

DESIGN DATA - US 2: RP 193.625 to RP 199.902				
Traffic	Average Daily			
Current 2023	Pass: 950	Trucks: 180	Total: 1130	
Preventive Maintenance				
DESIGN DATA - US 2: RP 199.902 to RP 201.444				
Traffic	Average Daily			
Current 2023	Pass: 950	Trucks: 180	Total: 1130	
Preventive Maintenance				

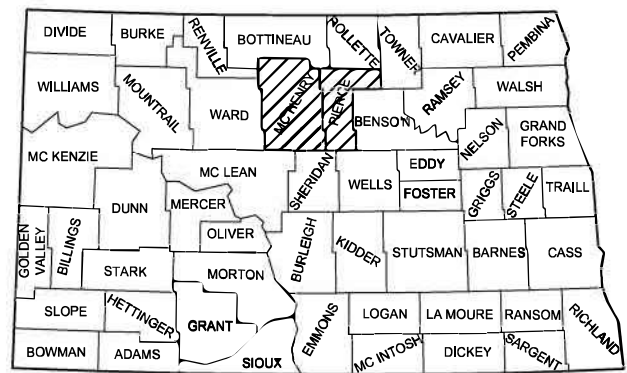
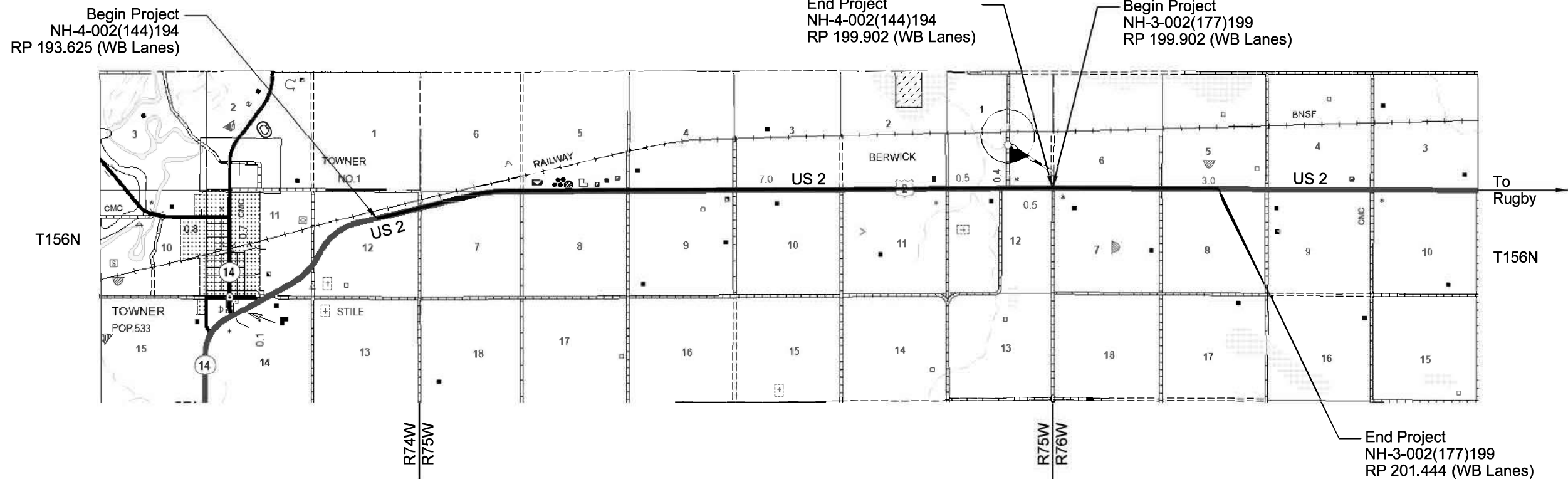
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	24046	1	1
	NH-4-002(144)194	24047		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

NH-3-002(177)199
NH-4-002(144)194
 McHenry & Pierce Counties
 Berwick to 1.5 Miles East of Berwick WB
 1.5 Miles East of Towner to Berwick WB
 Thin Lift Overlay

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-3-002(177)199	1.542	1.542
NH-4-002(144)194	6.277	6.277
Total	7.819	7.819



STATE COUNTY MAP

DESIGNER Hunter Waslaski
DESIGNER
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
 MINOT DISTRICT ENGINEER
Korby Seward 09/04/25

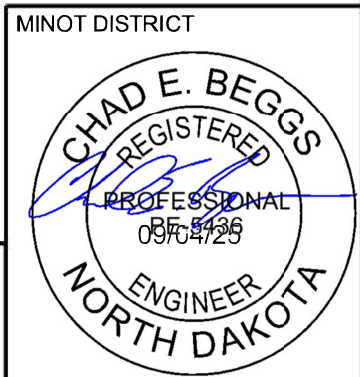


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LIST OF STANDARD DRAWINGS

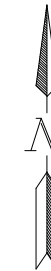
NH-4-002(144)194

PLAN SECTIONS			LIST OF STANDARD DRAWINGS	
Section	Page(s)	Description	Number	Description
1	1	Title Sheet	D-101-1, 2,3,4	NDDOT Abbreviations
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations
4	1	Scope of Work	D-101-20, 21	Line Styles
6	1	Notes	D-101-30, 31,32,33	Symbols
8	1 - 2	Quantities	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
10	1 - 2	Basis of Estimate	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
20	1 - 3	General Details	D-704-9	Construction Sign Details - Terminal And Guide Signs
30	1 - 2	Typical Sections	D-704-10	Construction Sign Details - Regulatory Signs
100	1 - 3	Work Zone Traffic Control	D-704-11, 11A	Construction Sign Details - Warning Signs
180	1 - 7	Pit Plats and Borrow Areas	D-704-12	Shoulder Closure Tapers
			D-704-13	Barricade And Channelizing Device Details
			D-704-14	Construction Sign Punching And Mounting Details
			D-704-15	Road Closure Layouts
			D-704-20	Terminal And Seal Coat Sign Layouts
			D-704-22	Construction Truck And Temporary Detour Layouts
			D-704-26	Miscellaneous Sign Layouts
			D-704-27	Mobile Operation (Pavement Marking)
			D-704-34, 34A	Sign Layout For One Lane Closure
			D-704-50	Portable Sign Support Assembly
			D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
			D-706-1	Bituminous Laboratory
			D-760-2	Rumble Strips - Divided Highways (Non-Interstate)
			D-762-4	Pavement Marking
			D-762-11	Short-Term Pavement Marking

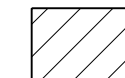
SPECIAL PROVISIONS

Number	Description
SSP 4	Longitudinal Joint Density
SP 411(23)	E-Ticketing (Mandatory)
SP 410(23)	E-Ticketing (Mandatory)

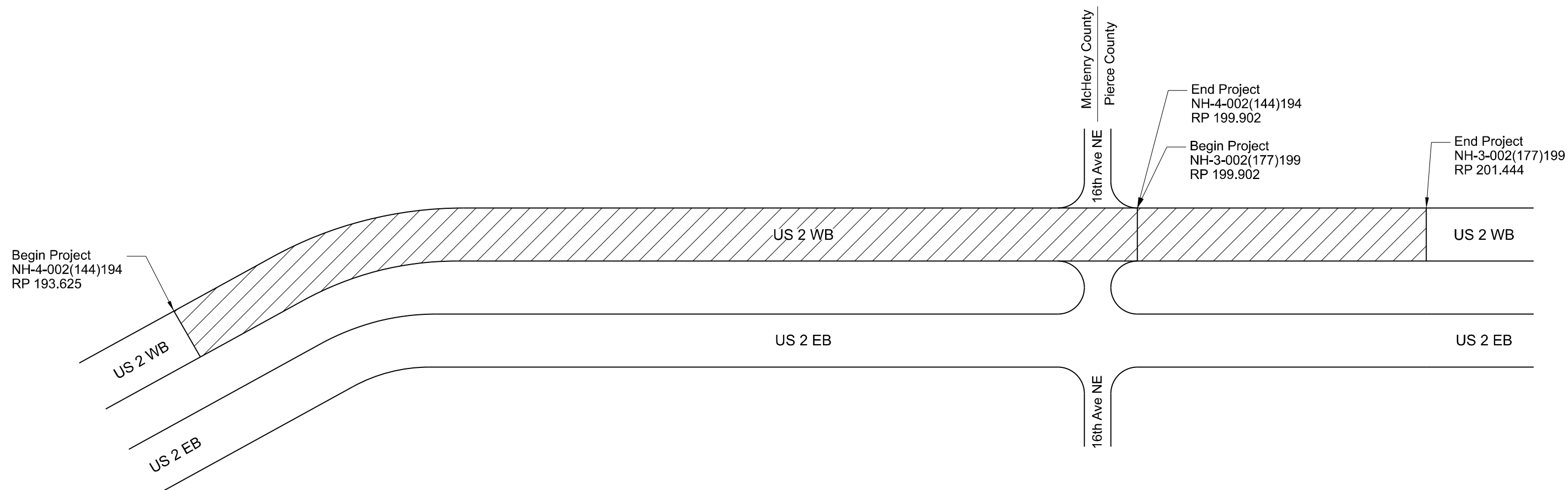
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(177)199	4	1
		NH-4-002(144)194		



LEGEND

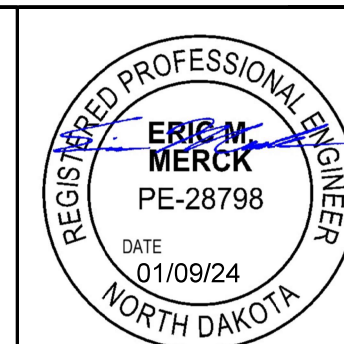


2" HMA Overlay



Scope of Work

US 2 Westbound
McHenry & Pierce Counties, ND



NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	6	1
	NH-4-002(144)194		

100-P01 COORDINATION OF PROJECTS: Other projects in the vicinity of this project are under contract during the 2024 construction season. The projects are NH-3-002(169)199; PCN 22921 located at Berwick to 1 Mile West of Rugby Eastbound and NH-4-002(138)194; PCN 22920 located at 1.5 Miles East of Towner to Berwick Eastbound.

230-P01 SHOULDER PREPARATION: Remove paragraphs 2 & 3 from the Standard Specification, 230.04 B "Shoulder Preparation."

401-P01 FOG COAT: Use only CSS1H Emulsified Asphalt. Apply CSS-1H fog seal at the rate shown in the Basis of Estimate. Dilute the fog seal at the supplier at a 50/50 ratio.

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

Place a longitudinal joint at the centerline of the roadway.

Construct each lane and the adjoining shoulder using a single pass or a hot seam.

A hot seam is defined as follows:

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

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

The maximum work zone length is limited to one day's production.

One day's production is defined as the length of roadway that can be paved in a single day.

For estimating purposes, the traffic control device list is based on a 7.819 mile work zone and the following list:

1. Standard D-704-20, Type G. Signing will be required at junctions:
 - US 2 & 13th Ave NE
 - US 2 & Berwick Ln
 - US 2 & 16th Ave NE
 - US 2 & 19th Ave NE
2. Standard D-704-22, Types K and L;
3. Standard D-704-26, Type CC, EE, and GG;
4. Standard D-704-34 – quantities include 108 delineator drums for approaches; and
5. Standard D-704-34A.

If all or portions of the lane closure are removed and uneven lanes exist, provide traffic control as specified in Section 704.04 O, "Traffic Control for Uneven Pavement".

Complete work in a manner such that lane closures can safely be removed if no work is to take place for more than 3 consecutive days. Remove lane closures if no work is to take place for more than 3 consecutive days.

The Department will pay for all necessary deployed devices, regardless of the number and length of the lane closures.

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



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.2	0.2
230	0125 SHOULDER PREPARATION	MILE	3.084	3.084
302	0356 AGGREGATE SURFACE COURSE CL 13	TON	14	14
401	0050 TACK COAT	GAL	3,773	3,773
401	0070 FOG SEAL	GAL	1,855	1,855
411	0105 MILLING PAVEMENT SURFACE	SY	456	456
430	0045 SUPERPAVE FAA 45	TON	4,129	4,129
430	1000 CORED SAMPLE	EA	29	29
430	5818 PG 58H-34 ASPHALT CEMENT	TON	247.9	247.9
702	0100 MOBILIZATION	L SUM	0.2	0.2
704	0100 FLAGGING	MHR	40	40
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,017	1,017
704	1060 DELINEATOR DRUMS	EA	64	64
704	1067 TUBULAR MARKERS	EA	68	68
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	1	1
706	0550 BITUMINOUS LABORATORY	EA	0.2	0.2
706	0600 CONTRACTOR'S LABORATORY	EA	0.2	0.2
760	0025 SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	3.084	3.084
762	0114 EPOXY PVMT MK 6IN LINE	LF	18,320	18,320
762	0432 SHORT TERM 6IN LINE-TYPE NR	LF	2,036	2,036

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(144)194	8	2

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.8	0.8
230	0125 SHOULDER PREPARATION	MILE	12.554	12.554
302	0356 AGGREGATE SURFACE COURSE CL 13	TON	50	50
401	0050 TACK COAT	GAL	15,734	15,734
401	0070 FOG SEAL	GAL	7,537	7,537
411	0105 MILLING PAVEMENT SURFACE	SY	400	400
430	0045 SUPERPAVE FAA 45	TON	17,223	17,223
430	1000 CORED SAMPLE	EA	108	108
430	5818 PG 58H-34 ASPHALT CEMENT	TON	1,034.2	1,034.2
702	0100 MOBILIZATION	L SUM	0.8	0.8
704	0100 FLAGGING	MHR	100	100
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,011	1,011
704	1060 DELINEATOR DRUMS	EA	160	160
704	1067 TUBULAR MARKERS	EA	277	277
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	1	1
706	0550 BITUMINOUS LABORATORY	EA	0.8	0.8
706	0600 CONTRACTOR'S LABORATORY	EA	0.8	0.8
760	0025 SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	12.554	12.554
762	0111 EPOXY PVMT MK 12IN LINE	LF	449	449
762	0112 EPOXY PVMT MK MESSAGE	SF	48	48
762	0114 EPOXY PVMT MK 6IN LINE	LF	74,572	74,572
762	0432 SHORT TERM 6IN LINE-TYPE NR	LF	8,286	8,286

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	10	1
	NH-4-002(144)194		

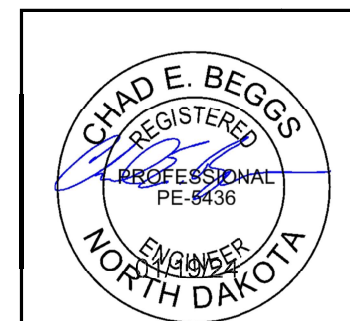
NH-3-002(177)199					
<u>Typical Section 2</u> (1.542 Miles)				<u>Approaches</u> See Sec. 20 - Sheet 1	Totals (Units)
RP 199.902 to 201.444					
Area: 6.73 SF					
Material	Unit	Width (ft)	Quantity per Mile		
Superpave FAA 45	Ton	41	2,632	70	4,129
Tack Coat @ 0.10 Gal/SY	Gal.	41	2,406	63	3,773
Fog Seal @ 0.05 Gal/SY	Gal.	41	1,203	-	1,855
PG 58H-34 Asphalt Cement @ 6.0%	Ton	-	158	4.3	247.9
Aggregate Surface Course CL 13	Ton	-	-	14	14

NH-3-002(144)199 HMA Cored Samples							
Specification Section	A	B		C	Quantity (A x B x C)	Quantity (1 per mile)	Unit
	Distance (Ft)÷1000	Lanes	Joints	Lifts			
430.04 1.2.b(1), "General"	9	2	N/A	1	18	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	9	N/A	1	1	9	N/A	EA
430.04 1.2b(3), "Pavement Thickness Determination Cores"					N/A	2	EA
Total					27	2	EA

NH-3-002(177)199 Milling Pavement Surface				
Location		(A)	(B)	(C) = (A x B)/9
Begin RP	End RP	Milling Length (ft)	Milling Width (ft)	Total (SY)
201.425	201.444	100	41	456
Total				456

NH-3-002(177)199 Rumble Strips - Sinusoidal	
Pay Quantity	Edge Line
Miles	3.084

Pavement Markings: NH-3-002(177)199					
Spec	Code	Bid Item	Basis	Permanent	Temporary
762	0432	SHORT TERM 6IN LINE - TYPE NR	Lane Skips 1,320 LF/mile (LF)	---	2,036
762	0114	EPOXY PVMT MK 6IN LINE	Lane Skips 1,320 LF/mile (LF)	2,036	---
762	0114	EPOXY PVMT MK 6IN LINE	Lt Edgeline (Yellow) 5,280 LF/mile (LF)	8,142	---
762	0114	EPOXY PVMT MK 6IN LINE	Rt Edgeline (White) 5,280 LF/mile (LF)	8,142	---



BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	10	2
	NH-4-002(144)194		

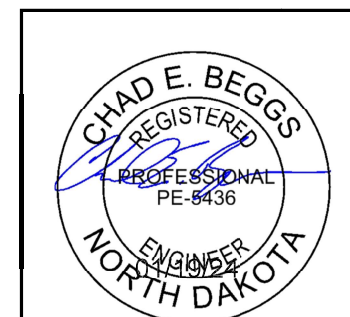
NH-4-002(144)194									
		<u>Typical Section 1</u> (0.376 Miles)		<u>Typical Section 2</u> (5.785 Miles)		<u>Typical Section 2</u> (0.116 Miles)		Approaches See Sec. 20 - Sheet 2	Totals (Units)
		RP 193.625 to 194.001		RP 194.001 to 199.470 RP 199.586 to 199.902		RP 199.470 to 199.586			
		Area: 5.89 SF		Area: 6.73 SF		Area: 8.72 SF			
<u>Material</u>	Unit	Width (ft)	Quantity per Mile	Width (ft)	Quantity per Mile	Width (ft)	Quantity per Mile		
Superpave FAA 45	Ton	36	2,304	41	2,632	53	3,411	734	17,223
Tack Coat @ 0.10 Gal/SY	Gal.	36	2,112	41	2,406	53	3,110	660	15,734
Fog Seal @ 0.05 Gal/SY	Gal.	36	1,056	41	1,203	53	1,555	-	7,537
PG 58H-34 Asphalt Cement @ 6.0%	Ton	-	139	-	158	-	205	44.1	1,034.2
Aggregate Surface Course CL 13	Ton	-	-	-	-	-	-	50	50

NH-4-002(144)194 HMA Cored Samples							
	A	B		C			
Specification Section	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General"	34	2	N/A	1	68	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	34	N/A	1	1	34	N/A	EA
430.04 I.2.b(3), "Pavement Thickness Determination Cores"					N/A	6	EA
				Total	102	6	EA

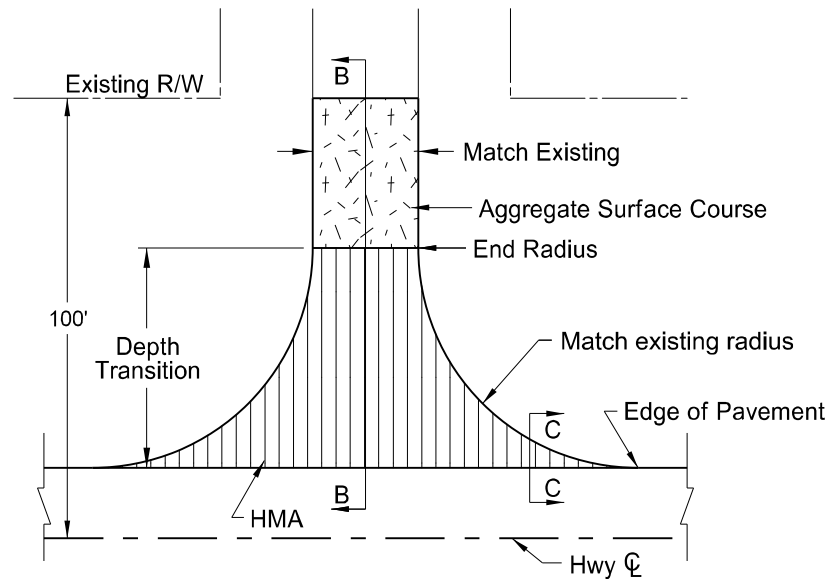
NH-4-002(144)194 Milling Pavement Surface				
Location		(A)	(B)	(C) = (A x B)/9
Begin RP	End RP	Milling Length (ft)	Milling Width (ft)	Total (SY)
193.625	193.644	100	36	400
Total				400

NH-4-002(144)199 Rumble Strips - Sinusoidal	
Pay Quantity	Edge Line
Miles	12.554

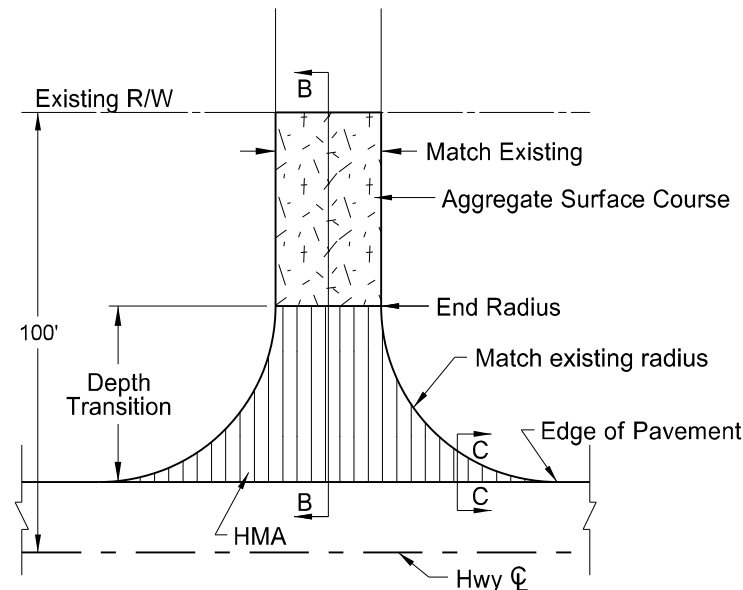
Pavement Markings: NH-4-002(144)194					
Spec	Code	Bid Item	Basis	Permanent	Temporary
762	0112	PVMT MK EPOXY MESSAGE	Turn Arrow x3 (SF) (16 SF EA)	48	---
762	0432	SHORT TERM 6IN LINE - TYPE NR	Lane Skips 1,320 LF/mile (LF)	---	8,286
762	0114	EPOXY PVMT MK 6IN LINE	Lane Skips 1,320 LF/mile (LF)	8,286	---
762	0114	EPOXY PVMT MK 6IN LINE	Lt Edgeline (Yellow) 5,280 LF/mile (LF)	33,143	---
762	0114	EPOXY PVMT MK 6IN LINE	Rt Edgeline (White) 5,280 LF/mile (LF)	33,143	---
762	0111	EPOXY PVMT MK 12IN LINE	Channel Line (LF)	449	---



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	20	1



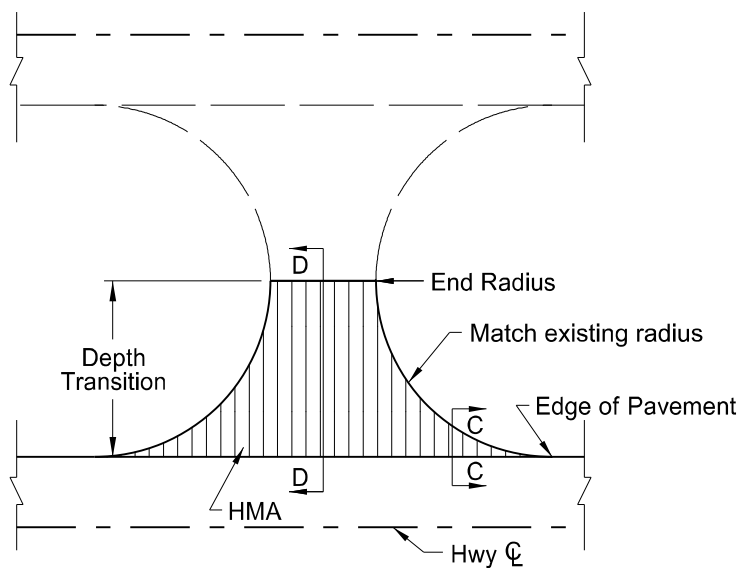
(1) Gravel Section Line, County Road, or Street Approach



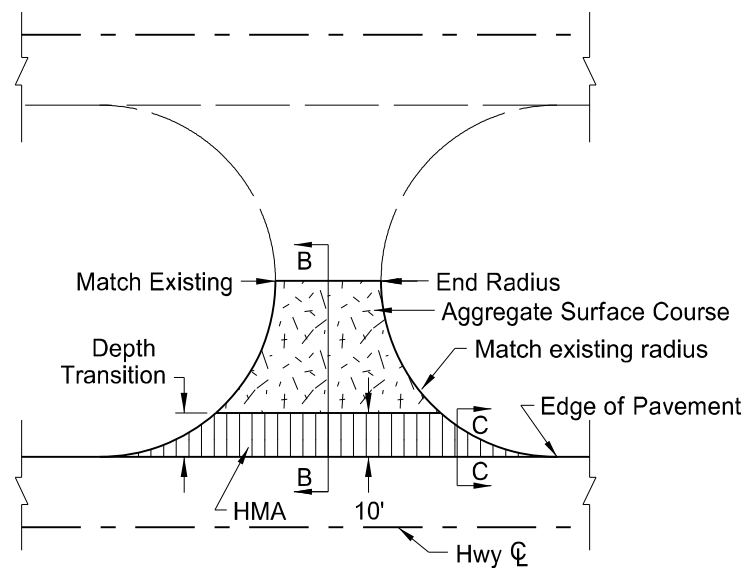
(2) Gravel Private Drive Approach

Notes:

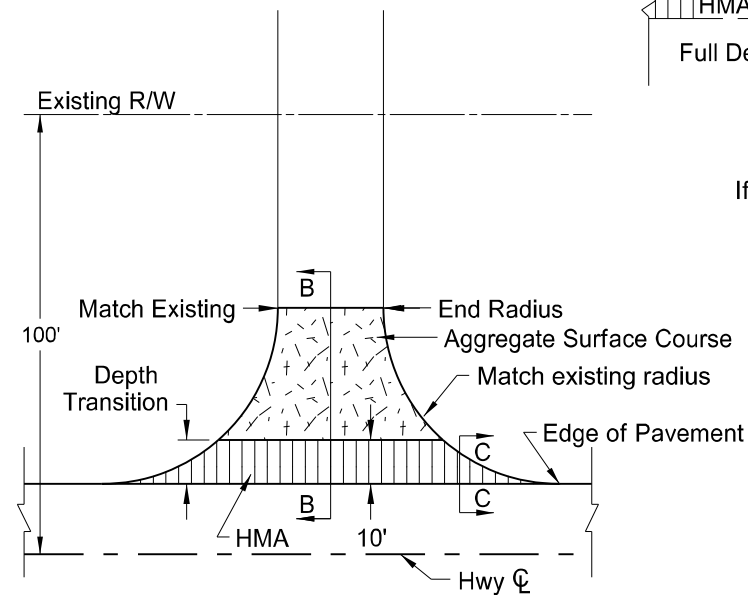
1. Actual HMA paving and aggregate surface course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
3. Aggregate surface course has been provided in the quantities to fill in around the radii.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



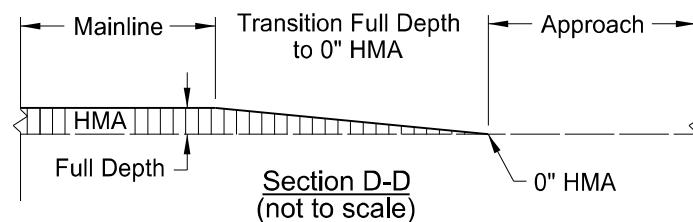
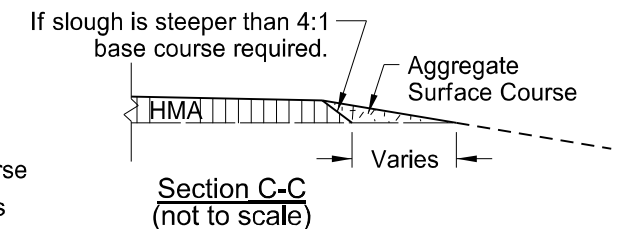
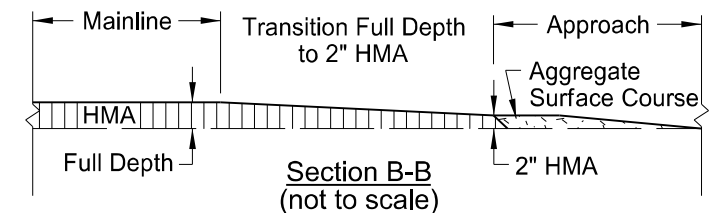
(3) Paved Median



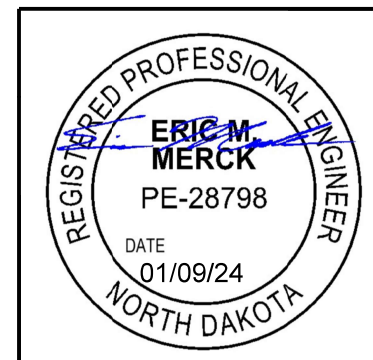
(4) Gravel Median



(5) Field Drive Approach



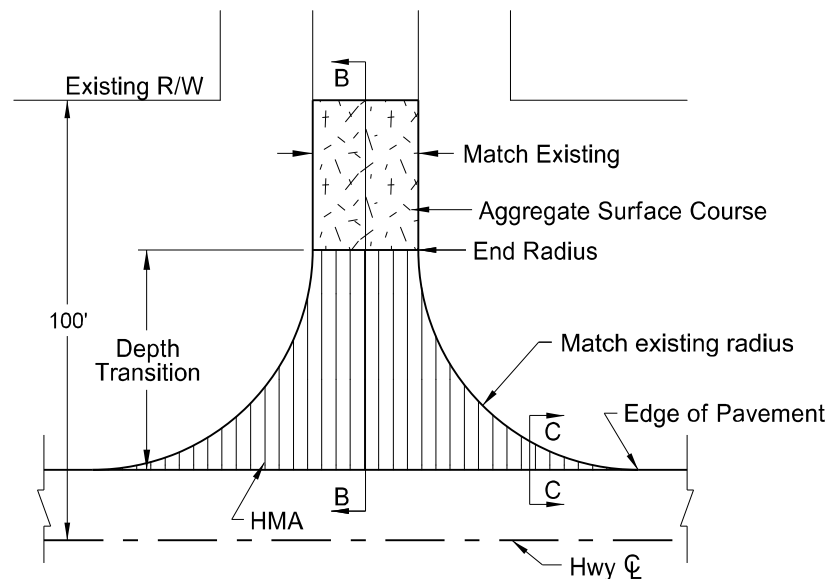
BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	TOTALS
ITEM	UNIT	Gravel Section Line	Gravel Private Drive	Paved Median	Gravel Median	Field Drive	
Number of Locations	#	1	0	1	3	3	8
Aggregate Surface Course CL 13	TON	2	0	N/A	6	6	14
Tack Coat	GAL	17	0	27	13	6	63
Superpave FAA 45	TON	19	0	30	14	7	70
PG 58H-34 Asphalt Cement	TON	1.2	0	1.8	0.9	0.4	4.3



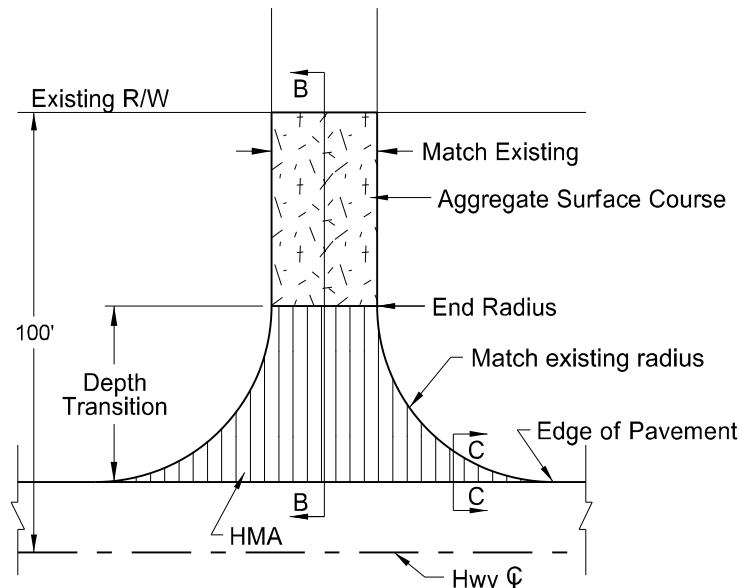
Approach & Median Paving Details

US 2 - Westbound
McHenry & Pierce Counties, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-002(144)194	20	2



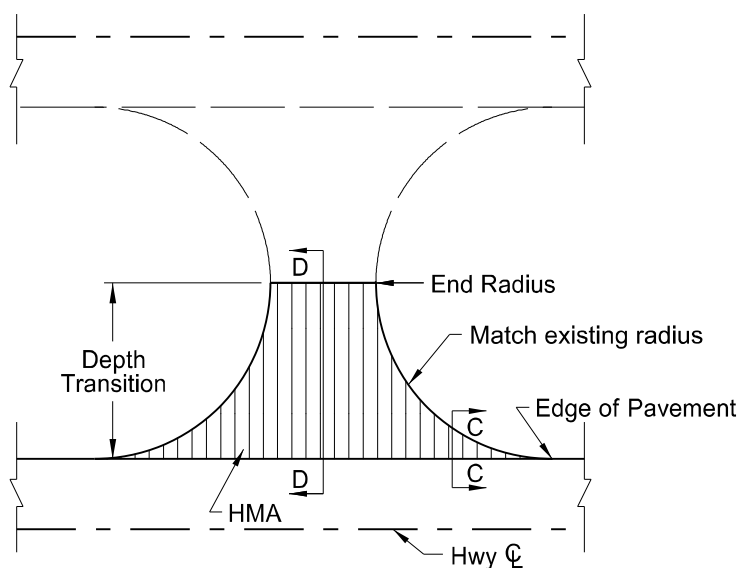
(1) Gravel Section Line, County Road, or Street Approach



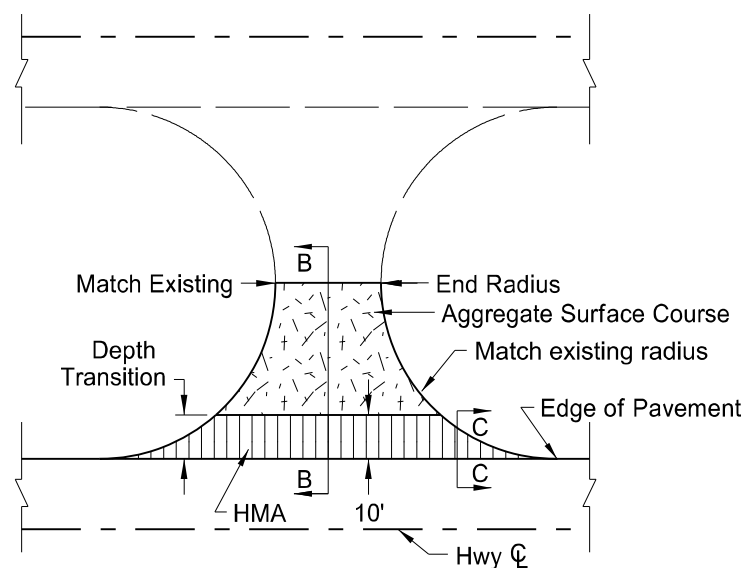
(2) Gravel Private Drive Approach

Notes:

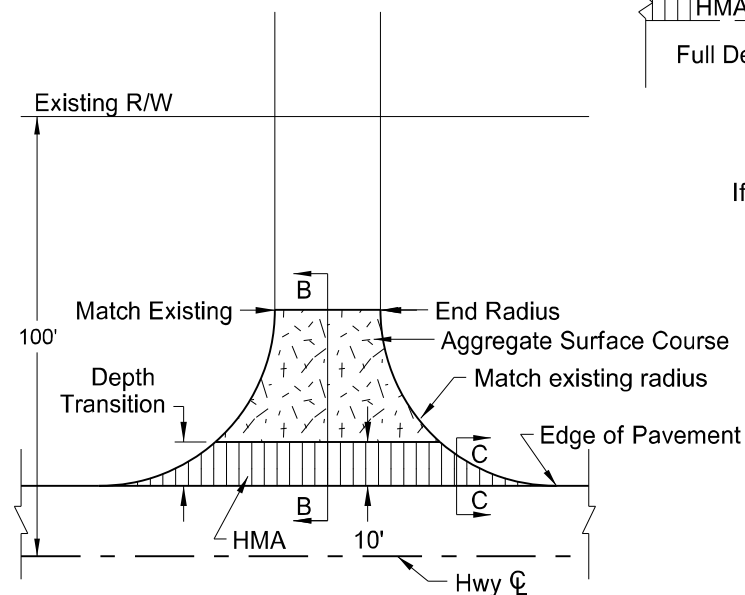
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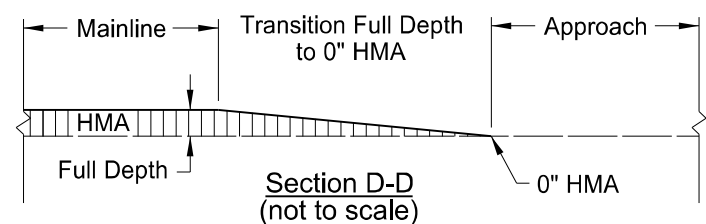
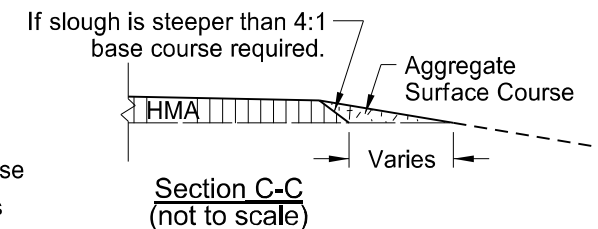
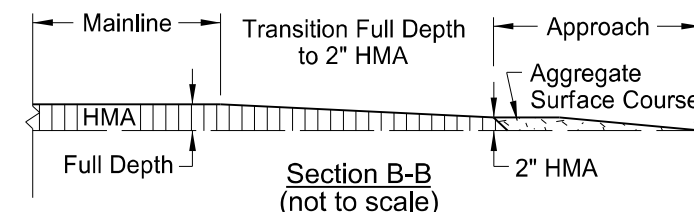
(3) Paved Median



(4) Gravel Median



(5) Field Drive Approach



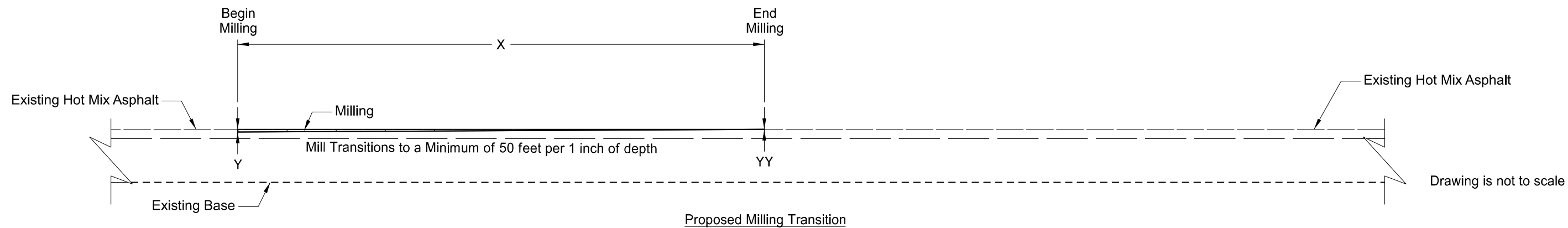
BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	TOTALS
ITEM	UNIT	Gravel Section Line	Gravel Private Drive	Paved Median	Gravel Median	Field Drive	
Number of Locations	#	7	5	17	6	7	42
Aggregate Surface Course CL 13	TON	14	10	N/A	12	14	50
Tack Coat	GAL	119	42	459	26	14	660
Superpave FAA 45	TON	133	47	510	28	16	734
PG 58H-34 Asphalt Cement	TON	8.0	2.8	30.6	1.7	1.0	44.1



Approach & Median Paving Details

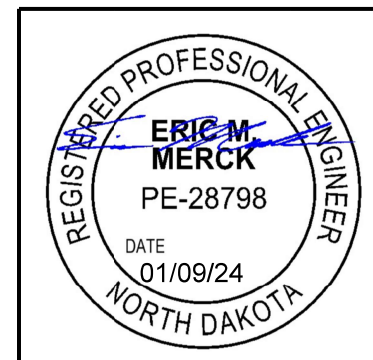
US 2 - Westbound
McHenry & Pierce Counties, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(177)199	20	3
		NH-4-002(144)194		



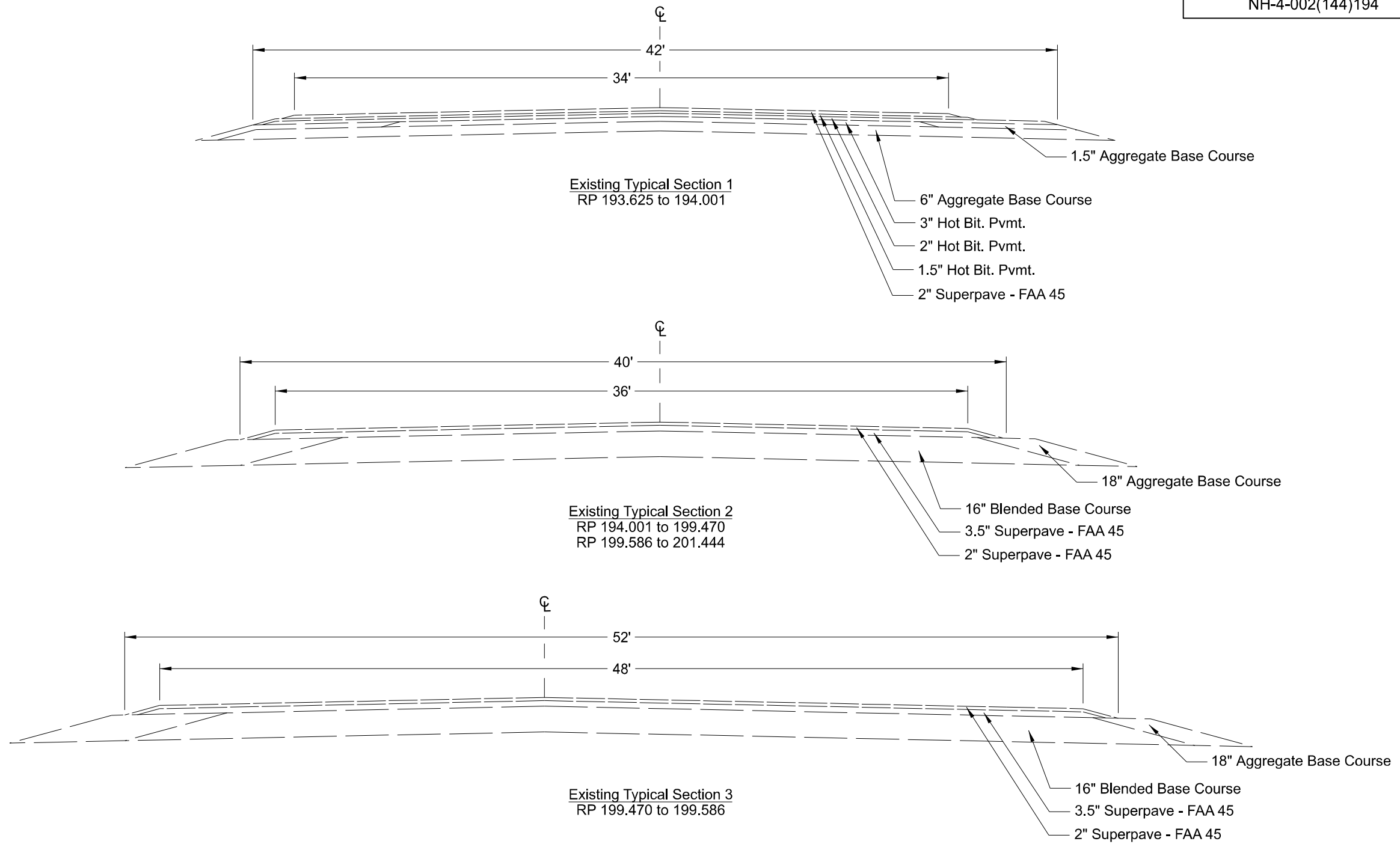
Milling Transitions

Location	X	Begin Milling Station	Y	YY	End Milling Station	Mill (SY)
RP 193.625	100 ft	RP 193.625	2 in	0 in	RP 193.644	400
RP 201.444	100 ft	RP 201.425	0 in	2 in	RP 201.444	456



Milling and Paving End Transitions
 US 2 Westbound
 McHenry & Pierce Counties, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(177)199	30	1
		NH-4-002(144)194		

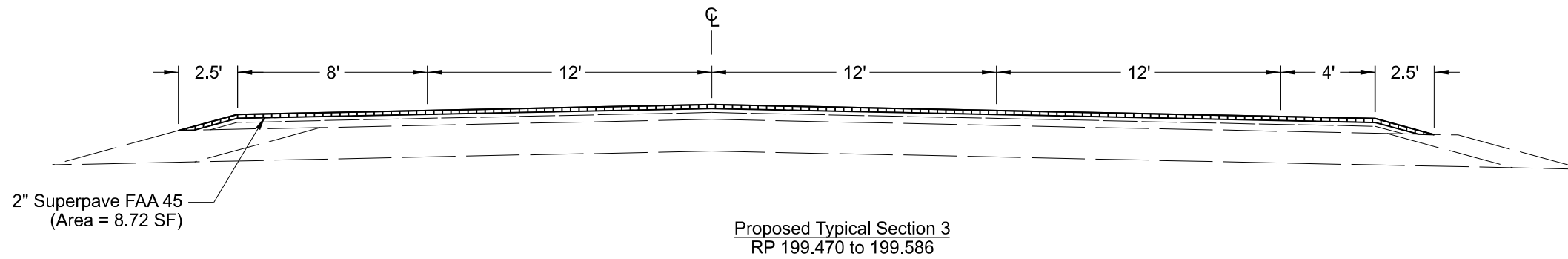
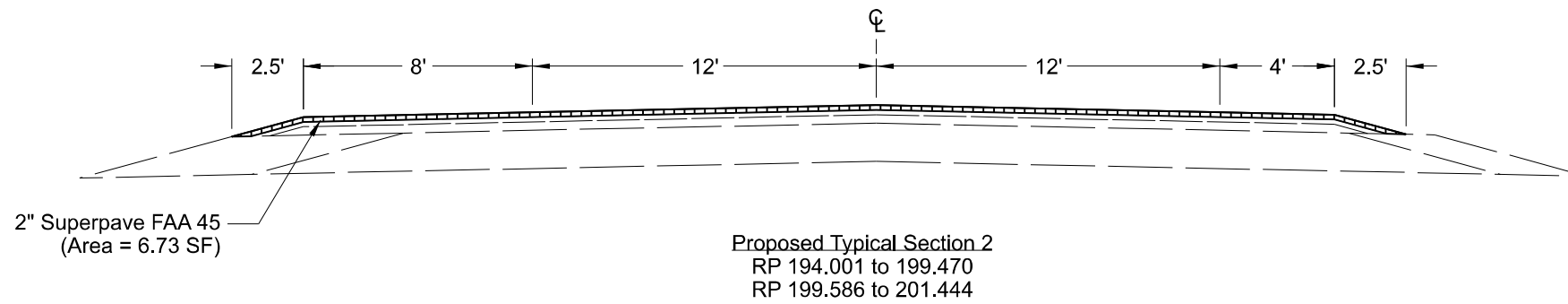
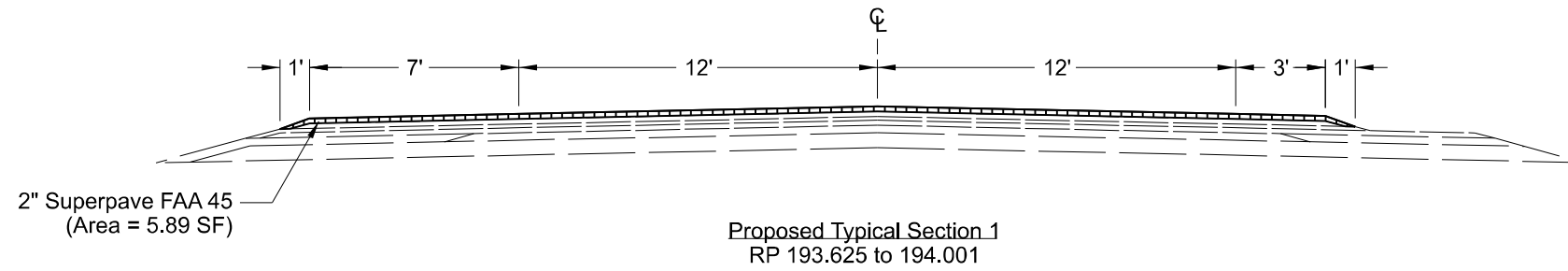


Existing Typical Sections

US 2 Westbound
McHenry & Pierce Counties, ND



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(177)199	30	2
		NH-4-002(144)194		



Proposed Typical Sections

US 2 Westbound
McHenry & Pierce Counties, ND



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199	100	3
	NH-4-002(144)194		



(2) R2-1-48 Post Mounted

(2) R2-1a-24 Post Mounted

G20-52a-72 Post Mounted

ROAD WORK AHEAD

W20-1-48 Post Mounted

(2) W20-1-48

(2) G20-55-96

(2) W20-5-48

(2) W3-5-48

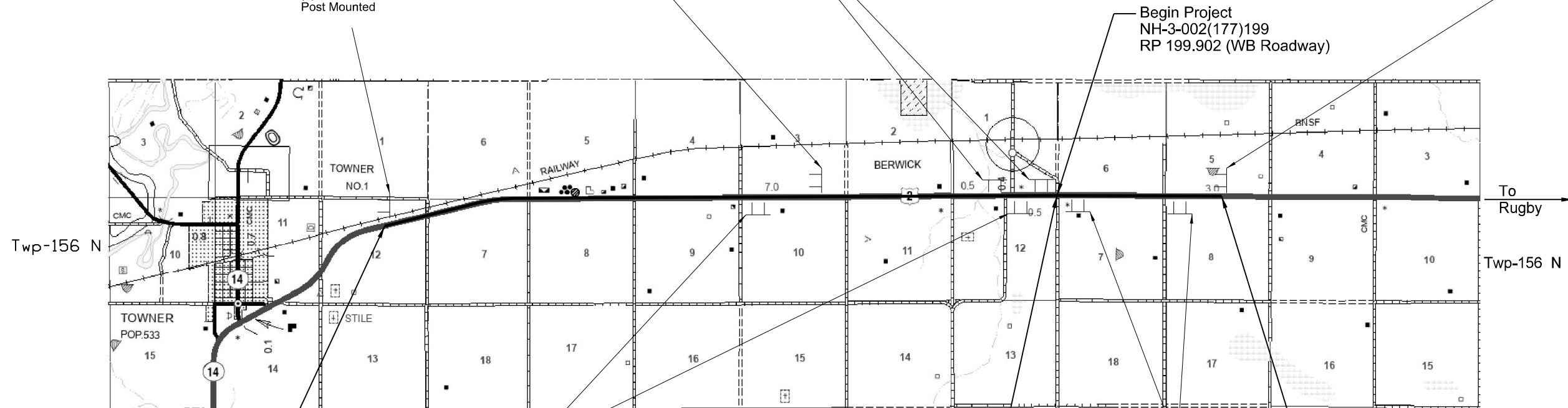
(2) R2-1-48

(2) W4-2-48

(2) R2-1aP-24

END ROAD WORK

(2) G20-2a-48 Post Mounted



Begin Project
NH-4-002(144)194
RP 193.625 (WB Roadway)

ROAD WORK NEXT XX MILES

G20-52a-72 Post Mounted

ROAD WORK AHEAD

W20-1-48 Post Mounted

End Project
NH-4-002(144)194
RP 199.902 (WB Roadway)

ROAD WORK NEXT XX MILES

G20-52a-72 Post Mounted

ROAD WORK AHEAD

W20-1-48 Post Mounted

Begin Project
NH-3-002(177)199
RP 201.444 (WB Roadway)



Work Zone Traffic Control Layout

US 2 Westbound
McHenry & Pierce County, ND

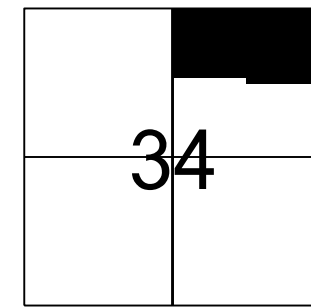
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-002(177)199 & TIED	180	1

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

LOCATION OF PIT IN SECTION

TEST HOLE PLAT

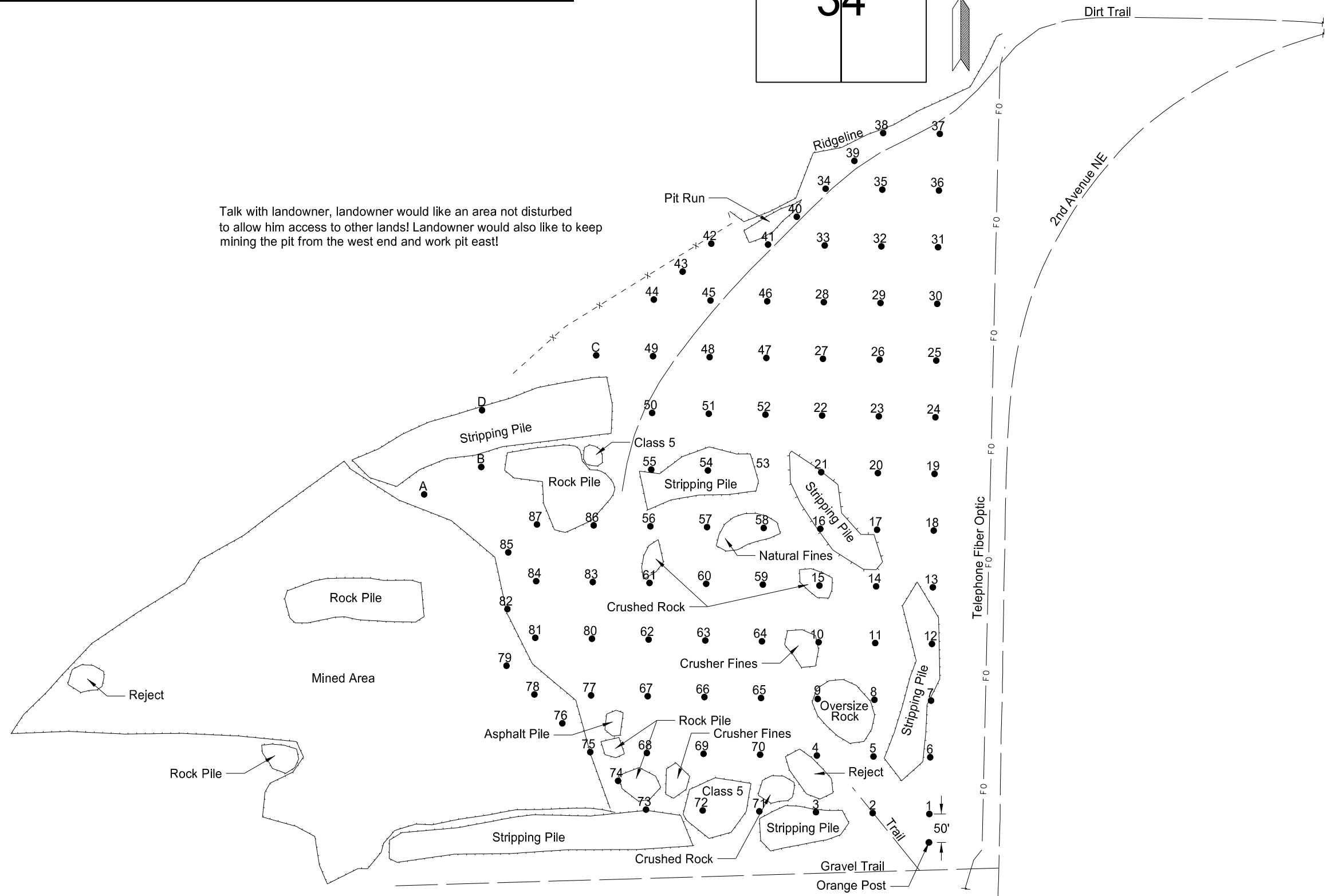
Location: NE1/4 34-155-77 County: McHenry
 Ownership: Helen E. Anderson Towner, ND



- Area "A" consists of Test Holes 1 - 9
- Area "B" consists of Test Holes 10 - 18
- Area "C" consists of Test Holes 19 - 27
- Area "D" consists of Test Holes 28 - 39
- Area "E" consists of Test Holes 40 - 46
- Area "F" consists of Test Holes 47 - 55
- Area "G" consists of Test Holes 56 - 64
- Area "H" consists of Test Holes 65 - 74
- Area "I" consists of Test Holes 75 - 87
- Testholes A - D for information only

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

Talk with landowner, landowner would like an area not disturbed to allow him access to other lands! Landowner would also like to keep mining the pit from the west end and work pit east!



Scale 1"=200'

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	2.5	0.5 gr SiCl	6	27	44	58	+WL 13.0	21	2.5	9.5 gr	2	22	39	50	+WL 13.0	42	1.5	9.5 gr	1	18	35	45	+WL 13.5	67	3.5	0.5 gr SiCl	1	18	39	50	+WL 13.5
		10.0 gr								0.5 SiCl								1.0 sd								9.5 gr					
2	2.0	8.5 gr	2	14	29	40	+WL 12.0			0.5 gr								1.5 gr						68	2.0	10.0 gr	2	18	37	48	+WL 12.0
		1.5 sd						22	2.0	11.0 gr	2	19	37	47	+WL 13.0	43	1.5	0.5 gr SiCl	6	27	42	52	+WL 14.0	69	3.0	10.0 gr	0	19	37	46	+WL 13.5
3	3.0	1.0 gr SiCl	1	18	34	46	FS SiCl	23	1.5	0.5 gr SiCl	1	22	36	46	+WL 13.0			12.0 gr								0.5 sd					
		6.0 gr								6.5 gr						44	3.0	10.5 gr	3	21	35	46	+WL 16.0	70	4.0	8.0 gr	1	17	31	40	+WL 14.0
		1.0 FS CoS								1.0 sd								0.5 sd								2.0 sd					
4	3.5	10.5 gr	3	19	36	48	+WL 14.0			0.5 Fgr								2.0 gr						71	2.0	10.0 gr	1	26	45	55	+WL 12.0
5	2.0	6.5 gr	5	23	38	48	+WL 13.0			3.0 gr						45	2.0	12.5 gr	4	23	41	51	+WL 14.5	72	1.0	6.5 gr	2	19	37	47	+WL 11.0
		0.5 sd						24	2.0	1.0 gr SiCl	2	17	35	45	+WL 13.0	46	2.0	1.0 gr SiCl	2	20	39	50	+WL 14.0			1.0 sd					
		1.0 sd CoS								10.0 gr								11.0 gr								2.5 gr					
		1.0 FS CoS						25	3.0	0.5 gr SiCl	1	19	34	46	+WL 14.5	47	2.0	9.0 gr	4	29	48	57	+WL 14.0	73	1.0	1.5 gr SiCl	1	23	40	51	+WL 10.5
		0.5 SiCl								8.0 gr								1.0 gr SiCl								8.0 gr					
		1.5 gr								0.5 sd								2.0 gr						74	0.5	9.0 gr	1	17	35	45	+WL 9.5
6	4.0	9.5 gr	2	17	36	47	+WL 14.5			2.5 gr						48	3.5	8.5 gr	4	15	31	40	+WL 15.0	75	0.5	2.5 gr	1	20	39	49	+WL 8.0
		1.0 sd						26	2.5	10.5 gr	2	20	36	45	+WL 14.0			1.0 sd								1.0 sd					
7	4.0	5.5 gr	4	22	39	47	+WL 15.0			1.0 gr CoS								2.0 gr								4.0 gr					
		0.5 sd						27	2.0	0.5 gr SiCl	3	23	39	49	+WL 14.0	49	5.5	0.5 gr SiCl	4	20	36	47	+WL 18.0	76	0.0	3.5 gr	1	17	35	45	+WL 3.5
		1.5 Fgr								11.5 gr								12.0 gr						77	0.0	10.5 gr	3	22	40	51	+WL 10.5
		0.5 FS CoS						28	3.0	8.0 gr	1	18	32	40	+WL 14.0	50	6.0	12.0 gr	2	16	34	44	+WL 18.0	78	0.0	7.0 gr	2	20	37	49	+WL 7.5
		1.0 FS SiCl								1.5 sd						51	4.5	0.5 gr SiCl	3	22	37	46	+WL 16.0			0.5 gr CoS					
		2.0 gr								1.5 FS								8.0 gr						79	0.0	2.0 gr	0	20	42	51	+WL 2.5
8	3.0	10.5 gr	3	20	39	50	+WL 13.5	29	2.5	0.5 gr SiCl	6	23	39	49	+WL 15.0			1.0 Fgr								0.5 gr CoS					
9	3.5	0.5 gr SiCl	4	22	37	48	+WL 14.0			10.0 gr								2.0 gr						80	3.0	9.0 gr	1	20	36	48	+WL 12.0
		6.5 gr								1.0 FS						52	3.5	6.5 gr	1	17	32	41	+WL 15.0	81	2.0	9.5 gr	6	28	43	52	+WL 11.5
		0.5 sd								1.0 gr								2.0 sd						82	0.0	4.0 gr	2	15	30	41	+WL 11.0
		3.0 gr						30	2.5	8.0 gr	2	17	31	41	+WL 15.0			0.5 gr								0.5 SiCl					
10	3.5	10.5 gr	1	16	33	43	+WL 14.0			0.5 SiCl								0.5 SiCl								3.5 gr					
11	3.5	8.5 gr	2	26	42	51	+WL 13.0			2.0 gr								2.0 gr CoS								1.0 sd CoS					
		0.5 sd								2.0 sd CoS						53	4.0	10.0 gr	2	24	39	50	+WL 15.0			1.0 sd					
		1.0 gr						31	3.0	12.0 gr	5	26	40	50	+WL 15.0			1.0 sd								1.0 gr					
12	1.0	10.0 gr	1	20	39	53	+WL 11.0	32	3.0	12.0 gr	3	18	36	47	+WL 15.0	54	5.5	9.5 gr	1	16	31	42	+WL 17.0	83	4.0	10.0 gr	6	26	42	53	+WL 14.0
13	6.0	10.0 gr	2	23	39	49	+WL 16.0	33	2.0	10.0 gr	4	23	40	53	+WL 15.0			1.0 gr CoS						84	3.0	10.5 gr	2	17	33	45	+WL 13.5
14	4.0	6.0 gr	1	16	29	38	+WL 14.0			1.0 sd								1.0 gr						85	3.0	11.0 gr	3	26	40	51	+WL 14.0
		2.0 sd								2.0 gr						55	7.0	11.0 gr	5	30	45	54	+WL 18.0	86	4.5	9.0 gr	2	24	39	50	+WL 13.5
		2.0 gr						34	1.0	13.0 gr	2	20	37	47	+WL 14.0	56	4.5	10.5	1	20	35	45	+WL 15.0	87	4.0	9.0 gr	3	20	32	42	+WL 14.5
15	4.0	7.5 gr	4	25	40	52	+WL 14.0	35	2.0	11.5 gr	6	24	41	51	+WL 15.0	57	4.5	10.5 gr	0	23	39	49	+WL 15.0			1.5 sd					
		0.5 gr SCoS								1.5 gr CoS						58	4.0	11.0 gr	1	20	39	50	+WL 15.0								
		2.0 gr						36	2.5	11.5 gr	3	22	37	45	+WL 15.0	59	4.0	10.0 gr	1	24	42	53	+WL 14.0								
16	3.0	8.5 gr	2	17	34	44	+WL 14.0			0.5 SiCl						60	6.0	10.0 gr	1	18	36	47	+WL 16.0								
		0.5 sd								0.5 gr						61	5.0	9.0 gr	1	23	40	51	+WL 15.0								
		2.0 gr						37	1.0	13.0 gr	2	28	42	50	+WL 14.0			1.0 gr CoS													
17	4.5	10.0 gr	3	20	35	45	+WL 16.0	38	1.0	13.0 gr	2	22	38	47	+WL 14.0	62	5.0	9.5 gr	3	18	38	50	+WL 14.5								
		0.5 sd						39	1.0	0.5 gr SiCl	0	19	35	46	+WL 14.0	63	5.5	8.5 gr	3	22	38	50	+WL 14.0								
		1.0 gr								10.5 gr						64	5.0	9.5 gr	2	15	35	46	+WL 14.5								
18	5.5	10.5 gr	2	9.5	32	43	+Cave			1.0 Fgr CoS						65	5.0	5.0 gr	1	18	36	49	+WL 14.5								
19	3.0	12.0 gr	5	26	40	49	+WL 15.0			1.0 gr								1.0 sd													
20	2.5	9.5 gr	2	16	32	44	+WL 14.0	40	1.5	12.5 gr	3	23	39	50	+WL 14.0			3.0 3.5													
		1.0 sd						41	1.5	12.5 gr	6	27	43	53	+WL 14.0	66	5.0	8.0 gr	1	15	31	42	+WL 15.0								
		1.0 gr																2.0 sd													

RANGE 77 TWP 155 SEC NE1/4 34
COUNTY McHenry Jun-20
PROSPECTED BY Volk/Nelson
INSPECTED & APPROVED Jeffrey Swank Jul-20

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
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Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	
A1	0.0	5.0 gr	3	22	39	50	+Cave																									
B1	4.5	0.5 gr SiCl	3	22	39	51	+WL 16.0																									
		8.5 gr																														
		0.5 sd																														
		2.0 gr																														
C1	1.5	9.0 gr	3	19	35	45	+WL 13.0																									
		0.5 gr SiCl																														
		2.0 gr																														
D1	6.0	13.0 gr	3	23	39	48	+WL 19.0																									

RANGE 77 TWP 155 SEC NE1/4 34
 COUNTY McHenry Jun-20
 PROSPECTED BY Volk/Nelson
 INSPECTED & APPROVED Jeffrey Swank Jul-20

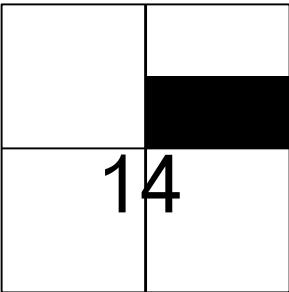
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-002(177)199 & TIED	180	4

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

LOCATION OF PIT IN SECTION

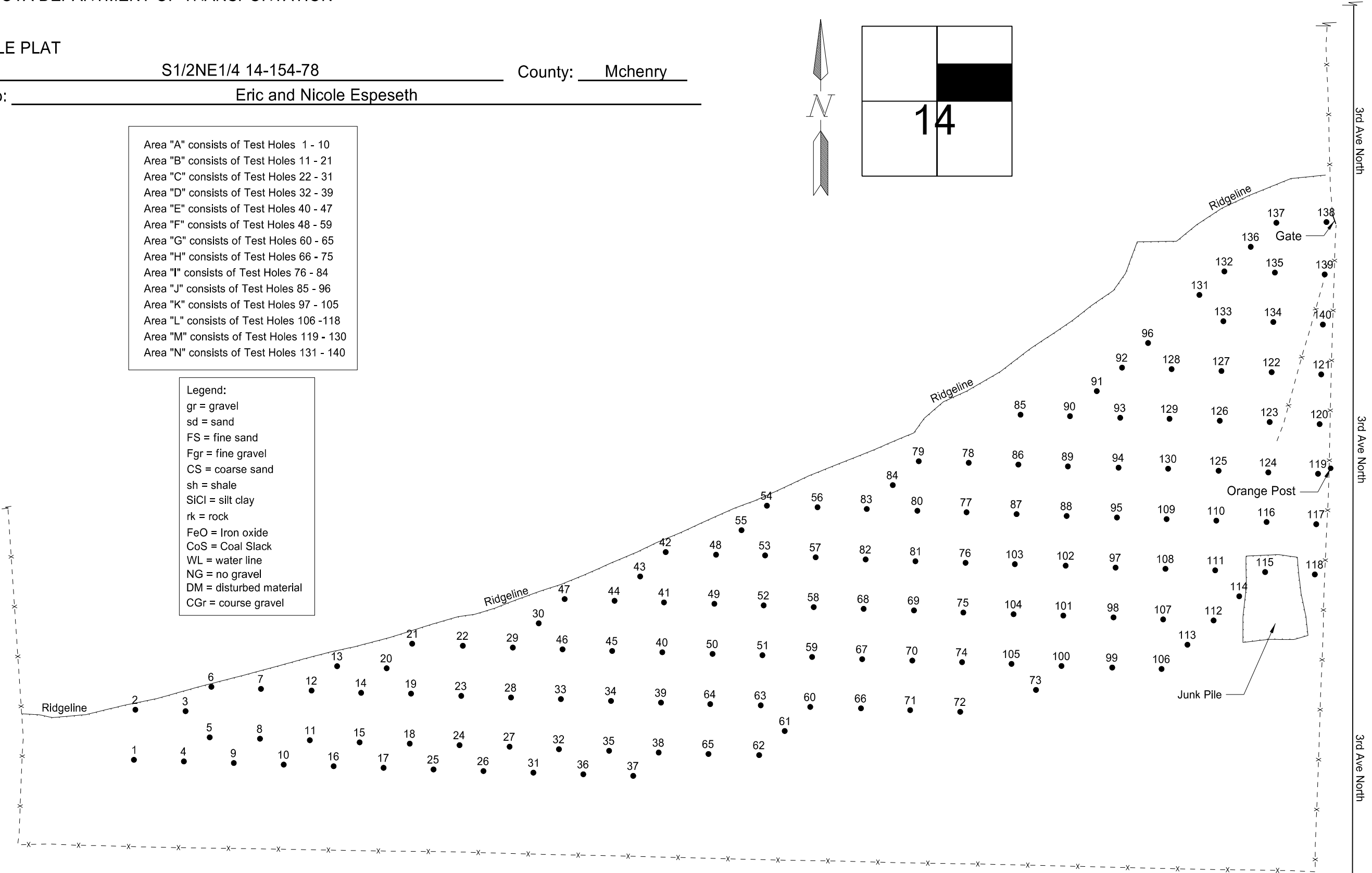
TEST HOLE PLAT

Location: S1/2NE1/4 14-154-78 County: Mchenry
 Ownership: Eric and Nicole Espeseth



- Area "A" consists of Test Holes 1 - 10
- Area "B" consists of Test Holes 11 - 21
- Area "C" consists of Test Holes 22 - 31
- Area "D" consists of Test Holes 32 - 39
- Area "E" consists of Test Holes 40 - 47
- Area "F" consists of Test Holes 48 - 59
- Area "G" consists of Test Holes 60 - 65
- Area "H" consists of Test Holes 66 - 75
- Area "I" consists of Test Holes 76 - 84
- Area "J" consists of Test Holes 85 - 96
- Area "K" consists of Test Holes 97 - 105
- Area "L" consists of Test Holes 106 -118
- Area "M" consists of Test Holes 119 - 130
- Area "N" consists of Test Holes 131 - 140

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



Scale 1"=200'

																						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
																						ND	NH-3-002(177)199 & tied	180	5

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	1.0	5.0 gr	0	9	24	39	+cave	18	1.0	2.0 gr	1	6	13	24	SiCl	36	1.0	5.5 gr	6	18	30	40	+cave	54	0.0	8.5 gr	3	15	30	45	sd
		2.0 CGr								1.0 Fgr							1.0 sd								0.5 Fgr						
		6.0 gr								10.0 gr							3.5 gr								2.0 gr						
2	0.5	11.5 gr	1	9	25	42	+cave			2.0 Fgr							1.0 Fgr								1.5 Fgr						
3	0.0	1.0 gr	1	9	22	39	+cave			1.0 gr					37	1.0	8.0 gr	3	13	27	40	SiCl	55	0.0	9.0 gr	3	12	23	33	+cave	
		2.0 Fgr						19	2.0	3.0 sd	1	11	25	40	+cave			2.0 Fgr								1.0 Fgr					
		8.0 gr								10.0 gr							3.5 gr								3.0 CS						
4	1.5	0.5 gr	1	9	18	30	SiCl	20	2.0	9.0 gr	2	14	27	40	+cave	38	1.0	8.0 gr	6	19	35	47	SiCl			1.5 Fgr					
		1.0 gr						21	0.0	3.0 CGr	4	17	32	47	+cave			1.0 Fgr								1.0 sd					
		1.0 sd								7.0 gr							5.0 gr								0.5 Fgr						
		2.0 Fgr						22	1.0	8.0 gr	3	14	26	36	+cave	39	2.0	6.0 gr	1	12	24	37	SiCl	56	2.0	6.5 gr	3	17	29	40	sd
		9.0 gr						23	2.0	3.0 sd	1	5	11	20	SiCl			2.0 Fgr								0.5 sd					
5	2.0	1.0 gr	3	13	23	36	SiCl			6.5 gr							1.0 sd								2.5 gr						
		2.0 CGr						24	1.0	11.0 gr	1	10	19	29	+cave			1.0 gr								0.5 sd					
		10.0 gr						25	1.0	1.0 FS	2	11	19	27	+cave			2.0 Fgr								1.0 Fgr					
6	1.0	8.0 gr	1	12	26	39	+cave			1.0 Fgr					40	3.0	4.0 gr	1	13	26	39	sd	57	3.0	2.5 FS	1	4	12	19	sd	
7	2.0	1.0 gr	1	8	19	31	+cave			5.5 gr							1.0 Fgr								2.5 gr						
		2.0 sd								1.5 Fgr							2.0 gr								4.5 Fgr						
		11.0 gr								2.0 gr					41	3.0	7.0 gr	1	9	23	42	+cave	58	2.0	7.0 gr	3	13	25	40	sd	
8	1.0	2.0 gr	1	11	21	33	SiCl			1.0 CS					42	0.0	9.0 gr	1	12	24	37	sd			2.0 Fgr						
		1.5 sd						26	2.0	6.0 gr	2	14	23	33	+cave			2.0 Fgr						59	2.0	11.5 gr	3	12	26	44	+cave
		5.5 gr								3.0 Fgr					43	0.5	8.5 gr	1	10	23	41	sd			0.5 Fgr						
		1.0 Fgr								1.0 FS							1.0 Fgr						60	2.0	8.0 gr	6	18	33	47	+cave	
		5.5 gr						27	1.0	8.0 gr	0	12	21	29	+WL14.0	44	2.0	5.0 gr	4	12	24	34	sd	61	2.0	6.0 gr	3	18	34	50	+cave
9	1.0	3.0 gr	2	13	22	32	+cave			4.0 FS							2.0 Fgr						62	1.0	8.0 gr	2	8	22	37	+cave	
		2.0 sd								1.0 CGr					45	2.0	4.5 gr	1	6	17	31	sd	63	2.0	8.0 gr	3	15	32	46	+cave	
		6.0 gr						28	2.0	4.0 FS	2	7	17	27	+cave			3.5 Fgr						64	2.0	12.0 gr	4	17	32	48	+cave
10	1.0	1.0 Fgr	2	11	22	34	+cave			7.0 gr					46	2.0	4.0 gr	5	13	24	35	sd	65	1.0	7.0 gr	4	18	37	54	+cave	
		9.0 gr						29	1.0	6.0 gr	1	3	13	28	+cave			2.0 Fgr						66	2.0	8.0 gr	5	18	33	48	+cave
11	0.5	13.5 gr	2	9	20	33	+cave			1.0 Fgr							1.0 gr						67	2.0	6.0 gr	1	14	30	46	+cave	
12	0.5	1.5 sd	1	11	25	37	+cave			1.0 FS							1.5 Fgr						68	2.0	9.0 gr	3	14	28	41	+cave	
		10.0 gr						30	0.0	7.5 gr	0	4	16	30	+cave	47	0.0	9.0 gr	3	5	22	35	+cave	69	1.5	7.5 gr	1	9	24	40	sd
13	0.5	0.5 sd	2	10	22	36	+cave			0.5 Fgr							5.0 Fgr								1.0 Fgr						
		7.0 gr								3.0 FS					48	0.0	6.0 gr	3	18	29	42	sd	70	1.0	8.0 gr	3	10	29	43	+cave	
		1.0 CS						31	3.0	3.5 gr	3	11	24	38	+cave			1.0 Fgr						71	0.5	11.5 gr	1	10	22	33	SiCl
		3.0 gr								0.5 Fgr					49	2.5	5.5 gr	4	11	21	32	SiCl			1.0 Fgr						
14	2.0	3.5 sd	1	9	14	28	+cave			5.0 gr							3.0 Fgr								1.0 sd						
		7.5 gr						32	1.0	8.0 gr	8	23	39	49	FS	50	2.0	10.0 gr	5	17	32	47	+cave			1.0 Fgr					
15	0.5	14.5 gr	0	6	17	29	SiCl	33	4.5	4.5 gr	1	14	25	38	+cave	51	1.5	12.0 gr	5	14	28	41	+cave								
16	0.5	9.5 gr	1	6	18	33	SiCl			3.0 Fgr					52	3.0	4.0 gr	1	12	21	30	+cave									
		2.0 Fgr								1.0 sd							4.0 Fgr														
		2.0 gr						34	3.0	6.0 gr	7	15	25	37	+cave			1.5 sd													
17	1.0	10.0 gr	1	9	21	35	SiCl			1.0 Fgr							0.5 Fgr														
		2.0 Fgr								2.0 sd					53	2.0	2.0 sd	4	11	20	30	+cave									
		1.0 gr								1.0 gr							6.0 gr														
								35	1.5	13.5 gr	3	15	29	44	+cave			3.0 Fgr													

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COUNTY McHenry Aug-25
PROSPECTED BY Renfrow/Rogstad
INSPECTED & APPROVED Jeffrey Swank Sep-25

																					STATE	PROJECT NO.	SECTION NO.	SHEET NO.
																					ND	NH-3-002(177)199 & tied	180	6

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
72	0.5	11.0 gr	1	9	22	35	+cave	88	3.0	7.0 gr	2	15	31	45	+cave	101	3.0	4.0 gr	2	11	23	38	+cave	115	1.0	7.0 gr	1	11	25	37	sd
		2.0 sd								1.0 Fgr								3.0 Fgr								2.0 Fgr					
		2.0 gr						89	2.0	7.5 gr	3	13	26	36	+cave			1.0 gr						116	2.0	4.0 gr	2	14	26	39	+cave
73	1.0	7.0 gr	2	13	25	39	+cave			1.5 Fgr								2.0 Fgr								5.0 Fgr					
		1.0 sd						90	1.0	4.0 gr	2	8	23	34	sd	102	2.5	10.5 gr	1	14	29	45	+cave			2.0 gr					
		4.0 gr								1.0 Fgr						103	1.5	8.5 gr	2	14	32	47	+cave	117	2.0	4.0 gr	3	13	25	36	sd
		1.0 sd								2.0 gr						104	2.0	7.0 gr	2	11	25	39	+cave			4.0 Fgr					
		1.0 gr								4.0 Fgr								4.0 Fgr						118	2.0	6.0 gr	2	10	23	37	sd
74	0.5	7.5 gr	1	10	25	39	sd	91	1.0	3.0 gr	1	7	16	28	sd	105	1.0	6.5 gr	3	12	26	40	sd			1.0 Fgr					
		1.0 Fgr								0.5 Fgr								0.5 Fgr						119	2.0	5.0 gr	2	8	19	32	+cave
		1.0 sd								0.5 sd								1.0 gr								4.0 Fgr					
		3.0 gr								1.0 Fgr								1.0 Fgr						120	3.0	4.0 gr	1	9	23	37	+cave
75	1.0	8.5 gr	3	16	30	42	+cave			2.0 gr								4.0 gr								3.0 Fgr					
		1.5 Fgr								4.0 Fgr						106	1.0	3.0 gr	0	10	20	32	sd			1.0 gr					
		1.0 sd						92	1.0	3.0 gr	0	4	9	23	sd			2.5 sd								1.0 Fgr					
		1.5 Fgr								1.0 Fgr								0.5 Fgr								2.0 gr					
		1.5 gr								3.0 gr								1.0 gr						121	2.0	6.5 gr	3	15	28	40	+cave
76	1.0	8.0 gr	1	10	23	38	+cave			4.0 Fgr						107	1.0	4.0 gr	2	17	27	36	+cave			3.0 Fgr					
77	3.0	6.0 gr	1	8	17	27	sd	93	1.0	9.0 gr	1	11	28	42	+cave			4.0 Fgr								1.0 Fgr					
		1.0 Fgr								3.0 Fgr								1.0 gr						122	4.0	7.0 gr	1	9	21	35	sd
		1.0 sd						94	2.5	7.5 gr	1	19	33	47	+cave			1.0 sd								1.0 Fgr					
		2.0 Fgr								1.0 Fgr								2.0 Fgr						123	2.0	6.0 gr	4	18	31	46	+cave
78	0.5	10.5 gr	2	13	31	47	sd	95	1.5	5.5 gr	1	13	26	40	sd			4.0 gr						108	2.0	6.0 gr	3	15	29	43	+cave
		0.5 Fgr								1.0 Fgr								2.5 Fgr						124	3.0	1.0 gr	1	9	22	37	+cave
79	0.5	8.5 gr	2	18	33	44	sd			4.0 gr								2.5 gr								1.0 Fgr					
80	0.5	7.5 gr	1	8	22	34	sd			1.0 Fgr						109	2.0	5.5 gr	4	17	32	43	+cave			5.0 gr					
		2.5 Fgr						96	0.5	5.0 gr	1	9	21	43	sd			2.5 Fgr						125	1.0	9.0 gr	6	19	34	47	+cave
		0.5 sd								0.5 sd								3.0 gr								1.0 Fgr					
		1.0 Fgr								0.5 gr						110	1.0	5.0 gr	1	11	23	38	+cave			2.0 gr					
81	2.5	4.5 gr	1	10	21	33	sd	97	2.0	9.0 gr	4	16	31	45	+cave			3.0 Fgr								2.0 Fgr					
		4.0 Fgr								9.0 gr								1.0 sd						126	0.5	8.5 gr	2	18	31	44	sd
82	4.0	5.0 gr	1	14	23	32	sd	98	2.0	3.0 gr	1	11	23	34	+cave			3.0 gr								1.0 Fgr					
		2.0 Fgr								2.5 Fgr								1.0 Fgr						127	1.0	5.0 gr	1	9	20	33	+cave
83	1.0	8.0 gr	1	12	22	33	sd			0.5 gr						111	1.0	6.0 gr	1	9	21	31	+cave			1.0 sd					
		2.5 Fgr								1.0 Fgr								1.0 Fgr								1.0 gr					
		0.5 sd								2.0 gr								2.0 sd								1.0 gr					
		1.0 Fgr								1.0 Fgr								2.0 gr								3.0 Fgr					
84	1.0	9.5 gr	3	10	31	45	+cave	99	1.0	3.5 gr	1	8	24	37	+cave	112	1.0	6.0 gr	3	15	28	40	+cave			6.0 gr					
		2.5 Fgr								0.5 Fgr								4.0 Fgr								2.0 sd					
85	1.0	4.0 gr	1	10	21	32	sd			7.0 gr						113	0.5	4.5 gr	1	8	19	33	+cave			4.5 gr					
		0.5 Fgr								3.0 Fgr								1.0 Fgr								1.0 Fgr					
		1.0 gr								1.0 gr								1.0 gr								0.5 Fgr					
		1.0 Fgr								0.5 Fgr								2.5 sd								3.0 gr					
		1.5 gr						100	1.0	3.0 gr	0	10	21	34	+cave			3.0 gr								6.0 gr	1	10	22	34	+cave
		1.0 Fgr								2.0 Fgr								2.0 sd								2.0 sd					
86	1.5	8.5 gr	1	14	29	43	+cave			1.0 gr						114	1.0	6.0 gr	1	10	22	34	+cave			3.0 gr					
		2.0 Fgr								2.0 Fgr								3.0 gr								3.0 gr					
87	2.0	6.0 gr	1	12	27	39	sd			2.0 gr								3.0 gr								3.0 gr					
		4.0 Fgr																													

RANGE 78 TWP 154 SEC S1/2NE1/4 14
COUNTY McHenry Aug-25
PROSPECTED BY Renfrow/Rogstad
INSPECTED & APPROVED Jeffrey Swank Sep-25

																							STATE	PROJECT NO.	SECTION NO.	SHEET NO.
																							ND	NH-3-002(177)199 & tied	180	7

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES										
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole			
128	1.0	7.0 gr	1	12	25	37	sd																											
		2.0 Fgr																																
129	2.0	9.0 gr	1	14	28	42	+cave																											
130	1.0	12.0 gr	1	17	37	52	+cave																											
131	0.5	0.5 gr	1	9	15	19	sd																											
		1.0 Fgr																																
		2.0 gr																																
		3.0 Fgr																																
132	0.5	5.5 gr	1	11	22	36	sd																											
		3.0 Fgr																																
133	1.0	6.0 gr	1	14	25	37	sd																											
		4.0 Fgr																																
134	1.0	6.5 gr	2	14	24	36	sd																											
		6.0 Fgr																																
135	1.0	7.0 gr	2	12	25	39	sd																											
		2.5 Fgr																																
136	1.0	4.0 gr	0	2	12	24	sd																											
		4.0 Fgr																																
137	1.0	7.0 gr	0	6	18	29	sd																											
		1.0 Fgr																																
138	1.0	4.0 gr	0	7	18	32	+cave																											
		4.0 Fgr																																
139	3.0	7.0 gr	1	15	30	45	sd																											
		1.0 Fgr																																
140	3.0	4.0 gr	1	11	24	35	sd																											
		1.0 Fgr																																
		1.0 sd																																
		1.0 gr																																
		1.0 Fgr																																

RANGE	78	TWP	154	SEC	S1/2NE1/4 14
COUNTY	McHenry		Aug-25		
PROSPECTED BY	Renfrow/Rogstad				
INSPECTED & APPROVED	Jeffrey Swank		Sep-25		

NDDOT ABBREVIATIONS

D-101-1

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

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

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

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

Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia or \emptyset diameter
 Dir direction
 Dist distance
 DM disturbed material
 DB ditch block
 DG ditch grade
 Dbl double
 Dn down
 Dwg drawing
 Dr drive
 Drwy driveway
 DI drop inlet
 D dry density

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
05-20-18	General Revisions
12-10-20	General Revisions
08-16-22	General Revisions



NDDOT ABBREVIATIONS

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

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08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



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NDDOT ABBREVIATIONS

D-101-3

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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08-16-22	General Revisions



LINE STYLES

D-101-20

Existing Topography

- Void — Void — Void — V 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
- - - - -x- - - - -x- Existing Fence
- | | | | | Existing Railroad
- Existing Field Line
- ~ ~ ~ ~ ~ Exst Flow
- ===== Existing Curb
- - - - - Existing Valley Gutter
- - - - - Existing Driveway Gutter
- ===== Existing Curb and Gutter
- ===== Existing Mountable Curb and Gutter

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

Proposed Topography

- — — — — 3-Cable w Posts
- ~ ~ ~ ~ ~ Flow
- x- - - -x- - - -x- Fence
- REMOVE — REMOVE — Remove Line
- ===== Wall
- ~ ~ ~ ~ ~ Retaining Wall (Plan View)
- ~ ~ ~ ~ ~ W-Beam w Posts
- • • • • High Tension Cable Guardrail with Posts

Existing Utilities

- — — — — E — Existing Electrical
- — — — — FO — Existing Fiber Optic Line
- — — — — FO — Existing TV Fiber Optic
- — — — — G — Existing Gas Pipe
- — — — — OH — Existing Overhead Utility Line
- — — — — P — Existing Power
- — — — — PL — Existing Fuel Pipeline
- — — — — PL — Existing Undefined Above Ground Pipe Line
- - - - - SAN - - - - - Existing Sanitary Sewer
- - - - - SAN FM - - - - - Existing Sanitary Force Main
- - - - - SD - - - - - Existing Storm Drain
- - - - - SD FM - - - - - Existing Storm Drain Force Main
- - - - - Existing Culvert
- — — — — T — Existing Telephone Line
- — — — — TV — Existing TV Line
- — — — — W — Existing Water or Steam Line
- ===== Existing Under Drain
- ===== Existing Slotted Drain
- — — — — Existing Conduit
- - - - - Existing Conductor
- — — — — Existing Down Guy Wire Down Guy
- — — — — Existing Underground Vault or Lift Station

Proposed Utilities

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

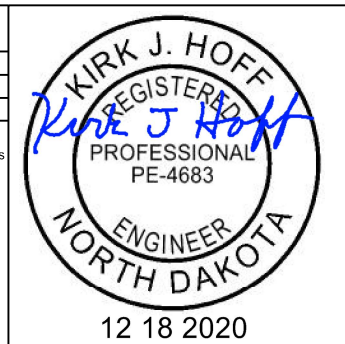
Traffic Utilities

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

Sign Structures

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typical

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

Geotechnical

- D ----- D ----- Geotextile Fabric Type D
- **Geo** ----- **Geo** ----- Geogrid
- R ----- R ----- Geotextile Fabric Type R
- R ----- R ----- Geotextile Fabric Type R1
- RR ----- RR ----- Geotextile Fabric Type RR
- S ----- S ----- Geotextile Fabric Type S

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- s ----- s ----- Floating Silt Curtain
- SF ----- SF ----- Silt Fence
- Excavation Limits
- Fiber Rolls

Environmental

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

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SYMBOLS



North Arrow (Half Scale)



Alignment Data Point



Alignment Monument



Spot Elevation



Existing Miscellaneous Spot



Existing Access Control Arrow



Existing Benchmark



Reset USGS Marker



Iron Monument Found



Iron Pin R/W Monument



Property Corner



Iron Pin Reference Monument



Right of Way Marker (Exst, Ppsd, Reset)



Existing Federal Reference Corner



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



Existing Witness Corner



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



Existing Traverse PI Aerial Panel



Existing Reference Marker Point NGS



Existing EFB Misc



Existing Bush or Shrub



Existing Large Evergreen Tree



Existing Small Evergreen Tree



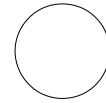
Existing Large Tree



Existing Small Tree



Existing Tree Trunk



Cairn or Stone Circle



Existing Artifact



Existing Satellite Dish



Existing Weather Station



Existing Windmill or Tower



Reinforced Pavement



Continuous Split Barrel Sample



Flight Auger Sample



Split Barrel Sample



Thinwall Tube Sample



Standard Penetration Test



Inclinometer Tube



Excavation Unit



















































































Existing Ground Water Well Bore Hole

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KIRK J. HOFF
 REGISTERED
 PROFESSIONAL
 ENGINEER
 PE-4683
 NORTH DAKOTA
 12 18 2020

SYMBOLS

D-101-32

 Existing Luminaire  Luminaire LED  Existing Light Standard Luminaire  Relocate Light Standard  Light Standard Light LED Luminaire  Light Standard 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 50 Watt High Pressure Sodium Vapor Luminaire  Light Standard 70 Watt High Pressure Sodium Vapor Luminaire  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Emergency Vehicle Detector  Video Detection Camera	  High Mast Light Standard 3 Luminaire (Exst, Ppsd)   High Mast Light Standard 4 Luminaire (Exst, Ppsd)   High Mast Light Standard 5 Luminaire (Exst, Ppsd)   High Mast Light Standard 6 Luminaire (Exst, Ppsd)   High Mast Light Standard 7 Luminaire (Exst, Ppsd)   High Mast Light Standard 8 Luminaire (Exst, Ppsd)   High Mast Light Standard 9 Luminaire (Exst, Ppsd)   High Mast Light Standard 10 Luminaire (Exst, Ppsd)   Overhead Sign Structure Load Center (Exst, Ppsd)   Traffic Signal Controller (Exst, Ppsd)   Pad Mounted Traffic Signal Controller (Exst, Ppsd)   Flashing Beacon (Exst, Ppsd)   Concrete Foundation (Exst, Ppsd)   Pipe Mounted Flasher (Exst, Ppsd)   Pad Mounted Feed Point (Exst, Ppsd)   Pipe Mounted Feed Point with Pad (Exst, Ppsd)   Pole Mounted Feed Point (Exst, Ppsd)   Junction Box (Exst, Ppsd)  Existing Pedestrian Head with Number  Existing Signal Head  Pole Mounted Head  Existing Lighting Standard Pole	 Existing Traffic Signal Standard    Pull Box (Exst-Ppsd-Undefined)   Intelligent Transportation Pull Box (Exst, Ppsd)   Transformer (Exst, Ppsd)    Power Pole (Exst-Ppsd-with Transformer)   Wood Pole (Exst, Ppsd)   Pedestrian Push Button Post (Exst, Ppsd)  Existing Pole  Existing Telephone Pole  Existing Post     Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
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KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

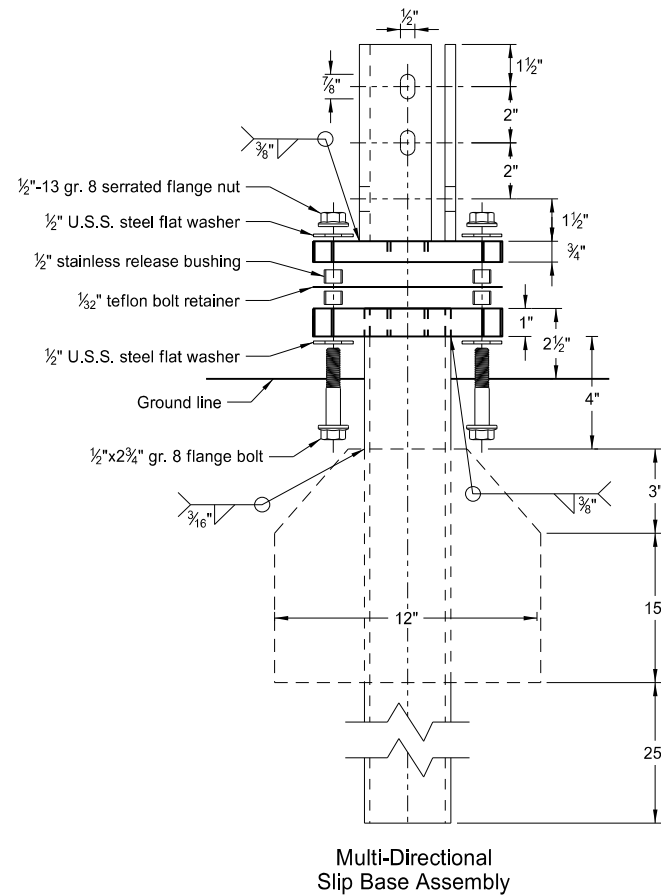
ENGINEER

NORTH DAKOTA

12 18 2020

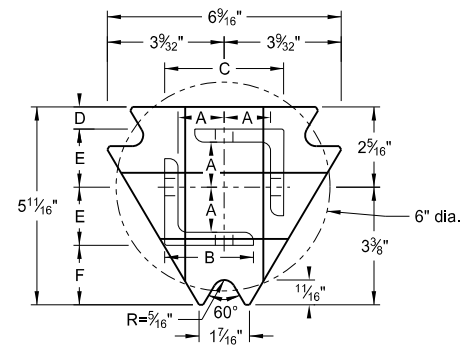
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

Perforated Tube



Multi-Directional Slip Base Assembly

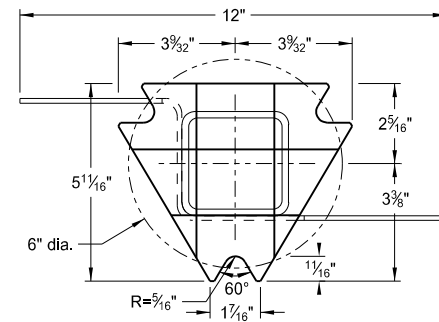
Traffic Flow



Top Post Receiver

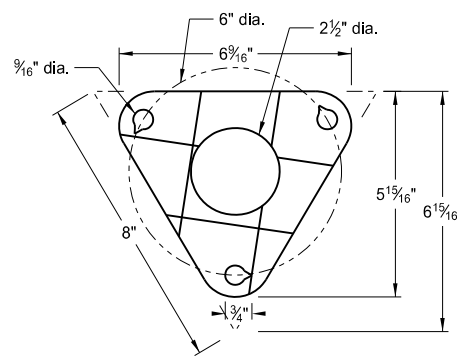
Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle

Traffic Flow



Bottom Soil Stub

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



Bolt Retainer for Base Connection
Bolt Retainer- 1/2" Reprocessed Teflon

Notes:

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

Telescoping Perforated Tube

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

Properties of Telescoping Perforated Tube

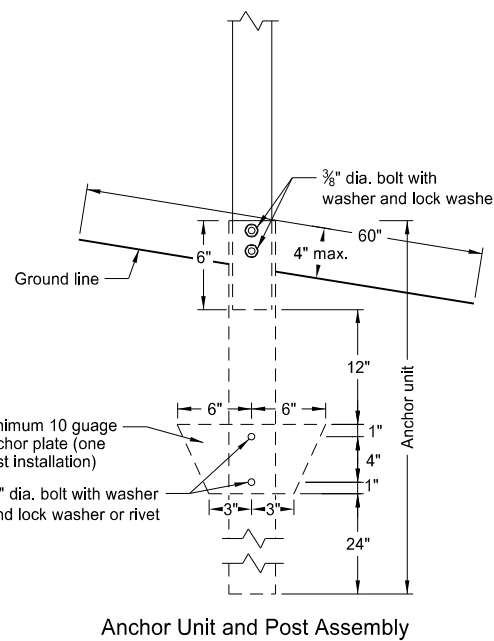
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432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

Top Post Receiver Data Table

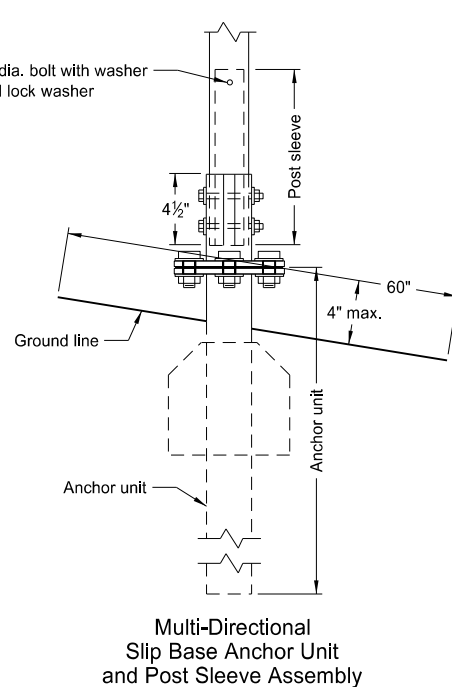
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16" x 10 ga.	1 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2" x 10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

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

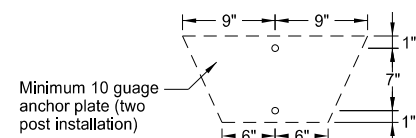
(B) For additional wind load, insert the 2 3/16" x 10 ga. into 2 1/2" x 10 ga.



Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly

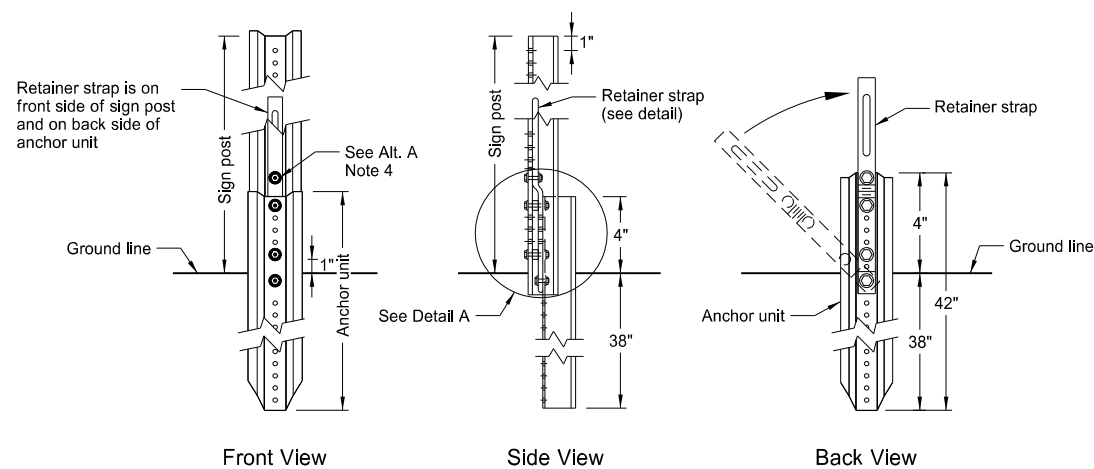
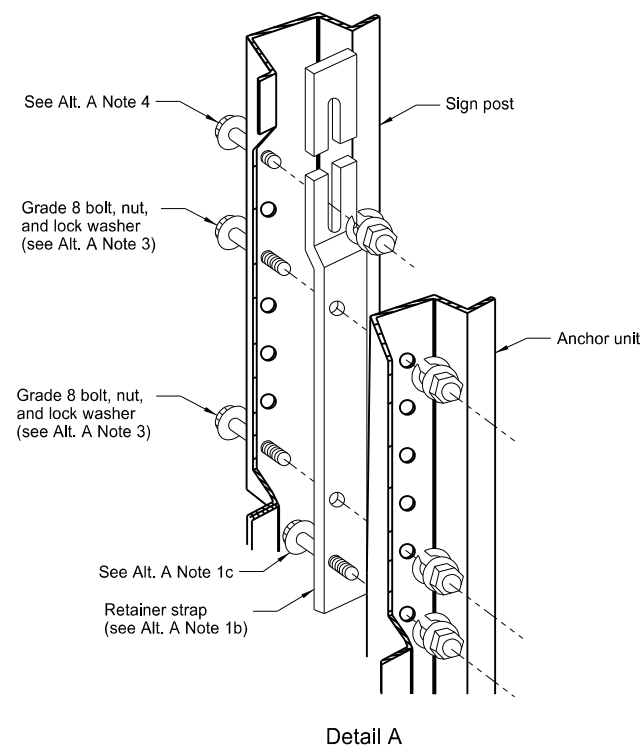


Minimum 10 gauge anchor plate (two post installation)

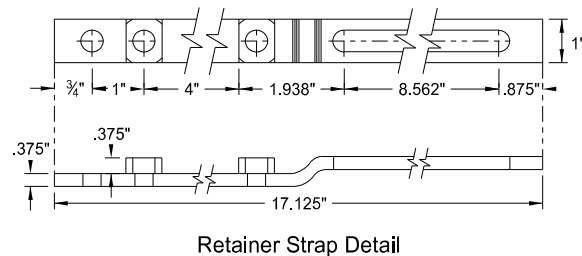
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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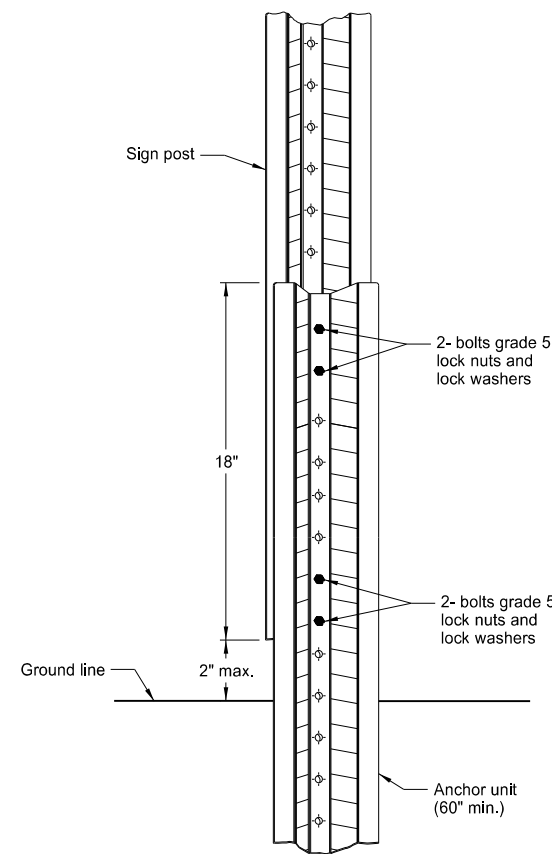
U-Channel Post



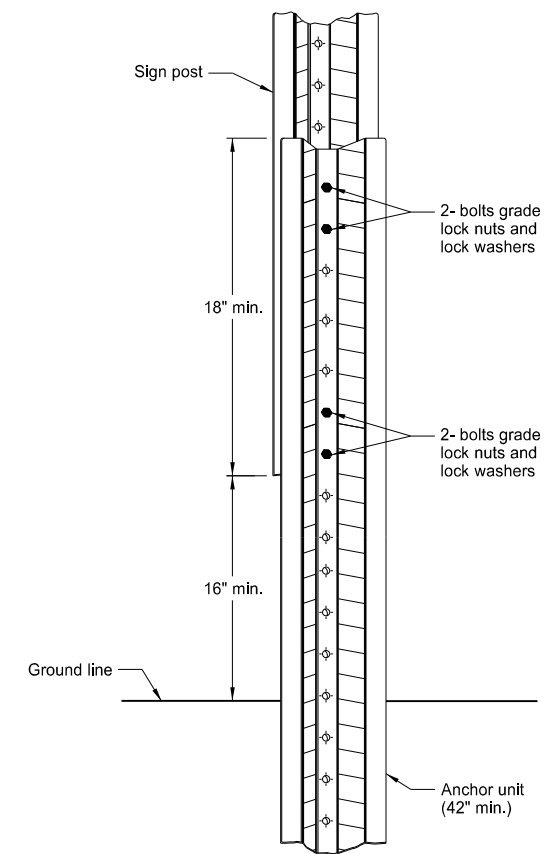
Breakaway U-Channel Detail Alternate A
Install a maximum of 2 posts within 7'.



Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B
(2.5 and 3 lb/ft)
Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail Alternate C
(2.5 and 3 lb/ft)
Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

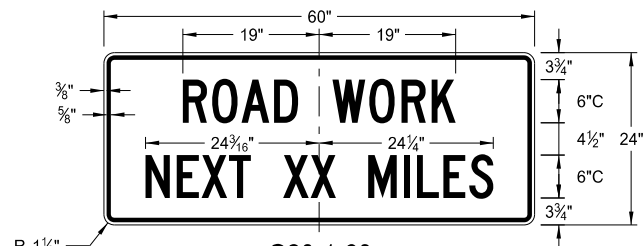
1. a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 1/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) Drive anchor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

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

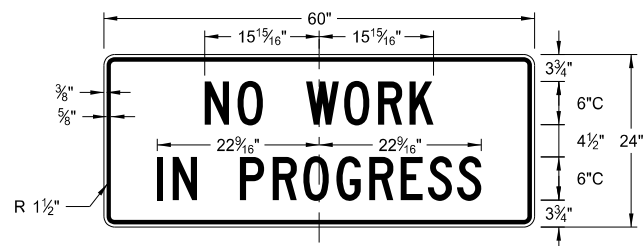
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

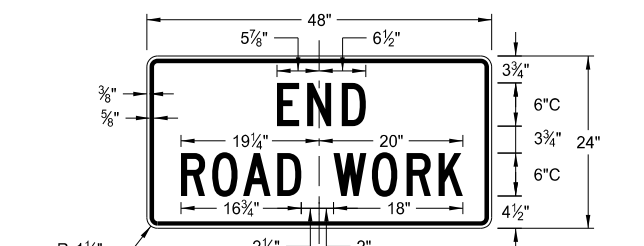
D-704-9



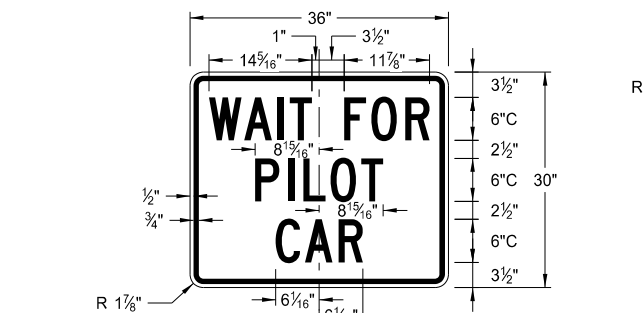
G20-1-60
 Legend: black (non-refl)
 Background: orange



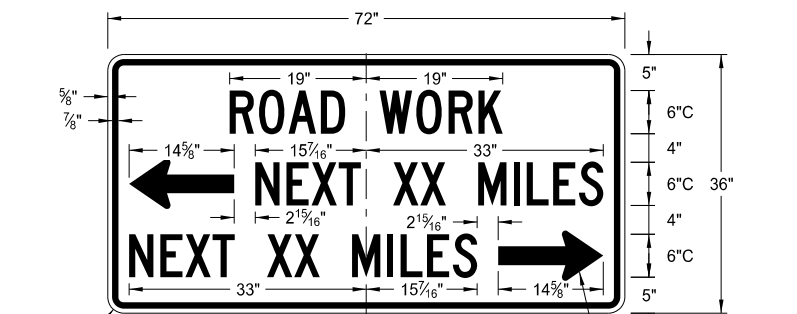
G20-1b-60
 Legend: black (non-refl)
 Background: orange



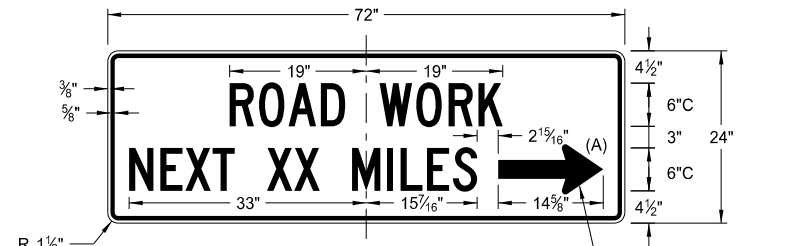
G20-2-48
 Legend: black (non-refl)
 Background: orange



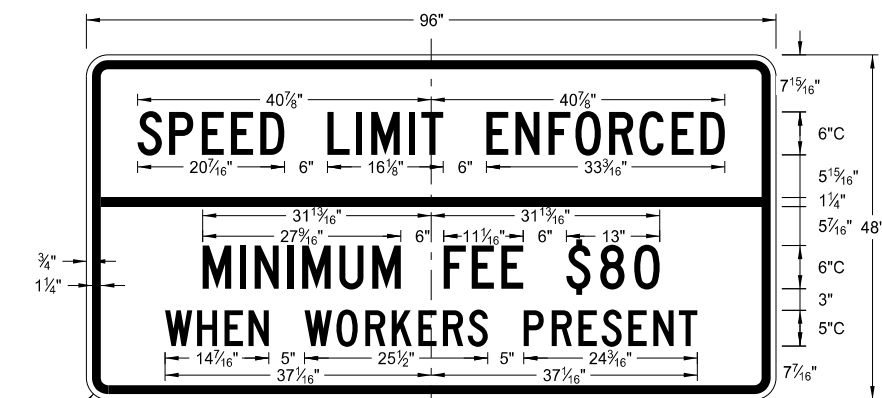
G20-4b-36
 Legend: black (non-refl)
 Background: orange



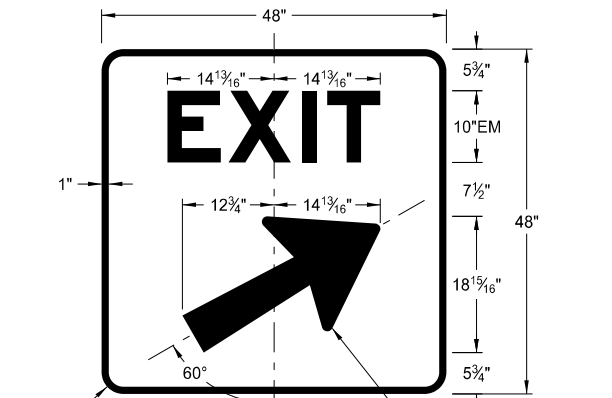
G20-50a-72
 Legend: black (non-refl)
 Background: orange



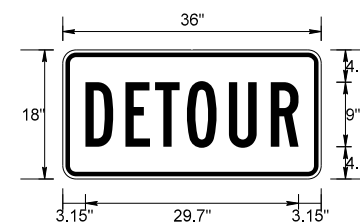
G20-52a-72
 Legend: black (non-refl)
 Background: orange



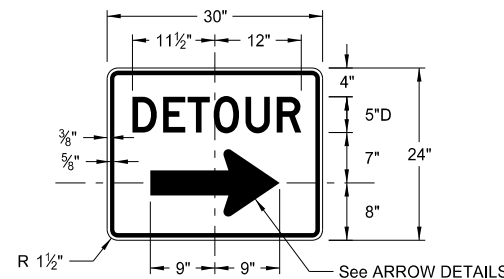
G20-55-96
 Legend: black (non-refl)
 Background: orange



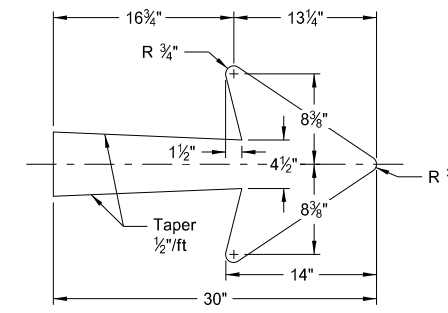
E5-1(L or R)-48
 Legend: white
 Background: green (orange optional)



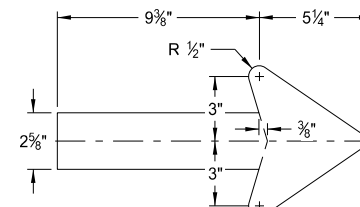
M4-8-36
 Legend: black (non-refl)
 Background: orange



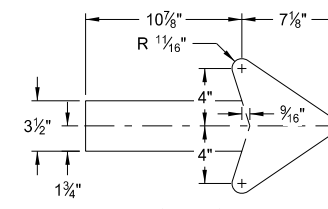
M4-9(L or R)-30 &
 M4-9-30
 Legend: black (non-refl)
 Background: orange



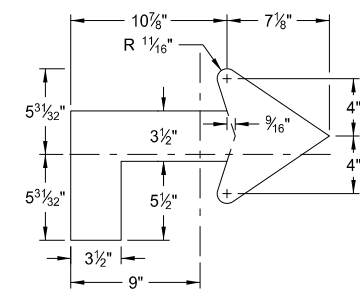
E5-1-48



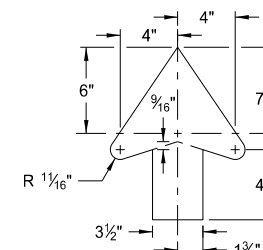
G20-50a-72
 G20-52a-72



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



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



M4-9-30
 Straight

ARROW DETAILS

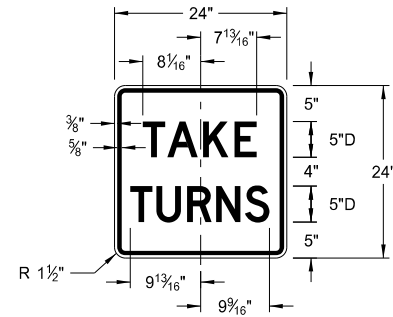
NOTES:

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

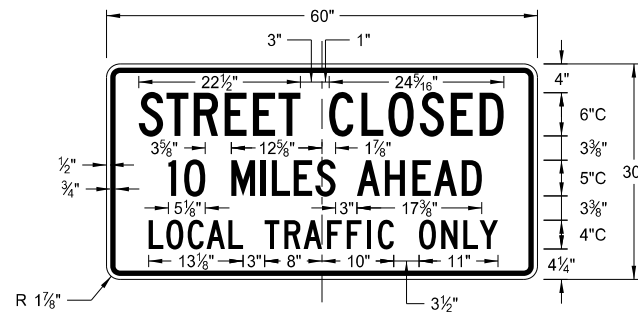
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp

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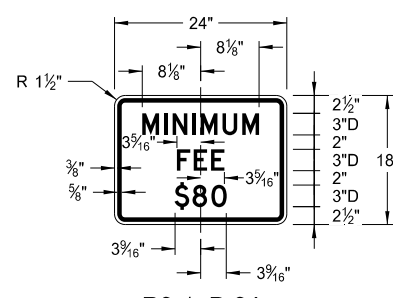
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



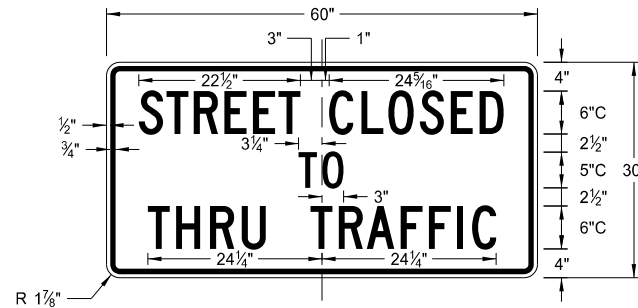
R1-50P-24
Legend: black (non-refl)
Background: white



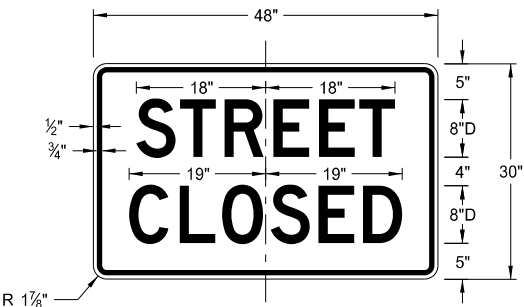
R11-3c-60
Legend: black (non-refl)
Background: white



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



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

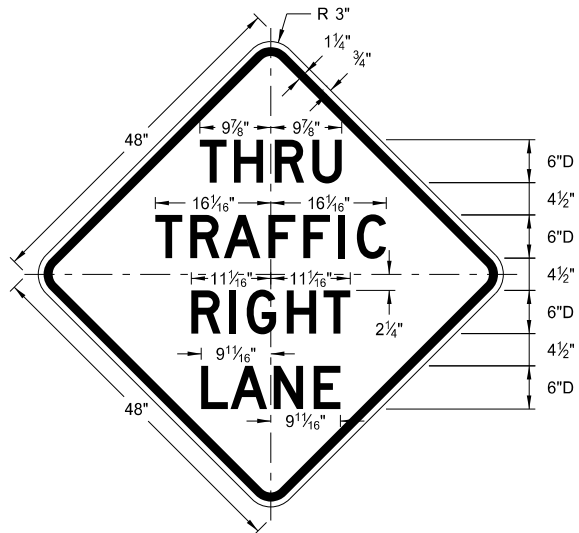


R11-2a-48
Legend: black (non-refl)
Background: white

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

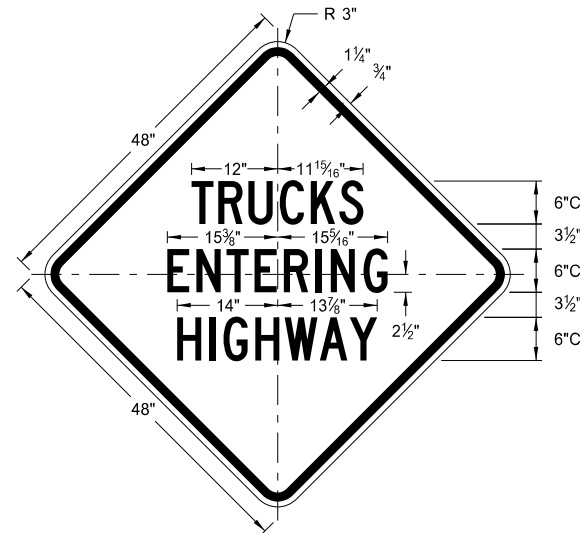
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of Transportation

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



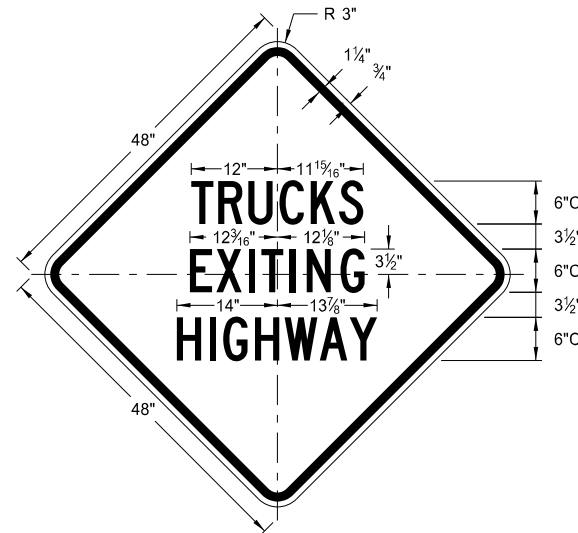
W5-8-48

Legend: black (non-refl)
Background: orange



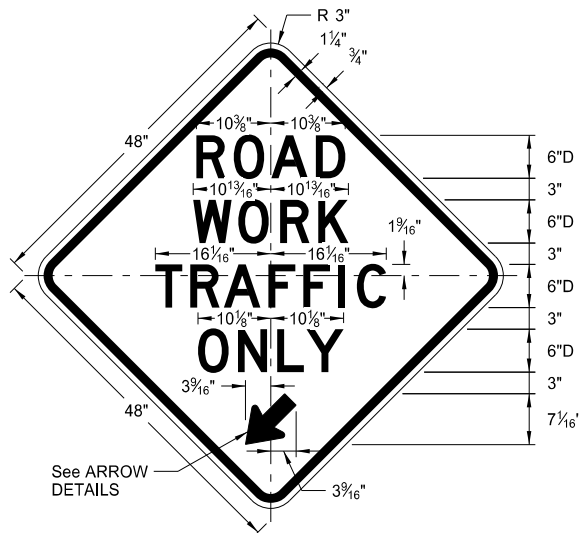
W8-53-48

Legend: black (non-refl)
Background: orange



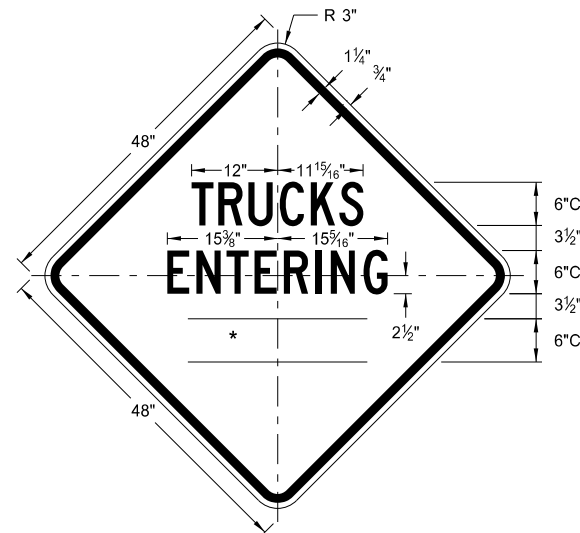
W8-56-48

Legend: black (non-refl)
Background: orange



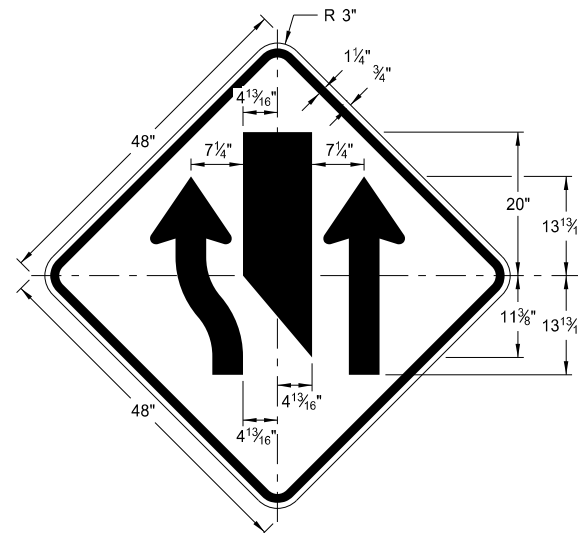
W5-9-48

Legend: black (non-refl)
Background: orange



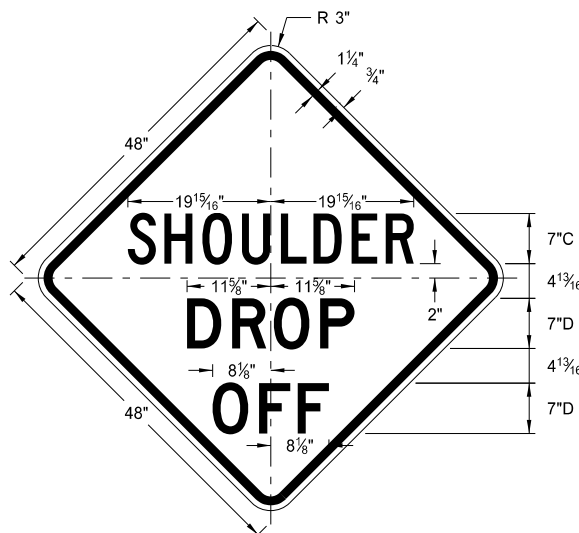
W8-54-48

Legend: black (non-refl)
Background: orange



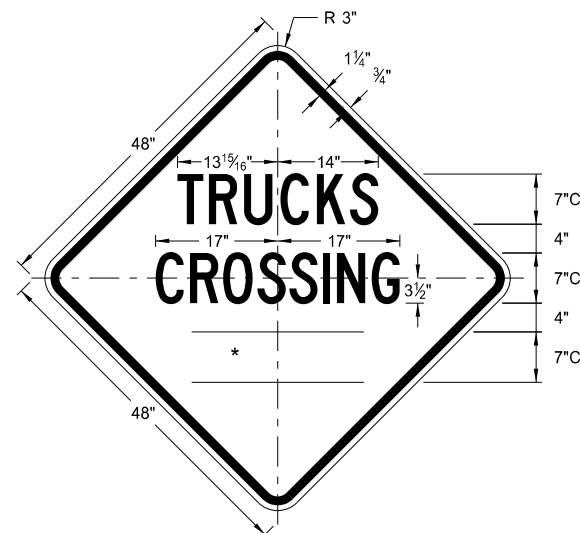
W9-3a-48

Legend: black (non-refl)
Background: orange



W8-9a-48

Legend: black (non-refl)
Background: orange

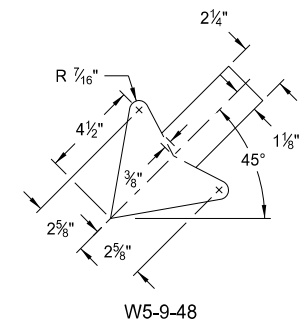


W8-55-48

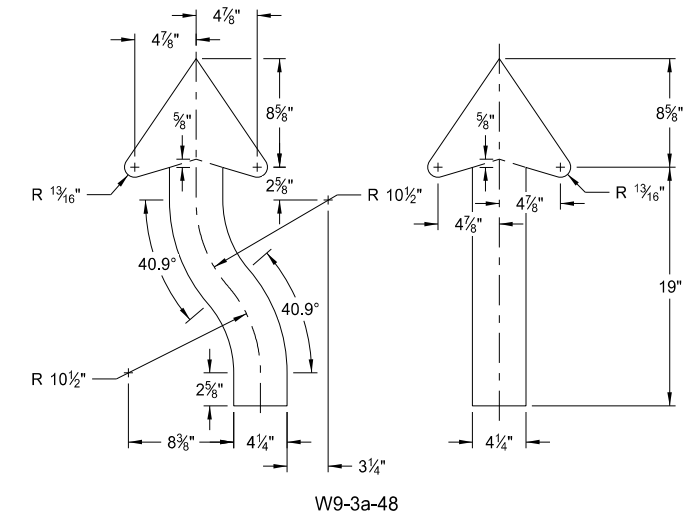
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
1/2 MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

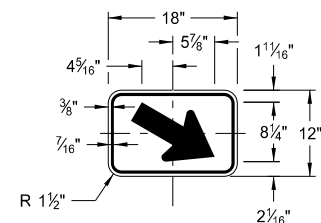
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

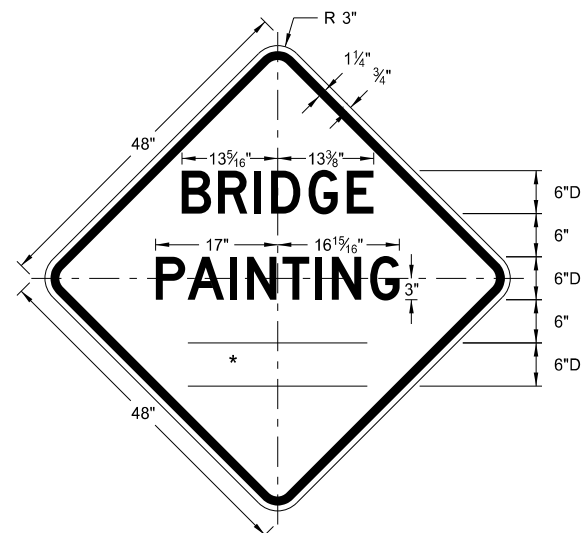
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



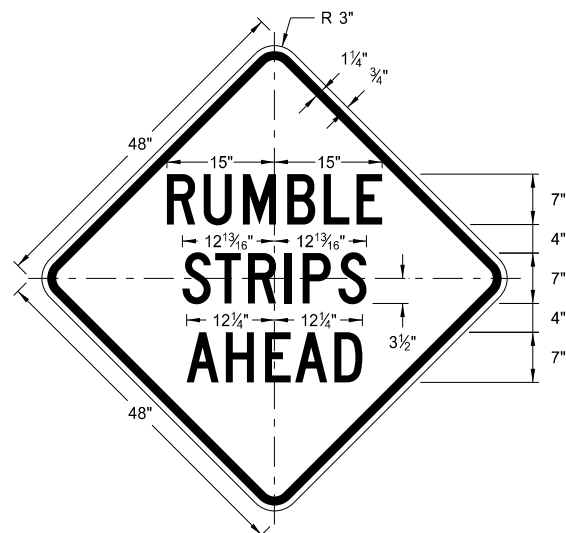
W16-7aP-18

Legend: black (non-refl)
Background: orange



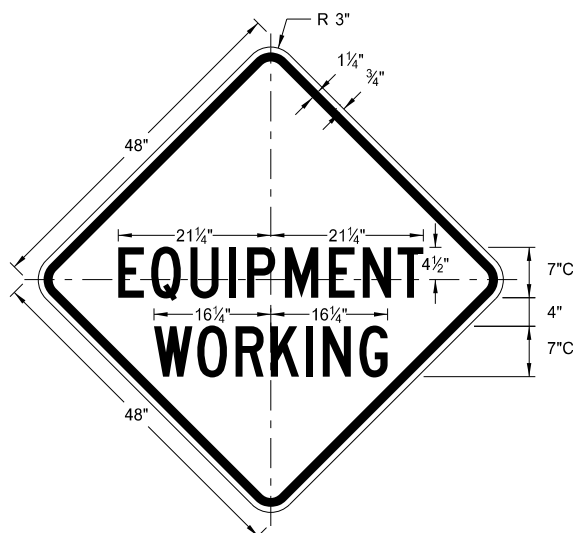
W21-50-48

Legend: black (non-refl)
Background: orange



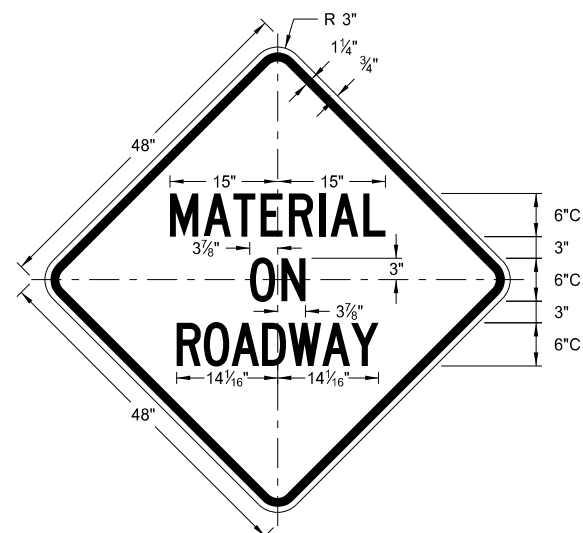
W21-53-48

Legend: black (non-refl)
Background: orange



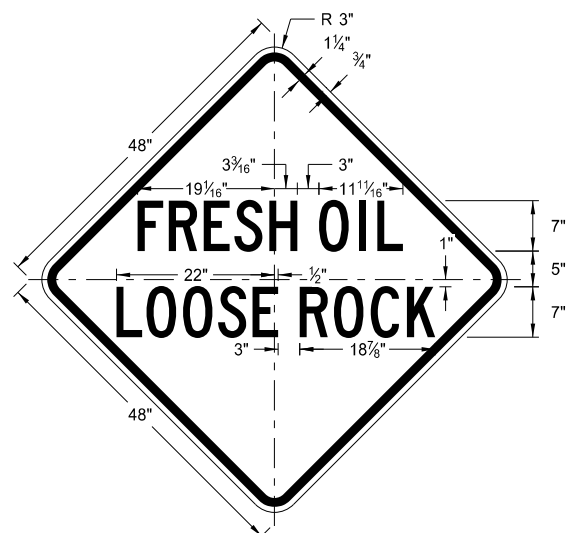
W20-51-48

Legend: black (non-refl)
Background: orange



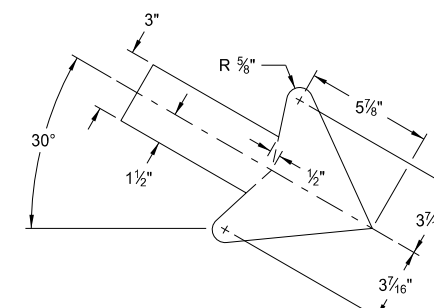
W21-51-48

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Background: orange

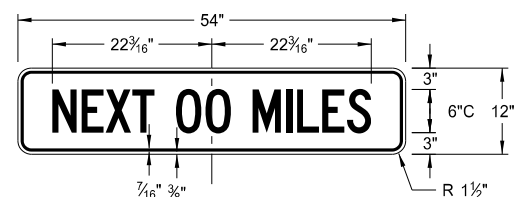


W22-8-48

Legend: black (non-refl)
Background: orange

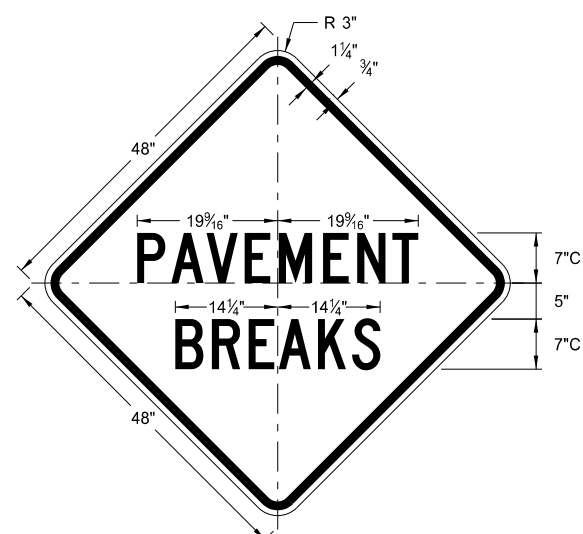


W16-7aP-18



W20-52P-54

Legend: black (non-refl)
Background: orange



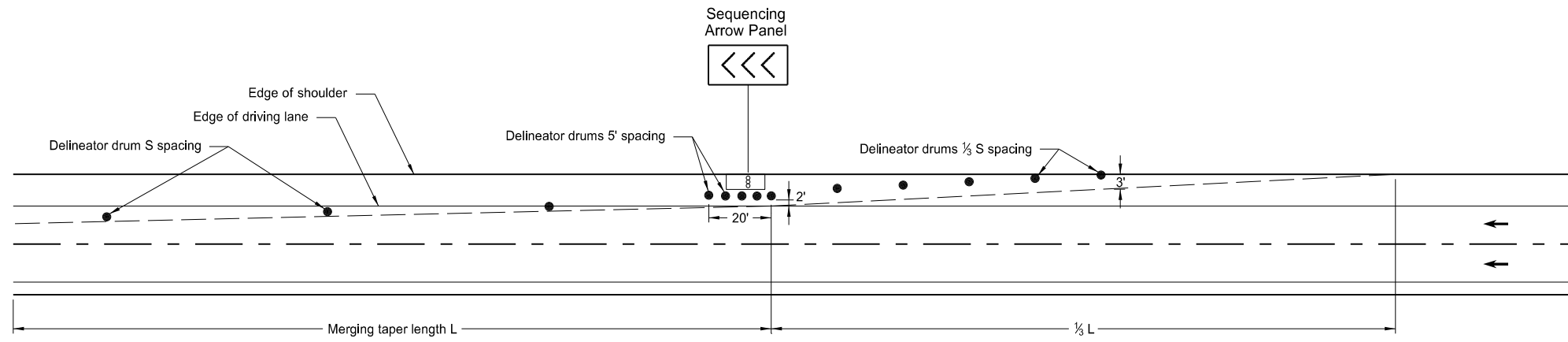
W21-52-48

Legend: black (non-refl)
Background: orange

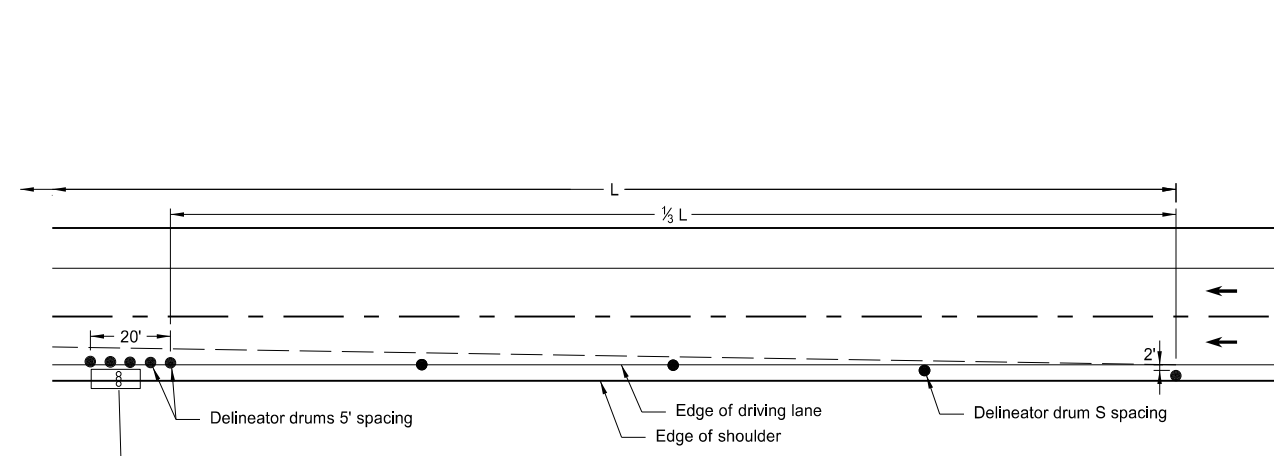
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.

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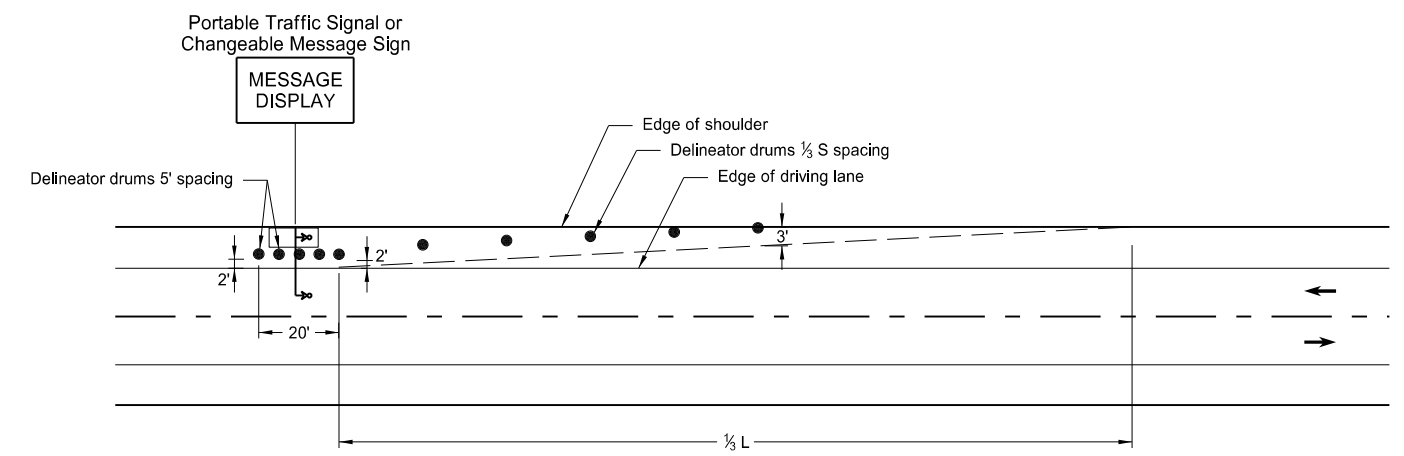
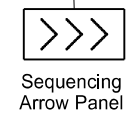
SHOULDER CLOSURE TAPERS



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

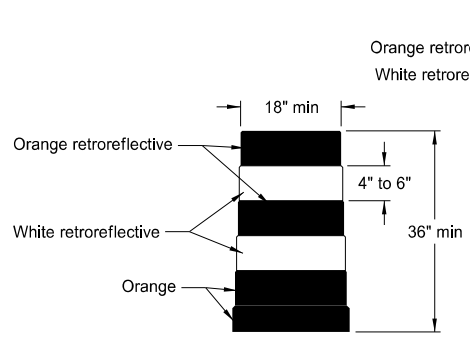
Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-25-19	Added L dimension to detail

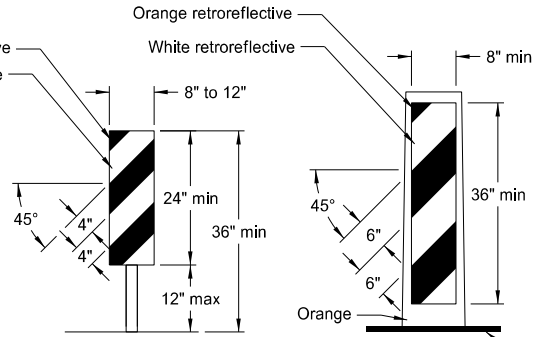
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BARRICADE AND CHANNELIZING DEVICE DETAILS



DELINEATOR DRUM

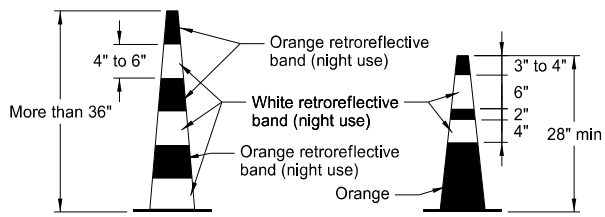
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and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



BACK TO BACK VERTICAL PANEL STACKABLE

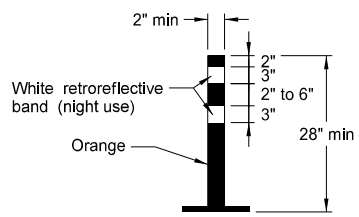
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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

Molded rubber base (min weight 30 lbs)



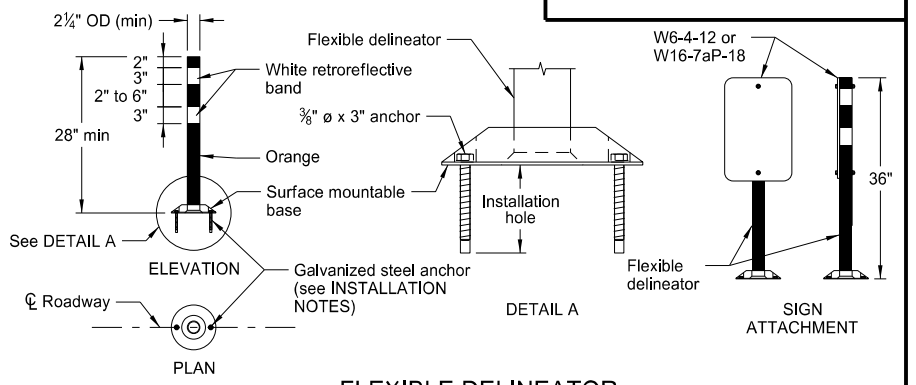
TRAFFIC CONE

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



TUBULAR MARKER

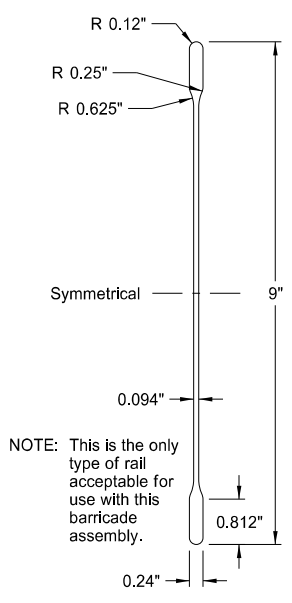
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

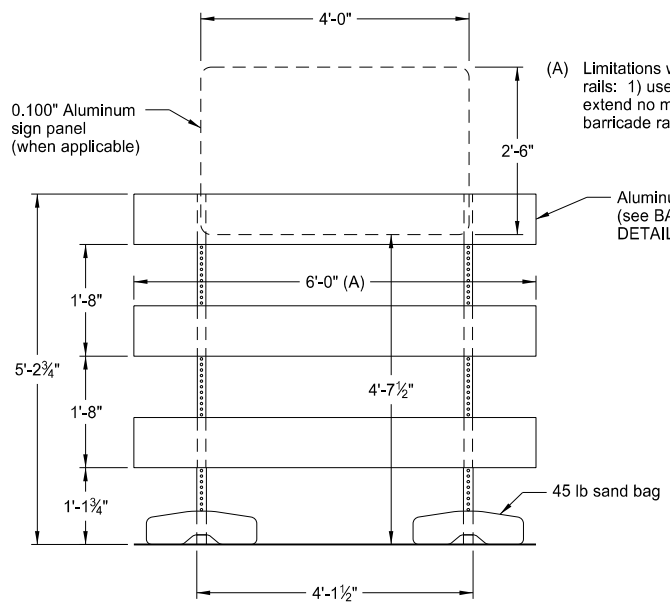
INSTALLATION NOTES:

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

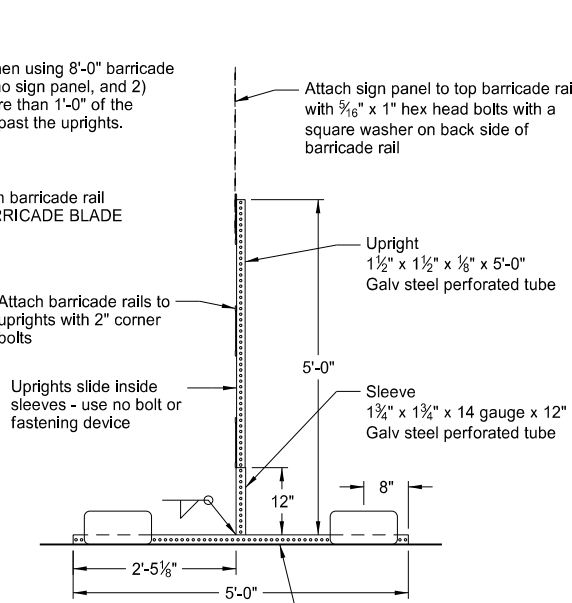


BARRICADE BLADE DETAIL

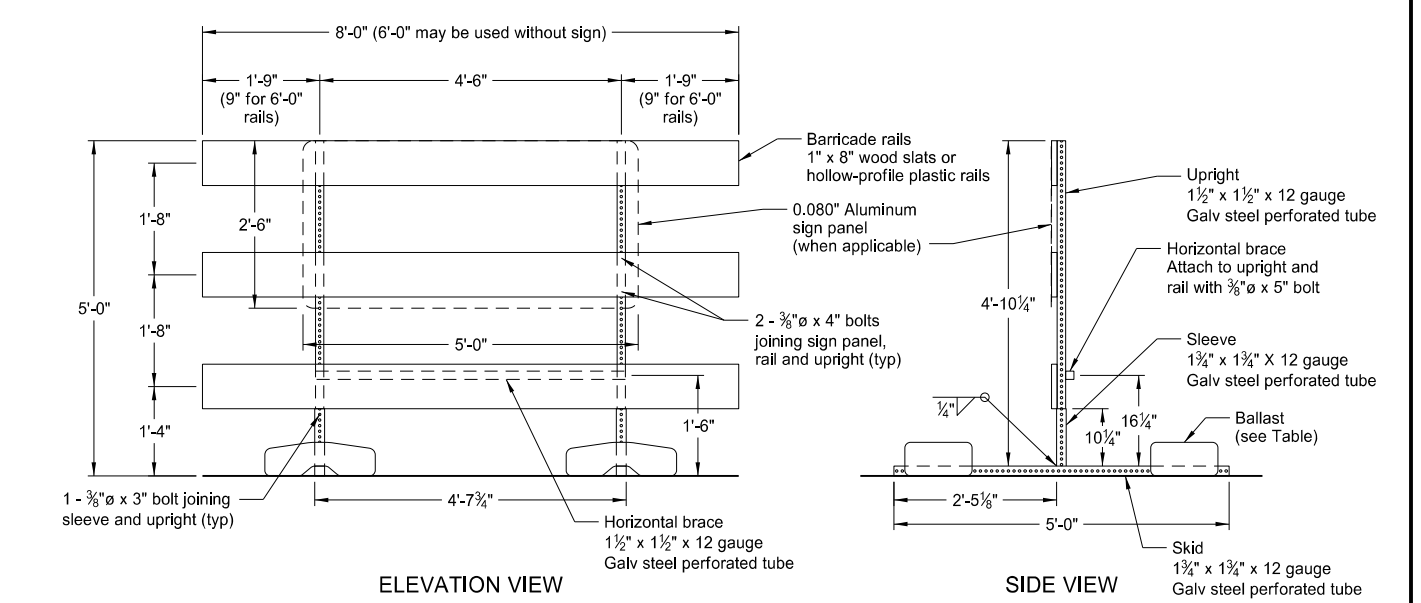
NOTE: This is the only type of rail acceptable for use with this barricade assembly.



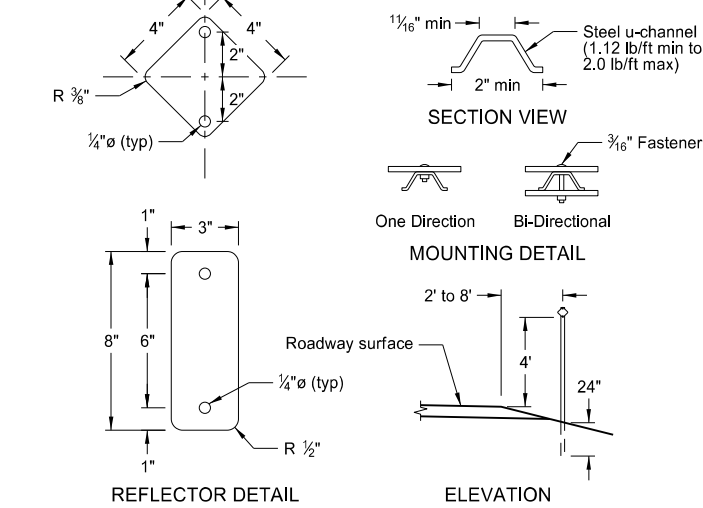
ELEVATION VIEW BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



SIDE VIEW BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)



ELEVATION VIEW BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

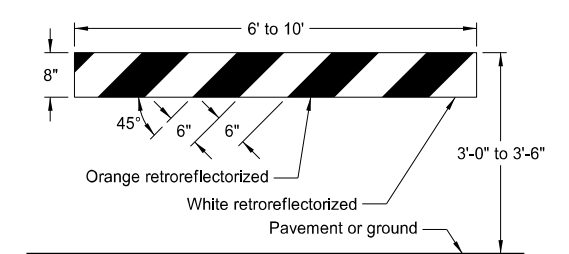


REFLECTOR DETAIL DELINEATORS

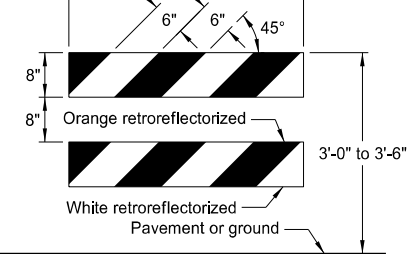
MINIMUM BALLAST (For each side of barricade support)

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

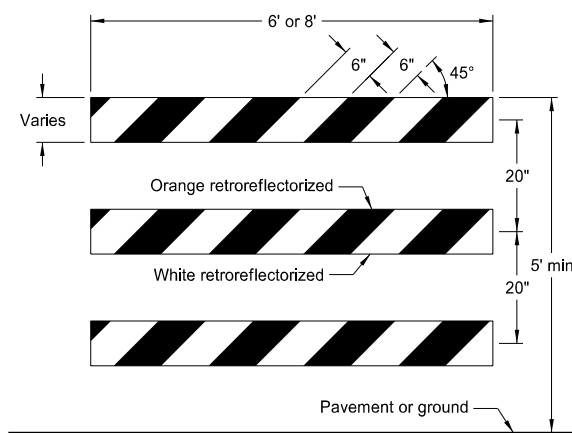
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.



TYPE I BARRICADE



TYPE II BARRICADE



TYPE III BARRICADE

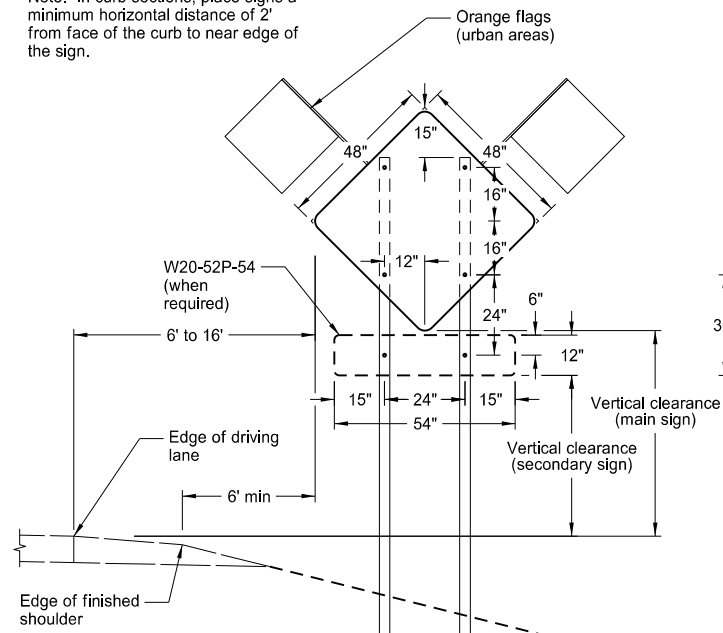
BARRICADE RAIL DETAILS

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

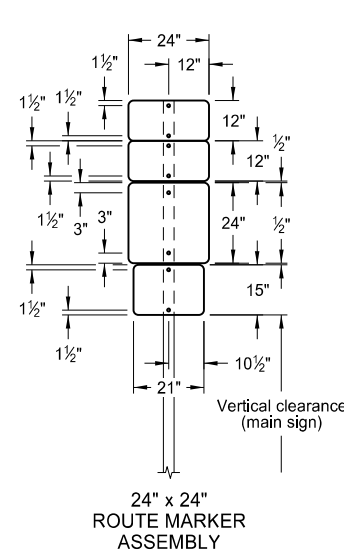
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

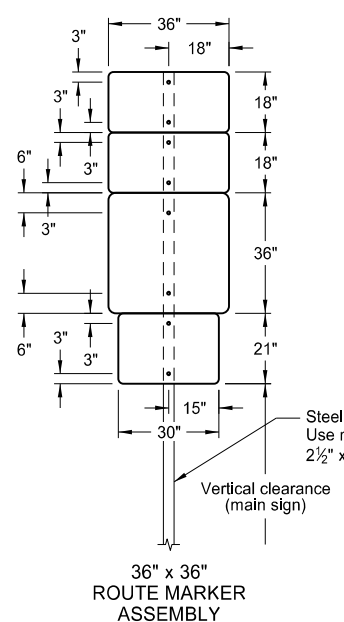
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



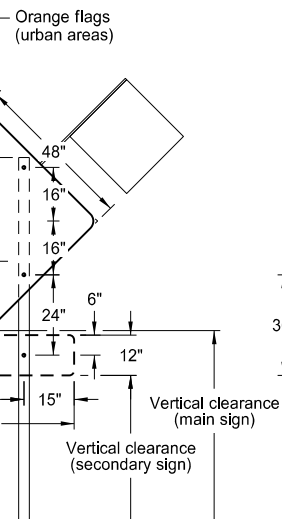
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



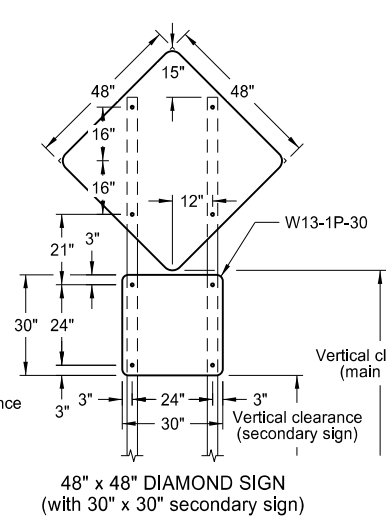
24" x 24" ROUTE MARKER ASSEMBLY



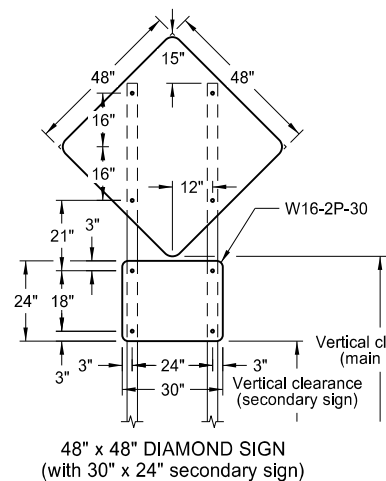
36" x 36" ROUTE MARKER ASSEMBLY



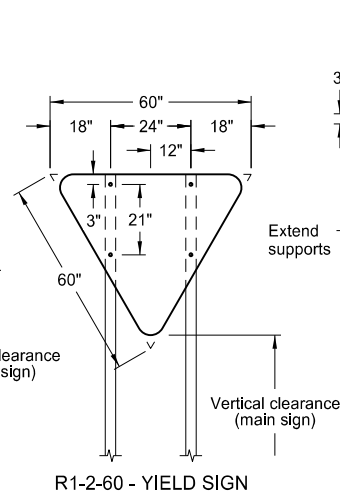
18" x 18" DIAMOND SIGN



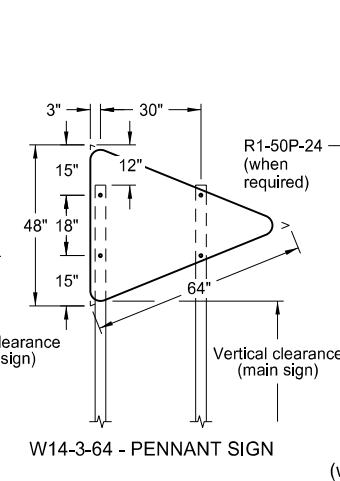
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



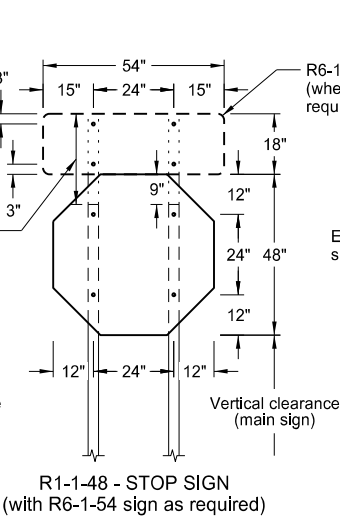
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



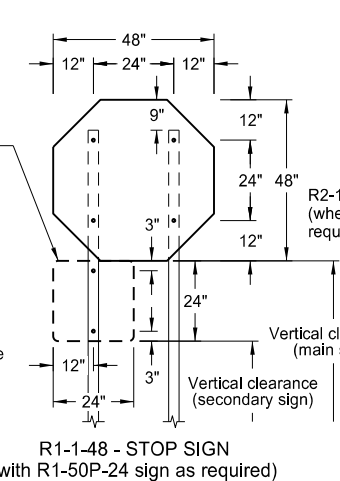
R1-2-60 - YIELD SIGN



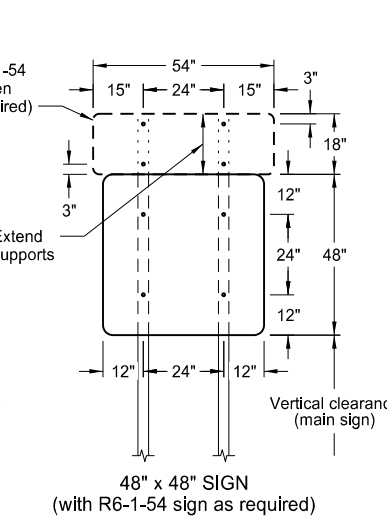
W14-3-64 - PENNANT SIGN



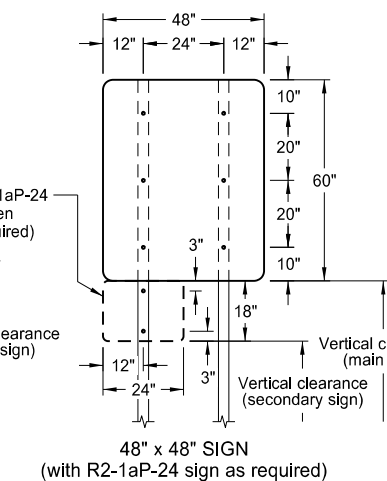
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



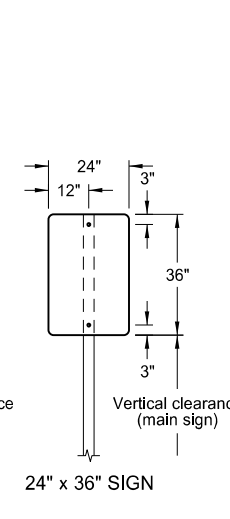
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



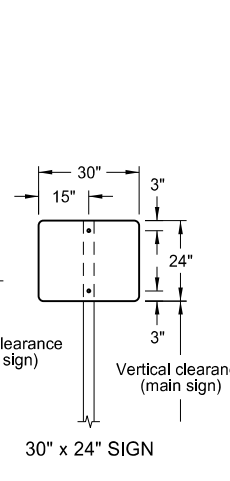
48" x 48" SIGN
(with R6-1-54 sign as required)



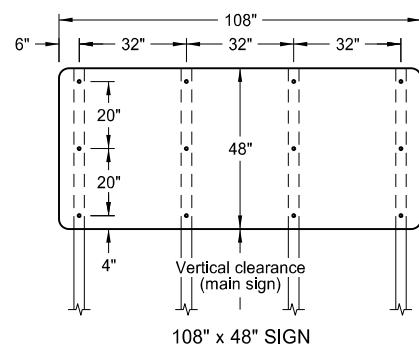
48" x 48" SIGN
(with R2-1aP-24 sign as required)



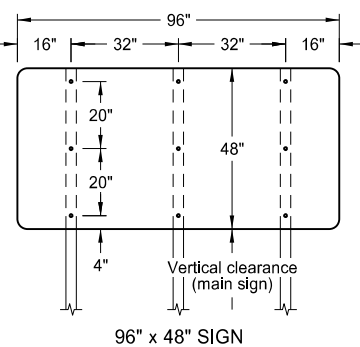
24" x 36" SIGN



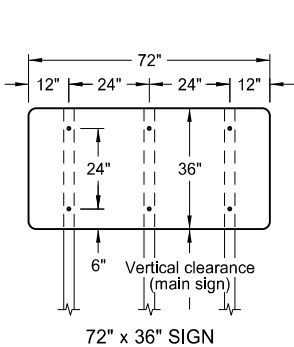
30" x 24" SIGN



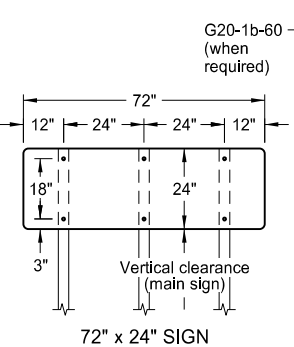
108" x 48" SIGN



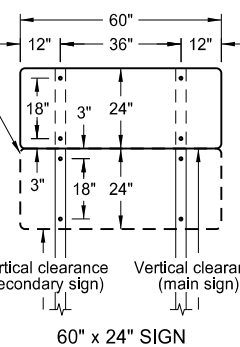
96" x 48" SIGN



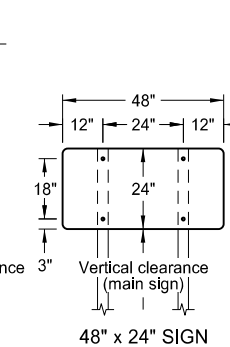
72" x 36" SIGN



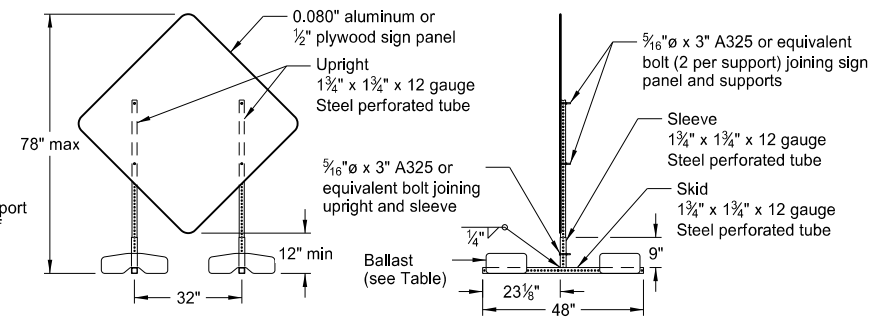
72" x 24" SIGN



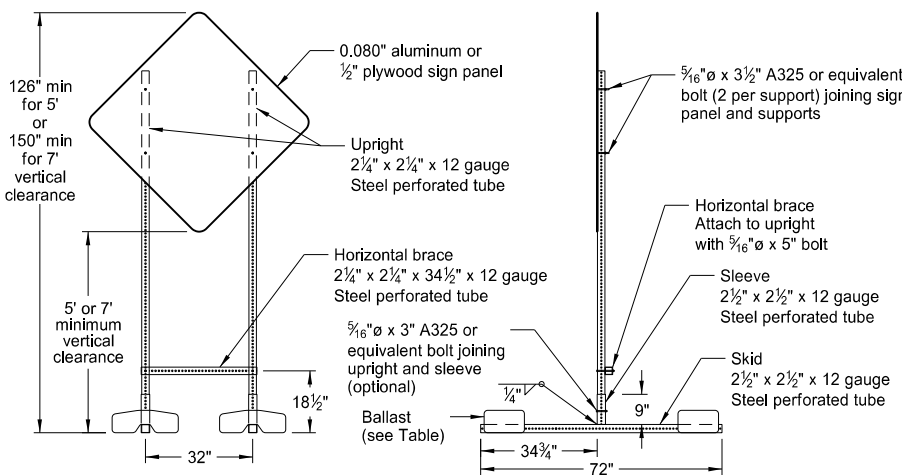
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

Place signs over 50 square feet on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
- Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 5/16" bolts.
- Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
- 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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

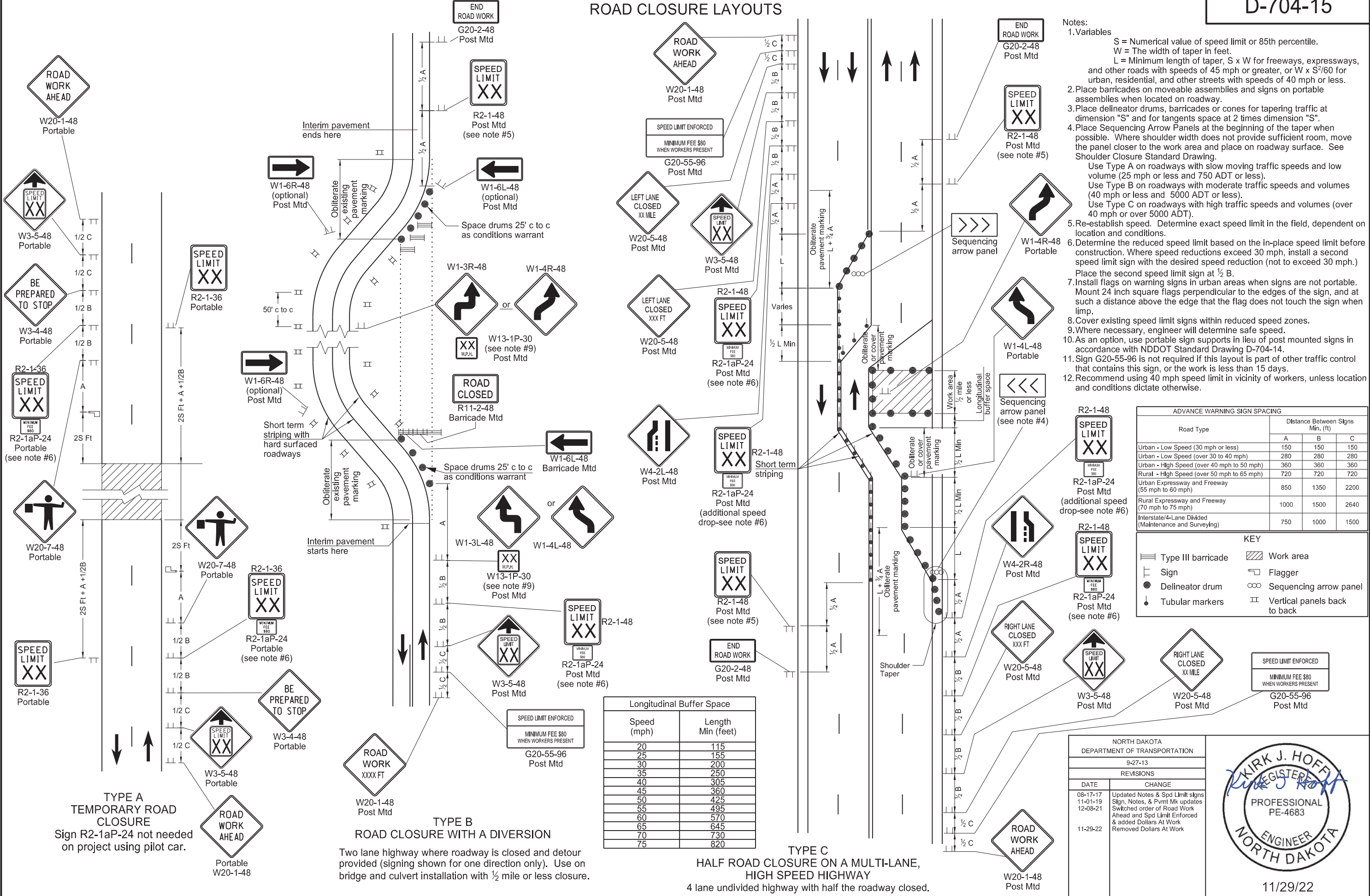
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

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

ROAD CLOSURE LAYOUTS

Notes:

- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet.
 - L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and other streets with speeds of 40 mph or less.
- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
- Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
- Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
 - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 - Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within reduced speed zones.
- Where necessary, engineer will determine safe speed.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.



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

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



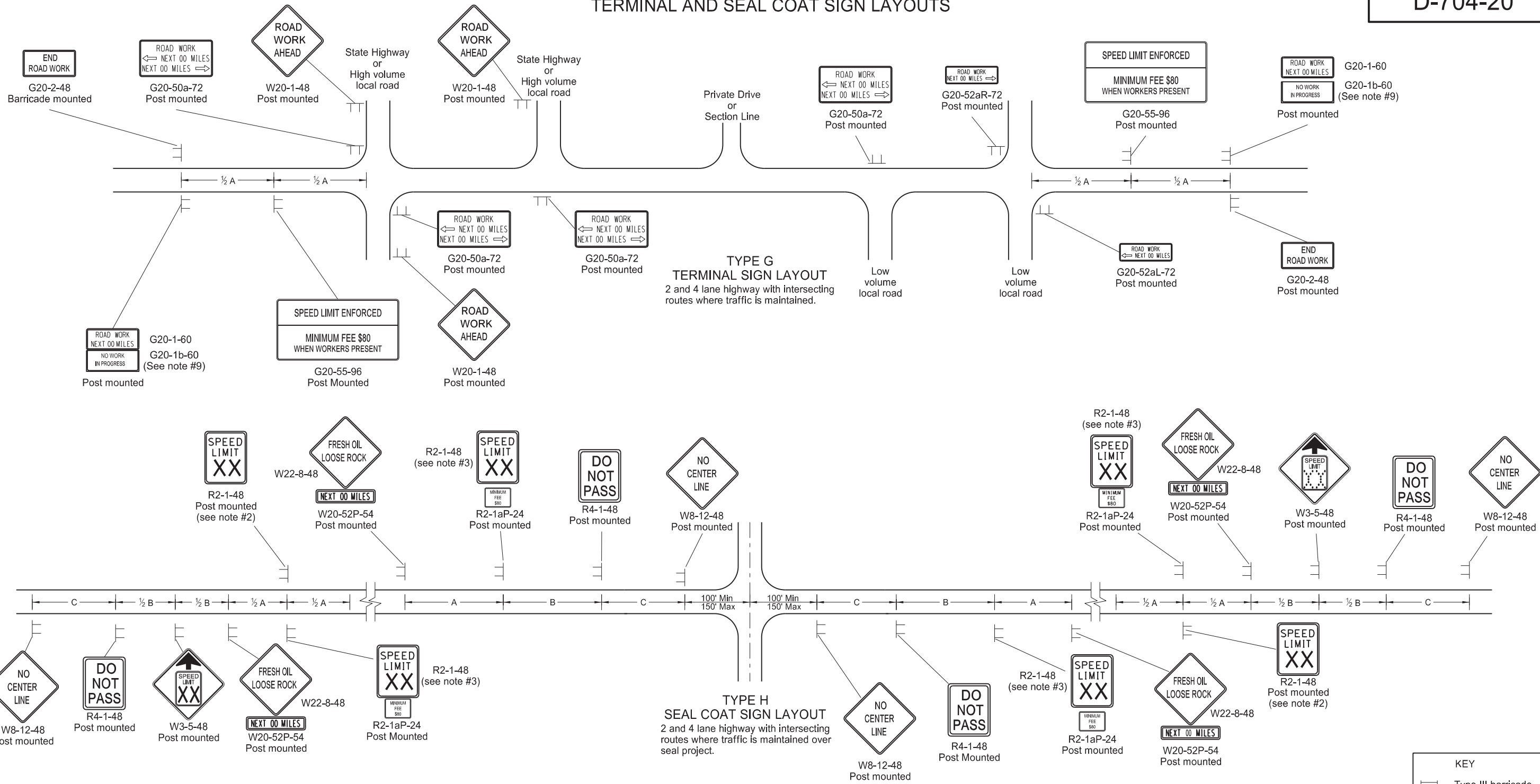
11/29/22

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

TYPE B ROAD CLOSURE WITH A DIVERSION
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with 1/2 mile or less closure.

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

TERMINAL AND SEAL COAT SIGN LAYOUTS



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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work

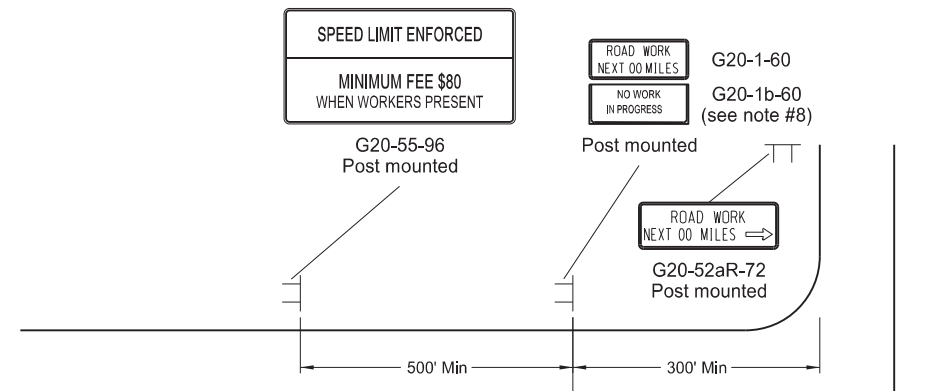
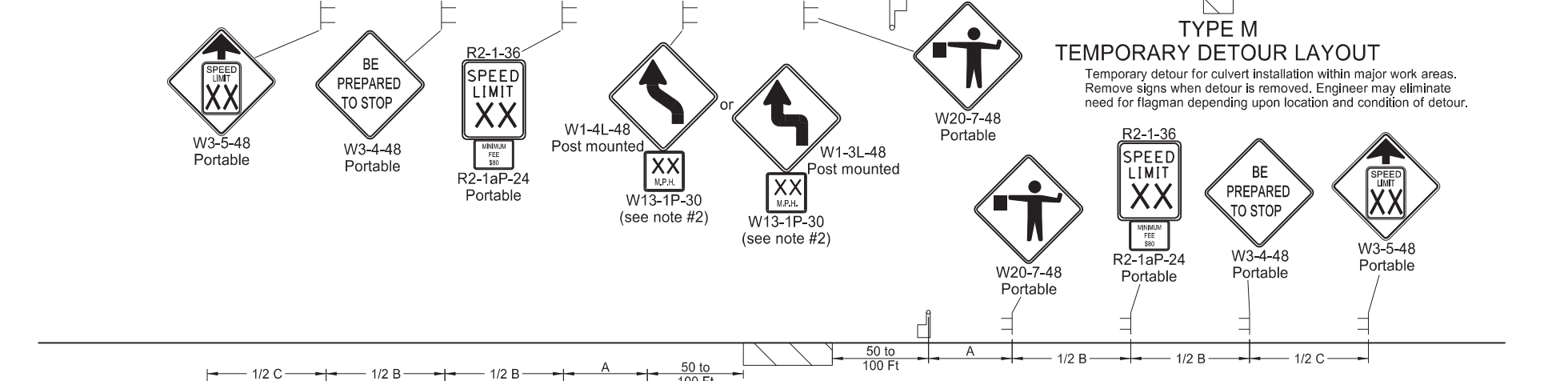
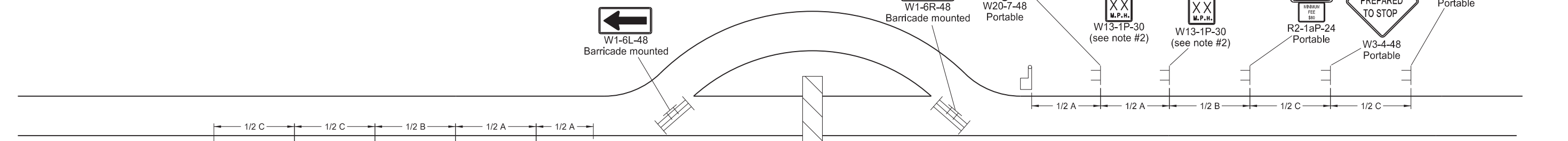
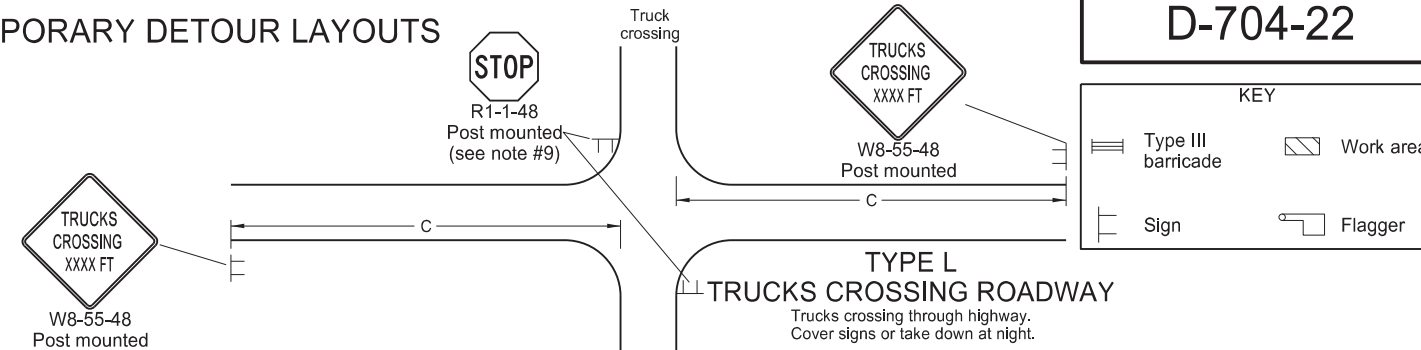
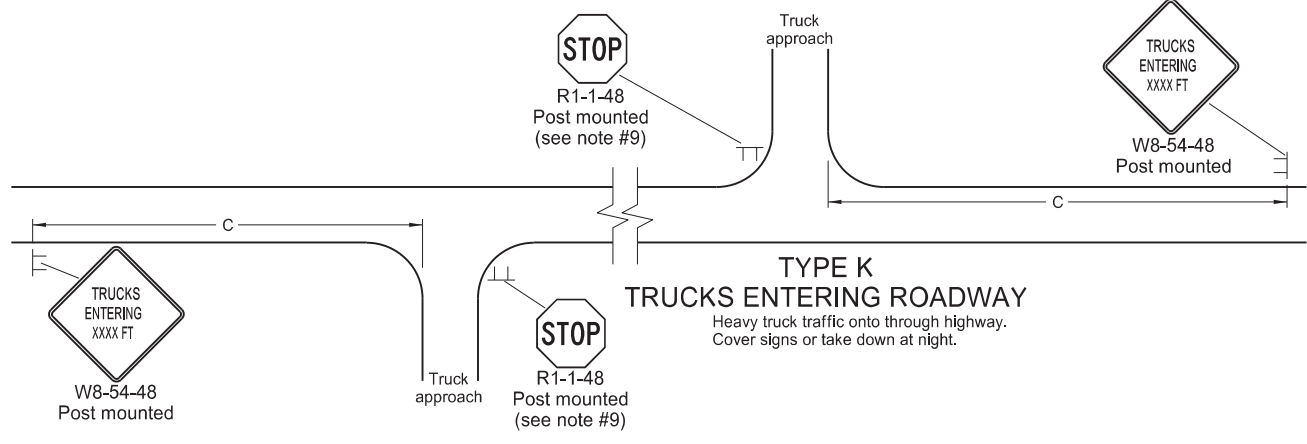


CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

KEY

- Type III barricade
- Sign
- Work area
- Flagger



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

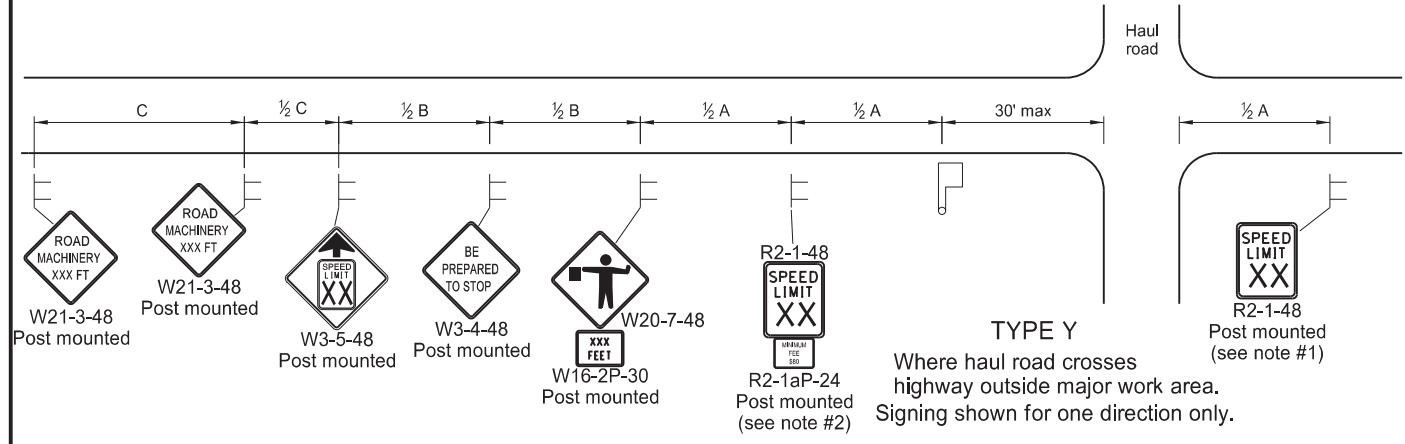
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60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

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

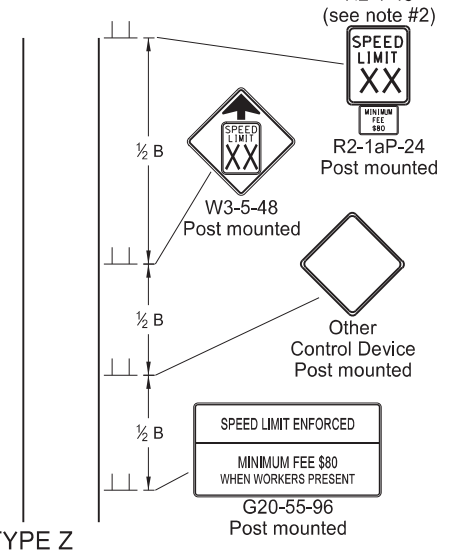


11/29/22

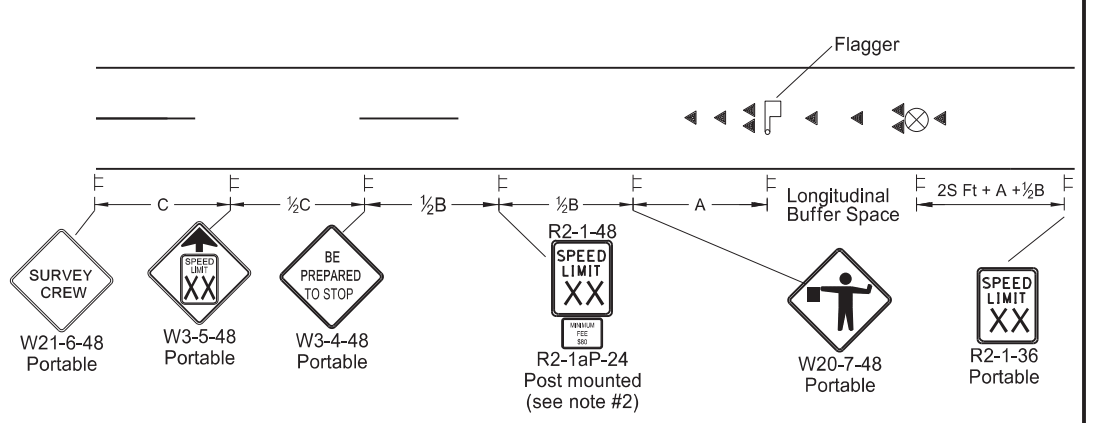
MISCELLANEOUS SIGN LAYOUTS



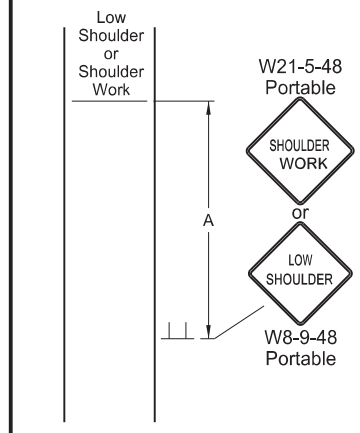
TYPE Y
Where haul road crosses highway outside major work area. Signing shown for one direction only.



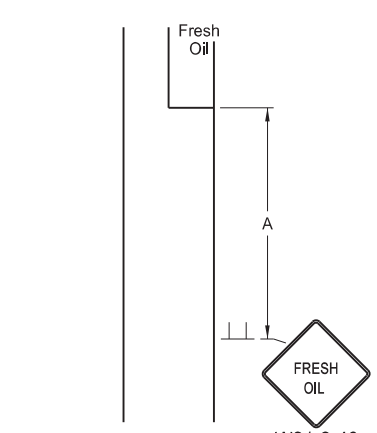
TYPE Z
Where speed zone is needed. Signing shown for one direction only.



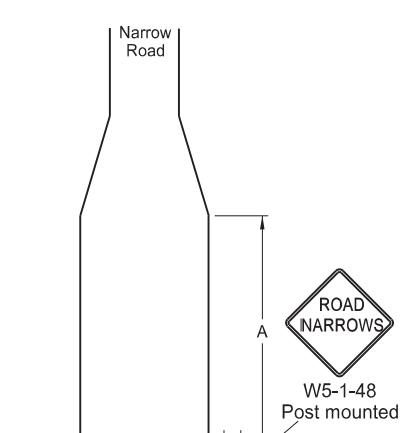
TYPE AA
Where survey crew is used. Signing shown for one direction only.



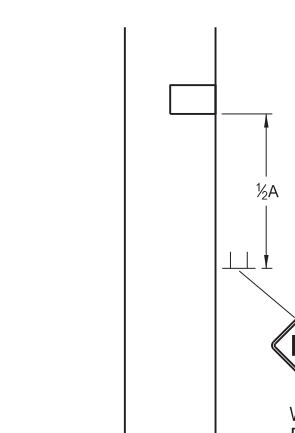
TYPE BB
Within major work area where sign conditions exist



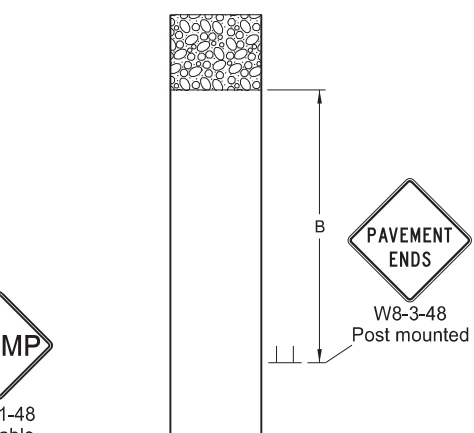
TYPE CC
Where sign conditions exist



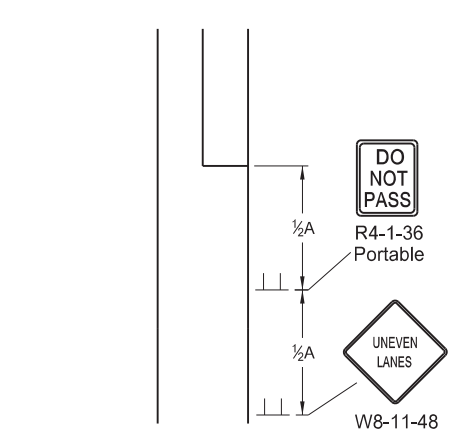
TYPE DD
Where sign conditions exist



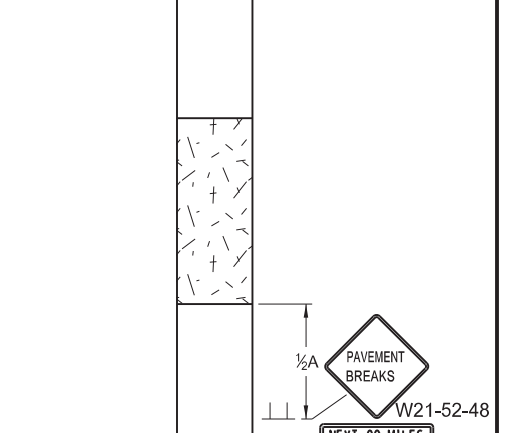
TYPE EE
Where sign conditions exist



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



TYPE GG
Where elevation difference exists between lanes

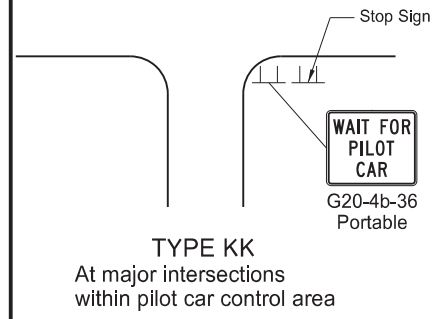


TYPE JJ
For break in pavement. Install signs when conditions exist and remove when not applicable. Signing shown for one direction only.

KEY

- ☐ Flagger
- ☐ Sign
- ▲ Cones
- ⊗ Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

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

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

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

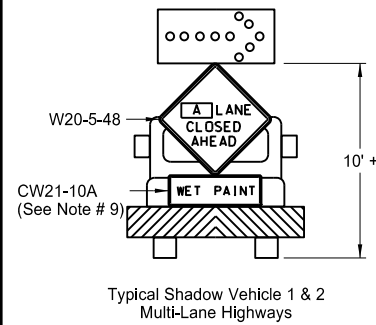
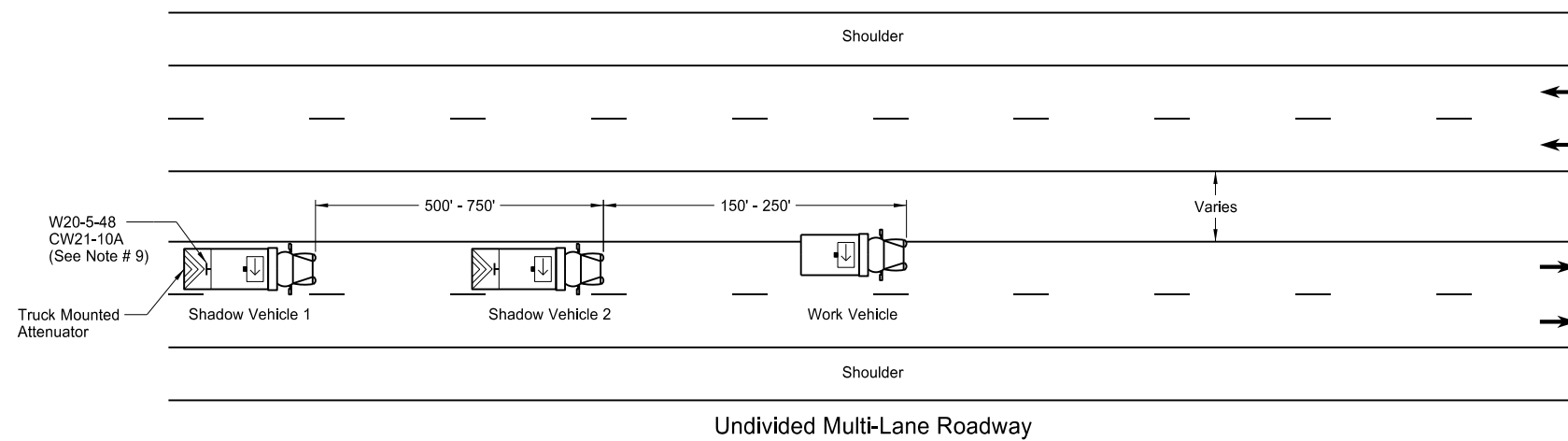
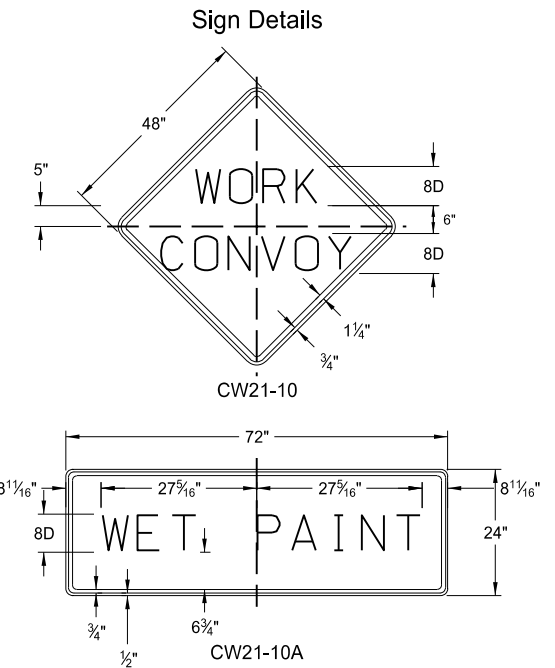
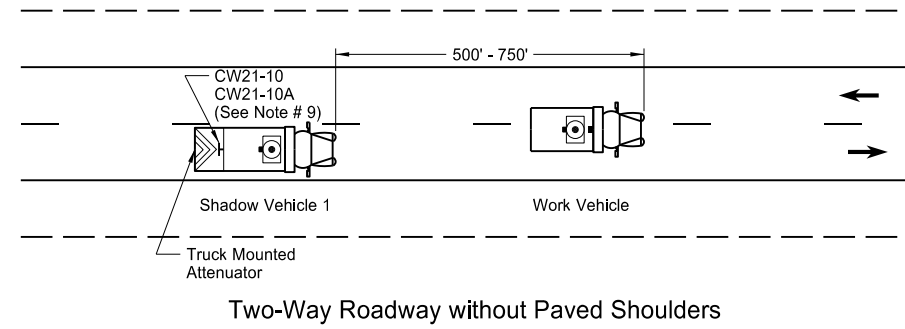
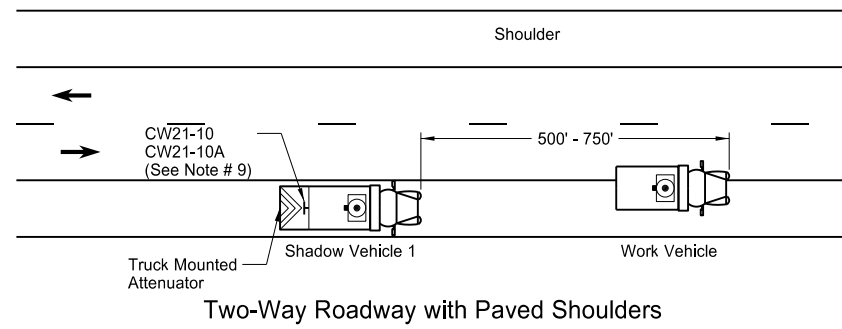
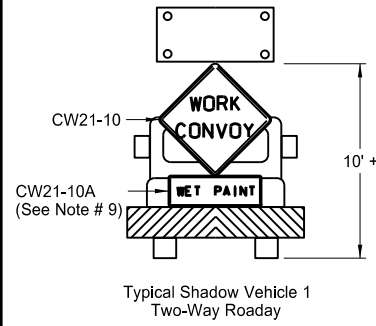
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

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

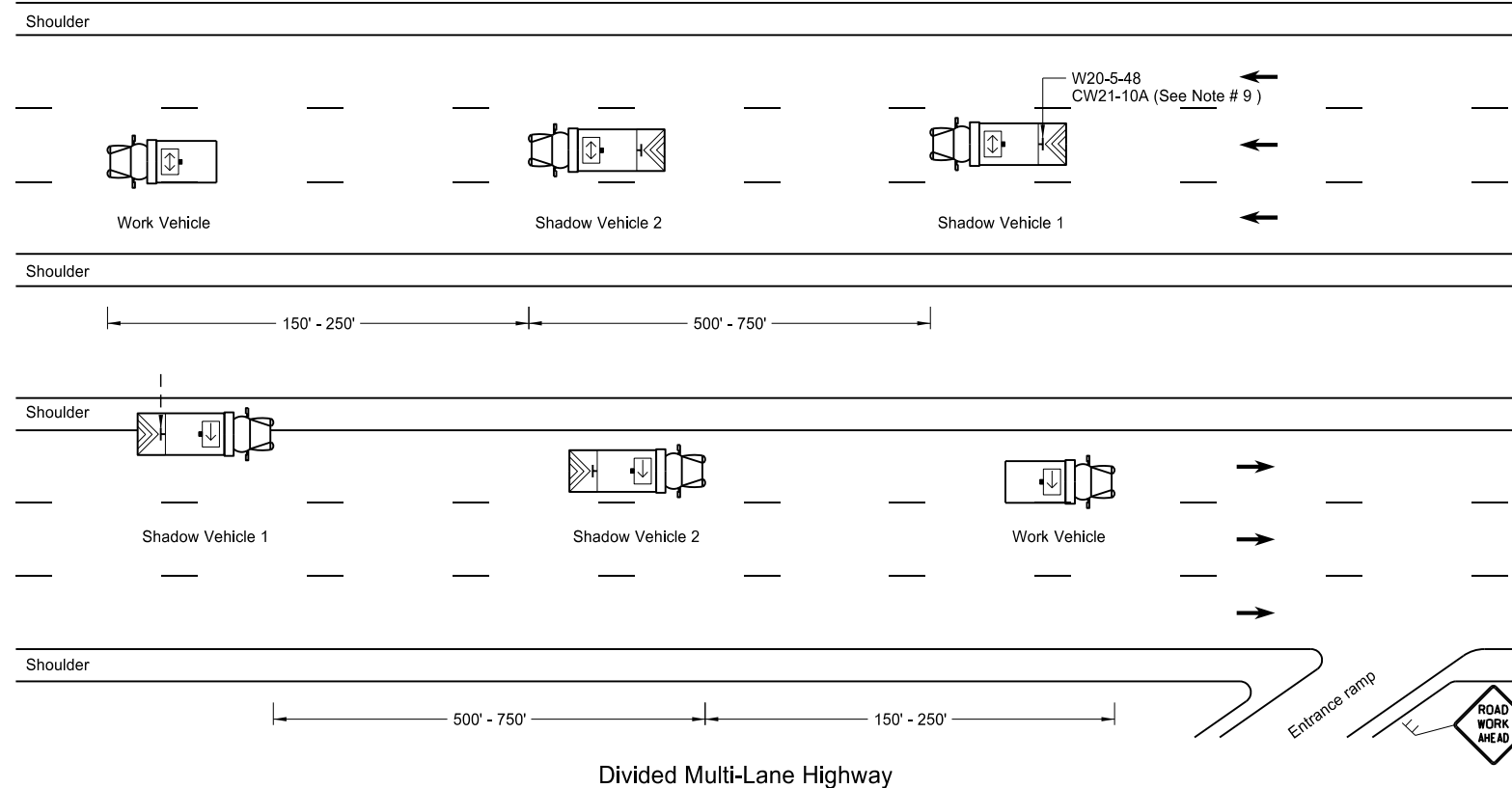


02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)



A = Left Right Center



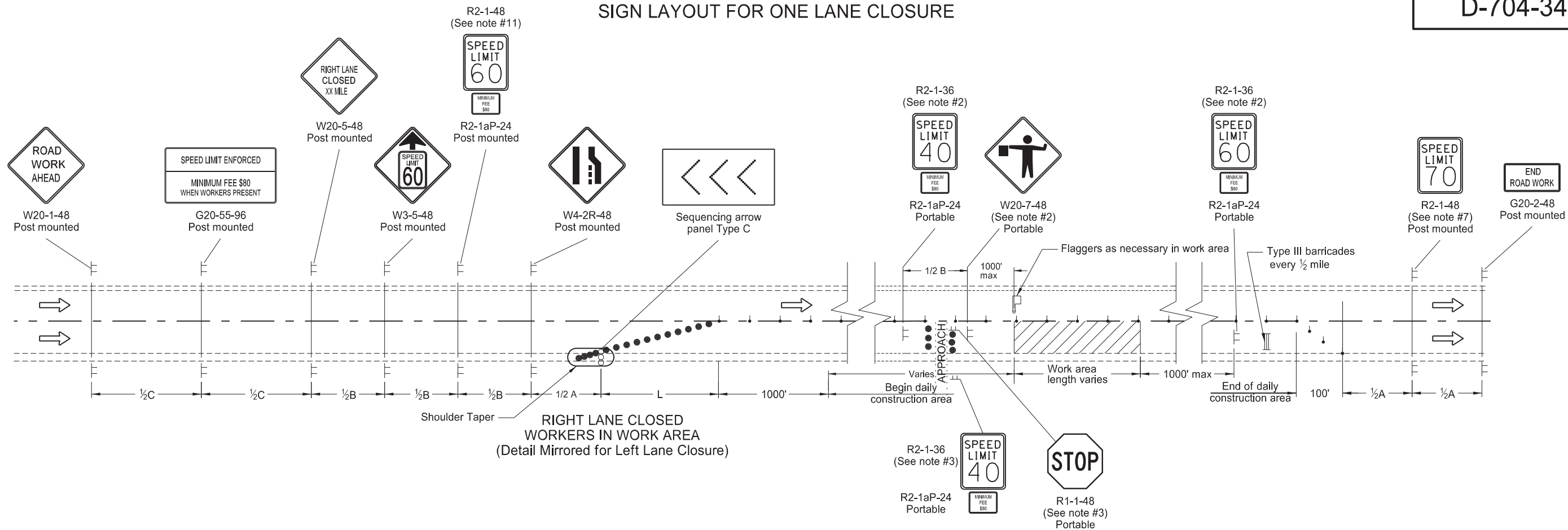
- Notes
- Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
 - Display yellow rotating beacons or strobe lights on shadow and work vehicles, unless otherwise stated in the plans.
 - Use Type B or Type C flashing arrow panels controlled from inside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

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

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

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

SIGN LAYOUT FOR ONE LANE CLOSURE



Notes:

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

KEY

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

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-26-2012

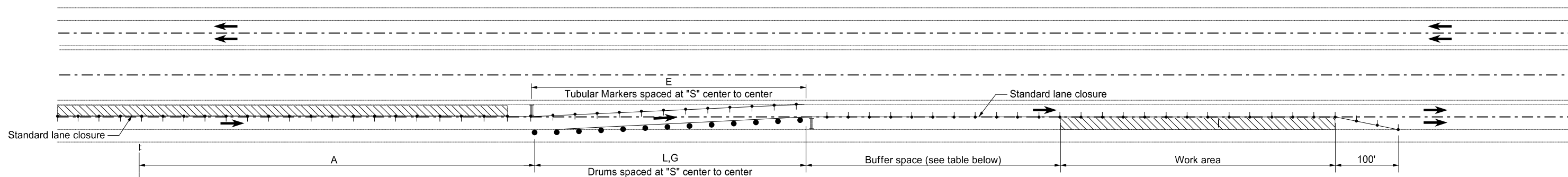
REVISIONS

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



11/29/22

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



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

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

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

Notes

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

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

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

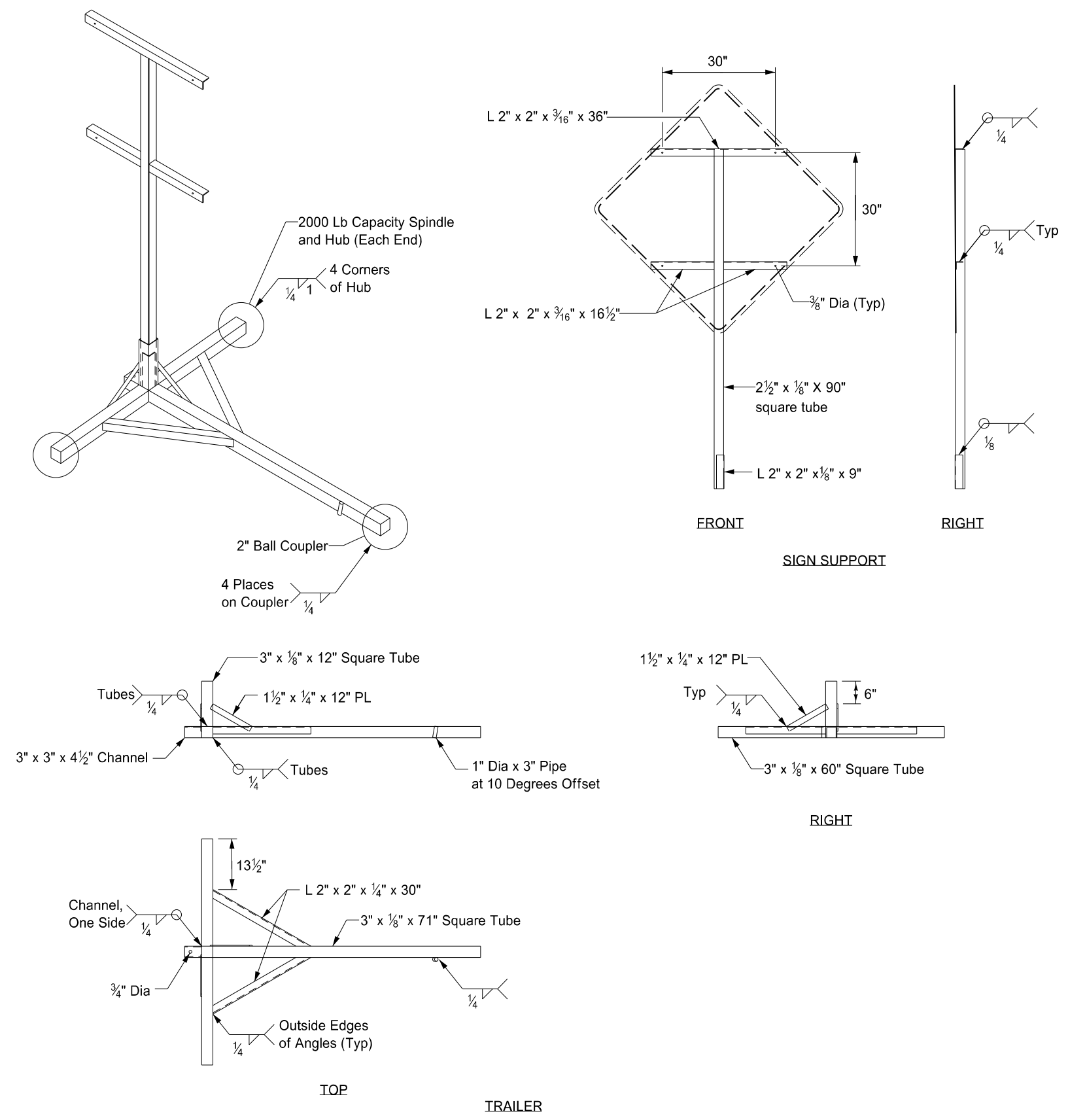
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-26-2012	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Clarified work zone

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

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

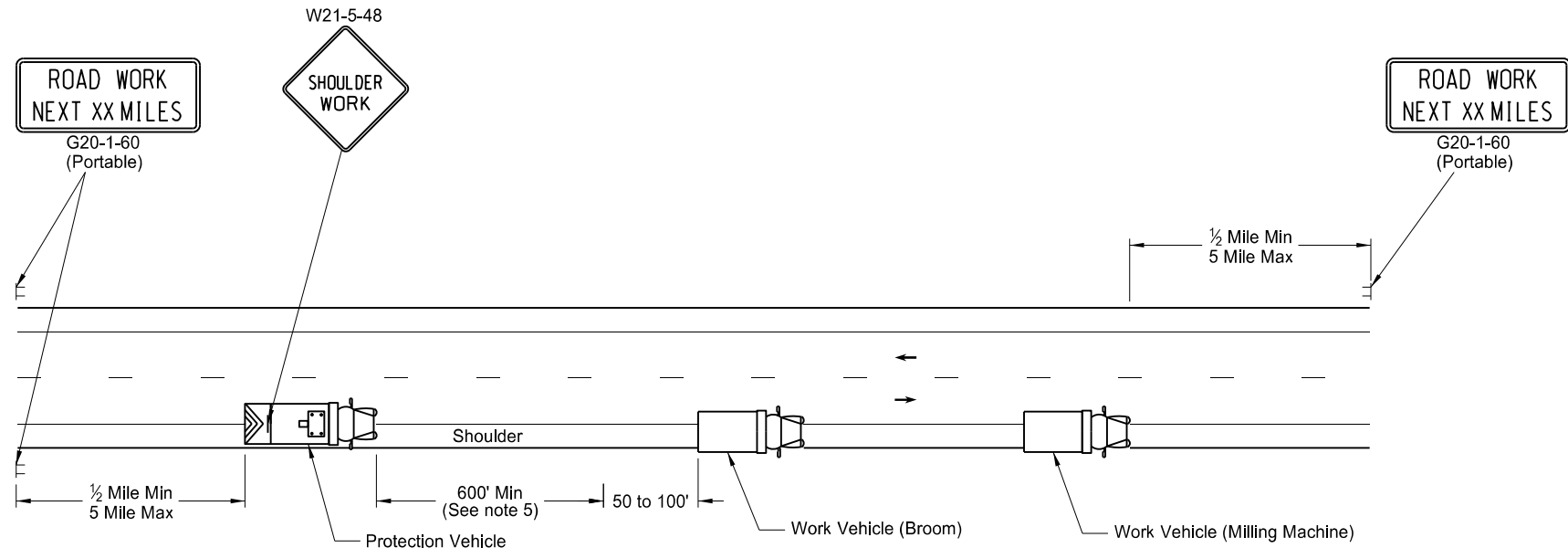


Notes:

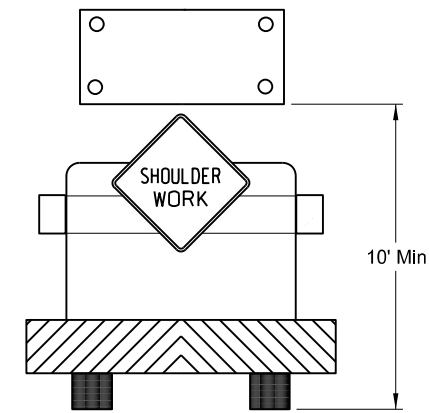
- ①. Maximum 250 pound weight of assembly.
- ②. Use a 14" wheel and tire.
- ③. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
- ④. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

MOBILE OPERATION
Grinding Shoulder Rumble Strips

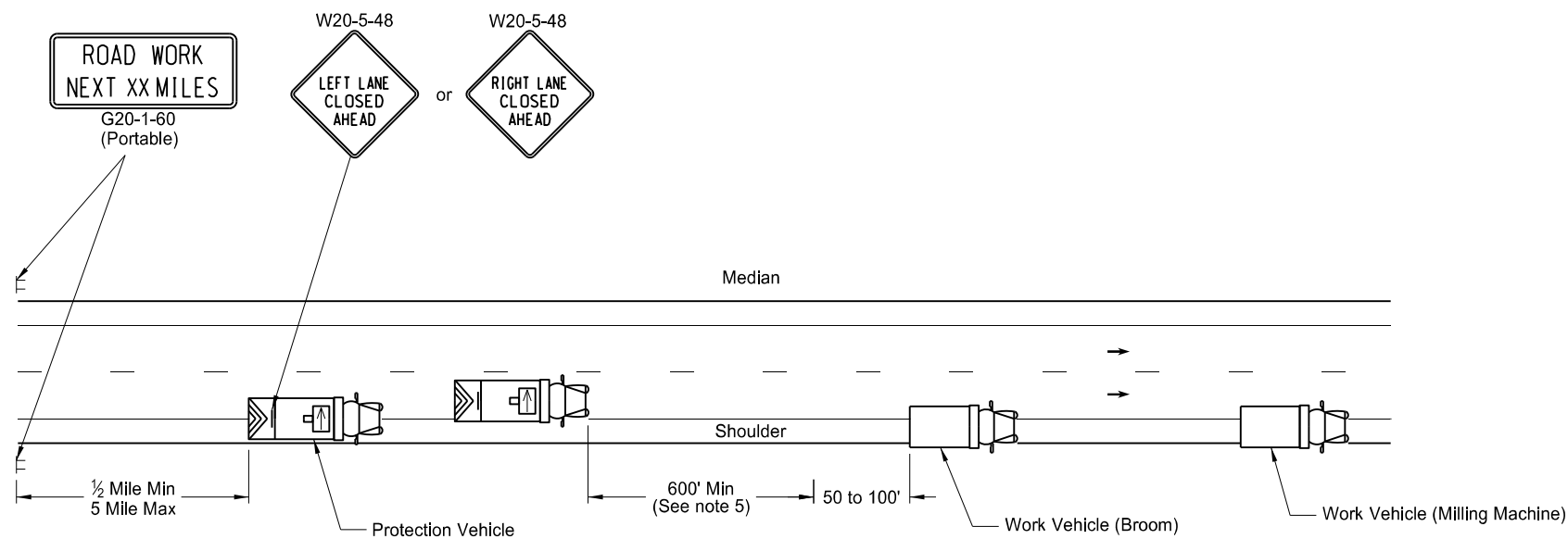


TWO LANE - TWO WAY ROADWAY

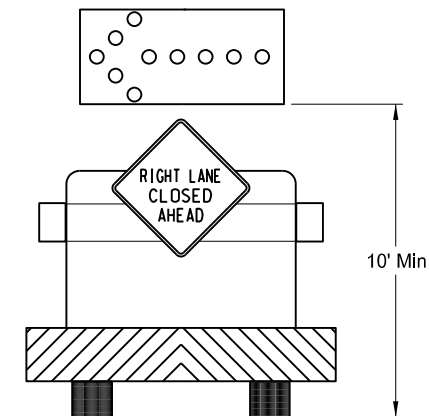


TWO LANE - TWO WAY ROADWAY
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

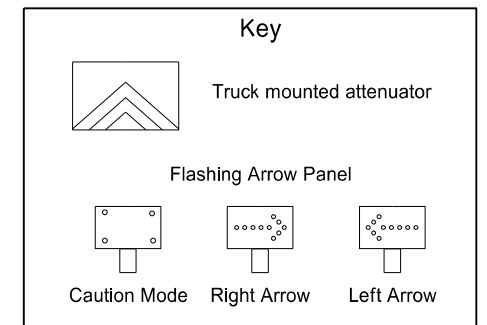
- Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
 2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
 3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
 4. Provide two - way electronic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



INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY
Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

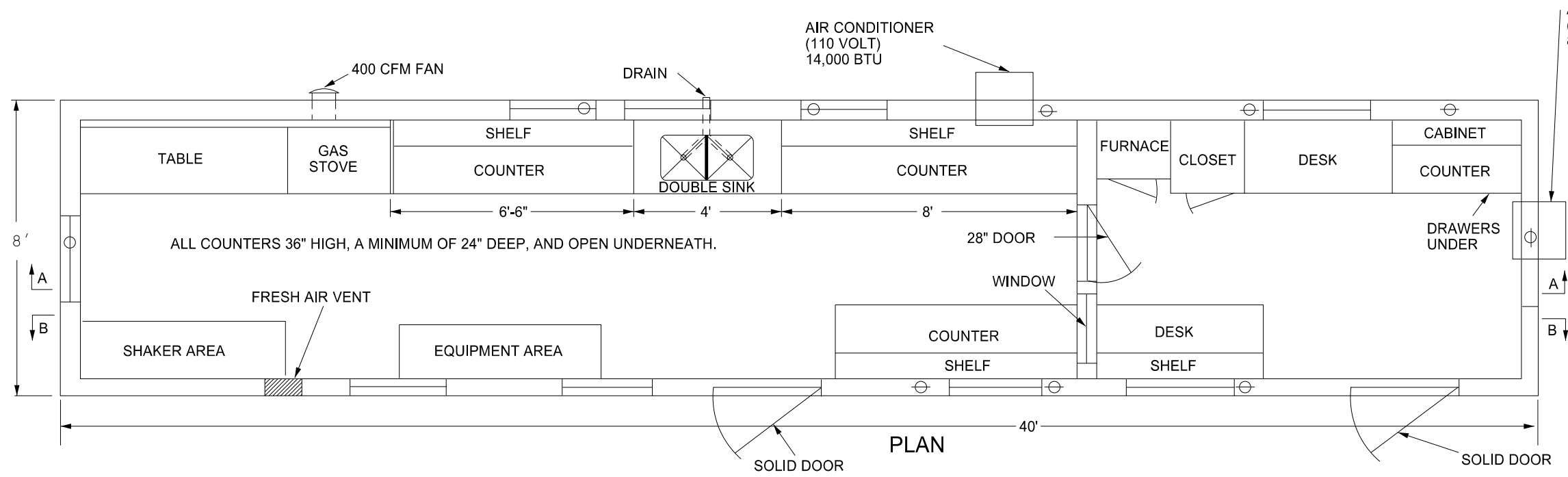


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

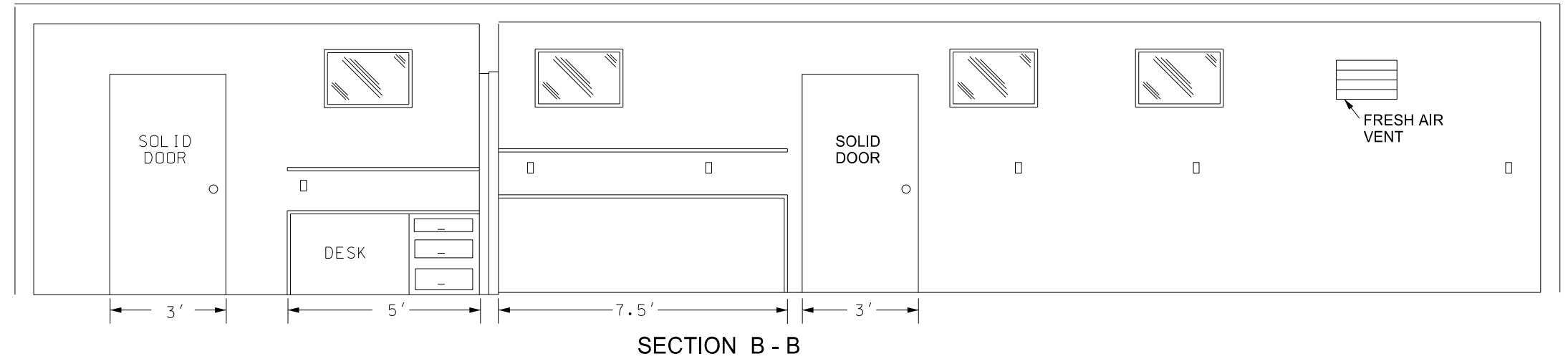
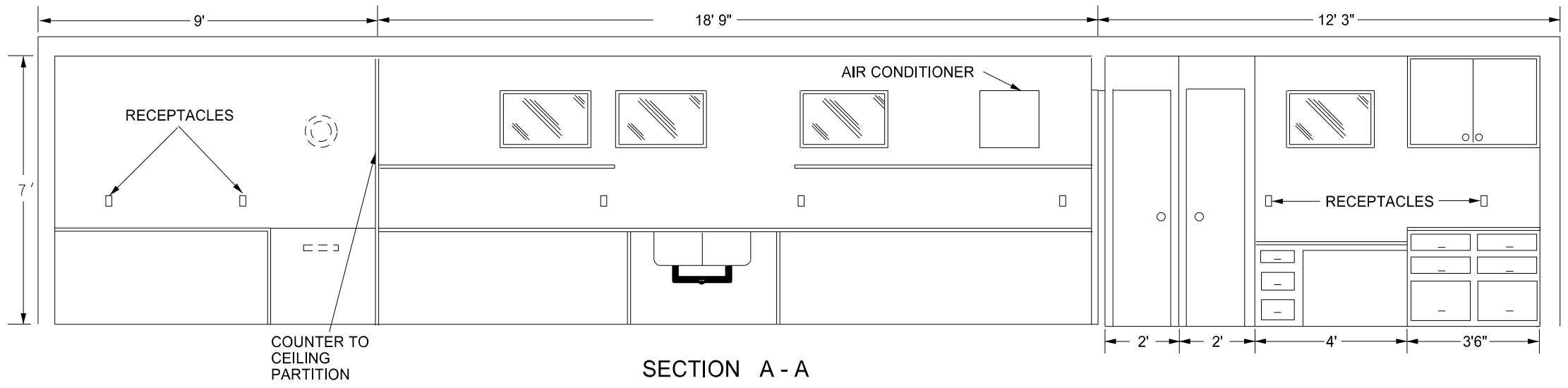
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 10/3/19 and the original document is stored at the
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BITUMINOUS LABORATORY

D-706-1



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



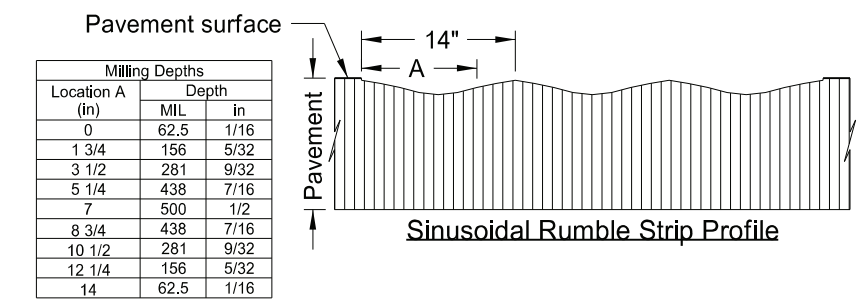
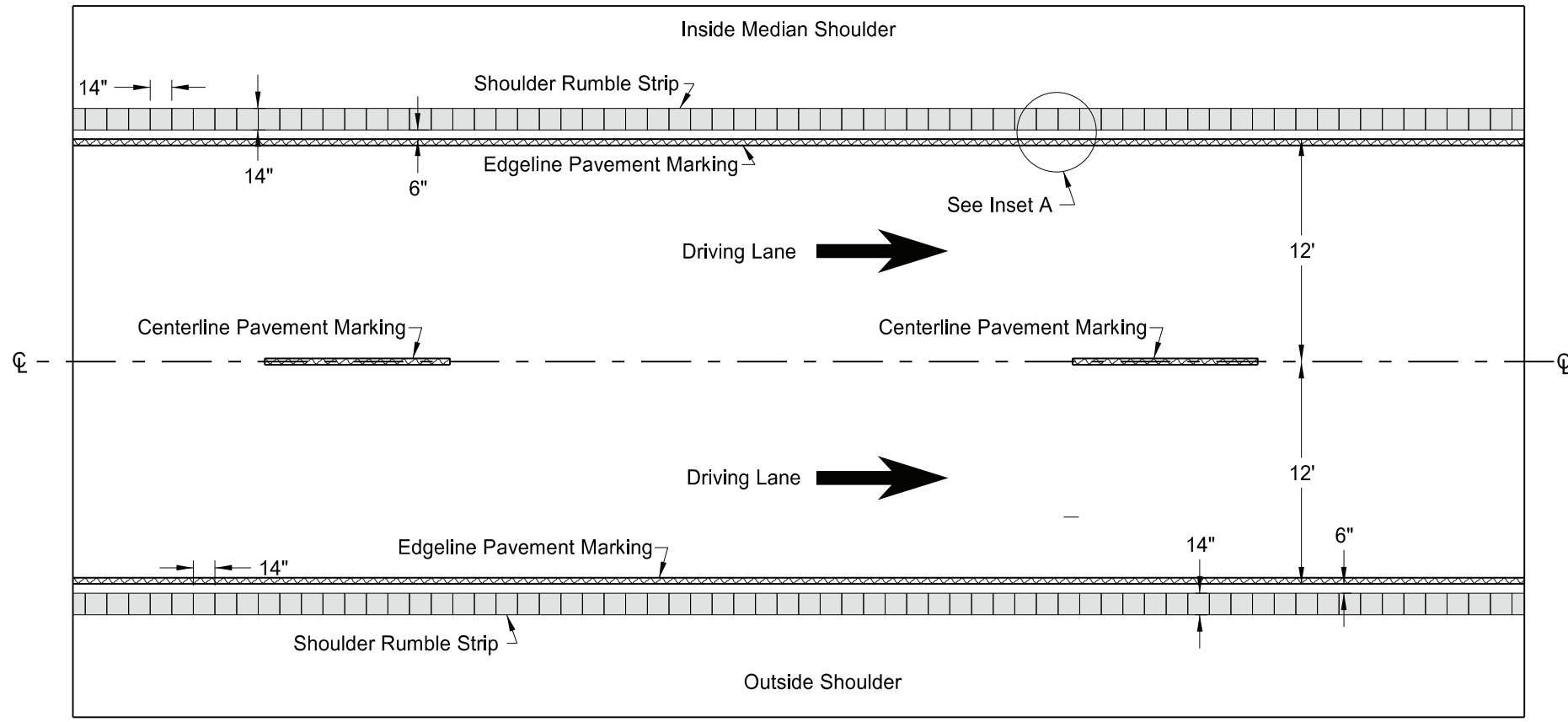
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

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

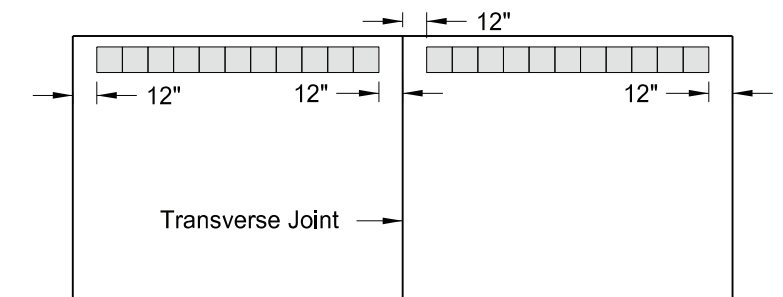
RUMBLE STRIPS
DIVIDED HIGHWAYS (NON-INTERSTATE)

NOTES:

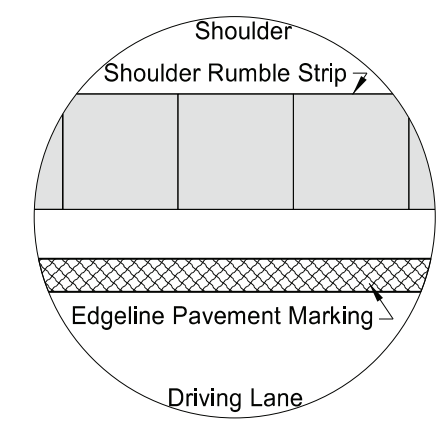
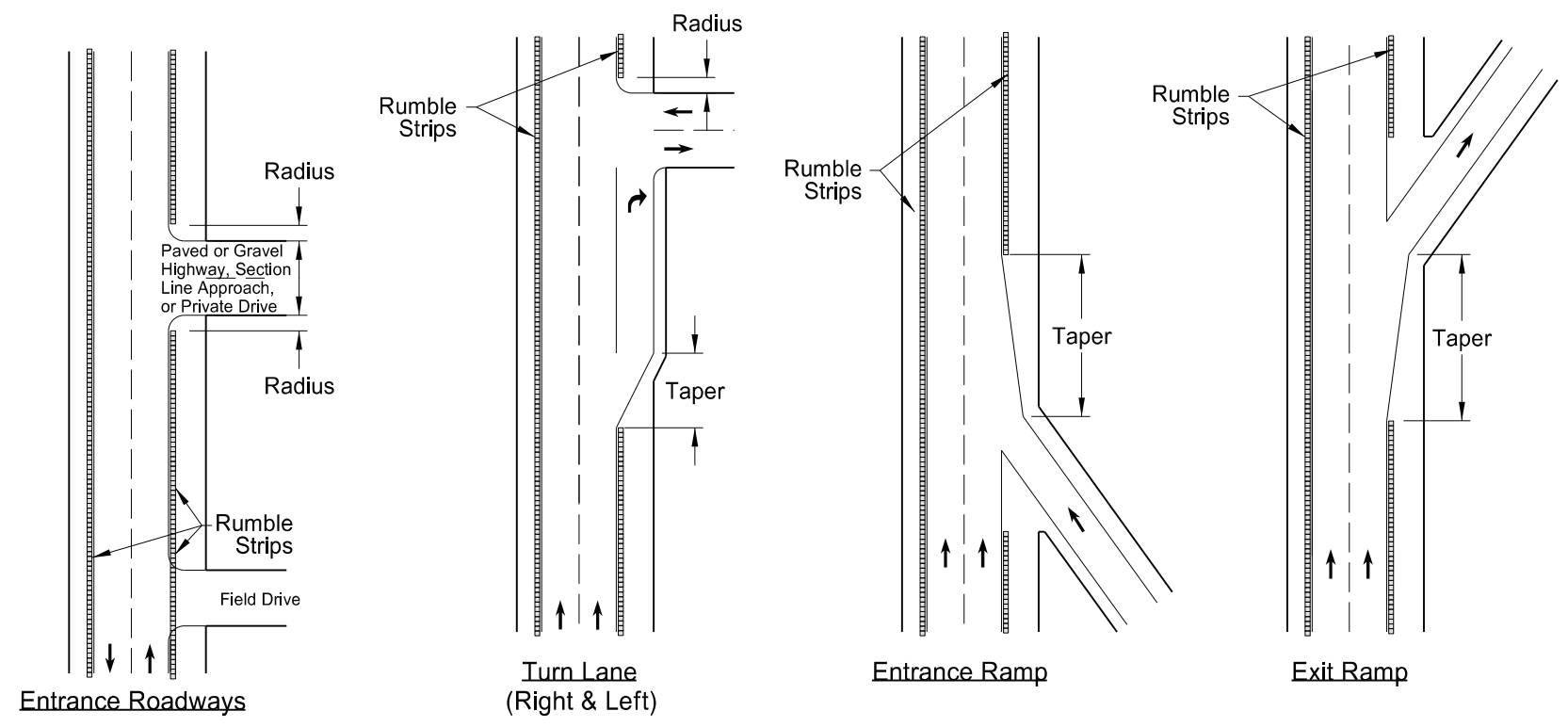
1) Discontinue rumble strips through the entire length of turn lanes and tapers, at ramps and tapers, and at the radius of paved or gravel highways, section line approaches, and private drives.



Divided Highways (Non-Interstate)



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



Inset A - Shoulder Rumble Strip
(Layout for opposite shoulder reversed)

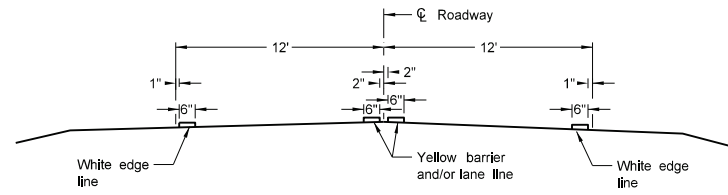
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
9-08-11	Revised Notes and D-760-2.
8-27-19	New Design Engr PE Stamp.
11-16-21	Added rumbles to end of taper.
5-26-23	Rumble strips made sinusoidal.



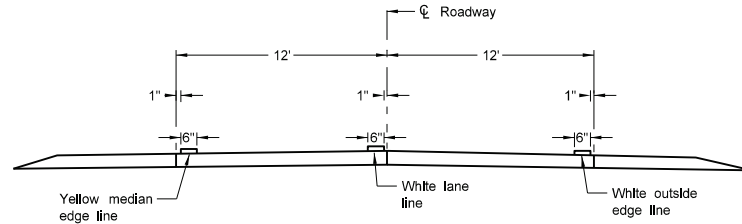
05/26/23

PAVEMENT MARKING

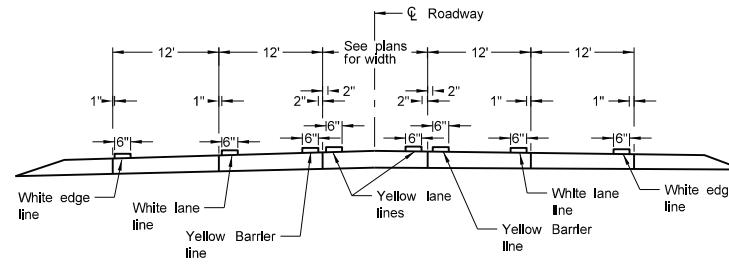
D-762-4



Two Lane Two Way
RURAL ROADWAY

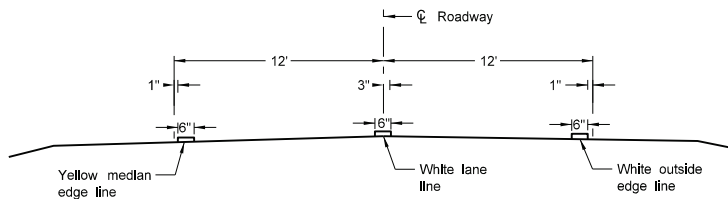


Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section

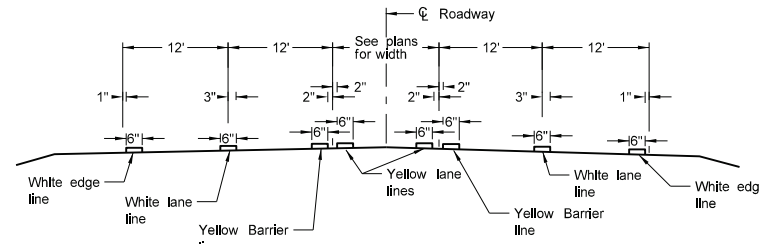


RURAL FIVE LANE ROADWAY
Concrete Section

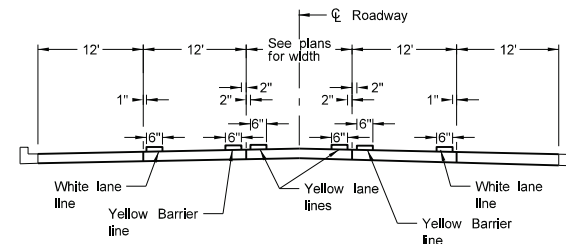
- NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
 2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
 3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.



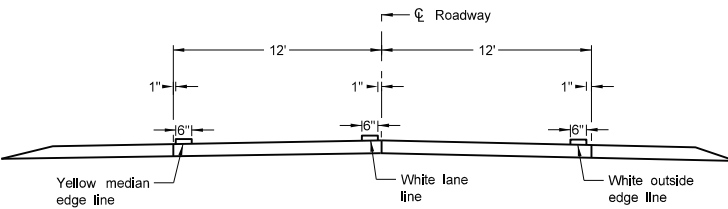
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



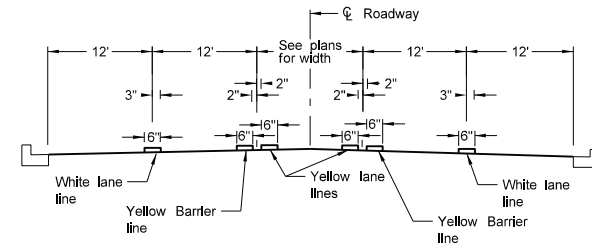
RURAL FIVE LANE ROADWAY
Asphalt Section



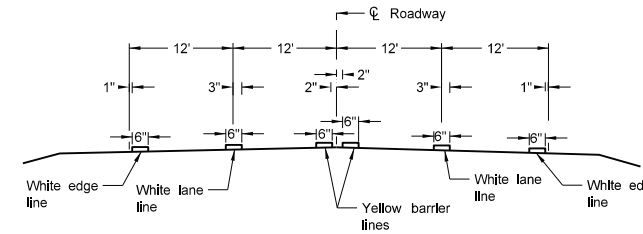
URBAN FIVE LANE SECTION
Concrete Section



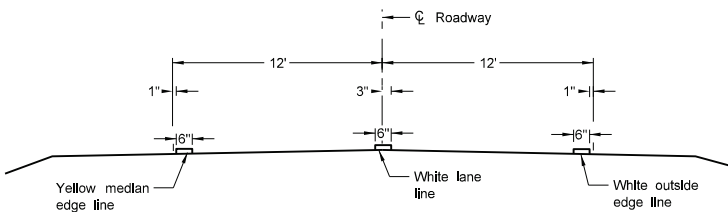
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



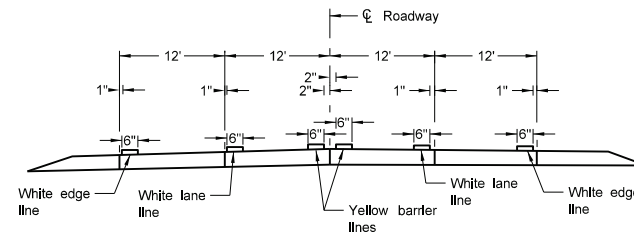
URBAN FIVE LANE SECTION
Asphalt Section



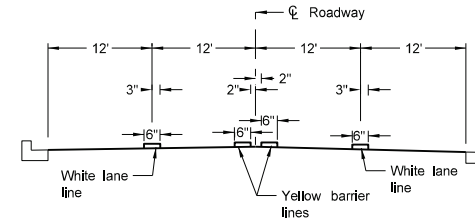
RURAL FOUR LANE ROADWAY
Asphalt Section



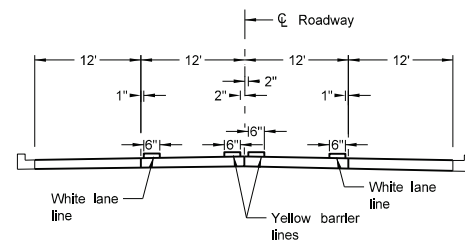
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



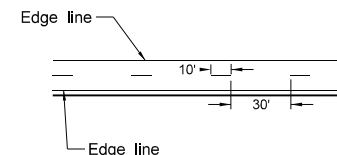
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



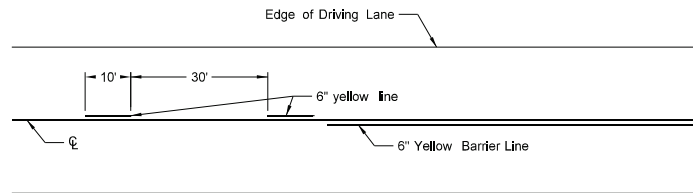
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.

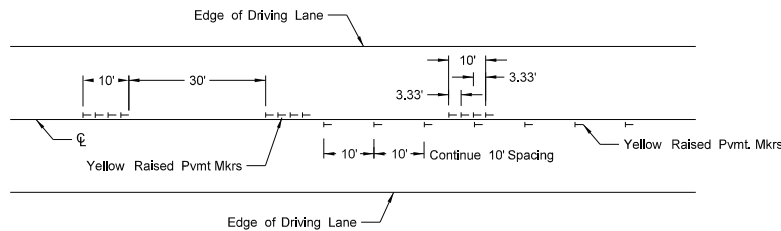


SHORT-TERM PAVEMENT MARKING

D-762-11

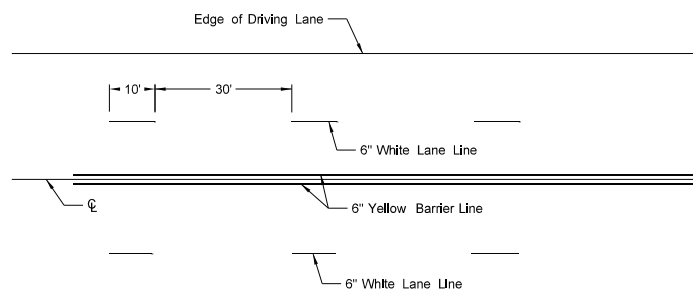


Painted or Tape Lines

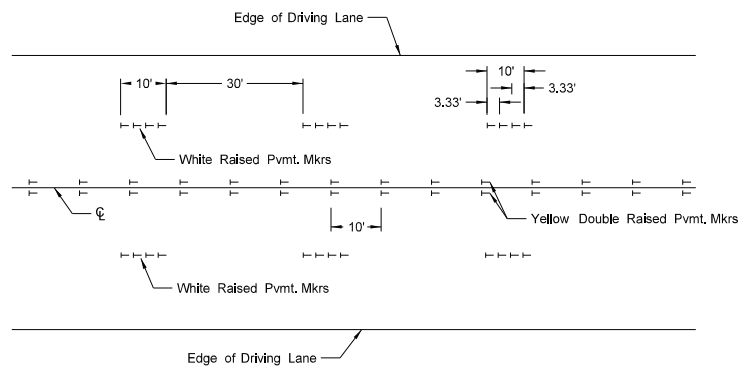


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

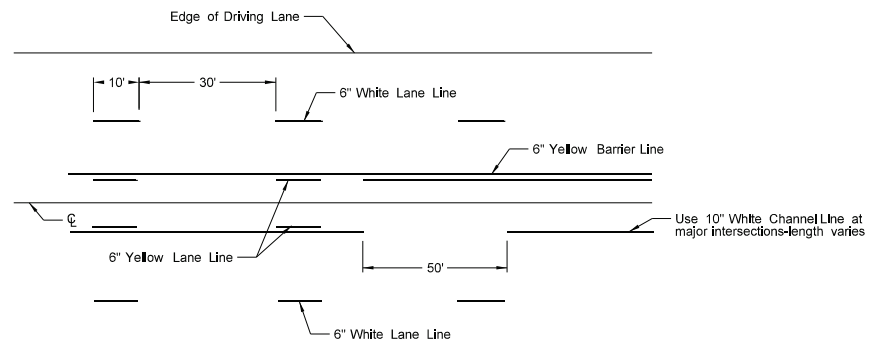


Painted or Tape Lines

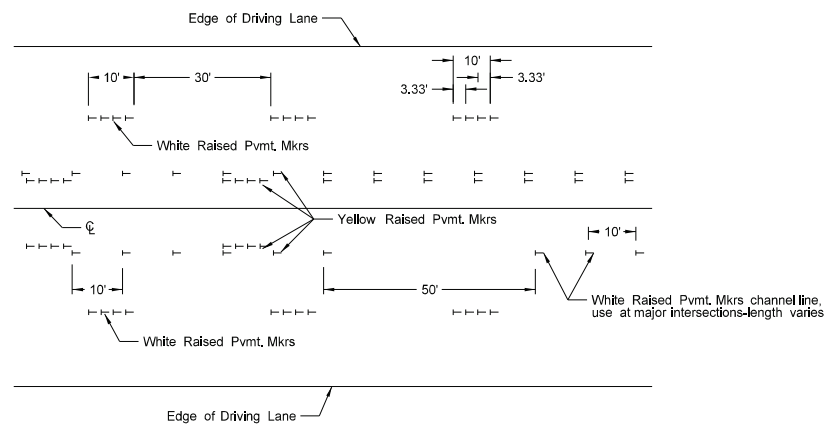


Raised Pavement Markers

FOUR LANE ROADWAY

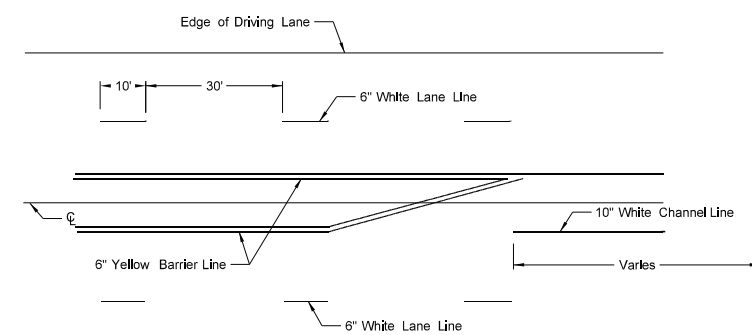


Painted or Tape Lines

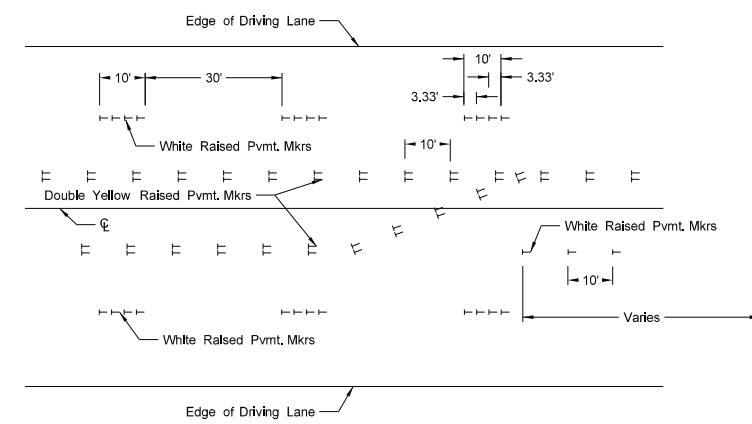


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 10 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths

