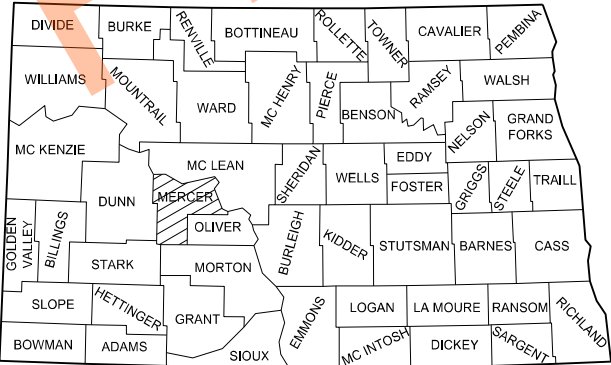
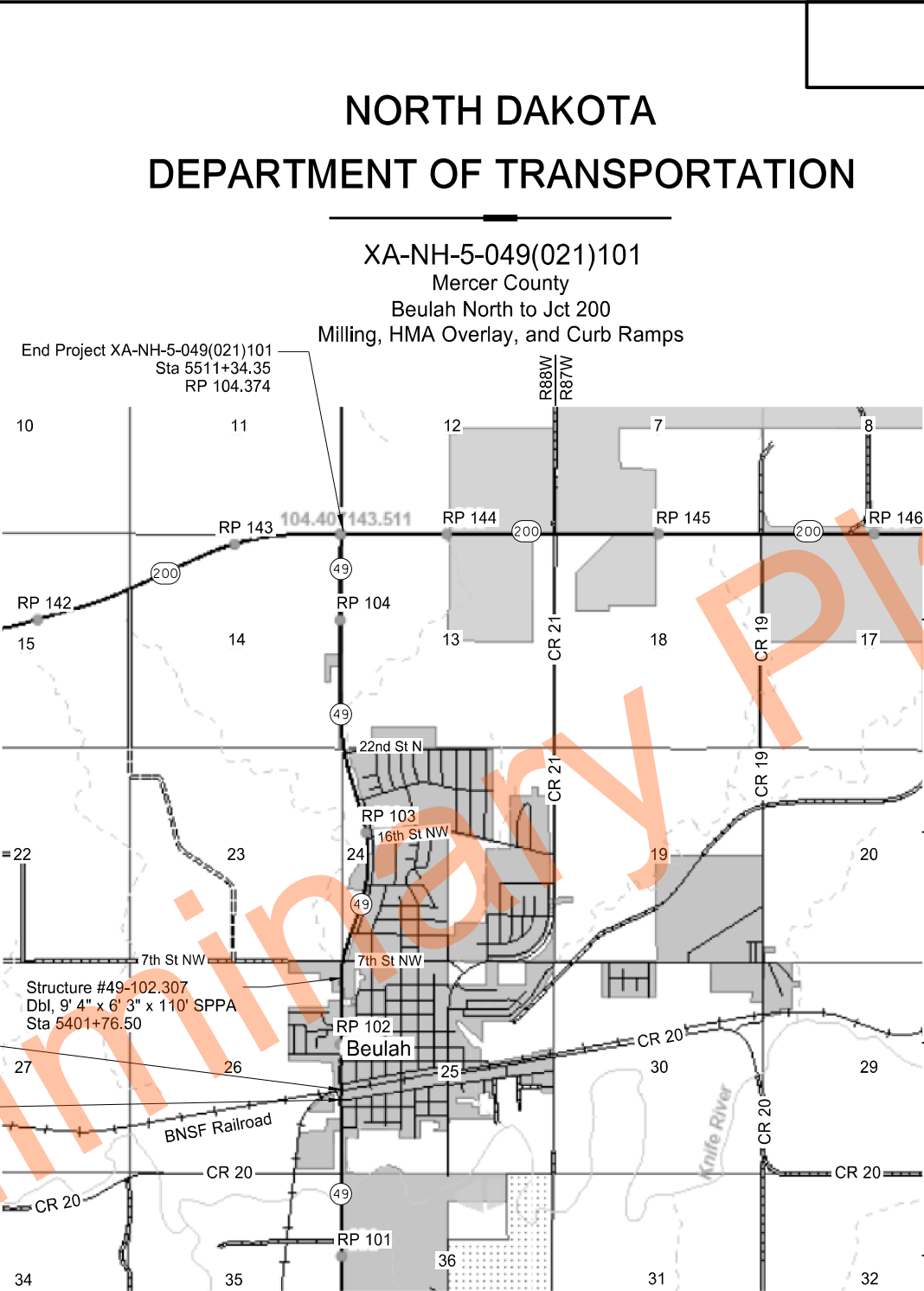


DESIGN DATA (RP 101.720 to 102.386)				
Traffic		Average Daily		
Current 2020	Pass: 3195	Trucks: 395	Total: 3590	
Forecast 2040	Pass: 3515	Trucks: 435	Total: 3950	
Clear Zone Distance: 16'		Design Speed: 25 mph		
Minimum Sight Dist. for Stopping: 155'		Bridges: N/A		
Sight Dist. for No Passing Zone: 450'				
Pavement Design Life 10 (years)				
Design Accumulated One-way Flexible ESALs: _____				
DESIGN DATA (RP 102.386 to RP 103.450, RP 104.151 to RP 104.374)				
Traffic		Average Daily		
Current 2020	Pass: 4220	Trucks: 470	Total: 4690	
Forecast 2040	Pass: 4645	Trucks: 520	Total: 5165	
Clear Zone Distance: 26'		Design Speed: 45 mph		
Minimum Sight Dist. for Stopping: 360'		Bridges: N/A		
Sight Dist. for No Passing Zone: 700'				
Pavement Design Life 10 (years)				
Design Accumulated One-way Flexible ESALs: _____				
DESIGN DATA (RP 103.450 to RP 104.151)				
Traffic		Average Daily		
Current 2020	Pass: 4220	Trucks: 470	Total: 4690	
Forecast 2040	Pass: 4645	Trucks: 520	Total: 5165	
Clear Zone Distance: 30'		Design Speed: 55 mph		
Minimum Sight Dist. for Stopping: 495'		Bridges: N/A		
Sight Dist. for No Passing Zone: 900'				
Pavement Design Life 10 (years)				
Design Accumulated One-way Flexible ESALs: _____				

DESIGNER Stacy Flaten
DESIGNER Austin Becker
DESIGNER



STATE COUNTY MAP



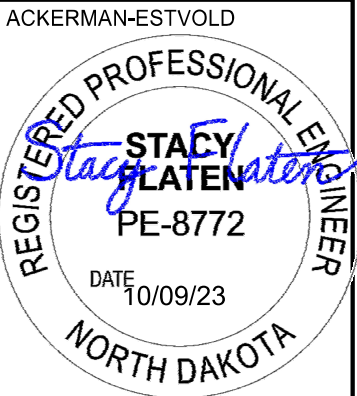
NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

XA-NH-5-049(021)101
Mercer County
Beulah North to Jct 200
Milling, HMA Overlay, and Curb Ramps

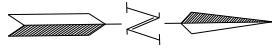
GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	4/1/2023
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
XA-NH-5-049(021)101	2.654	2.656

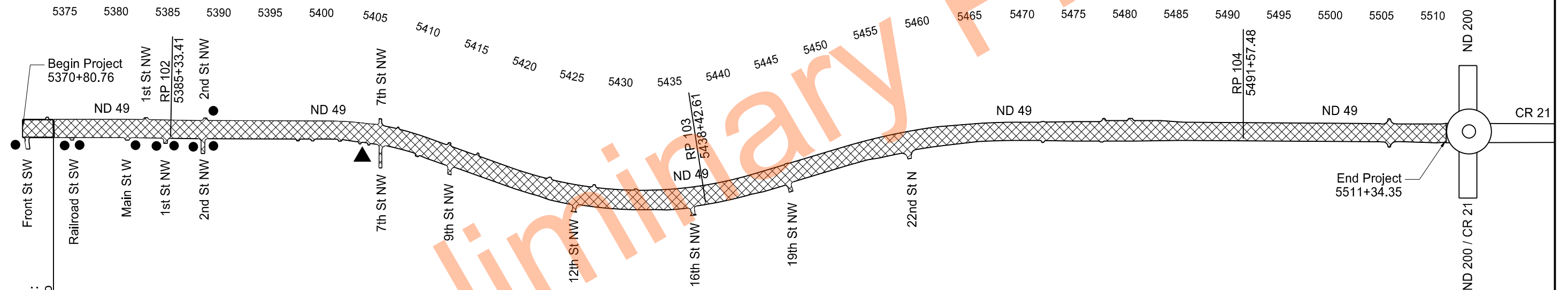


ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
Kirk Hoff
10/09/23

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2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations								
4	1	Scope of Work	D-101-20, 21	Line Styles								
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81	1	Survey Coordinate and Curve Data	D-704-19	Road Closure And Lane Closure On A Two Way Road Layouts								
82	1 - 4	Survey Data Layouts	D-704-20	Terminal And Seal Coat Sign Layouts								
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Legend

- Curb Ramp Improvements
- ▨ Milling Pavement Surface
RAP - Superpave FAA 45
- ▲ 7th St NW
Intersection Improvement

Scope of Work

ND 49
Beulah North to Jct 200

5370+80.76 to 5511+34.35



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NOTES

100-P01 ORDER OF OPERATION:

- 1. ADA Curb Ramp Revisions & 7th St NW Intersection Improvement
- 2. Milling
- 3. HMA (RAP – Superpave FAA 45)

107-115 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the BNSF Railway Company at RP 101.78. The type of work that will be performed within the railroad right of way is milling, asphalt overlay, signing, and pavement marking. Direct inquiries regarding protective liability insurance to:

Rosa Martinez
Marsh USA Inc.
4400 Comerica Bank Tower
1717 Main Street
Dallas, TX 75201-7357, USA
214-303-8519
Rosa.M.Martinez@marsh.com

Obtain information regarding crossing number 087813E from the Federal Railroad Administration website: <http://safetydata.fra.dot.gov/Officeofsafety/>

107-500 PAVEMENT SWEEPING: Sweep the roadway adjacent to the construction area at the end of each day. Utilize a vacuum or pickup type sweeper.

107-P01 MAINTAINING TRAFFIC – UNEVEN SHOULDER: If a shoulder and the adjacent lane are uneven due to milling or paving operations, the requirements of Section 704.04 O, "Traffic Control for Uneven Pavement" apply. If the uneven shoulder and adjacent lane are due to other circumstances, the contents of this note apply. If, at the end of the work-day, drop-offs greater than 2 inches and less than 18 inches or slopes steeper than 4:1 exist between the edge of a traffic lane and the outside edge of the proposed roadway, perform one of the following actions:

- Construct a traversable wedge in the area of the drop-off or steep slope; or
- Close the lane adjacent to the drop-off or steep slope and provide 24-hour flagging or pilot car operations.

When constructing a wedge, construct a wedge composed of aggregate or earthen materials with a 4:1 or flatter slope along the entire length of the area. Compact materials using Type C compaction, as specified in 203.04 G.4, "Compaction Control Type C".

Install stackable vertical panels that meet the requirements of Section 704.03 H, "Stackable Vertical Panels", along the edge of the driving lane closest to the wedge.

The Engineer will measure stackable vertical panels as specified in Section 704.05, "Method of Measurement" and will pay for panels as specified in Section 704.06, "Basis of Payment".

The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the price bid for "Aggregate Base Course CL 5".

If a 4:1 or flatter wedge is not installed, provide 24 hour flagging or pilot car operations and associated traffic control at no additional cost to the Department.

202-P01 REMOVAL OF CONCRETE: Concrete sidewalk, curb and gutter designated for removal may vary in thickness. There will be no additional compensation for the removal of extra thickness. Include the removal of aggregate or embankment beneath the sidewalk, curb and gutter in the costs of "Removal of Concrete Pavement" or "Removal of Curb & Gutter" bid items.

202-P02 REMOVAL OF BITUMINOUS SURFACING: Bituminous surfacing designated for full depth removal may vary in thickness. There will be no additional compensation for the removal of extra thickness. Include any costs for the removal of aggregate or embankment beneath the pavement in the "Removal of Bituminous Surfacing" bid item.

203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

203-385 AVERAGE HAUL: No average haul has been computed for this project.

302-P01 WATER: The cost of water needed for compaction is incidental to Aggregate Base Course CL 5.

430-P01 COMMERCIAL GRADE HOT MIX ASPHALT: Use for replacing asphalt adjacent to the new curb and gutter areas.



NOTES

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704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary lane closure, flagging, and a pilot car.

1. Standard D-704-15, Type A; place layout A at north end of job, on the west, north, and east legs of the roundabout when milling and paving near the roundabout.
2. Standard D-704-19, Type F;
3. Standard D-704-20, Type G;
4. Standard D-704-22, Types K and L;
5. Standard D-704-25, Type X;
6. Standard D-704-26, Type CC, EE, and GG.

Place flaggers and traffic control devices as shown on Standard D-704-15, Type A or Wait for Pilot Car sign G20-4b-36 at the intersections when the ND 49 lane closure spans across them.

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

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

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

709-P01 GEOSYNTHETIC MATERIAL: Expose the existing geosynthetic material and overlap with proposed geosynthetic material a minimum of 18 inches.

750-P01 SIDEWALK CONCRETE 4IN: There is an existing sprinkler system located in the NE quadrant of Railroad St SW. Exercise care in construction operations to ensure that no damage is done to the existing sprinkler system that is to remain in place. All costs to repair any damage will be at the Contractor's expense.

750-P02 DETECTABLE WARNING PANELS: Install yellow composite detectable warning panels that match the existing detectable warning panels.

970-P01 LANDSCAPE PREPARATION: Provide minimal grading and hydraulic mulch adjacent to the locations for sidewalk and curb & gutter replacement. Blend the existing topsoil adjacent to the sidewalk and or curb & gutter to eliminate any steep slopes or vertical edges. Remove excess topsoil from the project site. Import topsoil if needed. Provide hydraulic mulch and seed mixture (NDDOT Class I).

Use hydraulic mulch material as specified in Sections 253.01 to 253.04 of the NDDOT Standard Specifications. Apply the hydraulic mulch after the seed is

incorporated into the topsoil. Apply fertilizer at a rate of 100 pounds per acre with a mixture of 5-10-5. Include work necessary to restore landscaping, topsoil areas, seeding and mulching in unit price bid for "Landscape Preparation".



ENVIRONMENTAL NOTES

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ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

NOTIFICATIONS TO BE FILED BY CONTRACTOR:

EN-1 FAA Notice: Notification is required for work within 3 nautical miles of the airport. Complete the Federal Aviation Administration Notice of Proposed Construction or Alteration Form 7460-1 in accordance with 14 CFR 77.7 and 77.9 (at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest) (online at <http://oeaaa.faa.gov>).

Preliminary Plans



Estimated Quantities

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	ND	XA-NH-5-049(021)101	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
103	0100	CONTRACT BOND	L SUM	1
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1
107	0140	RAILROAD COORDINATION	L SUM	1
107	0145	RAILROAD FLAGGING	DAY	1600
201	0330	CLEARING & GRUBBING	L SUM	1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	198
202	0130	REMOVAL OF CURB & GUTTER	LF	137
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	182
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1
203	0140	BORROW-EXCAVATION	CY	22
255	0102	ECB TYPE 2	SY	22
261	0112	FIBER ROLLS 12IN	LF	560
261	0113	REMOVE FIBER ROLLS 12IN	LF	280
261	0200	WEIGHTED FIBER ROLLS	LF	225
261	0201	REMOVE WEIGHTED FIBER ROLLS	LF	225
302	0120	AGGREGATE BASE COURSE CL 5	TON	410
401	0050	TACK COAT	GAL	7945
411	0100	MILLING PAVEMENT SURFACE	TON	1663
430	0145	RAP - SUPERPAVE FAA 45	TON	12859
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	37
430	1000	CORED SAMPLE	EA	131
430	5818	PG 58H-34 ASPHALT CEMENT	TON	573
702	0100	MOBILIZATION	L SUM	1
704	0100	FLAGGING	MHR	700
704	1000	TRAFFIC CONTROL SIGNS	UNIT	4552
704	1052	TYPE III BARRICADE	EA	1
704	1054	SIDEWALK BARRICADE	EA	12
704	1058	PEDESTRIAN WALKWAY	LF	625
704	1060	DELINEATOR DRUMS	EA	10
704	1067	TUBULAR MARKERS	EA	211
704	1080	STACKABLE VERTICAL PANELS	EA	10
704	1185	PILOT CAR	HR	100
704	2108	TEMPORARY CURB RAMP	EA	9
706	0550	BITUMINOUS LABORATORY	EA	1
706	0600	CONTRACTOR'S LABORATORY	EA	1
708	1540	INLET PROTECTION-SPECIAL	EA	24
708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	24
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	126
714	0310	PIPE CONC REINF 18IN CL III	LF	4
714	3010	END SECT-CONC REINF 18IN	EA	1
722	6140	ADJUST GATE VALVE BOX	EA	1
722	6200	ADJUST MANHOLE	EA	12
748	0140	CURB & GUTTER-TYPE I	LF	191
750	0115	SIDEWALK CONCRETE 4IN	SY	309
750	2115	DETECTABLE WARNING PANELS	SF	140
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	40
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	3

Estimated Quantities

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SPEC	CODE	ITEM DESCRIPTION	UNIT		TOTAL
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	124	124
754	0563	REFERENCE MARKER-TYPE C	EA	1	1
754	0592	RESET SIGN PANEL	EA	2	2
762	0111	EPOXY PVMT MK 12IN LINE	LF	398	398
762	0112	EPOXY PVMT MK MESSAGE	SF	767	767
762	0113	EPOXY PVMT MK 4IN LINE	LF	63664	63664
762	0114	EPOXY PVMT MK 6IN LINE	LF	339	339
762	0115	EPOXY PVMT MK 8IN LINE	LF	4487	4487
762	0117	EPOXY PVMT MK 24IN LINE	LF	573	573
762	0118	EPOXY PVMT MK CURB TOP & FACE	LF	67	67
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	75500	75500
762	0434	SHORT TERM 8IN LINE-TYPE NR	LF	8858	8858
762	0436	SHORT TERM 24IN LINE-TYPE NR	LF	216	216
762	0442	SHORT TERM MESSAGE-TYPE NR	SF	1655	1655
970	0008	LANDSCAPE PREPARATION	SY	473	473

BASIS OF ESTIMATE

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Water (Incidental)

20 Gal/Ton for Aggregates

Pavement

Milling Pavement Surface @ 2 Ton/CY
Aggregate Base Course CL 5 @ 1.875 Ton/CY
Tack Coat @0.05 Gal/SY
RAP - Superpave FAA 45 @ 2 Ton/CY
PG 58H-34 Asphalt Cement @ 4.4%

Removal of Pavement

Aggregate Base @ 1.875 Ton/CY
Bituminous Pavement @ 2 Ton/CY
Concrete Pavement @ 2 Ton/CY

HMA Cored Samples							
	A	B		C			
Specification Section	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(2), " Pavement Density Cores "							
ND 49	14,045 / 1000 = 14	2	N/A	2	56	N/A	EA
Lt Turn Lanes	7450 / 1000 = 8	1	N/A	2	16	N/A	EA
Rt Turn Lanes	2866 / 1000 = 3	1	N/A	2	6	N/A	EA
SSP 4 Longitudinal Joint Density for HMA Pavements (Centerline)							
ND 49	14,045 / 1000 = 14	N/A	1	2	28	N/A	EA
Lt Turn Lanes	7450 / 1000 = 8	N/A	1	2	16	N/A	EA
Rt Turn Lanes	2866 / 1000 = 3	N/A	1	2	6	N/A	EA
430.04 I.2.b(3), "Pavement Thickness Determination Cores"					N/A	3	EA
Total					128	3	EA

Subtotal Description						
Spec - Code	Item Description	Unit	Section 20 Sheet 6	Section 40	Section 80	Section 90
202 - 0114	REMOVAL OF CONCRETE PAVEMENT	SY		198		
202 - 0130	REMOVAL OF CURB & GUTTER	LF		137		
202 - 0132	REMOVAL OF BITUMINOUS SURFACING	SY		182		
302 - 0120	AGGREGATE BASE COURSE CL 5	TON	211		177	22
401 - 0050	TACK COAT	GAL				7,945
411 - 0100	MILLING PAVEMENT SURFACE	TON		1,663		
430 - 0145	RAP - SUPERPAVE FAA 45	TON				12,859
430 - 0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON			37	
430 - 5818	PG 58H-34 ASPHALT CEMENT	TON				573
709 - 0100	GEOSYNTHETIC MATERIAL TYPE G	SY			126	
748 - 0140	CURB & GUTTER-TYPE I	LF			191	
750 - 0115	SIDEWALK CONCRETE 4IN	SY			309	
750 - 2115	DETECTABLE WARNING PANELS	SF			140	
TOTALS						

Short Term Pavement Marking

Type	Quantity	# of Applications	Quantity	Unit	
Short Term 4IN Line-Type NR					
Yellow Double Barrier	35,194	2	70,388	LF	
Yellow Double Barrier	1,704	3	5,112	LF	
			75,500	LF	Total
Short Term 8IN Line-Type NR					
White Channel Line	4,429	2	8,858	LF	Total
Short Term 24IN Line-Type NR					
Railroad Bands (12 LF x 6 EA)	72	3	216	LF	Total
Short Term Message-Type NR					
Railroad Cross and 2 R's (60.5 SF x 2 EA)	121	3	363	SF	
Arrows	646	2	1,292	SF	
			1,655	SF	Total

Note: # of Applications:
3 - (top of milling, top of 1st lift, top of 2nd lift)
2 - (top of 1st lift, top of 2nd lift)

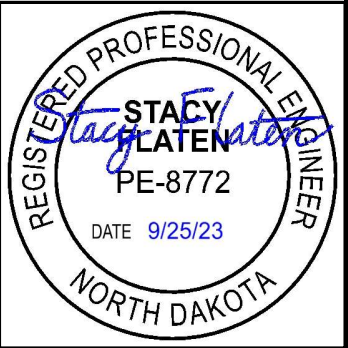


Earthwork Summary

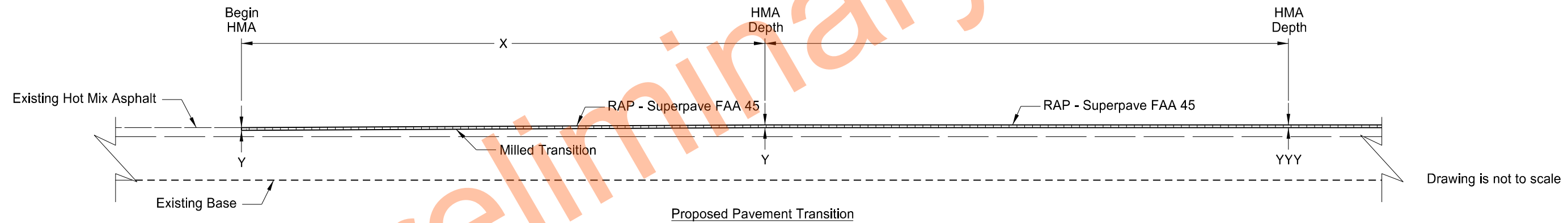
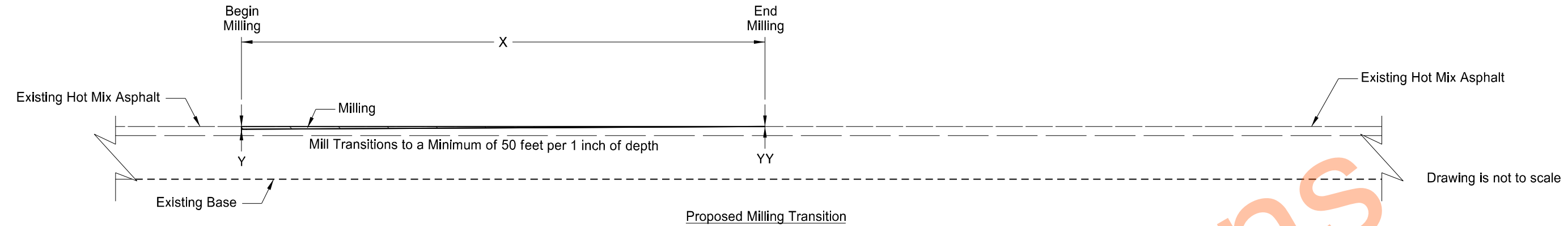
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Location	Embankment Volume	Compacted Volume	Borrow-Excavation (Pay Item)
	(CY)	(CY)	(CY)
	A	B = A * 1.25	D = B
ND 49 & 7th St NW, SE Quadrant	17.6	22	22

Preliminary Plans



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Milling and Paving Transitions

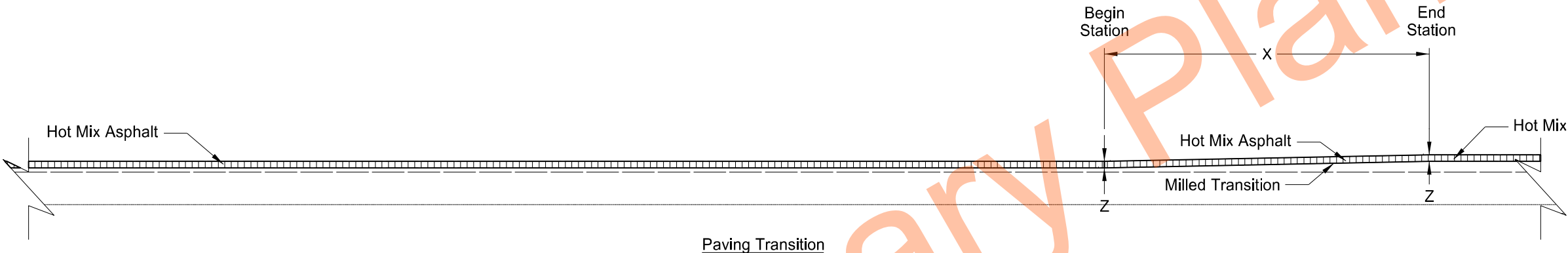
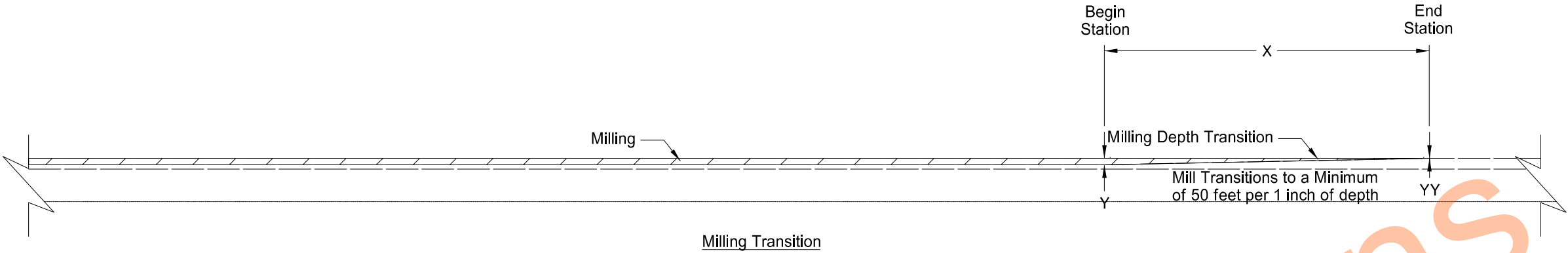
Location	X	Begin Milling/HMA Station	Y	YY	End Milling Station / HMA Station	YYY
RR (N. side)	150	5373+98	3"	3" @ C&G	5375+48	3"
				0" @ 12' Lt to 12' Rt		
End of Project	150	5511+34	3"	0"	5509+84	3"

Details

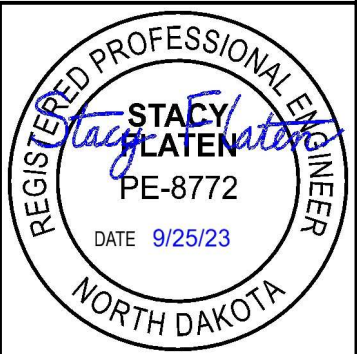
ND 49
Beulah North to Jct 200

Milling and Paving End Transitions



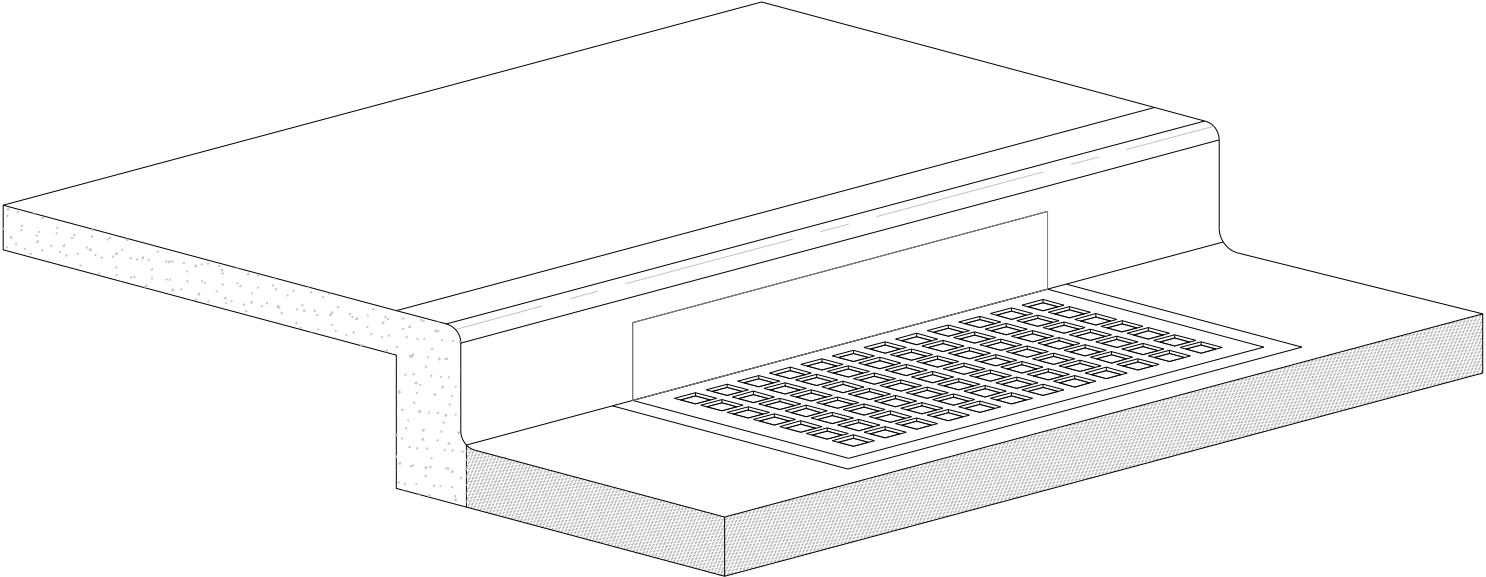


Milling & Paving Transitions					
X (ft)	Begin Station	Milling Transition Y (in)	End Station	Milling Transition YY (in)	Paving Transition Z (in)
133.49	5385+29.58	0" @ CL to 12' Rt 3" @ Rt Side	5386+63.07	0"	3"
133.49	5387+96.56	0" @ CL to 12' Rt 3" @ Rt Side	5386+63.07	0"	3"
150	5389+03.70	0" @ CL to 12' Rt 3" @ Rt Side	5390+53.70	0"	3"
150	5401+30.80	3" @ Lt Side 0" @ 12' Lt to CL & Rt Side	5402+80.80	3"	3"
150	5405+28.85	3" @ Lt Side 0" @ 12' Lt to CL & Rt Side	5403+78.85	3"	3"
150	5406+48	3" @ Lt Side 0" @ 12' Lt to CL	5407+98	0"	3"
48	5478+22.50	3" @ Lt Side 0" @ 30' Lt to CL	5477+74.68	0"	3"



Details
ND 49
Beulah North to Jct 200
Milling and Paving Transitions

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	20	3



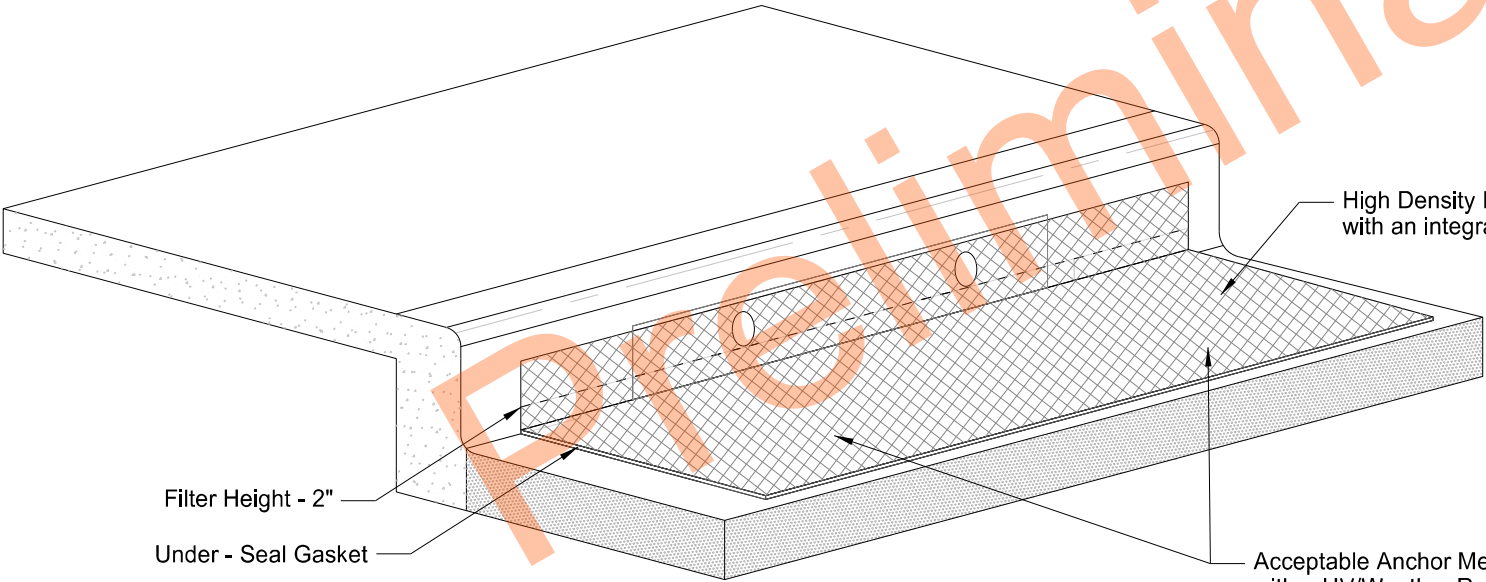
Inlet Protection Device

Installation Notes:

1. Place device tightly against drain opening and cover entire grate. Extend the device at least 2 inches past the grate toward the street.
2. Overlap the segments at longer openings.
3. Anchor the device so that water cannot flow behind it.

General Notes:

1. Remove material that falls into the inlet during maintenance or removal of the device.



Filter Height - 2"

Under - Seal Gasket

High Density Polyethylene (HDPE) high flow jacket filter (8,000 opening per SY) with an integrated 425 um (micron meter) fine filter particle mesh

Acceptable Anchor Method: Fasten to inlet casting grate with a UV/Weather Resistant Plastic Cable Zip Ties - 16 to 24 in. Install zip ties at each corner of the inlet near the perimeter and two additional zip ties near the middle of the casting. Punch hole through filter and run cable tie downward around grate and back up to fasten.

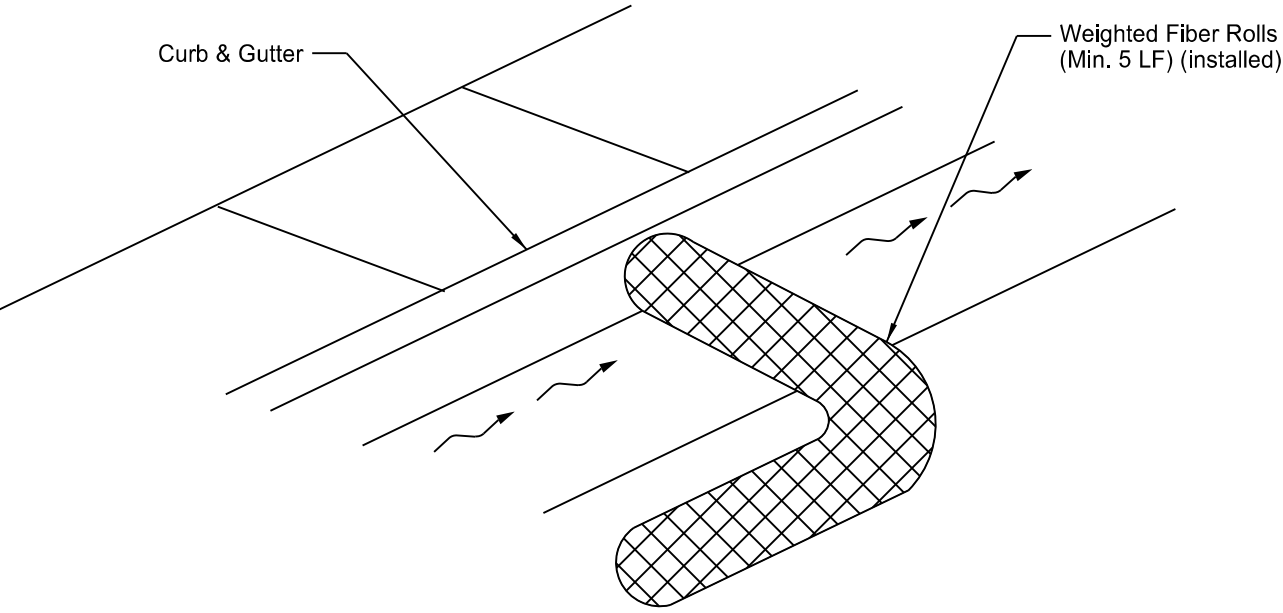
Details

ND 49
Beulah North to Jct 200

Inlet Protection Device



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	20	4



Weighted Fiber Roll Detail

Notes:

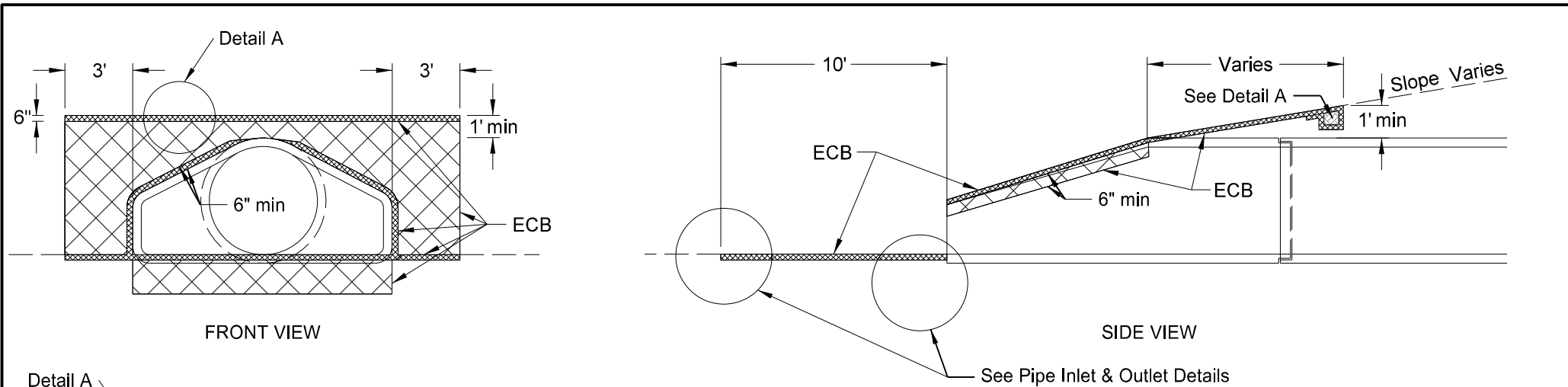
1. Provide materials that meet the following specifications:
Netting tube filled with wood curled excelsior and weighted inner core.
Roll Diameter: 6 inches
Weight: 8.33 Pounds per Linear Foot
2. Place weighted fiber rolls down slope from unprotected downstream areas, tight against and along the curb and gutters, to provide complete protection.
3. Remove and properly dispose of accumulated silt and debris to allow for proper function of device after every rain event, or as necessary for proper function.
4. Price includes weighted fiber roll, placement, and maintenance after each rain event. All costs related to this work shall be included in the price bid for "Weighted Fiber Rolls".
5. Removal of weighted fiber rolls shall be done after the up gradient surfaces are stabilized and surrounding streets and gutters are clean of debris.
6. Fiber Roll should be placed to avoid being in driving lane.

Details

ND 49
Beulah North to Jct 200

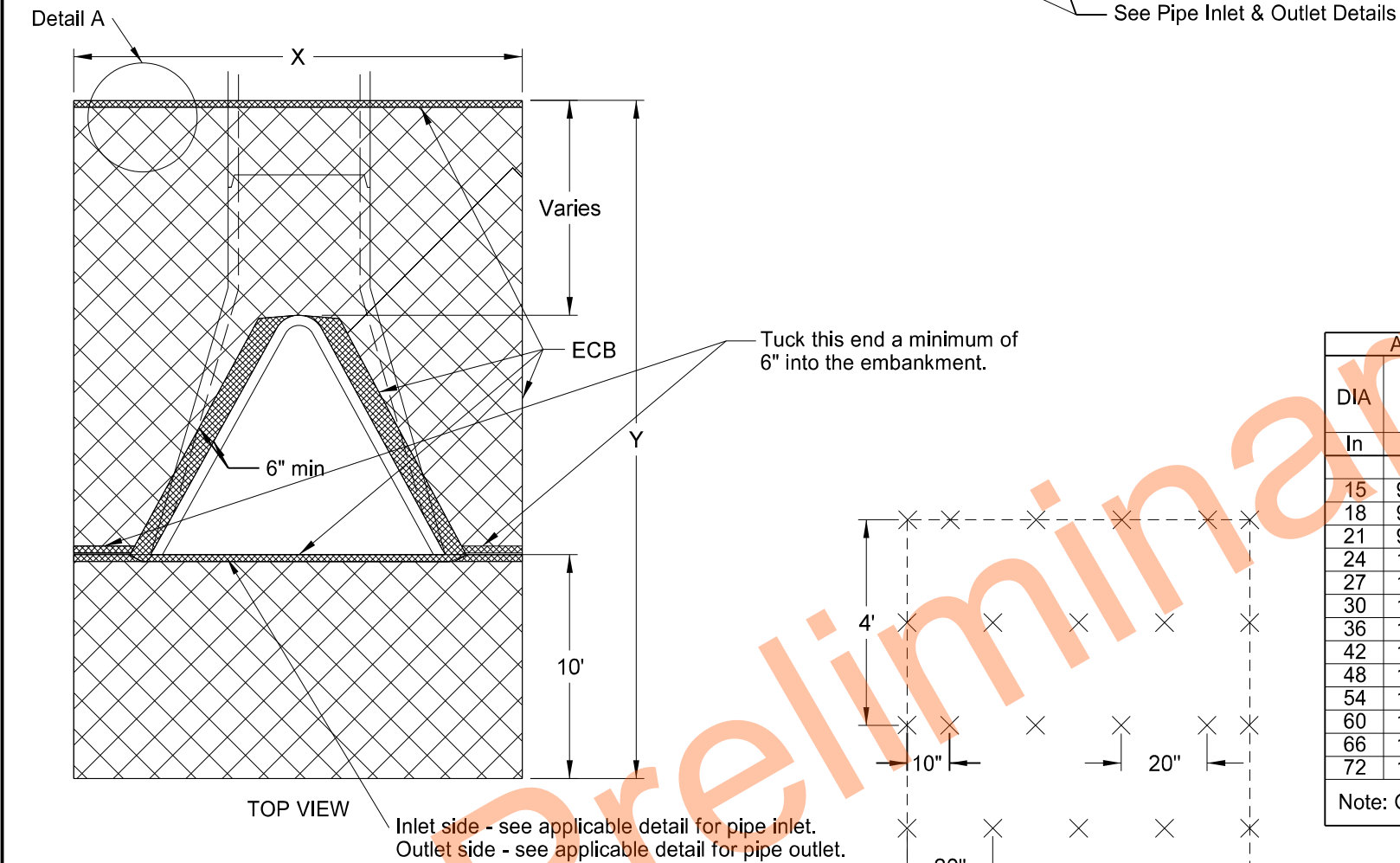
Weighted Fiber Rolls Detail





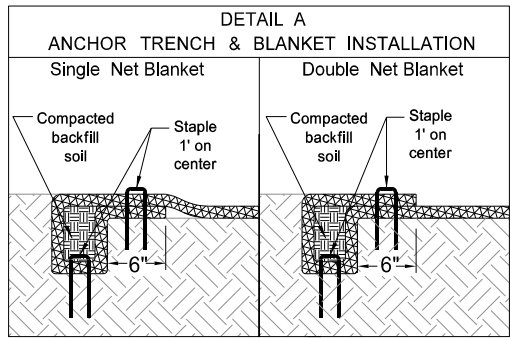
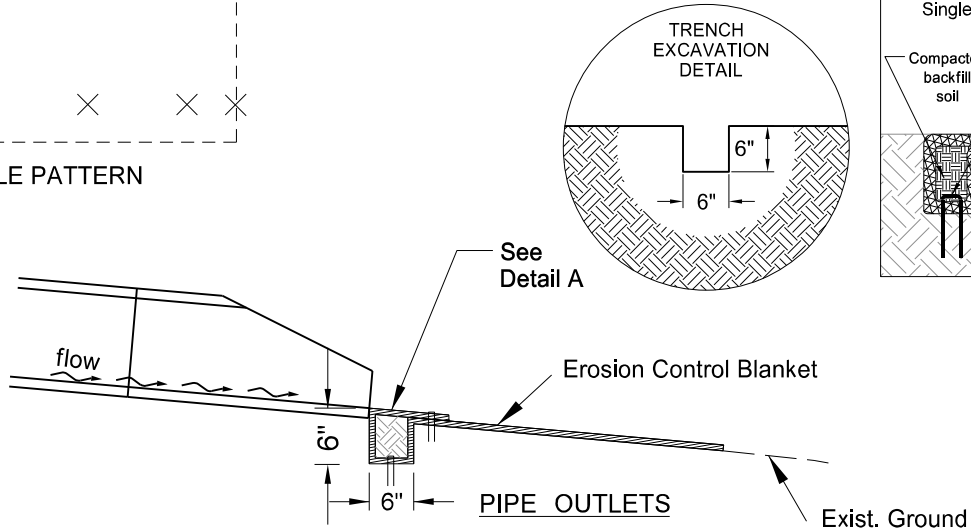
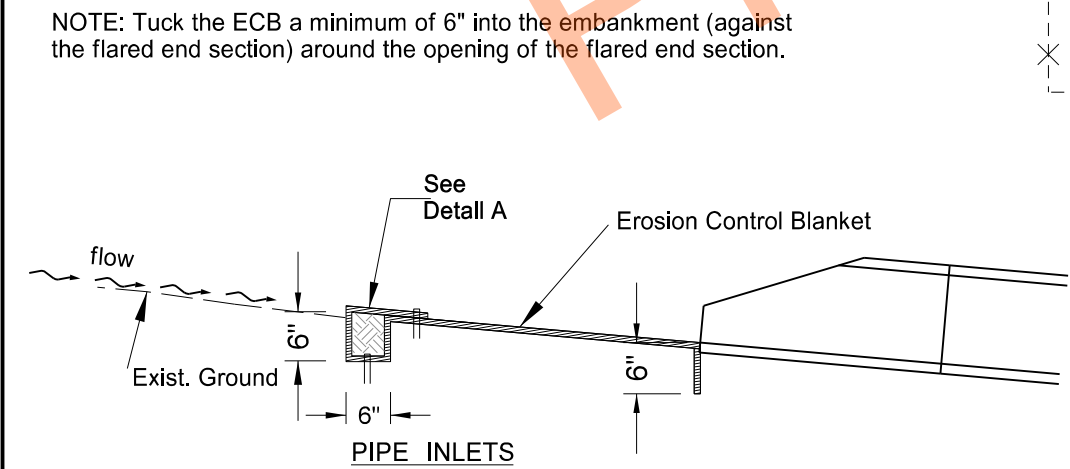
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	20	5

Erosion Control Blanket (ECB)				
Location to be Protected	Culvert Type Appr/CL	Pipe Diam (inch)	No.	Unit Quantity (SY)
ND 49 & Front St SW - SE Quadrant	Appr	18	1	22



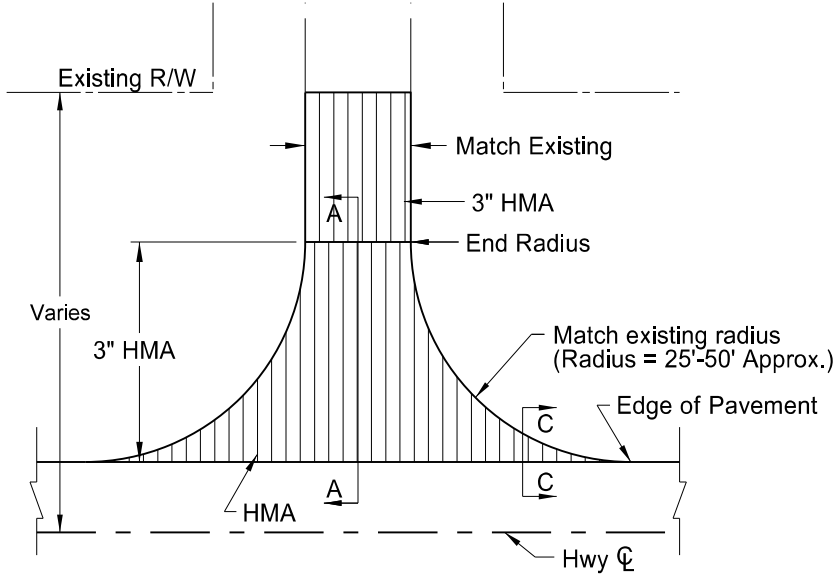
APPROACH CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
27	11.0	22.0	226.3	25
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	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.



Details
ND 49
Beulah North to Jct 200
Erosion Control at Culvert Flared End Sections

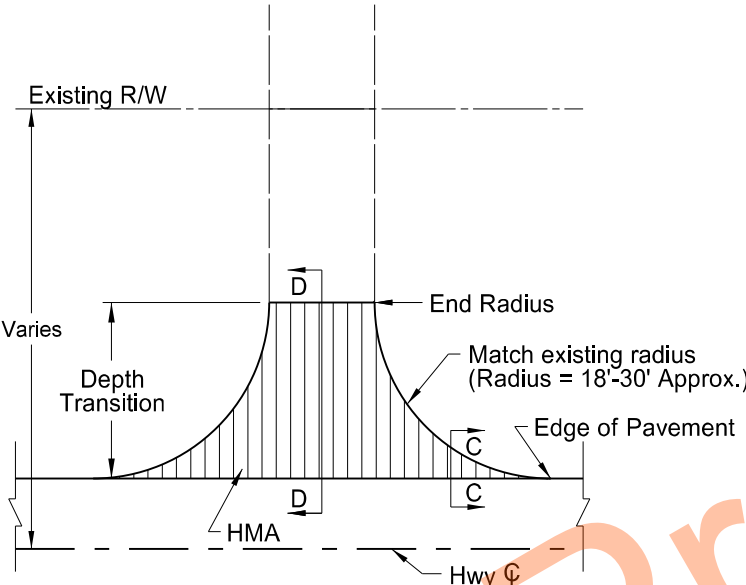
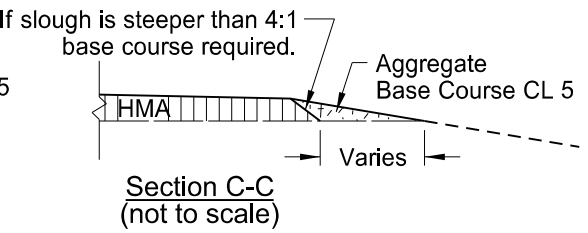
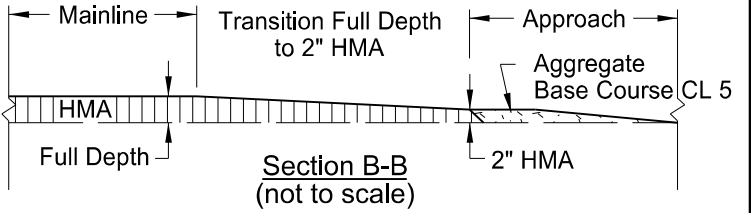
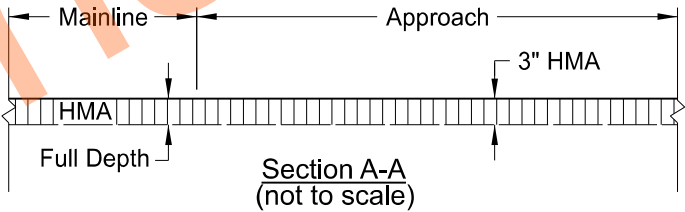
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-4-005(041)125	20	6



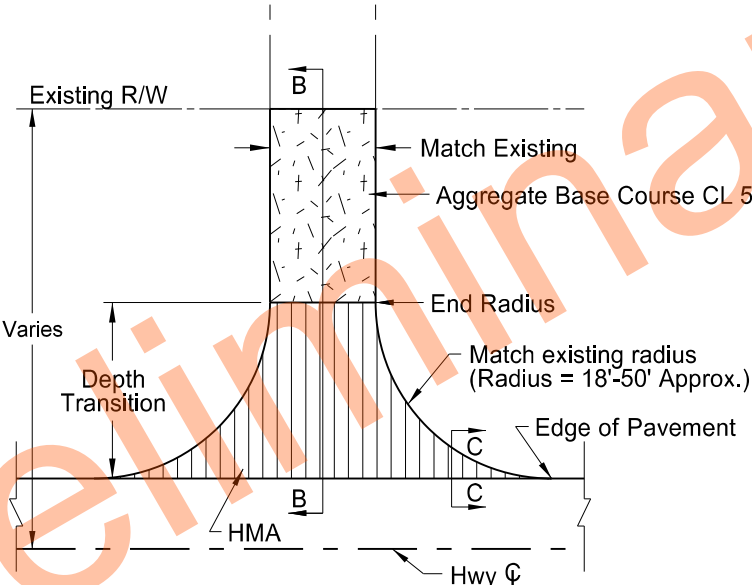
(1) Paved Section Line, County Road, or Street Approach

(1)		(2)	(3)	(4)
Paved Section Line		Paved Private Drive	Gravel Private Drive	Field Drive
5371+44 Rt	Front St SW	5373+30 Lt	5407+49 Lt	5446+65 Lt
5375+74 Rt	Railroad St SW	5397+74 Rt	5409+60 Rt	5472+05 Lt
5381+12 Rt	Main St	5399+17 Rt	5423+08 Lt	5477+77 Rt
5382+93 Lt	1st St NW	5401+85 Rt	5431+59 Lt	
5384+85 Rt	1st St NW	5403+83 Rt	5480+60 Lt	
5388+49 Rt	2nd St NW	5404+71 Rt	5505+78 Lt	
5388+71 Lt	2nd St NW	5412+66 Lt	5505+80 Rt	
5405+64 Lt	7th St NW	5415+65 Lt		
5405+82 Rt	7th St NW	5427+50 Lt		
5413+21 Rt	9th St NW	5472+05 Rt		
5425+70 Rt	12th St NW	5477+99 Lt		
5437+09 Rt	16th St NW			
5446+70 Rt	19th St NW			
5458+83 Rt	22nd St N			

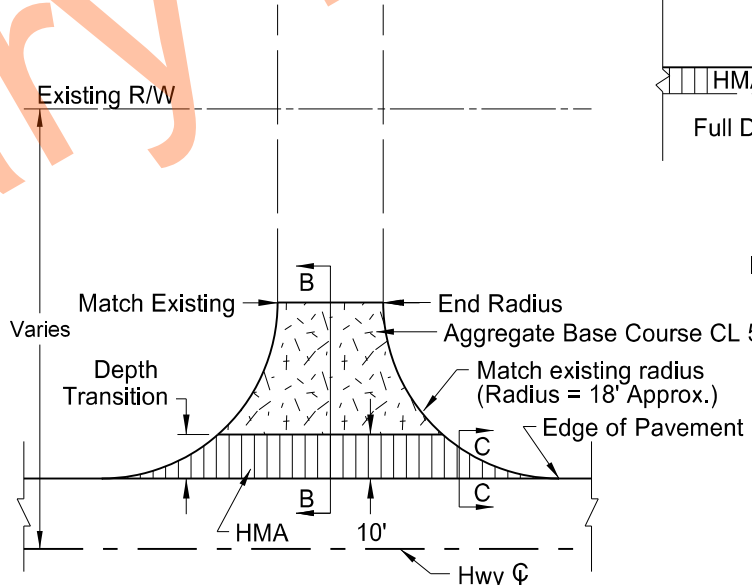
- Notes:
- Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
 - Quantity totals have been included in the bid items of the "Section 90" of the plans.
 - 100 TONS of Aggregate Base Course CL 5 has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



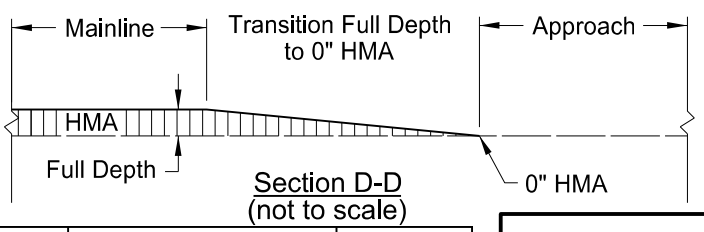
(2) Paved Private Drive Approach



(3) Gravel Private Drive Approach



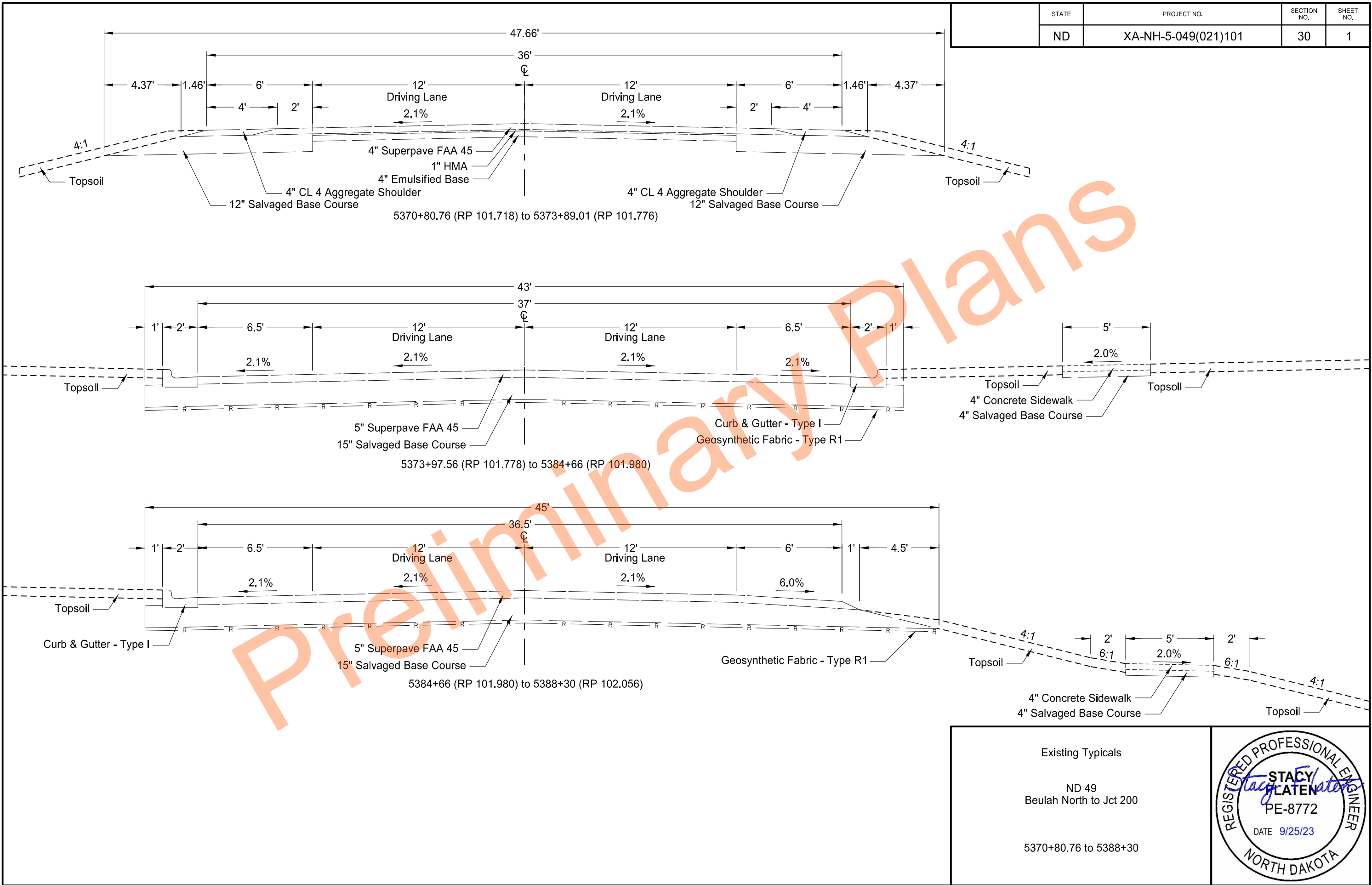
(4) Field Drive Approach



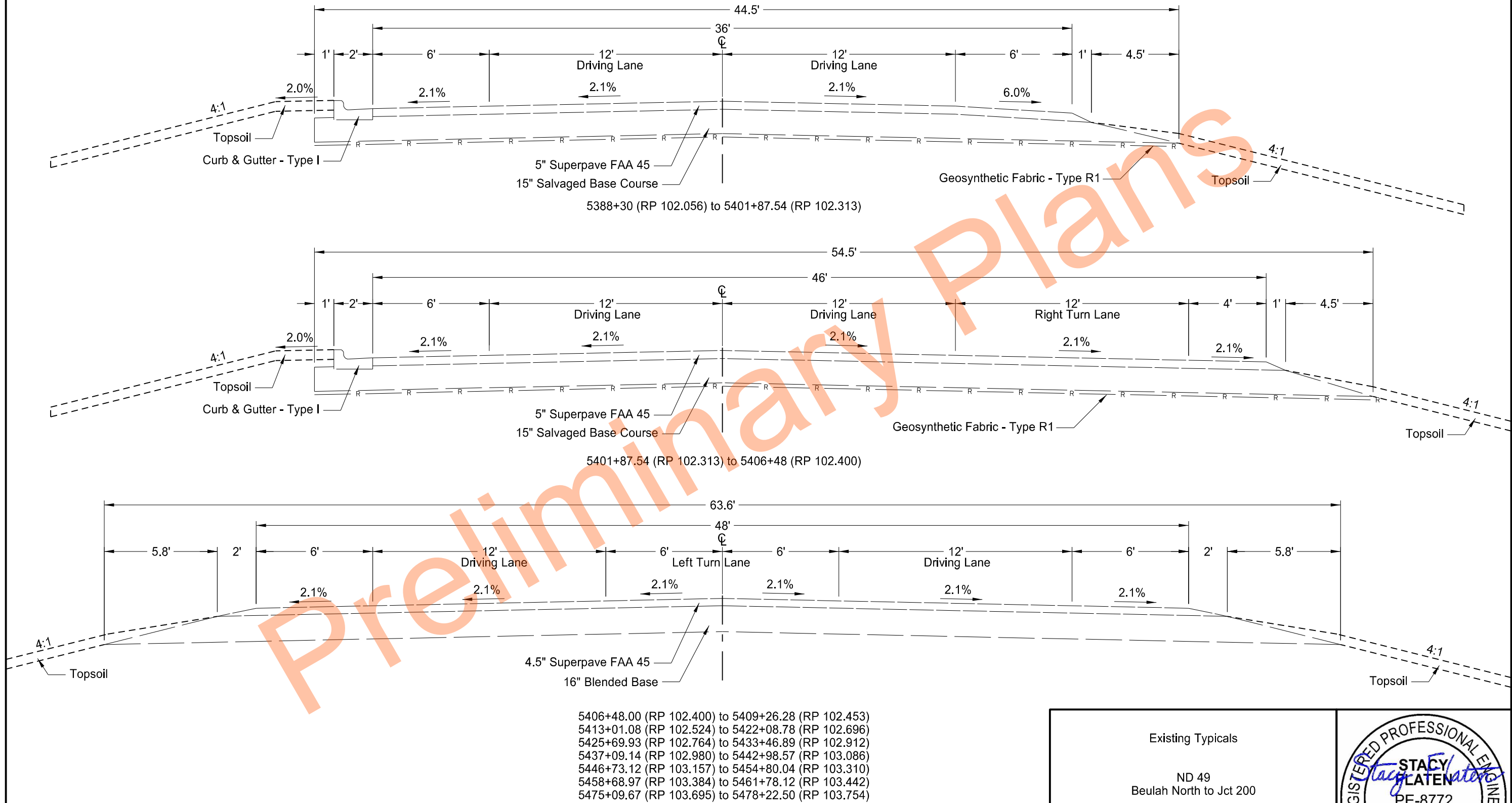
Basis of Estimate				(1)		(2)		(3)		(4)		Note 3		Totals
Spec	Code	Item	Unit	Paved Section Line		Paved Private Drive		Gravel Private Drive		Field Drive		(around radii)		
		Number of Locations	#	14		11		7		3		35		
				Total	Average	Total	Average	Total	Average	Total	Average	Total	Average	
302	120	Aggregate Base Course CL 5 @ 1.875 Ton/CY	TON					101	14.4	10	3.3	100	2.9	211

Note: Quantities Found in Section 90: Tack Coat, RAP - Superpave FAA 45, PG 58H-34 Asphalt Cement

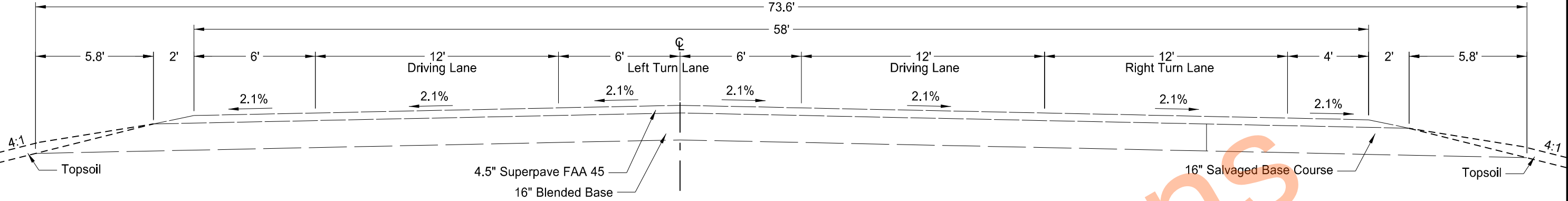
Details
ND 49
Beulah North to Jct 200
Approach Paving Details for Existing Rural Approaches



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	2

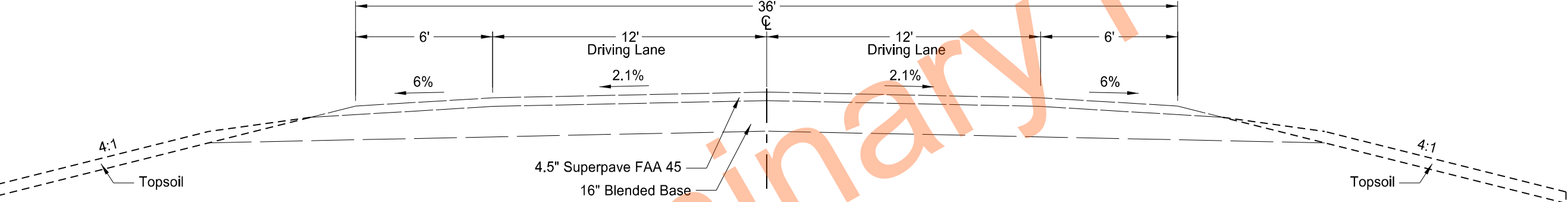


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	3

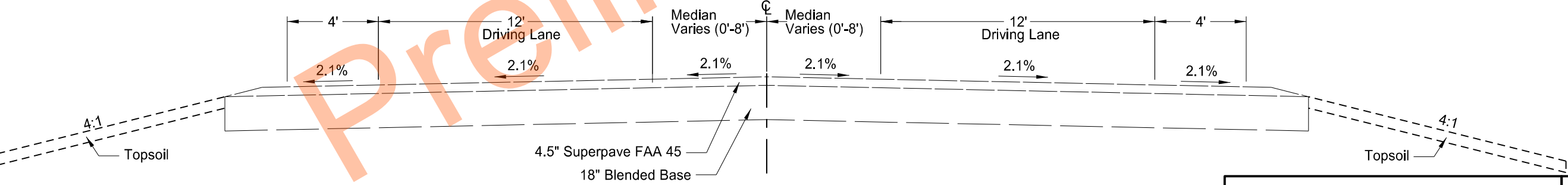


5409+26.28 (RP 102.453) to 5413+01.08 (RP 102.524)
5422+08.78 (RP 102.696) to 5425+69.93 (RP 102.764)
5433+46.89 (RP 102.912) to 5437+09.14 (RP 102.980)
5442+98.57 (RP 103.086) to 5446+73.12 (RP 103.157)
5454+80.04 (RP 103.310) to 5458+68.97 (RP 103.384)
5478+22.50 (RP 103.754) to 5483+55.90 (RP 103.855)*

* Note: Location is mirrored about centerline



5461+78.12 (RP 103.442) to 5475+09.67 (RP 103.695)
5483+55.90 (RP 103.855) to 5504+97.30 (RP 104.254)



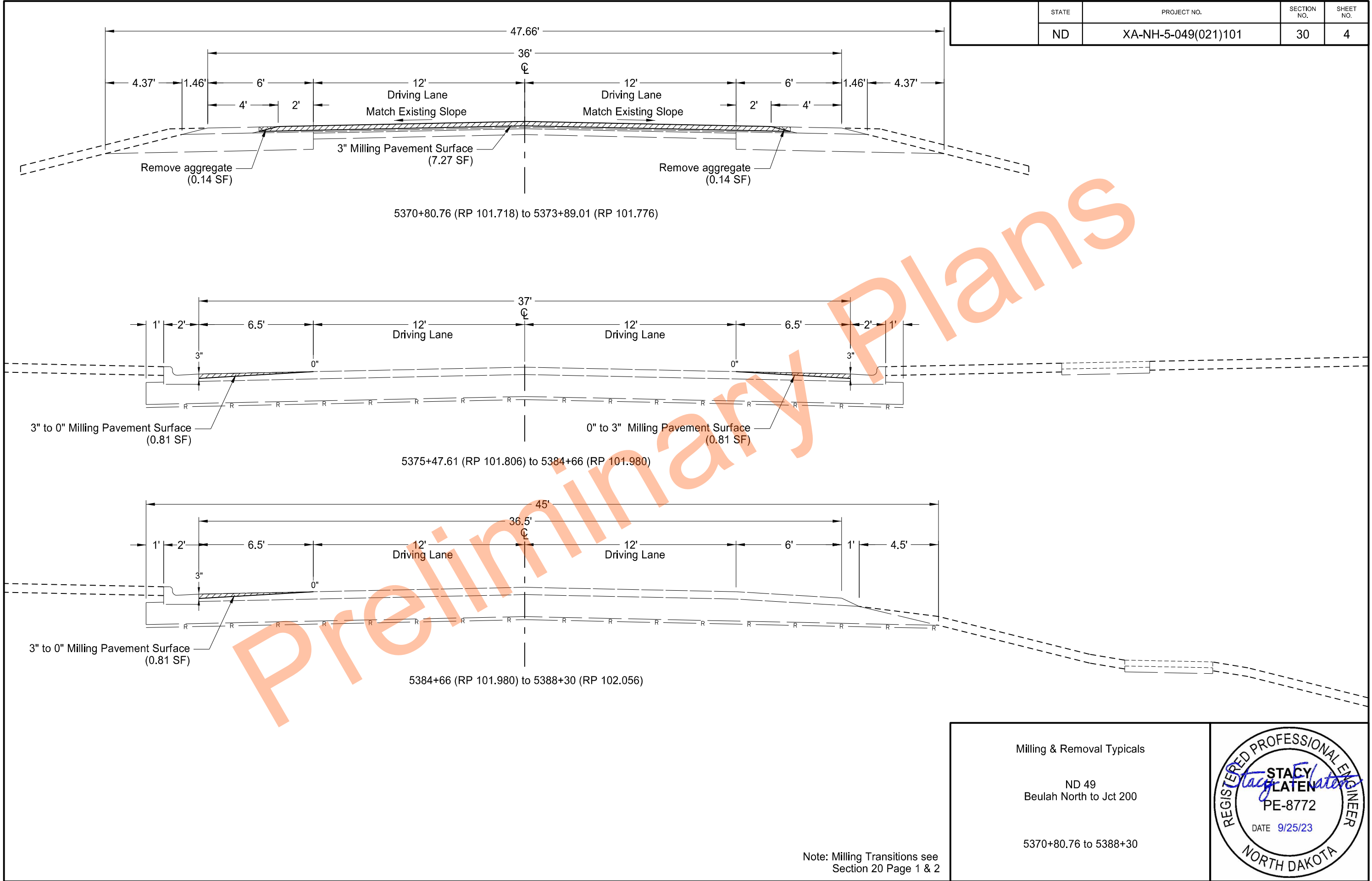
5504+97.30 (RP 104.254) to 5511+34.35 (RP 104.374)

Existing Typicals

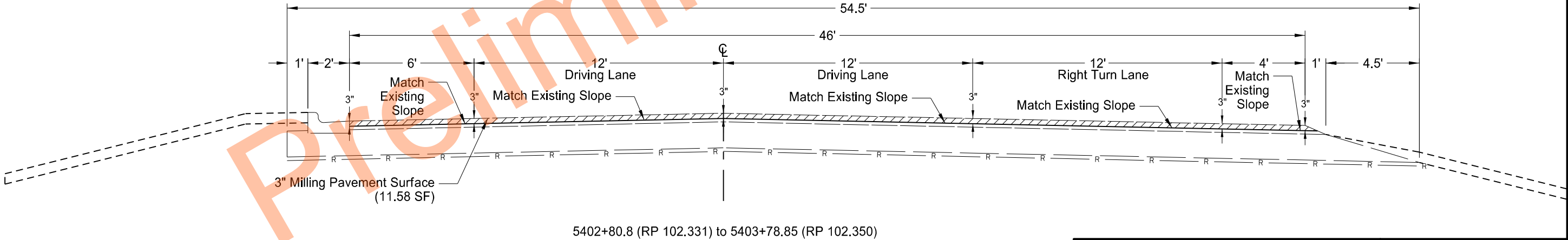
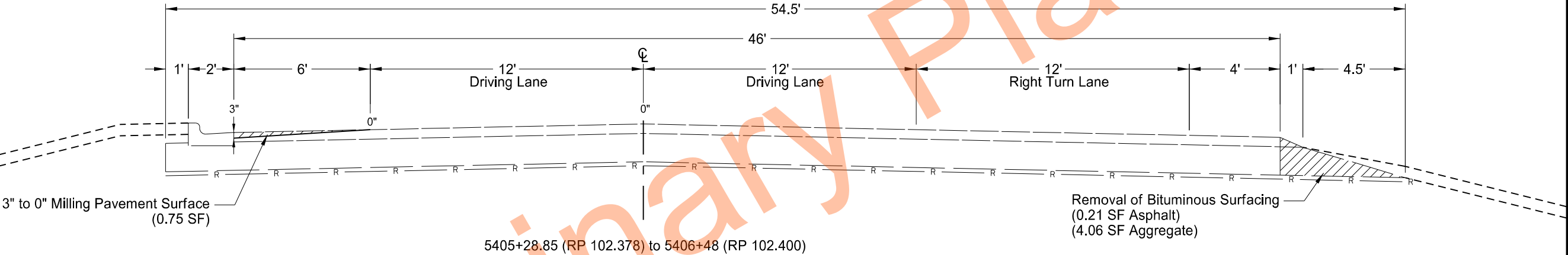
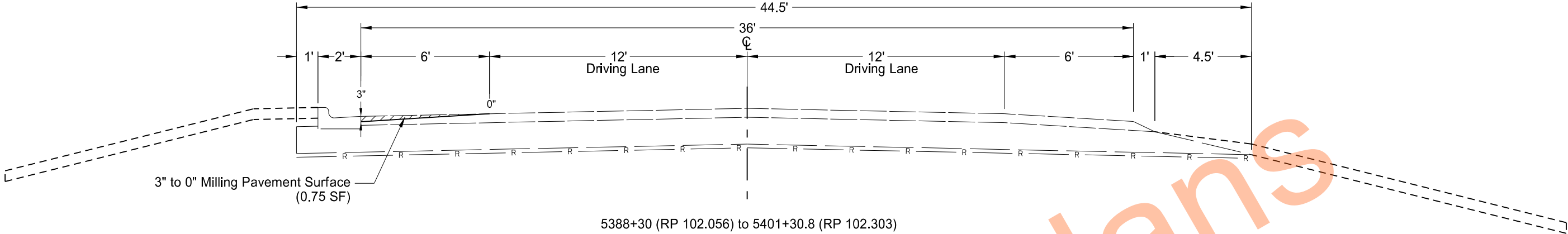
ND 49
Beulah North to Jct 200

ND 49





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	5



Milling & Removal Typicals

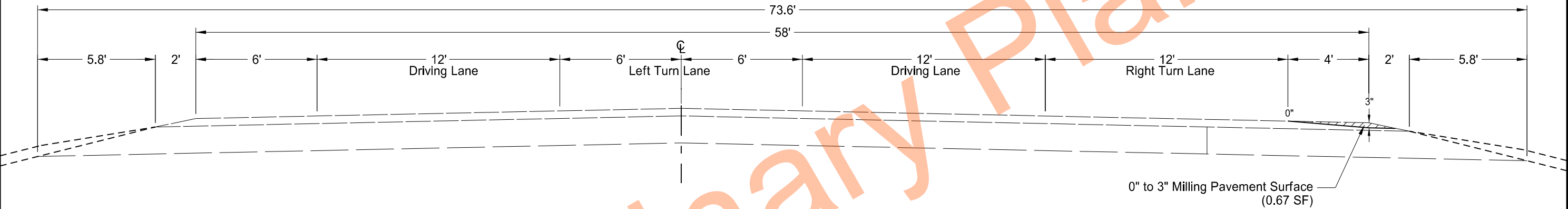
ND 49
Beulah North to Jct 200

5388+30 to 5406+48

Note: Milling Transitions see
Section 20 Page 1 & 2



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	6



5409+94.36 (RP 102.466) to 5413+01.08 (RP 102.524)
5422+08.78 (RP 102.696) to 5425+69.93 (RP 102.764)
5433+46.89 (RP 102.912) to 5437+09.14 (RP 102.980)
5442+98.57 (RP 103.086) to 5446+73.12 (RP 103.157)
5454+80.04 (RP 103.310) to 5458+68.97 (RP 103.384)
5478+22.50 (RP 103.754) to 5483+55.90 (RP 103.855)*

* Note: Location is mirred about centerline

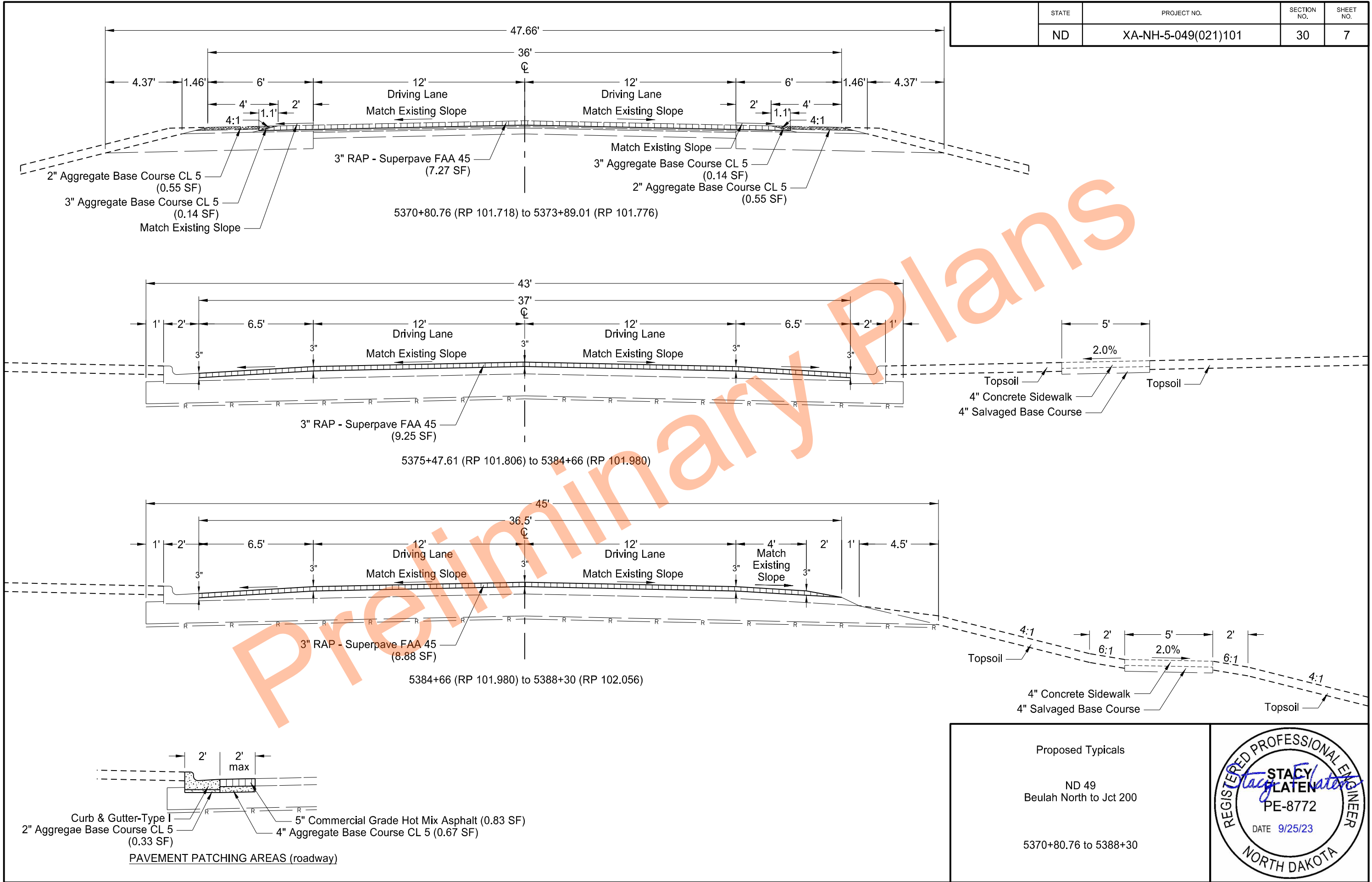
Milling & Removal Typicals

ND 49
Beulah North to Jct 200

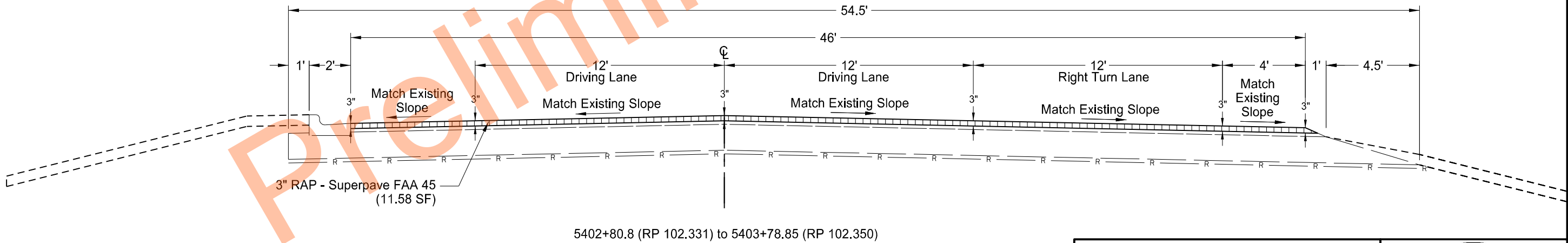
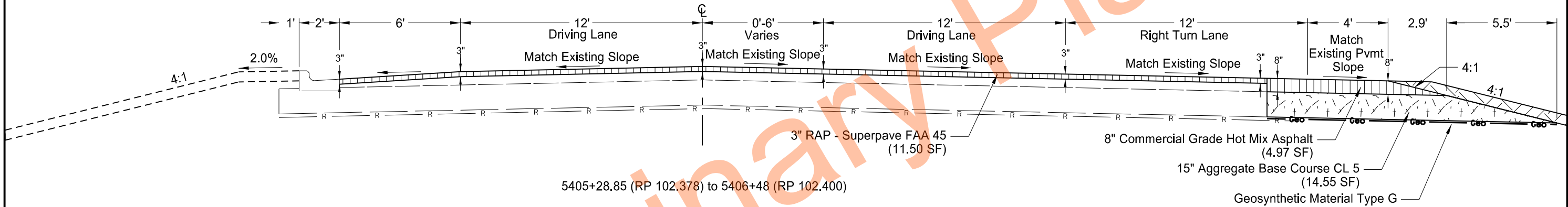
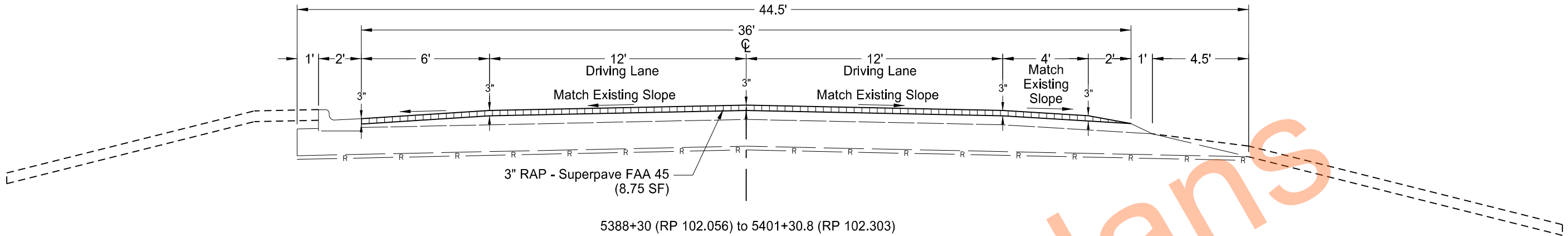
ND 49

Note: Milling Transitions see
Section 20 Page 1 & 2





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	8



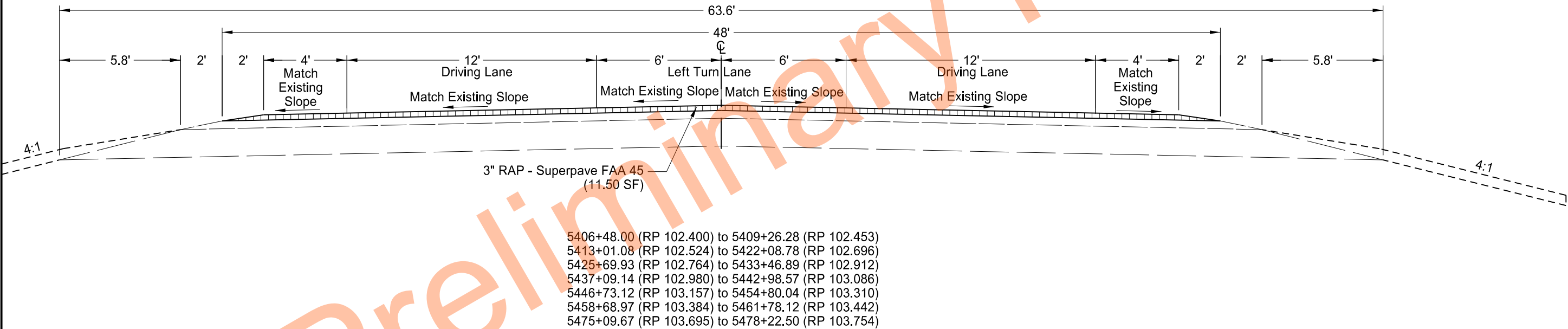
Proposed Typicals

ND 49
Beulah North to Jct 200

5388+30 to 5406+48



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	9



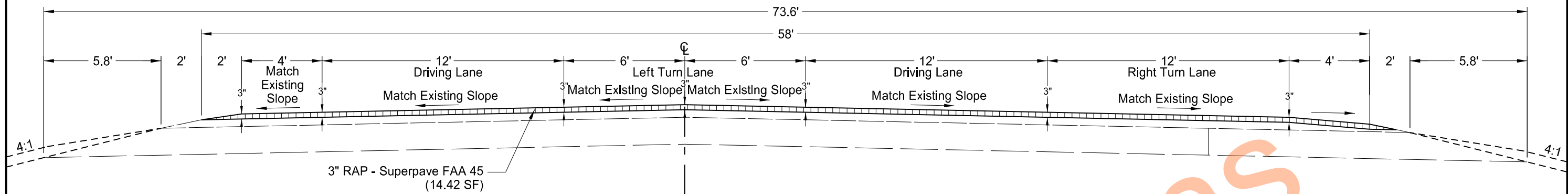
Proposed Typicals

ND 49
Beulah North to Jct 200

ND 49

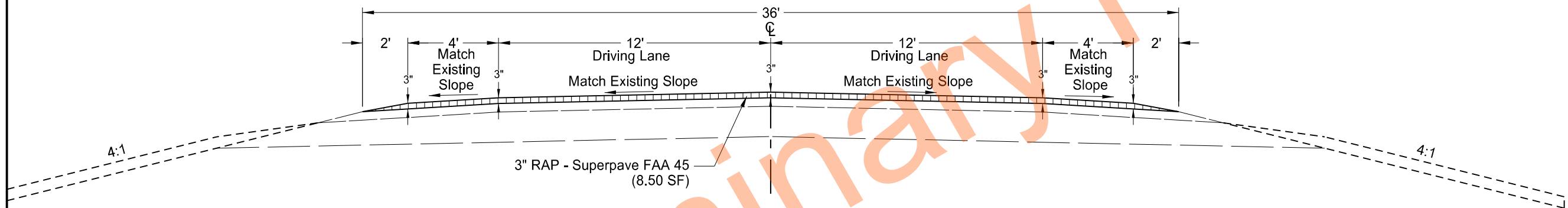


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	30	10

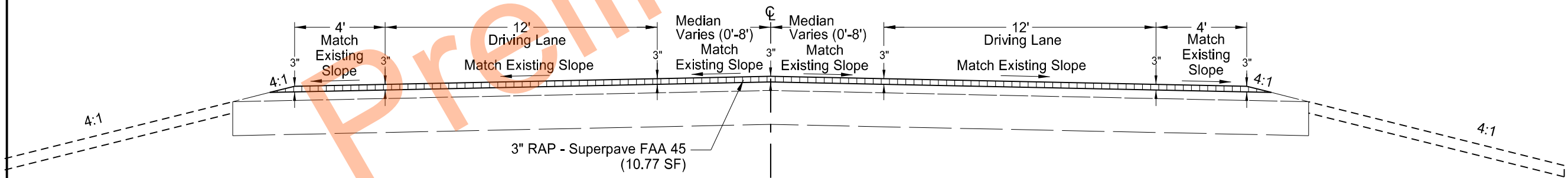


5409+26.28 (RP 102.453) to 5413+01.08 (RP 102.524)
5422+08.78 (RP 102.696) to 5425+69.93 (RP 102.764)
5433+46.89 (RP 102.912) to 5437+09.14 (RP 102.980)
5442+98.57 (RP 103.086) to 5446+73.12 (RP 103.157)
5454+80.04 (RP 103.310) to 5458+68.97 (RP 103.384)
5478+22.50 (RP 103.754) to 5483+55.90 (RP 103.855)*

* Note: Location is mirrored about centerline



5461+78.12 (RP 103.442) to 5475+09.67 (RP 103.695)
5483+55.90 (RP 103.855) to 5504+97.30 (RP 104.254)



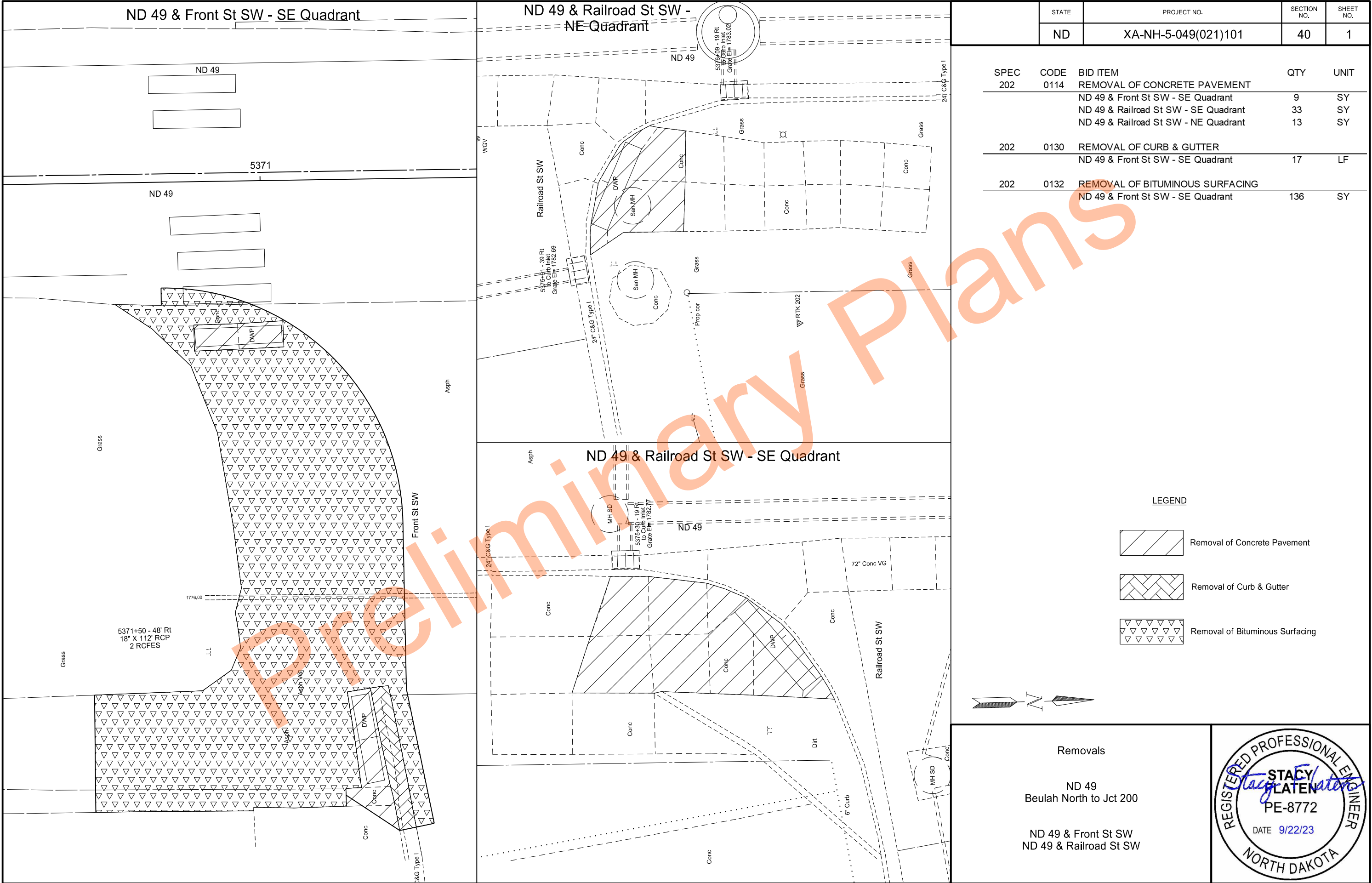
5504+97.30 (RP 104.254) to 5509+84.35 (RP 104.346)

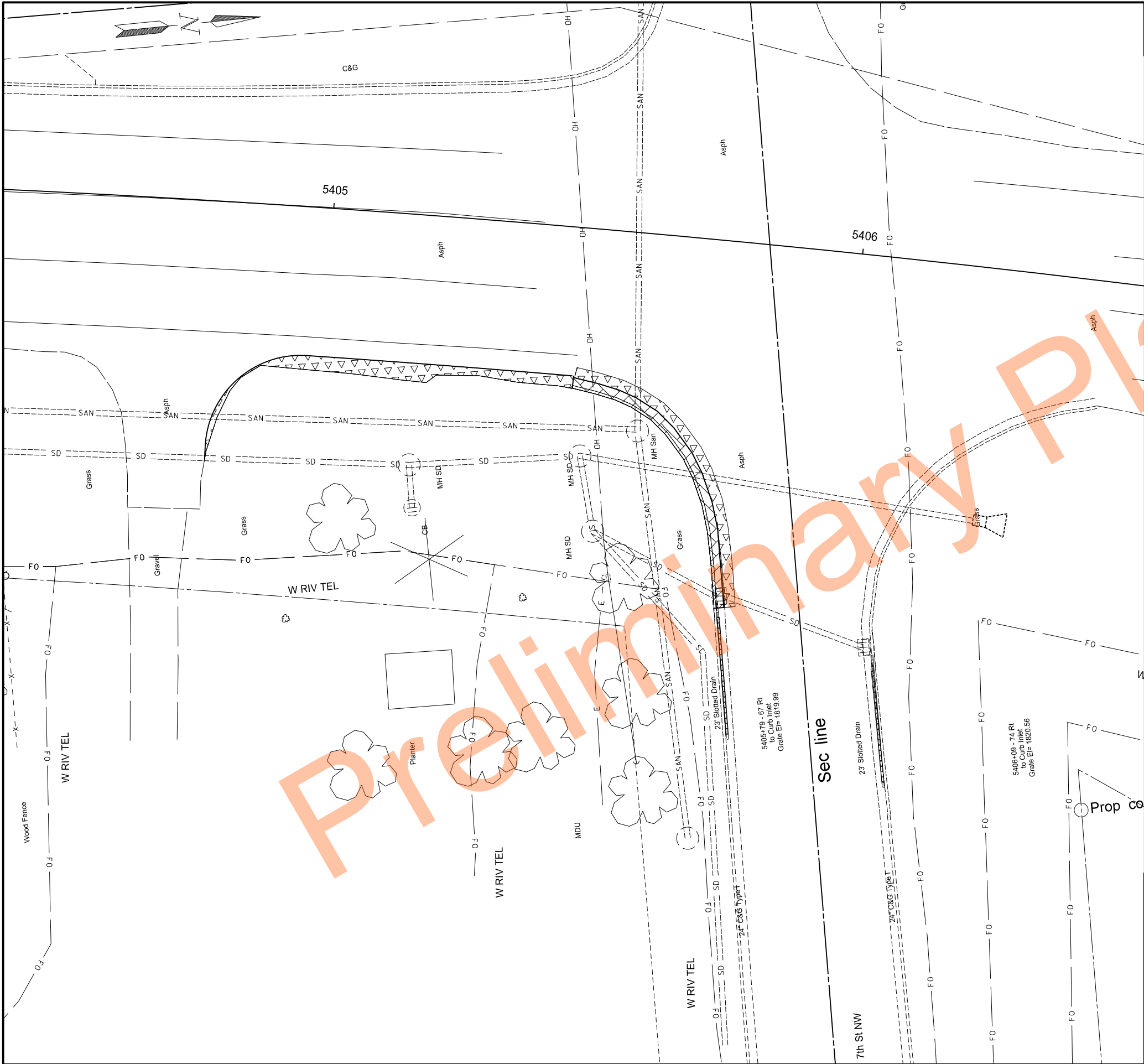
Proposed Typicals

ND 49
Beulah North to Jct 200

ND 49







		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	40	4
SPEC	CODE	BID ITEM		QTY	UNIT
202	0130	REMOVAL OF CURB & GUTTER			
		ND 49 & 7th St NW - SE Quadrant		56	LF
202	0132	REMOVAL OF BITUMINOUS SURFACING			
		ND 49 & 7th St NW - SE Quadrant		30	SY

LEGEND

Removal of Concrete Pavement

Removal of Curb & Gutter

Removal of Bituminous Surfacing

Removals

ND 49
Beulah North to Jct 200

ND 49 & 7th St NW

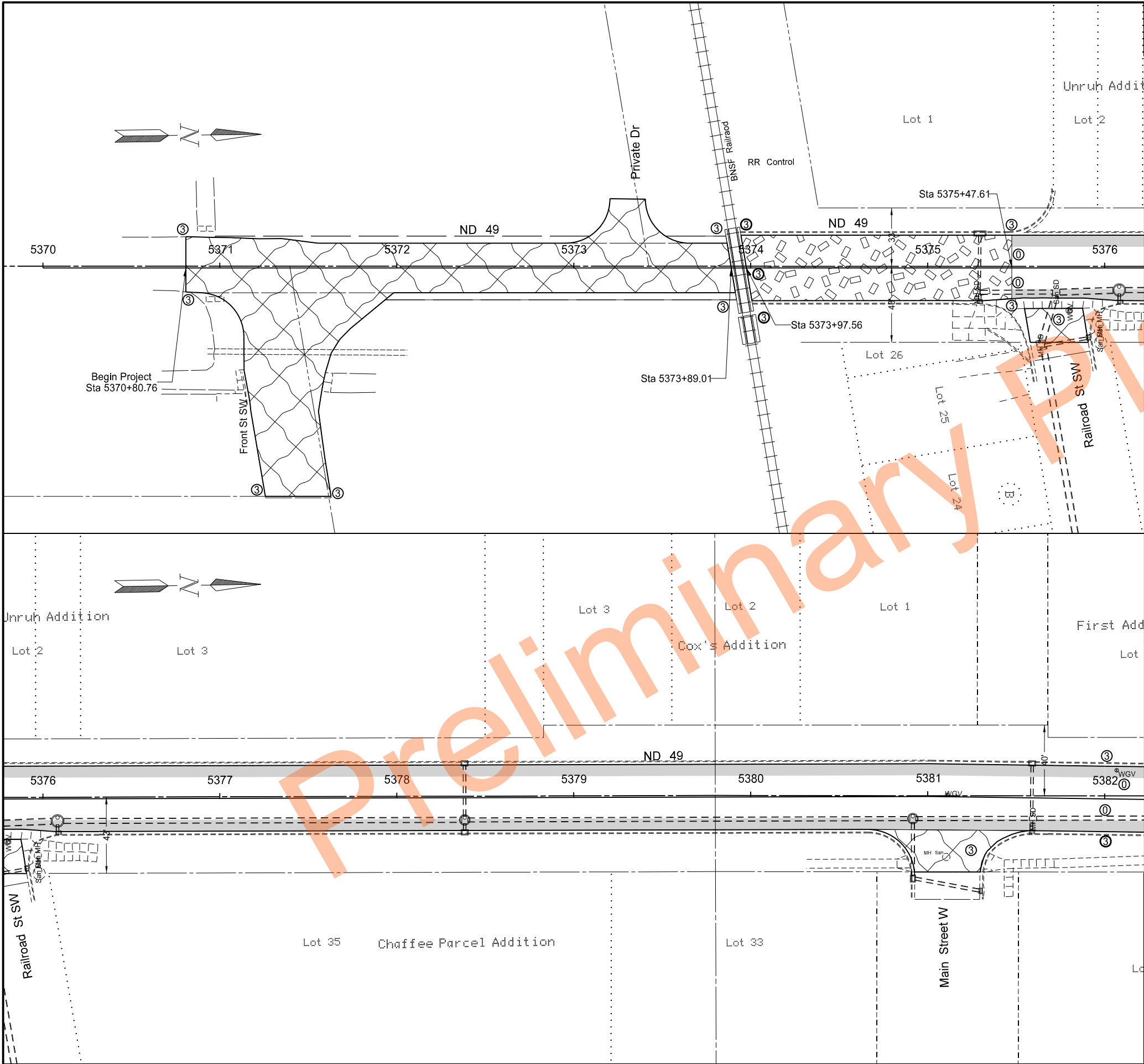
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/22/23

NORTH DAKOTA



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	40	5

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5370+80.76 to 5373+89.01 (3")	289	TON
		5373+97.56 to 5375+47.61 (3" @ FR, N end: 3" @ C&G, 0" @ 12' Lt to 12' Rt)	61	TON
		5375+47.61 to 5382+00 (3" @ C&G, 0" @ 12' Lt to 12' Rt)	79	TON
		Railroad St SW (ND 49 Rt side) (3")	12	TON
		Main St W (ND 49 Rt side) (3")	22	TON

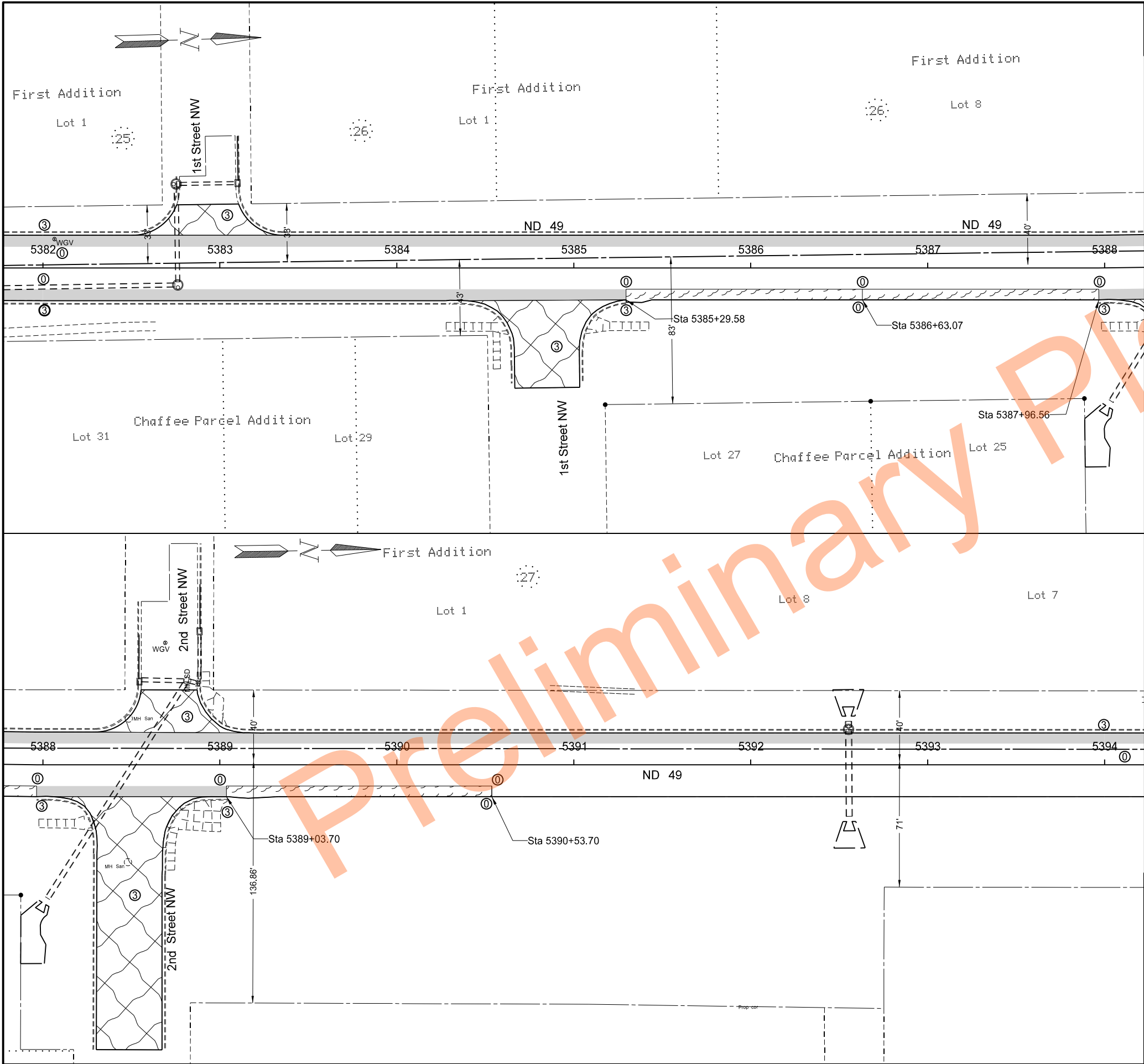
LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5370+80.76 to 5382+00



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	40	6

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5382+00 to 5394+00 Lt (3" @ C&G, 0" @ 12' Lt to CL)	70	TON
		5382+00 to 5385+29.58 Rt (3" @ C&G, 0" @ CL to 12' Rt)	20	TON
		1st St NW (ND 49 Lt side) (3")	16	TON
		1st St NW (ND 49 Rt side) (3")	40	TON
		5385+29.58 to 5387+96.56 Rt (S & N sides: 3" @ C&G, 0" @ CL to 12' Rt, middle: 0")	10	TON
		5387+96.56 to 5389+03.7 Rt (3" @ C&G, 0" @ CL to 12' Rt)	6	TON
		2nd St NW (ND 49 Lt side) (3")	20	TON
		2nd St NW (ND 49 Rt side) (3")	103	TON
		5389+03.70 to 5390+53.70 Rt (S side: 3" @ C&G, 0" @ CL to 12' Rt, N side: 0")	5	TON

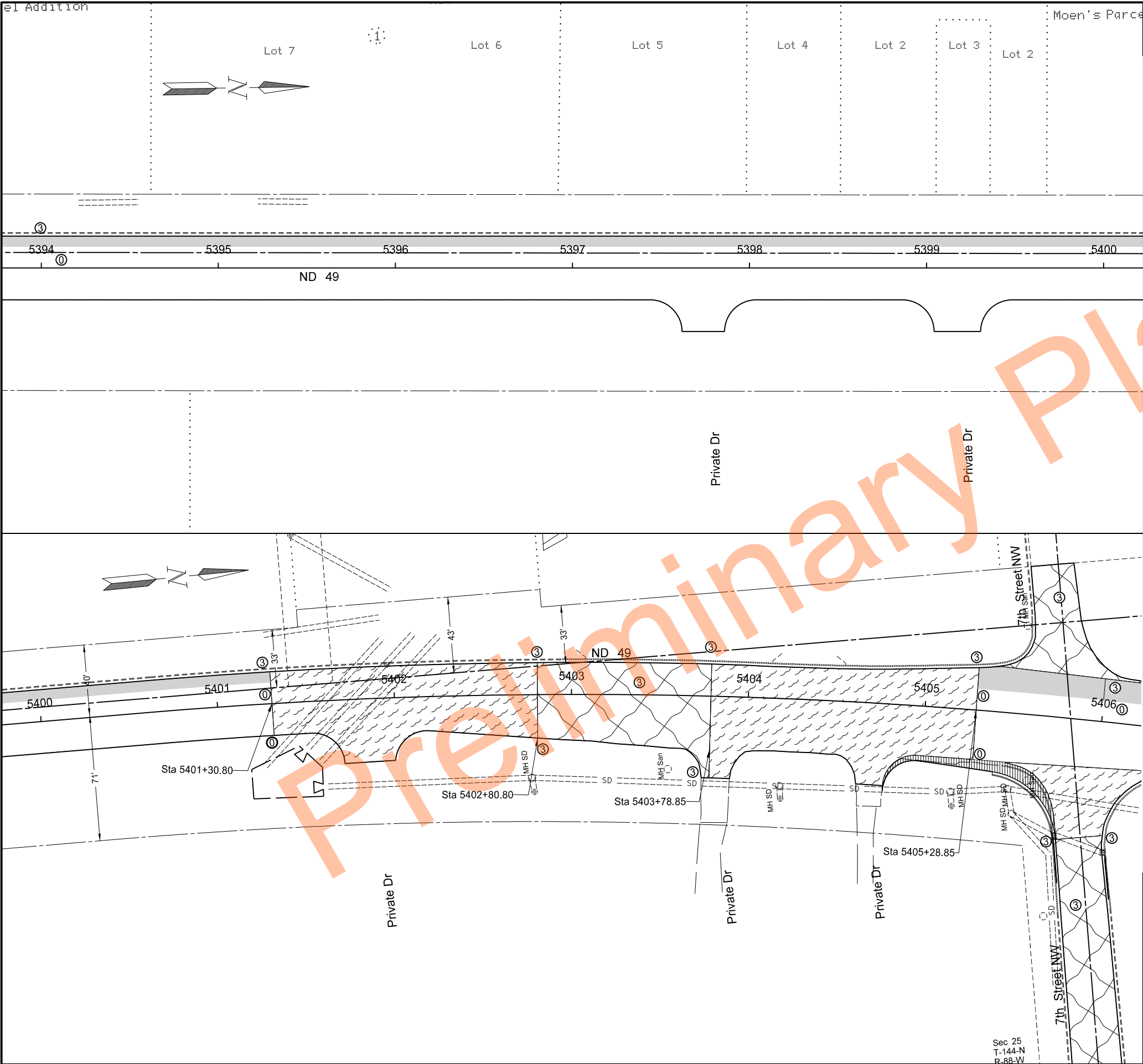
LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5382+00 to 5394+00



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	40	7

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5394+00 to 5401+30.8 Lt (3" @ C&G, 0" @ 12' Lt to CL)	41	TON
		5401+30.8 to 5402+80.8 (S side: 3' @ C&G, 0" @ 12' Lt to CL & Rt side, N side: 3")	63	TON
		5402+80.8 to 5403+78.85 (3")	86	TON
		5403+78.85 to 5405+28.85 (S side: 3", N side: 3" @ C&G, 0" @ 12' Lt to CL & Rt side)	79	TON
		5405+28.85 to 5406+00 Lt (3" @ C&G, 0" @ 12' Lt to CL)	9	TON
		7th St NW (ND 49 Lt side) (3")	36	TON

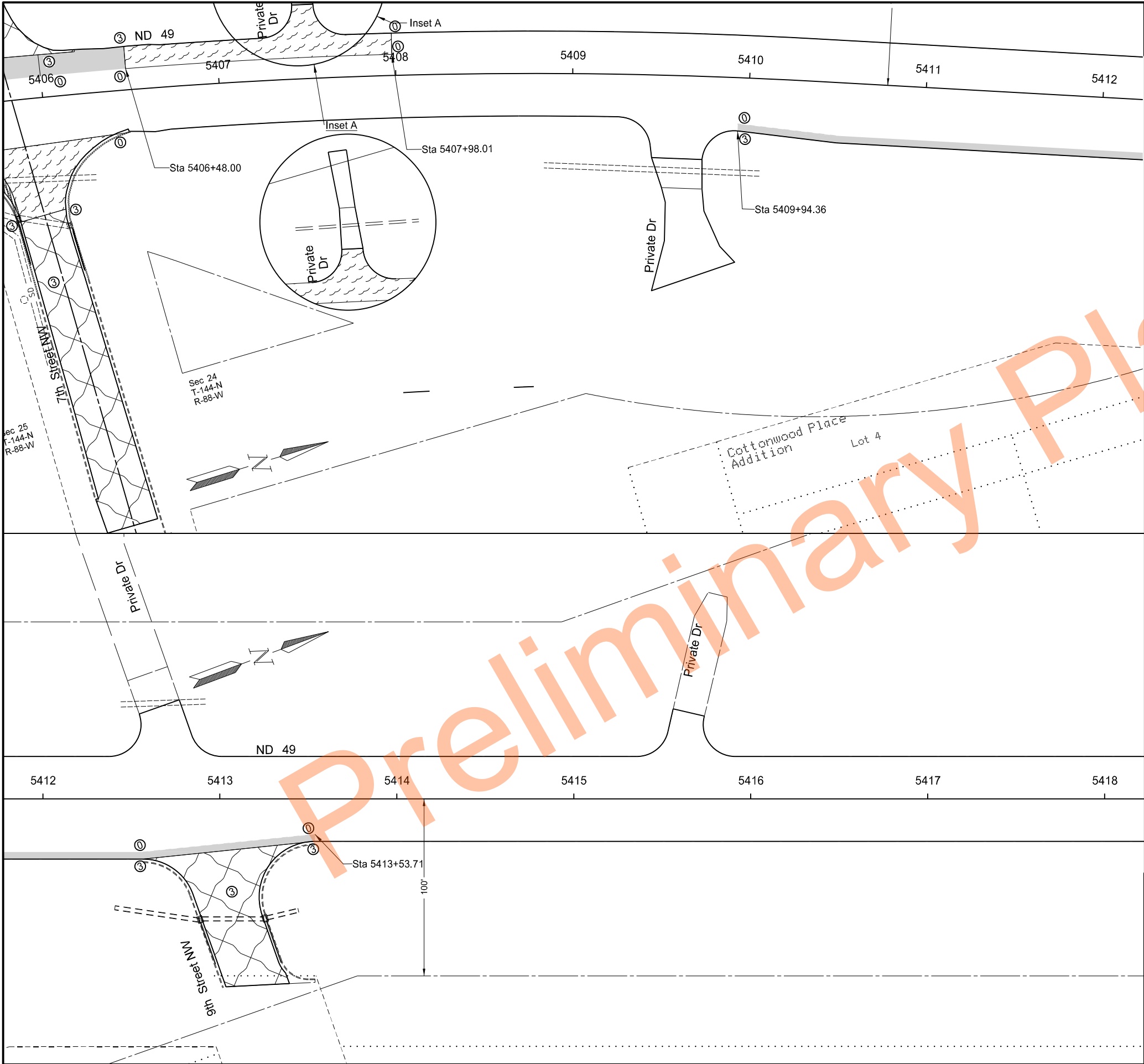
LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5394+00 to 5406+00



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	40	8

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		7th St NW (ND 49 Rt side) (3")	109	TON
		5406+00 to 5406+48 Lt (3" @ C&G 0" @ 12' Lt to CL)	6	TON
		5406+48 to 5407+98 Lt (S. side: 3" @ Lt side, 0" @ 12' Lt to CL, N side: 0")	11	TON
		5409+94.36 to 5413+53.71 Rt (3" @ Pmnt edge, 0" @ CL to 30' Rt)	14	TON
		9th St NW (ND 49 Rt side) (3")	58	TON

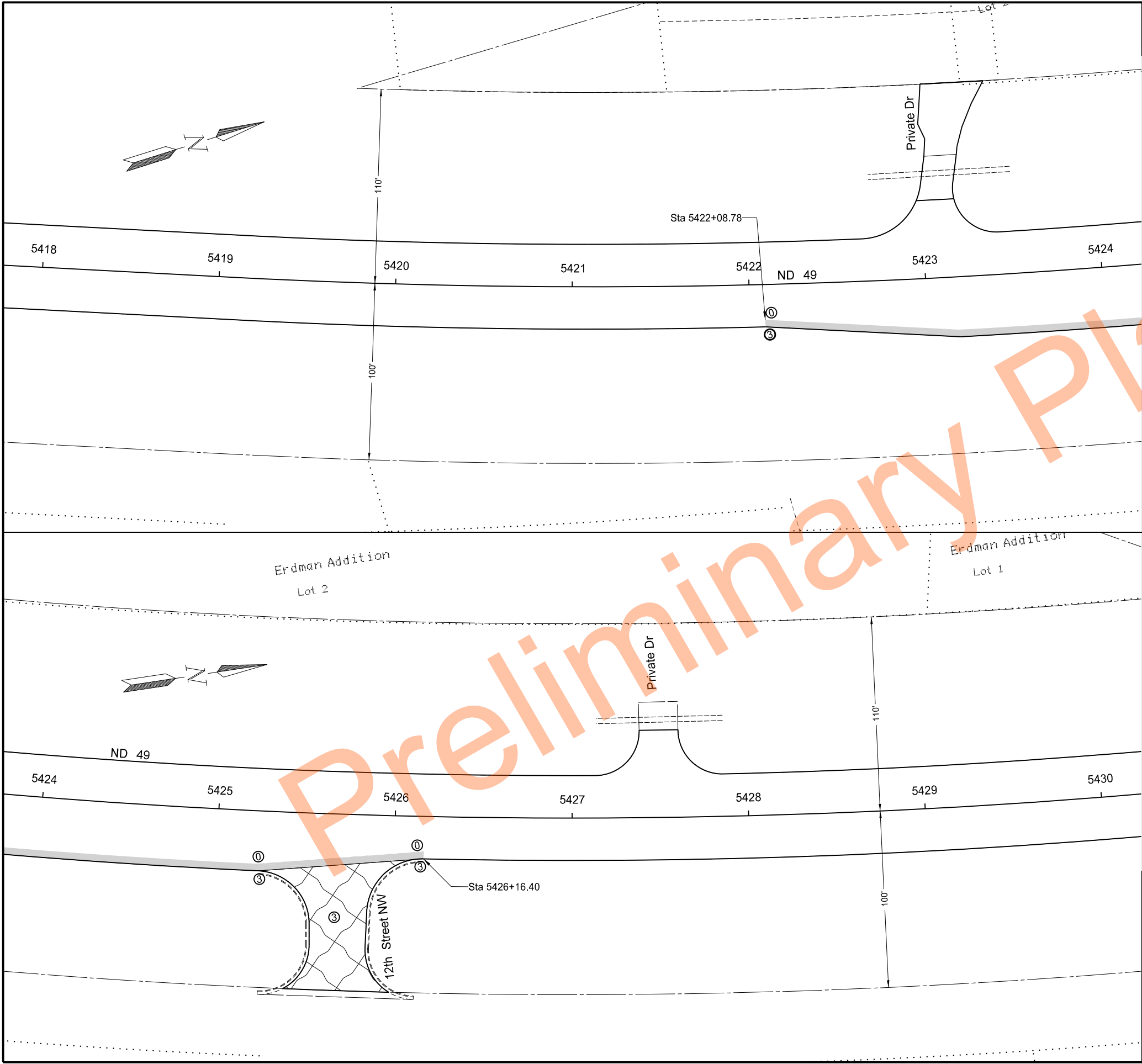
LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5406+00 to 5418+00



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	40	9

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5422+08.78 to 5426+16.40 Rt (3" @ Pmnt edge, 0" @ 30' Rt to CL)	16	TON
		12th St NW (ND 49 Rt side) (3")	54	TON

LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

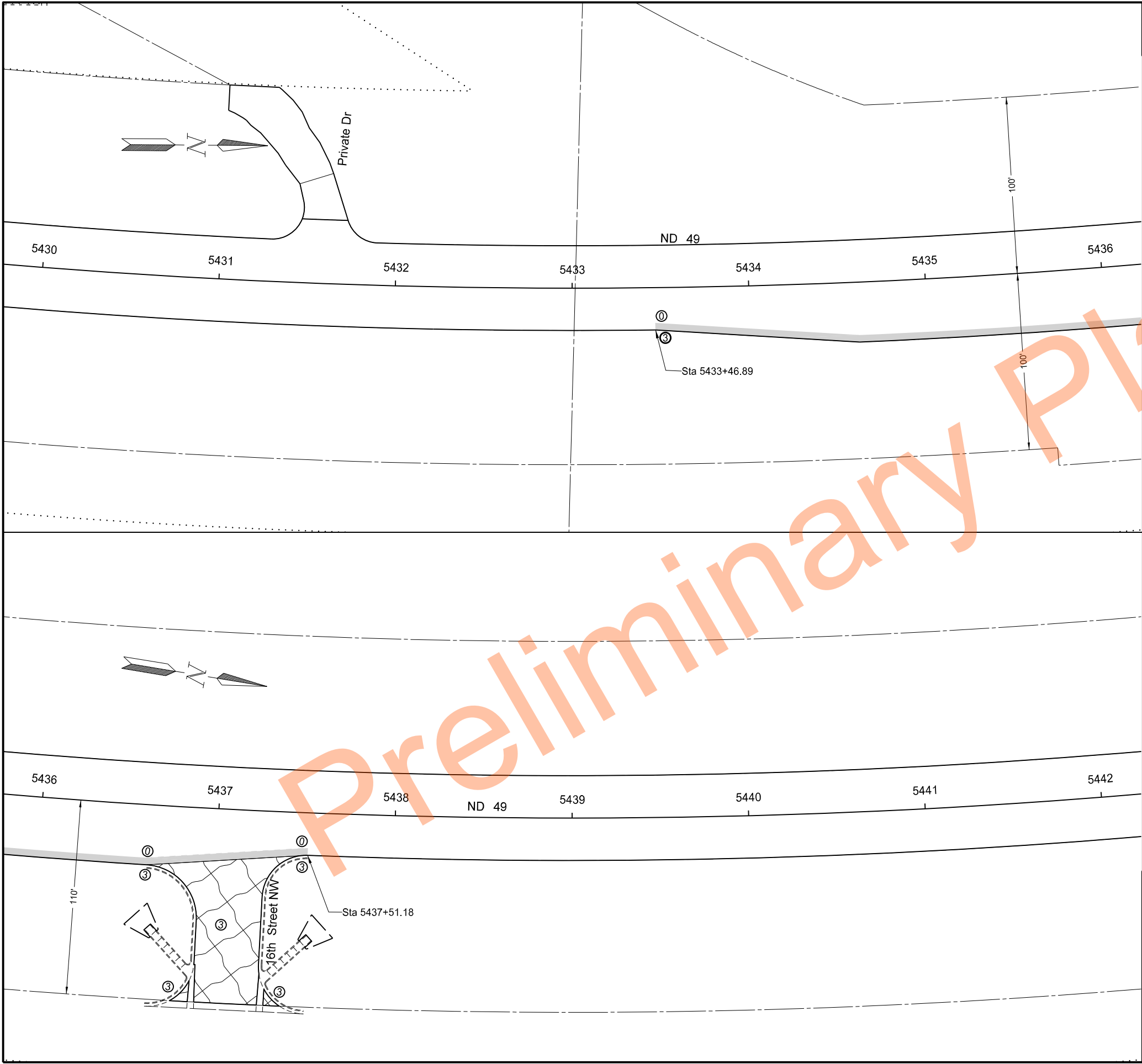
5418+00 to 5430+00

REGISTERED PROFESSIONAL ENGINEER

STACY LATEN
PE-8772

DATE 9/22/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	40	10

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5433+46.89 to 5437+51.18 Rt (3" @ Pmnt edge, 0" @ 30' Rt to CL)	16	TON
		16th St NW (ND 49 Rt side) (3")	63	TON

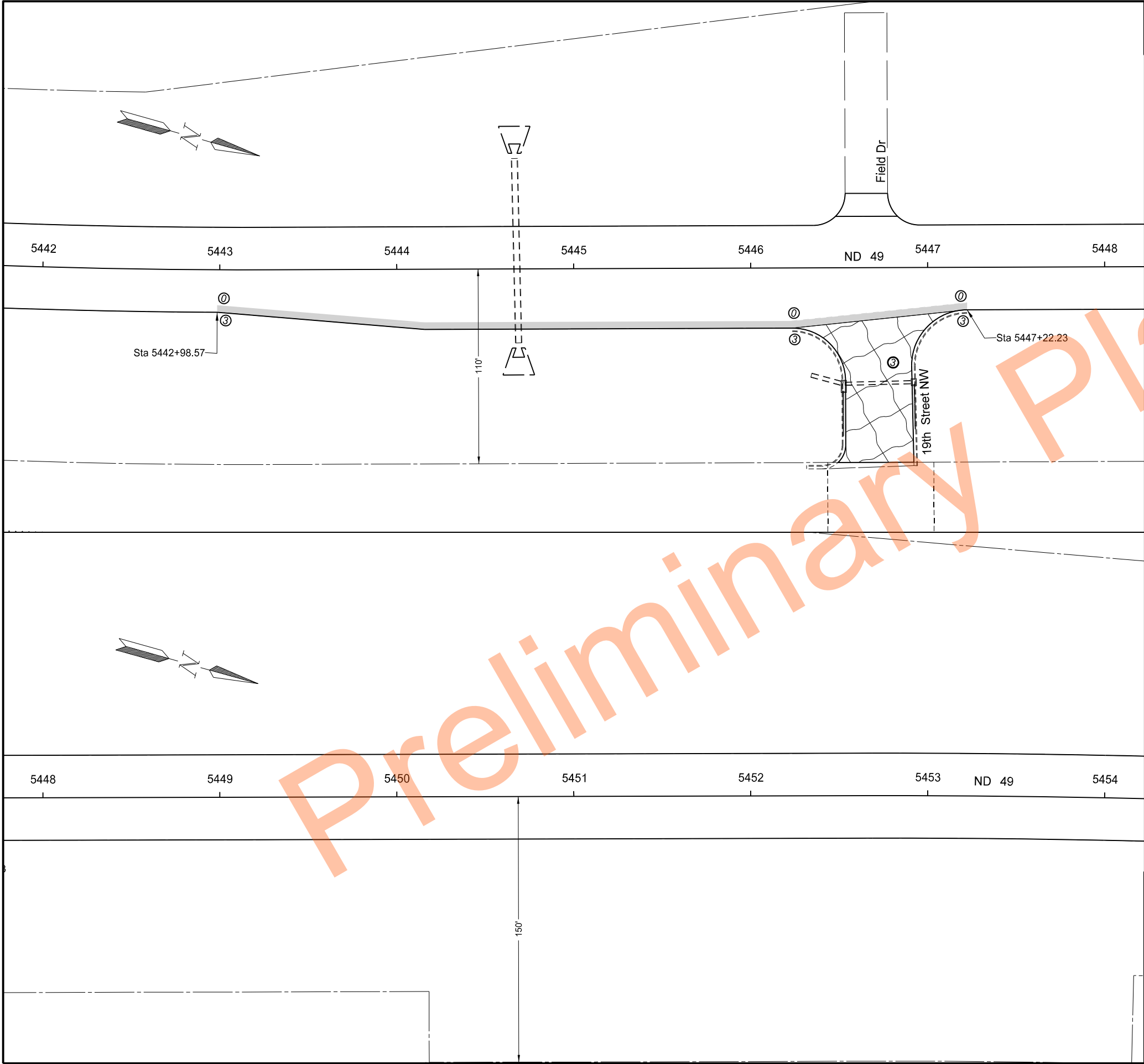
- LEGEND**
-  -Transition Mill 3" to 0"
 -  -Milling 3"
 -  -Milling 3" to 0" (Longitudinal) (see sheet 20-1)
 -  -Milling shoulder 3" to 0" (Transverse)
 -  -Removal of Pavement (see sheet 40-4)
 -  -Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5430+00 to 5442+00





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	40	11

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5442+98.57 to 5447+22.23 Rt (3" @ Rt side, 0" @ 30' Rt to CL)	16	TON
		19th St NW (ND 49 Rt side) (3")	65	TON

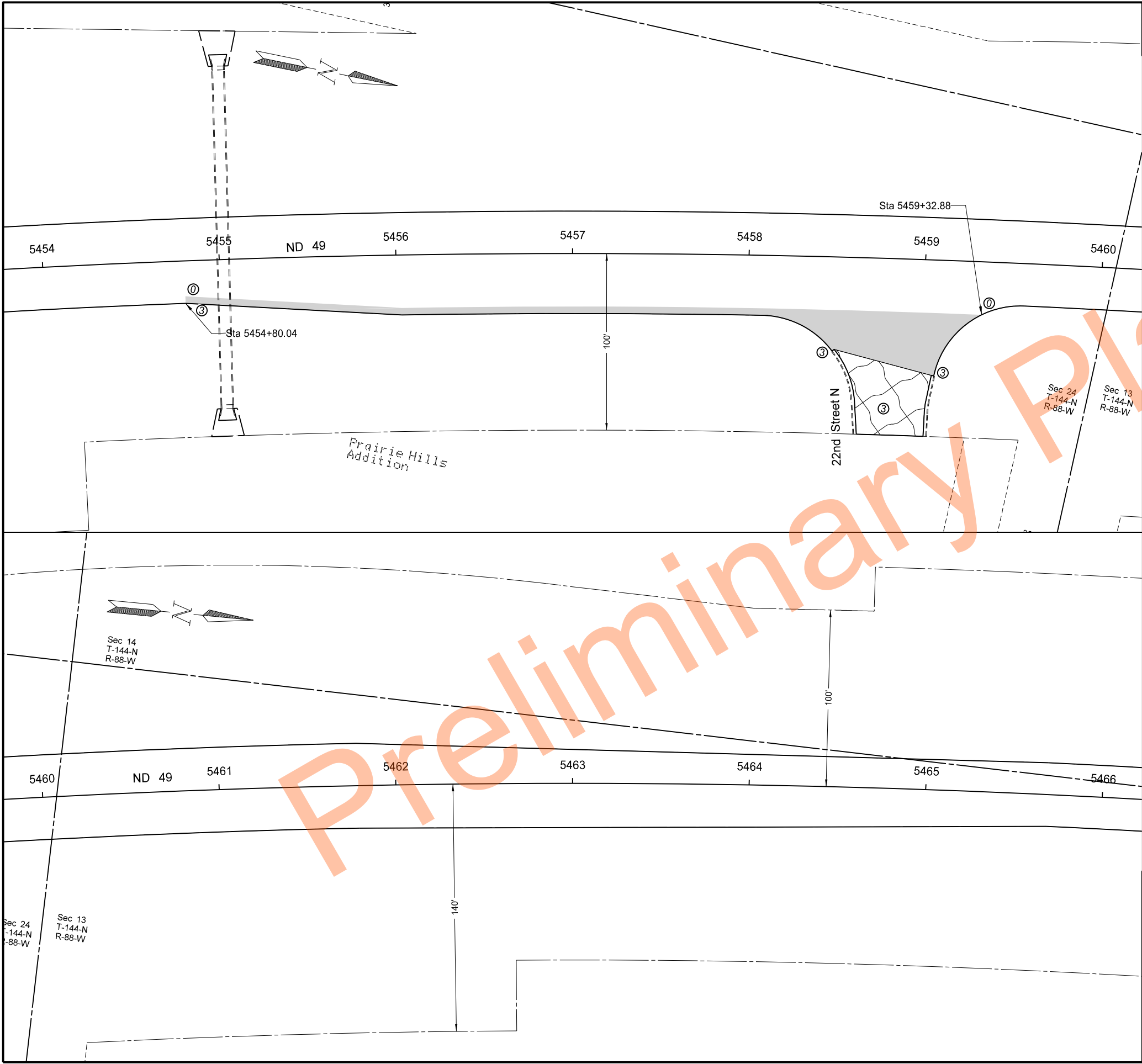
LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5442+00 to 5454+00



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	40	12

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		5454+80.04 to 5459+32.88 Rt (3" @ Rt side, 0" @ 30' Rt to CL)	35	TON
		22nd St N (ND 49 Rt side) (3")	32	TON

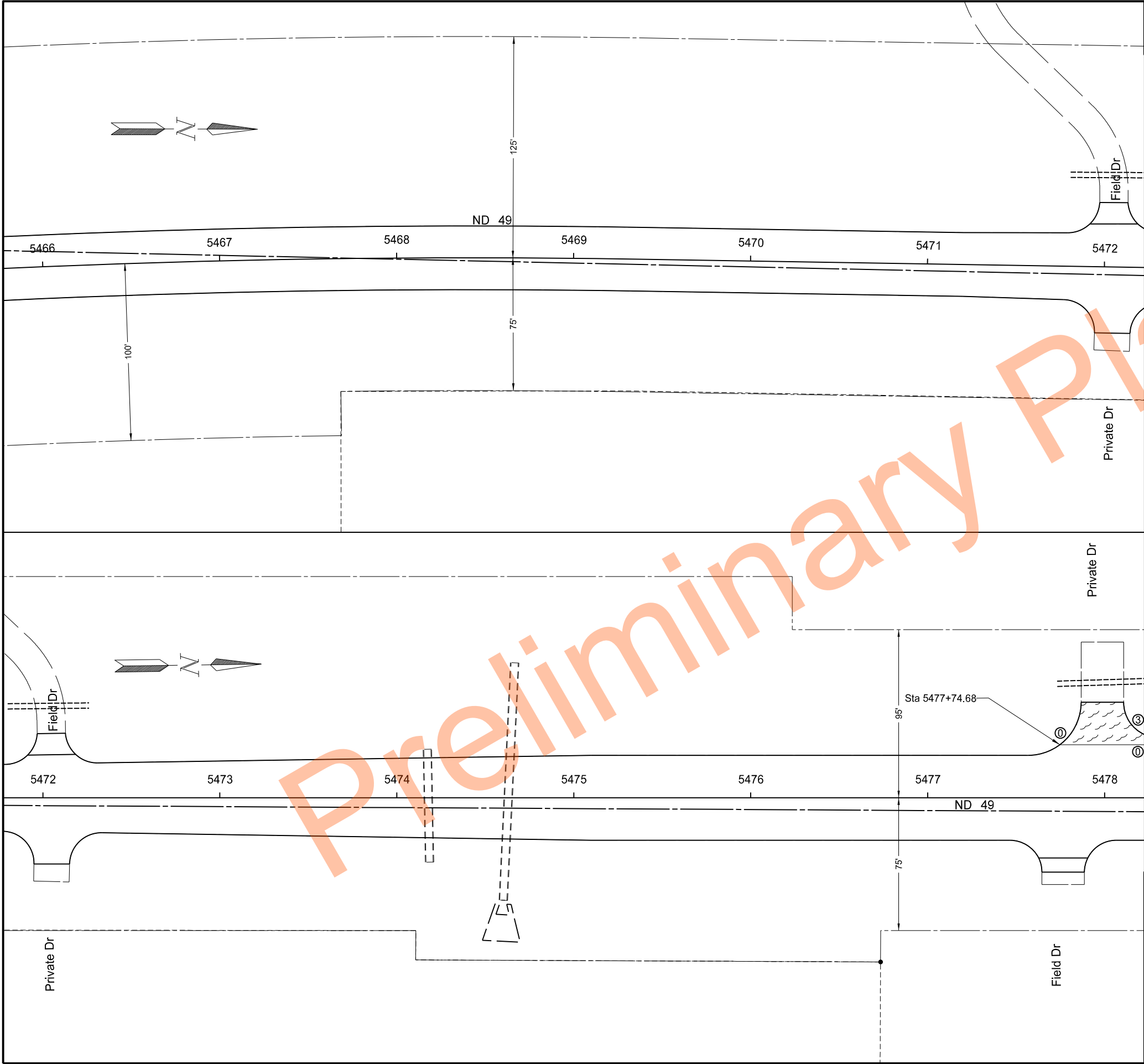
- LEGEND
- Transition Mill 3" to 0"
 - Milling 3"
 - Milling 3" to 0" (Longitudinal) (see sheet 20-1)
 - Milling shoulder 3" to 0" (Transverse)
 - Removal of Pavement (see sheet 40-4)
 - Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5454+00 to 5466+00





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	40	13

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
5477+74.68 to 5478+22.5 Lt (S side: 0", N side: 3" @ Lt side, 0" @ 30' Lt to CL)			4	TON

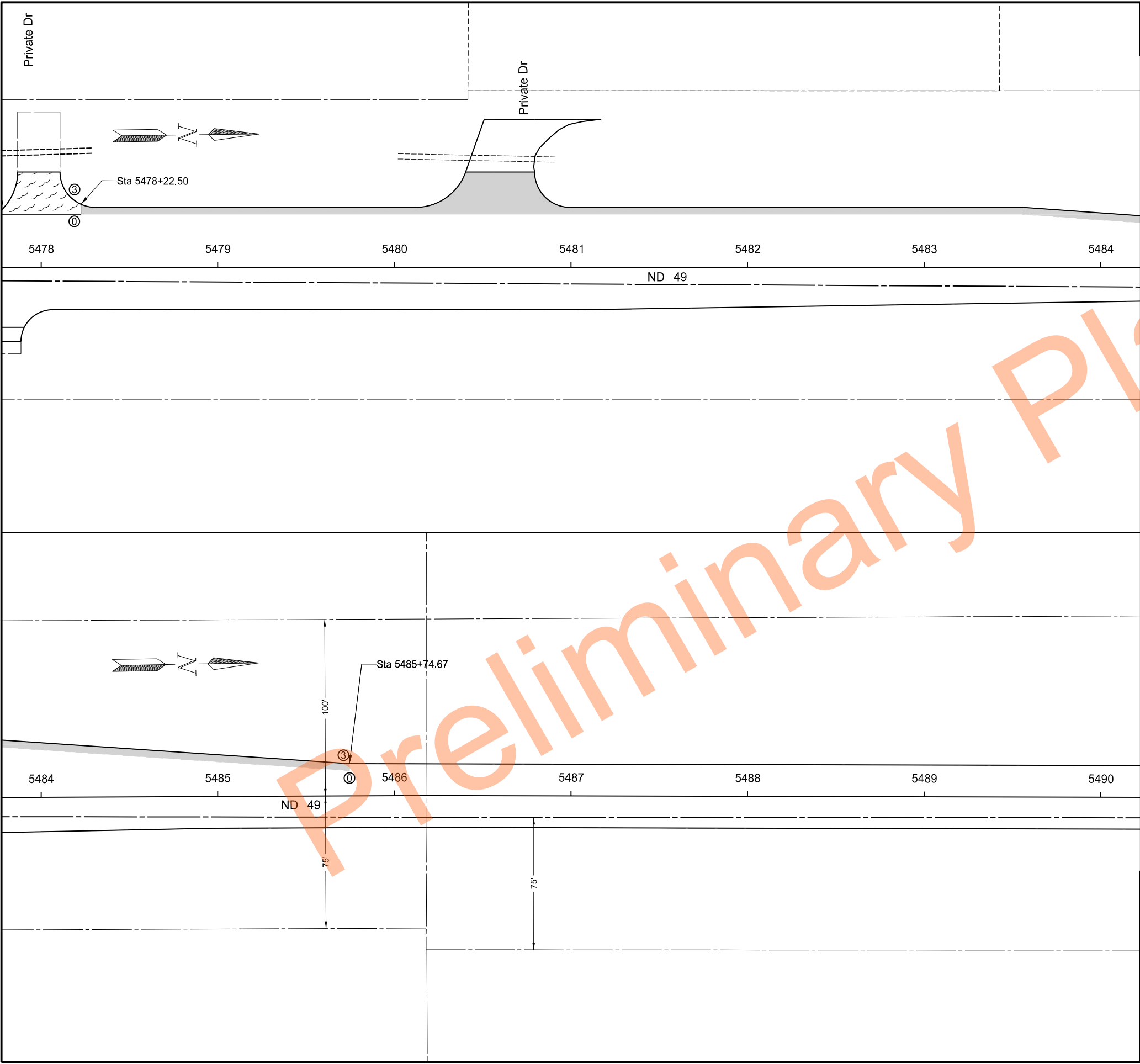
LEGEND

- Transition Mill 3" to 0"
- Milling 3"
- Milling 3" to 0" (Longitudinal) (see sheet 20-1)
- Milling shoulder 3" to 0" (Transverse)
- Removal of Pavement (see sheet 40-4)
- Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5466+00 to 5478+00



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	40	14

SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
5478+22.5 to 5485+74.67 Lt (3" @ Lt side, 0" @ 30' Lt to CL)			38	TON

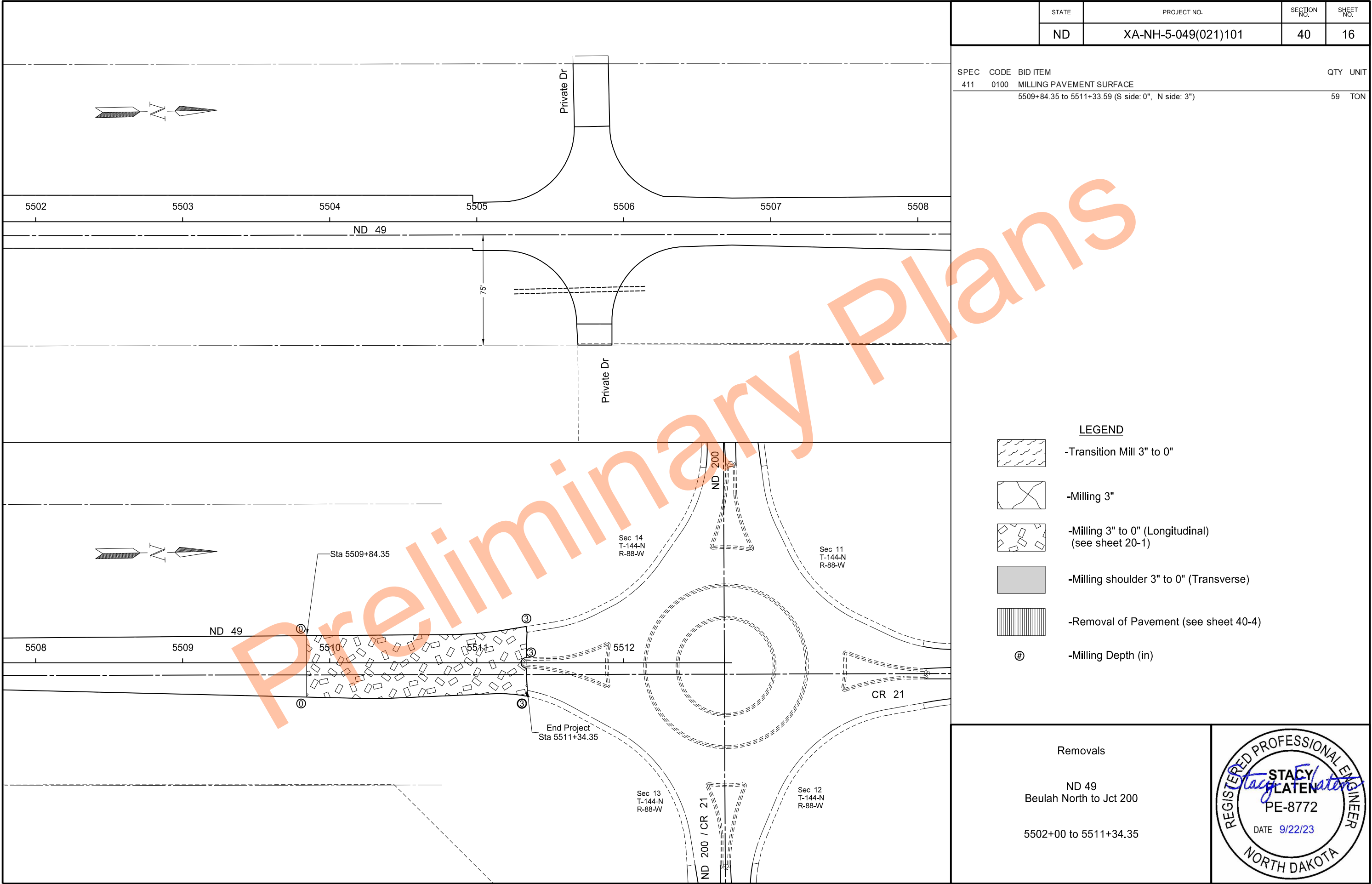
- LEGEND
- Transition Mill 3" to 0"
 - Milling 3"
 - Milling 3" to 0" (Longitudinal) (see sheet 20-1)
 - Milling shoulder 3" to 0" (Transverse)
 - Removal of Pavement (see sheet 40-4)
 - Milling Depth (in)

Removals

ND 49
Beulah North to Jct 200

5478+00 to 5490+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	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	Geosynthetic Material - Type G (Pay Item)	(*)		Applicable Backfill
													End Sections		
				In	Bid Item	LF							Begin	End	
				In	Bid Item	LF		In	Type		In	SY	EA	EA	
5370+89	47' Rt	5370+93	47' Rt	18	Pipe Conc. Reinf. CL III (Extension)	4'	Reinforced Concrete Pipe - Class III (barrell length = 4 LF)	18					FES		Specification 714.04 A

Corrugations:

2 = 2-2/3"x1/2"

3 = 3"x1"

5 = 5"x1"

Coatings: **Z** = Zinc
 A = Aluminum
 P = Polymeric (over Zinc or Aluminum)

Spiral Ribs: **3/4 = 3/4"x3/4"@7-1/2"**
 1 = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.

FES = Flared End Section

TES = Traversable End Section



Allowable Pipe List

ND 49
Beulah North to Jct 200

Other Waters Impact Table																			
Number	Location	Type	Feature	USACE Jurisdictional ¹	Impacts to Other Waters						Other Water Mitigation								
					Acres			Linear Feet			Mitigation Proposed			USACE Mitigation Bank		Onsite Mitigation Method		Onsite Constructed Location	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)	Mitigation Location; ratio	Acre(s)	Onsite Constructed Site #	Onsite Constructed Size Acre(s)
OW 1a & 1b	Sec. 25 & 26, T144N, R88W	Stream	Natural	Y	0.000	0.000	0.000	0.000	0.000	0.000	N	N	N						
Totals					0.000	0.000	0.000	0.000	0.000	0.000									

¹ A wetland Jurisdictional Determination was issued by the USACE on 12/2/2022; NWO-2009-1967-BIS.

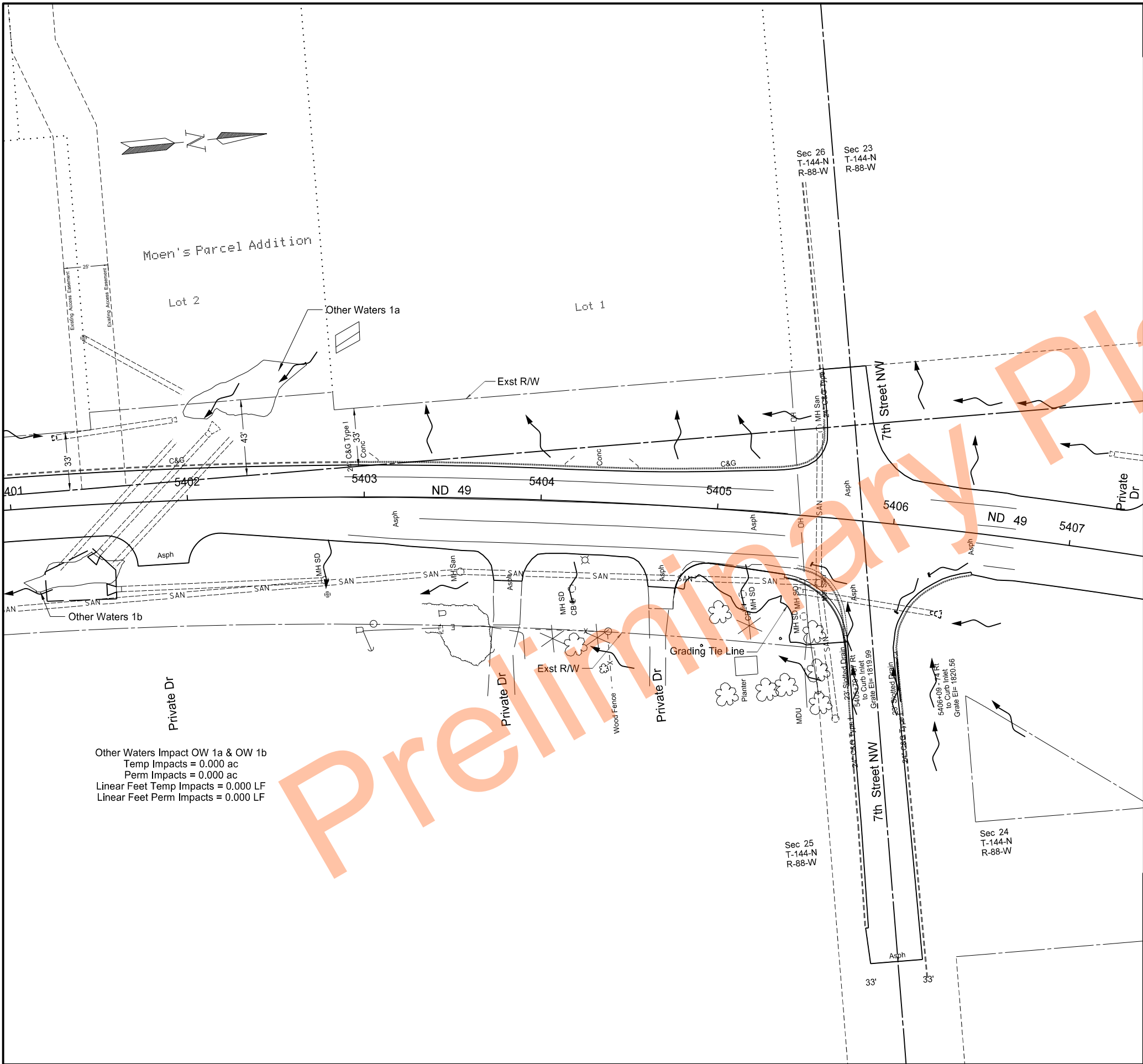
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	Water Type	Total Acre(s)
Natural/JD (Fill/Drain)	0.000	Temporary Wetland JD	0.000
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.000
Artificial/JD (Fill/Drain)	0.000		
Artificial /Non-JD (Fill/Drain))	0.000	Permanent OW	0.000
Total	0.000	Temporary OW	0.000
JD Natural (Cut)	0.000	Permanent OW-d	0.000
JD Artificial (Cut)	0.000	Temporary OW-d	0.000
Non-JD Natural (Cut)	0.000		
Non-JD Artificial (Cut)	0.000		
Total	0.000		

	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only						
EO 11990 Only						
USACE/11990						
USFWS						
Total		0.000	0.000	0.000	0.000	0.000



Wetlands Mitigation and Environmental

ND 49
Beulah North to Jct 200



Other Waters Impact OW 1a & OW 1b
Temp Impacts = 0.000 ac
Perm Impacts = 0.000 ac
Linear Feet Temp Impacts = 0.000 LF
Linear Feet Perm Impacts = 0.000 LF

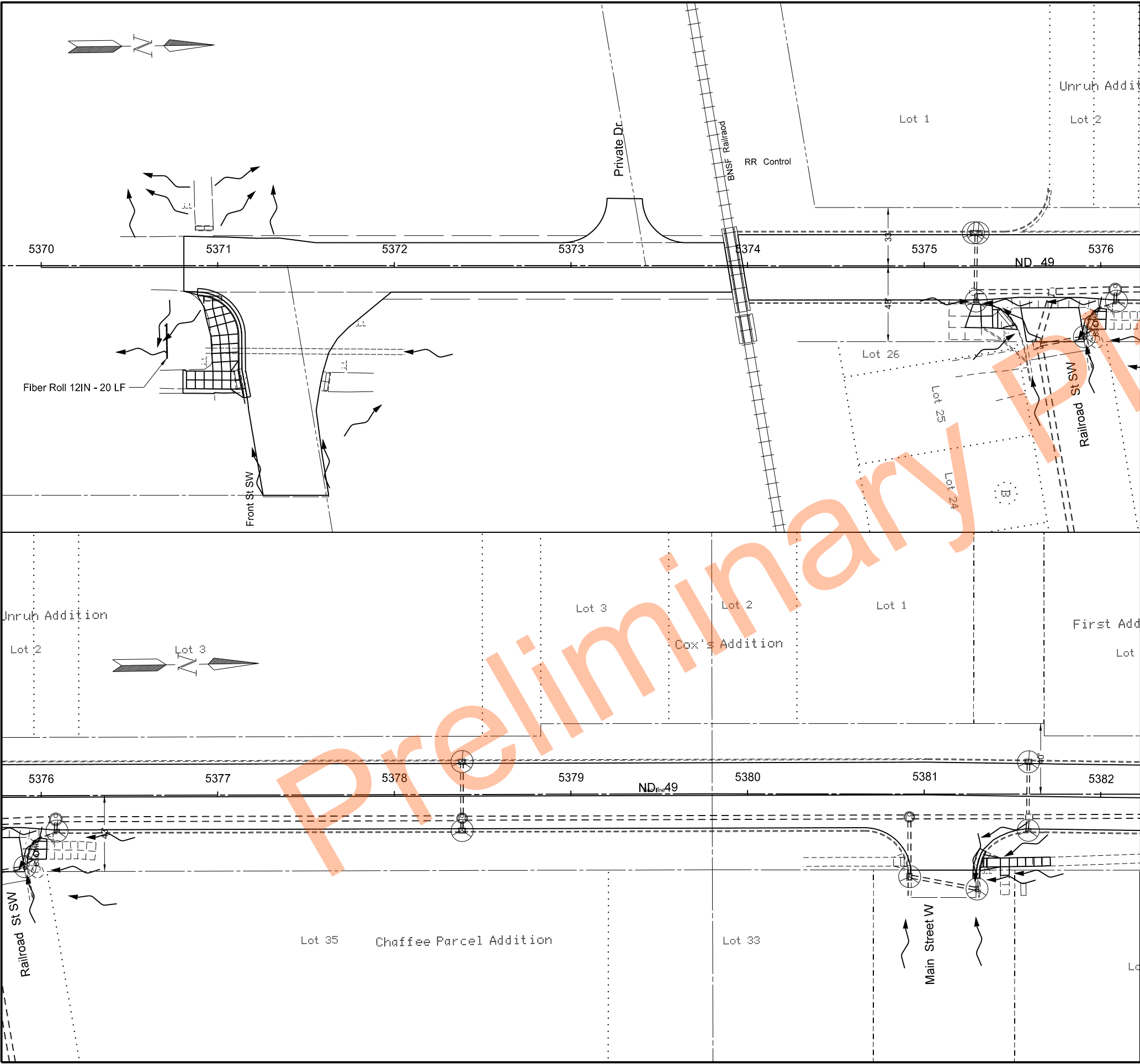
Wetland Impacts

ND 49
Beulah North to Jct 200

ND 49 & 7th St NW



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	75	2



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN ND 49 & Front St SW - SE Quadrant	20	LF
261	0113	REMOVE FIBER ROLLS 12IN ND 49 & Front St SW - SE Quadrant	20	LF
708	1540	INLET PROTECTION-SPECIAL ND 49 & Railroad S: SW - SW Quadrant ND 49 & Railroad S: SW - SE Quadrant ND 49 & Railroad S: SW - NE Quadrant 5378+38 Lt & Rt ND 49 & Main St W - NW Quadrant ND 49 & Main St W - SE Quadrant ND 49 & Main St W - NE Quadrant	2 1 2 2 1 1 2	EA EA EA EA EA EA EA
708	1541	REMOVE INLET PROTECTION-SPECIAL ND 49 & Railroad S: SW - SW Quadrant ND 49 & Railroad S: SW - SE Quadrant ND 49 & Railroad S: SW - NE Quadrant 5378+38 Lt & Rt ND 49 & Main St W - NW Quadrant ND 49 & Main St W - SE Quadrant ND 49 & Main St W - NE Quadrant	2 1 2 2 1 1 2	EA EA EA EA EA EA EA

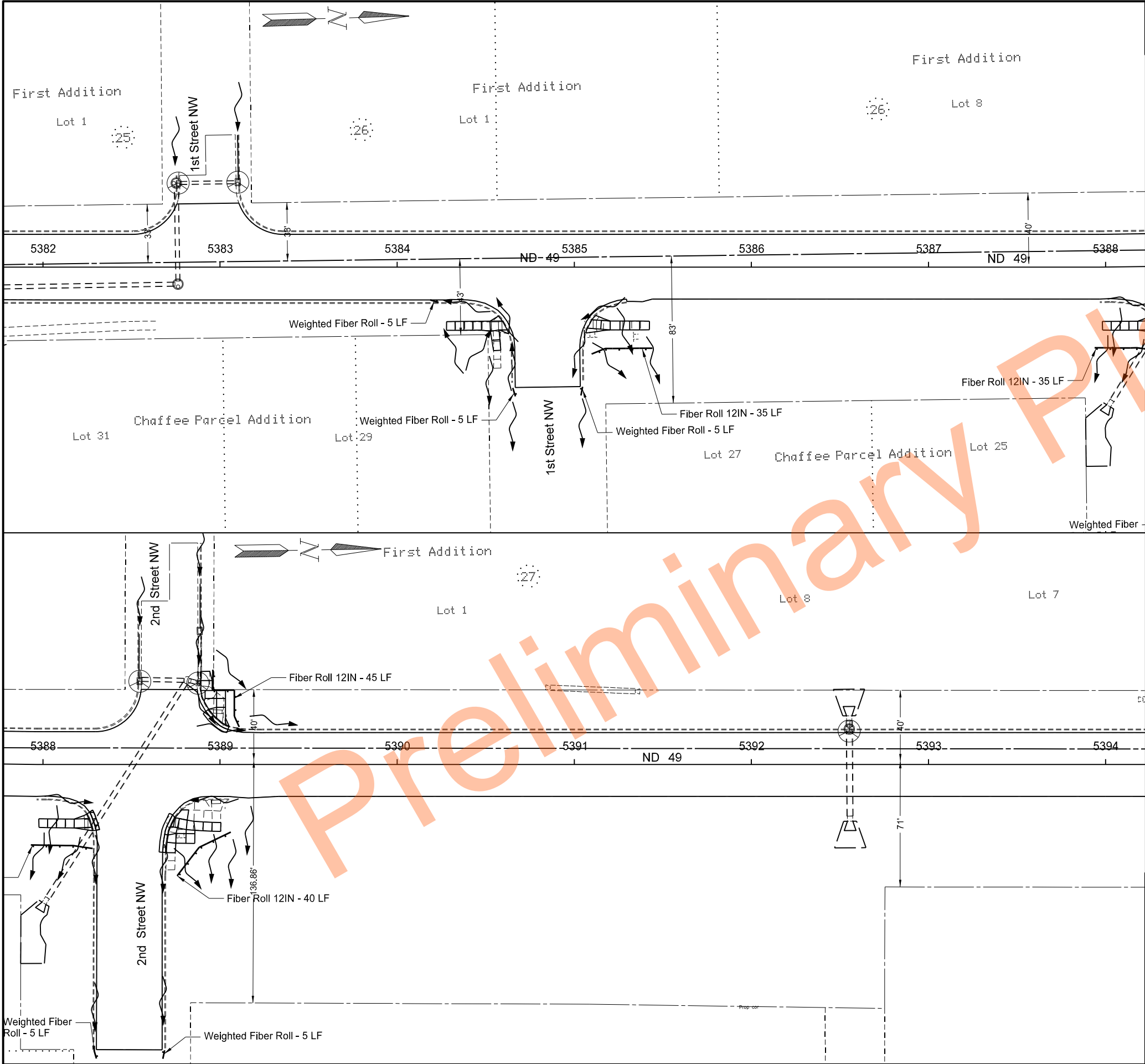
LEGEND
Inlet Protection-Special

Temporary Erosion Control

ND 49
Beulah, North to Jct 200

5370+80.76 to 5382+00





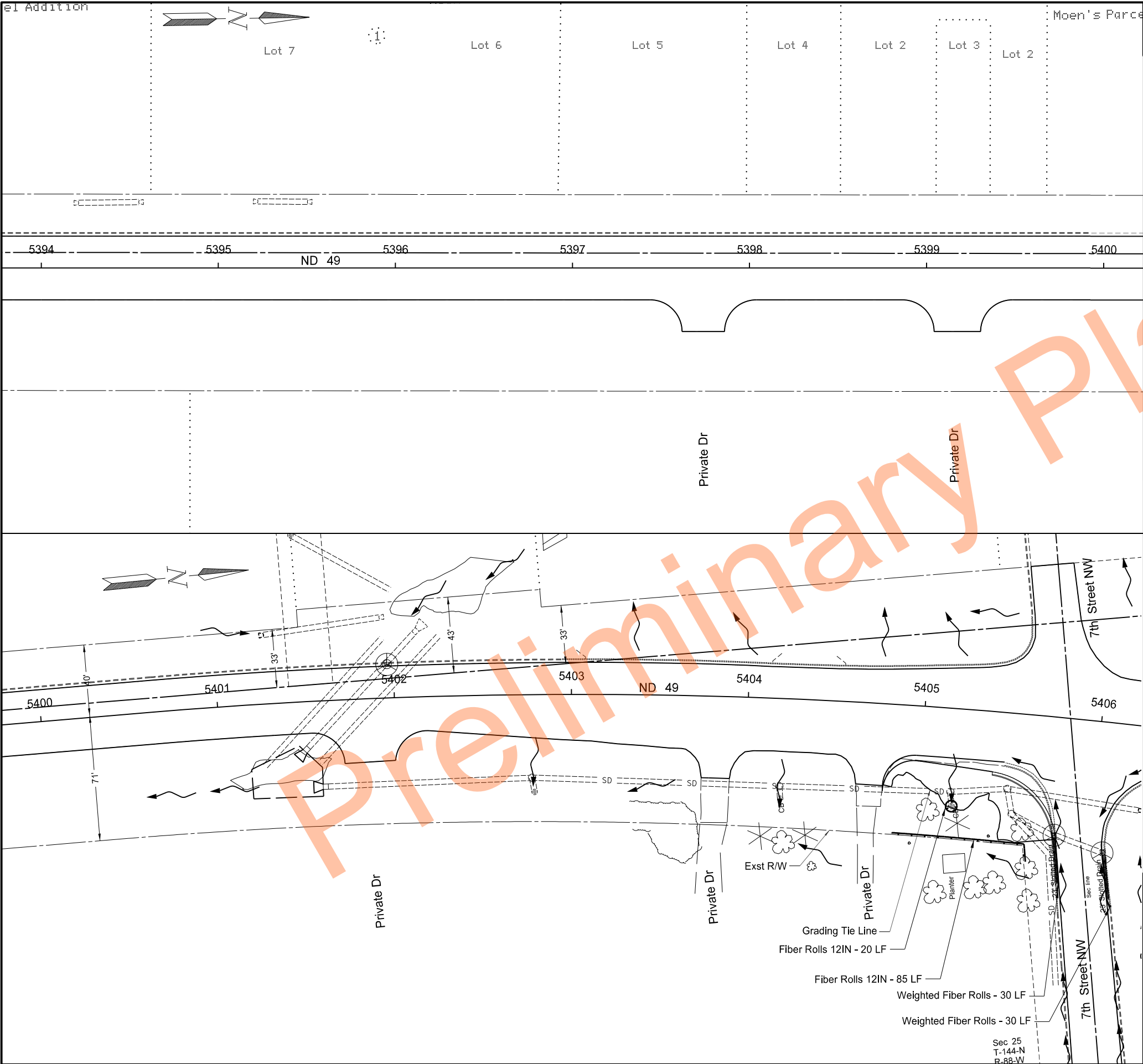
		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	76	2

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		ND 5 & 1st Ave NW - NE Quadrant	35	LF
		ND 49 & 2nd St NW - NW Quadrant	45	LF
		ND 49 & 2nd St NW - SE Quadrant	35	LF
		ND 49 & 2nd St NW - NE Quadrant	40	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		ND 5 & 1st Ave NW - NE Quadrant	35	LF
		ND 49 & 2nd St NW - NW Quadrant	45	LF
		ND 49 & 2nd St NW - SE Quadrant	35	LF
		ND 49 & 2nd St NW - NE Quadrant	40	LF
261	0200	WEIGHTED FIBER ROLLS		
		ND 5 & 1st Ave NW - SE Quadrant	10	LF
		ND 5 & 1st Ave NW - NE Quadrant	5	LF
		ND 5 & 2nd St NW - SE Quadrant	5	LF
		ND 5 & 2nd St NW - NE Quadrant	5	LF
261	0201	REMOVE WEIGHTED FIBER ROLLS		
		ND 5 & 1st Ave NW - SE Quadrant	10	LF
		ND 5 & 1st Ave NW - NE Quadrant	5	LF
		ND 5 & 2nd St NW - SE Quadrant	5	LF
		ND 5 & 2nd St NW - NE Quadrant	5	LF
708	1540	INLET PROTECTION-SPECIAL		
		ND 5 & 1st Ave NW - NW Quadrant	1	EA
		ND 5 & 1st Ave NW - SW Quadrant	1	EA
		ND 49 & 2nd St NW - NW Quadrant	1	EA
		ND 49 & 2nd St NW - SW Quadrant	1	EA
		5392+55 Lt	1	EA
708	1541	REMOVE INLET PROTECTION-SPECIAL		
		ND 5 & 1st Ave NW - NW Quadrant	1	EA
		ND 5 & 1st Ave NW - SW Quadrant	1	EA
		ND 49 & 2nd St NW - NW Quadrant	1	EA
		ND 49 & 2nd St NW - SW Quadrant	1	EA
		5392+55 Lt	1	EA

LEGEND

Inlet Protection-Special

Temporary Erosion Control	REGISTERED PROFESSIONAL ENGINEER STACY FLATEN PE-8772 DATE 9/28/23 NORTH DAKOTA
ND 49	
Beulah, North to Jct 200	
5382+00 to 5394+00	



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	76	3
SPEC	CODE	BID ITEM		QTY	UNIT
261	0112	FIBER ROLLS 12IN			
		ND 49 & 7th St NW - SE Quadrant		105	LF
261	0113	REMOVE FIBER ROLLS 12IN			
		ND 49 & 7th St NW - SE Quadrant		105	LF
261	0200	WEIGHTED FIBER ROLLS			
		ND 49 & 7th St NW - SE Quadrant		30	LF
		ND 49 & 7th St NW - NE Quadrant		30	LF
261	0201	REMOVE WEIGHTED FIBER ROLLS			
		ND 49 & 7th St NW - SE Quadrant		30	LF
		ND 49 & 7th St NW - NE Quadrant		30	LF
708	1540	INLET PROTECTION-SPECIAL			
		5401+96 Lt		1	EA
		ND 49 & 7th St NW - SE Quadrant		1	EA
		ND 49 & 7th St NW - NE Quadrant		1	EA
708	1541	REMOVE INLET PROTECTION-SPECIAL			
		5401+96 Lt		1	EA
		ND 49 & 7th St NW - SE Quadrant		1	EA
		ND 49 & 7th St NW - NE Quadrant		1	EA

LEGEND

Inlet Protection-Special

Temporary Erosion Control

ND 49
Beulah, North to Jct 200

5394+00 to 5406+00

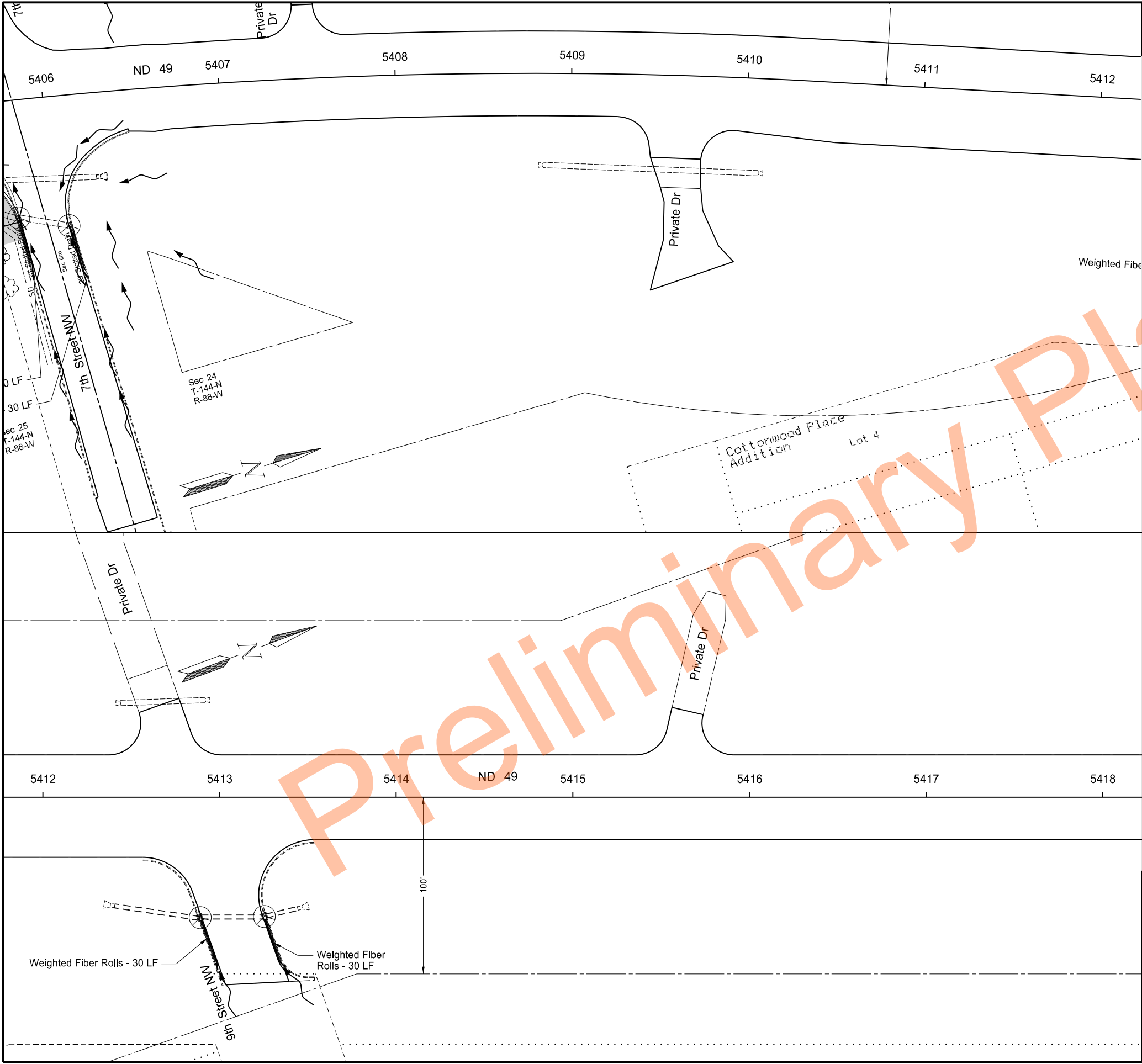
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/28/23

NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.

ND	XA-NH-5-049(021)101	76	4
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SPEC	CODE	BID ITEM	QTY	UNIT
261	0200	WEIGHTED FIBER ROLLS		
		ND 49 & 9th St NW - SE Quadrant	30	LF
		ND 49 & 9th St NW - NE Quadrant	30	LF
261	0201	REMOVE WEIGHTED FIBER ROLLS		
		ND 49 & 9th St NW - SE Quadrant	30	LF
		ND 49 & 9th St NW - NE Quadrant	30	LF
708	1540	INLET PROTECTION-SPECIAL		
		ND 49 & 9th St NW - SE Quadrant	1	EA
		ND 49 & 9th St NW - NE Quadrant	1	EA
708	1541	REMOVE INLET PROTECTION-SPECIAL		
		ND 49 & 9th St NW - SE Quadrant	1	EA
		ND 49 & 9th St NW - NE Quadrant	1	EA

LEGEND

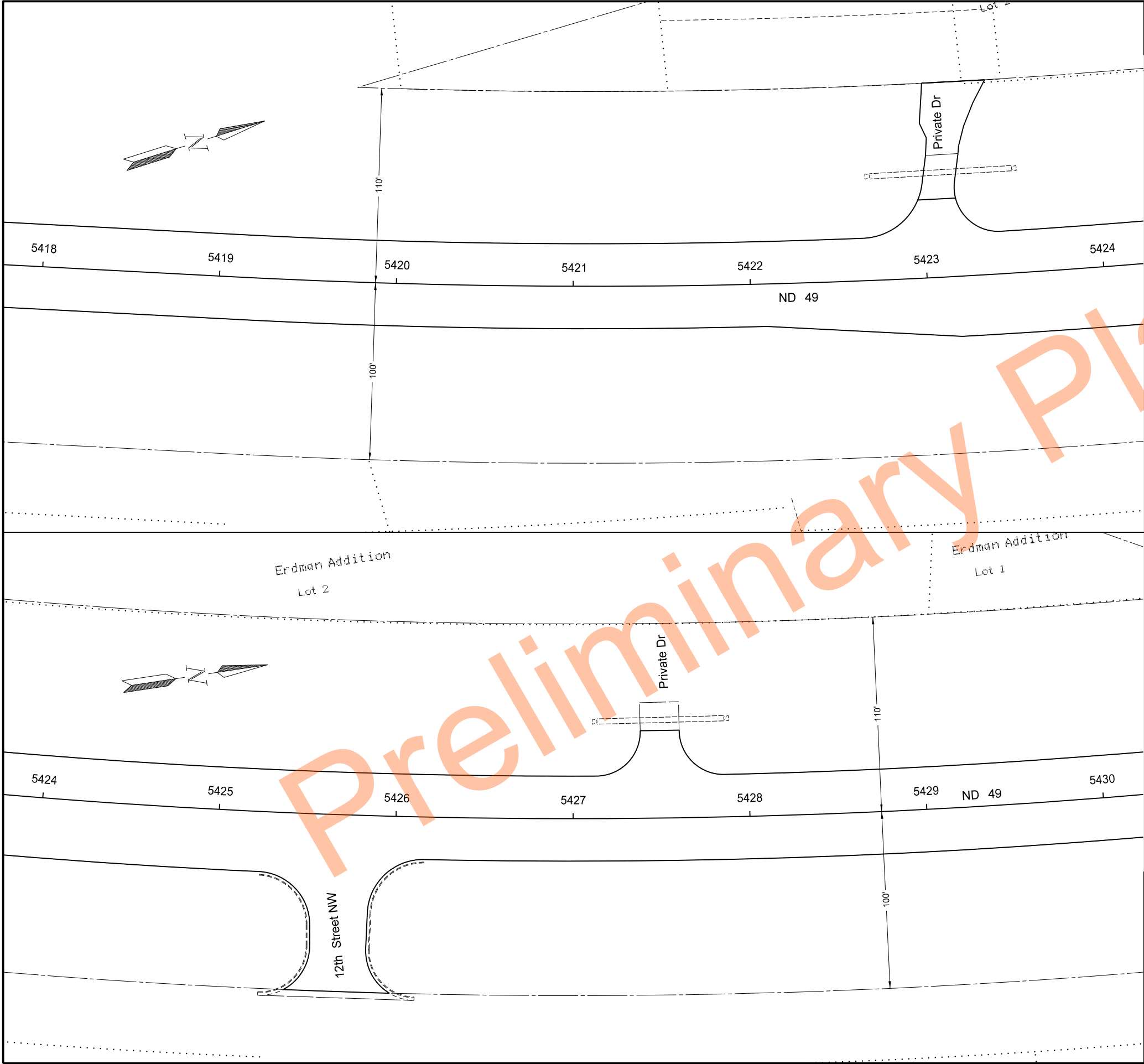
 Inlet Protection-Special

Temporary Erosion Control

ND 49
Beulah, North to Jct 200

5406+00 to 5418+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	76	5

LEGEND

⊗ Inlet Protection-Special

Temporary Erosion Control

ND 49
Beulah, North to Jct 200

5418+00 to 5430+00

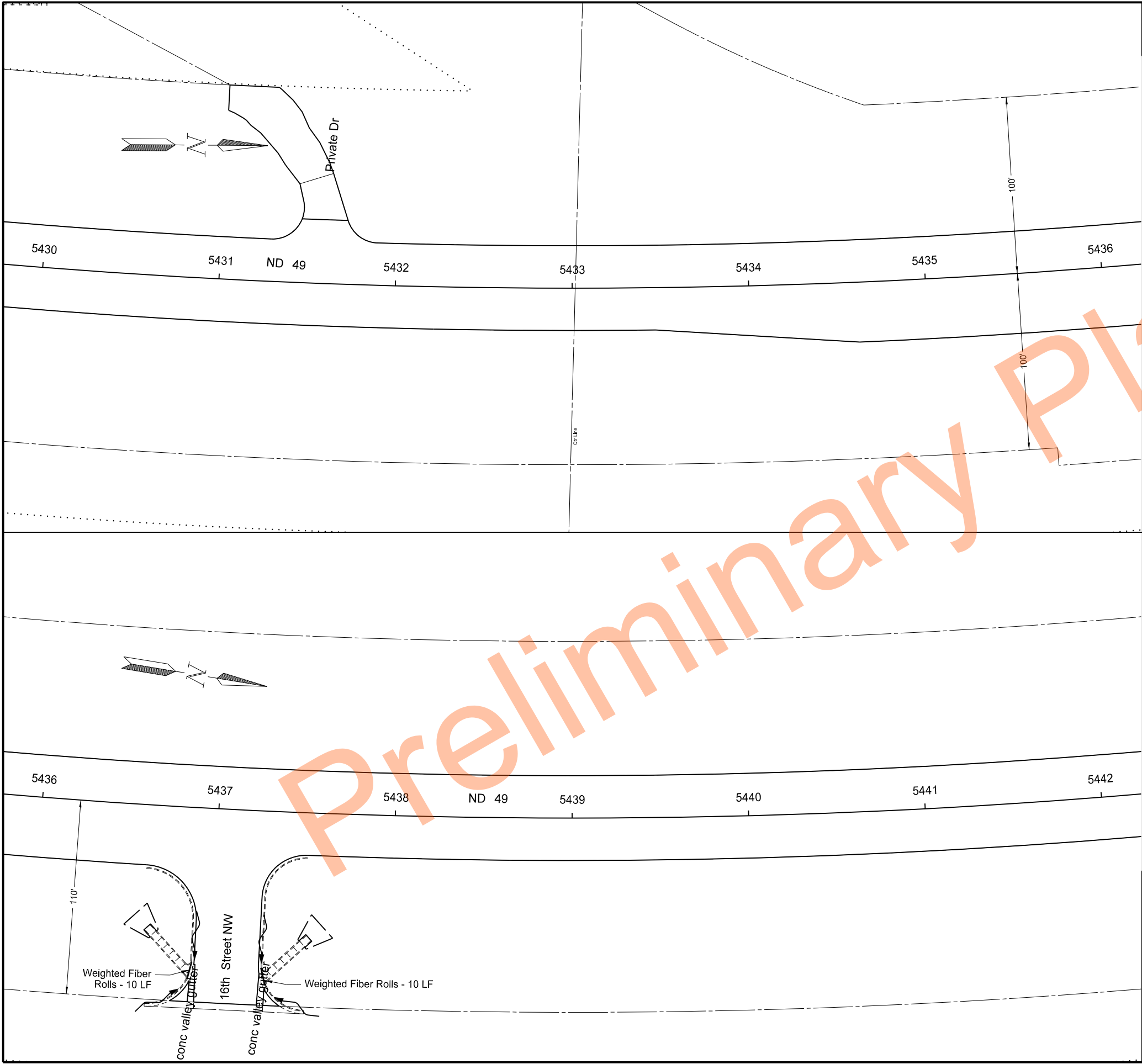
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/28/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	76	6

SPEC	CODE	BID ITEM	QTY	UNIT
261	0200	WEIGHTED FIBER ROLLS		
		ND 49 & 16th St NW - SE Quadrant	10	LF
		ND 49 & 16th St NW - NE Quadrant	10	LF
261	0201	REMOVE WEIGHTED FIBER ROLLS		
		ND 49 & 16th St NW - SE Quadrant	10	LF
		ND 49 & 16th St NW - NE Quadrant	10	LF

LEGEND

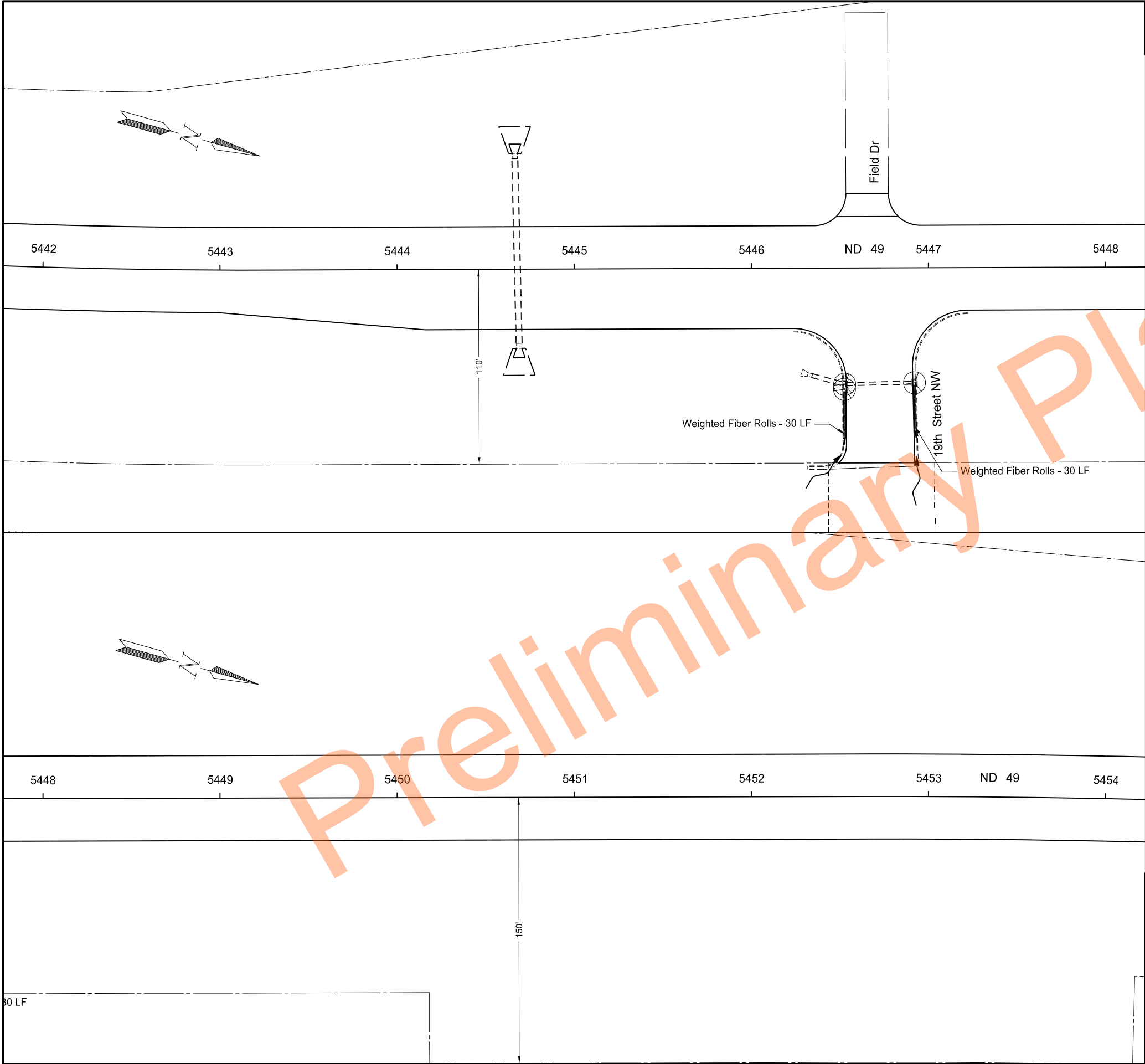
 Inlet Protection-Special

Temporary Erosion Control

ND 49
Beulah, North to Jct 200

5430+00 to 5442+00





STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	76	7

SPEC	CODE	BID ITEM	QTY	UNIT
261	0200	WEIGHTED FIBER ROLLS		
		ND 49 & 19th St NW - SE Quadrant	30	LF
		ND 49 & 19th St NW - NE Quadrant	30	LF
261	0201	REMOVE WEIGHTED FIBER ROLLS		
		ND 49 & 19th St NW - SE Quadrant	30	LF
		ND 49 & 19th St NW - NE Quadrant	30	LF
708	1540	INLET PROTECTION-SPECIAL		
		ND 49 & 19th St NW - SE Quadrant	2	EA
		ND 49 & 19th St NW - NE Quadrant	1	EA
708	1541	REMOVE INLET PROTECTION-SPECIAL		
		ND 49 & 19th St NW - SE Quadrant	2	EA
		ND 49 & 19th St NW - NE Quadrant	1	EA

LEGEND

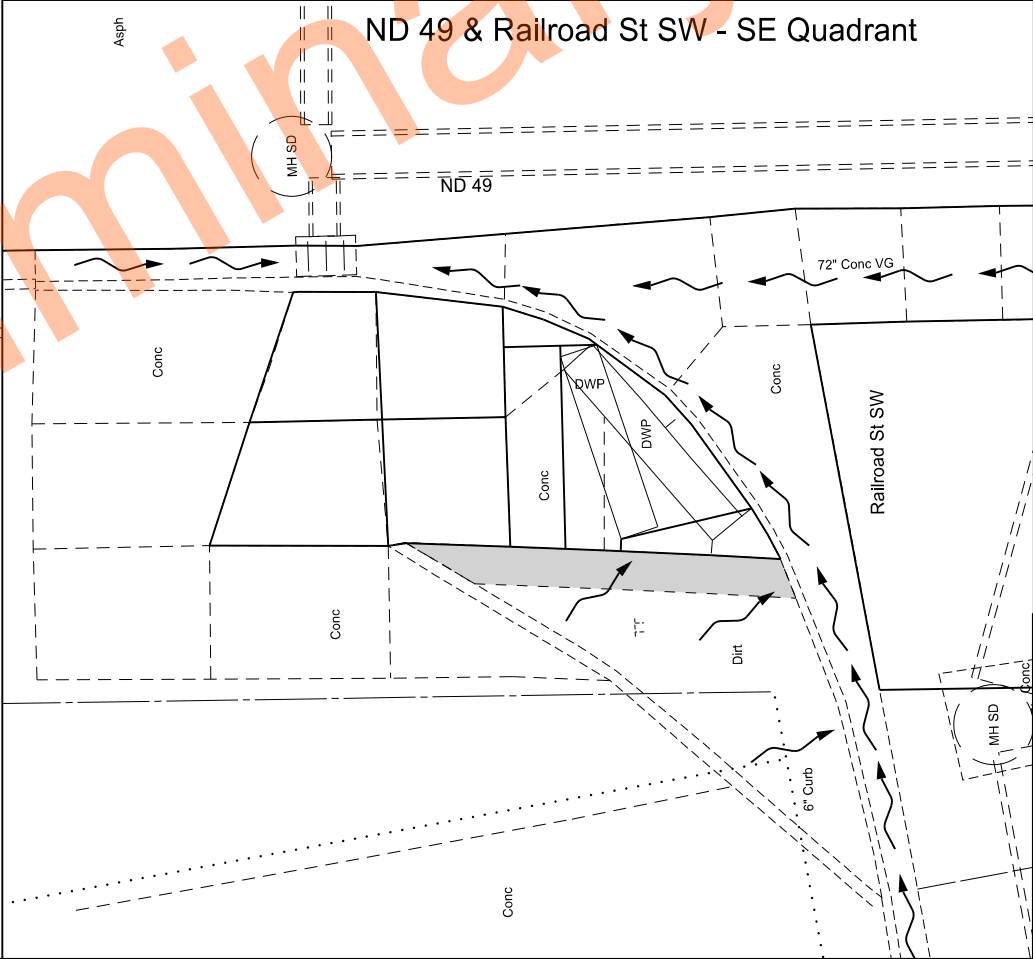
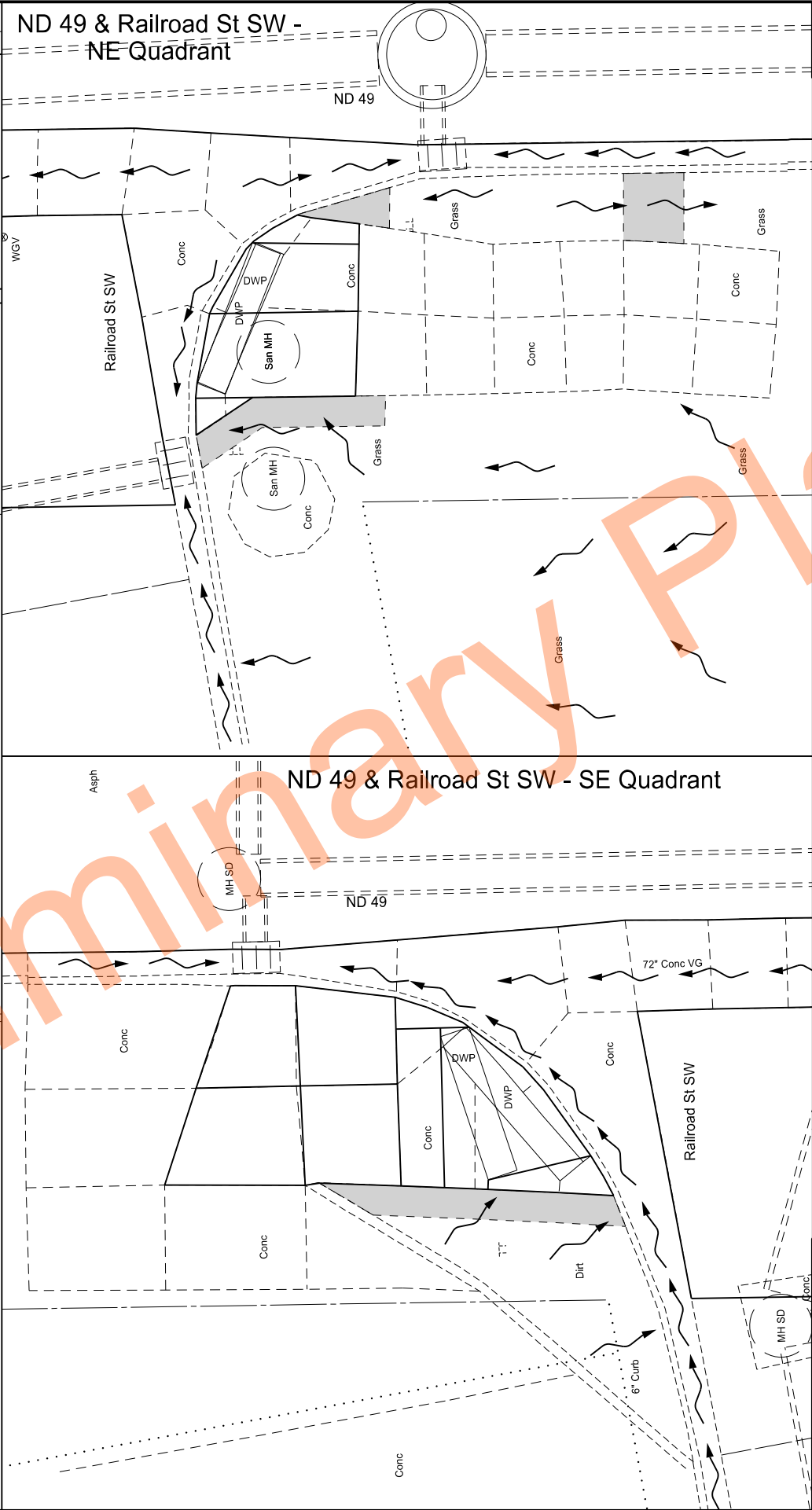
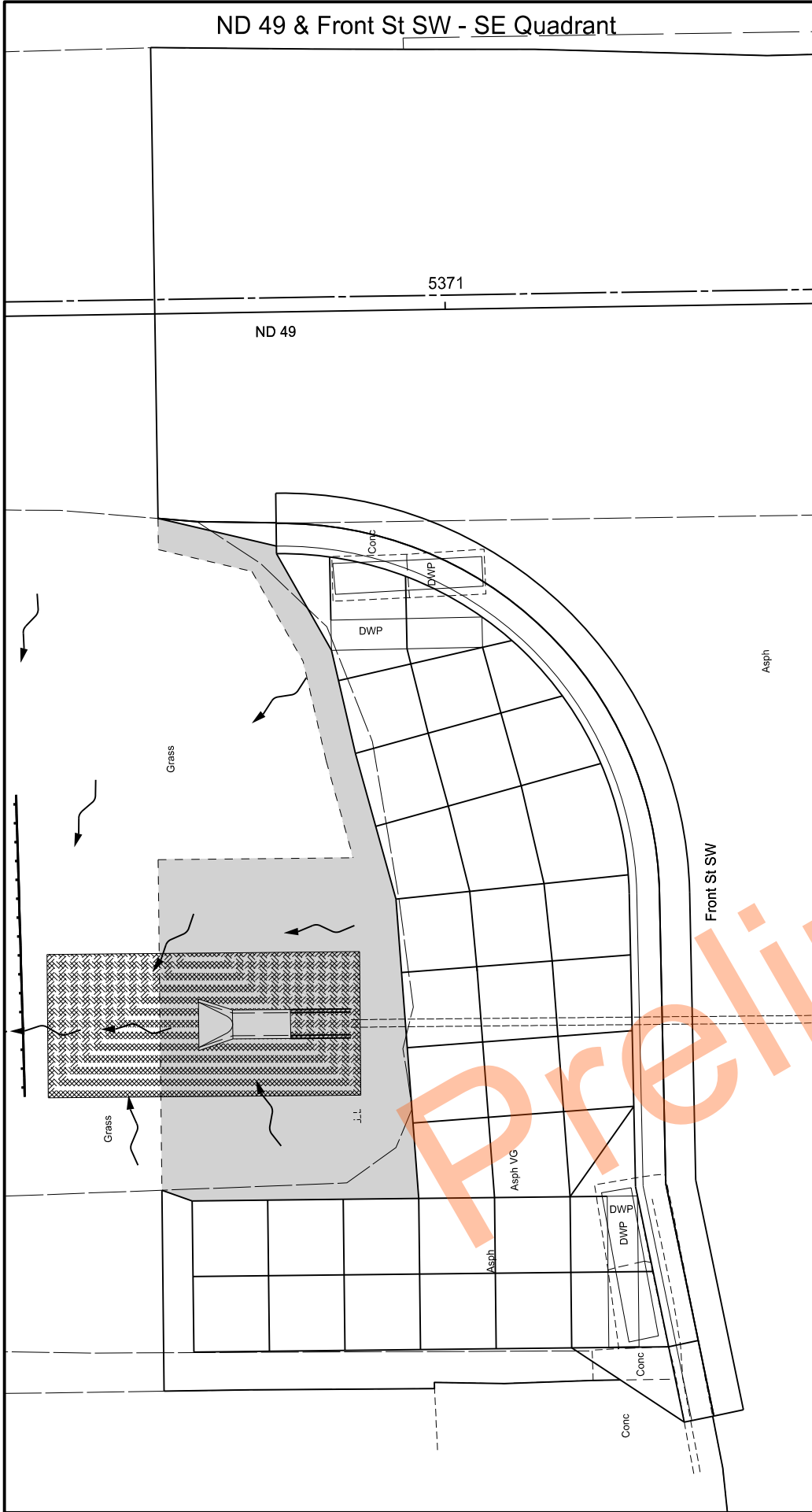
 Inlet Protection-Special

Temporary Erosion Control

ND 49
Beulah, North to Jct 200

5442+00 to 5454+00





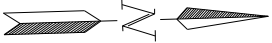
STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		ND 49 & Front St SW - SE Quadrant	20	LF
970	0008	LANDSCAPE PREPARATION		
		ND 49 & Front St SW - SE Quadrant	47	SY
		ND 49 & Railroad St SW - SE Quadrant	5	SY
		ND 49 & Railroad St SW - NE Quadrant	6	SY

LEGEND

 Landscape Preparation

 ECB Type 2

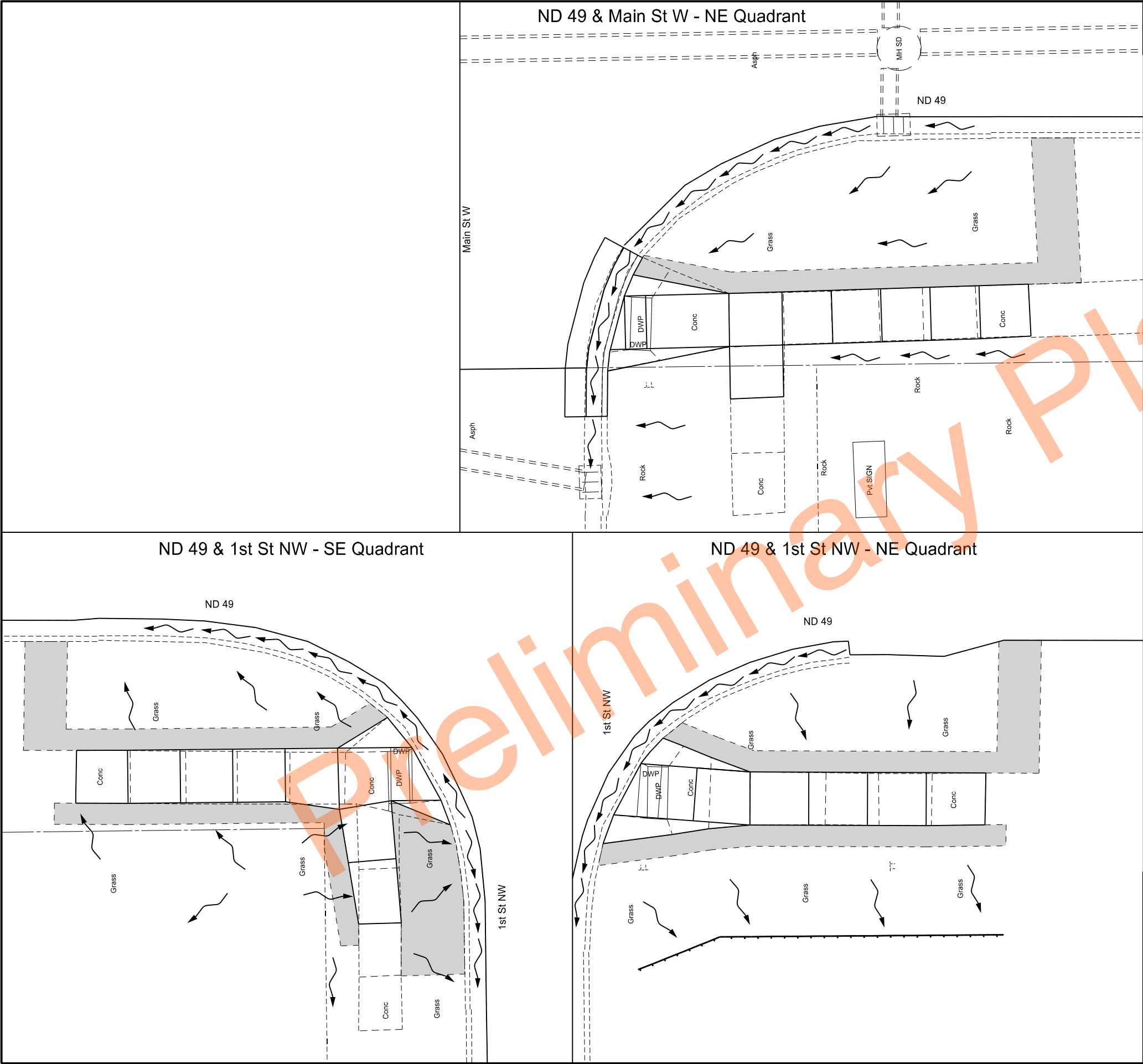


Permanent Erosion Control

ND 49
Beulah North to Jct 200

ND 49 & Front St SW
ND 49 & Railroad St SW

REGISTERED PROFESSIONAL ENGINEER
STACY LATEN
PE-8772
DATE 9/25/23
NORTH DAKOTA



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		XA-NH-5-049(021)101	77	2

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		ND 49 & 1st St NW - NE Quadrant	35	LF
970	0008	LANDSCAPE PREPARATION		
		ND 49 & Main St W - NE Quadrant	15	SY
		ND 49 & 1st St NW - SE Quadrant	30	SY
		ND 49 & 1st St NW - NE Quadrant	21	SY

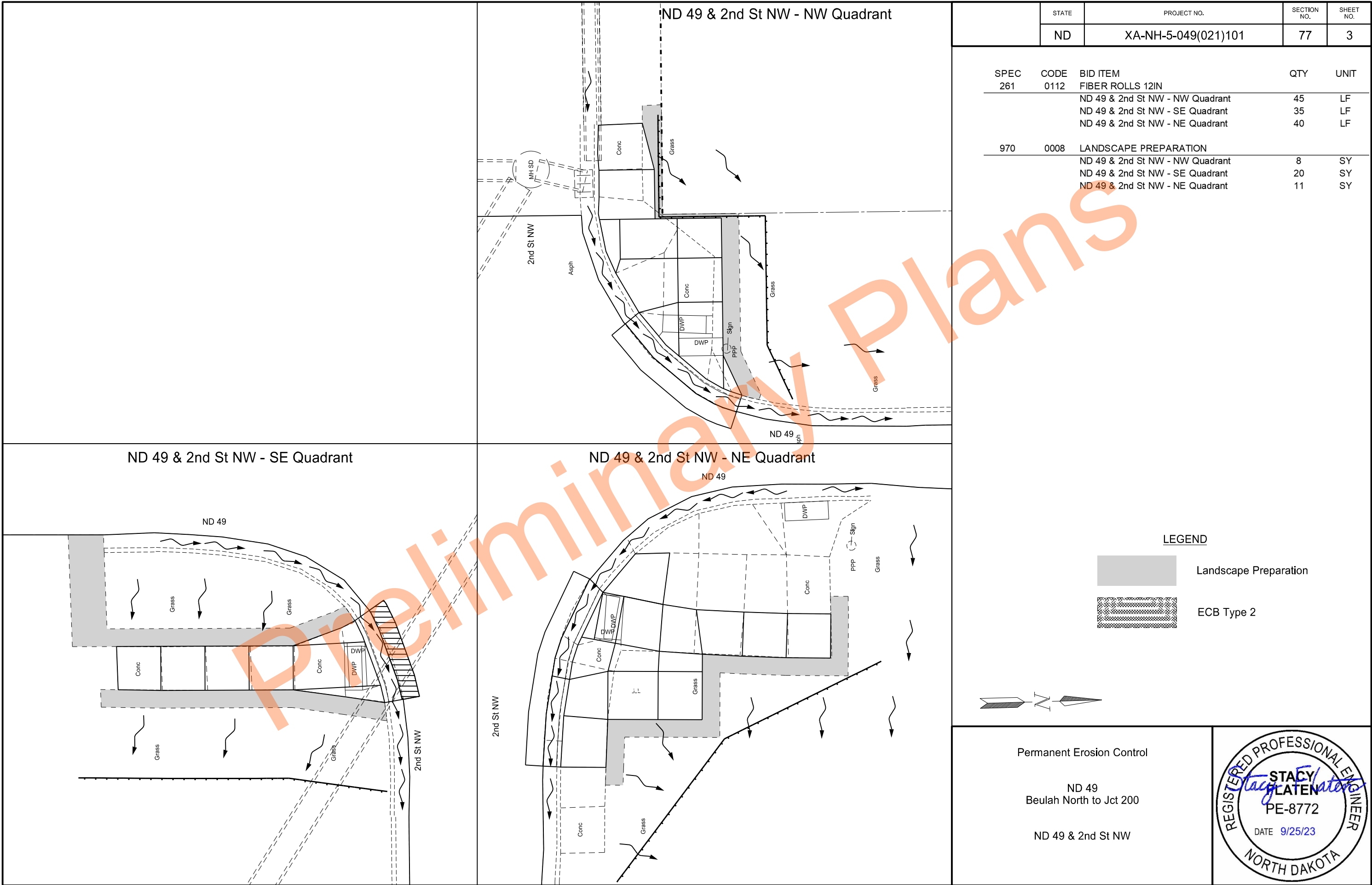
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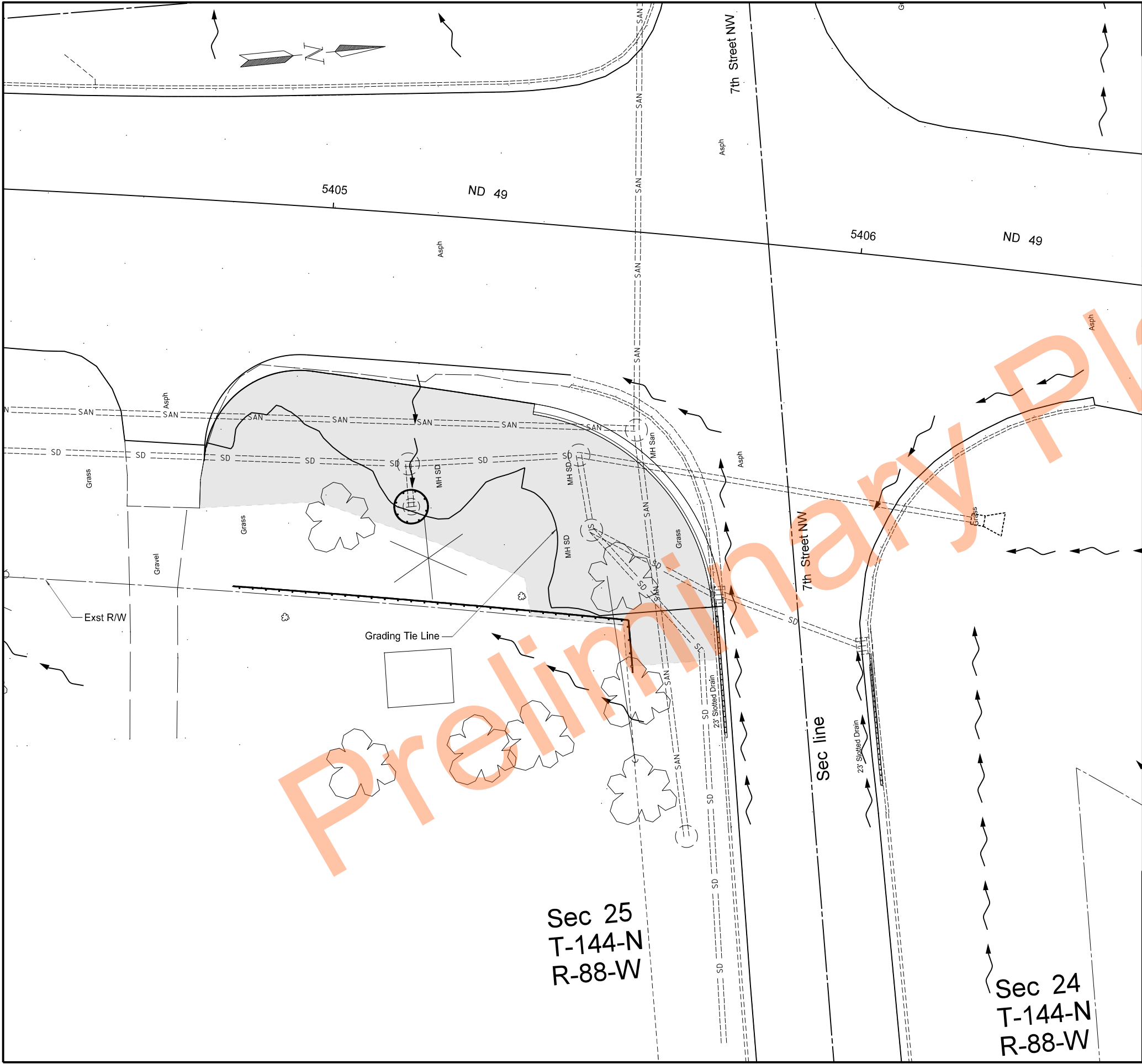
- Landscape Preparation
- ECB Type 2

Permanent Erosion Control

ND 49
Beulah North to Jct 200

ND 49 & Main St W
ND 49 & 1st St NW

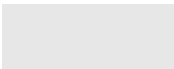
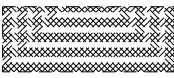




STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		77	4

SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		ND 49 & 7th St NW - SE Quadrant	105	LF
970	0008	LANDSCAPE PREPARATION		
		ND 49 & 7th St NW - SE Quadrant	310	SY

LEGEND

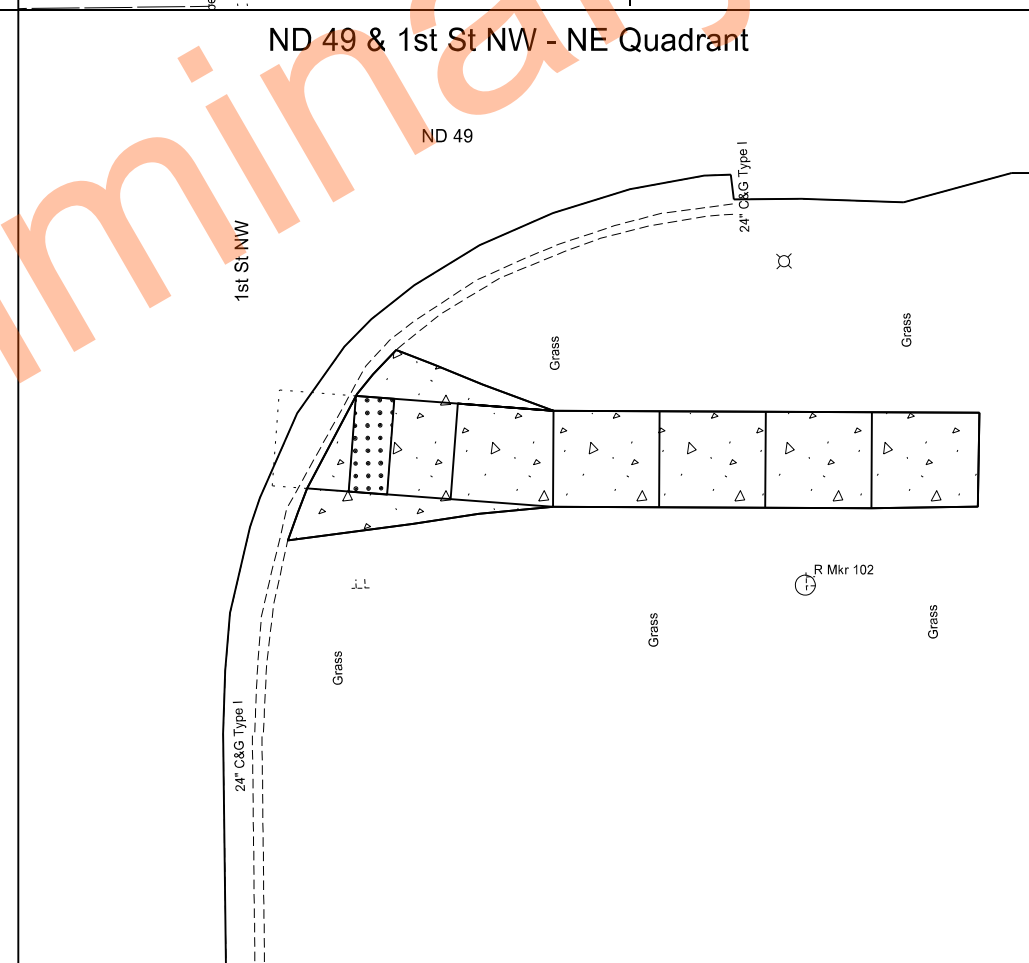
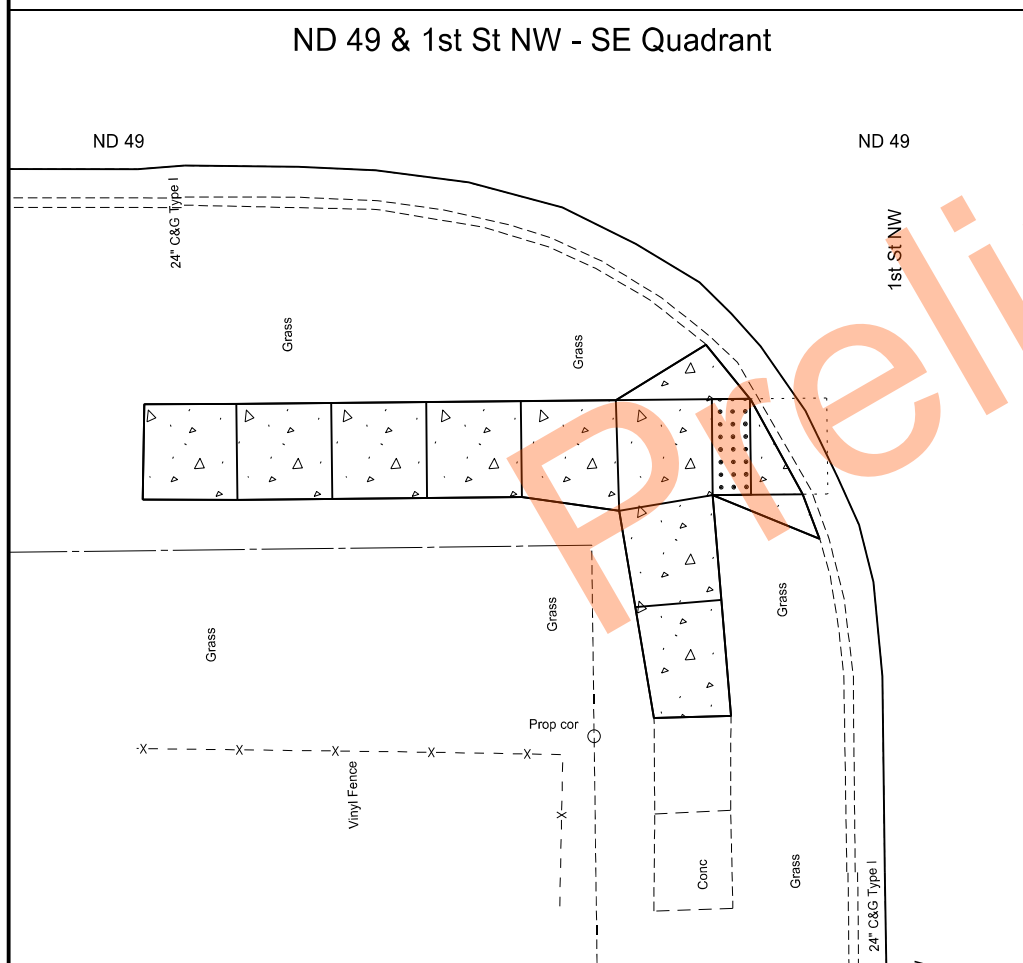
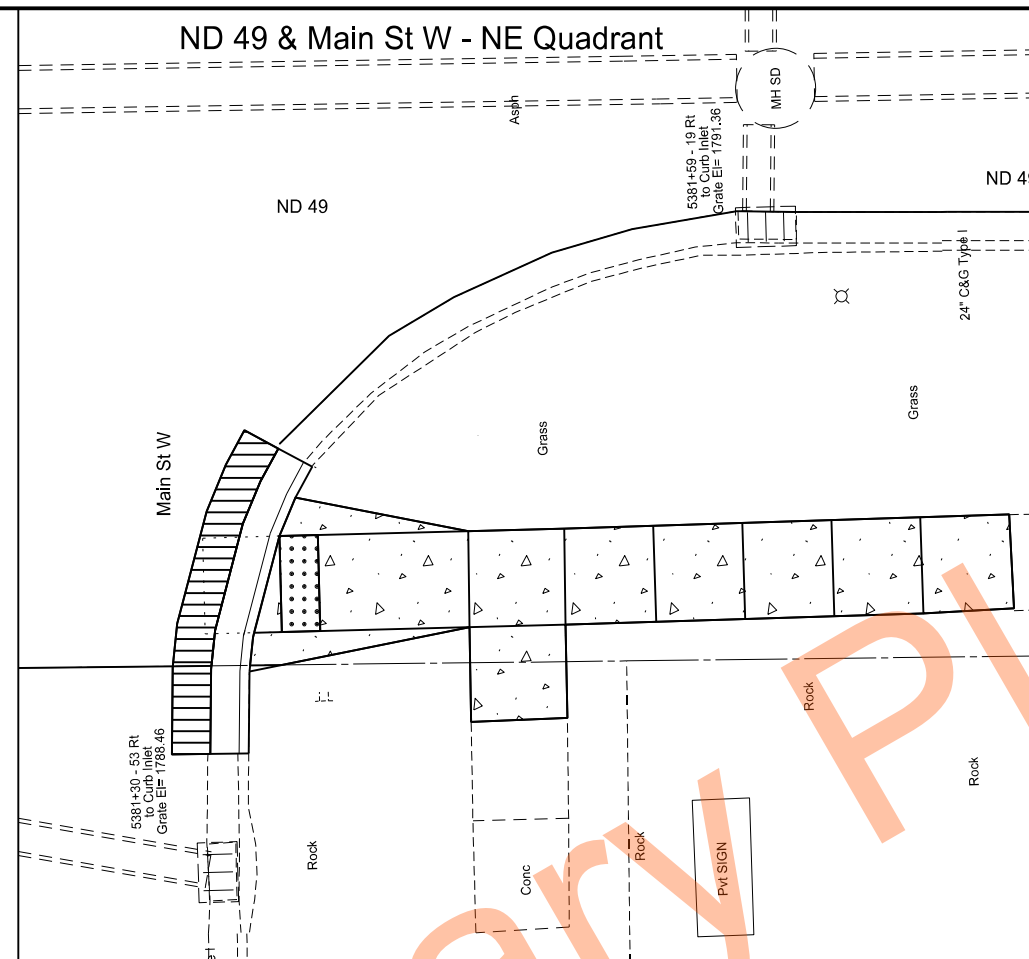
-  Landscape Preparation
-  ECB Type 2

Permanent Erosion Control

ND 49
Beulah North to Jct 200

ND 49 & 7th St NW

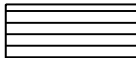




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	80	2

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		ND 49 & Main St W - NE Quadrant	7	TON
		ND 49 & 1st St NW - SE Quadrant	7	TON
		ND 49 & 1st St NW - NE Quadrant	6	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		ND 49 & Main St W - NE Quadrant	2	TON
748	0140	CURB & GUTTER-TYPE 1		
		ND 49 & Main St W - NE Quadrant	16	LF
750	0115	SIDEWALK CONCRETE 4IN		
		ND 49 & Main St W - NE Quadrant	27	SY
		ND 49 & 1st St NW - SE Quadrant	26	SY
		ND 49 & 1st St NW - NE Quadrant	23	SY
750	2115	DETECTABLE WARNING PANELS		
		ND 49 & Main St W - NE Quadrant	10	SF
		ND 49 & 1st St NW - SE Quadrant	10	SF
		ND 49 & 1st St NW - NE Quadrant	10	SF

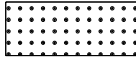
LEGEND



Patching



Sidewalk Concrete 4IN



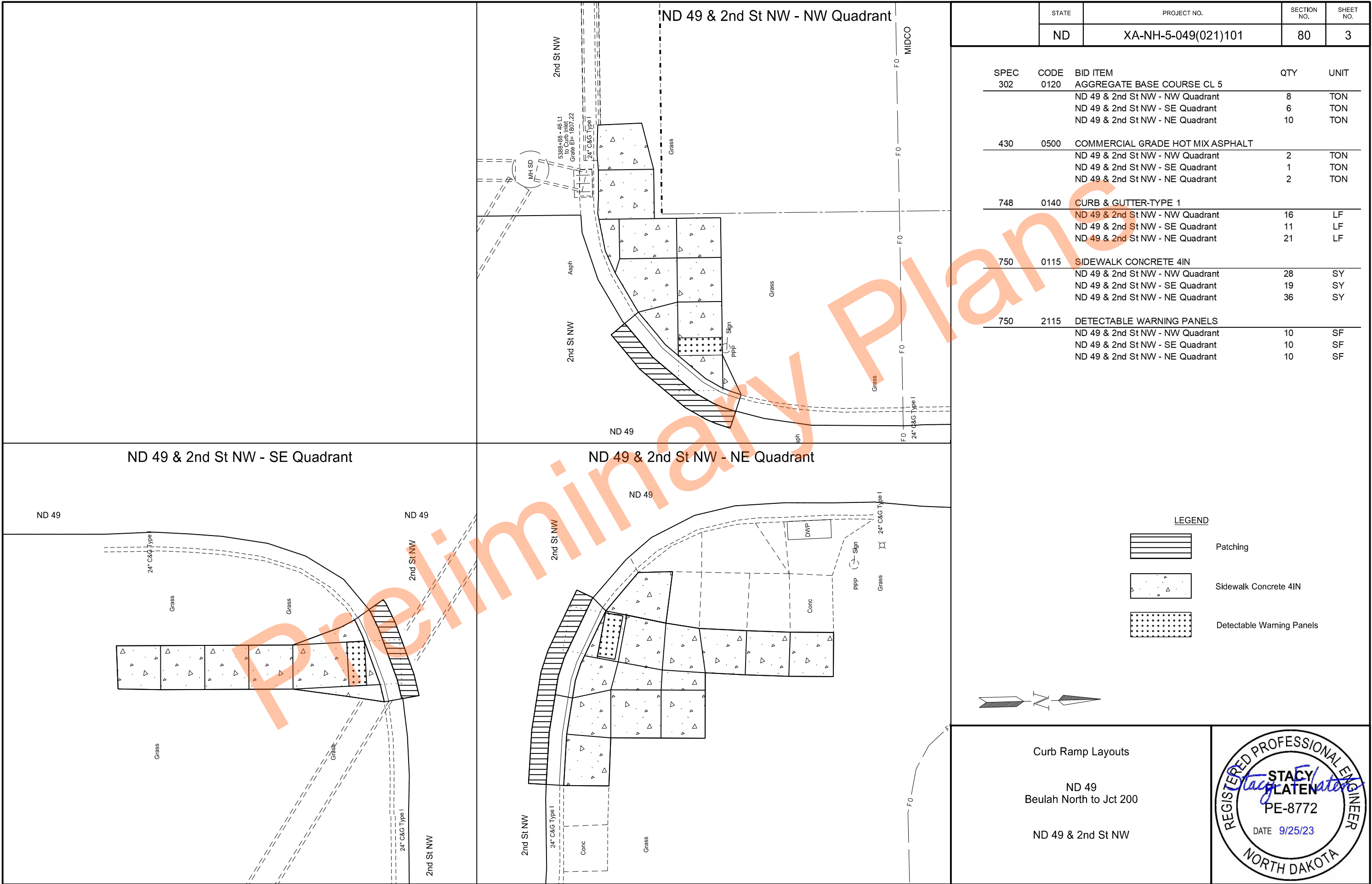
Detectable Warning Panels

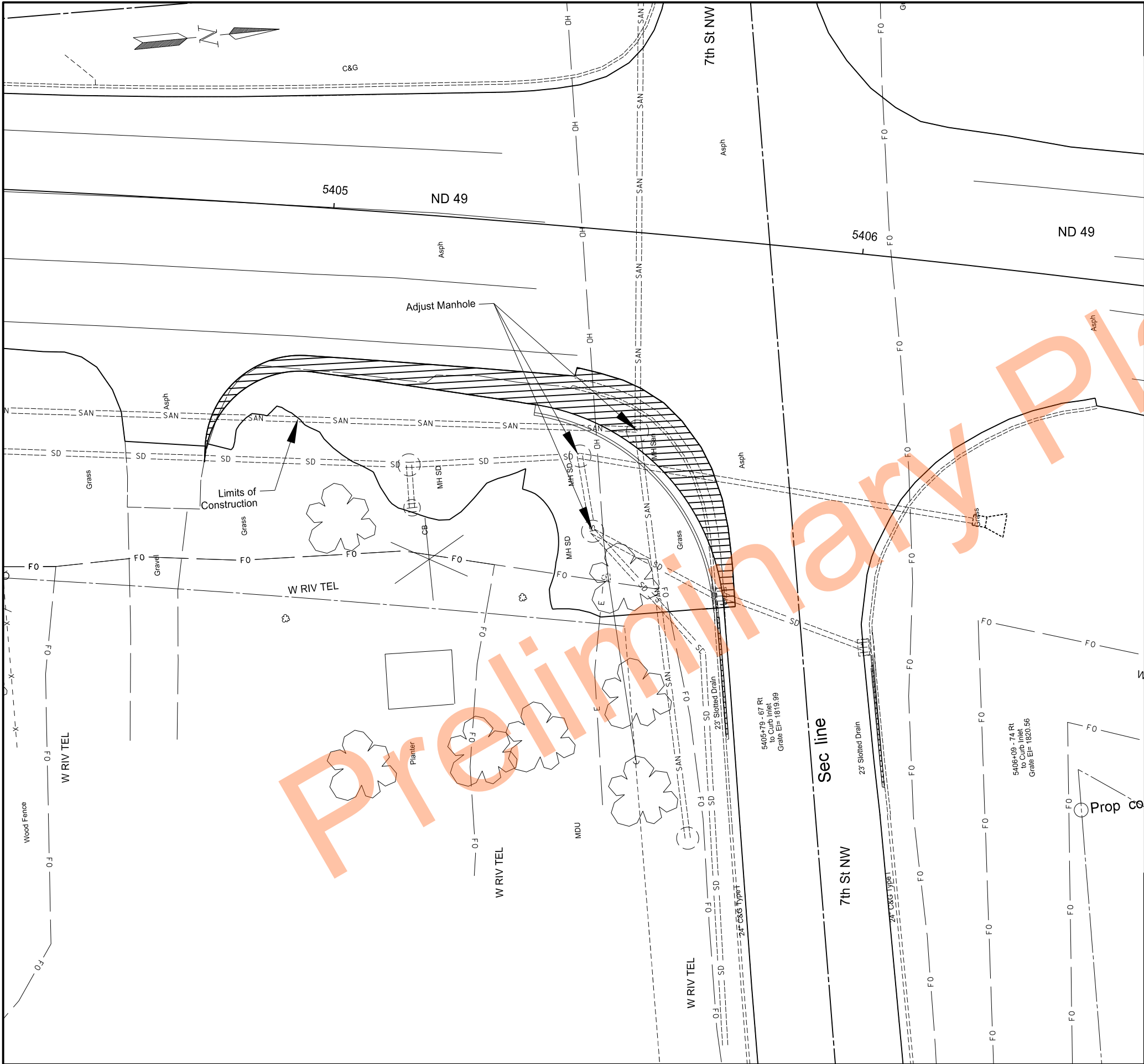
Curb Ramp Layouts

ND 49
Beulah North to Jct 200

ND 49 & Main St W
ND 49 & 1st St NW







	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	80	4
SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5 ND 49 & 7th St NW - SE Quadrant	93	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT ND 49 & 7th St NW - SE Quadrant	22	TON
709	0100	GEOSYNTHETIC MATERIAL TYPE G ND 49 & 7th St NW - SE Quadrant	126	SY
722	6200	ADJUST MANHOLE ND 49 & 7th St NW - SE Quadrant	3	EA
748	0140	CURB & GUTTER-TYPE 1 ND 49 & 7th St NW - SE Quadrant	55	LF

LEGEND

- Patching
- Sidewalk Concrete 4IN
- Detectable Warning Panels

Paving Layout

ND 49
Beulah North to Jct 200

ND 49 & 7th St NW

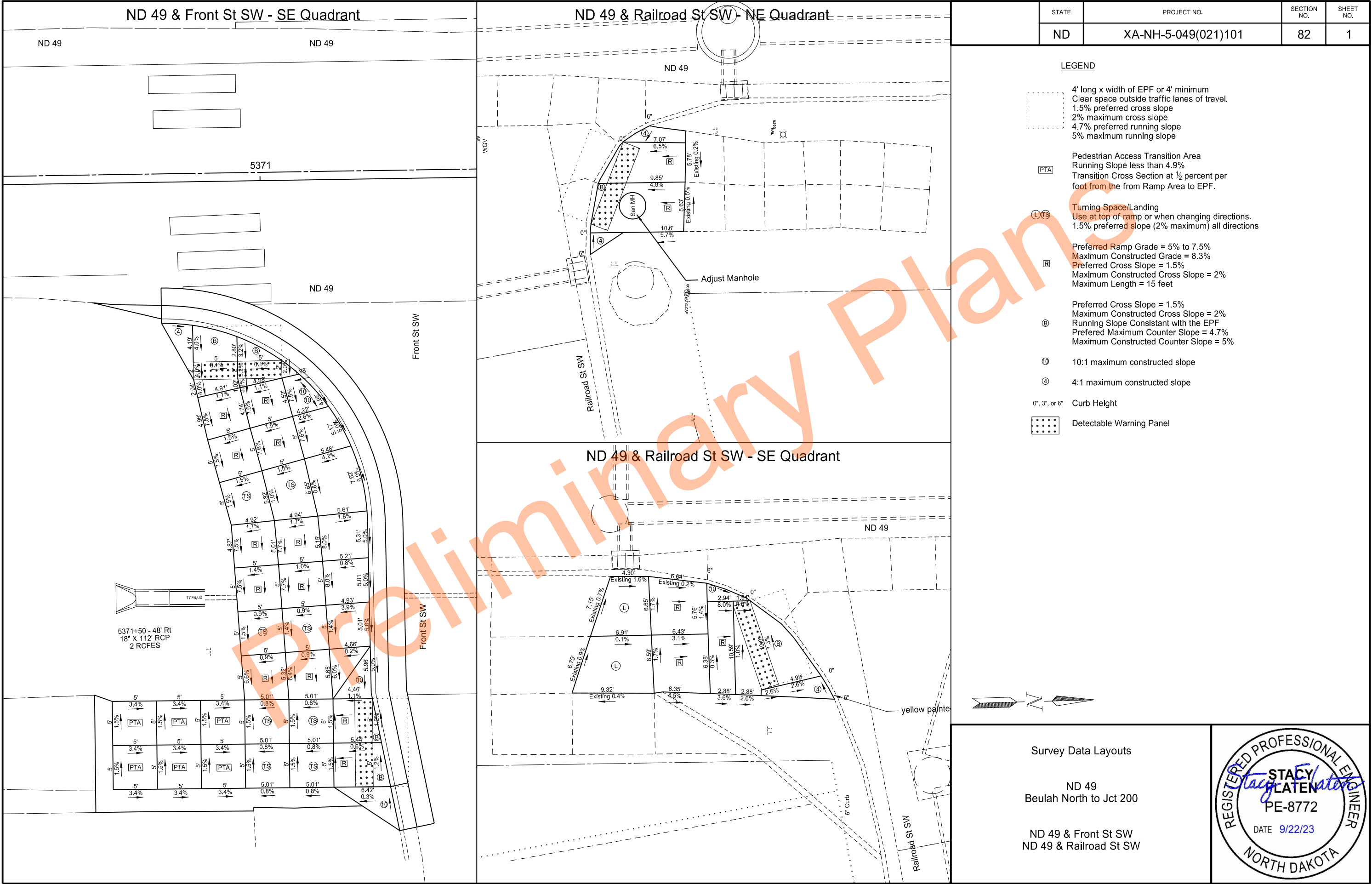
REGISTERED PROFESSIONAL ENGINEER

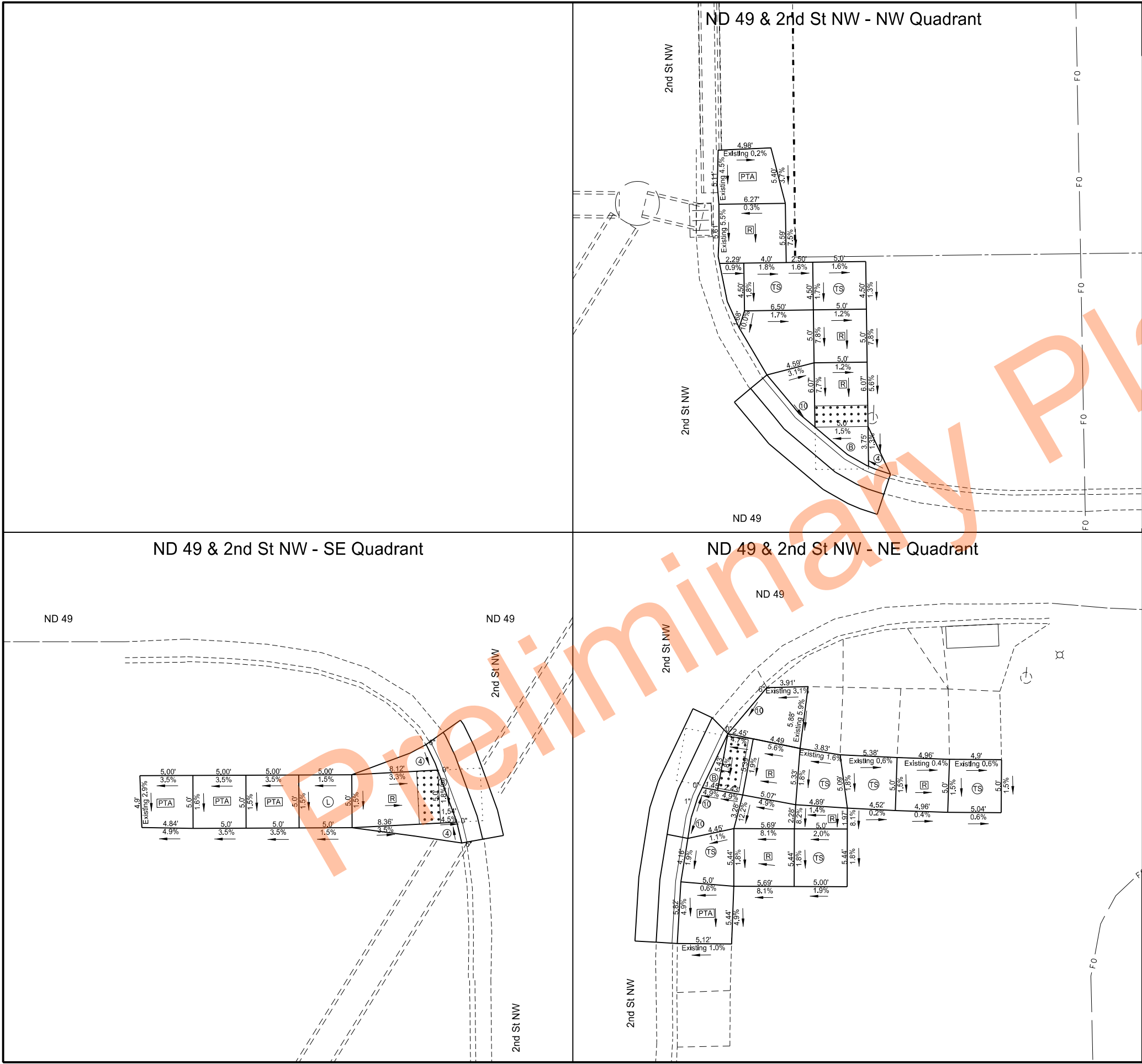
STACY LATEN
PE-8772

DATE 9/25/23

NORTH DAKOTA

SURVEY COORDINATE AND CURVE DATA - ND 49 from Beulah North to Jct 200											STATE	PROJECT NO.		SECTION NO.	SHEET NO.		
											ND	XA-ND-5-049(021)101		81	1		
HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS							
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		CORNER	IRN	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET		
ND 49 BEG Rec Sec Cor	5353+29.69	582,260.99	1,649,470.61	C22	C26	SW Cor Sec 13	11-G	592,768.67	1,649,638.44	MONUMENT DESCRIPTION							
Rec 1/4 Cor	5379+80.01	584,911.07	1,649,506.33	PI Sta = 5382+45.22	PI Sta = 5461+08.02	W ¼ Cor Sec 13	11-F	595,373.93	1,649,688.19	GPS 100	591,434.87	1,650,141.38	1,904.69	5446+07.65	93.25 Rt		
PC	5381+11.88	585,042.92	1,649,508.59	Delta = 1°20'00" (Rt)	Delta = 16°38'20" (Rt)	SE Cor Sec 23	11-J	587,510.43	1,649,550.92	Rebar with Aluminum Cap							
PI C22	5382+45.22	585,176.24	1,649,510.88	Da = 0°30'00"	Da = 0°59'55"	W ¼ Cor Sec 25	11-K	584,911.07	1,649,506.33	GPS 101	582,212.67	1,648,652.48	1,777.32	N/A	N/A		
PT	5383+78.56	585,309.48	1,649,516.27	R = 11,459.19'	R = 5,738.12'	NW ¼ Cor Sec 13	11-E	598,023.98	1,649,737.20	Rebar with Aluminum Cap, On approach south of County Road 20, 820FT west of intersection of Highway 49, and County Road 20							
PC	5384+12.69	585,343.59	1,649,517.65	T = 133.34'	T = 839.09'												
PI C23	5385+46.03	585,476.82	1,649,523.04	L = 266.68'	L = 1,666.37'												
PT	5386+79.37	585,610.15	1,649,525.32							RTK 200	583,831.89	1,649,576.03	1,779.87	N/A	N/A		
PC	5400+63.55	586,994.12	1,649,549.06	C23	C28					Rebar - 83' East and 298' South of Sta 5372+00							
PI C24	5405+53.74	587,484.24	1,649,557.47	PI Sta = 5385+46.03	PI Sta = 5506+54.96					RTK 201	584,034.03	1,649,435.80	1,779.60	N/A	N/A		
Sec Line Xing	5405+82.49	587,509.35	1,649,604.78	Delta = 1°20'00" (Lt)	Delta = 2°19'59" (Rt)					Rebar - 60' West and 98' South of Sta 5372+00							
PT	5410+34.53	587,943.68	1,649,728.35	Da = 0°30'00"	Da = 0°20'00"					RTK 202	584,546.23	1,649,547.97	1,783.67	5376+15.76	45.65 Rt		
PC	5419+10.64	588,764.84	1,650,033.76	R = 11,459.19'	R = 17,188.73'					Rebar							
PI C25	5431+61.73	589,937.46	1,650,469.88	T = 133.34'	T = 350.02'					RTK 203	548,999.11	1,649,536.42	1,787.96	5380+68.45	28.02 Rt		
1/4 Line Xing	5433+01.93	590,127.57	1,650,273.29	L = 266.68'	L = 699.95'					Rebar							
PT	5443+28.74	591,140.92	1,650,127.96							RTK 204	585,404.25	1,649,496.19	1,805.94	5384+72.66	23.80 Lt		
PC	5452+68.93	592,045.32	1,649,871.01	C24						Rebar							
Sec Line Xing	5460+08.07	592,767.35	1,649,715.29	PI Sta = 5405+53.74						RTK 205	585,767.81	1,649,495.43	1,806.97	5388+36.52	34.91 Lt		
PI C26	5461+08.02	592,852.46	1,649,641.69	Delta = 19°25'7" (Rt)						Rebar							
Sec Line Xing	5467+79.51	593,535.69	1,649,653.09	Da = 2°00'00"						RTK 206	586,063.80	1,649,558.93	1,803.81	5391+33.50	23.82 Rt		
PT	5469+35.30	593,691.48	1,649,653.09	R = 2,864.93'						Rebar							
1/4 Line Xing	5486+18.20	595,374.22	1,649,675.95	T = 490.19'						RTK 207	587,147.34	1,649,584.50	1,808.52	5402+18.89	27.75 Rt		
PC	5503+04.94	597,060.80	1,649,699.02	L = 970.98'						Rebar							
PI C28	5506+54.96	597,410.79	1,649,703.81			R MKR #	NORTHING	EASTING	ELEV	STATION	OFFSET	RTK 208	587,648.30	1,649,552.77	1,827.51	5407+04.97	81.41 Lt
PT	5510+04.89	597,760.29	1,649,722.84	C25		R Mkr 101	580,220.94	1,649,474.83	1,781.33	5353+30	32 Rt	Rebar					
ND 49 END Rec Sec Cor	5512+68.96	598,023.98	1,649,737.20	PI Sta = 5431+61.73		R Mkr 102	585,463.07	1,649,561.27	1,804.73	5385+33	39 Rt	RTK 209	587,555.91	1,649,876.29	1,839.88	5406+90.88	254.76 Rt
				Delta = 36°15'43" (Lt)		R Mkr 103	590,671.82	1,650,267.40	1,896.97	5438+43	37 Rt	Rebar					
				Da = 1°29'59"		R Mkr 104	595,912.88	1,649,720.72	1,994.67	5491+57	37 Rt	Chris Brekke Digitally signed by Chris Brekke DN: cn=Chris Brekke, o=Ackerman Surveying, ou, email=chris.brekke@ackermansurveying.com, c=US Date: 2023.09.12 12:26:47 -05'00'					
				R = 3,820.72'						All coordinates and measurements on this document derived from the International Foot definition.							
				T = 1,251.09'						INITIALIZING BENCH MARK NDGPS Stations (OPUS)							
				L = 2,418.10'						☒ NAVD-88							
										☐ GEOID12B							
										☒ GEOID18							
NOTES: Sheet 1 of 1 Existing alignment, section corners, and reference markers from project SS-RSS-5-049(008)101, PCN 17466				Date Survey Completed 10/20/22		☐ Assumed Coordinates ☒ All coordinates on this sheet are Mercer County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998590											





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	82	3

LEGEND

4' long x width of EPF or 4' minimum
Clear space outside traffic lanes of travel.
1.5% preferred cross slope
2% maximum cross slope
4.7% preferred running slope
5% maximum running slope

Pedestrian Access Transition Area
Running Slope less than 4.9%
Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.

Turning Space/Landing
Use at top of ramp or when changing directions.
1.5% preferred slope (2% maximum) all directions

Preferred Ramp Grade = 5% to 7.5%
Maximum Constructed Grade = 8.3%
Preferred Cross Slope = 1.5%
Maximum Constructed Cross Slope = 2%
Maximum Length = 15 feet

Preferred Cross Slope = 1.5%
Maximum Constructed Cross Slope = 2%
Running Slope Consistant with the EPF
Prefered Maximum Counter Slope = 4.7%
Maximum Constructed Counter Slope = 5%

10:1 maximum constructed slope

4:1 maximum constructed slope

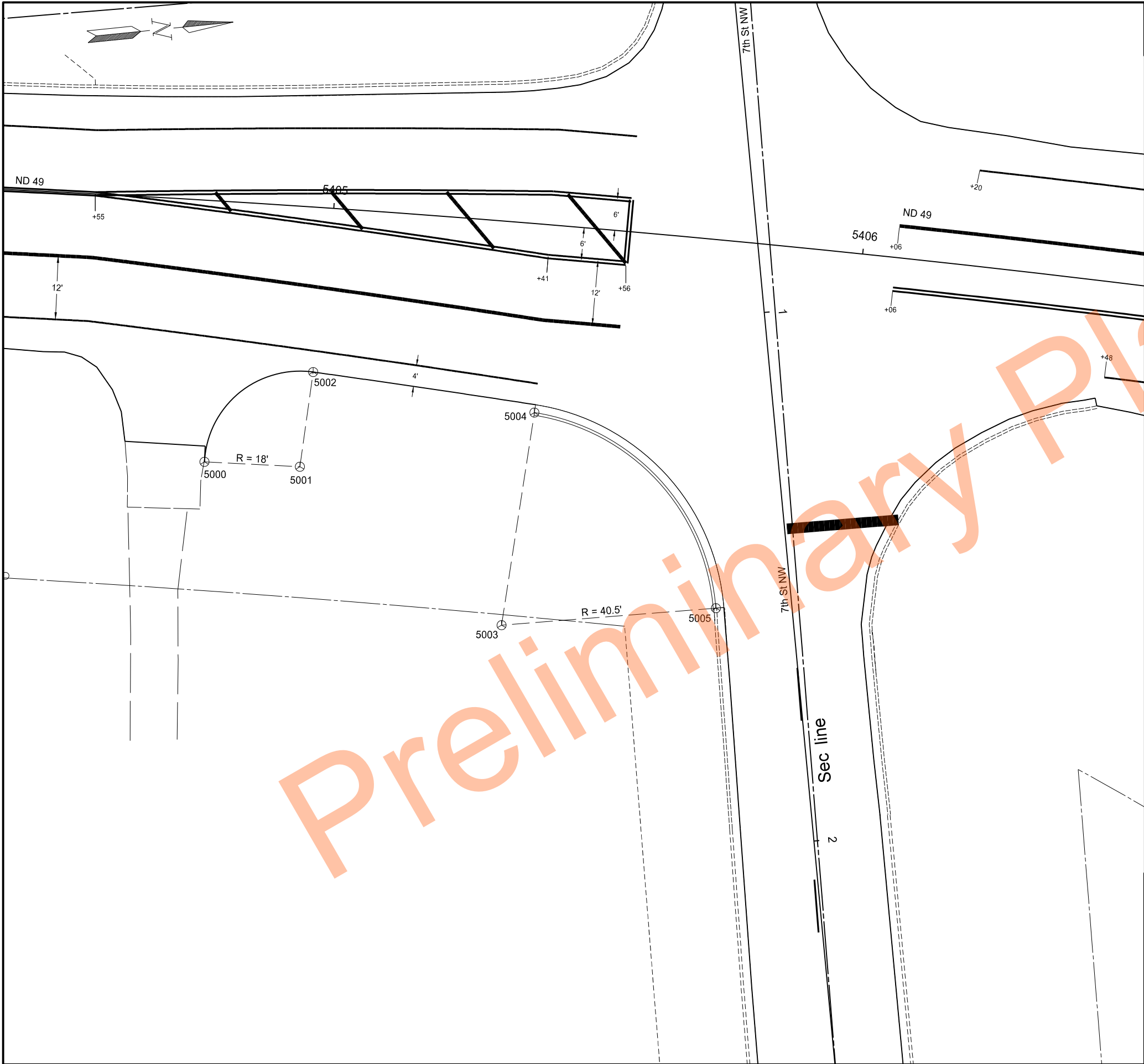
Curb Height

Detectable Warning Panel

Survey Data Layouts

ND 49
Beulah North to Jct 200

ND 49 & 2nd St NW



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	82	4

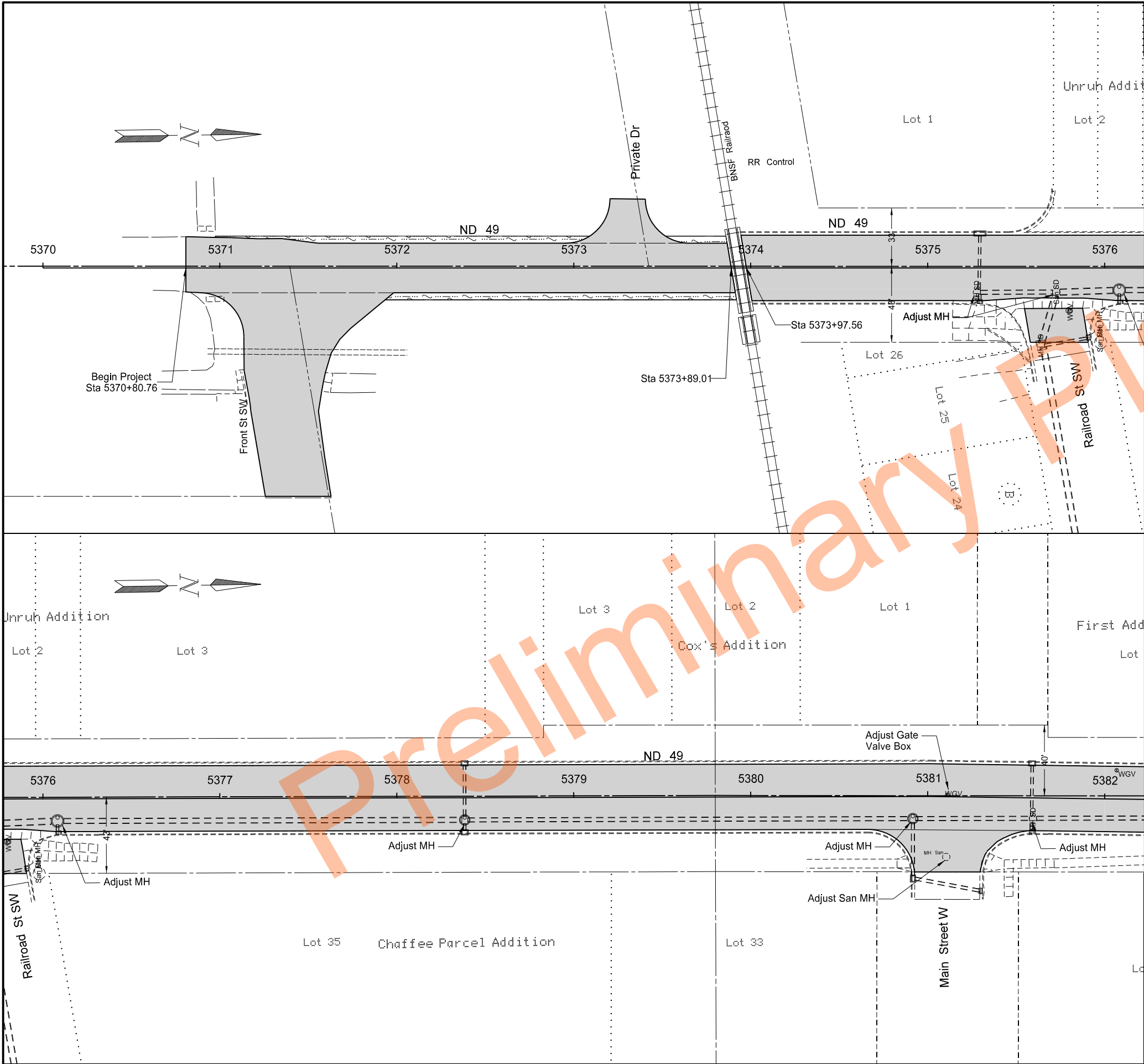
Point	Northing	Easting	Station	Offset
5000	587399.28	1649635.36	5404+78.60	49.21
5001	587417.08	1649638.06	5404+96.91	48.97
5002	587421.34	1649620.57	5404+98.22	31.02
5003	587451.91	1649671.54	5405+37.92	75.89
5004	587462.05	1649632.33	5405+40.84	35.49
5005	587492.40	1649672.38	5405+78.88	69.12

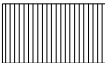
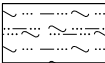
Note: Radius points given at curb & gutter - type I are measured from the face of the curb

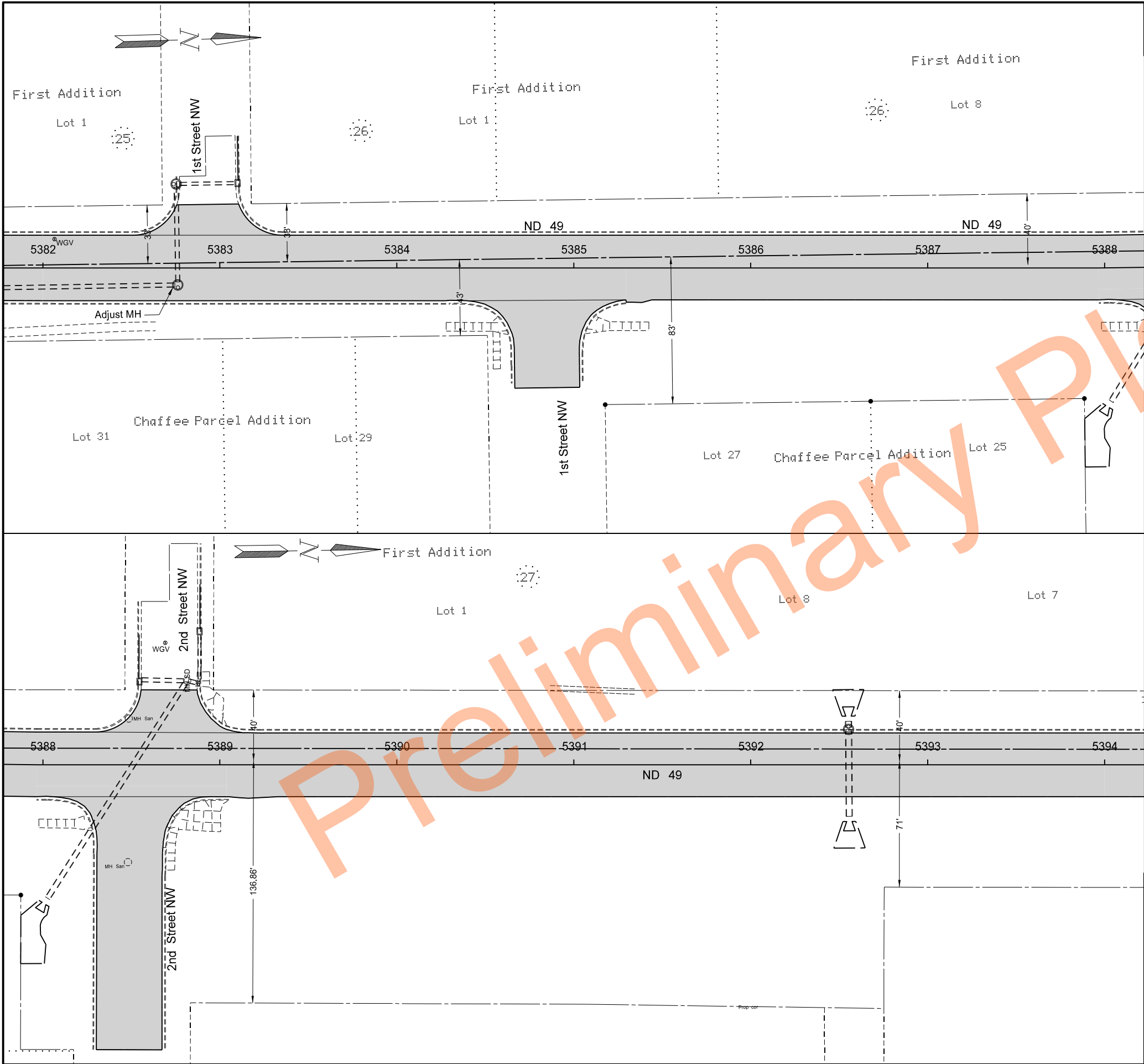
Survey Data Layouts

ND 49
Beulah North to Jct 200

ND 49 & 7th St NW



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	90	1
SPEC	CODE	BID ITEM			QTY UNIT
302	0120	AGGREGATE BASE COURSE CL 5			
		5370+80.76 to 5373+89.01 Lt & Rt shoulder			22 TON
401	0050	TACK COAT			
		5370+80.76 to 5373+89.01			178 GAL
		5373+97.56 to 5382+00			362 GAL
430	0145	RAP - SUPERPAVE FAA 45			
		5370+80.76 to 5373+89.01			289 TON
		5373+97.56 to 5382+00			549 TON
		Railroad St SW (ND 49 Rt side)			12 TON
		Main St W (ND 49 Rt side)			22 TON
430	5818	PG 58H-34 ASPHALT CEMENT			
		5370+80.76 to 5373+89.01			13 TON
		5373+97.56 to 5382+00			26 TON
722	6140	ADJUST GATE VALVE BOX			
		5381+11 - 1' Lt			1 EA
722	6200	ADJUST MANHOLE			
		5375+28 Rt			1 EA
		5375+73 Rt			1 EA
		5376+08 Rt			1 EA
		5378+38 Rt			1 EA
		5380+92 Rt			1 EA
		5381+11 Rt			1 EA
		5381+60 Rt			1 EA
LEGEND					
		-RAP-Superpave FAA 45: 3"			
		-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)			
		-Aggregate Base Course CL 5			
Paving Layouts					
ND 49					
Beulah North to Jct 200					
5370+80.76 to 5382+00					



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	90	2

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
5382+00 to 5394+00			616	GAL
430	0145	RAP - SUPERPAVE FAA 45		
5382+00 to 5394+00			824	TON
1st St NW (ND 49 Lt side)			16	TON
1st St NW (ND 49 Rt side)			40	TON
2nd St NW (ND 49 Lt side)			20	TON
2nd St NW (ND 49 Rt side)			103	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
5382+00 to 5394+00			45	TON
722	6200	ADJUST MANHOLE		
5382+76 Rt			1	EA

LEGEND

-RAP-Superpave FAA 45: 3"

-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)

-Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5382+00 to 5394+00

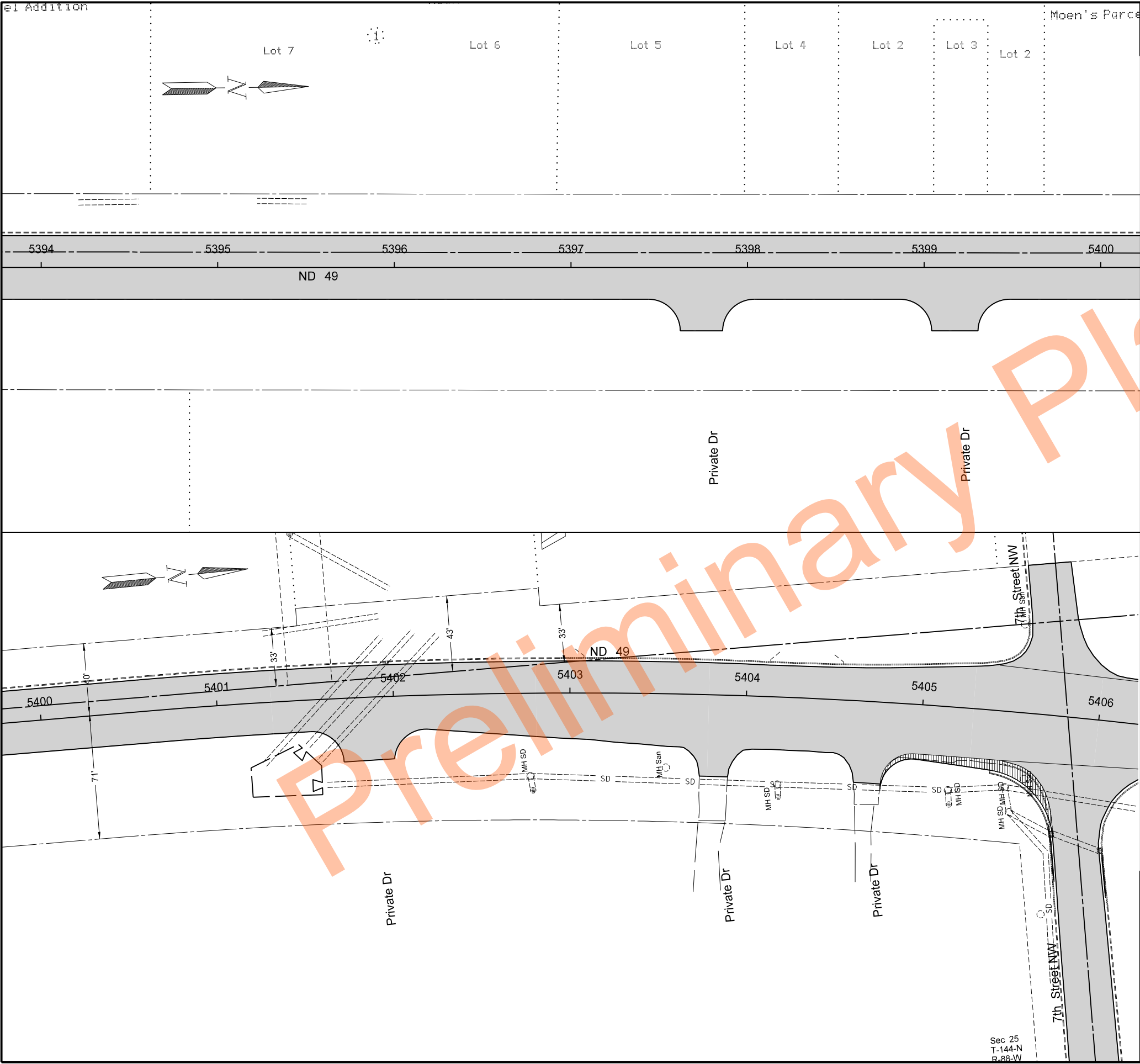
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 9/22/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	90	3

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5394+00 to 5406+00	604	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5394+00 to 5406+00	943	TON
		7th St NW (ND 49 Lt side)	36	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5394+00 to 5406+00	44	TON

LEGEND

- RAP-Superpave FAA 45: 3"
- 8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)
- Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5394+00 to 5406+00

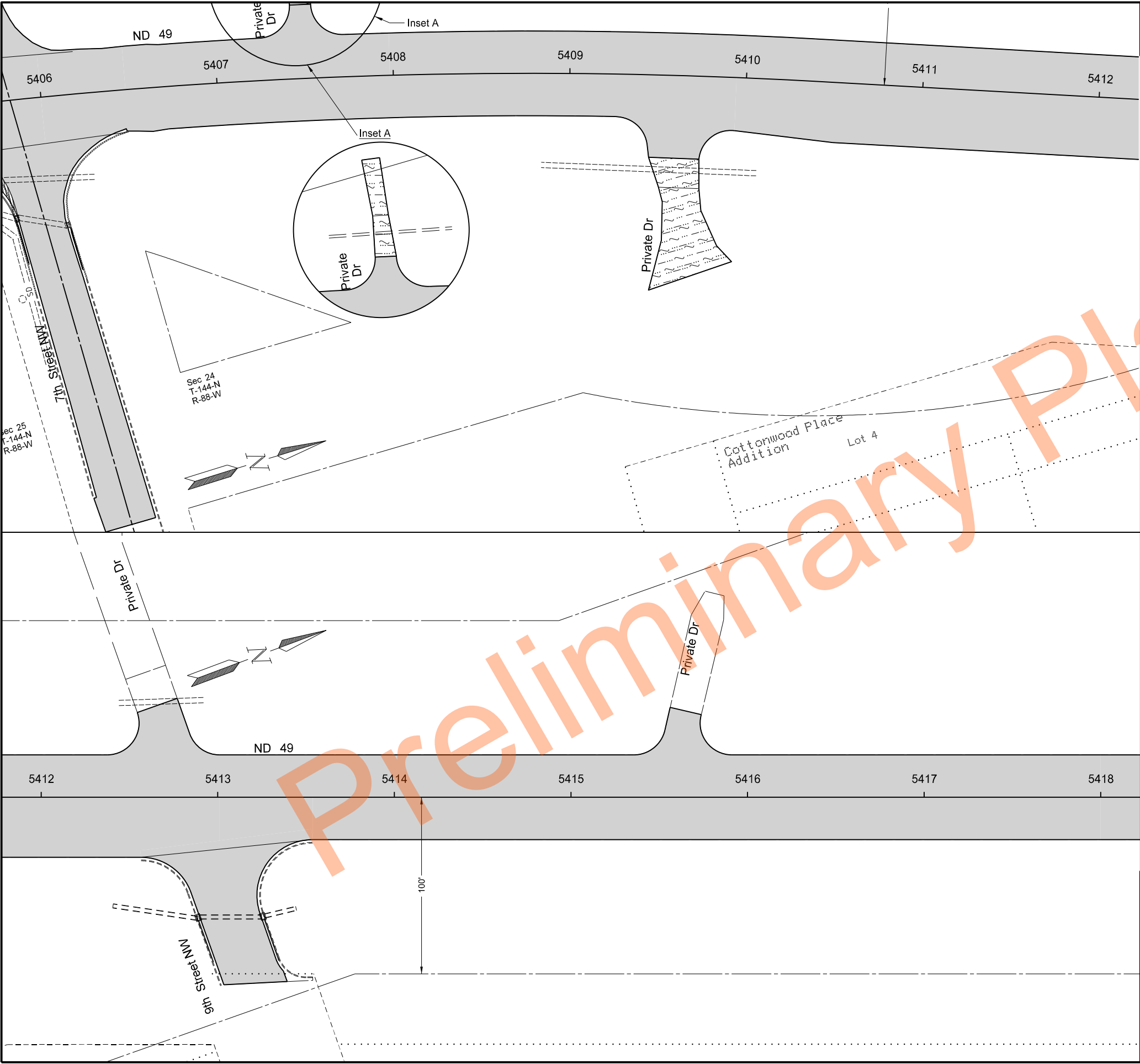
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/22/23

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	90	4
SPEC	CODE	BID ITEM		QTY	UNIT
401	0050	TACK COAT			
		5406+00 to 5418+00		857	GAL
430	0145	RAP - SUPERPAVE FAA 45			
		7th St NW (ND 49 Rt side)		124	TON
		5406+00 to 5418+00		1217	TON
		9th St NW (ND 49 Rt side)		58	TON
430	5818	PG 58H-34 ASPHALT CEMENT			
		5406+00 to 5418+00		62	TON

LEGEND

-RAP-Superpave FAA 45: 3"

-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)

-Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5406+00 to 5418+00

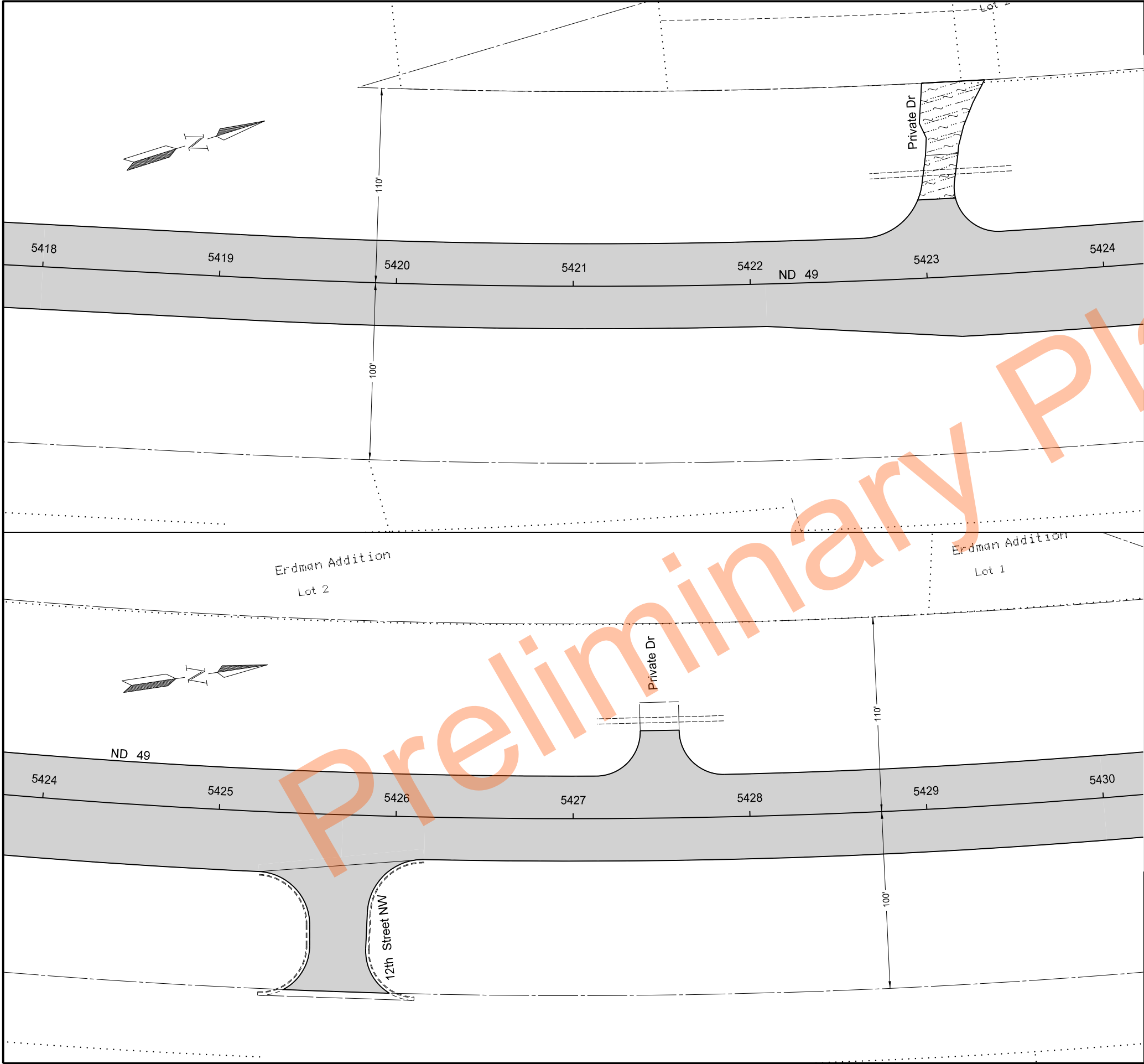
REGISTERED PROFESSIONAL ENGINEER

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PE-8772

DATE 9/22/23

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	90	5
SPEC	CODE	BID ITEM		QTY	UNIT
401	0050	TACK COAT			
		5418+00 to 5430+00		770	GAL
430	0145	RAP - SUPERPAVE FAA 45			
		5418+00 to 5430+00		1194	TON
		12th St NW (ND 49 Rt side)		54	TON
430	5818	PG 58H-34 ASPHALT CEMENT			
		5418+00 to 5430+00		55	TON

LEGEND

-RAP-Superpave FAA 45: 3"

-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)

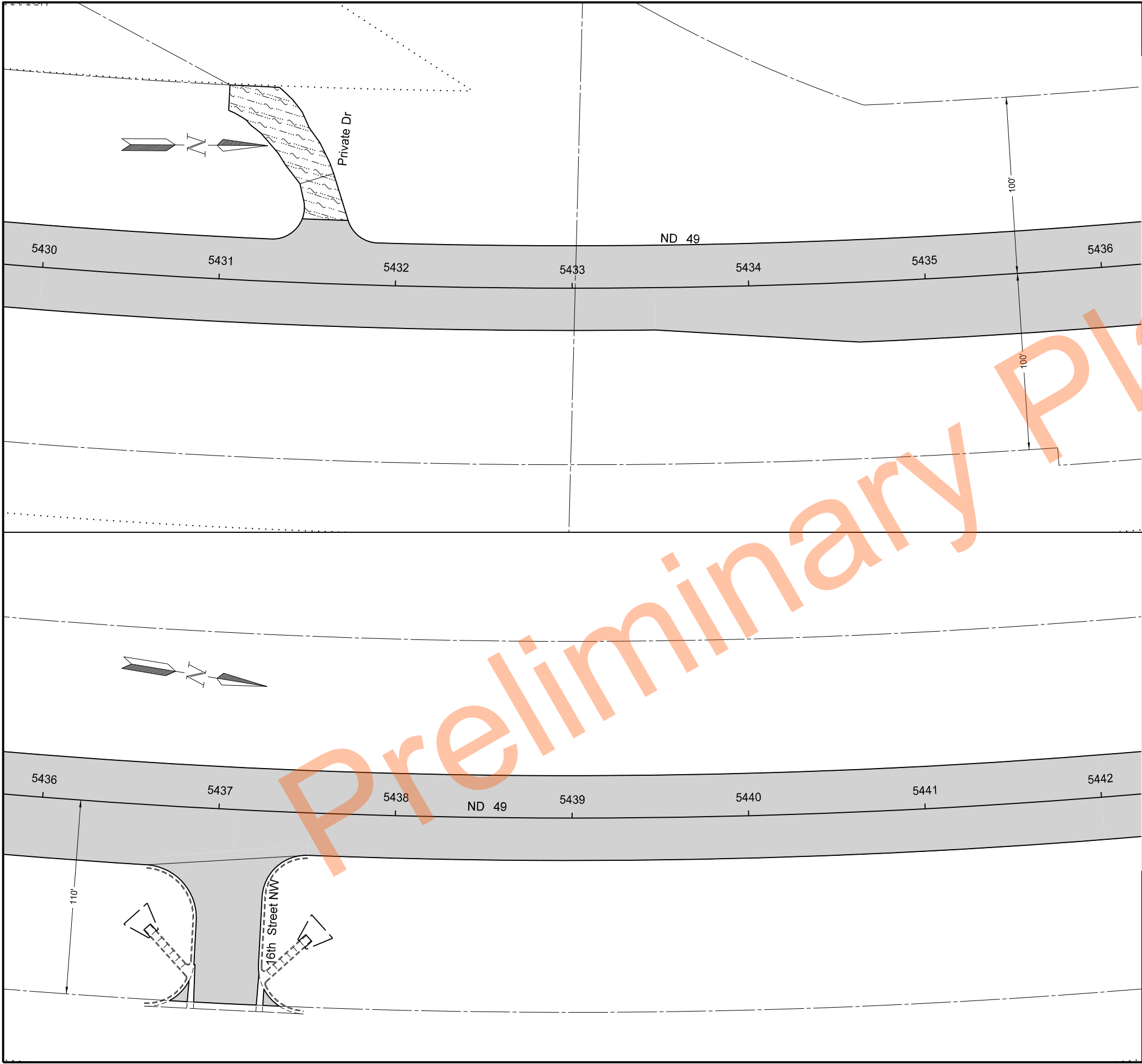
-Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5418+00 to 5430+00

REGISTERED PROFESSIONAL ENGINEER
STACY LATEN
PE-8772
DATE 9/22/23
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	90	6

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5430+00 to 5442+00	762	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5430+00 to 5442+00	1172	TON
		16th St NW (ND 49 Rt side)	63	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5430+00 to 5442+00	55	TON

LEGEND

-RAP-Superpave FAA 45: 3"

-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)

-Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5430+00 to 5442+00

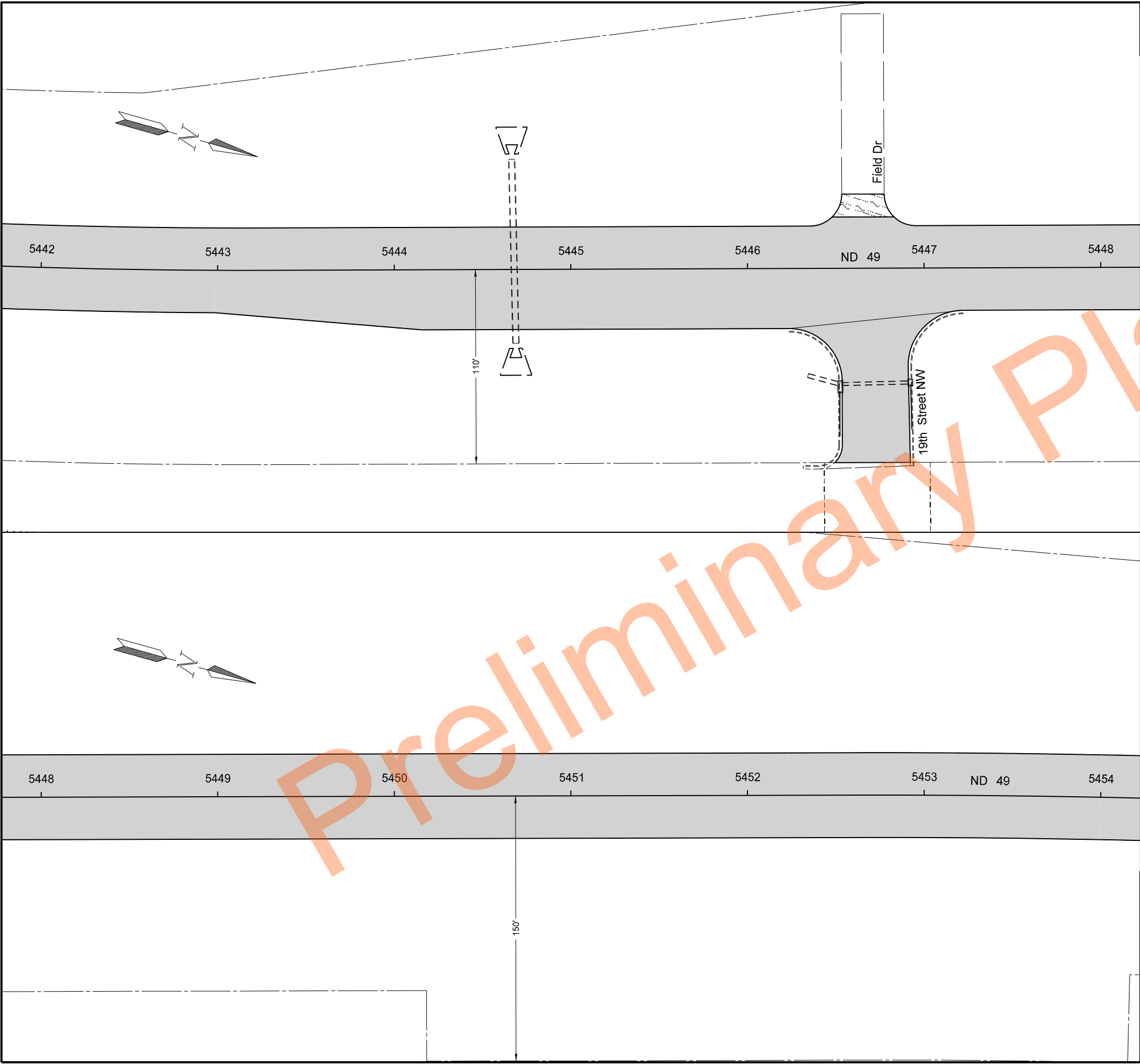
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/22/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	90	7

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5442+00 to 5454+00	762	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5442+00 to 5454+00	1170	TON
		19th St NW (ND 49 Rt side)	65	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5442+00 to 5454+00	55	TON

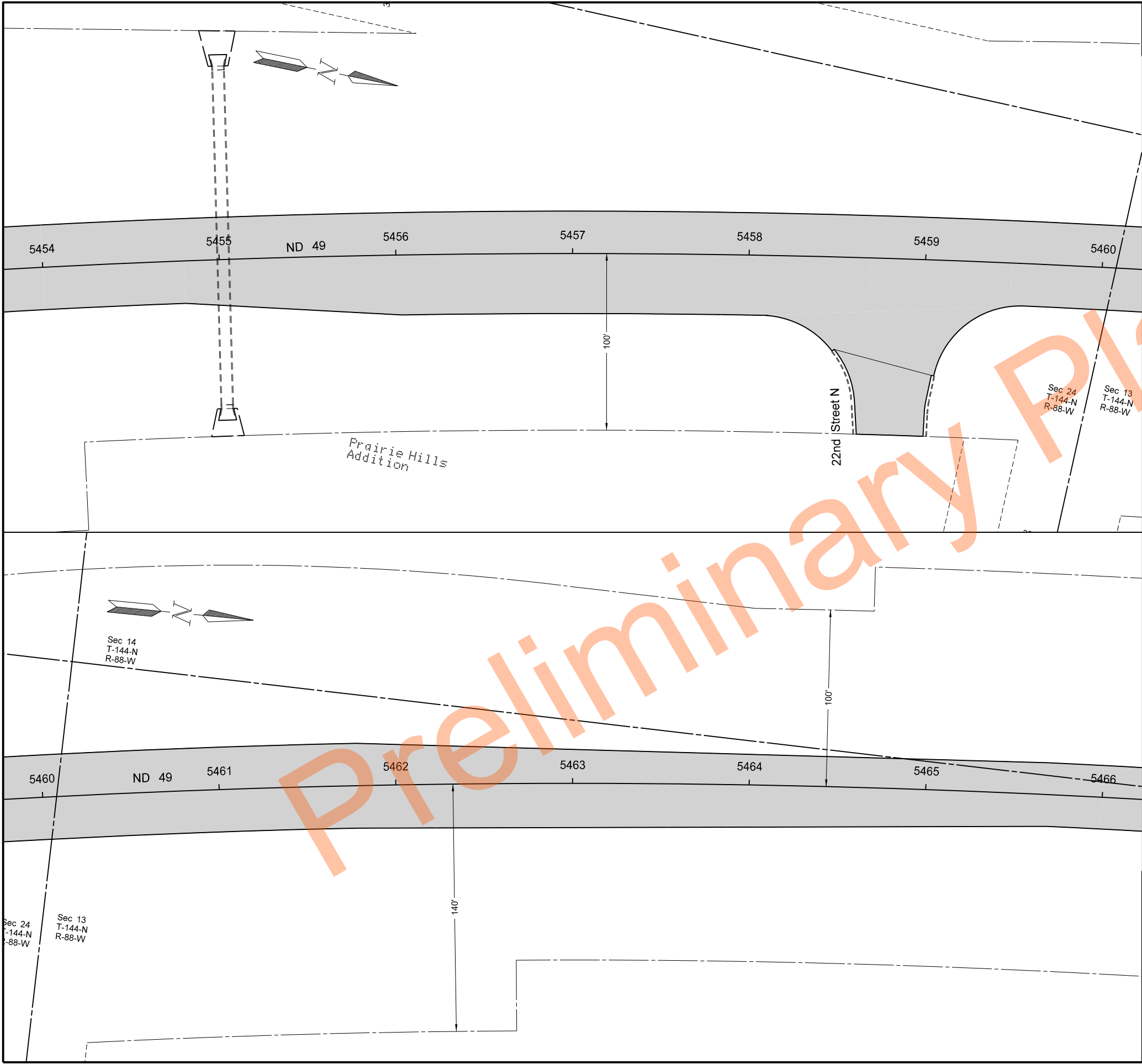
LEGEND

- RAP-Superpave FAA 45: 3"
- 8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)
- Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5442+00 to 5454+00



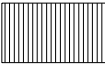
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	ND	XA-NH-5-049(021)101	90	8

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5454+00 to 5466+00	740	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5454+00 to 5466+00	1166	TON
		22nd St N (ND 49 Rt side)	32	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5454+00 to 5466+00	53	TON

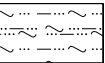
LEGEND



-RAP-Superpave FAA 45: 3"



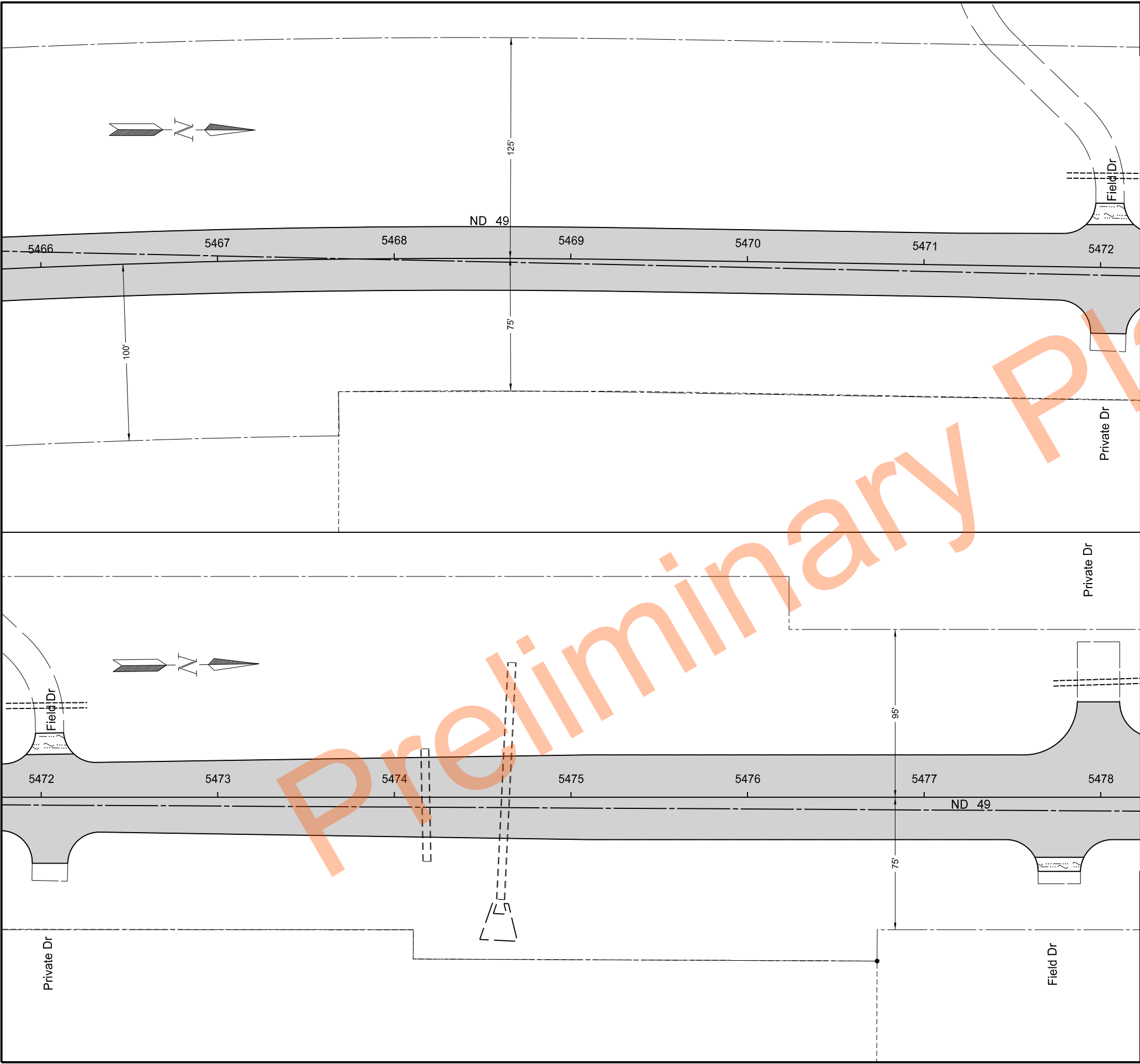
-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)



-Aggregate Base Course CL 5

Paving Layouts
ND 49
Beulah North to Jct 200
5454+00 to 5466+00





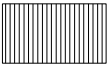
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	ND	XA-NH-5-049(021)101	90	9

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5466+00 to 5478+00	620	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5466+00 to 5478+00	1004	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5466+00 to 5478+00	45	TON

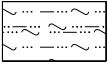
LEGEND



-RAP-Superpave FAA 45: 3"



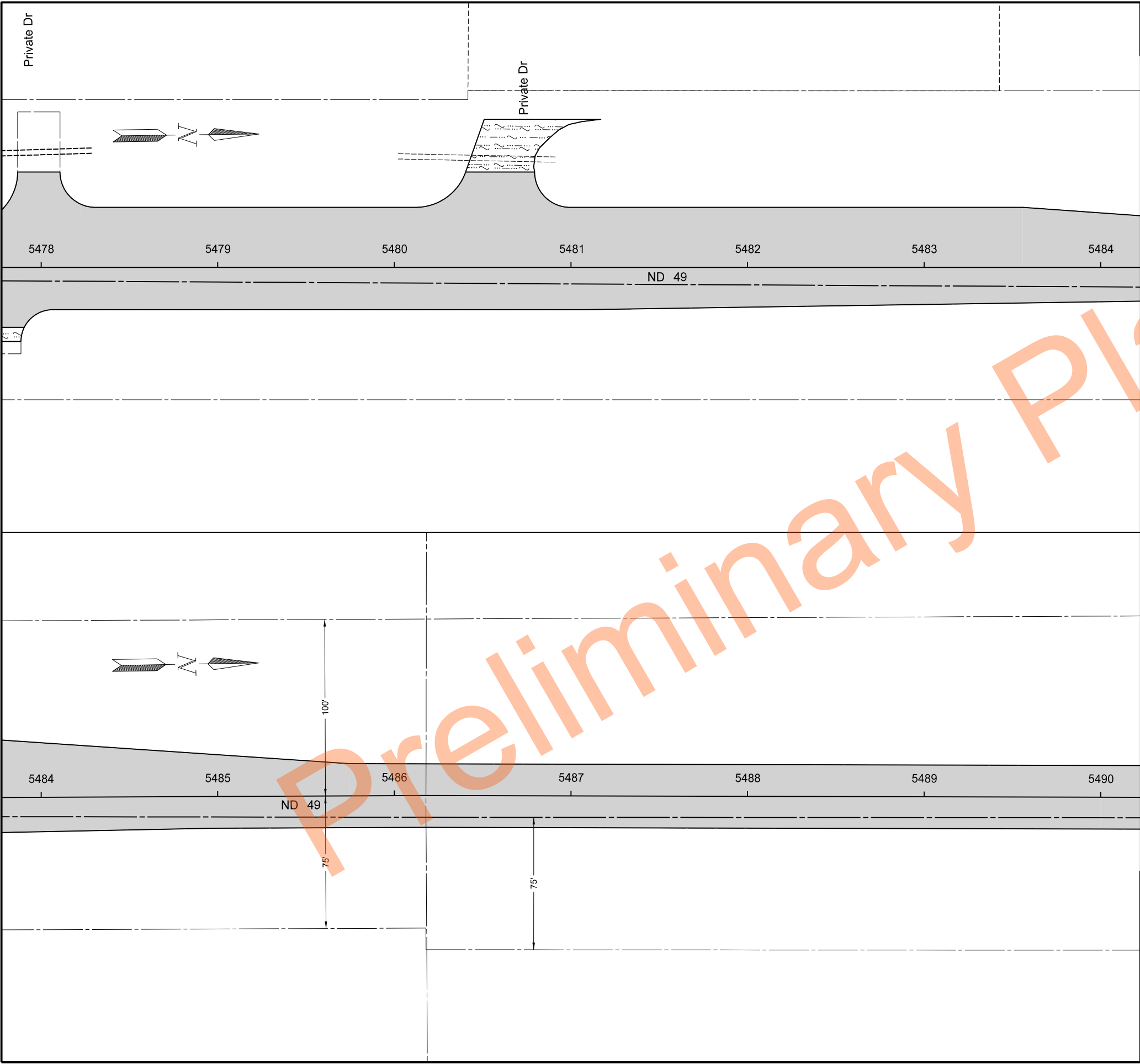
-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)



-Aggregate Base Course CL 5

Paving Layouts
ND 49
Beulah North to Jct 200
5466+00 to 5478+00





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	90	10

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5478+00 to 5490+00	672	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5478+00 to 5490+00	1089	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5478+00 to 5490+00	48	TON

LEGEND

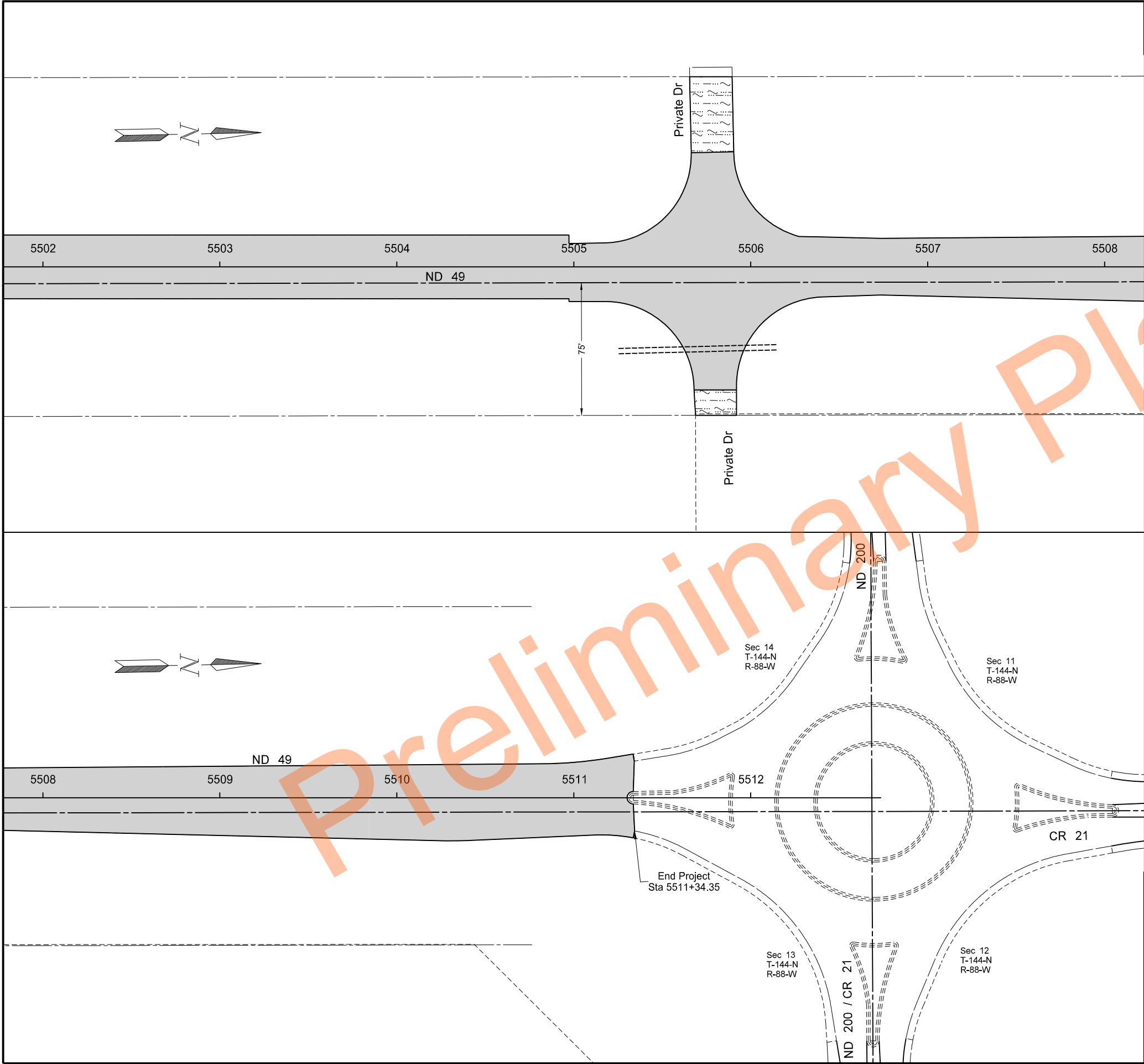
- RAP-Superpave FAA 45: 3"
- 8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)
- Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5478+00 to 5490+00





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	90	12

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		5502+00 to 5511+33.59	476	GAL
430	0145	RAP - SUPERPAVE FAA 45		
		5502+00 to 5511+33.59	752	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		5502+00 to 5511+33.59	34	TON

LEGEND

-RAP-Superpave FAA 45: 3"

-8" Commercial Grade Hot Mix Asphalt (see sheet 80-4)

-Aggregate Base Course CL 5

Paving Layouts

ND 49
Beulah North to Jct 200

5502+00 to 5511+34.35

REGISTERED PROFESSIONAL ENGINEER

STACY LATEN
PE-8772

DATE 9/22/23

NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	100	1

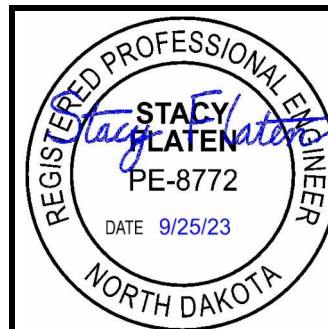
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT _____ MILES	2	28	56
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	48"x24"	END ROAD WORK	2	26	52
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)	1	18	18
G20-4b-36	36"x30"	WAIT FOR PILOT CAR	2	18	36
G20-50a-72	72"x36"	ROAD WORK NEXT _____ MILES RT & LT ARROWS	13	43	559
G20-52a-72	72"x24"	ROAD WORK NEXT _____ MILES RT or LT ARROW	3	36	108
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	59	118
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT (Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT _____ (Portable only)	8	30	240
R2-1-48	48"x60"	SPEED LIMIT _____	8	39	312
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	6	10	60
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS	2	39	78
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R9-9-24	24"x12"	SIDEWALK CLOSED (Mounted on barricade)	12	3	36
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED _____ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED _____ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP	7	35	245
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	6	35	210
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP	34	35	1190
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF	2	35	70
W8-11-48	48"x48"	UNEVEN LANES	2	35	70
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or _____ FT or _____ MILE	2	35	70
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or _____ FT or _____ MILE	2	35	70
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	_____ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x30"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	_____ FEET PLAQUE (Mounted on warning sign post)	2	10	20
W20-1-48	48"x48"	ROAD WORK AHEAD or _____ FT or _____ MILE	7	35	245
W20-2-48	48"x48"	DETOUR AHEAD or _____ FT or _____ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or _____ FT or _____ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or _____ FT or _____ MILE	2	35	70
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or _____ FT or _____ MILE		35	
W20-7-48	48"x48"	FLAGGER	7	35	245
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	7	5	35
W20-52P-54	54"x12"	NEXT _____ MILES (Mounted on warning sign post)	2	12	24
W21-1-48	48"x48"	WORKERS	4	35	140
W21-2-48	48"x48"	FRESH OIL	2	35	70
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or _____ FT or _____ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK	3	35	105

[illegible][illegible]

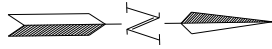
SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	4552

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	700
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	1
704-1054	SEWALK BARRICADE	EA	12
704-1058	PEDESTRIAN WALKWAY	LF	625
704-1060	DELINEATOR DRUMS	EACH	10
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	211
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	10
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1185	PILOT CAR	HR	100
704-1500	OBLITERATION OF PVMT MK	SF	
704-2108	TEMPORARY CURB RAMP	EA	9
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	75500
762-0434	SHORT TERM 8IN LINE-TYPE NR	LF	8858
762-0436	SHORT TERM 24IN LINE-TYPE NR	LF	216
762-0442	SHORT TERM MESSAGE-TYPE NR	SF	1655

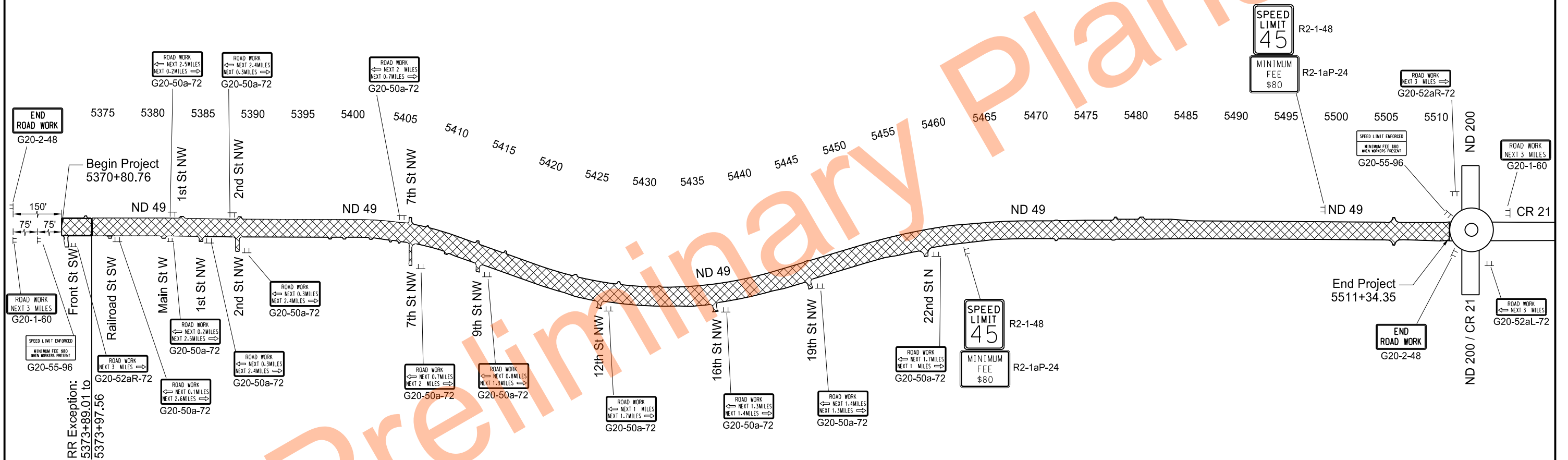
NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
<http://www.dot.nd.gov/>



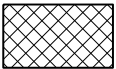
Traffic Control Devices List
ND 49
Beulah North to Jct 200



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	100	2



Legend



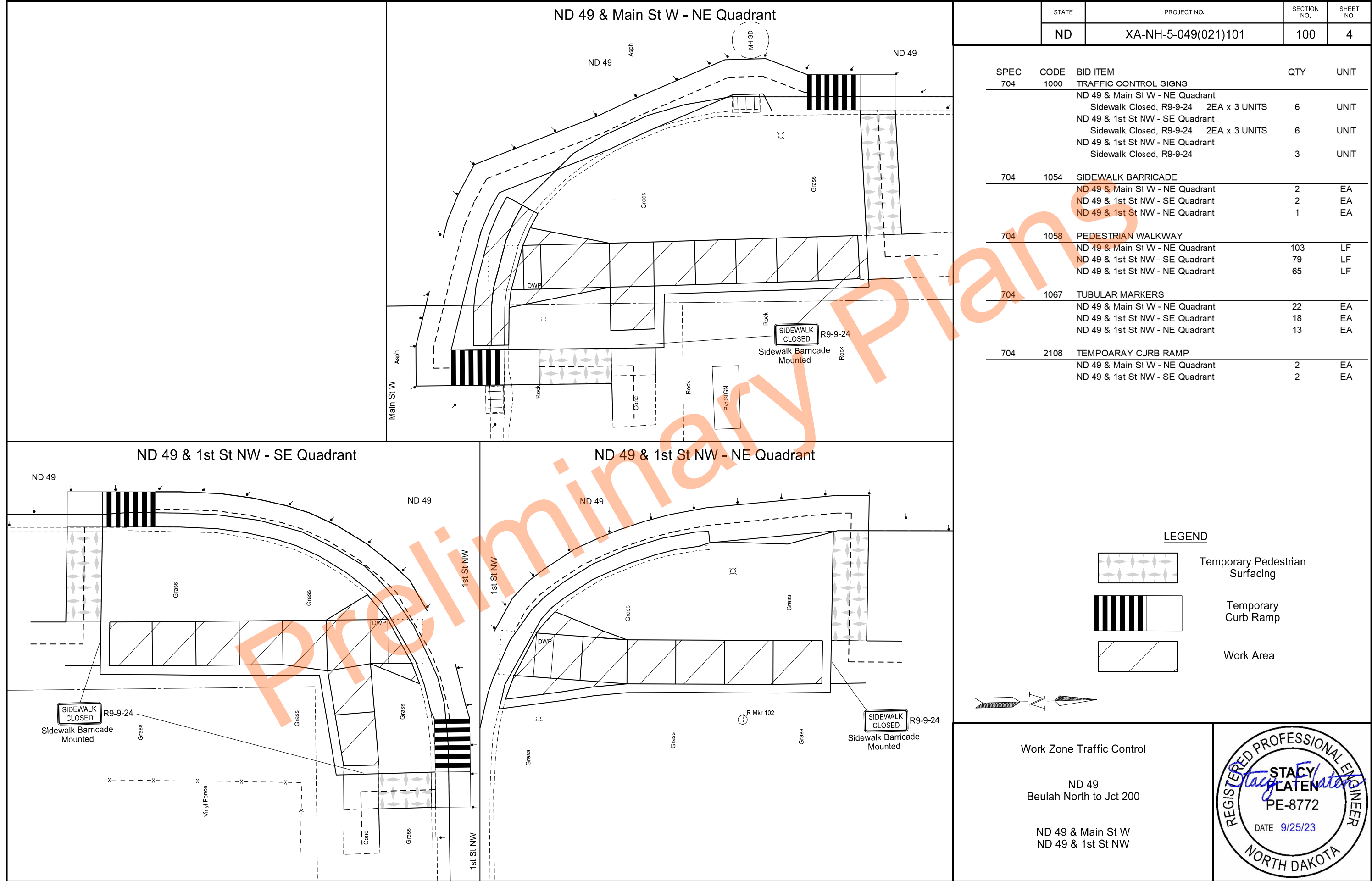
Work Zone

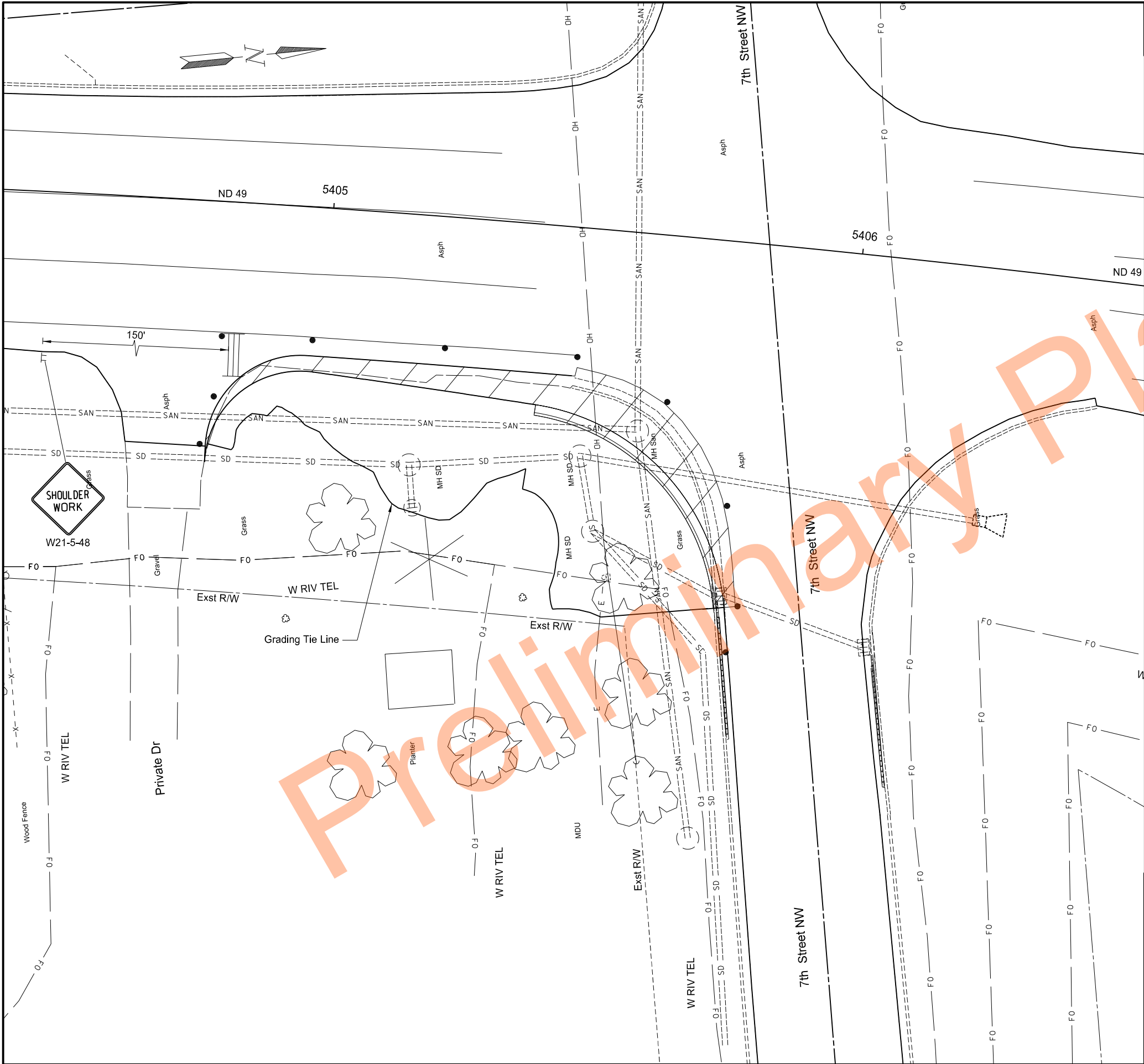
Work Zone Traffic Control

ND 49
Beulah North to Jct 200

ND 49
5370+80.76 to 5511+34.35





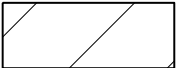


		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	100	6
SPEC	CODE	BID ITEM		QTY	UNIT
704	1000	TRAFFIC CONTROL SIGNS			
		ND 49 & 7th St N/W - SE Quadrant Shoulder Work, W21-5-48		35	UNIT
704	1052	TYPE III BARRICADE			
		ND 49 & 7th St N/W - SE Quadrant		1	EA
704	1060	DELINEATOR DRUMS			
		ND 49 & 7th St N/W - SE Quadrant		10	EA

LEGEND

Temporary Pedestrian Surfacing

Temporary Curb Ramp

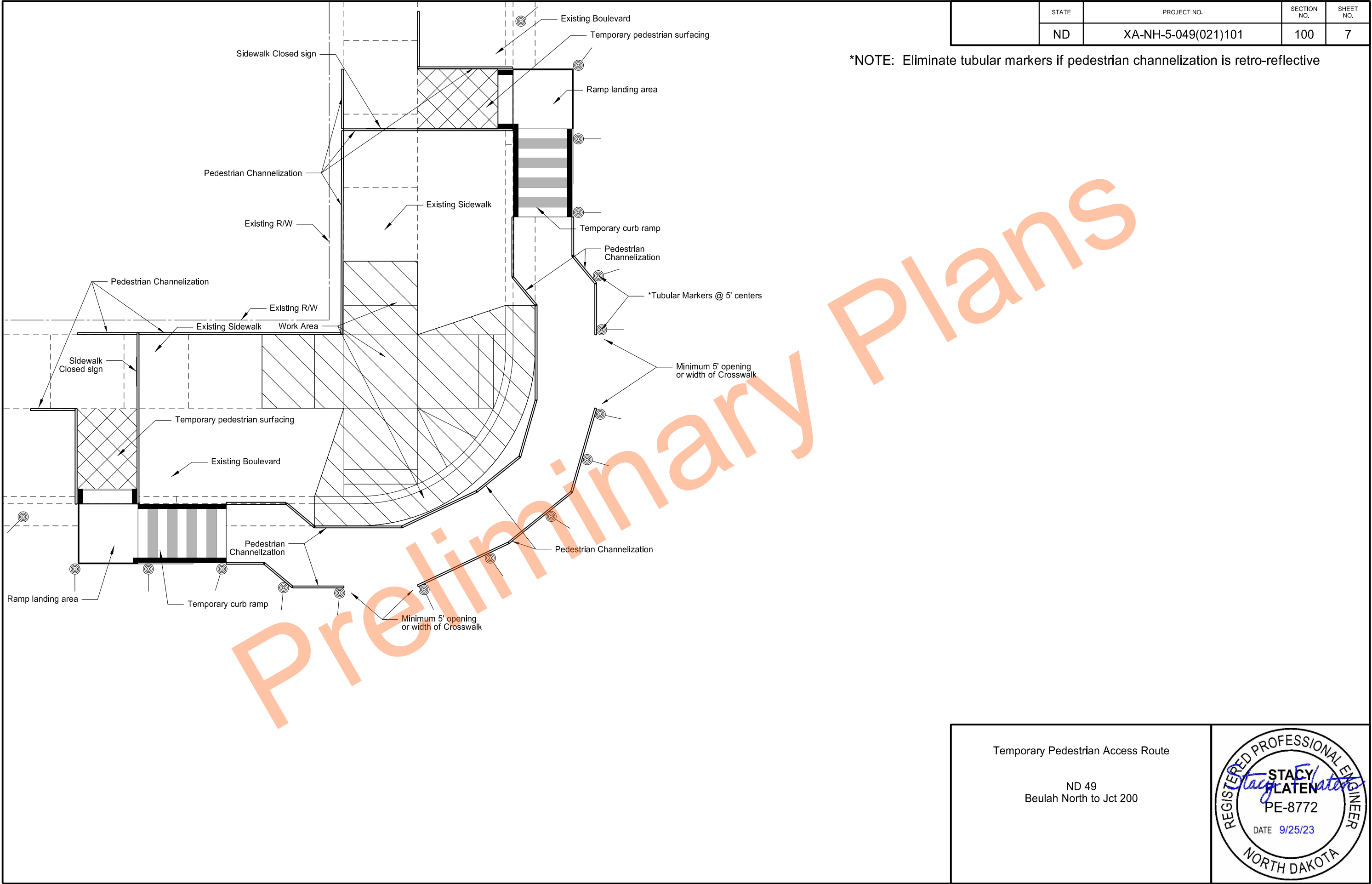
Work Area

Work Zone Traffic Control

ND 49
Beulah North to Jct 200

ND 49 & 7th St NW

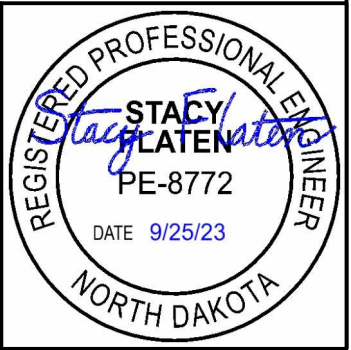




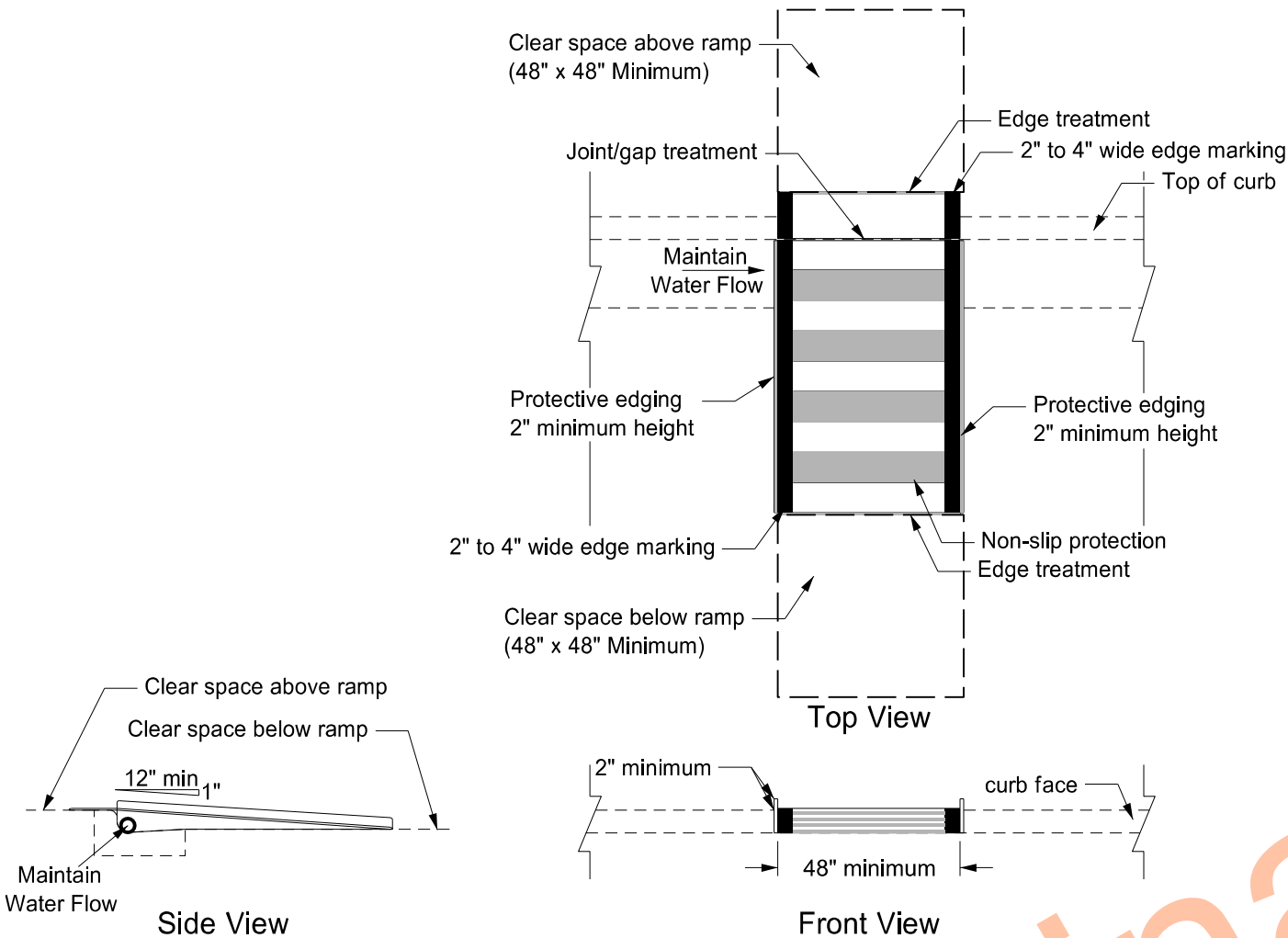
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	100	7

Temporary Pedestrian Access Route

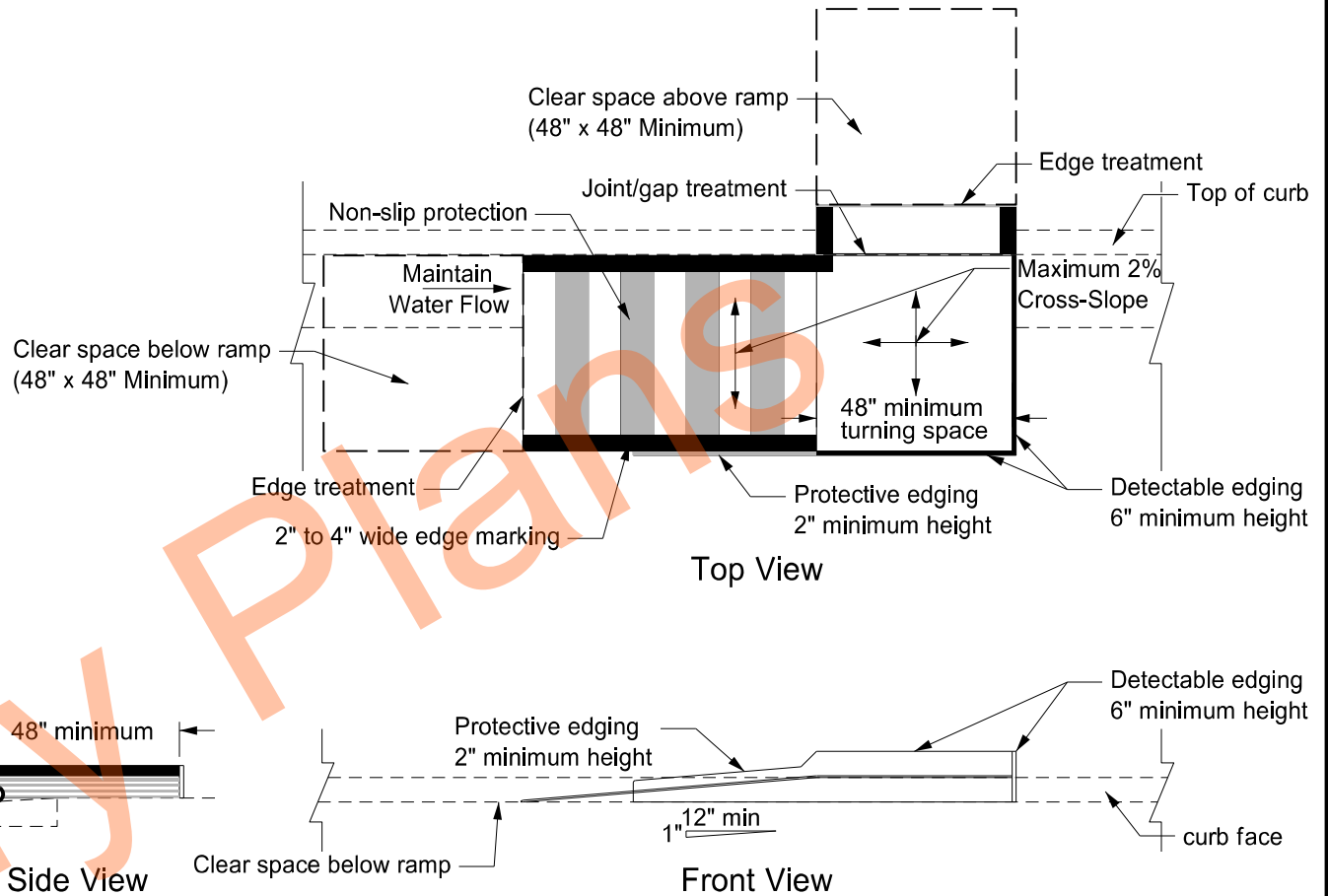
ND 49
Beulah North to Jct 200



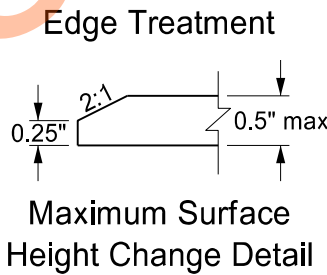
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	ND	XA-NH-5-049(021)101	100	8



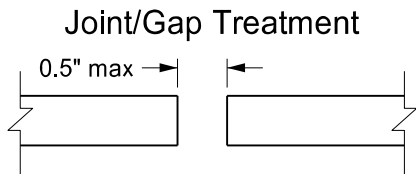
Temporary Perpendicular Curb Ramp



Temporary Parallel Curb Ramp



Maximum Surface Height Change Detail



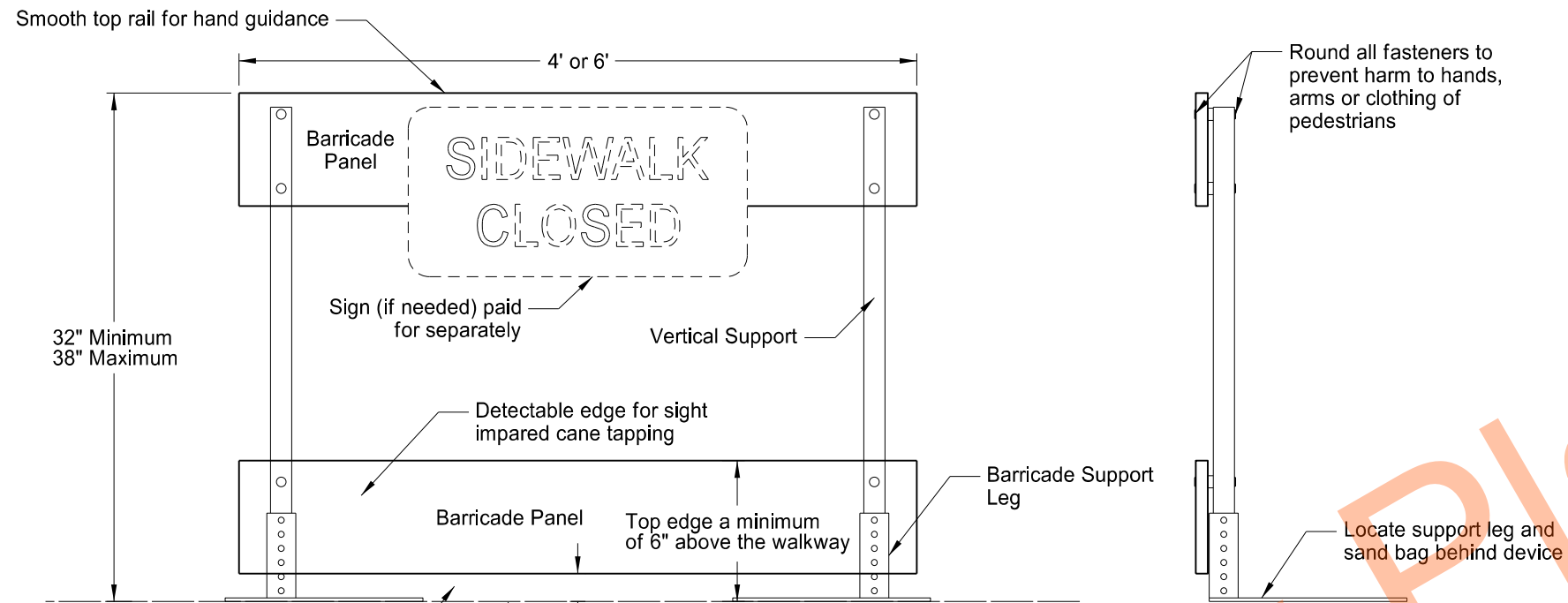
Maximum Width Lateral Joints or Gaps

Temporary Pedestrian Curb Ramp Details

ND 49
Beulah North to Jct 200



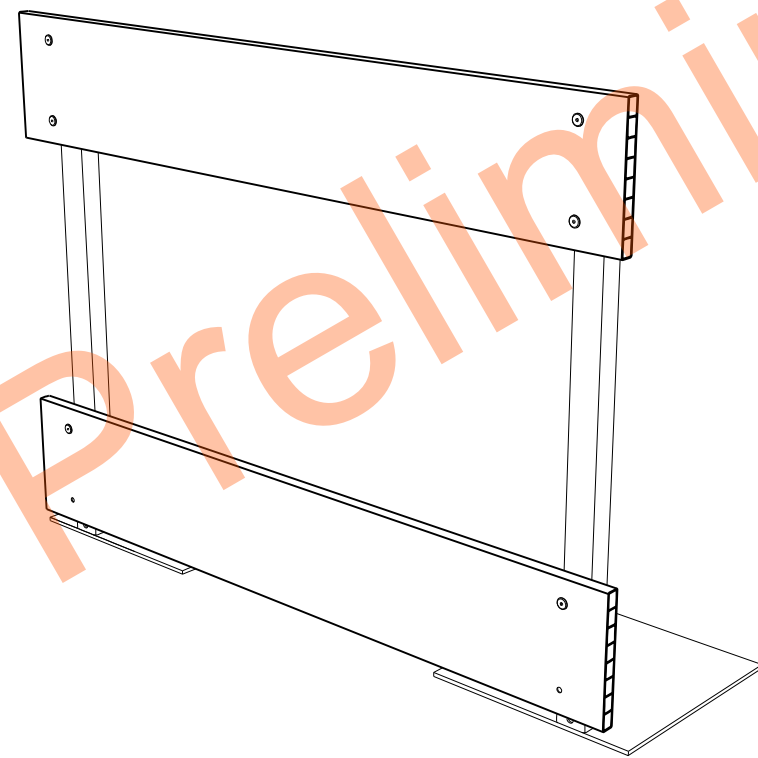
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	100	9



NOTES:

Sidewalk Barricades

1. Provide self standing sidewalk barricade with no supports extending into the pedestrians path.
2. Use orange or orange and white diagonal striped barricade panels contrasting with the walkway surface.
3. Provide ADA compliant and NCHRP 350 or Mash Test Level 3 (TL3) approved sidewalk barricades.
4. Include all costs to furnish, maintain and remove sidewalk barricades in the price bid for "Sidewalk Barricade".



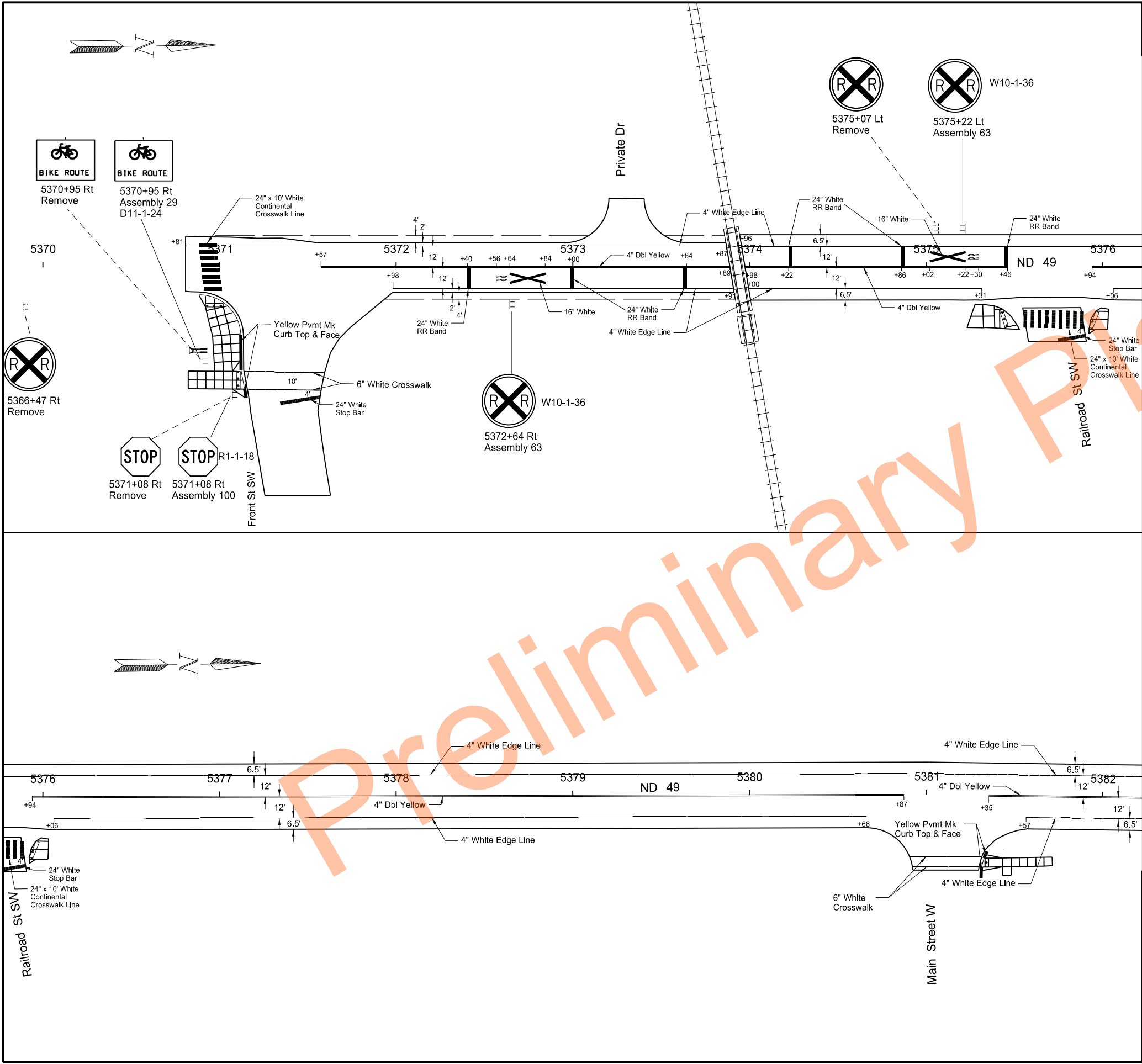
Perspective View

Sidewalk Barricade

ND 49
Beulah North to Jct 200



6/8/23 3:41:52PM
Page 1 of 1



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	110	2
SPEC	CODE	BID ITEM	QTY	UNIT	
762	0112	EPOXY PVMT MK MESSAGE Railroad Cross and 2 R's (60.5 SF x 2 EA)	121	SF	
762	0113	EPOXY PVMT MK 4IN LINE Yellow Double Barrier White Edge Line	1876 1937	LF LF	
762	0114	EPOXY PVMT MK 6IN LINE White Crosswalk (Front St SW) White Crosswalk (Main Street W)	88 79	LF LF	
762	0117	EPOXY PVMT MK 24IN LINE Railroad Bands Stop Bar (Front St SW) Stop Bar (Railroad St SW) 24"x10' Continental Crosswalk Line (Front St) 24"x10' Continental Crosswalk Line (Railroad St)	72 23 16 80 90	LF LF LF LF LF	
762	0118	EPOXY PVMT MK CURB TOP & FACE Front St SW, SE Quad Main St W, NE Quad	25 11	LF LF	

Signing & Pavement Marking Layout

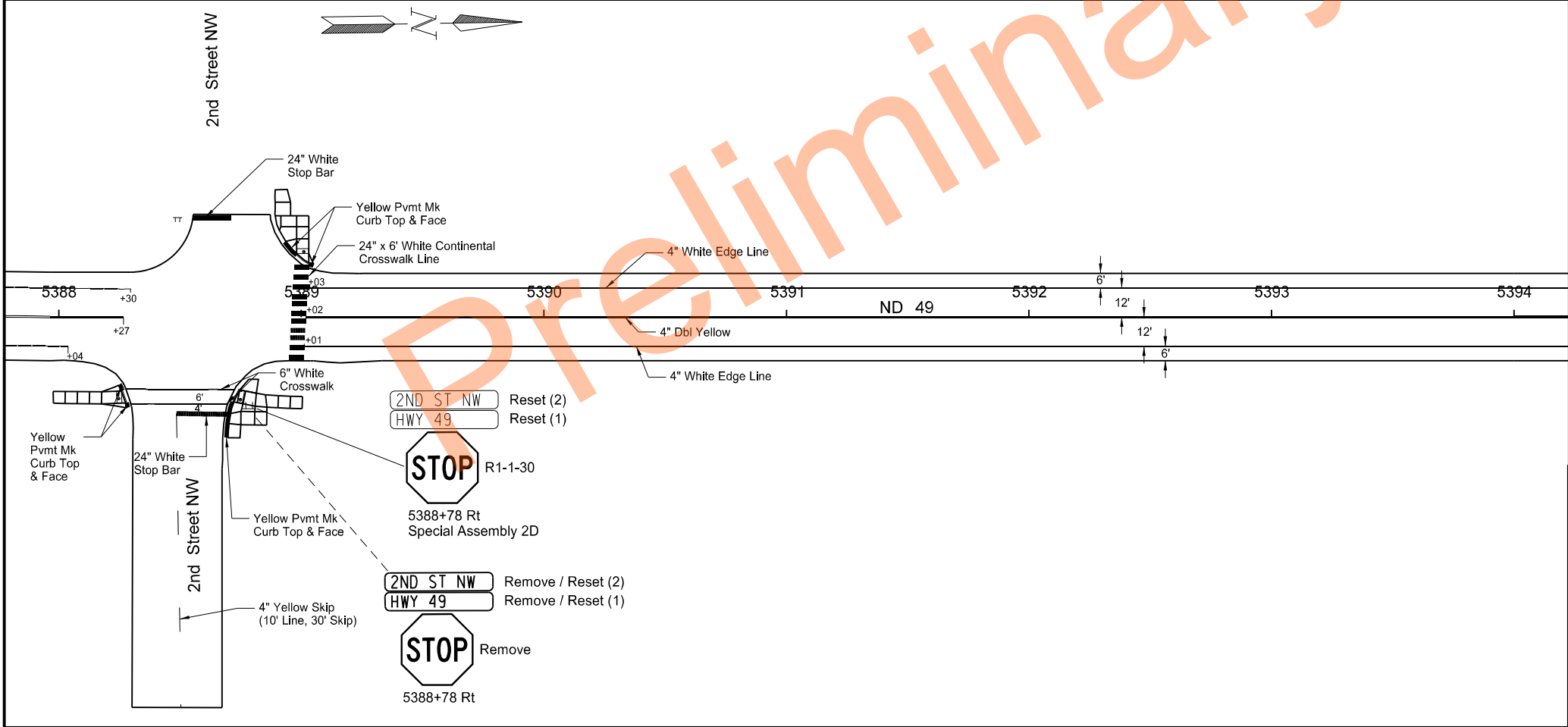
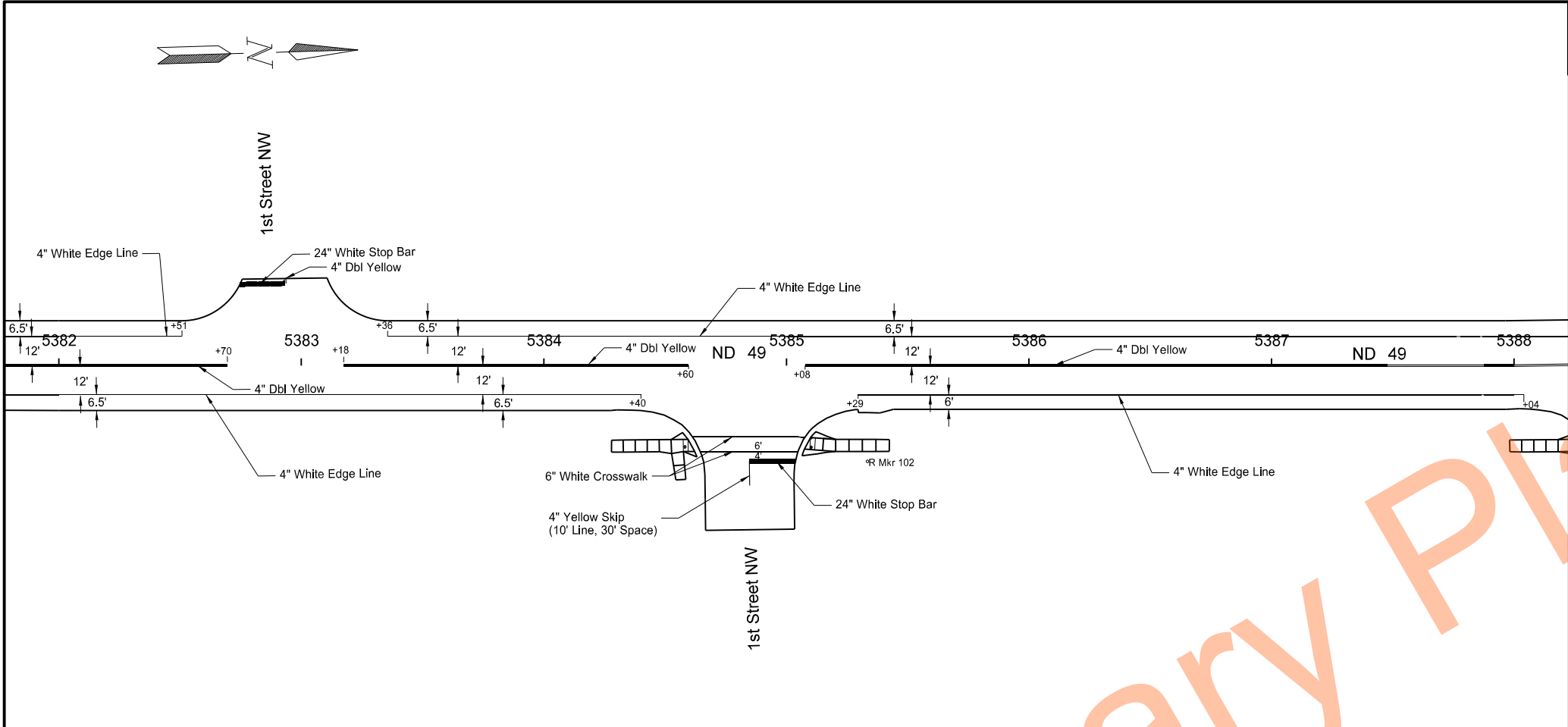
ND 49
Beulah, North to Jct 200

5370+80.76 to 5382+00

REGISTERED PROFESSIONAL ENGINEER

STACY LATEN
PE-8772
DATE 9/25/23

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	110	3
SPEC	CODE	BID ITEM		QTY	UNIT
762	0113	EPOXY PVMT MK 4IN LINE			
		Yellow Double Barrier		2062	LF
		Yellow Skip Line		40	LF
762	0114	EPOXY PVMT MK 6IN LINE			
		White Crosswalk (1st St NW)		87	LF
		White Crosswalk (2nd St NW)		85	LF
762	0117	EPOXY PVMT MK 24IN LINE			
		Stop Bar (1st St NW)		38	LF
		Stop Bar (2nd St NW)		36	LF
		24"x6' Continental Crosswalk Line		66	LF
762	0118	EPOXY PVMT MK CURB TOP & FACE			
		2nd St NW, NW Quad		10	LF
		2nd St NW, SE Quad		5	LF
		2nd St NW, NE Quad		16	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5382+00 to 5394+00

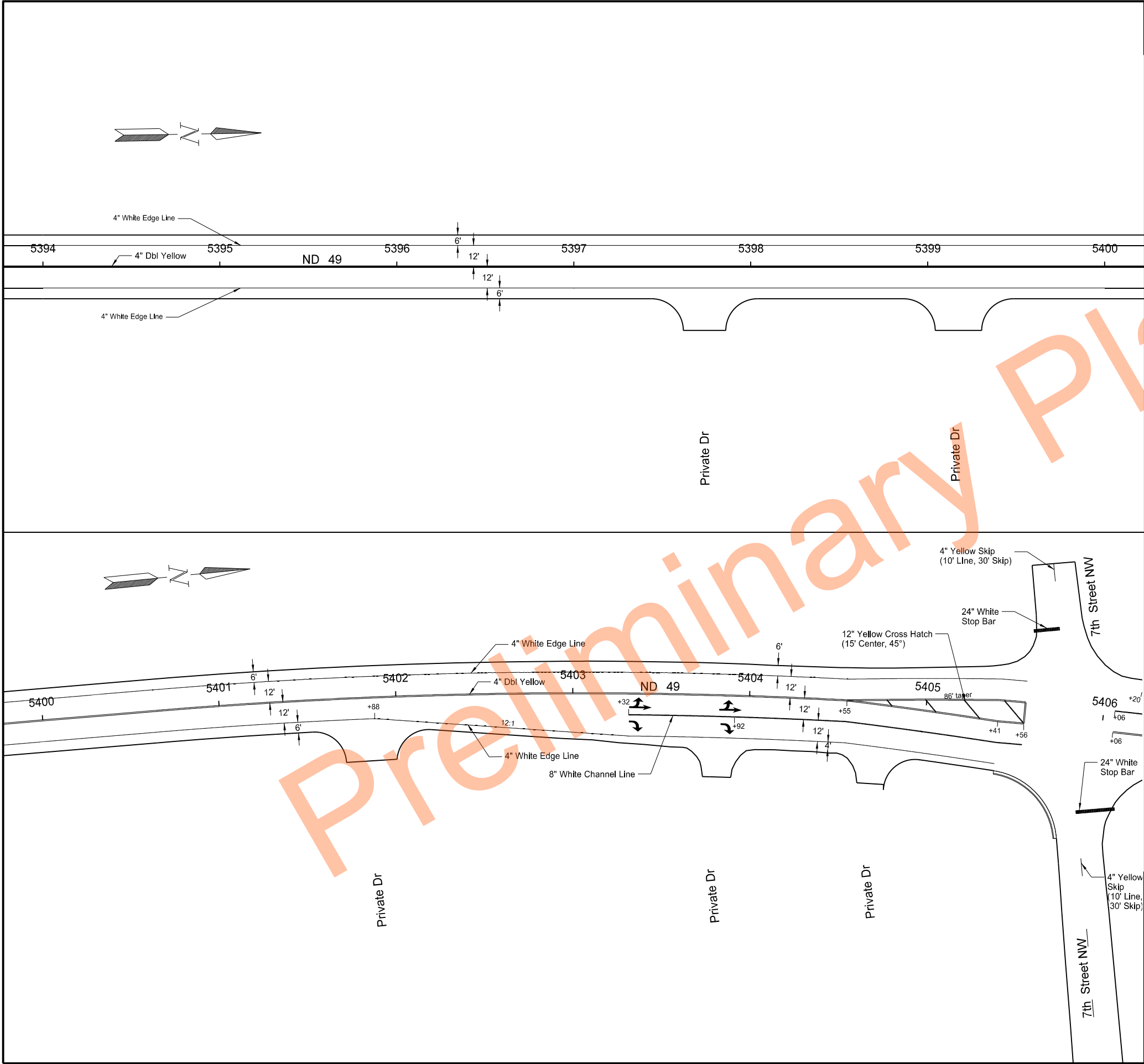
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/25/23

NORTH DAKOTA



		STATE	PROJECT NO.		SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101		110	4
SPEC	CODE	BID ITEM			QTY	UNIT
762	0112	EPOXY PVMT MK MESSAGE				
		Arrow (Rt)	16 SF x 2 EA	32	SF	
		Arrow (Lt & Through Arrow)	27 SF x 2 EA	54	SF	
762	0113	EPOXY PVMT MK 4IN LINE				
		Yellow Double Barrier		2538	LF	
		Yellow Skip Line		60	LF	
		White Edge Line		2297	LF	
762	0115	EPOXY PVMT MK 8IN LINE				
		White Channel Line		224	LF	
762	0111	EPOXY PVMT MK 12IN LINE				
		Yellow Cross Hatch		45	LF	
762	0117	EPOXY PVMT MK 24IN LINE				
		Stop Bar (7th St NW)		36	LF	

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5394+00 to 5406+00

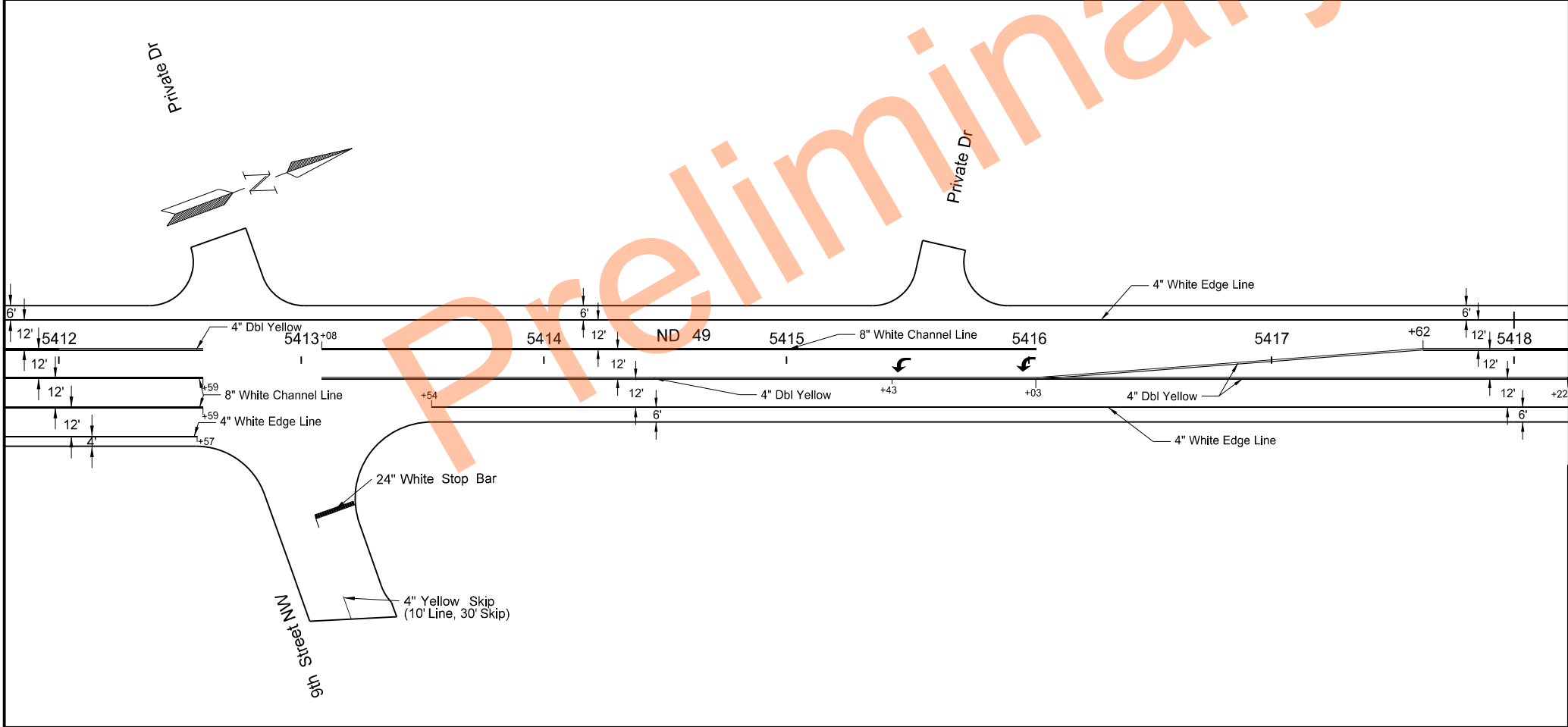
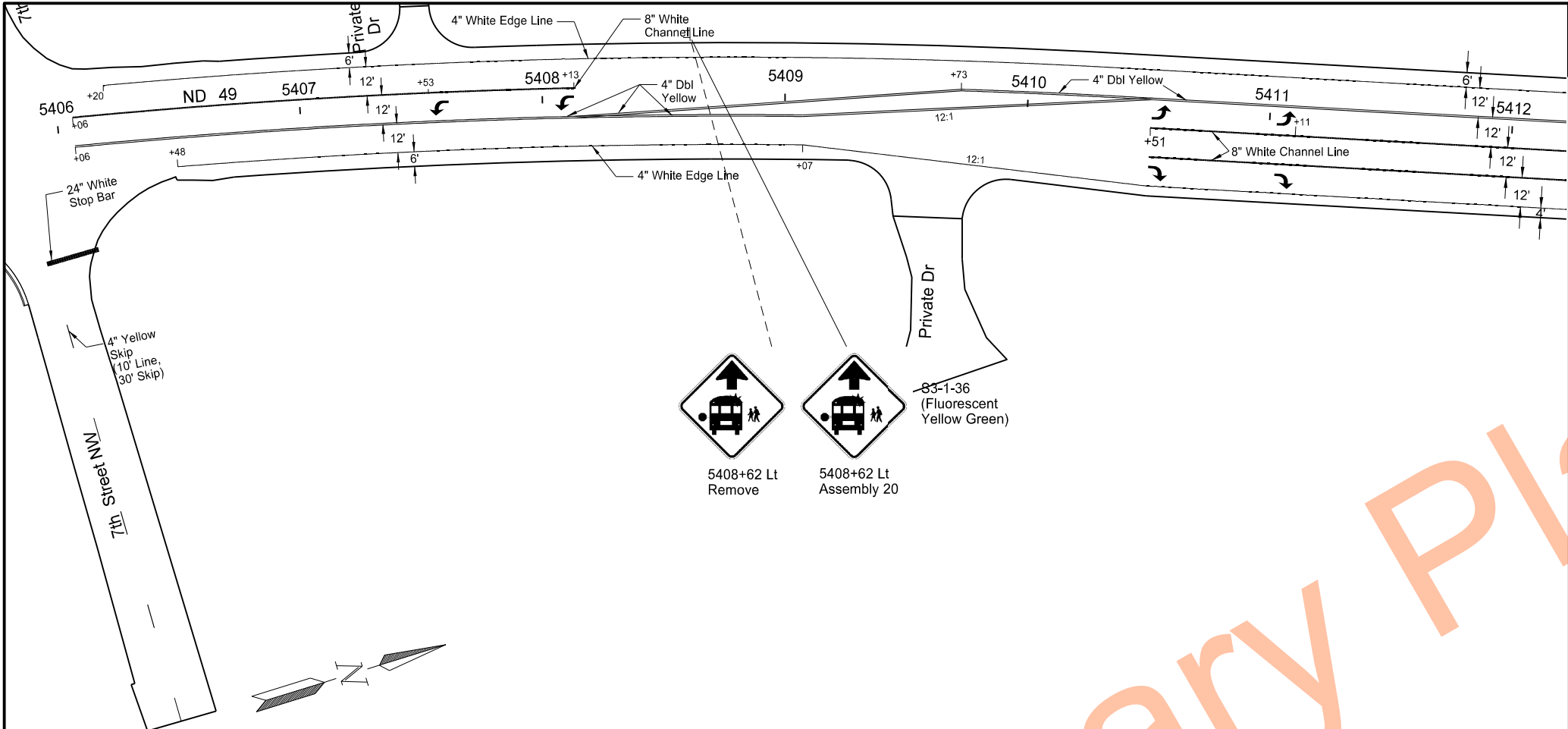
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 9/25/23

NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	XA-NH-5-049(021)101	110	5

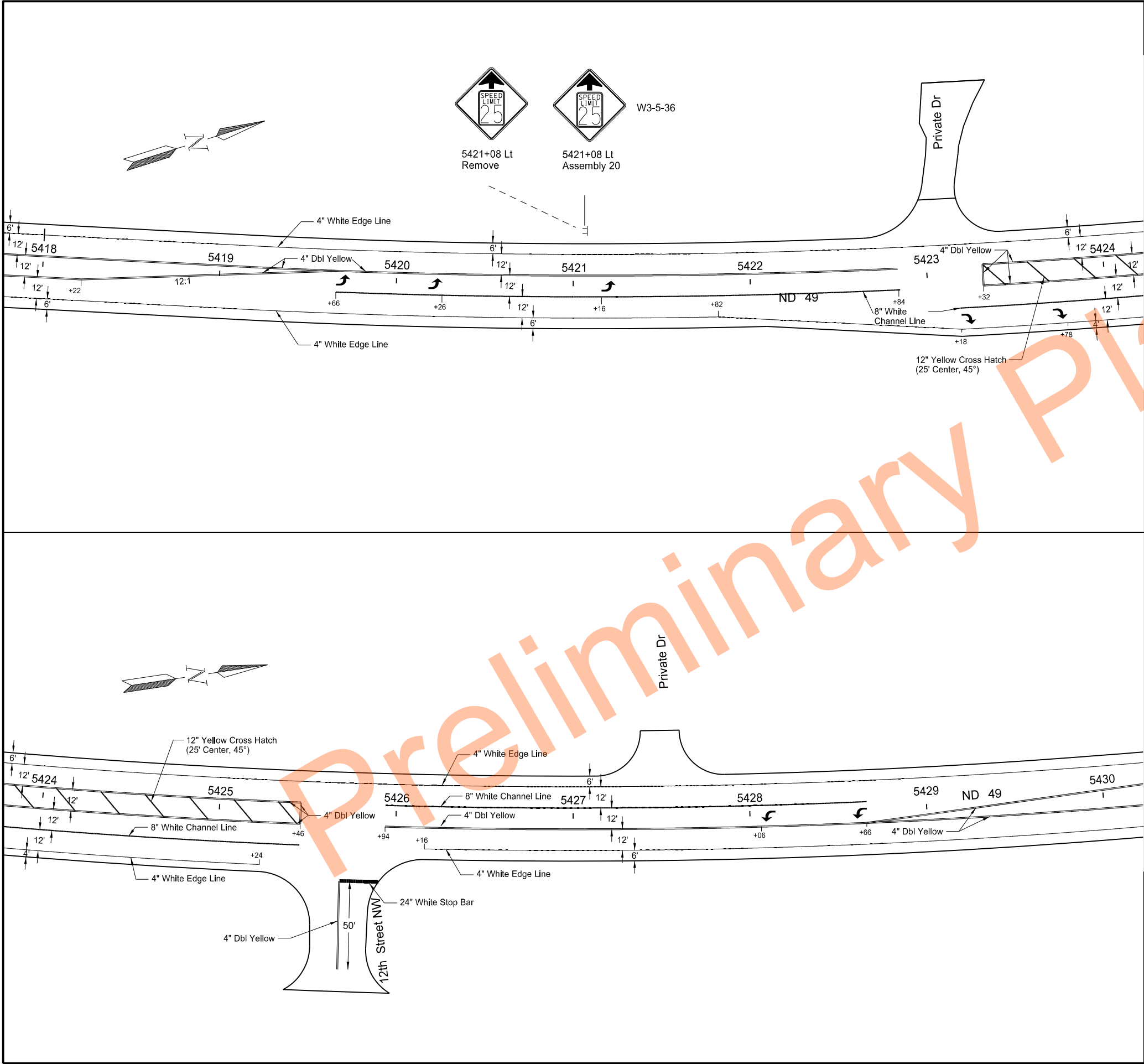
SPEC	CODE	BID ITEM	QTY	UNIT
762	0112	EPOXY PVMT MK MESSAGE		
		Arrow (Lt)	16 SF x 6 EA	96 SF
		Arrow (Rt)	16 SF x 2 EA	32 SF
762	0113	EPOXY PVMT MK 4IN LINE		
		Yellow Double Barrier	3162	LF
		Yellow Skip Line	20	LF
		White Edge Line	2235	LF
762	0115	EPOXY PVMT MK 8IN LINE		
		White Channel Line	918	LF
762	0117	EPOXY PVMT MK 24IN LINE		
		Stop Bar (9th St NW)	17	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5406+00 to 5418+00





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	110	6
SPEC	CODE	BID ITEM		QTY	UNIT
762	0112	EPOXY PVMT MK MESSAGE			
		Arrow (Lt)	16 SF x 5 EA	80	SF
		Arrow (Rt)	16 SF x 2 EA	32	SF
762	0113	EPOXY PVMT MK 4IN LINE			
		Yellow Double Barrier		3386	LF
		White Edge Line		2308	LF
762	0115	EPOXY PVMT MK 8IN LINE			
		White Channel Line		818	LF
762	0111	EPOXY PVMT MK 12IN LINE			
		Yellow Cross Hatch		150	LF
762	0117	EPOXY PVMT MK 24IN LINE			
		Stop Bar (12th St NW)		22	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

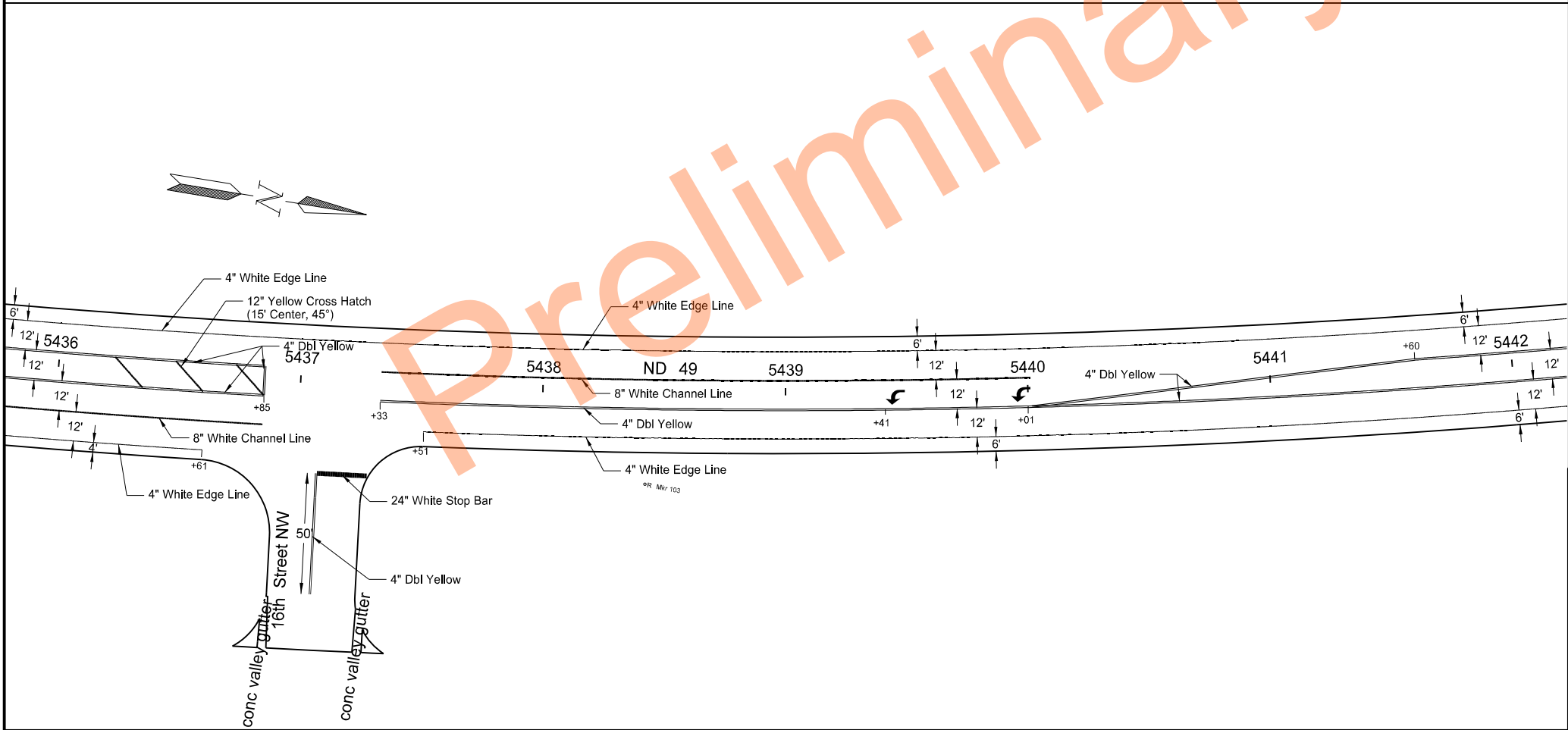
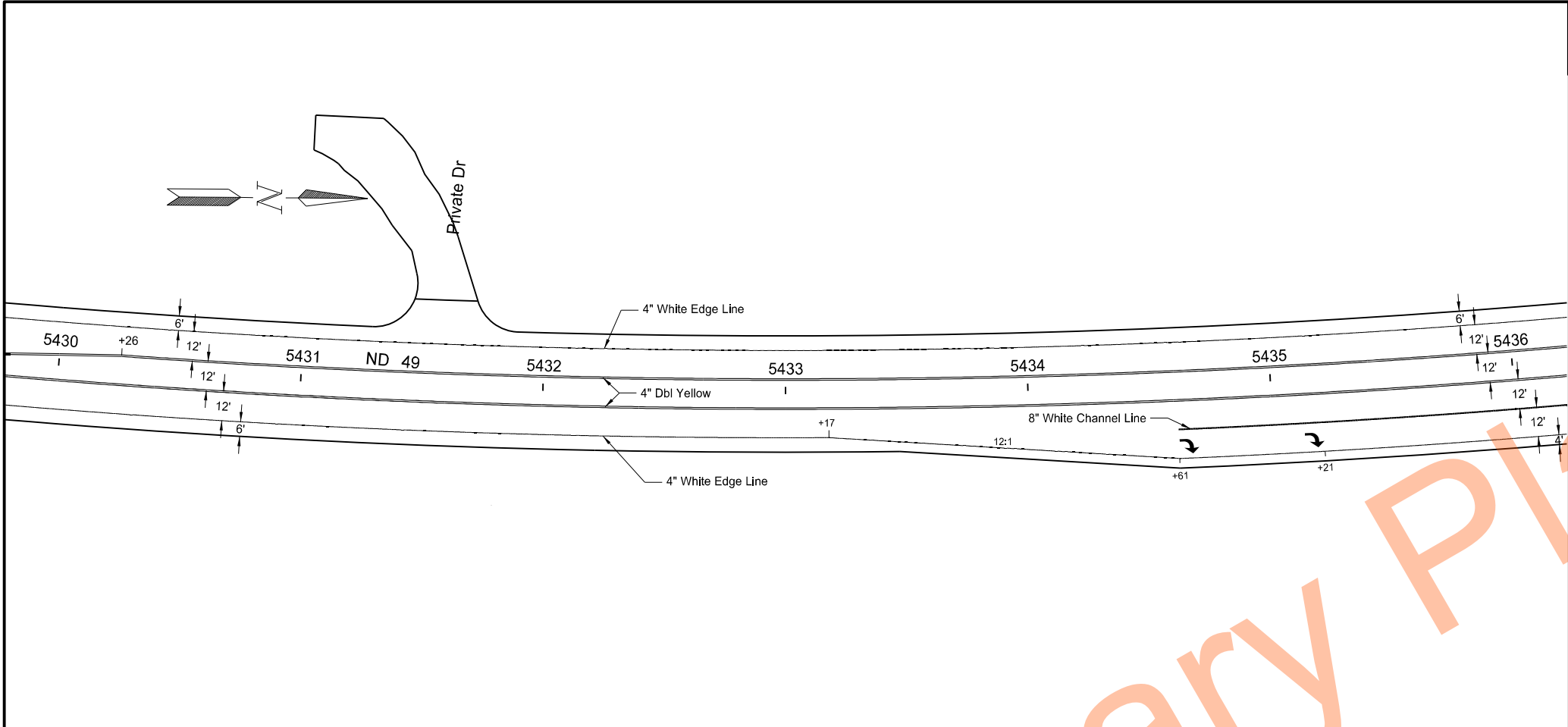
5418+00 to 5430+00

REGISTERED PROFESSIONAL ENGINEER

STACY LATEN
PE-8772

DATE 9/25/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	110	7

SPEC	CODE	BID ITEM	QTY	UNIT
762	0112	EPOXY PVMT MK MESSAGE		
		Arrow (Lt)	16 SF x 2 EA	32 SF
		Arrow (Rt)	16 SF x 2 EA	32 SF
762	0113	EPOXY PVMT MK 4IN LINE		
		Yellow Double Barrier	4198	LF
		White Edge Line	2310	LF
762	0115	EPOXY PVMT MK 8IN LINE		
		White Channel Line	492	LF
762	0111	EPOXY PVMT MK 12IN LINE		
		Yellow Cross Hatch	51	LF
762	0117	EPOXY PVMT MK 24IN LINE		
		Stop Bar (16th S: NW)	21	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5430+00 to 5442+00

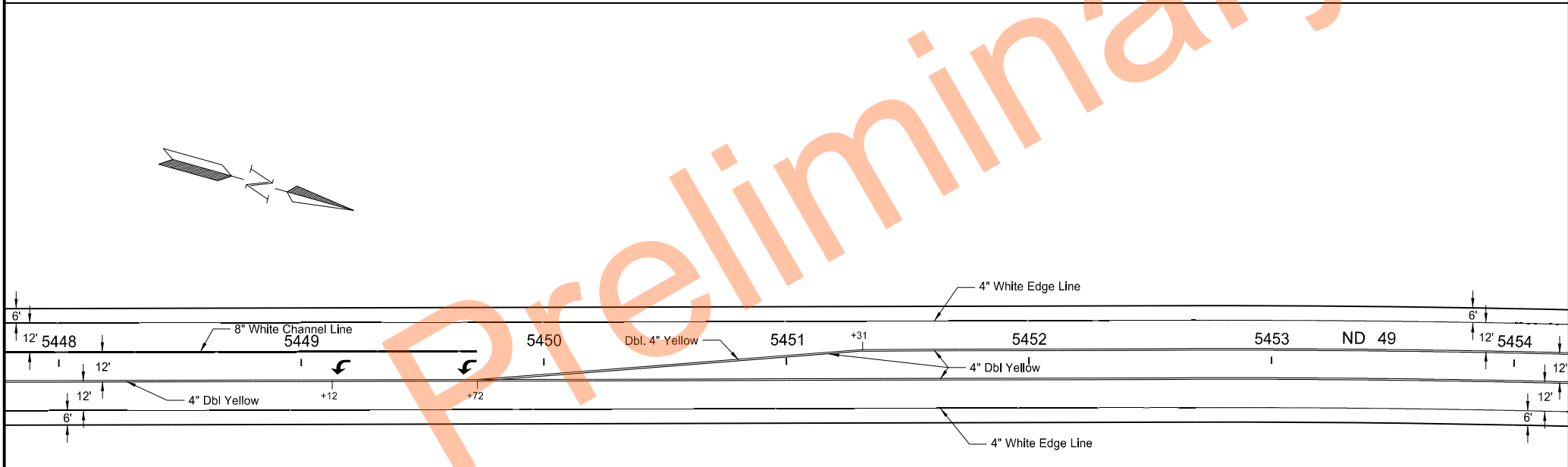
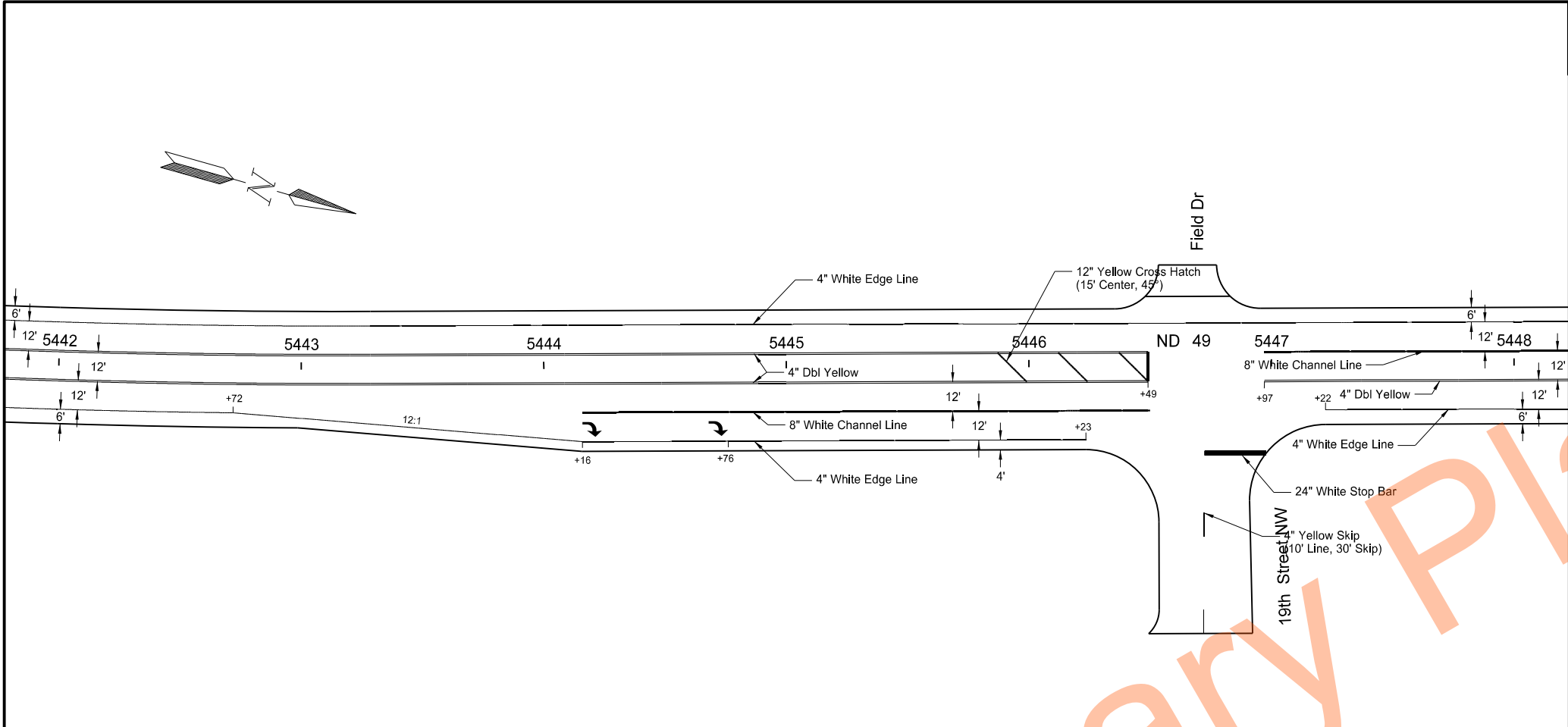
REGISTERED PROFESSIONAL ENGINEER

STACY LATEN

PE-8772

DATE 9/25/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	110	8

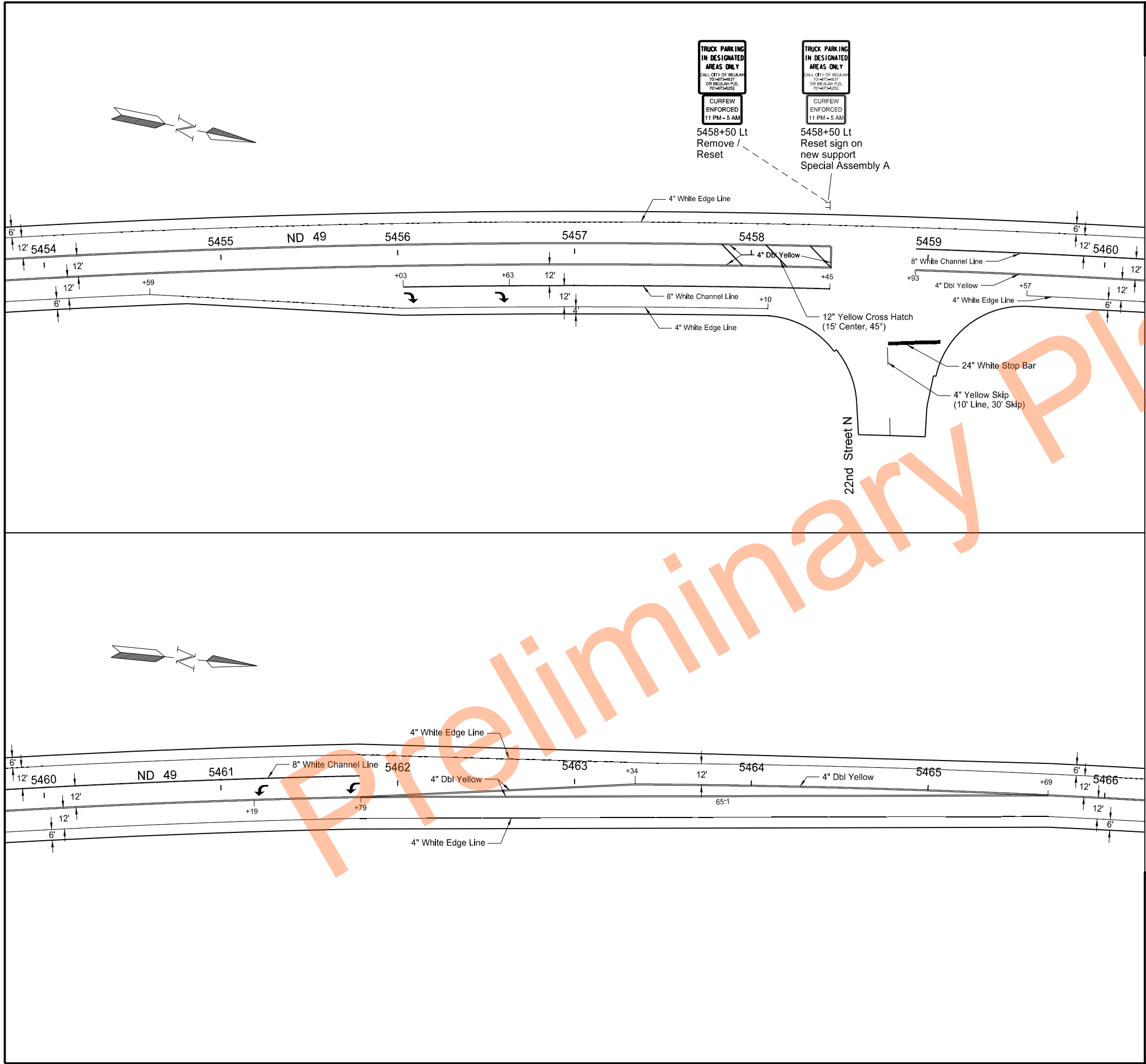
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762	0112	EPOXY PVMT MK MESSAGE		
		Arrow (Lt)	16 SF x 2 EA	32 SF
		Arrow (Rt)	16 SF x 2 EA	32 SF
762	0113	EPOXY PVMT MK 4IN LINE		
		Yellow Double Barrier	4082	LF
		Yellow Skip Line	20	LF
		White Edge Line	2301	LF
762	0115	EPOXY PVMT MK 8IN LINE		
		White Channel Line	508	LF
762	0111	EPOXY PVMT MK 12IN LINE		
		Yellow Cross Hatch	51	LF
762	0117	EPOXY PVMT MK 24IN LINE		
		Stop Bar (19th St NW)	26	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5442+00 to 5454+00





	STATE	PROJECT NO.		SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101		110	9

SPEC	CODE	BID ITEM	QTY	UNIT
762	0112	EPOXY PVMT MK MESSAGE		
		Arrow (Lt)	16 SF x 2 EA	32 SF
		Arrow (Rt)	16 SF x 2 EA	32 SF
762	0113	EPOXY PVMT MK 4IN LINE		
		Yellow Double Barrier	3996	LF
		Yellow Skip Line	20	LF
		White Edge Line	2253	LF
762	0115	EPOXY PVMT MK 8IN LINE		
		White Channel Line	528	LF
762	0111	EPOXY PVMT MK 12IN LINE		
		Yellow Cross Hatch	51	LF
762	0117	EPOXY PVMT MK 24IN LINE		
		Stop Bar (22nd St N)	30	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5454+00 to 5466+00

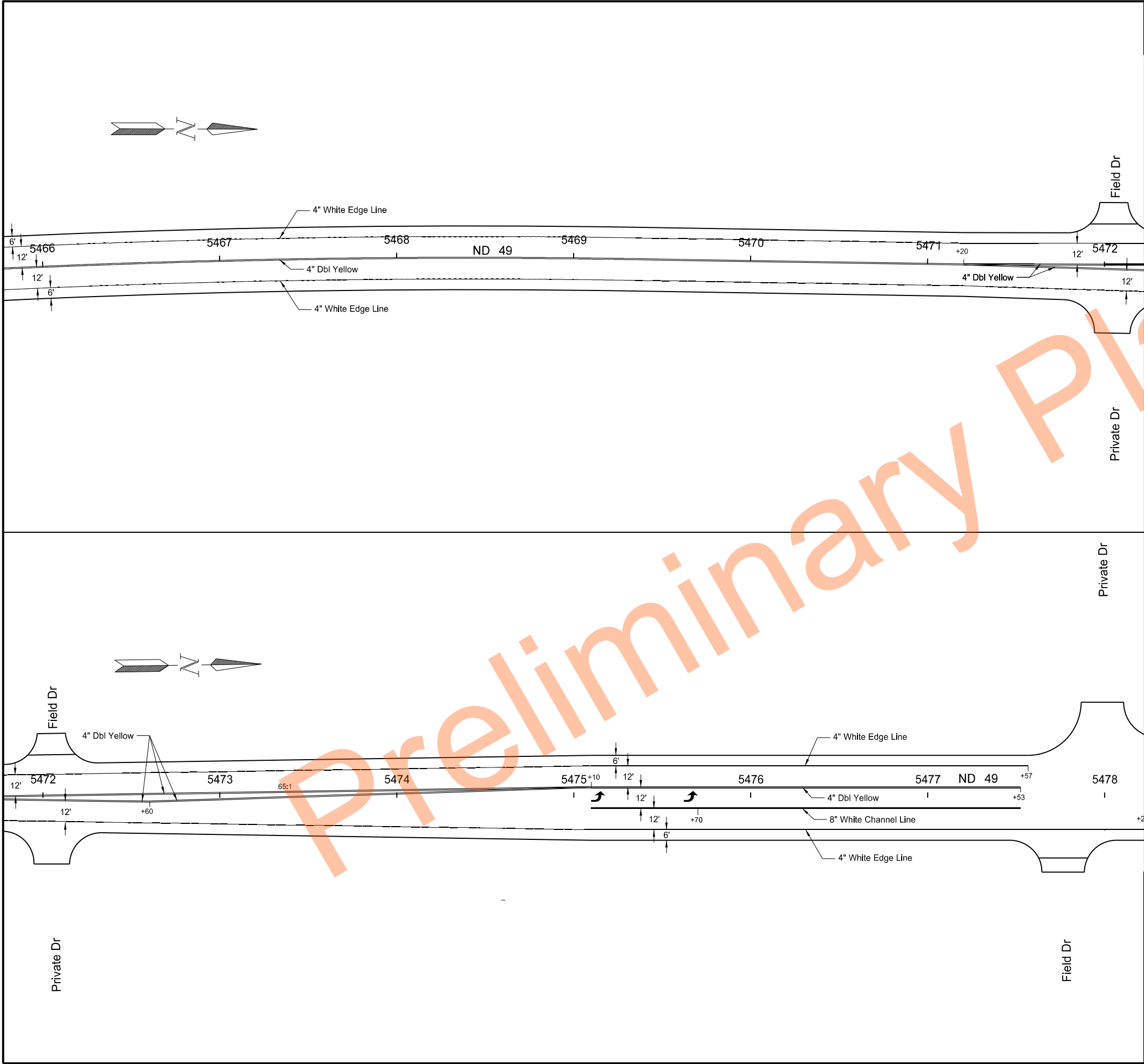
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 9/25/23

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	XA-NH-5-049(021)101	110	10
SPEC	CODE	BID ITEM		QTY	UNIT
762	0112	EPOXY PVMT MK MESSAGE			
		Arrow (Lt)		16 SF x 2 EA	32 SF
762	0113	EPOXY PVMT MK 4IN LINE			
		Yellow Double Barrier		3086	LF
		White Edge Line		2357	LF
762	0115	EPOXY PVMT MK 8IN LINE			
		White Channel Line		243	LF

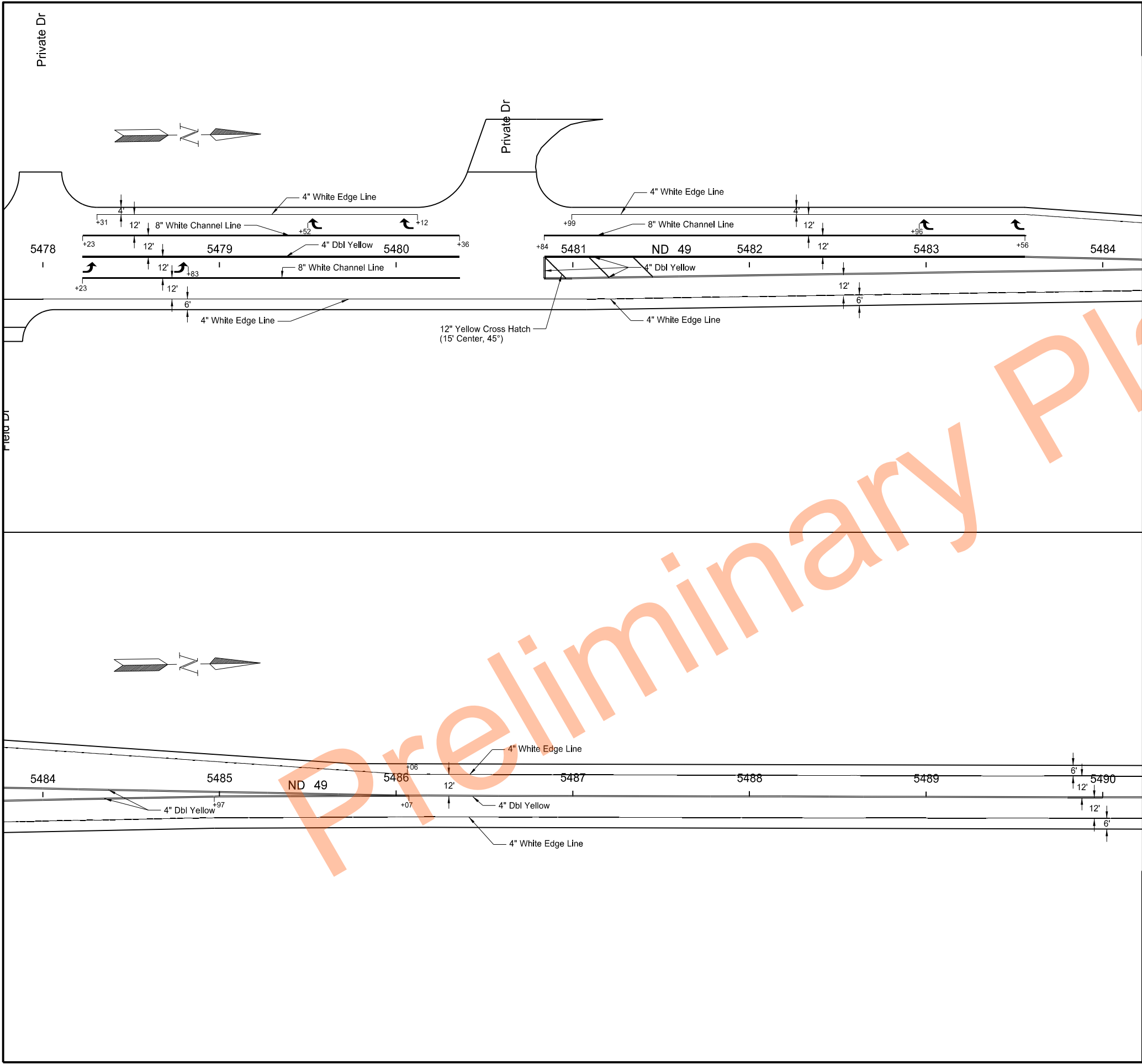
Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200
5466+00 to 5478+00

REGISTERED PROFESSIONAL ENGINEER

STACY LATEN
PE-8772
DATE 9/25/23

NORTH DAKOTA



	STATE	PROJECT NO.		SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101		110	11

SPEC	CODE	BID ITEM	QTY	UNIT	
762	0112	EPOXY PVMT MK MESSAGE			
		Arrow (Lt)	16 SF x 2 EA	32	SF
		Arrow (Rt)	16 SF x 4 EA	64	SF
762	0113	EPOXY PVMT MK 4IN LINE			
		Yellow Double Barrier		3324	LF
		White Edge Line		2282	LF
762	0115	EPOXY PVMT MK 8IN LINE			
		White Channel Line		698	LF
762	0111	EPOXY PVMT MK 12IN LINE			
		Yellow Cross Hatch		50	LF

Signing & Pavement Marking Layout

ND 49
Beulah, North to Jct 200

5478+00 to 5490+00

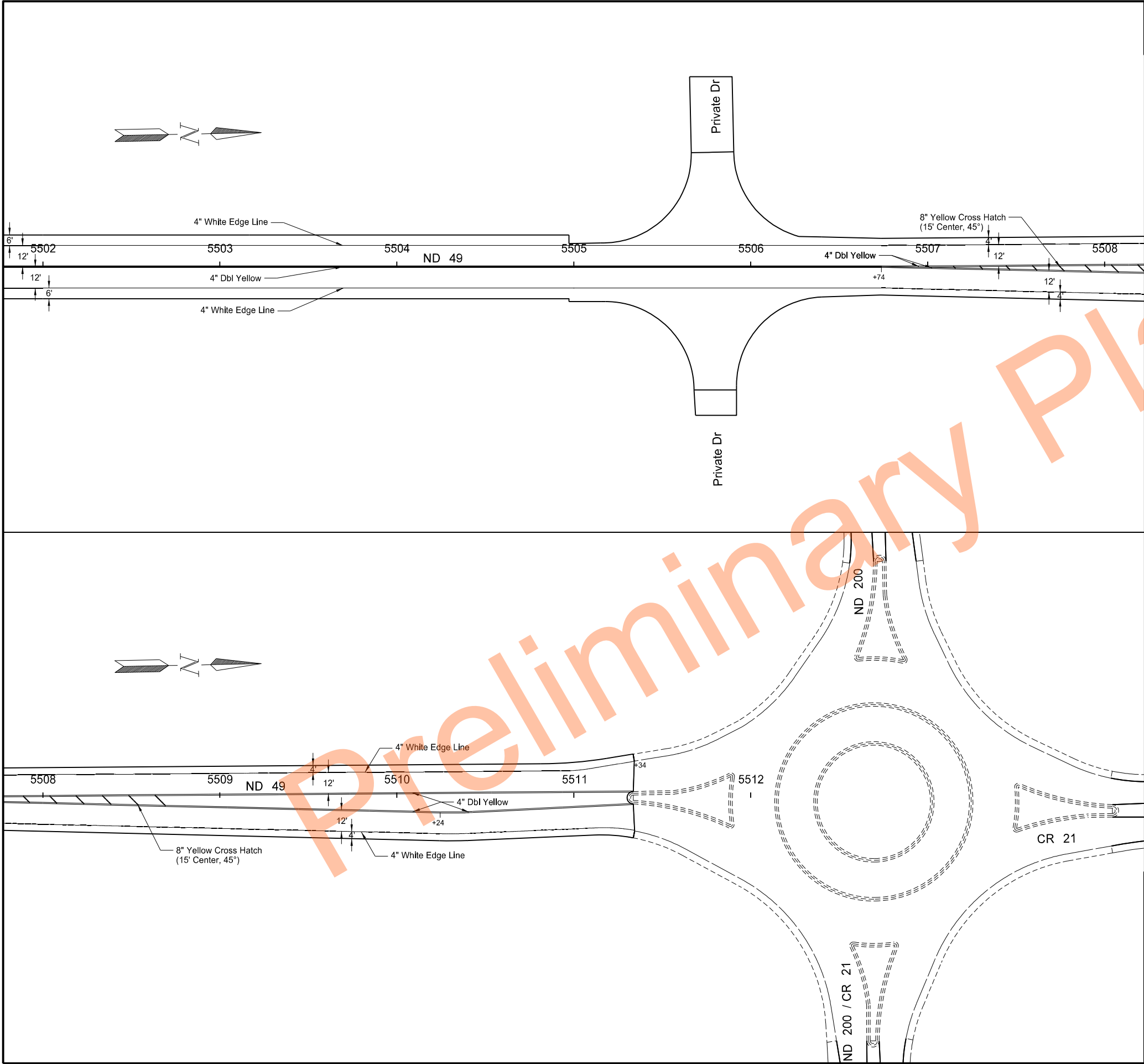
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STACY LATEN

PE-8772

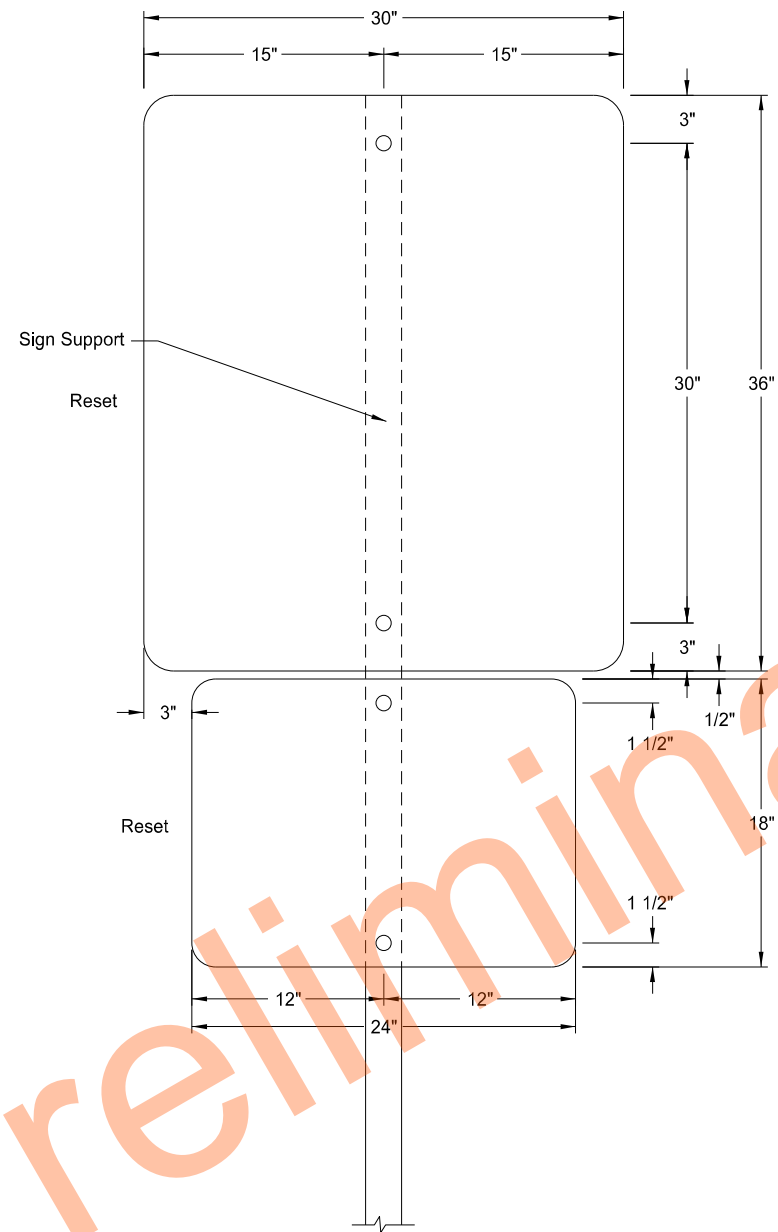
DATE 9/25/23

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	110	13
SPEC	CODE	BID ITEM	QTY	UNIT
762	0113	EPOXY PVMT MK 4IN LINE		
		Yellow Double Barrier	2788	LF
		White Edge Line	1870	LF
762	0115	EPOXY PVMT MK 8IN LINE		
		Yellow Cross Hatch	58	LF

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	110	14



Special Assembly A
5458+50 Lt
Design Area 10.5 SF
Reset Sign

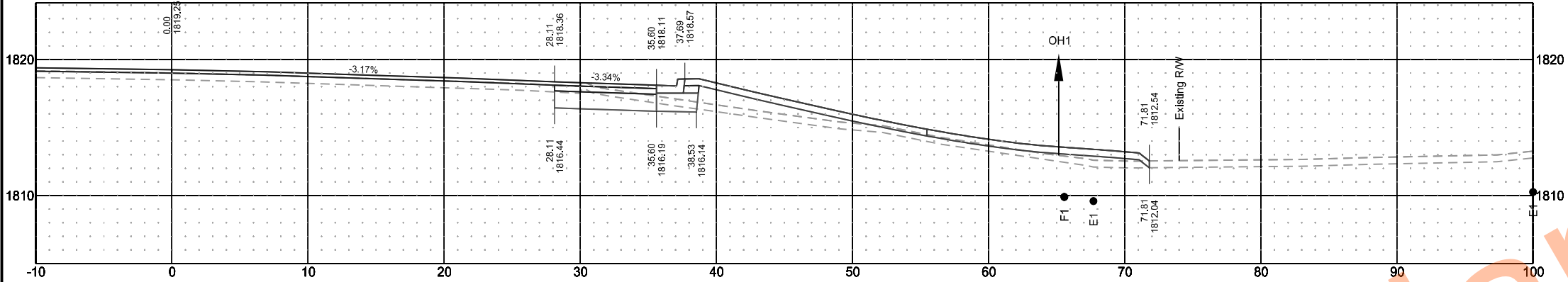
Signing Details

ND 49
Beulah North to Jct 200

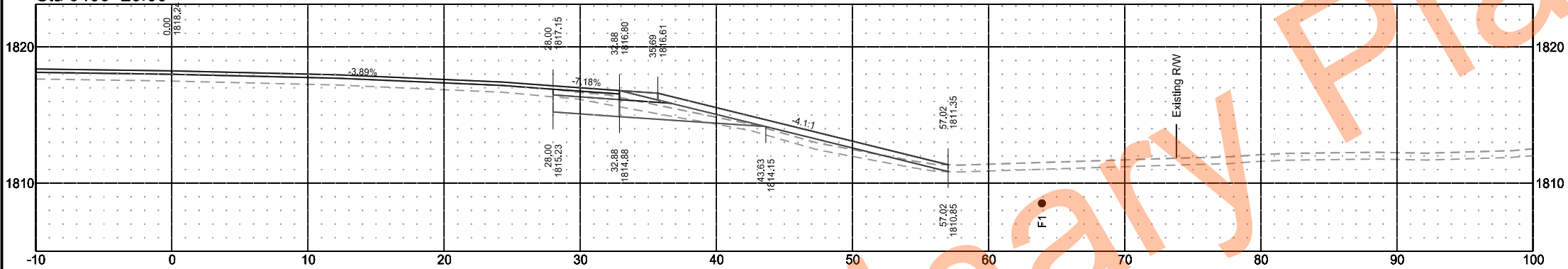
Special Assembly A
5458+50 Lt



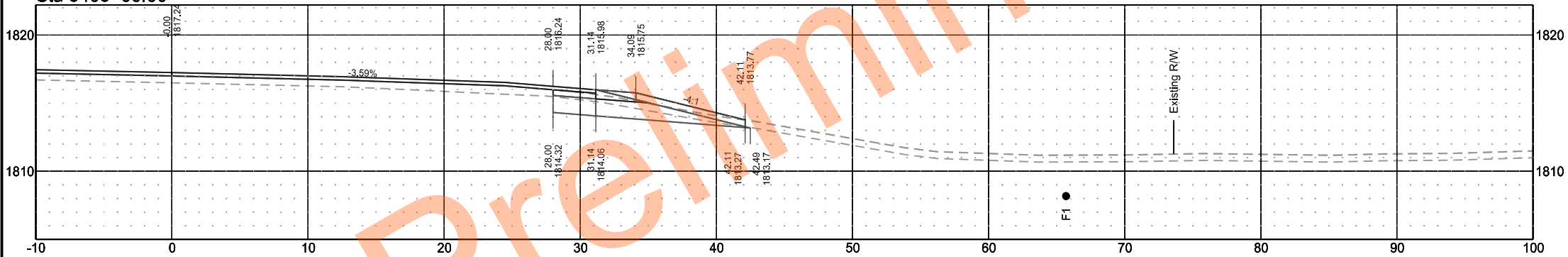
Sta 5405+50.00



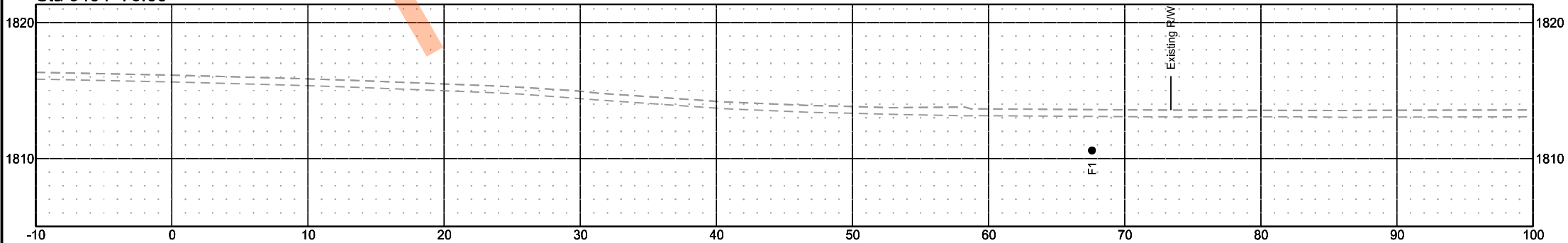
Sta 5405+25.00



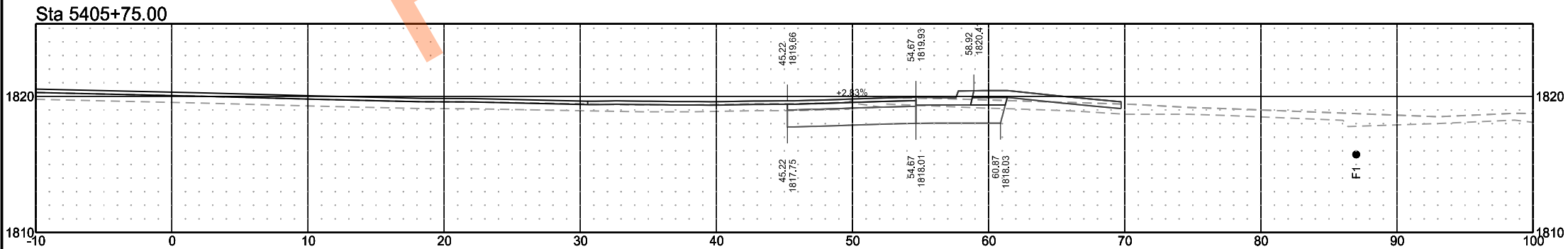
Sta 5405+00.00



Sta 5404+75.00

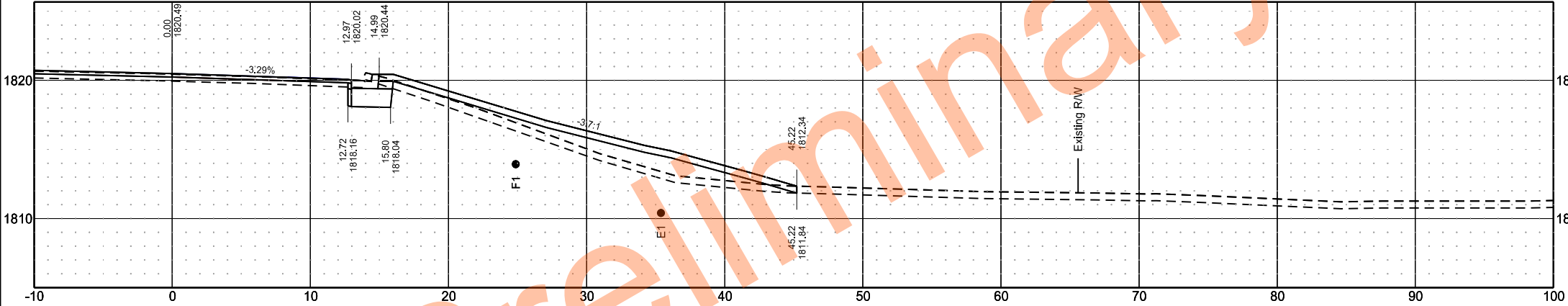


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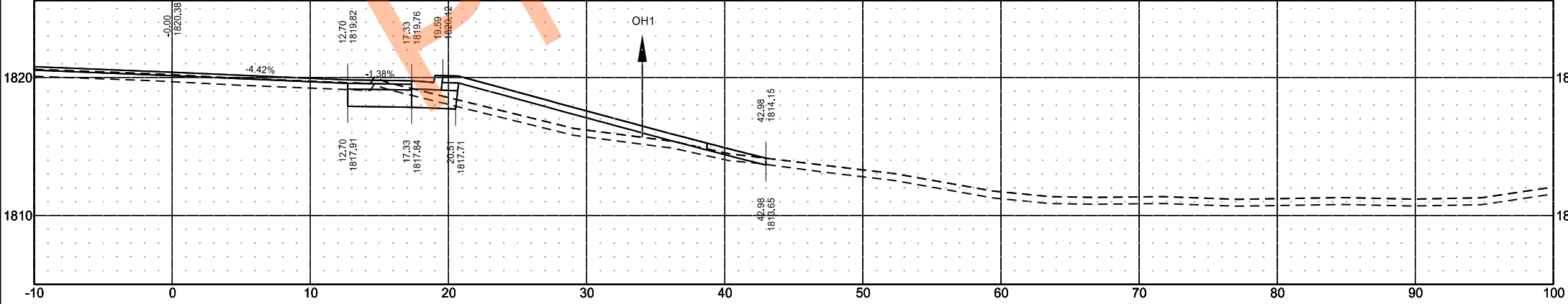


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	XA-NH-5-049(021)101	200	3

Sta 1+50.00



Sta 1+35.00



D-101-1

NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
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12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-28-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



08/16/22

LINE STYLES

D-101-20

Existing Topography

	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	Existing Guardrail Metal
	Existing Edge of Water
	Existing Fence
	Existing Railroad
	Existing Field Line
	Exst Flow
	Existing Curb
	Existing Valley Gutter
	Existing Driveway Gutter
	Existing Curb and Gutter
	Existing Mountable Curb and Gutter

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

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

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PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S
	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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09-23-16	Added and Revised Items, Organized by Functional Groups
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12 18 2020

SYMBOLS

D-101-30

	North Arrow (Half Scale)		Existing Bush or Shrub		Continuous Split Barrel Sample
	Alignment Data Point		Existing Large Evergreen Tree		Flight Auger Sample
	Alignment Monument		Existing Small Evergreen Tree		Split Barrel Sample
	Spot Elevation		Existing Large Tree		Thinwall Tube Sample
	Existing Miscellaneous Spot		Existing Small Tree		Standard Penetration Test
	Existing Access Control Arrow		Existing Tree Trunk		Inclinometer Tube
	Existing Benchmark		Cairn or Stone Circle		Excavation Unit
	Reset USGS Marker		Existing Artifact		Existing Ground Water Well Bore Hole
	Iron Monument Found		Existing Satellite Dish		
	Iron Pin R/W Monument		Existing Weather Station		
	Property Corner		Existing Windmill or Tower		
	Iron Pin Reference Monument		Reinforced Pavement		
	Right of Way Marker (Exst, Ppsd, Reset)				
	Existing Federal Reference Corner				
	Existing Section Corner (Full, Quarter, Sixteenth, Meander)				
	Existing Witness Corner				
	Existing Control Point (CP, GPS-RTK, TRI)				
	Existing Traverse PI Aerial Panel				
	Existing Reference Marker Point NGS				
	Existing EFB Misc				

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

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12 18 2020

SYMBOLS

D-101-31

				Flexible Delineator				Highway Sign (Exst, Ppsd)
				Flexible Delineator Type A (Exst, Ppsd)				Mile Post Type A (Exst-Ppsd-Reset)
				Flexible Delineator Type B (Exst, Ppsd)				Mile Post Type B (Exst, Ppsd)
				Flexible Delineator Type C (Exst, Ppsd)				Mile Post Type C (Exst, Ppsd)
				Flexible Delineator Type D (Exst, Ppsd)				Object Marker Type I (Exst, Ppsd)
				Flexible Delineator Type E (Exst, Ppsd)				Object Marker Type II (Exst, Ppsd)
				Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)				Object Marker Type III (Exst, Ppsd)
				Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)				Existing Reference Marker
				Delineator Type C (Exst, Ppsd, Diamond Grade)				Road Closure Gate 18 Ft (Exst, Ppsd)
				Delineator Type D (Exst, Ppsd, Diamond Grade)				Road Closure Gate 28 Ft (Exst, Ppsd)
				Delineator Type E (Exst, Ppsd, Diamond Grade)				Road Closure Gate 40 Ft (Exst, Ppsd)
				Barricade (Type I, Type II, Type III)				Existing Railroad Battery Box
				Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)				Existing RR Profile Spot
				Attenuation Device				Existing Railroad Crossbuck
				Truck Mounted Attenuator				Existing Railroad Frog
				Delineator Drums				Existing Mailbox (Private, Federal)
				Flagger				
				Tubular Marker				
				Traffic Cone				
				Back to Back Vertical Panel Sign				

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

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12 18 2020

SYMBOLS

D-101-32

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

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

12 18 2020

SYMBOLS

D-101-33

			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Pump Sanitary, Storm Drain, Exst Water
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Existing Water Appurtenance		Existing Utility Marker
			Sprinkler Head (Exst, Ppsd)		Existing Meter
			Fire Hydrant (Exst, Ppsd)		Existing Fuel Dispensers
			Cleanout (Exst Sanitary, Underdrain)		Existing Fuel Filler Pipes
			Existing Catch Basin Inlet (Round, Square)		Existing Fuel Leak Sensors
			Existing Curb Inlet (Round, Square)		
			Existing Slotted Reinforced Concrete Pipe		
			Catch Basin (Riser 30 Inch, Beehive, Type A)		
			Inlet Mountable Curb (Type A, Type B)		
			Inlet Saddle Base (Type 1, Type 2)		
			Inlet Special (Catch Basin, Type 1, Type A)		
			Inlet (Tee, Type 1, Type 2, Type 2 Double)		
			Median Drain		
			Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier, Ppsd Double with Vegetation Barrier)		

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

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12 18 2020

Cross Section Legend

D-101-40

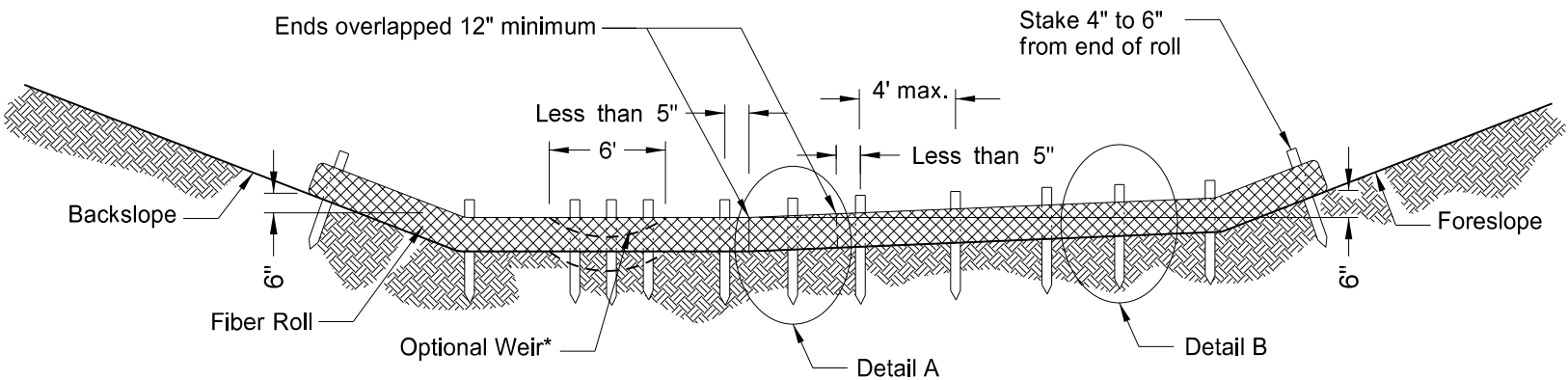


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update

06/14/23

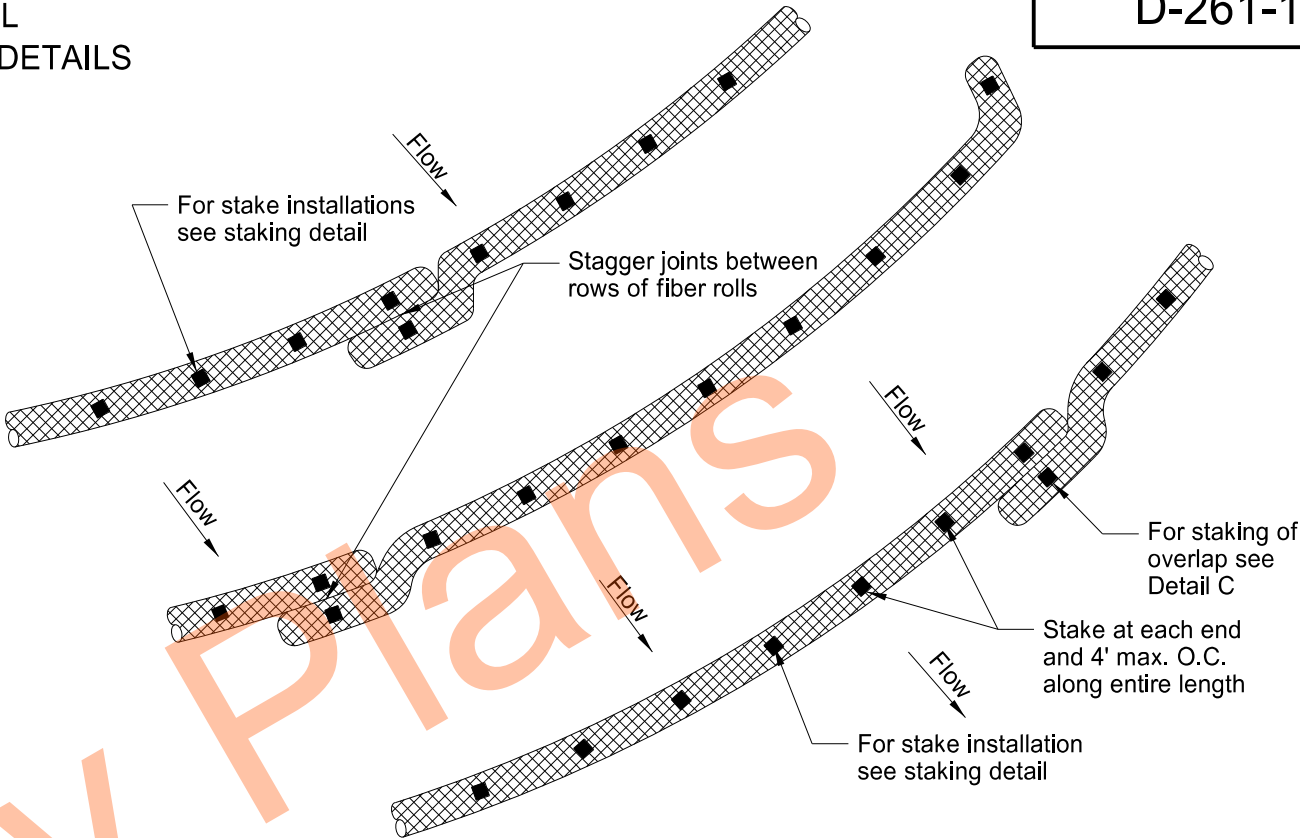
EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1

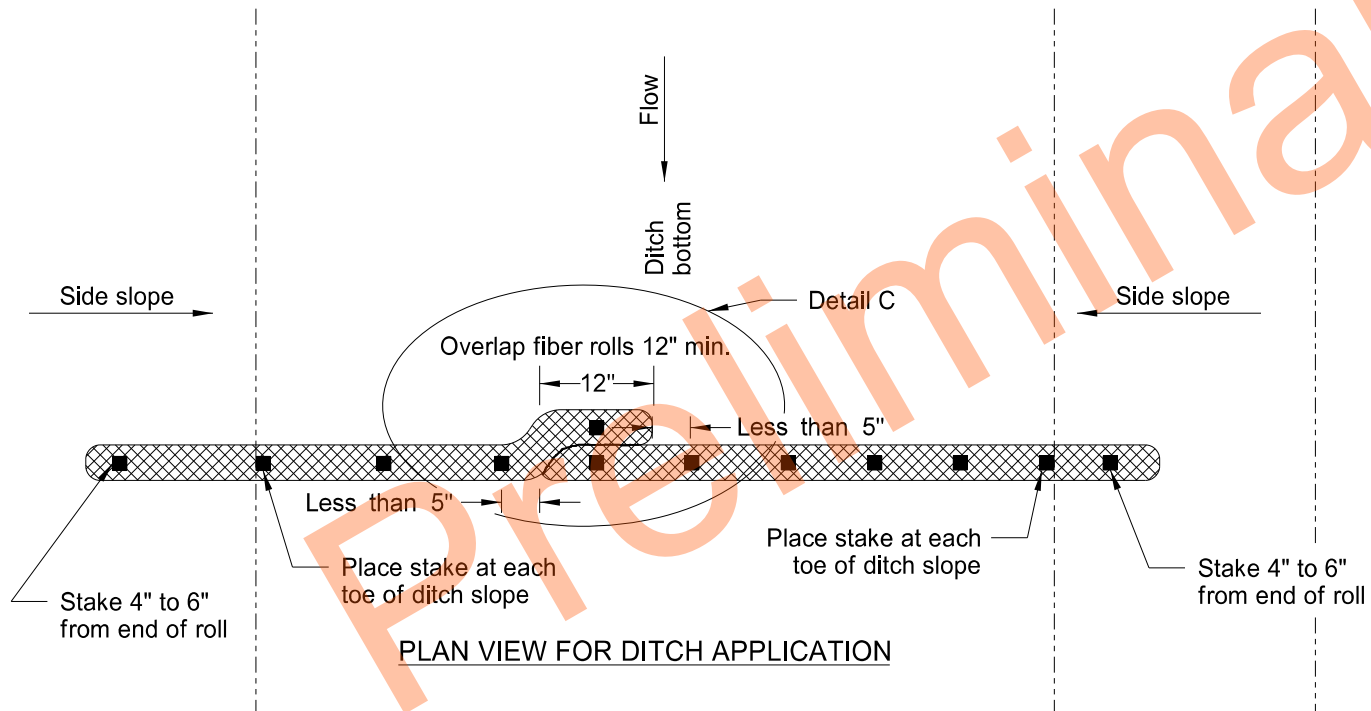


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up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

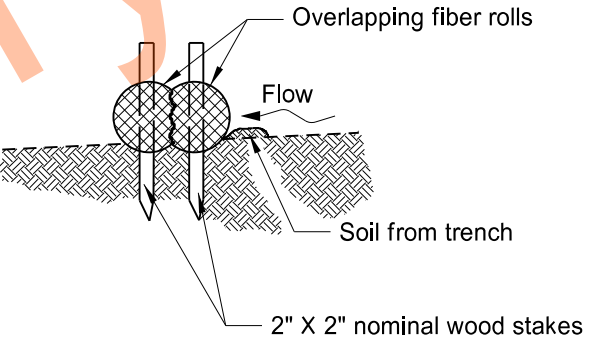
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



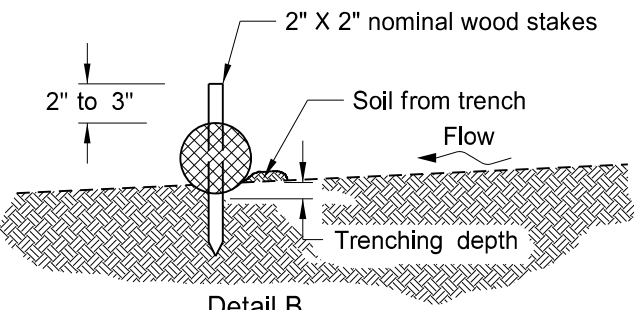
PLAN VIEW FOR SLOPE APPLICATION



PLAN VIEW FOR DITCH APPLICATION



Detail A
Fiber Roll Overlapping Staking Detail



Detail B
Fiber Roll Staking Detail

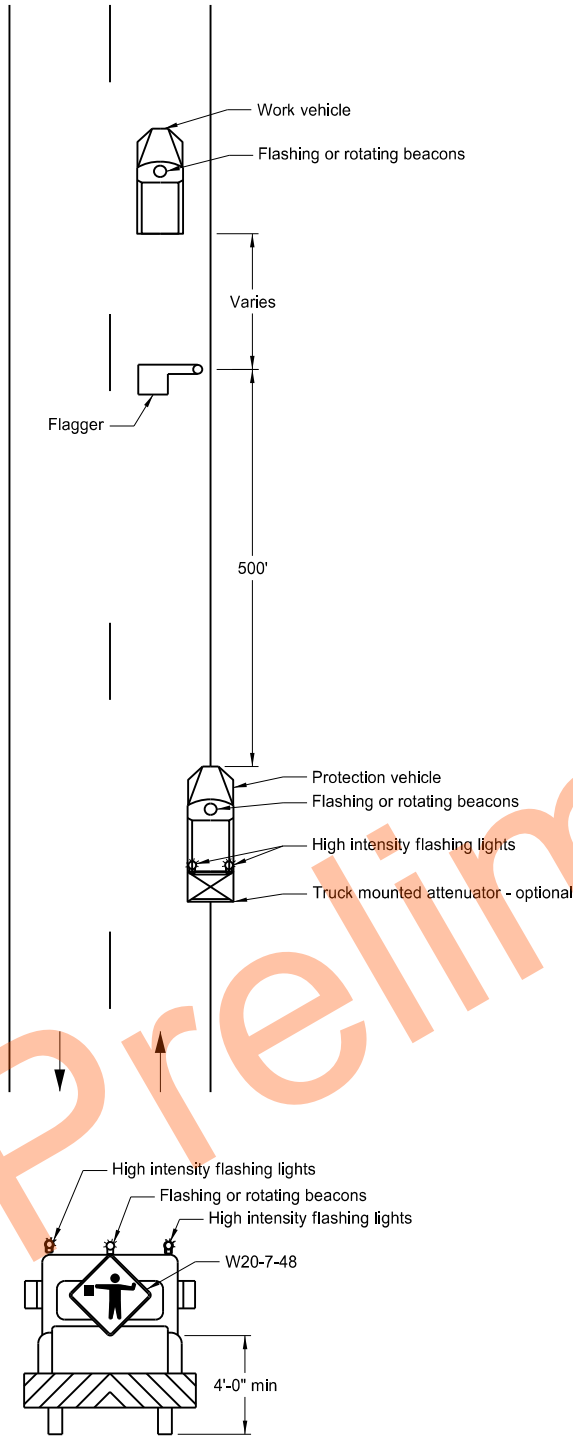
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

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.
08-27-19	New Design Engineer PE Stamp

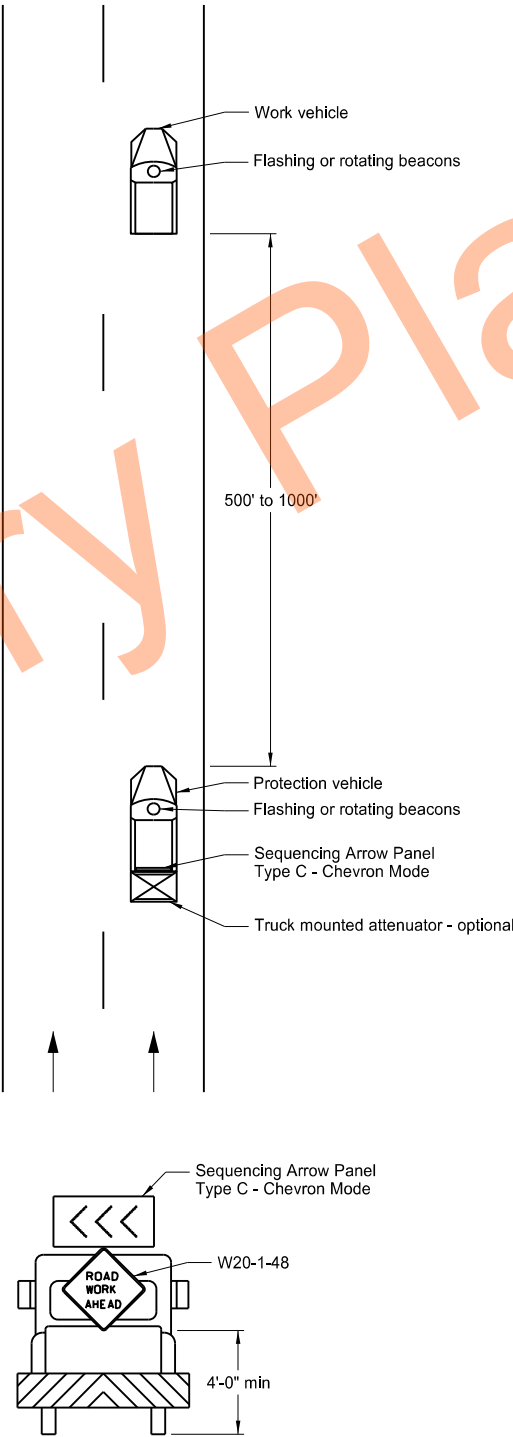
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Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

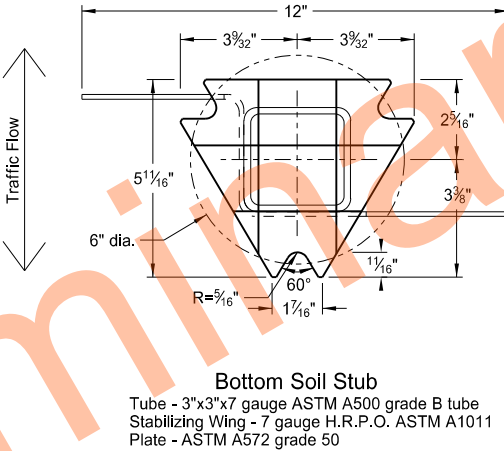
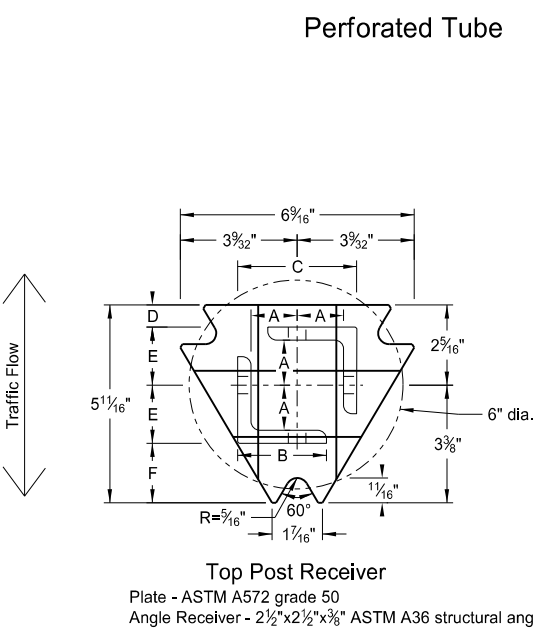
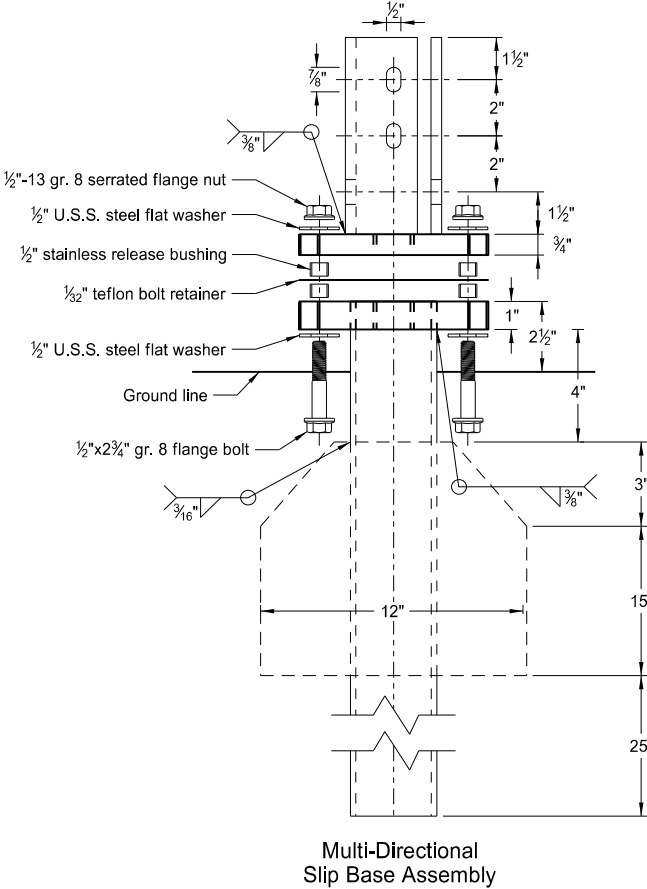
- Notes:
- 1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
 - 2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
 - 3. Use these layouts during daylight hours and in areas of good visibility only.
 - 4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

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

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Perforated Tube

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

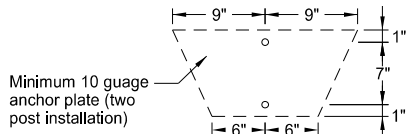
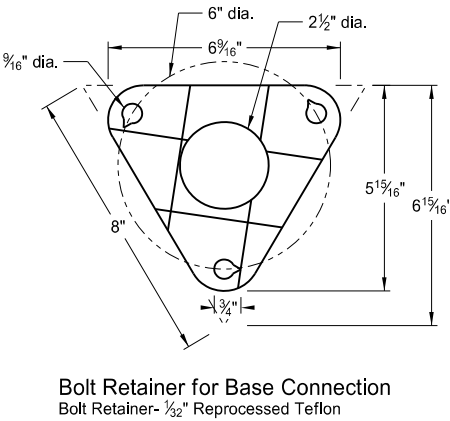
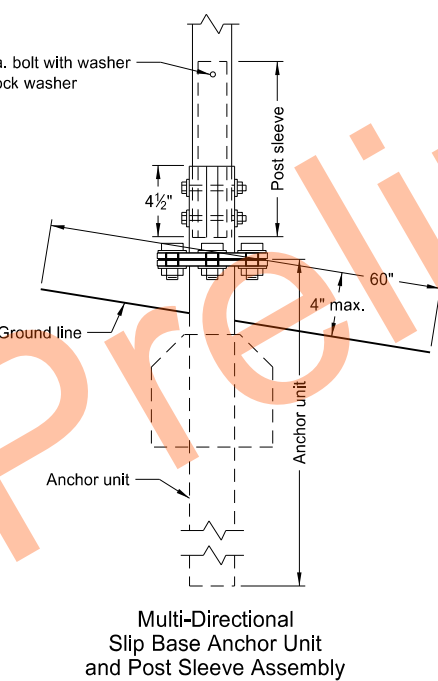
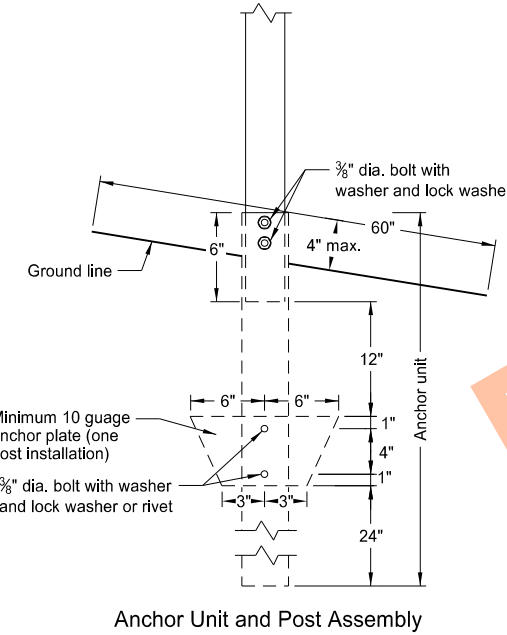


Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No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

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 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	0.785

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/8"x10 ga. into 2 1/2"x10 ga.



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

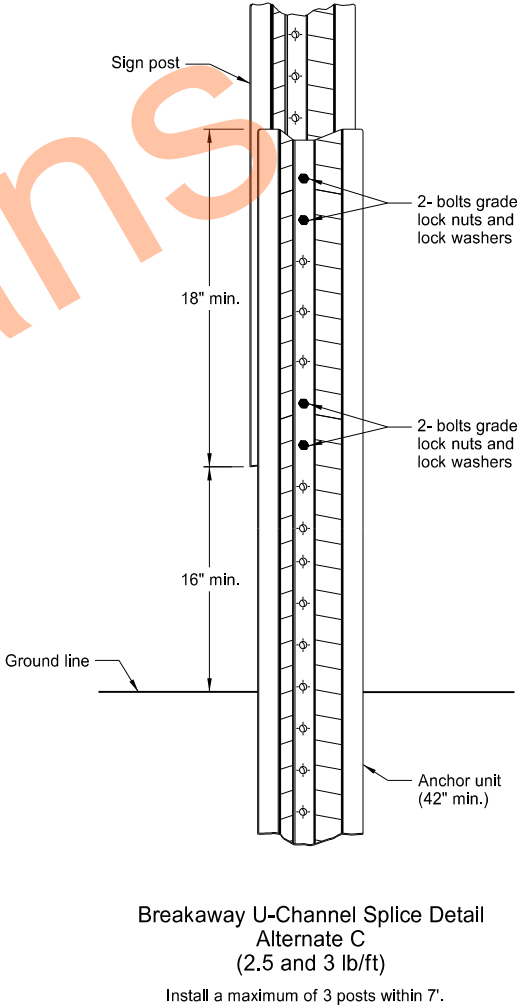
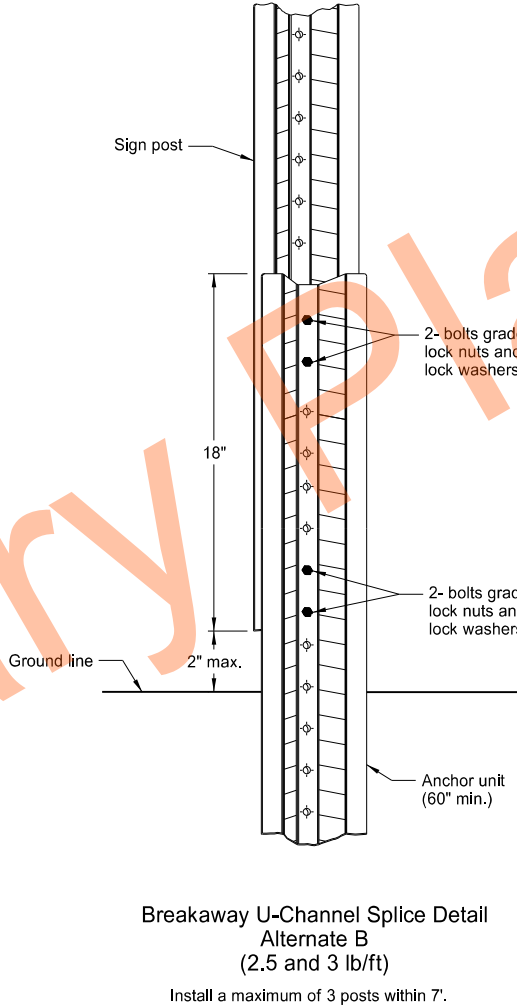
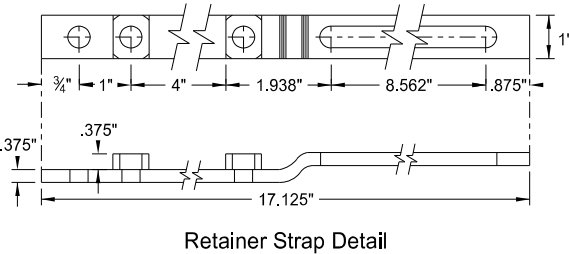
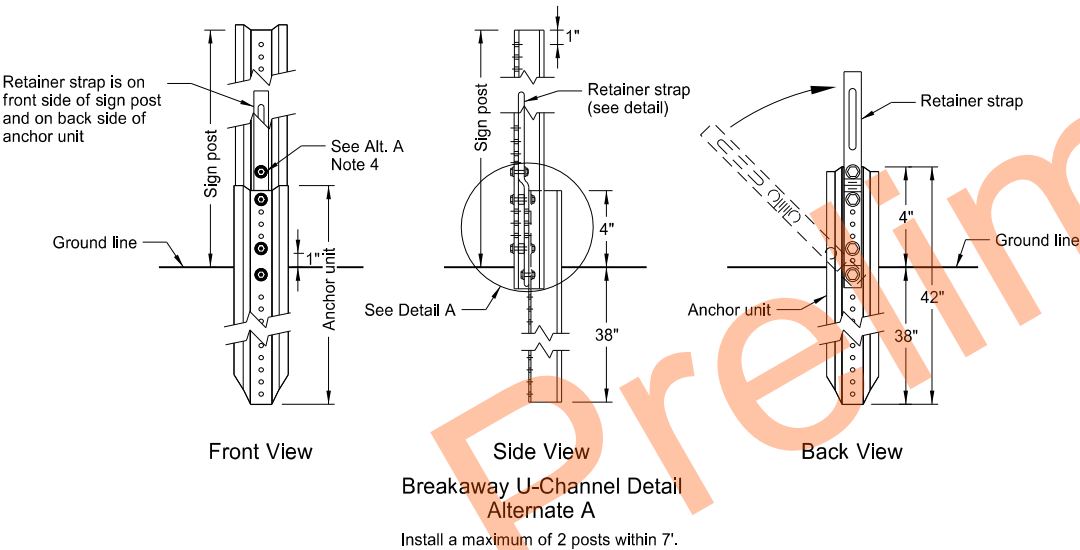
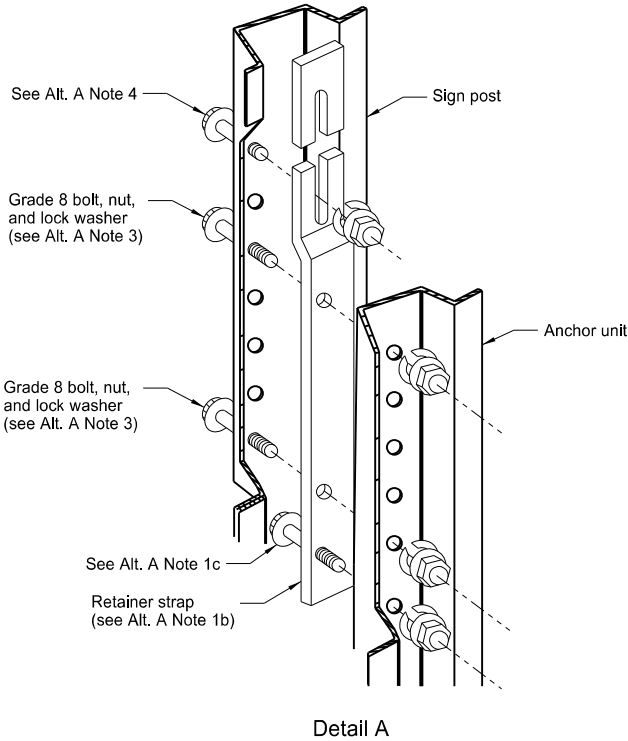
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U-Channel Post



Alternate A Steps of Installation:

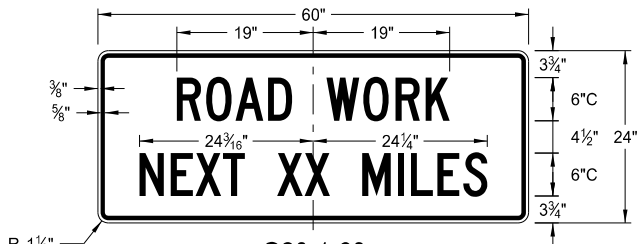
- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor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

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

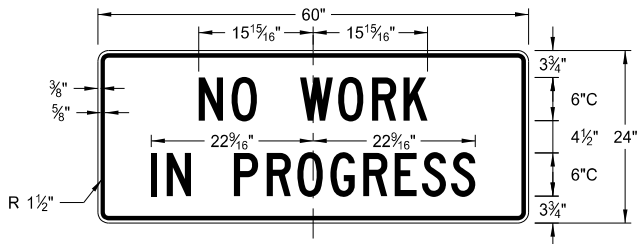
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

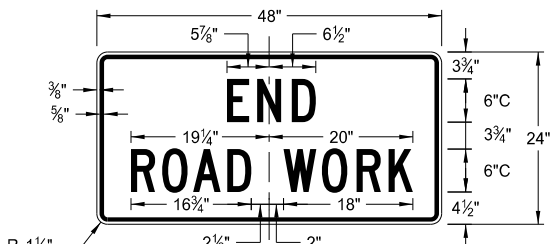
D-704-9



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



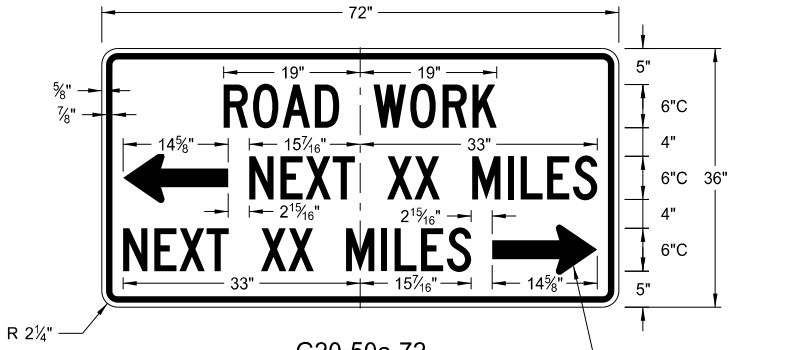
G20-1b-60
Legend: black (non-refl)
Background: orange



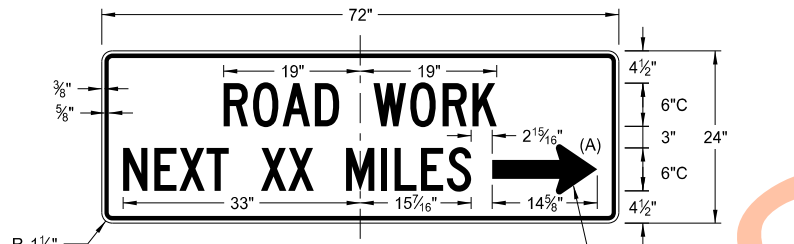
G20-2-48
Legend: black (non-refl)
Background: orange



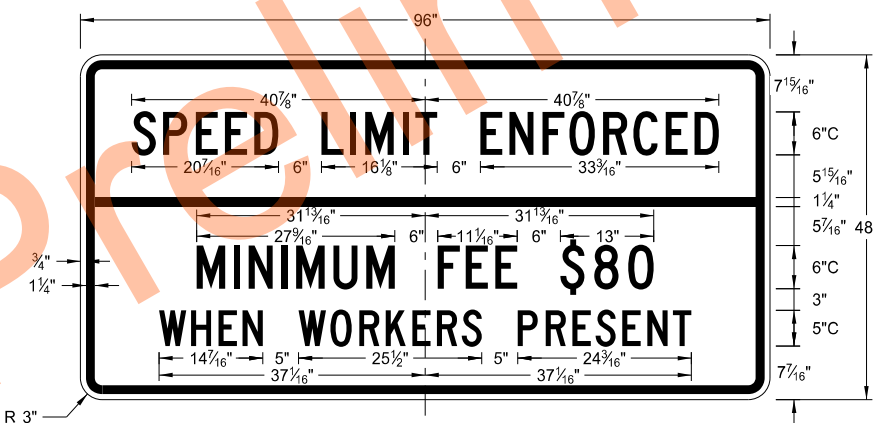
G20-4b-36
Legend: black (non-refl)
Background: orange



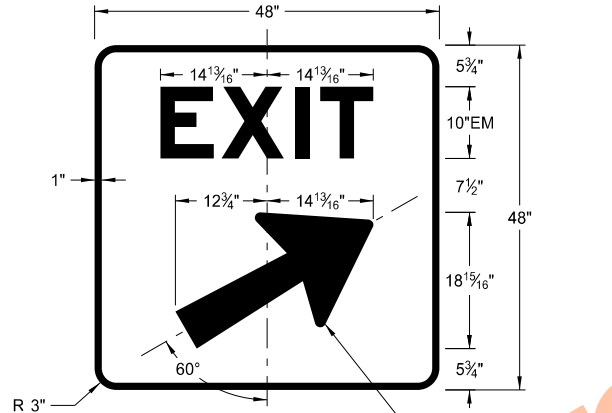
G20-50a-72
Legend: black (non-refl)
Background: orange



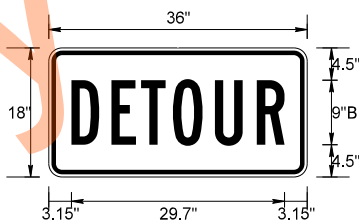
G20-52a-72
Legend: black (non-refl)
Background: orange



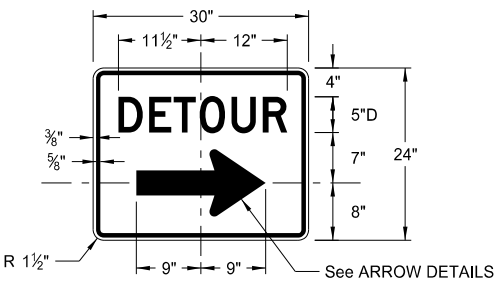
G20-55-96
Legend: black (non-refl)
Background: orange



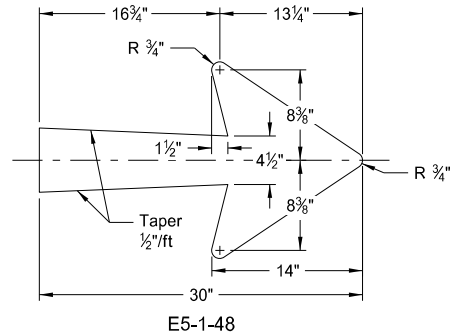
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



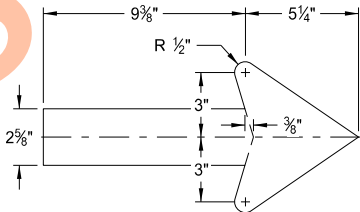
M4-8-36
Legend: black (non-refl)
Background: orange



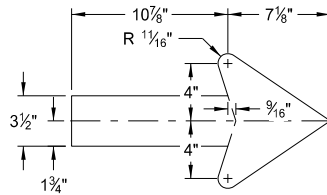
M4-9(L or R)-30 & M4-9-30
Legend: black (non-refl)
Background: orange



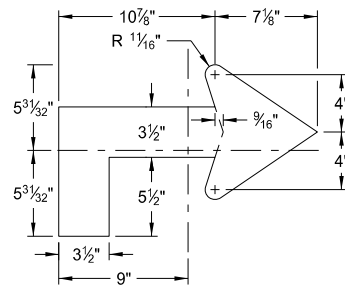
E5-1-48



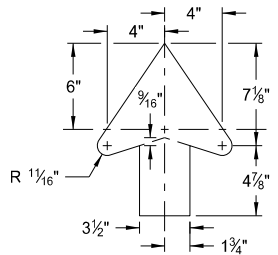
G20-50a-72
G20-52a-72



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



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



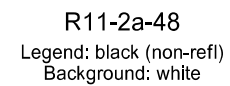
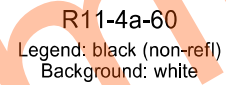
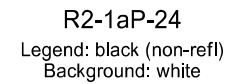
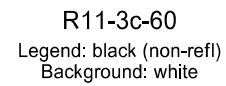
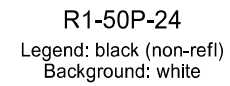
M4-9-30
Straight

ARROW DETAILS

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

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

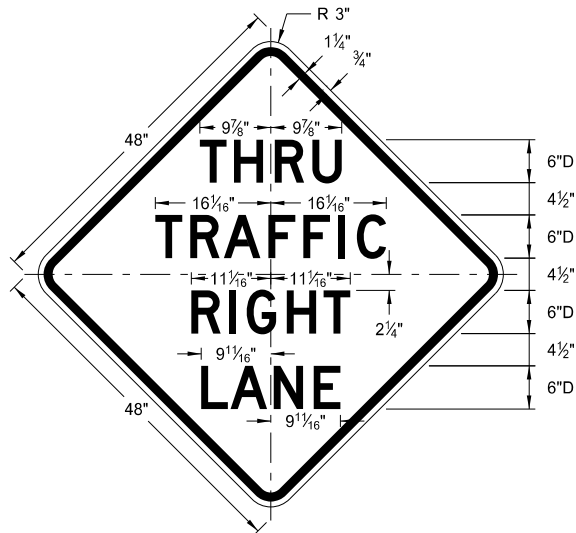
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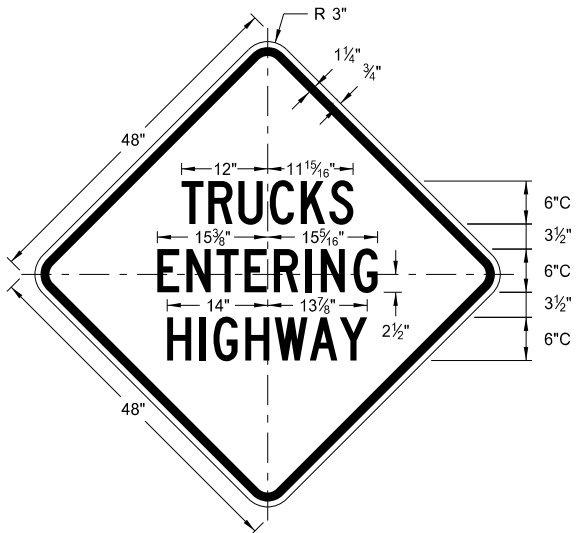
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

D-704-11



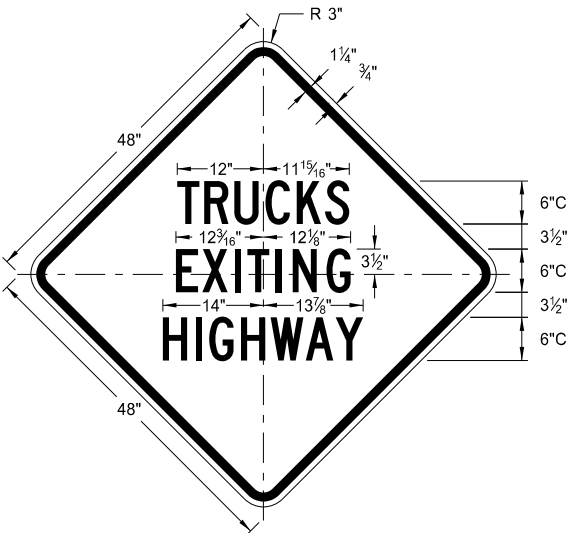
W5-8-48

Legend: black (non-refl)
Background: orange



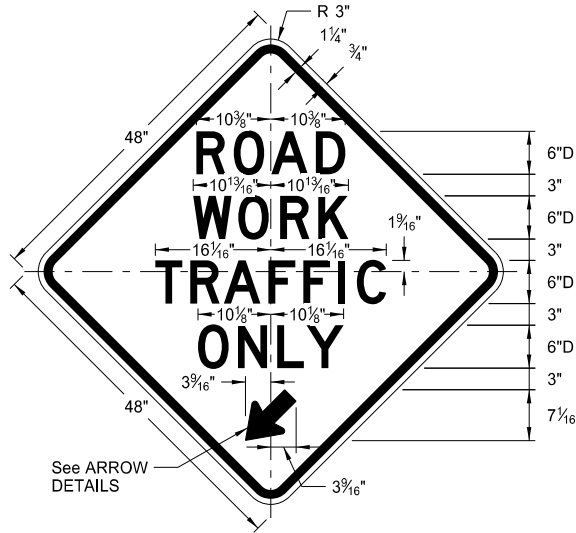
W8-53-48

Legend: black (non-refl)
Background: orange



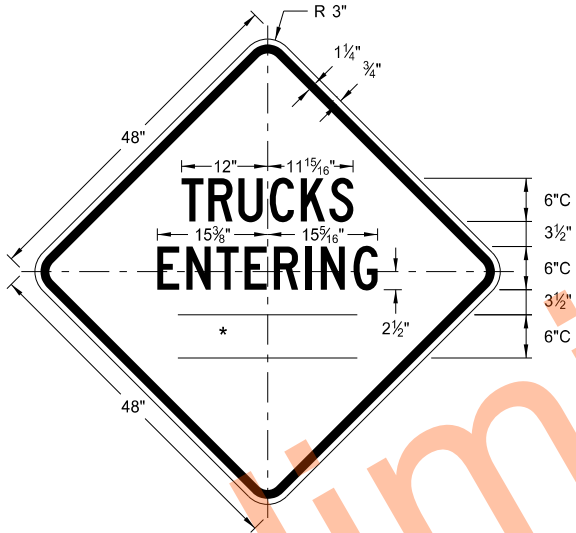
W8-56-48

Legend: black (non-refl)
Background: orange



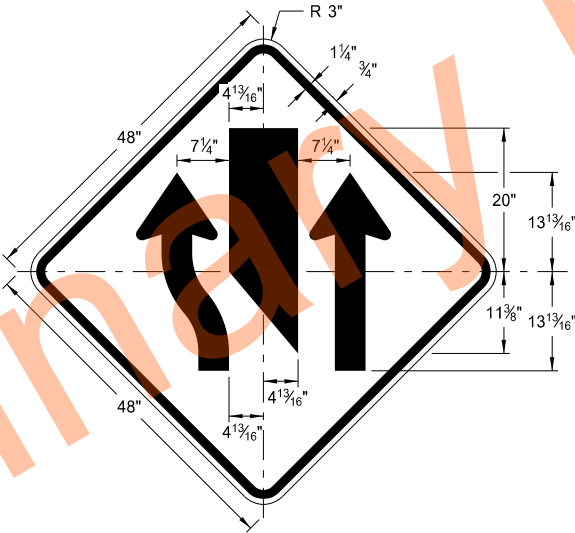
W5-9-48

Legend: black (non-refl)
Background: orange



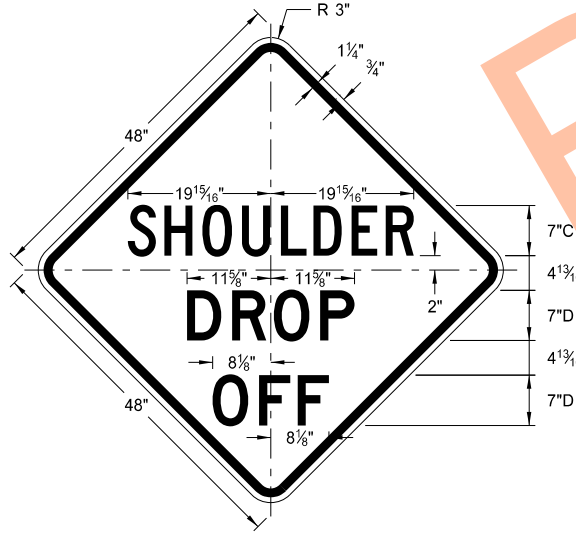
W8-54-48

Legend: black (non-refl)
Background: orange



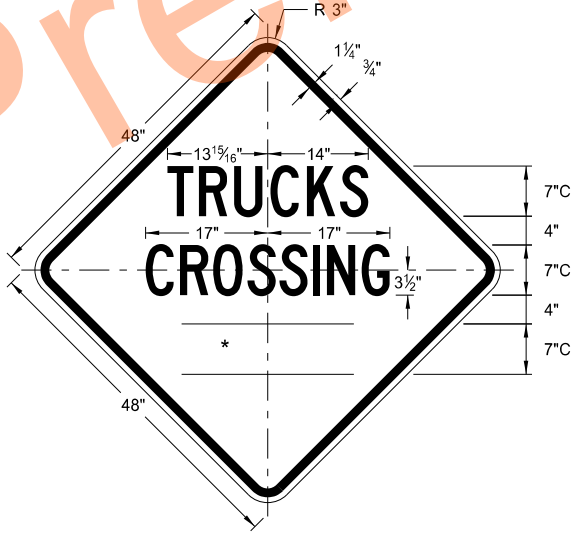
W9-3a-48

Legend: black (non-refl)
Background: orange



W8-9a-48

Legend: black (non-refl)
Background: orange

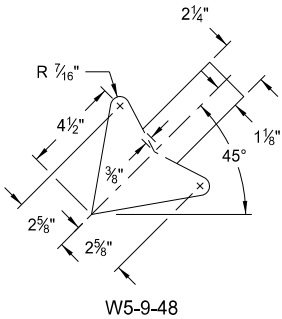


W8-55-48

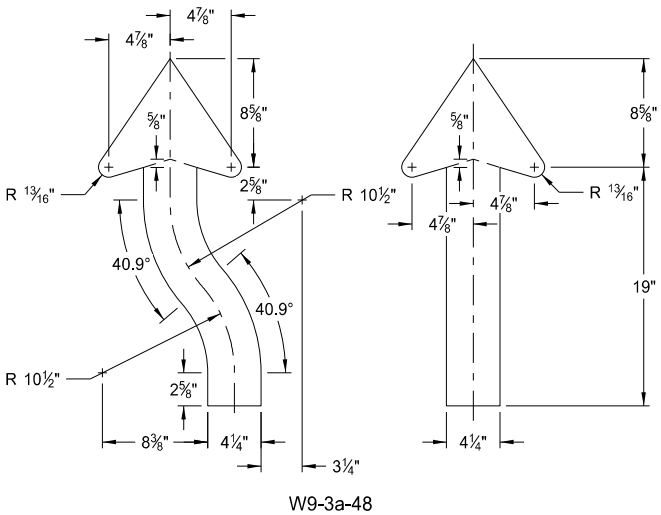
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

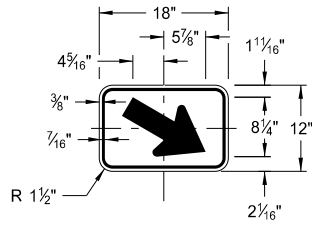
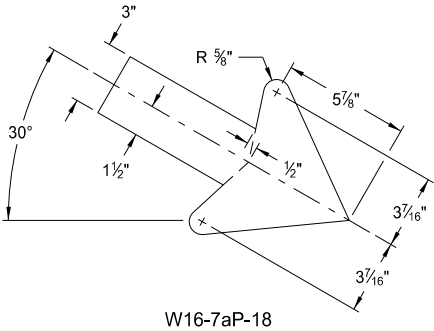
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

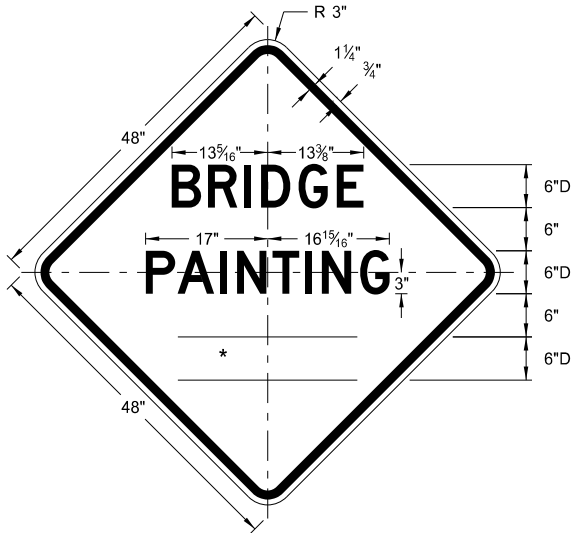
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



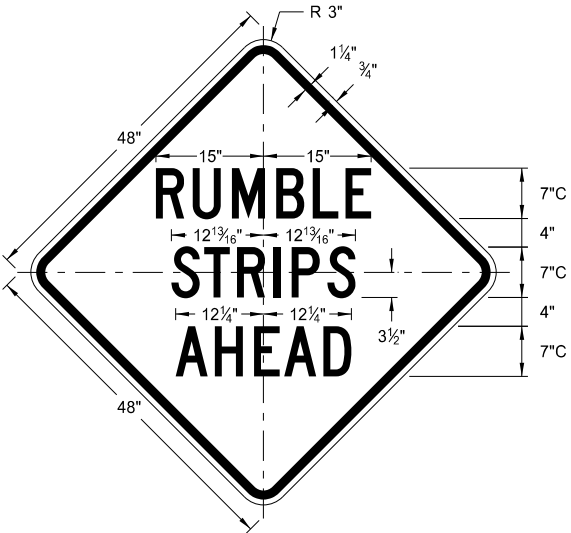
W16-7aP-18

Legend: black (non-refl)
Background: orange



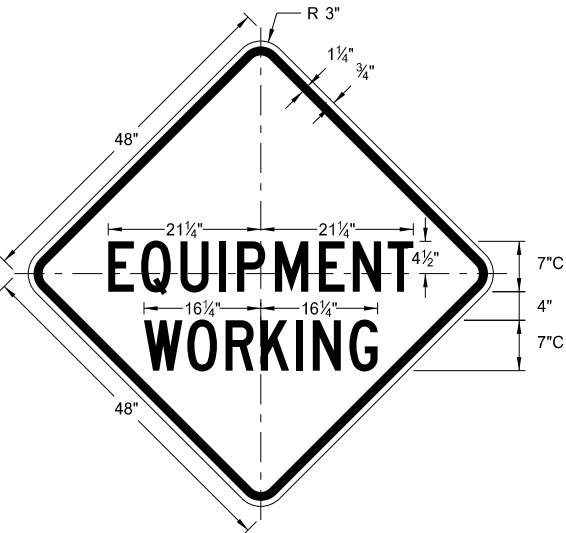
W21-50-48

Legend: black (non-refl)
Background: orange



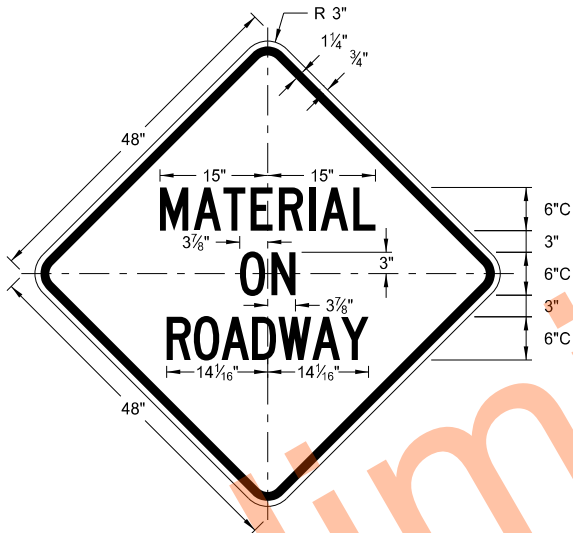
W21-53-48

Legend: black (non-refl)
Background: orange



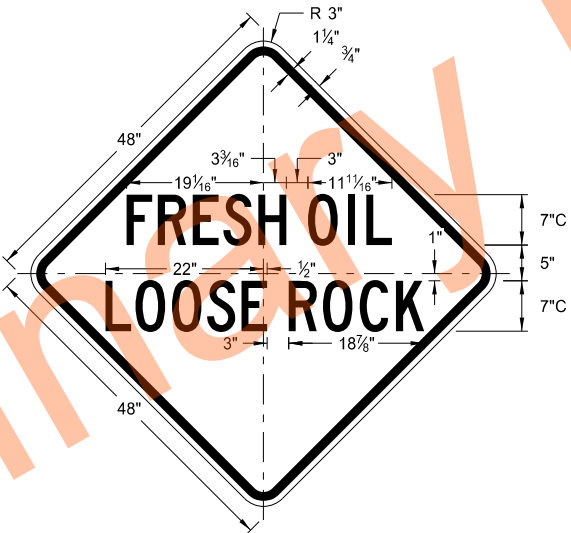
W20-51-48

Legend: black (non-refl)
Background: orange



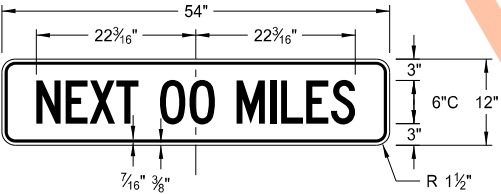
W21-51-48

Legend: black (non-refl)
Background: orange



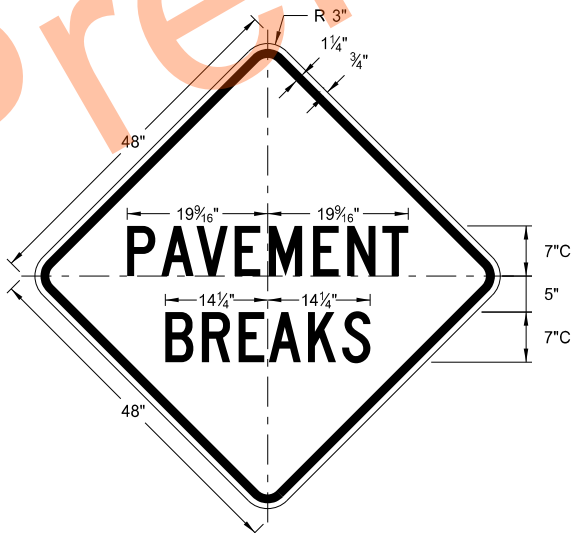
W22-8-48

Legend: black (non-refl)
Background: orange



W20-52P-54

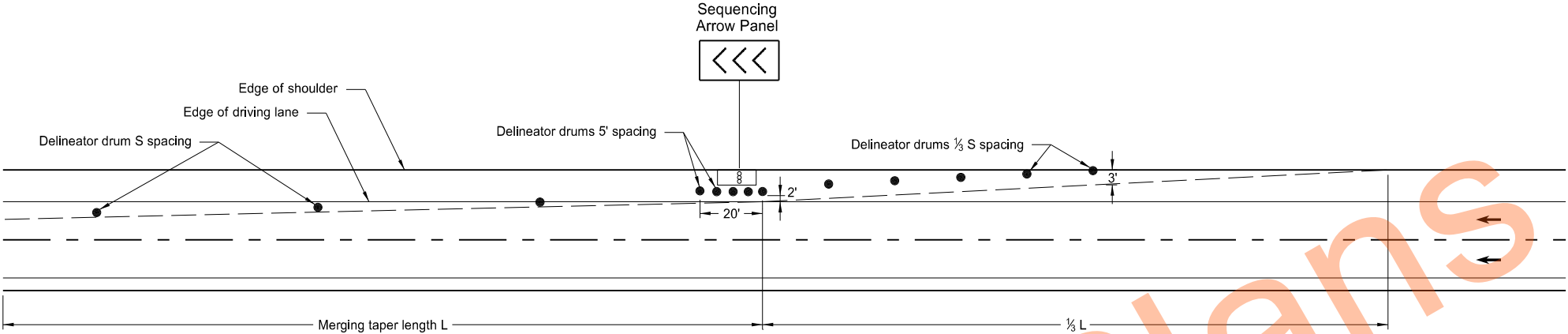
Legend: black (non-refl)
Background: orange



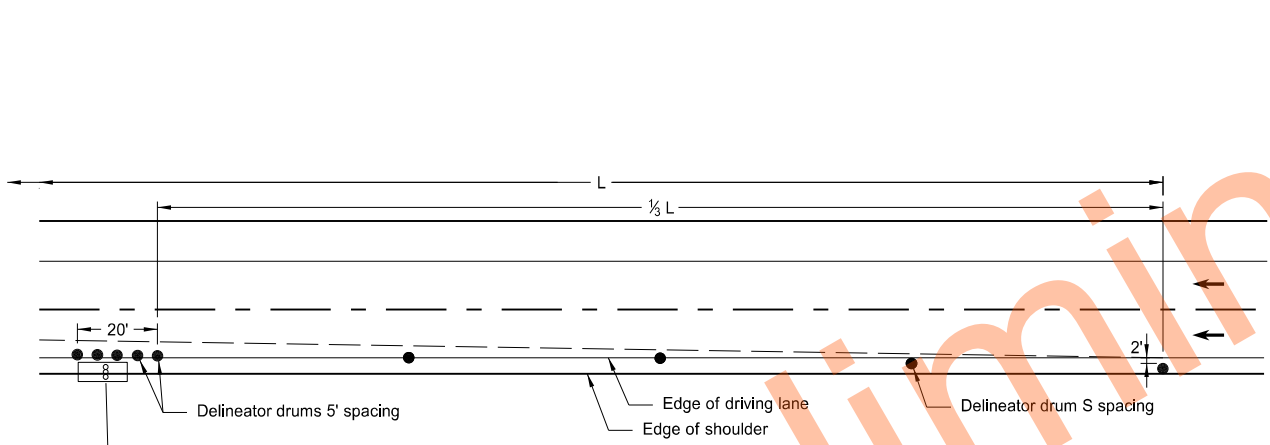
W21-52-48

Legend: black (non-refl)
Background: orange

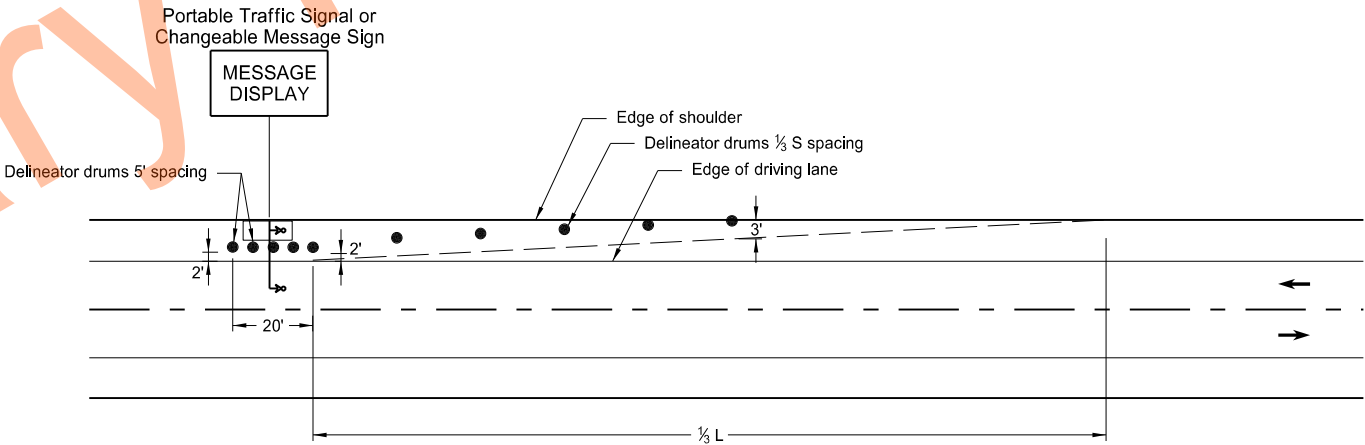
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation
5-31-18		
REVISIONS		
DATE	CHANGE	
11-01-19	Added details for sign W16-7aP-18.	



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

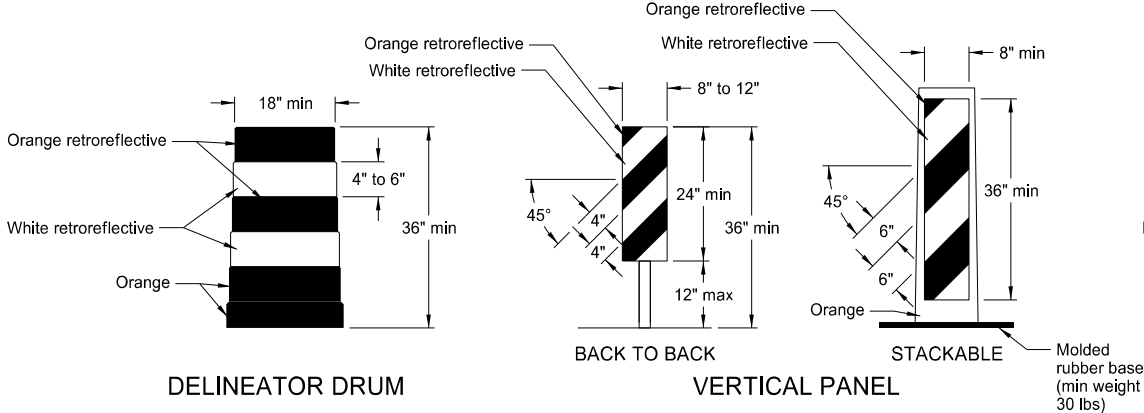
Notes:

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

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

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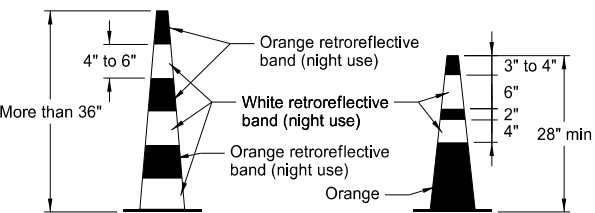
BARRICADE AND CHANNELIZING DEVICE DETAILS



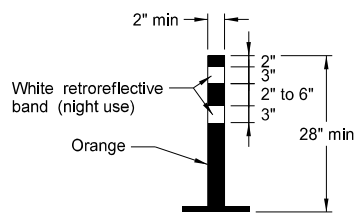
DELINEATOR DRUM

VERTICAL PANEL

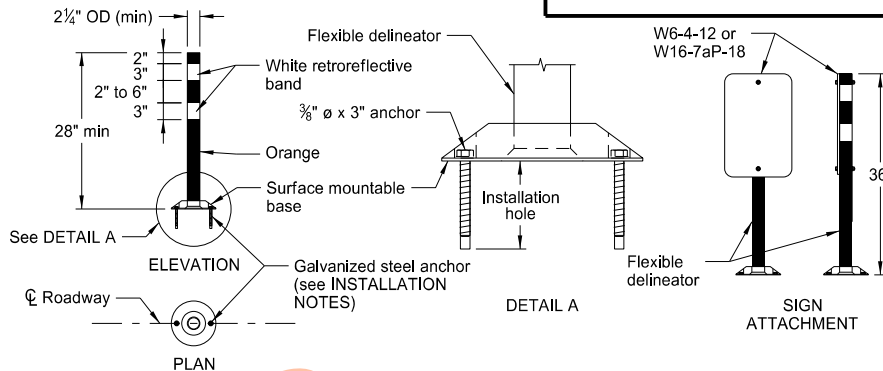
STACKABLE



TRAFFIC CONE



TUBULAR MARKER



FLEXIBLE DELINEATOR

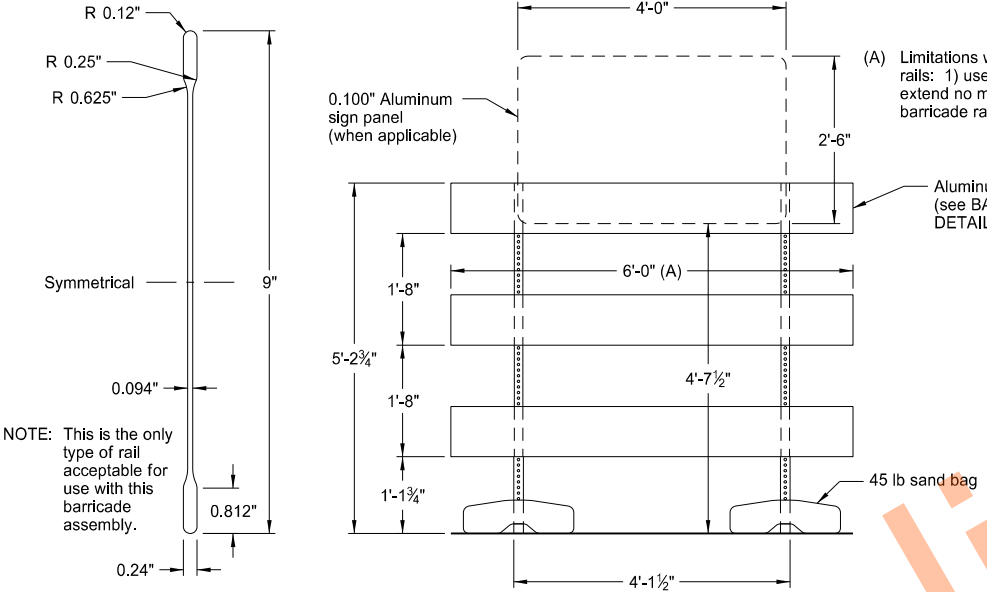
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and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

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

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

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

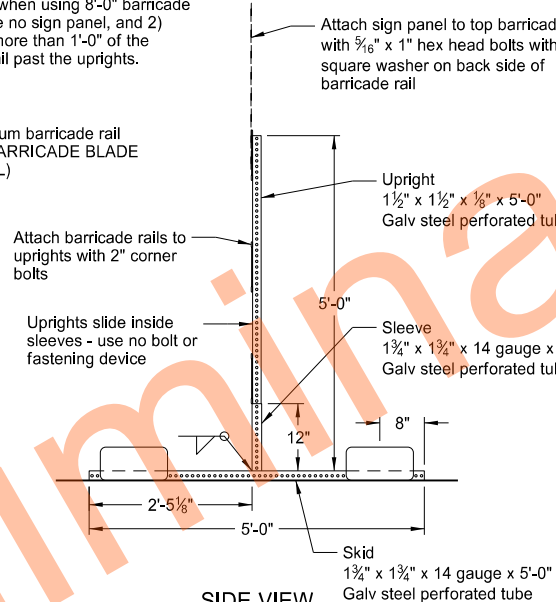
- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl.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



BARRICADE BLADE DETAIL

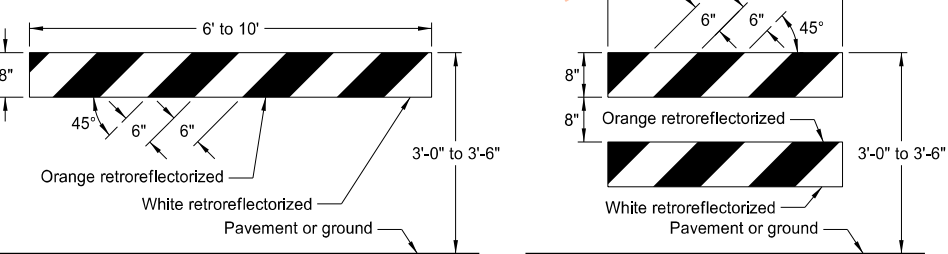
ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



SIDE VIEW

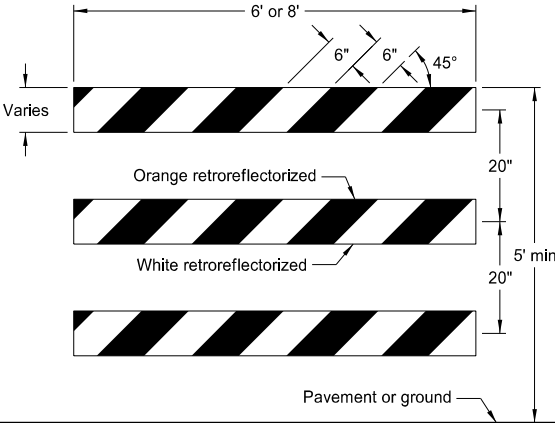
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



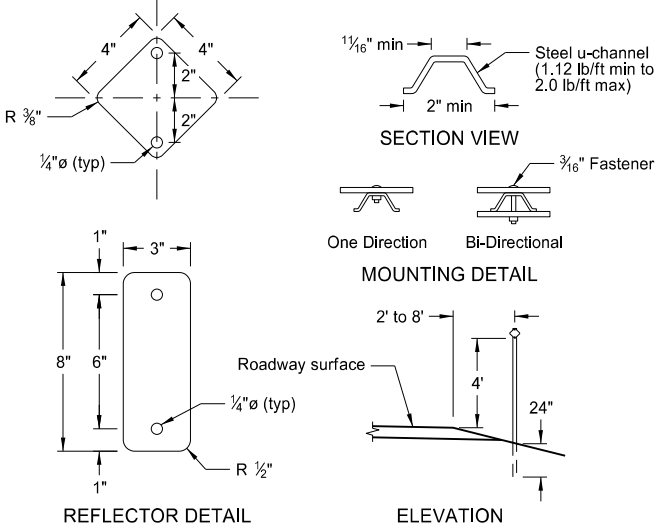
TYPE I BARRICADE

TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

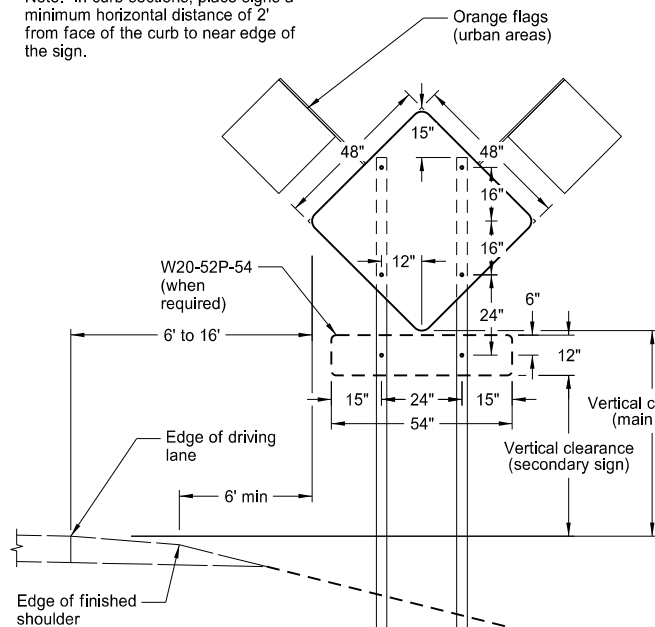
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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

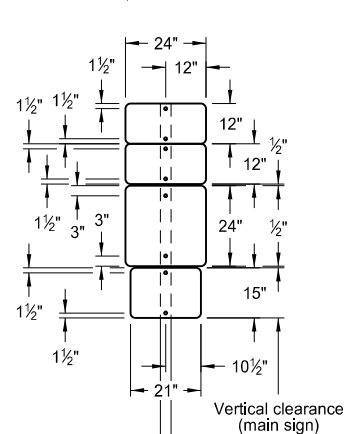
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

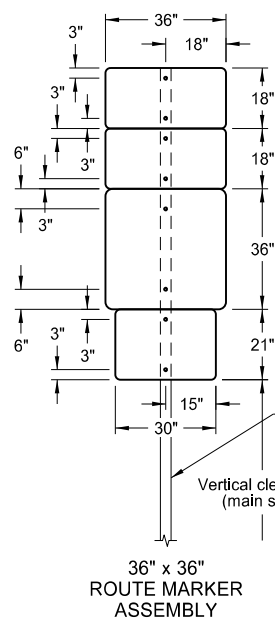
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



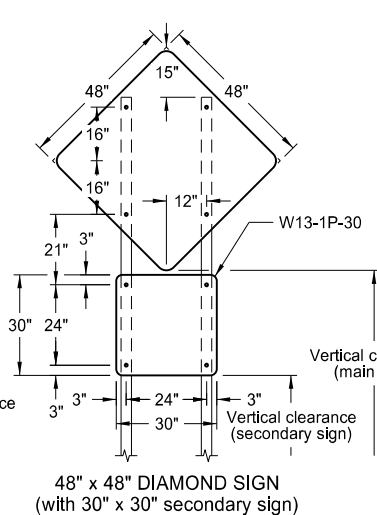
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



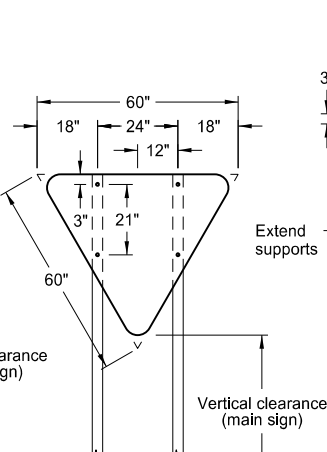
24" x 24"
ROUTE MARKER
ASSEMBLY



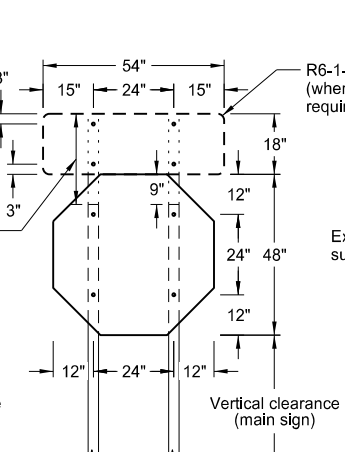
36" x 36"
ROUTE MARKER
ASSEMBLY



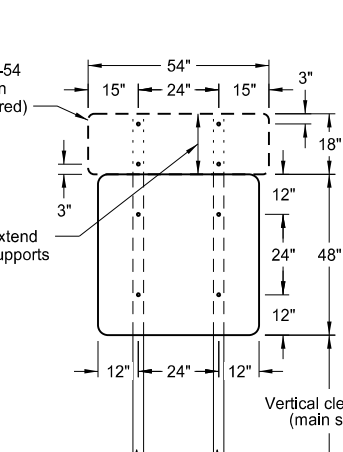
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



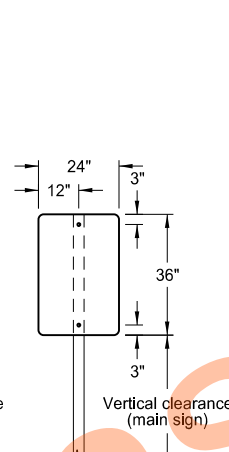
R1-2-60 - YIELD SIGN



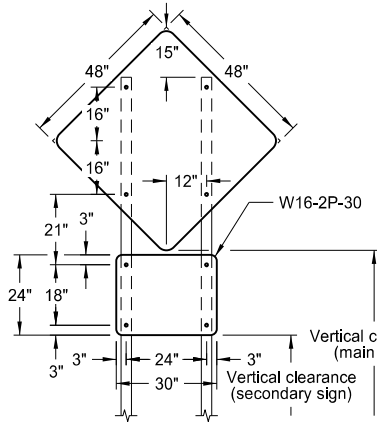
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



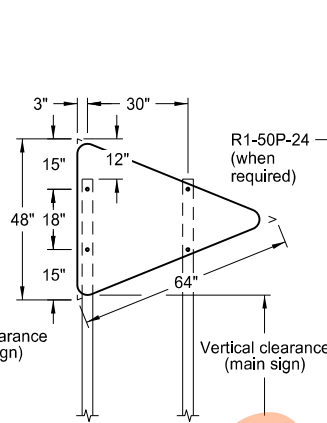
48" x 48" SIGN
(with R6-1-54 sign as required)



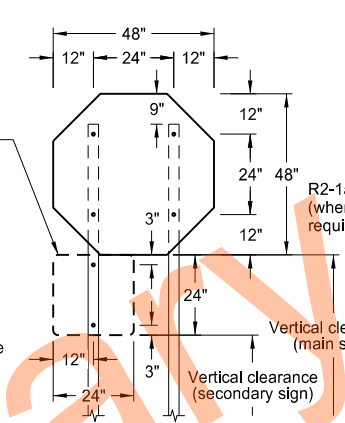
24" x 36" SIGN



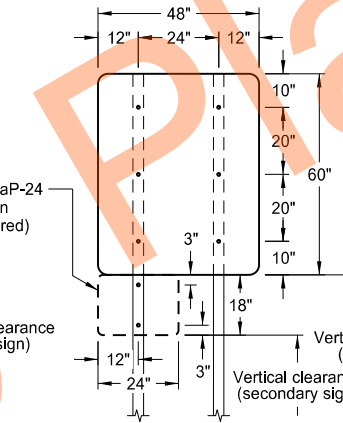
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



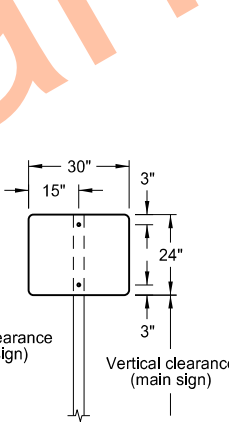
W14-3-64 - PENNANT SIGN



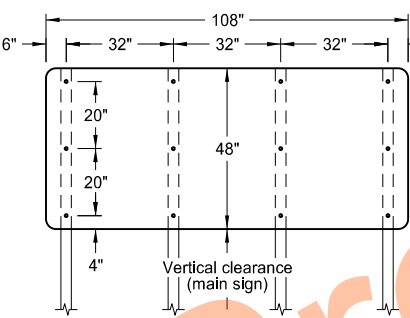
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



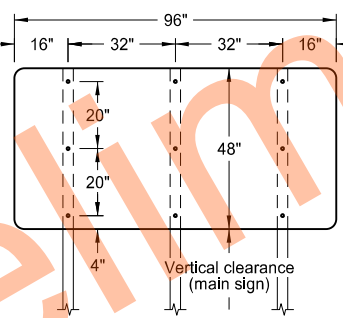
48" x 48" SIGN
(with R2-1aP-24 sign as required)



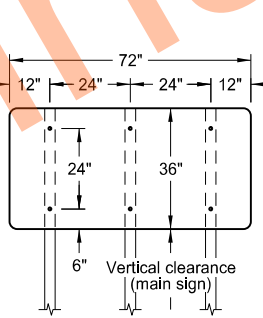
30" x 24" SIGN



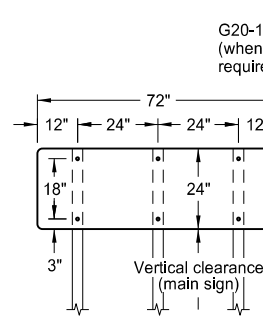
108" x 48" SIGN



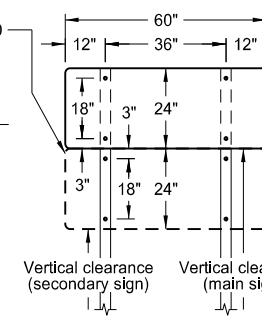
96" x 48" SIGN



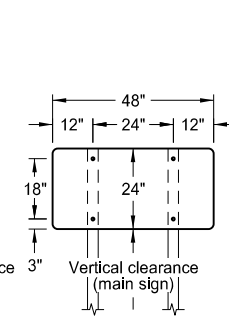
72" x 36" SIGN



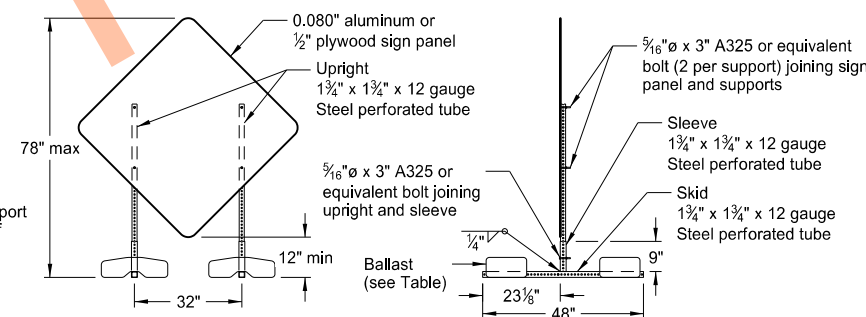
72" x 24" SIGN



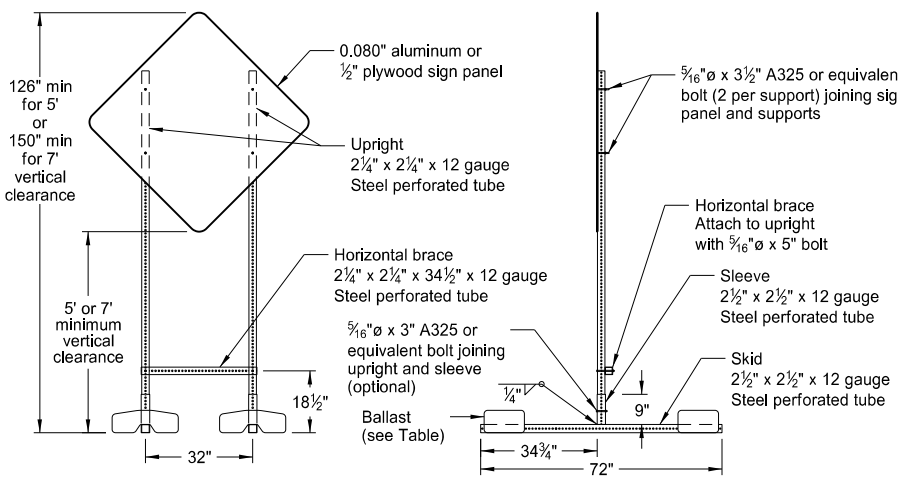
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

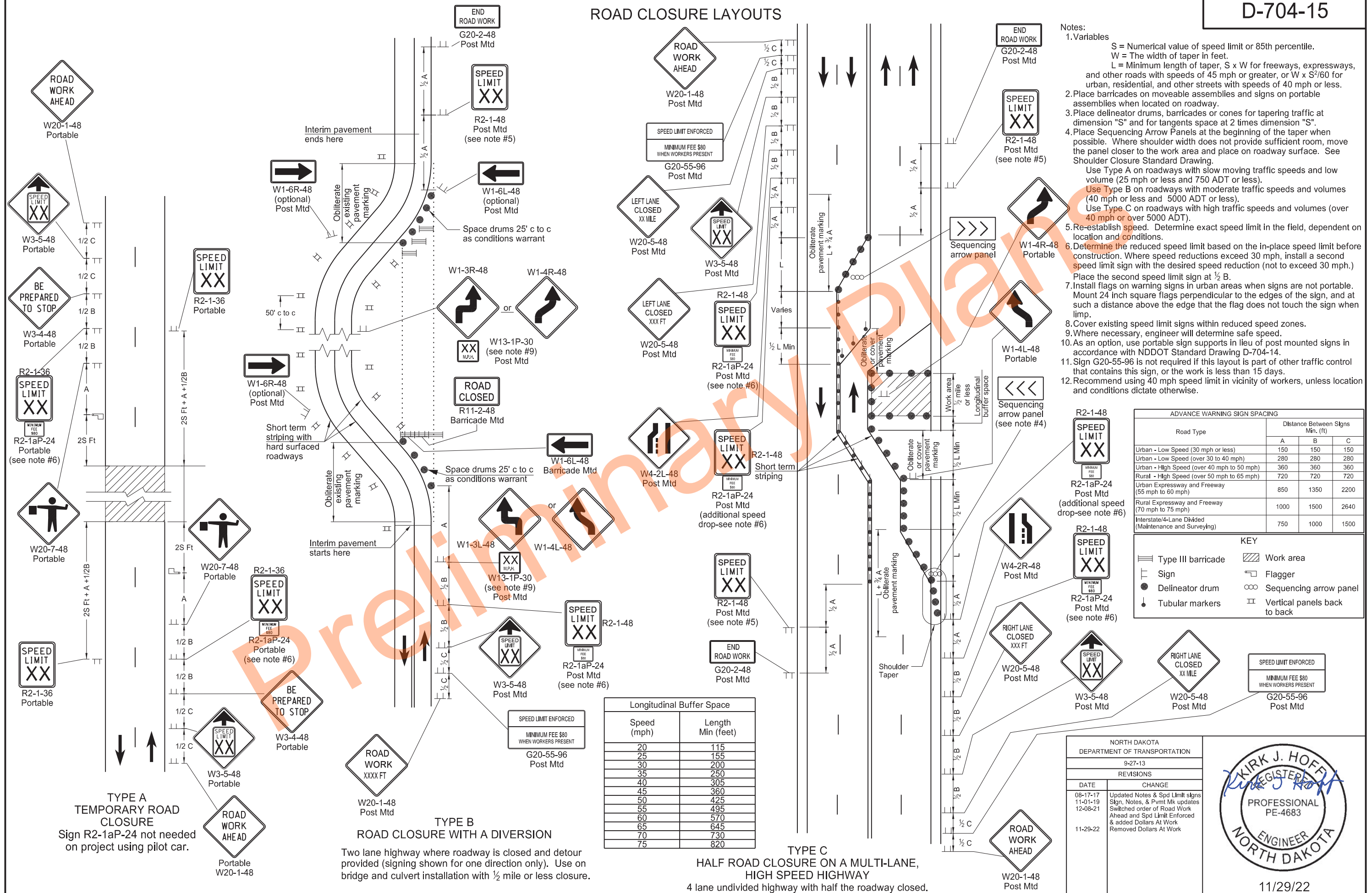
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

This document was originally issued and sealed by

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

ROAD CLOSURE LAYOUTS

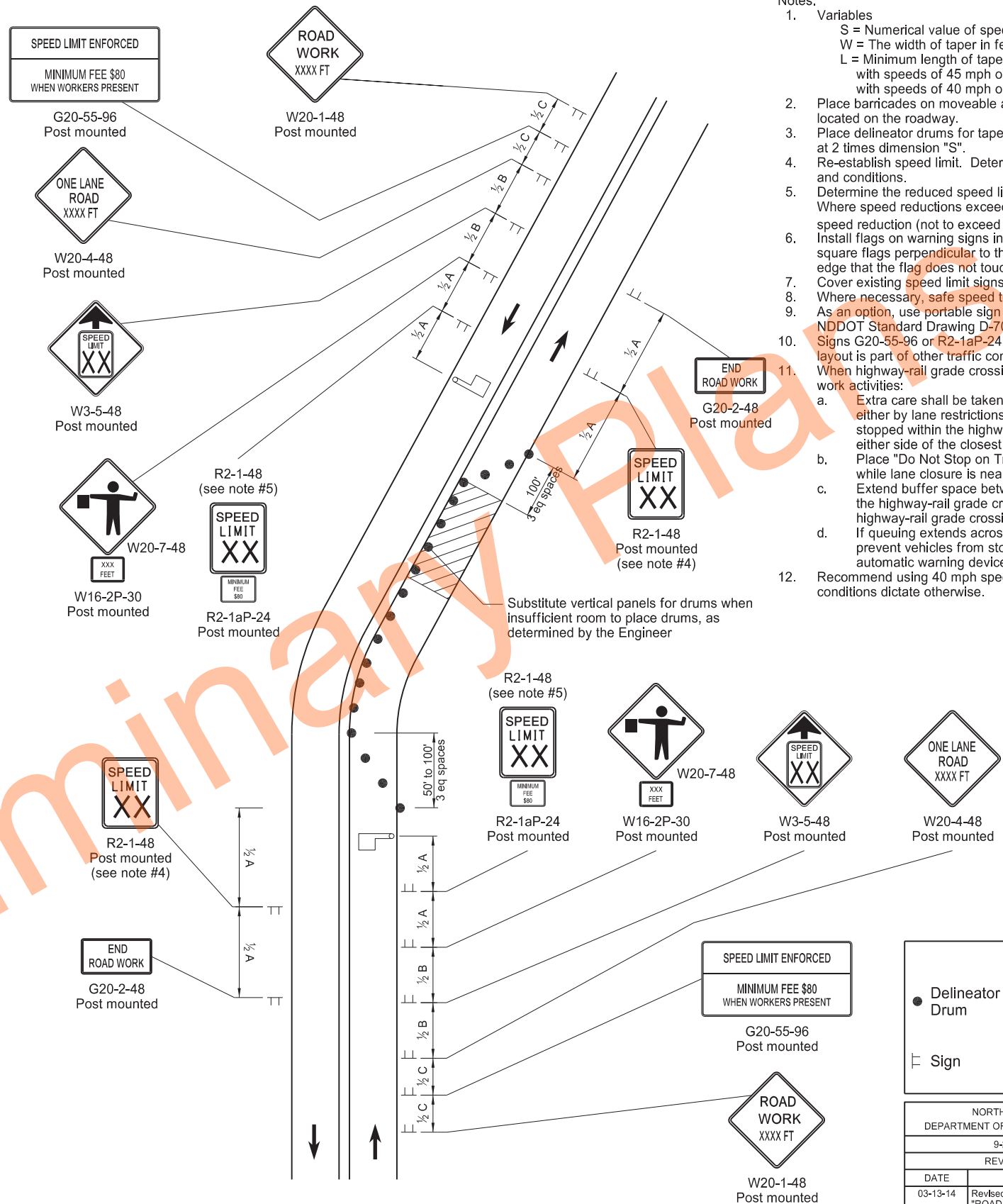


NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

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



11/29/22



1. Variables
S = Numerical value of speed limit or 85th percentile.
W = The width of taper in feet
L = Minimum length of taper in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
3. Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Determine the reduced speed limit based on the in place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place second speed limit sign at ½B.
6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
7. Cover existing speed limit signs within a reduced speed zone.
8. Where necessary, safe speed to be determined by the Engineer.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
10. Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - b. Place "Do Not Stop on Tracks" sign (R8-B-24) near cross buck in each direction while lane closure is near tracks.
 - c. Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
 - d. If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 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

Two lane highway with one lane closed.
Flagger at point visible to approaching traffic.

KEY

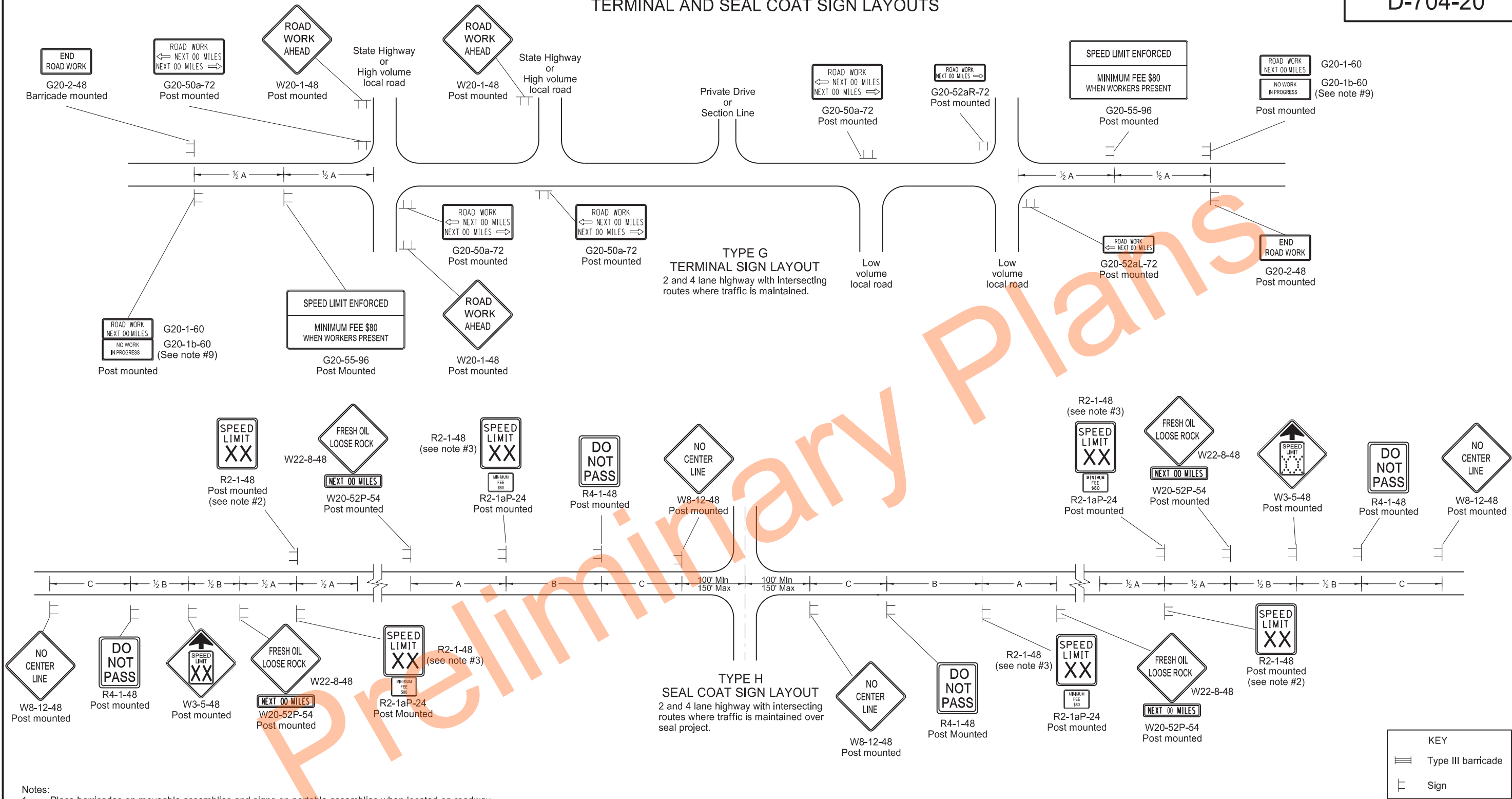
 Delineator Drum	 Type III Barricade	 Flagger
 Sign	 Work/Hazard Area	

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISONS	
DATE	CHANGE
03-13-14	Revised Sign Cell "ROAD WORK XXX FT"
08-17-17	Update notes & sign numbers
11-01-19	Revised signs, sign #s, & notes
12-08-21	Switched order of Road Work XXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work

11/29/22

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



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

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

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



11/29/22

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

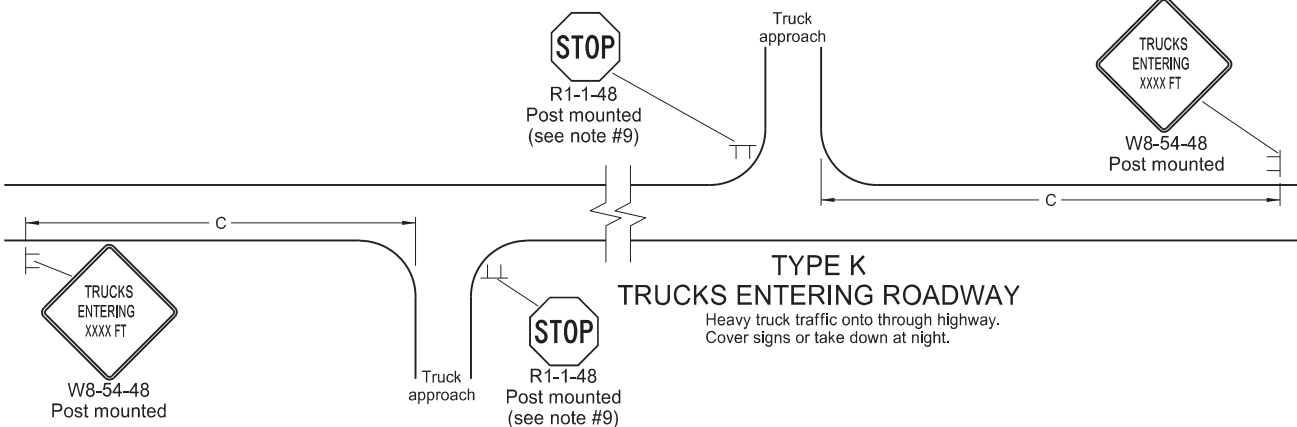
D-704-22

KEY

- Type III barricade
- Sign
- Work area
- Flagger

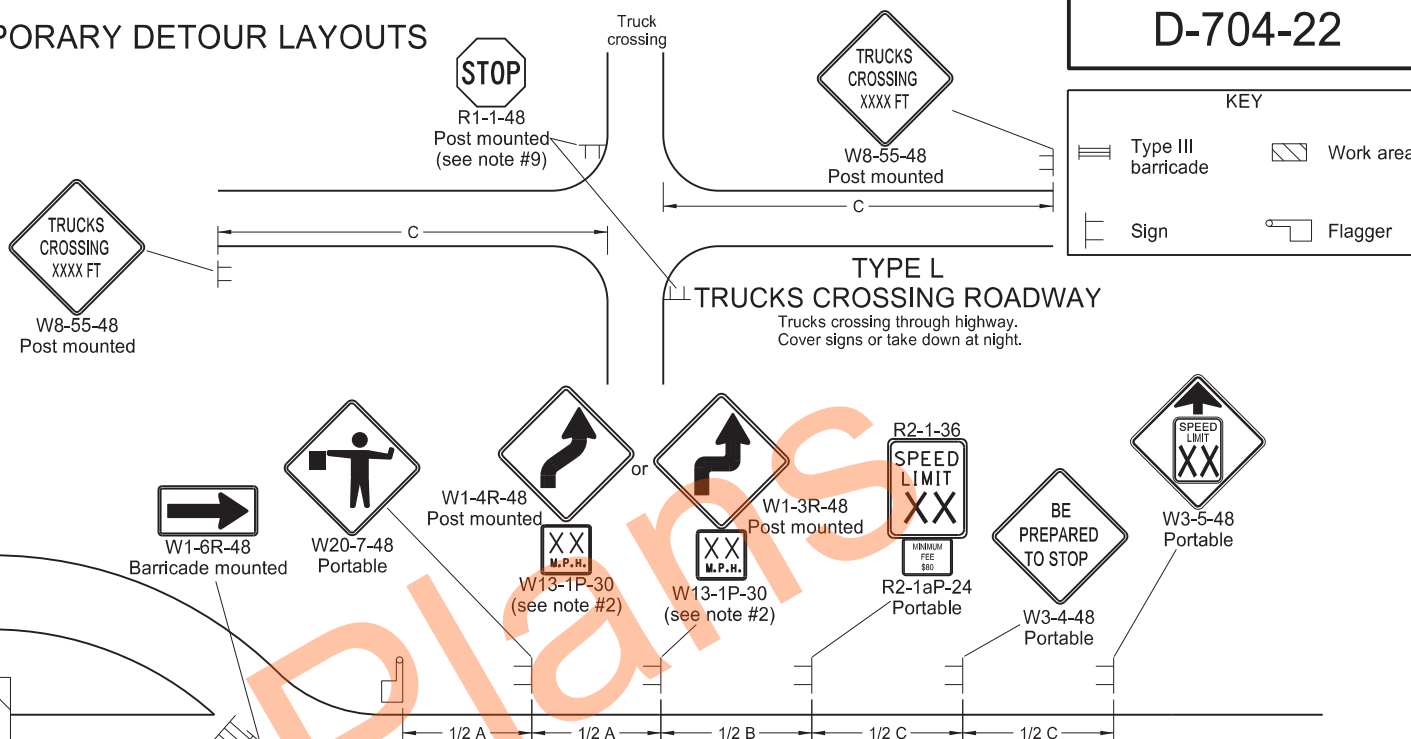
TYPE K TRUCKS ENTERING ROADWAY

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



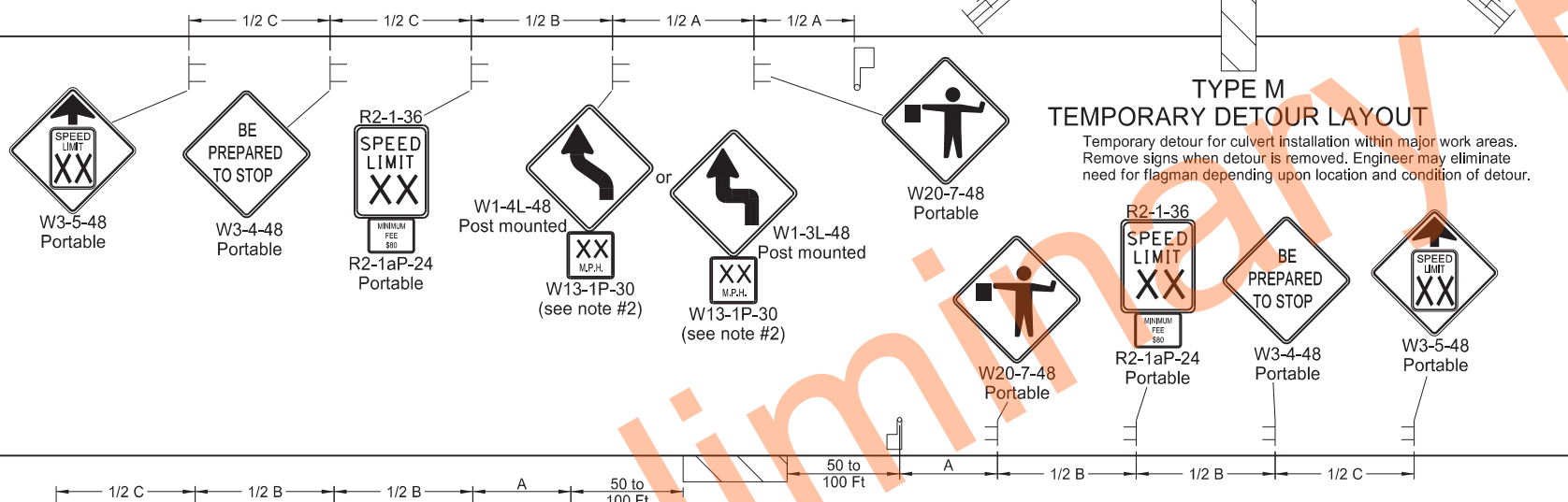
TYPE L TRUCKS CROSSING ROADWAY

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



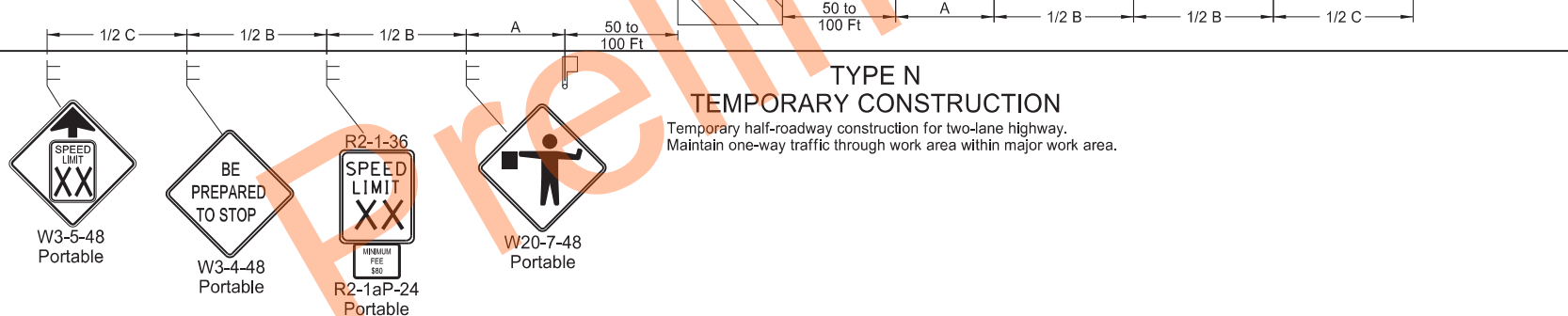
TYPE M TEMPORARY DETOUR LAYOUT

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



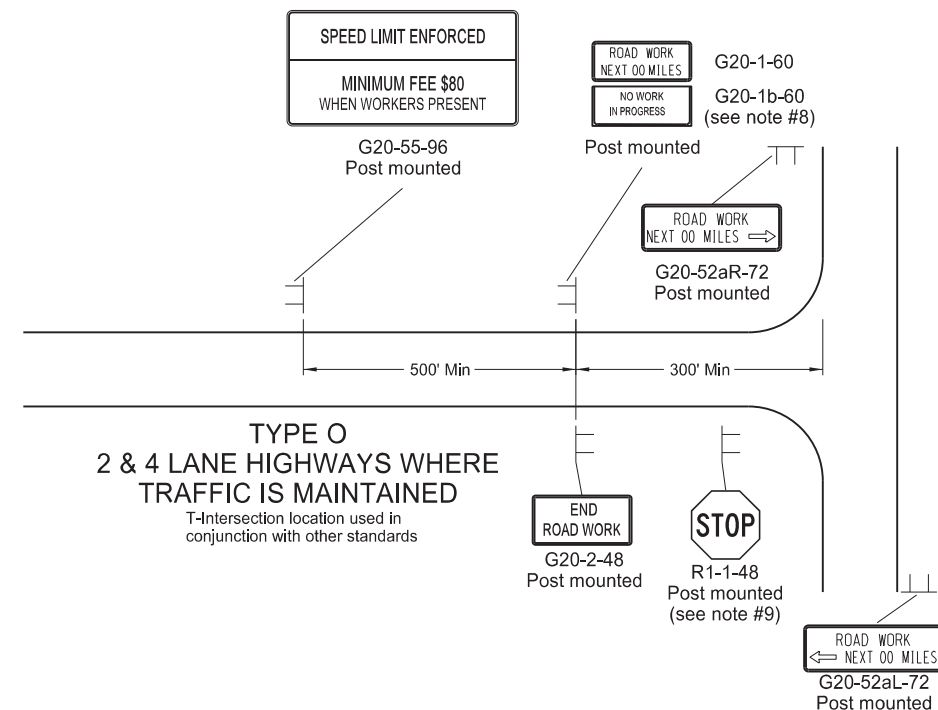
TYPE N TEMPORARY CONSTRUCTION

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



TYPE O 2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards



Notes:

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

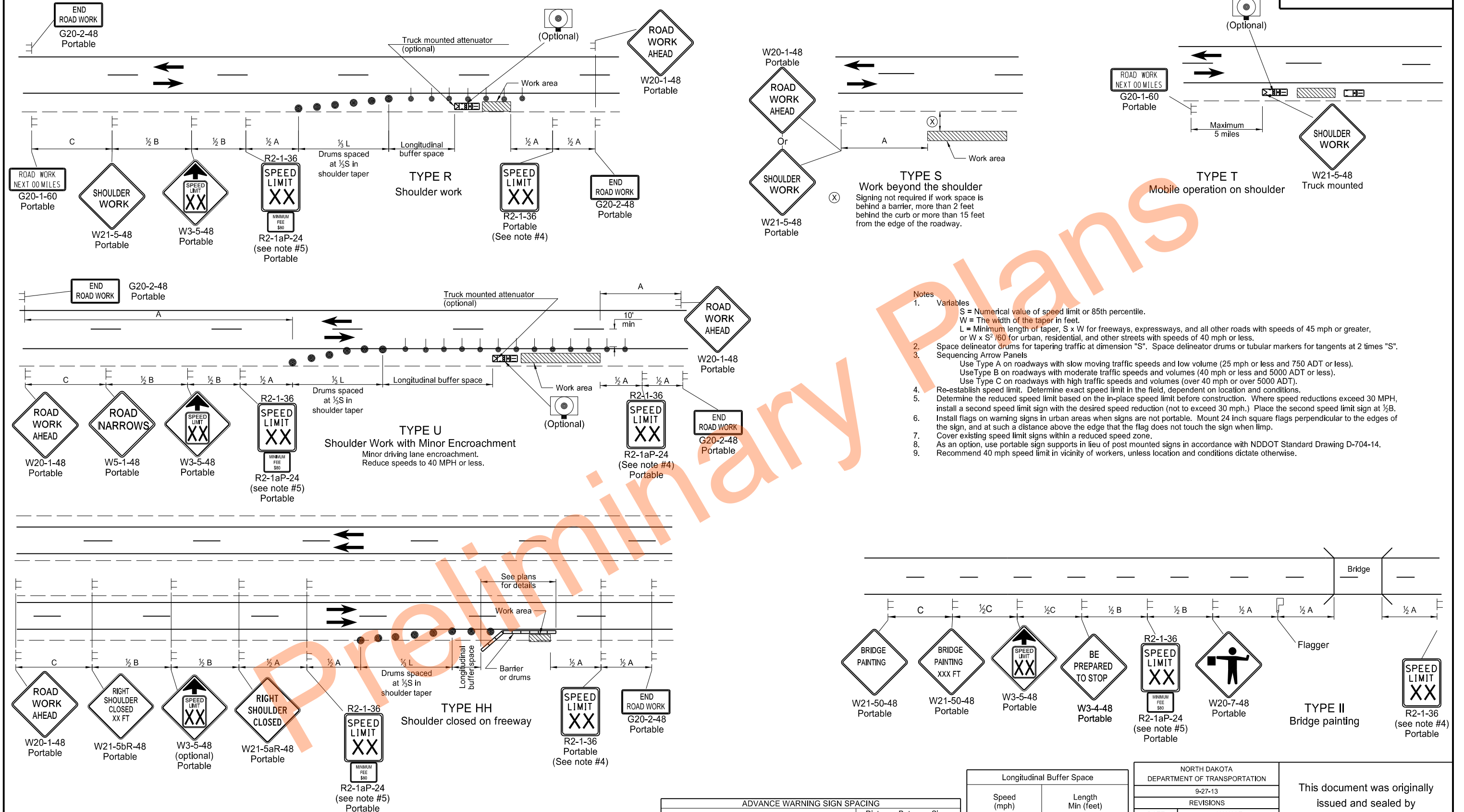
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

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



11/29/22

D-704-24



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

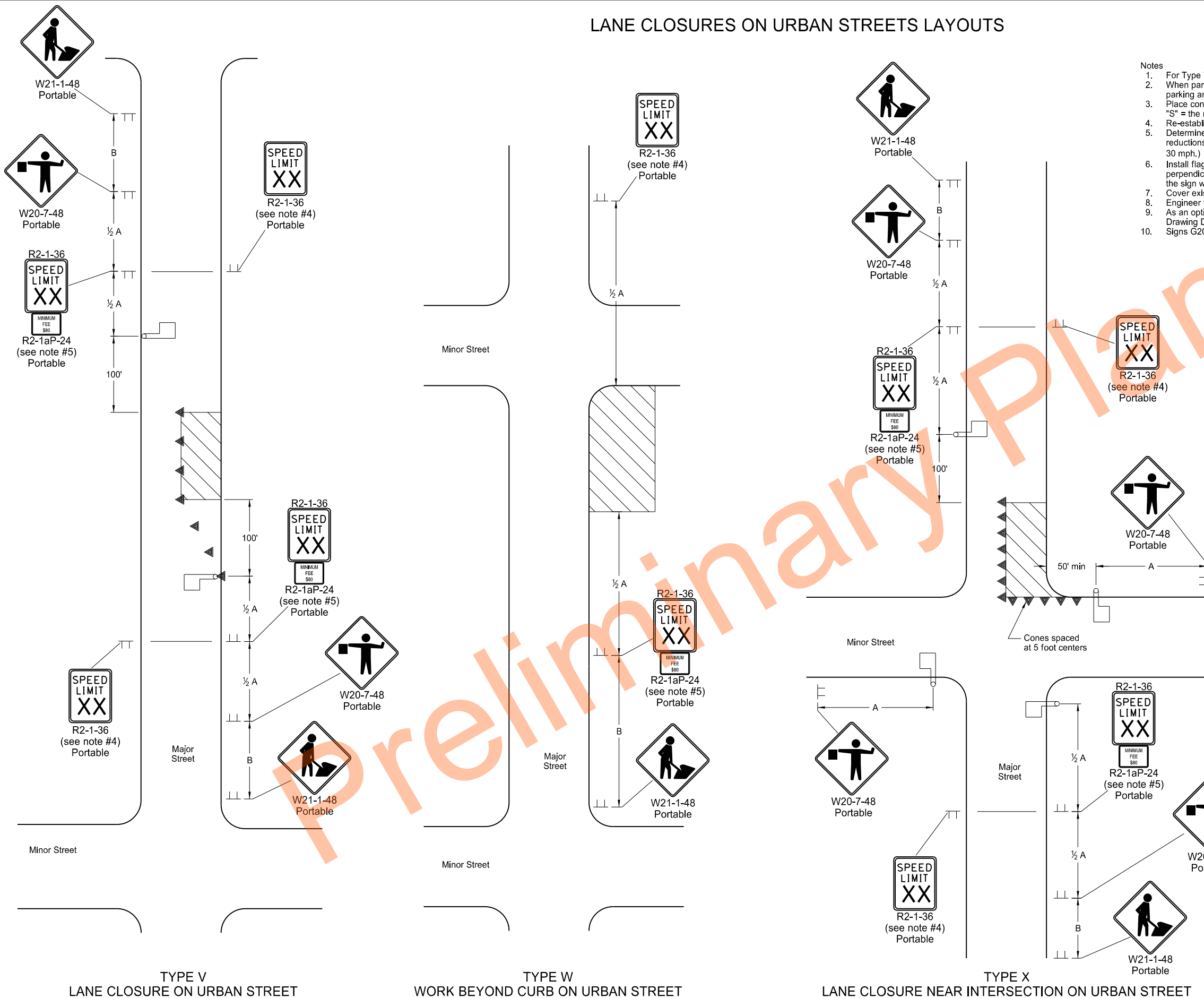
Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17 11-01-19	Updated notes & revised signs Revised drum spacing & signs nos

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

LANE CLOSURES ON URBAN STREETS LAYOUTS

D-704-25



- Notes
- For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
 - When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic. Place signs on portable mounts when located on roadway.
 - Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S".
 - "S" = the numerical value of speed limit.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within reduced speed zones.
 - Engineer to determine safe speed, when necessary.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

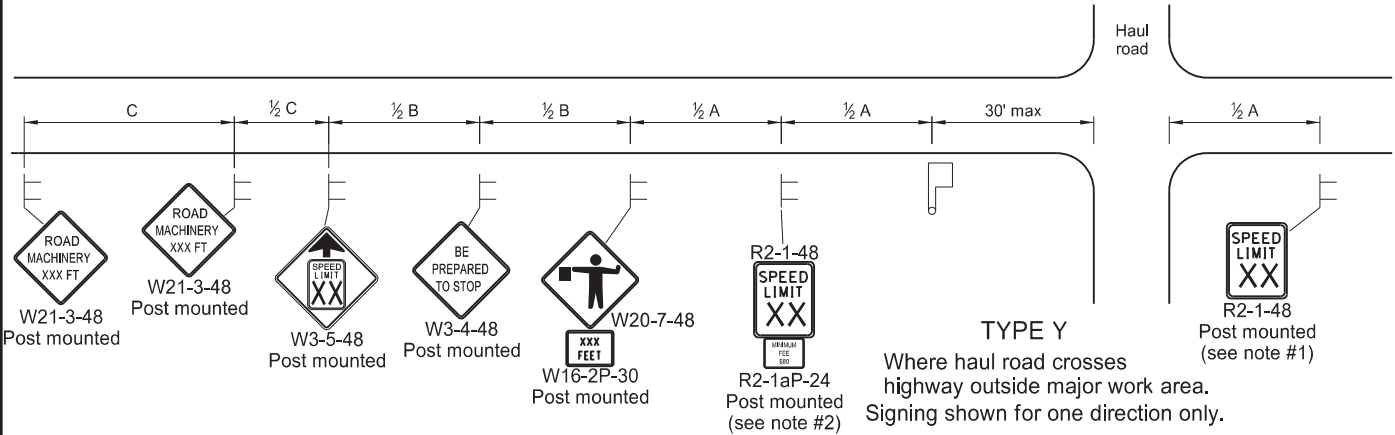
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

KEY	
	Sign
	Cones
	Work area
	Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & removed signs
11-01-19	Revised note & added Min Fee sign

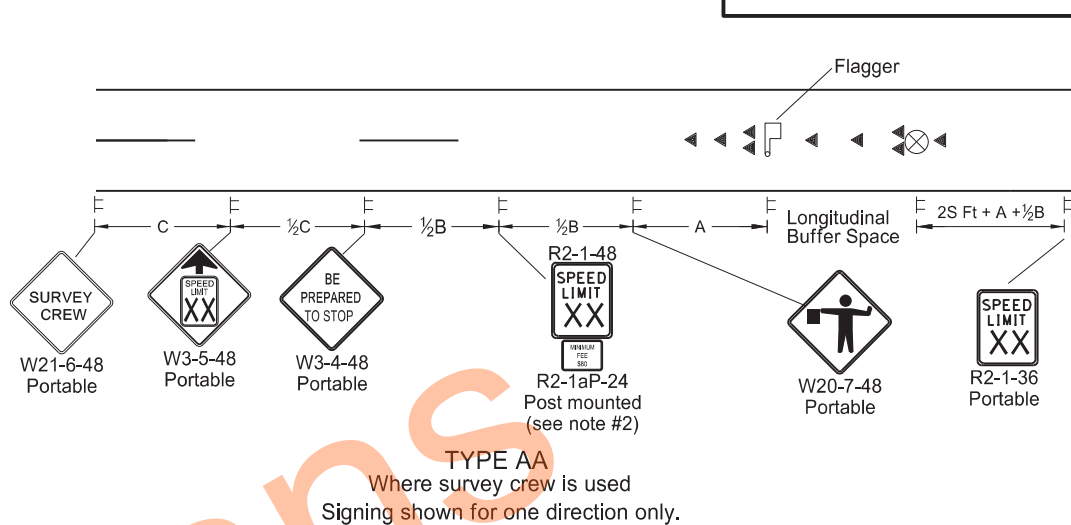
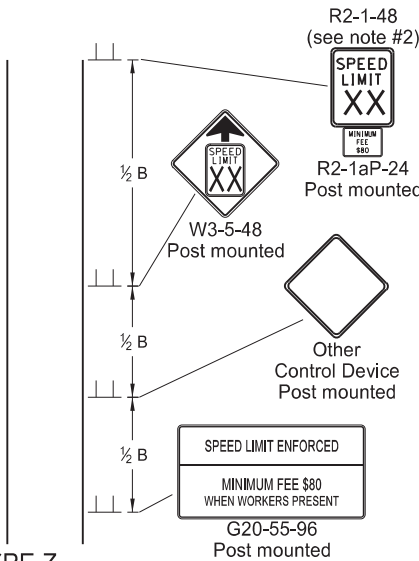
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the
North Dakota Department
of Transportation

MISCELLANEOUS SIGN LAYOUTS

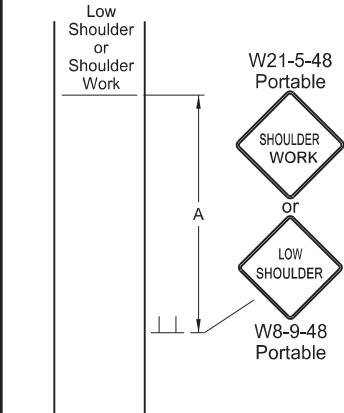


TYPE Y
Where haul road crosses highway outside major work area. Signing shown for one direction only.

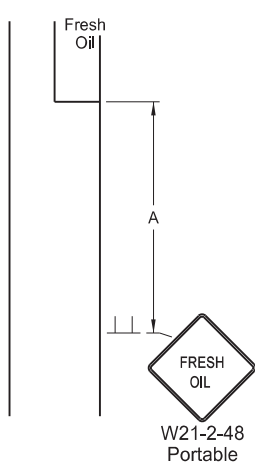
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



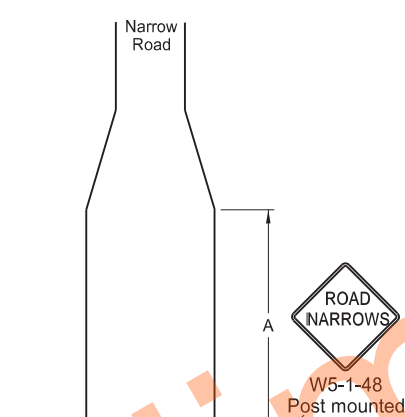
TYPE AA
Where survey crew is used
Signing shown for one direction only.



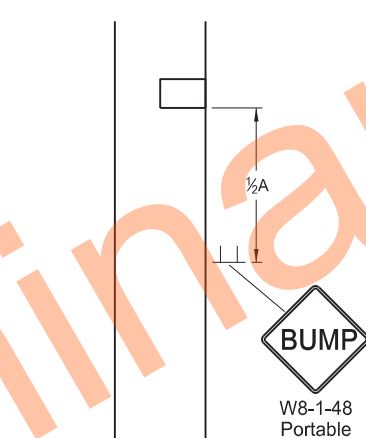
TYPE BB
Within major work area where sign conditions exist



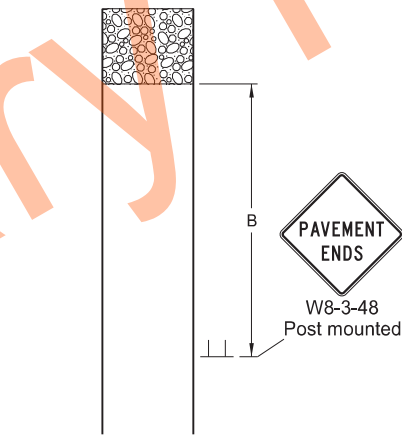
TYPE CC
Where sign conditions exist



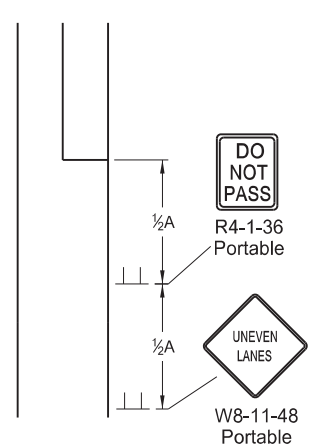
TYPE DD
Where sign conditions exist



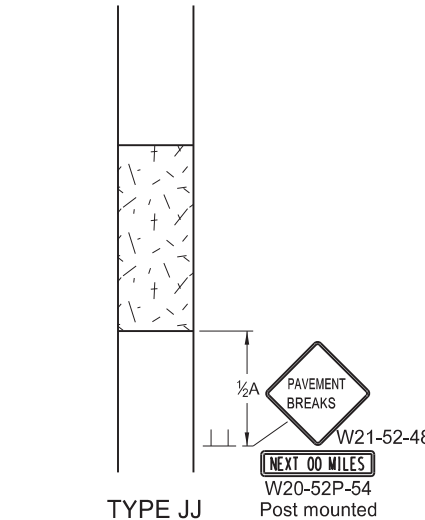
TYPE EE
Where sign conditions exist



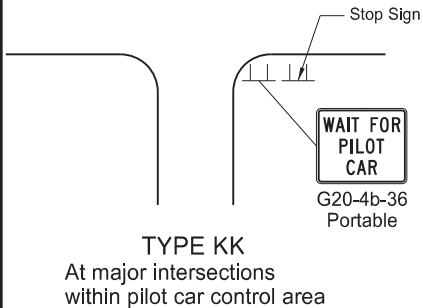
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



TYPE GG
Where elevation difference exists between lanes



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



TYPE KK
At major intersections within pilot car control area

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

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

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

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

KEY

Flagger Sign

Cones Survey Equipment

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

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

KIRK J. HOFF

REGISTERED

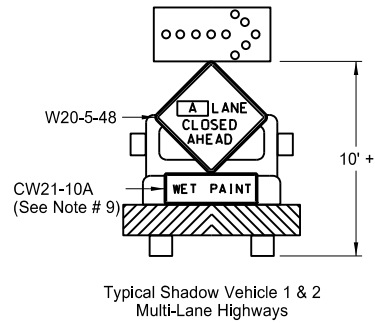
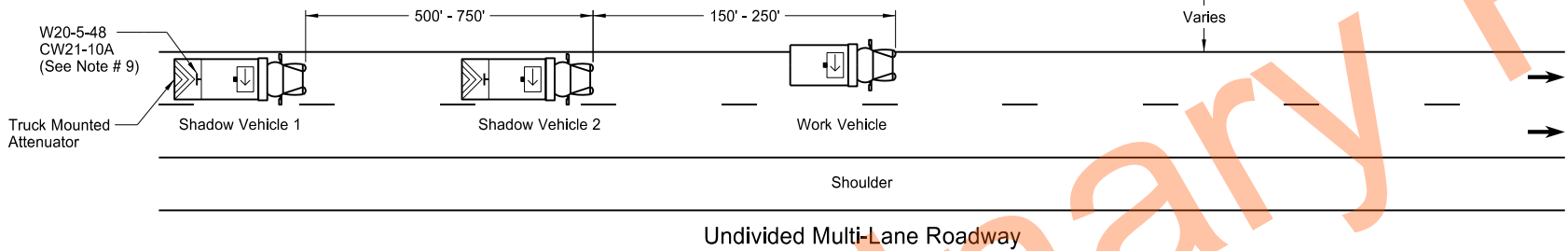
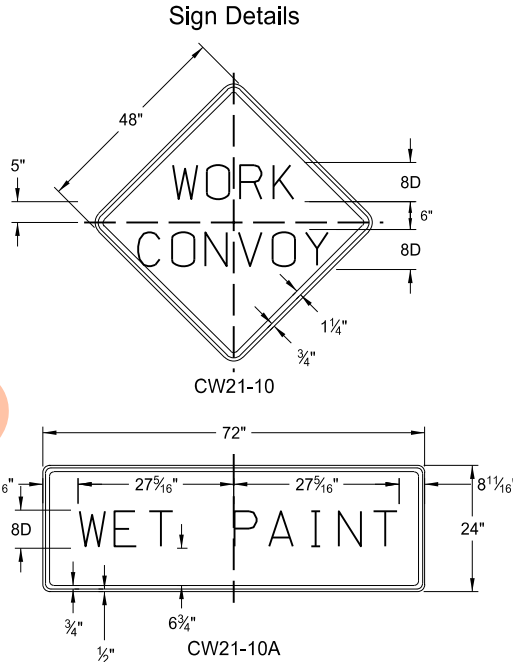
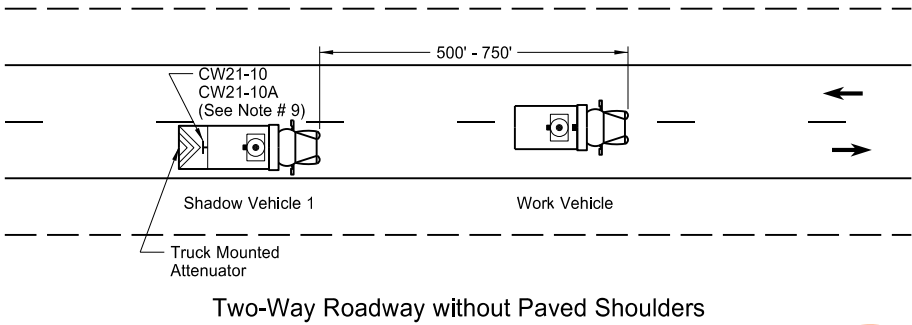
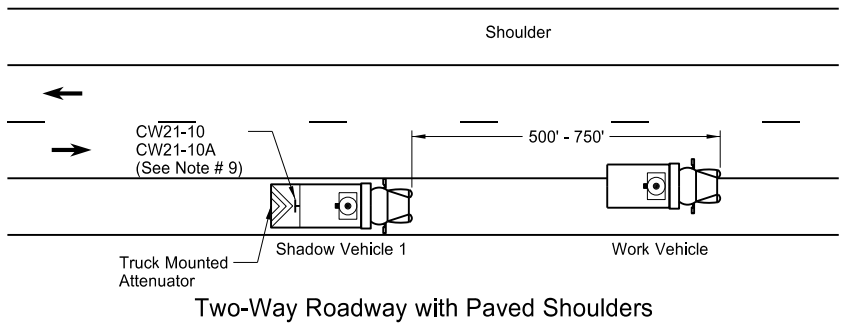
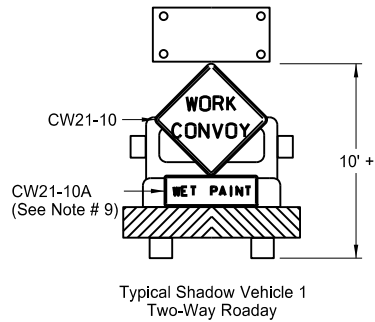
PROFESSIONAL PE-4683

ENGINEER NORTH DAKOTA

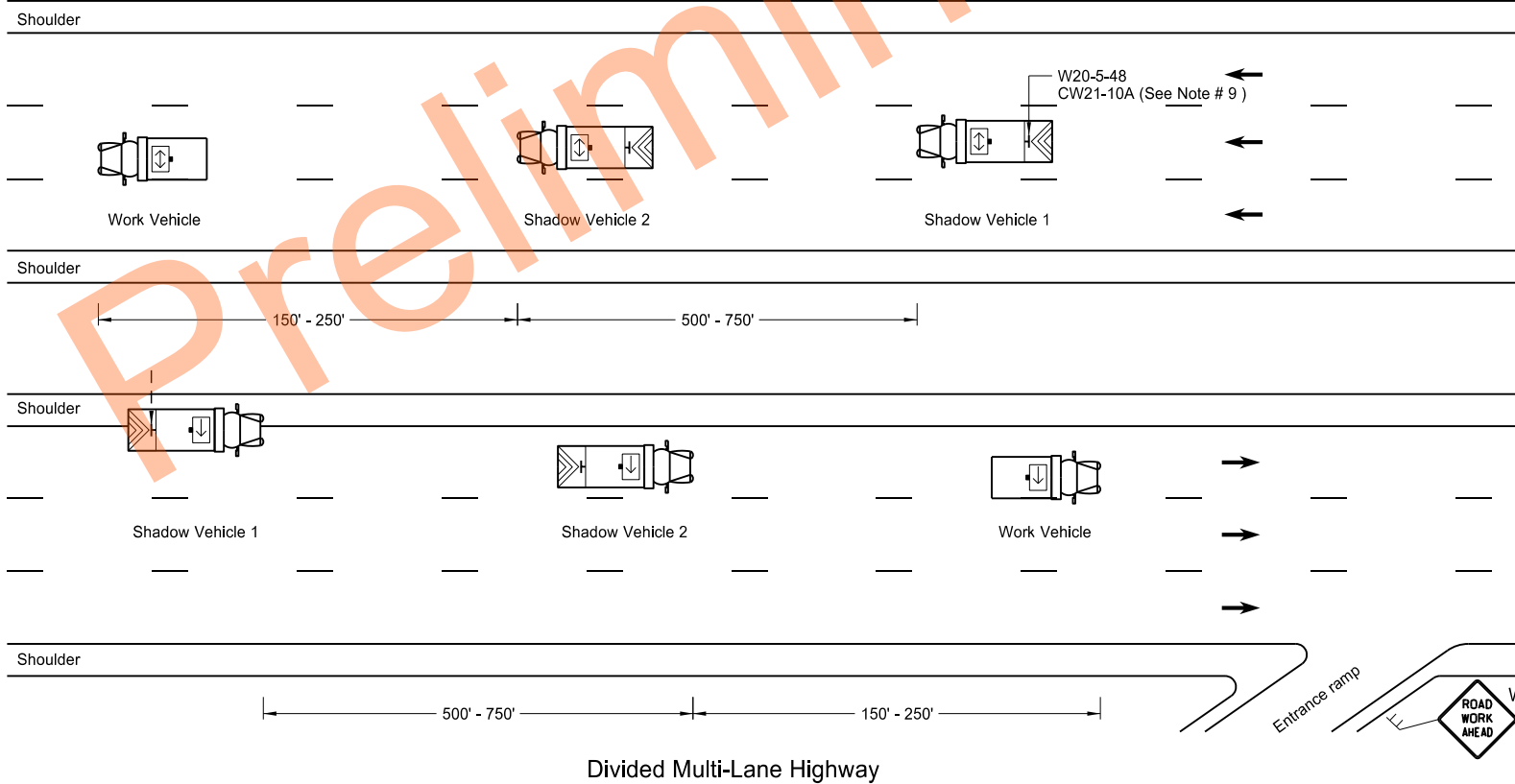
02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)

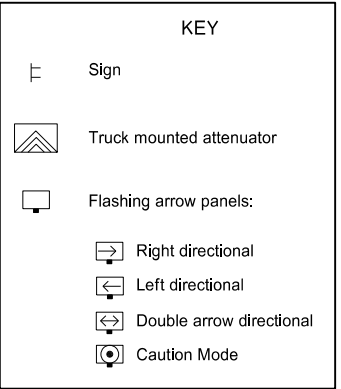
D-704-27



A = Left Right Center



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

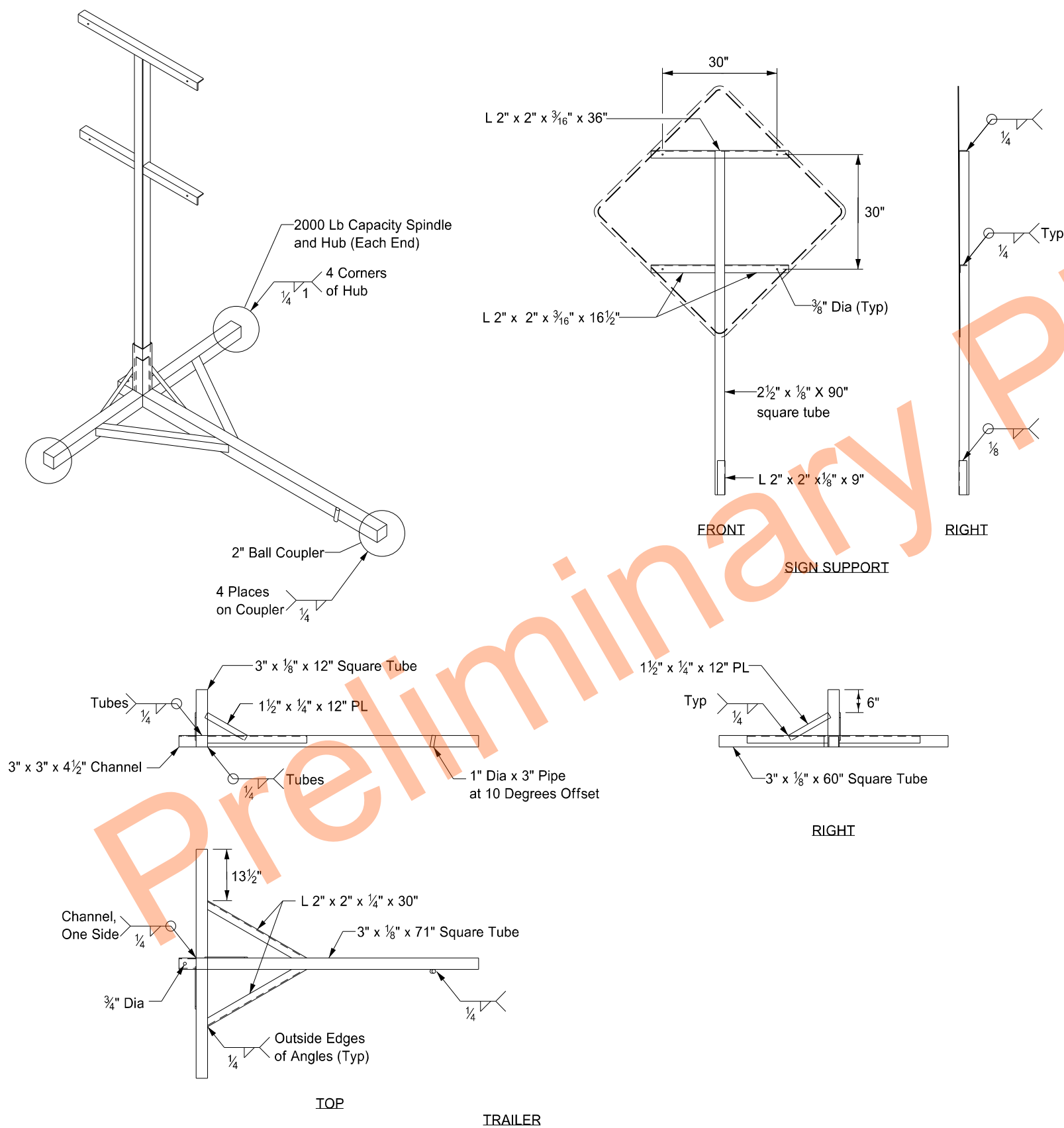


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

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

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

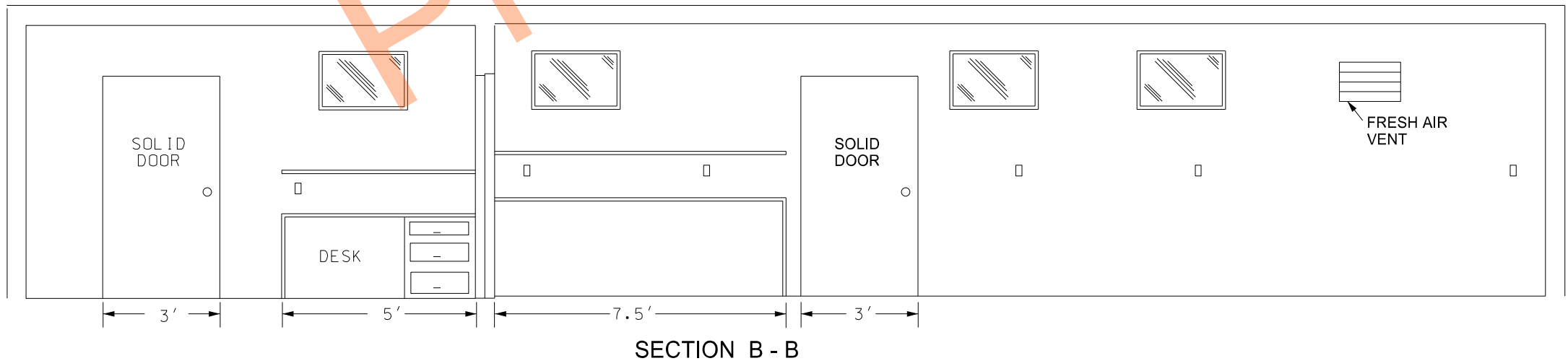
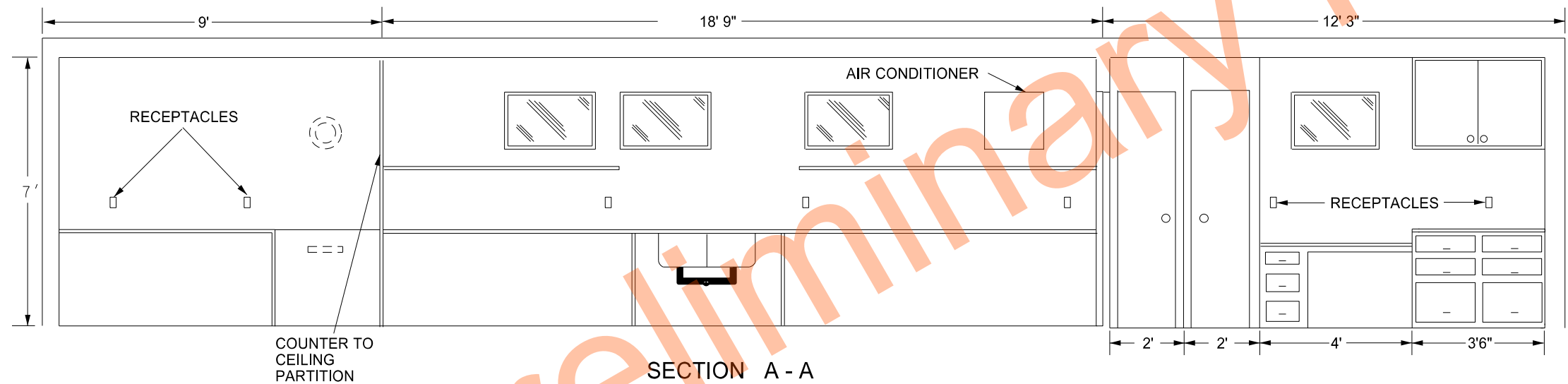
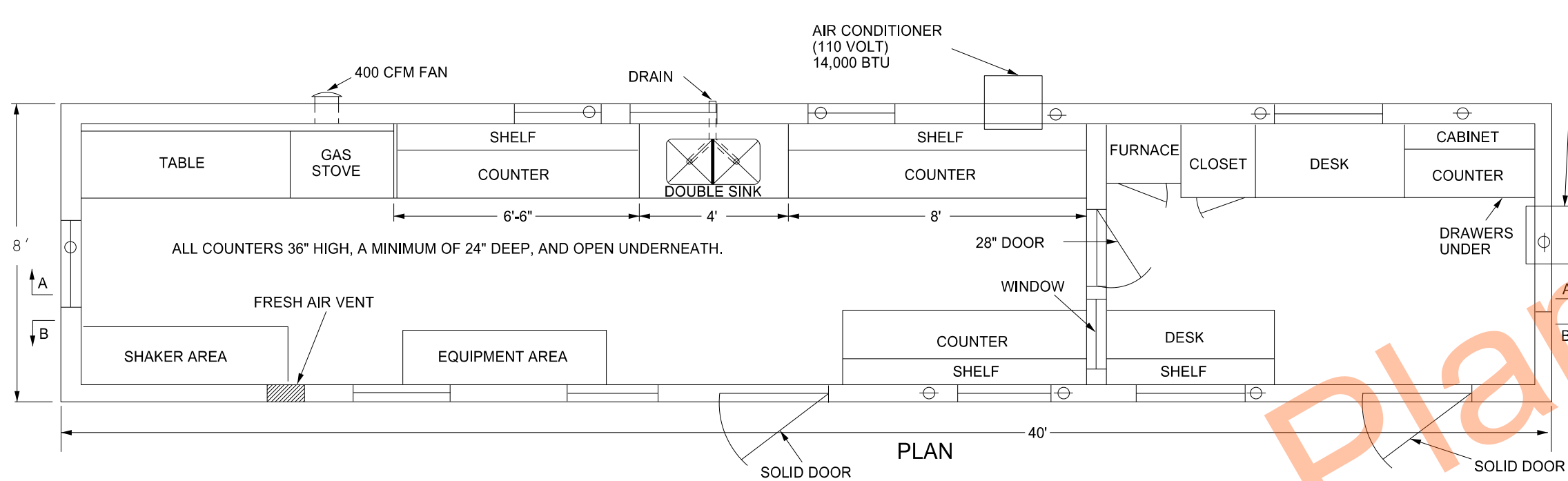
1. Maximum 250 pound weight of assembly.
2. Use a 14" wheel and tire.
3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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



BITUMINOUS LABORATORY

D-706-1



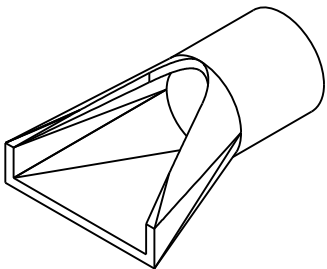
Provide a laboratory with the following:

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

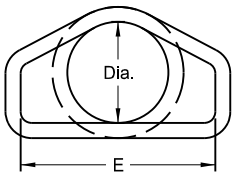
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

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Registration Number
PE- 4683,
on 08/27/19 and the original document is stored at the
North Dakota Department
of Transportation

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0 ⁷ / ₈ "	6'-0 ⁷ / ₈ "	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2 ¹ / ₄ "
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2 ¹ / ₂ "
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2 ³ / ₄ "
24	0'-9 ¹ / ₂ "	3'-7 ¹ / ₂ "	2'-6"	6'-1 ¹ / ₂ "	4'-0"	3"
27	0'-10 ¹ / ₂ "	4'-0"	2'-1 ¹ / ₂ "	6'-1 ¹ / ₂ "	4'-6"	3 ¹ / ₂ "
30	1'-0"	4'-6"	1'-7 ³ / ₄ "	6'-1 ³ / ₄ "	5'-0"	3 ¹ / ₂ "
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4 ¹ / ₂ "
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9 ¹ / ₂ "	8'-2 ¹ / ₄ "	7'-6"	5 ¹ / ₂ "
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5 ¹ / ₂ "
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6 ¹ / ₂ "
84	3'-0"	7'-6 ¹ / ₂ "	1'-9"	9'-3 ¹ / ₂ "	10'-0"	6 ¹ / ₂ "
90	3'-5"	7'-3 ¹ / ₂ "	2'-0"	9'-3 ¹ / ₄ "	11'-0"	6 ¹ / ₂ "

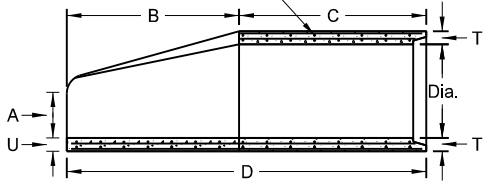


PERSPECTIVE

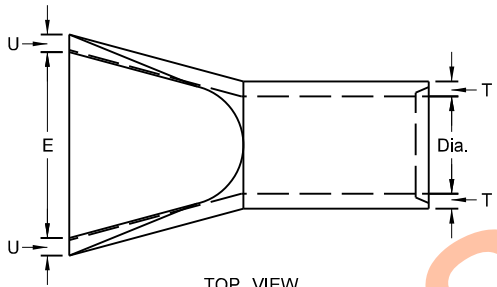


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

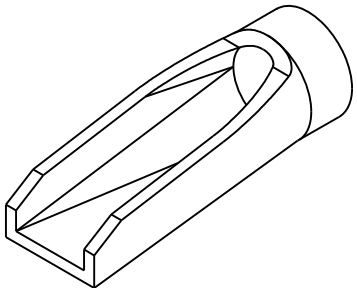
NOTES:

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 section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

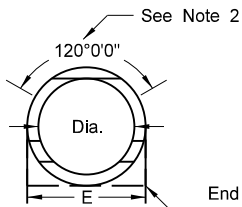
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

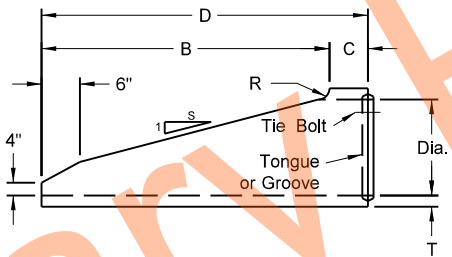
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



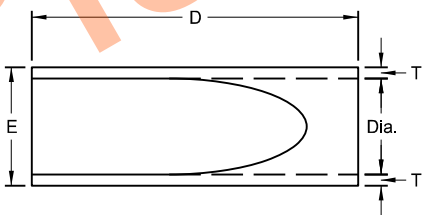
PERSPECTIVE



END VIEW



SIDE VIEW



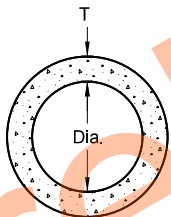
TOP VIEW

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.

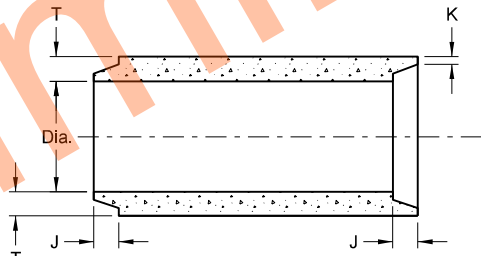
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

Reinforcement to be equivalent to Class III RCP

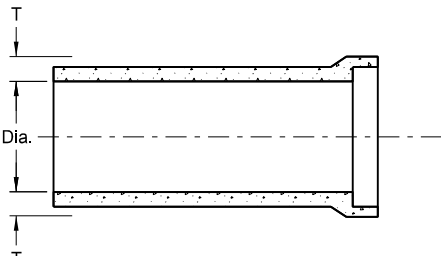


END VIEW

CIRCULAR PIPE

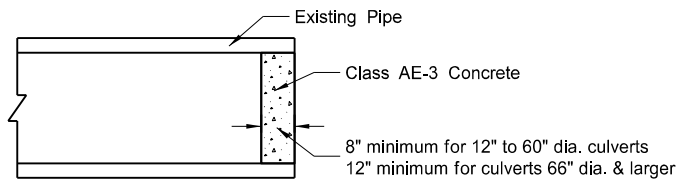


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

All Classifications of Round Concrete Pipe						
Internal Dia. of pipe in Inches	Cross-Sectional Water Area	Weight per Lin. Foot of pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue & Groove Min.	Minimum Wall Thickness (T)	
Dia	Sq. ft.	Lbs.	In.	In.	In.	
12	0.79	92	1 ⁵ / ₈ -2 ³ / ₈	3/4	2	
15	1.23	127	1 ³ / ₄ -2 ¹ / ₄	7/8	2 ¹ / ₄	
18	1.77	168	1 ¹ / ₂ -2 ¹ / ₂	1	2 ¹ / ₂	
21	2.40	214	1 ¹ / ₂ -3 ¹ / ₈	1 ¹ / ₈	2 ³ / ₄	
24	3.14	265	2 ³ / ₄ -3 ¹ / ₄	1 ¹ / ₂	3	
27	3.98	322	2 ³ / ₄ -4	1 ¹ / ₄	3 ¹ / ₄	
30	4.91	384	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₄	3 ¹ / ₂	
33	5.94	452	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	3 ³ / ₄	
36	7.07	524	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	4	
42	9.62	685	3 ¹ / ₄ -4 ¹ / ₄	1 ³ / ₄	4 ¹ / ₂	
48	12.57	685	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	5	
54	15.90	1070	4 ¹ / ₈ -5 ¹ / ₄	2	5 ¹ / ₂	
60	19.63	1296	4 ¹ / ₂ -5 ¹ / ₂	2 ¹ / ₄	6	
66	23.76	1542	5-6	2 ³ / ₈	6 ¹ / ₂	
72	28.27	1810	5 ⁵ / ₈ -6 ³ / ₄	2 ³ / ₈	7	
78	33.18	2098	6 ¹ / ₄ -7 ¹ / ₄	2 ³ / ₈	7 ¹ / ₂	
84	38.48	2410	5 ⁵ / ₈ -7 ¹ / ₄	3 ³ / ₈	8	
90	44.18	2793	6 ³ / ₄ -8 ¹ / ₂	3 ³ / ₈	8 ¹ / ₂	
96	50.27	3092	7-8 ¹ / ₄	3 ¹ / ₂	9	
102	56.75	3466	7-8 ¹ / ₄	3 ¹ / ₂	9 ¹ / ₂	
108	63.62	3864	7 ¹ / ₄ -8 ¹ / ₂	3 ³ / ₄	10	

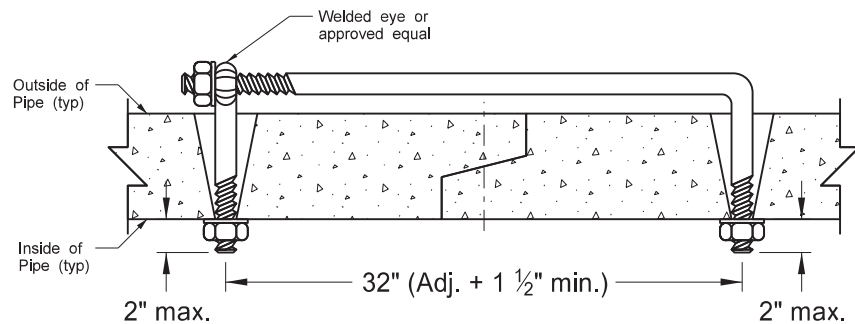
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions
09-18-19	Updated Perspective View Details

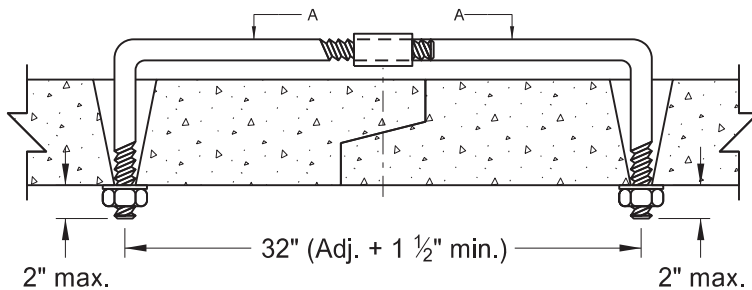
This document was originally issued and sealed by
Jon Ketterling
Registration Number
PE- 4684,
on 9/18/19 and the original document is stored at the
North Dakota Department
of Transportation

CONCRETE PIPE, CATTLE PASS, OR
PRECAST CONCRETE BOX CULVERT TIES

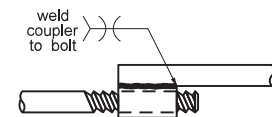
D-714-22



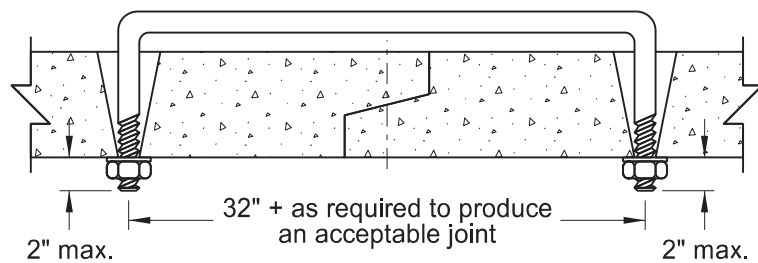
EYE BOLT TIE (PIPES ONLY)



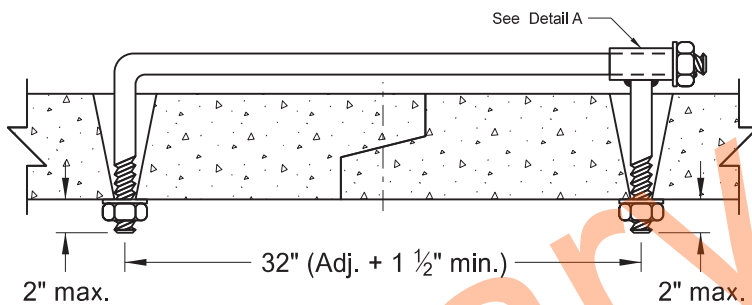
ADJUSTABLE TIE (RCB AND PIPES ONLY)



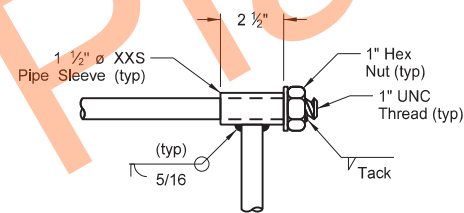
SECTION A-A



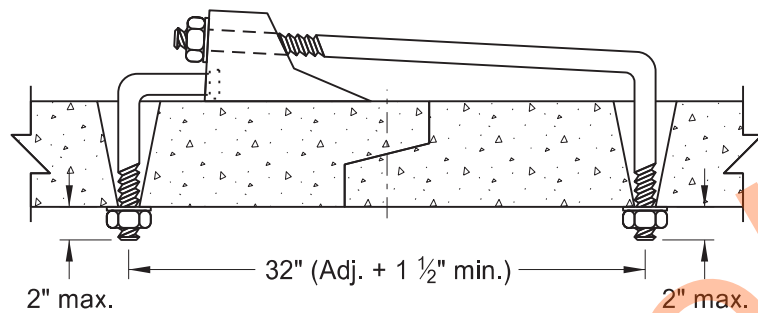
U BOLT TIE (RCB, PIPES, OR CATTLE PASSES)



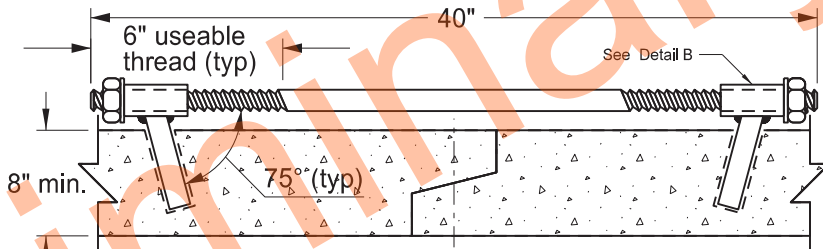
WELDED TIE (RCB AND PIPES ONLY)



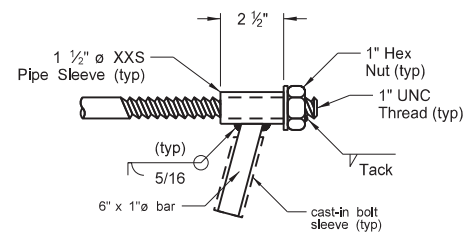
DETAIL A



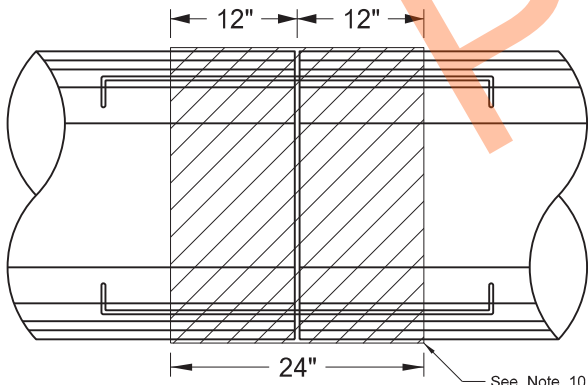
CANOPY TIE (PIPES ONLY)



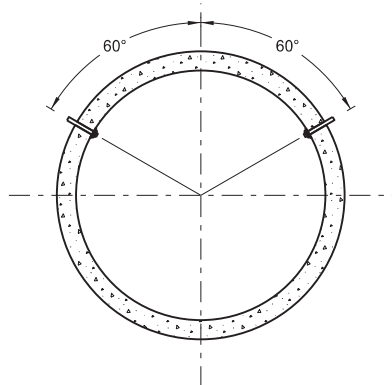
HIDDEN TIE (RCB ONLY)



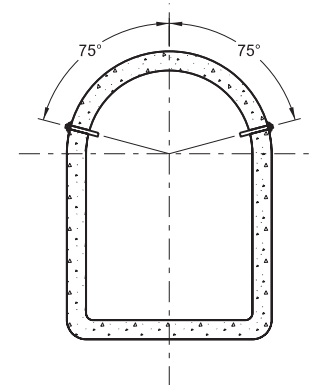
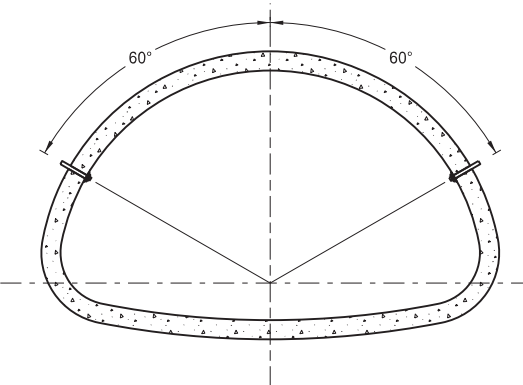
DETAIL B



PLAN VIEW (PIPES ONLY)



END VIEW



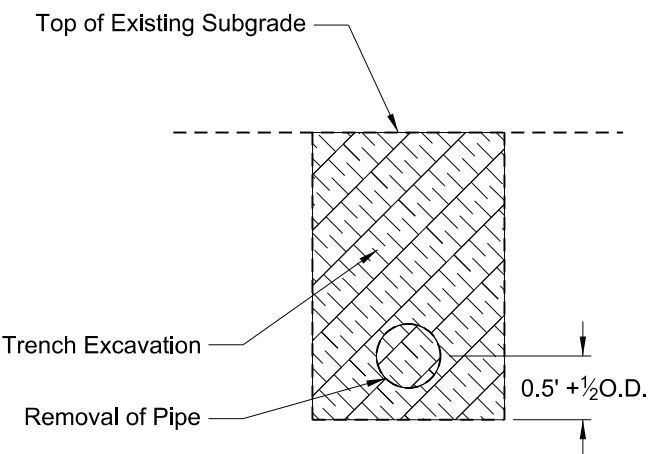
REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ϕ	XXS Pipe Sleeve Inner ϕ
18" - 24"	$\frac{5}{8}$ " See note 3	$\frac{3}{4}$ "
30" - 66"	$\frac{3}{4}$ "	1"
72" - 120"	1"	1 $\frac{1}{4}$ "
RCB/Cattle Pass		

- NOTES:
- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
 - Insert pipe ties from the inside of the pipes and grout in place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
 - Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
 - Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
 - Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
 - Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Use holes that have a diameter $\frac{1}{4}$ " larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1 $\frac{1}{4}$ ".
 - Select the type of tie bolt used from those shown.
 - Include the cost of precasting or drilling the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
 - Tie all centerline and approach RCP culvert joints. Tie the first three joints including the end section of all free ends of storm drain systems. 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.
 - Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C877 (Type III). Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
 - Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
 - Tie RCB's at locations shown on the plans.

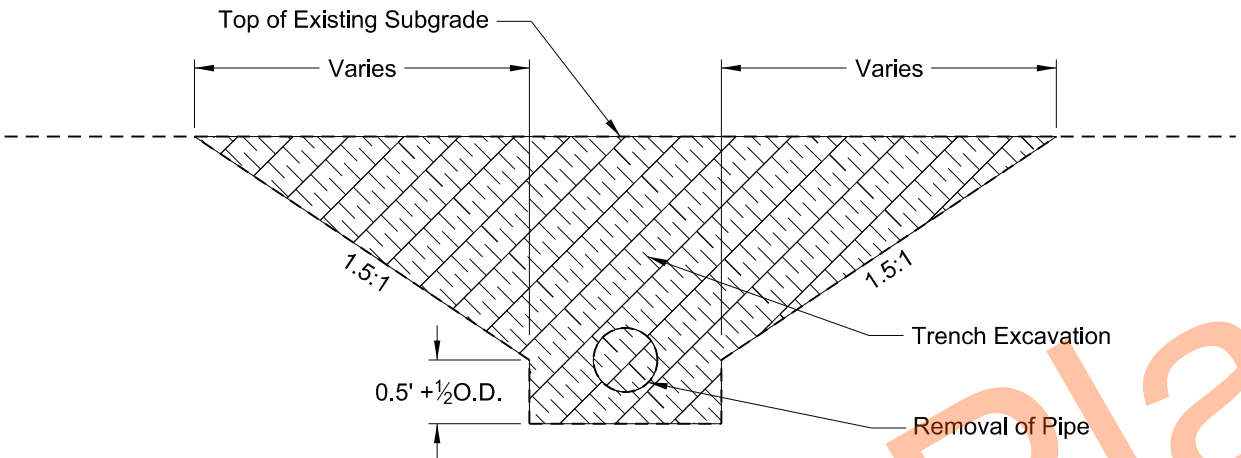
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-8-17	Notes 2-11, Table, Title, Labels
8-11-21	Notes 2-12, Table, Label



PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE
OR PIPE NOT UNDER THE ROADWAY



EXCAVATION DETAIL A



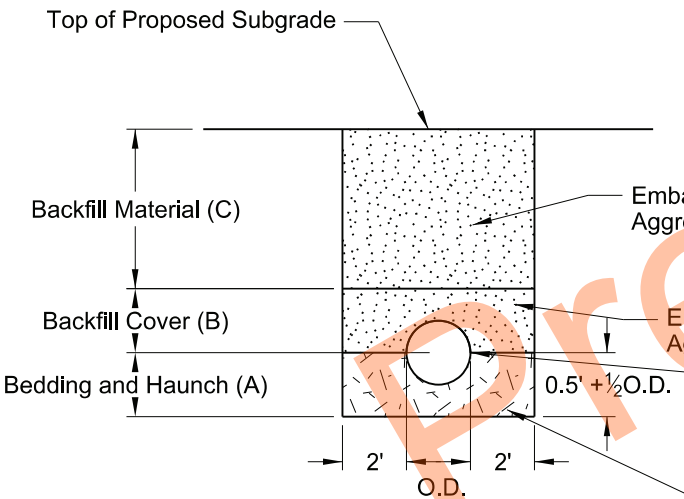
EXCAVATION DETAIL B

Pay Items
1) Pipe*
2) Removal of Pipe (if required)

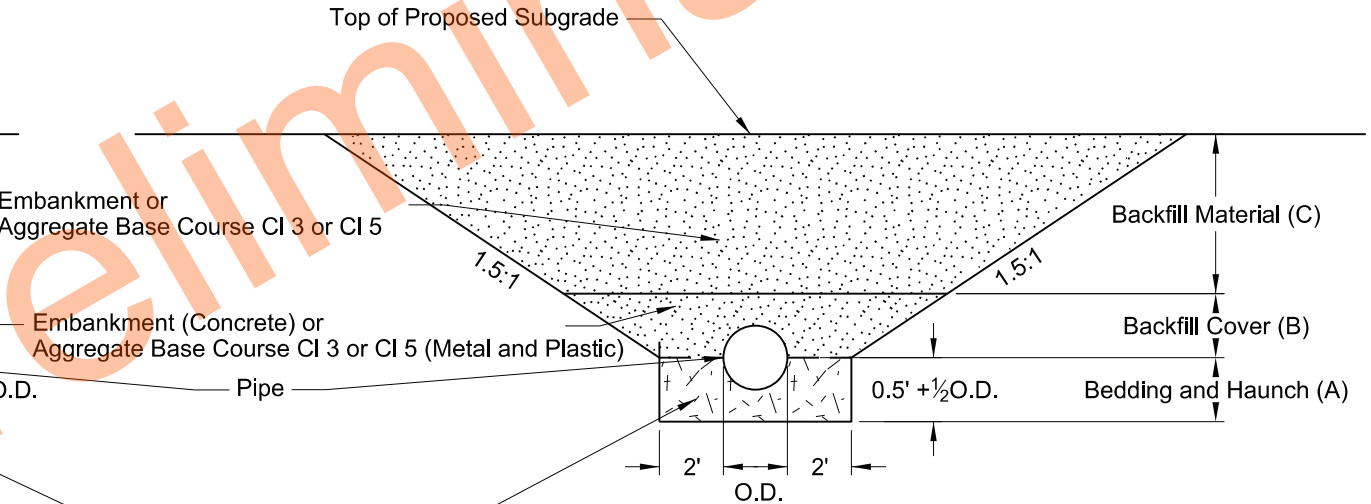
*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course CI 3 or CI 5
4) Embankment

NOTES:
1) This drawing does not apply to pipes in approaches.
2) It is the contractor's option to select Detail A or B.
3) Embankment may be either Borrow Excavation or Common Excavation - Type A

Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 0.5 Feet
Pipes Under the Roadway = 0.5 O.D. + 0.5 Feet
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI3 or CI 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B



BACKFILL DETAIL A



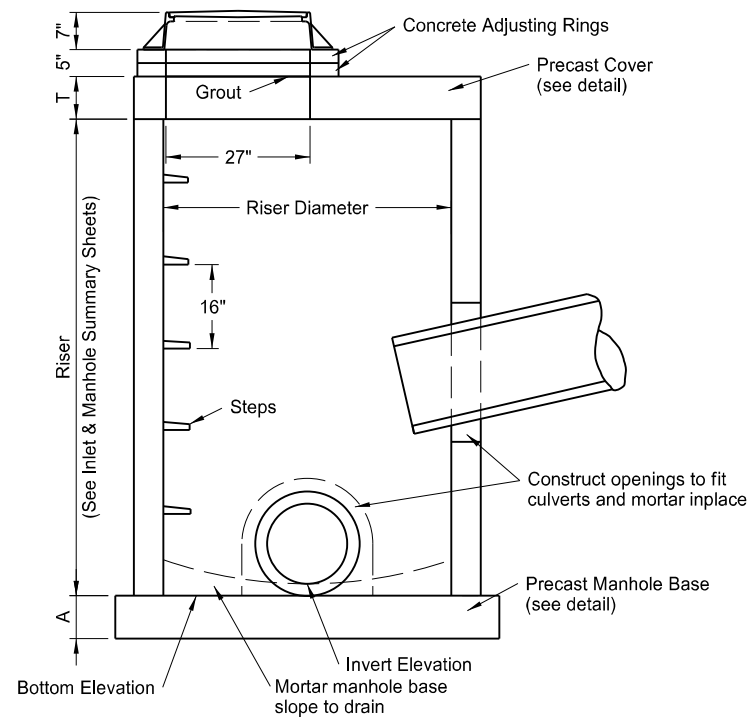
BACKFILL DETAIL B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
12-10-15	Added Plastic Pipe
5-27-20	Changed bedding depth and updated table

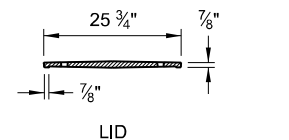
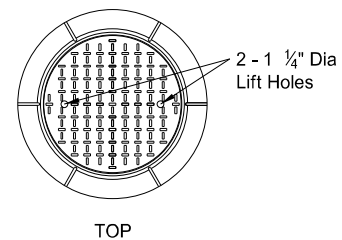


MANHOLE DETAILS

D-722-5



ELEVATION



FRAME

MANHOLE CAST IRON RING & COVER

PRECAST MANHOLE COVERS

RISER DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM * BARS	TOP * BARS
48"	58"	1,080 Lb	6"	6"	8"	#4 at 6"	-----
54"	65"	1,910 Lb	8"	6"	8"	#4 at 6"	-----
60"	72"	2,430 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
66"	79"	3,010 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
72"	86"	3,640 Lb	8"	8"	10"	#4 at 6"	#4 at 11"
84"	100"	5,060 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
96"	114"	6,695 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
108"	128"	12,810 Lb	12"	10"	12"	#5 at 6"	#5 at 11"
120"	142"	15,900 Lb	12"	11"	13"	#5 at 6"	#5 at 11"

* - Place reinforcement listed in each direction.

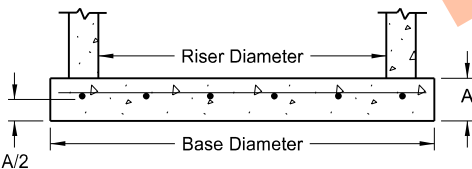
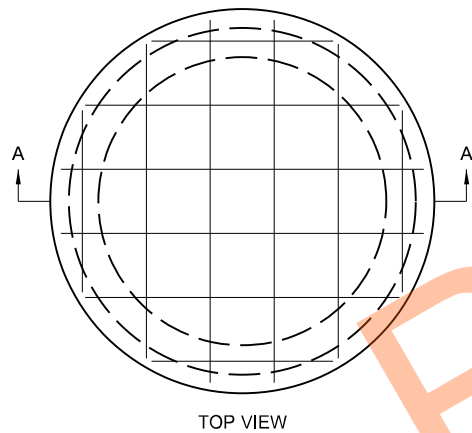
MANHOLE BASES

RISER DIAMETER	BASE DIAMETER	WEIGHT OF SECTION	A	BARS *
48"	66"	1,785 Lb	6"	#4 at 12"
54"	72"	2,830 Lb	8"	#4 at 12"
60"	78"	3,320 Lb	8"	#4 at 12"
66"	86"	4,035 Lb	8"	#4 at 12"
72"	92"	4,620 Lb	8"	#4 at 12"
84"	107"	6,245 Lb	8"	#4 at 12"
96"	120"	7,855 Lb	8"	#4 at 12"
108"	132"	14,255 Lb	12"	#4 at 8"
120"	148"	17,925 Lb	12"	#4 at 8"

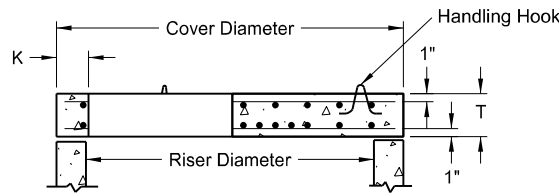
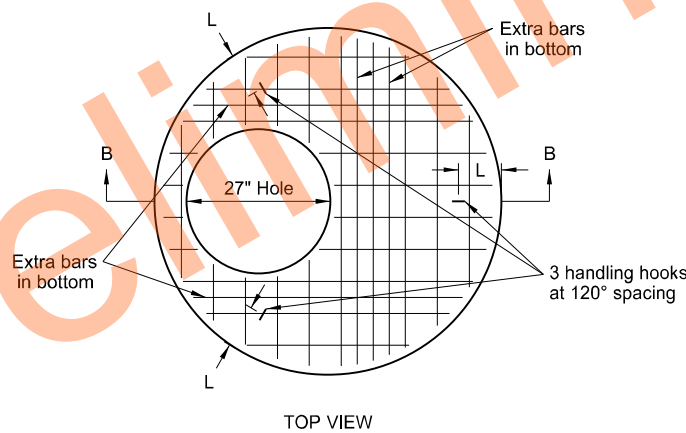
* - Place reinforcement listed in each direction.

NOTES:

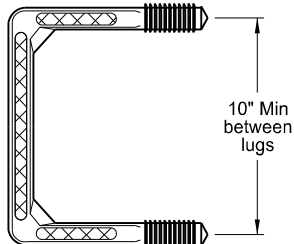
1. Use class AE concrete precast or cast-in-place bases constructed in accordance with NDDOT Standard Specifications. Use aggregate size approved by the engineer.
2. Use precast concrete manholes, risers and steps conforming to AASHTO M199.
3. Reinforce precast concrete bases and covers as shown in the table for the corresponding riser diameter.
4. Use Grade 60 reinforcing steel.
5. Cut or Precast manhole riser bottoms square to fit the manhole base. Grout joint between base and riser with cement mortar.
6. The manhole riser length listed in the plans is based on a 7" manhole casting, plus 2 concrete adjusting rings (5"), plus the "T" dimension shown in the Precast Manhole Covers table.
7. Use corrosion resistant manhole steps with a minimum 800 pound vertical load resistance and a minimum 400 pound horizontal pull-out resistance. Use configuration of steps approved by the Engineer.
8. Precast concrete manhole covers shown are designed for an HS-20 wheel load and maximum fill height of 15'-0". Special design is required for heavier wheel loads and/or greater fill heights.
9. Use of other castings, similar in dimension, is allowed if the casting conforms to the manhole cover and has a lid style specified in the plans. Modifications to the manhole cover to facilitate similar castings are only allowed with written approval from the Engineer.
10. Use castings manufactured in accordance with AASHTO M306-09. Use metal conforming to AASHTO M105 Class 35B in the manufacture of castings.



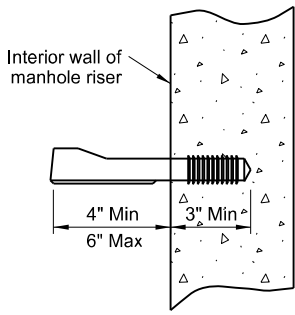
SECTION A-A
PRECAST MANHOLE BASE



SECTION B-B
PRECAST COVER



TOP VIEW

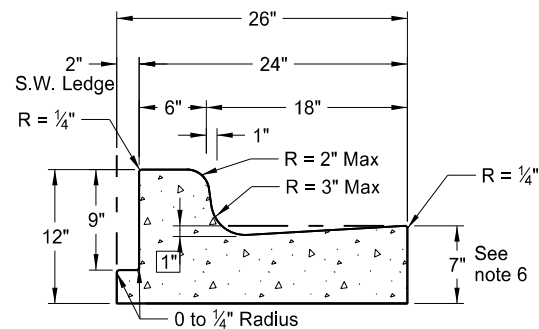


STEP DETAIL

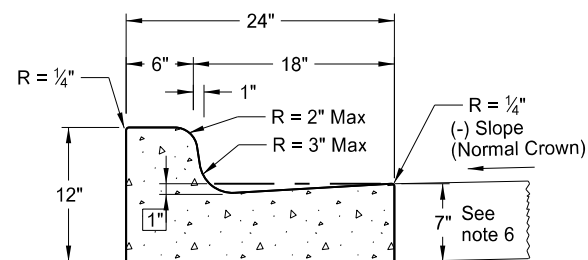
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-14-2013	
REVISIONS	
DATE	CHANGE
6-24-14	Revised notes 1 & 6, added dimensions to Elev. drawing.
10-17-17	Updated to active voice.
12-02-20	Updated PE stamp and signature.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

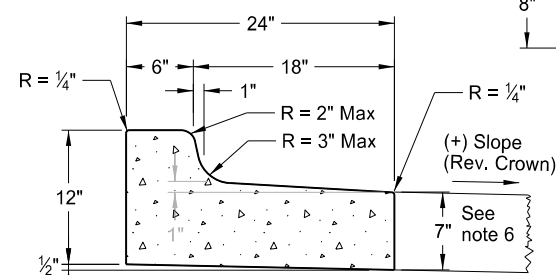
Curb & Gutter and Valley Gutter



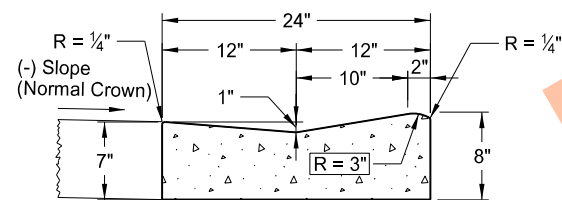
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk,
Median, or Parking Lot.
(Sec. A shown. See Sec B for
additional details.)



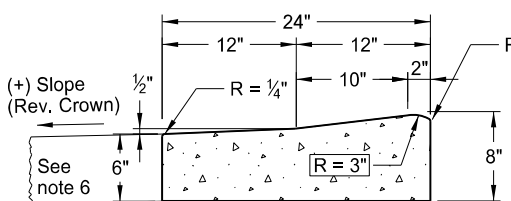
Curb & Gutter Type 1 (Sec. A)



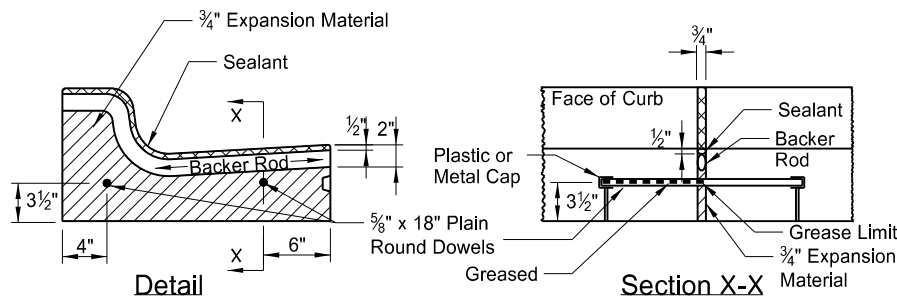
Curb & Gutter Type 1 (Sec. B)



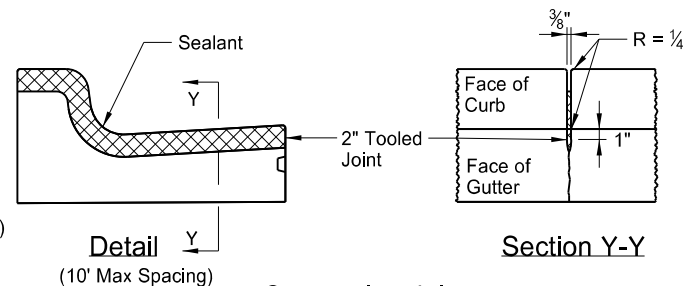
Mountable Curb & Gutter Type 1 (Sec. A)



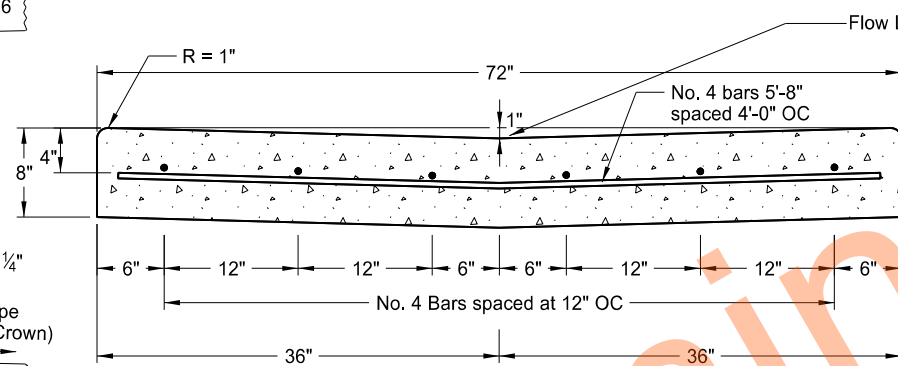
Mountable Curb & Gutter Type 1 (Sec. B)



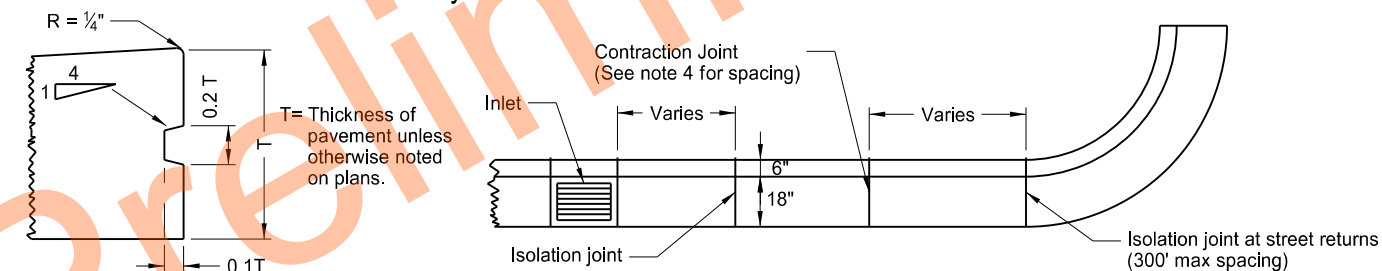
Isolation Joint



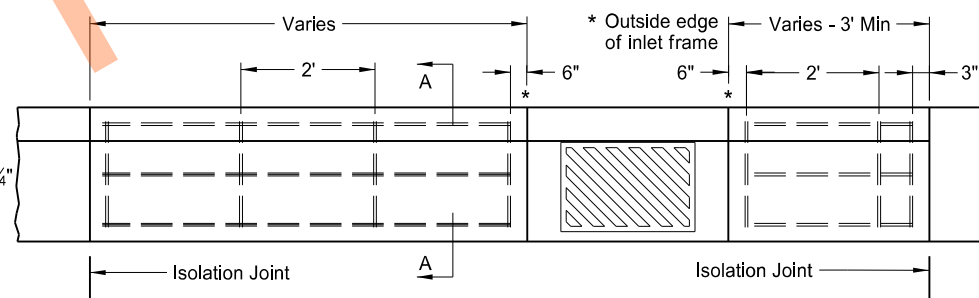
Contraction Joint
(10' Max Spacing)



72" Concrete Valley Gutter Detail

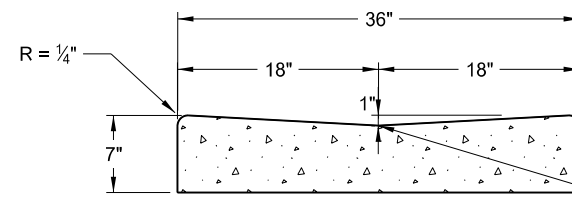


Joint Location Detail

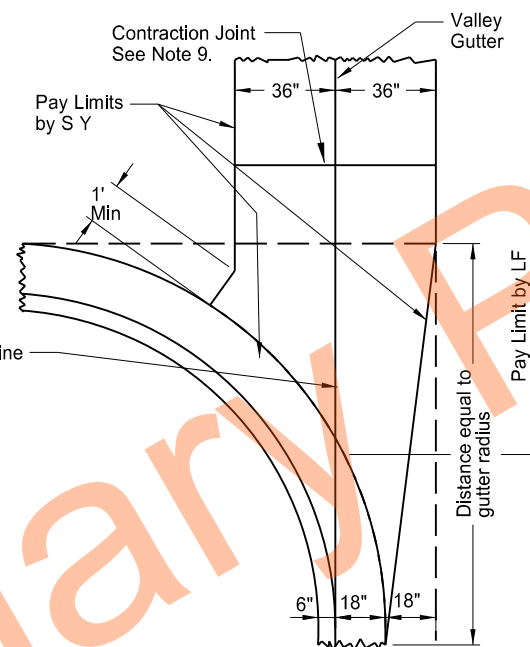


Curb & Gutter Reinforcing at Inlets

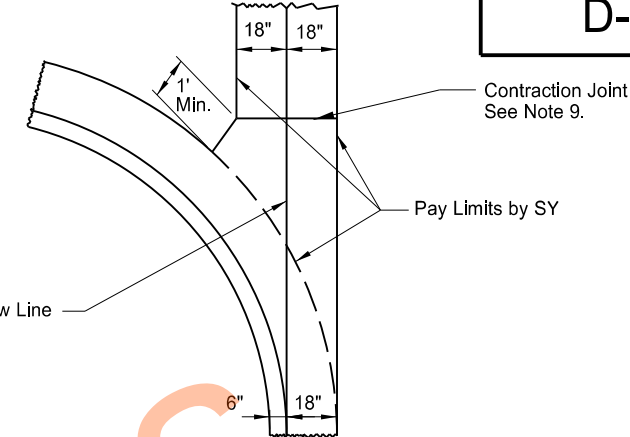
NOTE: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlet locations (even inlets located on radii) in the price bid for "Curb and Gutter - Type 1." Extend reinforcement to the second joint (rebar placed through the first joint) in cases where the 3' min. panel length cannot be obtained.



36" Concrete Valley Gutter Detail



72" Concrete Valley Gutter Plan



36" Concrete Valley Gutter Plan

NOTES:

1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use 3/4" expansion joint filler for isolation joint material. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.
4. Joint Spacing: For hot bituminous pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)
5. Joint sealing: Seal contraction and isolation joints as shown in the details. Use joint sealant for contraction joints that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.
6. Face of Gutter Depth: For hot bituminous pavement use 7" gutter depth as shown. For PCC pavements, match the gutter depth to the depth of adjacent PCC pavement or to construct a 7" depth as shown.
7. Tie curb and gutter to abutting PCC pavement with No. 3 bars, 1'-6" in length, spaced at 4' centers.
8. On street returns and other locations where new curb and gutter ends and does not abut existing curb and gutter, taper the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint, the same shape as the curb and gutter just ahead of the taper. Install an 18" tie bar across the joint.
9. Valley Gutter Joints: Form, saw, or score 1/8" min. to 3/8" max. width contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic type joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.

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

SIDEWALK

D-750-2

NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

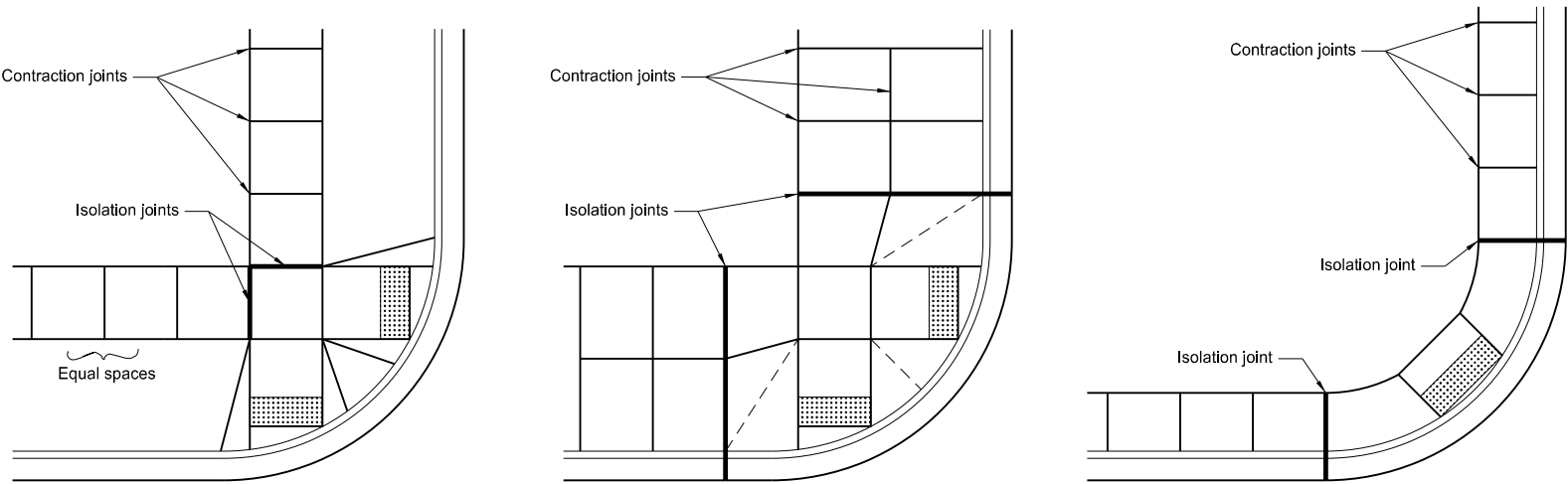
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

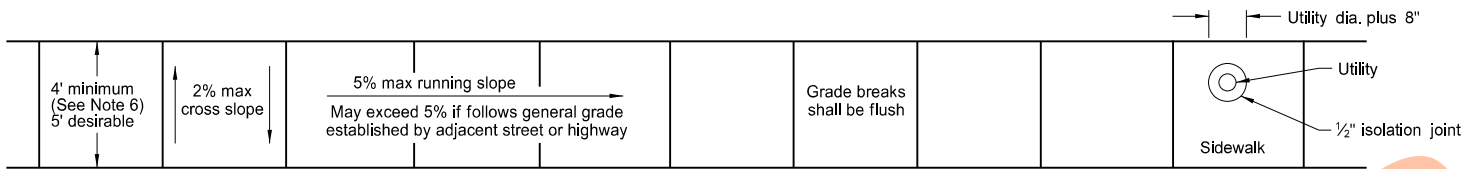
Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

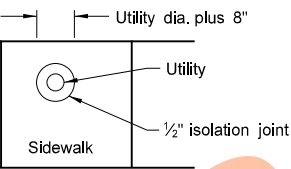
When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.



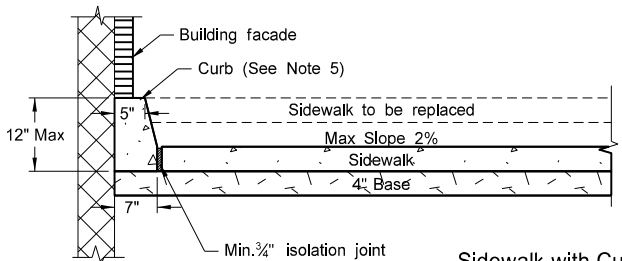
Typical Joint Layouts



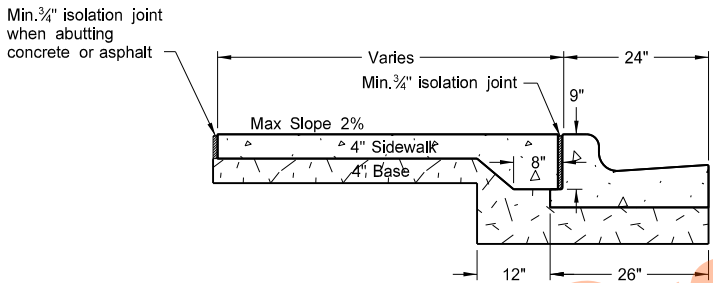
Sidewalk Width and Grade



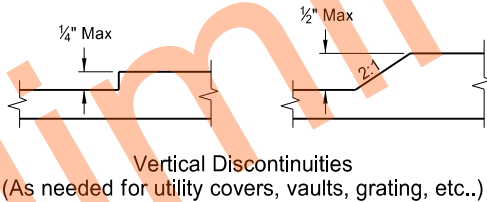
Utility Blockout



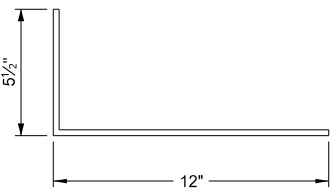
Sidewalk with Curb Detail
(Building face application)



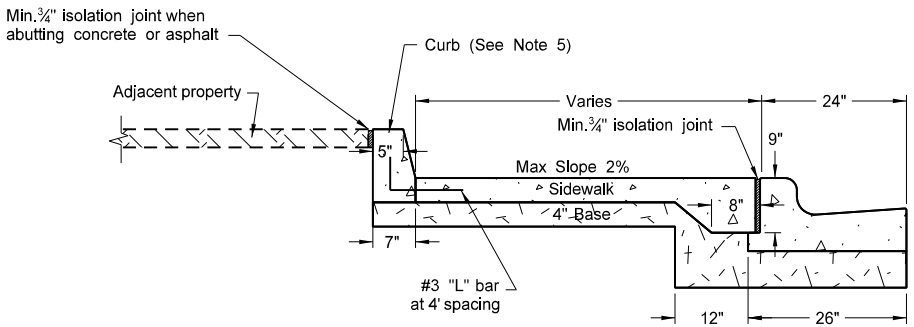
Sidewalk Detail
(Installed adjacent to curb and gutter)



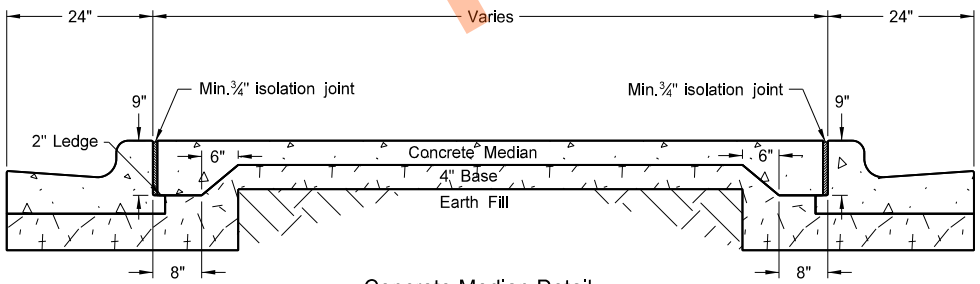
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



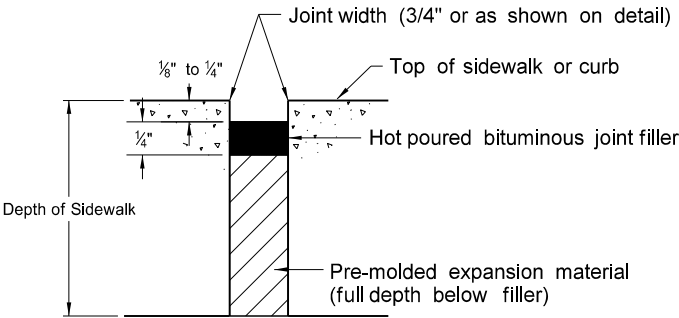
"L" Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



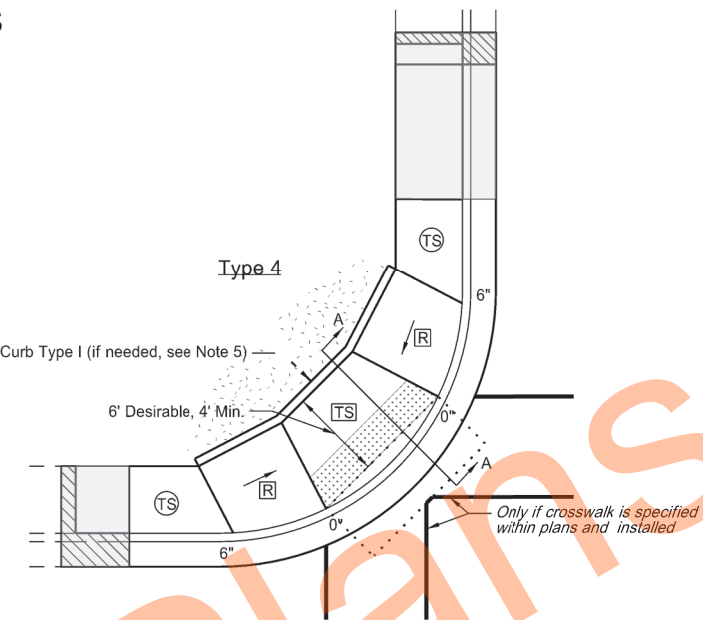
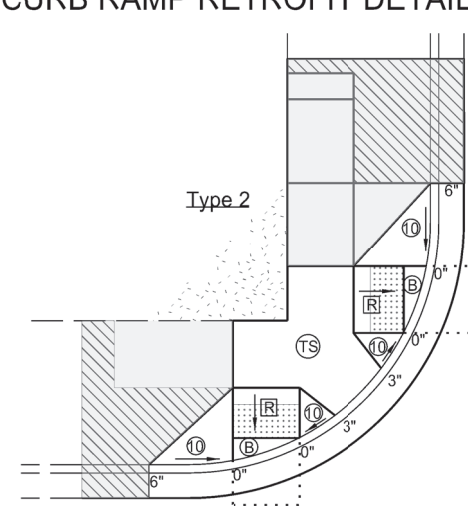
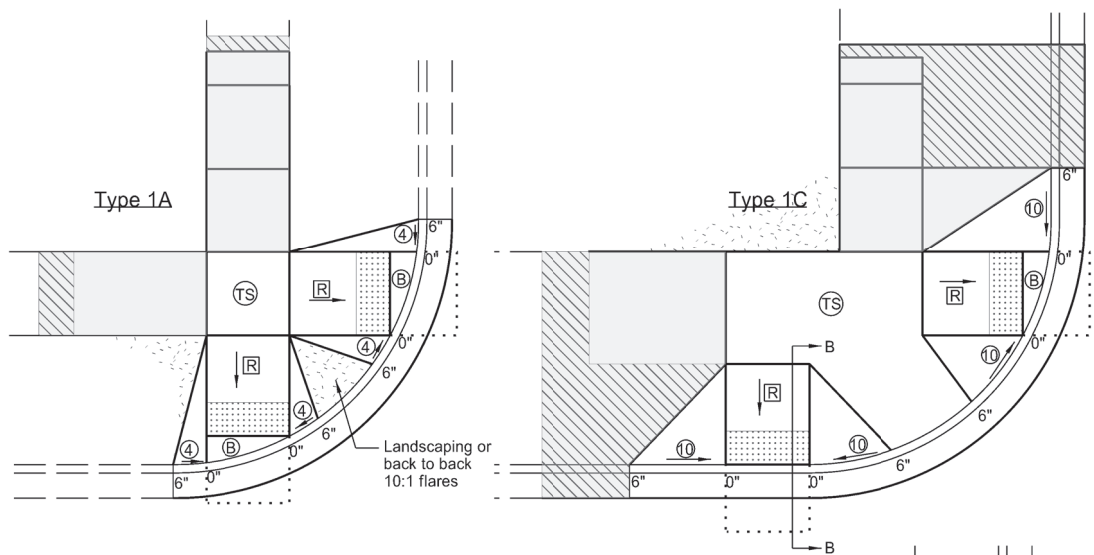
Typical Isolation Joint Seal
(longitudinal and transverse)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width and grade and passing lane requirements.
08-27-19	New Design Engineer PE Stamp.

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

CURB RAMP RETROFIT DETAILS

D-750-3

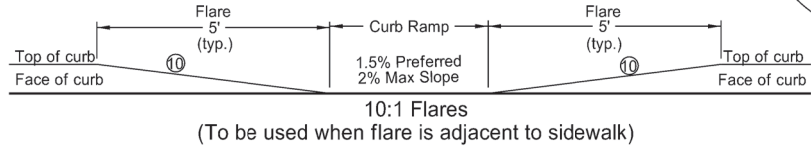
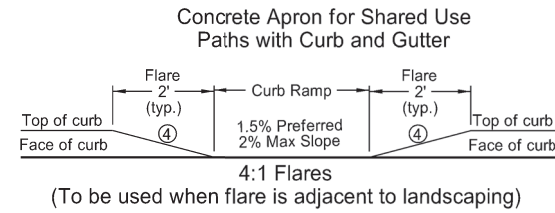
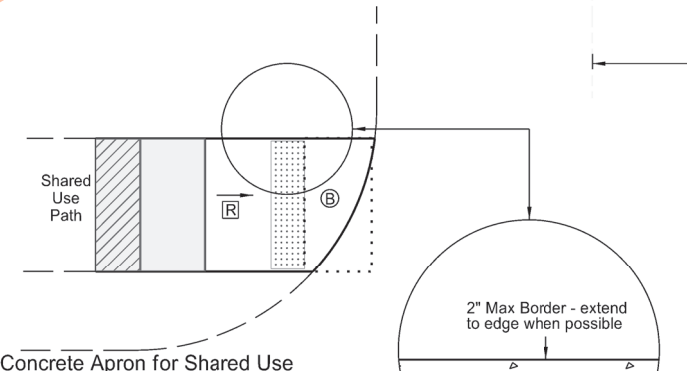
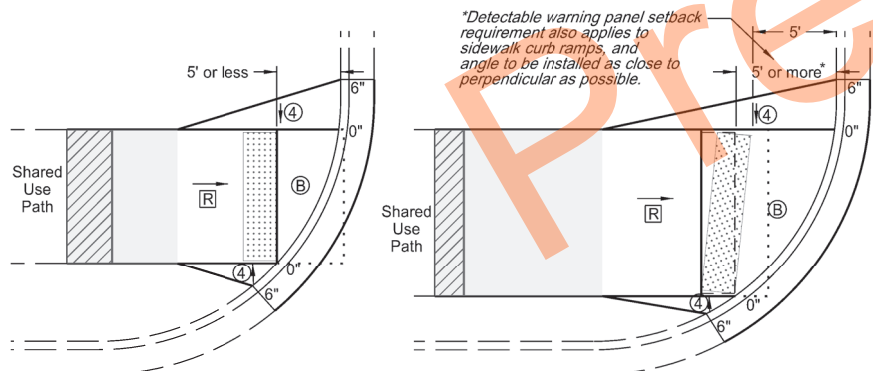
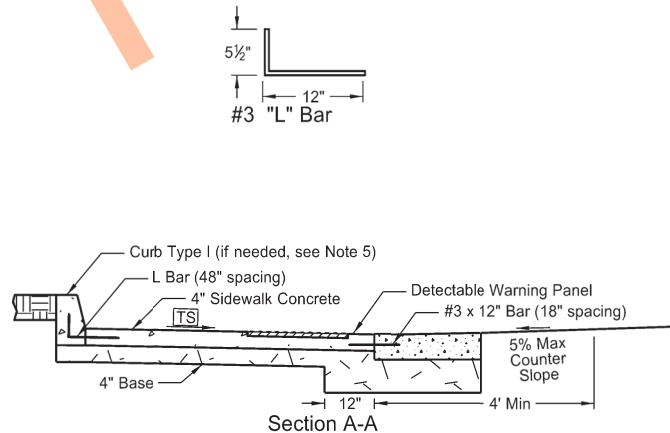
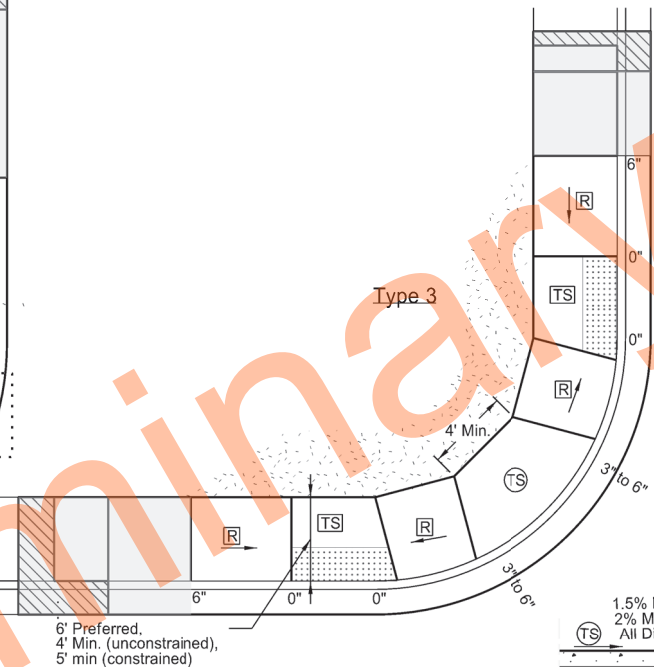
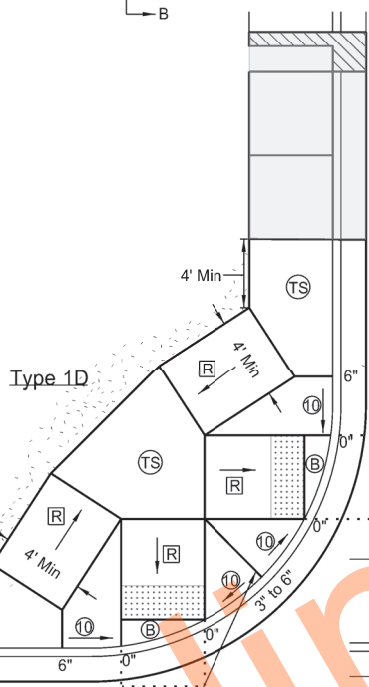
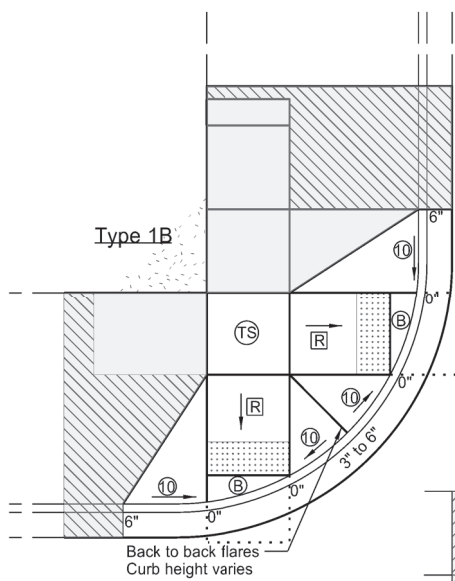


NOTES:

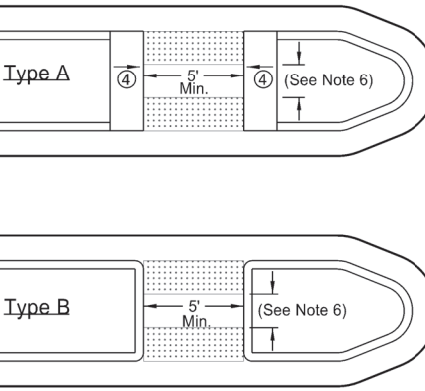
1. Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
2. Provide turning space with desirable 5' x 5' size or larger and minimum 4' x 4' unconstrained size, for any change of direction. Provide landing 5' long x width of path at the bottom and top of parallel ramps and at the top of perpendicular ramps. Turning spaces and Landings may overlap.
3. Match detectable warning panel width to ramp width. Radial panels are allowed. Place detectable warning panel within the lower turning space.
4. Provide a continuous 4' minimum width EPF with 1.5% preferred cross slope and max 2% constructed cross slope.
5. Modify existing ground slope with landscaping, as needed. If not possible, use a vertical curb as detailed on Standard D-750-2. The Engineer will measure curb at the unit price bid for "Curb - Type 1" per lineal foot.
6. Islands: If the profile of the island curb ramp is 2% or less, provide a minimum distance of 2' between warning panels. If the profile of the island curb ramp is steeper than 2%, provide a turning space between the ramps.
7. Provide generally planar vertical alignments. Provide grade breaks, perpendicular to the direction of the pedestrian travel, at the top and bottom of curb ramps (1.5% preferred, 2% max constructed cross slope).
8. See Curb Ramp Retrofit Transition Details Standard D-750-4 for additional information. Also See PROWAG for full compliance in the curb ramp area.
9. Grade transitions shall be flush.

LEGEND:

- Detectable Warning Panel.
- Landscaping.
- Transitional tie-in to nearest joint, if needed.
- Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
- 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running and counter slope 5% maximum running and counter slope
- (TS) : Turning Space Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- (R) : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2%.
- (B) : 1.5% preferred cross slope 2% maximum constructed cross slope running slope consistent with the EPF 4.7% preferred max counter slope 5.0% max constructed counter slope
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.



Median Refuge Islands (Cut-Through)

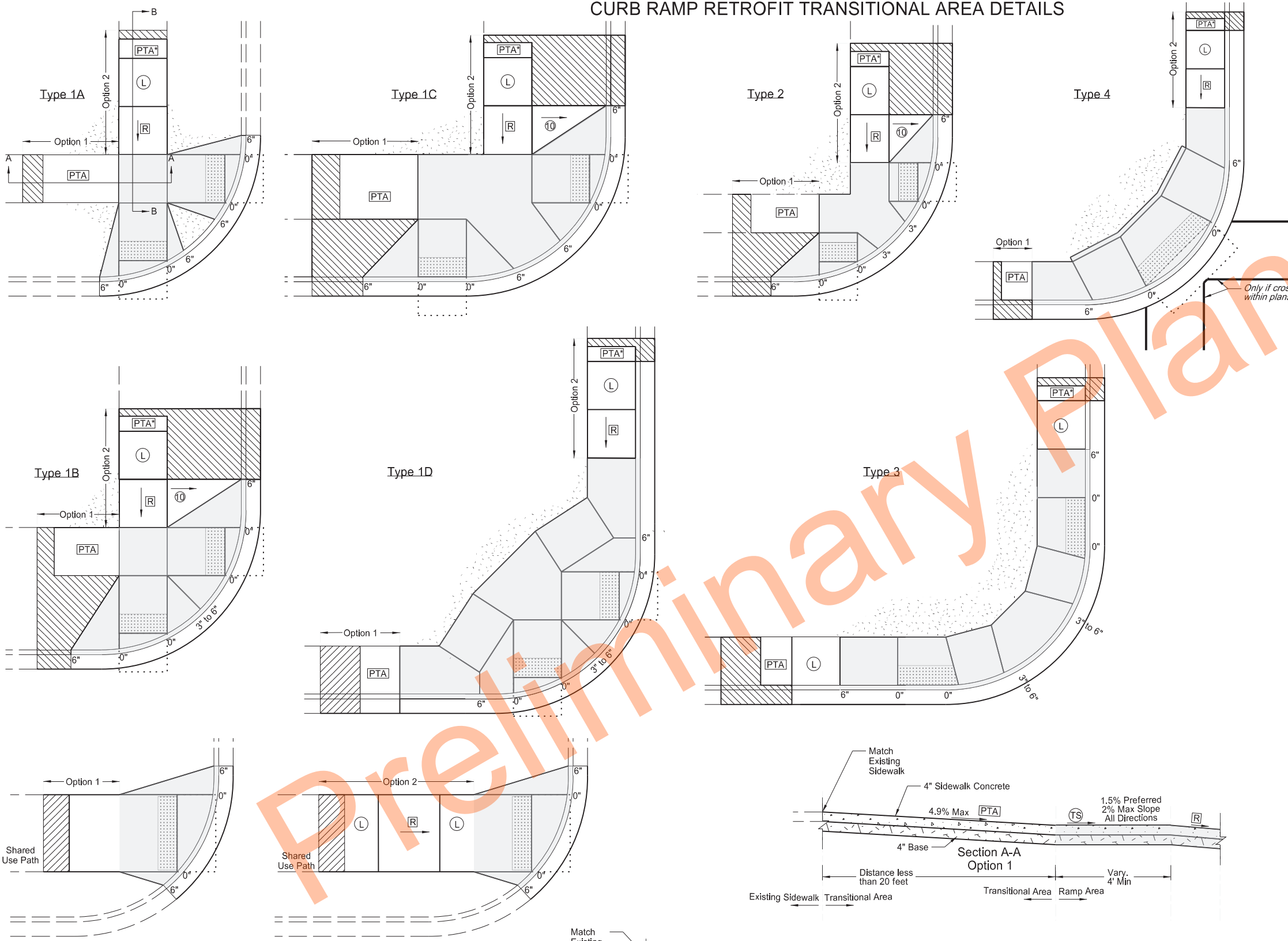


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition Area from Curb Ramp area



CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

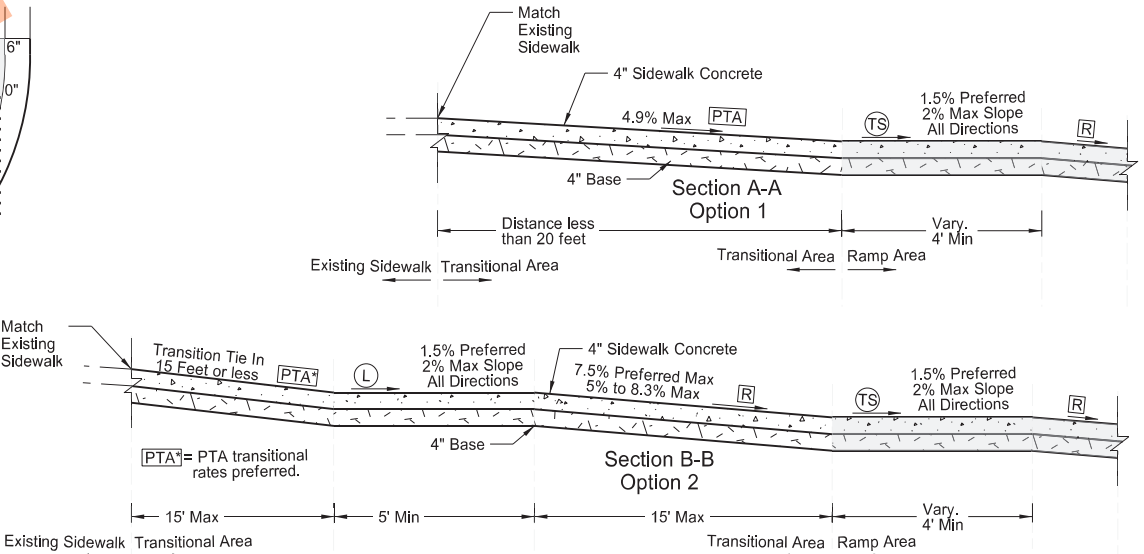
D-750-4



- NOTES:
1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
 2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
 3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.
- Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
 5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.

- LEGEND:
- [Pattern] : Detectable Warning Panel.
 - [Pattern] : Landscaping.
 - [Pattern] : Transitional tie-in to nearest joint, if needed.
 - [Pattern] : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
 - [Pattern] : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running slope 5% maximum running slope
 - [PTA] : Pedestrian Access Transition Area Running Slope less than 4.9%. Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.
 - [L] [TS] : Turning Space/Landing Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
 - [R] : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2% Maximum Length = 15 feet
 - [10] : 10:1 maximum constructed slope.
 - [4] : 4:1 maximum constructed slope.
 - 0", 3", or 6" : Curb Height.

Transition Areas for Shared Use Paths



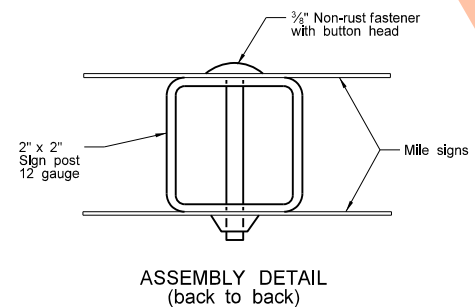
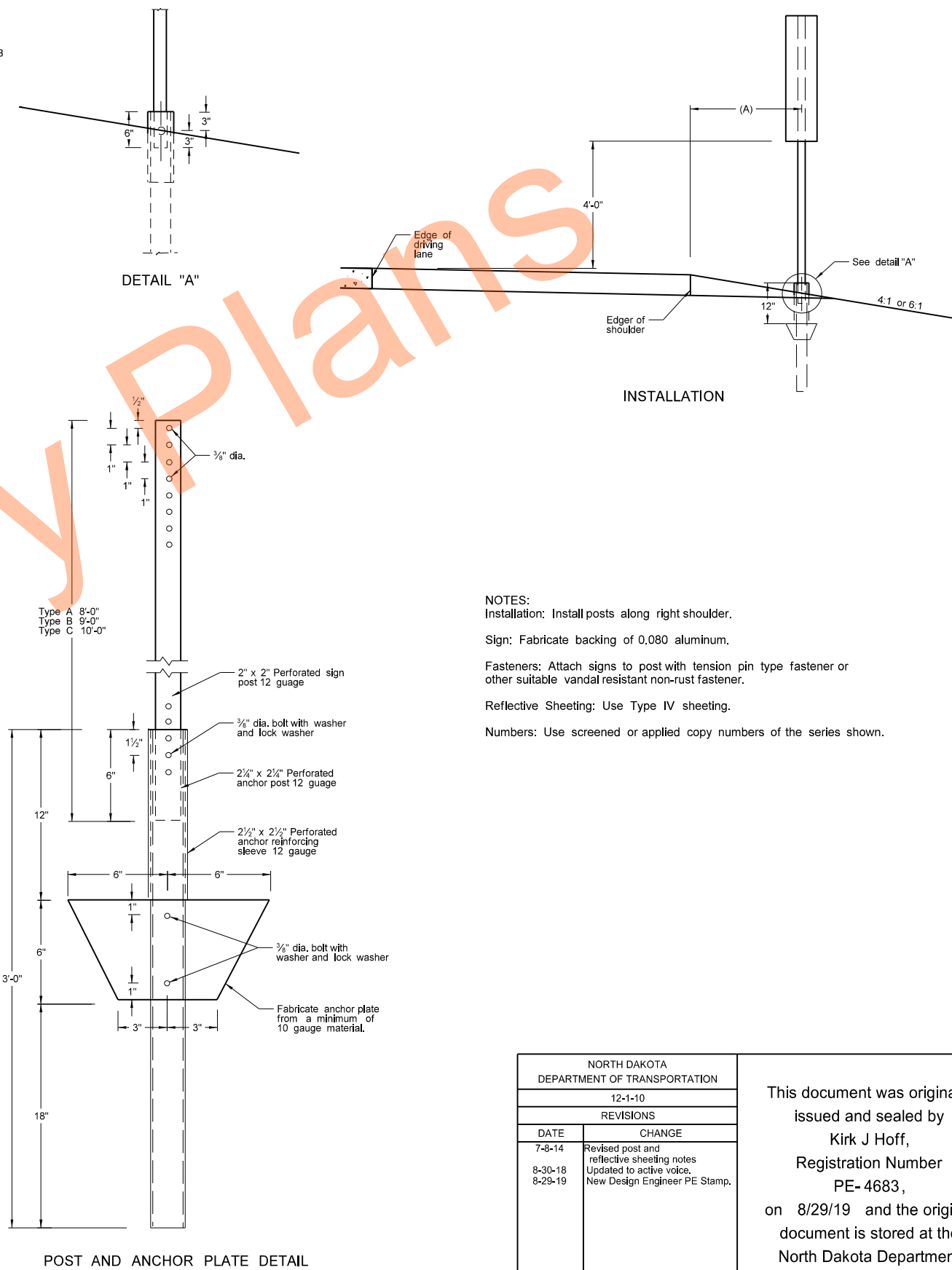
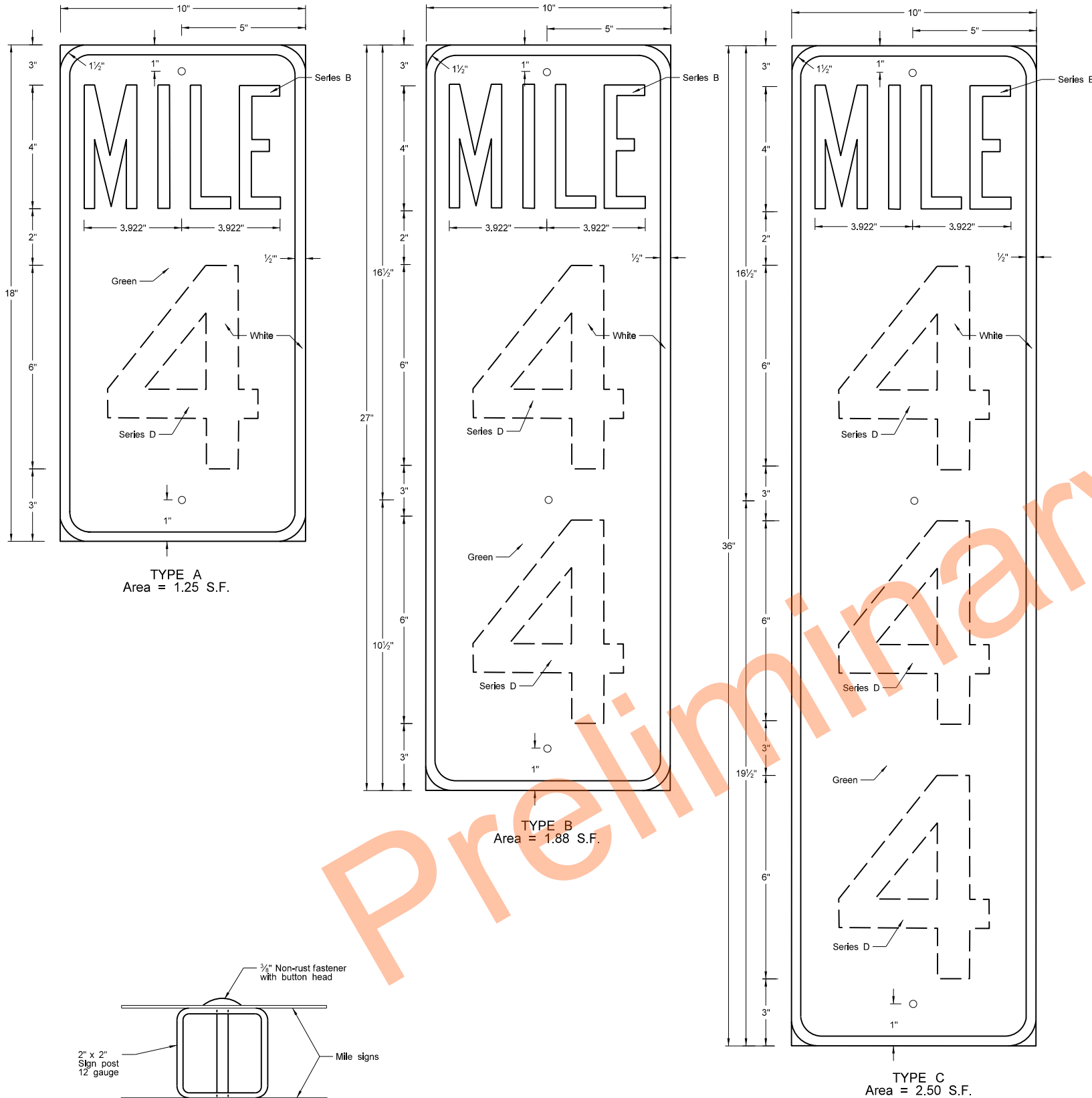
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-19-21	
REVISIONS	
DATE	CHANGE

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
05 19 2021

(CONVENTIONAL USE) REFERENCE MARKERS

D-754-19

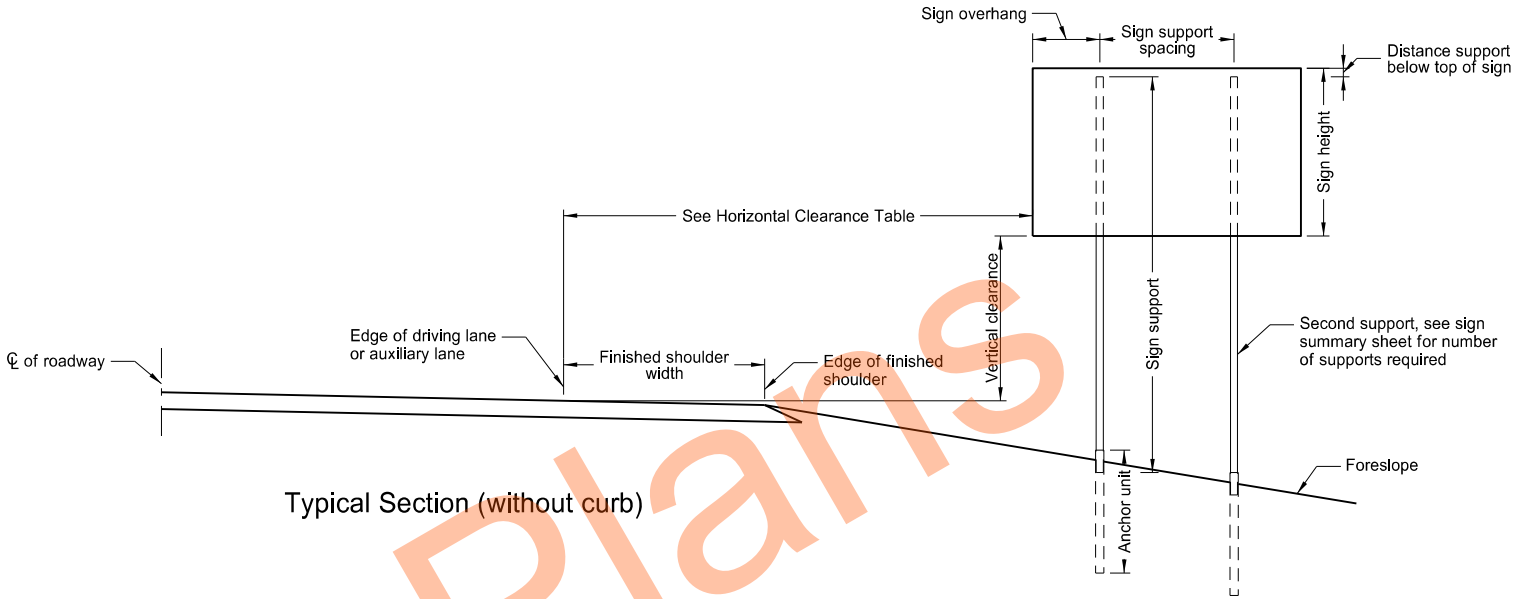
(A) 8' Clearance to finished shoulder or in line with existing delineator posts.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation
12-1-10		
REVISIONS		
DATE	CHANGE	
7-8-14	Revised post and reflective sheeting notes	
8-30-18	Updated to active voice.	
8-29-19	New Design Engineer PE Stamp.	

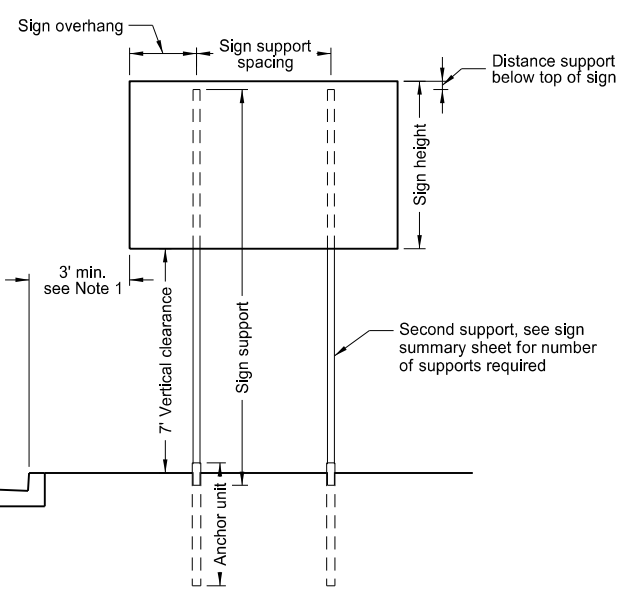
Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.
- Install signs on expressways a minimum height of 7'.
- Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.
- Maximum vertical clearance is 6" greater than the minimum vertical clearance.
3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.

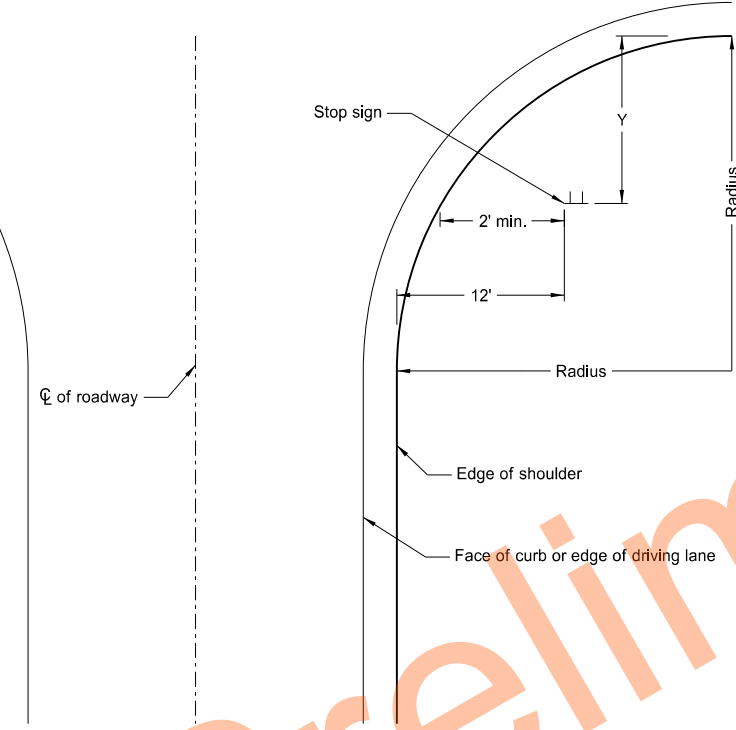


Typical Section (without curb)

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	

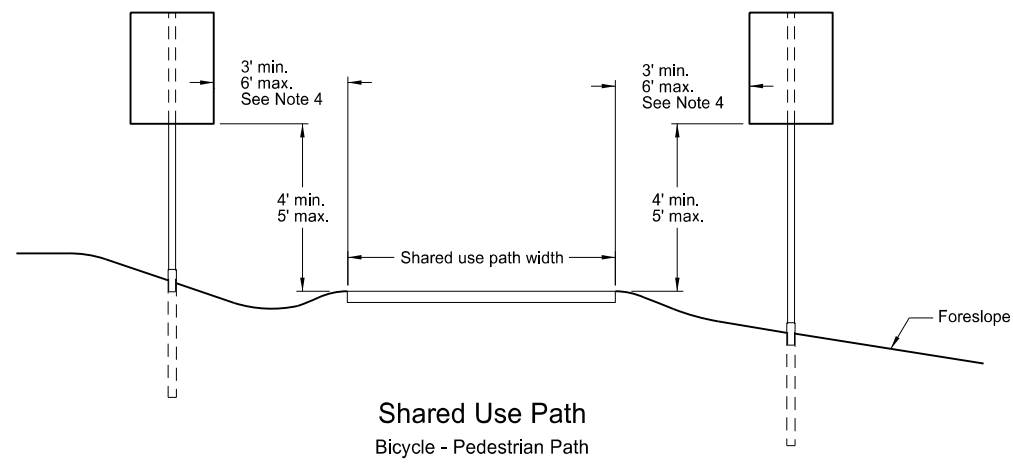


Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection
Use layout 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



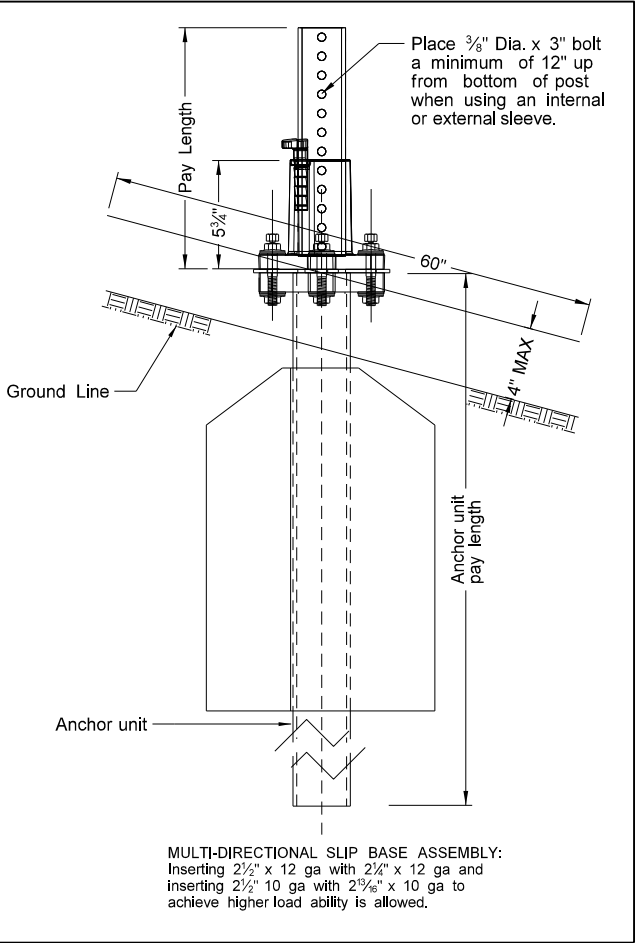
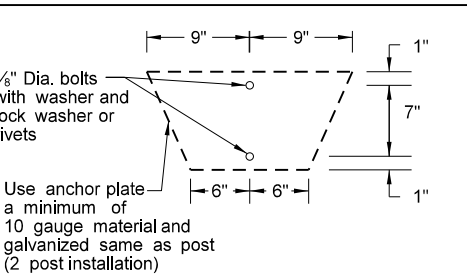
Shared Use Path
Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.

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Kirk J Hoff,
Registration Number
PE- 4683,
on **8/29/19** and the original document is stored at the North Dakota Department of Transportation

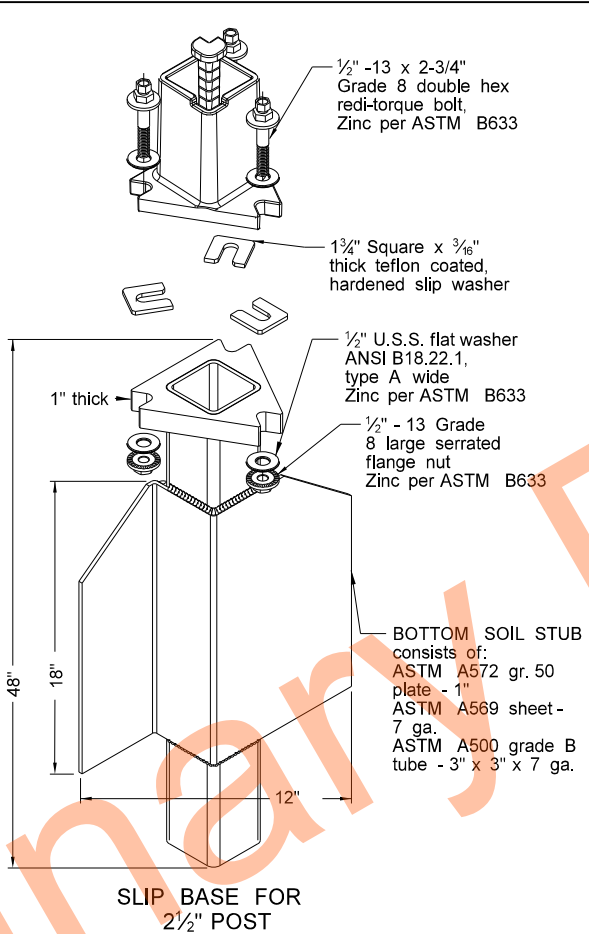
Telescoping Perforated Tube							
Number of Posts	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2 1/2	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2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

(B) - Provide a shim as specified by the manufacturer when placing 2 1/2", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will 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.

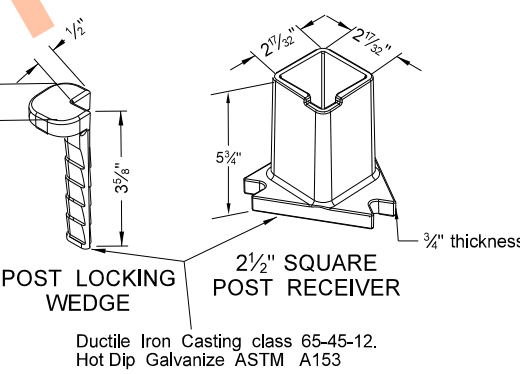


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2 1/2" x 12 ga with 2 1/4" x 12 ga and inserting 2 1/2" 10 ga with 2 3/8" x 10 ga to achieve higher load ability is allowed.

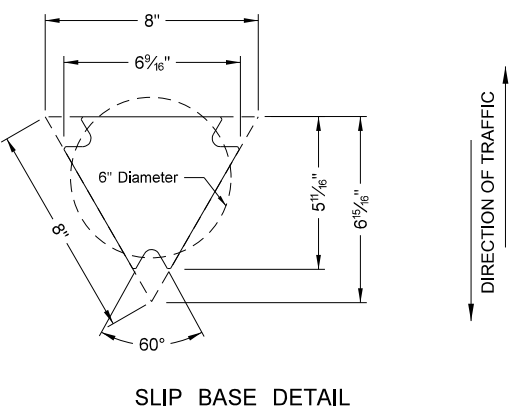
Mounting Details Perforated Tube



SLIP BASE FOR 2 1/2" POST



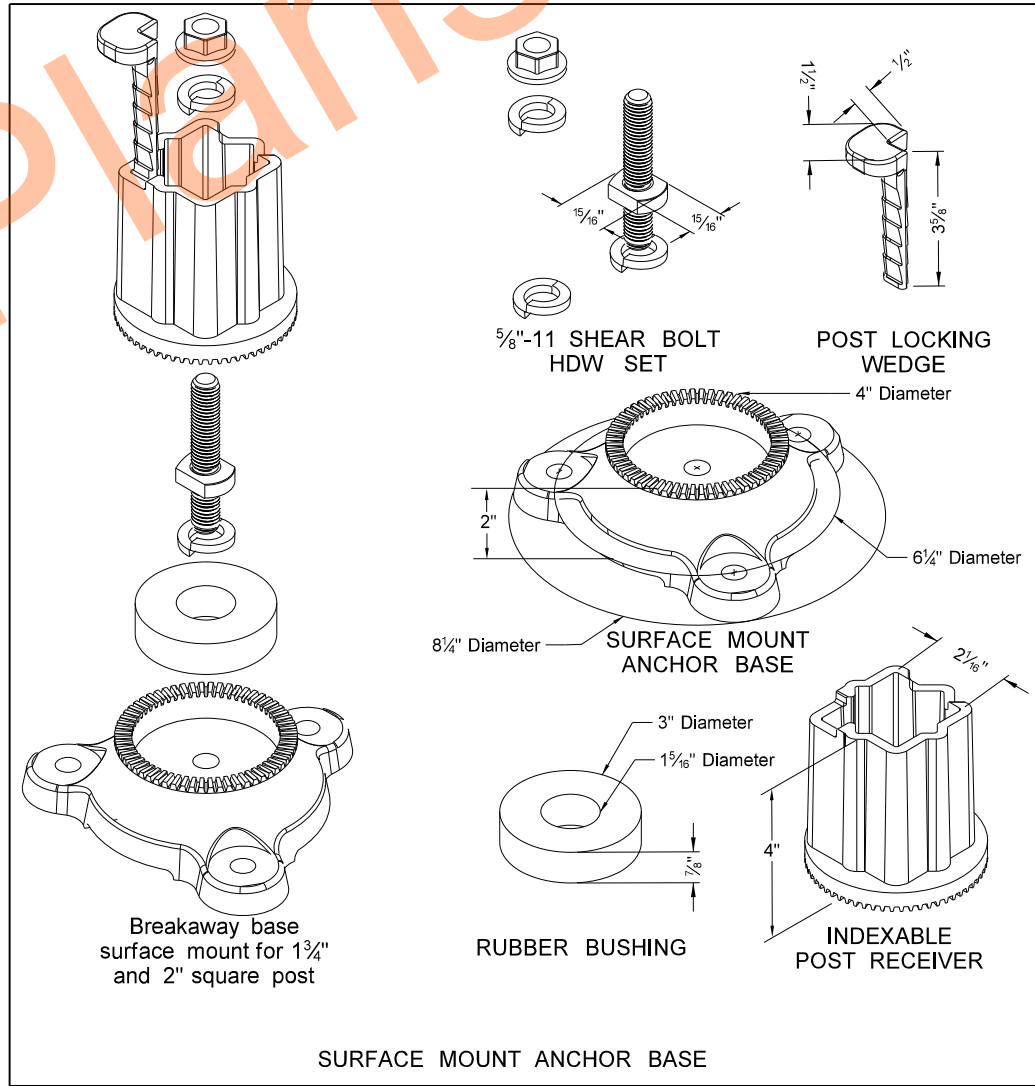
Ductile Iron Casting class 65-45-12.
Hot Dip Galvanize ASTM A153



SLIP BASE DETAIL

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 is above and below post location and also back and ahead of post.
- Provide 7 gauge HRPO commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- Eliminate wings when anchor is used in concrete sidewalk.
- Provide a minimum 8" distance between the first and fourth post on four post signs.
- Install in accordance with manufacturers recommendation.
- Use a minimum 1/2" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.

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Registration Number
PE- 4683
on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

Breakaway Coupler System
for Perforated Tubes

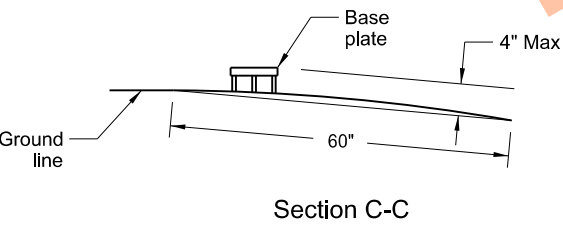
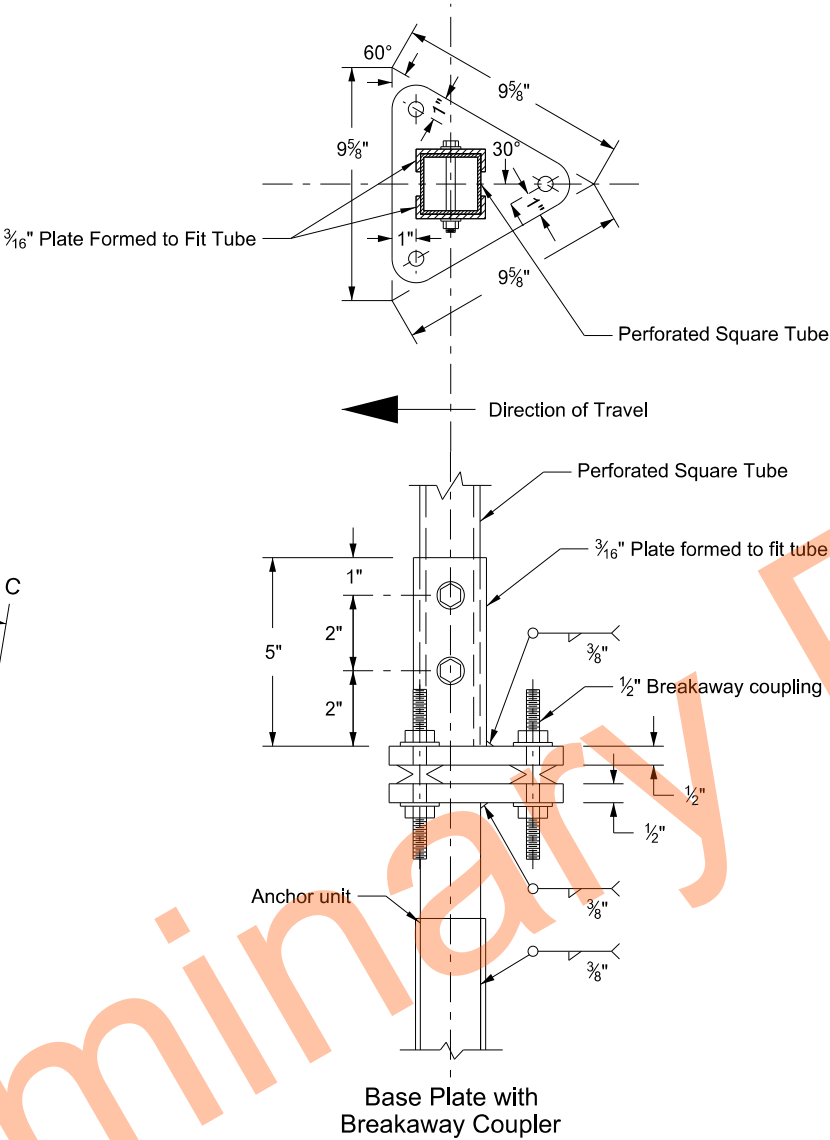
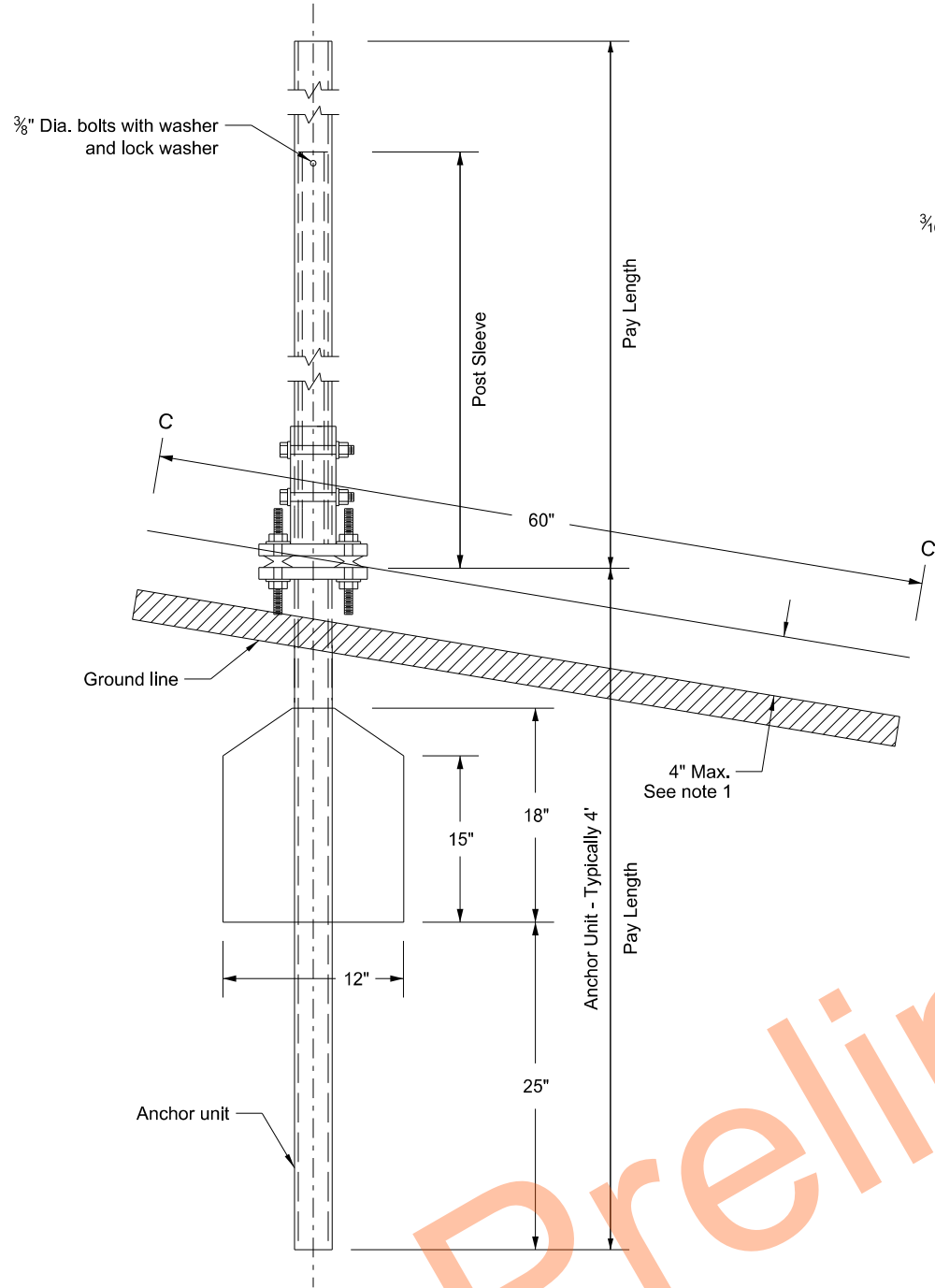
Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

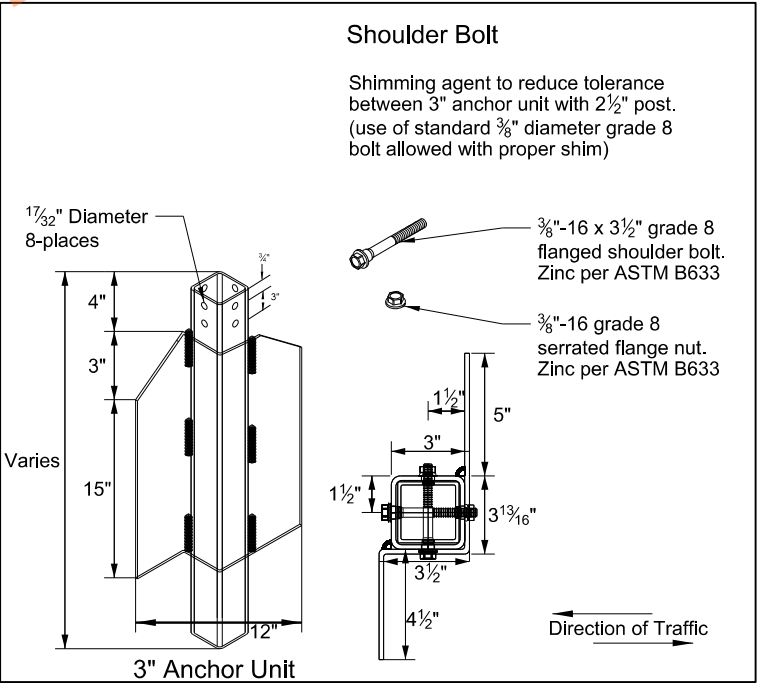
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2¾	10	Yes		7

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit



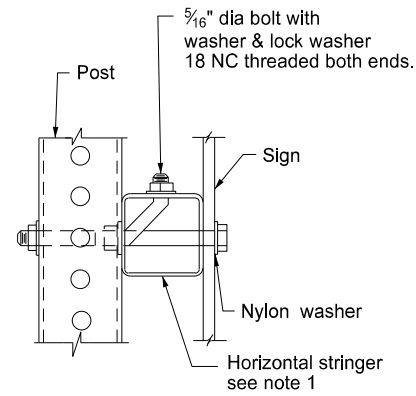
Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



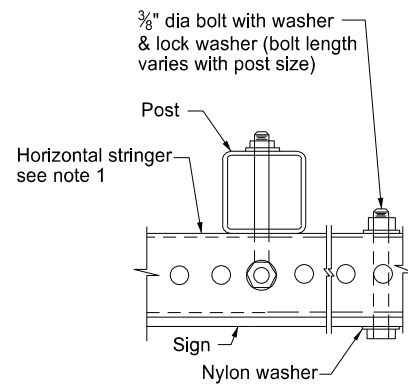
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19	Updated notes to active voice. New Design Engr PE Stamp.

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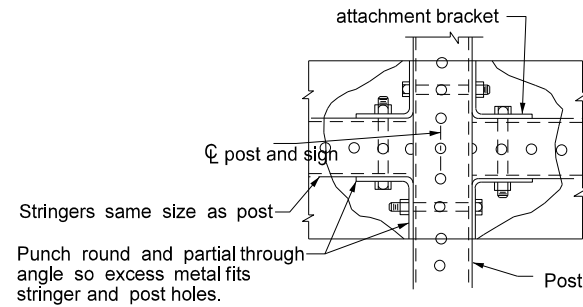
Mounting Details Perforated Tube



Side View



Top View

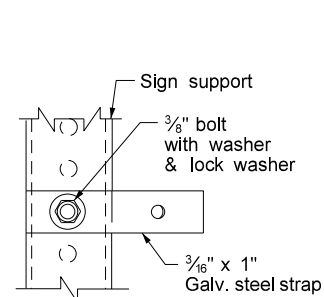


STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

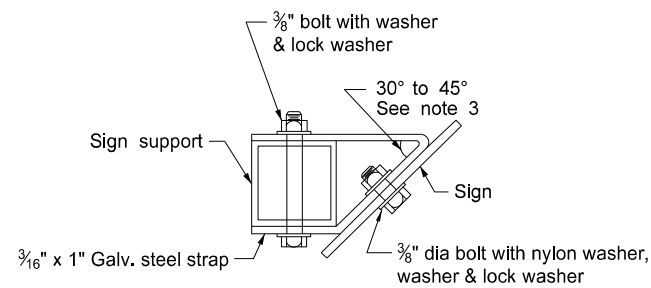
Note:

1. Horizontal stringers - Use perforated tubes or $1\frac{3}{4}" \times \frac{3}{16}"$ thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter $\frac{15}{16}" \pm \frac{1}{16}"$ and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST)

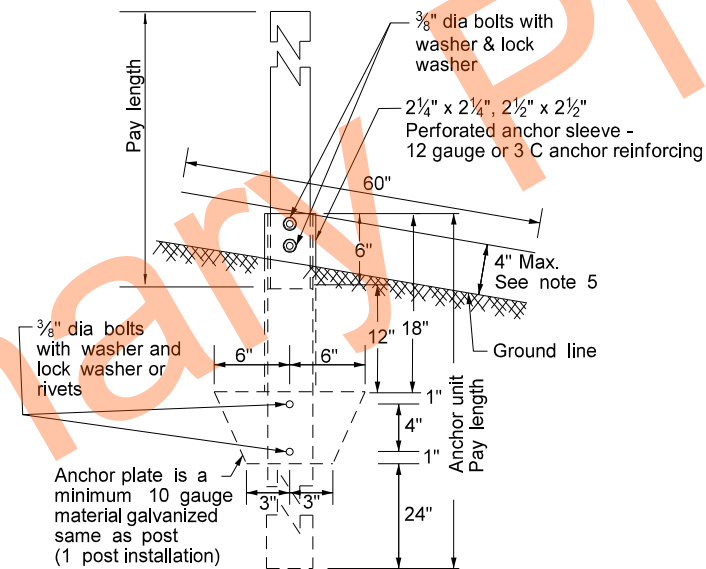


Side View

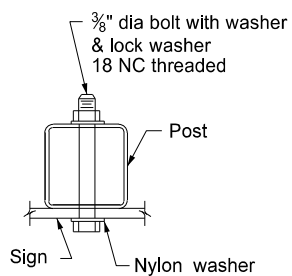


Top View

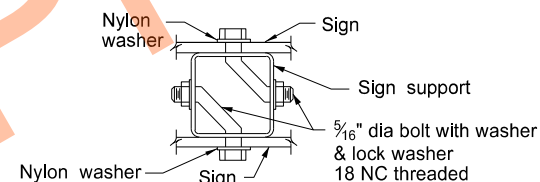
STRAP DETAIL



ANCHOR UNIT AND POST ASSEMBLY

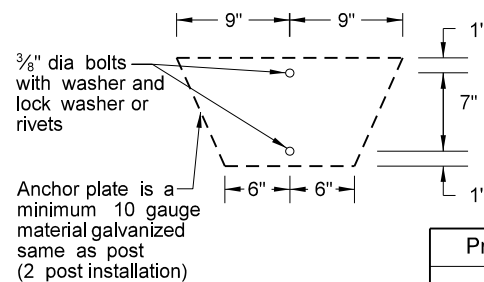


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



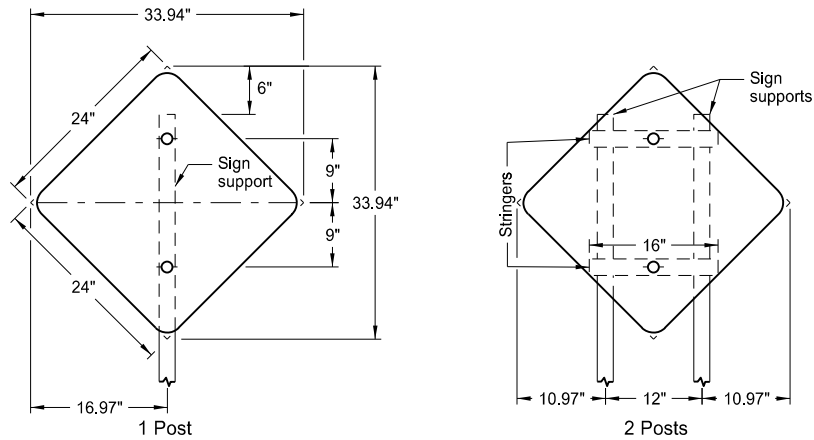
Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. area In. ²	Section Modulus In. ³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2¾ ₁₆ x 2¾ ₁₆	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.066	0.979	1.010	0.783

The 2 $\frac{3}{16}$ " size 10 gauge is shown as 2.19" size on the plans.
The 2 $\frac{1}{2}$ " size is shown as 2.51" size on the plans.

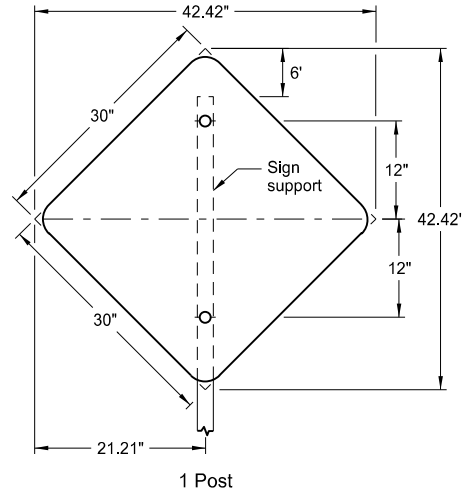
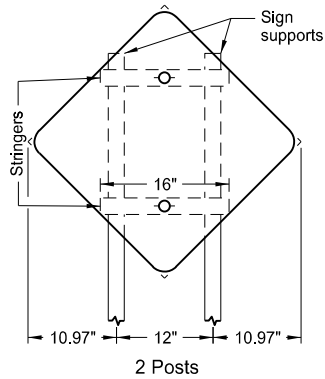
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

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 Registration Number
 PE- 4683 ,
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 of Transportation

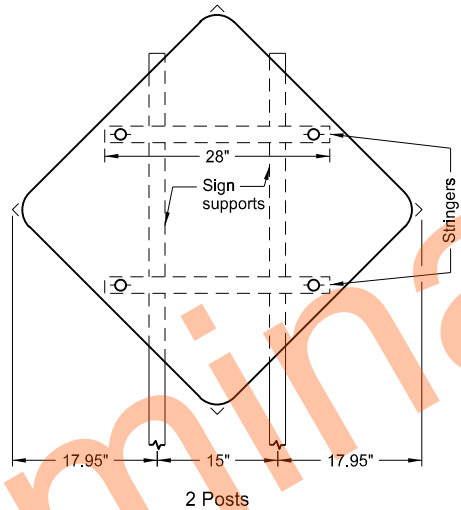
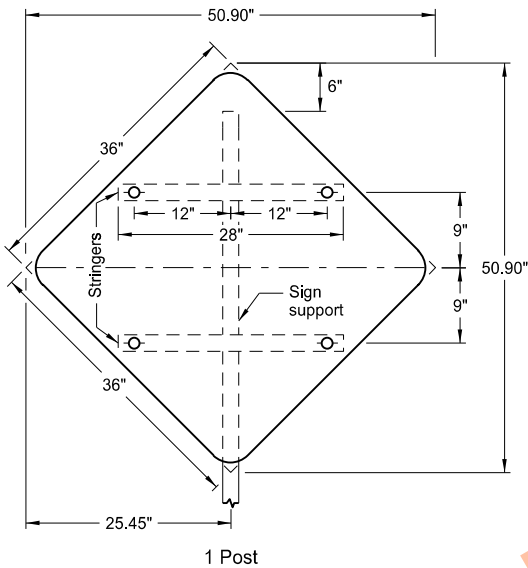
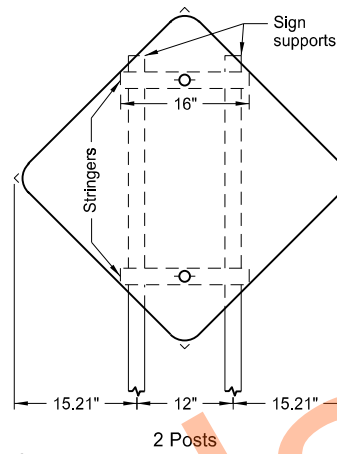
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



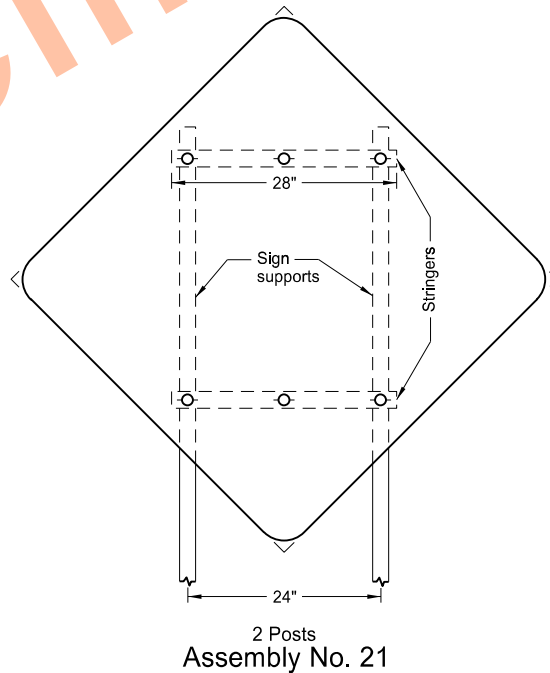
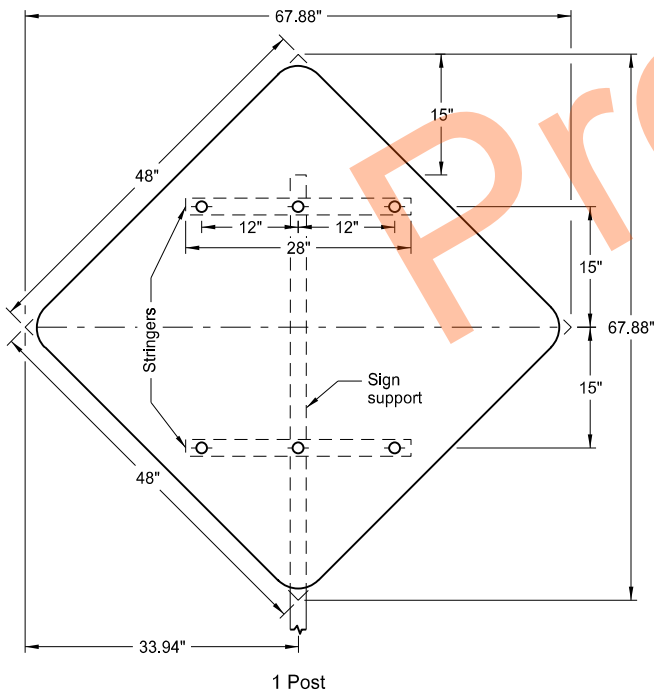
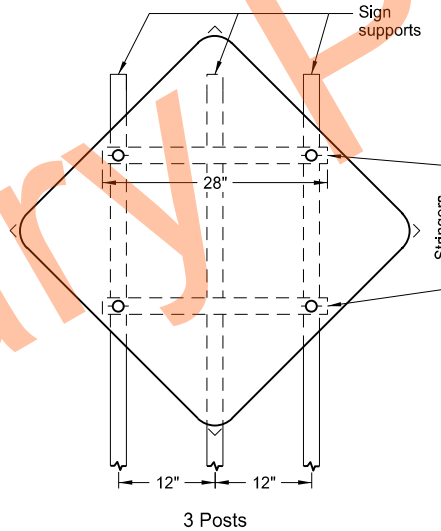
Assembly No. 18



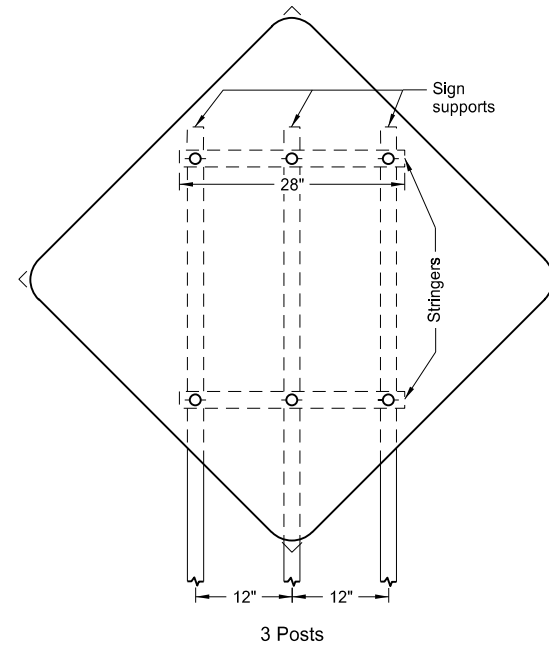
Assembly No. 19



Assembly No. 20



Assembly No. 21

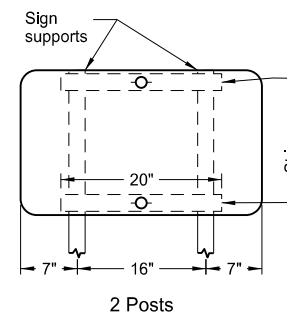
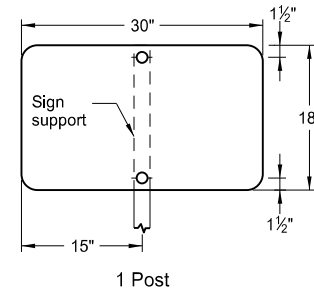
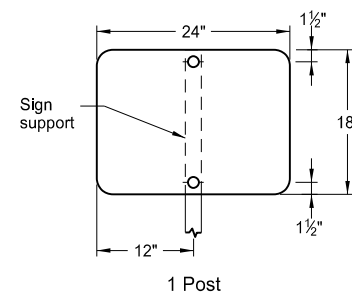
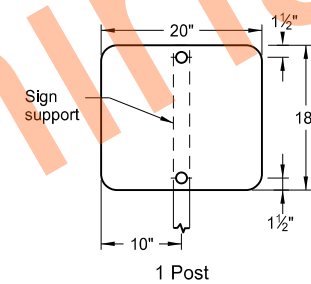
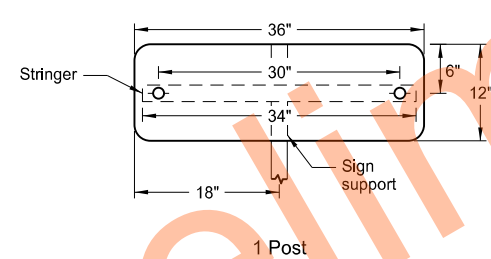
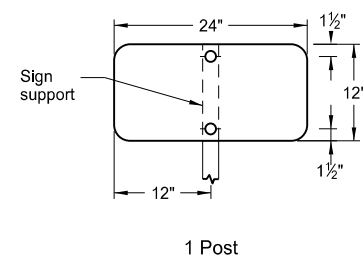
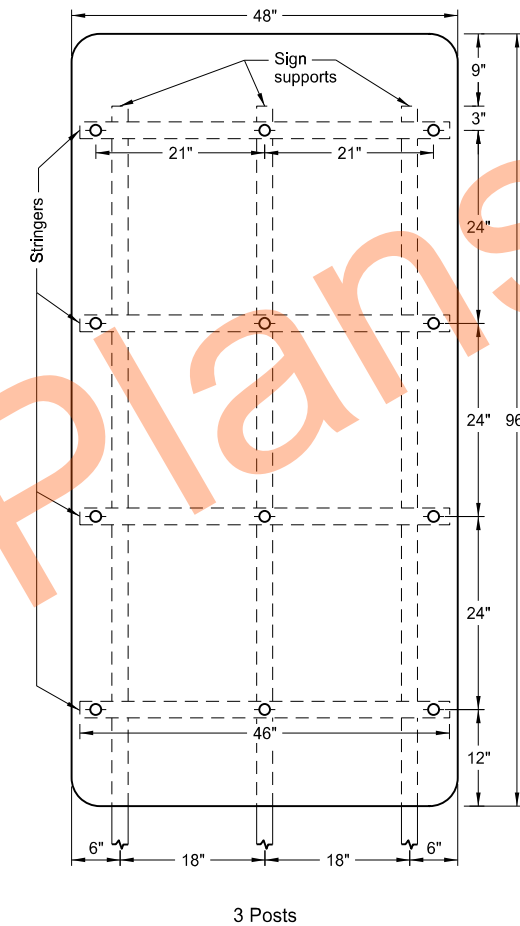
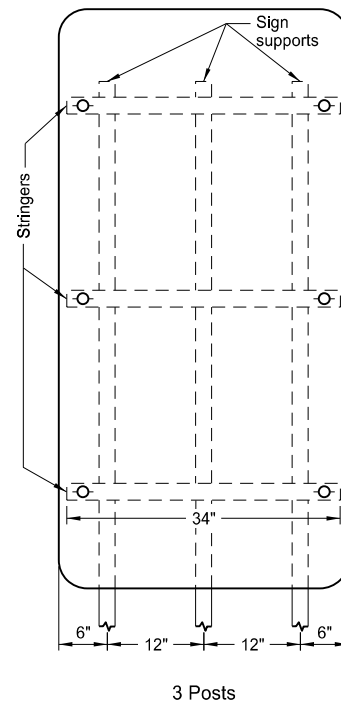
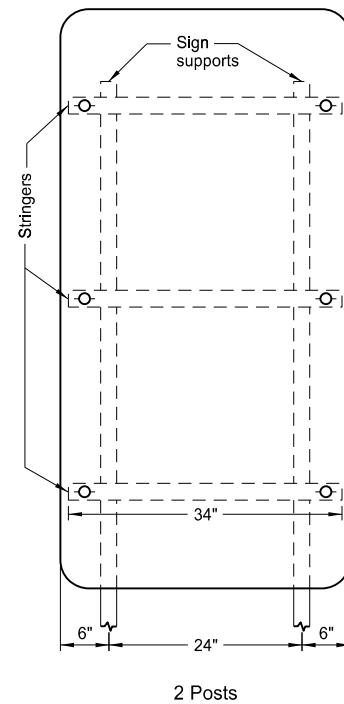
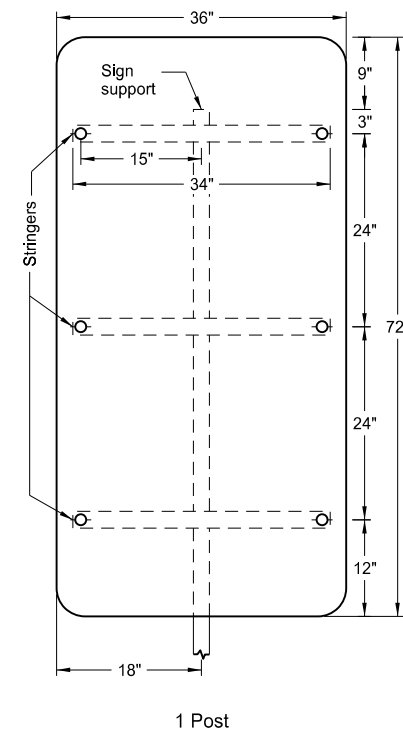


- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

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Kirk J Hoff,
Registration Number
PE- 4683,
on 8/30/19 and the original document is stored at the
North Dakota Department
of Transportation

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



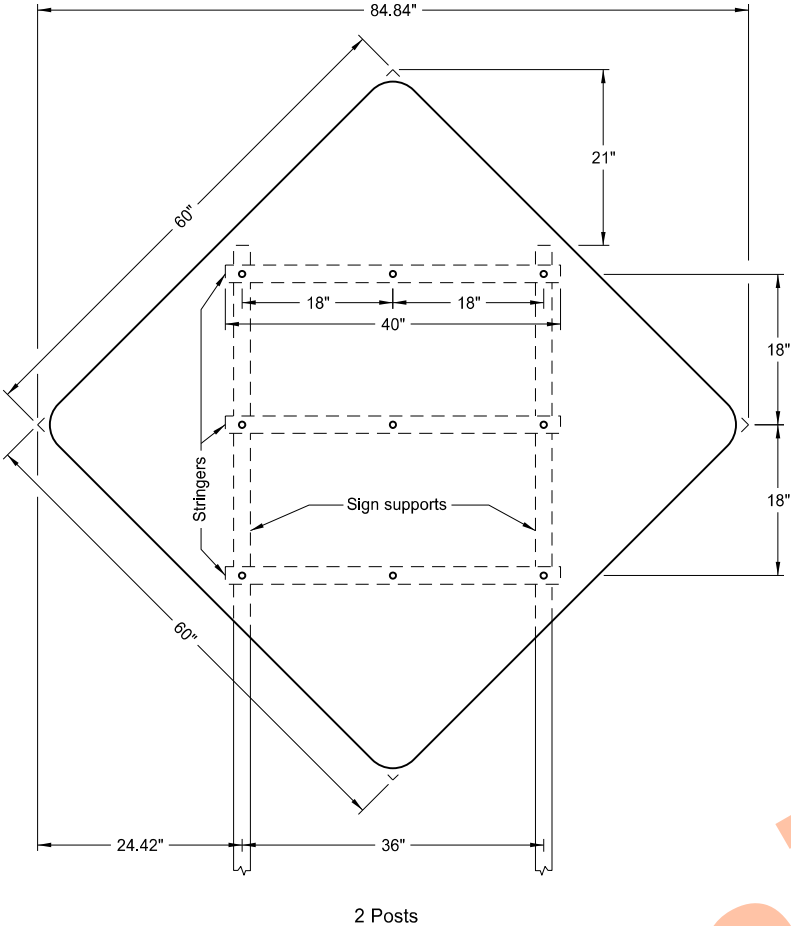
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19	Updated notes to active voice, New Design Engineer PE Stamp.

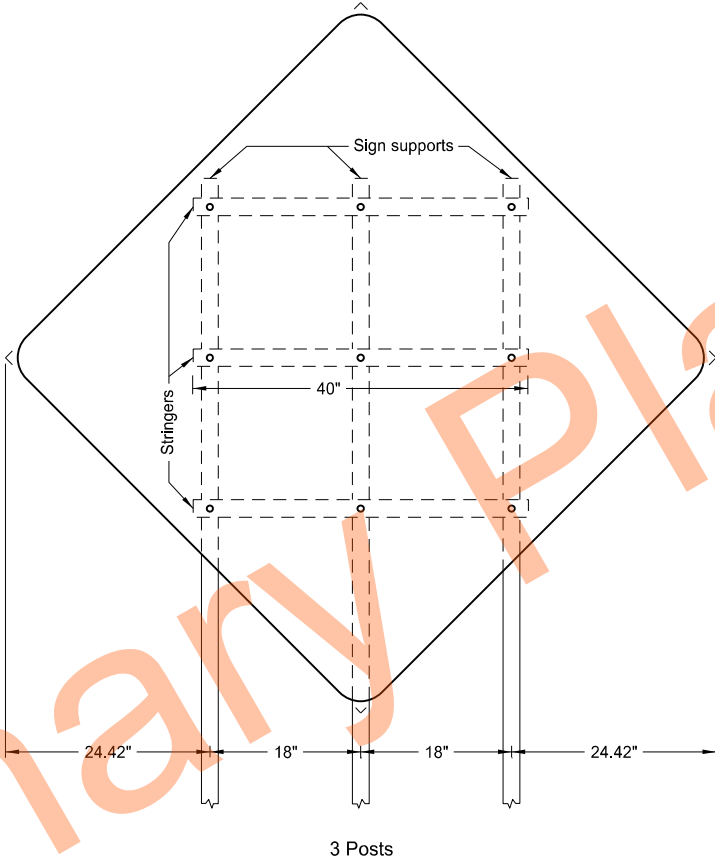
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING AND GUIDE SIGNS

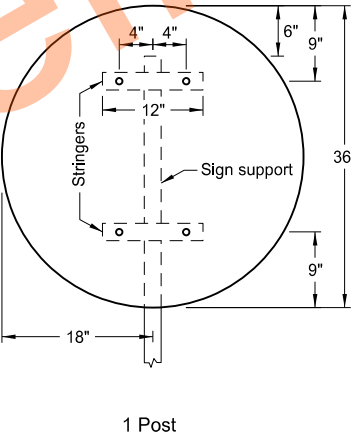
D-754-40



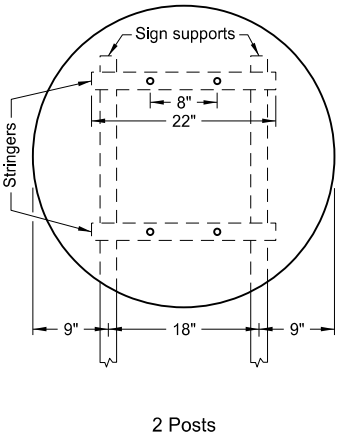
ASSEMBLY NO. 62



3 Posts



1 Post



2 Posts

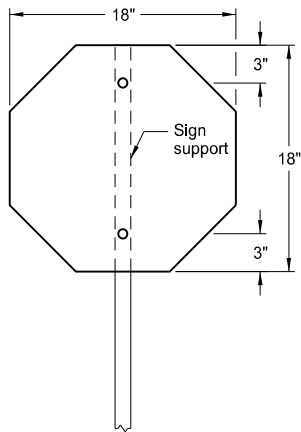
ASSEMBLY NO. 63

- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½"x1½" perforated square tube stringers.
 3. Punch holes round for ⅜" bolt.

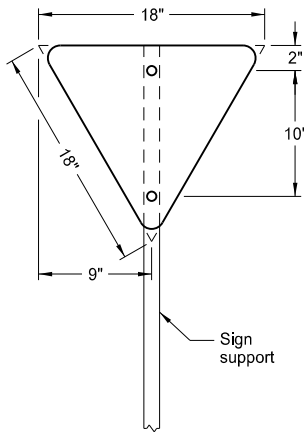
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 8/30/19 and the original document is stored at the
North Dakota Department
of Transportation

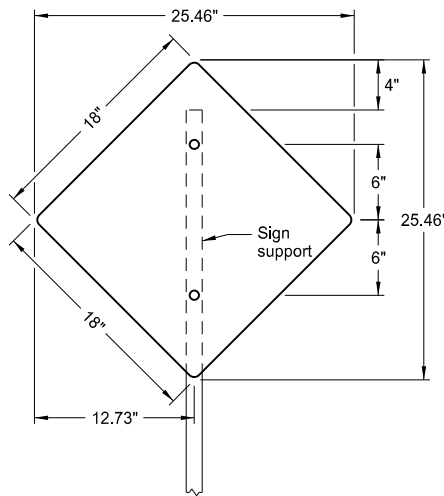
PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS
FOR REGULATORY, WARNING AND GUIDE BIKE ROUTE SIGNS



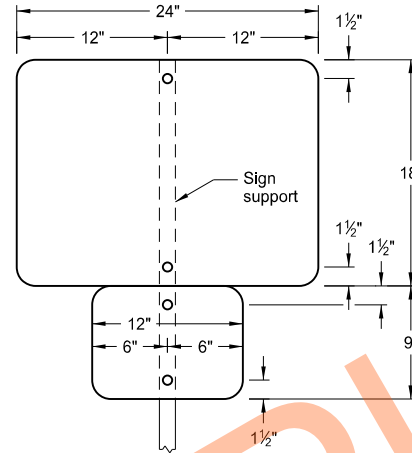
1 Post
Assembly No. 100



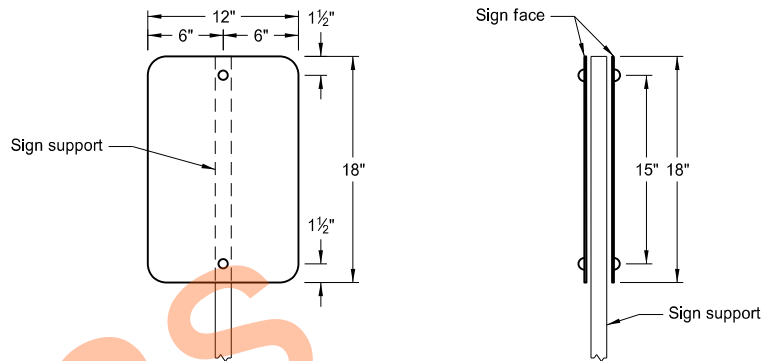
1 Post
Assembly No. 101



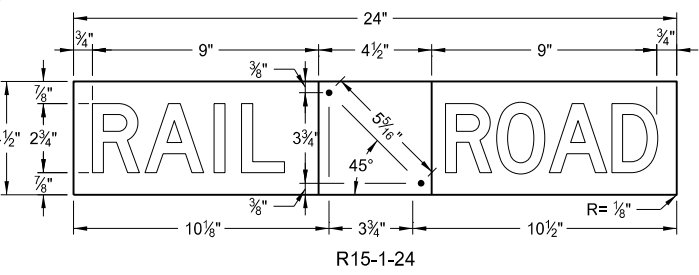
1 Post
Assembly No. 102



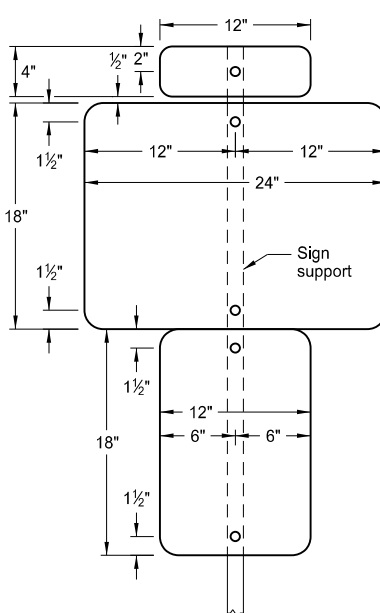
1 Post
Assembly No. 103



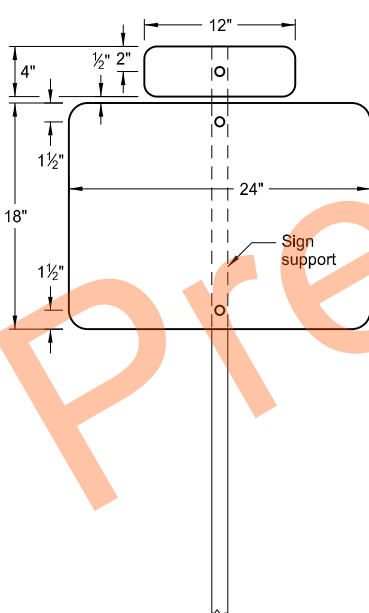
1 Post
back to back
Assembly No. 104



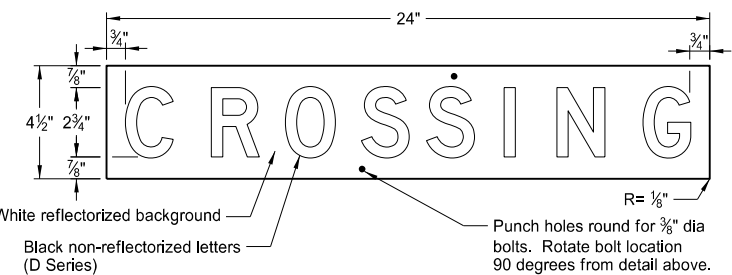
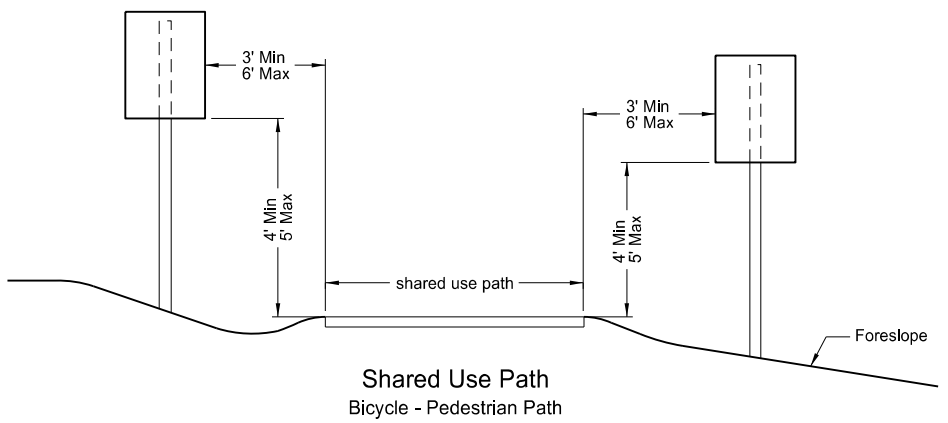
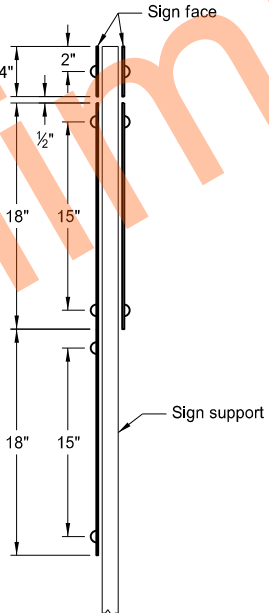
1 Post
back to back
Assembly No. 105



1 Post
Assembly No. 106



1 Post
Assembly No. 107



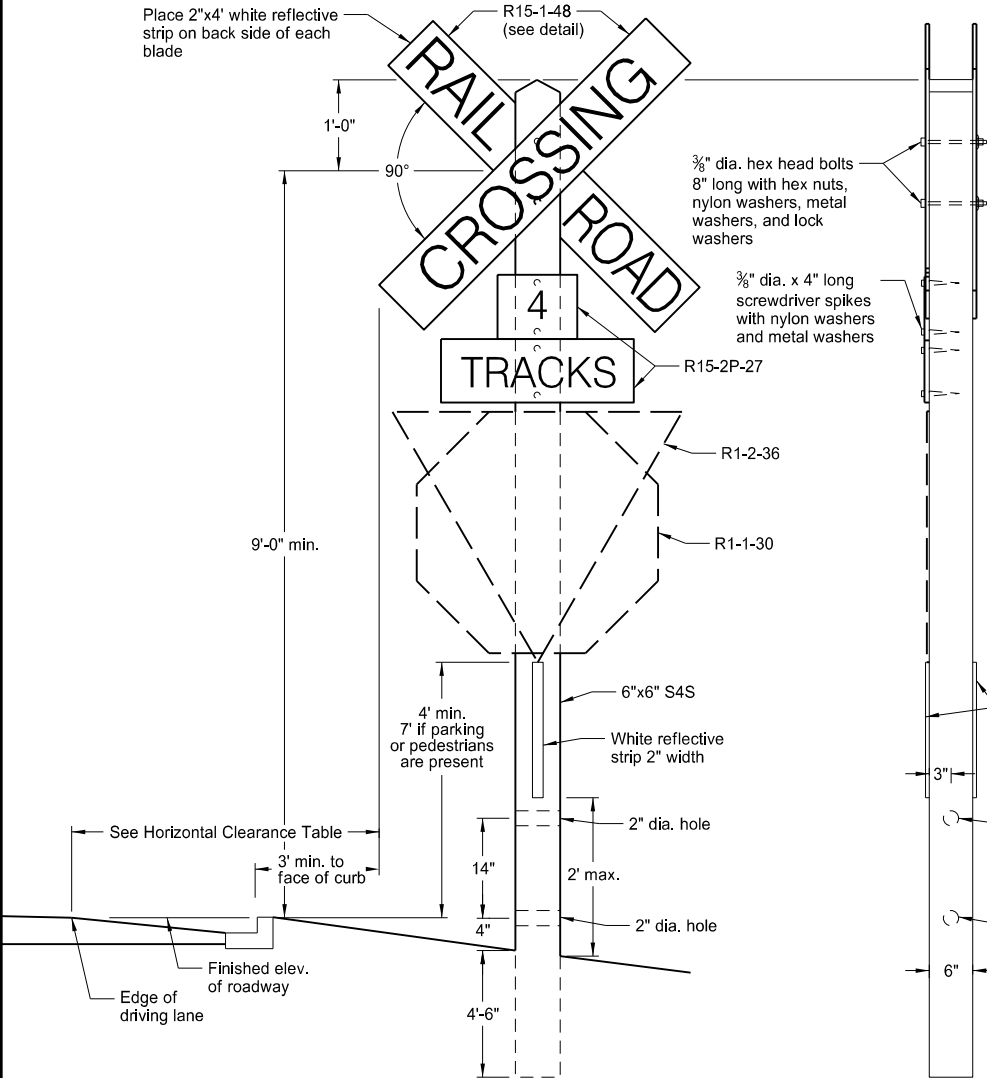
Railroad Crossing Sign Details

- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Punch holes round for 3/8" bolt.

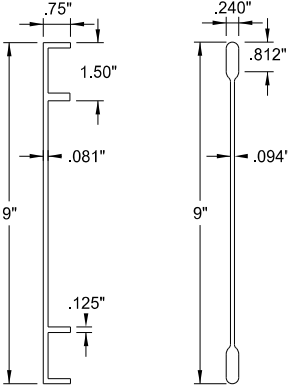
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
9-18-15	Revised Title Name.
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

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Registration Number
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RAILROAD CROSSING SIGNS FOR PASSIVE GRADE CROSSINGS

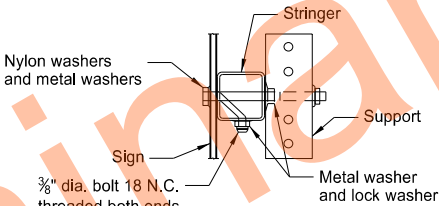


Crossing Sign Assembly

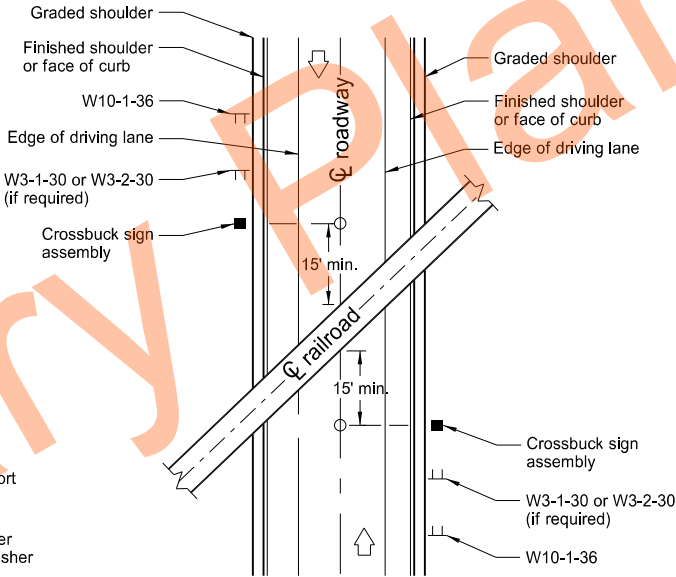


Cross Sign Details

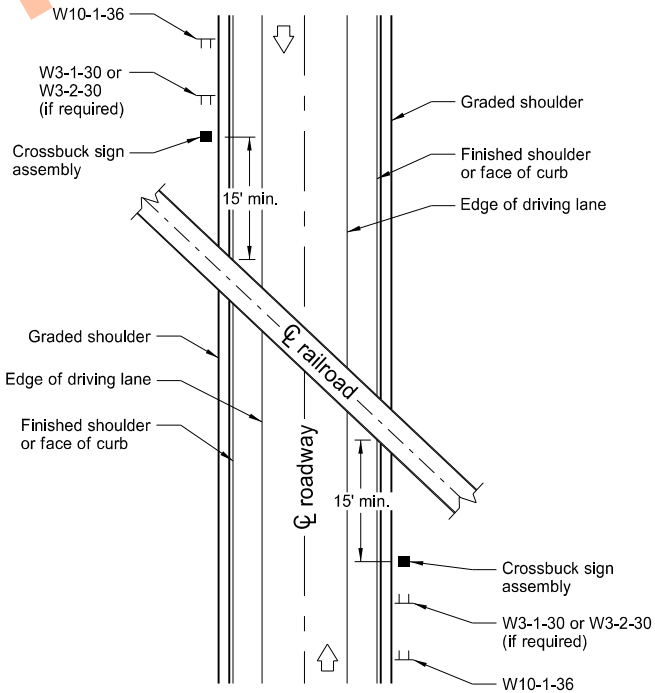
Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



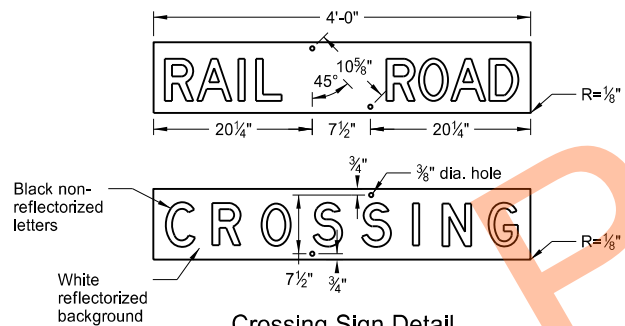
Section A-A



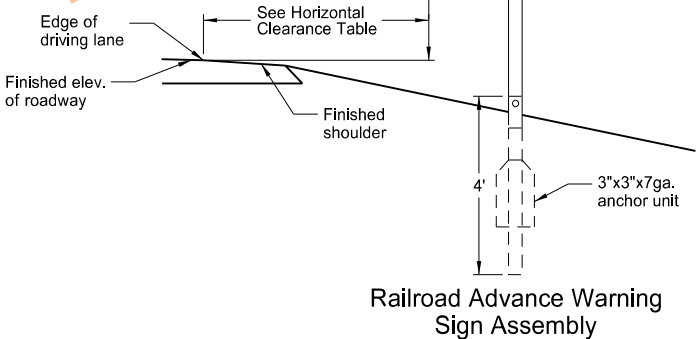
Layout for Obtuse Angle Intersection



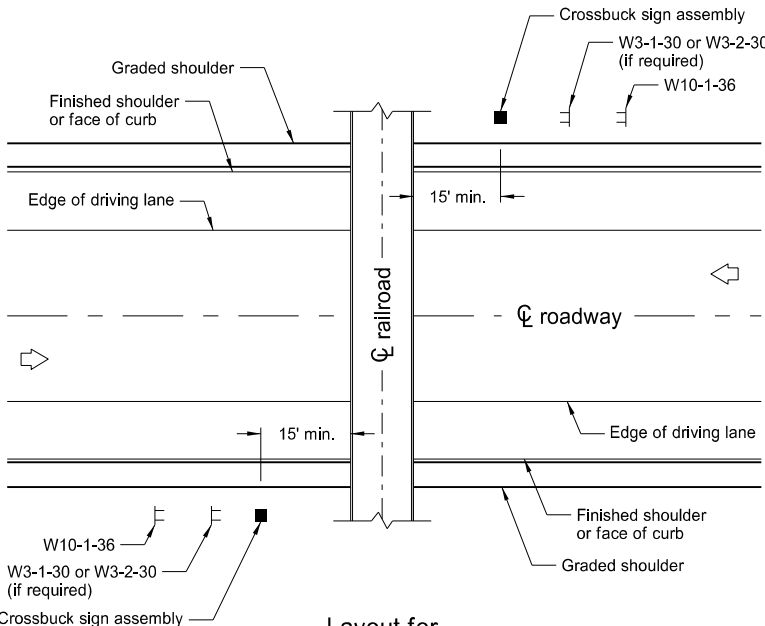
Layout for Acute Angle Intersection



Crossing Sign Detail R15-1-48



Railroad Advance Warning Sign Assembly



Layout for Right Angle Intersection

Notes:

See MUTCD for placement of Grade Crossing Warning Signs.

When distance between tracks exceeds 100', consider additional sign assemblies to inform the public.

Use metal washers and nylon washers with a minimum outside diameter of 1 5/16" ± 1/16" and 10 gauge thickness on the sign face.

Where there are two or more tracks, use track number signs (R15-2P-27) to display the number of tracks being crossed.

Use No. 1 white pine, fir, spruce, western hemlock, cedar, or western larch sign supports. Use sign supports free of heart centers, and in compliance with the Standard Grading Rules of the American Lumber Standards. Treat post in conformance with Section 846 of the Standard Specifications. Use wood post surfaced on all four sides (S4S).

Use sign material meeting ASTM D-4956 Type XI. On the crossing and track number sign, screen the message or apply non-reflective plastic film letters.

When extruded aluminum sign backing is used and the stiffener ribs are 1 1/2" from the edge, space the holes at 5 5/16" from the center of the signs.

Rotate bolt location 90° as shown in the Crossing Sign Detail.

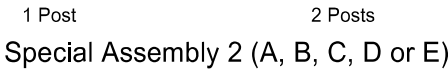
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-10-13	
REVISIONS	
DATE	CHANGE
11-4-13 10-25-19	Anchor Unit detail was removed. Updated notes to active voice.

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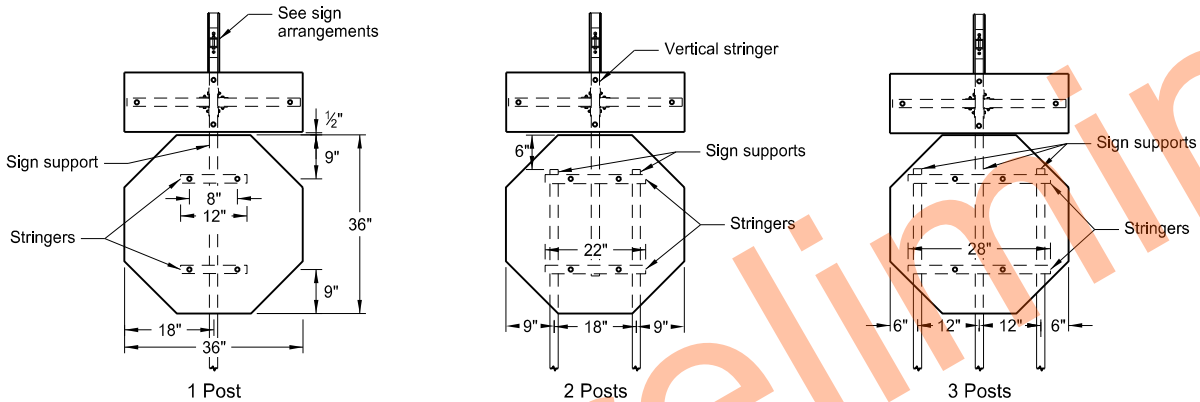
The diagram illustrates two types of sign support arrangements:

- 1 Post:** A single vertical post supports a rectangular sign. The sign is divided into two sections. The left section is labeled "Sign with least area" and the right section is labeled "Sign with greatest area". The width of the sign is indicated as "Varies". The post is labeled "Sign support".
- 2 Posts:** Two vertical posts support a rectangular sign. The sign is divided into two sections. The left section is labeled "Sign with least area" and the right section is labeled "Sign with greatest area". The width of the sign is indicated as "Varies". The posts are labeled "Sign support nearest roadway" and "Sign support".

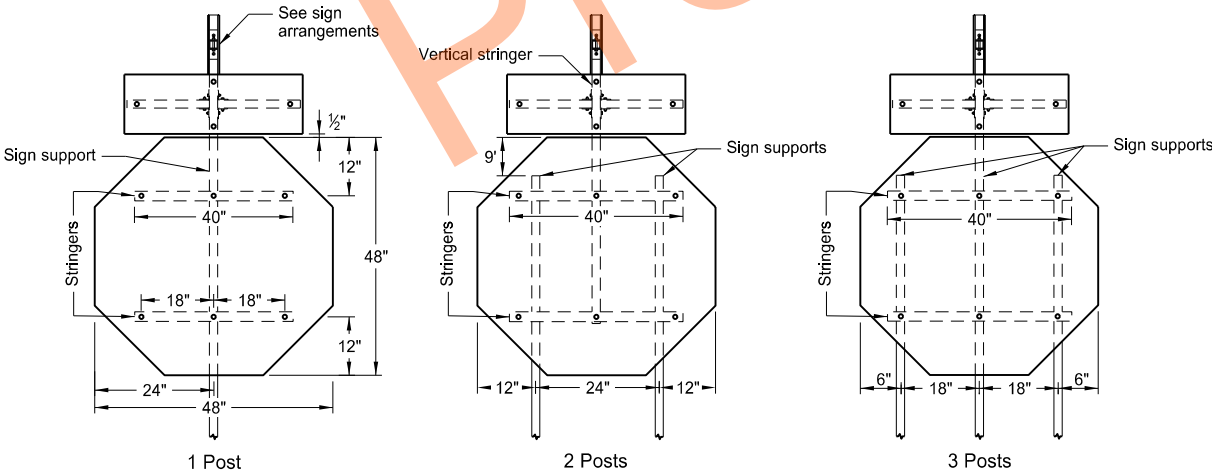
Special Assembly 1 (A, B, C, D or E)



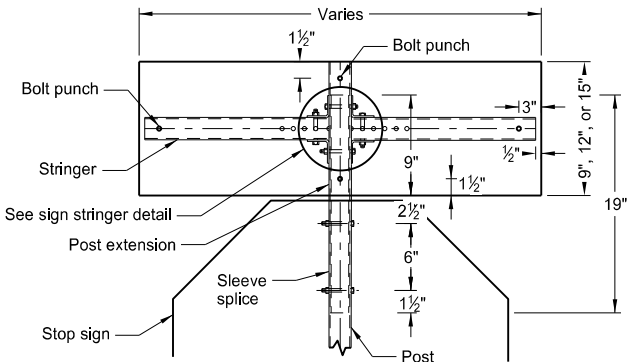
Special Assembly 3 (A, B, C, D or E)



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



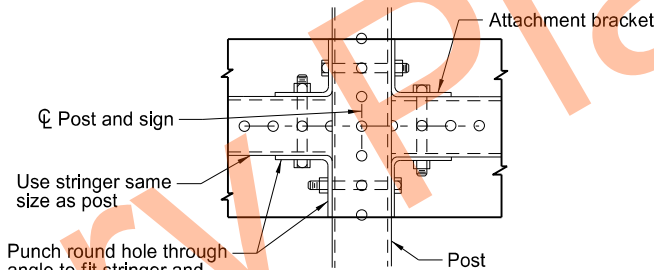
Special Assembly 5 (A, B, C, D or E)



Front View

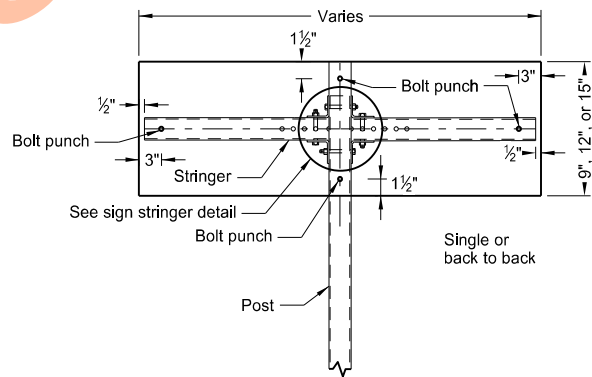
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.

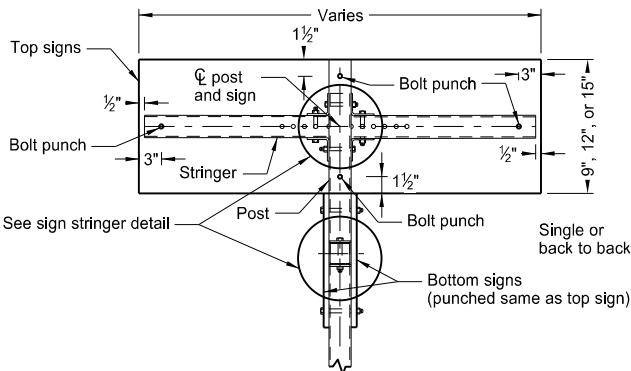


Sign Stringer Detail

Punch round hole through angle to fit stringer and post holes.



Detail A or B



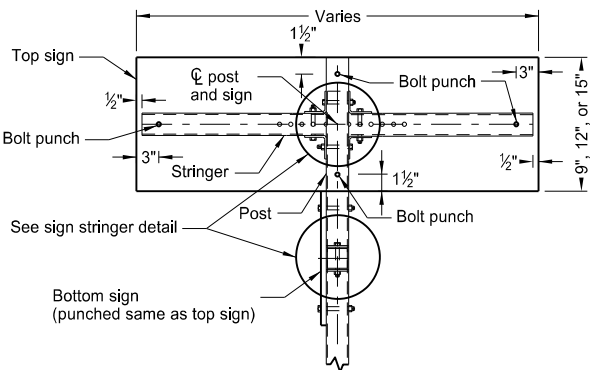
Detail D or E

Diagram illustrating the placement of a stop sign at a street corner. The diagram shows the intersection of two roads. The stop sign is placed on the corner, with the following dimensions and labels:

- Face of curb or edge of driving lane
- Edge of finished shoulder
- 14'
- 20' min. 30' max.
- Stop sign
- Street Name or 911 Signs
- G. of roadway

Intersection Layout

Note: Use layout for street name signs or 911 signs with Special Assembly 1.



Detail C

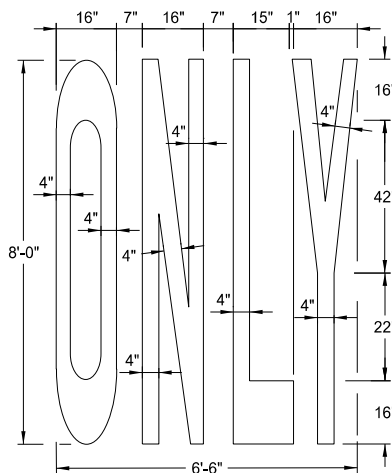
Sign Arrangements

NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Added 2 post layout for SA1 and Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

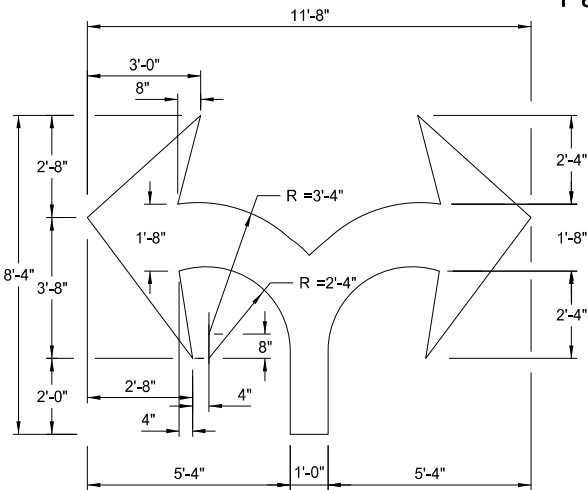
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of Transportation

Pavement Marking Message Details

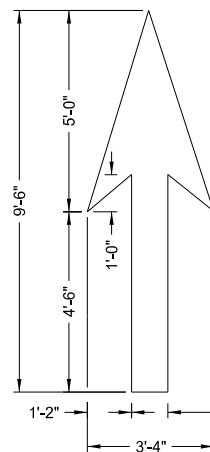
D-762-1



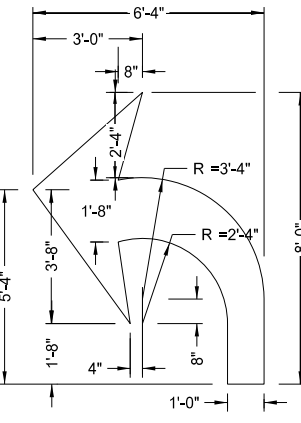
22 S. F.



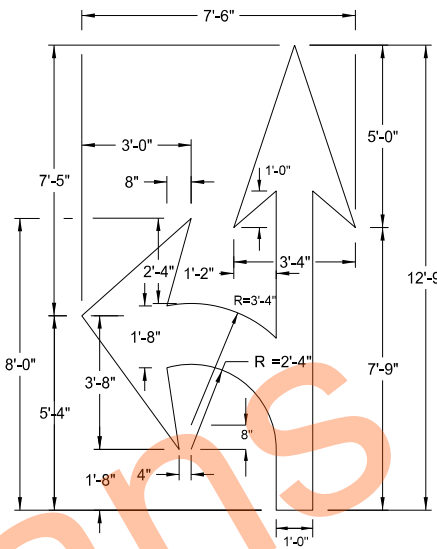
29 S. F.



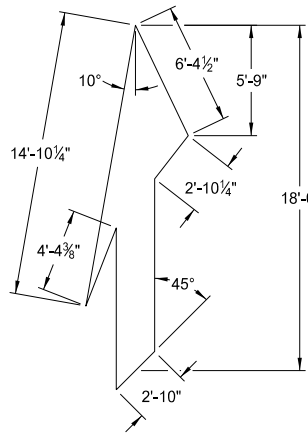
12 S. F.



16 S. F.



27 S. F.

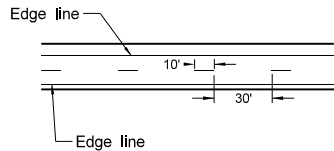


41 S. F.

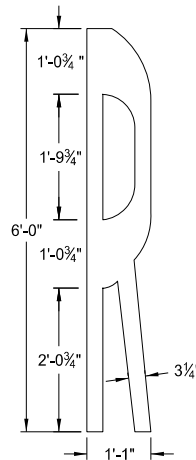
Note: Rotate merge arrow 20° from edge of roadway.

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

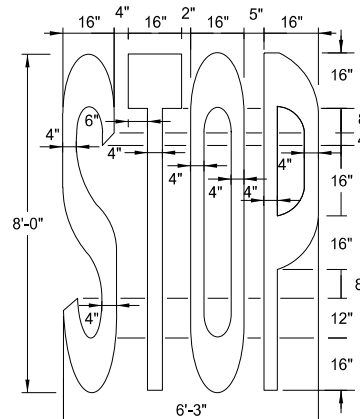
Chevron Crosshatching Table



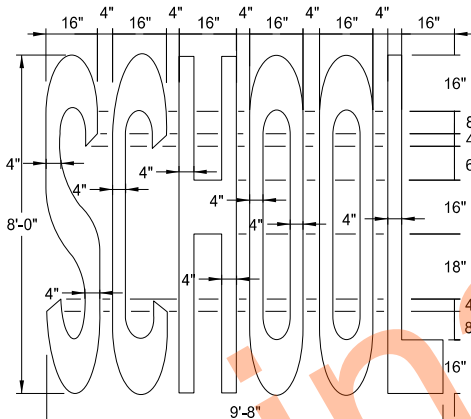
Centerline Pavement Marking Skip Spacing Detail



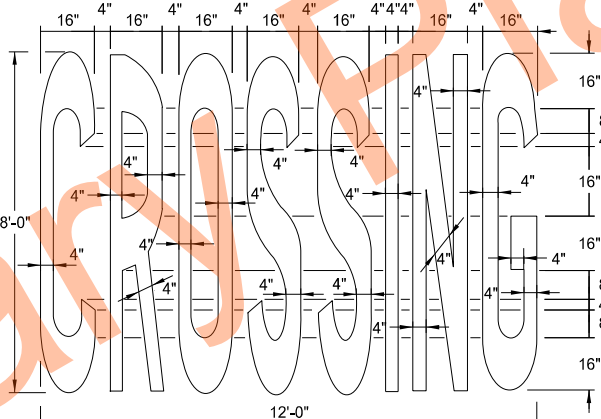
4 S. F.



22 S. F.

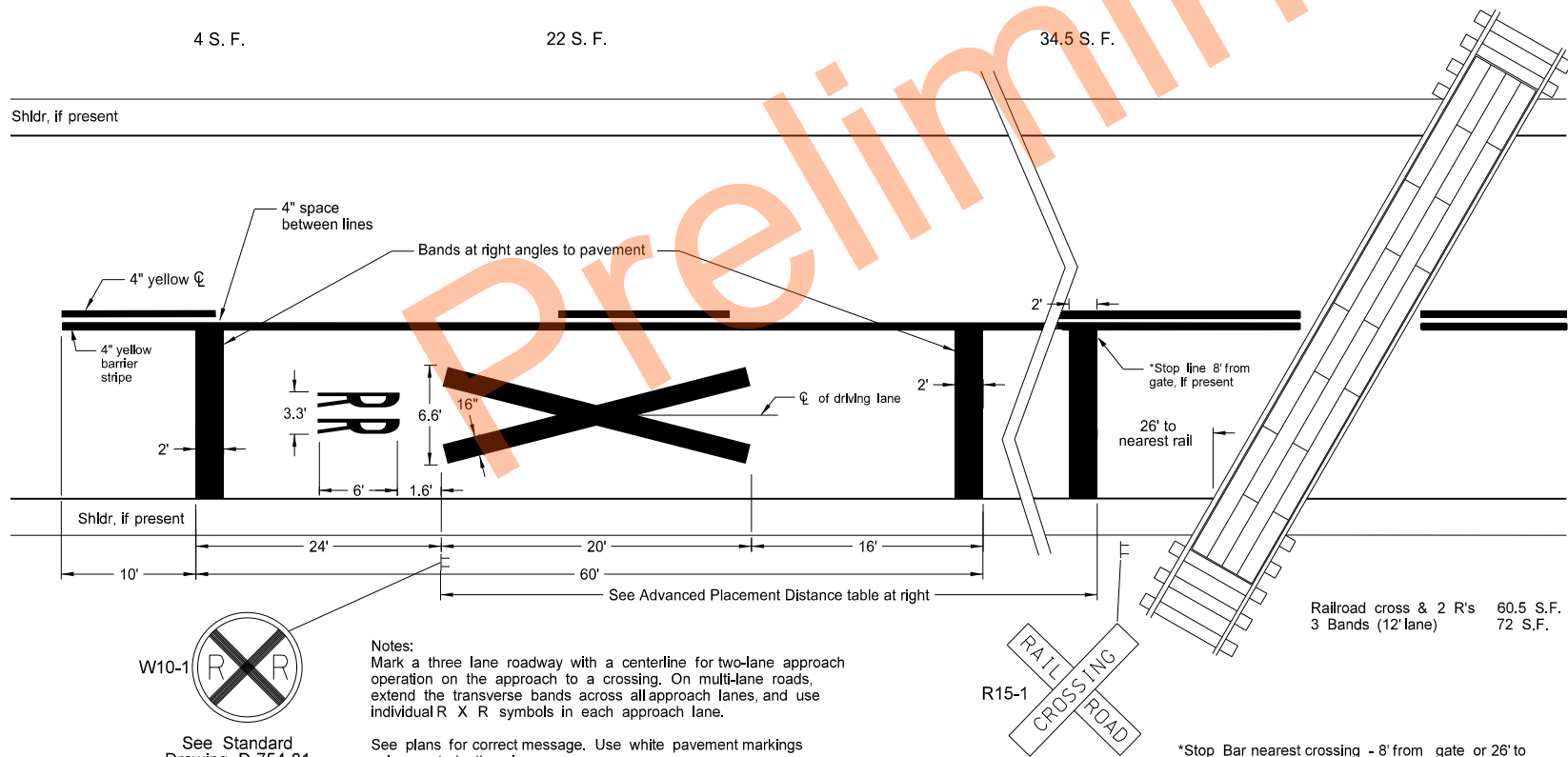


34.5 S. F.



46 S. F.

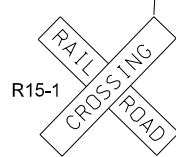
Shldr, if present



See Standard Drawing D-754-81

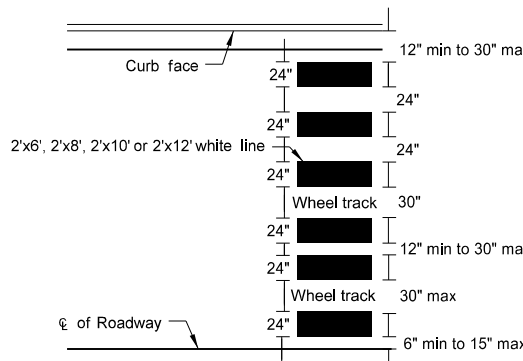
Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

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



R15-1

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



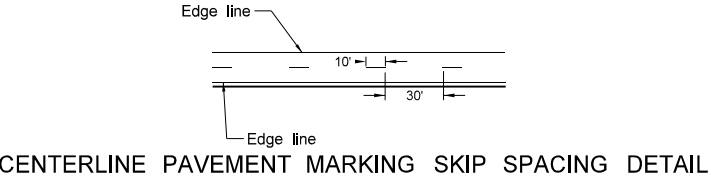
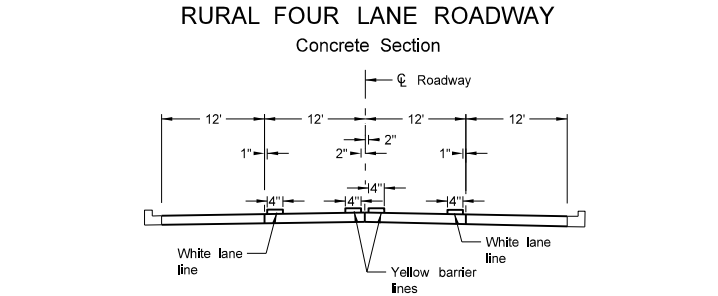
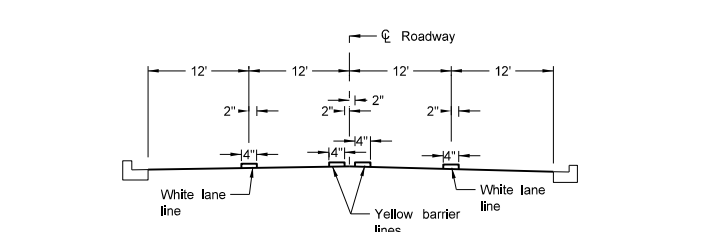
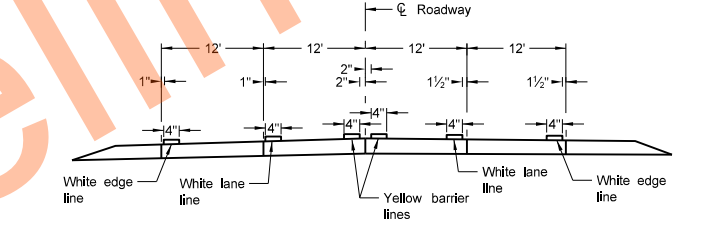
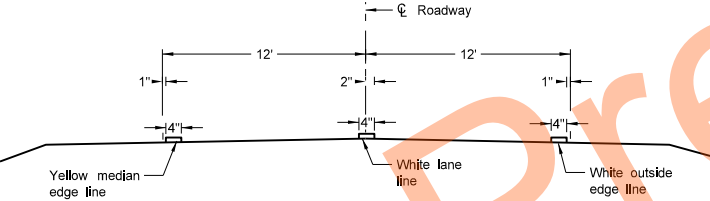
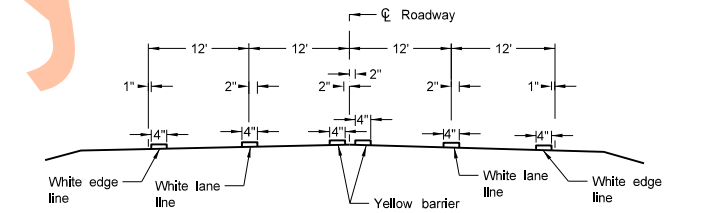
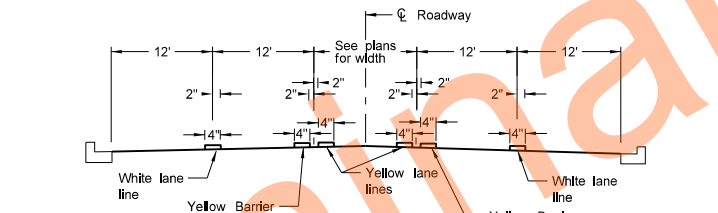
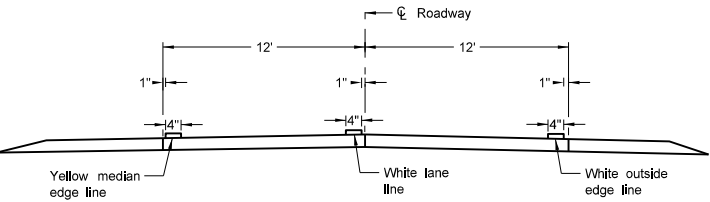
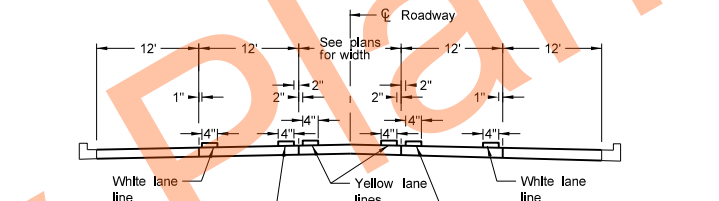
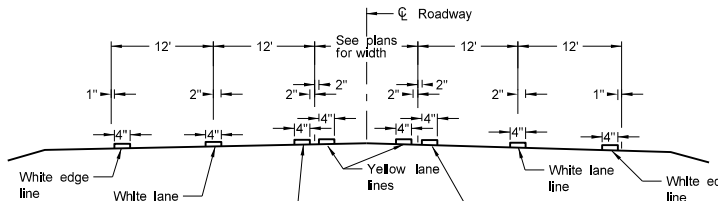
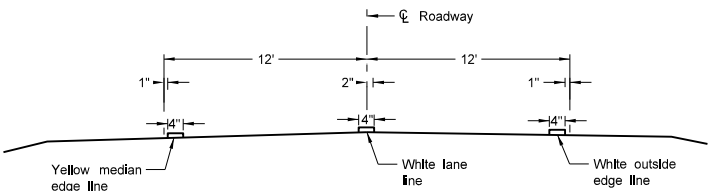
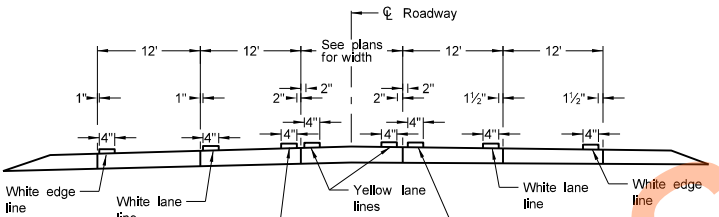
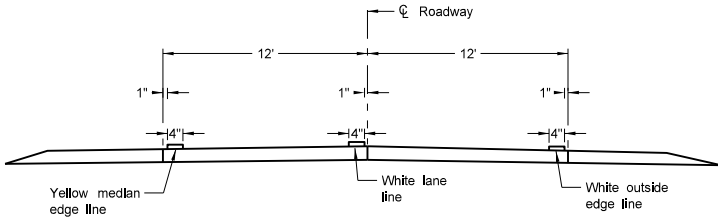
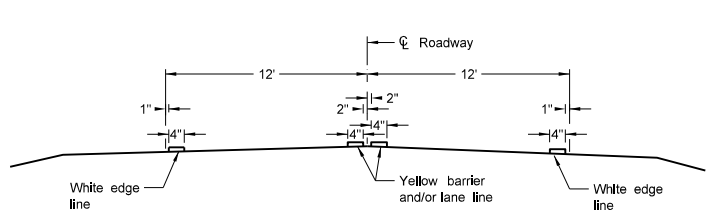
Continental Crosswalk Detail

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19 01-28-2020	Updated to active voice. New Design Engineer PE Stamp. Revised min Stop Bar distance to rail.

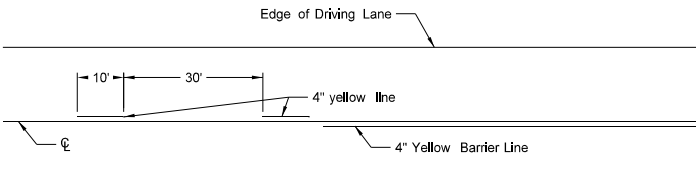
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on 1/28/2020 and the original document is stored at the
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NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

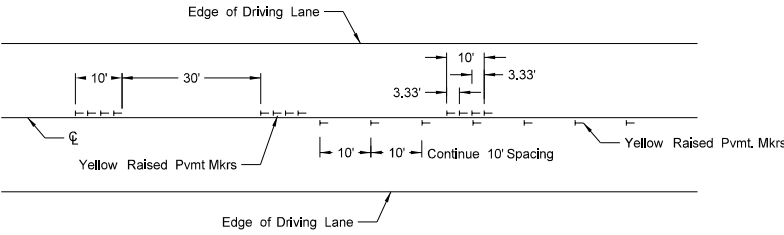


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

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Registration Number
PE-4683,
on 8/27/19 and the original document is stored at the
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of Transportation

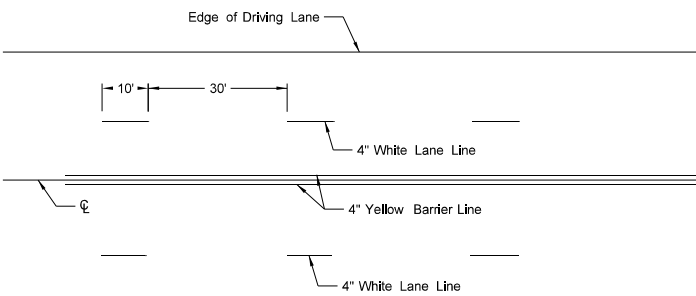


Painted or Tape Lines

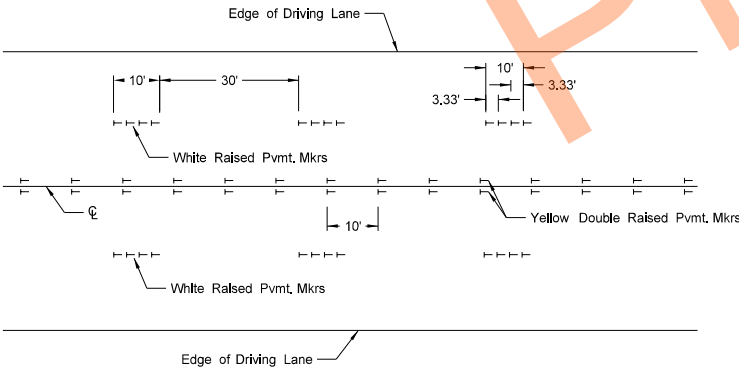


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

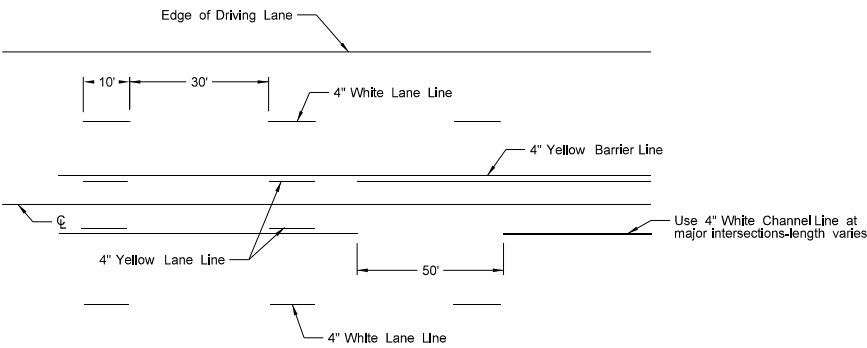


Painted or Tape Lines

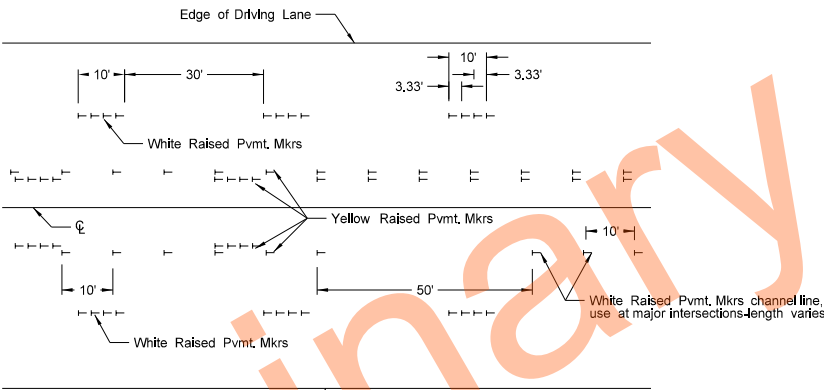


Raised Pavement Markers

FOUR LANE ROADWAY

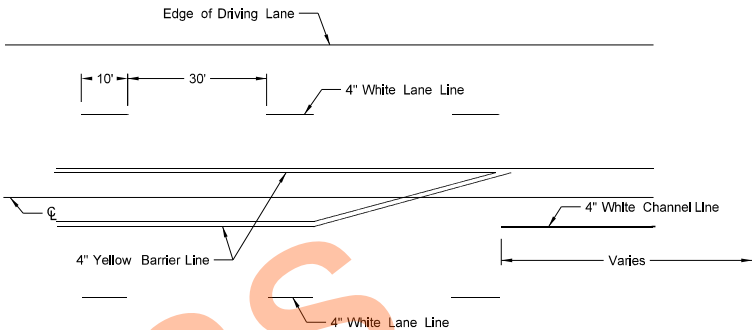


Painted or Tape Lines

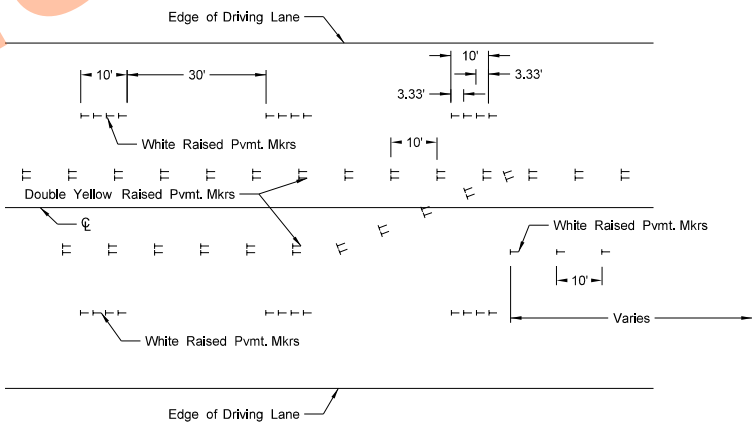


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

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

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

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PE- 4683,
on 8/27/19 and the original document is stored at the
North Dakota Department
of Transportation