

DESIGN DATA			
Traffic	Average Daily		
Current 2014	Pass: 1,070	Trucks: 285	Total: 1,355
Forecast 2034	Pass: 1,595	Trucks: 425	Total: 2,020
Clear Zone Distance: 32 ft		Design Speed: 65 mph	
Minimum Sight Dist. for Stopping: 645 ft		Bridges: N/A	
Sight Dist. for No Passing Zone: 1100 ft			
Pavement Design Life 20 (years)			
Design Accumulated One-way Flexible ESALs: 1,086,396			

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	20864	1	1

JOB # 5 NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

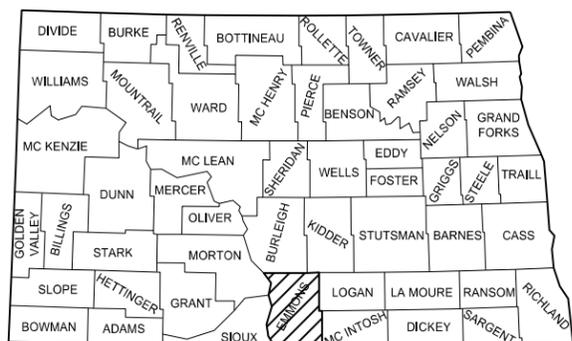
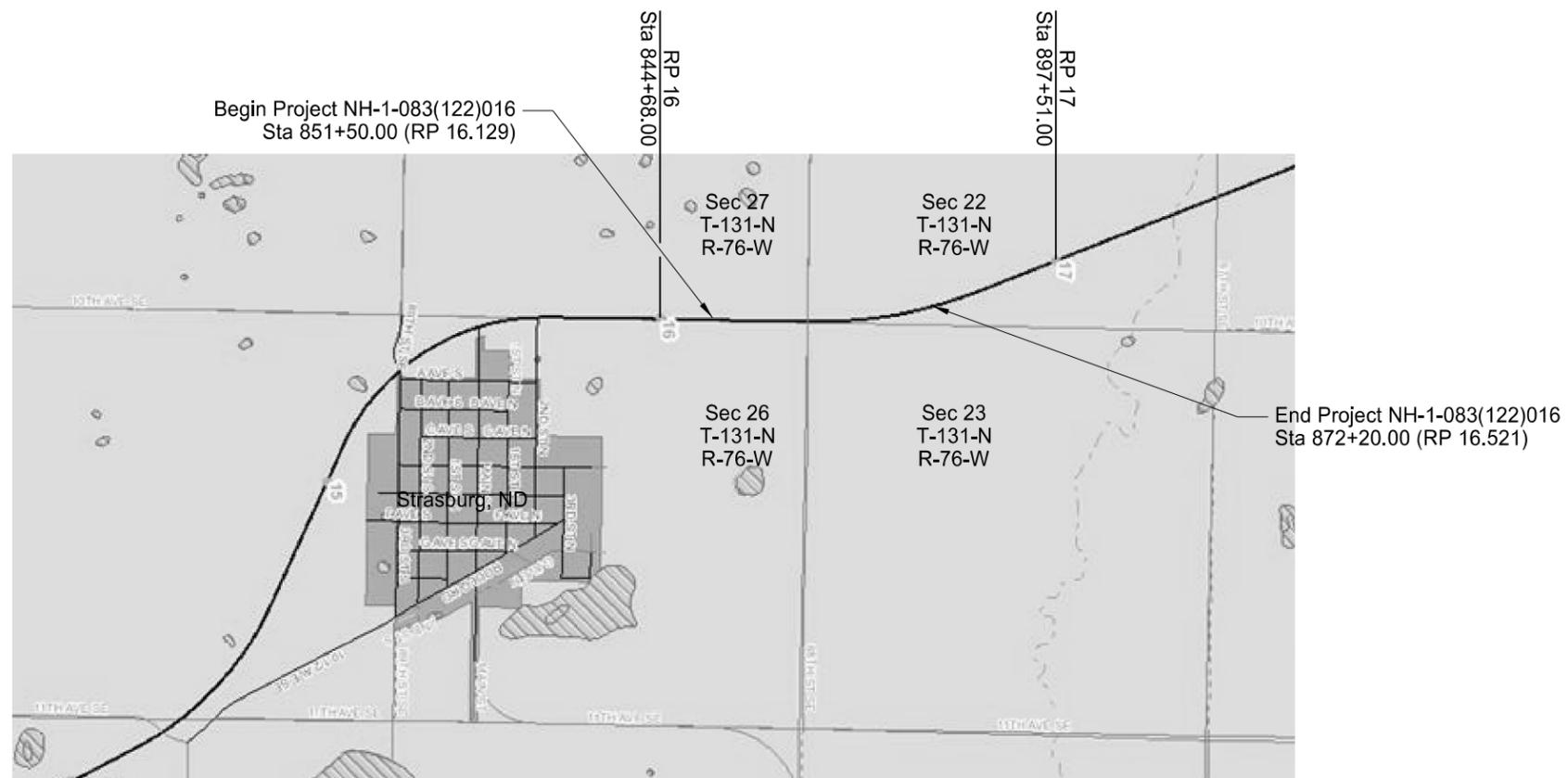
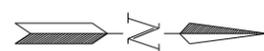
NH-1-083(122)016

Emmons County
88th St SE Intersection
North of Strasburg
Widening, Hot Mix Asphalt, Aggregate Base Course,
Culvert Extension, Signing, Pavement Marking, and Incidentals

GOVERNING SPECIFICATIONS:

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-1-083(122)016 (88th St SE Intersection)	0.392 miles	0.392 miles



STATE COUNTY MAP

DESIGNERS
Darell Arne /s/
Douglas A. Schumaker /s/

APPROVED DATE 08/07/15

 Roger Weigel /s/
 for OFFICE OF PROJECT DEVELOPMENT
 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 08/07/15

 James Douglas Rath /s/
 NDDOT DESIGN DIVISION

This document was originally issued and sealed by James Douglas Rath, Registration Number PE- 4288, on 08/07/15 and the original document is stored at the North Dakota Department of Transportation

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ND	NH-1-083(122)016	2	1

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LIST OF SPECIAL PROVISIONS (SP)

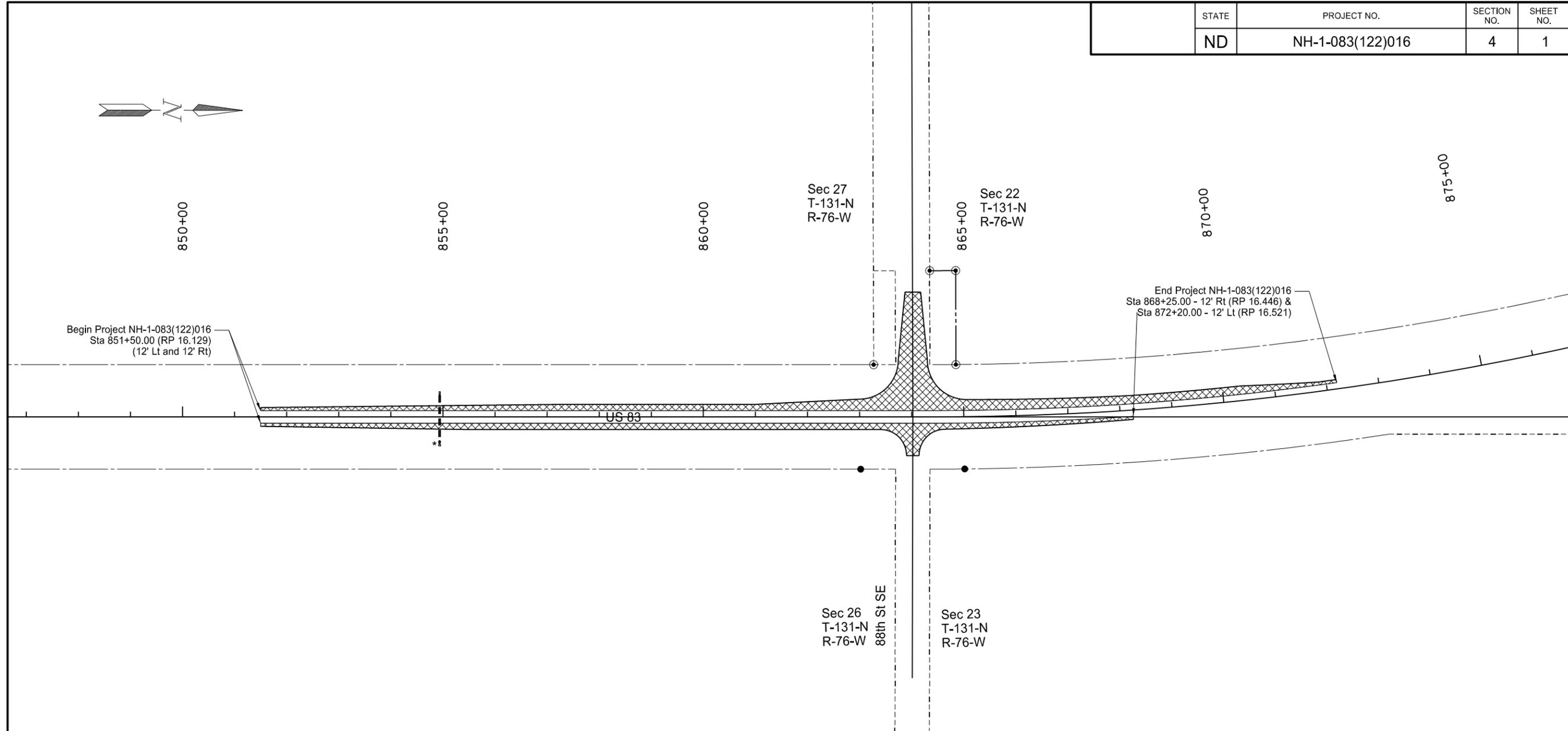
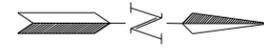
<u>SP #</u>	<u>Description</u>
SP 0003(14)	Temporary Erosion and Sediment Best Management Practices

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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LIST OF STANDARD DRAWINGS

<u>Standard No.</u>	<u>Description</u>		
D-101-1, 2, 3	NDDOT Abbreviations	D-754-26, 27, 29	Sign Punching, Stringer, and Support Location Details Regulatory, Warning, and Guide Signs
D-101-10	NDDOT Utility Company and Organization Abbreviations	D-754-48, 49	Sign Punching, Stringer, and Support Location Details for Variable Length Signs
D-101-20, 21	Line Styles	D-754-83	Object Markers – Culverts
D-101-30, 31, 32	Symbols	D-754-87	Sign Punching, Stringer, and Support Location Details for Street Name Signs and 911 Signing
D-203-6	Standard 90 Degree Flared Intersection	D-760-3	Rumble Strips Undivided Highways (Shoulders 4' or Greater)
D-203-8	Standard Rural Approaches	D-762-1	Pavement Marking Message Details
D-255-2	Erosion and Siltation Control – Erosion Control Blanket Installation	D-762-3	Pavement Marking Standard 90 Degree Flared Intersection
D-261-1	Erosion Control – Fiber Roll Placement Details	D-762-4	Pavement Marking
D-704-7	Breakaway Systems for Construction Zone Signs – Perforated Tube	D-762-6	Short Term Pavement Marking
D-704-8	Breakaway Systems for Construction Zone Signs – U-Channel Post		
D-704-9	Construction Sign Details – Terminal and Guide Signs		
D-704-10	Construction Sign Details – Regulatory Signs		
D-704-11	Construction Sign Details – Warning Signs		
D-704-13	Barricade and Channelizing Device Details		
D-704-14	Construction Sign Punching and Mounting Details		
D-704-15	Road Closure Layouts		
D-704-22	Construction Truck and Temporary Detour Layouts		
D-704-24	Shoulder Closures and Bridge Painting 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-708-6	Erosion and Siltation Controls – Median or Ditch Inlet Protection		
D-714-1	Reinforced Concrete Pipe Culverts and End Sections (Round Pipe)		
D-714-22	Concrete Pipe or Precast Concrete Box Culvert Ties		
D-720-1	Standard Monuments and Right of Way Markers		
D-754-9	Letter and Arrow Details for Variable Lengths Signs		
D-754-23	Perforated Tube Assembly Details		
D-754-24	Mounting Details Perforated Tube		
D-754-24A	Breakaway Coupler System for Perforated Tubes		
D-754-25	Mounting Details Perforated Tube		

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LEGEND:



Widening for Northbound Left Turn Lane & Southbound Right Turn Lane
(5.5" Commercial Grade Hot Mix Asphalt over 18" Aggregate Base Course CI 5)



Culvert Extension

OTHER WORK:

--Mill and Fill centerline rumble strips (Sta 850+50.00 to Sta 868+25.00)
(2" Mill and 2" Commercial Grade Hot Mix Asphalt)
(See Sheets 30-2 and 30-3)

--Pavement Marking and Signing

This document was originally issued and sealed by Ranka Samardzic, Registration Number PE- 4888, on 02/12/15 and the original document is stored at the North Dakota Department of Transportation

SCOPE OF WORK

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

107-P01 MAINTAINING TRAFFIC – PAVEMENT DROP-OFFS: If public traffic is operating in an area with a drop-off greater than 2 inches, construct a temporary wedge composed of aggregate or embankment material with a foreslope of 4:1 or flatter.

Install stackable vertical panels along the edge of the driving lane that is adjacent to the drop off.

The Engineer will measure stackable vertical panels as specified in Section 704, "Temporary Traffic Control".

The Engineer will not measure material used to construct the wedge. Include cost for the additional aggregate or embankment required for this operation in the price bid for aggregate or earthwork pay items.

If unable to complete a traversable taper wedge provide 24 hour flagging and traffic control at no additional cost to the department.

203-010 SHRINKAGE: 30 percent additional volume is included for shrinkage in earth embankment.

203-P01 EXCESS EXCAVATION: Dispose of excess excavation on the slopes within the project limits.

261-P01 TEMPORARY EROSION CONTROL: Use the existing topsoil to create an earthen berm at the bottom of the foreslope in widened areas. The earthen berm, along with the grass remaining in the ditch and fiber rolls will serve as the temporary erosion control. The earthen berm is not a separate pay item, all costs associated with creating, maintaining, and dismantling the berm are included in the unit cost for "Topsoil".

Build the berm 12 inches minimum height. When the foreslope has reached final grade, remove the earthen berm and spread the topsoil on the foreslope before the permanent seeding and mulching work is commenced. To allow storm water to drain through the berm, place the weirs intermittently as needed throughout the length of the berm. Construct weirs no more than 5 feet wide and install fiber rolls across the weir on the downslope side of the berm. If a weir must be made during conditions that would allow storm water to flow through immediately, the fiber roll must be installed before the weir is made in the earthen berm.

401-100 TACK COAT: When MS-1 is used for tack coat, it may be diluted by the supplier or the Contractor.

430-P01 COMMERCIAL GRADE HOT MIX ASPHALT: Provide commercial grade asphalt that meets the requirements of Section 430.03F. The aggregate and mix design properties will meet the requirements outlined in Section 430.03B and 430.03C for FAA 45.

704-P01 TRAFFIC CONTROL: Traffic control device quantities are based on the following list:

1. D-704-15, Layout Type A or D-704-56 for grinding shoulder rumble strips.
2. D-704-15, Layout Type B for shifting both lanes of traffic.
3. D-704-22, Layouts Type K and L for trucks hauling material.
4. D-704-24, Layouts Type R and S for shoulder work and pipe extension work outside of the shoulder.
5. D-704-26, Layout Type Y for trucks hauling material.
6. D-704-26, Layouts Type CC, EE as needed.
7. D-704-26 Type BB for shoulder work.
8. Section 100 sheets.

704-P02 TRAFFIC SERVICE AGGREGATE: Provide "Traffic Service Aggregate" to carry traffic throughout the project limits as shown in the Phase 1 typical sections in Section 100 of the plans. Maintain the temporary traffic service aggregate at all times. Remove the temporary traffic service aggregate prior to the paving operations and incorporate in the slopes or use at the approach tie-ins. Include all costs for time, material, and labor required to supply traffic service aggregate and to place, maintain, salvage and reuse the material in the unit bid price for "Traffic Service Aggregate".

This document was originally issued and sealed by
Darell Arne,
Registration Number PE-6523,
on 3/9/15 and the original document is stored at the North Dakota Department of Transportation.

NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	6	2

SECTION 110

754-225 RESET SIGN PANEL: Remove sign panels from existing supports. Reinstall sign panels, angles, stringers, and steel channels on new supports.

Provide all necessary brackets and hardware to attach sign panels, angles, stringers, and steel channels on new supports.

The Engineer will measure the item "Reset Sign Panel" by the number of locations a sign or sign assembly has been reset.

754-226 RESET SIGN SUPPORT: The Engineer will measure the item "Reset Sign Support" by each leg of a sign support that has been reset.

754-P01 RETROREFLECTIVE STRIP: The sign located at station 863+87 It mdn shall have a 2" wide white retroreflective strip placed on all side of the sign support except for the side that faces traffic. The cost of installing the white retroreflective strip shall not be bid separately but shall be included in the price bid for the item "Steel Galvanized Posts – Telescoping Perforated Tube".

754-P02 SURFACE MOUNTED BASE: New sign at Sta 863+87 It mdn shall be installed on Surface Mounted Anchor Base in lieu of 4 ft perorated tube anchor. The cost of installing shall be included in the price bid for the item "Steel Galvanized Posts – Telescoping Perforated Tube".

This document was originally issued and sealed by Douglas A Schumaker, Registration Number PE-5047, on 2/5/15 and the original document is stored at the North Dakota Department of Transportation.

ENVIRONMENTAL COMMITMENTS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-083(122)016	6	3

ENVIRONMENTAL COMMITMENTS (EC): The North Dakota Department of Transportation and the Federal Highway have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable impacts to wetlands will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank.

ACTION REQUIRED /TAKEN: 0.00 acres of permanent impacts to jurisdictional waters and 0.02 acres of permanent impacts to *natural/non-jurisdictional* wetlands will require mitigation. The NDDOT proposes to mitigate 0.02 acres of FHWA EO 11990 wetlands at Vollrath 16/17 mitigation bank in the Red River Regional Service Area.

Wetland Impact Table															
Wetland Number	Location	Field Cowardin Class.	Wetland Type	Wetland Size Ac.	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts (acres)		USFWS Easement Impacts		Wetland Mitigation				
							Temp. Ac.	Perm. Ac.	Temp.	Perm.	Mitigation Required			Location; Acreage; Wetland#; Ratio	Onsite Mitigation Acres
											EO 11990	USACE	USFWS		
1	Sec. 26, T131N, R76W	PEMA	Basin	0.24	Natural	No	0.07	0.02	0.00	0.00	Y	N	N	1:1 @ Vollrath 16/17	
Totals				0.24			0.07	0.02	0.00	0.00					

* A wetland Jurisdictional Determination was issued by the USACE on 1/6/2015; NWO-2014-2759-BIS.

**All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.

***All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), Preamble Wetlands, and temporary impacts do not require mitigation.

Summary Impact Table			
Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.00	Temporary JD	0.00
Natural/Non-JD	0.02	Non-JD Temporary	0.07
Artificial/JD	0.00	Permanent JD > 0.10	0.00
Artificial /Non-JD	0.00	Permanent OW	0.00
Total	0.02	Temporary OW	0.00

Compensation Requirements by Agency and Water Type		
Water Type	USACE Mitigation	EO 11990 Mitigation
Natural/JD Wetland	> 0.1 acre	All
Natural/Non-JD Wetland	No mitigation required	All
Artificial/JD Wetland	> 0.1 acre	No mitigation required
Artificial/Non-JD Wetland	No mitigation required	No mitigation required
Deep Water (> than 6.6 feet)	No mitigation required	No mitigation required
Other Water	> 300 linear feet	No mitigation required
Preamble	No mitigation required	No mitigation required

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.39	0.39
202	0135 REMOVAL OF BITUMINOUS SURFACING	TON	2,899	2,899
202	0169 REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1	1
203	0101 COMMON EXCAVATION-TYPE A	CY	3,213	3,213
203	0109 TOPSOIL	CY	1,543	1,543
216	0100 WATER	M GAL	29	29
251	0200 SEEDING CLASS II	ACRE	2.9	2.9
251	2000 TEMPORARY COVER CROP	ACRE	2.9	2.9
253	0101 STRAW MULCH	ACRE	5.8	5.8
255	0102 ECB TYPE 2	SY	48	48
261	0112 FIBER ROLLS 12IN	LF	1,075	1,075
261	0113 REMOVE FIBER ROLLS 12IN	LF	260	260
302	0050 TRAFFIC SERVICE AGGREGATE	TON	400	400
302	0120 AGGREGATE BASE COURSE CL 5	TON	9,619	9,619
401	0050 TACK COAT	GAL	1,034	1,034
411	0100 MILLING PAVEMENT SURFACE	TON	42	42
430	0500 COMMERCIAL GRADE HOT MIX ASPHALT	TON	2,332	2,332
430	5828 PG 58-28 ASPHALT CEMENT	TON	139	139
702	0100 MOBILIZATION	L SUM	0.39	0.39
704	0100 FLAGGING	MHR	250	250
704	1000 TRAFFIC CONTROL SIGNS	UNIT	2,126	2,126
704	1060 DELINEATOR DRUMS	EA	12	12
704	1067 TUBULAR MARKERS	EA	98	98
704	1080 STACKABLE VERTICAL PANELS	EA	76	76
704	1500 OBLITERATION OF PAVEMENT MARKING	SF	1,807	1,807
714	0615 PIPE CONC REINF 24IN CL III	LF	4	4
714	3023 END SECT-TRAVERSABLE REINF. CONC.24IN	EA	1	1
714	9660 REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	1	1
720	0110 RIGHT OF WAY MARKERS	EA	6	6
720	0130 IRON PIN R/W MONUMENTS	EA	4	4
720	0135 IRON PIN REFERENCE MONUMENTS	EA	2	2
754	0110 FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	10	10
754	0112 FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	62	62

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	8	2

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
754 0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	102	102
754 0592	RESET SIGN PANEL	EA	3	3
754 0593	RESET SIGN SUPPORT	EA	3	3
754 0805	OBJECT MARKERS - CULVERTS	EA	2	2
760 0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	0.56	0.56
762 0430	SHORT TERM 4IN LINE-TYPE NR	LF	12,066	12,066
762 0434	SHORT TERM 8IN LINE-TYPE NR	LF	1,390	1,390
762 0436	SHORT TERM 24IN LINE-TYPE NR	LF	24	24
762 0442	SHORT TERM MESSAGE-TYPE NR	SF	128	128

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MATERIALS

AGGREGATE BASE COURSE CL 5 @ 1.5 TON/CY + 25% = 1.875 TON/CY
TACK COAT @ 0.05 GAL/SY
COMMERCIAL GRADE HOT MIX ASPHALT @ 2 TON/CY
PG 58-28 ASPHALT CEMENT @ 5.9% of COMMERCIAL GRADE HOT MIX ASPHALT

216-0100 WATER:

Water for Compaction:
20 GAL/TON for Aggregate Base Course Cl 5
10 GAL/CY for Embankment

Water for Dust Palliative:
25 MGAL/Mile

TOPSOIL

4" removal depth

SEEDING AND MULCHING

88th St. SE Intersection
251-0200: SEEDING CLASS II = 2.9 acres
251-2000: TEMPORARY COVER CROP = 2.9 acres
253-0101: STRAW MULCH = 5.8 acres

REMOVAL OF BITUMINOUS SURFACING

Bituminous Pavement and Base @ 1.875 TON/CY;
US 83 Existing Mainline Shoulder (based on 4" pavement and 9.5" base thickness).
(Sta 851+50.00 to Sta 854+64.00 and Sta 855+24.00 to Sta 872+20.00)

US 83 Existing Mainline Shoulder (based on 6" pavement and 15" base thickness).
(Sta 854+64.00 to Sta 855+24.00)

Milling Pavement Surface @ 1.875 TON/CY

SPEC CODE	BID ITEM	UNIT	QUANTITY
754 0805	OBJECT MARKERS - CULVERTS Sta 854+94 - Lt & Rt (CL Pipe)	EA	2

760 0005 RUMBLE STRIPS - ASPHALT SHOULDER		
Location	Unit	Quantity
US 83 and 88th St. SE Intersection		
- Sta 851+50.00 Lt to Sta 864+02.13 Lt	Mile	0.24
- Sta 851+50.00 Rt to Sta 868+25.00 Rt	Mile	0.32
TOTAL	Mile	0.56

Short Term Pavement Marking

Short Term Pavement Marking		
Location - Type	Basis	Quantity
Centerline - Short Term 4IN Line - Type NR	Centerline Skips 1,320 LF/Mile	1,085
	Barrier Stripe 700 LF	
Edge Lines - Short Term 4IN Line - Type NR	Edge Line 10,560 LF/Mile	1,145
	TOTAL	2,230

Note: These quantities include the striping that was obliterated as shown in section 100 of the plans, but not included in section 110 of the plans. (Sta 843+80.00 to Sta 851+50.00 and Sta 868+25.00 to Sta 875+95.00)

BARRIER STRIPE

Station 867+00.00 to Station 874+00.00 SB

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Darell Arne,
Registration Number
PE- 6523,
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BASIS OF ESTIMATE

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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EARTHWORK SUMMARY

Location	Excavation (CY)	Pvmt & Base Removal from Excavation Areas (CY)	Common Excavation - Type A (CY)	Embankment (CY)	Excess Excavation (CY)	Topsoil from Stripping (CY)
	A	B	Pay Item C = A - B	D	E = C - D	Pay Item F
Sta 851+50.00 to Sta 872+20.00 (US 83 Mainline - 88th St. SE Intersection)	4,760	1,547	3,213	2,086	1,127	1,543
TOTALS =	4,760	1,547	3,213	2,086	1,127	1,543

Note 1: Quantity shown for embankment has been increased by 30% to account for shrinkage.
Note 2: Quantities shown above are for both left and right side of roadway.

BASE COURSE SUMMARY

Location	*Removal of Bituminous Surfacing (TON)	Milling Pavement Surface (TON)	Aggregate Base Course CI 5 Required (TON)
	A	B	C
Sta 851+50.00 Lt to Sta 872+20.00 Lt (US 83 Mainline Widening - 88th St. SE Intersection)	1,598	0	4,770
Sta 851+50.00 Rt to Sta 868+25.00 Rt (US 83 Mainline Widening - 88th St. SE Intersection)	1,301	0	3,296
Sta 851+50.00 to Sta 868+25.00 (US 83 CL Rumble Strip Milling Area - 88th St. SE Intersection)	0	42	0
Flared Intersection - Sta 864+02.13 Lt	0	0	1,549
Approach - Sta 864+02.13 Rt	0	0	4
TOTALS =	2,899	42	9,619

* Includes the removal of pavement and base as shown on the removal typical sections in section 30.

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EARTHWORK SUMMARY AND
BASE COURSE SUMMARY

US 83 / 88th St SE Intersection
North of Strasburg

**US 83 ML EARTHWORK SUMMARY
- LEFT OF CENTERLINE**

Station	End Area (SF)		Volume (CY)		
	*Exca	**Fill	*Exca	**Fill	Mass Ordinate
851+50.00	23.9	0	0	0	0
852+00.00	23.7	0.5	44.1	0.6	43
852+50.00	23.7	1.2	43.9	2.1	85
853+00.00	23.6	2.4	43.9	4.4	125
853+50.00	23.7	4.1	43.9	7.9	161
854+00.00	23.8	6.3	44	12.6	192
854+50.00	24.9	4.4	45.1	12.9	224
854+94.00	28.6	2.2	43.6	7	261
855+00.00	25.6	9.8	6	1.7	265
855+42.50	24.4	10.7	39.4	21	284
855+50.00	24.6	10.6	6.8	3.8	287
856+00.00	24.9	9.8	45.8	24.5	308
856+50.00	23.9	9.8	45.2	23.6	329
857+00.00	23.9	9.1	44.3	22.7	351
857+22.50	23.9	9.4	19.9	10	361
857+50.00	23.9	9.4	24.4	12.5	373
858+00.00	23.9	9.3	44.3	22.6	395
858+50.00	23.6	8.1	44	20.9	418
859+00.00	22.9	7	43.1	18.1	443
859+50.00	23.4	7.6	42.9	17.6	468
860+00.00	23.9	8.1	43.8	18.9	493
860+50.00	23.9	8.4	44.3	19.9	517
861+00.00	23.9	8.7	44.3	20.6	541
861+50.00	23.9	13.9	44.3	27.3	558
862+00.00	25.7	20.1	45.9	40.9	563
862+50.00	30.6	23.9	52.1	53	562
862+97.00	33.3	27.3	55.6	58	560
863+92.00	502.1	0	941.9	62.4	1439
864+02.00	336	0	155.2	0	1594
864+12.00	119.8	0.6	84.4	0.1	1679
865+07.00	24.3	11.8	253.5	28.3	1904
865+50.00	24.4	13.8	38.8	26.5	1916
866+00.00	23.8	15.8	44.7	35.6	1925
866+50.00	24.1	14.2	44.4	36.1	1933
867+00.00	23.7	14	44.3	34	1944
867+50.00	24.6	16.4	44.8	36.6	1952
868+00.00	24.7	19.8	45.7	43.5	1954

868+21.60	24.9	19.9	19.8	20.6	1953
868+25.00	24.9	19.9	3.1	3.3	1953
868+26.00	25	19.9	0.9	1	1953
868+50.00	25	18.1	22.2	21.9	1953
869+00.00	24.7	17.3	46	42.5	1957
869+50.00	25.1	18.4	46.1	43	1960
870+00.00	25.7	19.3	47	45.5	1961
870+50.00	26.5	14.1	48.3	40.2	1970
871+00.00	27.5	7.8	50	26.3	1993
871+50.00	25	3	48.6	12.9	2029
871+85.13	24.9	0.9	32.5	3.2	2058
872+00.00	24.7	1.4	13.6	0.8	2071
872+20.00	24.9	1.4	18.4	1.4	2088
	Volume (CY)				
	*Exca	**Fill	Mass Ordinate		
Totals	3139	1051			

*Excavation quantities include the "Removal of Bituminous Pavement" quantities from the removal typical sections.

**Fill quantities have been increased by 30% to account for shrinkage.

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EARTHWORK SUMMARY
DATA TABLES

US 83 / 88th St SE Intersection
North of Strasburg

**US 83 ML EARTHWORK SUMMARY
- RIGHT OF CENTERLINE**

Station	End Area (SF)		Volume (CY)		
	*Exca	**Fill	*Exca	**Fill	Mass Ordinate
851+50.00	23.8	0.1	0	0	0
852+00.00	26.4	1.4	46.5	1.7	45
852+50.00	24.1	3.6	46.8	6	86
853+00.00	23.9	6.2	44.5	11.8	118
853+50.00	23.9	10.6	44.3	20.2	142
854+00.00	23.8	15.9	44.2	31.9	155
854+50.00	23.7	19.9	44	43.1	156
854+94.00	23.6	23.2	38.6	45.6	149
855+00.00	23.6	23.9	5.3	6.8	147
855+42.50	23.7	31.9	37.2	57.1	127
855+50.00	23.7	32.7	6.6	11.7	122
856+00.00	23.7	35	43.9	81.5	85
856+50.00	23.7	31.6	43.9	80.2	48
857+00.00	24	25.4	44.2	68.6	24
857+22.50	24	23	20	26.2	18
857+50.00	24	21.4	24.4	29.4	13
858+00.00	23.8	15.5	44.2	44.4	12
858+50.00	23.8	14	44	35.5	21
859+00.00	23.9	12.2	44.1	31.5	33
859+50.00	23.6	12.5	44	29.7	48
860+00.00	23.6	12.5	43.8	30.1	61
860+50.00	23.9	12.1	44	29.6	76
861+00.00	23.9	11.9	44.3	28.9	91
861+50.00	23.9	11.5	44.2	28.2	107
862+00.00	24.1	10.9	44.4	27	125
862+50.00	24.1	10.6	44.6	25.9	143
862+97.00	24.2	10.2	42.1	23.5	162
863+92.00	68.8	0	163.6	23.3	302
864+02.00	90.8	0	29.6	0	332
864+12.00	65.2	0	28.9	0	361
865+07.00	20.1	13.9	150	31.7	479
865+50.00	20.2	12.3	32	27.1	484
866+00.00	20.7	9.4	37.8	26.1	496
866+50.00	20.1	8.7	37.8	21.8	512
867+00.00	19.9	6.6	37.1	18.4	531
867+50.00	19.3	5.4	36.3	14.5	552
868+00.00	19.5	2.6	35.9	9.7	579

868+21.60	19.9	1.3	15.8	2	592
868+25.00	19.9	1.4	2.5	0.2	595
			Volume (CY)		
			*Exca	**Fill	Mass Ordinate
Totals			1625	1031	

*Excavation quantities include the "Removal of Bituminous Pavement" quantities from the removal typical sections.

**Fill quantities have been increased by 30% to account for shrinkage.

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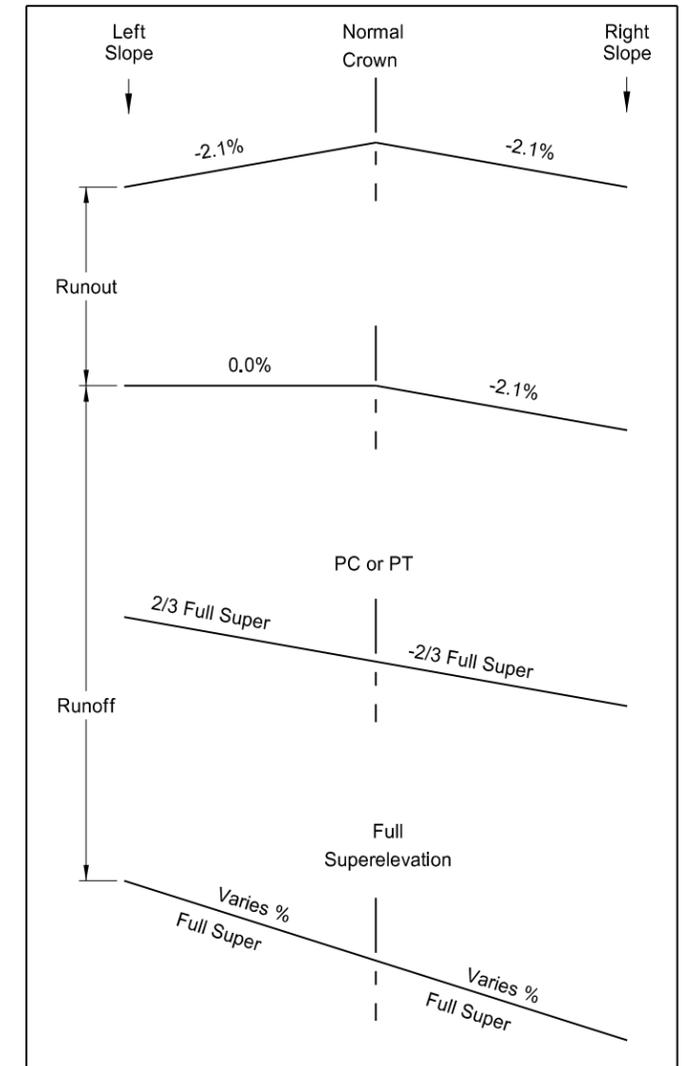
EARTHWORK SUMMARY
DATA TABLES

US 83 / 88th St SE Intersection
North of Strasburg

Curve C350

P.C. Station 864+34.94
P.I. Station 875+72.95
Delta = 22° 28' 04.00" (LT)
Degree = 1° 00' 00.00"
Tangent = 1,138.01
Length = 2,246.78
Radius = 5,729,5800
P.T. Station 886+81.72

Station	Left Slope	Right Slope
862+97.50	-2.1	-2.1
863+67.83	-2.1	0.0
864+38.29	-2.1	2.1
864+68.46	-3.0	3.0
886+48.20	-3.0	3.0
886+78.37	-2.1	2.1
887+48.68	-2.1	0.0
888+19.16	-2.1	-2.1



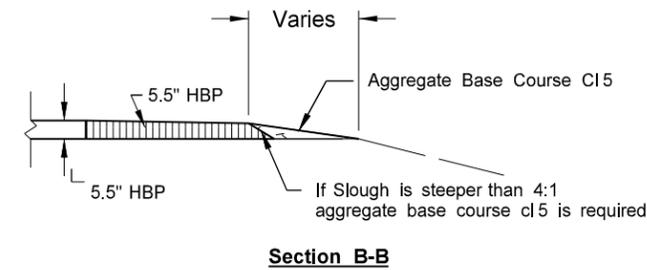
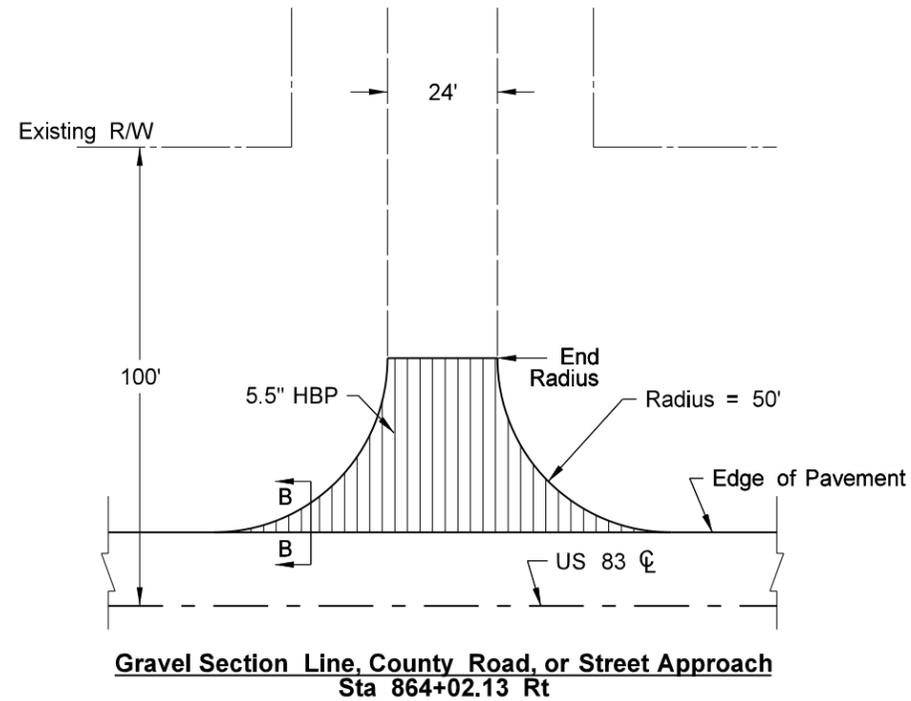
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Superelevation Table

US 83 / 88th St SE Intersection
North of Strasburg

Note: Calculations based on AASHTO method five. A design speed of 65 mph and maximum superelevation of 6% were used.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	20	2



Notes:

1. Actual HBP paving and aggregate base locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.

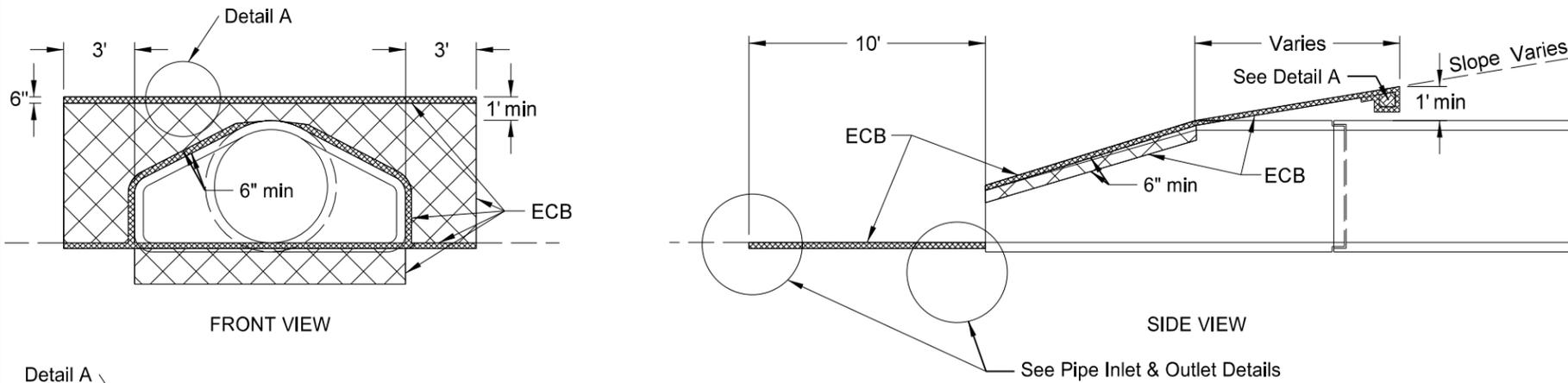
BASIS OF ESTIMATE				Gravel Section Line	
SPEC	CODE	DESCRIPTION	UNIT	Location Sta 864+02.13 Rt	TOTAL
				Sub Total	
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 TON/CY	TON	4	4
401	0050	TACK COAT @ 0.05 GAL/SY	GAL	38	38
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT @ 2 TON/CY	TON	85	85
430	5828	PG 58-28 ASPHALT CEMENT @ 5.9% of COMMERCIAL GRADE HOT MIX ASPHALT	TON	5	5

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Approach Paving Details for Structural Improvement, Major Rehabilitation, or New/Reconstruction Projects

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	20	3

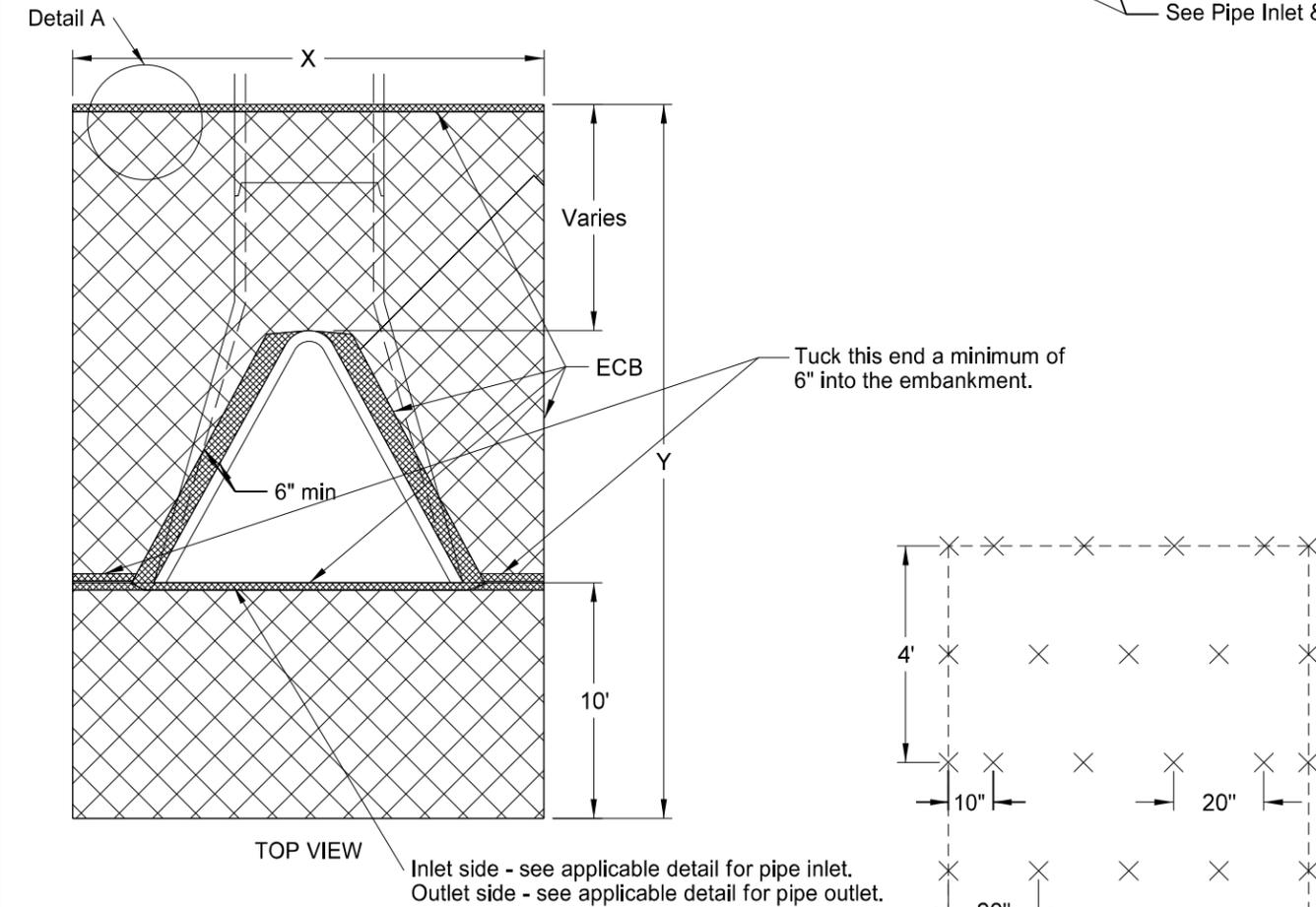


255 0102 ECB TYPE 2				
Location of Surface Area to be Protected	Pipe Dia	No	Unit Quantity	Total Quantity
US 83	(In)		(SY)	(SY)
854+94 - CL (Lt and Rt)	24	2	24	48

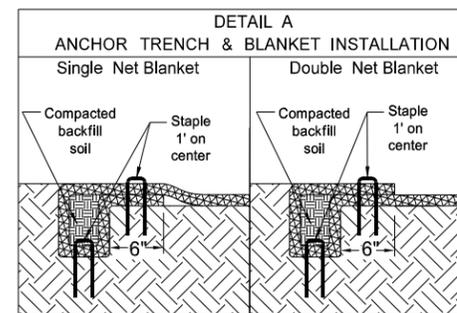
Note: Quantities for this culvert are shown on the section 77 sheet.

DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38

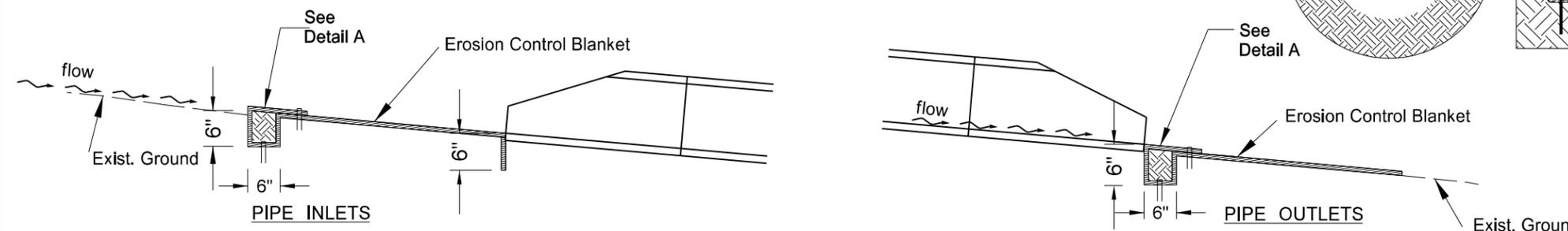
Note: Quantities based on 8:1 slope.



NOTE: Tuck the ECB a minimum of 6" into the embankment (against the flared end section) around the opening of the flared end section.

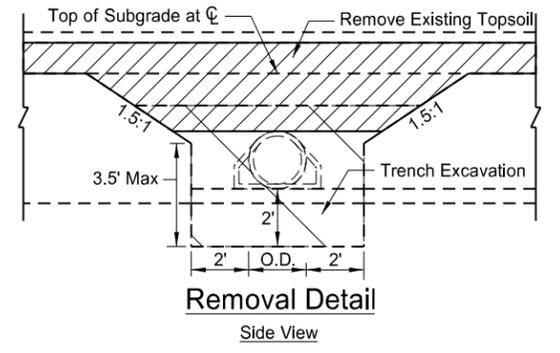
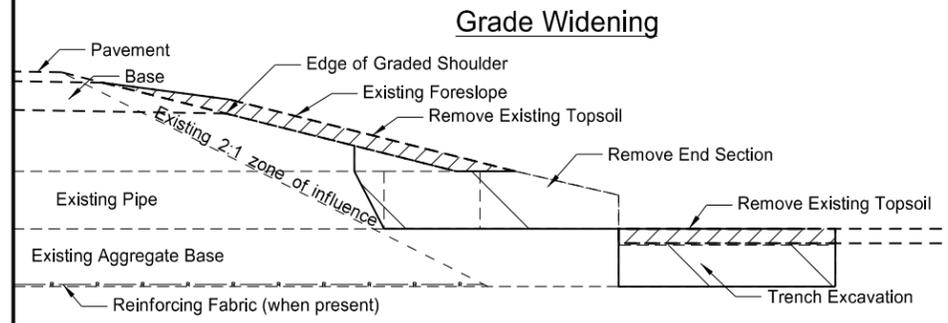


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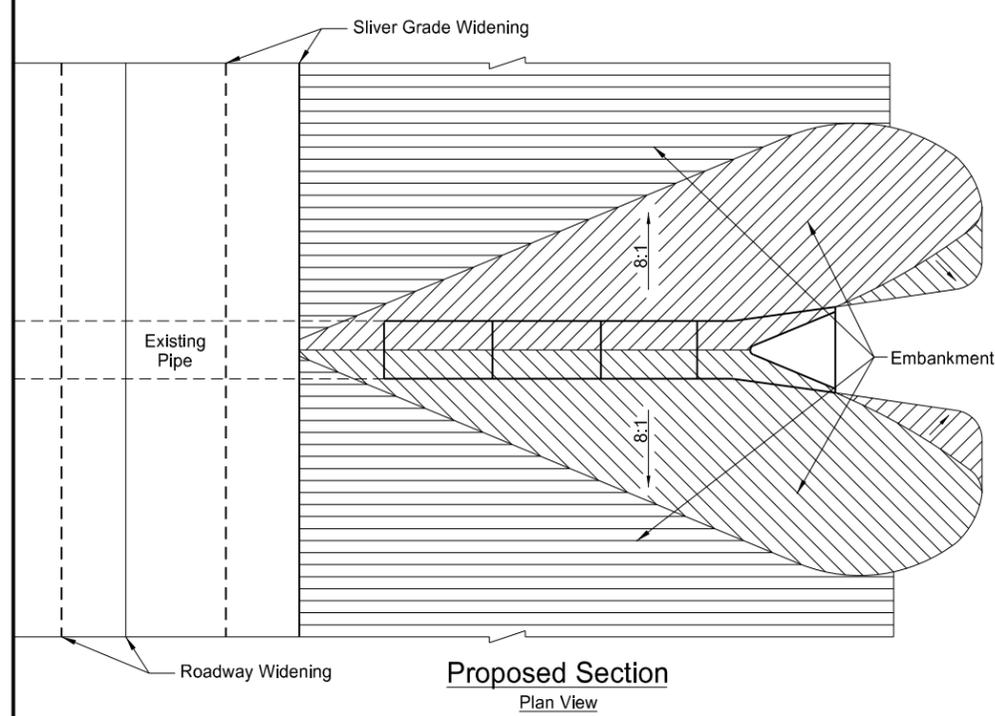
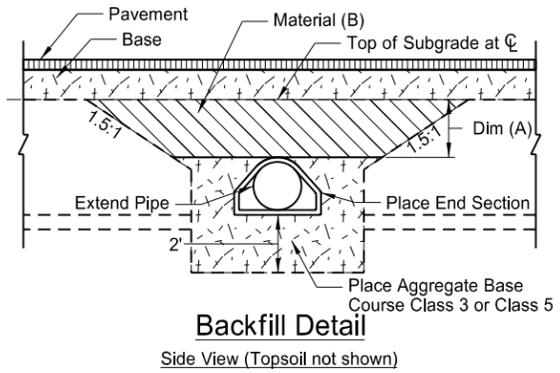
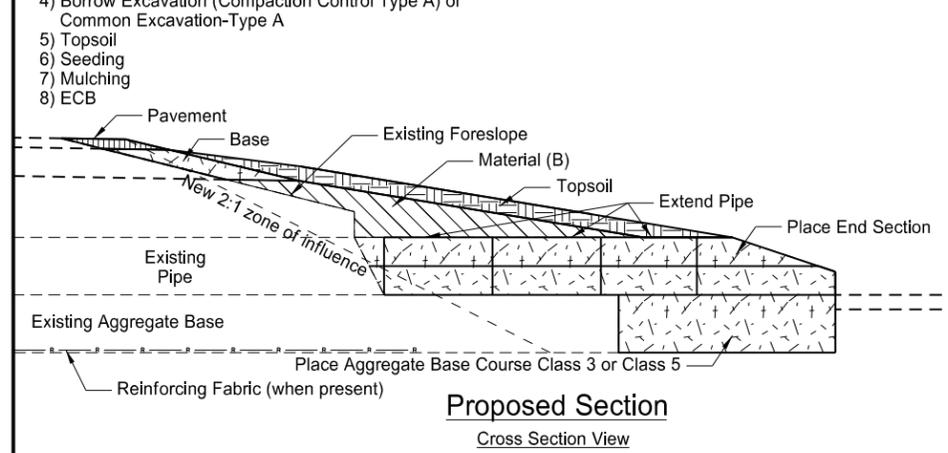


Erosion Control at Culvert Flared End Sections

US 83 / 88th St SE Intersection
North of Strasburg



- Pay Items**
- 1) Pipe*
 - 2) Remove & Relay Pipe - All Types & Sizes (when required)
 - 3) Remove & Reset End Section or new End Section
 - 4) Borrow Excavation (Compaction Control Type A) or Common Excavation-Type A
 - 5) Topsoil
 - 6) Seeding
 - 7) Mulching
 - 8) ECB
- *Included in Pipe Pay Item**
- 1) Pipe
 - 2) Trench excavation
 - 3) Aggregate Base Course Class 3 or Class 5



Pipe Materials	Dim (A) ≤ 4 Feet	Dim (A) > 4 Feet
Concrete	Material (B)	Material (B)
Metal	Embank or Aggr	Embank or Aggr

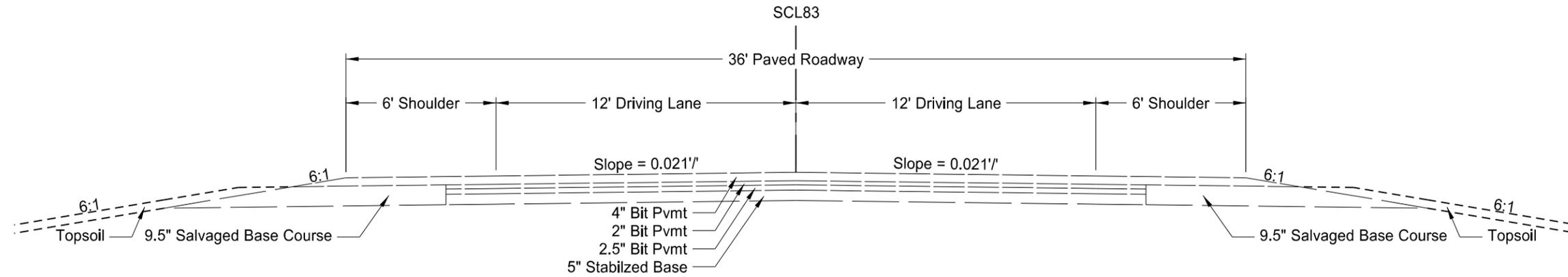
- NOTES:**
- Embankment may be either Borrow Excavation (Compaction Control - Type A) or Common Excavation - Type A.
 - Aggregate may be either Class 3 or Class 5 Aggregate Base Course.

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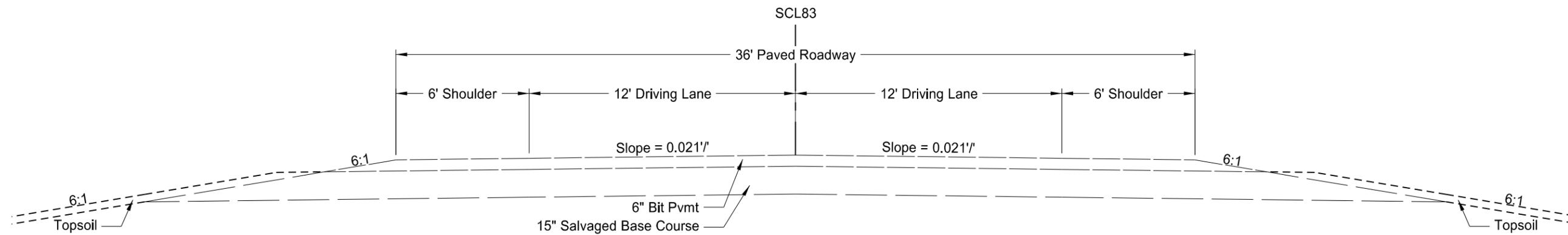
Mainline Pipe Extension Detail

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	30	1



EXISTING TYPICAL SECTION
Sta 851+50.00 to Sta 854+64.00
Sta 855+24.00 to Sta 872+20.00

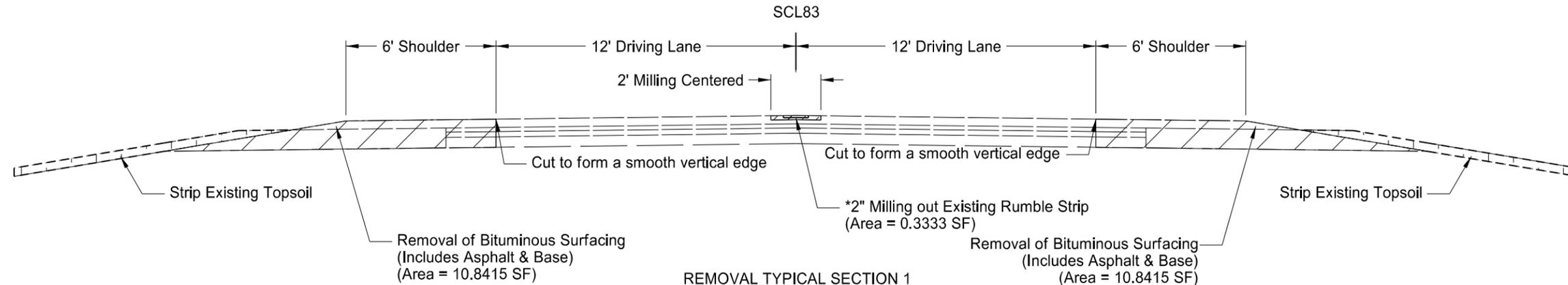


EXISTING TYPICAL SECTION
Sta 854+64.00 to Sta 855+24.00

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EXISTING TYPICAL SECTIONS

US 83 / 88th St SE Intersection
North of Strasburg

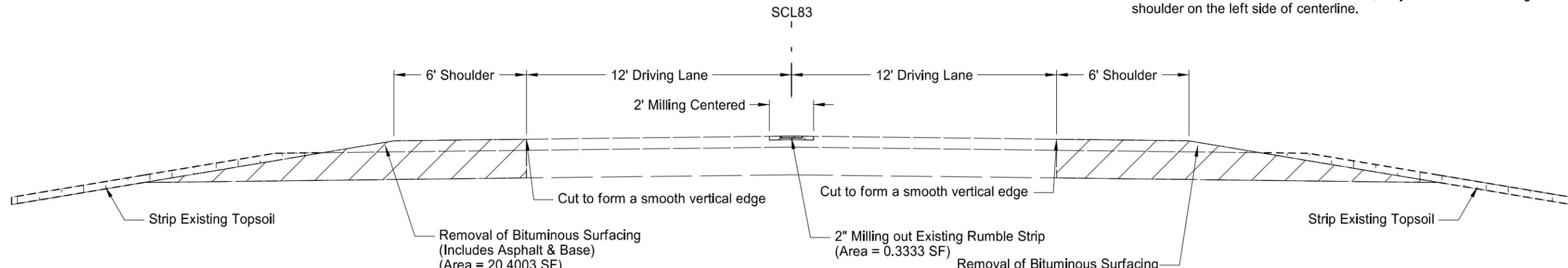


REMOVAL TYPICAL SECTION 1
 Sta 851+50.00 to Sta 854+64.00
 **Sta 855+24.00 to Sta 872+20.00

Removal of Bituminous Surfacing
 (Includes Asphalt & Base)
 (Area = 10.8415 SF)

*Mill out existing centerline rumble strip starting at Sta 850+50.00 according to D-760-3 (100' before left turn lane taper begins).

**From Sta 868+25.00 to Sta 872+20.00, only remove the existing shoulder on the left side of centerline.



REMOVAL TYPICAL SECTION 2
 Sta 854+64.00 to Sta 855+24.00

Removal of Bituminous Surfacing
 (Includes Asphalt & Base)
 (Area = 20.4003 SF)

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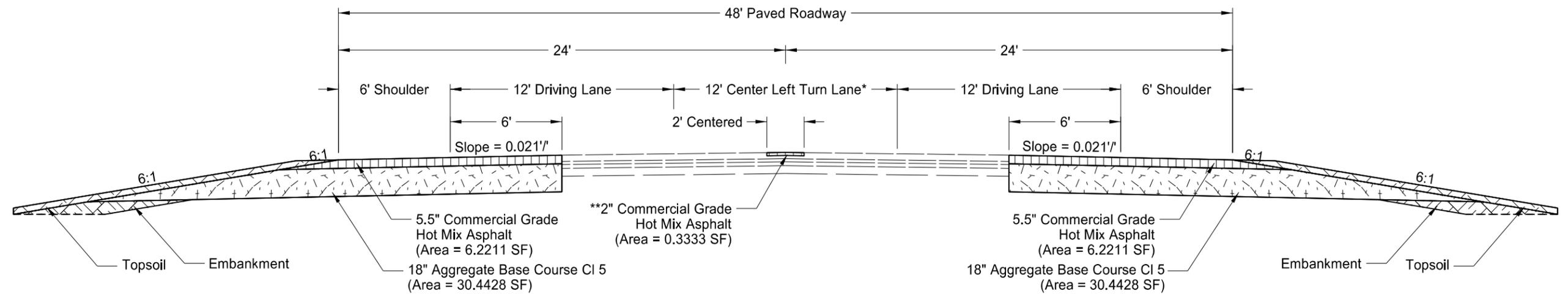
SPEC	CODE	BID ITEM	UNIT	REMOVAL TYPICAL SECTION 1 *Sta 851+50.00 to Sta 854+64.00 Sta 855+24.00 to Sta 868+25.00				REMOVAL TYPICAL SECTION 1 Sta 868+25.00 to Sta 872+20.00				REMOVAL TYPICAL SECTION 2 Sta 854+64.00 to Sta 855+24.00			
				Area (SF)	Depth (in)	Quantity per Station	SubTotal	Area (SF)	Depth (in)	Quantity per Station	SubTotal	Area (SF)	Depth (in)	Quantity per Station	SubTotal
202	0135	REMOVAL OF BITUMINOUS SURFACING @ 1.875 TON/CY	TON	21.683	13.5	150.6	2,432	10.8415	13.5	75.3	297	40.8006	21	283.4	170
411	0100	MILLING PAVEMENT SURFACE @ 1.875 TON/CY	TON	0.3333	2	2.4	41	--	--	--	--	0.3333	2	2.4	1

*Start milling of existing centerline rumble strip at Sta 850+50.00 according to D-760-3 (100' before left turn lane taper begins).

REMOVAL TYPICAL SECTIONS

 US 83 / 88th St SE Intersection
 North of Strasburg

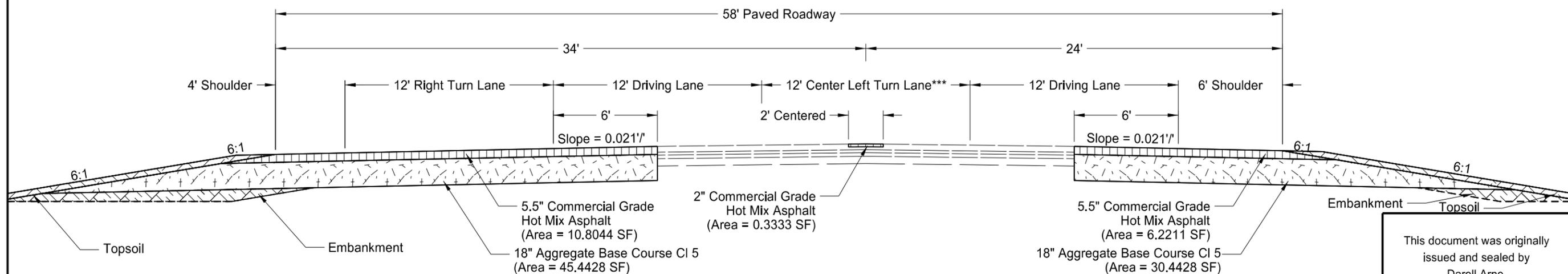
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	30	3



PROPOSED TYPICAL SECTION
Sta 851+50.00 to Sta 864+02.13

* Varies from Sta 851+50.00 to Sta 857+22.50

**Pave existing centerline rumble strip starting at Sta 850+50.00 according to D-760-3 (100' before left turn lane taper begins).



PROPOSED TYPICAL SECTION
Sta 864+02.13 to Sta 872+20.00

***Varies from Sta 864+31.60 to Sta 868+25.00

Note: The paving on the right side of the centerline and at centerline ends at Sta 868+25.00.

Note: The right turn lane taper begins at Sta 870+35.13.

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PROPOSED TYPICAL SECTIONS

US 83 / 88th St SE Intersection
North of Strasburg

Note: See Section 90 for layout and quantities.

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-083(122)016	50	1

HYDRAULIC DATA FOR NH-1-083(122)016 (A)									
STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA (ACRES)	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE (CFS)	DESIGN HEADWATER (FT)	DESIGN VELOCITY (FPS)	DESIGN STAGE (NAVD 88)	100-YEAR DISCHARGE (CFS)	100-YEAR STAGE (NAVD 88)
854+94	24" X 88' RCP	24" (B)	35	21	3.09	10.16	1799.89	35	1802.56

(A) Hydraulic data provided is for smooth-walled type conduits

(B) Culvert diameter given at this location in the NDDOT Policy minimum diameter and exceeds hydraulic requirements.

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Culvert Hydraulic Data
 US Highway 83
 88th St SE Intersection
 North of Strasburg

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-083(122)016	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)		Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	(*) End Sections		Applicable Backfill Detail
				In	LF							BegIn	End	
854+94	41.3' Lt	854+94	41.3' Lt	24	(No Extension)	Reinforced Concrete Pipe - Class III (No extension)	24					EA	EA	
854+94	45.7' Rt	854+94	49.7' Rt	24	Pipe Conc. Reinf. CL III (Extension)	Reinforced Concrete Pipe - Class III (barrel length = 4 LF)	24					TES	Remove & Relay	Sheet 20-4

(*) The price bid for "Pipe Conduit" bid items includes end sections. Pipe Extensions shall pay for end sections separately.

FES = Flared End Section

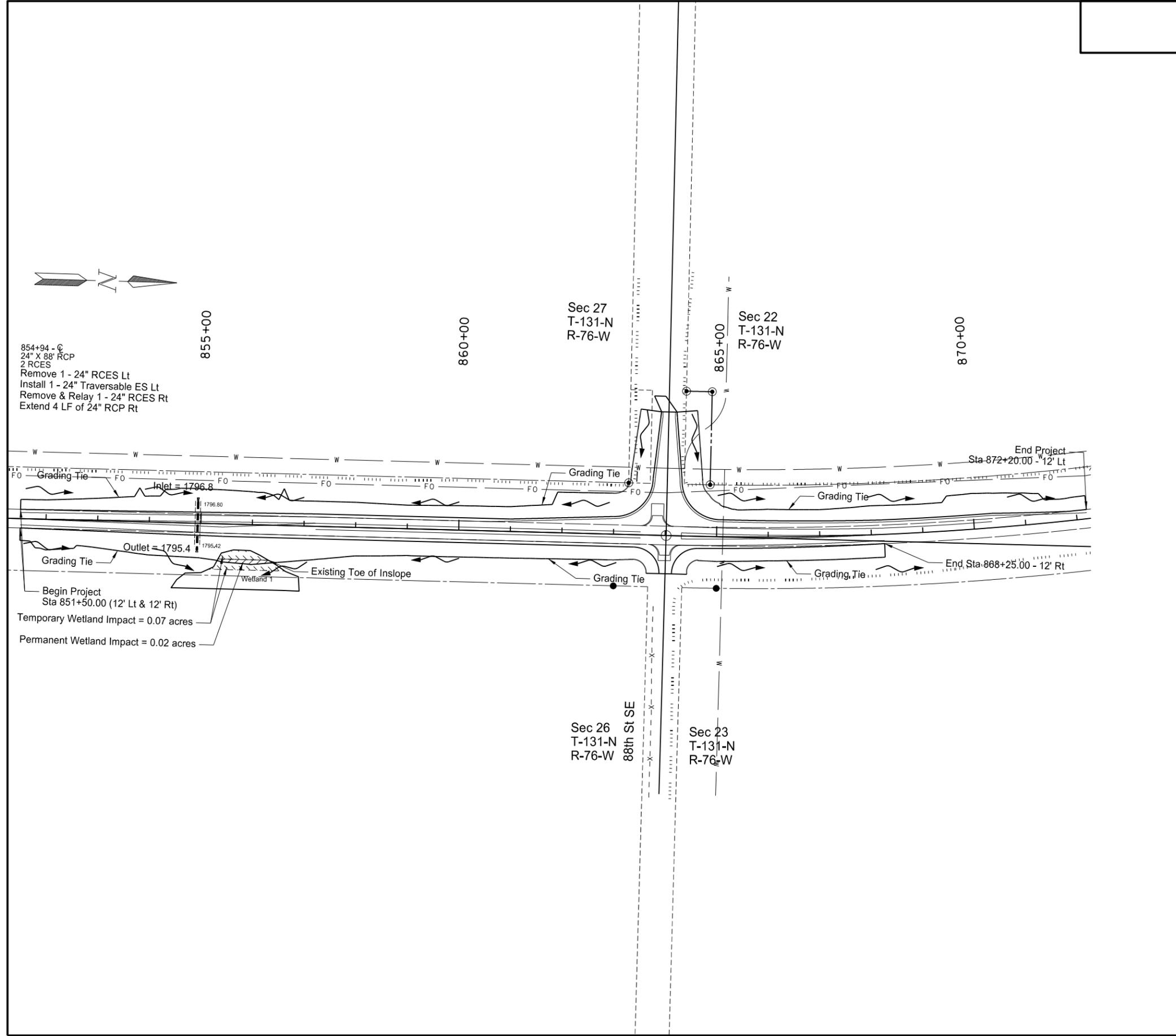
TES = Traversable End Section

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ALLOWABLE PIPE LIST

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	75	1



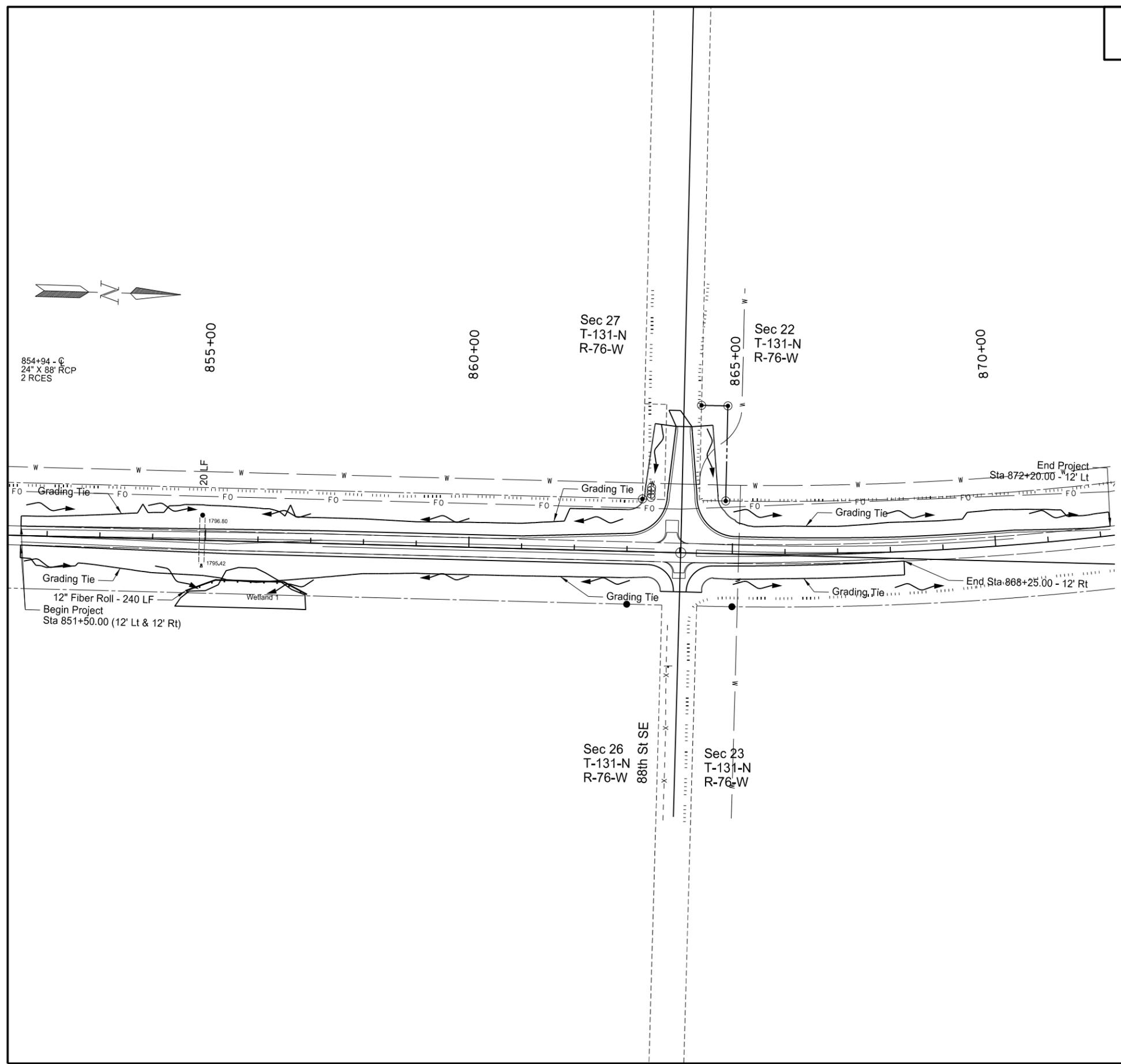
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WETLAND IMPACTS

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	76	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
261	0112	FIBER ROLLS 12IN		
		854+65 Rt to 856+95 Rt (Protecting Wetland 1)	LF	240
		854+94 Lt (Protecting Existing Culvert Inlet)	LF	20
261	0113	REMOVE FIBER ROLLS 12IN		
		854+65 Rt to 856+95 Rt (Protecting Wetland 1)	LF	240
		854+94 Lt (Protecting Existing Culvert Inlet)	LF	20



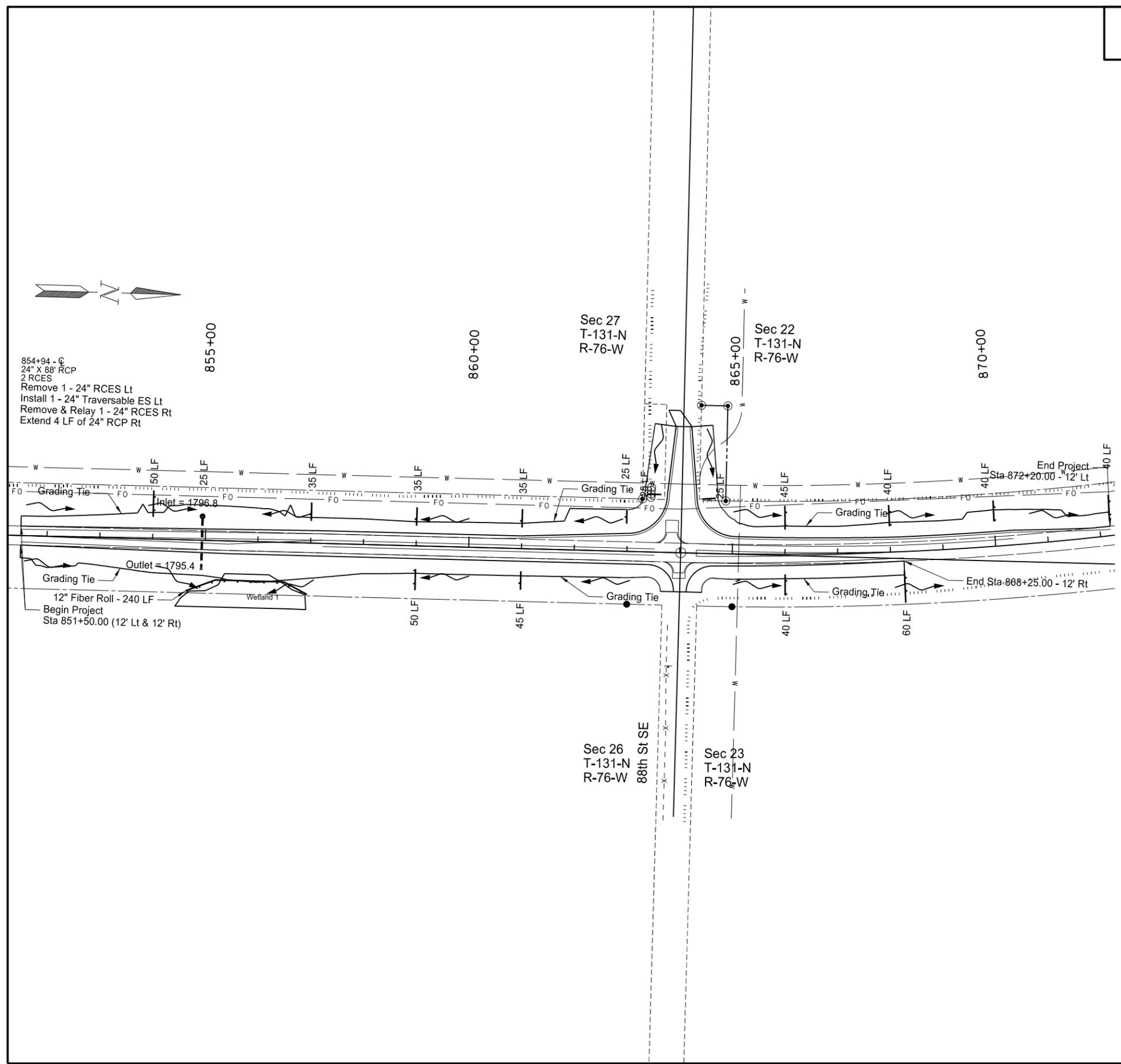
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TEMPORARY SEDIMENT AND EROSION CONTROL

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	77	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
255	0102	ECB TYPE 2		
		854+94 Lt & Rt (CL Culvert Extension)	SY	48
261	0112	FIBER ROLLS 12IN		
		854+65 Rt to 856+95 Rt (Protecting Wetland 1)	LF	240
		851+50 Lt to 872+20 Lt (Ditch Checks)	LF	355
		851+50 Rt to 868+25 Rt (Ditch Checks)	LF	195
		854+94 Lt (Protecting New Culvert Inlet)	LF	25



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PERMANENT SEDIMENT AND EROSION CONTROL

US 83 / 88th St SE Intersection
North of Strasburg

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Strasburg N to Linton

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	81	1

HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA			SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		DESC. SEC-TWP-RGE	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
									CONTROL POINT DESCRIPTION					
US 83 - SCL83						SW Cor Sec 34 T-131-N R-76-W	164245.03	2046961.81						
TS	794+90.11	168720.69	2054149.11	SCS349		SW Cor Sec 35 T-131-N R-76-W	164252.36	2052248.32						
SC	798+90.11	168888.58	2053786.14	PI STA = 815+65.75		S ¼ Cor Sec 35T-131-N R-76-W	164256.02	2054891.58	PRIMARY CONTROL					
Sec line	815+23.69 (Bk Tan)	169531.27	2052284.06	Delta = 66° 23' 08" RT		W ¼ Cor Sec 35 T-131-N R-76-W	166891.78	2052246.92	GPS 83-6 178055.70 2051463.54 1801.54 897+49 86' Rt					
PI SCS349	815+65.75	169548.03	2052245.48	D _a = 2° 00'		E ¼ Cor Sec 35 T-131-N R-76-W	166904.33	2057531.29	#6 Rebar w/1.5" Alum cap stamped "NDDOT GPS 83-6 PE/LS 1139					
CS	828+09.39	171223.89	2052251.17	R = 2864.79'		NW Cor Sec 34 T-131-N R-76-W	169522.50	2046957.87	GPS 83-7 193739.67 2044878.59 1821.89 1067+53 72' Rt					
ST	832+09.39	171623.67	2052241.00	L _s = 400.00'		NW Cor Sec 35 T-131-N R-76-W	169531.21	2052245.52	#6 Rebar w/1.5" Alum cap stamped "NDDOT GPS 83-7 PE/LS 1139					
¼ Cor	837+59.52	172173.80	2052239.81	S _c = 4° 00'		N ¼ Cor Sec 35 T-131-N R-76-W	169535.56	2054887.17	GPS 83-8 206567.84 2037900.44 1798.64 1223+26 1556' Rt					
Sec cor	864+02.13	174816.40	2052234.10	T _s = 2075.64		NW Cor Sec 36 T-131-N R-76-W	169548.97	2057527.75	#6 Rebar w/1.5" Alum cap stamped "NDDOT GPS 83-8 PE/LS 1139					
PC	864+34.94	174849.22	2052234.03	L = 2919.28'		NE Cor Sec 36 T-131-N R-76-W	169554.43	2062801.26						
PI C350	875+72.95	175987.22	2052231.57			W ¼ Cor Sec 26 T-131-N R-76-W	172173.80	2052239.81	SECONDARY CONTROL					
PT	886+81.72	177037.91	2051794.39	C350		NW Cor Sec 27T-131-N R-76-W	174790.68	2046948.82	RTK2828 205629.25 2036480.41 1730.39 1214+26 35' Rt					
¼ Line	891+36.42	177457.72	2051619.71	PI STA = 875+72.95		NW Cor Sec 26 T-131-N R-76-W	174816.40	2052234.10	RTK2829 206101.93 2036405.85 1728.32 1219+08 31' Rt					
Sec line	919+97.60	180099.35	2050520.56	Delta = 22° 28' 04" LT		W ¼ Cor Sec 22T-131-N R-76-W	177440.62	2046947.46	RTK2826 214917.13 2036342.38 1712.09 1307+27 23' Rt					
¼ Line	944+30.04	182345.14	2049586.11	D _a = 1° 00'		E ¼ Cor Sec 22 T-131-N R-76-W	177459.95	2052228.38	RTK2824 215034.21 2036225.34 1707.33 1308+45 94' Lt					
¼ Line	948+52.39	182735.08	2049423.86	R = 5729.58'		NW Cor Sec 22 T-131-N R-76-W	180090.64	2046946.14	RTK2825 215034.52 2036434.38 1708.20 1308+44 115' Rt					
Sec line	977+07.99	185371.56	2048326.86	T = 1138.01'		N ¼ Cor Sec 22 T-131-N R-76-W	180097.09	2049587.26						
¼ Line	1005+72.42	188016.19	2047226.46	L = 2246.78'		NE Cor Sec 22 T-131-N R-76-W	180103.50	2052228.34						
Sec line	1013+19.93	188706.35	2046939.29			W ¼ Cor Sec 15 T-131-N R-76-W	182730.77	2046944.40						
Sec line	1034+38.40	190662.26	2046125.46	C351		E ¼ Cor Sec 15 T-131-N R-76-W	182739.95	2052228.25						
PC	1059+35.96	192968.17	2045166.00	PI STA = 1071+54.03		SW Cor Sec 10 T-131-N R-76-W	185369.86	2046941.07						
¼ Line	1063+03.14 (Bk Tan)	193307.18	2045024.94	Delta = 16° 55' 43" LT		S ¼ Cor Sec 10 T-131-N R-76-W	185373.11	2049584.58						
PI C351	1071+54.03	194092.77	2044698.07	D _a = 0° 42'		NE Cor Sec 15 T-131-N R-76-W	185376.40	2052228.17						
¼ Line	644.57' from PI AHD TAN	194589.99	2044287.90	R = 8185.11'		SW Cor Sec 9 T-131-N R-76-W	185378.02	2041656.03						
PT	1083+54.35	195032.39	2043922.95	T = 1218.07'		W ¼ Cor Sec 10T-131-N R-76-W	188015.69	2046939.66						
Twp line	1095+63.37	195965.03	2043153.58	L = 2418.39'		E ¼ Cor Sec 10 T-131-N R-76-W	188024.84	2052219.52						
Sec line	1119+38.14	197796.92	2041642.40			NE Cor Sec 9T-131-N R-76-W	190661.53	2046938.25						
¼ Line	1129+95.27	198612.39	2040969.69			N ¼ Cor Sec 9 T-131-N R-76-W	190663.90	2044293.81						
Airport Glide path	1151+89.91	200305.34	2039573.12			N ⅙ Cor Sec 10T-131-N R-76-W	190664.05	2048262.26						
¼ Line	1160+94.43	201003.08	2038997.53			NW Cor Sec 9 T-131-N R-76-W	190666.50	2041649.66	All coordinates and measurements on this document derived from the International Foot definition. This document was originally issued and sealed by Chad Hanson Registration Number LS- 5572 on 12/29/14 and the original document is stored at the North Dakota Department of Transportation					
Sec line	1164+28.40	201260.70	2038785.01			NE Cor Sec 10 T-131-N R-76-W	190673.27	2052210.87						
US 83 - SCL83 - Continued on sheet 2						E ¼ Cor Sec 4T-131-N R-76-W	193304.42	2046933.28						
NOTES: Sheet 1 of 2				Date Survey Completed 07/13/10		<input type="checkbox"/> Assumed Coordinates <input checked="" type="checkbox"/> All coordinates on this sheet are Emmons County ground coordinates. They are derived from the "North Dakota Coordinate System of 1983" NAD83(CORS) South Zone Combination factor (cf) = 0.9998910			<input checked="" type="checkbox"/> NAVD-88 <input type="checkbox"/> NGVD-29 <input checked="" type="checkbox"/> ENGLISH UNITS <input type="checkbox"/> METRIC UNITS					

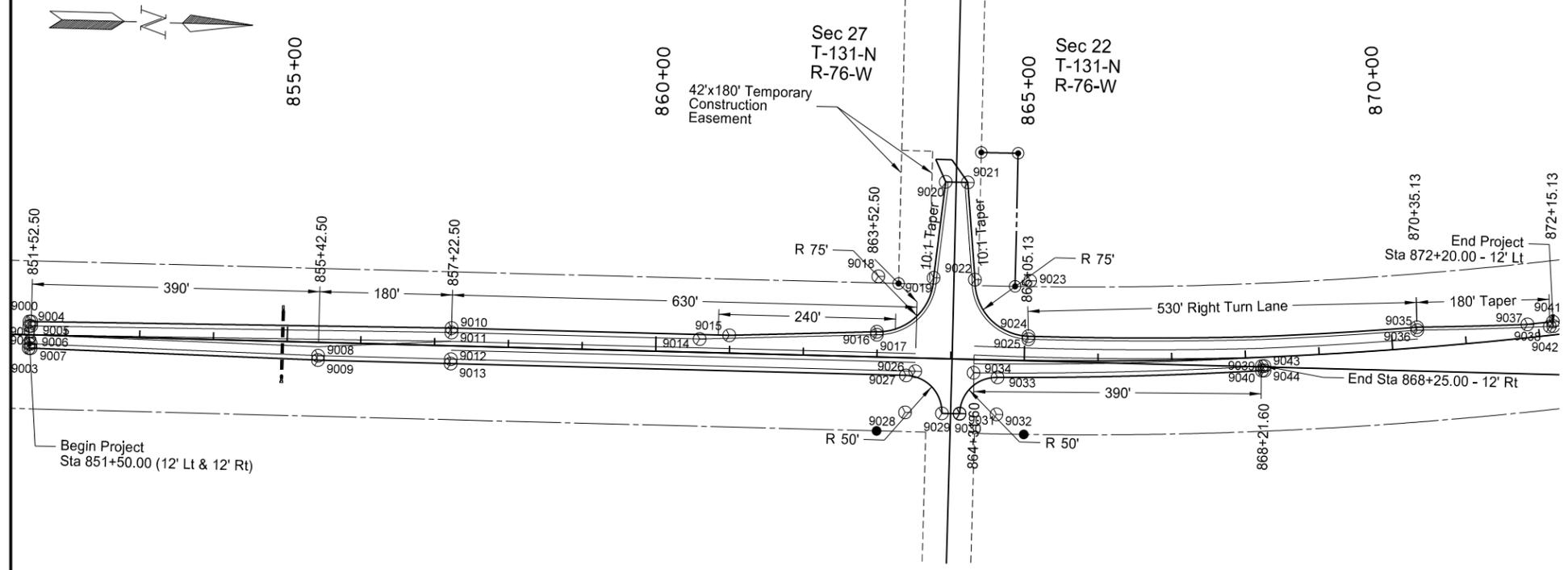
PRELIMINARY SURVEY COORDINATE AND CURVE DATA - Strasburg N to Linton

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	81	2

HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA			SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		DESC. SEC-TWP-RGE	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
									CONTROL POINT DESCRIPTION					
US 83 - SCL83 - Continued from sheet 1						W ¼ Cor Sec 4T-131-N R-76-W	193312.07	2041646.29						
PC	1171+86.61	201845.59	2038302.52	C718		NW Cor Sec 4T-131-N R-76-W	195964.22	2041642.89						
PI C718	1177+83.15	202305.76	2037922.91	PI STA = 1177+83.15		N ¼ Cor Sec 4 T-131-N R-76-W	195965.64	2044285.82						
PT	1183+75.65	202832.56	2037643.02	Delta = 11° 32' 17" RT		S ¼ Cor Sec 32T-132-N R-76-W	195969.03	2039003.36						
¼ Line	1195+87.41	203902.65	2037074.46	D _a = 0° 58' 13"		SW Cor Sec 32 T-132-N R-76-W	195973.84	2036363.84						
PC	1197+20.13	204019.85	2037012.19	R = 5904.58'		E ¼ Cor Sec 32 T-132-N R-76-W	198611.57	2041642.18						
PI C3116	1211+39.49	205273.28	2036346.23	T = 596.54'		W ¼ Cor Sec 32 T-132-N R-76-W	198618.04	2036358.42						
Sec Cor	1269.25' from PI AHD TAN	206542.52	2036342.80	L = 1189.05'		SE Cor Sec 29 T-132-N R-76-W	201258.92	2041641.47						
PT	1225+02.83	206692.63	2036342.38			S ¼ Cor Sec 29T-132-N R-76-W	201260.57	2038997.24	R MKR #	NORTHING	EASTING	STATION(SCL83)	OFFSET	
¼ Cor	1250+01.28	209191.07	2036335.57	C3116		NW Cor Sec 32 T-132-N R-76-W	201262.23	2036353.01	6	132393.51	2078787.97	316+96	39' Rt	
Sec Cor	1276+48.55	211838.33	2036328.35	PI STA = 1211+39.49		W ¼ Cor Sec 29 T-132-N R-76-W	203902.38	2036348.00	7	137658.72	2078739.23	369+67	30' Rt	
¼ Cor	1302+88.75	214478.52	2036320.63	Delta = 27° 49' 37" RT		E ¼ Cor Sec 29 T-132-N R-76-W	203904.33	2041638.59	8	142955.91	2078720.77	422+64	39' Rt	
Intersection US 83 and ND 13				D _a = 1° 00'		NW Cor Sec 29 T-132-N R-76-W	206542.52	2036342.79	9	148060.61	2077929.30	475+09	32' Rt	
US 83 Bk	1315+65.13	215754.90	2036317.15	R = 5729.58'		NE Cor Sec 29T-132-N R-76-W	206549.75	2041635.71	10	151754.58	2074171.69	527+75	28' Rt	
US 83 Ahd	1316+93.76	215754.90	2036317.15	T = 1419.36'		SW Cor Sec 19 T-132-N R-76-W	206555.07	2031564.23	11	154921.10	2069946.44	580+55	62' Rt	
ND 13	10560+00.00	215754.90	2036317.15	L = 2782.70'		W ¼ Cor Sec 20 T-132-N R-76-W	209191.07	2036335.57	12	158011.84	2065679.14	633+24	31' Rt	
Sec Cor	1330+57.58	217118.72	2036313.43			W ¼ Cor Sec 19 T-132-N R-76-W	209214.88	2031547.10	13	161092.24	2061413.55	685+86	28' Rt	
						NW Cor Sec 20 T-132-N R-76-W	211838.33	2036328.35	14	165366.35	2058420.04	738+72	30' Rt	
						NW Cor Sec 19 T-132-N R-76-W	211884.34	2031529.49	15	168627.11	2054438.98	791+87	30' Rt	
						W ¼ Cor Sec 17 T-132-N R-76-W	214478.52	2036320.63	16	172882.74	2052274.06	844+68	36' Rt	
						NW Cor Sec 17 T-132-N R-76-W	217118.72	2036313.43	17	178038.13	2051414.43	897+51	33' Rt	
ND 13 - SCL13									18	182919.84	2049384.26	950+38	34' Rt	
Beg @ Intscn US 83	10560+00.00	215754.90	2036317.15						19	187786.64	2047349.86	1003+13	26' Rt	
End	10581+48.15	216275.95	2038401.16						20	192673.61	2045325.83	1056+03	34' Rt	
									21	196971.00	2042368.57	1108+39	35' Rt	
									22	201054.86	2038995.77	1161+35	32' Rt	
									23	205628.74	2036478.70	1214+26	33' Rt	
									24	210913.21	2036363.81	1267+23	33' Rt	
									25	216178.52	2036350.59	1321+17	35' Rt	
NOTES: Sheet 2 of 2				Date Survey Completed 07/13/10		<input type="checkbox"/> Assumed Coordinates <input checked="" type="checkbox"/> All coordinates on this sheet are Emmons County ground coordinates. They are derived from the "North Dakota Coordinate System of 1983" NAD83(CORS) South Zone Combination factor (cf) = 0.9998910			All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Stations (OPUS) <input checked="" type="checkbox"/> NAVD-88 <input type="checkbox"/> NGVD-29 <input checked="" type="checkbox"/> ENGLISH UNITS <input type="checkbox"/> METRIC UNITS		This document was originally issued and sealed by Chad Hanson, Registration Number LS- 5572 on 12/29/14 and the original document is stored at the North Dakota Department of Transportation			

Stationing and Offsets are from Centerline Chain SCL83

North	East	Right of Way / Reference Monuments and Markers				
		Station	Offset	Iron Pin R/W monument	R/W Marker (witness post)	Iron Pin Reference Monument
174716.6209	2052334.3123	863+02.13	100.0000		X	X
174916.2368	2052333.4981	865+00.60	100.0000		X	X
174740.9196	2052134.2607	863+26.86	-100.0000	X	X	
174898.9169	2052133.6965	864+85.75	-100.0000	X	X	
174898.0408	2051953.6951	864+86.91	-280.0000	X	X	
174848.0418	2051954.0274	864+34.37	-280.0000	X	X	
		TOTAL		4	6	2



Stationing and Offsets are from Centerline Chain SCL83

Point	North	East	Station	Offset
9000	173564.2393	2052218.8028	851+50.00	-18.0000
9001	173564.2523	2052224.8027	851+50.00	-12.0000
9002	173564.3042	2052248.8027	851+50.00	12.0000
9003	173564.3171	2052254.8027	851+50.00	18.0000
9004	173566.7393	2052218.7974	851+52.50	-18.0000
9005	173566.7523	2052224.7973	851+52.50	-12.0000
9006	173566.8042	2052248.7973	851+52.50	12.0000
9007	173566.8171	2052254.7973	851+52.50	18.0000
9008	173956.8162	2052253.9543	855+42.50	18.0000
9009	173956.8292	2052259.9543	855+42.50	24.0000
9010	174136.7250	2052211.5654	857+22.50	-24.0000
9011	174136.7380	2052217.5654	857+22.50	-18.0000
9012	174136.8158	2052253.5653	857+22.50	18.0000
9013	174136.8288	2052259.5653	857+22.50	24.0000
9014	174473.3672	2052216.8378	860+99.13	-18.0000
9015	174513.3541	2052210.7514	860+99.13	-24.0000
9016	174713.3321	2052200.3191	862+99.13	-34.0000
9017	174713.3407	2052204.3191	862+99.13	-30.0000
9018	174713.1700	2052125.3193	862+99.13	-109.0000
9019	174788.1698	2052125.1572	863+74.13	-109.0000
9020	174800.8888	2051995.1294	863+87.13	-239.0000
9021	174830.8887	2051995.0646	864+17.13	-239.0000
9022	174844.1721	2052126.1674	864+30.13	-107.8688
9023	174919.1698	2052125.5789	865+06.48	-107.8570

Stationing and Offsets are from Centerline Chain SCL83

Point	North	East	Station	Offset
9024	174918.9287	2052200.5785	865+05.13	-32.8688
9025	174918.9864	2052204.5781	865+05.13	-28.8688
9026	174766.8143	2052252.2036	863+52.50	18.0000
9027	174754.4573	2052258.2304	863+40.13	24.0000
9028	174754.5654	2052308.2302	863+40.13	74.0000
9029	174804.5653	2052308.1222	863+90.13	74.0000
9030	174828.5652	2052308.0703	864+14.13	74.0000
9031	174828.5641	2052307.5698	864+14.13	73.4995
9032	174878.5638	2052307.3870	864+63.76	73.4981
9033	174878.5754	2052257.3870	864+64.13	23.4995
9034	174845.9141	2052252.0327	864+31.60	18.0000
9035	175445.2510	2052173.4837	870+35.13	-28.0000
9036	175445.6779	2052177.4609	870+35.13	-24.0000
9037	175594.7673	2052165.5262	871+85.13	-18.0000
9038	175625.2253	2052167.4227	872+15.13	-12.0000
9039	175236.3878	2052232.1196	868+21.60	12.0000
9040	175236.8053	2052238.1051	868+21.60	18.0000
9041	175629.2060	2052160.8086	872+20.00	-18.0000
9042	175630.0384	2052166.7506	872+20.00	-12.0000
9043	175239.7866	2052231.8815	868+25.00	12.0000
9044	175240.2077	2052237.8667	868+25.00	18.0000

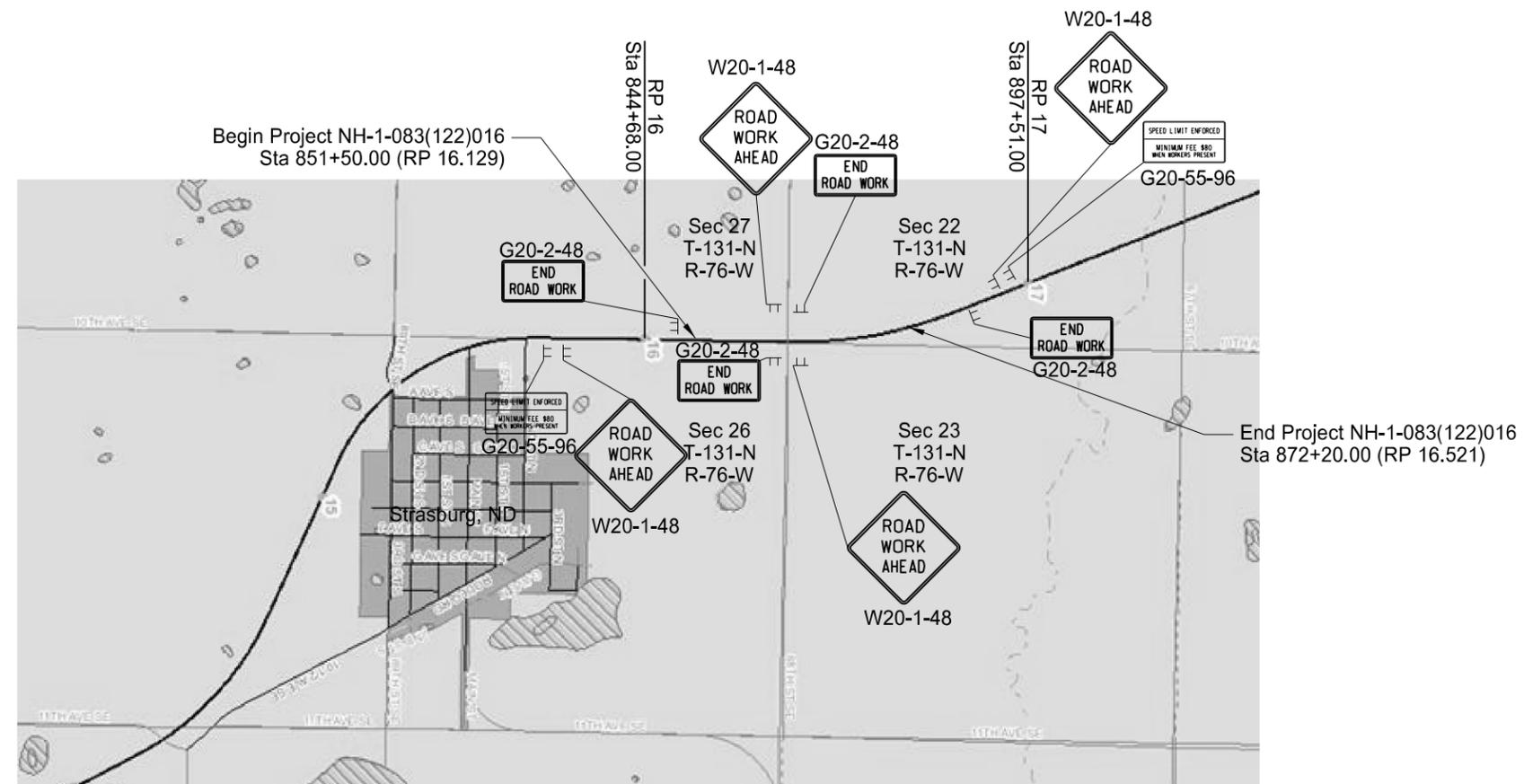
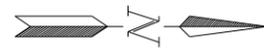
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SURVEY DATA LAYOUT

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	100	2

Refer to Plan Notes and Standard Drawings
for sign spacing and other traffic control layout details.

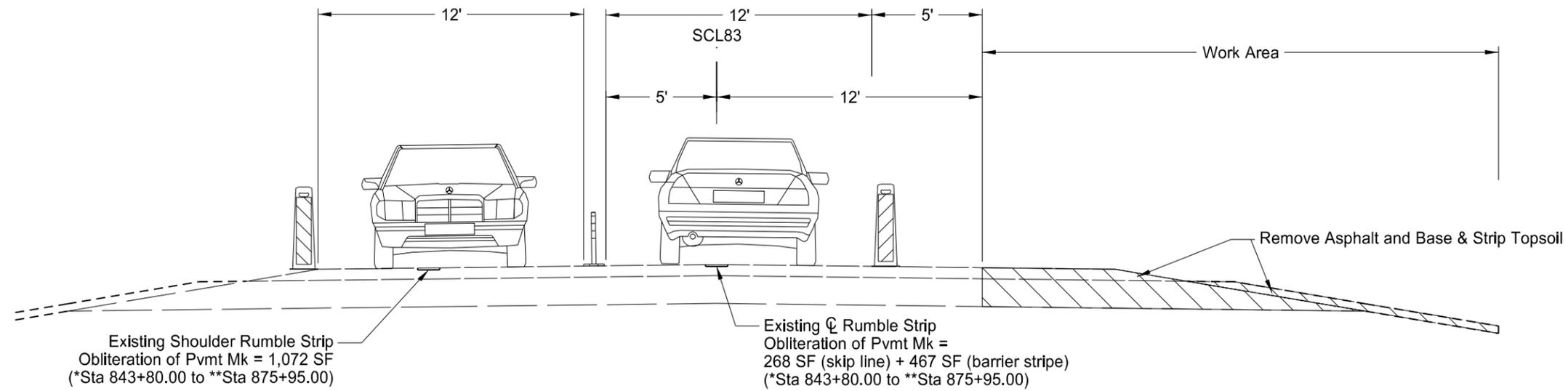


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WORK ZONE TRAFFIC CONTROL
TERMINAL SIGNING

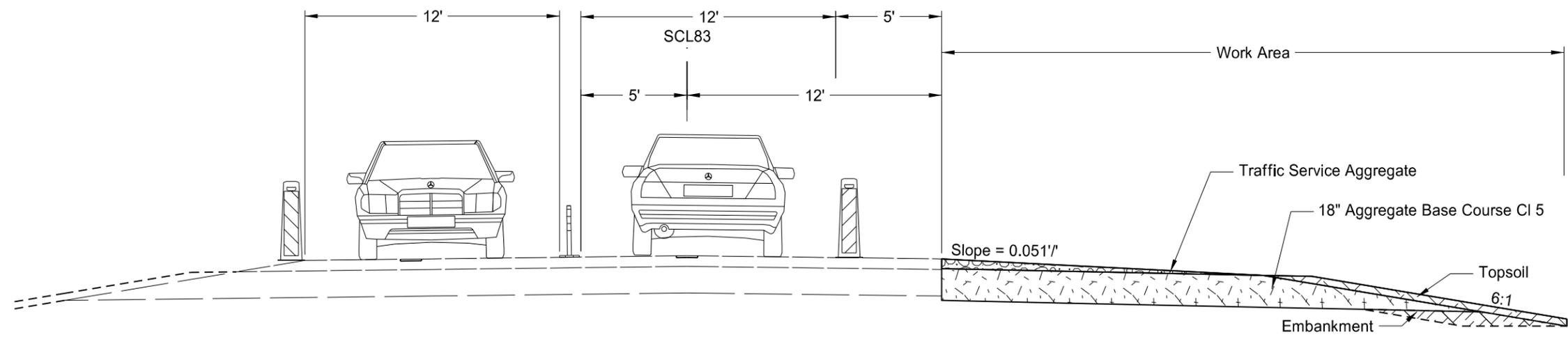
US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	100	3



WORK ZONE TRAFFIC CONTROL
Removal - Phase 1a

* The Begin Station = Begin Work Area Station - Longitudinal Buffer Space (495' for 55 mph) - Taper Length (275' for 5' width @ 55 mph)
 **The End Station = End Work Area Station + Longitudinal Buffer Space (495' for 55 mph) + Taper Length (275' for 5' width @ 55 mph)



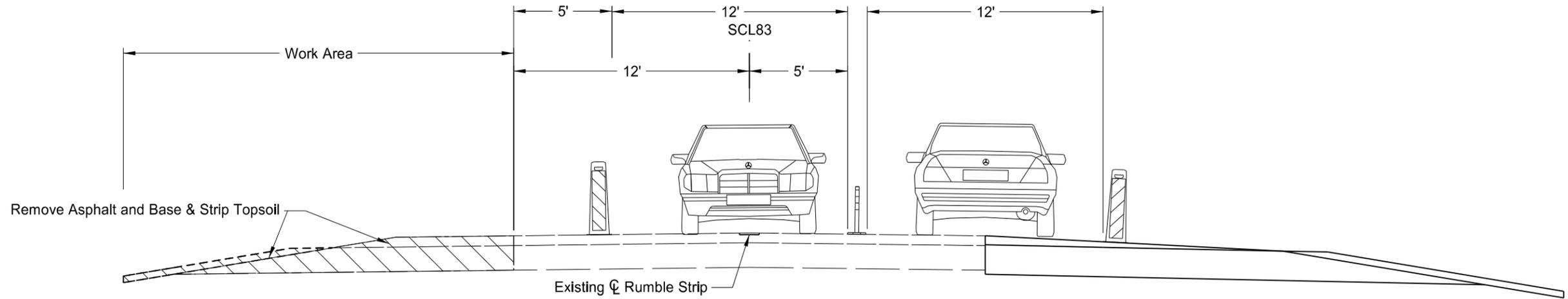
WORK ZONE TRAFFIC CONTROL
Proposed - Phase 1b

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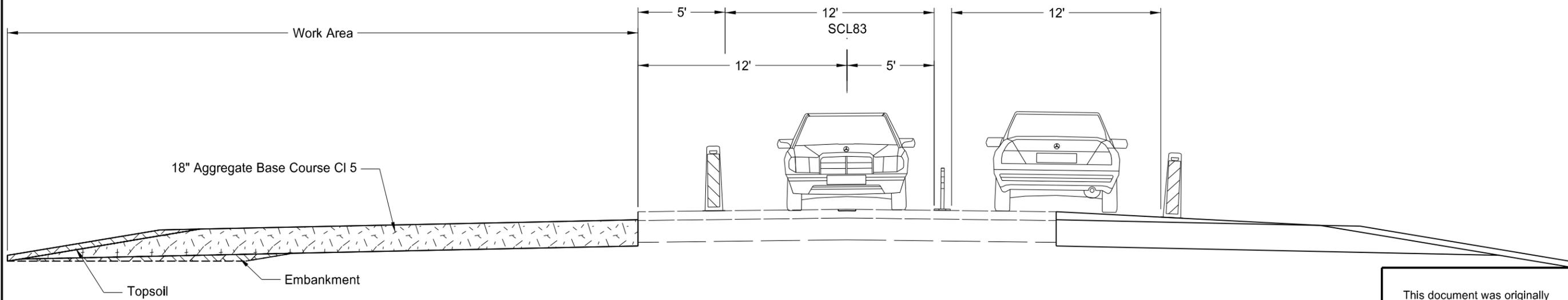
WORK ZONE TRAFFIC CONTROL
PHASE 1 TYPICAL SECTIONS

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	100	4



WORK ZONE TRAFFIC CONTROL
Removal - Phase 2a



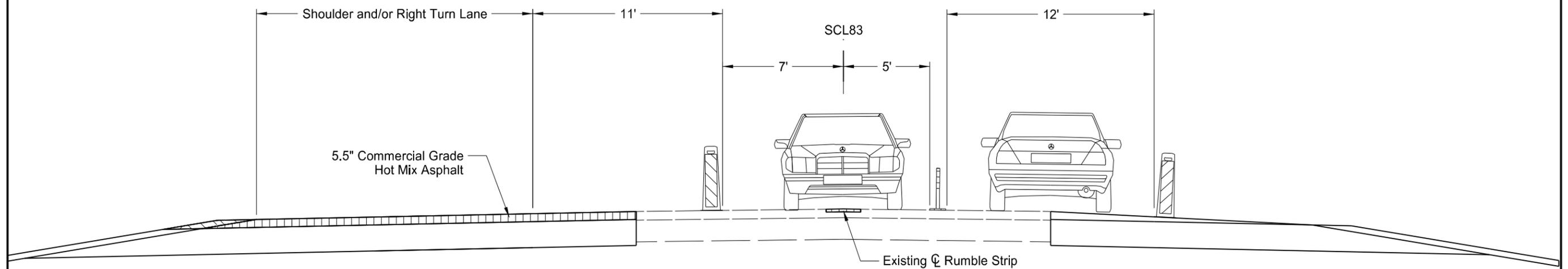
WORK ZONE TRAFFIC CONTROL
Proposed - Phase 2b

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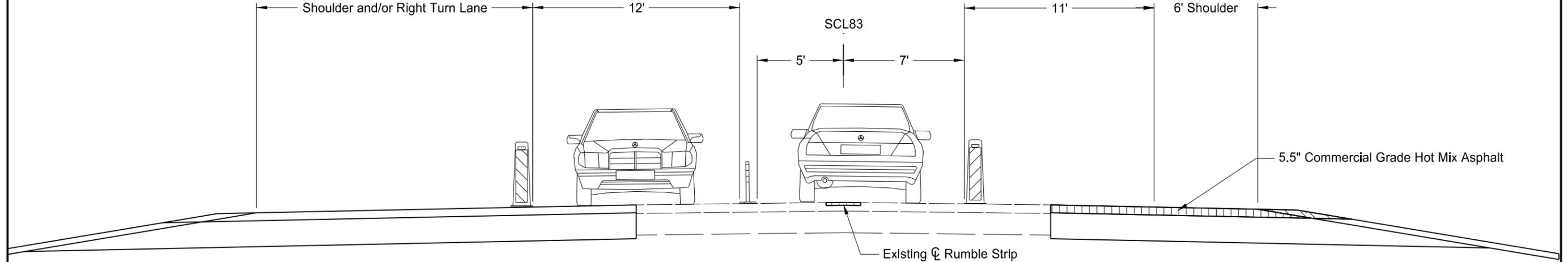
WORK ZONE TRAFFIC CONTROL
PHASE 2 TYPICAL SECTIONS

US 83 / 88th St SE Intersection
North of Strasburg

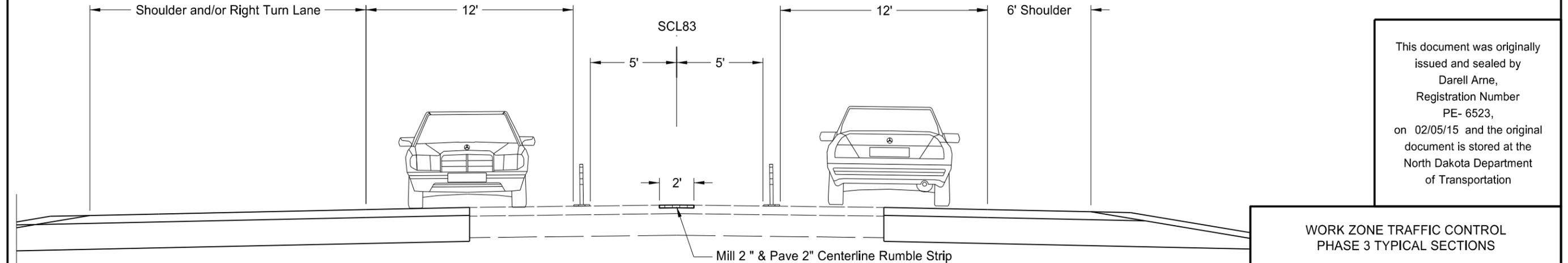
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	100	5



WORK ZONE TRAFFIC CONTROL
Paving - Phase 3a



WORK ZONE TRAFFIC CONTROL
Paving - Phase 3b



WORK ZONE TRAFFIC CONTROL
Milling & Paving of Rumble Strip Area - Phase 3c

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WORK ZONE TRAFFIC CONTROL
PHASE 3 TYPICAL SECTIONS

US 83 / 88th St SE Intersection
North of Strasburg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-1-083(122)016	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
US Hwy 83																						
856+04 Rt	SN 1		30.0		10.5	11.1	11.6		2.25 x 2.25 12 ga	12.2	3.1	3.7	4.2		2 x 2 12 ga	3	4	3 x 3 7 ga			3	
862+08 Rt		19							2.25 x 2.25 12 ga										1	1		
863+51 Lt		1		5.2	11.0				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
863+87 Lt mdn		1		5.2	7.7				2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga				
864+38 Rt	SNS								2 x 2 12 ga										1	1		
871+97 Lt	SN 2		31.5		10.5	11.5			2.5 x 2.5 10 ga	12.2	3.1	4.1		2.19 x 2.19 10 ga	2	4	3 x 3 7 ga				2	
Sub Total			61.5	10.4	Total 73.9											Total 28			2	2	5	
88th St SE																						
864+00 Lt	SL 45	9							2 x 2 12 ga										1	1		
Sub Total			0.0	0.0	Total 0.0											Total 0			1	1	0	
Grand Total			61.5	10.4	Total 73.9											Total 28			3	3	5	

Basis of Estimate
Sign Support Lengths
The sign support lengths have been calculated using the following vertical clearances:
Rural Roadway - 60"

<p>This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE-5047, on 2/5/2015 and the original document is stored at the North Dakota Department of Transportation</p>	<p>Sign Summary Perforated Tube 88th St SE Intersection Strasburg N. Dak. Emmons County</p>
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	110	2

SHORT TERM 4IN LINE - TYPE NR
 4" white edge line 1700 LF
 4" dbl yellow line (4" between) 2844 LF
 TOTAL 4544 LF

SHORT TERM 8IN LINE - TYPE NR
 8" white channel line 278 LF

SHORT TERM MESSAGE - TYPE NR
 Left arrow (2) 32 SF

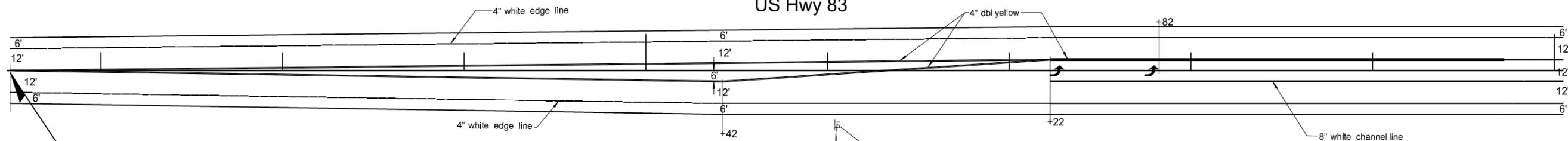


852+00

855+00

860+00

US Hwy 83



Begin Project
 Station 851+50
 RP 16.129

Welk Farmstead
 Historic Site
 ← 2 Miles

Sta 856+04 rt
 Remove

← Welk Homestead
 Historic Site 2

Sta 856+04 rt

Sign 1

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Signing and Pavement Marking
 88th St SE Intersection
 Strasburg N. Dak.
 Emmons County

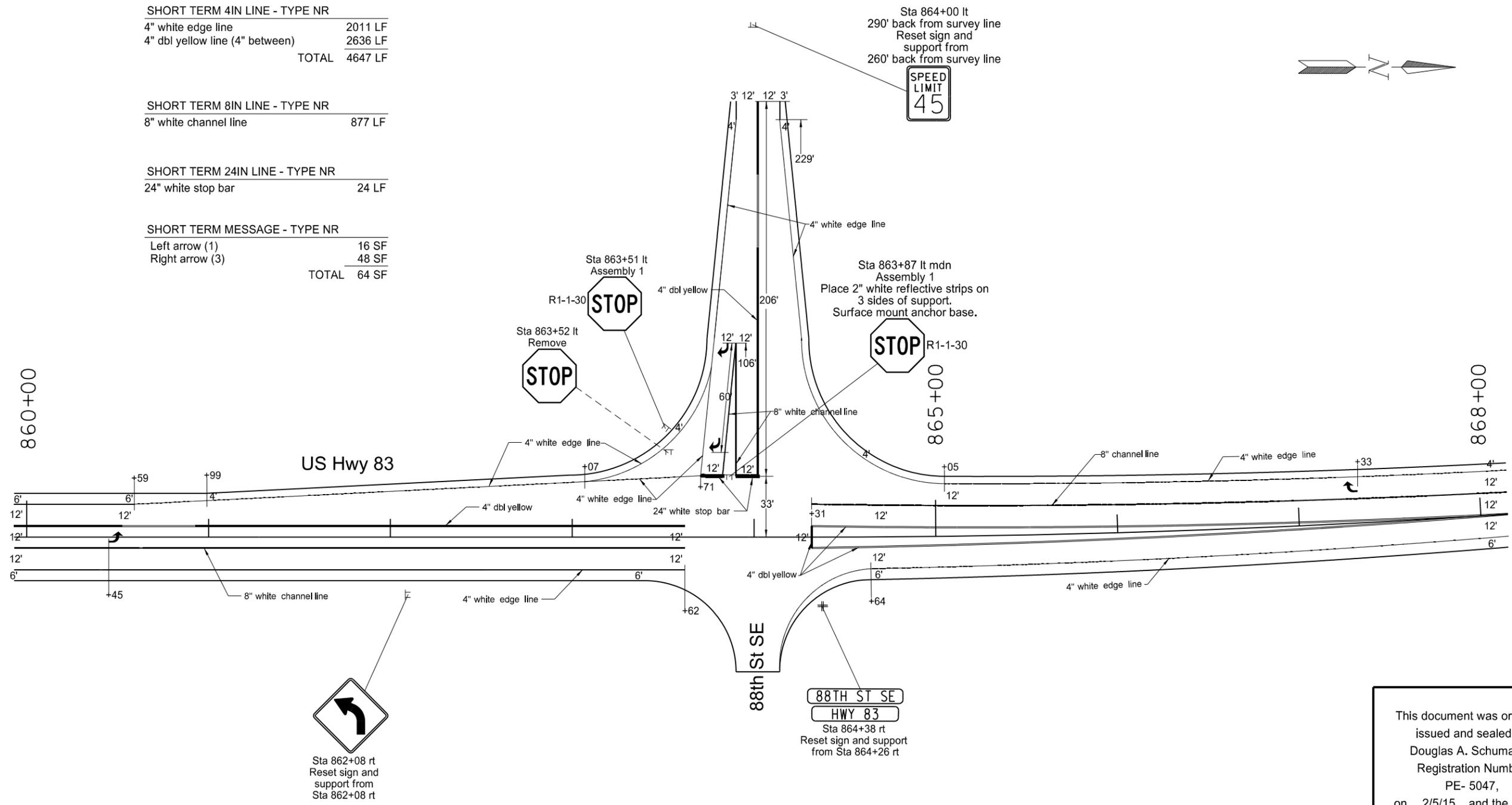
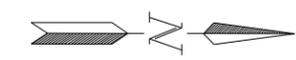
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	110	3

SHORT TERM 4IN LINE - TYPE NR
 4" white edge line 2011 LF
 4" dbl yellow line (4" between) 2636 LF
 TOTAL 4647 LF

SHORT TERM 8IN LINE - TYPE NR
 8" white channel line 877 LF

SHORT TERM 24IN LINE - TYPE NR
 24" white stop bar 24 LF

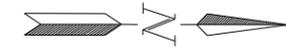
SHORT TERM MESSAGE - TYPE NR
 Left arrow (1) 16 SF
 Right arrow (3) 48 SF
 TOTAL 64 SF



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Signing and Pavement Marking
 88th St SE Intersection
 Strasburg N. Dak.
 Emmons County

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	110	4



SHORT TERM 4IN LINE - TYPE NR

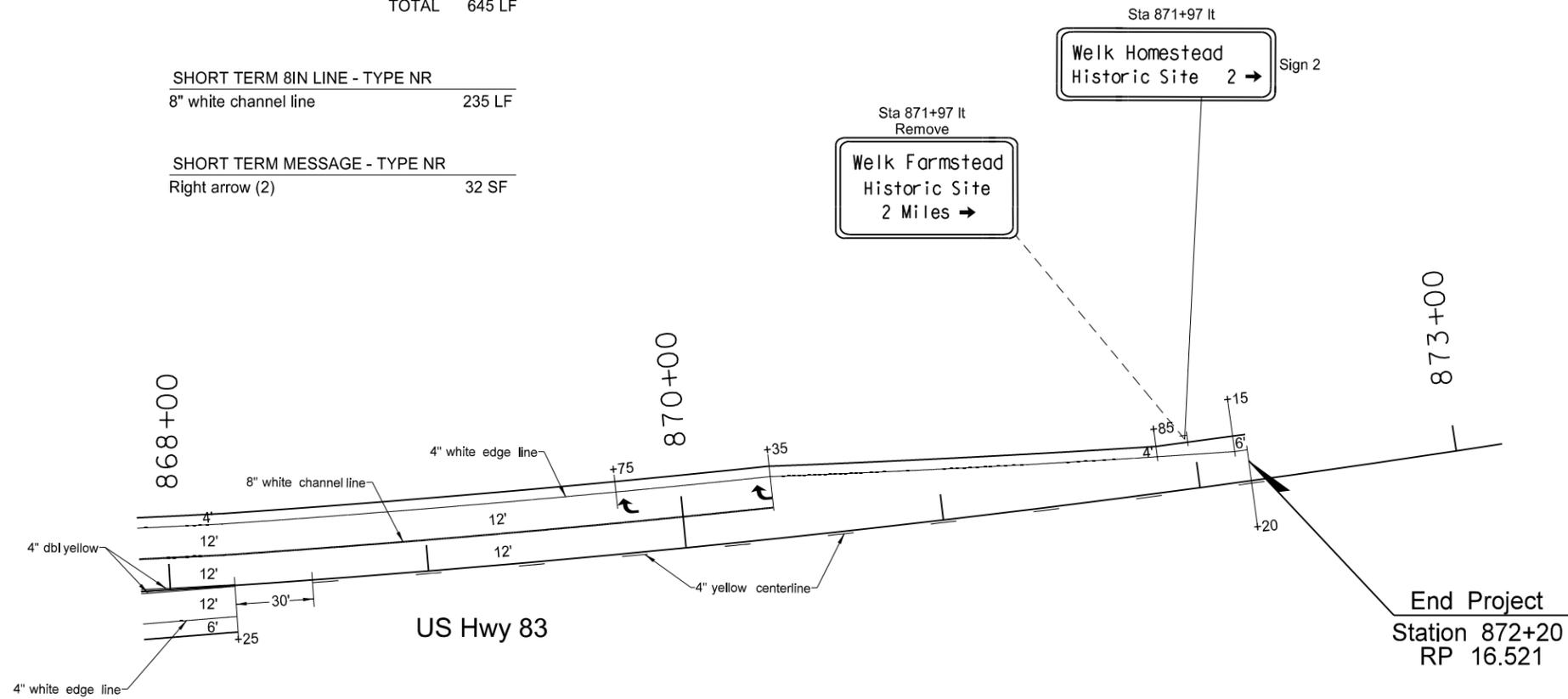
4" white edge line	445 LF
4" dbl yellow line (4" between)	100 LF
4" yellow centerline (10' line, 30' skip)	100 LF
TOTAL	645 LF

SHORT TERM 8IN LINE - TYPE NR

8" white channel line	235 LF
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SHORT TERM MESSAGE - TYPE NR

Right arrow (2)	32 SF
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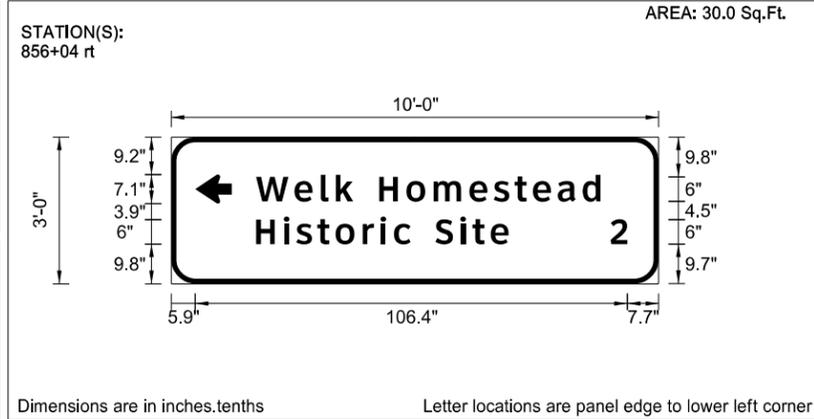


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Signing and Pavement Marking
88th St SE Interseciton
Strasburg N. Dak.
Emmons County

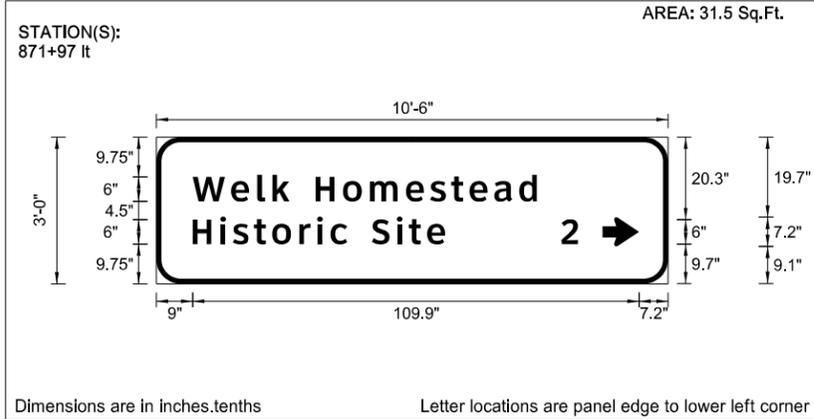
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-083(122)016	110	5

SIGN NUMBER	Sign 1				
WIDTH x HEIGHT	10'-0" x 3'-0"				
BORDER WIDTH	1.25" (inset 0")				
CORNER RADIUS	6"				
MOUNTING	Ground				
BACKGROUND	TYPE: IV Reflective				
	COLOR: Brown				
LEGEND/BORDER	TYPE: IV Reflective				
	COLOR: White				
SYMBOL	X	Y	WID	HT	ANGLE
ARDD	5.9	19.7	7.1	9	180



LETTER POSITION (X)													LENGTH	SIZE	SERIES					
W	e	l	k		H	o	m	e	s	t	e	a	d				84.7	6/4.9	ClearviewHwy-5-W	
20.9	30.4	36.8	40.5	44.8	51.2	57.9	64.6	73.4	79.4	84.6	89.1	95.2	101.3							
H	i	s	t	o	r	i	c		S	i	t	e								
20.9	27.7	30.8	36	40.5	47.2	51.5	54.8	58.9	65	71.2	74.1	78.6								
2																				
108.2																				

SIGN NUMBER	Sign 2				
WIDTH x HEIGHT	10'-6" x 3'-0"				
BORDER WIDTH	1.25" (inset 0")				
CORNER RADIUS	6"				
MOUNTING	Ground				
BACKGROUND	TYPE: IV Reflective				
	COLOR: Brown				
LEGEND/BORDER	TYPE: IV Reflective				
	COLOR: White				
SYMBOL	X	Y	WID	HT	ANGLE
ARDD	109.8	9.2	7.2	9	0



LETTER POSITION (X)													LENGTH	SIZE	SERIES					
W	e	l	k		H	o	m	e	s	t	e	a	d				84.7	6/4.9	ClearviewHwy-5-W	
9	18.4	24.9	28.6	32.8	39.2	45.9	52.6	61.5	67.4	72.6	77.1	83.2	89.4							
H	i	s	t	o	r	i	c		S	i	t	e								
9	15.8	18.9	24	28.5	35.2	39.6	42.9	47	53.1	59.2	62.2	66.7								
2																				
99.7																				

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Sign Details
88th St SE Intersection
Strasburg N. Dak.
Emmons County

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	
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NDDOT ABBREVIATIONS

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

D-101-10

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		
DOPE 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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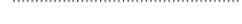
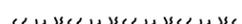
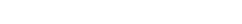
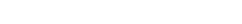
Line Styles

.....	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	.....

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

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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)		

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

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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		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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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		

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

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Symbols

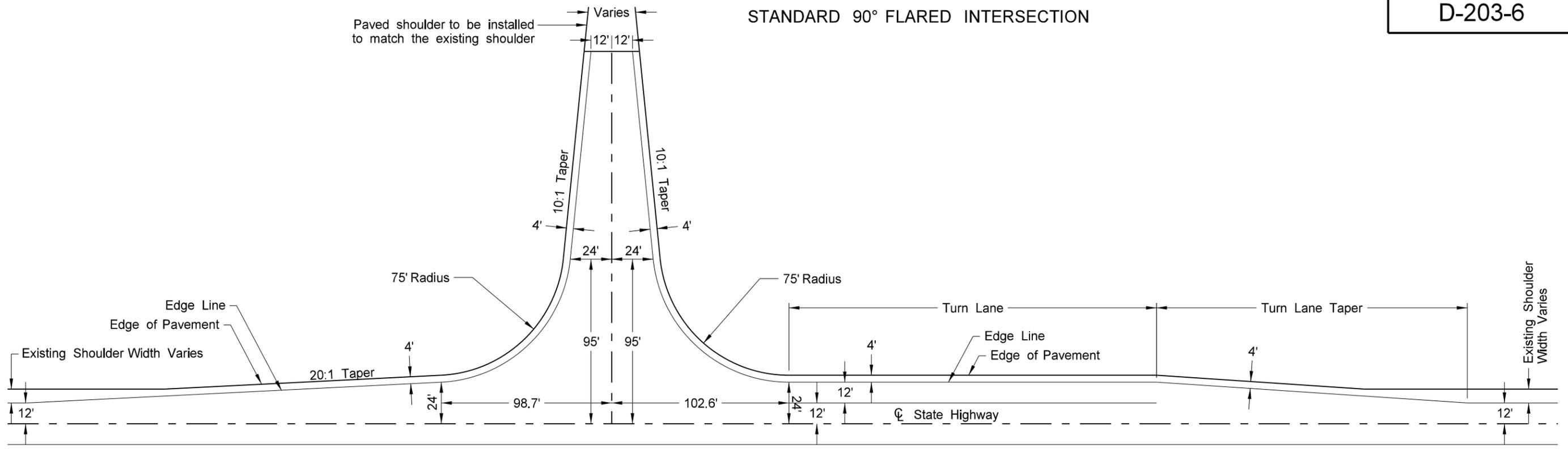
D-101-32

 Pad Mounted Feed Point  Pipe Mounted Feed Point with Pad  Pole Mounted Feed Point  Headwall  Double Headwall with 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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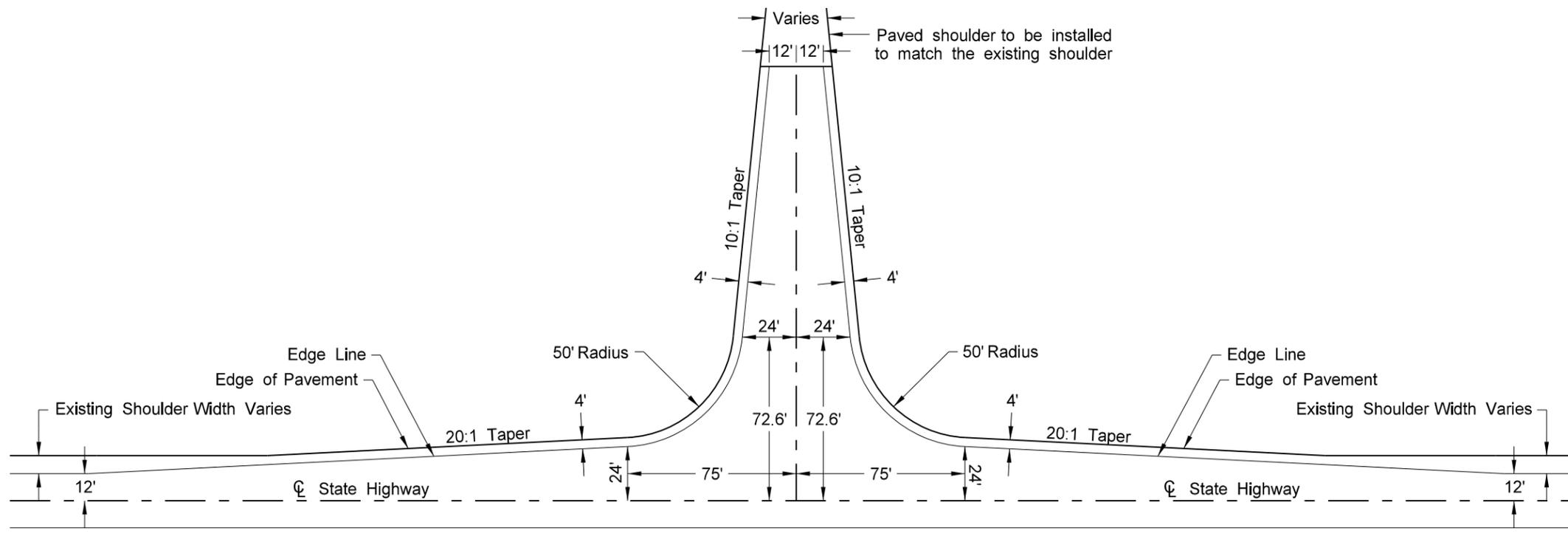
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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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

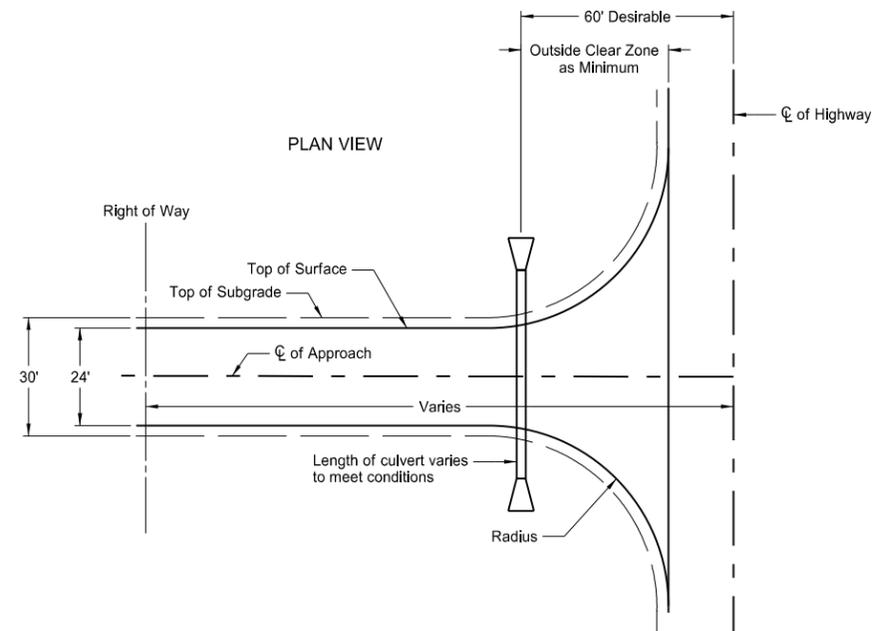
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STANDARD RURAL APPROACHES

D-203-8

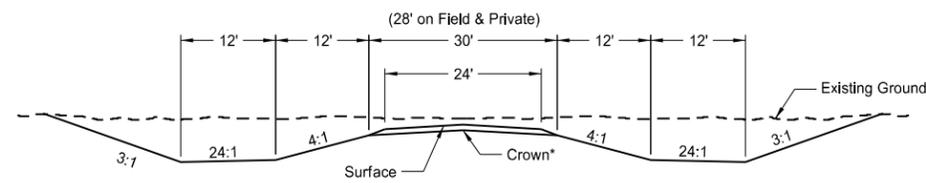
NOTES:

1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.



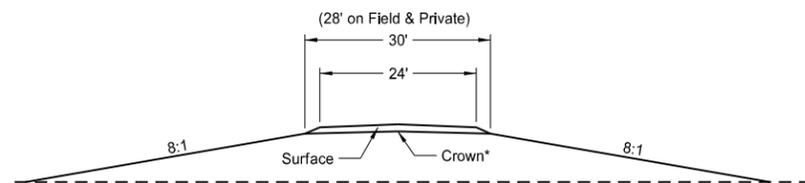
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=24 ft	R=30 ft	R=40 ft
Maximum Grade	10%	7%	7%
Storage Platform	20 ft	24 ft	30 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

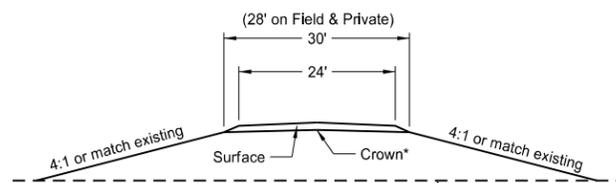


SECTION A-A

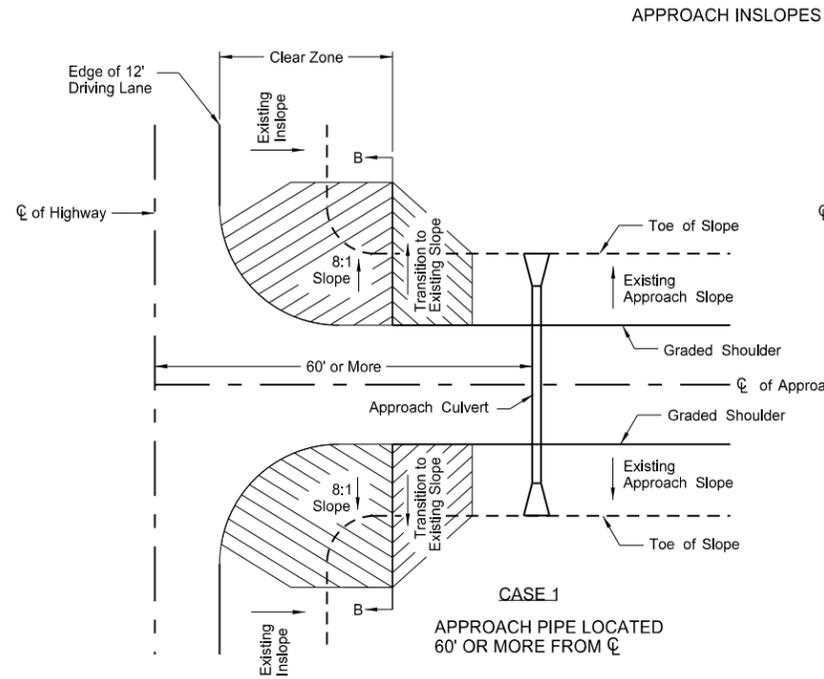
*2.1% crown for paved surface
*3.0% crown for gravel surface



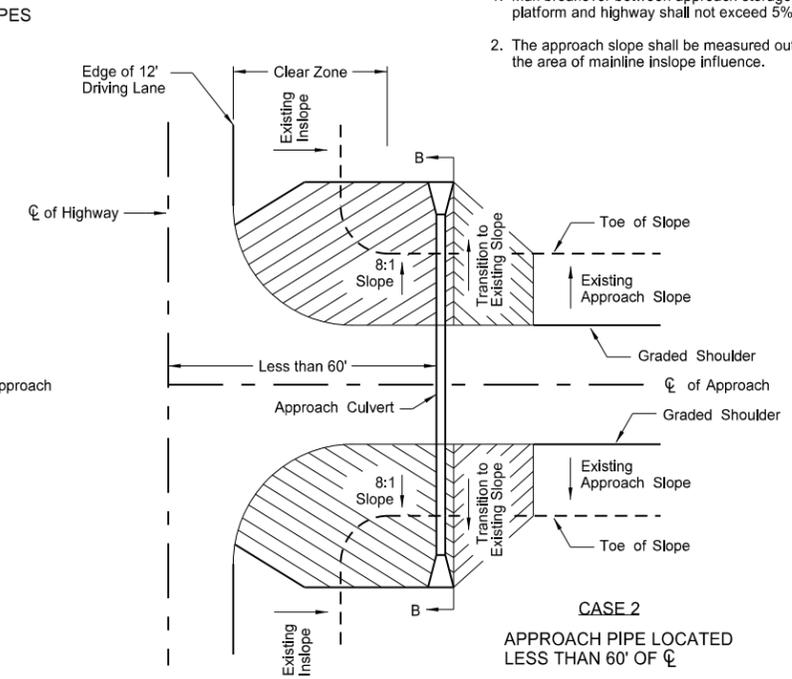
SECTION B-B



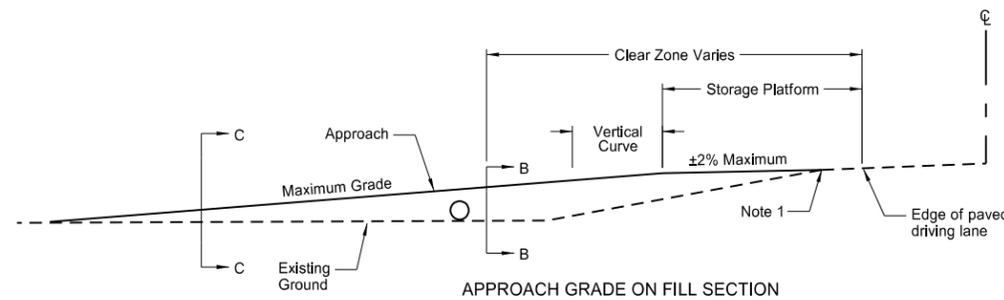
SECTION C-C



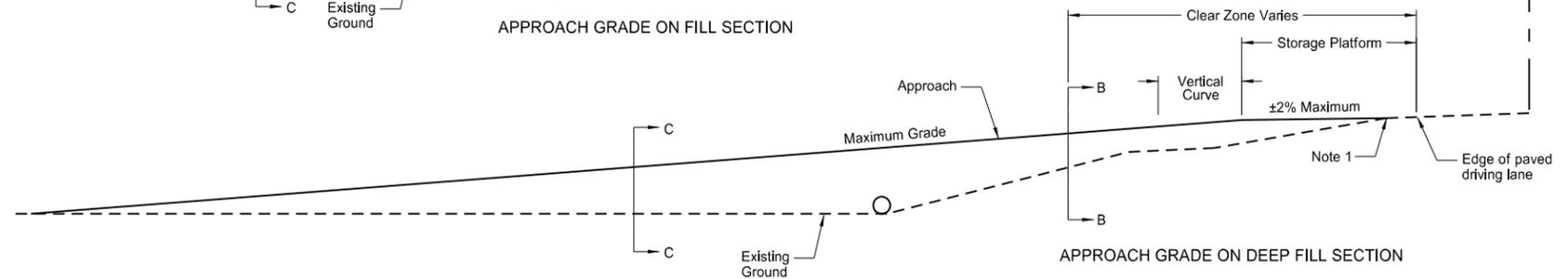
CASE 1
APPROACH PIPE LOCATED
60' OR MORE FROM C



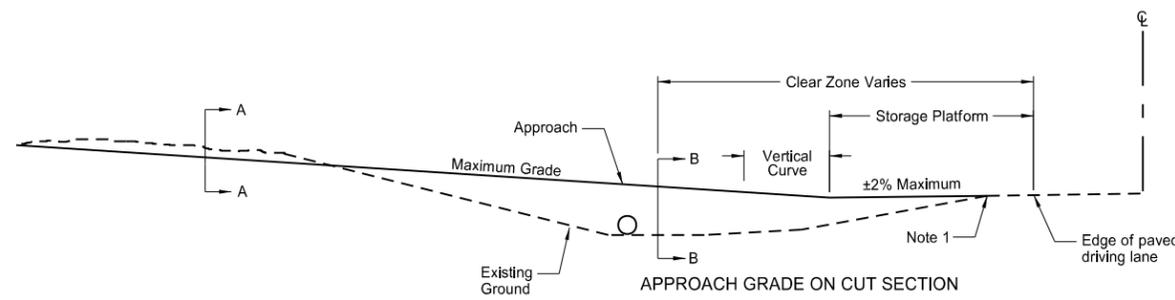
CASE 2
APPROACH PIPE LOCATED
LESS THAN 60' OF C



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION

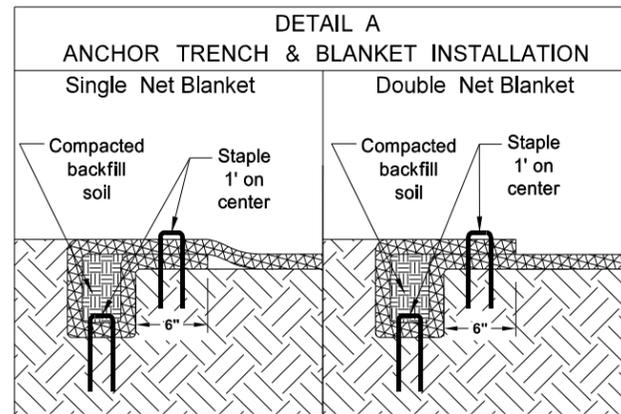


APPROACH GRADE ON CUT SECTION

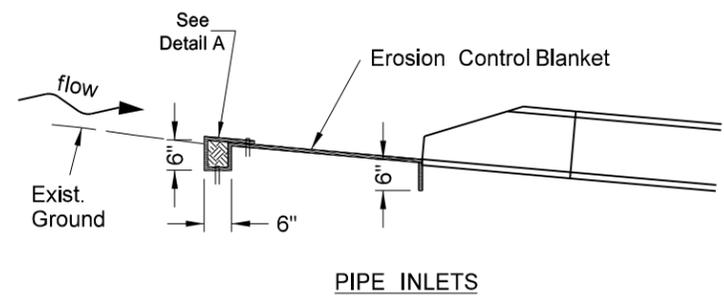
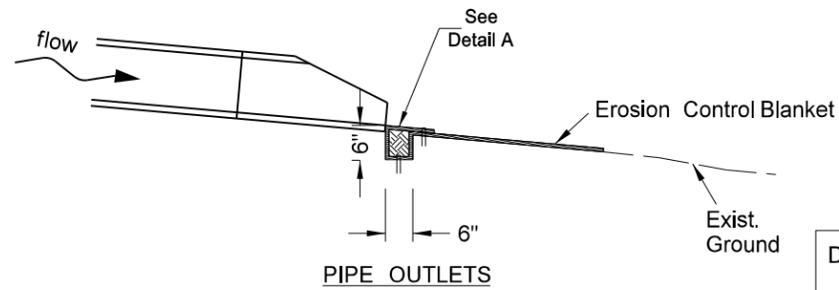
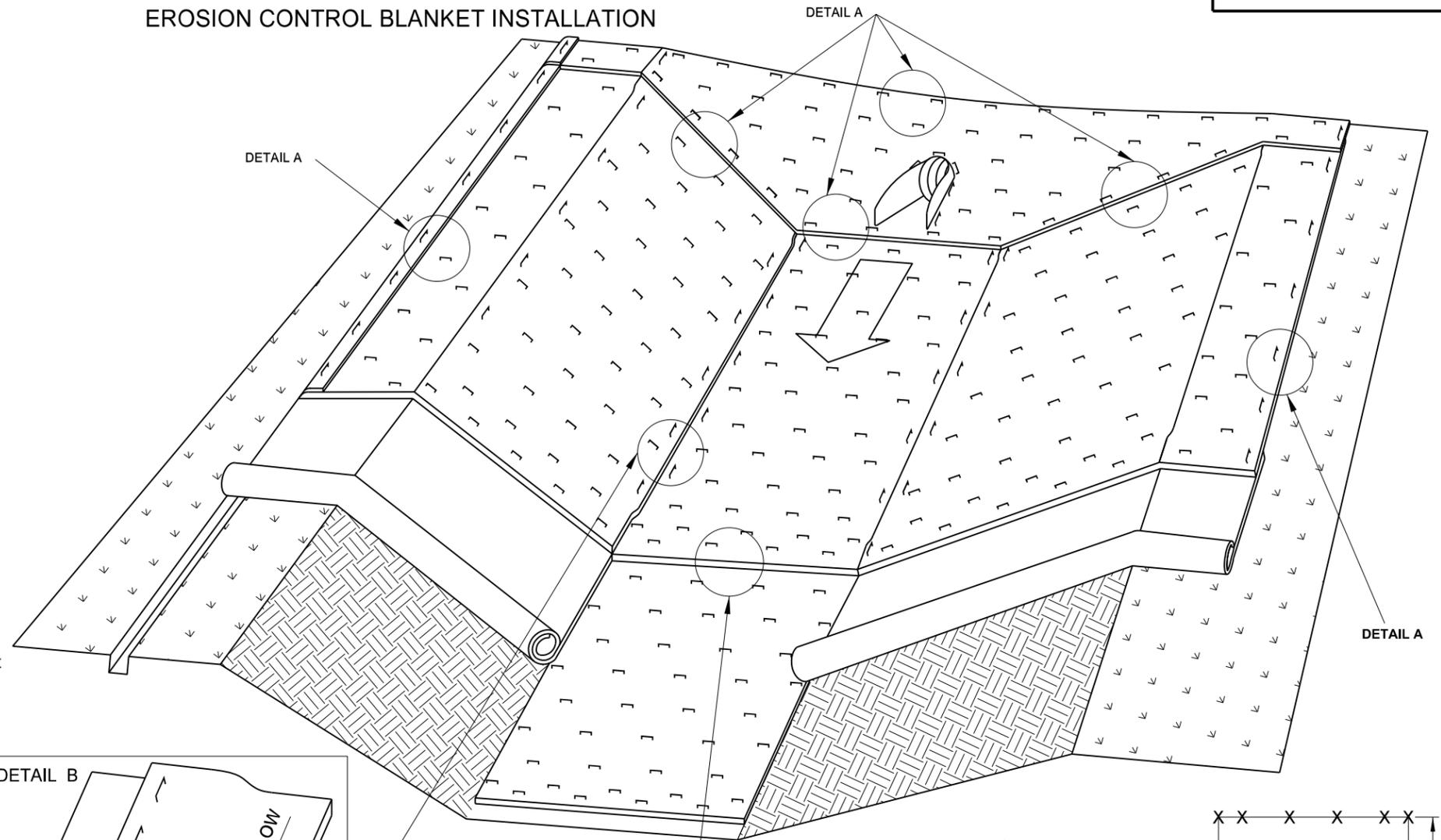
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE

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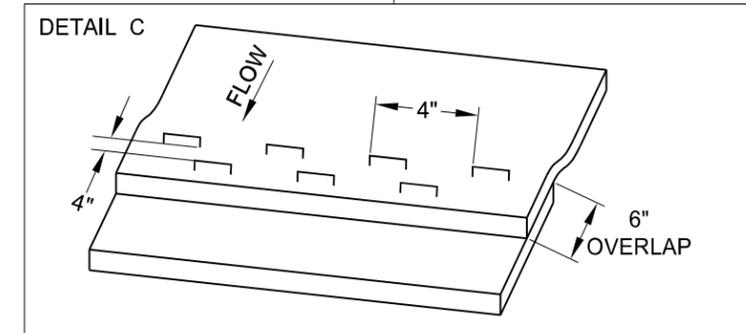
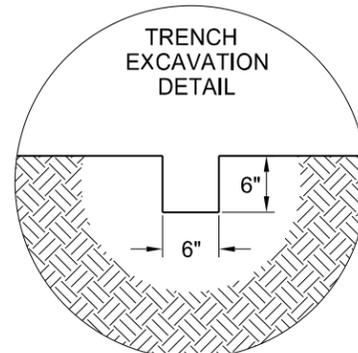
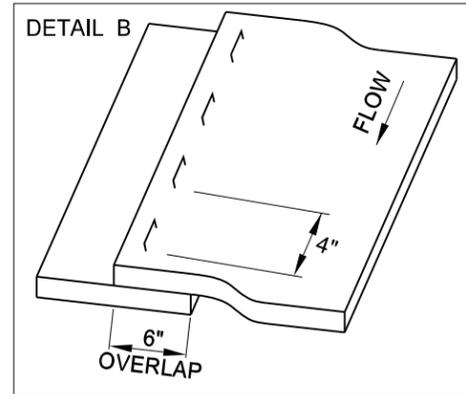
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



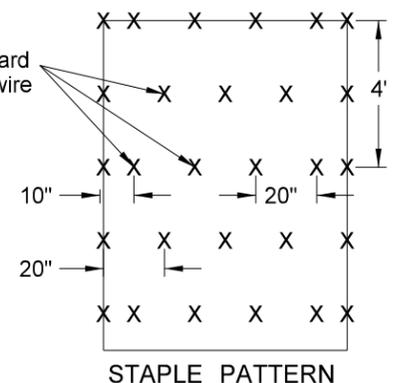
NOTE:
If a Single Net Blanket is used the side with the netting should be on the top once the blanket is installed.



PIPE INLETS
INSTALLATION AT PIPE ENDS



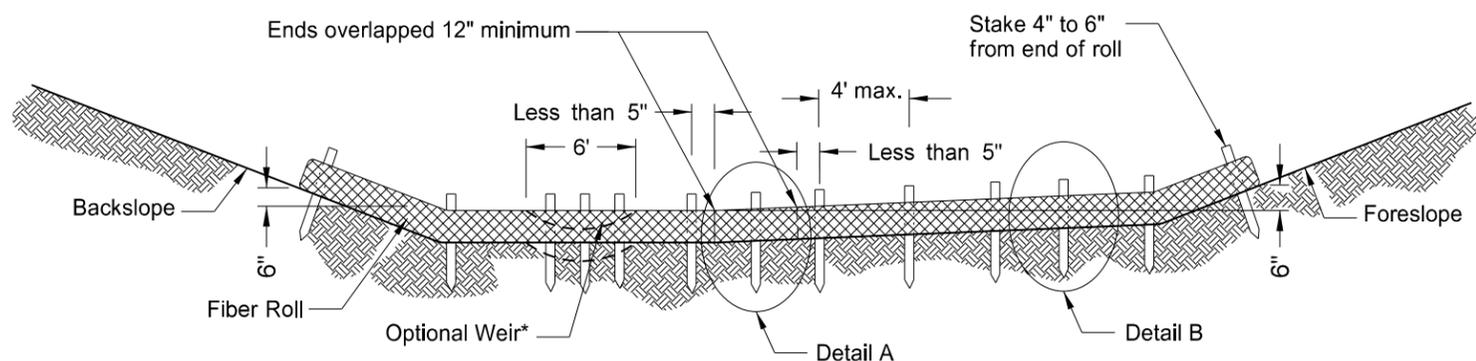
3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-5 to D-255-2.
07-27-15	Changed installation details such as trench depth and overlap dimensions.

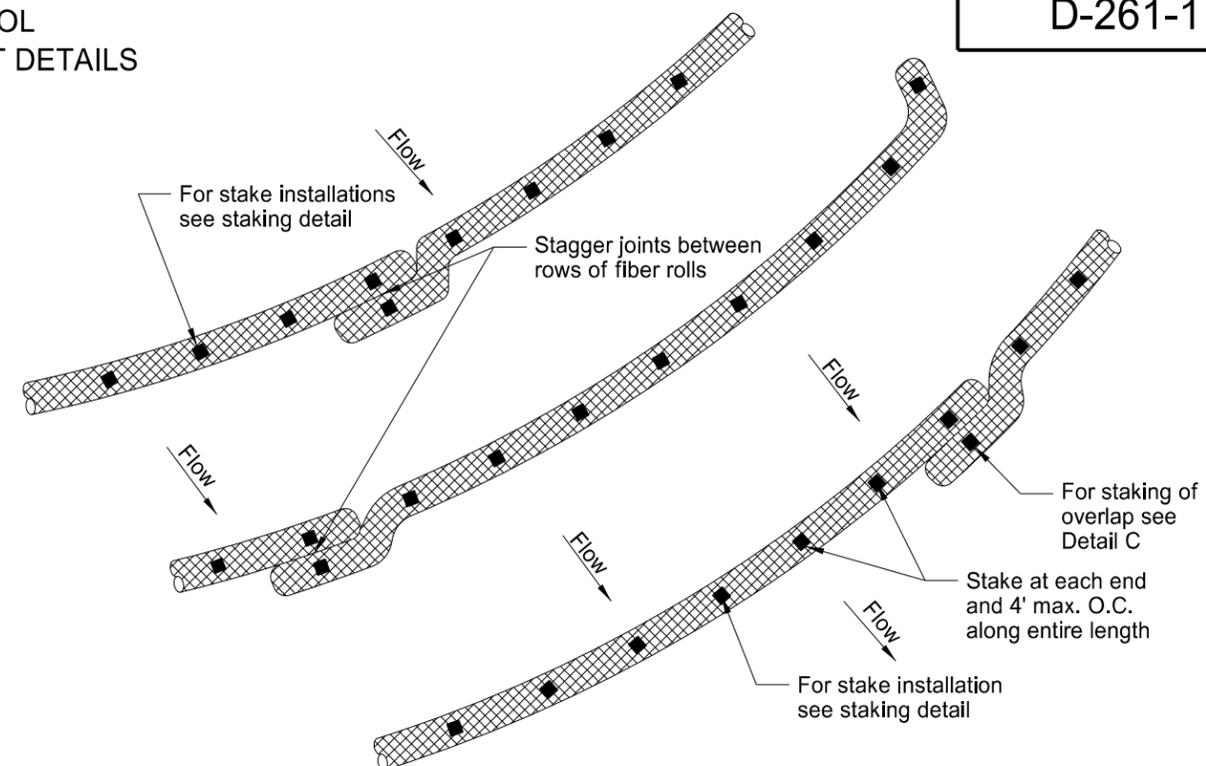
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

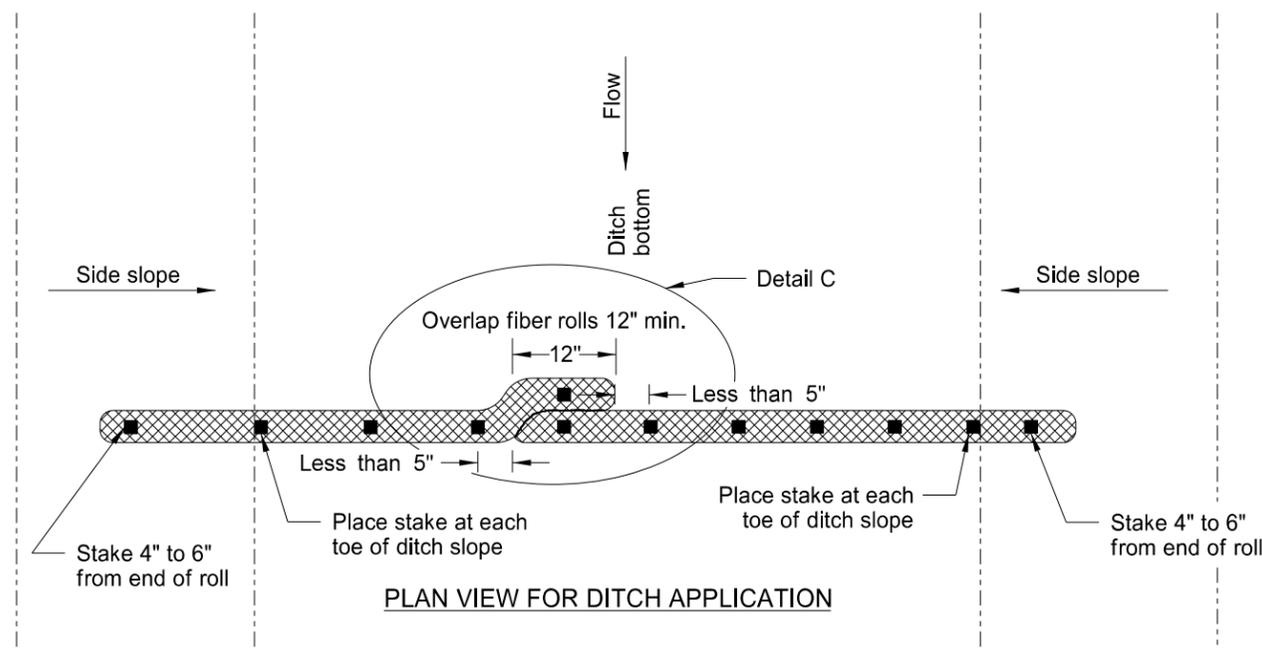


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

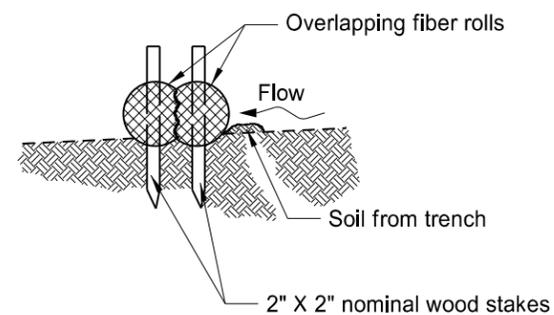
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



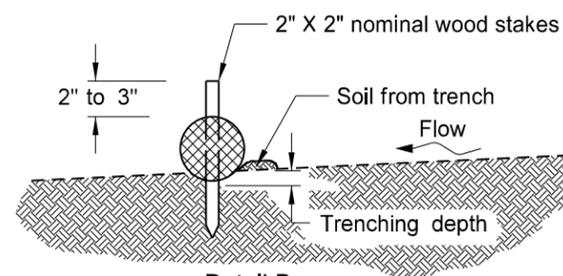
PLAN VIEW FOR SLOPE APPLICATION



PLAN VIEW FOR DITCH APPLICATION



Detail A
Fiber Roll Overlapping Staking Detail



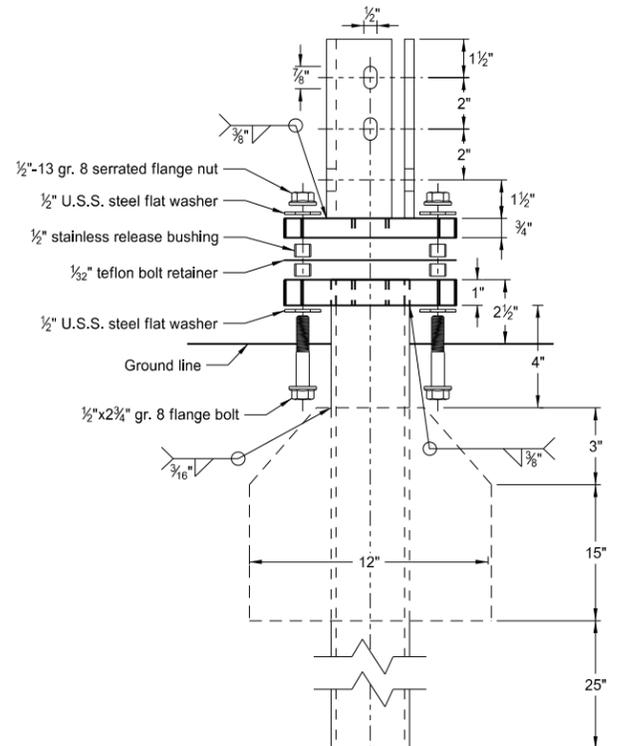
Detail B
Fiber Roll Staking Detail

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

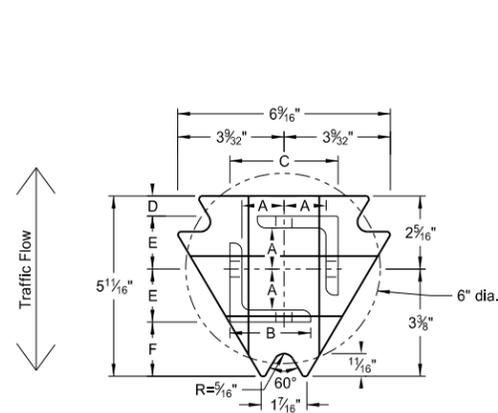
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application, Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1

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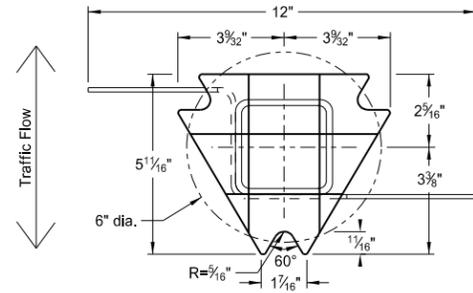


Multi-Directional Slip Base Assembly

Perforated Tube



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



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

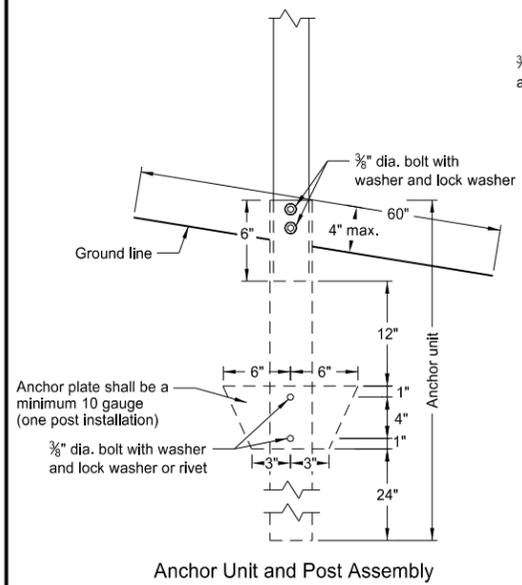
Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

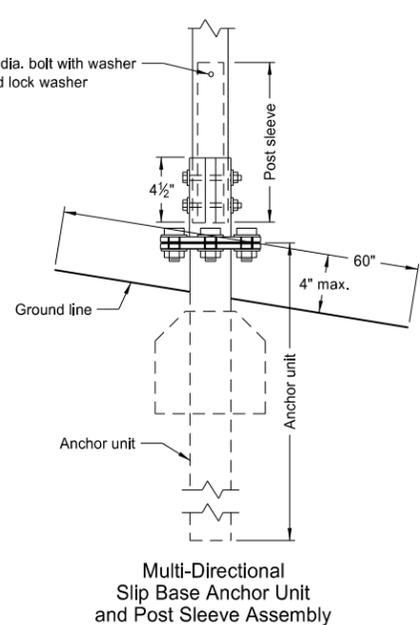
Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2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

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

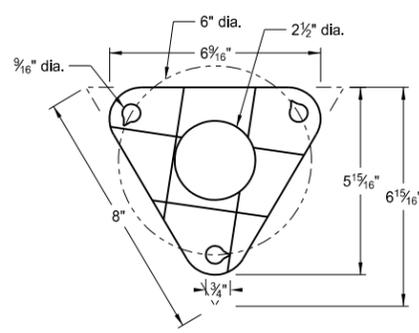
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16" x 10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2" x 10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"



Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



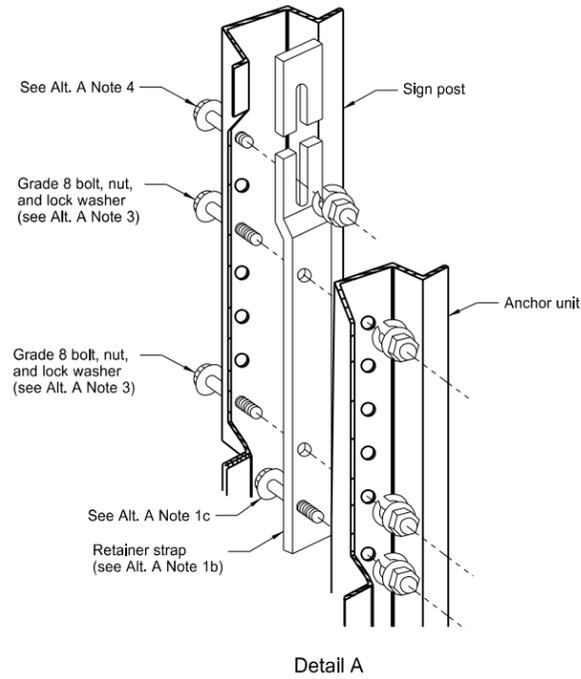
Bolt Retainer for Base Connection
Bolt Retainer - 1/32" Reprocessed Teflon

- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
(B) The 2 3/16" x 10 ga. may be inserted into 2 1/2" x 10 ga. for additional wind load.

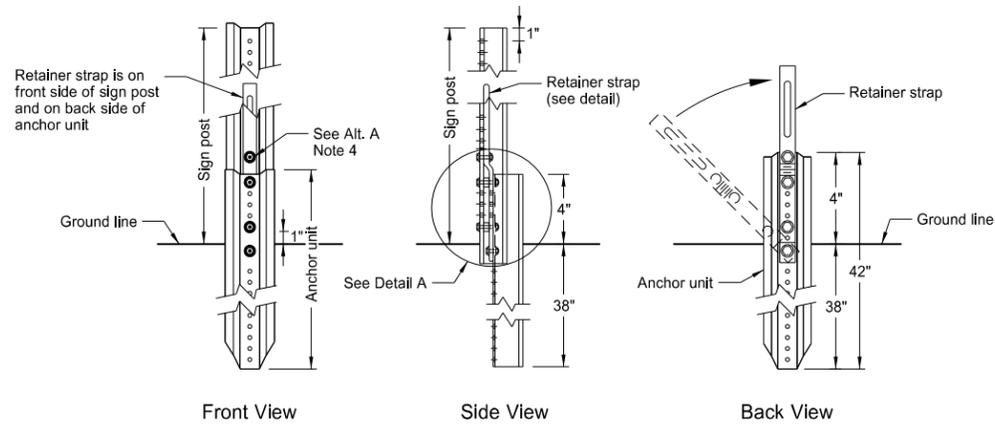
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2-28-14	
REVISIONS	
DATE	CHANGE

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U-Channel Post



Detail A



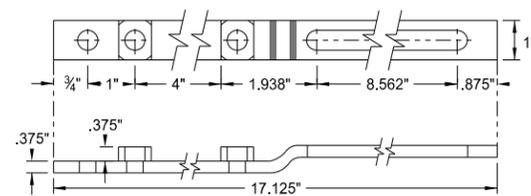
Front View

Side View

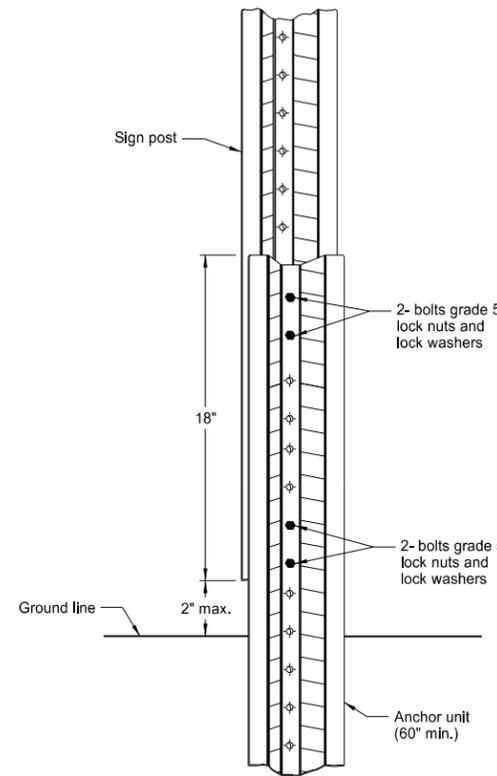
Back View

Breakaway U-Channel Detail Alternate A

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

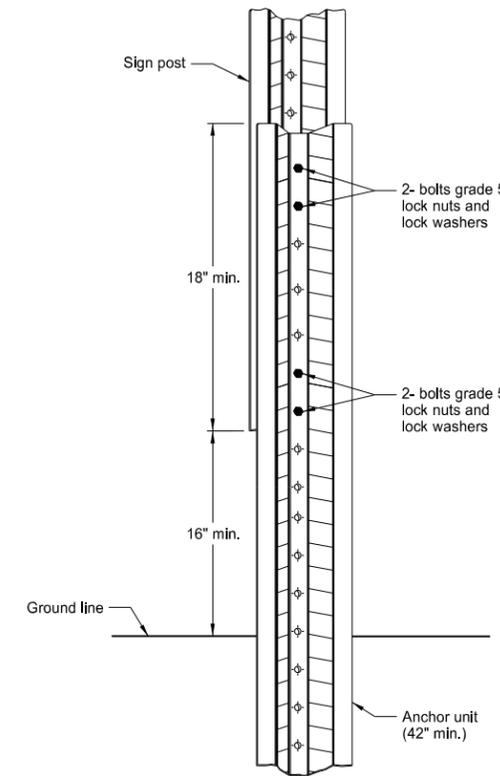


Retainer Strap Detail



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

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



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

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

Alternate A Steps of Installation:

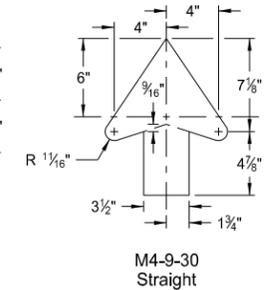
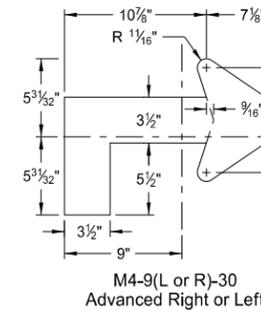
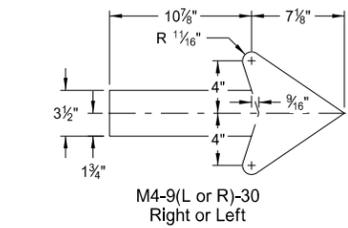
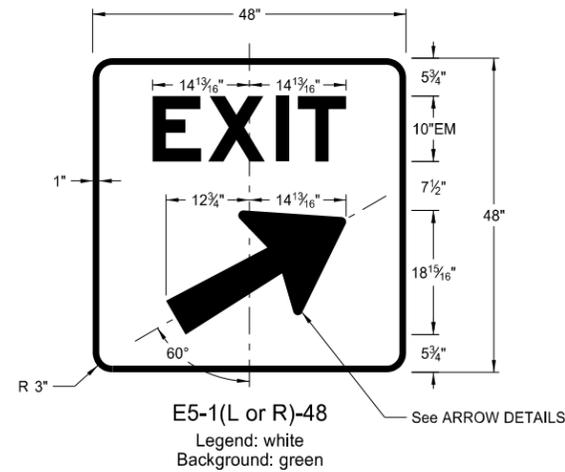
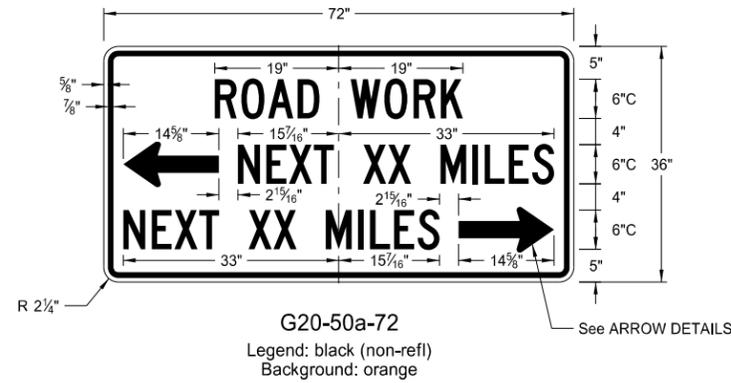
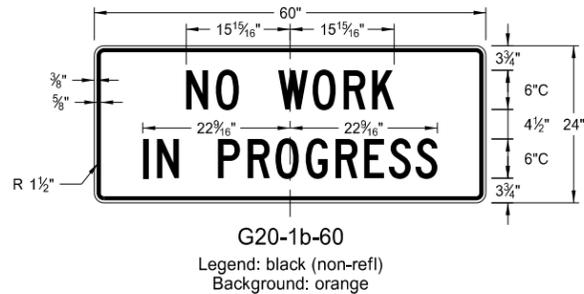
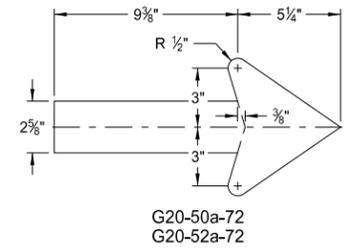
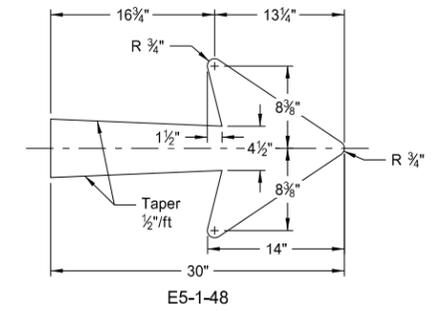
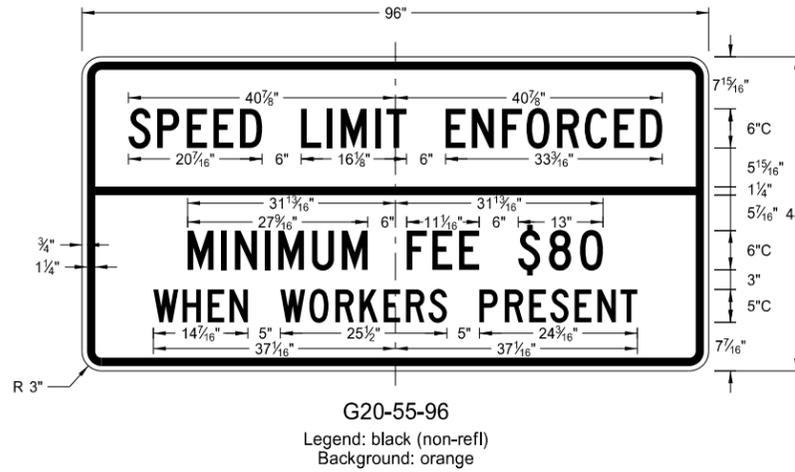
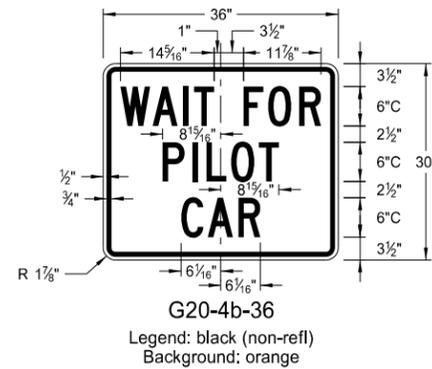
1. a) Drive anchor unit to within 12" of ground level.
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a)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

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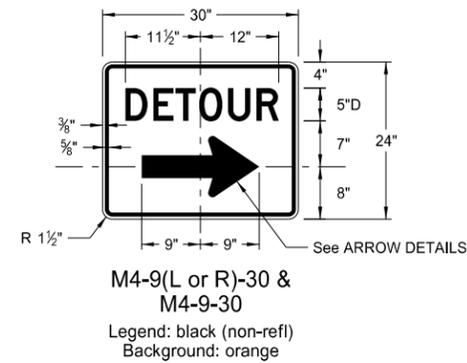
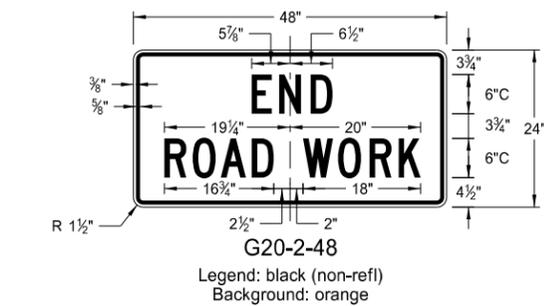
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

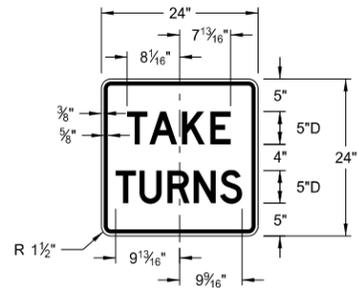
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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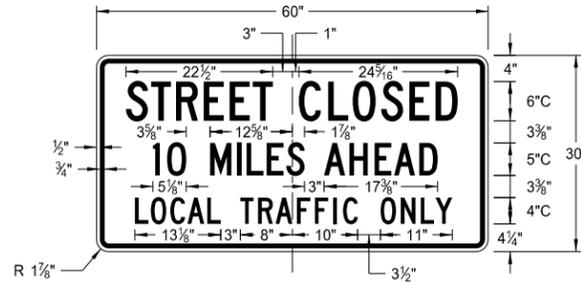
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

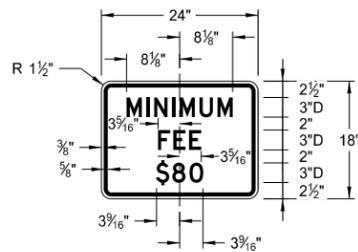
D-704-10



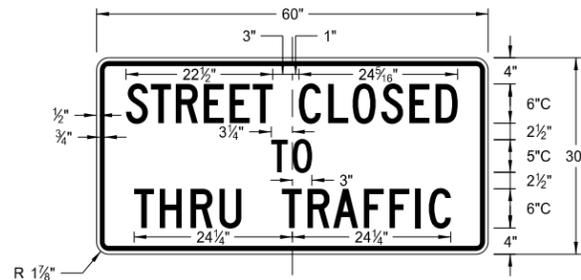
R1-50-24
Legend: black (non-refl)
Background: white



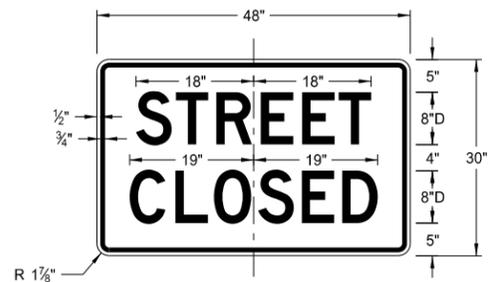
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

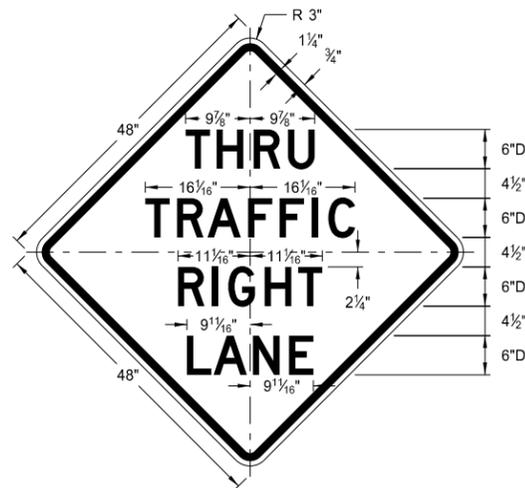
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8-13-13	
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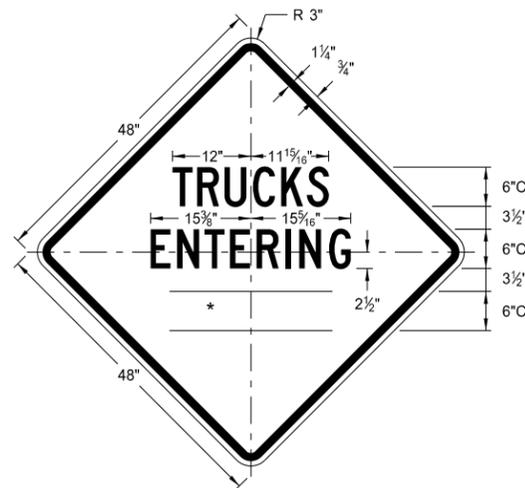
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

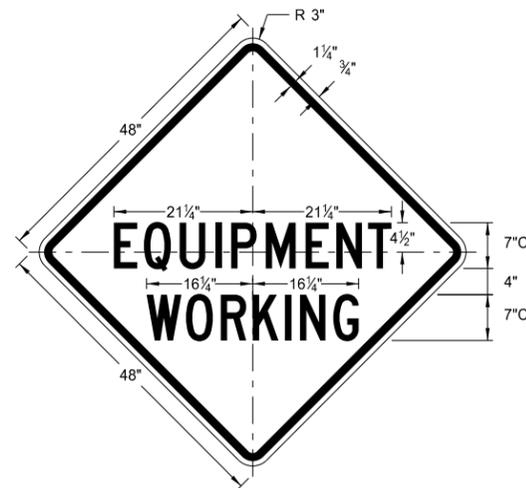
* DISTANCE MESSAGES



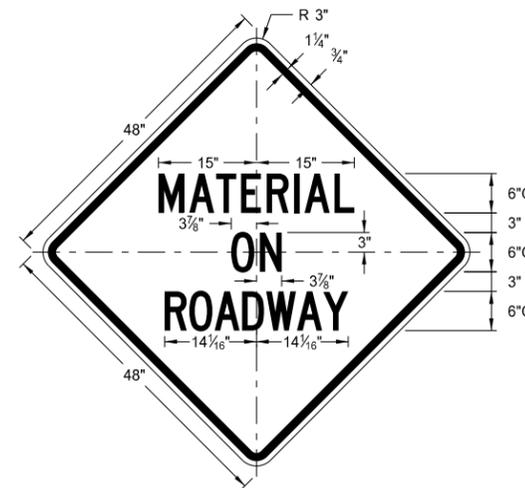
W5-8-48
Legend: black (non-refl)
Background: orange



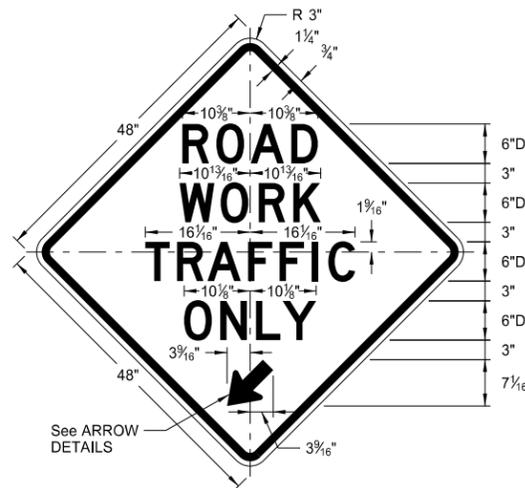
W8-54-48
Legend: black (non-refl)
Background: orange



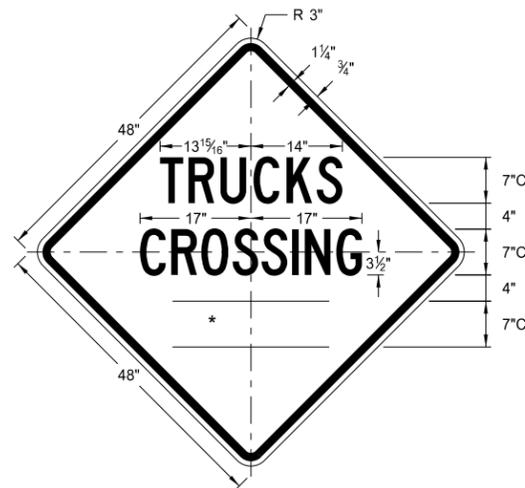
W20-51-48
Legend: black (non-refl)
Background: orange



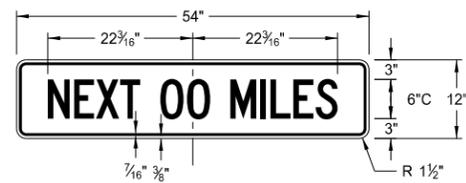
W21-51-48
Legend: black (non-refl)
Background: orange



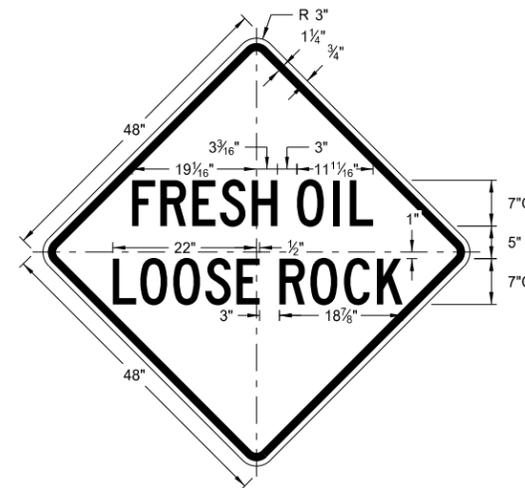
W5-9-48
Legend: black (non-refl)
Background: orange



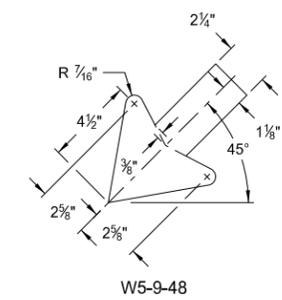
W8-55-48
Legend: black (non-refl)
Background: orange



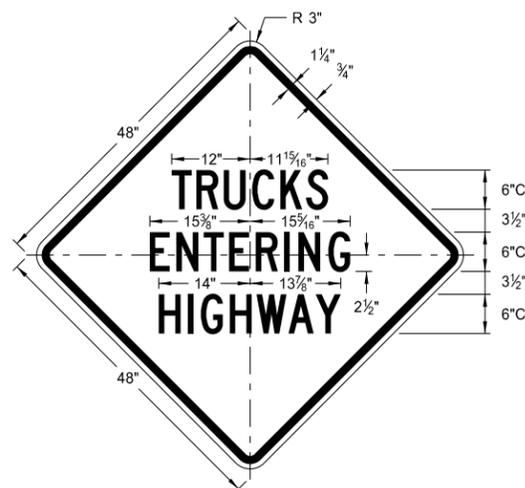
W20-52-54
Legend: black (non-refl)
Background: orange



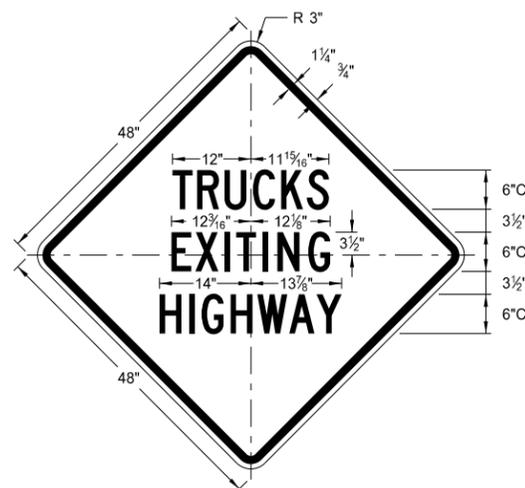
W22-8-48
Legend: black (non-refl)
Background: orange



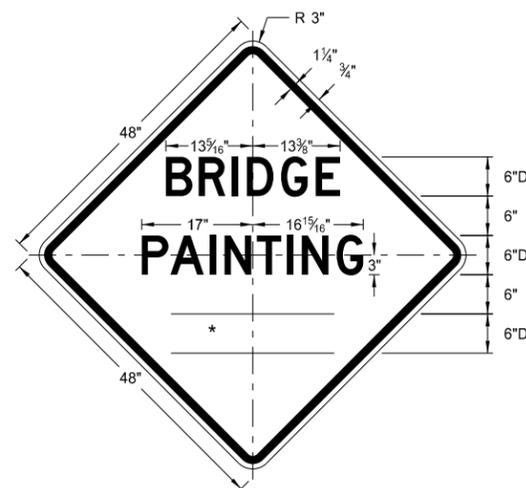
W5-9-48
ARROW DETAILS



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



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

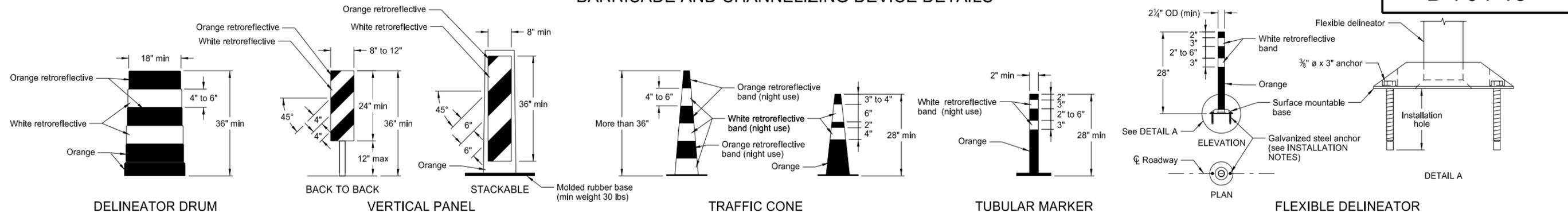


W21-50-48
Legend: black (non-refl)
Background: orange

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BARRICADE AND CHANNELIZING DEVICE DETAILS



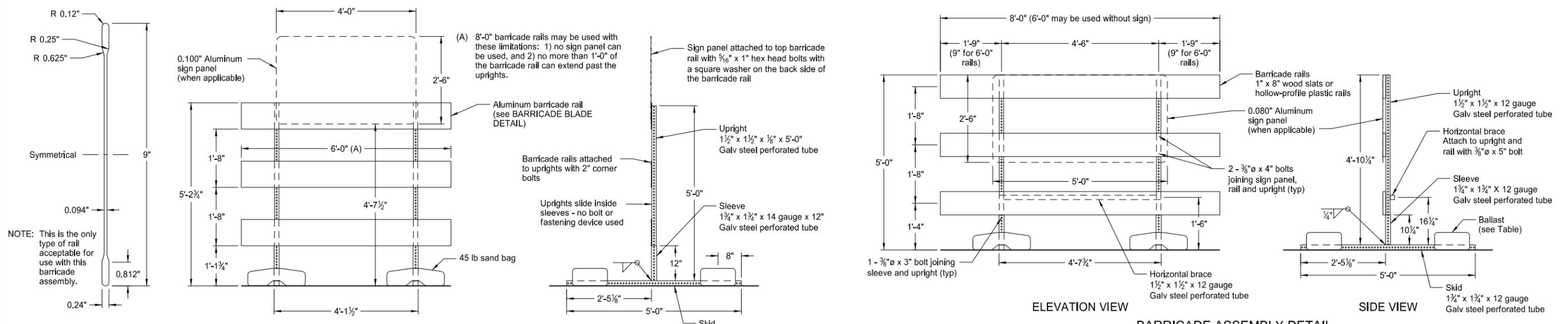
- INSTALLATION NOTES:**
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl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

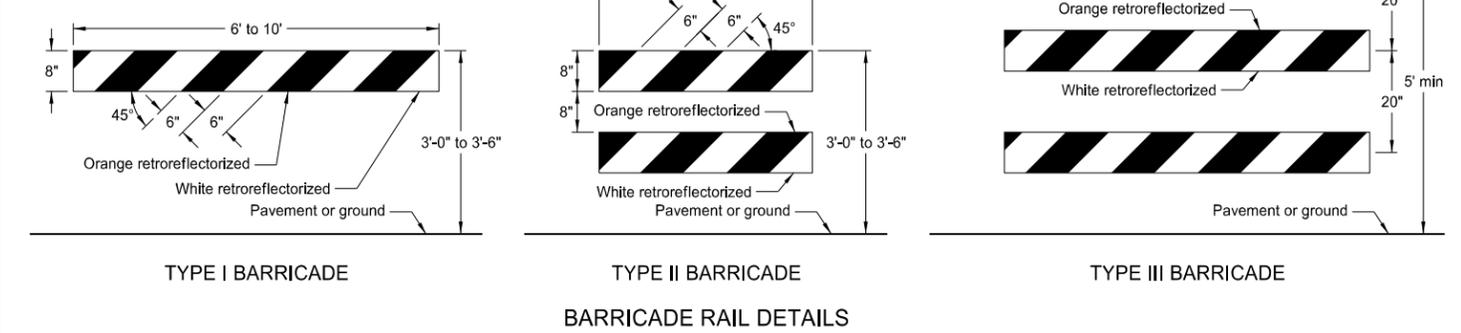


BARRICADE BLADE DETAIL

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

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

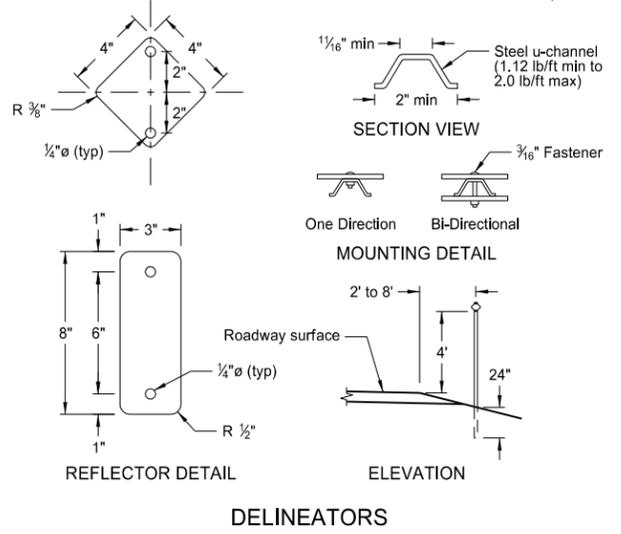


TYPE I BARRICADE

TYPE II BARRICADE

TYPE III BARRICADE

BARRICADE RAIL DETAILS



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

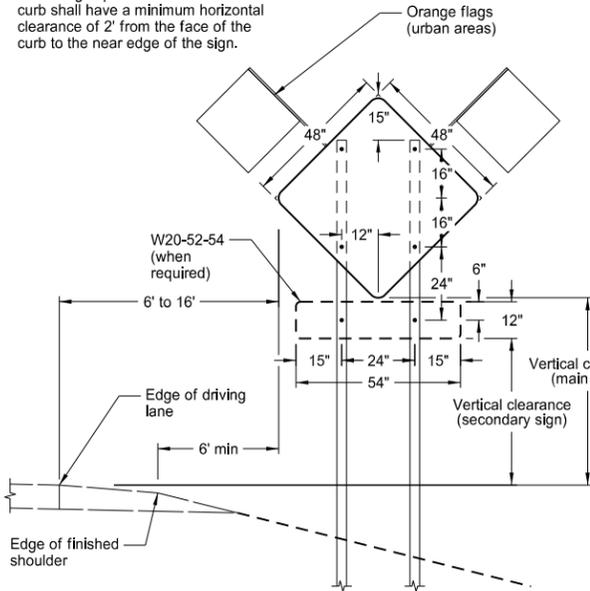
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

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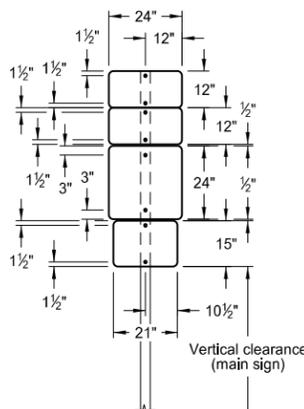
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

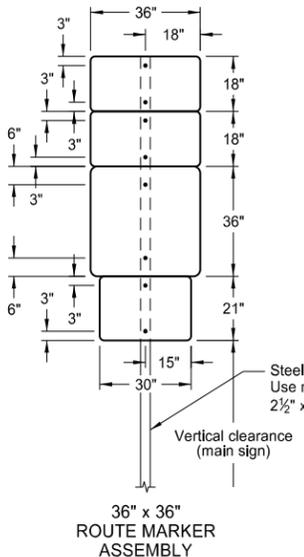
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



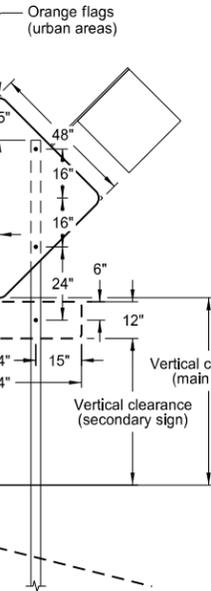
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



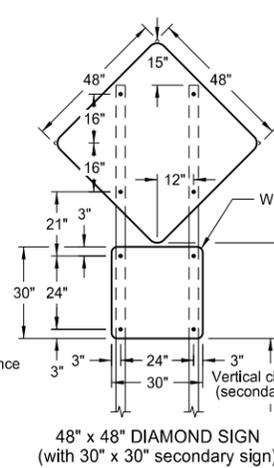
24" x 24" ROUTE MARKER ASSEMBLY



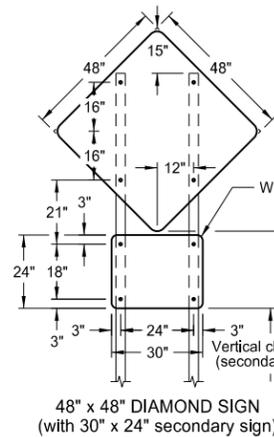
36" x 36" ROUTE MARKER ASSEMBLY



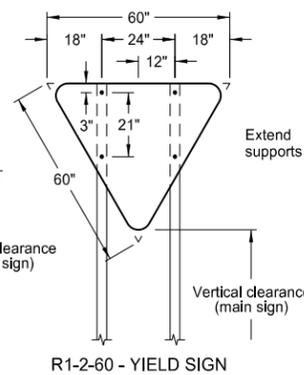
18" x 18" DIAMOND SIGN



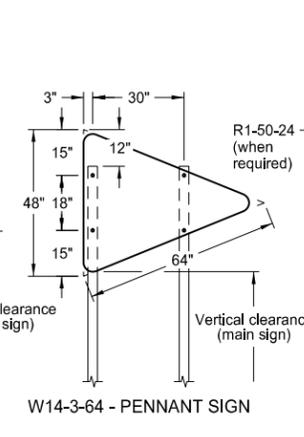
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



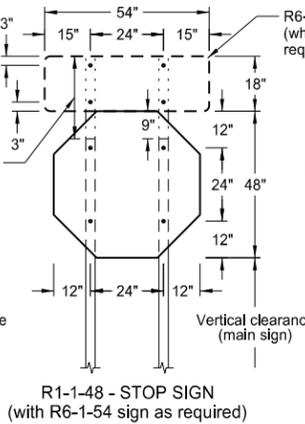
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



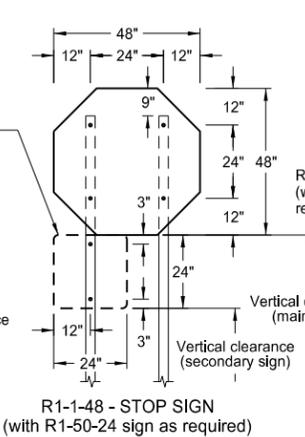
R1-2-60 - YIELD SIGN



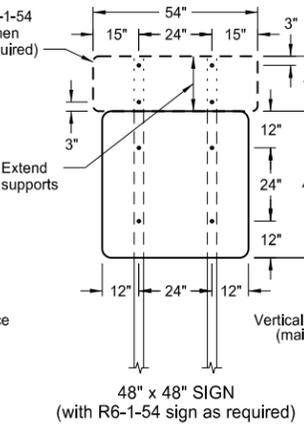
W14-3-64 - PENNANT SIGN



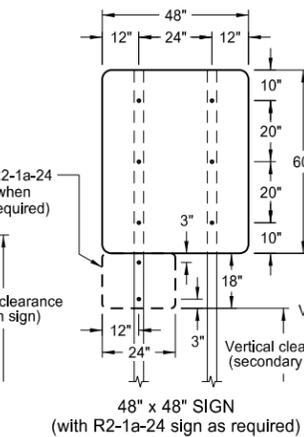
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



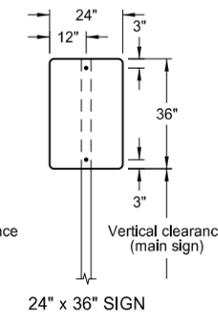
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



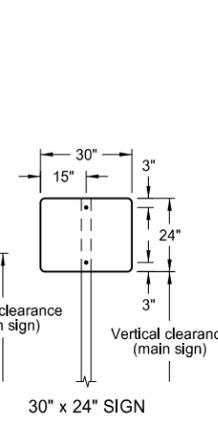
48" x 48" SIGN
(with R6-1-54 sign as required)



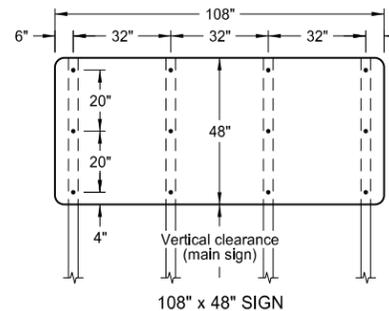
48" x 48" SIGN
(with R2-1a-24 sign as required)



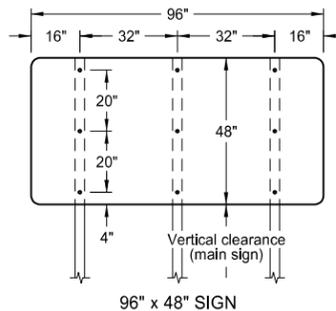
24" x 36" SIGN



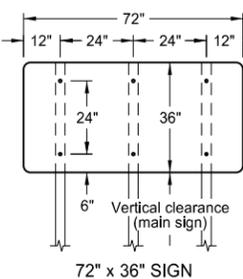
30" x 24" SIGN



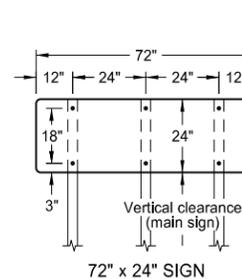
108" x 48" SIGN



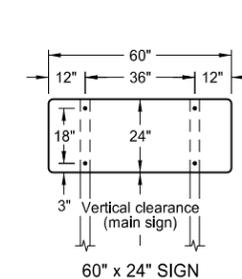
96" x 48" SIGN



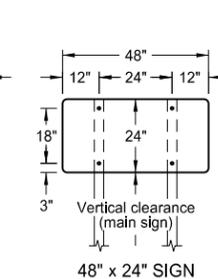
72" x 36" SIGN



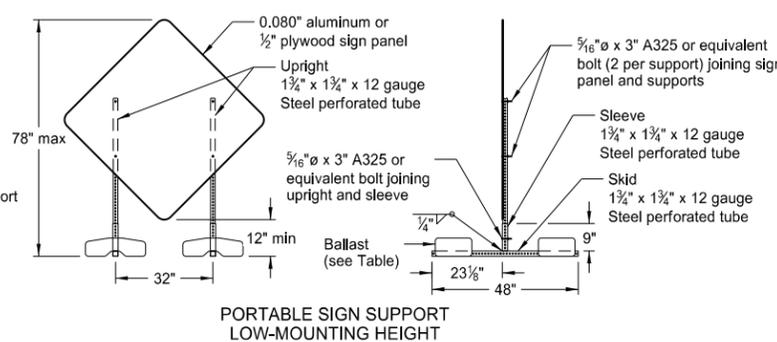
72" x 24" SIGN



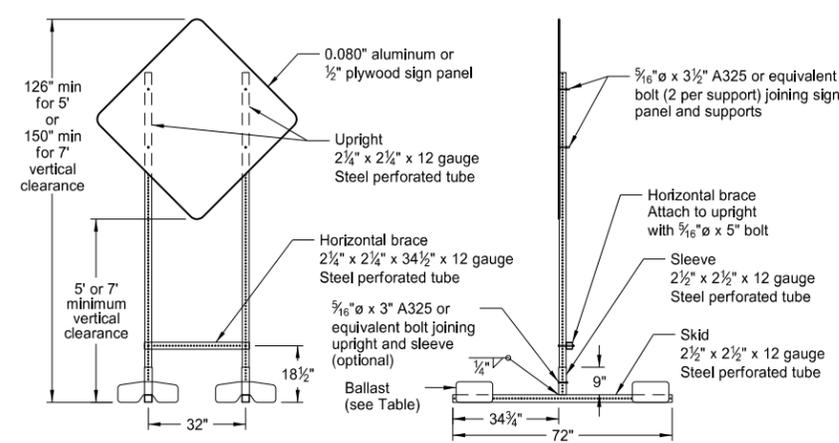
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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 2 1/2" x 2 1/2" 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, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" 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	
REVISIONS	
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 $S \times W$ 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 $\frac{1}{2}$ 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	ADVANCE WARNING SIGN SPACING		
	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

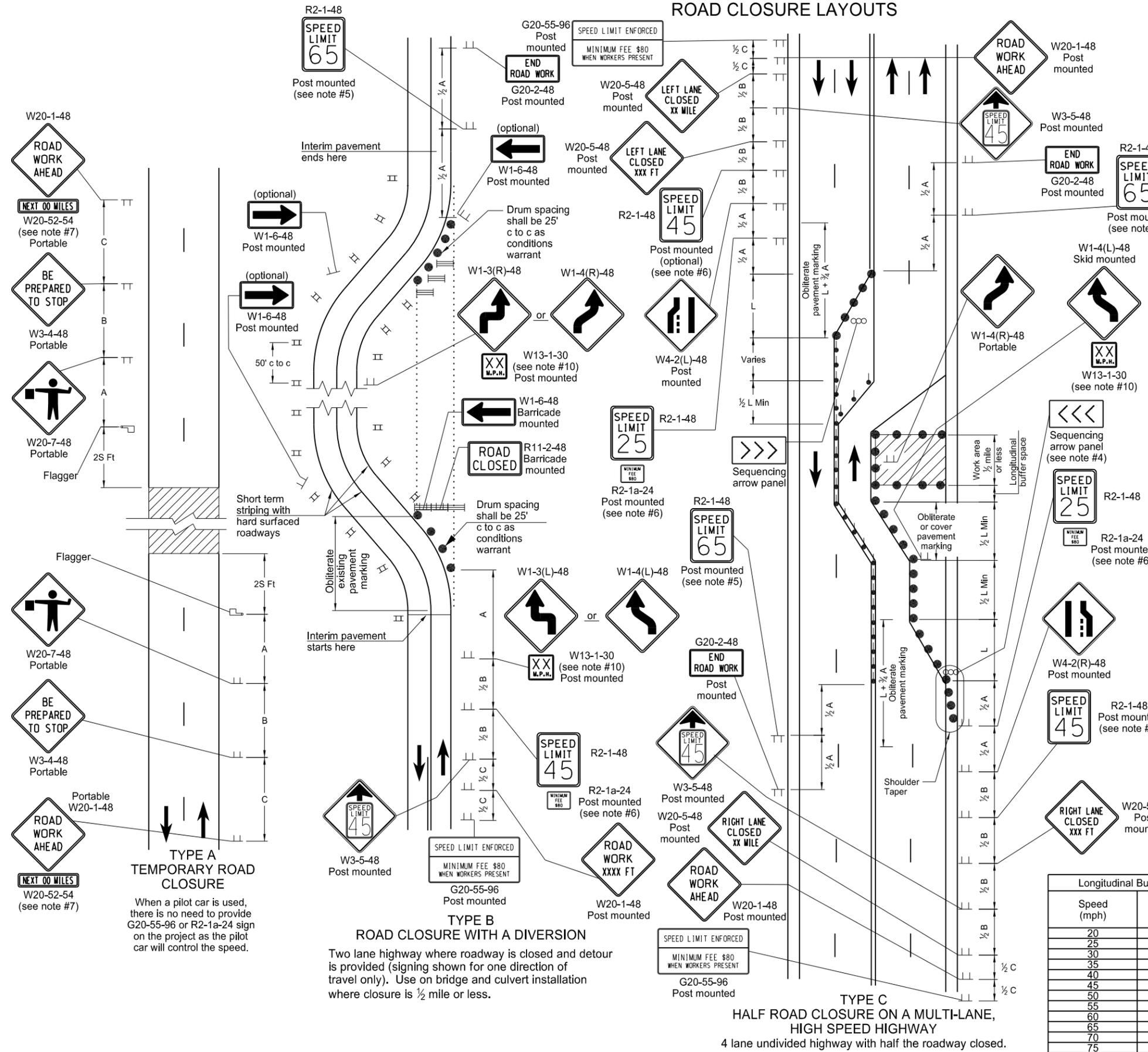
KEY

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

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

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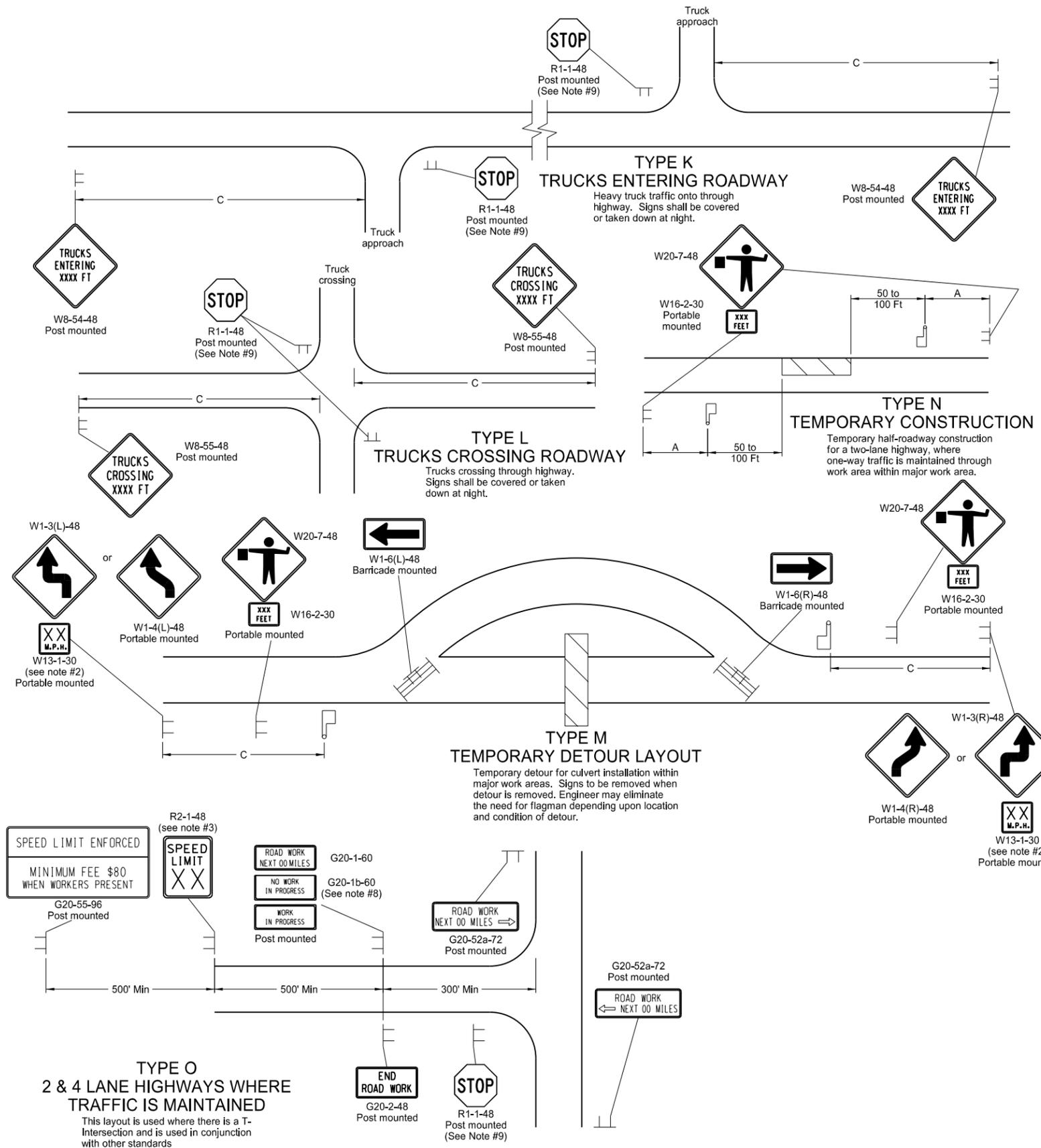
TYPE A TEMPORARY ROAD CLOSURE
 When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.

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 $\frac{1}{2}$ mile or less.

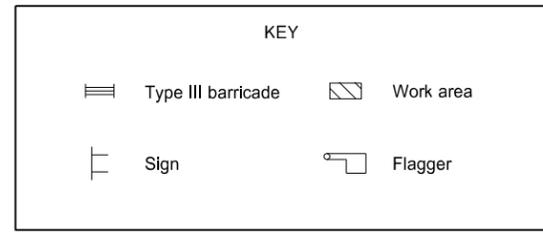
TYPE C HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
 4 lane undivided highway with half the roadway closed.

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

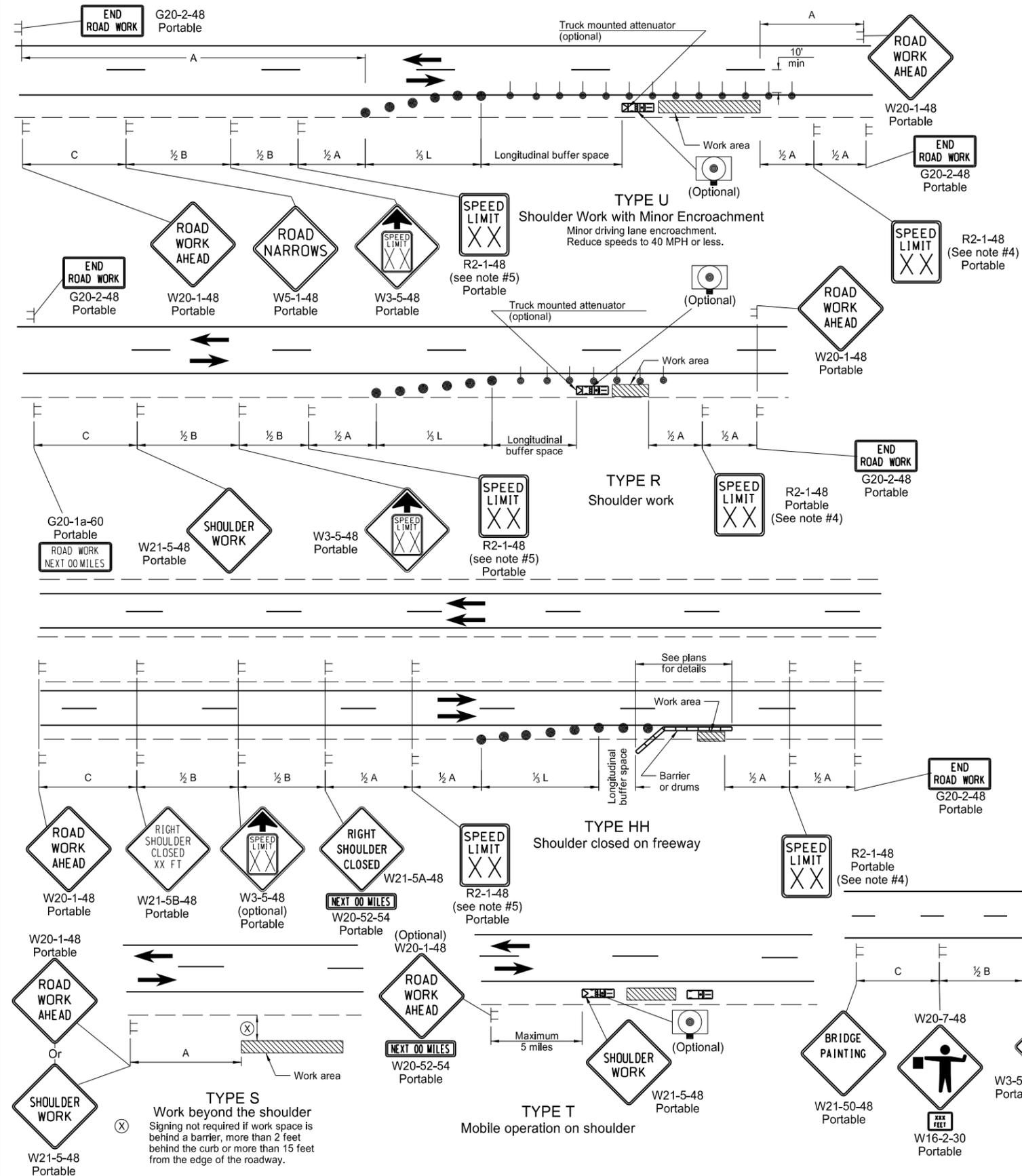
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SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

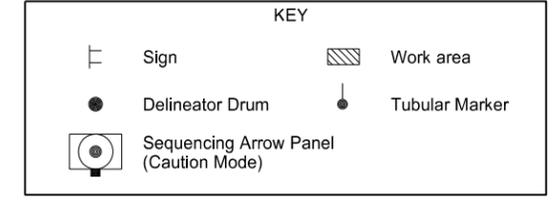
D-704-24



- Notes
- Variables
S = Numerical value of speed limit or 85th percentile.
W = The width of the taper.
L = Minimum length of taper, or $S \times W$ 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.
 - Delineator drums used for tapering traffic shall be spaced at dimension "S".
Delineator drums or tubular markers used for tangents shall be spaced at 2 times "S".
 - Sequencing Arrow Panels
Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
 - 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 $\frac{1}{2}B$.
 - 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.
 - The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.

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

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

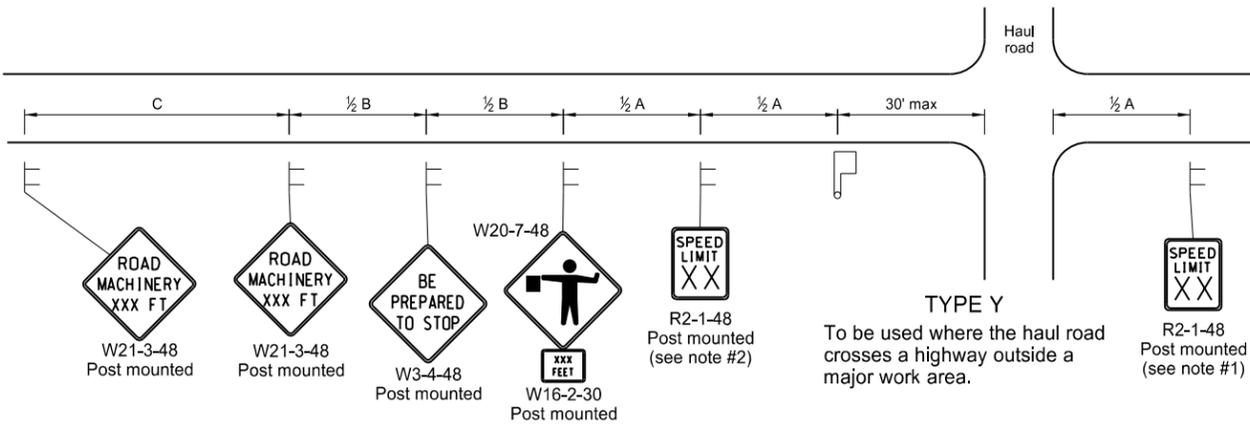


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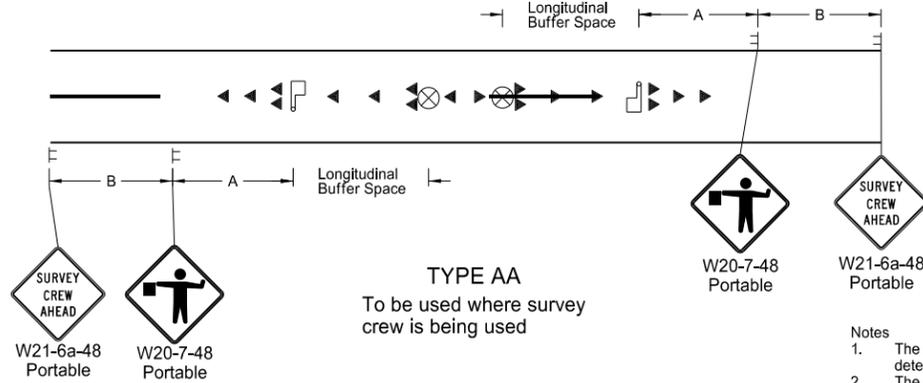
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MISCELLANEOUS SIGN LAYOUTS

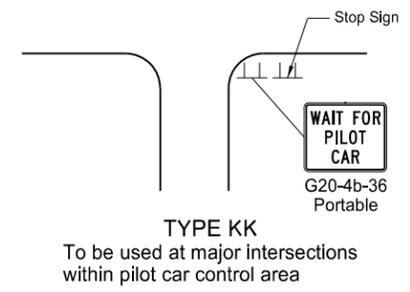
D-704-26



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

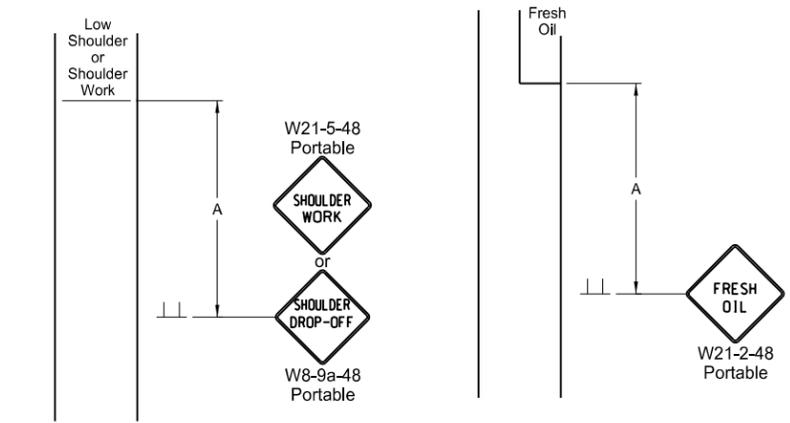


TYPE AA
To be used where survey crew is being used



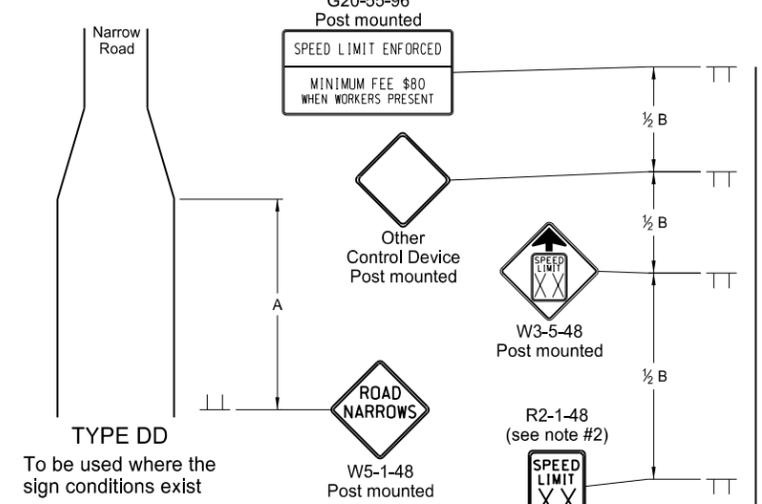
TYPE KK
To be used at major intersections within pilot car control area

- 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.

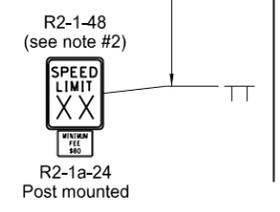


TYPE BB
To be used within a major work area where the sign conditions exist

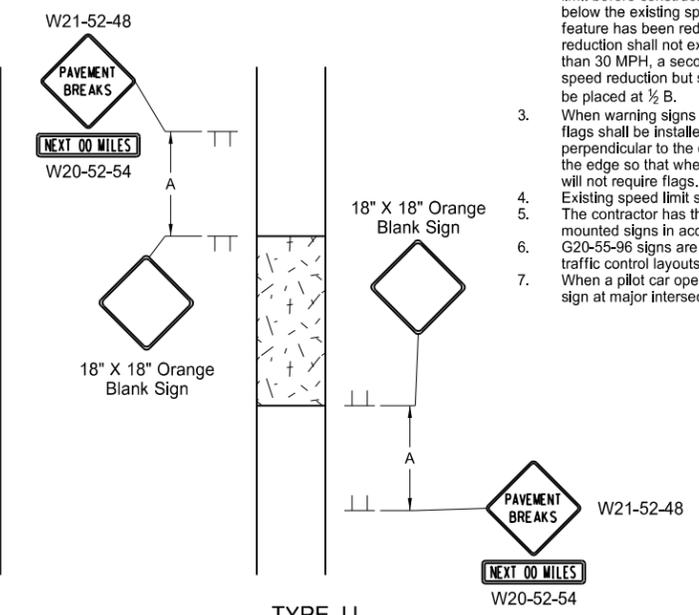
TYPE CC
To be used where the sign conditions exist



TYPE DD
To be used where the sign conditions exist



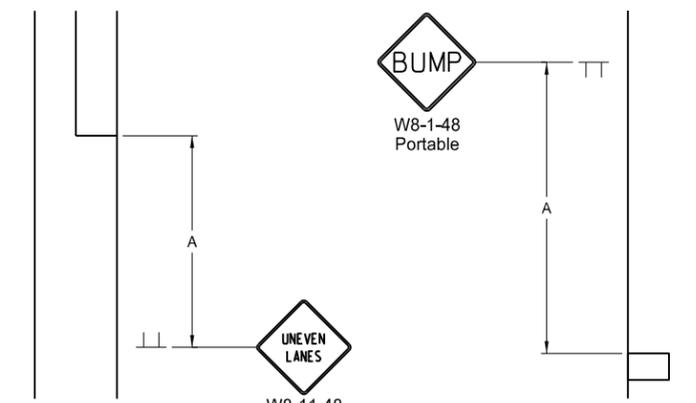
TYPE Z
To be used where speed zone is needed



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.

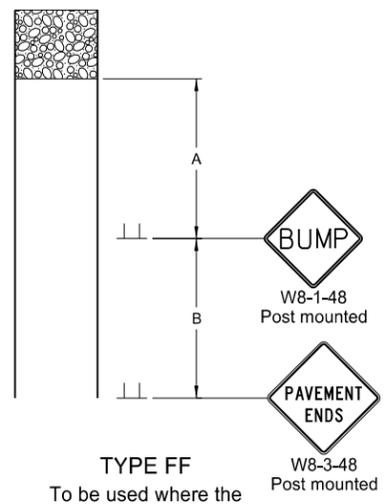
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

* 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)

Flagger (represented by a square with a diagonal line)

Cones (represented by a triangle)

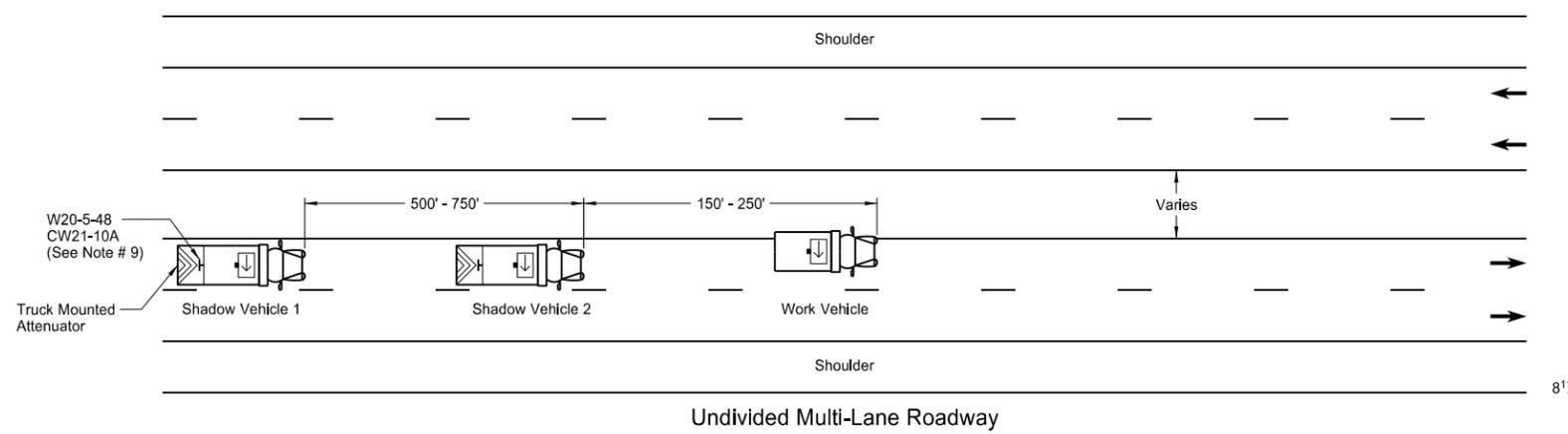
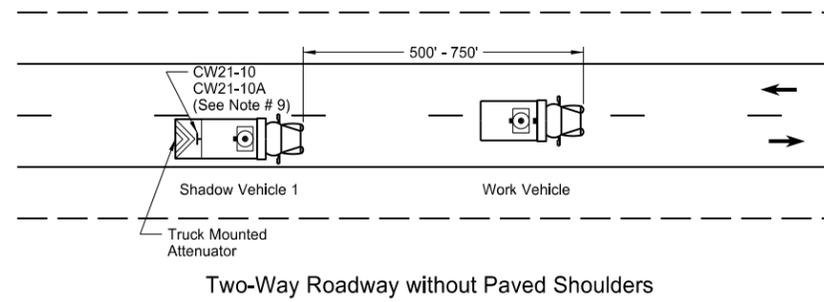
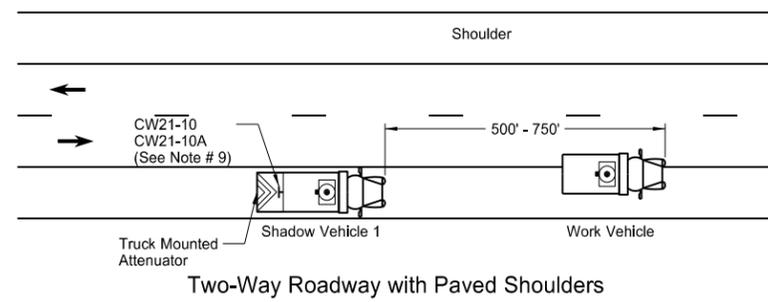
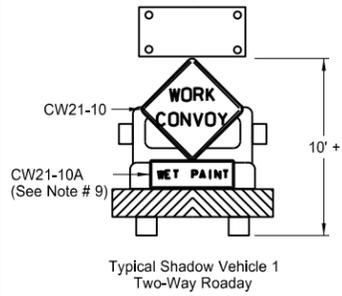
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 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

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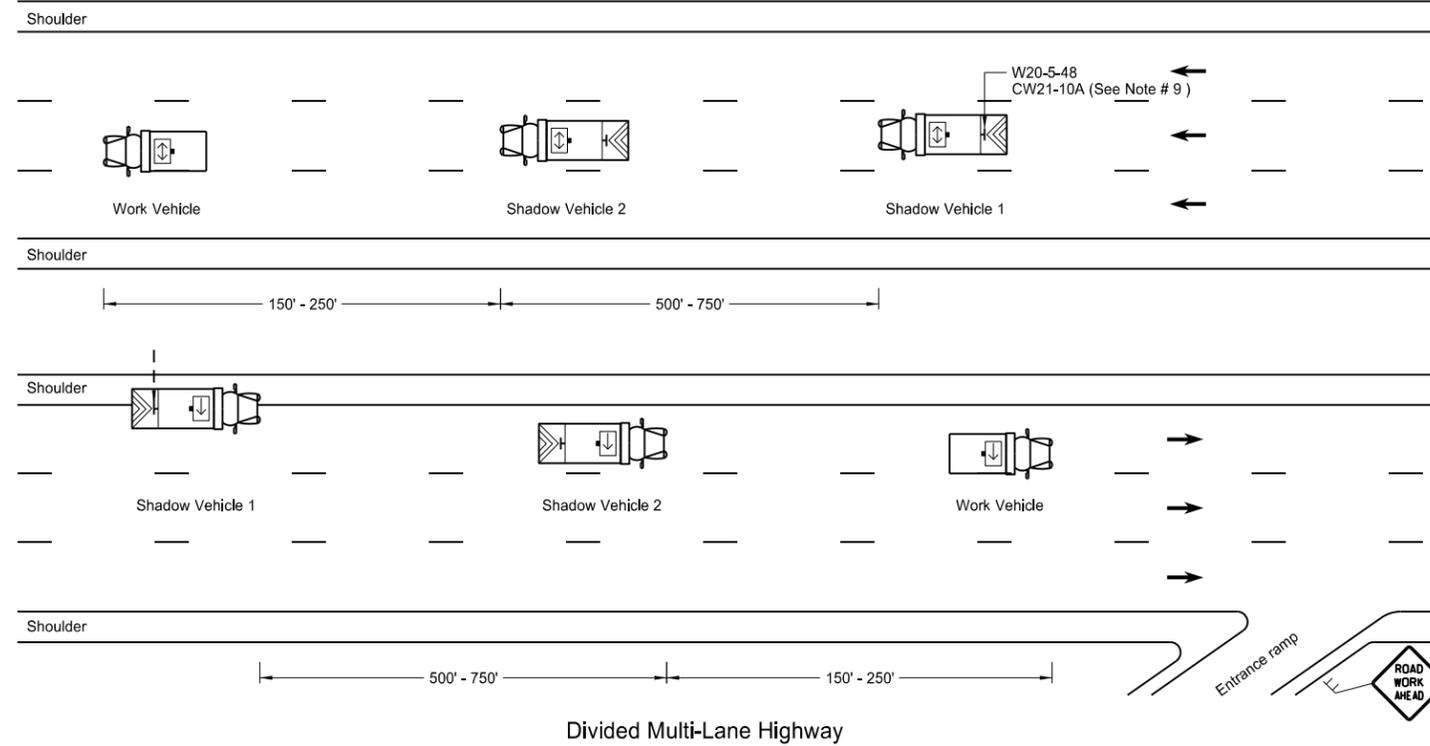
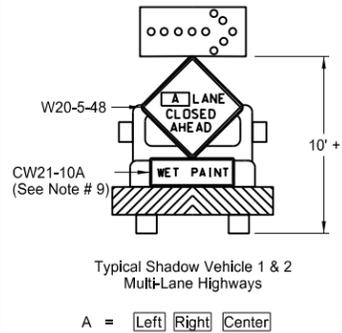
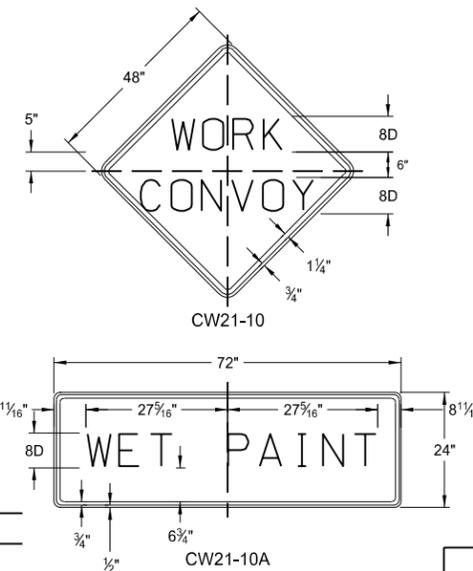
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TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

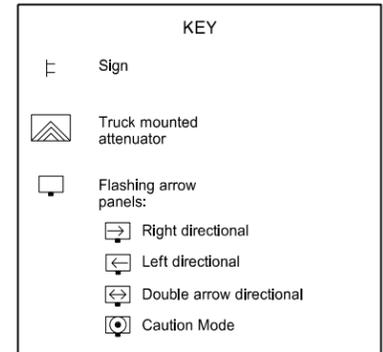
D-704-27



Sign Details



- Notes
- 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.
 - Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the plans.
 - Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
 - Each vehicle shall have two-way electronic communication capability.
 - When work convoys must change lanes, shadow vehicle 1 should change lanes first to shadow other convoy vehicles.
 - 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.
 - Sign Colors
Letters = Black
Border = Black
Background = Orange
 - Shadow vehicle 2 may be used as the paint tender vehicle.
 - Sign CW21-10A shall only be used during a painting operation.
 - On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.

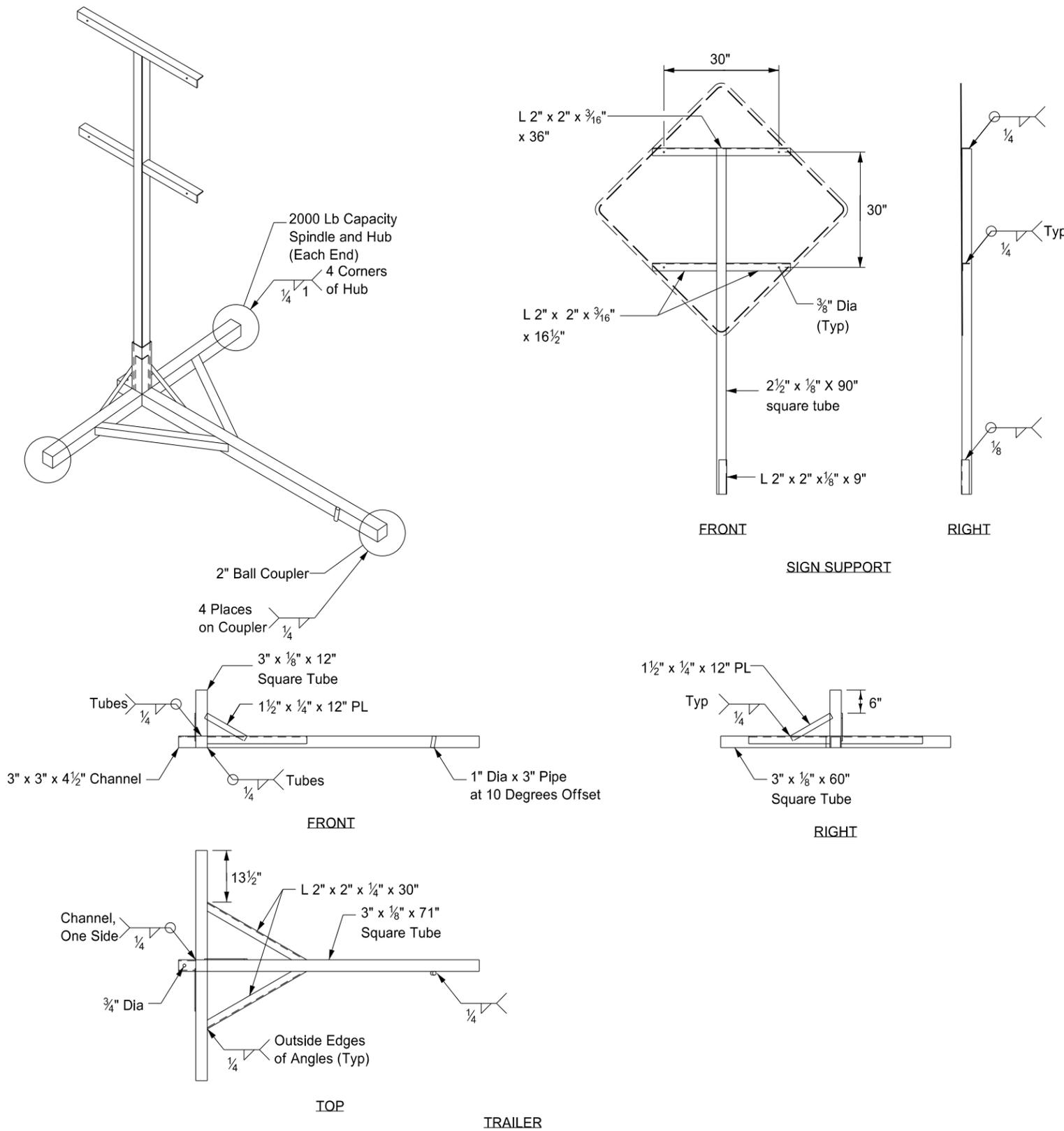


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



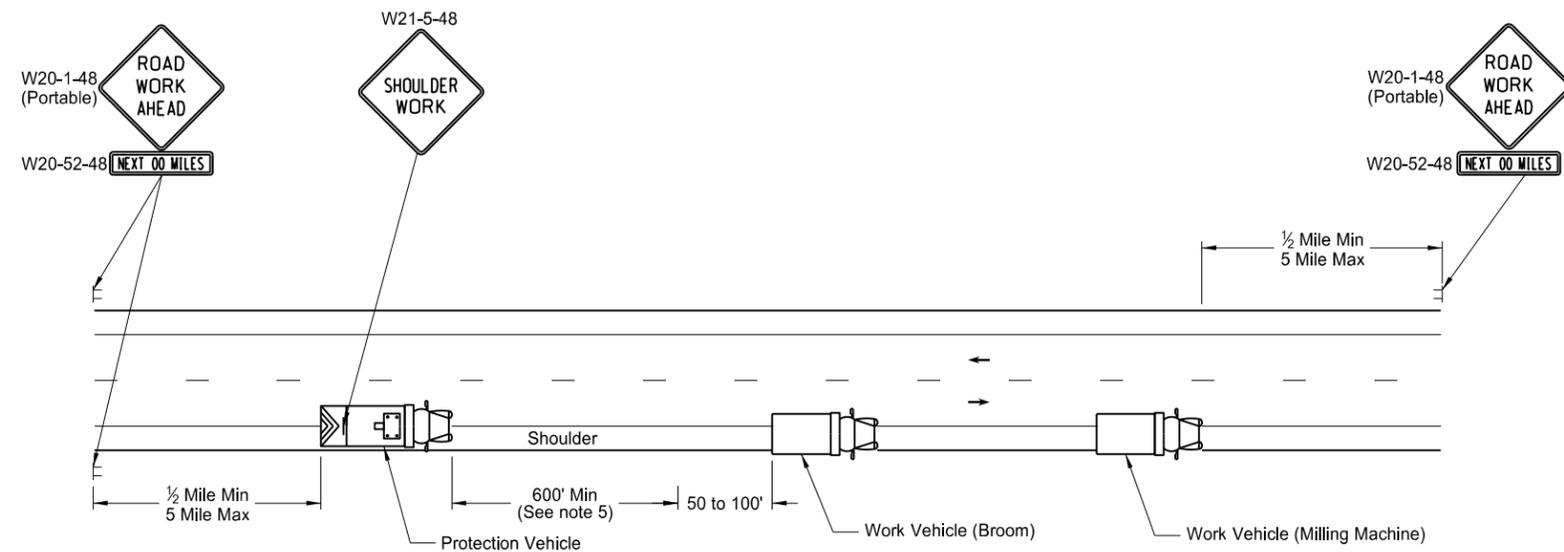
Notes:

- 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.

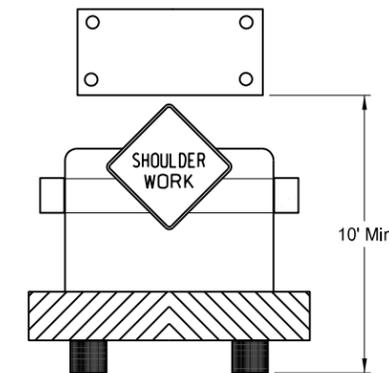
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11-23-10	
REVISIONS	
DATE	CHANGE

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MOBILE OPERATION
Grinding Shoulder Rumble Strips



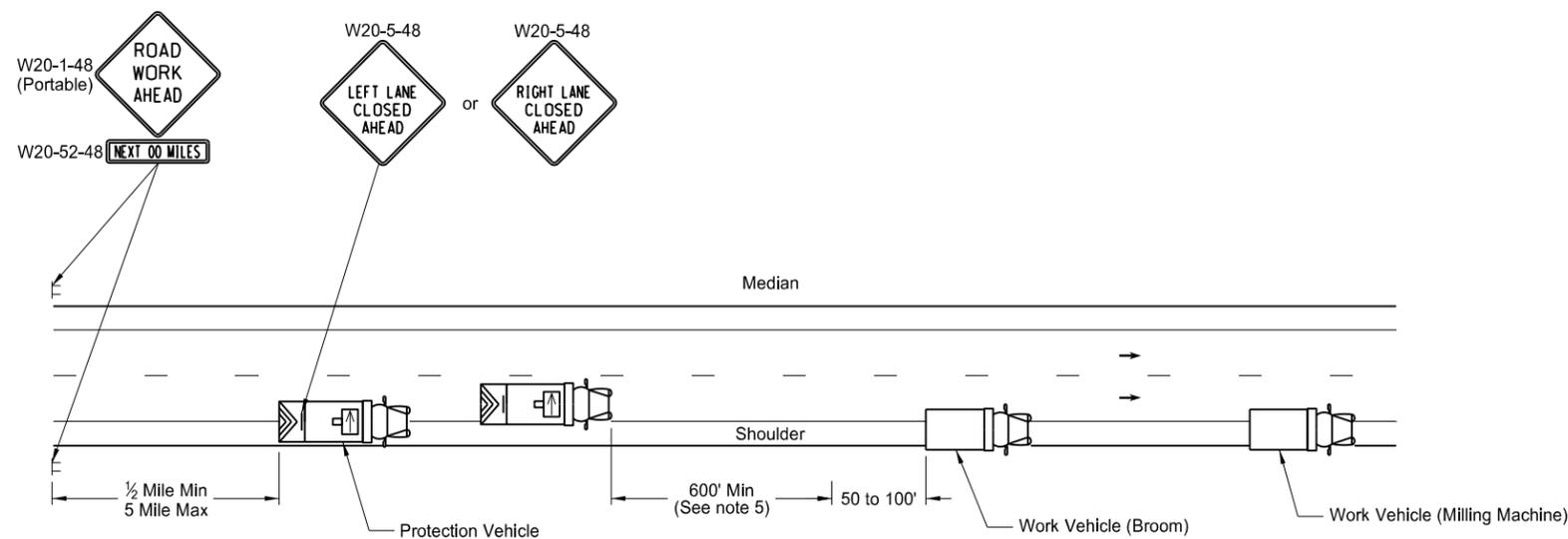
TWO LANE - TWO WAY ROADWAY



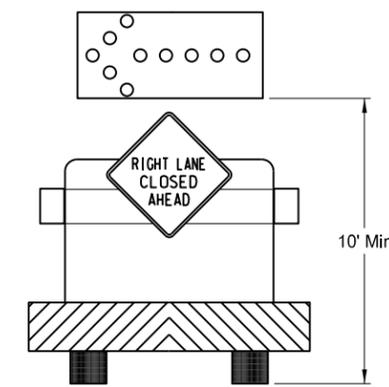
TWO LANE - TWO WAY ROADWAY
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

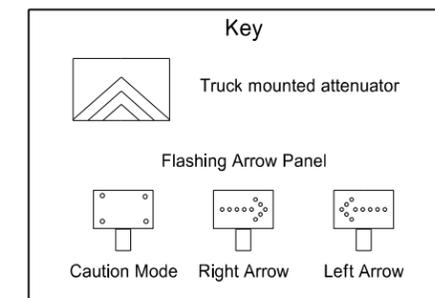
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
2. Vehicles shall have a rotating, flashing, oscillating or strobe lights.
3. Flashing arrow panels shall be Type B or Type 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



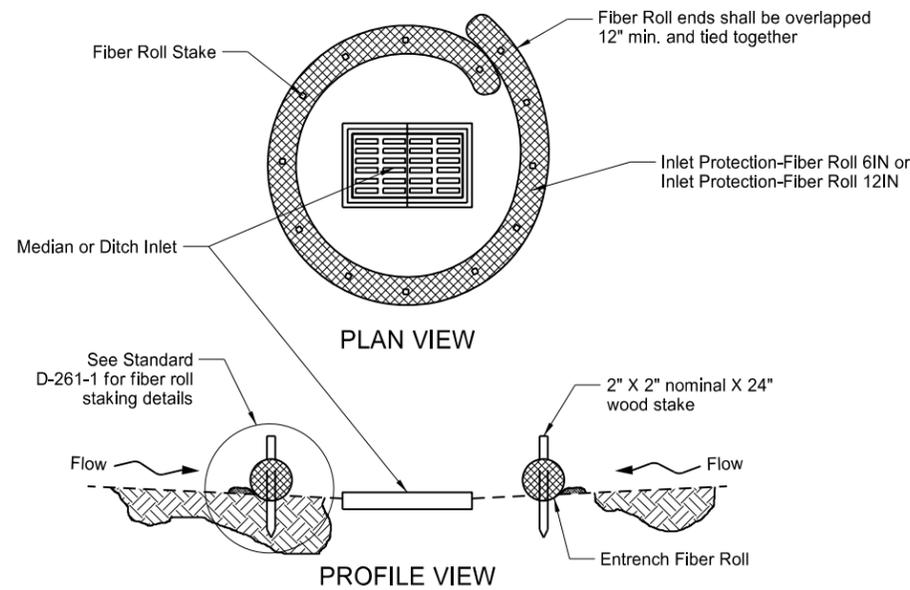
INTERSTATE & 4 LANE DIVIDED HIGHWAY
Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode



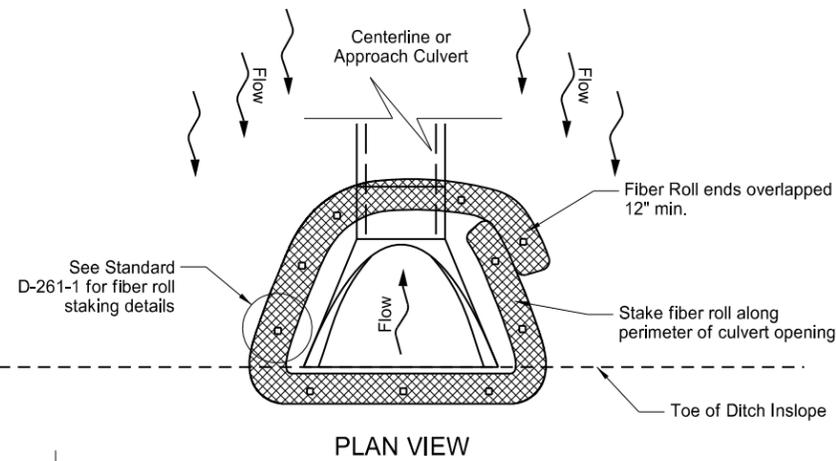
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE

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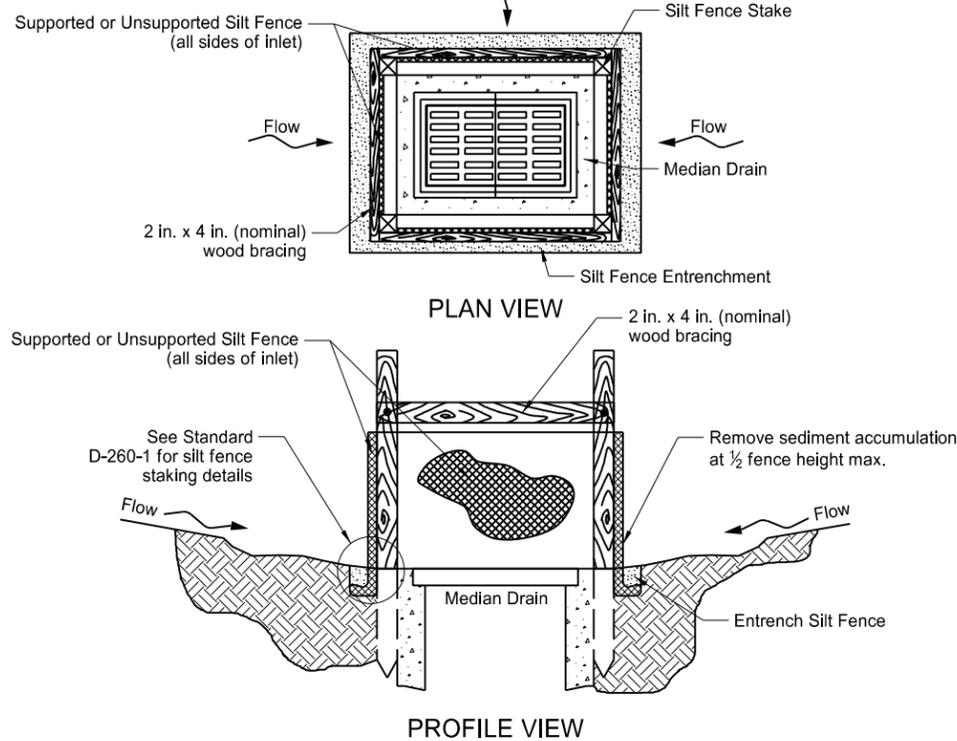
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



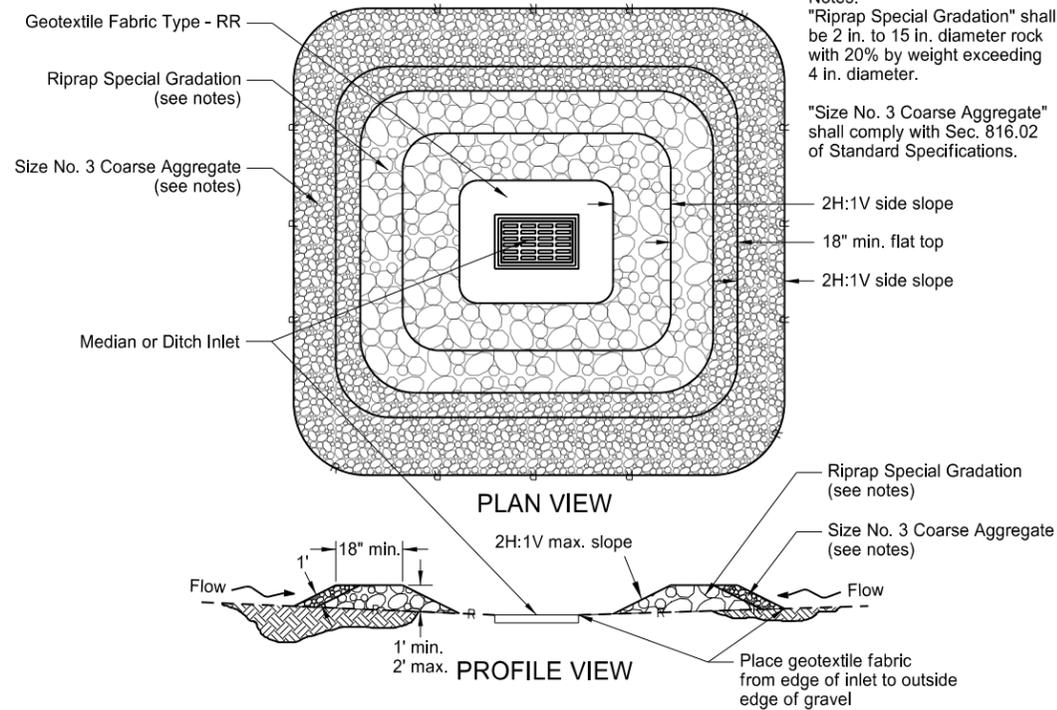
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



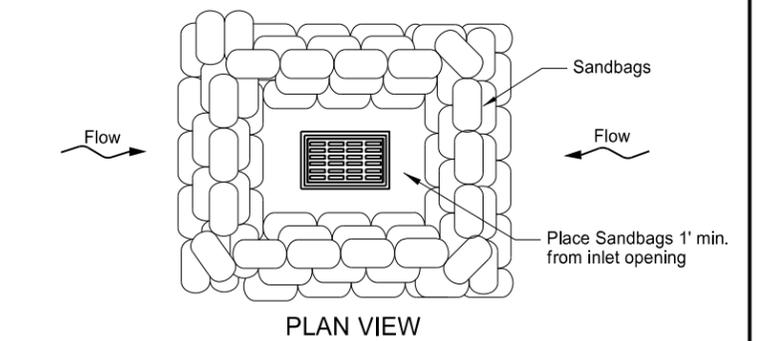
FIBER ROLL PROTECTION (INLET OF CULVERT)



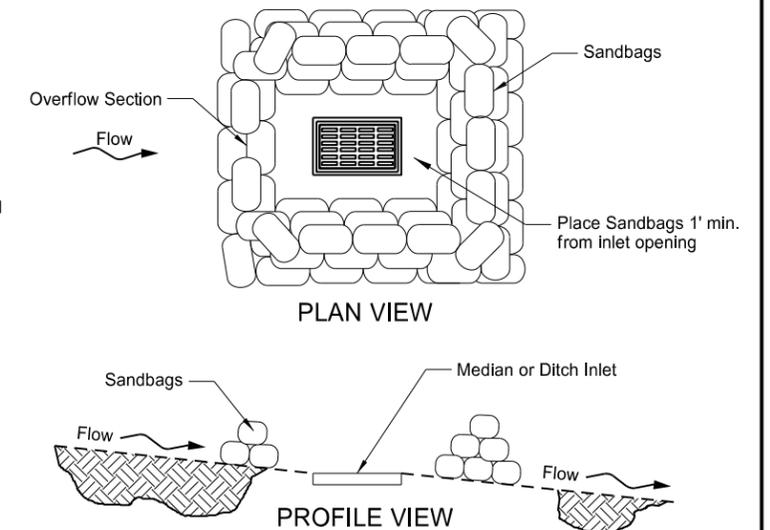
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)



SANDBAG PROTECTION (LOW POINT)



SANDBAG PROTECTION (ON SLOPE)

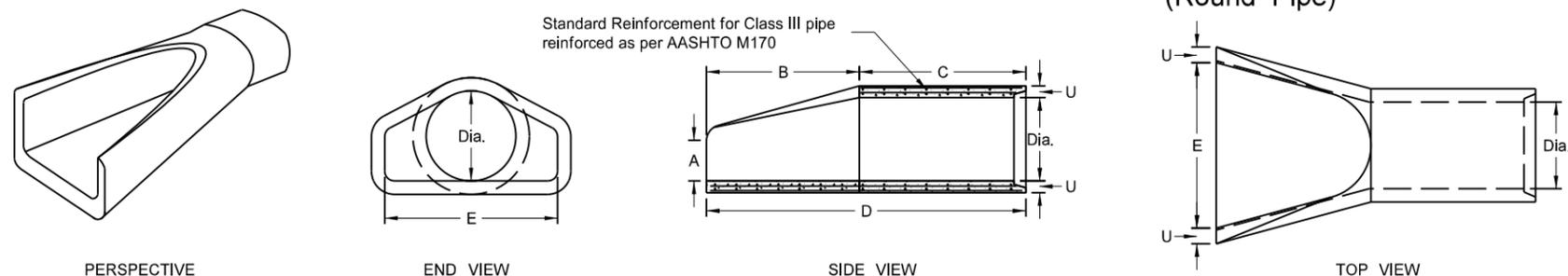
Notes:
"Riprap Special Gradation" shall be 2 in. to 15 in. diameter rock with 20% by weight exceeding 4 in. diameter.
"Size No. 3 Coarse Aggregate" shall comply with Sec. 816.02 of Standard Specifications.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE

06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.

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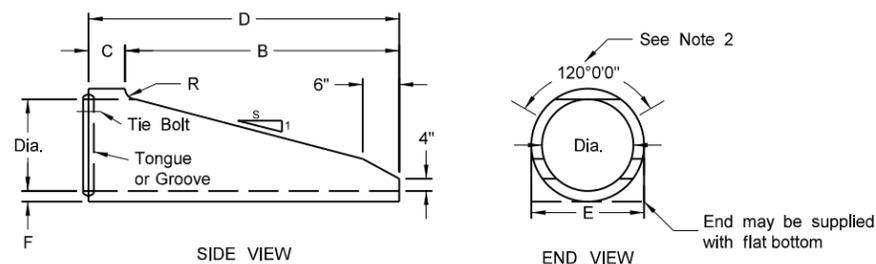
REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)



Standard Reinforcement for Class III pipe reinforced as per AASHTO M170

REINFORCED CONCRETE PIPE - FLARED END SECTION
Reinforcement to be equivalent to Class III RCP

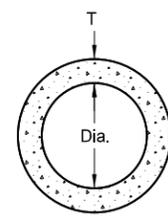
TRAVERSABLE END SECTION							
DIA	B	C	D	E	F	R	S
15"	4"	9"	4'-9"	1'-7½"	2½"	3"	6"
18"	5'-9"	9"	6'-6"	1'-11"	2½"	3"	6"
24"	6"	1'	7"	2'-6"	3"	3"	4"
30"	7'-6"	1'	8'-6"	3'-1"	3½"	3½"	4"
36"	7'-3"	15"	8'-6"	3'-8"	4"	3"	4"



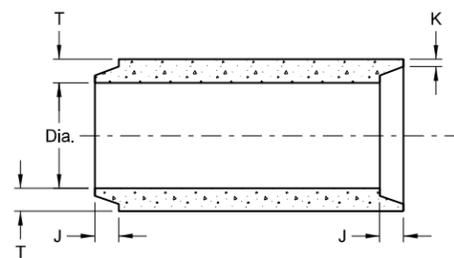
NOTES (Traversable End Section):

1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

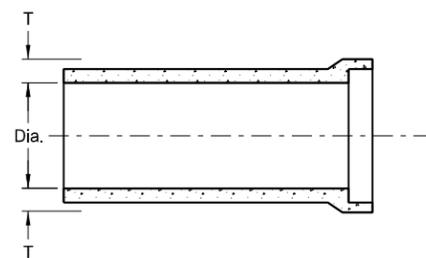
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION
Reinforcement to be equivalent to Class III RCP



END VIEW
CIRCULAR PIPE

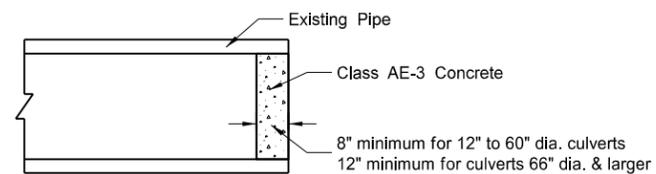


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0½"	6'-0½"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2½"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2½"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3½"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9½"	8'-2½"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"

All Classifications of Round Concrete Pipe

Internal Dia. of Pipe (In.)	Cross-Sectional Water Area (Sq. ft.)	Weight per Lin. Foot of Pipe (Lbs.)	Joint Groove Min./Max. (In.)	Joint Tongue Min./Max. (In.)	Minimum Wall Thickness (In.)
12	0.79	92	1½-2¾	¾	2
15	1.23	127	1¾-2¾	¾	2½
18	1.77	168	1½-2¾	1	2½
21	2.40	214	1¾-3¾	1½	2¾
24	3.14	265	2¾-3¾	1½	3
27	3.98	322	2¾-4	1¾	3¼
30	4.91	384	3¼-4¼	1¾	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3¼-4¼	1½	4
42	9.62	685	3¼-4¼	1¾	4½
48	12.57	885	3¼-4¼	1¾	5
54	15.90	1070	4½-5½	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2½	6½
72	28.27	1810	5½-6¾	2½	7
78	33.18	2098	6¼-7¼	2½	7½
84	38.48	2410	5½-7¼	3¾	8
90	44.18	2793	6¾-8½	3¾	8½
96	50.27	3092	7-8¼	3½	9
102	56.75	3466	7-8¼	3½	9½
108	63.62	3864	7¼-8½	3¾	10

SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

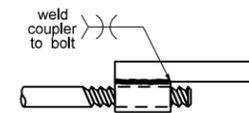
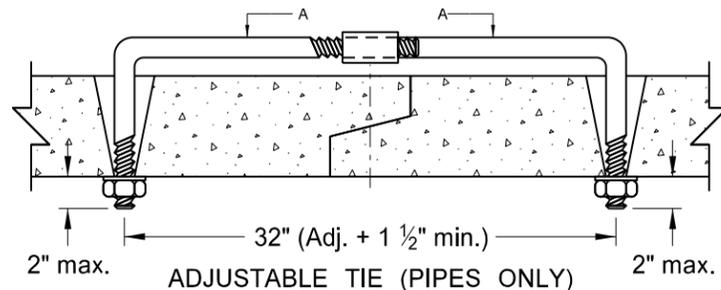
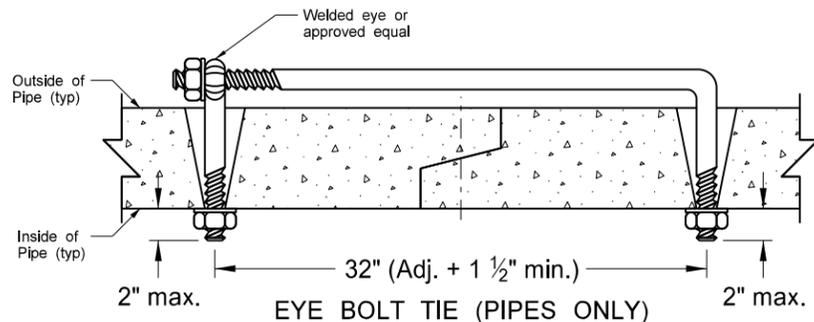
NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end sections, shop drawings and design calculations shall be sealed by a Professional Engineer and submitted for Engineer's review.

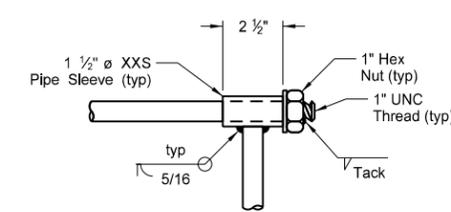
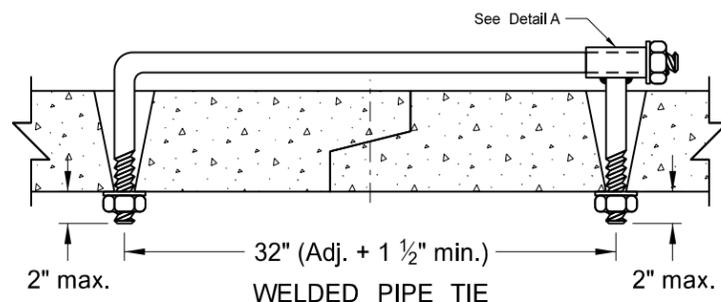
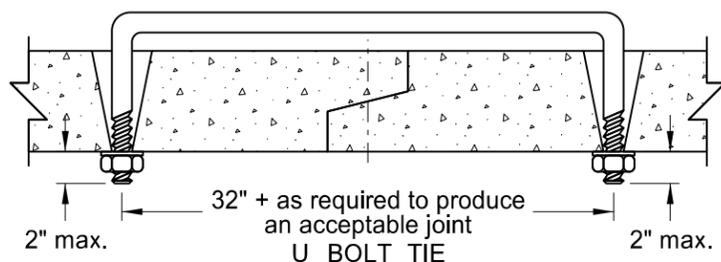
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE

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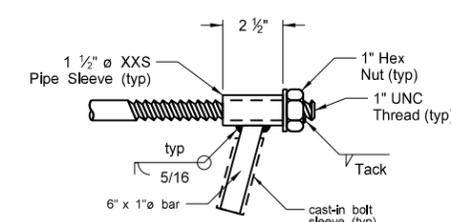
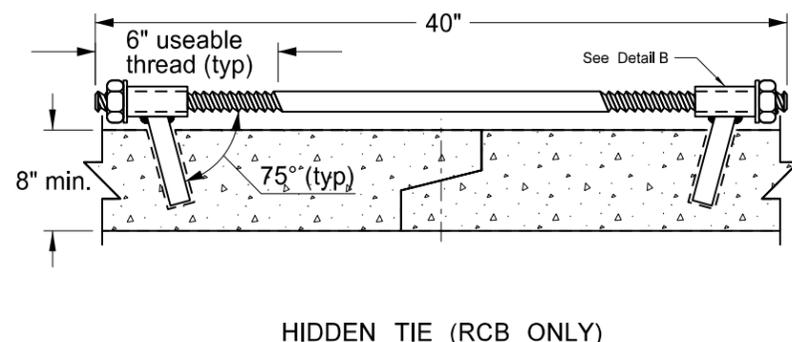
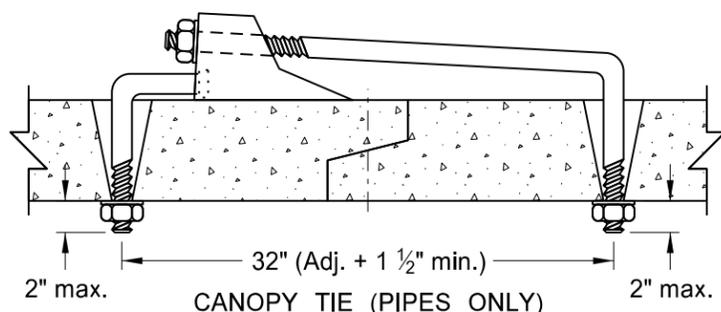
CONCRETE PIPE OR PRECAST CONCRETE BOX CULVERT TIES



SECTION A-A



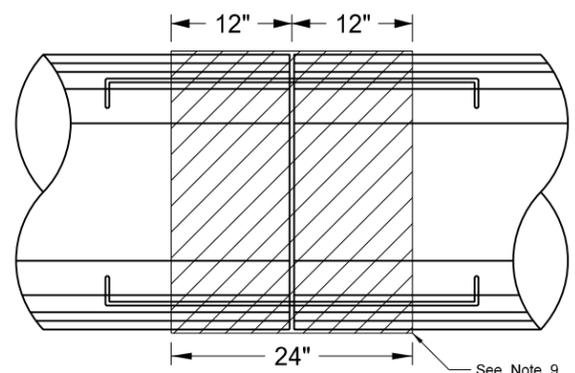
DETAIL A



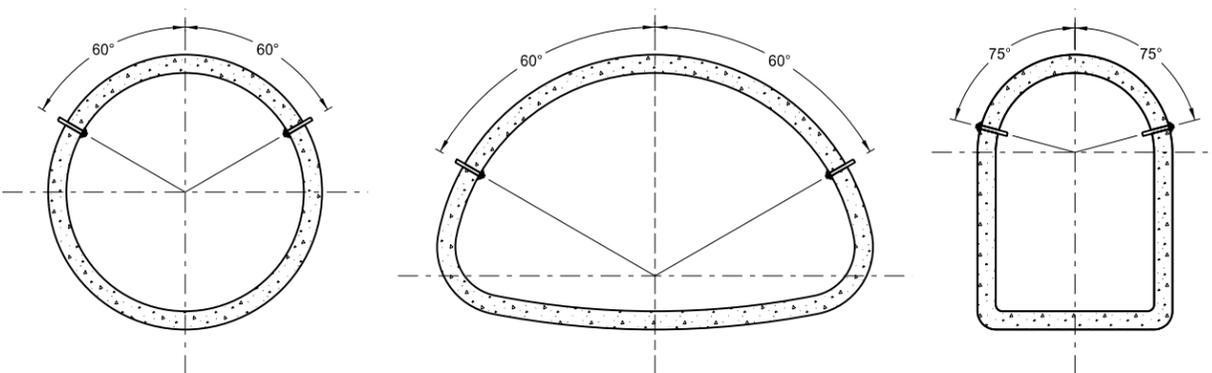
DETAIL B

REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ϕ	XXS Pipe Sleeve Inner ϕ
18" - 24"	5/8" See note 2	3/4"
30" - 66"	3/4"	1"
72" - 78"	1"	1 1/4"
RCB		

- NOTES:
- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
 - Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
 - Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
 - Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
 - Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter 1/4" larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 1/4".
 - The contractor has the option of selecting the type of tie bolt used from those shown.
 - The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for the appropriate conduit or RCB pay item.
 - All centerline and approach RCP culvert joints shall be tied. Storm drain systems shall have the first three joints including the end section of all free ends tied. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
 - When joint wrap is specified in the plans, place wrap beneath ties. Overlap the joint by 12" in both directions.
 - Tie bolts shall conform to ASTM A 36. Nuts shall be heavy hex and conform to ASTM A 563. Washers shall conform to ASTM F 436, Type 1. Welded pipe sleeves and cast-in bolt sleeves shall conform to ASTM A 53, Grade B.
 - Cattle Pass and Jacked and Bored pipes shall have pipe ties inserted from the inside of the pipes and grouted into place. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
 - RCB tie locations shall be as shown on the plans.



PLAN VIEW



END VIEW

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8

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STANDARD MONUMENTS AND RIGHT OF WAY MARKERS

NOTES:

The construction and installation of Alignment Monuments, Iron Pin Reference Monuments, Iron Pin R/W Monuments, and Right of Way Markers (witness posts) shall conform to Section 720 of the Standard Specifications.

ALIGNMENT MONUMENTS:

Iron Pin or Precast Concrete Alignment Monuments with aluminum caps will be placed on the centerline alignment PI's, section corners, quarter corners, section line crossings, quarter line crossings, and at curve points (PC's, PT's, TS's, and ST's) on the centerline.

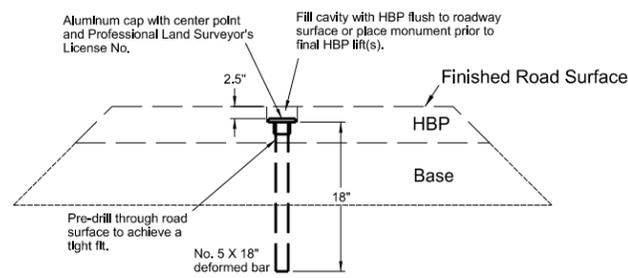
IRON PIN R/W MONUMENT:

Iron pins with aluminum caps (No. 5 X 18") will be placed at breaks on the Right of Way line, and at curve points (PC's, PT's, TS's and ST's) on the Right of Way line.

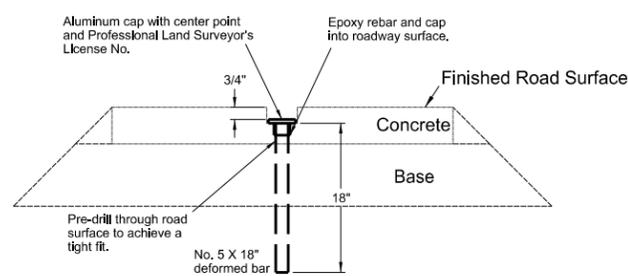
IRON PIN REFERENCE MONUMENT:

Iron Pins without aluminum caps (No. 5 X 18") will be placed as reference monuments on the Right of Way line at section corners, quarter corners, section line crossings, and quarter line crossings.

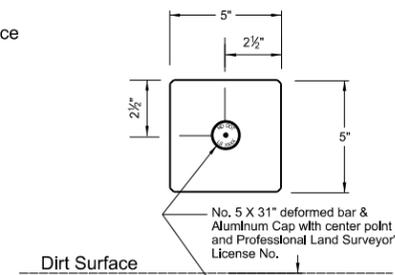
ALIGNMENT MONUMENT DETAILS



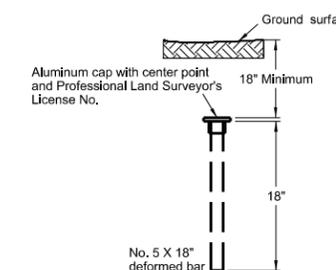
IRON PIN
(Within Finished Roadway Surface)



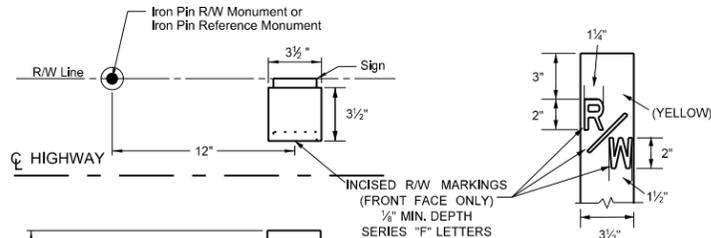
IRON PIN
(Within Finished Roadway Surface)



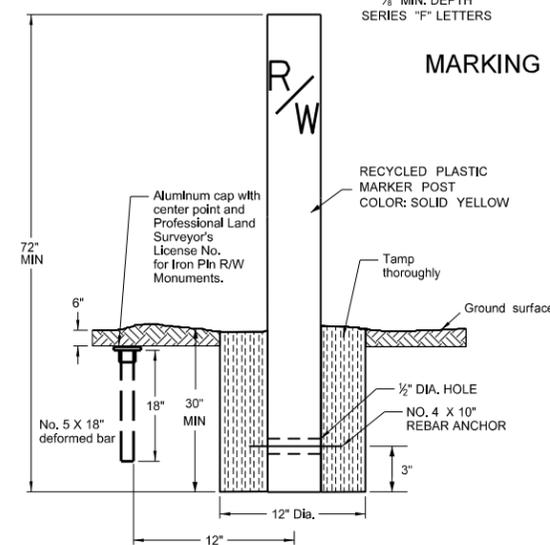
PRECAST CONCRETE
(Outside Finished Roadway Surface)
(Inside R/W Limits)



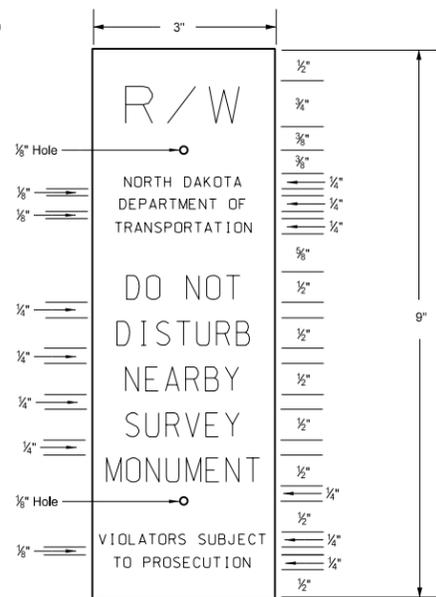
IRON PIN
(Outside Finished Roadway Surface)
(Outside R/W Limits)



MARKING DETAIL



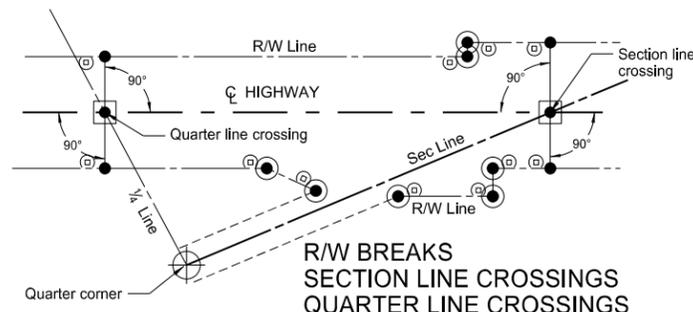
RECYCLED PLASTIC
RIGHT OF WAY MARKER
(WITNESS POST) DETAILS
&
IRON PIN REFERENCE AND R/W
MONUMENT DETAILS



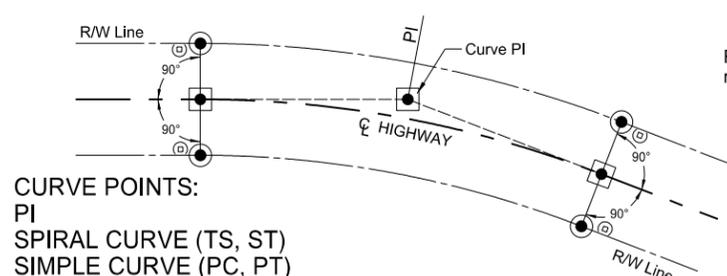
SIGN DETAIL

Black letters on orange high intensity background sheeting meeting ASTM D-4956 Type III or higher on 80 gauge 5052-H38 aluminum. Silk screen graphics. One color print. Sign shall be attached by drilling two holes in the face of the post (side facing the private owner, away from the Department of Transportation right of way). Put inserts into the holes and mount the sign with #4 vandal proof screws. Sign shall be installed 2" from top of post.

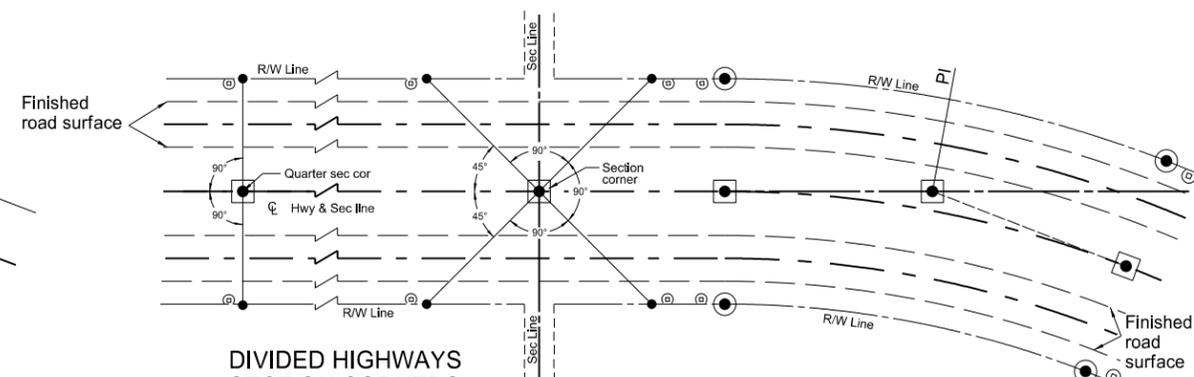
VARIOUS MONUMENT AND MARKER PLACEMENTS



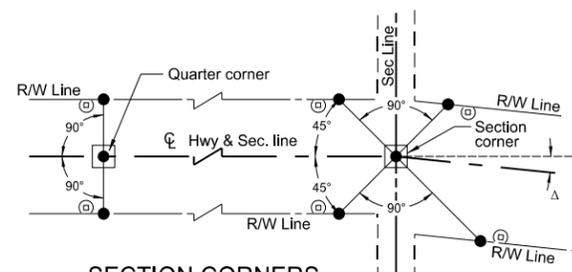
R/W BREAKS
SECTION LINE CROSSINGS
QUARTER LINE CROSSINGS



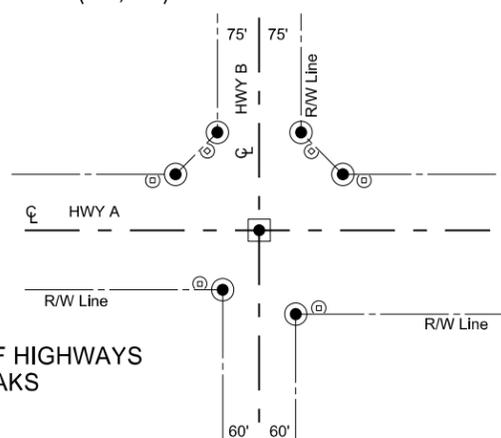
CURVE POINTS:
PI
SPIRAL CURVE (TS, ST)
SIMPLE CURVE (PC, PT)



DIVIDED HIGHWAYS
SECTION CORNERS
QUARTER CORNERS



SECTION CORNERS
QUARTER CORNERS



INTERSECTION OF HIGHWAYS
FLARED R/W BREAKS

LEGEND

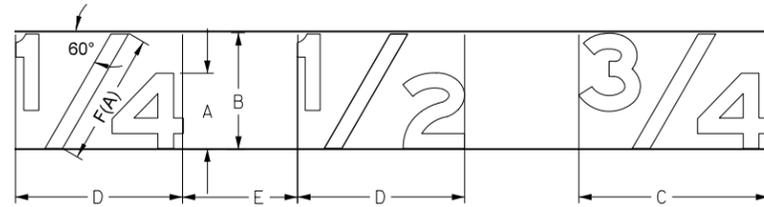
- Iron Pin Reference Monument
- ⊙ R/W Marker (witness post)
- Alignment Monument
- Iron Pin R/W Monument

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
11/12/13	Note for SIGN DETAIL modified to meet ASTM D-4956 Type III or higher on 80 gauge 5052-H38

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LETTER AND ARROW DETAILS FOR VARIABLE LENGTH SIGNS

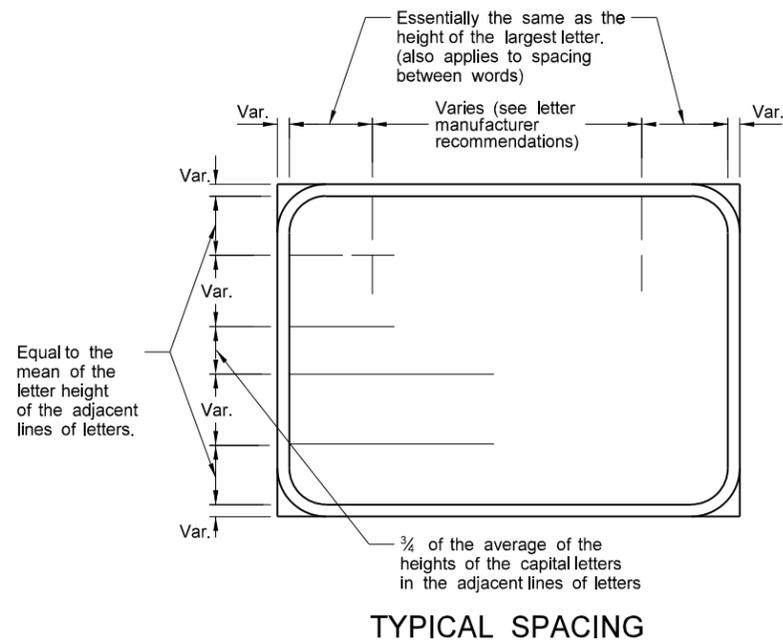
D-754-9



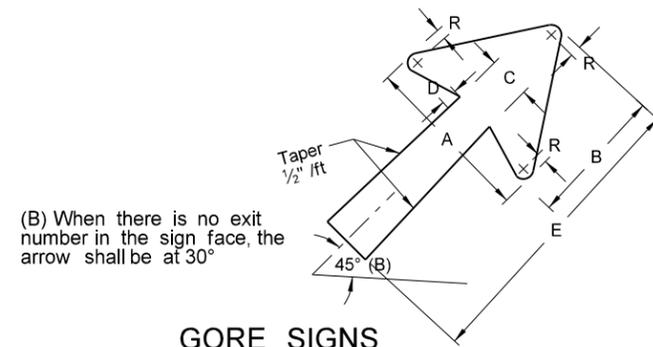
SIZE OF THE FRACTION IS DETERMINED AS FOLLOWS:

SYMBOL	TITLE	RATIO TO HEIGHT OF CAPITAL OR UPPER CASE
A	Letter height	1.0 of capital or upper case
B	Fraction height	1.5 X A
C	Fraction width	2.5 X A
D	Fraction width	2 X A
E	Space to next character	1 to 1.5 X A
F(A)	Length of diagonal	1.75 X A

(A) Diagonal stroke of fraction is to be centered optically.

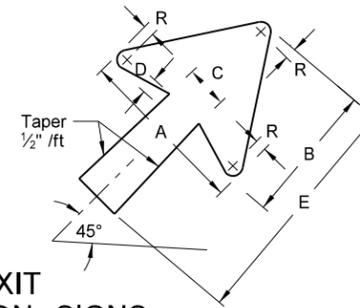


TYPICAL SPACING



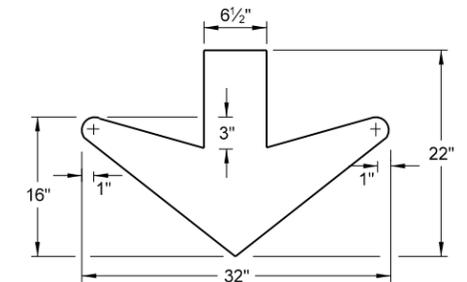
GORE SIGNS

"EXIT" LETTER SIZE (Upper Case)	A	B	C	D	E	R
8"	15 1/8"	11 1/16"	3 3/4"	1 5/16"	25"	13 1/16"
10" - 13 1/3"	18 1/4"	14"	4 1/2"	1 1/2"	30"	3 1/4"

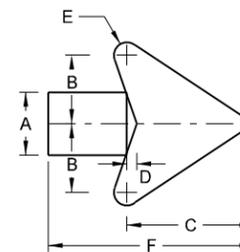


EXIT DIRECTION SIGNS

LETTER SIZE (Upper Case)	A	B	C	D	E	R
8"	15 1/8"	11 1/16"	3 3/4"	1 5/16"	17"	13 1/16"
10" - 13 1/3"	18 1/4"	14"	4 1/2"	1 1/2"	20"	3 1/4"
16" - 20"	22 1/4"	17"	5 3/8"	1 3/4"	25"	1"



DOWN ARROW



DISTANCE AND DESTINATION SIGNS

LETTER SIZE (Upper Case)	A	B	C	D	E	F
4"	1 3/4"	2"	3 9/16"	5/16"	3/8"	6"
6"	2 3/4"	3"	5 9/16"	7/16"	9/16"	9"
8"	3 1/2"	4"	7 1/8"	9/16"	1 1/16"	12"
12"	5 1/4"	6"	10 5/8"	1 3/16"	1 1/16"	18"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow

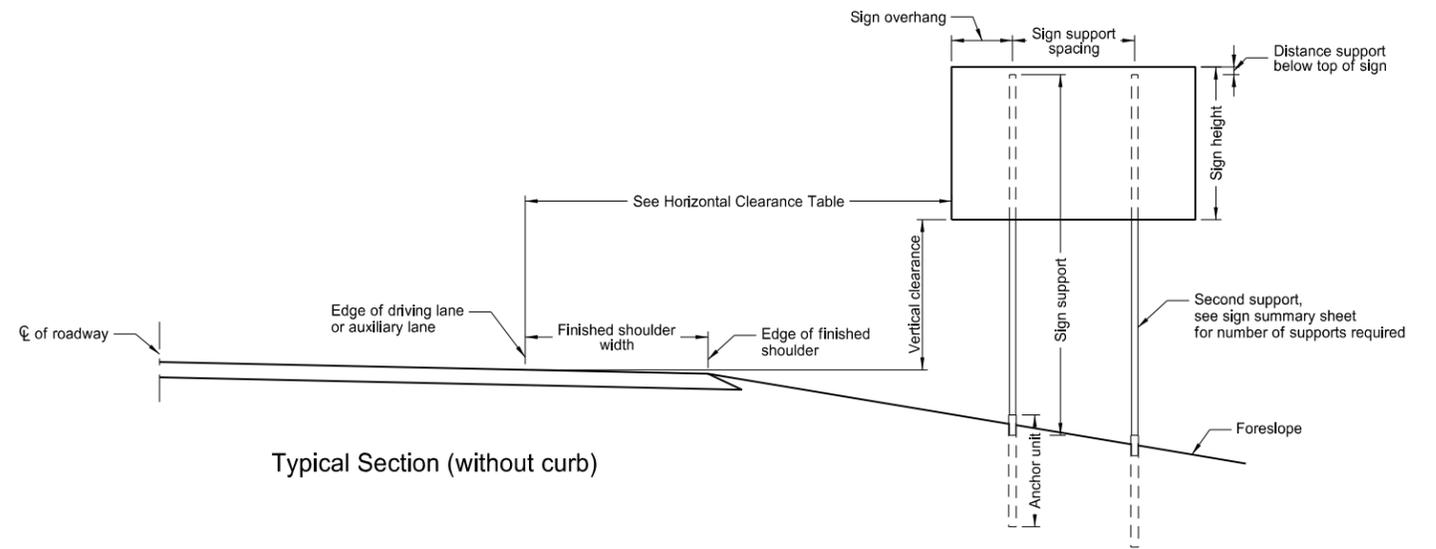
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PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

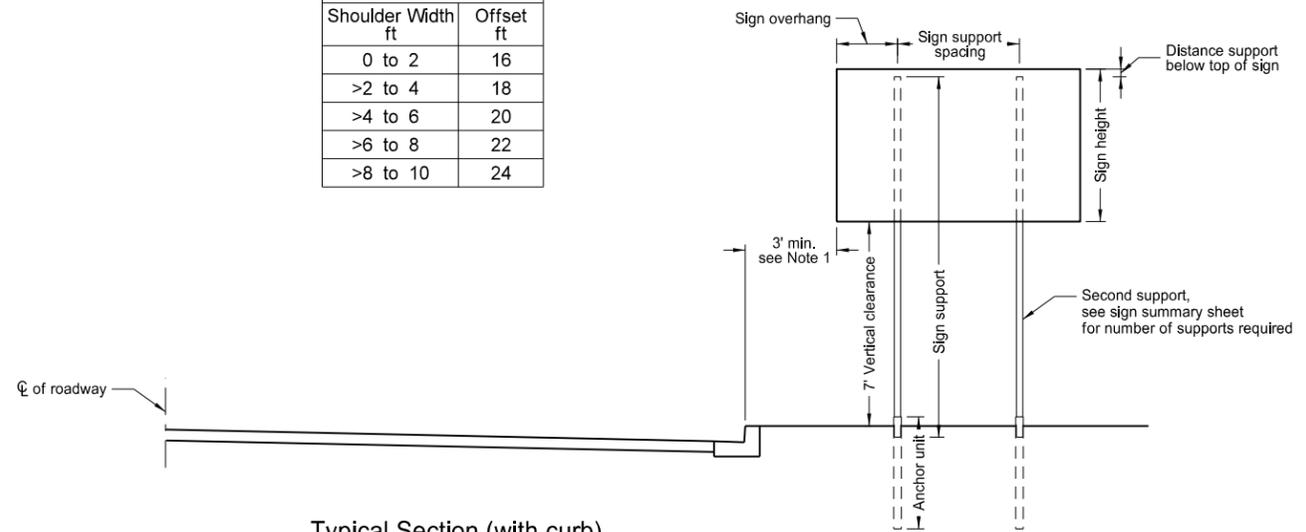
Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.
- Signs on expressways shall be installed with a minimum height of 7'.
- Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.
- The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.
3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.

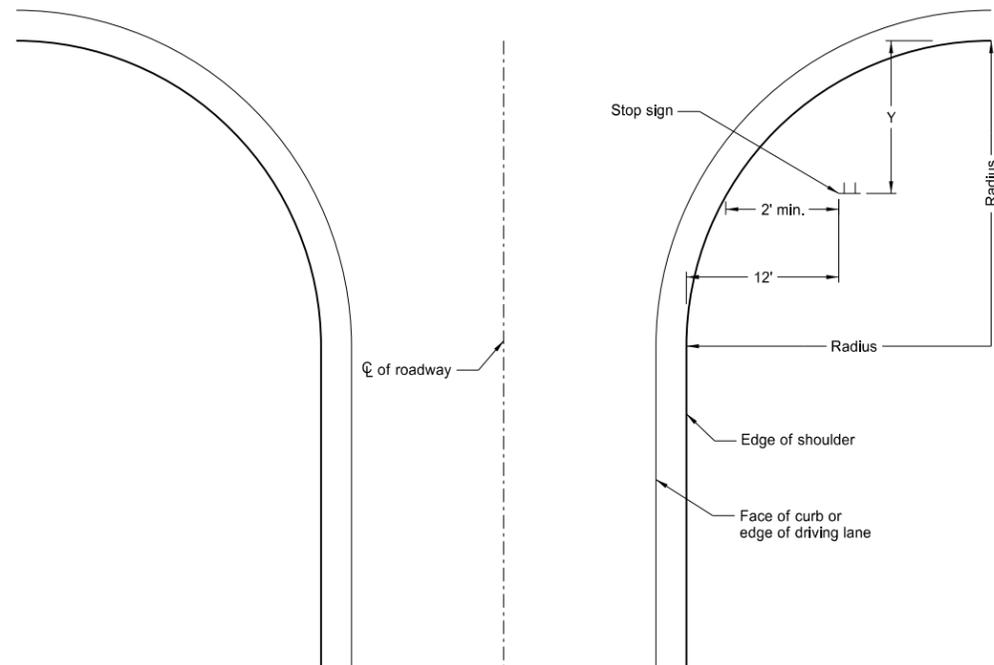


Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



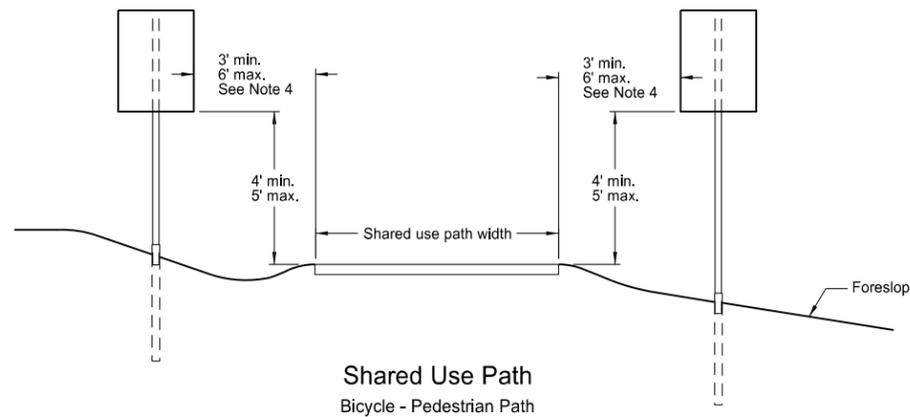
Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection

This layout is to be used for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



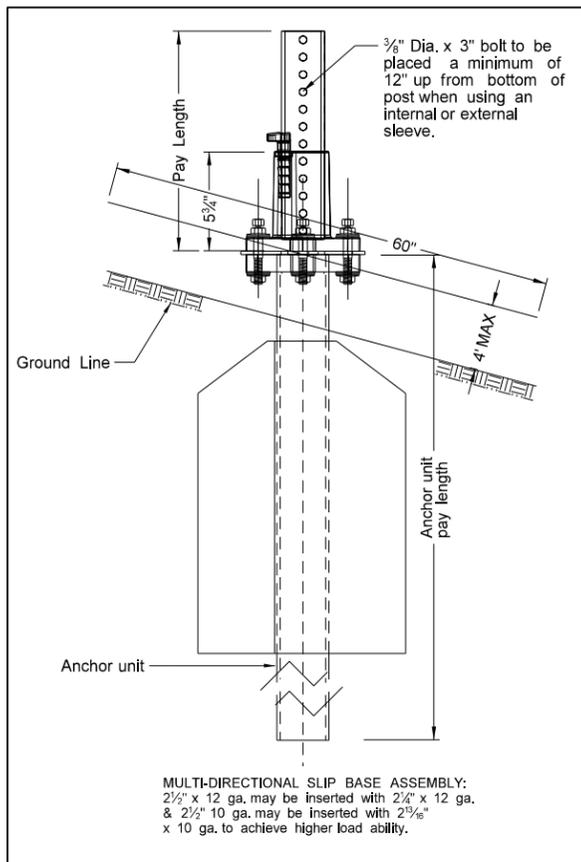
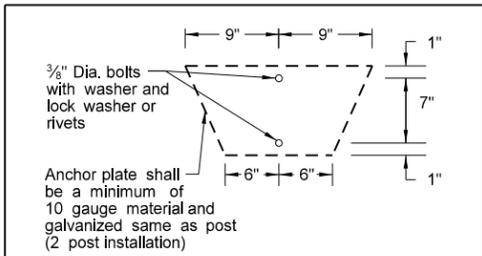
Shared Use Path
Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

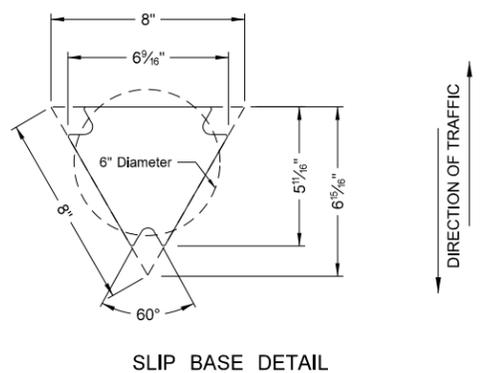
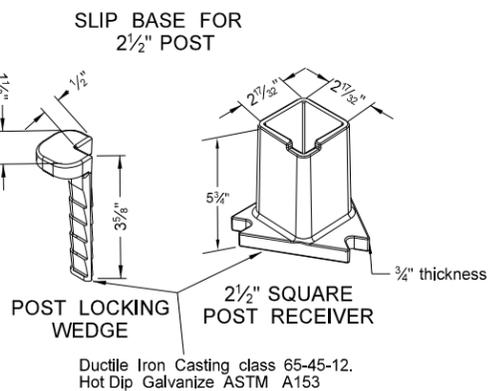
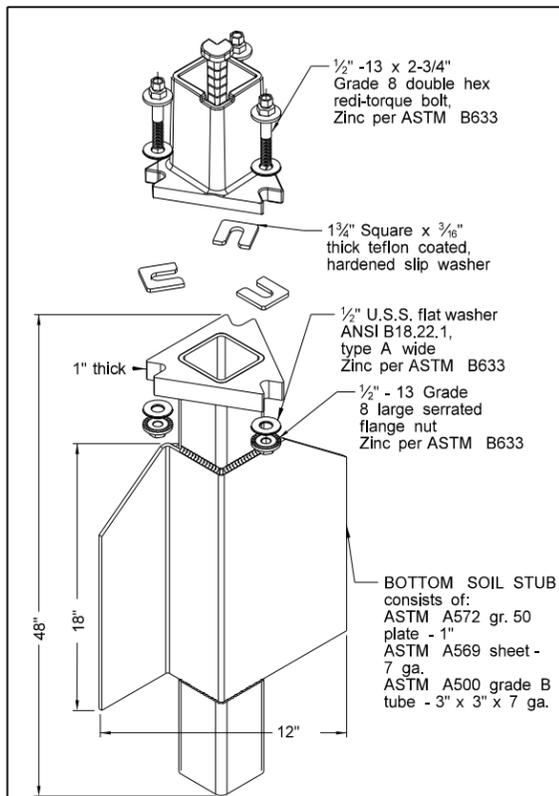
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Telescoping Perforated Tube							
Number of Posts	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 1/8	10	Yes		7

(B) - The 2 1/2", 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.
 (C) - 3" anchor unit
 (D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.



Mounting Details Perforated Tube

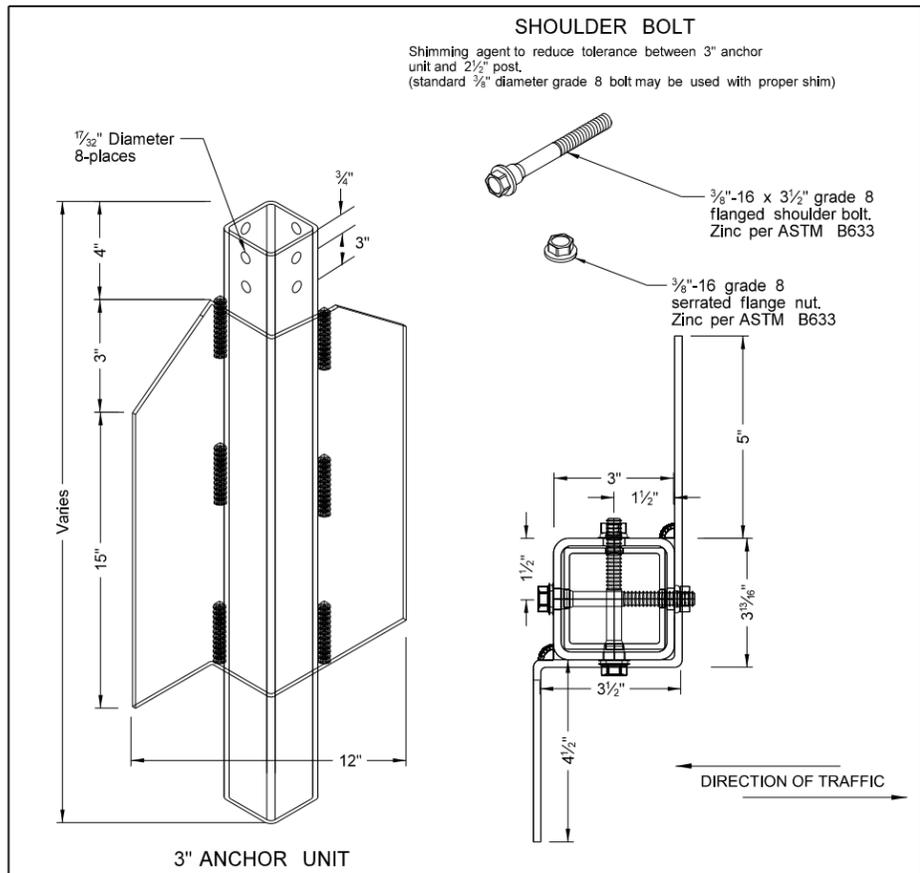
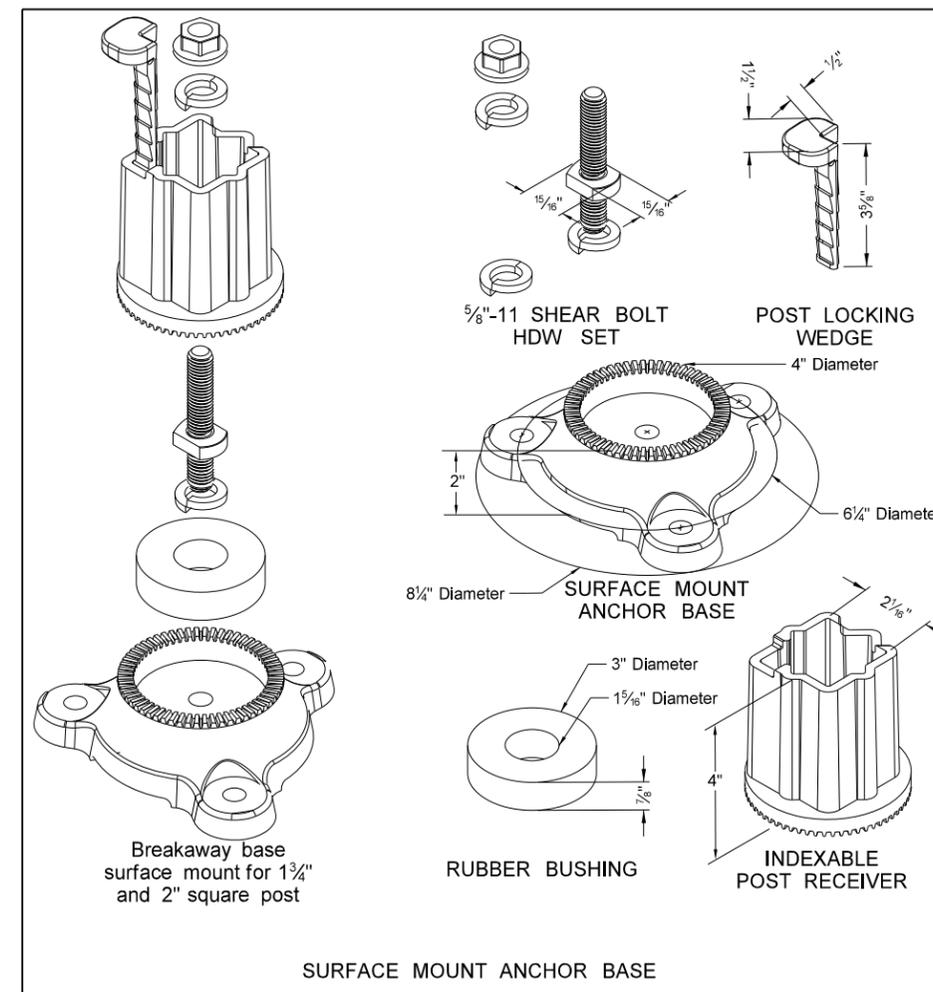


Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. Area In. ²	Section Modulus In. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	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	0.783

The 2 3/8" size 10 gauge is shown as 2.19" size on the plans;
 The 2 1/2" size is shown as 2.51" size on the plans.

NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
- Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- When used in concrete sidewalk, anchor shall be the same concept without the wings.
- Four post signs shall have over 8" between the first and fourth posts.
- Installation procedures as per manufacturers recommendation.
- Concrete fasteners for surface mount breakaway base shall be a minimum 1/2" diameter x 4" grade 8.



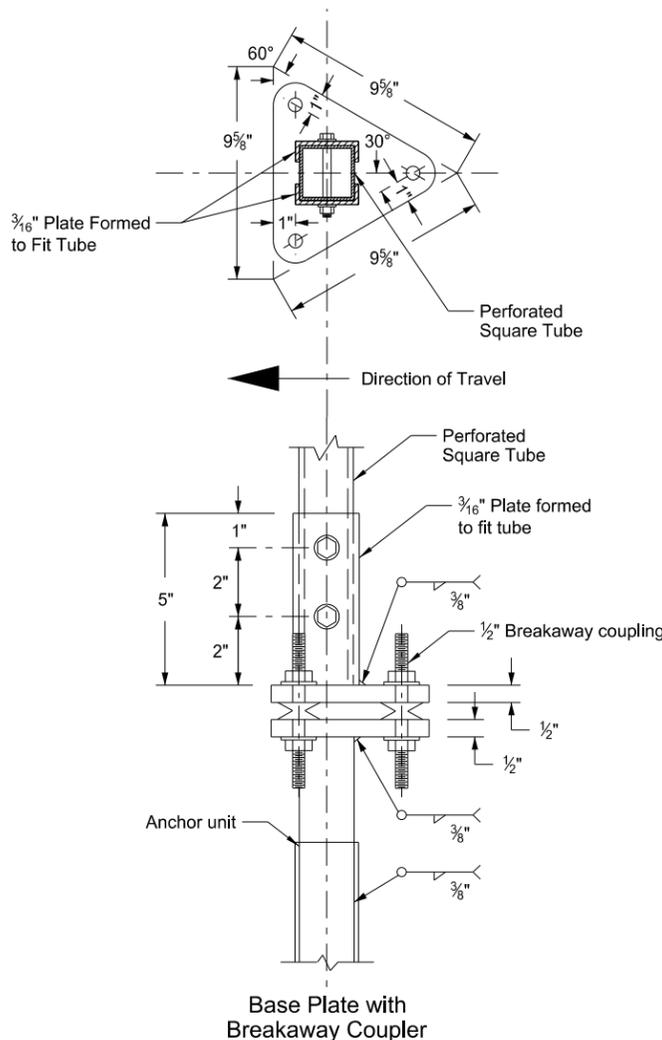
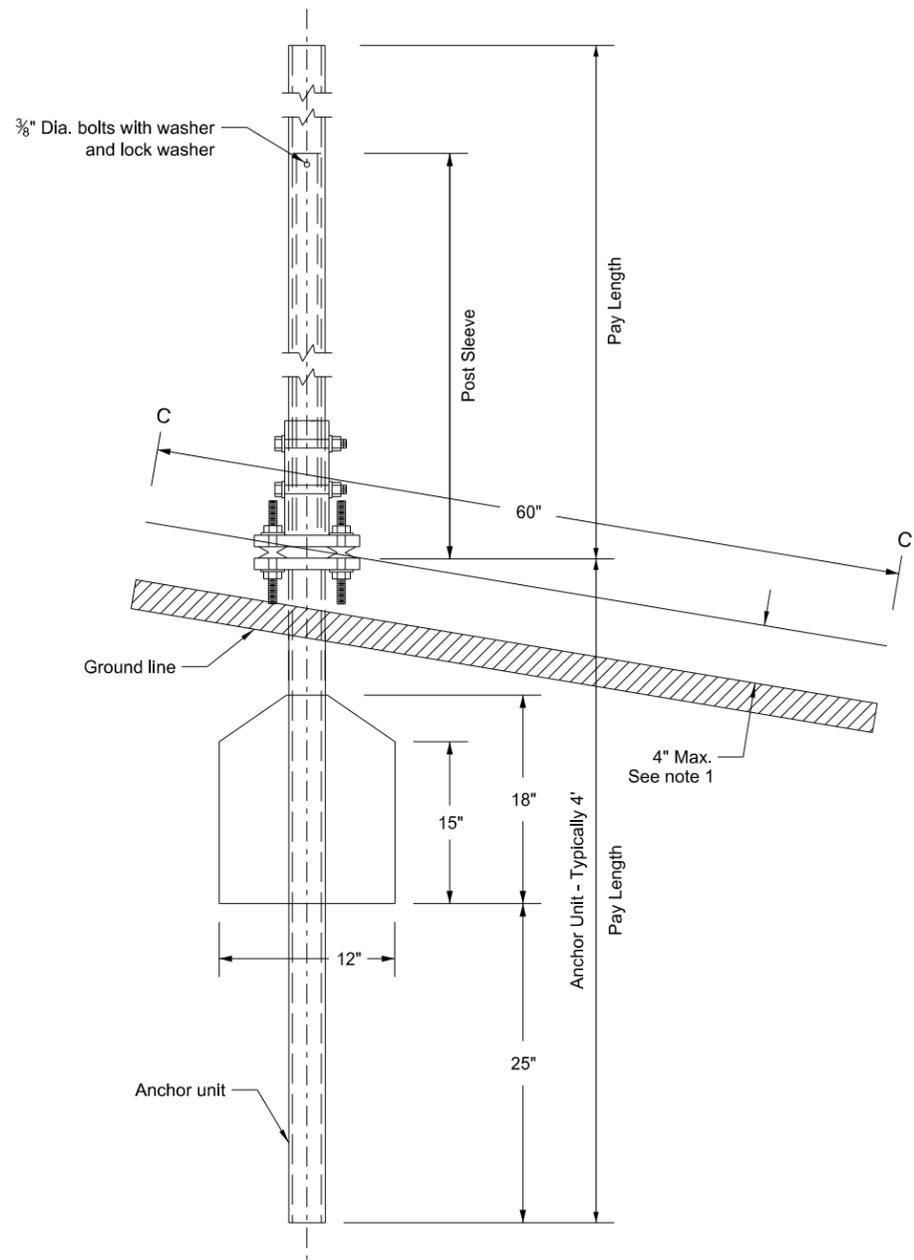
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-8-09	
REVISIONS	
DATE	CHANGE

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Breakaway Coupler System for Perforated Tubes

Notes:

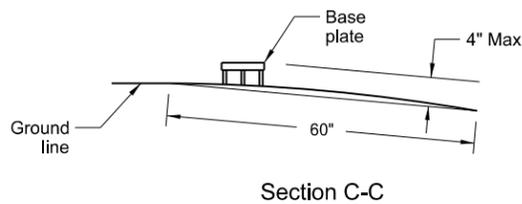
- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
- Anchor unit shall be the same size as the post and shall have the same specification as the post.
- Four post signs shall have over 8' between the first and fourth post.
- In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.



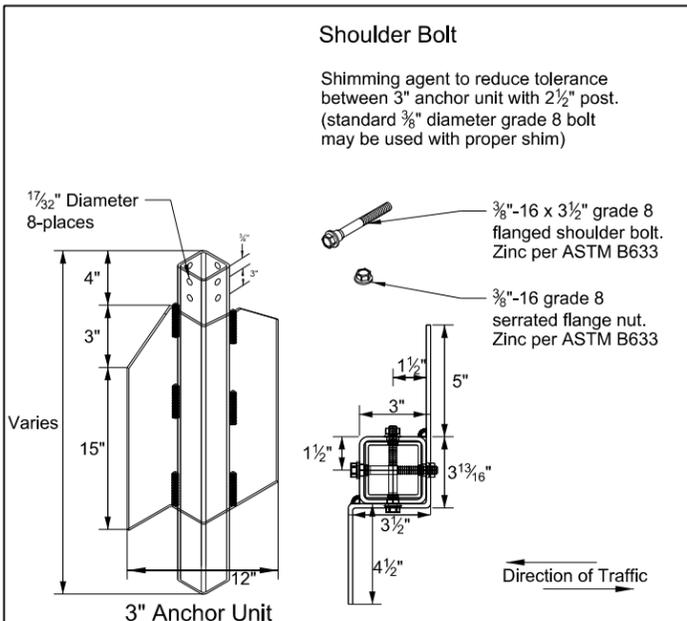
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2	12	Yes		7
3 & 4	2 1/2	10	2 3/16	10	Yes		7

(B) - The 2 1/2" 12 gauge posts do not need breakaway bases when placed in standard soils. 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.

(C) - 3" anchor unit



Max. protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



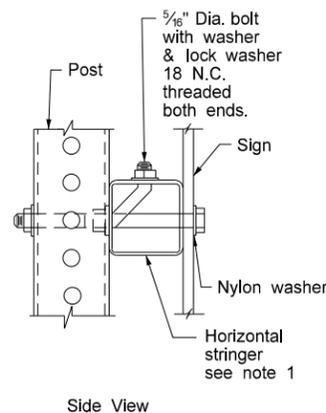
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 10-3-2013	
REVISIONS	
DATE	CHANGE

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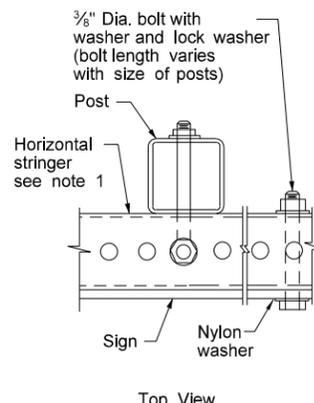
Mounting Details Perforated Tube

Note:

- Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1 1/2" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
- Metal washers used on sign face shall have a minimum outside diameter of 5/16" ± 1/16" and 10 gauge thickness.
- No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers.
- In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

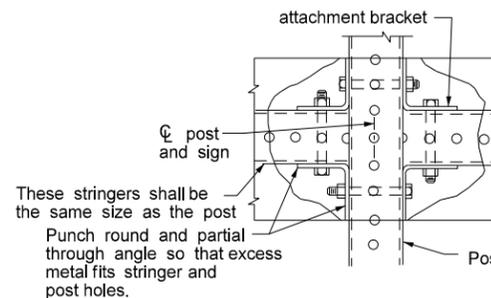


Side View



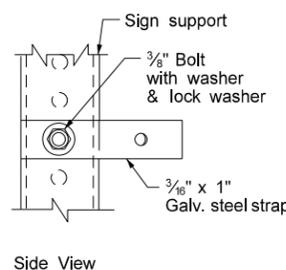
Top View

STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST)

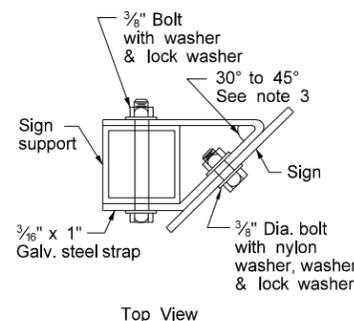


These stringers shall be the same size as the post. Punch round and partial through angle so that excess metal fits stringer and post holes.

STREET NAME SIGNS AND ONE WAY SIGNS SINGLE POST ASSEMBLY ONE STRINGER OR BACK TO BACK MOUNTING

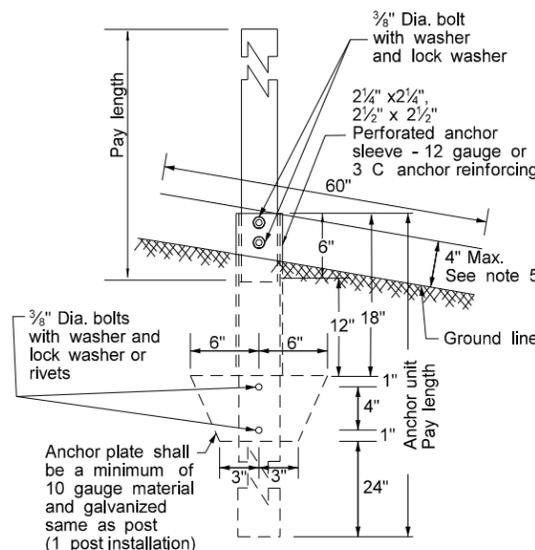


Side View

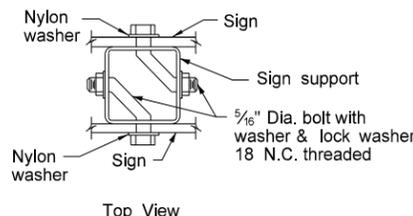
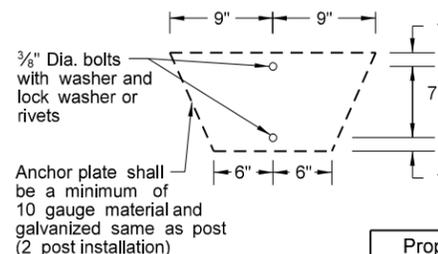


Top View

STRAP DETAIL

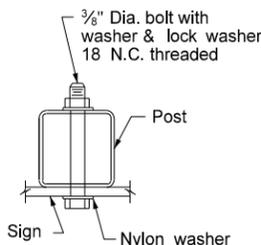


ANCHOR UNIT AND POST ASSEMBLY



Top View

BACK TO BACK MOUNTING



BOLT MOUNTING

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.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/16	10	Yes		7

(B) - The 2 1/2", 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.
 (C) - 3" anchor unit
 (D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

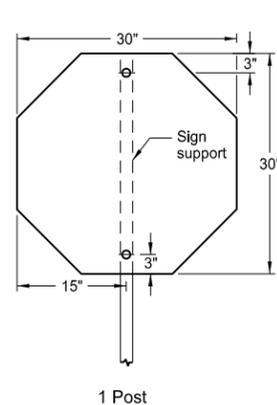
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. area In. ²	Section Modulus In. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	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	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size is shown as 2.51" size on the plans.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3

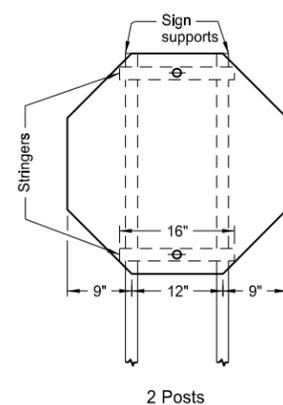
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

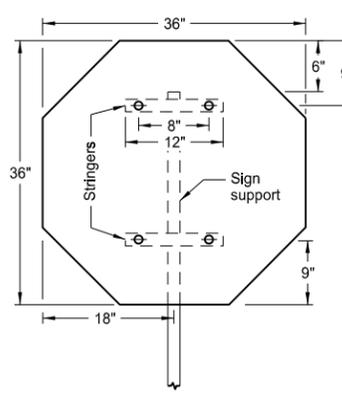


1 Post

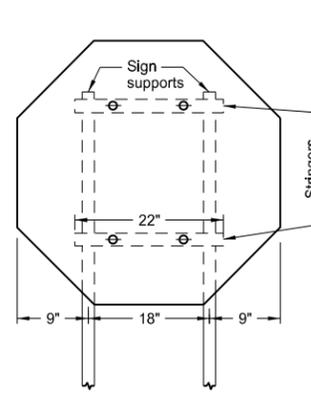
Assembly No. 1



2 Posts

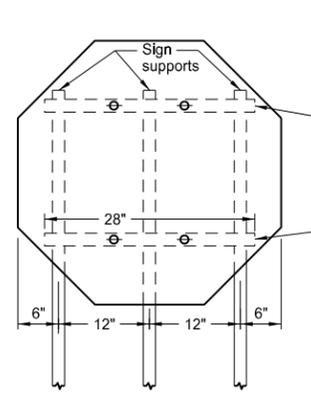


1 Post



2 Posts

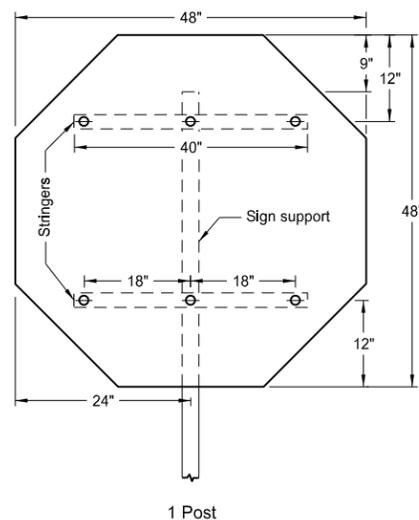
Assembly No. 2



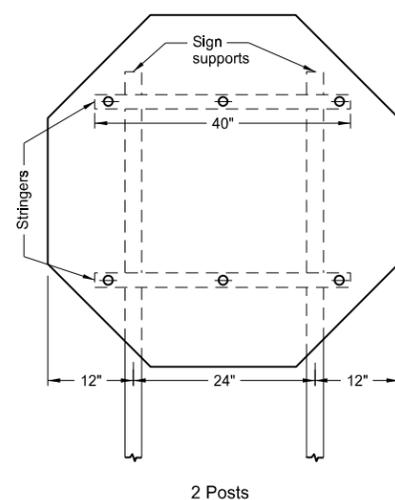
3 Posts

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

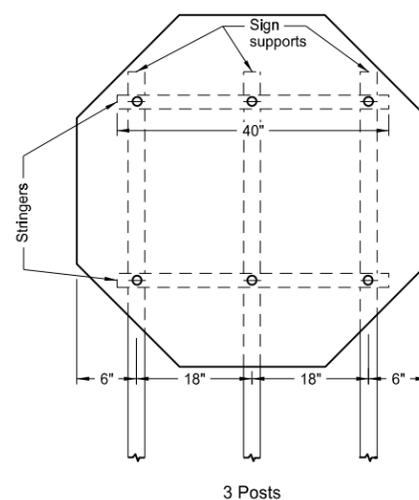


1 Post

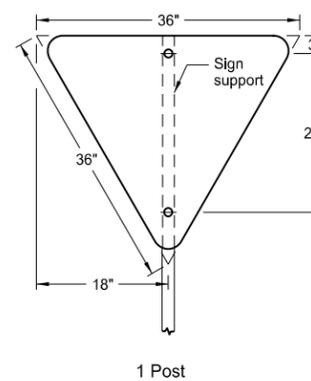


2 Posts

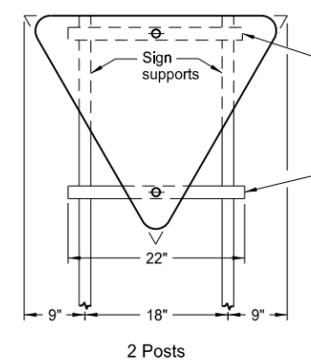
Assembly No. 3



3 Posts

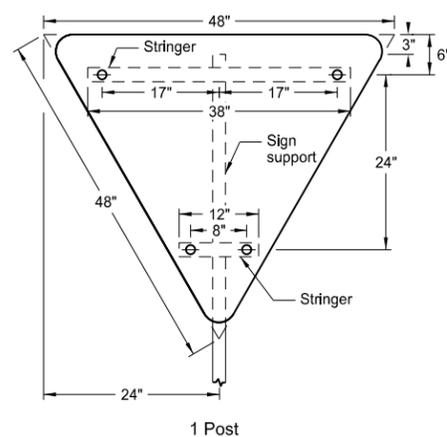


1 Post

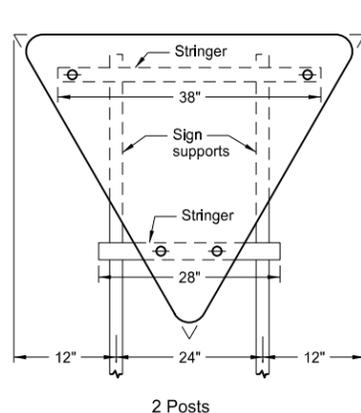


2 Posts

Assembly No. 4

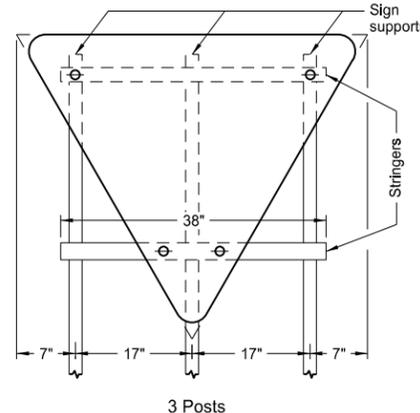


1 Post



2 Posts

Assembly No. 5

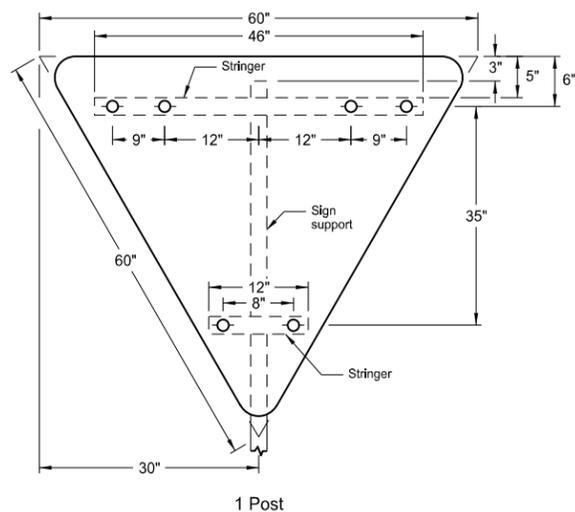


3 Posts

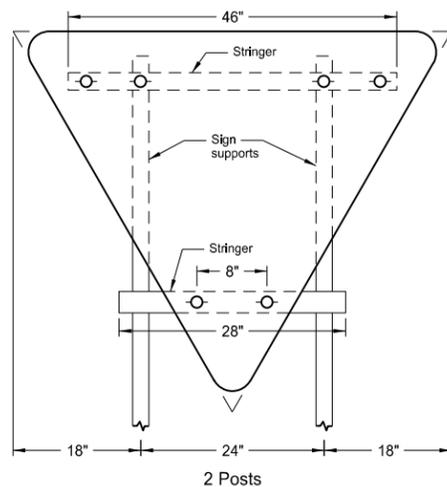
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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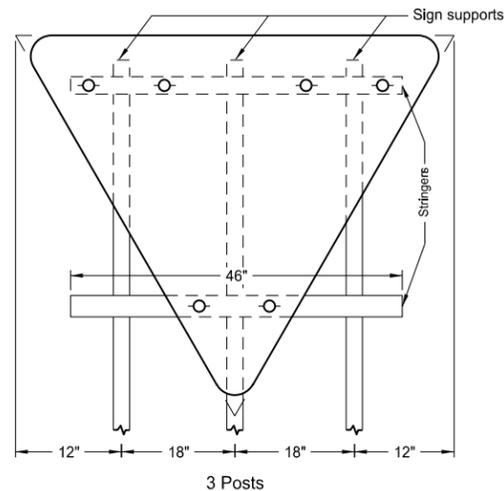
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

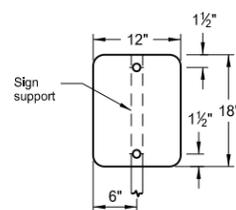


3 Posts

Assembly No. 6

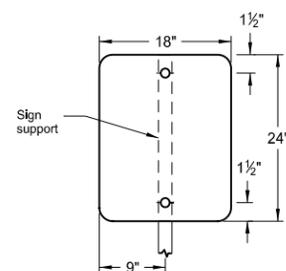
Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1 1/2" x 1 1/2".
4. All holes shall be punched round for 3/8" bolt.



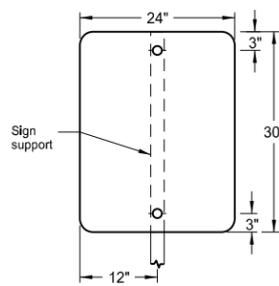
1 Post

Assembly No. 7



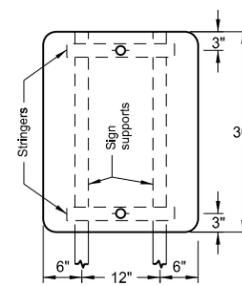
1 Post

Assembly No. 8

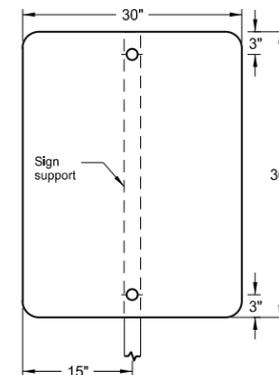


1 Post

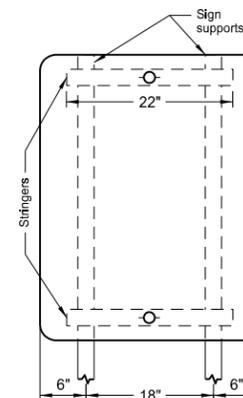
Assembly No. 9



2 Posts

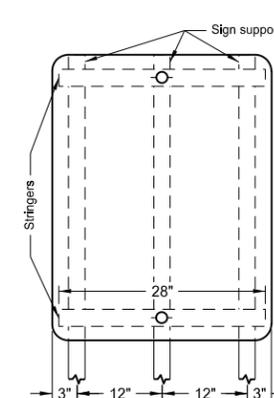


1 Post

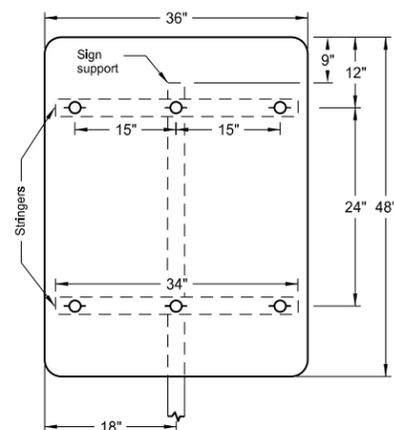


2 Posts

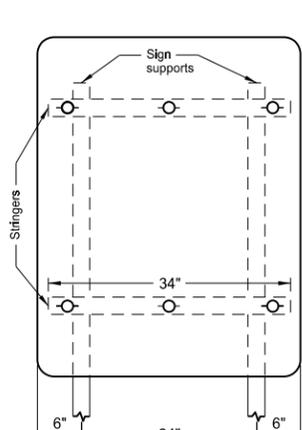
Assembly No. 10



3 Posts

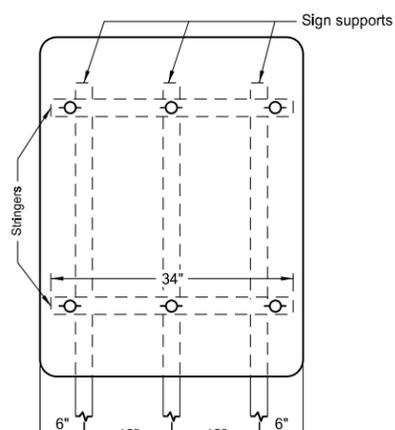


1 Post



2 Posts

Assembly No. 11

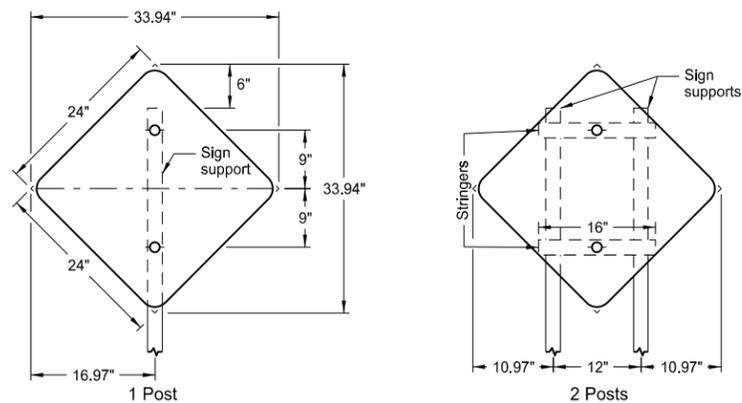


3 Posts

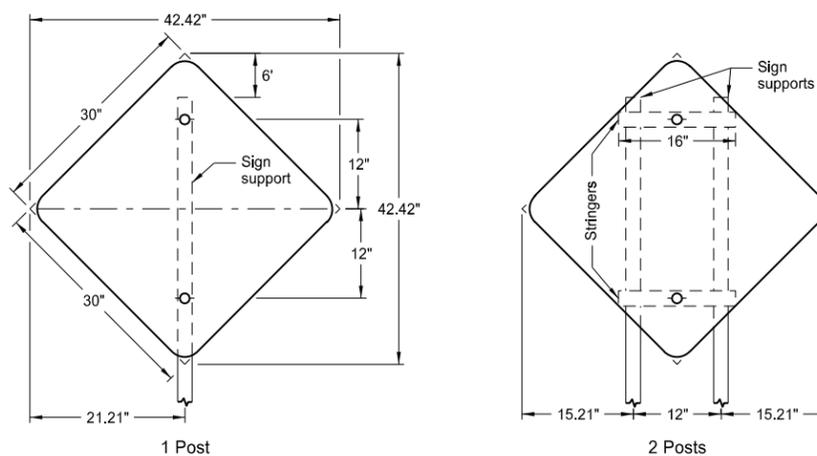
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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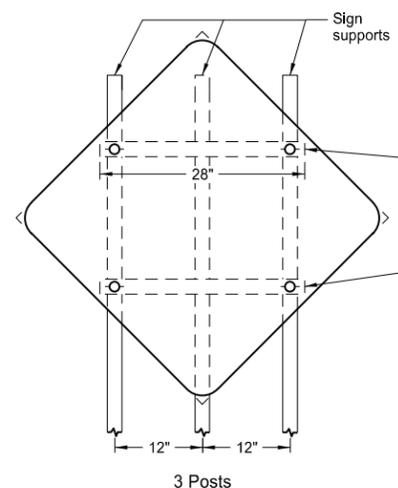
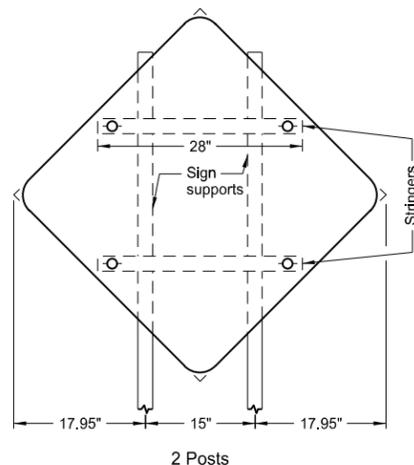
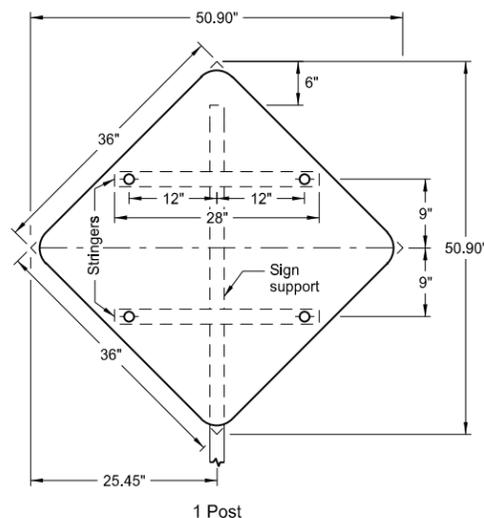
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



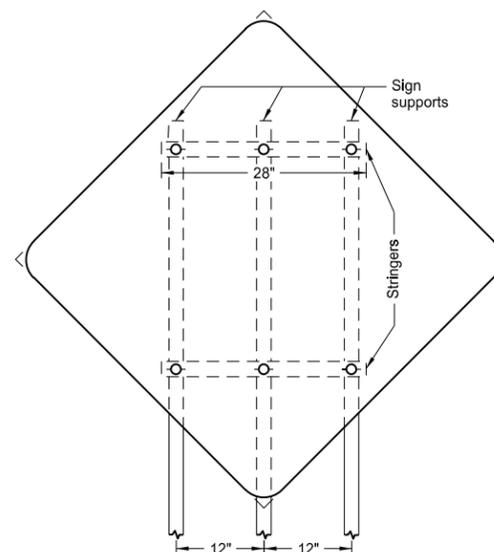
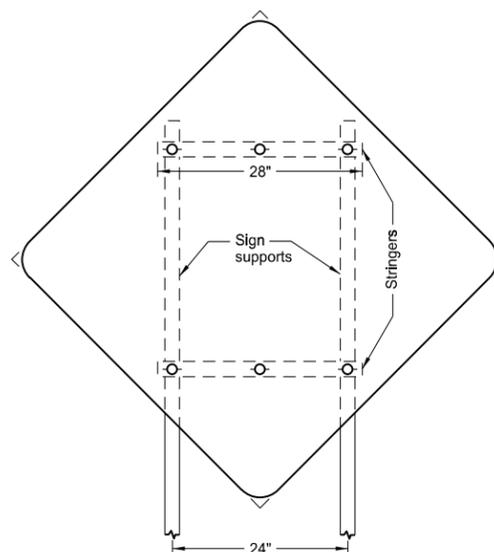
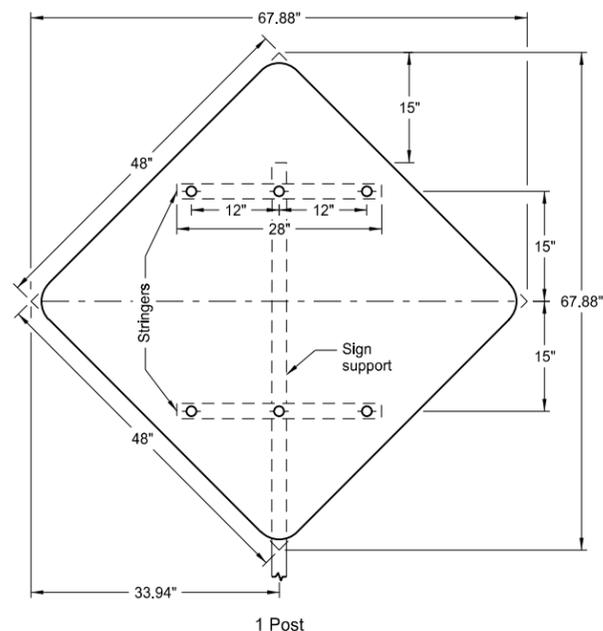
Assembly No. 18



Assembly No. 19



Assembly No. 20



Assembly No. 21

Notes:

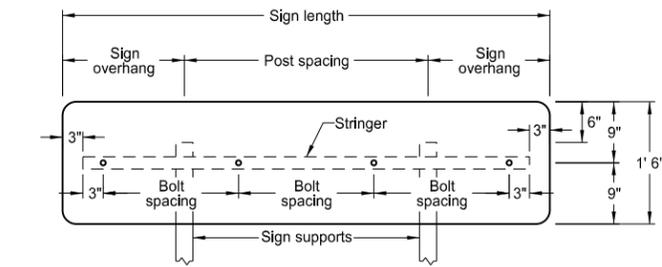
1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

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

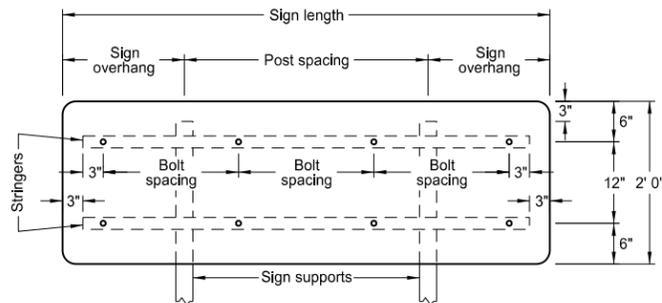
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

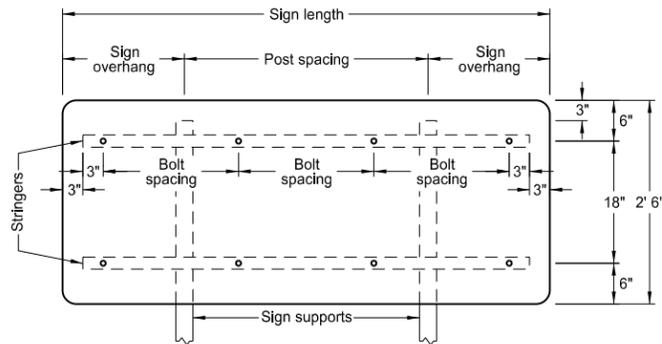
D-754-48



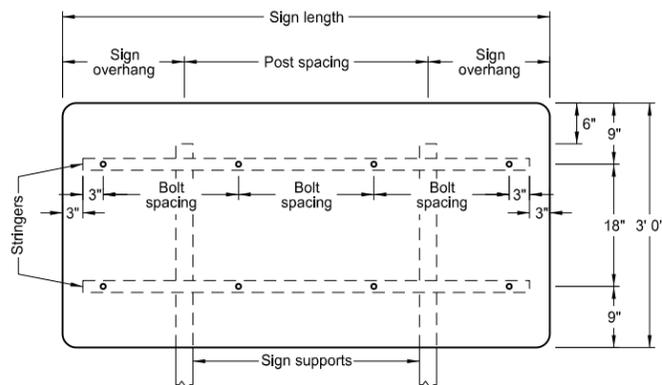
VARIES X 1'-6"



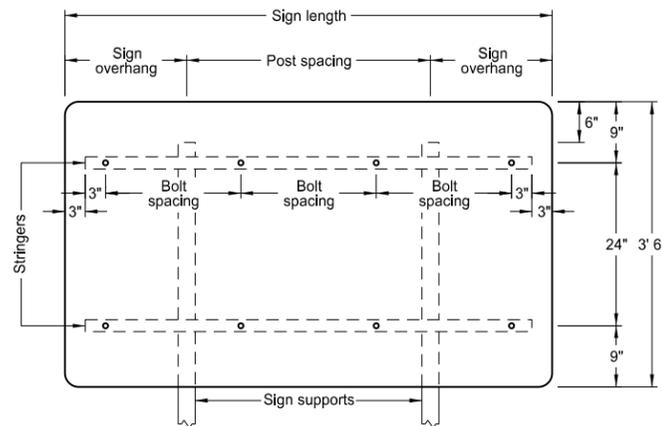
VARIES X 2'-0"



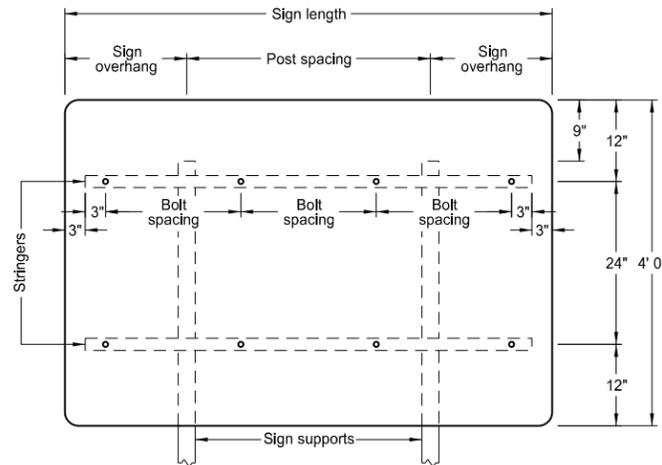
VARIES X 2'-6"



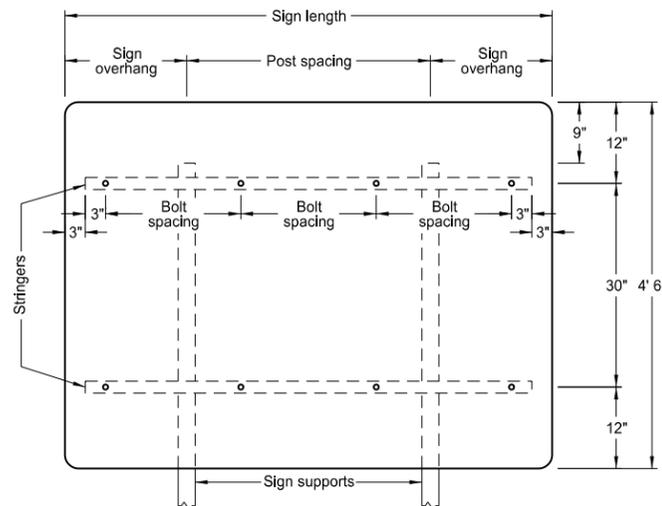
VARIES X 3'-0"



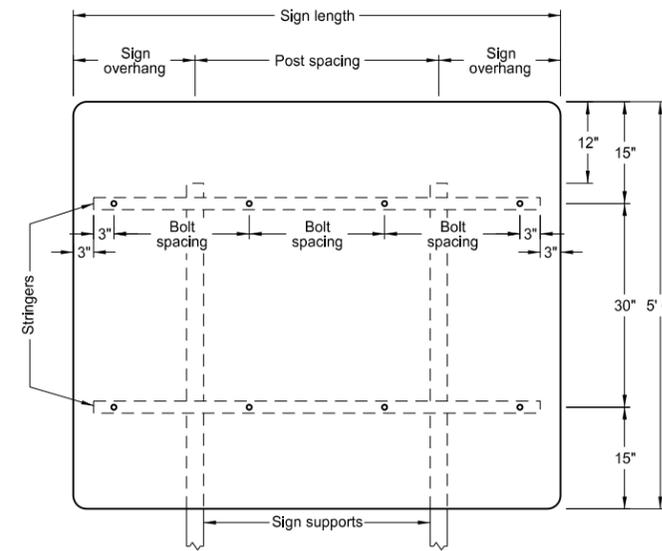
VARIES X 3'-6"



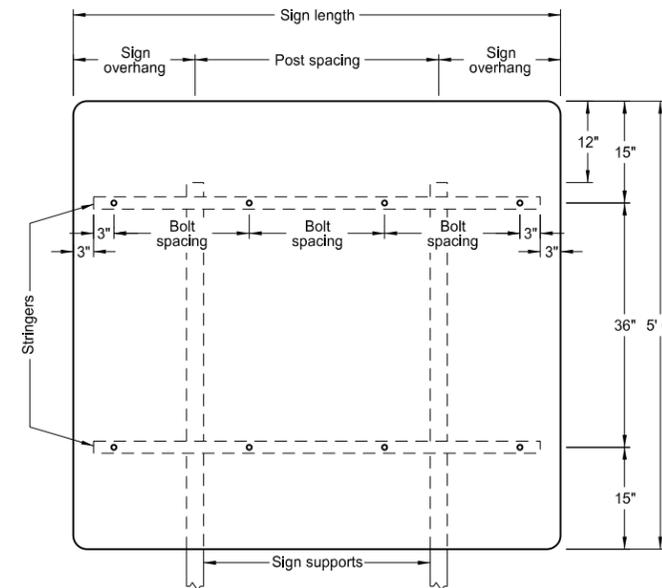
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

2 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	1'-0"	2'-0"	18"
4'-6"	1'-3"	2'-0"	21"
5'-0"	1'-0"	3'-0"	24"
5'-6"	1'-3"	3'-0"	18"
6'-0"	1'-6"	3'-0"	20"
6'-6"	1'-3"	4'-0"	22"
7'-0"	1'-6"	4'-0"	24"
7'-6"	1'-9"	4'-0"	2'-20" & 2'-19"
8'-0"	2'-0"	4'-0"	21"
8'-6"	1'-9"	5'-0"	2'-22" & 2'-23"
9'-0"	2'-0"	5'-0"	24"
9'-6"	1'-9"	6'-0"	4'-20" & 1'-22"
10'-0"	2'-0"	6'-0"	2'-21" & 3'-22"
10'-6"	2'-3"	6'-0"	4'-23" & 1'-22"
11'-0"	2'-6"	6'-0"	24"
11'-6"	2'-9"	6'-0"	21"
12'-0"	2'-0"	8'-0"	22"
12'-6"	2'-3"	8'-0"	23"
13'-0"	2'-6"	8'-0"	24"
13'-6"	2'-9"	8'-0"	3'-22" & 4'-21"
14'-0"	3'-0"	8'-0"	2'-23" & 5'-22"
14'-6"	3'-3"	8'-0"	6'-23" & 1'-24"
15'-0"	3'-6"	8'-0"	24"
15'-6"	2'-9"	10'-0"	6'-22" & 2'-21"
16'-0"	3'-0"	10'-0"	4'-23" & 4'-22"
16'-6"	3'-3"	10'-0"	6'-23" & 2'-24"
17'-0"	3'-6"	10'-0"	24"
17'-6"	3'-9"	10'-0"	22"
18'-0"	3'-0"	12'-0"	6'-23" & 3'-22"
18'-6"	3'-3"	12'-0"	6'-23" & 3'-24"
19'-0"	3'-6"	12'-0"	24"
19'-6"	3'-9"	12'-0"	8'-22" & 2'-23"
20'-0"	4'-0"	12'-0"	8'-23" & 2'-22"

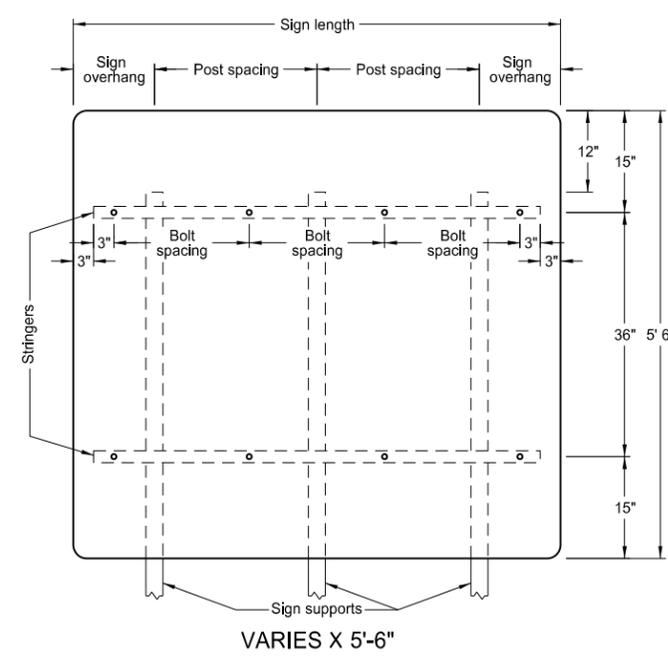
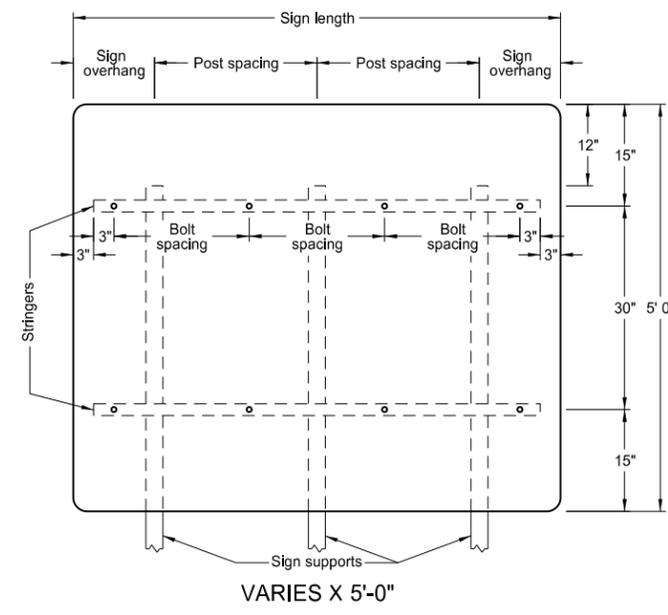
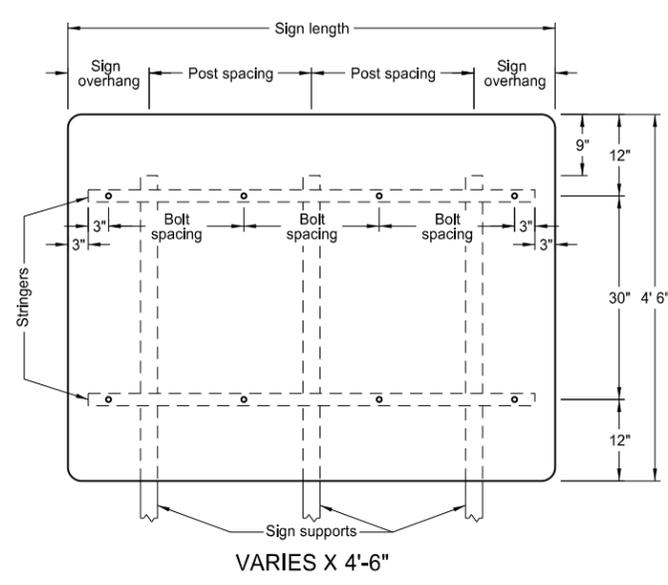
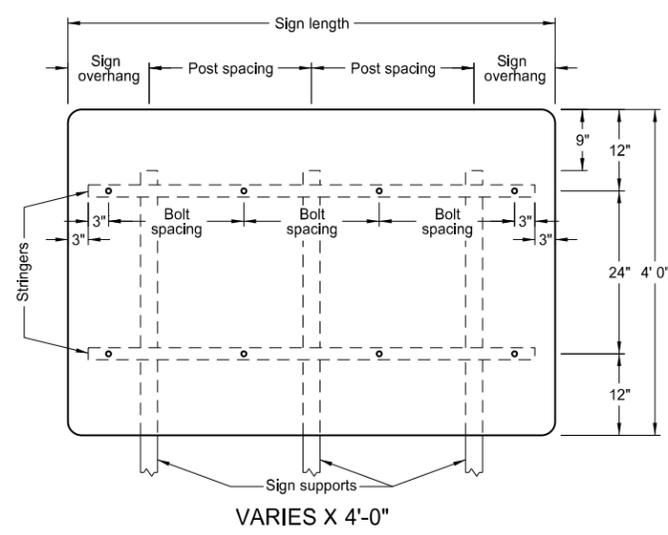
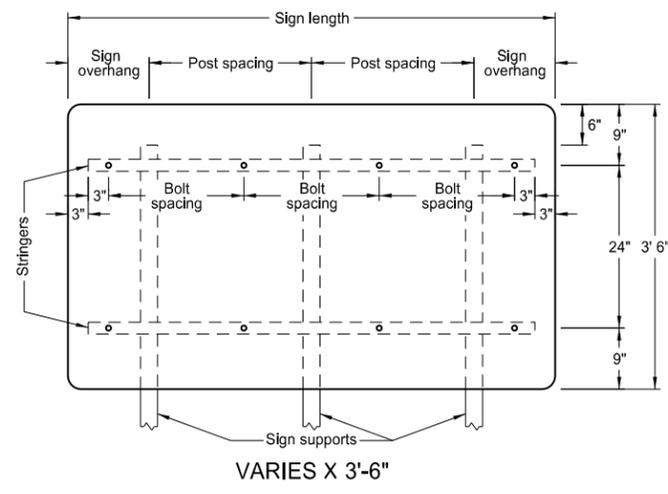
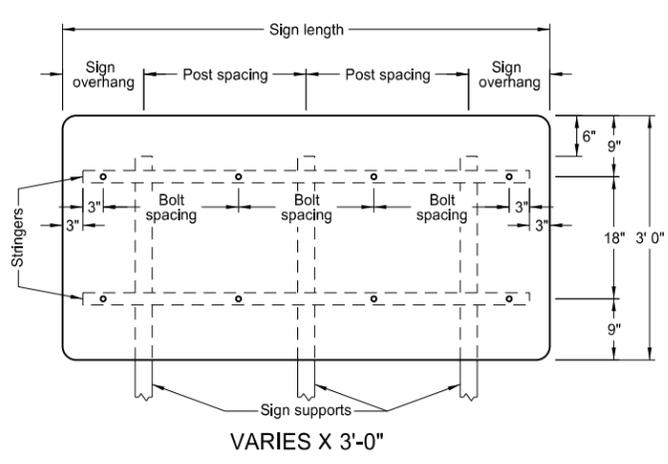
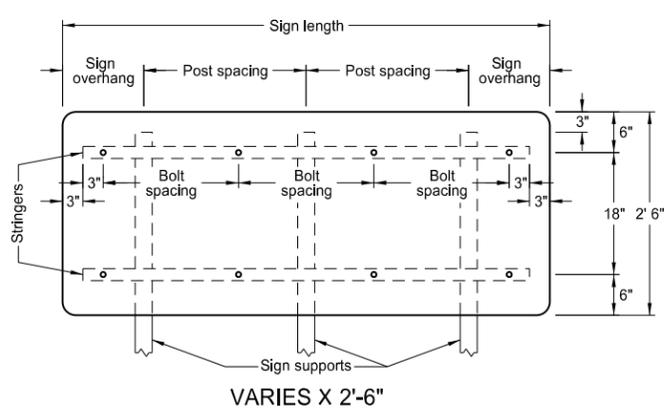
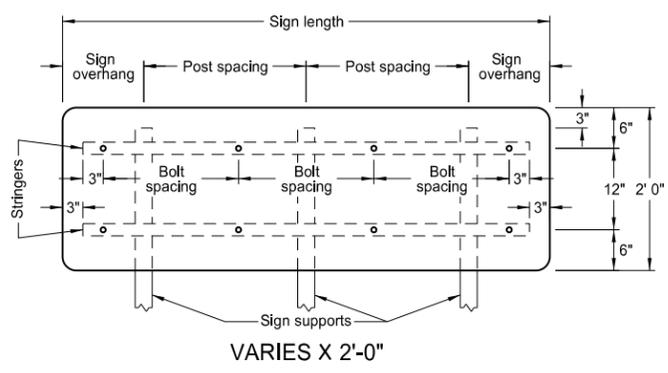
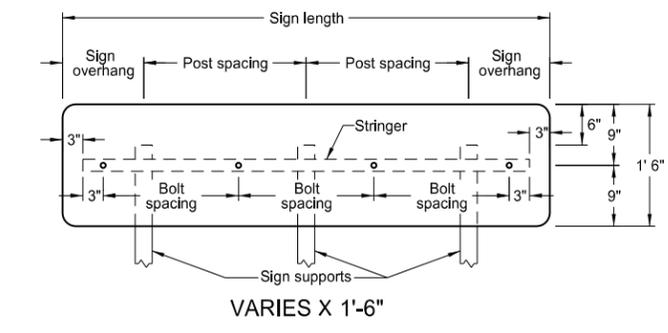
- Notes:
1. The minimum sign backing material thickness shall be 0.100 inch.
 2. Perforated square tube stringer shall be 1½" x 1½".
 3. All holes shall be punched round for ⅜" bolt.

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

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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

D-754-49



3 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	0'-6"	1'-6"	18"
4'-6"	0'-6"	1'-9"	21"
5'-0"	0'-6"	2'-0"	24"
5'-6"	1'-3"	1'-6"	18"
6'-0"	1'-0"	2'-0"	20"
6'-6"	1'-3"	2'-0"	22"
7'-0"	1'-6"	2'-0"	24"
7'-6"	1'-6"	2'-3"	2-20" & 2-19"
8'-0"	1'-9"	2'-3"	21"
8'-6"	2'-0"	2'-3"	2-22" & 2-23"
9'-0"	1'-6"	3'-0"	24"
9'-6"	1'-9"	3'-0"	4-20" & 1-22"
10'-0"	1'-9"	3'-3"	2-21" & 3-22"
10'-6"	1'-9"	3'-6"	4-23" & 1-22"
11'-0"	2'-0"	3'-6"	24"
11'-6"	2'-3"	3'-6"	21"
12'-0"	2'-4"	3'-8"	22"
12'-6"	2'-5"	3'-10"	23"
13'-0"	2'-6"	4'-0"	24"
13'-6"	2'-9"	4'-0"	3-22" & 4-21"
14'-0"	3'-0"	4'-0"	2-23" & 5-22"
14'-6"	3'-3"	4'-0"	6-23" & 1-24"
15'-0"	3'-6"	4'-0"	24"
15'-6"	2'-4"	5'-5"	6-22" & 2-21"
16'-0"	2'-5"	5'-7"	4-23" & 4-22"
16'-6"	2'-5"	5'-10"	6-23" & 2-24"
17'-0"	2'-6"	6'-0"	24"
17'-6"	3'-3"	5'-6"	22"
18'-0"	3'-6"	5'-6"	6-23" & 3-22"
18'-6"	3'-9"	5'-6"	6-23" & 3-24"
19'-0"	3'-6"	6'-0"	24"
19'-6"	4'-3"	5'-6"	8-22" & 2-23"
20'-0"	4'-4"	5'-8"	8-23" & 2-22"

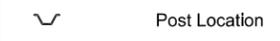
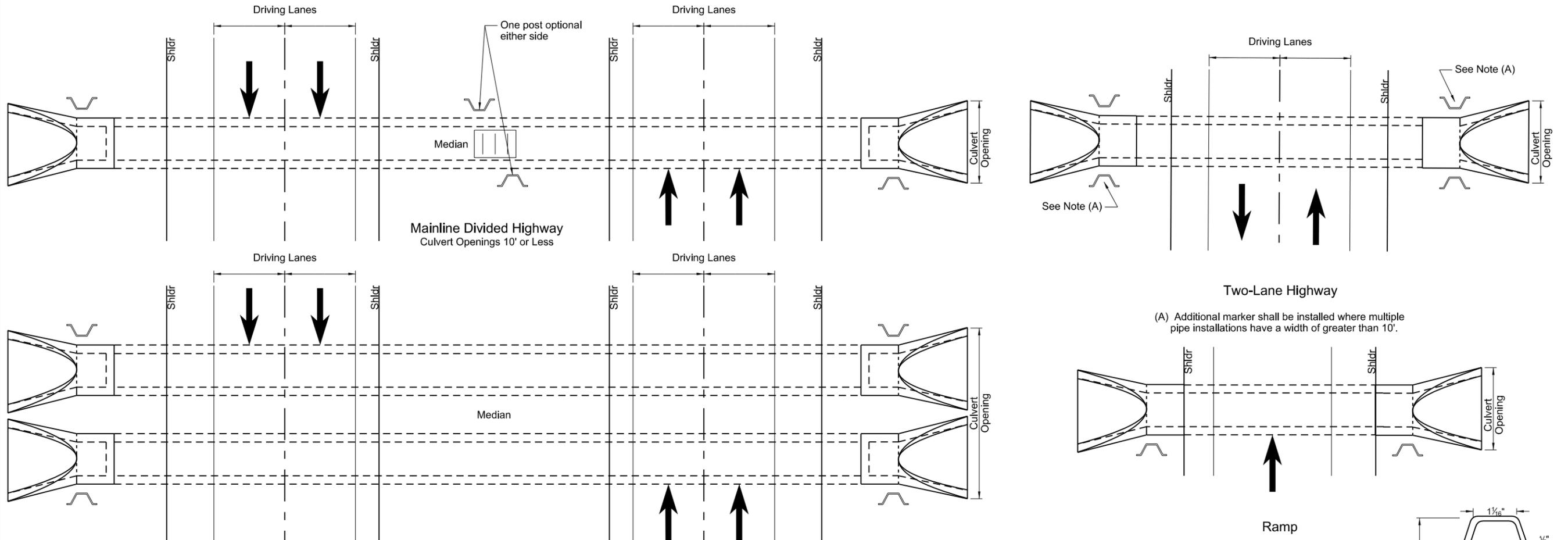
- Notes:
1. The minimum sign backing material thickness shall be 0.100 inch.
 2. Perforated square tube stringer shall be 1½" x 1½".
 3. All holes shall be punched round for ⅜" bolt.

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

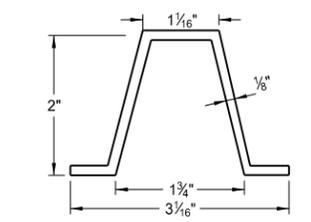
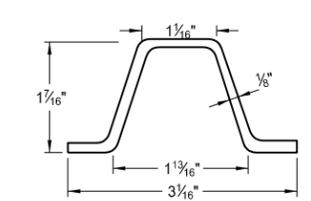
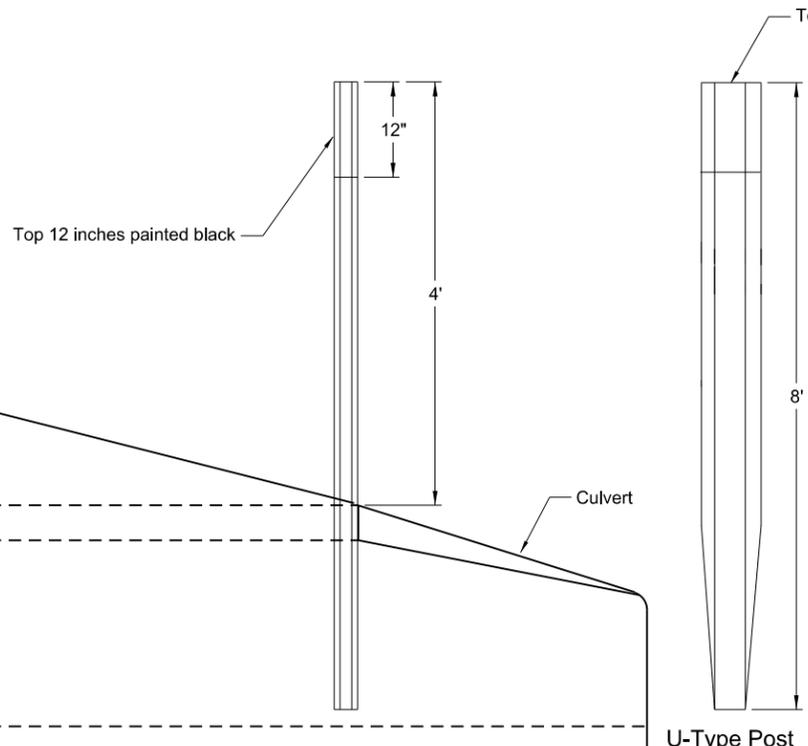
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OBJECT MARKERS - CULVERTS

D-754-83



Mainline Divided Highway
Culvert Openings Greater than 10'
Multiple Installations



Notes:

Installation: Construction requirements shall meet 754.04D. Each end of culverts crossing the roadway within the right-of-way shall be marked with a post as shown. Posts are to be installed in front of the culvert in the direction of travel along the side of the culvert and one foot from the culvert opening unless shown otherwise on the plans.

Posts: Posts shall conform to section 894.04A of the Standard Specifications with the exception that the post may or may not have holes drilled.

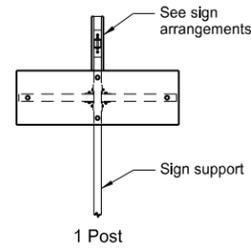
Basis of Payment: The quantity will be measured by the number of object markers each installed. All costs for furnishing and installing the markers shall be included in the price bid for the item "Object Markers - Culverts".

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes

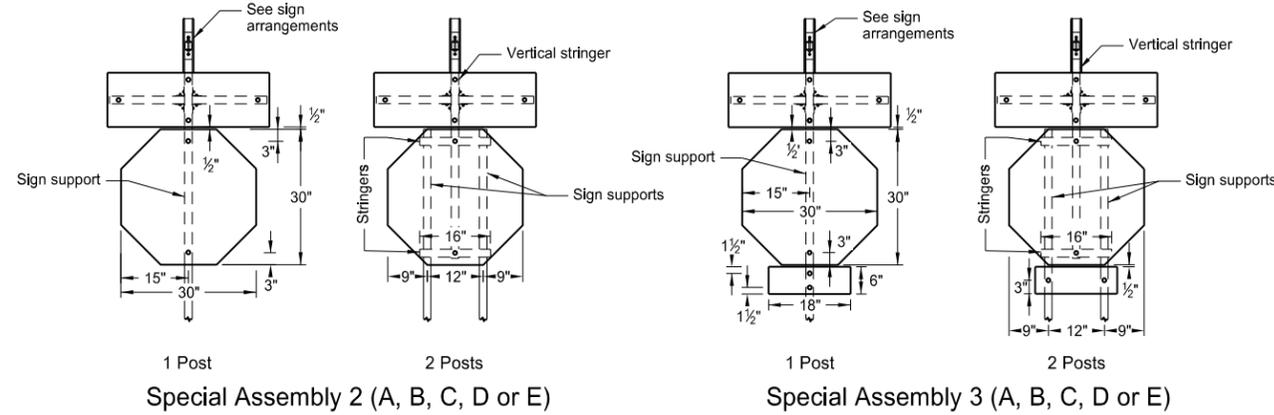
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

- A - Single sign
- B - Single sign back to back
- C - Single sign each direction
- D - Single sign one direction, back to back other direction
- E - Back to back both directions



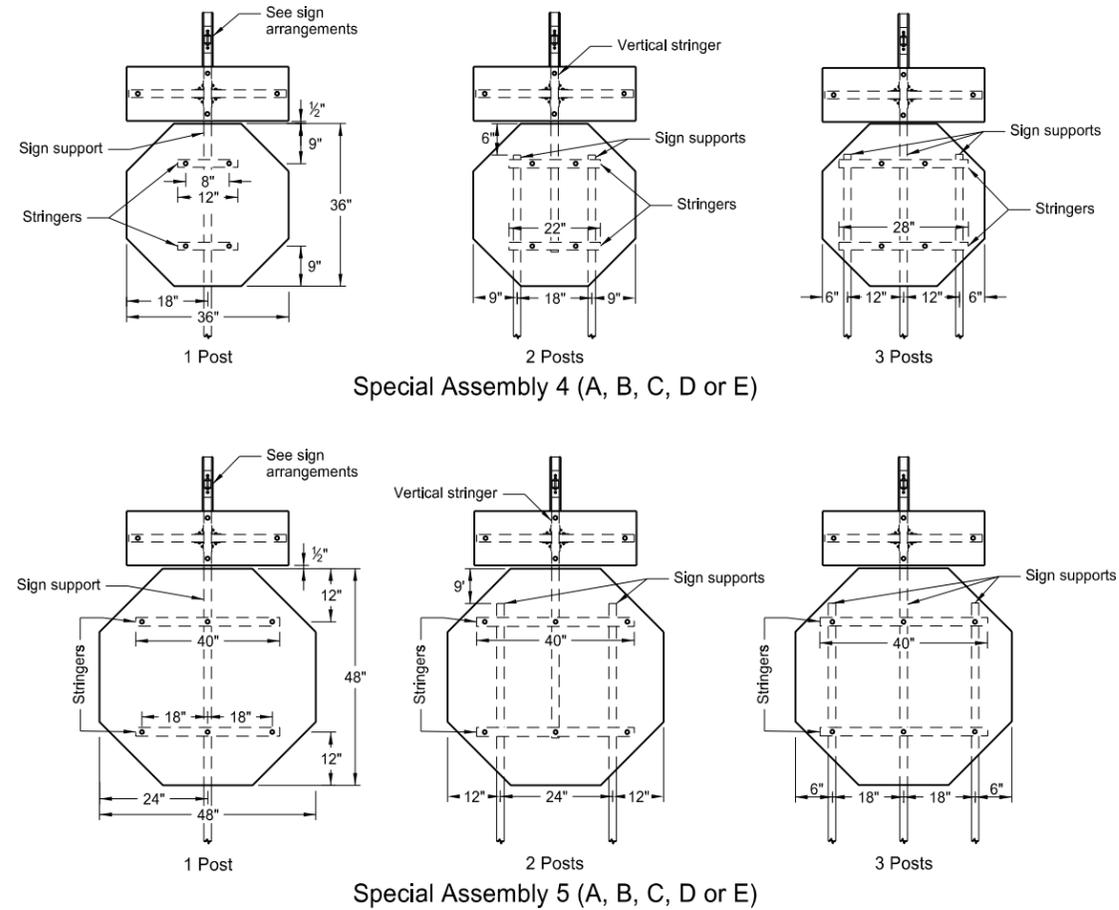
Special Assembly 1 (A, B, C, D or E)



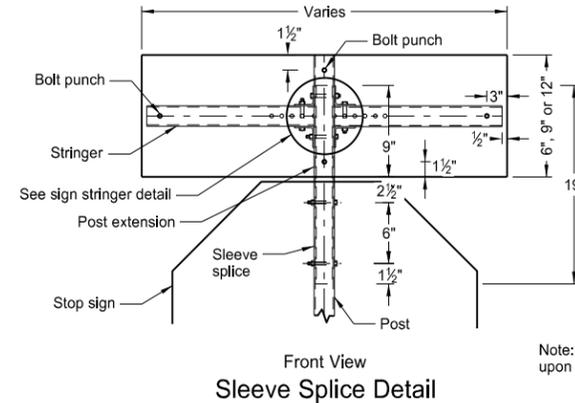
Special Assembly 2 (A, B, C, D or E)

Special Assembly 3 (A, B, C, D or E)

Special Assembly 4 (A, B, C, D or E)

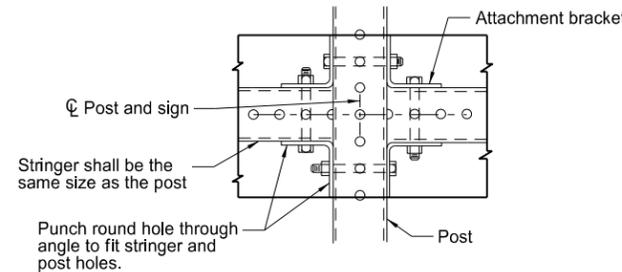


Special Assembly 5 (A, B, C, D or E)

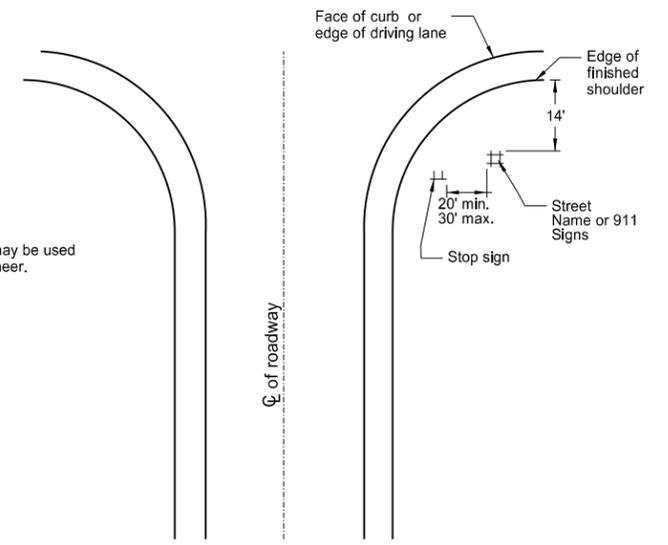


Sleeve Splice Detail

Note: The splice method may be used upon approval of the engineer.

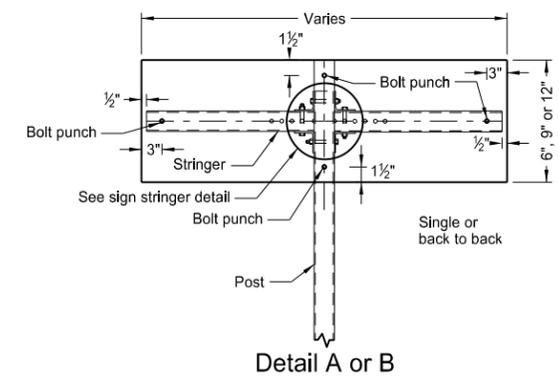


Sign Stringer Detail

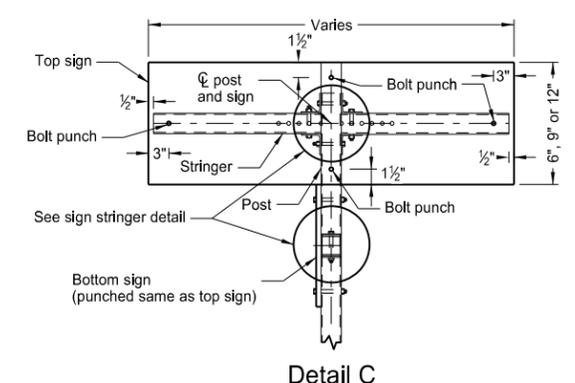


Intersection Layout

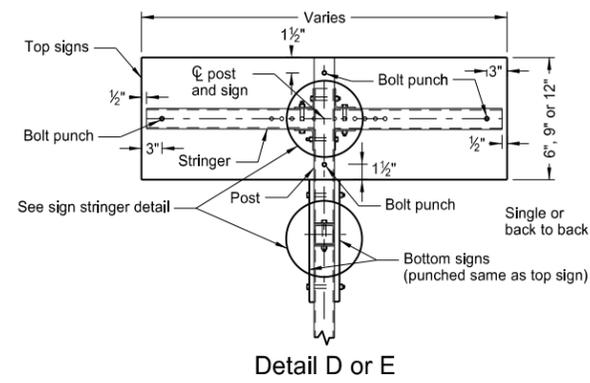
Note: This layout is to be used for street name signs or 911 signs that are used with Special Assembly 1.



Detail A or B



Detail C



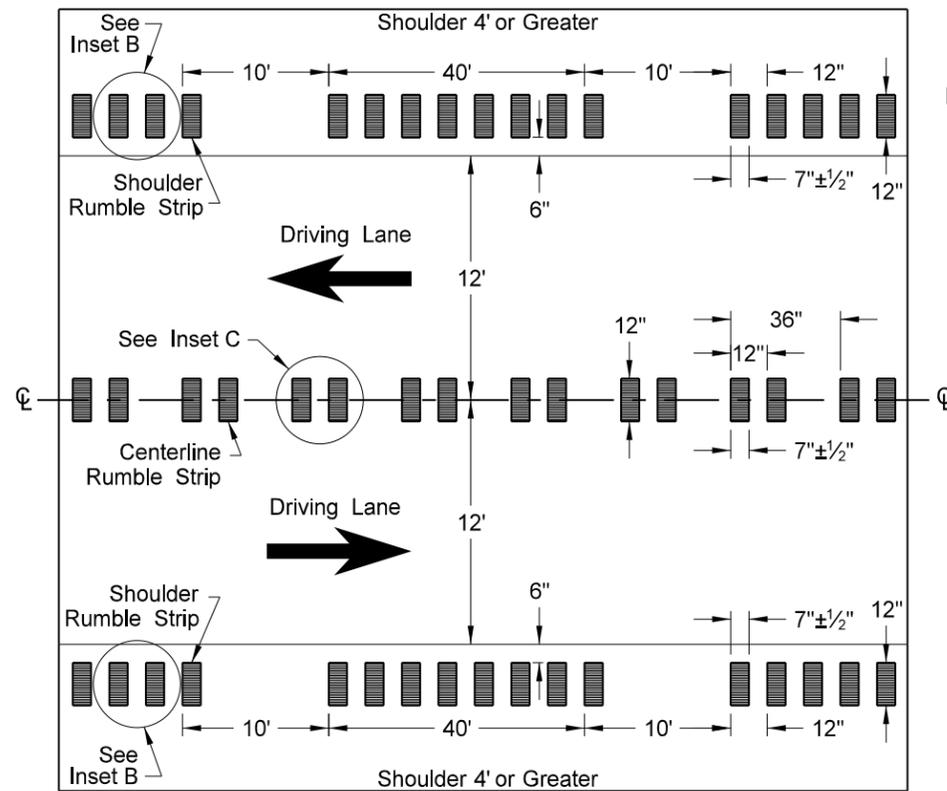
Detail D or E

Sign Arrangements

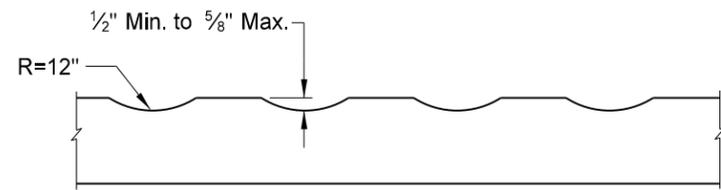
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

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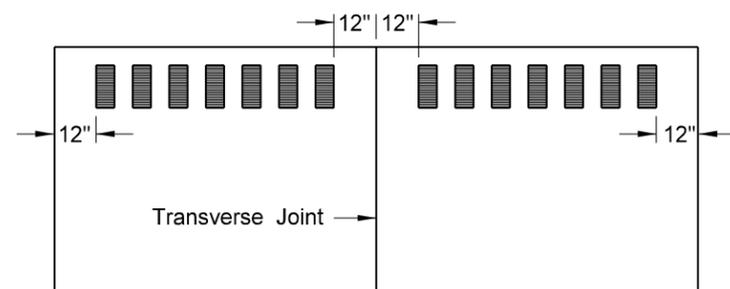
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)



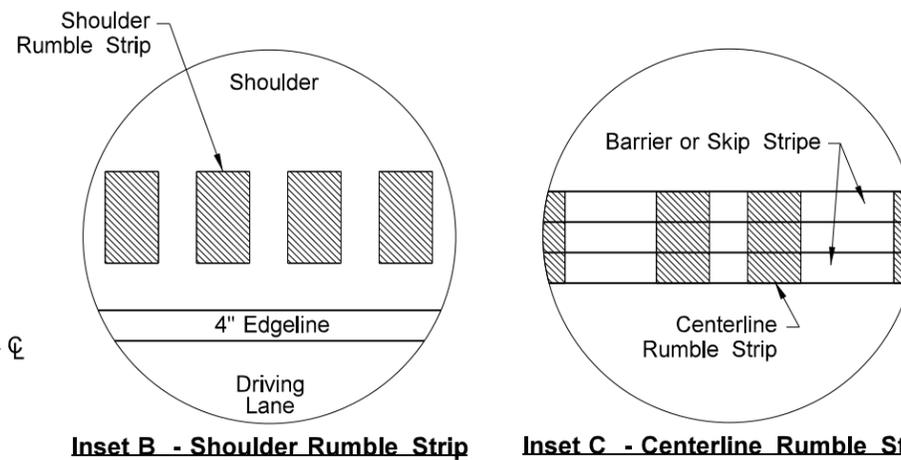
Undivided Highways (Shoulders 4' or Greater)



Profile of Rumble Strips - Bituminous and PCC Pavements



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

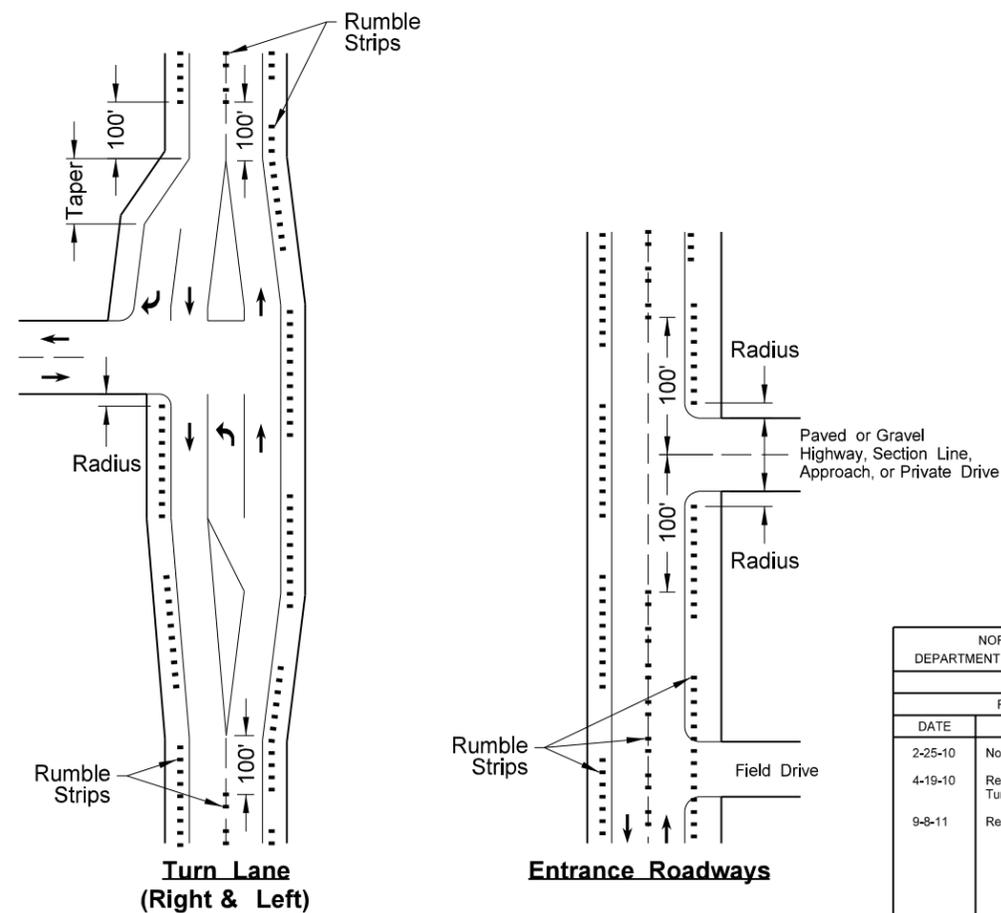


Inset B - Shoulder Rumble Strip

Inset C - Centerline Rumble Strip

NOTES:

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



Turn Lane (Right & Left)

Entrance Roadways

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

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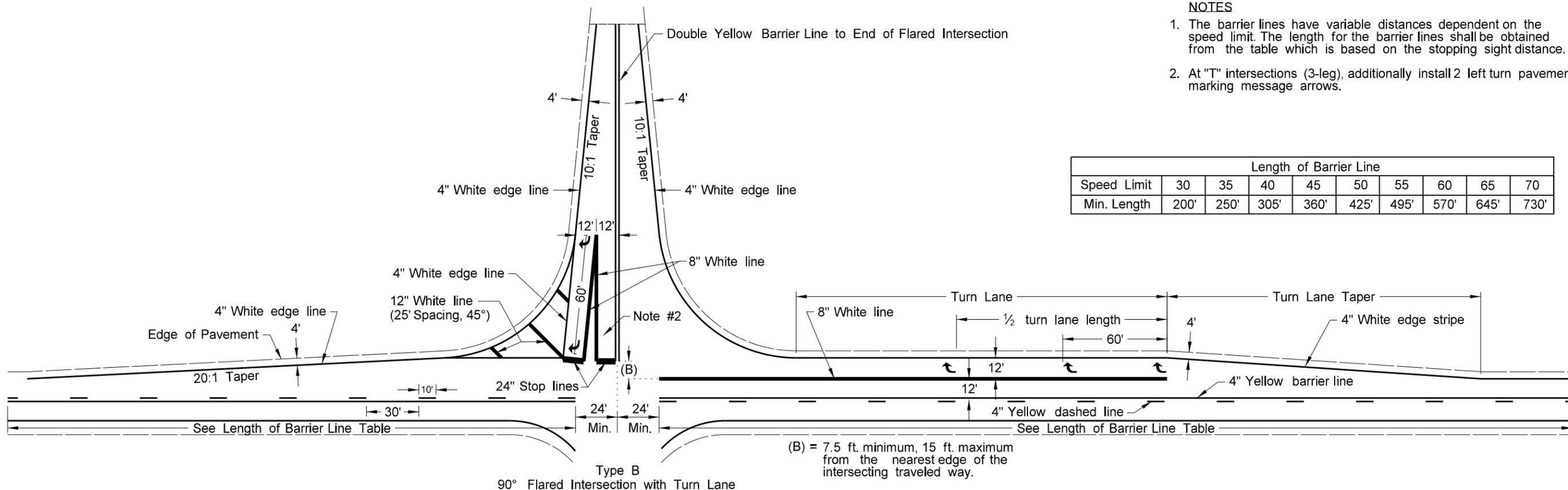
PAVEMENT MARKING FOR STANDARD 90° FLARED INTERSECTION

D-762-3

NOTES

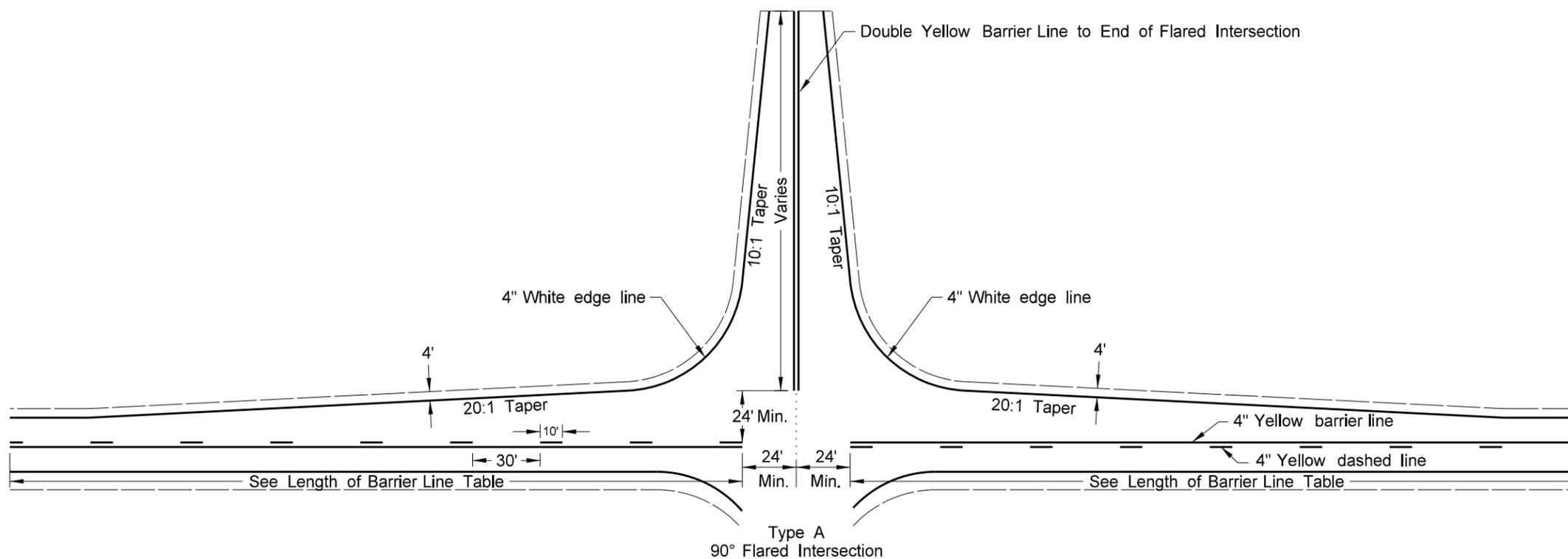
1. The barrier lines have variable distances dependent on the speed limit. The length for the barrier lines shall be obtained from the table which is based on the stopping sight distance.
2. At "T" intersections (3-leg), additionally install 2 left turn pavement marking message arrows.

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

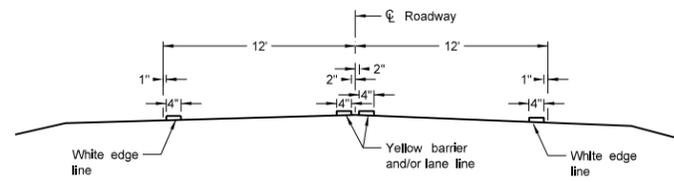


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-9-09	
REVISIONS	
DATE	CHANGE
9-24-09	Barrier Stripe Correction
9-21-11	Revised Turn Lane Markings
11-25-13	Revised Type B Layout

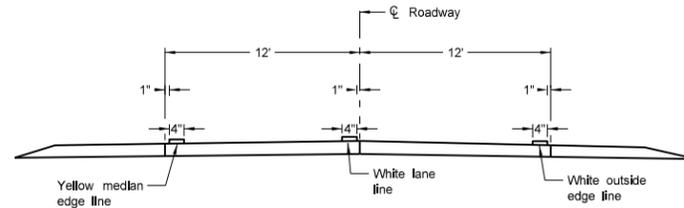
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 of Transportation

PAVEMENT MARKING

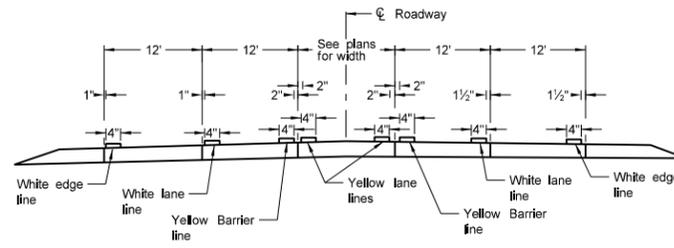
D-762-4



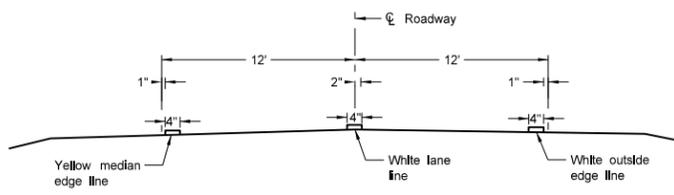
Two Lane Two Way
RURAL ROADWAY



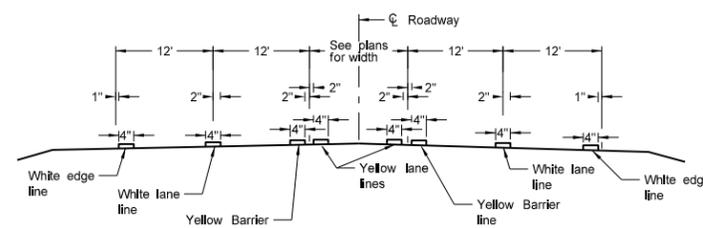
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



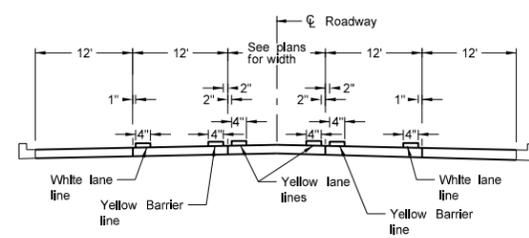
RURAL FIVE LANE ROADWAY
Concrete Section



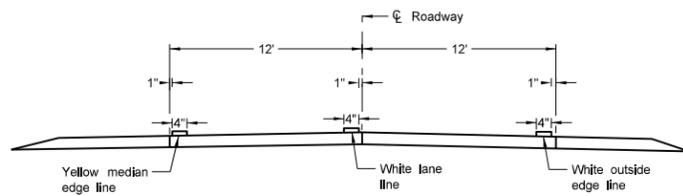
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



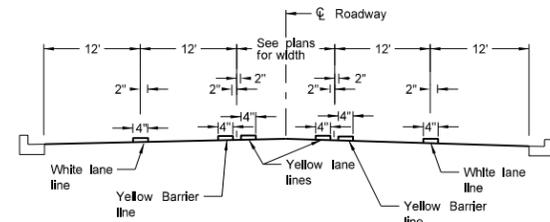
RURAL FIVE LANE ROADWAY
Asphalt Section



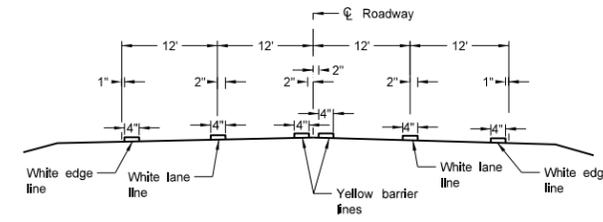
URBAN FIVE LANE SECTION
Concrete Section



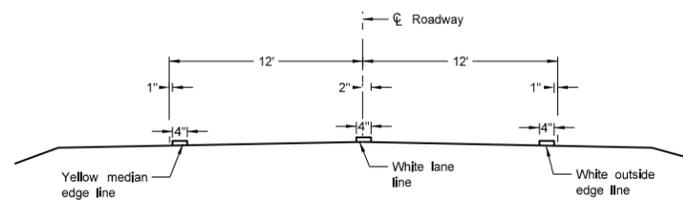
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



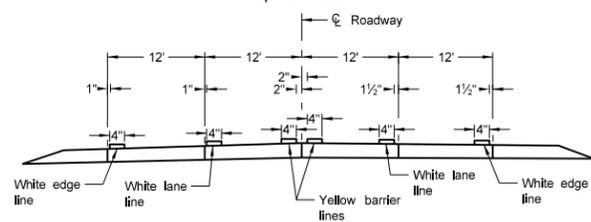
URBAN FIVE LANE SECTION
Asphalt Section



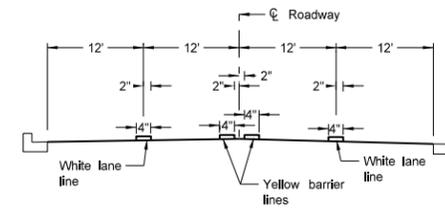
RURAL FOUR LANE ROADWAY
Asphalt Section



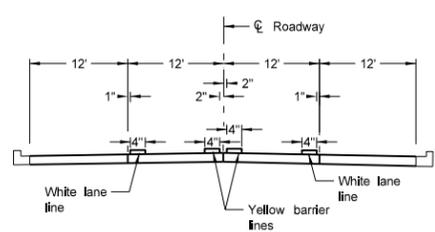
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



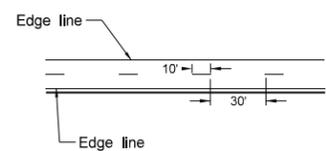
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



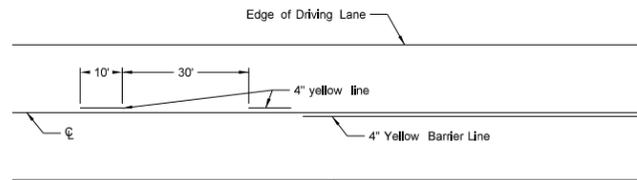
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

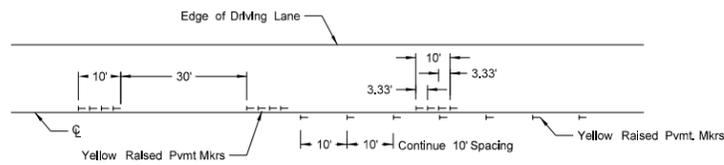
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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SHORT-TERM PAVEMENT MARKING

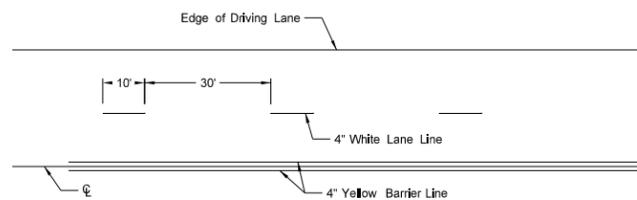


Painted or Tape Lines

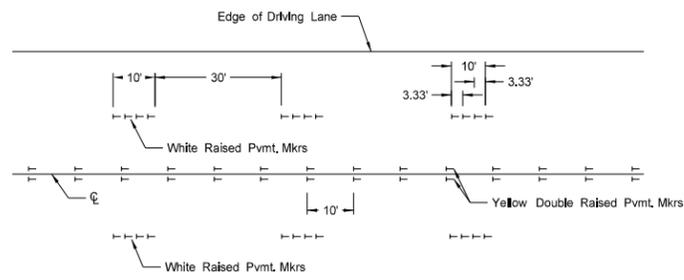


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

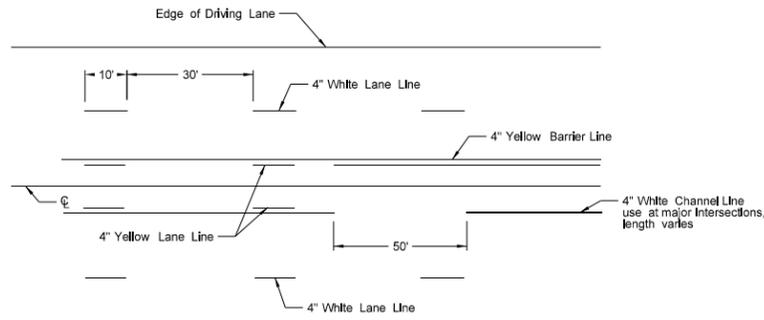


Painted or Tape Lines

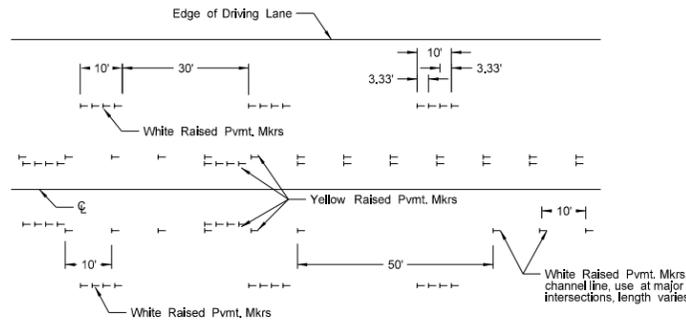


Raised Pavement Markers

FOUR LANE ROADWAY

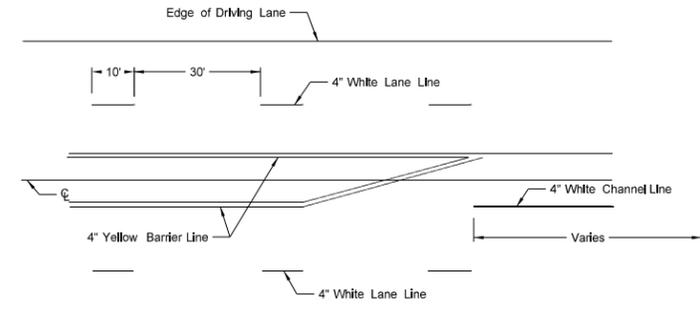


Painted or Tape Lines

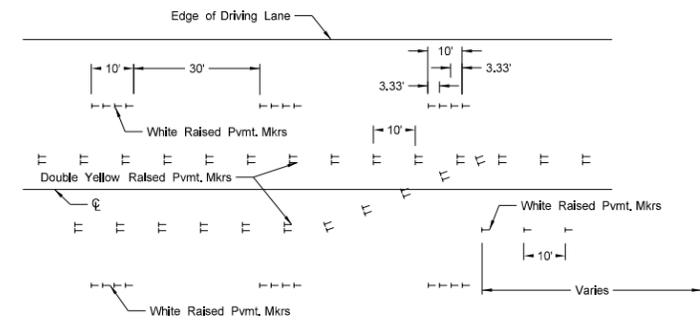


Raised Pavement Markers

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.

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