOSURE LAYOUTS

D-704-15



TYPE A
TEMPORARY ROAD CLOSURE

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



TYPE B
ROAD CLOSURE WITH A DIVERSION

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

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.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
4. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
7. Use when work area is 1 mile or longer.
8. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
9. Existing speed limit signs within a reduced speed zone shall be covered.
10. Where necessary, safe speed to be determined by the Engineer.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
12. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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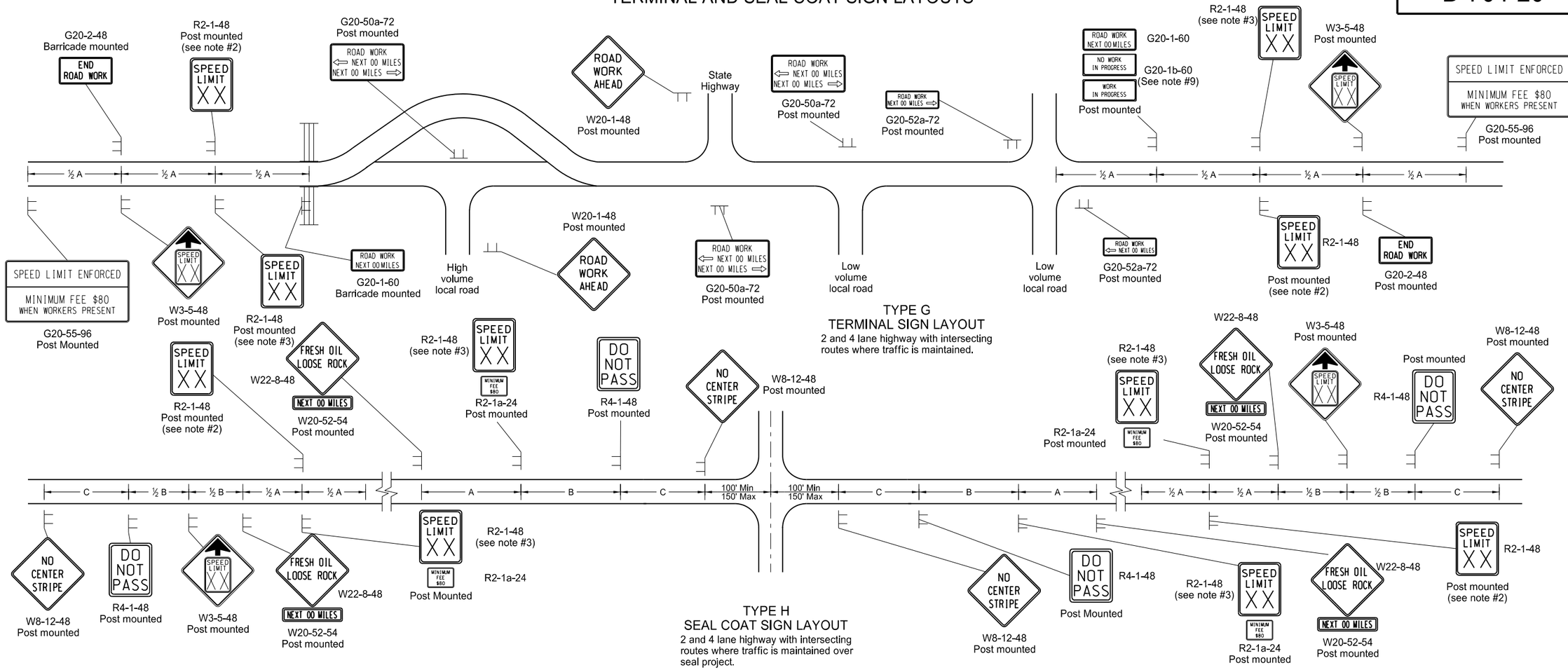
TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
11. G20-55-96 sign is not required if work is less than 15 days.

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

KEY

Type III barricade

Sign

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
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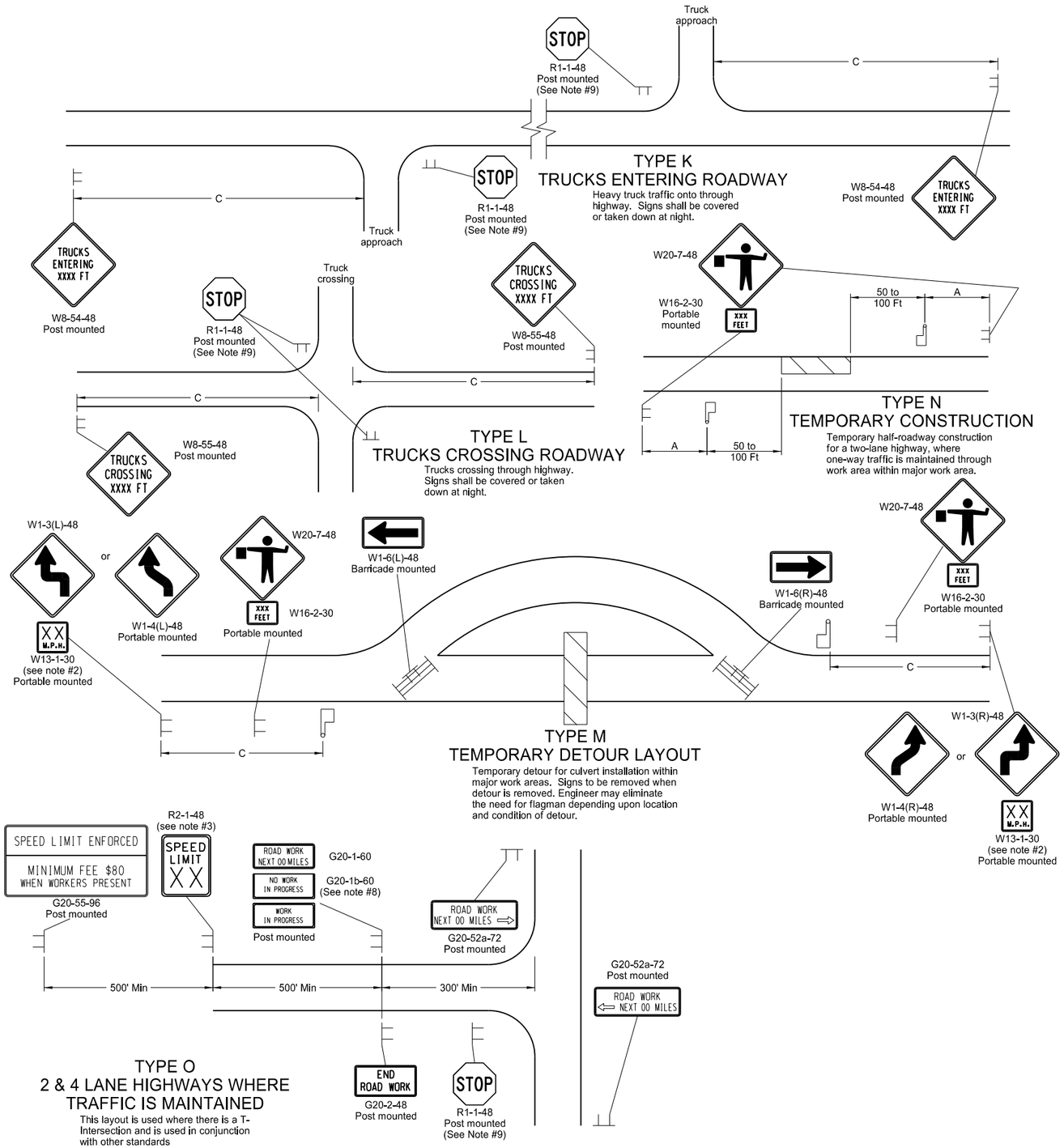
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

KEY

Type III barricade — Work area

Sign — Flagger

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

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9-27-13	
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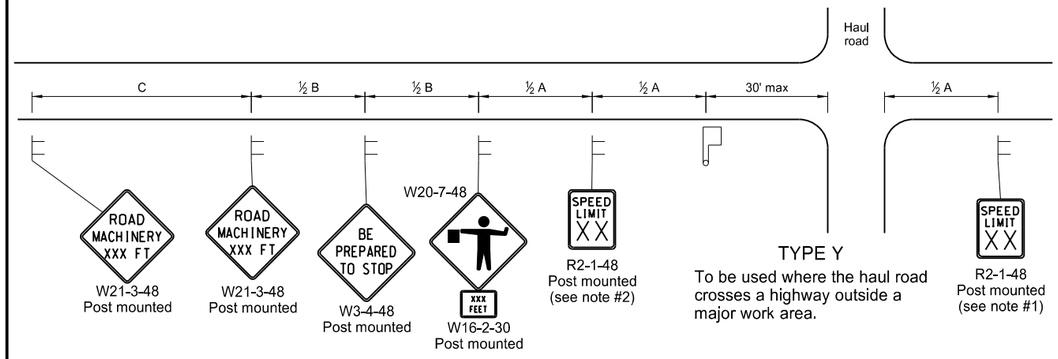
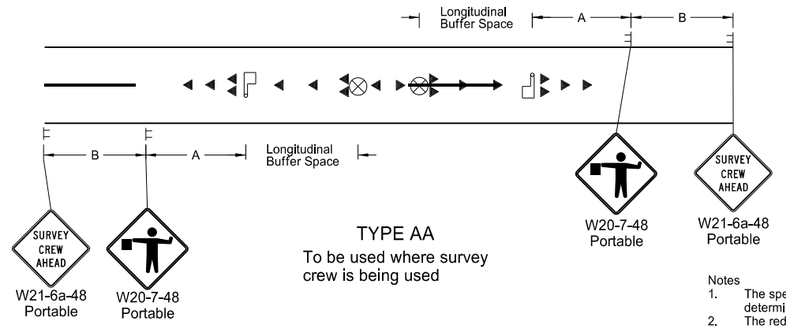
MISCELLANEOUS SIGN LAYOUTS

D-704-26



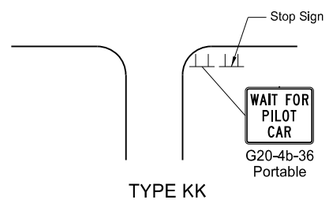
TYPE Y

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



TYPE AA

To be used where survey crew is being used

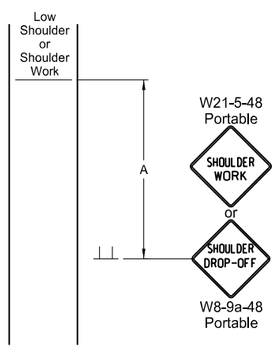


TYPE KK

To be used at major intersections within pilot car control area

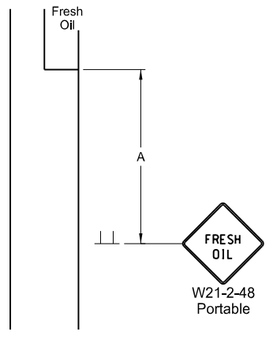
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



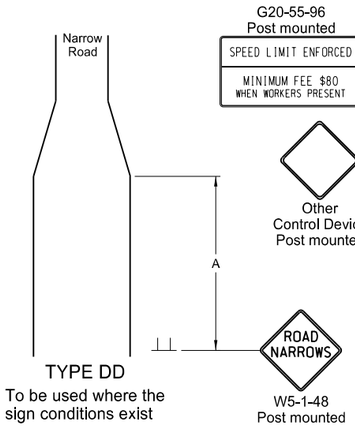
TYPE BB

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



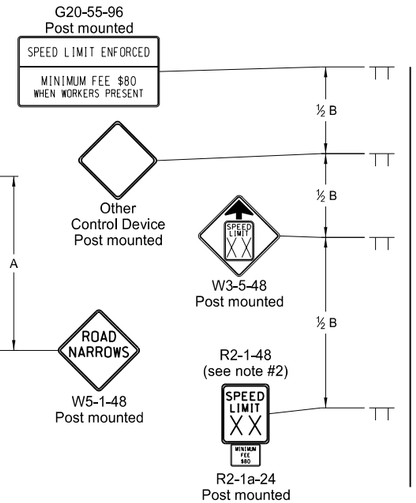
TYPE CC

To be used where the sign conditions exist



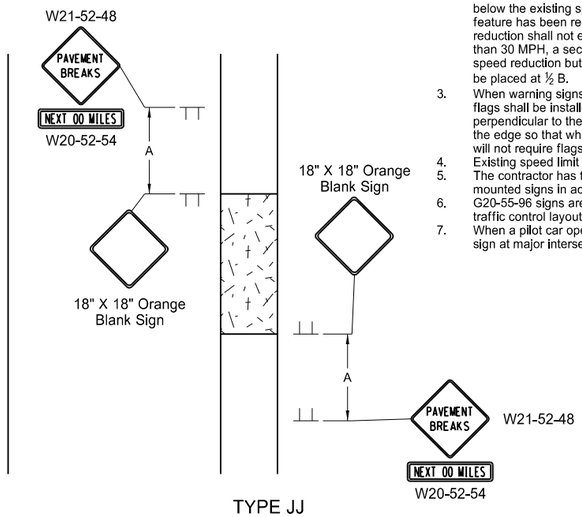
TYPE DD

To be used where the sign conditions exist



TYPE Z

To be used where speed zone is needed

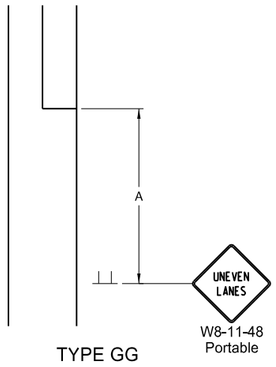


TYPE JJ

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

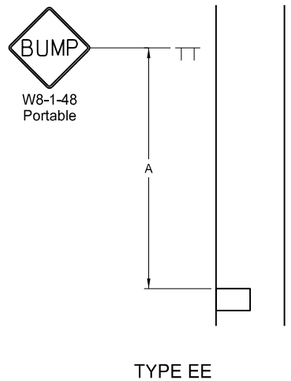
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

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



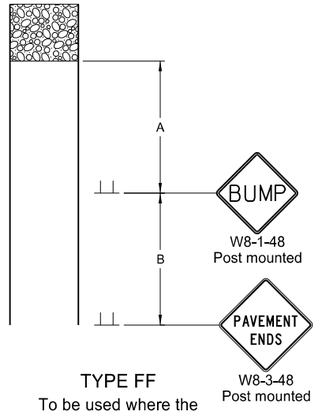
TYPE GG

To be used where a difference of elevation between lanes exist



TYPE EE

To be used where the sign conditions exist



TYPE FF

To be used where the sign conditions exist

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

KEY

Sign — Flagger

Cones

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
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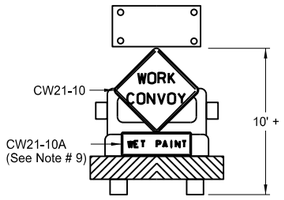
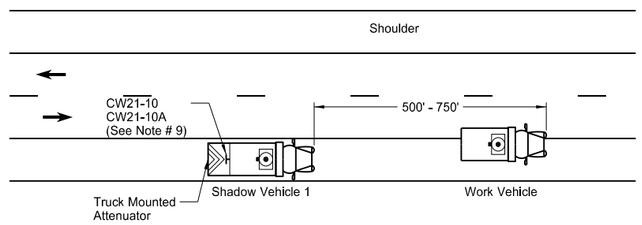
TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

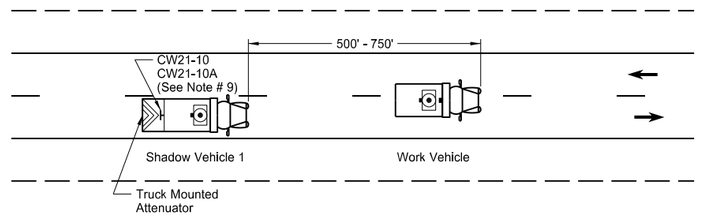
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday



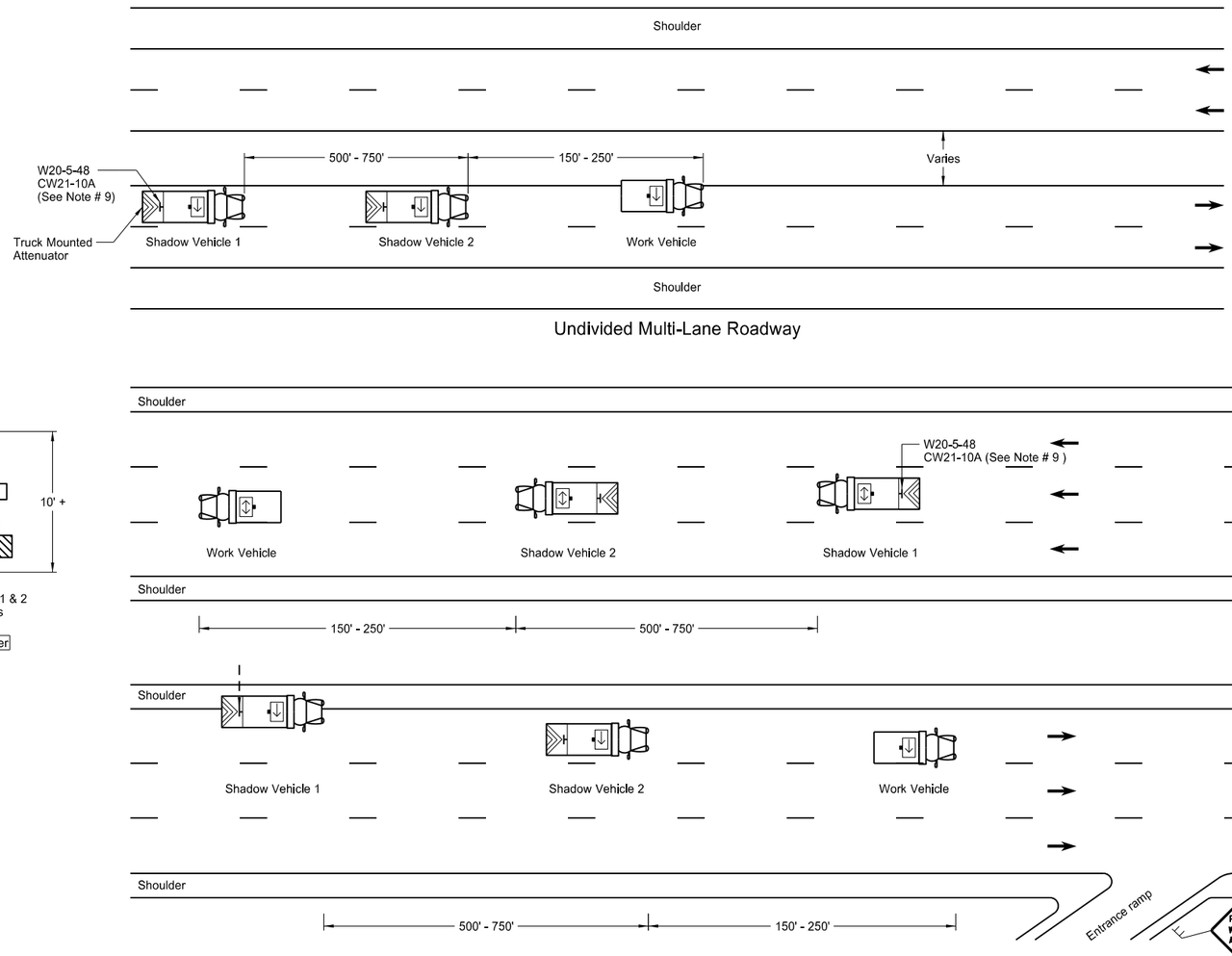
Two-Way Roadway with Paved Shoulders



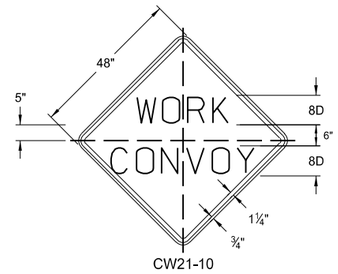
Two-Way Roadway without Paved Shoulders

Notes

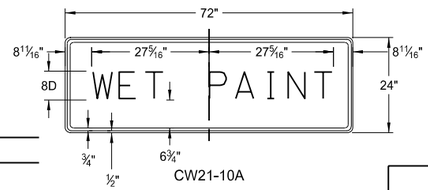
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
2. Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the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



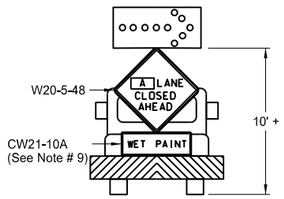
Sign Details



CW21-10



CW21-10A



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center

KEY

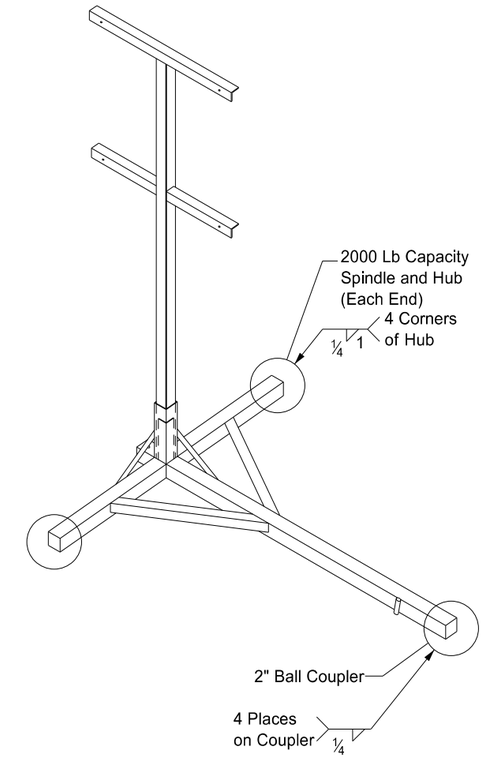
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

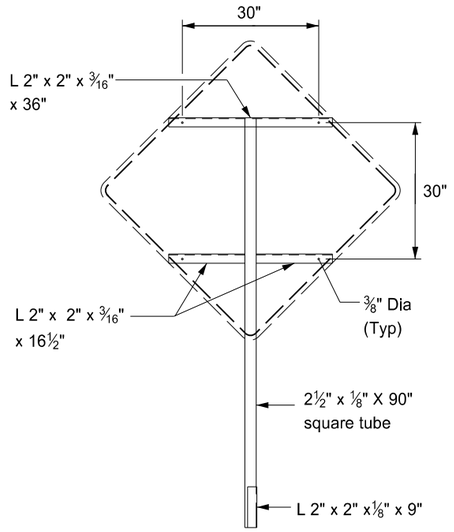
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

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

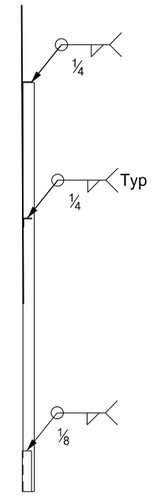
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



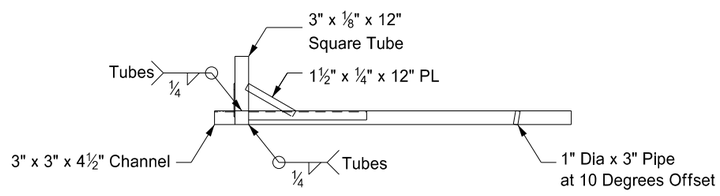


FRONT



RIGHT

SIGN SUPPORT



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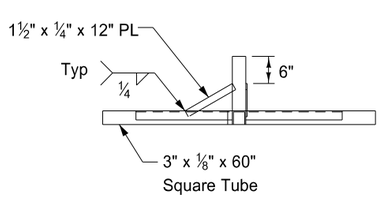
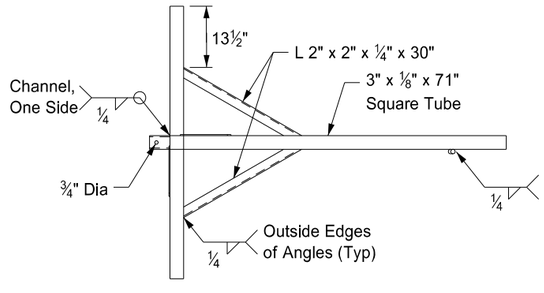


RIGHT



TOP

TRAILER

Notes:

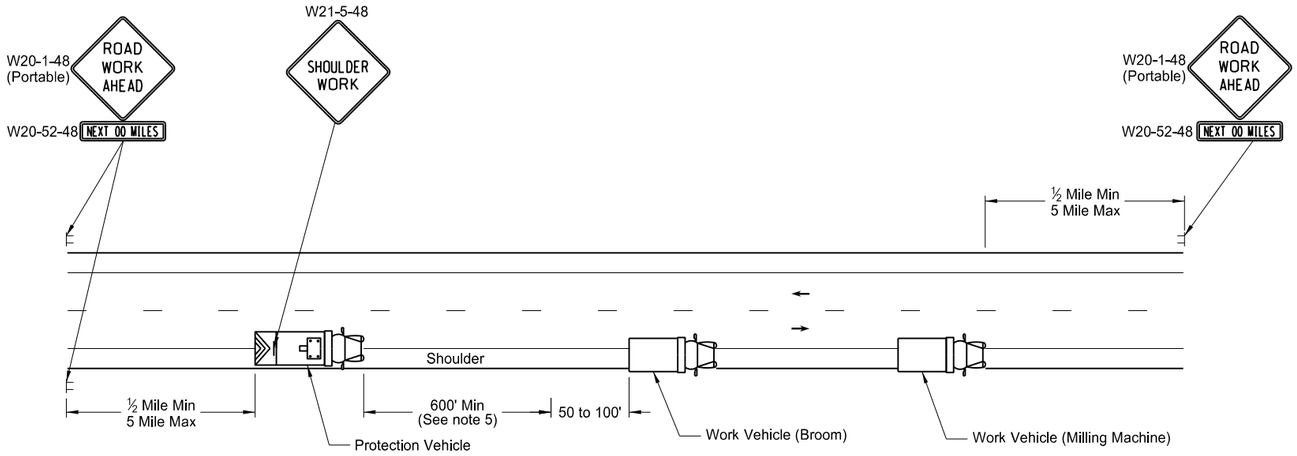
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

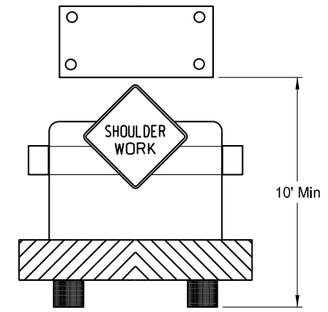
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



TWO LANE - TWO WAY ROADWAY

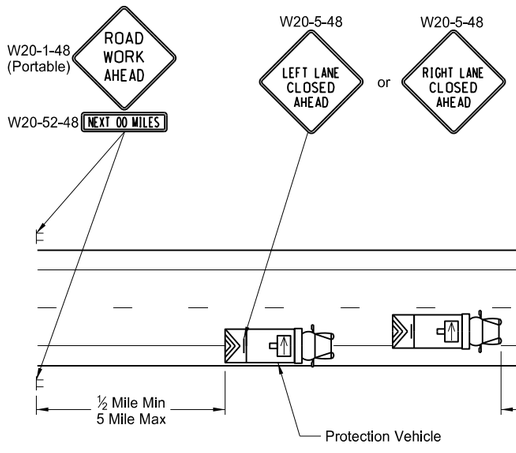


TWO LANE - TWO WAY ROADWAY

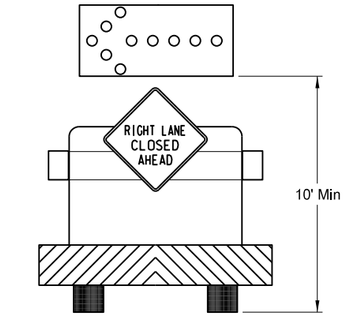
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

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

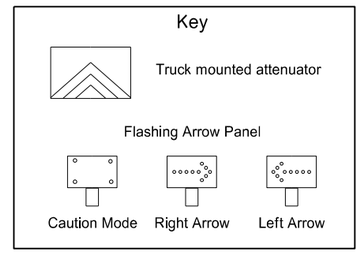


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE

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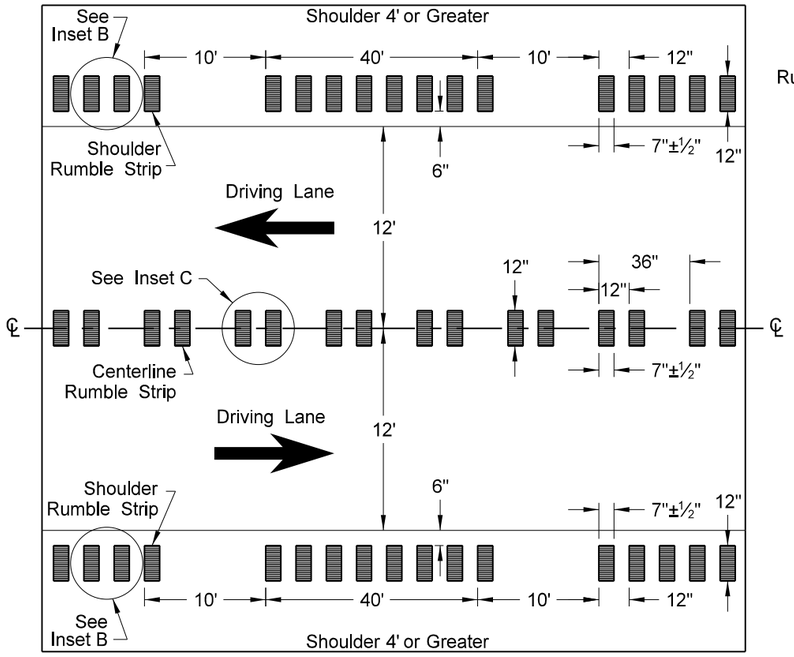
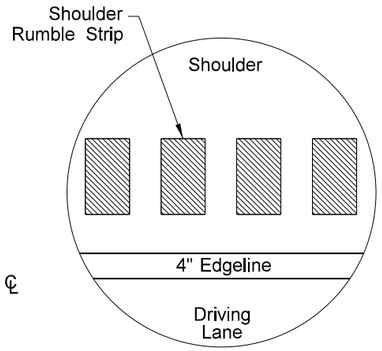
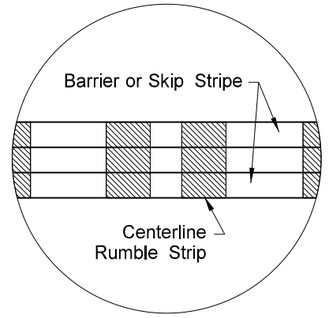
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)



Undivided Highways (Shoulders 4' or Greater)



Inset B - Shoulder Rumble Strip

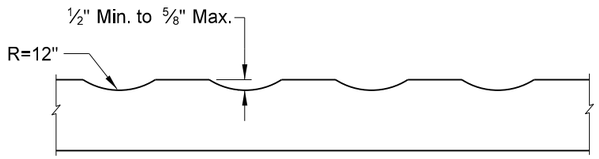


Inset C - Centerline Rumble Strip

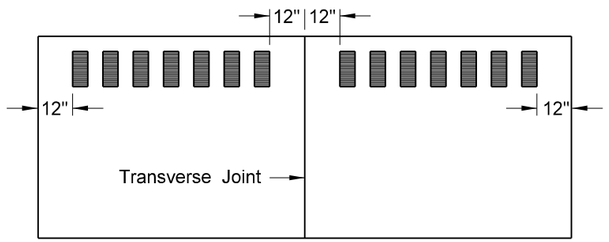
NOTES:

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.

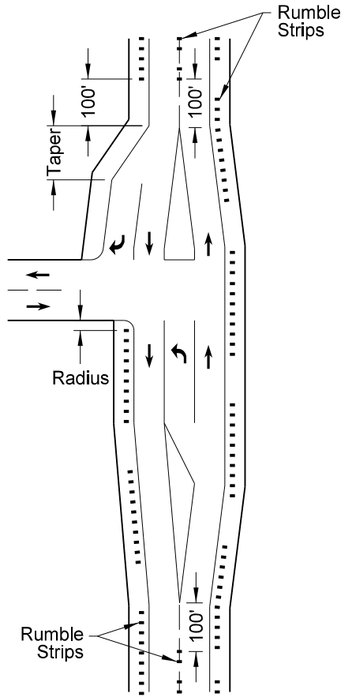
2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, and 100' before and after a paved or gravel highway, section line, approach, or private drive.



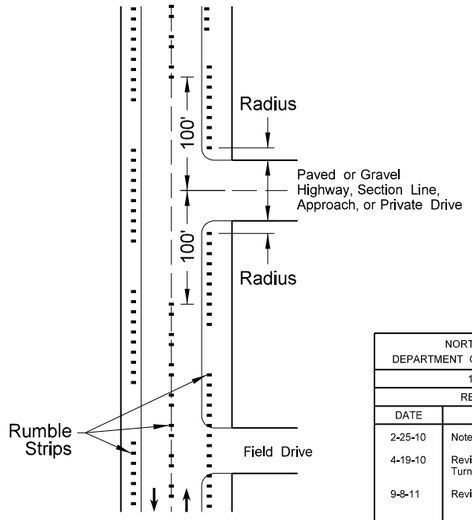
Profile of Rumble Strips - Bituminous and PCC Pavements



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



Turn Lane (Right & Left)

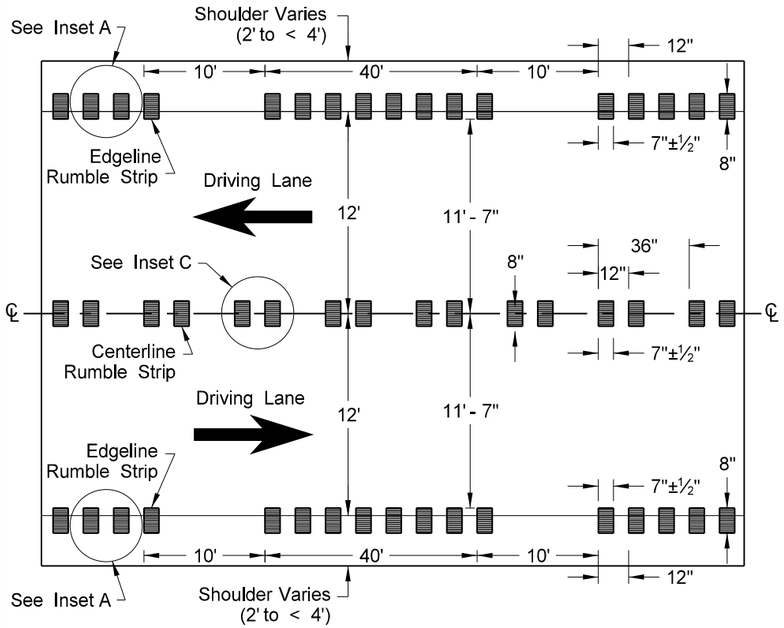


Entrance Roadways

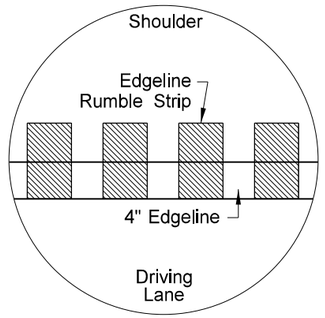
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-8-11	Revised Notes and D-760-3.

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 9/8/11 and the original document is stored at the North Dakota Department of Transportation

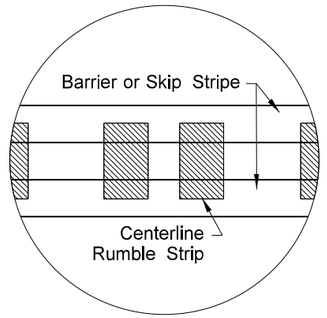
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')



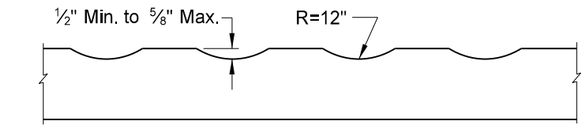
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



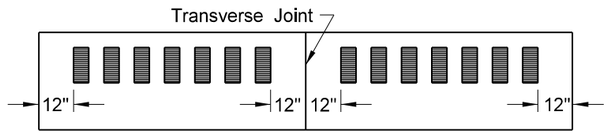
Inset A - Edgeline Rumble Strip



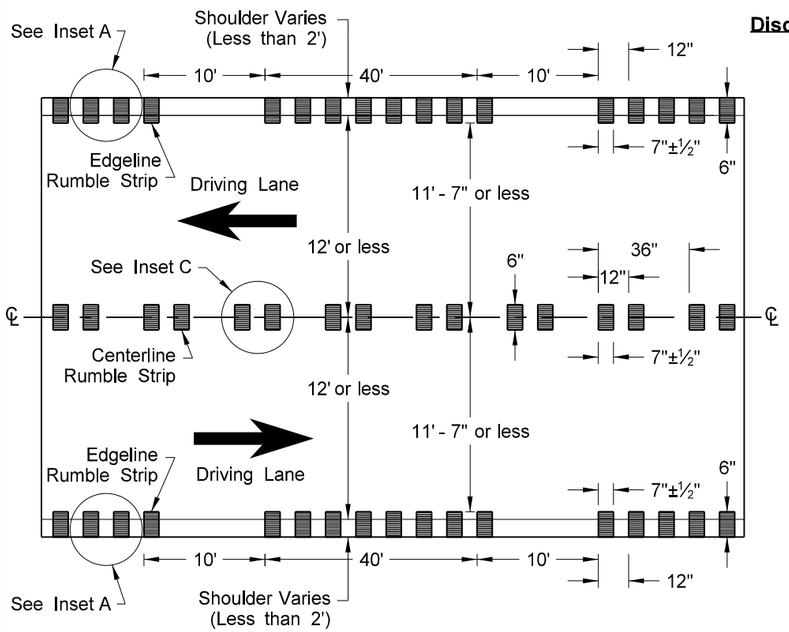
Inset C - Centerline Rumble Strip



Profile of Rumble Strips - Bituminous and PCC Pavements



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

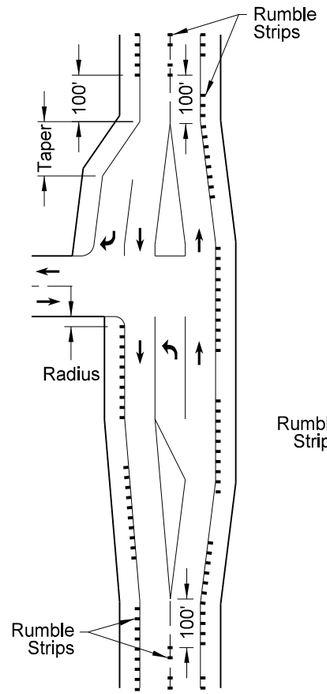


Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')

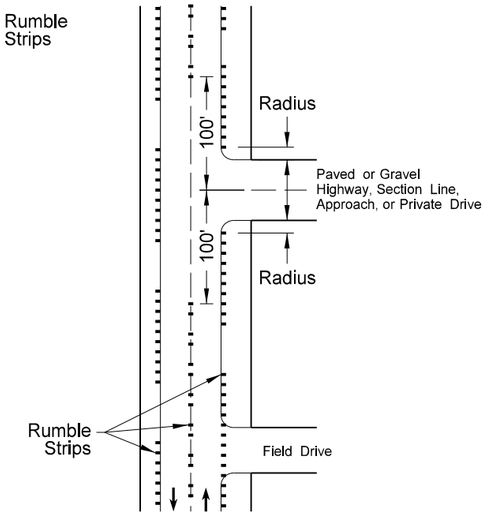
NOTES:

1) Discontinue edgeline 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, 100' before and after a paved or gravel highway, section line, approach, or private drive.



Turn Lane
(Right & Left)



Entrance Roadways

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-8-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.

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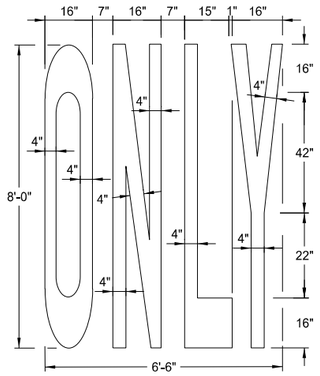
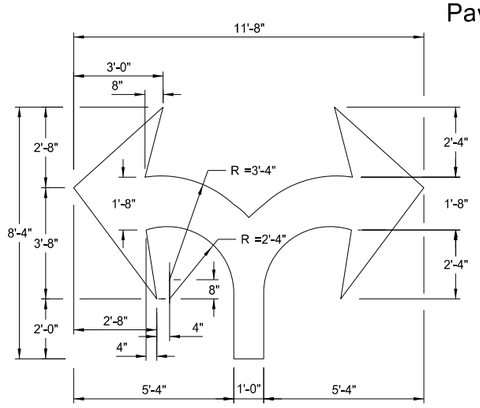
Pavement Marking Message Details

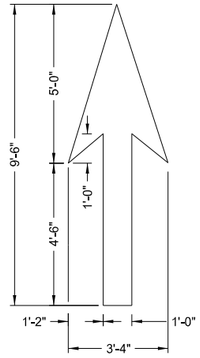
D-762-1



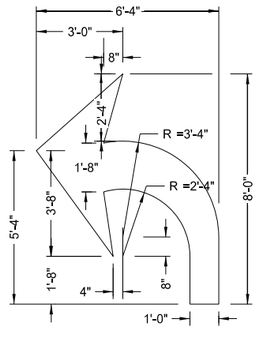
22 S. F.



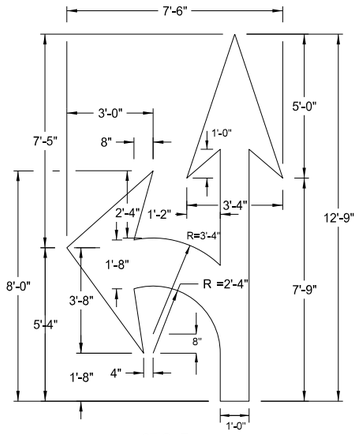
29 S. F.



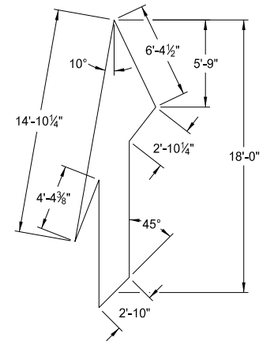
12 S. F.



16 S. F.

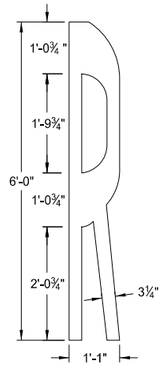


27 S. F.

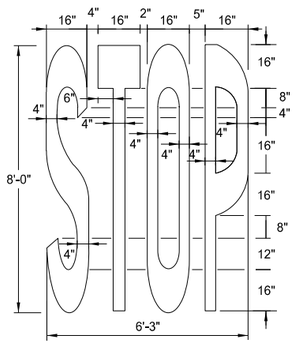


41 S. F.

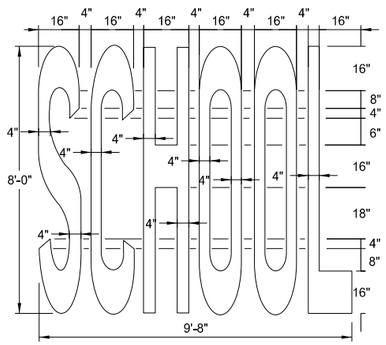
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



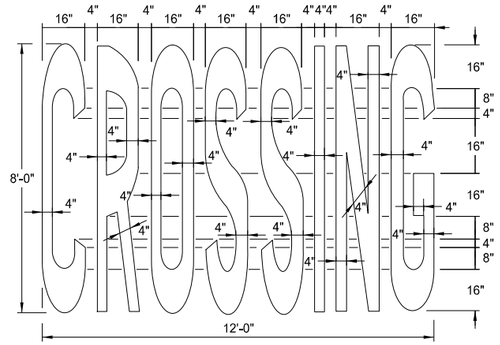
4 S. F.



22 S. F.



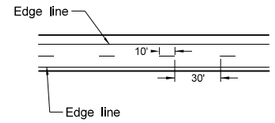
34.5 S. F.



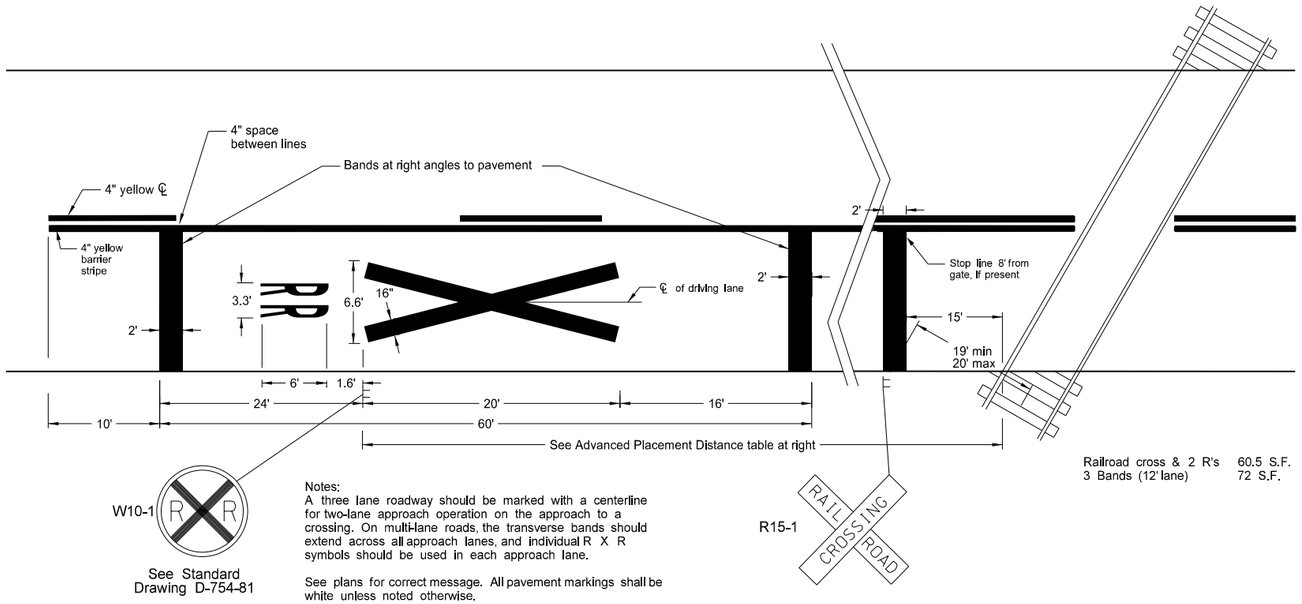
46 S. F.

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

Chevron Crosshatching Table



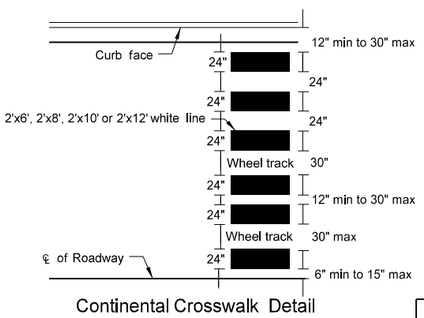
Centerline Pavement Marking Skip Spacing Detail



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

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

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



Continental Crosswalk Detail

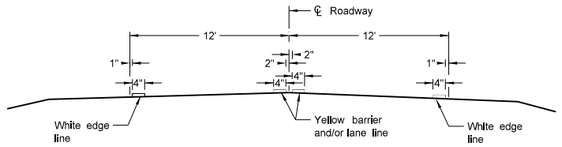
Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE

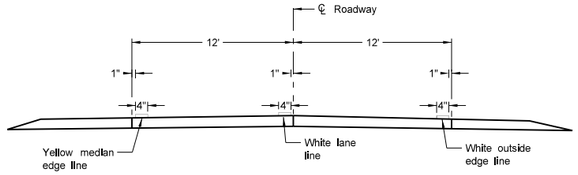
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12/06/11 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

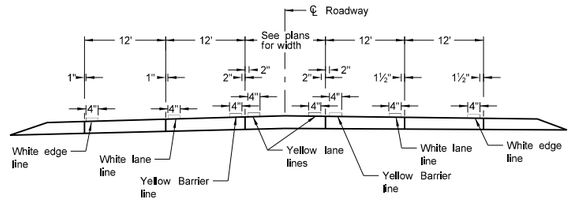
D-762-4



Two Lane Two Way
RURAL ROADWAY



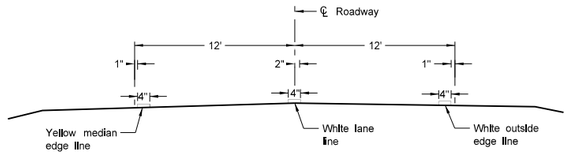
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



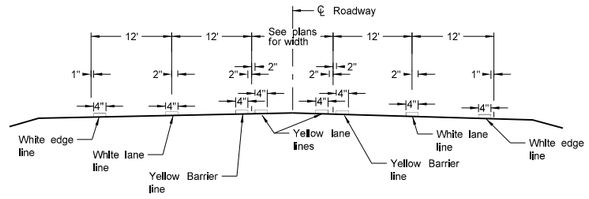
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

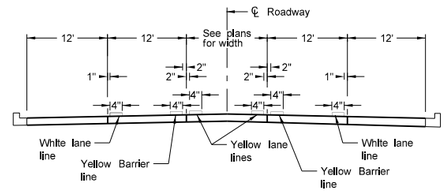
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



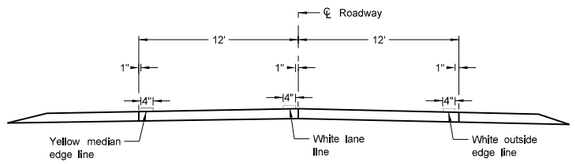
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



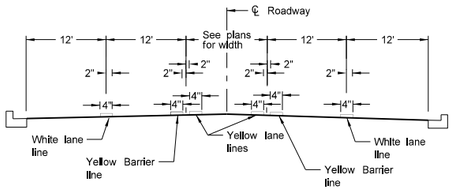
RURAL FIVE LANE ROADWAY
Asphalt Section



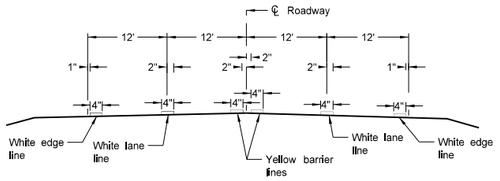
URBAN FIVE LANE SECTION
Concrete Section



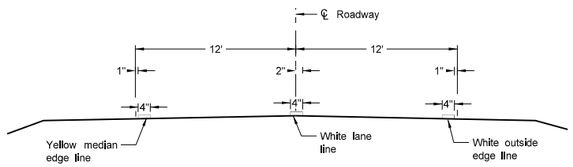
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



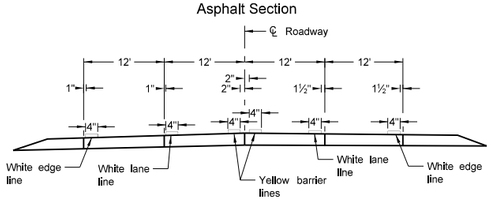
URBAN FIVE LANE SECTION
Asphalt Section



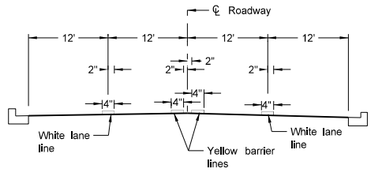
RURAL FOUR LANE ROADWAY
Asphalt Section



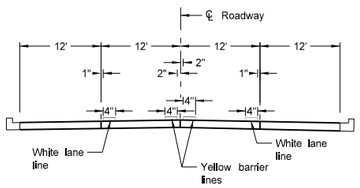
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



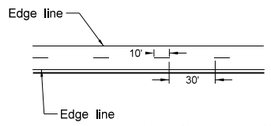
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

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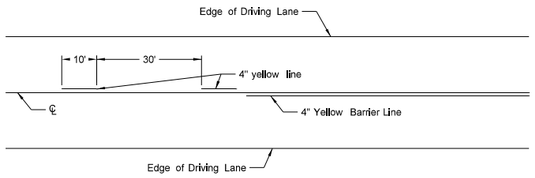
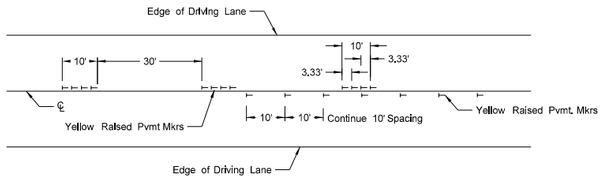
SHORT-TERM PAVEMENT MARKING

D-762-11

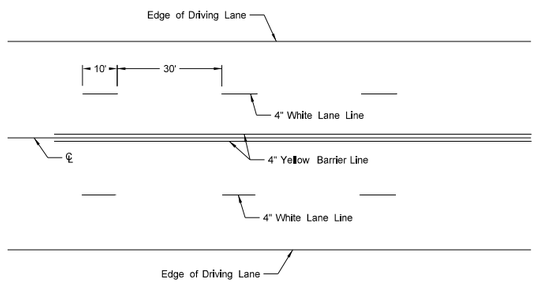


Painted or Tape Lines



Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY



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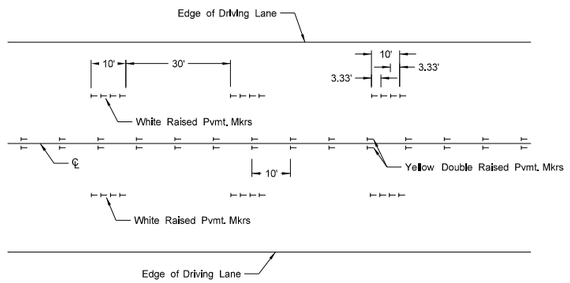
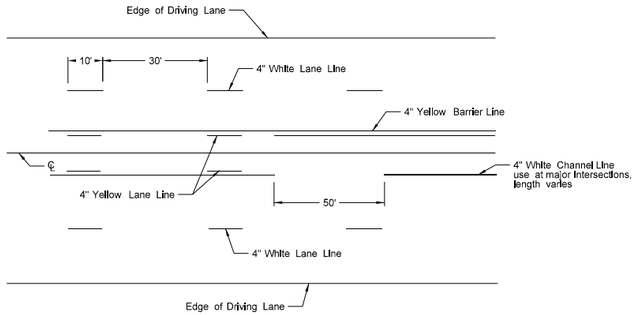


Raised Pavement Markers

FOUR LANE ROADWAY



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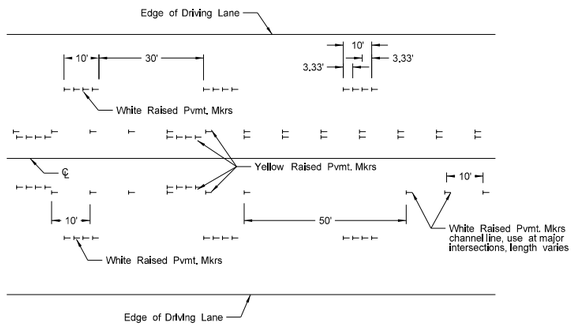
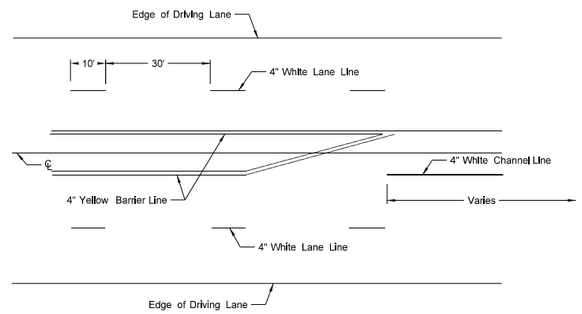


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



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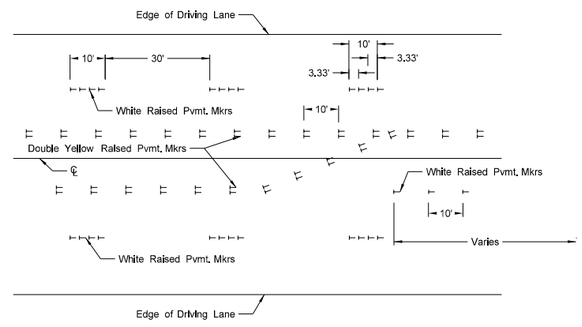

Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

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

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 03/29/16 and the original document is stored at the North Dakota Department of Transportation