

RP 302.000 to RP 312.447 DESIGN DATA			
Traffic		Average Daily	
Current 2013	Pass: 1,055	Trucks: 250	Total: 1,305
Preventative Maintenance			
RP 312.447 to RP 313.257 DESIGN DATA			
Traffic		Average Daily	
Current 2013	Pass: 2,640	Trucks: 270	Total: 2,910
Preventative Maintenance			

JOB # 34 NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	18336	1	1

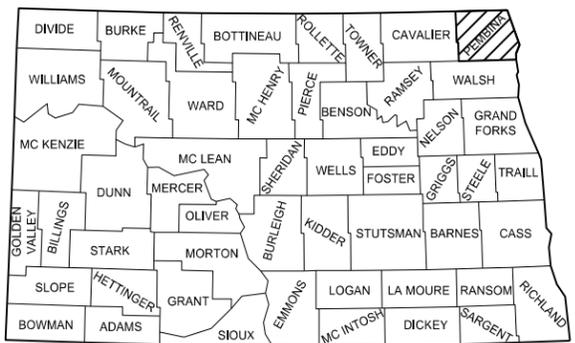
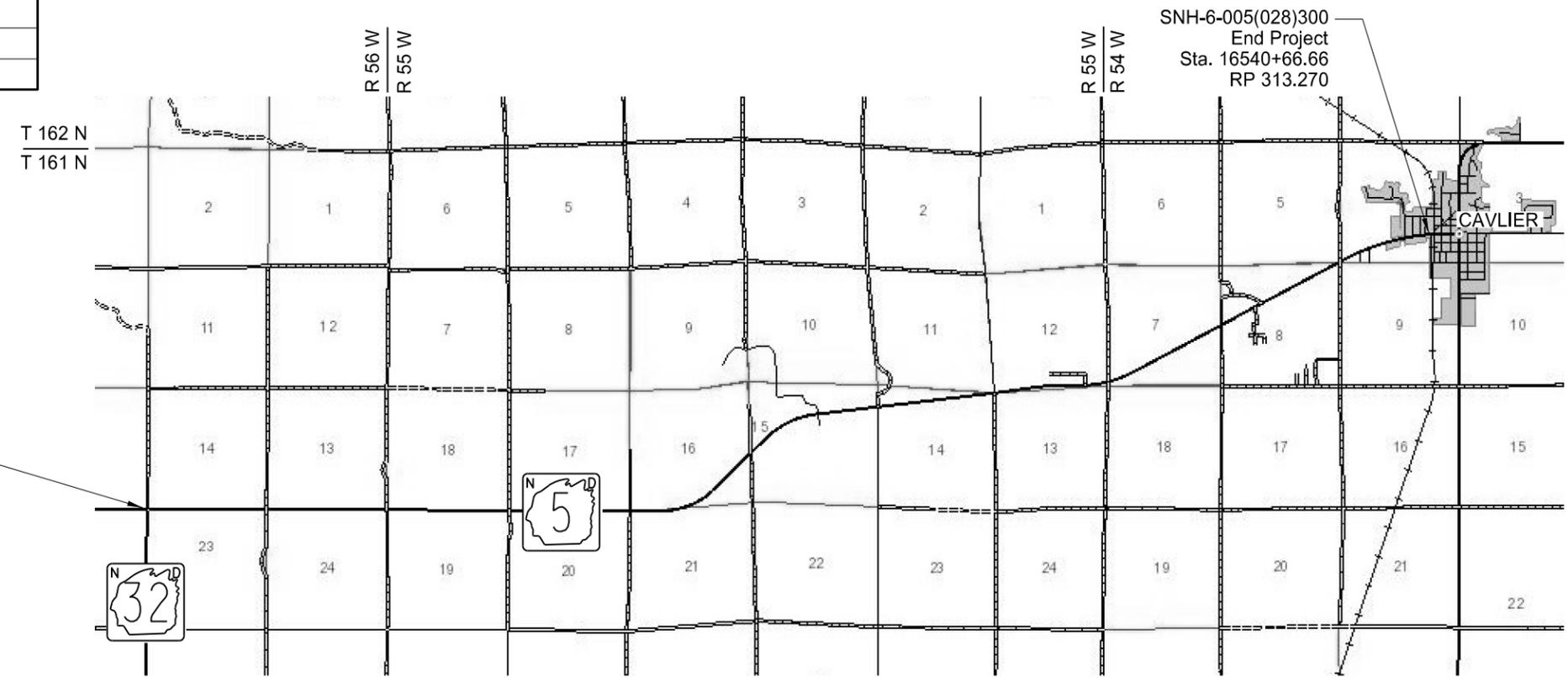
SNH-6-005(028)300
Pembina County
East Jct. ND 32 - E to Cavalier
RP 301.972 to RP 313.270
2" Mill and 2" Recycled HBP FAA 43 Overlay
ADA Pedestrian Ramps along Shared Use Path

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SNH-6-005(028)300	11.298	11.298



SNH-6-005(028)300
Begin Project
Sta. 15944+16.4
RP 301.972



STATE COUNTY MAP

DESIGNERS
Marc Mohagen /s/
Lee Westling /s/

APPROVED DATE 08/14/14

Edward Pavlish /s/
Grand Forks District
ND DEPARTMENT OF TRANSPORTATION

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

APPROVED DATE 8/14/14

Christopher K. Beggs /s/
Grand Forks District

This document was originally issued and sealed by Christopher K. Beggs Registration Number PE- 6240, on 08/14/14 and the original document is stored at the North Dakota Department of Transportation

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	2	1

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6	1-2	Notes
8	1	Quantities
10	1-2	Basis of Estimate
20	1-8	General Details
30	1-6	Typical Sections
100	1-2	Work Zone Traffic Control
120	1-3	Pavement Marking

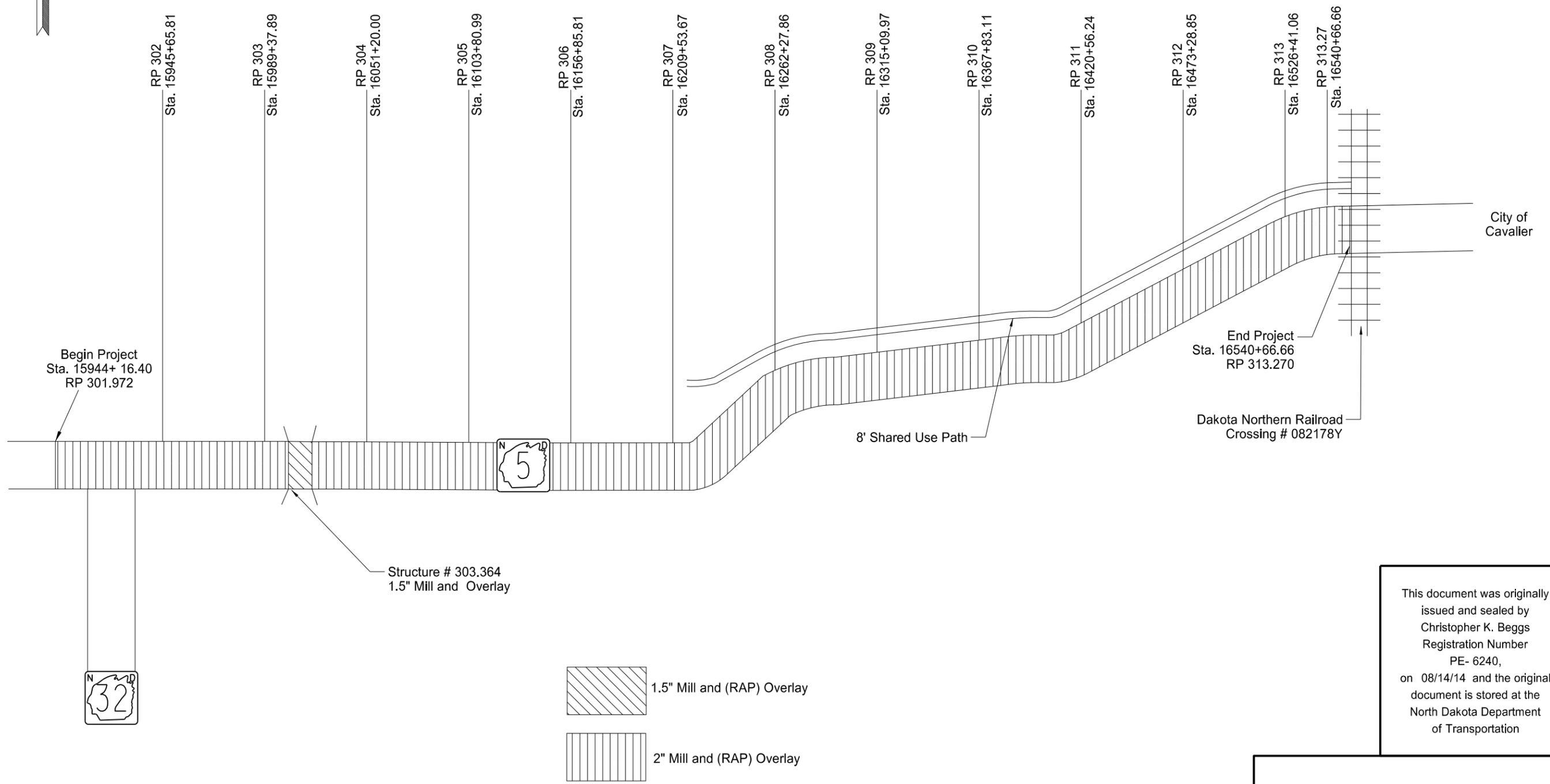
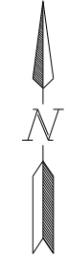
LIST OF STANDARD DRAWINGS

<u>Standard No.</u>	<u>Description</u>
D-101-01, 02, 03	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line-styles
D-101-30, 31, 32	Symbols
D-203-6	Standard 90 degree Flared Intersection
D-704-2	Traffic Control for Coring of Hot Bituminous Pavement
D-704-5	Contractor Sign Detail
D-704-7, 8	Breakaway Systems for Construction Zone Signs
D-704-9, 10, 11	Construction Sign Details
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	Traffic Control Plan for Moving Operations
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation (Grinding Shoulder Rumble Strips)
D-706-1	Bituminous Laboratory
D-750-2	Sidewalk
D-750-3	Curb Ramp Details
D-760-4	Rumble Strips Undivided Highways (Shoulders Less Than 4')
D-762-1	Pavement Marking Message Details
D-762-3	Pavement Marking for Standard 90 Degree Flared Intersection
D-762-4	Pavement Marking
D-762-6	Short-Term Pavement Marking

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ND	SNH-6-005(028)300	4	1

Scope of Work

- (1) - 2" Mill and 2" Recycled HBP-Superpave FAA 43 Overlay.
 - (2) - ADA Pedestrian Ramps along the Shared Use Path, within ND 5 Right of Way
- Note: ADA Details and Locations are in Sect. 20 Sheet 9.



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Scope of Work

* NOTE: Drawing not to scale

NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	6	1

107-115 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses Dakota Northern Railroad at RP 313.270 (ND 5). The type of work that will be performed within the railroad right of way is 2.0" HBP mill and 2.0" Recycled HBP Overlay. Inquiries for protective liability insurance should be directed to:

DN Engineering Department
 Dakota Northern Railroad
 P.O. Box 705
 Crookston, MN 56716
 218-281-4704
 mntrack@rrv.net

Information on crossing number #082178Y may be obtained from the Federal Railroad Administration web site: <http://safetydata.fra.dot.gov/Officeofsafety/>.

107-P01 HAUL ROAD RESTRICTIONS: The contractor shall contact the appropriate State, County, Township, City or Political Subdivision official(s) to determine if the proposed haul road has local load restrictions or is designated as a "No Haul Route" prior to preparing a bid for this project. Paved roads off the state system will not be designated as haul roads by the NDDOT. If the contractor chooses to use a paved road off the state system for this project, the contractor shall be responsible for all costs of the inspection, maintenance, restoration, and release of the haul road. The entire haul cycle, loaded and empty, will be considered for haul routes.

302-P01 SALVAGED BASE COURSE: Approximately 300 tons of Salvaged Base have been provided for in the plans for filling in around approach radii or if there are areas where the shoulders are steeper than 4:1. Millings will be allowed as a substitute for salvage base with a maximum particle size of 1.5". All costs associated with hauling, placing, spreading, and compacting shall be included in the price bid for "Salvaged Base Course".

401-P01 FOG COAT: The final lift of pavement shall receive a fog seal with a SS1H or CSS1H emulsified asphalt. MS 1 shall not be used as a fog seal unless approved by the Project Engineer. After final rolling, the fog seal shall be applied to pavement with a minimum mat temperature of 125 degrees F. Blotter sand may be necessary to correct an over application of emulsion. The blotter material shall be applied with equipment as specified in section 154.02 C of the Standard Specifications or as approved by the Engineer. All costs for providing and placing the blotter sand shall be paid for under the PS-1 Schedule.

411-P01 MILLED MATERIAL: All remaining milled material from this project SNH-6-005(028)300 not used for the production of recycled hot bituminous pavement shall become the property of the contractor and must be disposed of off state highway right-of-way at a location approved by the Engineer.

411-P02 MILLED SECTIONS: At the beginning and end of the milling sections, the existing bituminous material shall be removed to form a straight vertical edge to allow placement of the full depth of surfacing. All material removed in these operations shall become the property of the contractor and shall be disposed of off the right-of-way.

411-P03 TEMPORARY ASPHALT WEDGES: The contractor shall place temporary asphalt wedges at the beginning and ends of this project, RR crossings, ends of milled sections, and intersecting routes to allow smooth passage of vehicles at these milled locations. Asphalt wedges shall be placed at these milled areas prior to the traffic being allowed back on the milled roadway section. All costs associated with labor, materials, and equipment for the installation, maintenance and removal of the asphalt wedges shall be included in the price bid for "MILLING PAVEMENT SURFACE".

430-P01 RECYCLED ASPHALT PAVEMENT – SUPERPAVE FAA 43: During mix production, the virgin aggregate shall meet the physical property requirements as determined from the mix design. The Initial Control Points for Superpave Aggregate may be waived.

The mix design for mainline paving containing virgin and RAP material shall meet the requirements of Section 430 of the Standard Specifications.

RAP shall be introduced into the drum and combined with the virgin aggregate so that RAP does not come into direct contact with the burner flame. Asphalt binder shall be added to the mixture in the drum after the virgin aggregate and RAP have been combined.

The contractor shall supply a 165 lb. sample of RAP milled from the above referenced project(s) in addition to the virgin aggregate and liquid asphalt required in Section 430 for mix design verification purposes. The samples shall be submitted to the Grand Forks District.

430-P02 CONTRACTOR DEVELOPED MIX DESIGN: The contractor shall submit the Final Superpave Volumetric Mix Design. A mix design shall be submitted utilizing the RAP listed in note 430-P02. The aggregate source and bitumen target percentage shall be shown on the mix design.

If the contractor is producing for NDDOT, a mix of equivalent or higher quality than what is shown in the plans, the contractor may propose it for use on this project. The Project Engineer will consider the use of equivalent or higher quality mix on this project. There will be no adjustment in bid price for this substitution if accepted.

The mix designs shall be submitted for approval 10 calendar days before the material is used.

430-P03 AGGREGATE AND MIX DESIGN PROPERTIES: The aggregate blend and properties shall meet the requirements outlined in Section 430 Hot Mix Asphalt. The following aggregate and mix design properties are required:

Test	Criteria	Reference
Gyratory Effort, # Gyration	$N_{ini}=7, N_{des}=75, N_{max}=115$	AASHTO R 35

430-P04 AGGREGATE SAMPLING DEVICE: The Contractor shall provide an aggregate sampling device that can be safely operated by the Contractor and is capable of obtaining a representative sample of the combined aggregate from a flowing aggregate stream in accordance with the requirements of AASHTO T 2, NDDOT Modified prior to entering the dryer drum or drum mixer and without stopping plant production.

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NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	6	2

704-P01 TRAFFIC CONTROL FOR BITUMINOUS SURFACING: Traffic control shall consist of a temporary road closure, flagging, and a pilot car. Traffic Control Devices shall comply with the following Standard Drawings:

- 1) Standard D-704-15, layout A: For temporary roadway closure during paving operations.
- 2) Standard D-704-20, layout G: For construction signing during paving operations. Sign G20-1b-60 will not be required. Signs R2-1-48 and R2-1a-24 are to be moved as the work area moves through the construction zone and should be placed a minimum of 500 ft in advance of flagging signs. Signing will be required at South Junction of ND 32, North and South Junctions of County Rd. 12, Icelandic State Park entrance, and Beginning and End of Project.
- 3) Standard D-704-22, layouts K and L: For trucks hauling material.
- 4) Standard D-704-26, layouts CC, EE, and GG: For paving operations.
- 5) Standard D-704-27: For moving operations on conventional highways.
- 6) Standard Drawings D-704-2, 5, 7, 8, 9, 10, 11, 13, 14 and 50 are applicable.
- 7) Standard D-704-56: Mobile Operation (Grinding Shoulder Rumble Strips)
Quantities have been developed based on a 6 mile limitation for the paving and milling operations. Additional devices required to accommodate the Contractor's operation shall be the Contractor's responsibility.

704-P02 SHARED USE PATH & SIDEWALK CLOSURES: Quantities have been included for signing for closures that will be required at ADA curb ramp construction locations. Layouts for the closures have not been included in the plans. Layouts for the closures shall be based on Section 6F.14 of the MUTCD and will be required during ADA/sidewalk construction. Sign R9-9-24 (SIDEWALK CLOSED) shall be placed on a Type III Barricade, and put on both sides of each proposed ADA location during installation until all work on ADA's is completed. All work must be completed in 5 calendar days, or the contractor will be required to provide an alternate route of travel other than the shared use path.

750-P01 MIX DESIGN (SIDEWALK): The Contractor shall submit a concrete class AE-3 mix design for all of the sidewalk concrete required for this project. The mix design shall be submitted a minimum of 7 working days prior to concrete placement for approval.

The mix designs shall include the following:

- a. A list of all ingredients
- b. The source of all materials
- c. Gradation of the aggregates
- d. The absorption of the aggregates
- e. The SSD bulk specific gravity of the aggregates
- f. The specific gravity of the pozzolan
- g. Results of 7 day compressive strength tests
- h. Water/Cement Ratio
- i. Mixture Proportions:
 1. Water - lb/CY
 2. Cement - lb/CY
 3. Fly ash - lb/CY
 4. Coarse Aggregate - lb/CY
 5. Intermediate Aggregate - lb/CY
 6. Fine Aggregate - lb/CY
 7. Air content %
 8. Air-entraining admixture - fl oz.
 9. Water-reducing admixture - fl oz.

750-P02 SIDEWALK CONCRETE: Sidewalk concrete is for the installation of ADA ramps at the locations shown on the plans. The ramps shall be constructed as per detail layouts as per Section 20 Sheet No. 9. All sidewalk replacement areas shall have a #3 deformed reinforcing bar placed 24" on center longitudinally and 18" on center transversely. The bar shall be six (6) inches shorter than the width of the slab and placed accurately at one-half the depth of the slab. Plastic chairs will be used. At sidewalk replacement areas, the Contractor shall excavate material to accommodate the proposed aggregate base, strip and salvage the existing topsoil, dispose of excess excavation. The cost of labor, equipment and materials to perform the above referenced work shall be included in the price bid for "Sidewalk Concrete."

762-P01 PAVEMENT MARKING: Pavement markings will not be measured for payment unless changes are made in the field. Payment for pavement markings will be at plan quantity.

970-P01 LANDSCAPE PREPARATION: An estimated area of approximately 29 SY has been delineated as "Landscape Preparation" around the ADA ramps. All costs associated with labor, equipment and materials to perform the following work will be included in the price bid for "Landscape Preparation".

1. Removal of topsoil and earth necessary for placement of new concrete and base material
2. Backfilling of topsoil around new concrete and grading of existing ground to blend into newly constructed curb ramps prior to seeding
3. Seeding Class II seed & mulch in accordance with Section 251.03 of the Standard Specifications.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	1	1
107	0100 RAILWAY PROTECTION INSURANCE	L SUM	1	1
202	0132 REMOVAL OF BITUMINOUS SURFACING	SY	58	58
202	0153 SAW BITUMINOUS SURFACING-FULL DEPTH	LF	256	256
302	0100 SALVAGED BASE COURSE	TON	312	312
401	0050 TACK COAT	GAL	10,576	10,576
401	0070 FOG SEAL	GAL	8,389	8,389
411	0105 MILLING PAVEMENT SURFACE	SY	202,366	202,366
430	0143 RAP - SUPERPAVE FAA 43	TON	22,644	22,644
430	1000 CORED SAMPLE	EA	72	72
430	5828 PG 58-28 ASPHALT CEMENT	TON	1,109	1,109
702	0100 MOBILIZATION	L SUM	1	1
704	0100 FLAGGING	MHR	390	390
704	1000 TRAFFIC CONTROL SIGNS	UNIT	2,380	2,380
704	1052 TYPE III BARRICADE	EA	32	32
704	1067 TUBULAR MARKERS	EA	240	240
704	1185 PILOT CAR	HR	195	195
706	0550 BITUMINOUS LABORATORY	EA	1	1
706	0600 CONTRACTOR'S LABORATORY	EA	1	1
750	0100 SIDEWALK CONCRETE	SY	58	58
750	2115 DETECTABLE WARNING PANELS	SF	256	256
760	0005 RUMBLE STRIPS - ASPHALT SHOULDER	MILE	19.726	19.726
760	0007 RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	9.435	9.435
762	0103 PVMT MK PAINTED-MESSAGE	SF	516.5	516.5
762	0430 SHORT TERM 4IN LINE-TYPE NR	LF	95,532	95,532
762	0434 SHORT TERM 8IN LINE-TYPE NR	LF	1,392	1,392
762	1104 PVMT MK PAINTED 4IN LINE	LF	150,826	150,826
762	1108 PVMT MK PAINTED 8IN LINE	LF	1,392	1,392
762	1124 PVMT MK PAINTED 24IN LINE	LF	63	63
970	0008 LANDSCAPE PREPARATION	SY	29	29

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	10	1

Surfacing/ Milling Quantities			
Description	Unit	Width (ft.)	Unit/Mile
Typical Section 1: Total Length= 10.106 Miles			
Super-pave FAA 43 (RAP) <i>(4.957 SF x 5280 ft. / Mi. x 2 Ton/CY / 27 CF/CY = 1,939 Ton/Mi.)</i>	Ton	28'	1,939
PG 58-28 Asphalt Cement @ 4.9% <i>(1,939 Tons/Mi. x 0.049 = 95 Tons/Mi.)</i>	Ton		95
Tack Coat @ 0.05 gal/SY <i>(31 FT x 5280' / 9 x .05 Gal/SY = 909 Gal/Mi.)</i>	Gal	31'	909
Fog Coat @ 0.05 gal/SY <i>(24 FT x 5280' / 9 x .05 Gal/SY = 704 Gal/Mi.)</i>	Gal	24'	704
Milling Pavement Surface Quantities <i>(29.5 FT x 5280 ft. /Mi. / 9 SF/SY = 17,307 SY/Mi.)</i>	SY	29.5'	17,307
Typical Section 2: Total Length= .50 Miles			
Super-pave FAA 43 (RAP) <i>(4.856 SF x 5280 ft. / Mi. x 2 Ton/CY / 27 CF/CY = 1,899 Ton/Mi.)</i>	Ton	30'	1,899
PG 58-28 Asphalt Cement @ 4.9% <i>(1,899 Tons/Mi. x 0.049 = 93 Tons/Mi.)</i>	Ton		93
Tack Coat @ 0.05 gal/SY <i>(30 FT x 5280' / 9 x .05 Gal/SY = 880 Gal/Mi.)</i>	Gal	30'	880
Fog Coat @ 0.05 gal/SY <i>(24 FT x 5280' / 9 x .05 Gal/SY = 704 Gal/Mi.)</i>	Gal	24'	704
Milling Pavement Surface Quantities <i>(28.5 FT x 5280 ft. /Mi. / 9 SF/SY = 16,720 SY/Mi.)</i>	SY	28.5'	16,720
Typical Section 3: Total Length= .274 Miles			
Super-pave FAA 43 (RAP) <i>(4.430 SF x 5280 ft. / Mi. x 2 Ton/CY / 27 CF/CY = 1,733 Ton/Mi.)</i>	Ton	27.5'	1,733
PG 58-28 Asphalt Cement @ 4.9% <i>(1,733 Tons/Mi. x 0.049 = 85 Tons/Mi.)</i>	Ton		85
Tack Coat @ 0.05 gal/SY <i>(27.5 FT x 5280' / 9 x .05 Gal/SY = 807 Gal/Mi.)</i>	Gal	27.5'	807
Fog Coat @ 0.05 gal/SY <i>(24 FT x 5280' / 9 x .05 Gal/SY = 704 Gal/Mi.)</i>	Gal	24'	704
Milling Pavement Surface Quantities <i>(27.5 FT x 5280 ft. /Mi. / 9 SF/SY = 16,133 SY/Mi.)</i>	SY	27.5'	16,133

Additional Surfacing Quantities		
Description	Basis	Quantity
Jct. County Road 12		
HBP Recycled Super-pave FAA 43	Section 20 Sheet 6	17 T
PG 58-28 Asphalt Cement @ 4.9%		1 T
Tack Coat @ .05 Gal/SY		8 Gal
Fog Coat @ .05 Gal/SY		8 Gal
Milling (Based on computed Area)		149 SY
East Jct. of ND32 and ND5		
HBP Recycled Super-pave FAA 43	Section 20 Sheet 7	107 T
PG 58-28 Asphalt Cement @ 4.9%		5 T
Tack Coat @ .05 Gal/SY		48 Gal
Fog Coat @ .05 Gal/SY		48 Gal
Milling (Based on computed Area)		957 SY
Turn Lanes at Icelandic State Park (Typical Section 4)		
HBP Recycled Super-pave FAA 43	Section 20 Sheets 4 & 5	1,500 T
PG 58-28 Asphalt Cement @ 4.9%		73 T
Tack Coat @ .05 Gal/SY		673 Gal
Fog Coat @ .05 Gal/SY		673 Gal
Milling (Based on computed Area)		13,475 SY

Estimated Rap Quantities			
Millings (RAP) Available	Milled Area (SF)	Length (Mi.)	Tons (2 Tons/CY)
Typical Section 1	4.709	10.106	18,613
Typical Section 2	4.586	0.5	897
Typical Section 3	4.43	0.274	475
Typical Section 4 quantities based on Square Yards (13,475 SY)			1,500
Junction of County Road 12 (149 SY)			17
Junction of ND 32 (957 SY)			107
*Total Millings Available= 21,609 Tons (19,448 after 10% loss)			19,448
Milling (RAP) required for production of Recycled HBP			5,655
22,621 tons HBP @ 25% RAP = 5,655 tons RAP			
Millings (RAP) to become property of the Contractor			13,793

*Estimated quantity allows for 10% losses

Typical Section Locations & Exceptions				
Typical Section	Begin RP	End RP	Length (Miles)	Description
1	302	306.256	4.256	Tangent
2	306.256	306.756	0.5	Curve
1	306.756	307.374	0.618	Tangent
3	307.374	307.648	0.274	Curve
4	307.648	308.038	0.39	Tangent
1	308.038	313.27	5.232	Tangent
Total Length =			11.27	

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BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	10	2

<u>Pavement Marking Painted 4-In Line</u>		
Location	Basis	Quantity
Centerline Skips 1,320 LF/mile (10' line, 30' Skip)		
Centerline	RP 302.000 to RP 307.641	7,446 LF
	RP 308.038 to RP 312.425	5,791 LF
Edge Lines 10,560 LF/mile		
Edge Line	RP 302.000 to RP 307.641	59,569 LF
	RP 308.038 to RP 313.270	55,250 LF
4" Yellow Double Barrier Line 10,560 LF/Mile		
Centerline	RP 312.425 to RP 313.270	8,923 LF
4" Yellow Single Barrier Line		
Centerline	RP 302.000 to RP 302.186	982 LF
	RP 308.271 to RP 308.472	1,061 LF
	RP 309.240 to RP 309.466	1,193 LF
Total Yellow Pavement Marking =		31,844 LF
Total White Pavement Marking =		118,982 LF
<u>Additional Paint Quantities</u>		
1- BNSF Rail Road Crossing Message (EB Lane) Crossing # 082178Y Standard Drawing D-762-1		
RR Cross and 2- R's = (60.5 SF)		60.5 SF
3- Bands (12' lane) = (72 SF)		72 SF
Total Message=		132.5 SF
24" White Stop line (3 @ 21LF), 2 @ RP 307.844 and 1 @ RP 301.986		63 LF
<u>Additional Paint Quantities (Turn Lanes at Icelandic State Park)</u> <u>(Typical Section 4)</u>		
Description	Basis	Quantity
4" White Edge Line	Sect. 120 Sheet 1-3	4,163 LF
4" Yellow Double Barrier	Sect. 120 Sheet 1-3	6,448 LF
8" White Channel Line	Sect. 120 Sheet 1-3	1,392 LF
Continental Crosswalk	Sect. 120 Sheet 1-3	192 SF
Right Arrows (6) @ 16 SF	Sect. 120 Sheet 1-3	96 SF
Left Arrows (6) @ 16 SF	Sect. 120 Sheet 1-3	96 SF

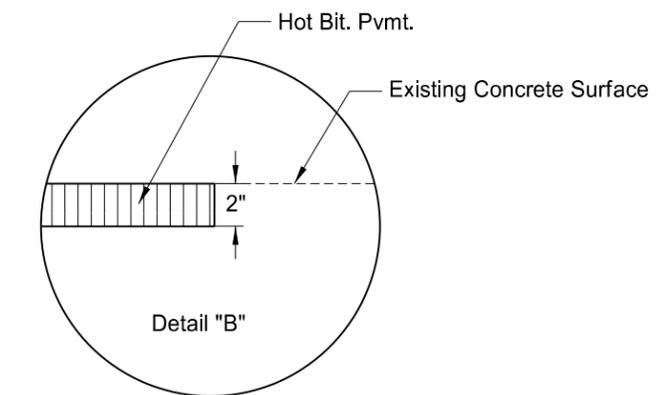
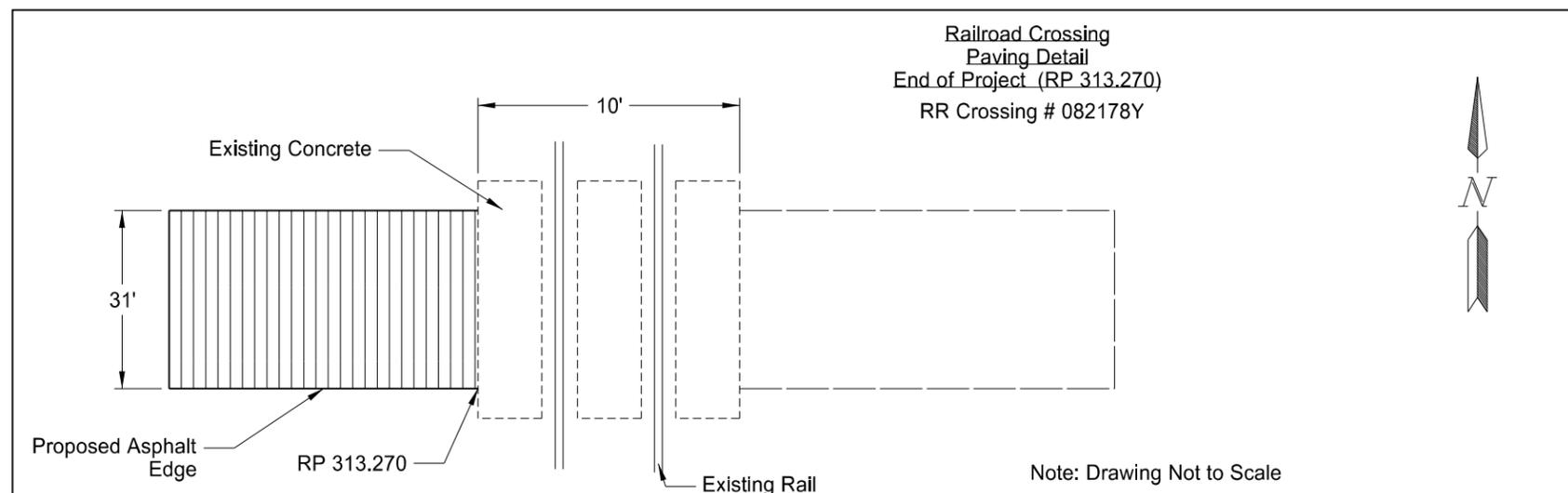
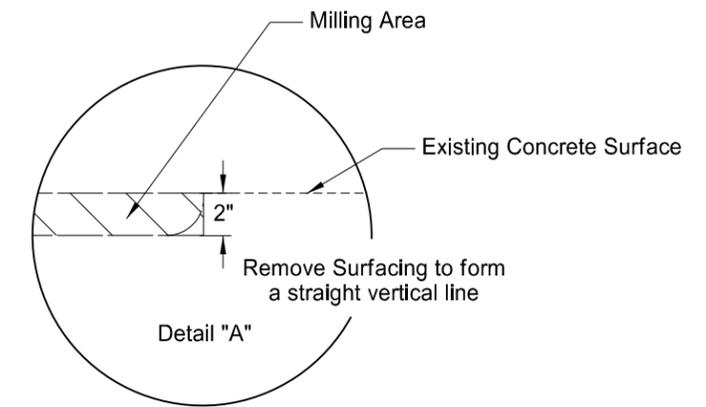
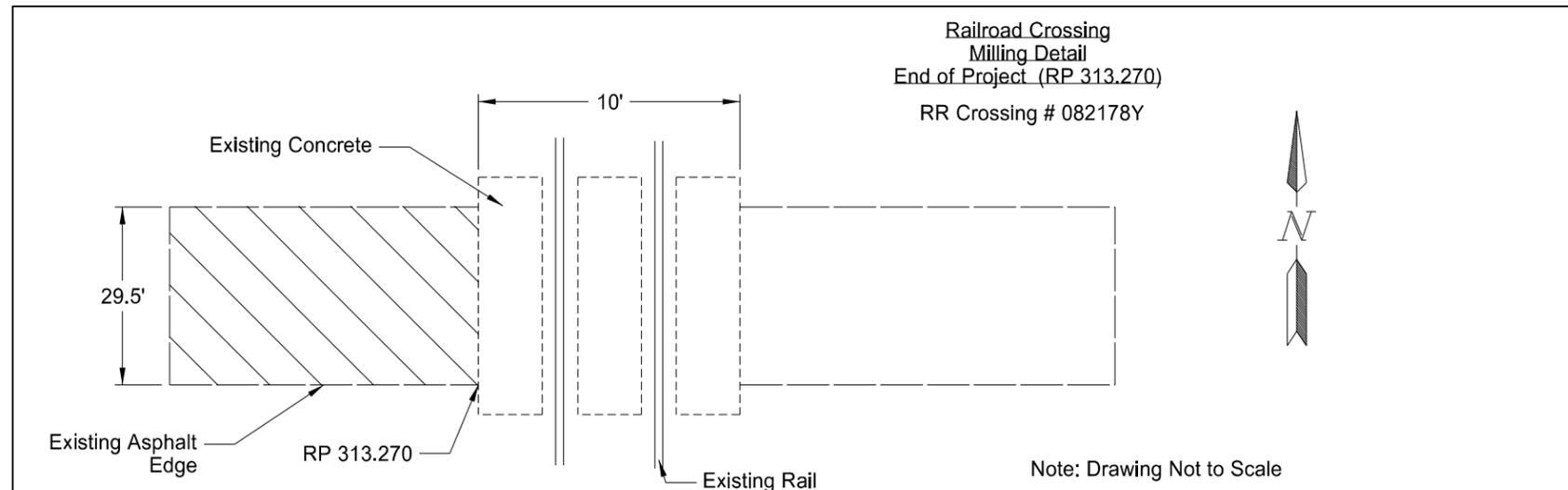
<u>Short Term 4-in Line - Type NR</u>		
Location	Basis	Quantity
Centerline	Centerline Skips 1,320 LF/Mile (10' line, 30' Skip) =13,237 LF* 3- Applications=39,711	39,711 LF
Centerline	Single Yellow Barrier Stripe =3,236 LF * 3- Applications=9,708	9,708 LF
Centerline	Double Yellow Barrier Stripe =8,923 LF * 3- Applications=26,769	26,769 LF
Total Short Term Yellow Pavement Marking=		95,532 LF
<u>Additional Short-Term Pavement Marking Quantities</u>		
Description	Basis	Quantity
4" Yellow Double Barrier 6,448 LF*3 Applications =19,344	Sect. 120 Sheet 1-3	19,344 LF
8" White Channel Line (1 Application)	Sect. 120 Sheet 1-3	1,392 LF

<u>ADA Pedestrian Ramp Quantities</u>		
Description	Basis	Quantity
Saw Bituminous Surfacing (Full Depth) 16 LF x 16 Locations=256	Section 20 Sheet 8	256 LF
Removal of Bituminous Surfacing 3.6 SY x 16 Locations=58		58 SY
Salvaged Base Course .74 Ton x 16 Locations=12		12 Tons
Sidewalk Concrete 3.6 SY x 16 Locations=58		58 SY
Detectable Warning Panels 16 SF x 16 Locations=256		256 SF
Landscape Preparation 1.8 SY x 16 Locations= 29		29 SY

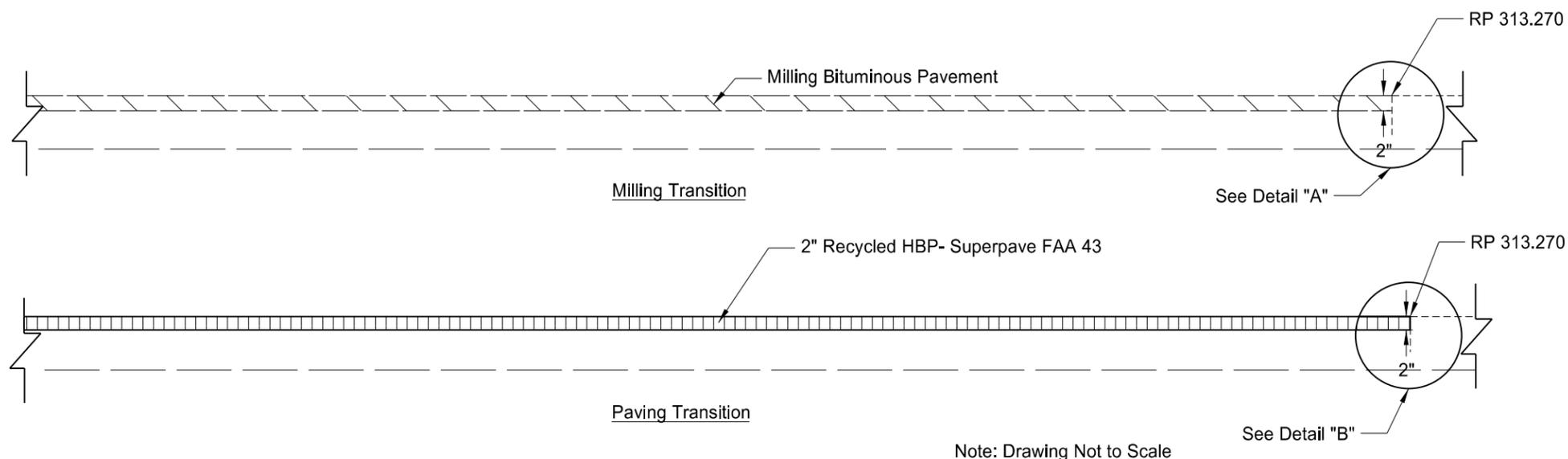
<u>Rumble Strip Locations</u>			
Location	RP Locations	Length (Miles)	Total (Miles)
Shoulder	RP 302.000 to RP 311.863	9.863	19.726
Centerline	RP 302.000 to RP 307.629	5.629	9.435
	RP 308.057 to RP 311.863	3.806	

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	20	1



**Milling and Paving Transitions for
R.R. Crossing RP 313.270 (End of Project)**

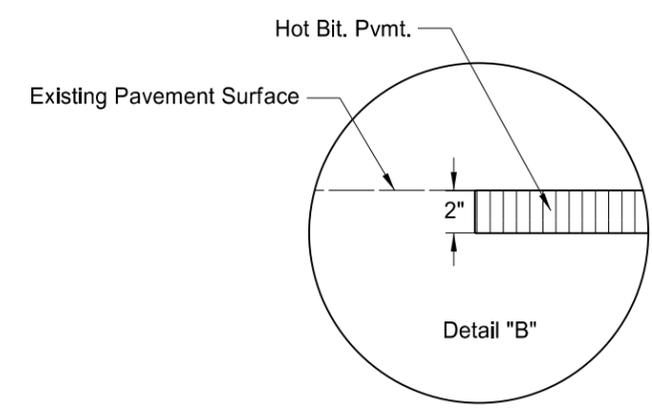
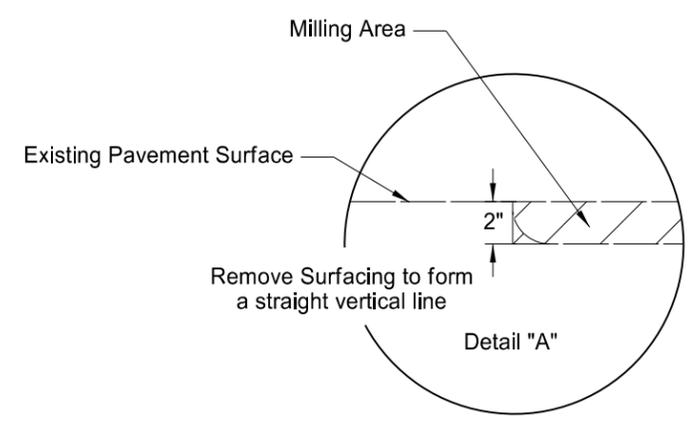
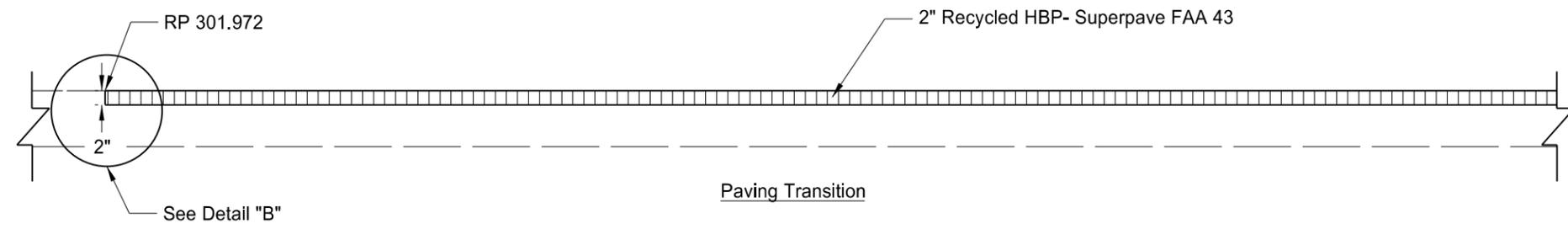
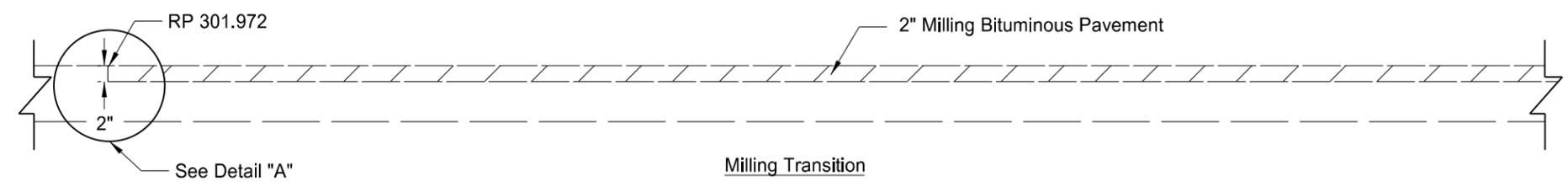


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**MILLING AND PAVING
Transitions
Dakota Northern Railroad
RR Crossing # 082178Y (RP 313.270)**

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	20	2

Milling and Paving Transitions for
 RP 301.972 (Beginning of Project at
 West side of Jct. ND 32 South)



Note: Drawing Not to Scale

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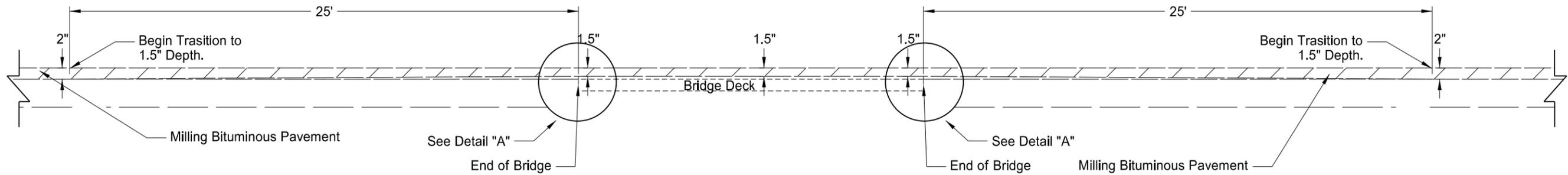
MILLING AND PAVING Transitions RP 301.972 Beginning of Project at West side of Jct. ND 32 South

Milling and Paving Transitions for
Structure # 05-303.364

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	20	3

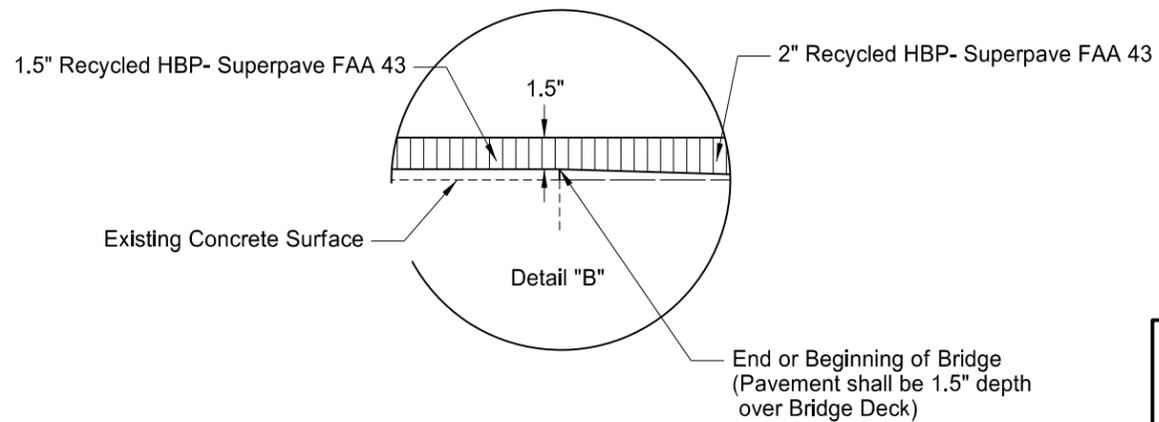
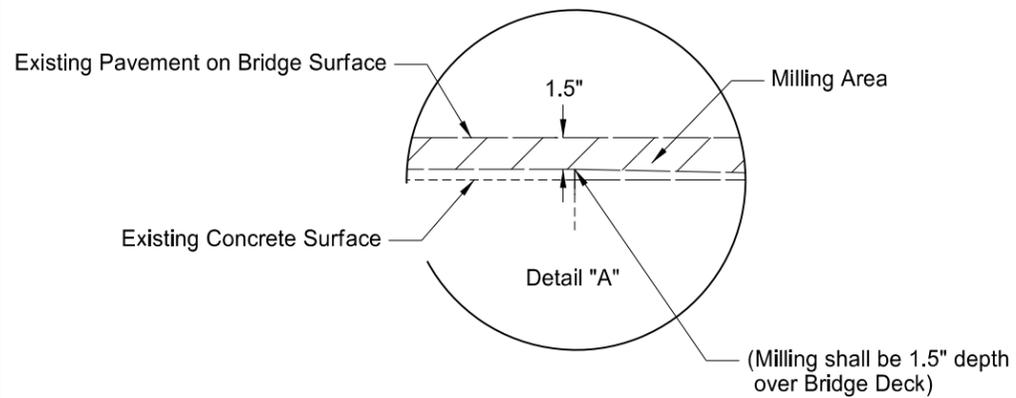
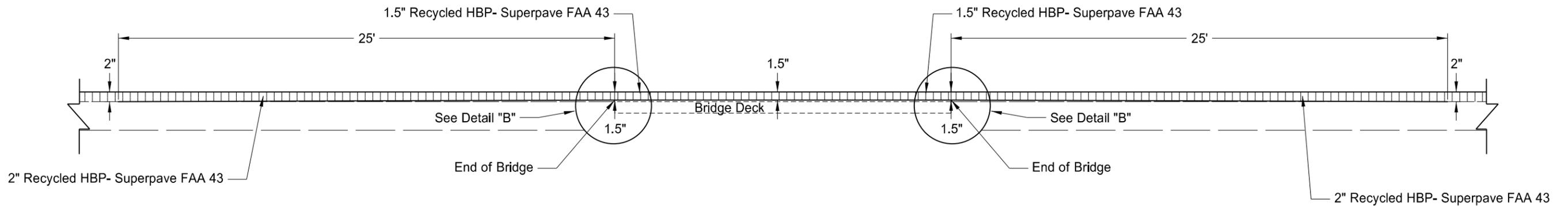
Milling Transition

Note: Starting 25' from the Bridge, Milling will transition from 2" to 1.5" over the Bridge Deck.



Paving Transition

Note: Starting 25' from the Bridge, Paving will transition from 2" to 1.5" over the Bridge Deck.



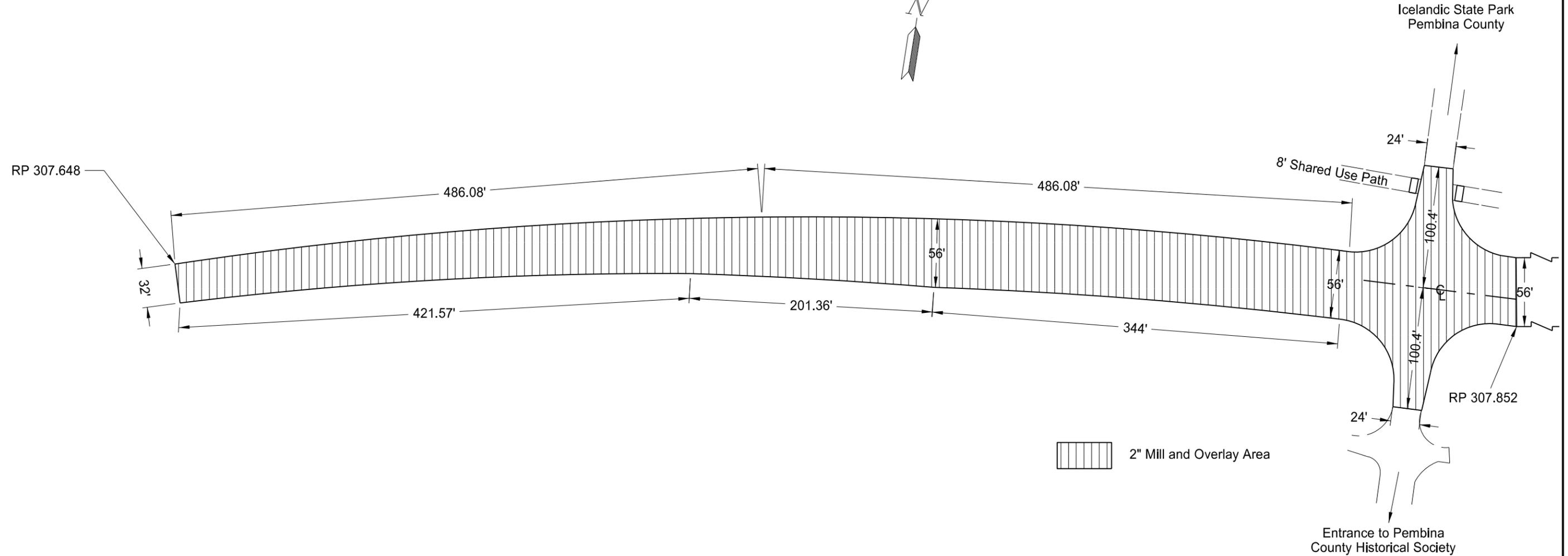
Note: Drawing Not to Scale

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MILLING AND PAVING
Transitions
Structure # 05-303.364

Additional Quantities for Milling and Paving
RP 307.648 to RP 307.852

Description	Quantity
2" Recycled HBP- Superpave FAA 43	925 Tons
PG 58-28 Asphalt Cement @ 4.9%	45 Tons
Tack Coat (.05 Gal / SY)	415 Gal
Fog Coat (.05 Gal / SY)	415 Gal
Milling (SY)	8,306 SY



 2" Mill and Overlay Area

Icelandic State Park
Pembina County

Entrance to Pembina
County Historical Society

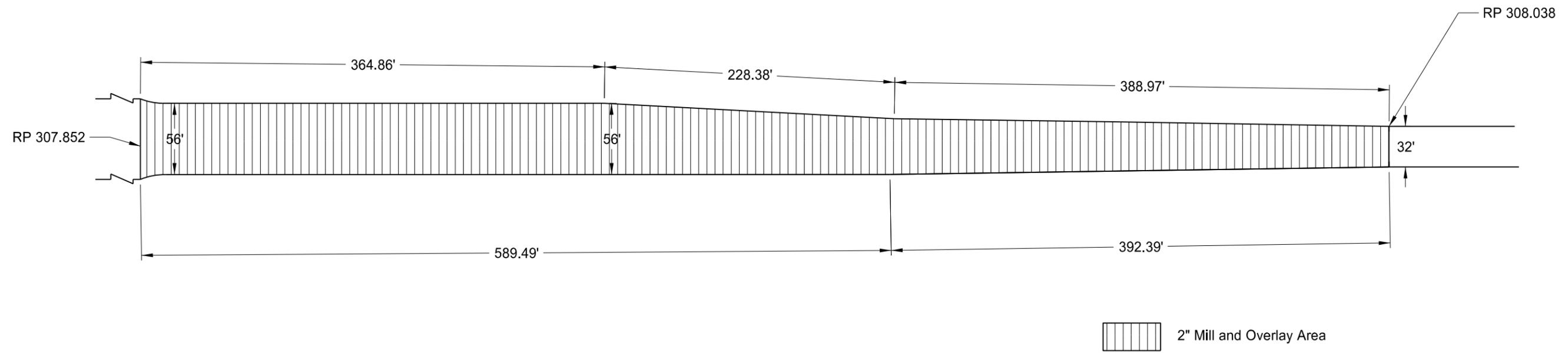
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Milling and Paving Details
Existing Turn Lane Widening at
Icelandic State Park
RP 307.648 to RP 307.852

Note: Drawing Not to Scale

Additional Quantities for Milling and Paving
RP 307.852 to RP 308.038

Description	Quantity
2" Recycled HBP- Superpave FAA 43	575 Tons
PG 58-28 Asphalt Cement @ 4.9%	28 Tons
Tack Coat (.05 Gal / SY)	258 Gal
Fog Coat (.05 Gal / SY)	258 Gal
Milling (SY)	5,169 SY

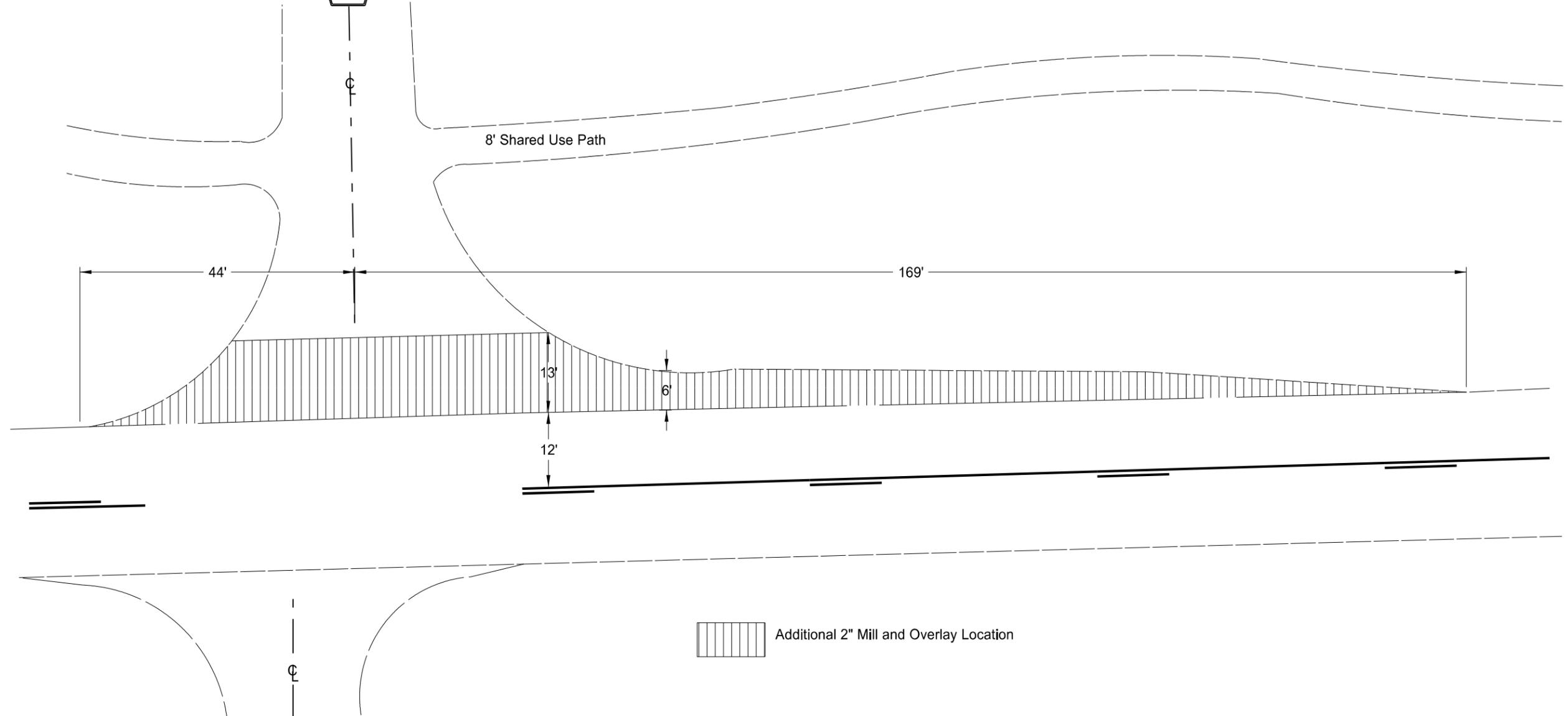


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Milling and Paving Details
Existing Turn Lane Widening at
Icelandic State Park
RP 307.852 to RP 308.038

Note: Drawing Not to Scale

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	20	6



 Additional 2" Mill and Overlay Location

Additional Quantities for Milling and Paving for CO. Road 12 Turn Lane

Description	Quantity
2" Recycled HBP- Superpave FAA 43	17 Tons
PG 58-28 Asphalt Cement @ 4.9%	1 Ton
Tack Coat .05 Gal / SY	8 Gal
Fog Coat .05 Gal / SY	8 Gal
Milling	149 SY

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Milling and Paving Details
County Road 12 North
Turn Lane Paving Detail and Quantities

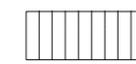
Note: Drawing Not to Scale

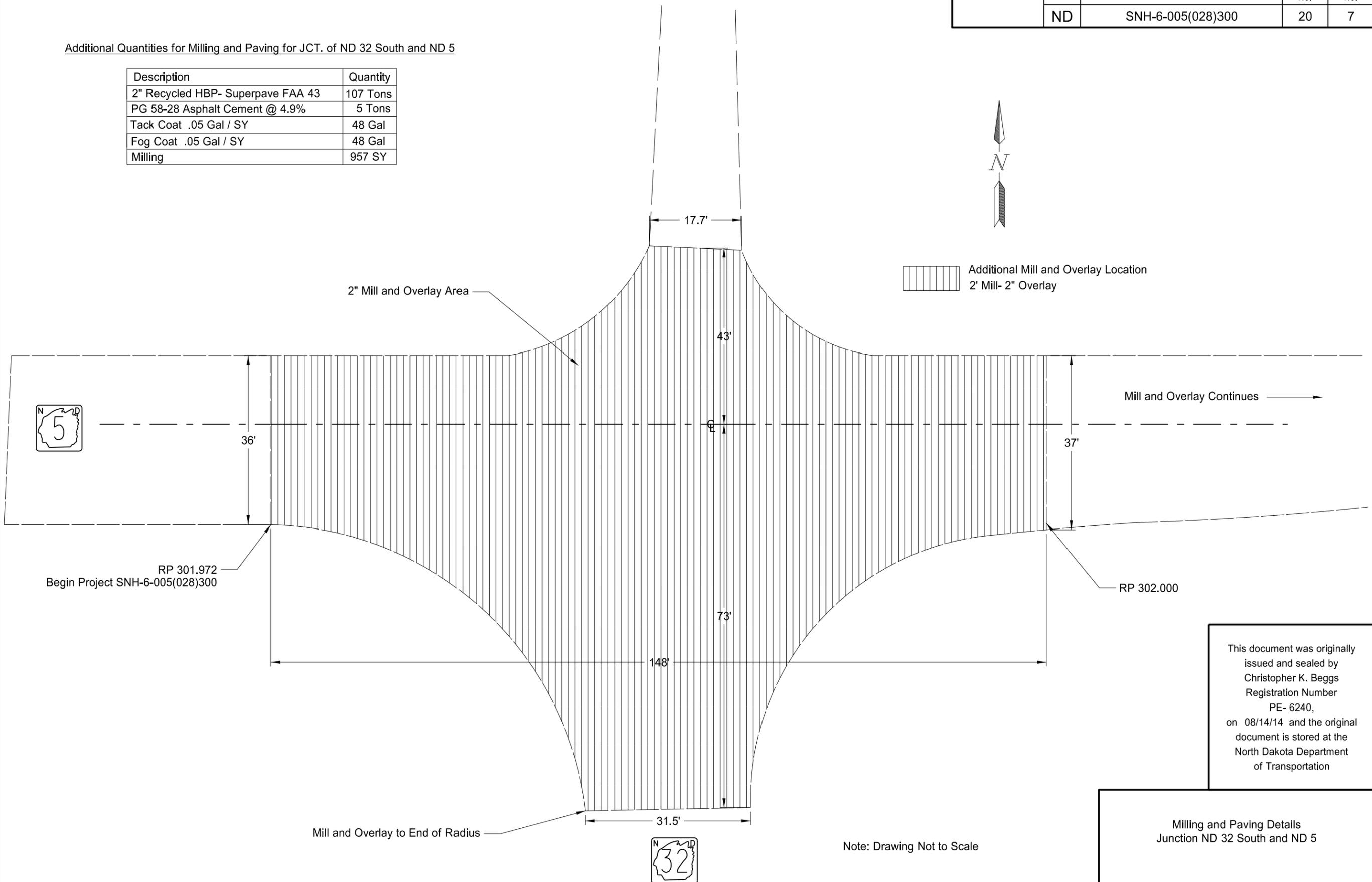
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	20	7

Additional Quantities for Milling and Paving for JCT. of ND 32 South and ND 5

Description	Quantity
2" Recycled HBP- Superpave FAA 43	107 Tons
PG 58-28 Asphalt Cement @ 4.9%	5 Tons
Tack Coat .05 Gal / SY	48 Gal
Fog Coat .05 Gal / SY	48 Gal
Milling	957 SY

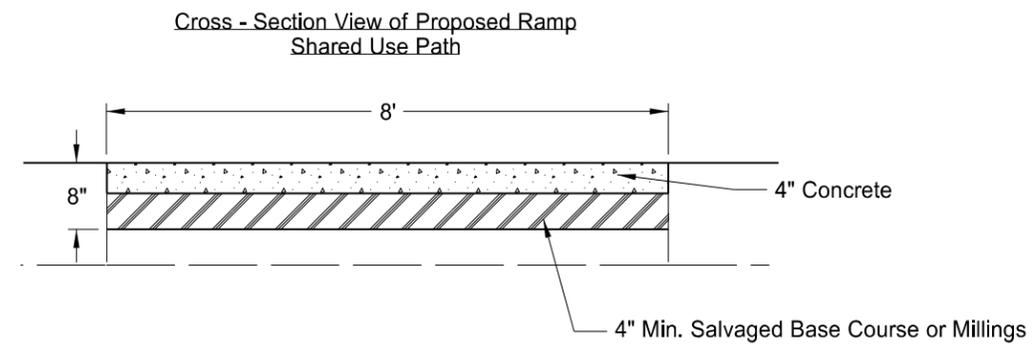
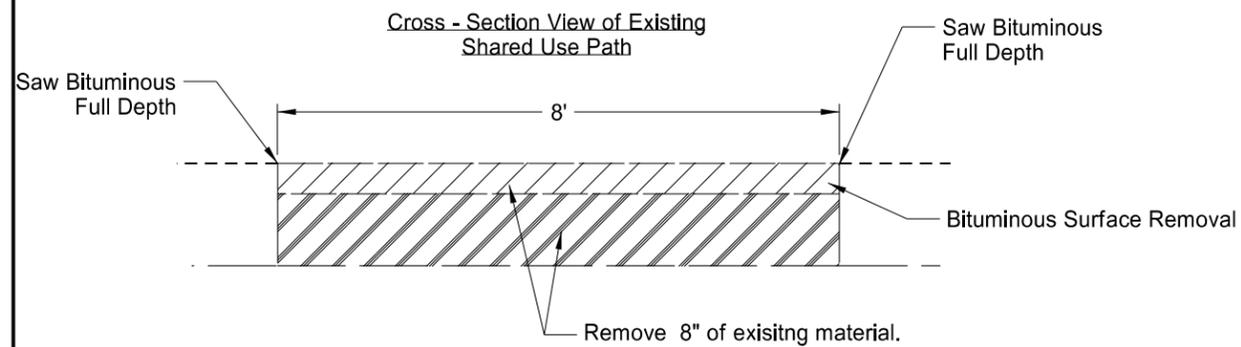
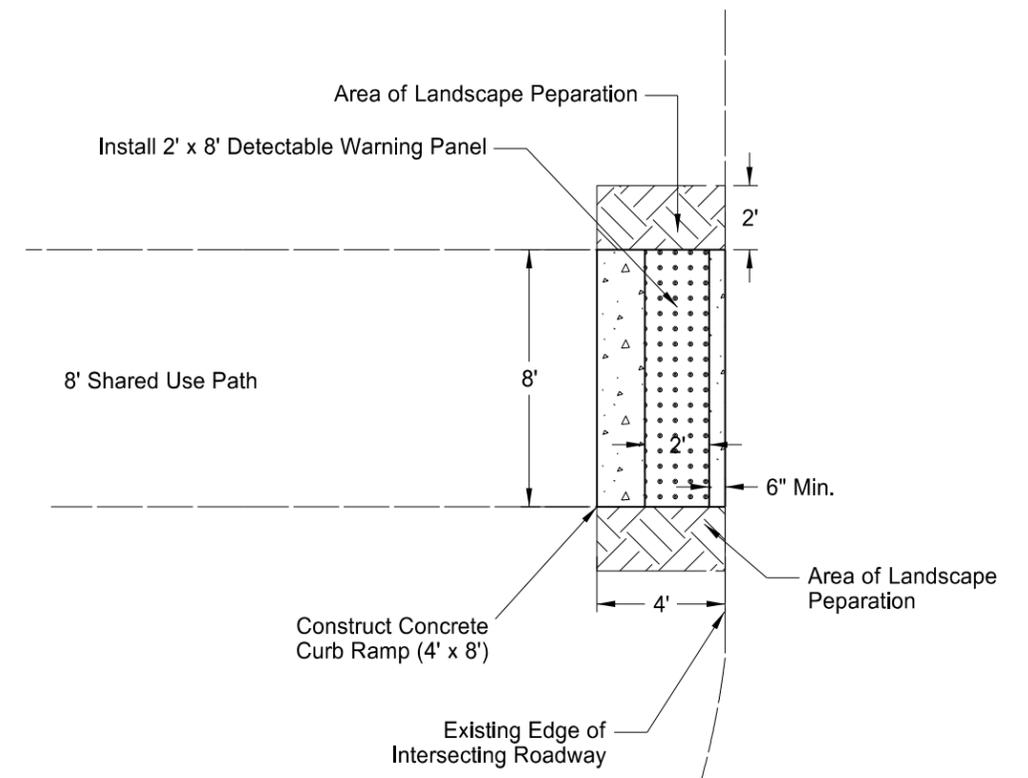
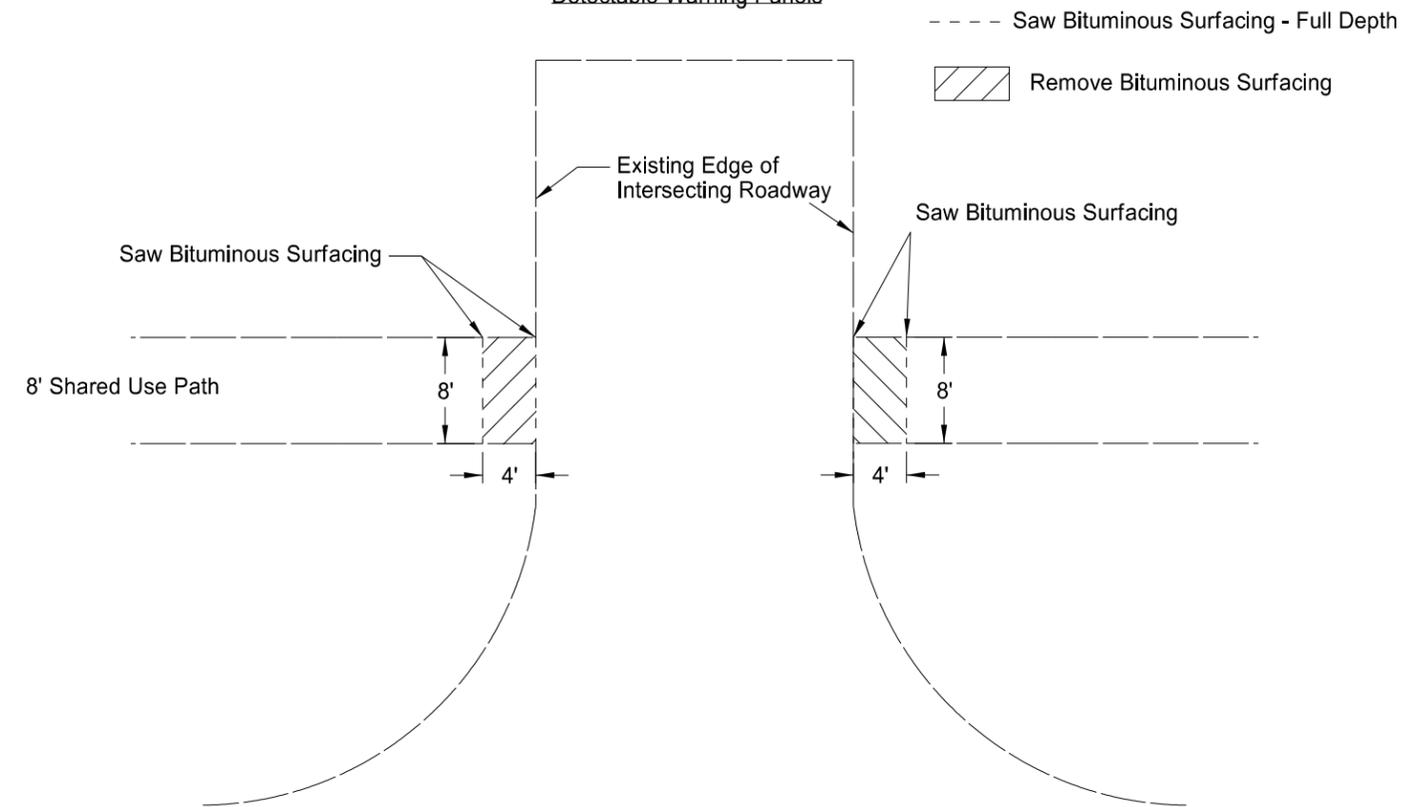


 Additional Mill and Overlay Location
2' Mill- 2" Overlay



Removal Detail for Installation of ADA Pedestrian Ramps with Detectable Warning Panels

Installation Detail for ADA Pedestrian Ramps with Detectable Warning Panels



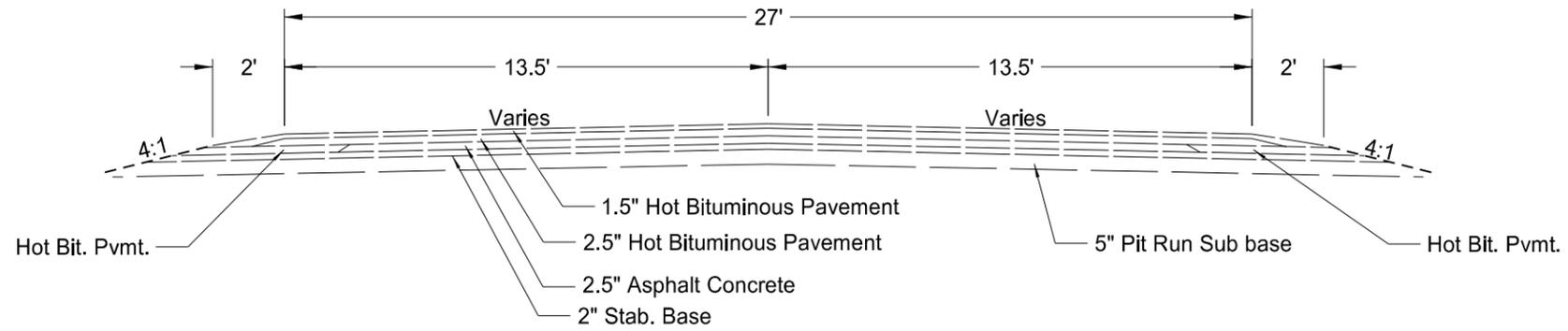
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Proposed ADA Ramp Locations	Qty.	SPEC CODE	Bid Item	Quantity/Location	UNIT	Total
County Road 12 North	2	202 0153	Saw Bituminous Surfacing (Full Depth)	16	LF	256
138th Ave NE	2	202 0132	Removal of Bituminous Surfacing	3.6	SY	58
139th Ave NE	2	302 0100	Salvaged Base Course	.74	TON	12
140th Ave NE	2	750 0100	Sidewalk Concrete	3.6	SY	58
Bjornson Drive	2	750 2115	Detectable Warning Panels	16	SF	256
Bedrock Lane	2	970 0008	Landscape Preparation	1.8	SY	29
5th Ave NW	2					
Millana Ct.	2					
Total # Locations=	16					

Note: Drawing Not to Scale

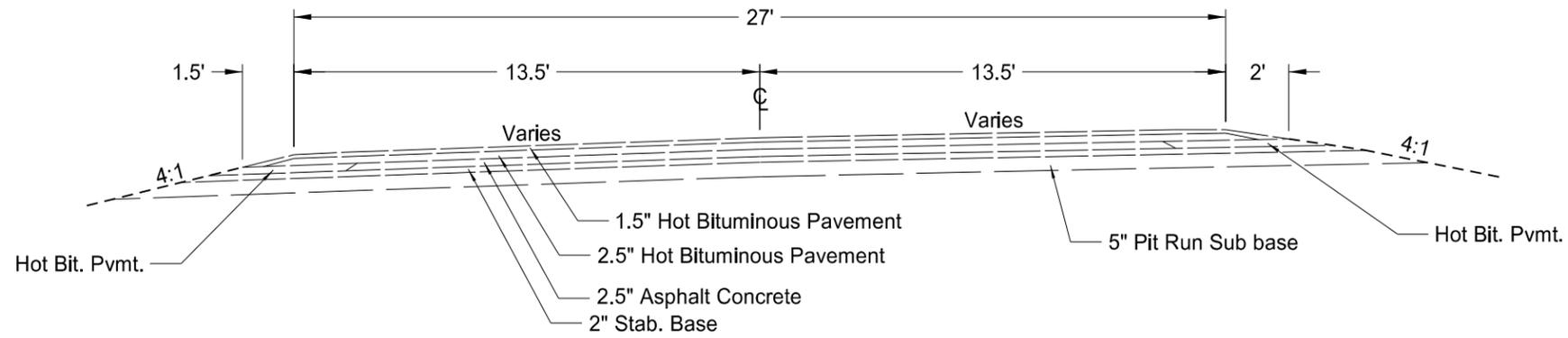
Proposed ADA Ramps Removals, Locations, Details and Quantities

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	30	1



Typical Existing Section 1

RP 302.000 to RP 306.256
 RP 306.756 to RP 307.374
 RP 308.038 to RP 313.270

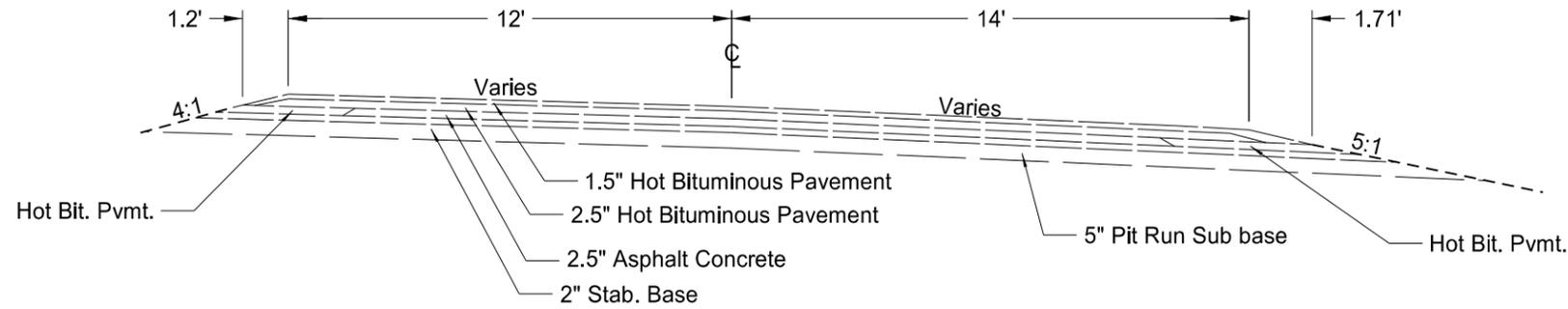


Typical Existing Section 2

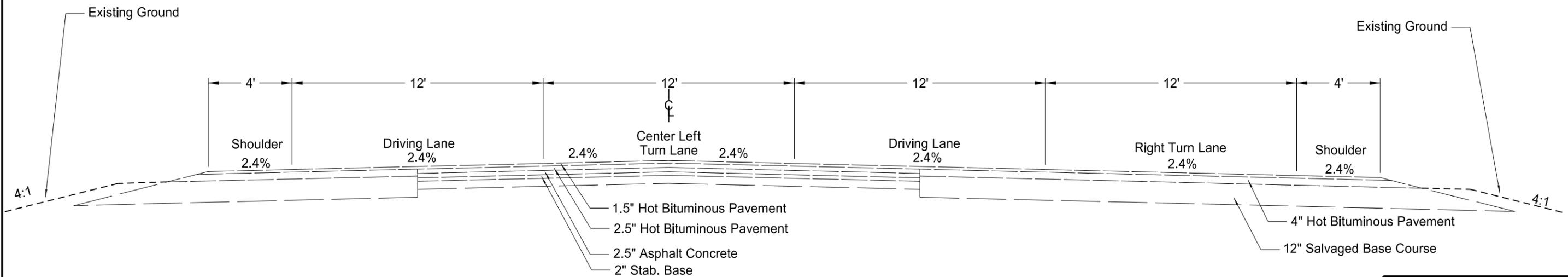
RP 306.256 to RP 306.756

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Typical Existing Sections



Typical Existing Section 3
 RP 307.374 to RP 307.648

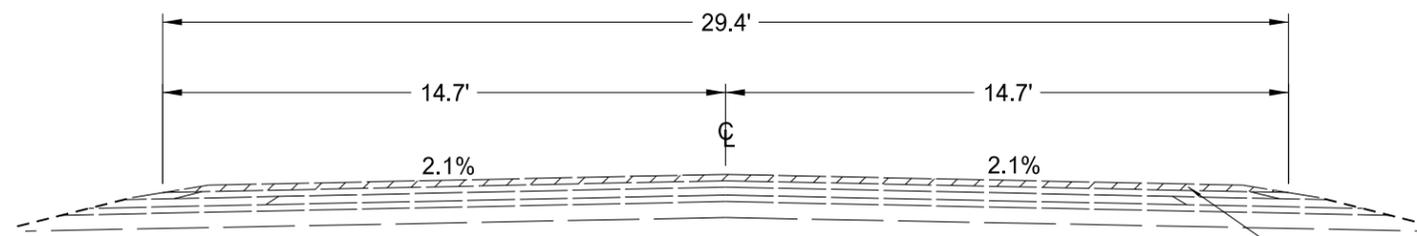


Typical Existing Section 4
 RP 307.648 To RP 308.038

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Note: Roadway width varies between RP 307.648 to 308.038. Refer to section 20 sheets 4-5

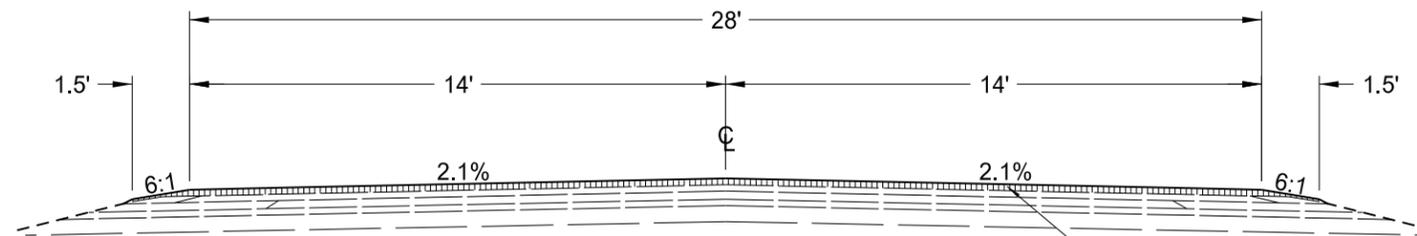
Typical Existing Sections



2" Milling on centerline at 2.1% cross-slope, full-width
(Area= 4.709 SF)

Typical Milling Section 1

RP 302.000 to RP 306.256
RP 306.756 to RP 307.374
RP 308.038 to RP 313.270



2.0" Recycled HBP - Superpave FAA 43
(Area = 4.957 SF)

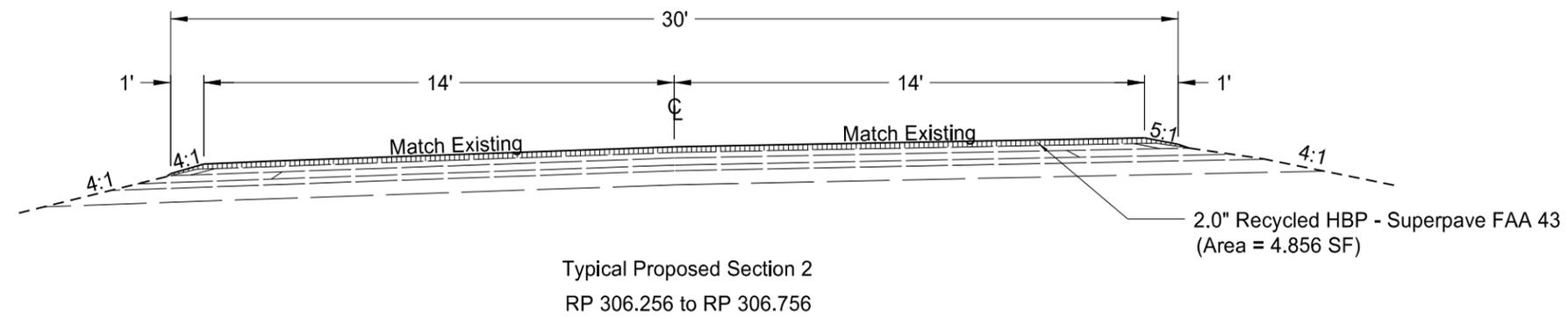
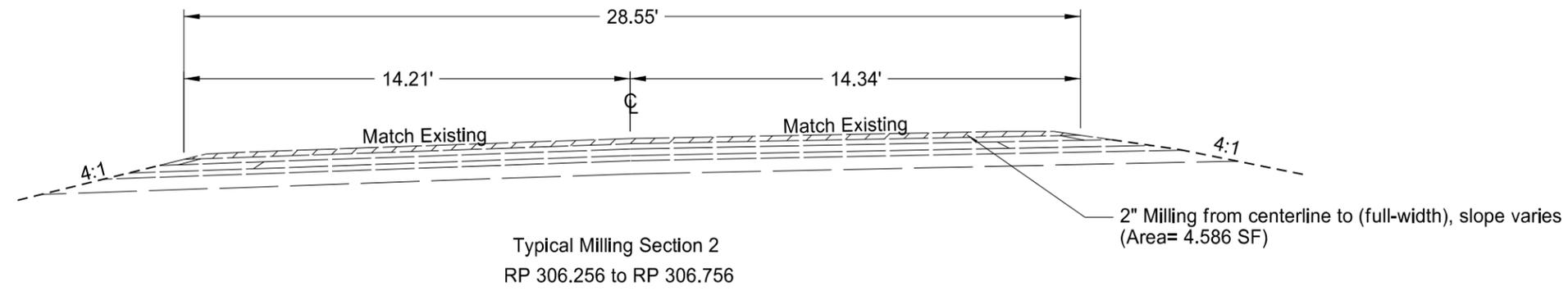
Typical Proposed Section 1

RP 302.000 to RP 306.256
RP 306.756 to RP 307.374
RP 308.038 to RP 313.270

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Typical Proposed Sections

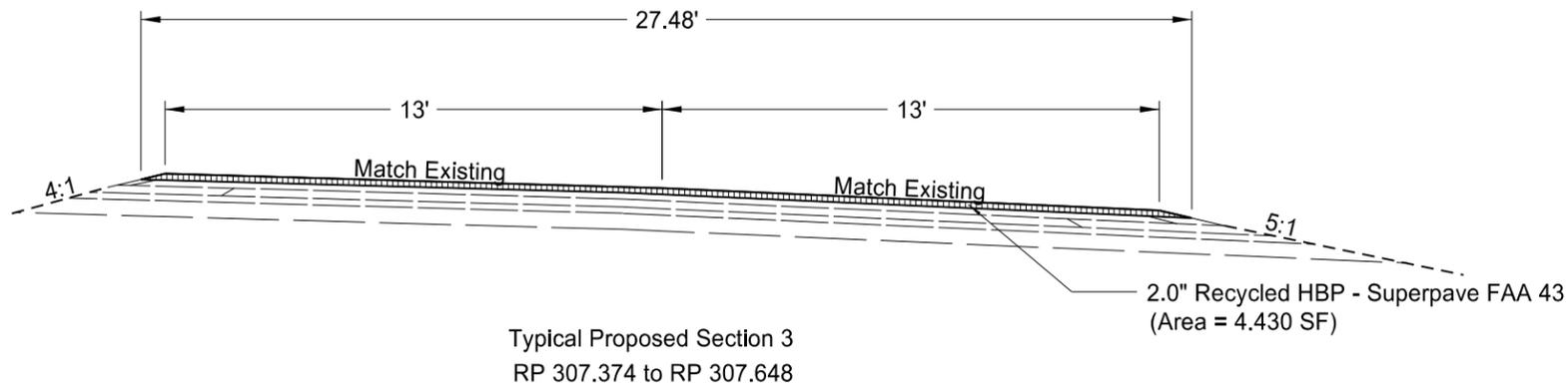
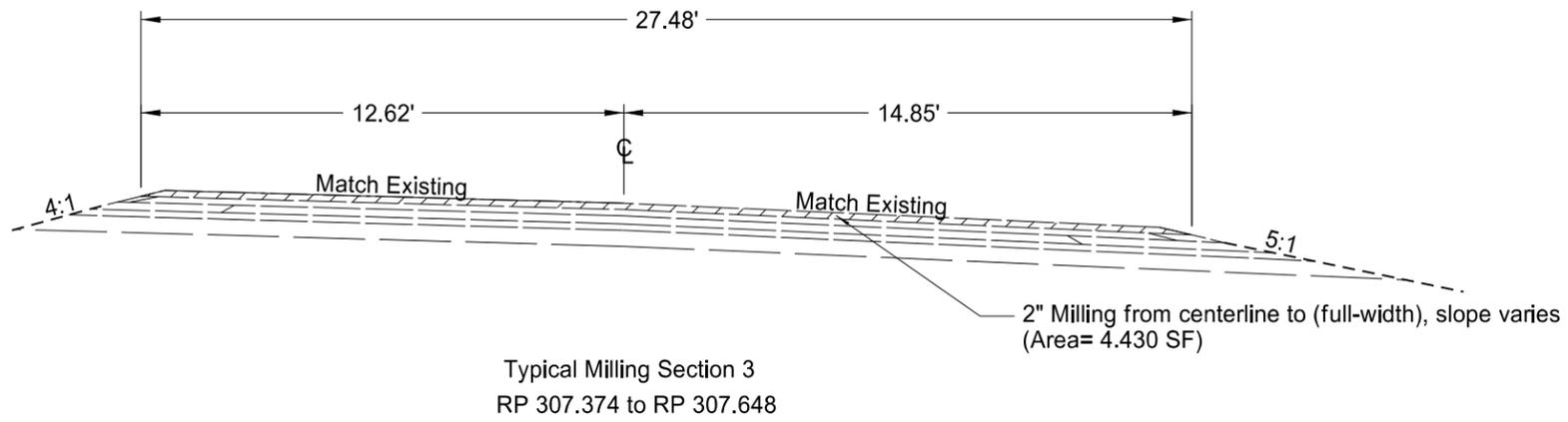
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	30	4



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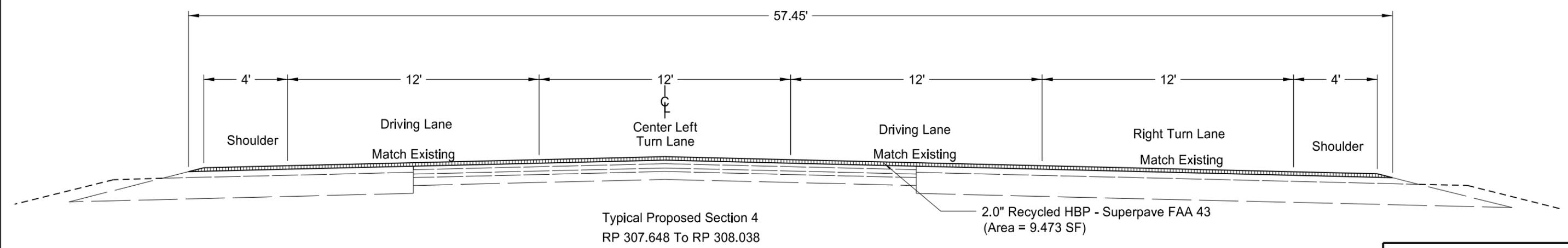
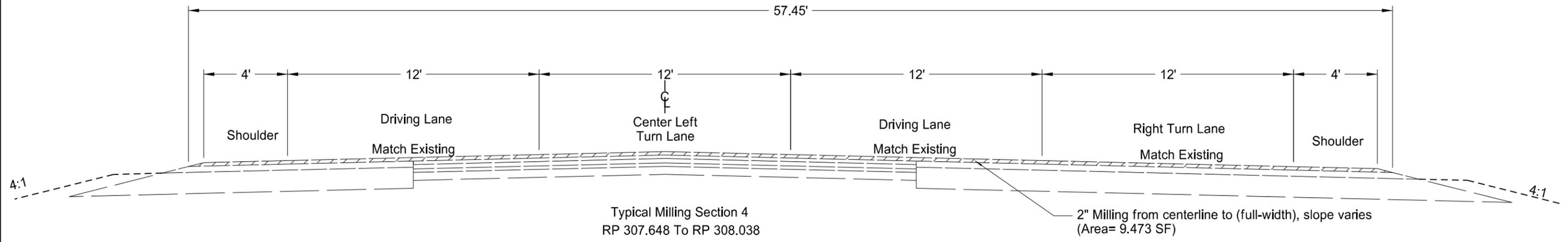
Typical Proposed Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	30	5



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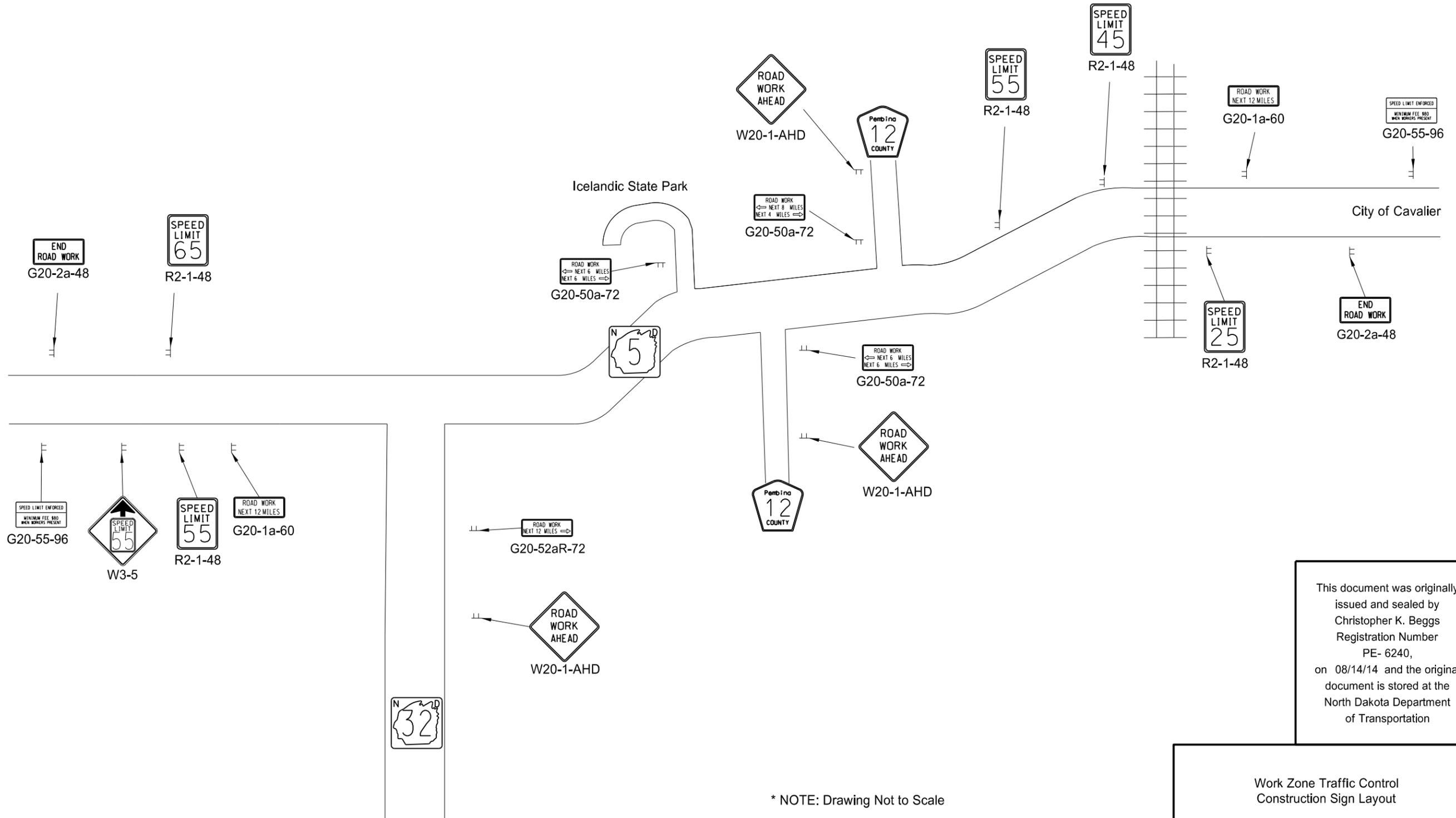
Typical Proposed Sections



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Typical Proposed Sections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	100	2



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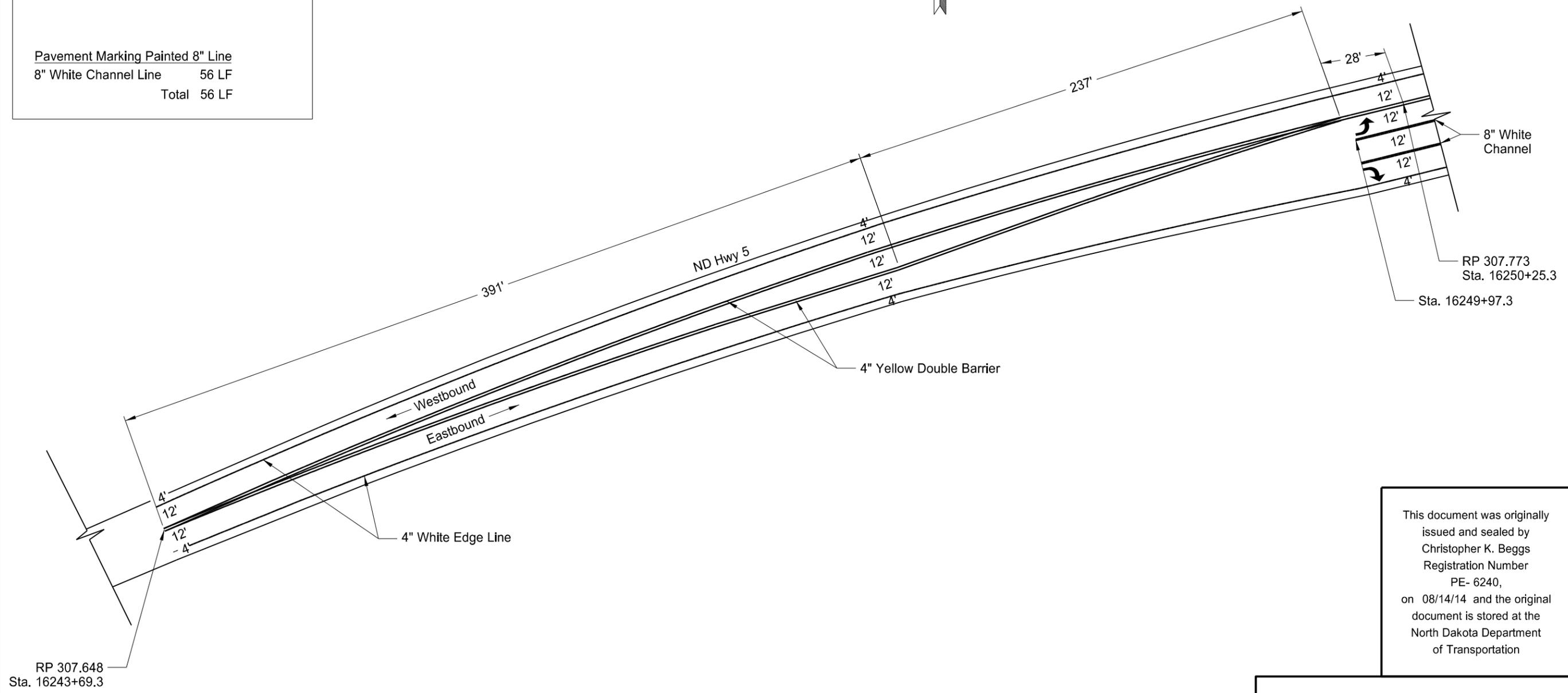
Work Zone Traffic Control Construction Sign Layout

* NOTE: Drawing Not to Scale

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	120	1

Permanent Pavement Marking	
<u>Pavement Marking Painted 4" Line</u>	
4" White Edge Line	1,312 LF
4" Yellow Double Barrier	2,568 LF
Total 3,880 LF	
<u>Pavement Marking Painted- Message</u>	
Right Arrow (1) @ 16 SF Each	16 SF
Left Arrow (1) @ 16 SF Each	16 SF
Total 32 SF	
<u>Pavement Marking Painted 8" Line</u>	
8" White Channel Line	56 LF
Total 56 LF	

Short -Term Pavement Marking	
<u>Pavement Marking Painted 4" Line</u>	
4" Yellow Double Barrier	2,568 LF
Total 7,704 LF	
<u>Pavement Marking Painted 8" Line</u>	
8" White Channel Line	56 LF
Total 56 LF	



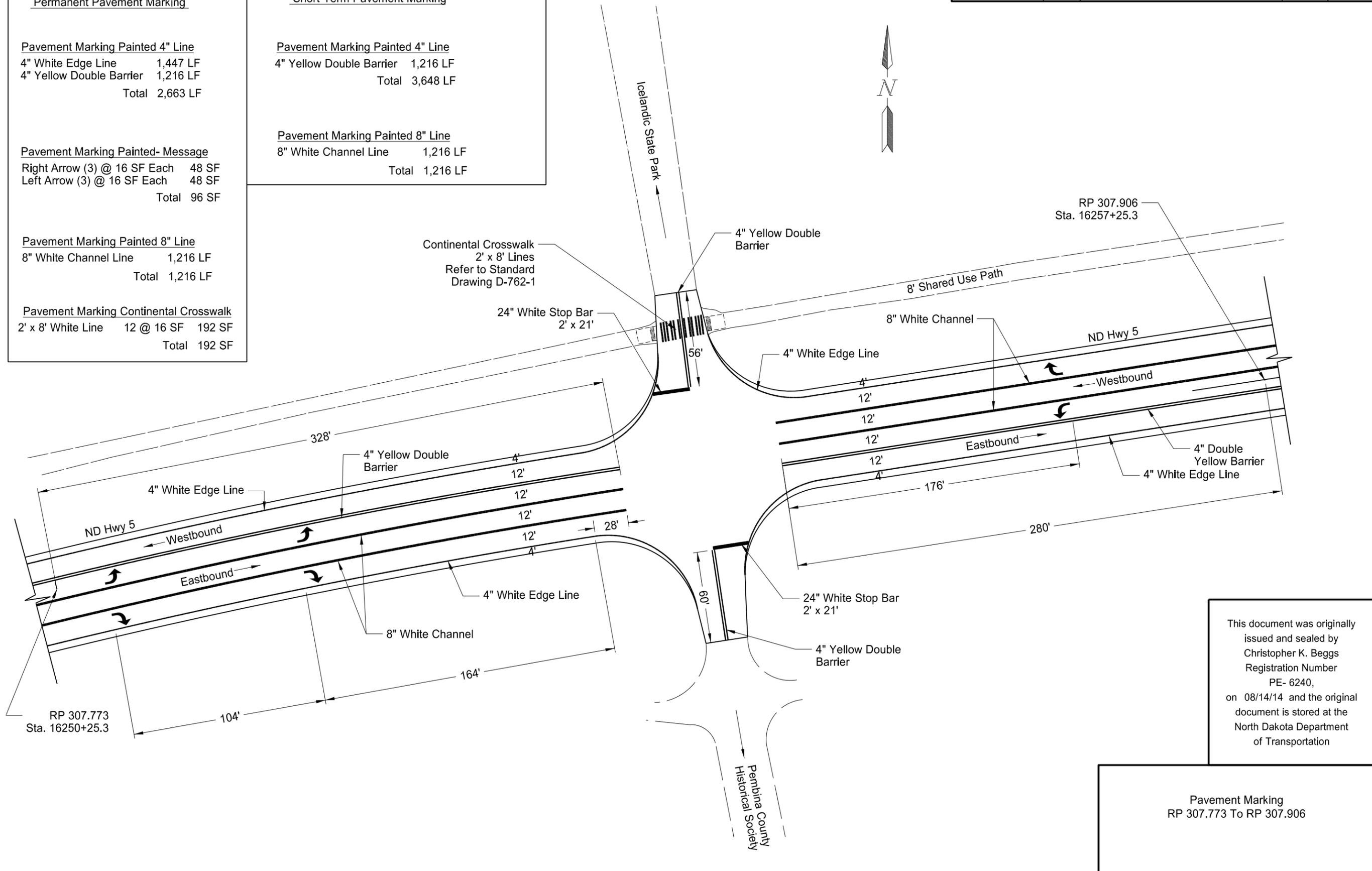
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Pavement Marking
RP 307.648 to RP 307.773

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	120	2

Permanent Pavement Marking	
Pavement Marking Painted 4" Line	
4" White Edge Line	1,447 LF
4" Yellow Double Barrier	1,216 LF
Total 2,663 LF	
Pavement Marking Painted- Message	
Right Arrow (3) @ 16 SF Each	48 SF
Left Arrow (3) @ 16 SF Each	48 SF
Total 96 SF	
Pavement Marking Painted 8" Line	
8" White Channel Line	1,216 LF
Total 1,216 LF	
Pavement Marking Continental Crosswalk	
2' x 8' White Line	12 @ 16 SF
Total 192 SF	

Short-Term Pavement Marking	
Pavement Marking Painted 4" Line	
4" Yellow Double Barrier	1,216 LF
Total 3,648 LF	
Pavement Marking Painted 8" Line	
8" White Channel Line	1,216 LF
Total 1,216 LF	



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Pavement Marking
RP 307.773 To RP 307.906

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-6-005(028)300	120	3

Permanent Pavement Marking

Pavement Marking Painted 4" Line
4" White Edge Line 1,404 LF
4" Yellow Double Barrier 2,664 LF
Total 4,068 LF

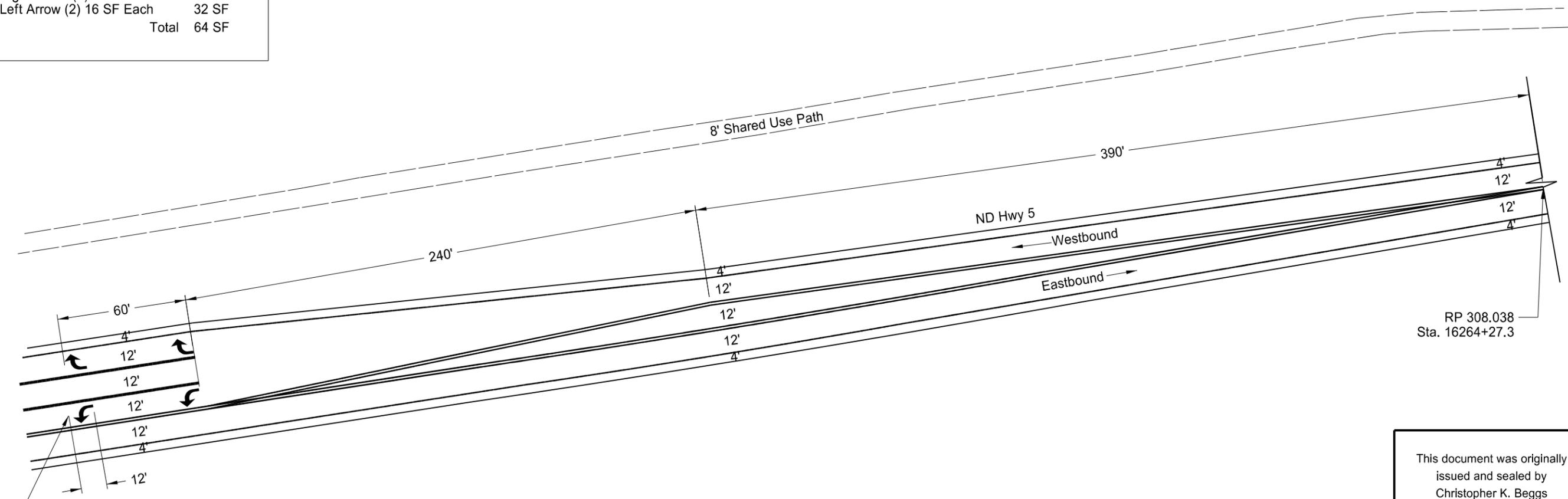
Pavement Marking Painted 8" Line
8" White Channel Line 60 LF
Total 60 LF

Pavement Marking Painted- Message
Right Arrow (2) 16 SF Each 32 SF
Left Arrow (2) 16 SF Each 32 SF
Total 64 SF

Short- Term Pavement Marking

Pavement Marking Painted 4" Line
4" Yellow Double Barrier 2,664 LF
Total 7,992 LF

Pavement Marking Painted 8" Line
8" White Channel Line 60 LF
Total 60 LF



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Pavement Marking
RP 307.906 To 308.038

NDDOT ABBREVIATIONS

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

Abn abandoned
 Abut abutment
 Ac acres
 Adj adjusted
 Aggr aggregate
 Ahd ahead
 ARV air release valve
 Align alignment
 Al alley
 Alt alternate
 Alum aluminum
 ADA Americans with Disabilities Act
 A ampere
 & and
 Appr approach
 Approx approximate
 ACP asbestos cement pipe
 Asph asphalt
 AC asphalt cement
 Assmd assumed
 @ at
 Atten attenuation
 ATR automatic traffic recorder
 Ave Avenue
 Avg average
 ADT average daily traffic
 Az azimuth
 Bk back
 BF back face
 Bs backsight
 Balc balcony
 B Wire barbed wire
 Barr barricade
 Btry battery
 Brg bearing
 BI beehive inlet
 Beg begin
 BM bench mark
 Bkwy bikeway
 Bit bituminous
 Blk block
 Bd Ft board feet
 BH bore hole
 BS both sides
 Bot bottom
 Blvd Boulevard
 Bndry boundary
 BC brass cap
 Brkwy breakaway
 Br bridge
 Bldg building

BV butterfly valve
 Byp bypass
 C Gdrl cable guardrail
 Calc calculate
 Cd candela
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 Cl or C centerline
 Cm centimeter
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Co S coal slack
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 Cond conductor
 Const construction
 Cont continuous
 CSB continuous split barrel sample
 Contr contraction
 Contr contractor
 CP control point
 Coord coordinate
 Cor corner
 Corr corrected
 CAES corrugated aluminum end section
 CAP corrugated aluminum pipe
 CMES corrugated metal end section
 CMP corrugated metal pipe
 CPVCP corrugated poly-vinyl chloride pipe
 CSES corrugated steel end section
 CSP corrugated steel pipe
 C coulomb
 Co County
 Crse course
 C Gr course gravel
 CS course sand

Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd Crossroad
 Crn crown
 CF cubic feet
 M3 cubic meter
 M3/s cubic meters per second
 CY cubic yard
 Cy/mi cubic yards per mile
 Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 CS curve to spiral
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 Deg or D degree
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia diameter
 Dir direction
 Dist distance
 DM disturbed material
 DB ditch block
 DG ditch grade
 Dbl double
 Dn down
 Dwg drawing
 Dr drive
 Drwy driveway
 DI drop inlet
 D dry density
 Ea each
 Esmt easement
 E East
 EB Eastbound
 Elast elastomeric
 EL electric locker
 E Mtr electric meter
 Elec electric/al
 EDM electronic distance meter
 Elev or El elevation
 Ellipt elliptical
 Emb embankment
 Emuls emulsion/emulsified

ES end section
 Engr engineer
 ESS environmental sensor station
 Eq equal
 Eq equation
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded
 FOS factor of safety
 F Fahrenheit
 FS far side
 F farad
 Fed Federal
 FP feed point
 Ft feet/foot
 Fn fence
 Fn P fence post
 FO fiber optic
 FB field book
 FD field drive
 F fill
 FAA fine aggregate angularity
 FS fine sand
 FH fire hydrant
 Fl flange
 Flrd flared
 FES flared end section
 F Bcn flashing beacon
 FA flight auger sample
 FL flow line
 Ftg footing
 FM force main
 Fs foresight
 Fnd found
 Fdn foundation
 Frac fractional
 Frwy freeway
 Frt front
 FF front face
 F Disp fuel dispenser

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

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NDDOT ABBREVIATIONS

D-101-2

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

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NDDOT ABBREVIATIONS

D-101-3

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

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702COM	702 Communications	GT PLNS NAT GAS	Great Plains Natural Gas Company	RED RIV TEL	Red River Rural Telephone
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 Coop
All PI	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	RSR ELEC	R.S.R. Electric Cooperative
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	MID-CONT CABLE	Mid-Continent Cable	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 W W S	Missouri West Water System	TRI-CNTY WU	Tri-County Water Users Incorporated
CAP ELEC	Capital Electric Cooperative Incorporat	MNKOTA PWR	Minnkota Power	TRL CO RWU	Traill County Rural Water Users
CASS CO ELEC	Cass County Electric Cooperative	MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative	UNTD TEL	United Telephone
CASS RWU	Cass Rural Water Users Incorporated	MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative	UPPR SOUR WUA	Upper Souris Water Users Association
CAV ELEC	Cavalier Rural Electric Cooperative	MRE LBTY TEL	Moore & Liberty Telephone	US SPRINT	U.S. Sprint
CBLCOM	Cablecom Of Fargo	MUNICIPAL	City Water And Sewer	USAF MSL CABLE	U.S.A.F. Missile Cable
CENEX PL	Cenex Pipeline	MUNICIPAL	City Of '.....'	USFWS	US Fish and Wildlife Service
CENT PL WATER DIST	Central Pipe Line Water District	N CENT ELEC	North Central Electric Cooperative	USW COMM	U.S. West Communications
CENT PWR ELEC	Central Power Electric Cooperative	N VALL W DIST	North Valley Water District	VRNDRY ELEC	Verendrye Electric Cooperative
COE	Corps of Engineers	ND PKS & REC	North Dakota Parks And Recreation	W RIV TEL	West River Telephone Incorporated
CONS TEL	Consolidated Telephone	ND TEL	North Dakota Telephone Company	WEB	W. E. B. Water Development Association
CONT RES	Continental Resource Inc	NDDOT	North Dakota Department of Transportation	WILLI RWA	Williams Rural Water Association
CPR	Canadian Pacific Railway	NDSU SOIL SCI DEPT	NDSU Soil Science Department	WILSTN BAS PL	Williston Basin Interstate Pipeline Company
D O E	Department Of Energy	NEMONT TEL	Nemont Telephone	WLSH RWD	Walsh Water Rural Water District
DAK CARR	Dakota Carrier Network	NODAK R ELEC	Nodak Rural Electric Cooperative	WOLVRTN TEL	Wolverton Telephone
DAK CENT TEL	Dakota Central Telephone	NOON FRMS TEL	Noonan Farmers Telephone Company	XLENER	Xcel Energy
DAK RWD	Dakota Rural Water District	NPR	Northern Plains Railroad	YSVR	Yellowstone Valley Railroad
DGC	Dakota Gasification Company	NSP	Northern States Power		
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	ONEOK	Oneok gas		
DVMW	Dakota, Missouri Valley & Western	OSHA	Occupational Safety and Health Administration		
ENBRDG	Enbridge Pipelines Incorporated	OTTR TL PWR	Otter Tail Power Company		
ENVENTIS	Enventis Telephone	P L E M	Prairielands Energy Marketing		
FALK MNG	Falkirk Mining Company	POLAR COM	Polar Communications		
FHWA	Federal Highway Administration	PVT ELEC	Private Electric		
G FKS-TRL WD	Grand Forks-traill Water District	QWEST	Qwest Communications		
GETTY TRD & TRAN	Getty Trading & Transportation	R&T W SUPPLY	R & T Water Supply Association		
GLDN W ELEC	Golden West Electric Cooperative	RAMSEY R SEW	Ramsey Rural Sewer Association		
GRGS CO TEL	Griggs County Telephone	RAMSEY RW	Ramsey Rural Water Association		
		RAMSEY UTIL	Ramsey County Rural Utilities		

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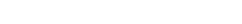
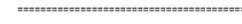
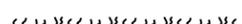
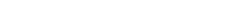
Line Styles

.....	Limits of Const Transition Line	—— s —— s ——	Floating Silt Curtain	—— ——— ———	Existing Aggregate (Cross Section View)	- - - - -	Existing Centerline
.....	Bale Check	—— ——— T ——	Existing Telephone Line	—— ——— ———	Existing Curb and Gutter (Cross Section View)	- - - - -	Supplemental Contour
.....	Rock Check	—— ——— TV ——	Existing TV Line	—— ——— ———	Existing Riprap	—— - - - - -	Right of Way
.....	Sight Distance Triangle Line	Void — void — void — v	Existing Assumed Ground (Not Surveyed)	—— ——— ———	Existing Underground Vault or Lift Station	—— - - - - -	Existing Right of Way
- - - - -	Small Hidden Object	Void — void — void — v	Tentative Ground Line	—— ——— ———	Tangent Line	—— - - - - -	Existing Right of Way Railroad
- - - - -	Dimension Leader	—— ——— w ——	Existing Water or Steam Line	- - - - -	Hidden Object	- - - - -	Failure Line
- - - - -	Existing Ground	=====	Existing Under Drain	—— ——— ———	Existing Dirt Surface	- - - - -	Existing Conditions
- - - - -	Existing Topsoil (Cross Section View)	=====	Under Drain	—— ——— ———	Existing Conduit	- - - - -	Existing Ground (Details)
—— ——— ———	Large Hidden Object	=====	Wall	—— ——— ———	Topsoil Profile	—— - - - - -	Existing Sixteenth Section Line
—— ——— ———	Edge Drain	=====	Existing Slotted Drain	- - - - -	Existing Conductor	- - - - -	Existing Right of Way Not State Owned
—— D —— D ——	Geotextile Fabric Type D	—— + —— + ——	Existing Cemetary Boundary	- - - - -	Conductor	- - - - -	Phantom Object
—— ——— E ——	Existing Electrical	—— ——— ———	Centerline Pavement Marking	- - - - -	Fiber Optic	- - - - -	Centerline Main
—— ——— FO ——	Existing Fiber Optic Line	=====	Barrier with Centerline Pavement Marking	- - - - -	Existing Loop Detector	-	Existing Guardrail Cable
—— ——— FO ——	Existing TV Fiber Optic	=====	Barrier Pavement Marking	- - - - -	Subgrade, Subcut or Ditch Grade	— • — • — • — •	Existing Guardrail Metal
—— ——— G ——	Existing Gas Pipe	- - - - -	Stripe 4 IN Dotted Extension White	—— ——— ———	Existing Asphalt Surface	—— . —— . —— . —— . ——	Existing Edge of Water
—— Geo —— Geo ——	Geogrid	- - - - -	Stripe 8 IN Dotted Extension White	—— ——— ———	Existing Asphalt (Cross Section View)	- - - - -	Excavation Limits
—— ——— OH ——	Existing Overhead Utility Line	- - - - -	Stripe 8 IN Lane Drop	—— ——— ———	Existing Reinforcement Rebar	—— . . . —— . . . —— . . . —— . . . ——	Existing Government Lot Line
—— ——— P ——	Existing Power	—— v v v ——	Wetland Mitigation	—— ——— ———	Existing Tie Point Line	.....	Existing Adjacent Block Lines
—— ——— PL ——	Existing Fuel Pipeline	- - - - -	Existing Box Culvert Bridge	—— ——— ———	Existing State or International Line	.....	Existing Adjacent Lot Lines
—— ——— PL ——	Existing Undefined Above Ground Pipe Line	- - - - -	Existing Concrete Surface	—— ——— ———	Existing Quarter Section Line	.....	Existing Adjacent Property Line
—— ——— R —— R ——	Geotextile Fabric Type R	- - - - -	Existing Drainage Structure	—— ——— ———	Existing County	.....	Existing Adjacent Subdivision Lines
—— ——— R —— R ——	Geotextile Fabric Type R1	- - - - -	Easement	—— ——— ———	Existing Section Line	.....
—— REMOVE —— REMOVE ——	Remove Line	- - - - -	Existing Concrete	—— ——— ———	Existing Township	.....
—— RR —— RR ——	Geotextile Fabric Type RR	- - - - -	Existing Easement	—— ——— ———	Existing Railroad Centerline	
—— S —— S ——	Geotextile Fabric Type S	—— ——— ———	Existing Gravel Surface	—— - - - - -	Centerline	

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Line Styles

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

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Symbols

	North Arrow (Half Scale)		Attenuation Device		Existing Railroad Battery Box		Existing Delineator Type E
	Truck Mounted Attenuator		Diamond Grade Delineator Type A		Existing Bush or Shrub		Existing EFB Misc
	Type I Barricade		Diamond Grade Delineator Type B		Existing Gas Cap or Stub		Existing Flashing Beacon
	Type II Barricade		Diamond Grade Delineator Type C		Existing Sanitary Cap or Stub		Existing Pipe Mounted Flasher
	Type III Barricade		Diamond Grade Delineator Type D		Existing Storm Drain Cap or Stub		Existing Pad Mounted Feed Point
	Catch Basin		Diamond Grade Delineator Type E		Existing Water Cap or Stub		Existing Pipe Mounted Feed Point with Pad
	Cairn or Stone Circle		Flexible Delineator		Existing Sanitary Cleanout		Existing Pole Mounted Feed Point
	Video Detection Camera		Flexible Delineator Type A		Existing Concrete Foundation		Existing Railroad Frog
	Storm Drain Cap or Stub		Flexible Delineator Type B		Existing Traffic Signal Controller		Existing Snow Gate 18
	Corrugated Metal End Section 18 Inch		Flexible Delineator Type C		Existing Pad Mounted Signal Controller		Existing Snow Gate 28
	Corrugated Metal End Section 24 Inch		Flexible Delineator Type D		Existing Sixteenth Section Corner		Existing Snow Gate 40
	Corrugated Metal End Section 30 Inch		Flexible Delineator Type E		Existing Quarter Section Corner		Existing Headwall
	Corrugated Metal End Section 36 Inch		Delineator Type A		Existing Section Corner		Existing Pedestrian Head with Number
	Corrugated Metal End Section 42 Inch		Delineator Type A Reset		Existing Railroad Crossbuck		Existing Signal Head
	Corrugated Metal End Section 48 Inch		Delineator Type B		Existing Satellite Dish		Existing Sprinkler Head
	Concrete Foundation		Delineator Type B Reset		Existing Fuel Dispensers		Existing Fire Hydrant
	Ground Connection Conductor		Delineator Type C		Existing Flexible Delineator Type A		Existing Catch Basin Drop Inlet
	Neutral Connection Conductor		Delineator Type D		Existing Flexible Delineator Type B		Existing Curb Inlet
	Phase 1 Connection Conductor		Delineator Type E		Existing Flexible Delineator Type C		Existing Manhole Inlet
	Phase 2 Connection Conductor		Delineator Drums		Existing Flexible Delineator Type D		Existing Junction Box
	Traffic Cone		Spot Elevation		Existing Flexible Delineator Type E		
	Signal Controller		Existing Access Control Arrow		Existing Delineator Type A		
	Pad Mounted Signal Controller		Existing Artifact		Existing Delineator Type B		
	Alignment Data Point		Existing Flashing Beacon		Existing Delineator Type C		
	Emergency Vehicle Detector		Existing Benchmark		Existing Delineator Type D		

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Symbols

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

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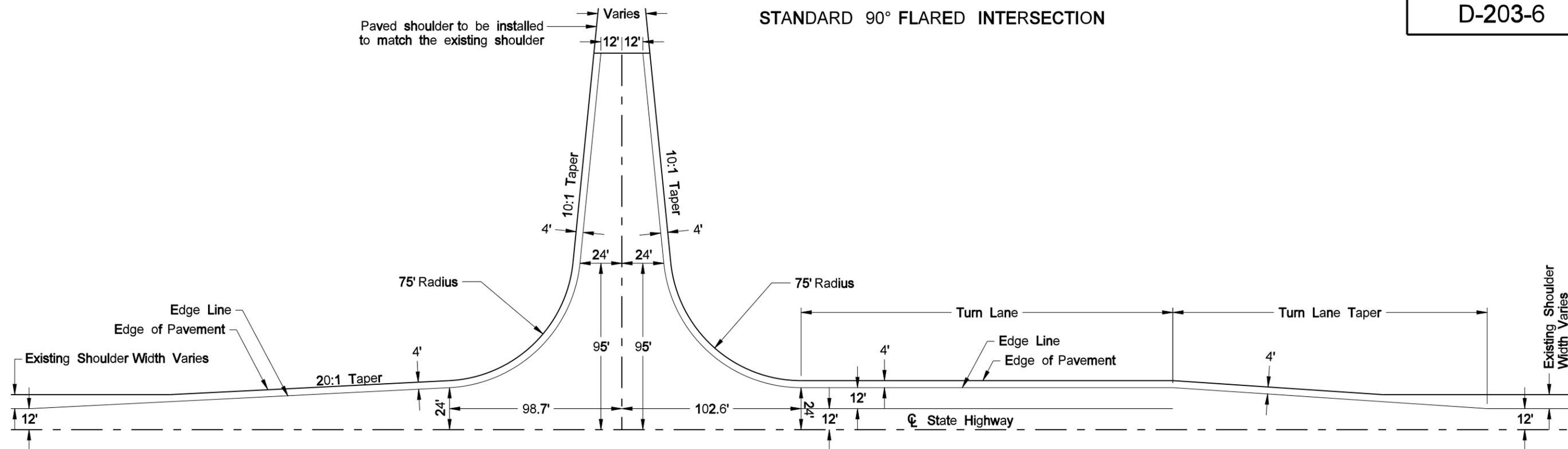
D-101-32

 Pad Mounted Feed Point  Pipe Mounted Feed Point with Pad  Pole Mounted Feed Point  Headwall  Double Headwall with Vegetation Barrier  Single Headwall with Vegetation Barrier  Pole Mounted Head  Sprinkler Head  Fire Hydrant  Inlet Type 1  Inlet Type 2  Double Inlet Type 2  Inlet Gate Type 2  Junction Box  High Mast Light Standard 10 Luminaire  High Mast Light Standard 3 Luminaire  High Mast Light Standard 4 Luminaire  High Mast Light Standard 5 Luminaire  High Mast Light Standard 6 Luminaire  High Mast Light Standard 7 Luminaire  High Mast Light Standard 8 Luminaire  High Mast Light Standard 9 Luminaire  Relocate Light Standard  Overhead Sign Structure Load Center  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire	 Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 175 Watt High Pressure Sodium Vapor Luminaire  Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  Light Standard 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  Light Standard 50 Watt High Pressure Sodium Vapor Luminaire  Light Standard 70 Watt High Pressure Sodium Vapor Luminaire  Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  Manhole  Manhole 48 Inch  Sanitary Force Main Manhole  Sanitary Sewer Manhole  Storm Drain Manhole  Storm Drain Manhole with Inlet  Reset Mile Post  Mile Post Type A  Mile Post Type B  Mile Post Type C  Right of Way Marker  Tubular Marker  Alignment Monument  Iron Pin Reference Monument	 Object Marker Type I  Object Marker Type II  Object Marker Type III  Caution Mode Arrow Panel  Back to Back Vertical Panel Sign  Double Direction Arrow Panel  Left Directional Arrow Panel  Right Directional Arrow Panel  Sequencing Arrow Panel  Truck Mounted Arrow Panel  Power Pole  Wood Pole  Pedestrian Push Button Post  Property Corner  Pull Box  Intelligent Transportation Pull Box  Sanitary Pump  Storm Drain Pump  Reinforced Pavement  Reinforced Concrete End Section 15 Inch  Reinforced Concrete End Section 18 Inch  Reinforced Concrete End Section 24 Inch  Reinforced Concrete End Section 30 Inch  Reinforced Concrete End Section 36 Inch  Reinforced Concrete End Section 42 Inch	 Reinforced Concrete End Section 48 Inch  Reinforced Concrete End Section 54 Inch  Reset Right of Way Marker  Reset USGS Marker  Right of Way Markers  Riser 30 Inch  Continuous Split Barrel Sample  Flight Auger Sample  Split Barrel Sample  Thinwall Tube Sample  Highway Sign  SNOW GATE 18 FT  SNOW GATE 28 FT  SNOW GATE 40 FT  Standard Penetration Test  Transformer  Inclinometer Tube  Underdrain Cleanout  Excavation Unit  Water Valve
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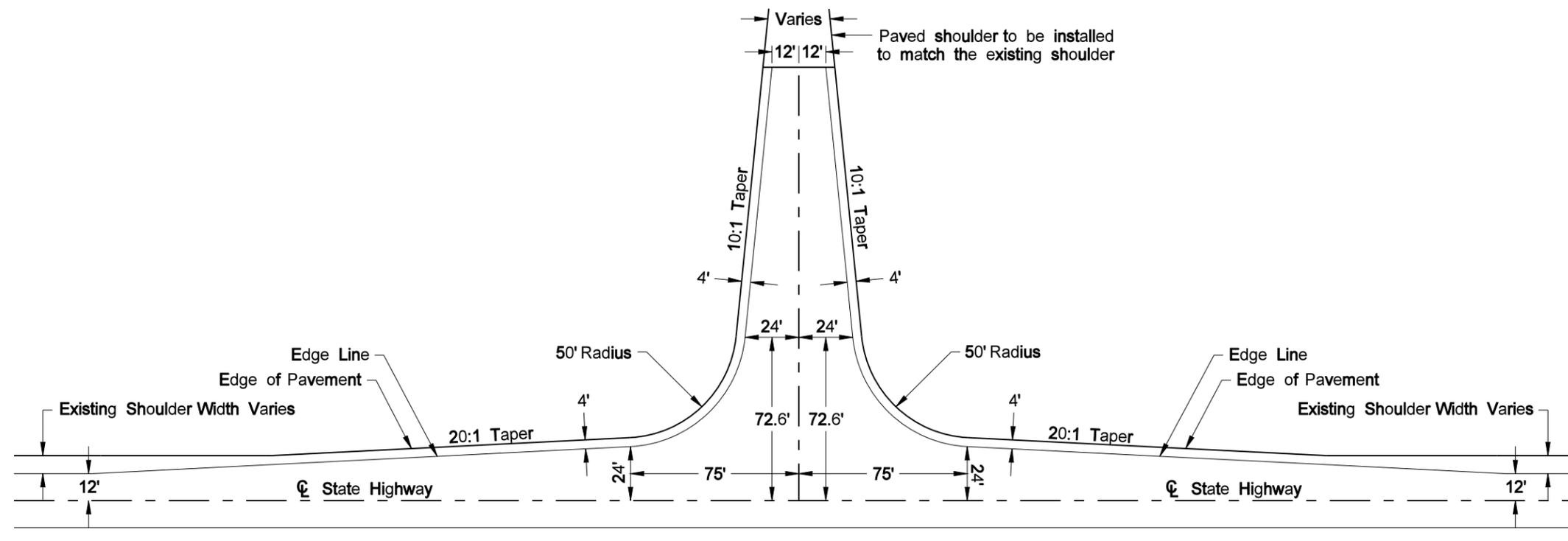
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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 of Transportation

STANDARD 90° FLARED INTERSECTION



Type B
90° Flared Intersection with Turn Lane

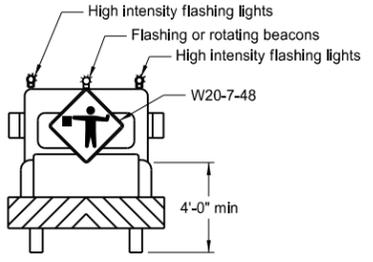
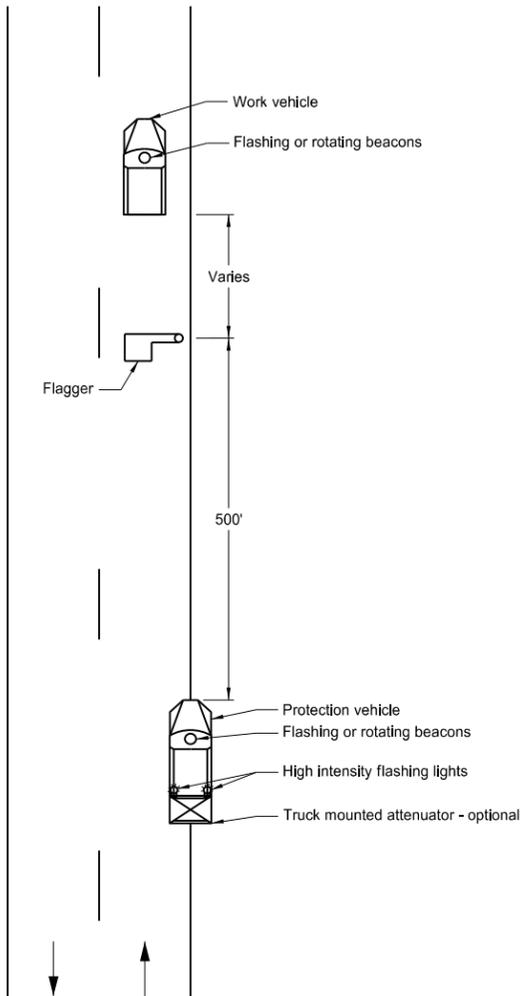


Type A
90° Flared Intersection

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-19-09	
REVISIONS	
DATE	CHANGE

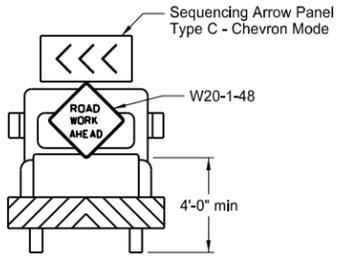
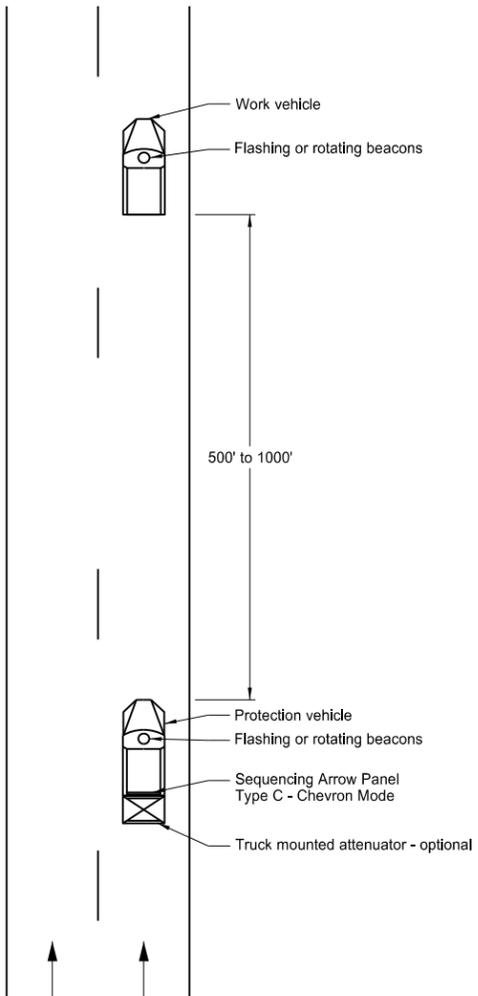
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Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

- Notes:
1. The working vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light.
 2. The shadow vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light. The shadow vehicle for Multilane Roadway shall also have a sequencing arrow panel Type C operated in the chevron mode.
 3. This application is for use during daylight hours and in areas of good visibility only.
 4. Two lane, two way roadway, a flagger shall be used to protect the work area and warn oncoming traffic.

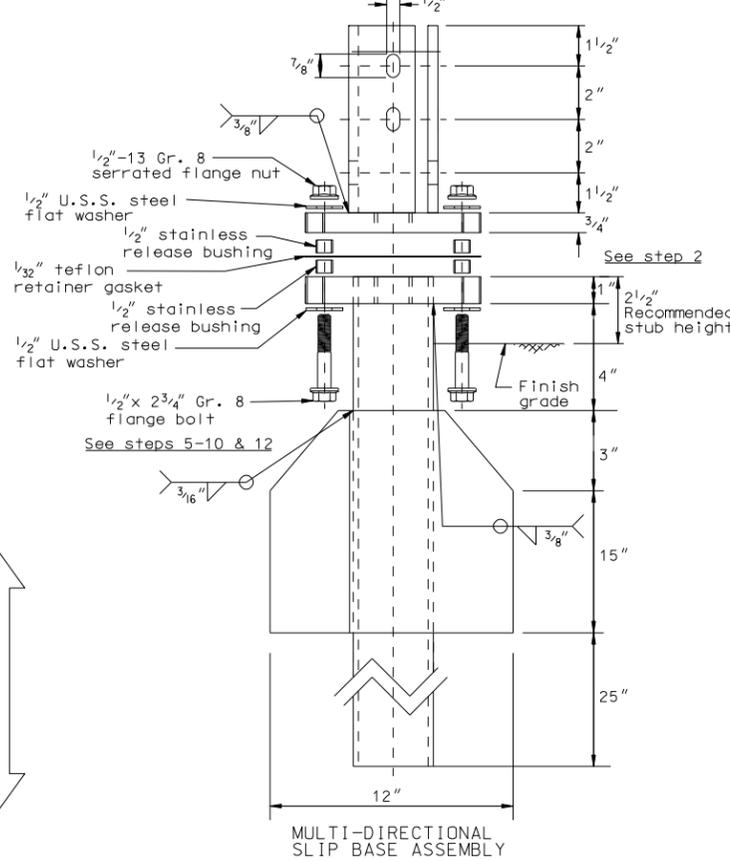
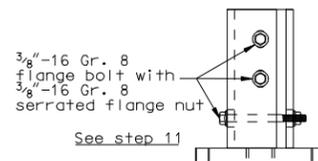
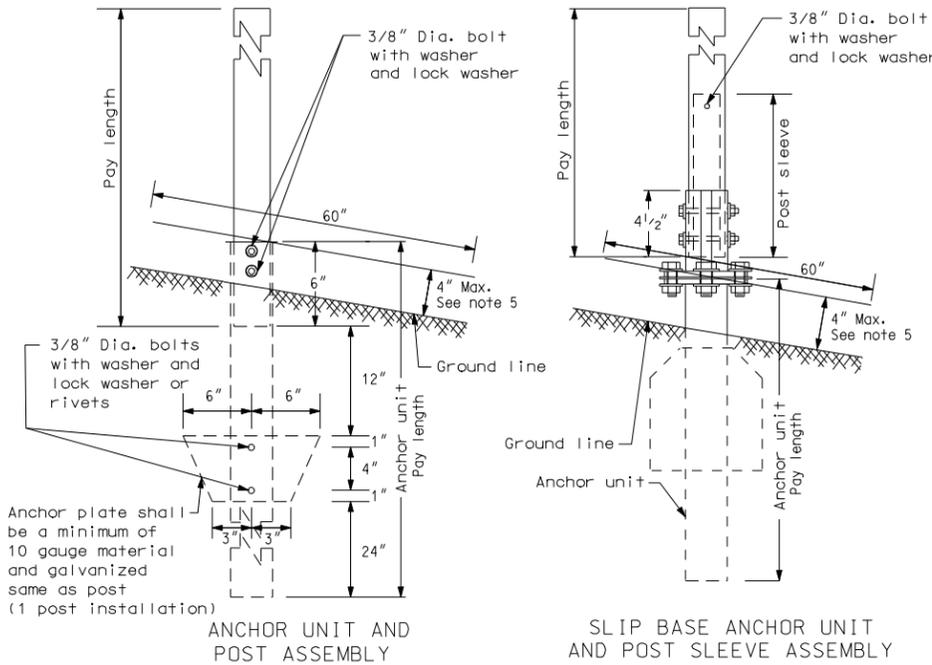
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

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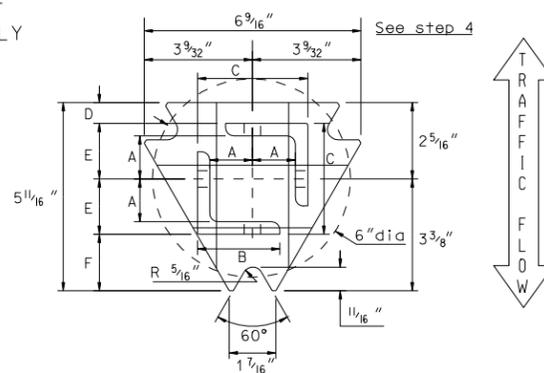
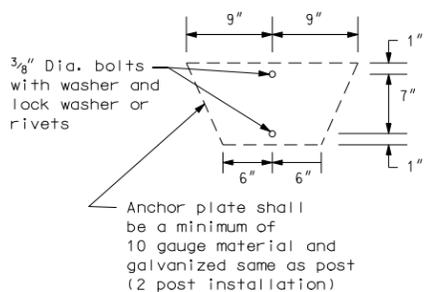
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

PERFORATED TUBE



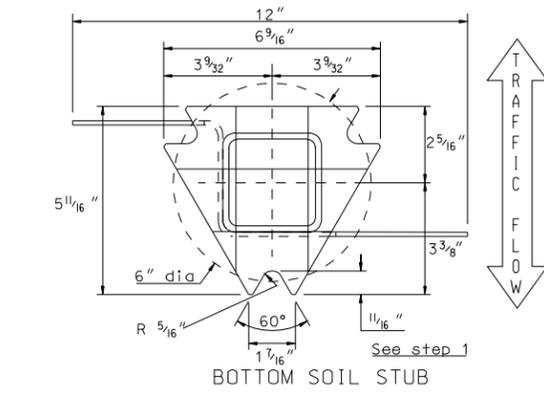
- Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
 2. The 2 3/16 inch size 10 gauge is shown as 2.19 inch size on the plans. The 2 1/2 inch size 10 gauge is shown as 2.51 inch size on the plans.
 3. Anchor for 2 inch, 2 1/4 inch, and 2 1/2 inch posts.
 4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3 inch x 3 inch x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
 5. 4 inch vertical clearance of anchor or breakaway base. The 4 inch x 60 inch measurement shall be made above and below post location and also back and ahead of post.
 6. When used in concrete sidewalk, anchor shall be the same except without the wings.
 7. Four post signs shall have over 8 feet between the first and fourth posts.



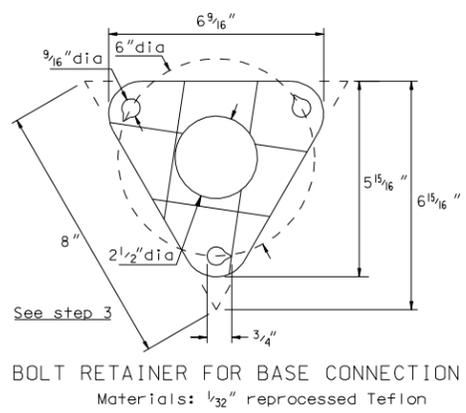
TOP POST RECEIVER
Materials: Plate - ASTM A572 grade 50
Angle receiver - 2 1/2 inch x 2 1/2 inch x 3/8 inch ASTM A36 structural angle

TOP POST RECEIVER DATA TABLE						
Square Post Sizes	A	B	C	D	E	F
2 3/16 inch x 10 Ga. Square Post	1 3/64 inch	2 1/2 inch	3 1/32 inch	2 3/32 inch	1 3/64 inch	1 7/8 inch
2 1/2 inch x 10 Ga. Square Post	1 3/32 inch	2 1/2 inch	3 5/16 inch	5/8 inch	1 2/32 inch	1 3/4 inch

2 3/16 inch x 10 gauge may be inserted into 2 1/2 inch x 10 gauge for additional wind load.



BOTTOM SOIL STUB
Materials: Tube - 3 inch x 3 inch x 7 gauge ASTM A500 Gr B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
Plate - ASTM A572 grade 50



BOLT RETAINER FOR BASE CONNECTION
Materials: 1/32 inch reprocessed Teflon

MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave 2 1/2 inch from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each 1/2 inch flat washer on to 1 each inverted 1/2 inch - 13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading 1/2 inch - 13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out. *NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48 inch, not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each 3/8 inch - 16 gr. 8 flange bolts and 3 each 3/8 inch - 16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three 1/2 inch - 13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque. *NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.

Number of Posts	Telescoping Perforated Tube					
	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			B	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	10			Yes	
2	2 1/4	12	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	

B - The 2 1/2 inch, 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. 4	Cross Sect. 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
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

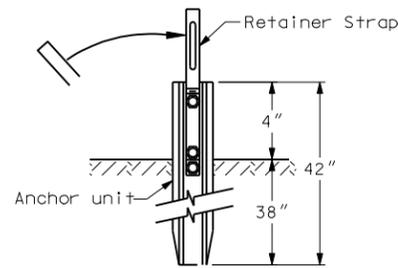
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

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BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

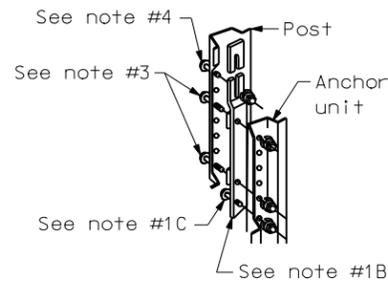
FLANGED CHANNEL



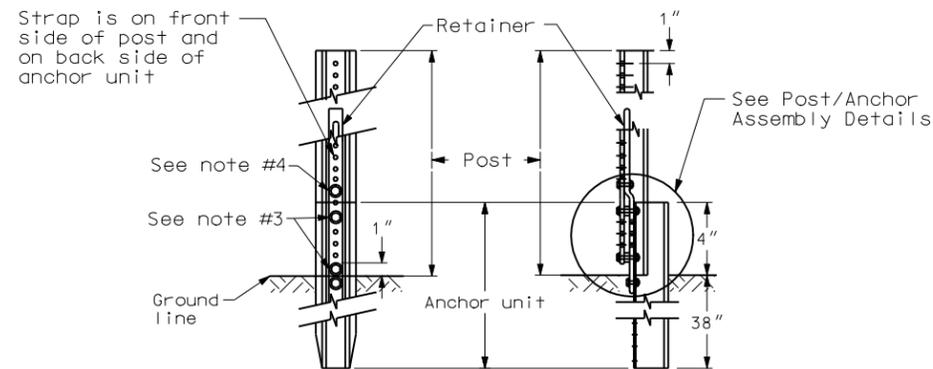
Anchor Unit & Strap Assembly Detail

STEPS OF INSTALLATION

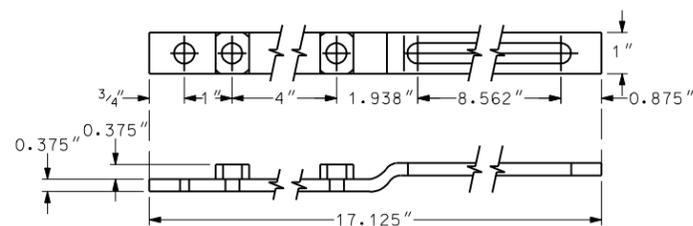
1. A) Drive anchor unit to within 12" of ground level.
B) Proper assembly established by lining up the top 3/4" slot of retainer spacer strap with top hole of anchor unit.
C) Assemble strap to back of anchor unit using 3/8"-16 UNC x 2.0" long bolt, lock washer and nut.
D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4" dimension.
B) Rotate strap to vertical position.
3. A) Place 3/8"-16 UNC x 2" bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom 3/4" slot in the strap).
B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening 3/8"-16 UNC x 2" long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap and sign post at the bolts have full contact across the entire width.



Post/Anchor Assembly Details



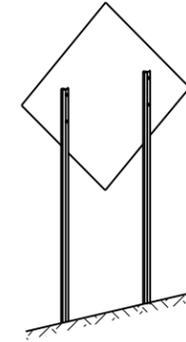
Front View Side View Sign Post Assembly Detail



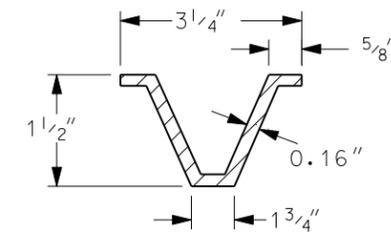
Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN. 3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560

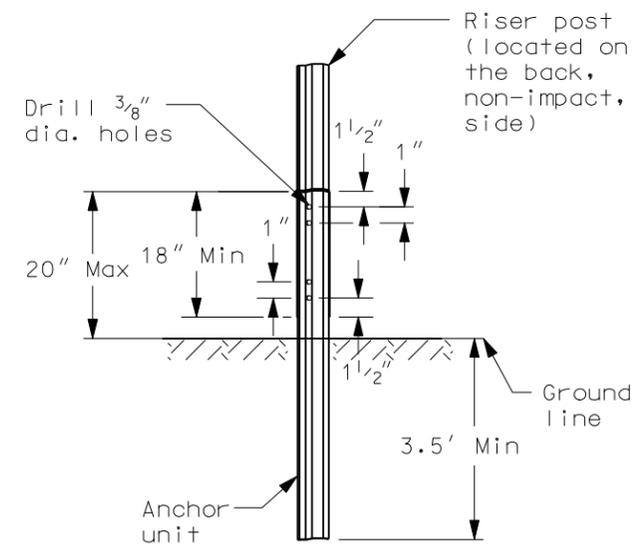
3 LB/FT U POSTS



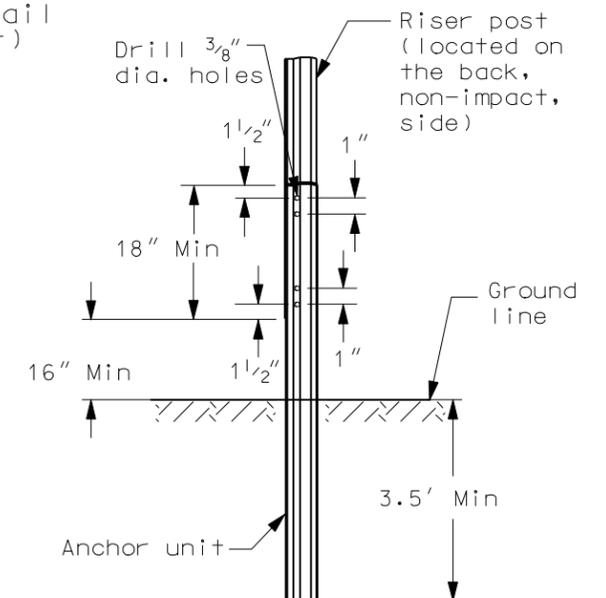
Typical Installation



U-Post Detail (3 lb/ft)



U-Channel Splice Option 1



U-Channel Splice Option 2

Notes

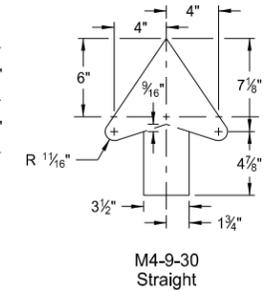
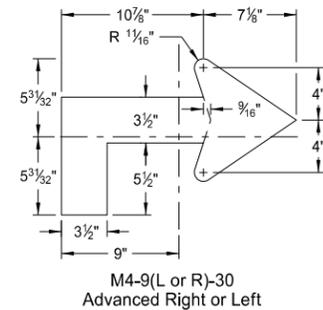
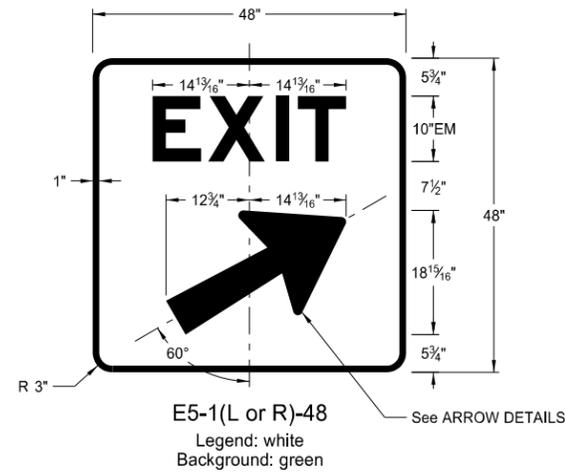
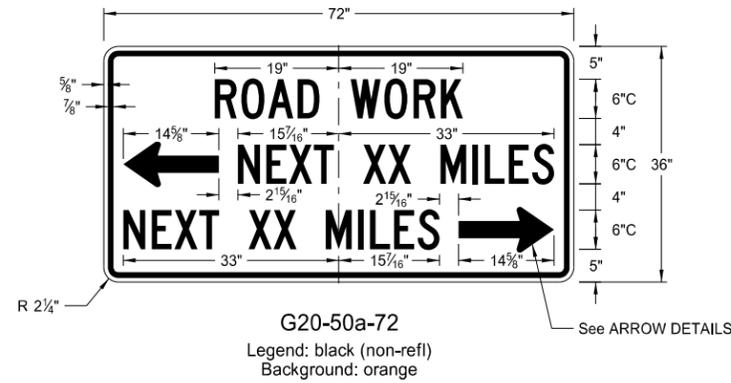
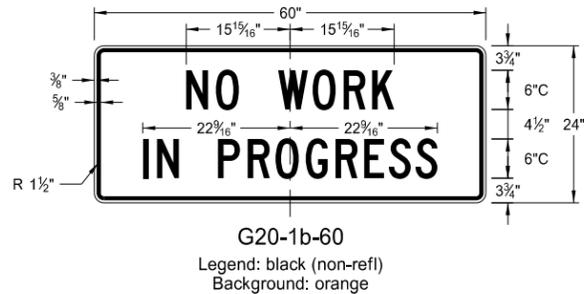
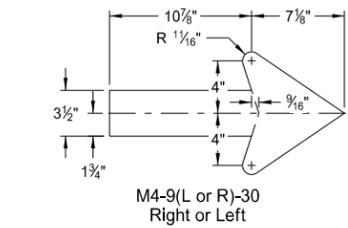
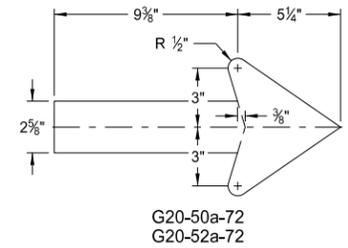
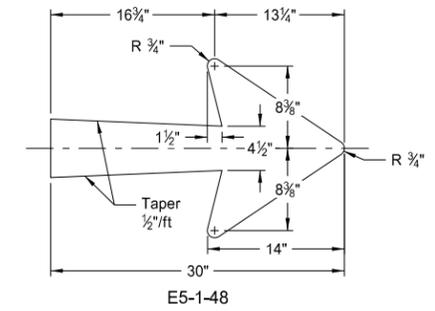
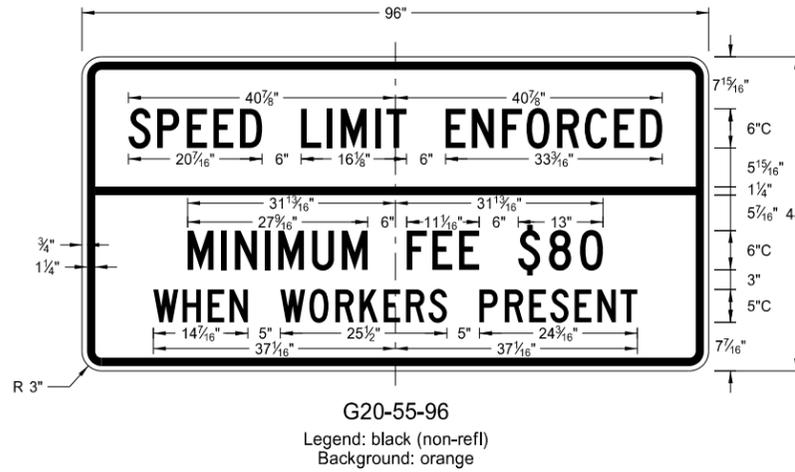
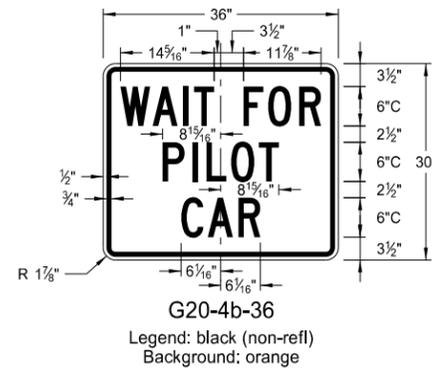
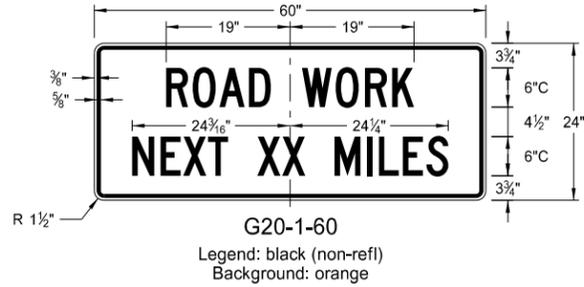
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7' long and embedded at least 3.5'.
3. A splice shall overlap a minimum of 18".
4. Use 4 bolts 5/16" diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4" above ground and embedded at least 3.5'.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

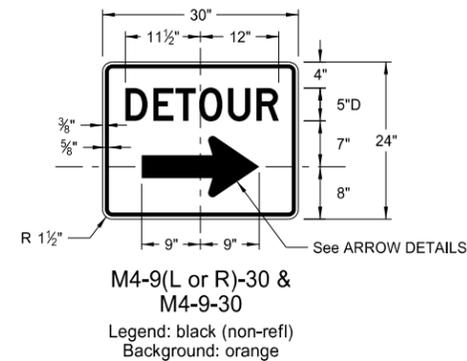
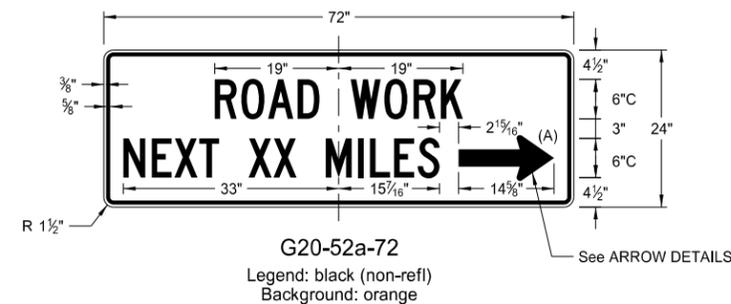
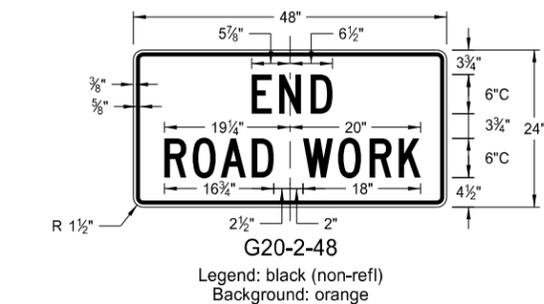
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

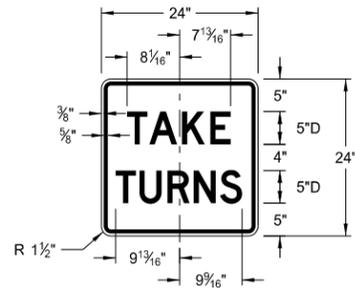
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

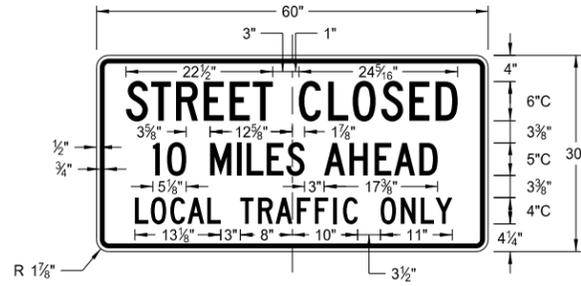
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

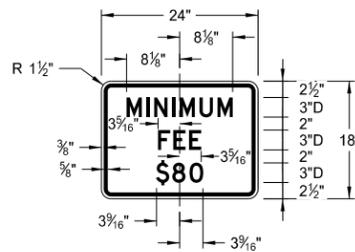
D-704-10



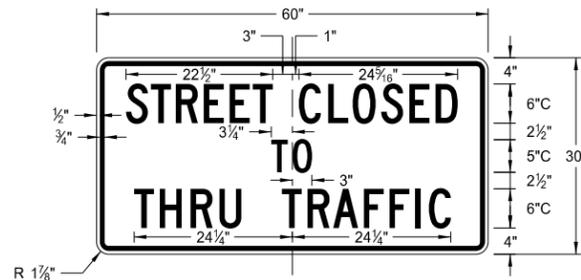
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Background: white



R11-3c-60
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R2-1a-24
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R11-4a-60
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R11-2a-48
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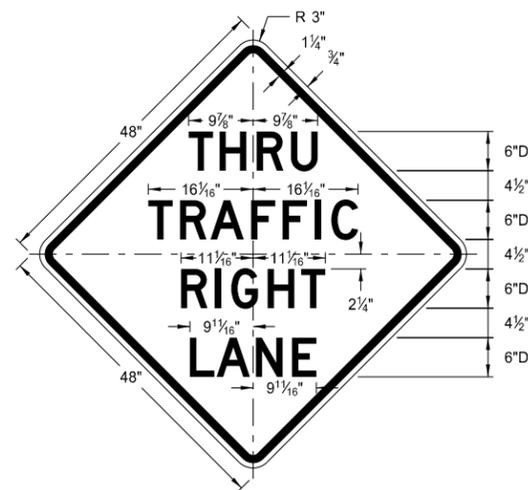
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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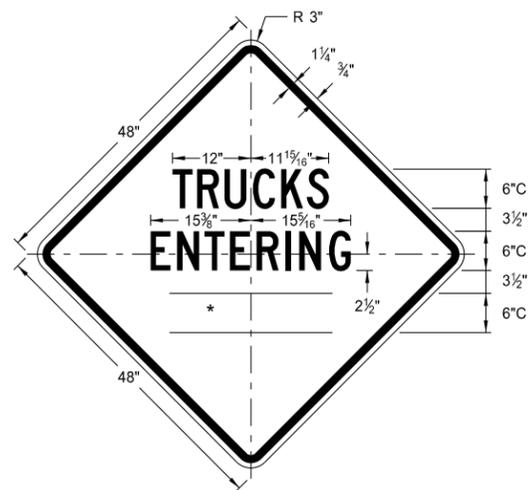
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

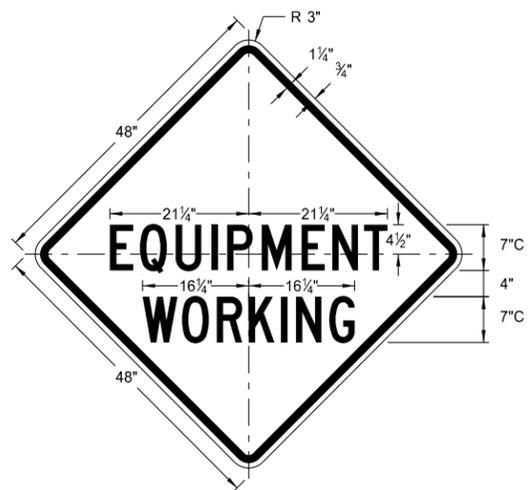
* DISTANCE MESSAGES



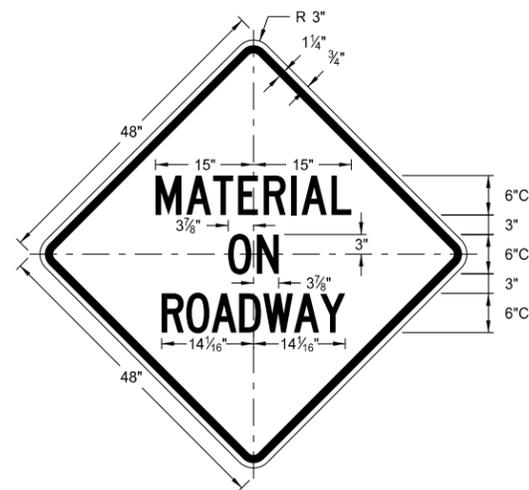
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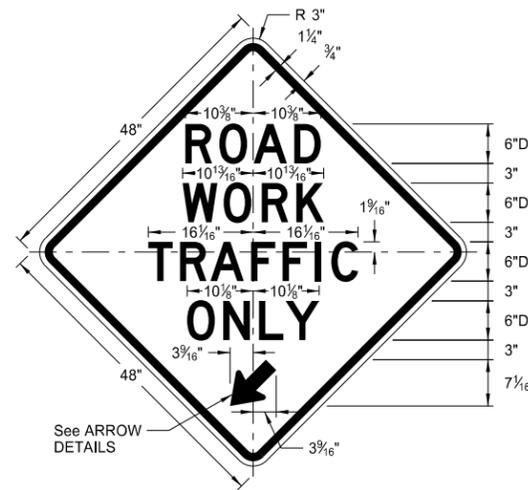
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Legend: black (non-refl)
Background: orange



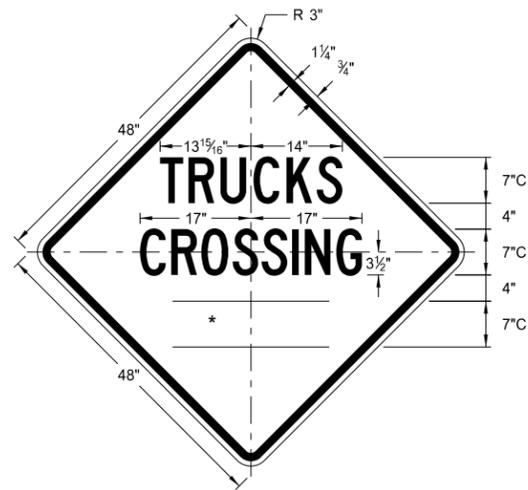
W20-51-48
Legend: black (non-refl)
Background: orange



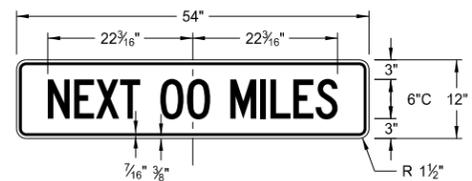
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Legend: black (non-refl)
Background: orange



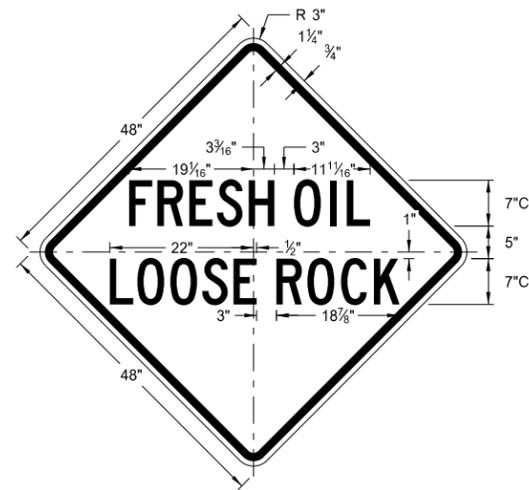
W5-9-48
Legend: black (non-refl)
Background: orange



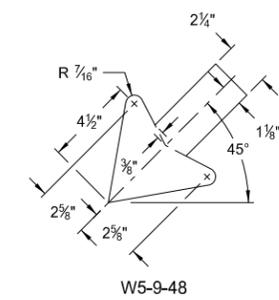
W8-55-48
Legend: black (non-refl)
Background: orange



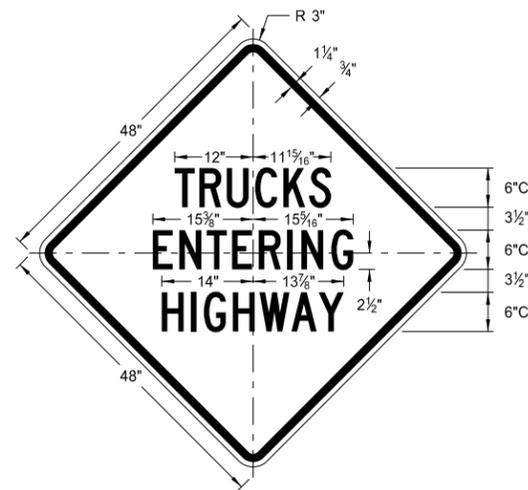
W20-52-54
Legend: black (non-refl)
Background: orange



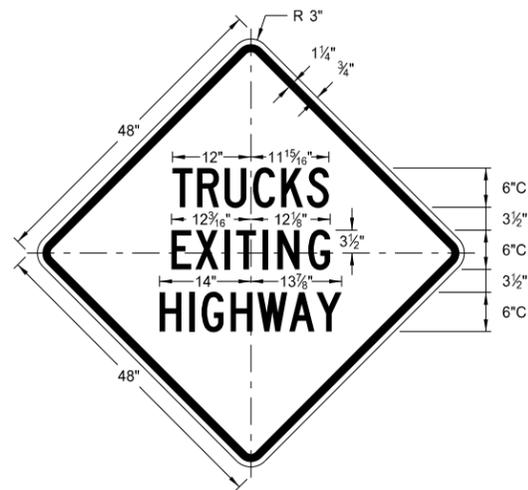
W22-8-48
Legend: black (non-refl)
Background: orange



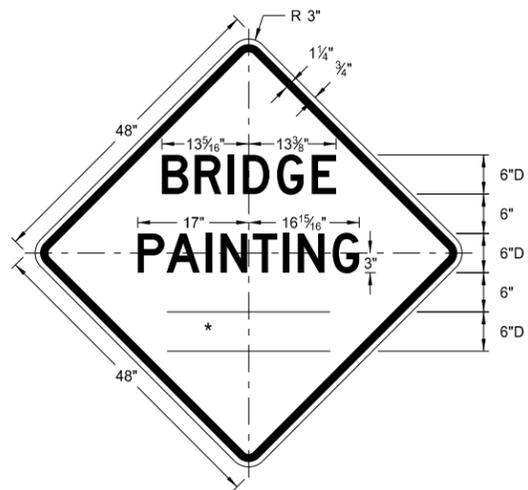
W5-9-48
ARROW DETAILS



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



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

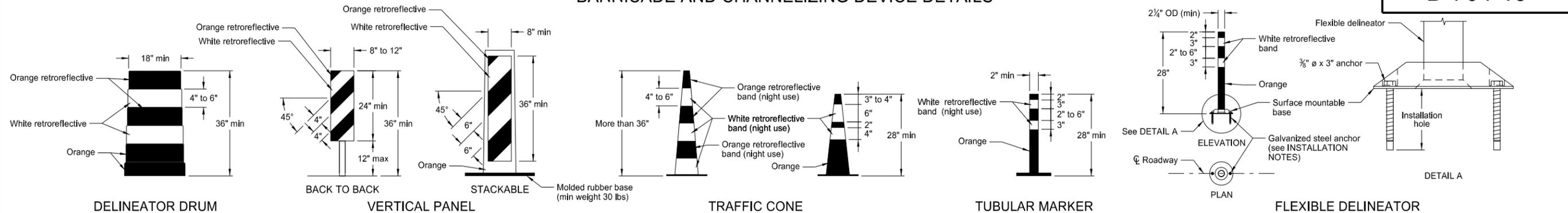


W21-50-48
Legend: black (non-refl)
Background: orange

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

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BARRICADE AND CHANNELIZING DEVICE DETAILS



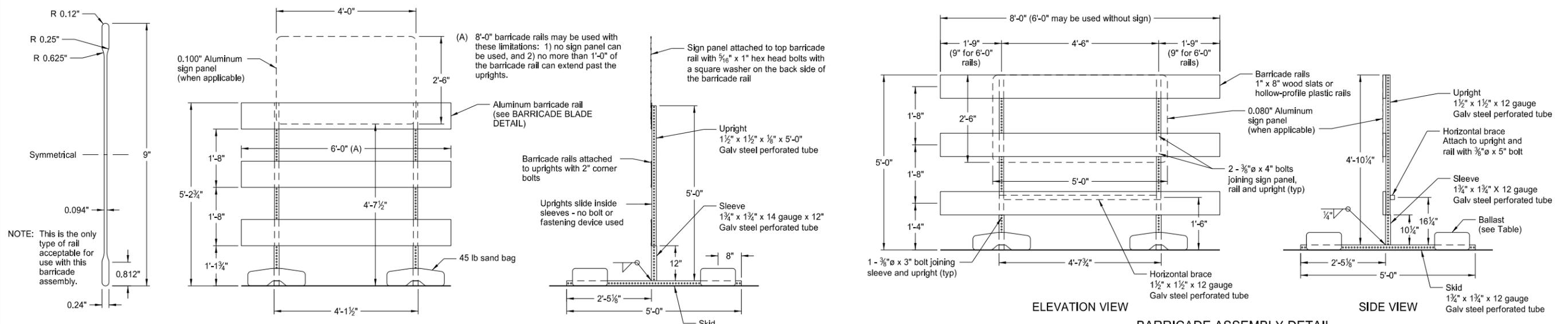
- INSTALLATION NOTES:**
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl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

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

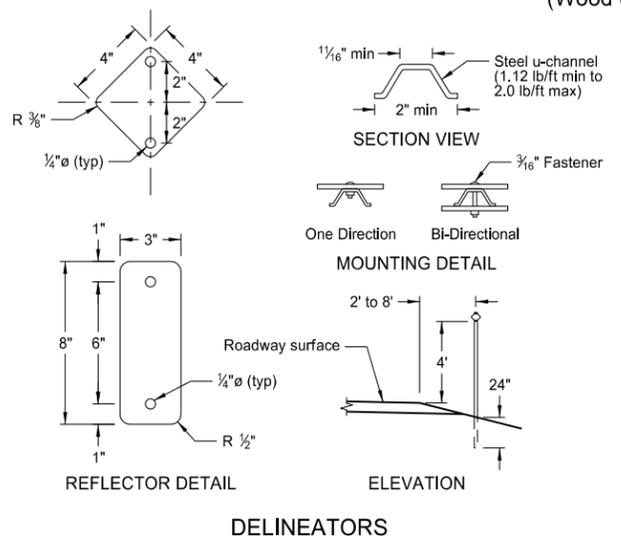
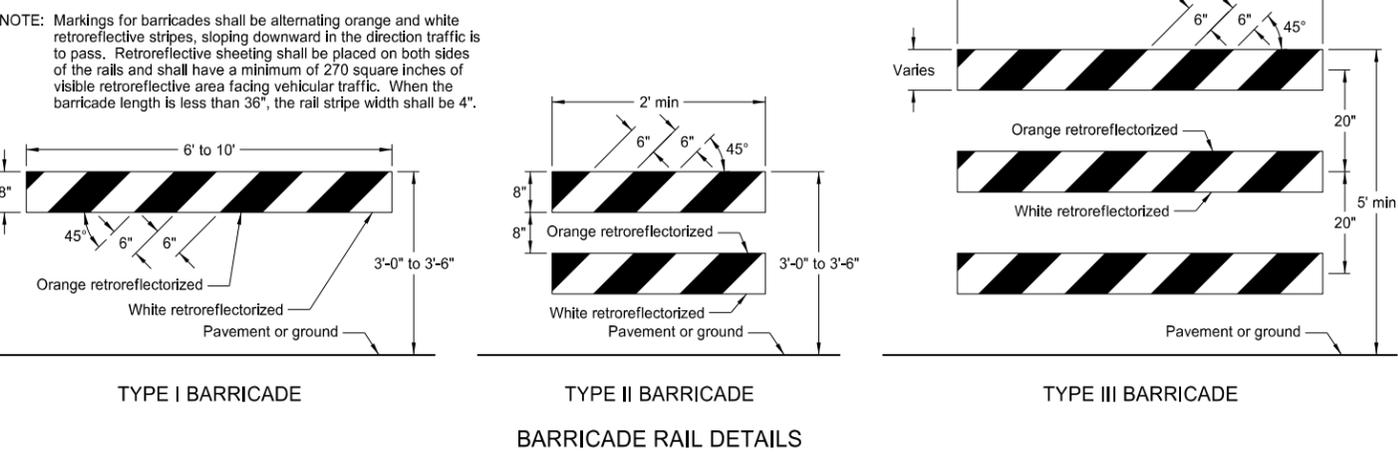
Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular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

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

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



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



MINIMUM BALLAST
 (For each side of barricade support)

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

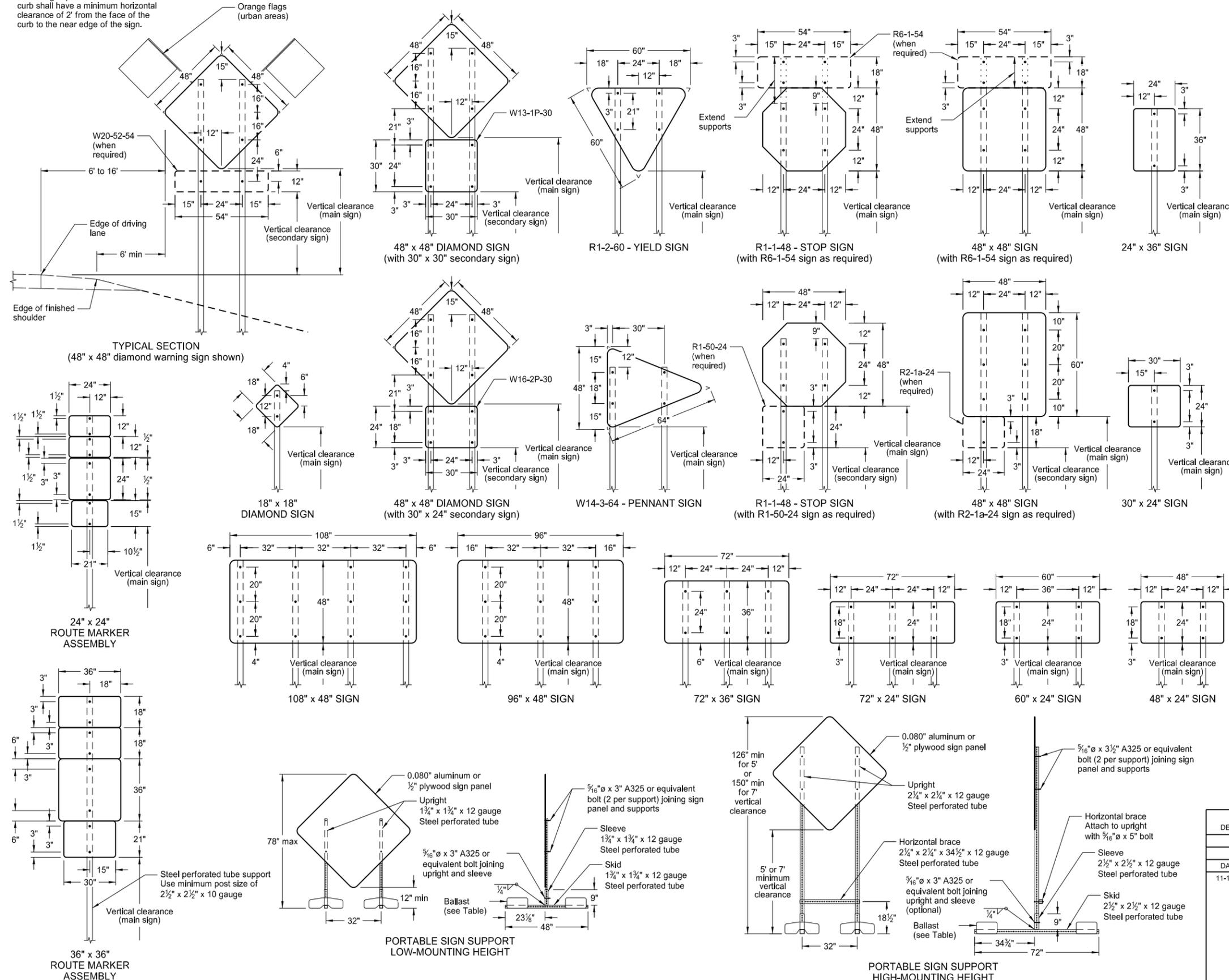
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

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

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



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

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

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.
 2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.
 3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)
 4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background
 5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

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

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.
 6. Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

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

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ROAD CLOSURE LAYOUTS

Notes

- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper.
 - L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
- Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
- Sequencing Arrow Panels
 - Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
 - Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 - Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- Use when work area is 1 mile or longer.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- Where necessary, safe speed to be determined by the Engineer.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

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

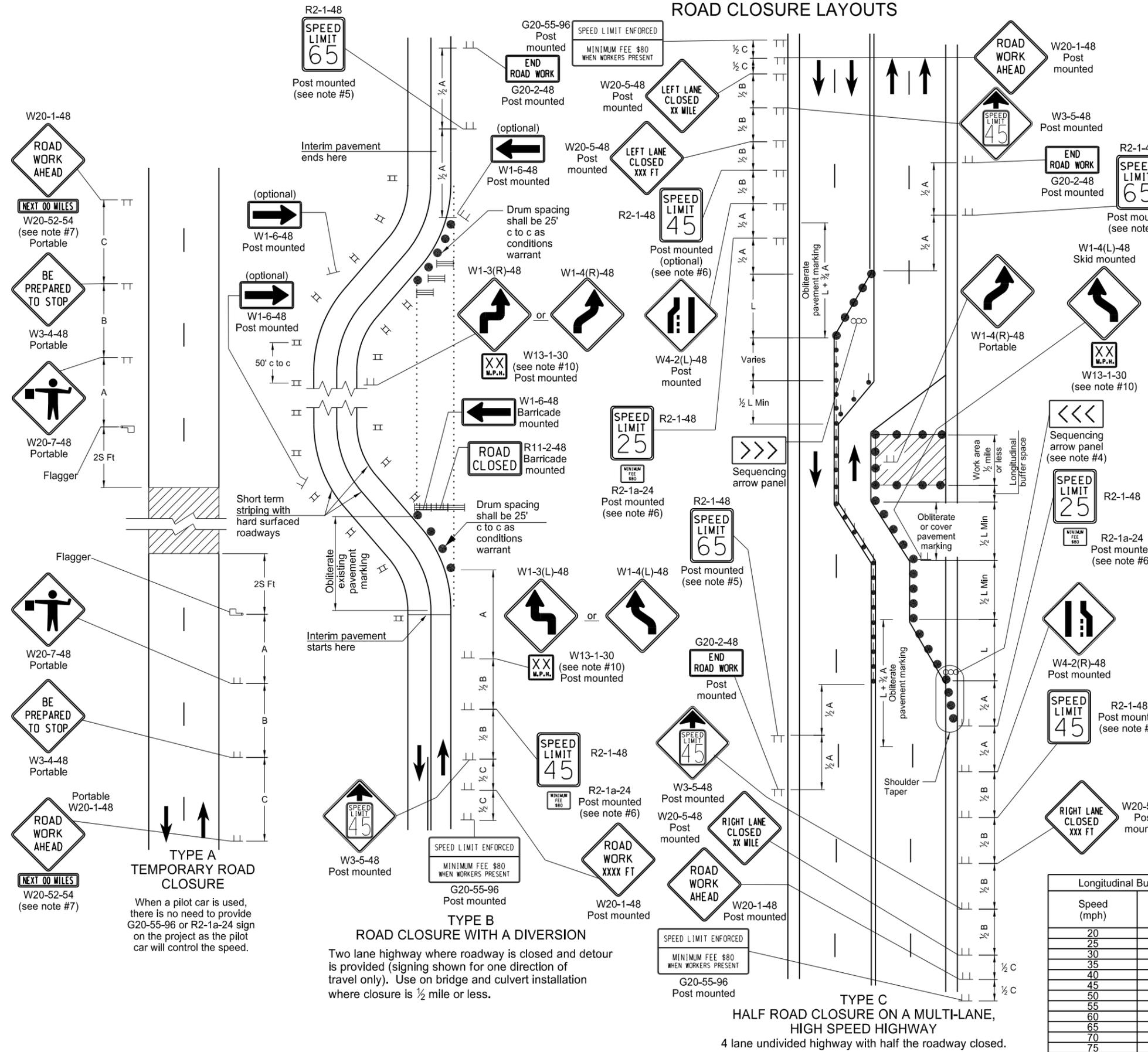
KEY

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

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

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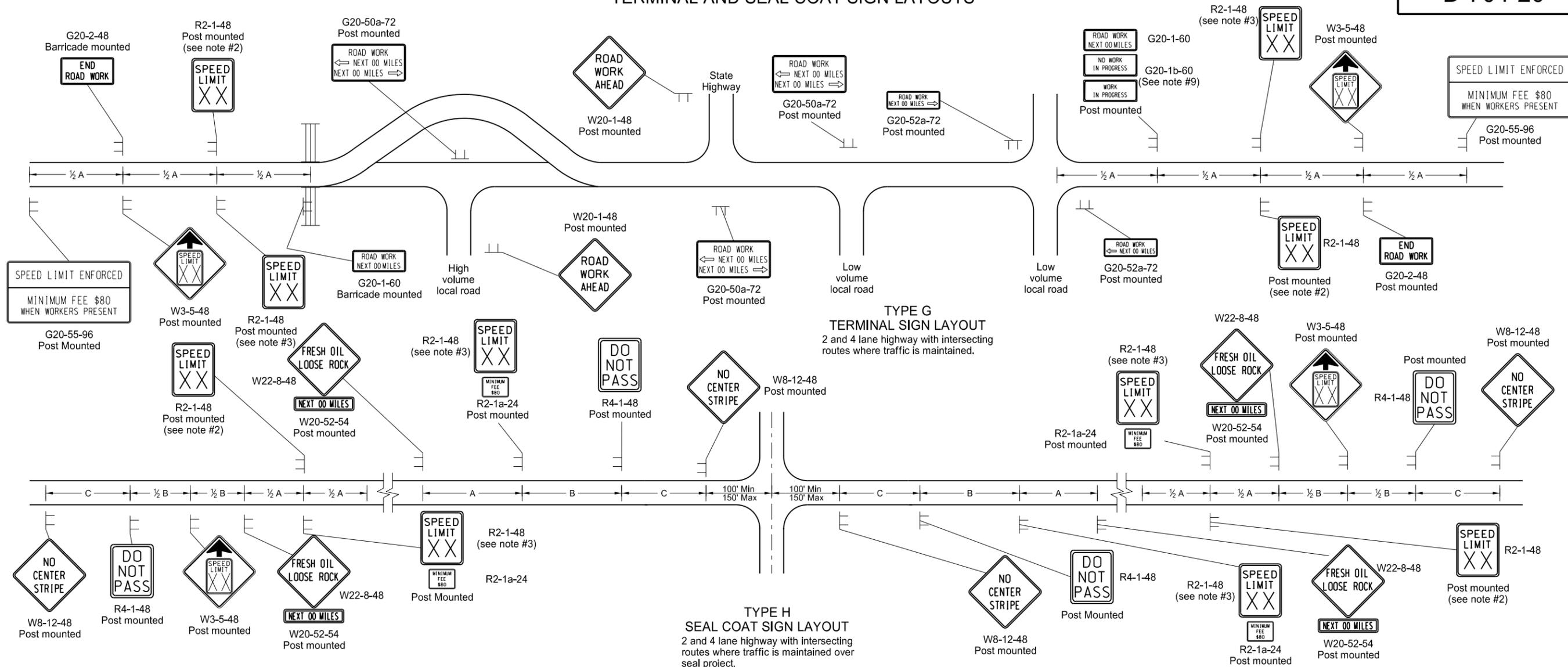
TYPE A TEMPORARY ROAD CLOSURE
When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.

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

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

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



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

KEY

Type III barricade
 Sign

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

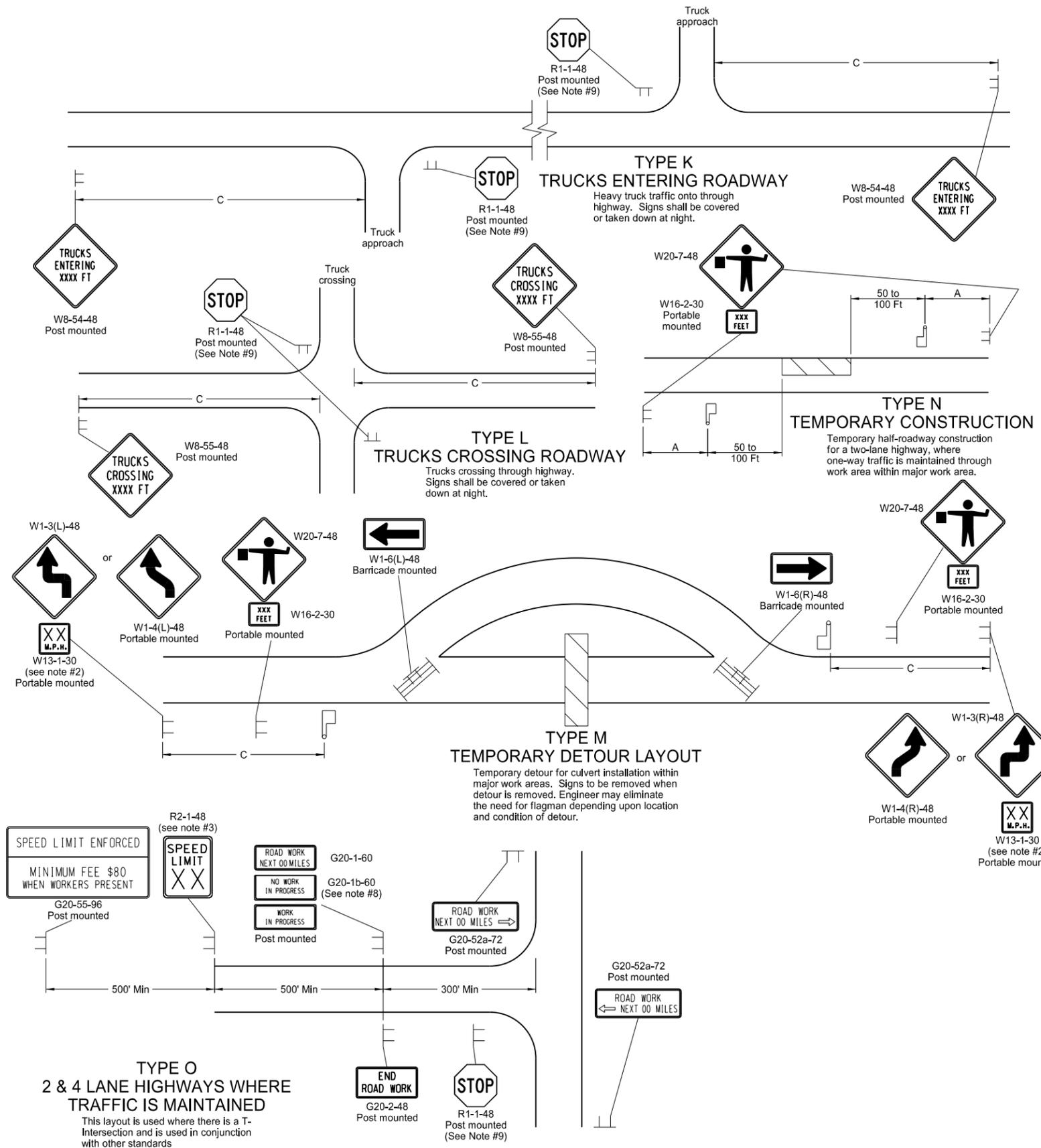
NORTH DAKOTA
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9-27-13

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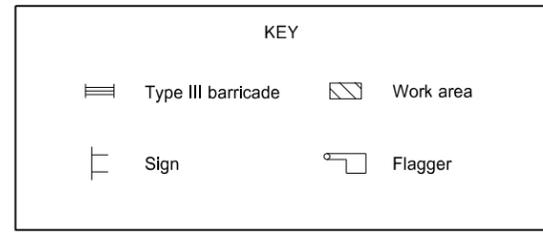
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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



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



ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

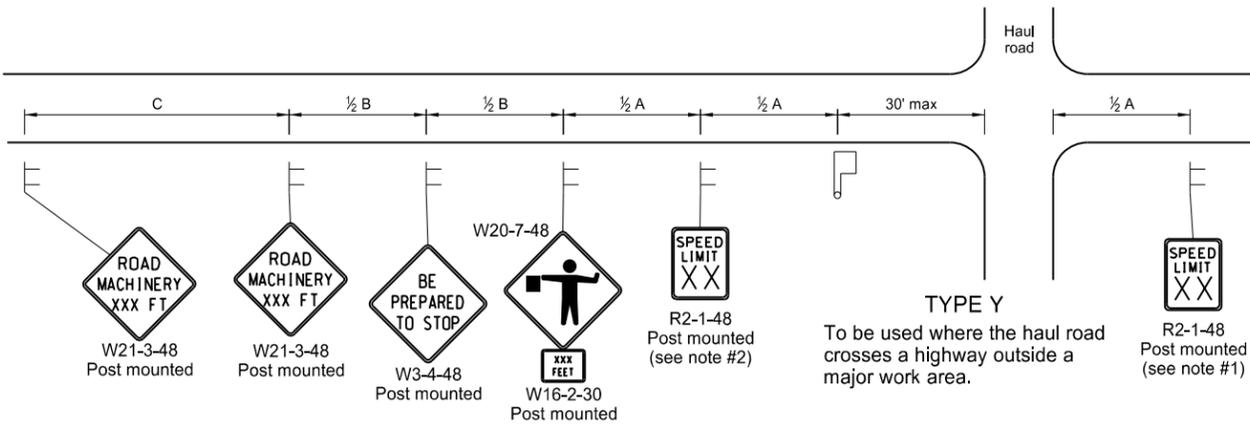
REVISIONS

DATE	CHANGE

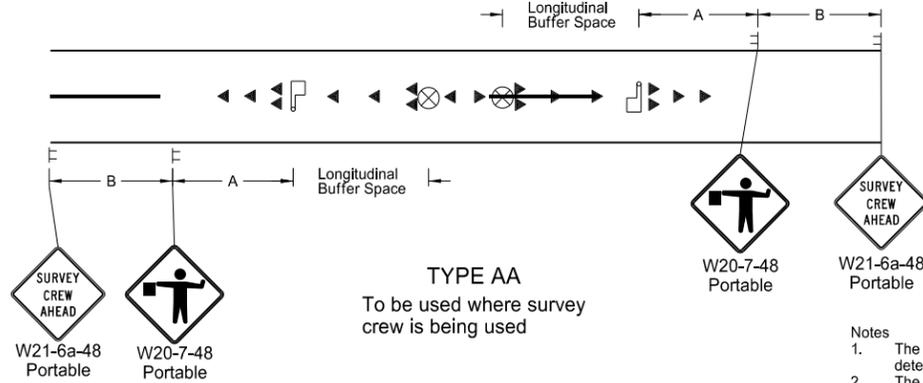
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MISCELLANEOUS SIGN LAYOUTS

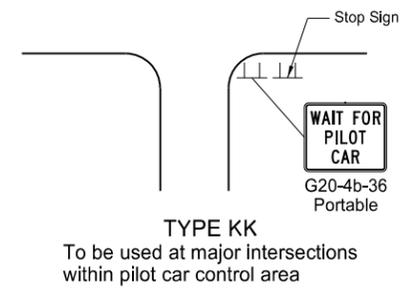
D-704-26



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

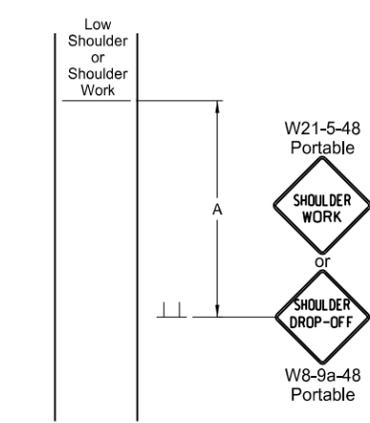


TYPE AA
To be used where survey crew is being used

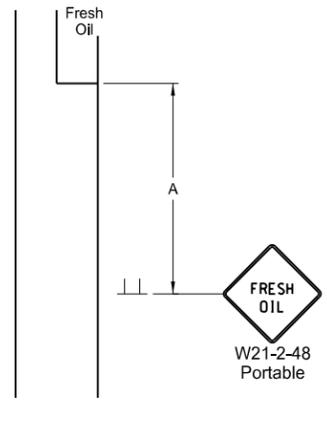


TYPE KK
To be used at major intersections within pilot car control area

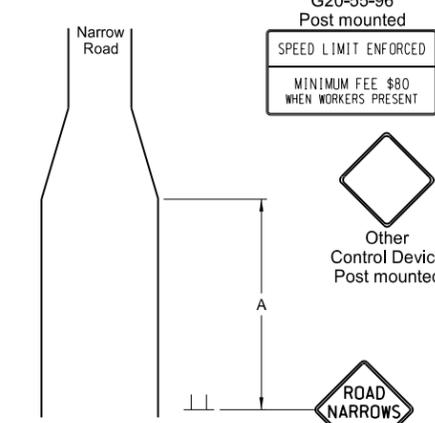
- Notes
1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
 2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph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



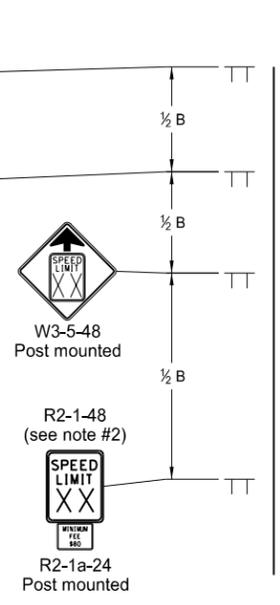
TYPE BB
To be used within a major work area where the sign conditions exist



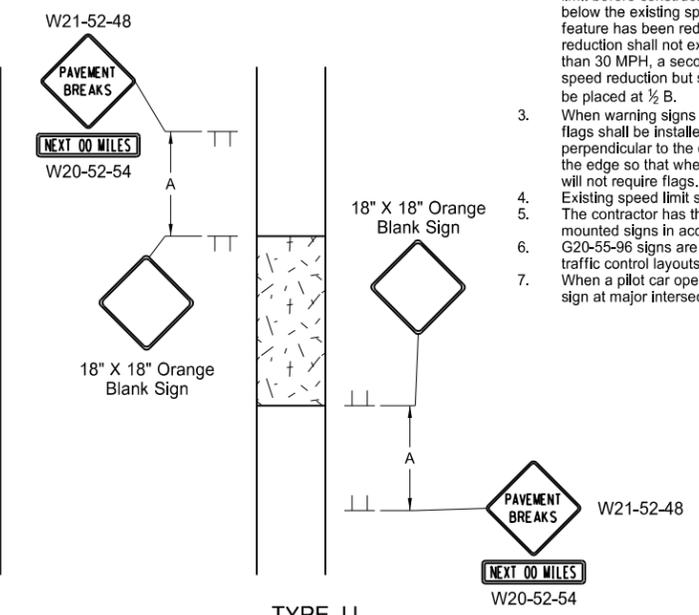
TYPE CC
To be used where the sign conditions exist



TYPE DD
To be used where the sign conditions exist



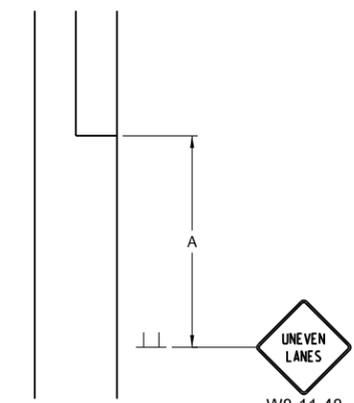
TYPE Z
To be used where speed zone is needed



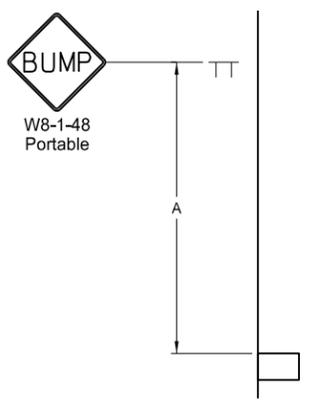
TYPE JJ
To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

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

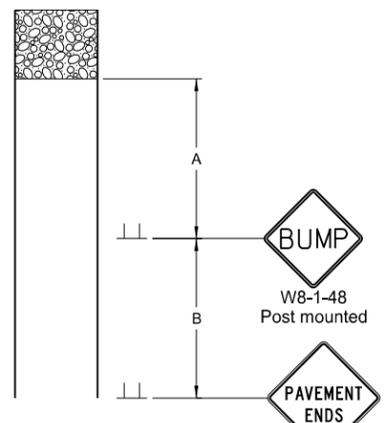
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.



TYPE GG
To be used where a difference of elevation between lanes exist



TYPE EE
To be used where the sign conditions exist



TYPE FF
To be used where the sign conditions exist

KEY

Sign (represented by a vertical line with a horizontal bar)

Cones (represented by a triangle)

Flagger (represented by a square with a diagonal line)

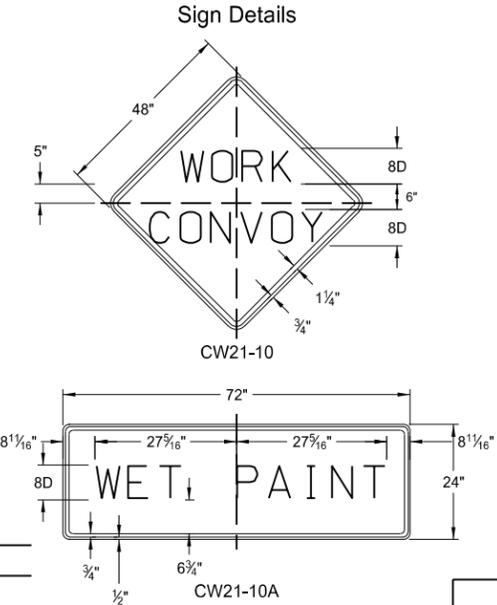
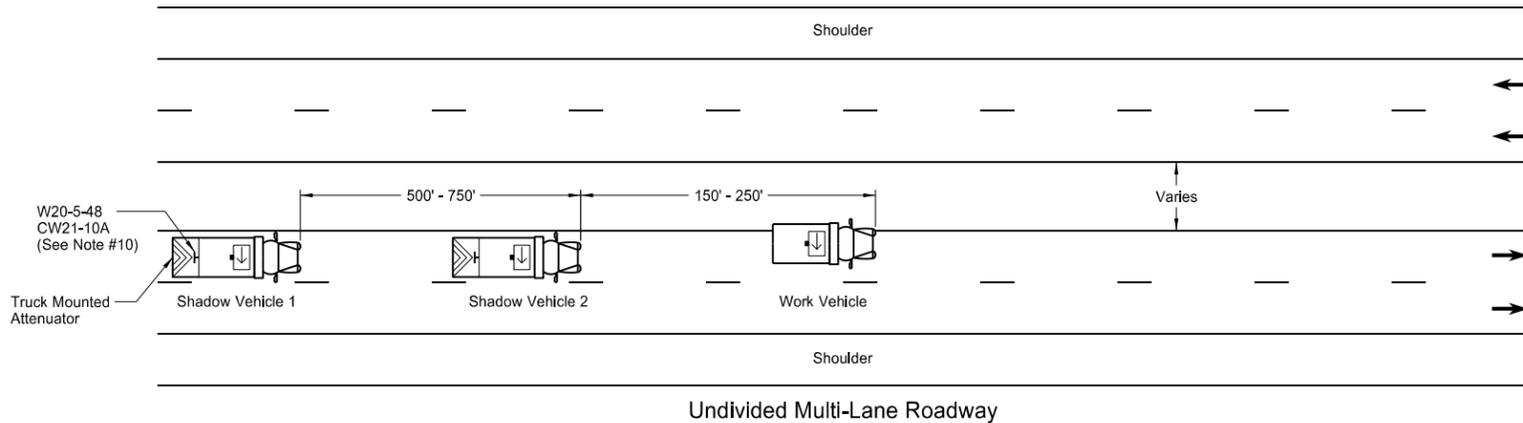
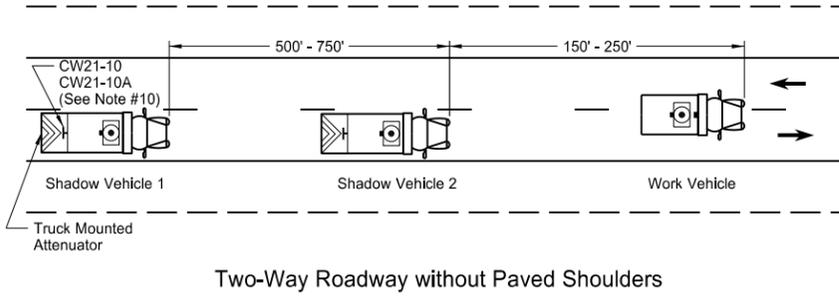
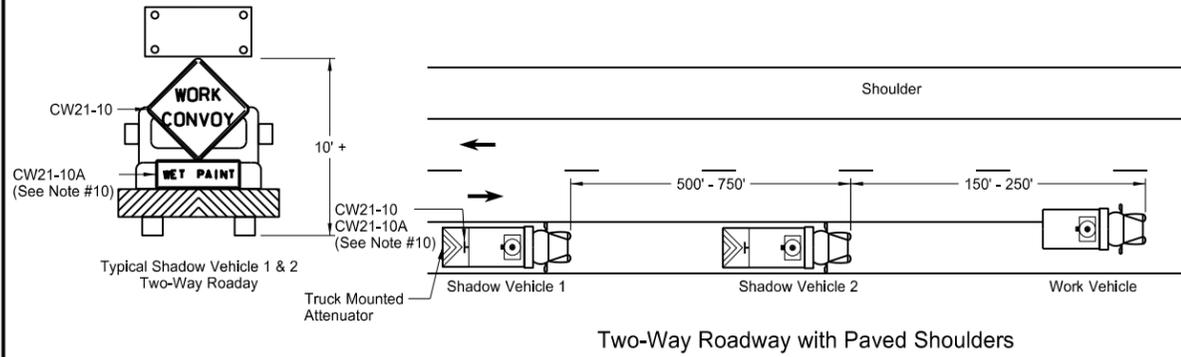
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
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Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph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

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REVISIONS	
DATE	CHANGE

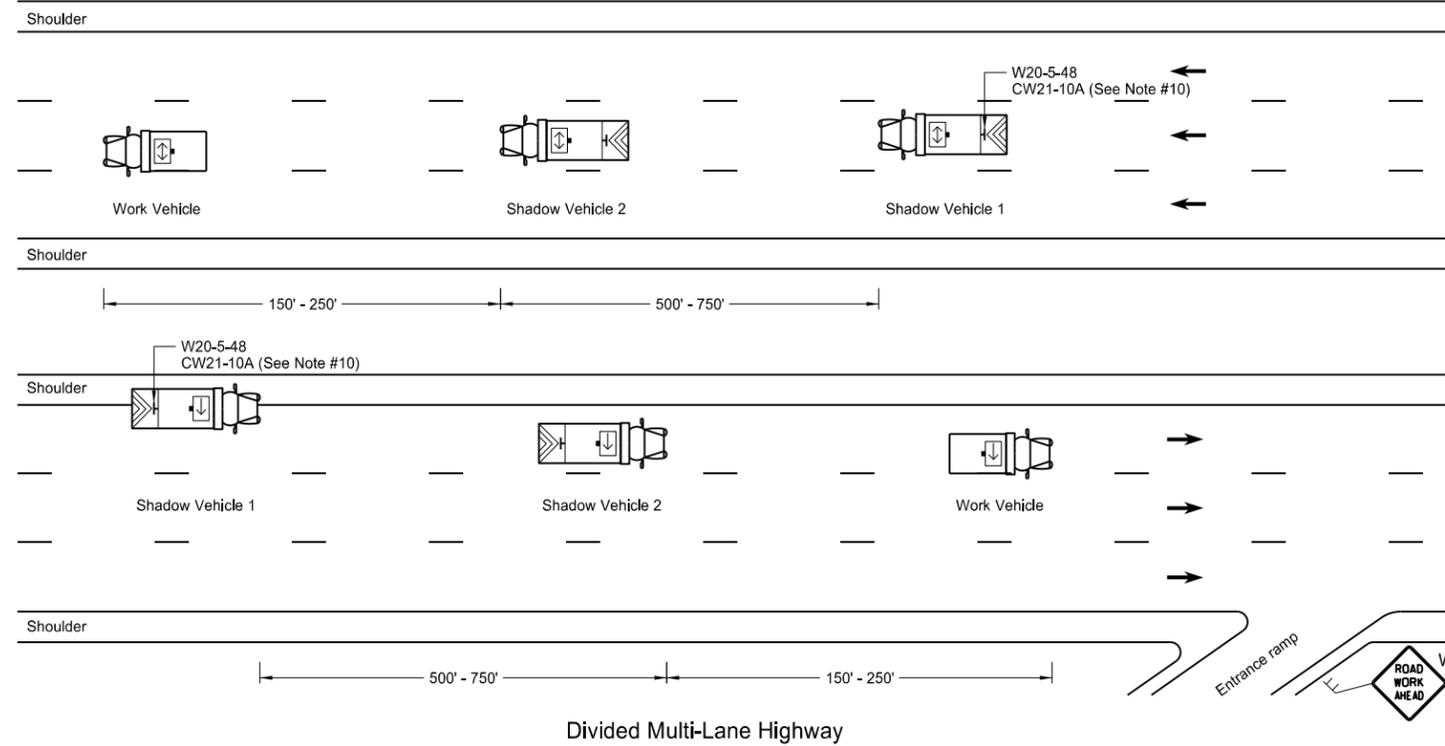
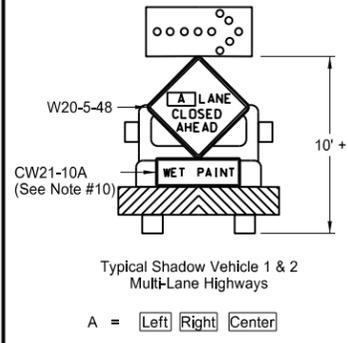
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TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

D-704-27



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



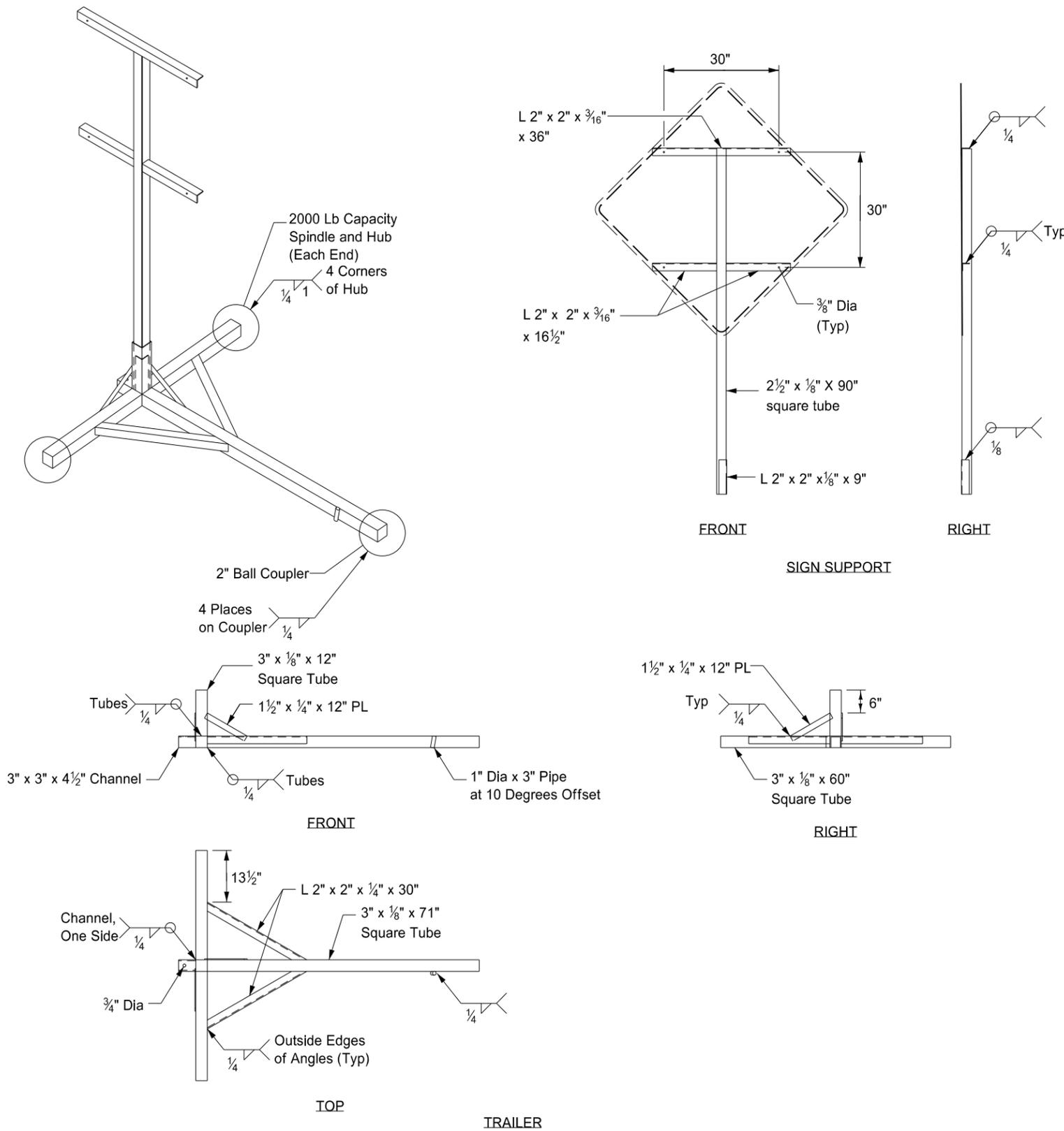
KEY	
	Sign
	Truck mounted attenuator
	Flashing arrow panels:
	Right directional
	Left directional
	Double arrow directional
	Caution Mode

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

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



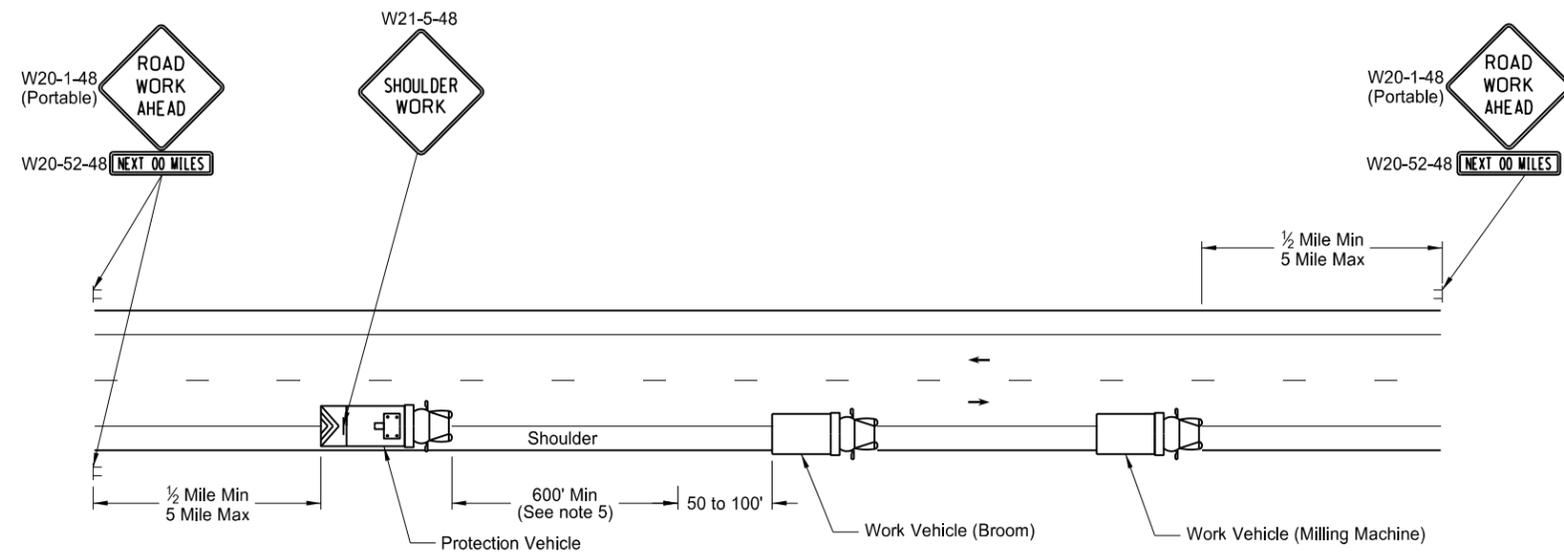
Notes:

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

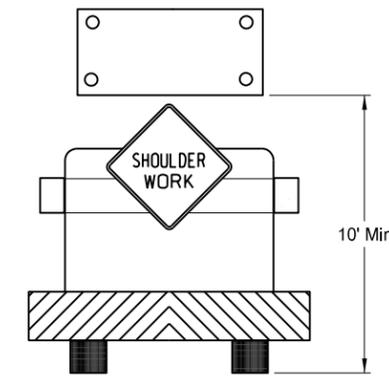
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

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MOBILE OPERATION
Grinding Shoulder Rumble Strips

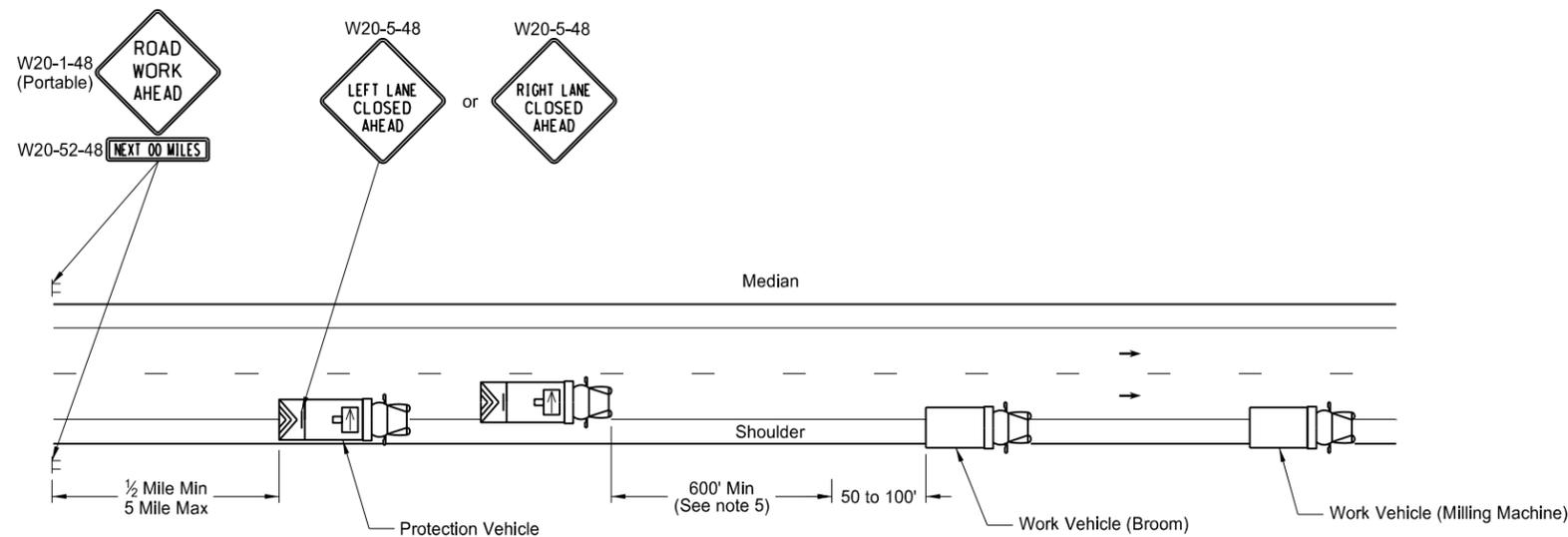


TWO LANE - TWO WAY ROADWAY

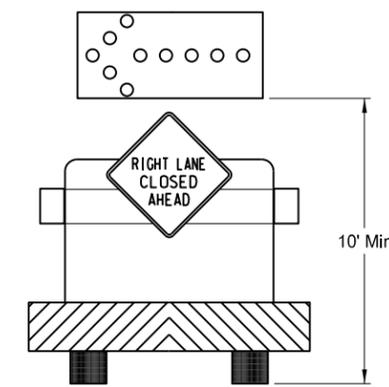


TWO LANE - TWO WAY ROADWAY
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

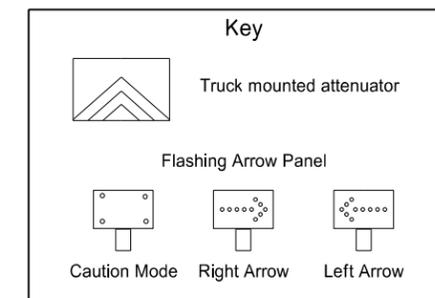
- Notes:
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
 2. Vehicles shall have a rotating, flashing, oscillating or strobe lights.
 3. Flashing arrow panels shall be Type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



INTERSTATE & 4 LANE DIVIDED HIGHWAY



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

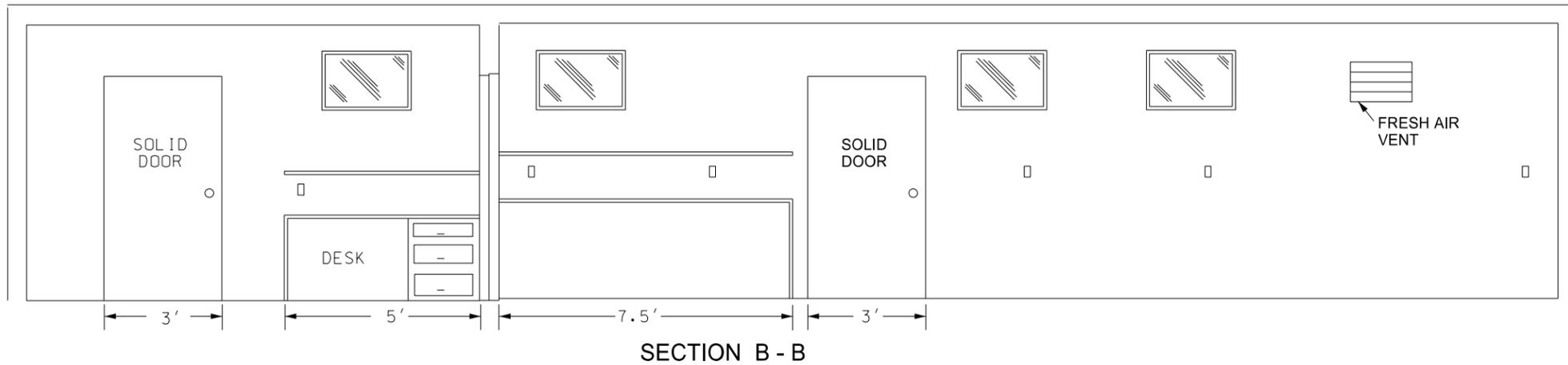
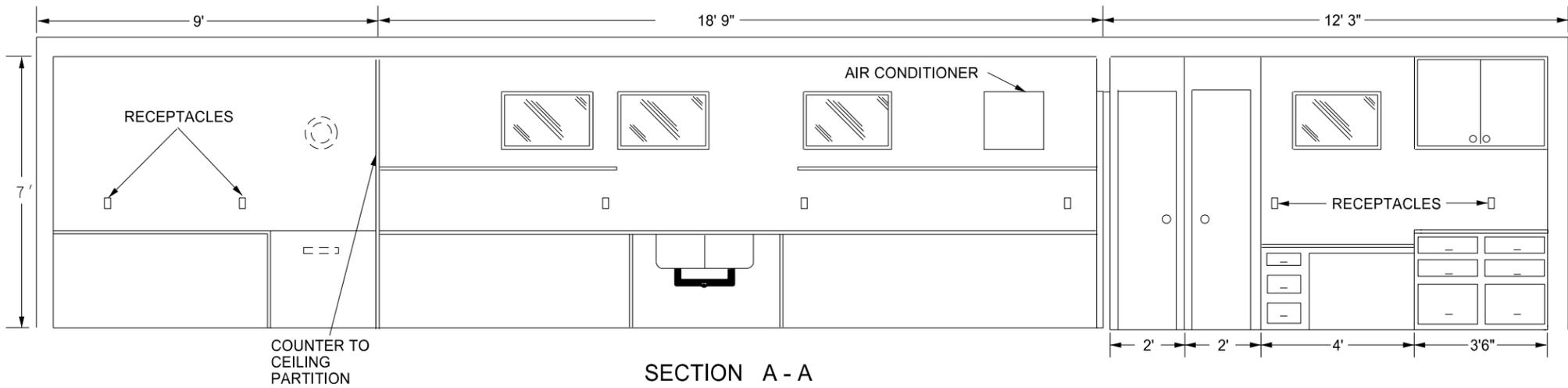
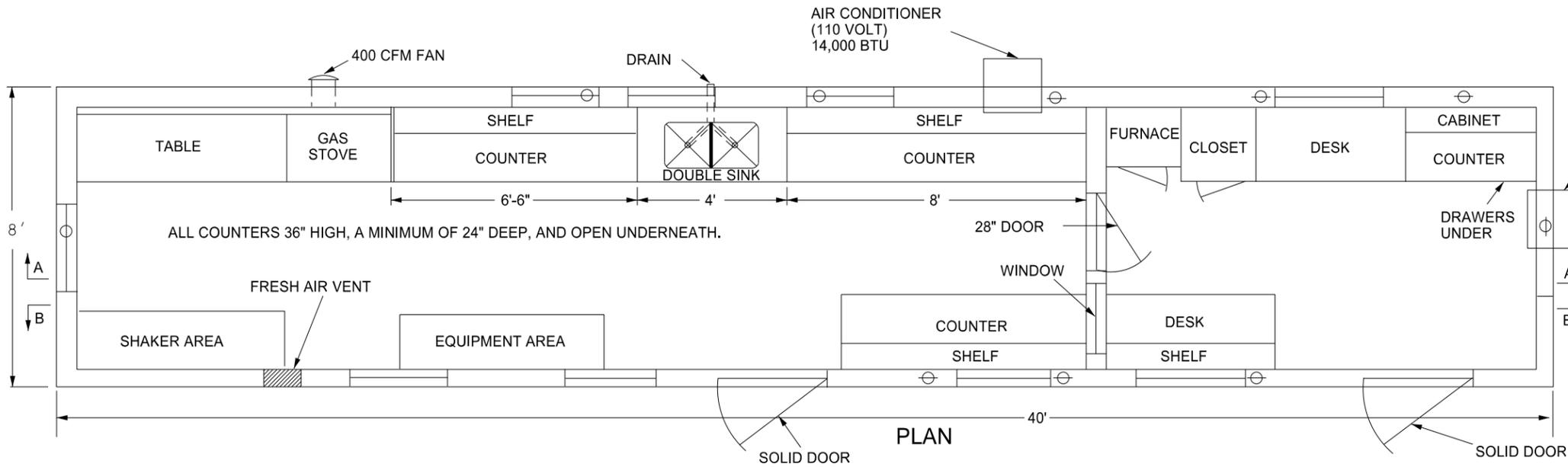


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE

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BITUMINOUS LABORATORY

D-706-1



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.

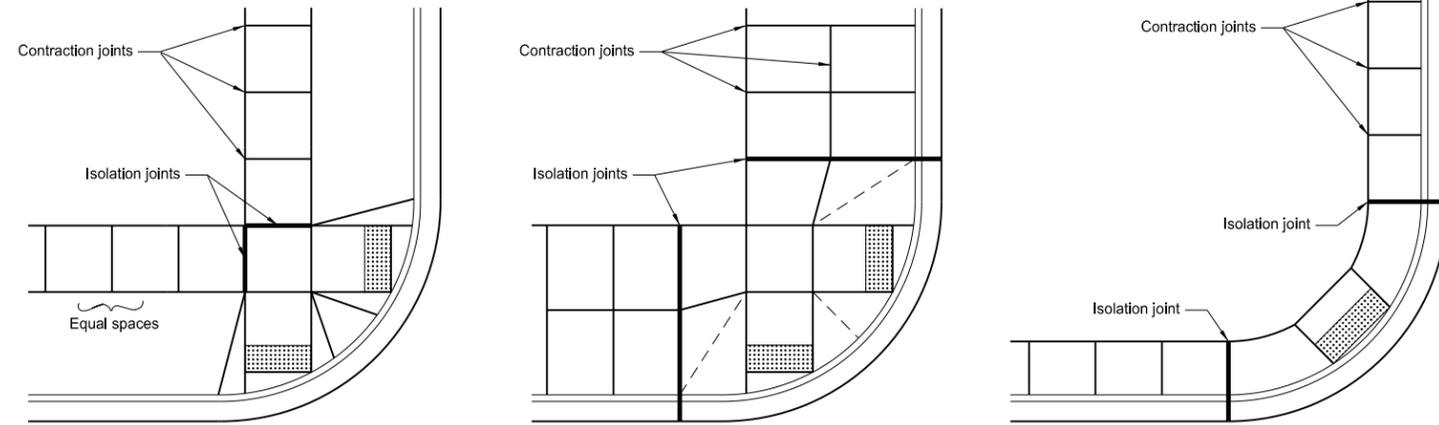
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SIDEWALK

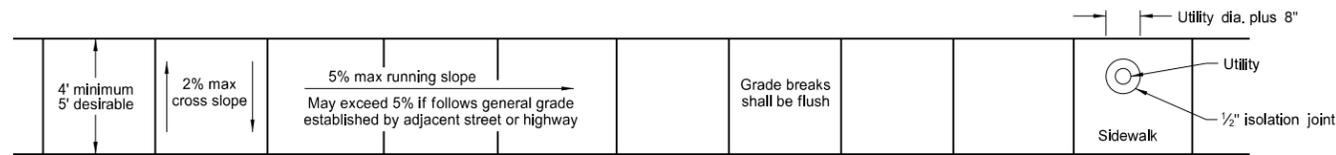
D-750-2

NOTES:

1. Curb ramp and detectable warning panel layouts are for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Transverse contraction joint spacing shall vary from 4' to 6' to create approximate square panels. Longitudinal contraction joints shall be used where the sidewalk width is 8' or greater, and shall be spaced at half the sidewalk width. The contraction joints may be sawed or a grooved joint, and shall be a minimum of 1/3 the depth of the concrete. When the sidewalk is adjacent to the curb & gutter, the sidewalk joint spacing shall be varied to match up with the curb & gutter joints. Isolation joints should also be used between separately poured concretes, or between old and new concrete. The cost for all labor, equipment, and material necessary to construct contraction and isolation joints shall be included in the price bid for sidewalk concrete.
3. 4" sidewalk concrete thickness to be used unless otherwise specified in the plans.
4. 4" base material thickness to be used unless otherwise specified in the plans. All labor and materials necessary to place the base material shall be included in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."
5. Landscaping is preferred to modify existing ground slope changes as needed. If not possible, such as adjacent buildings, a vertical curb may be used as shown in the detail below. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.

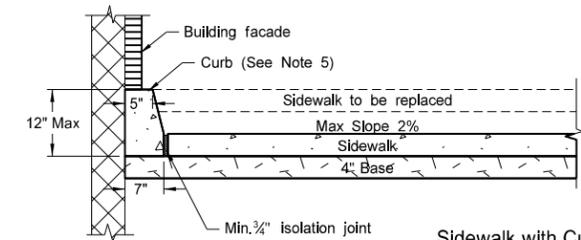


Typical Joint Layouts

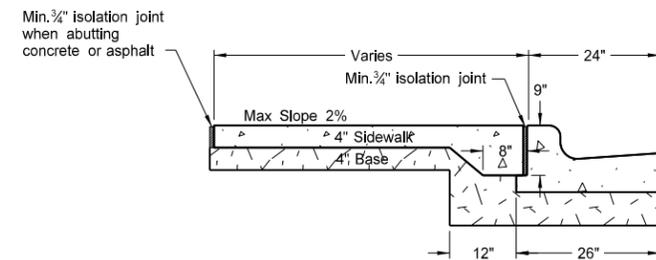


Sidewalk Width and Grade

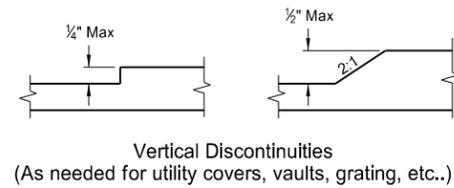
Utility Blockout



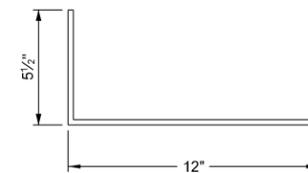
Sidewalk with Curb Detail (Building face application)



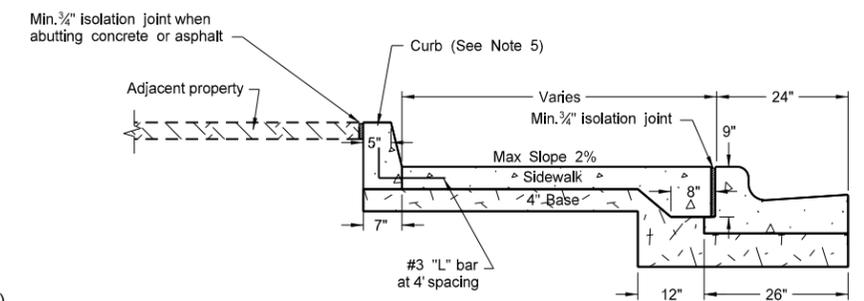
Sidewalk Detail (Installed adjacent to curb and gutter)



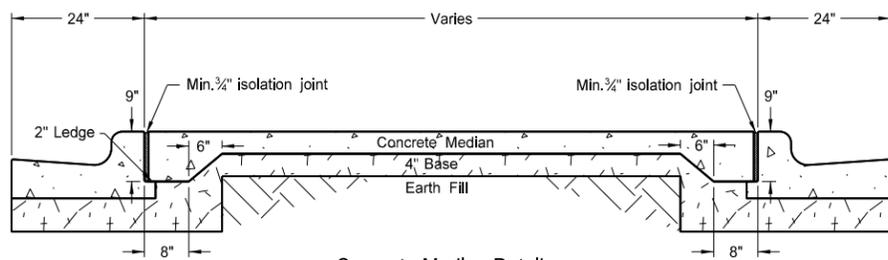
Vertical Discontinuities (As needed for utility covers, vaults, grating, etc..)



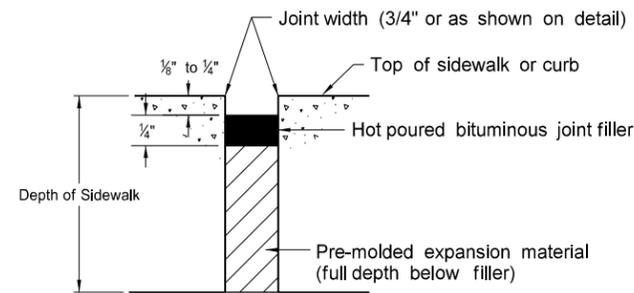
"L" Bar Detail #3 Bar



Sidewalk with Curb Detail (Adjacent property application)



Concrete Median Detail



Typical Isolation Joint Seal (longitudinal and transverse)

NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
11-26-13	
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DATE	CHANGE

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CURB RAMP DETAILS

D-750-3

+More Right of Way

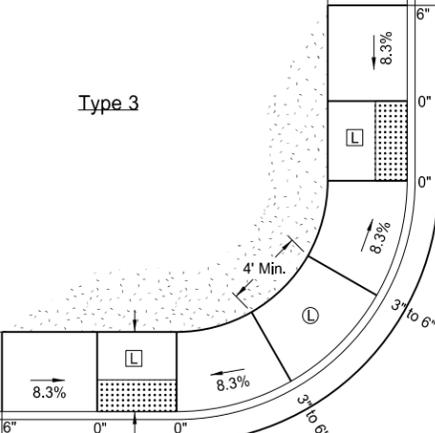
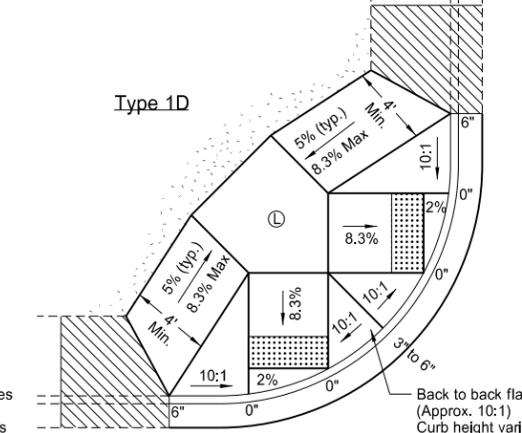
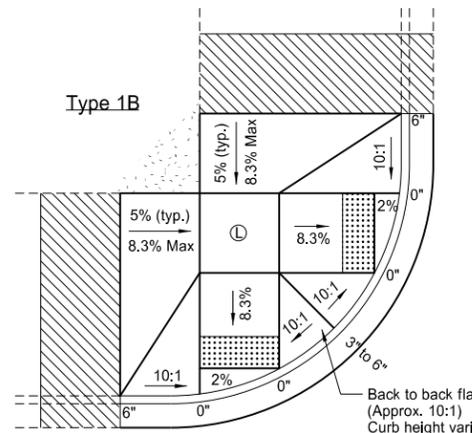
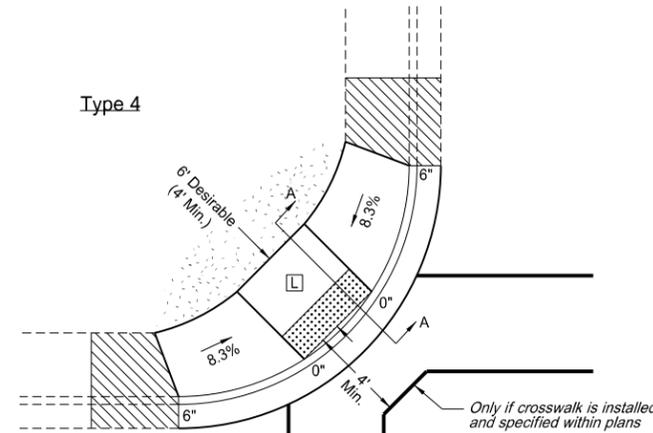
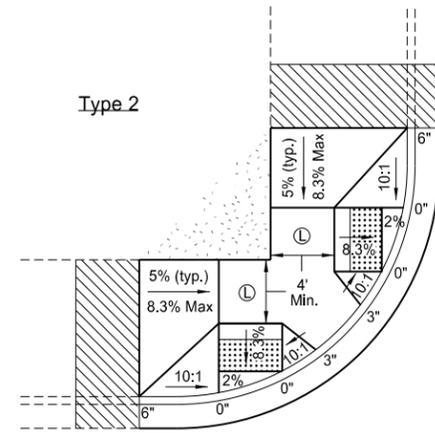
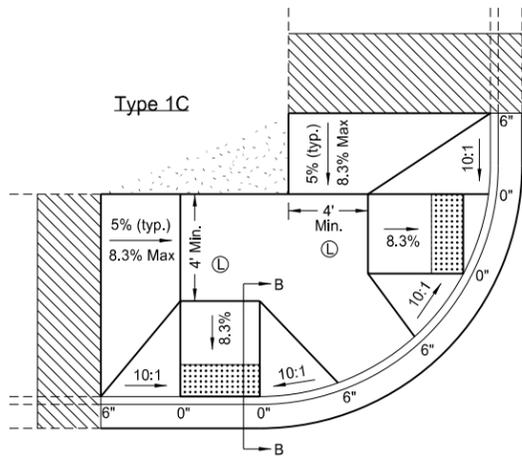
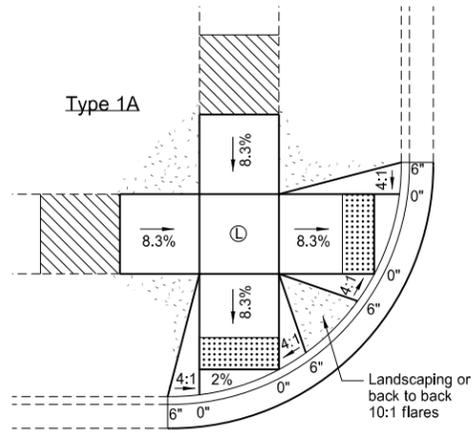
Less Right of Way

NOTES:

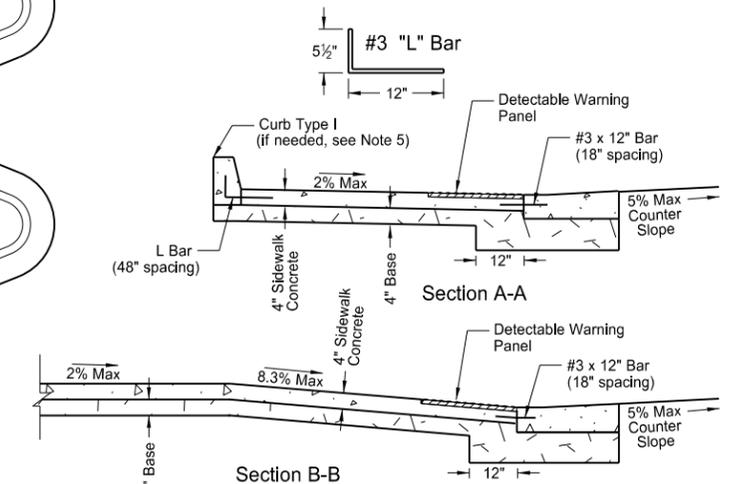
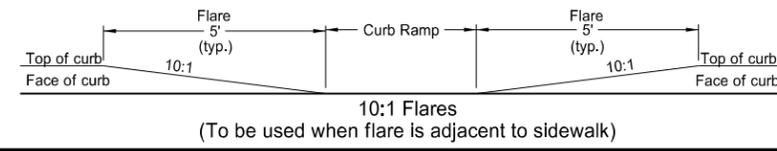
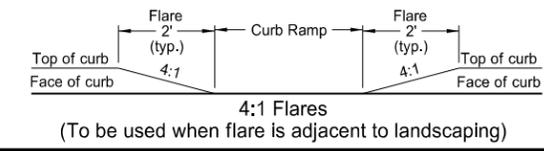
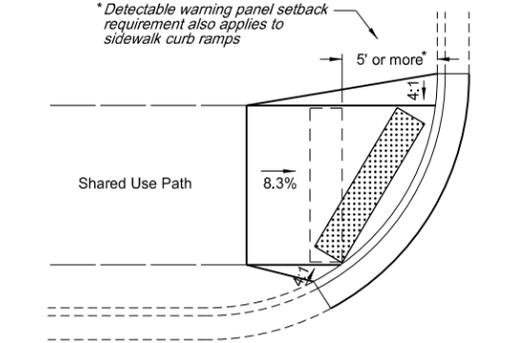
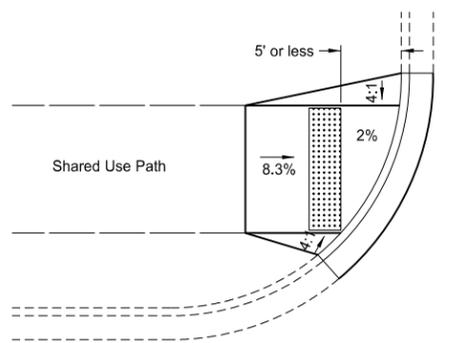
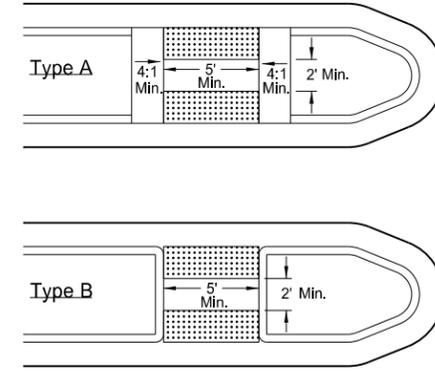
- Ramp width is defined as the useable portion of the ramp, excluding flares if used.
Curb ramp width should match the existing sidewalk width. 4' width minimum.
Ramp width for shared-use paths should match the existing shared use path width.
Ramp length shall be maximum of 15'.
- Landings shall be a minimum of 4' x 4' and shall have a max 2% slope in any direction. Landings are desirably 5' x 5' or larger.
- Detectable warning panels shall match the ramp width. Radial panels may also be used. The detectable warning panel may be located within the lower landing.
- The pedestrian access route shall be continuous 4' min. width. Max 2% cross slope applies to all concrete, excluding flares.
- Landscaping is preferred to modify existing ground slope changes as needed. If not possible, such as adjacent buildings, a vertical curb may be used as shown in the detail below. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.

LEGEND:

- : Detectable Warning Panel
- : Landscaping
- : Transitional tie-in segment if needed for retrofits. Max grade slope 8.3%.
- : Upper Landing
- : Lower Landing
- 0", 3", or 6" : Curb Height
- 8.3% : All slopes shown are max grades. Flatter slopes may be used.



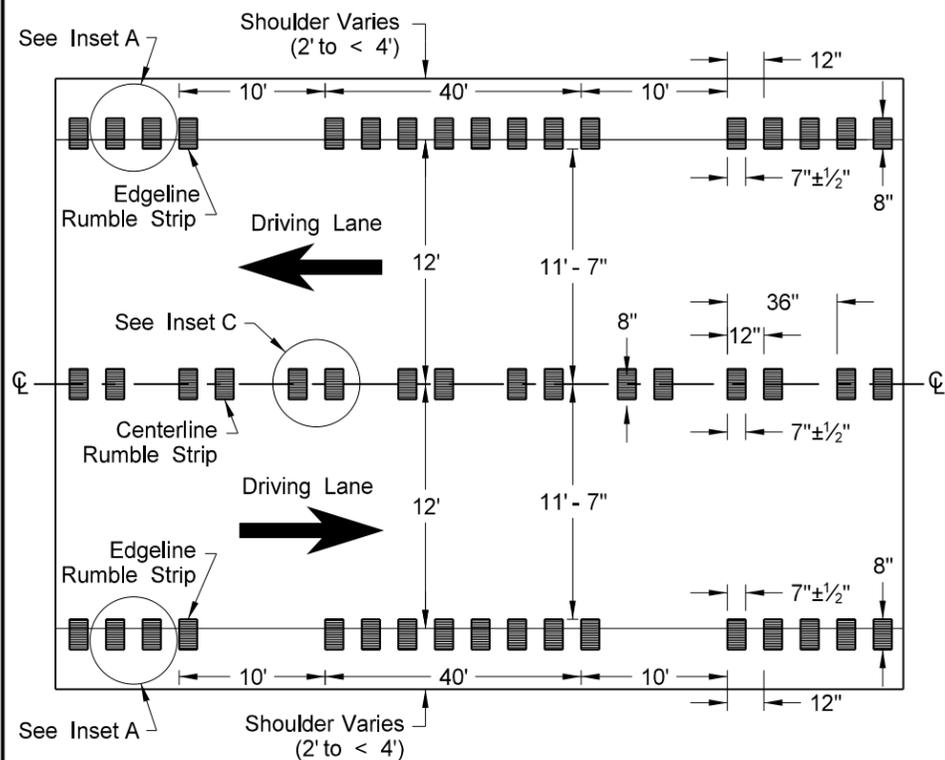
Median Refuge Islands (Cut-Through)



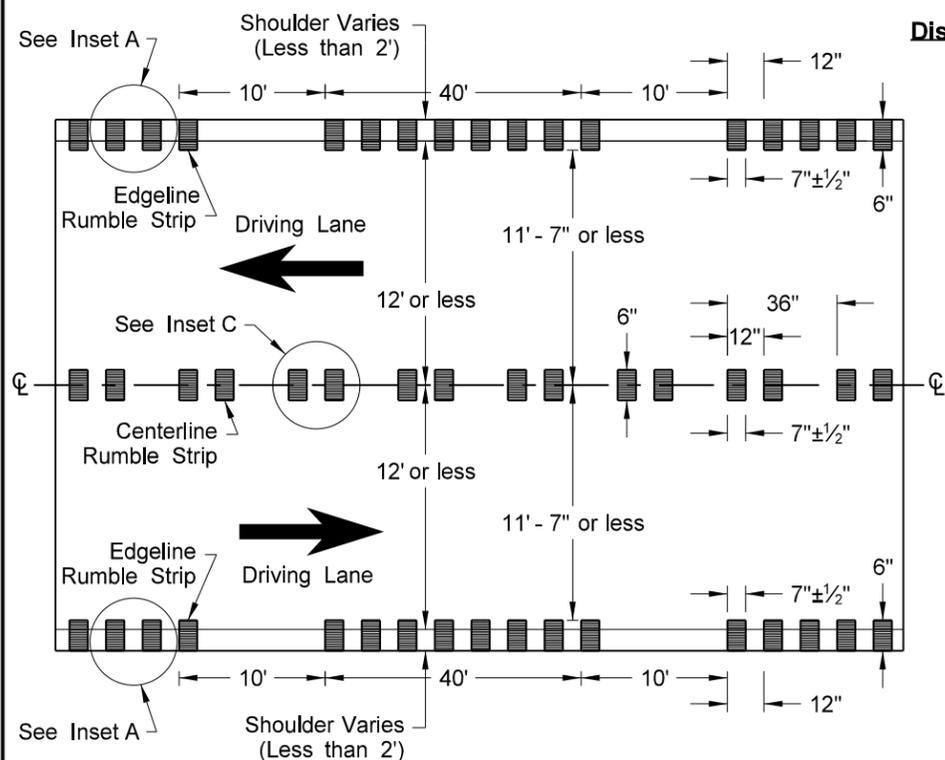
NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE

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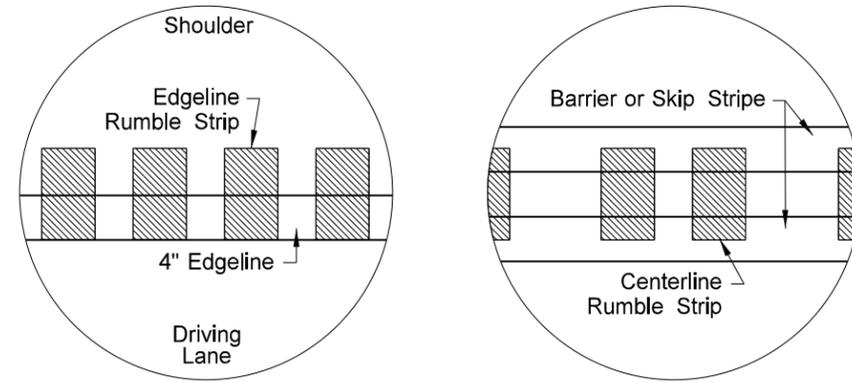
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')



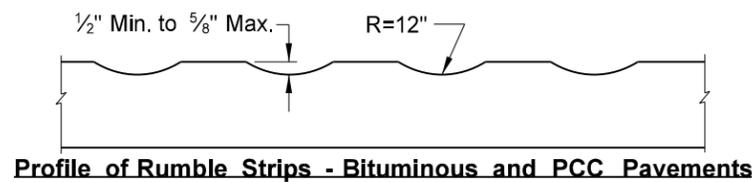
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



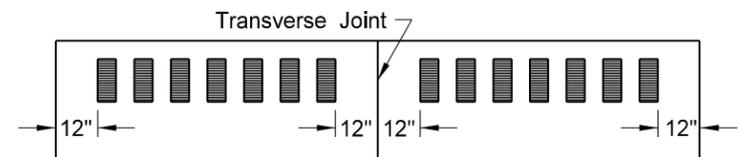
Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')



Inset A - Edgeline Rumble Strip Inset C - Centerline Rumble Strip



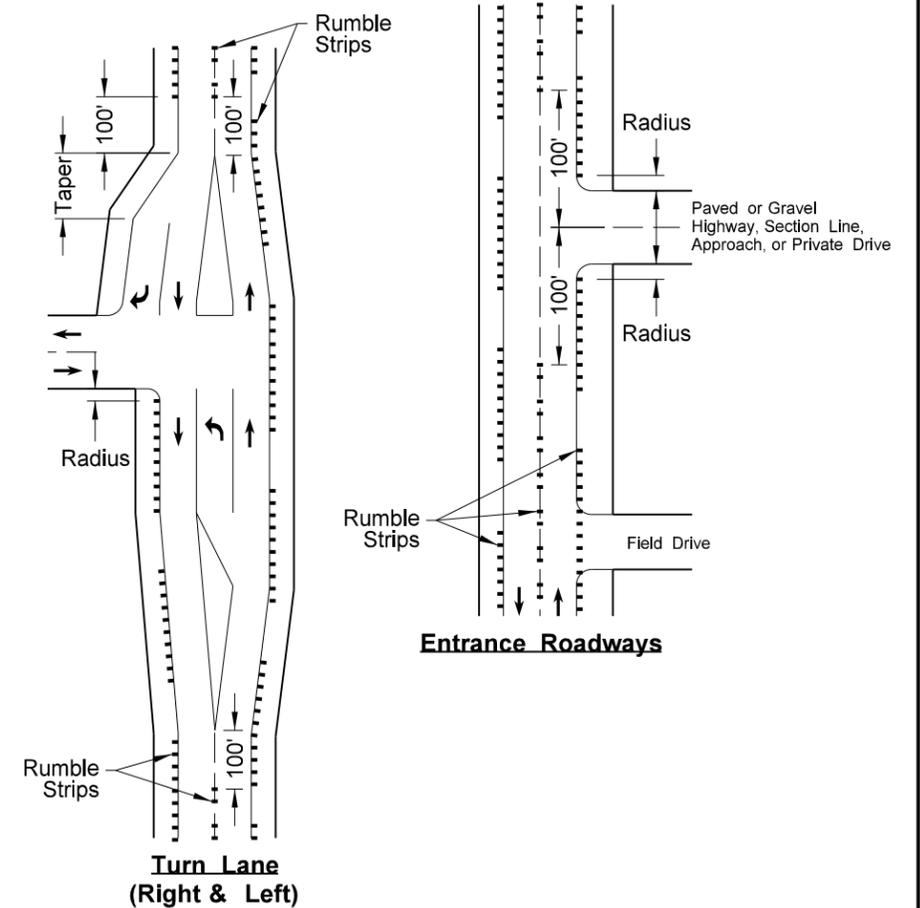
Profile of Rumble Strips - Bituminous and PCC Pavements



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

NOTES:

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



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

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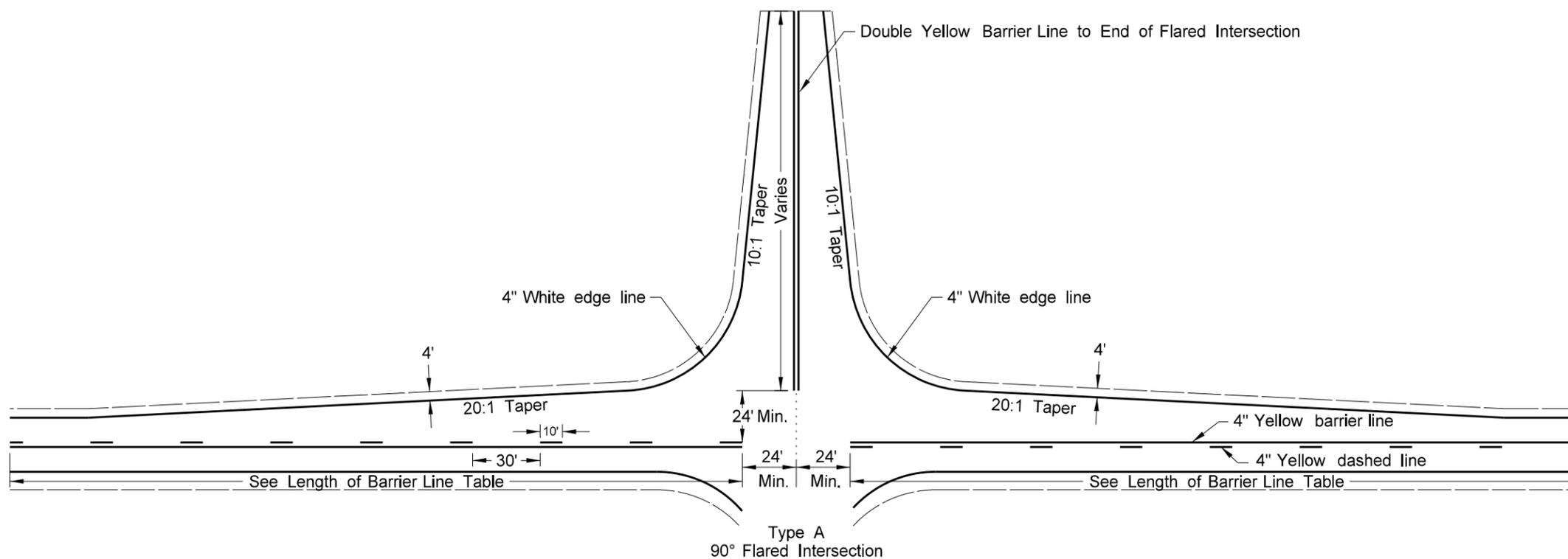
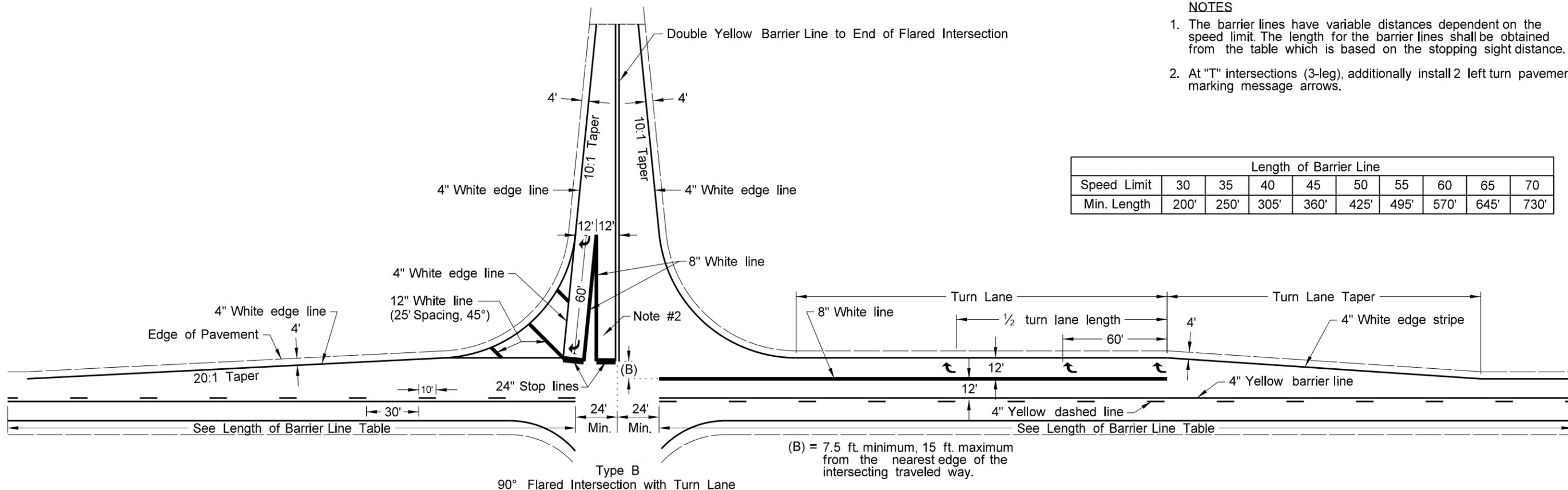
PAVEMENT MARKING FOR STANDARD 90° FLARED INTERSECTION

D-762-3

NOTES

1. The barrier lines have variable distances dependent on the speed limit. The length for the barrier lines shall be obtained from the table which is based on the stopping sight distance.
2. At "T" intersections (3-leg), additionally install 2 left turn pavement marking message arrows.

Length of Barrier Line									
Speed Limit	30	35	40	45	50	55	60	65	70
Min. Length	200'	250'	305'	360'	425'	495'	570'	645'	730'



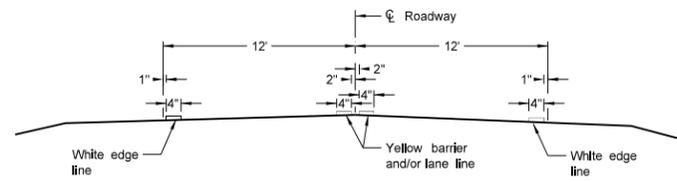
Legend

- 4" Line
- 8" Line
- 12" Line
- 24" Line

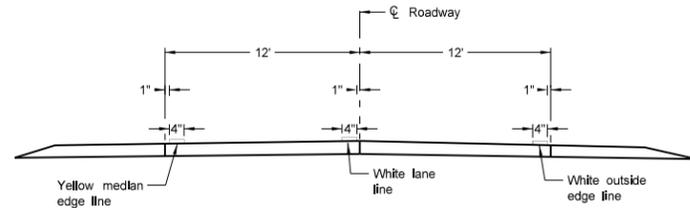
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-9-09	
REVISIONS	
DATE	CHANGE
9-24-09	Barrier Stripe Correction
9-21-11	Revised Turn Lane Markings
11-25-13	Revised Type B Layout

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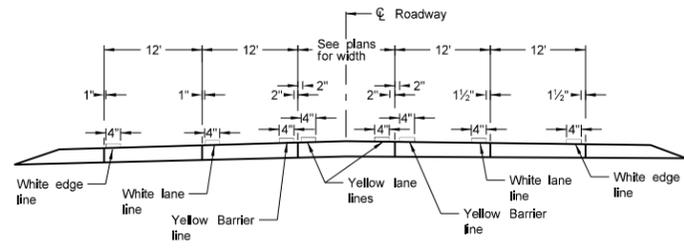
PAVEMENT MARKING



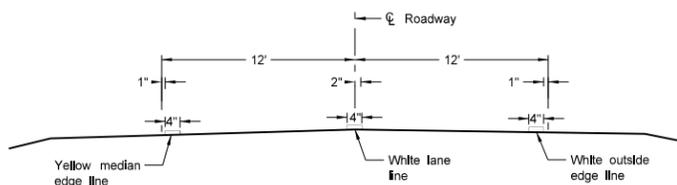
Two Lane Two Way
RURAL ROADWAY



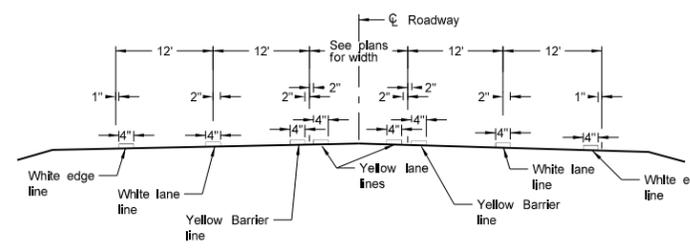
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



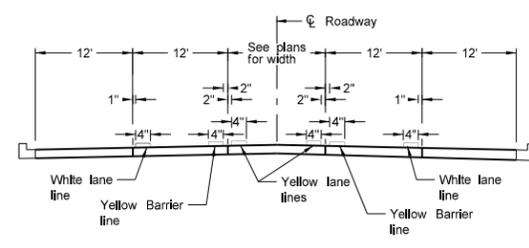
RURAL FIVE LANE ROADWAY
Concrete Section



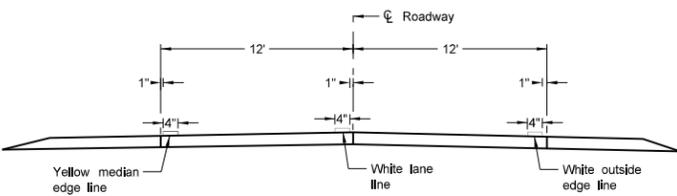
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



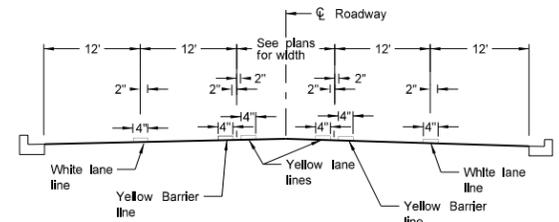
RURAL FIVE LANE ROADWAY
Asphalt Section



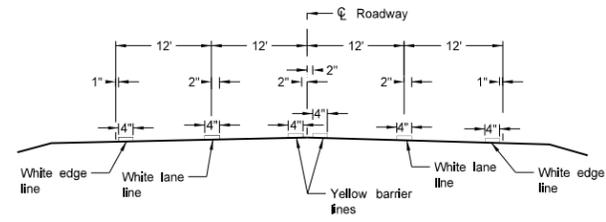
URBAN FIVE LANE SECTION
Concrete Section



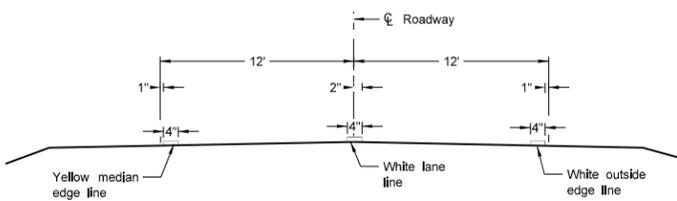
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



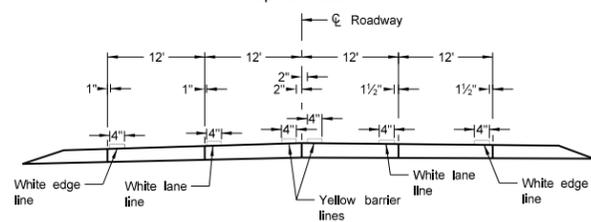
URBAN FIVE LANE SECTION
Asphalt Section



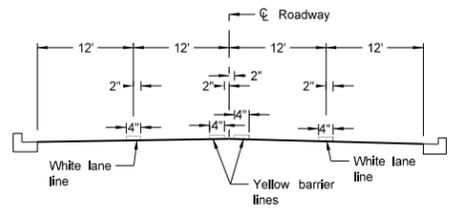
RURAL FOUR LANE ROADWAY
Asphalt Section



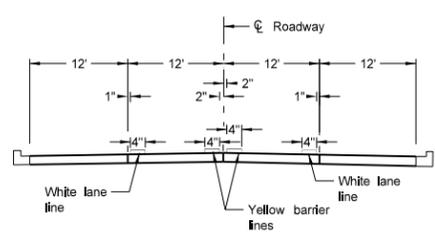
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



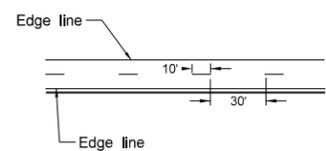
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



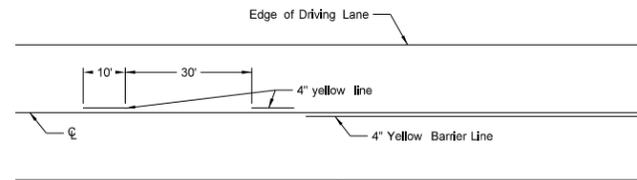
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

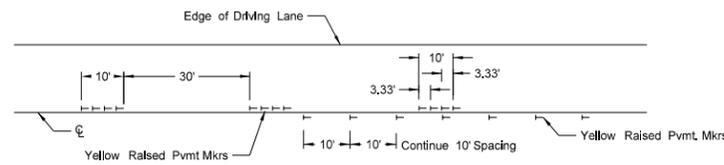
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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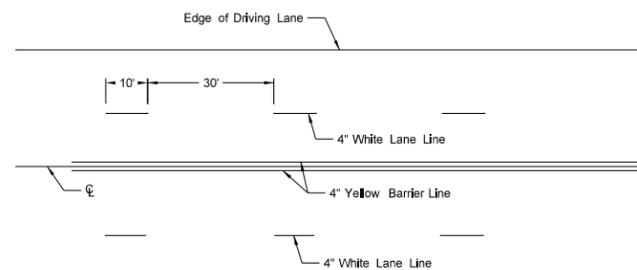
SHORT-TERM PAVEMENT MARKING



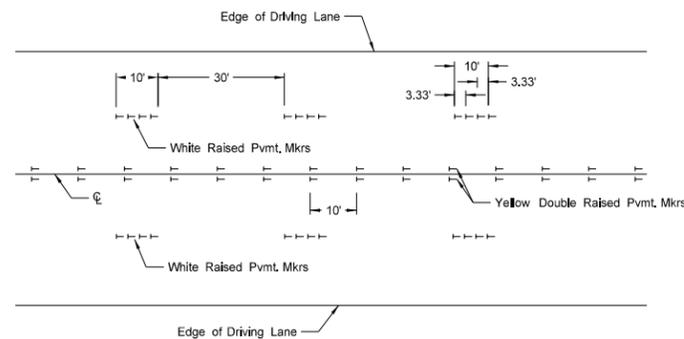
Painted or Tape Lines



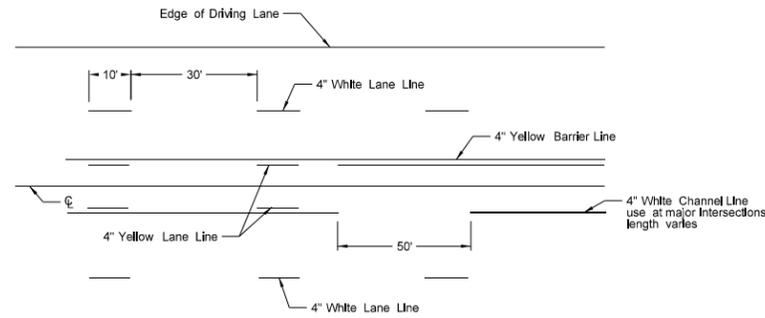
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



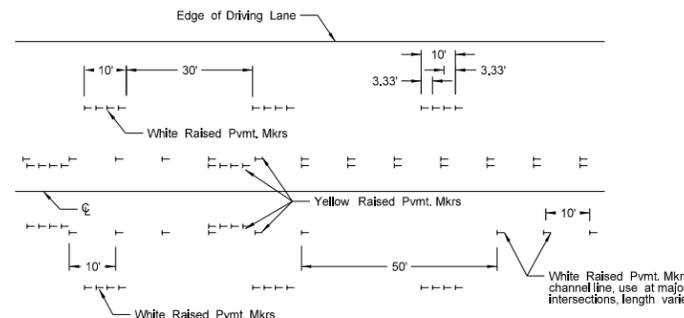
Painted or Tape Lines



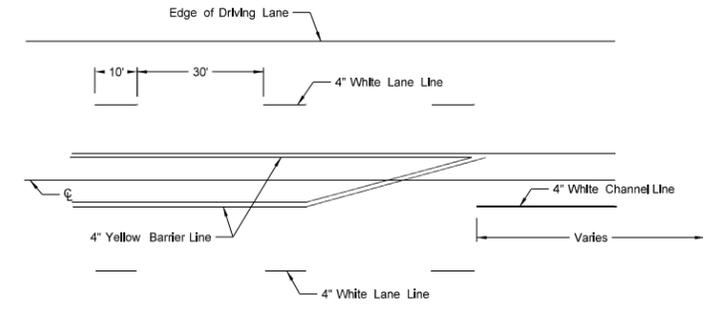
Raised Pavement Markers
FOUR LANE ROADWAY



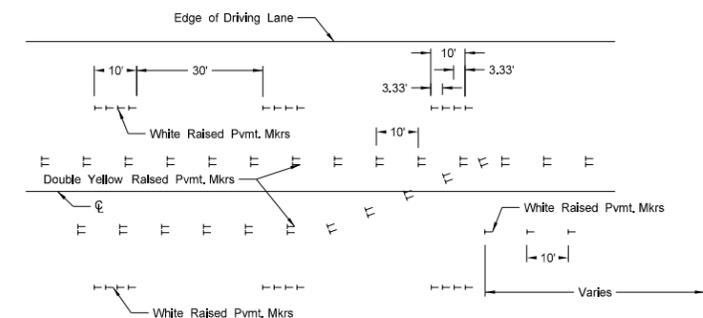
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

- Two-lane two-way roadways shall have no passing zones placed as shown. No passing zone signs may be placed in lieu of short term no passing zone pavement markings. These signs will be allowed to remain in place for three days, at which time the short term no passing zone pavement marking shall be placed.
- Short term center line stripe (paint) on top lift shall be carefully placed with exact spacing so that the permanent stripe will match when applied.
- Raised markers and tape markings shall be removed after permanent pavement marking has been installed. Removed markings shall become the property of the contractor.

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12-1-10 and the original document is stored at the North Dakota Department of Transportation